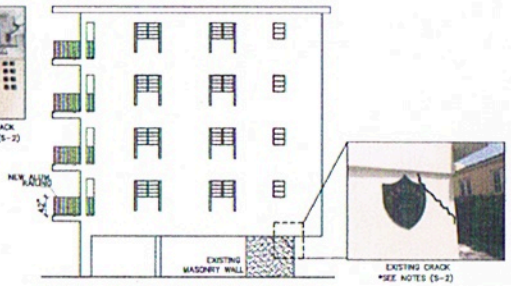
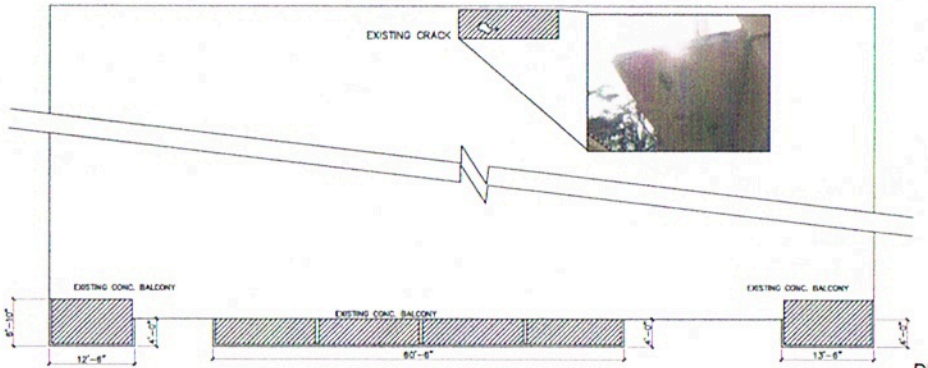
LEFT ELEVATION. NEW RAILING
SCALE 3/32" = 1'-0"

FRONT ELEVATION - NEW RAILING
SCALE 3/32" = 1'-0"



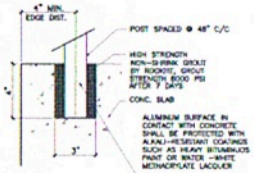
RIGTH ELEVATION-NEW RAILING
SCALE 3/32" = 1'-0"



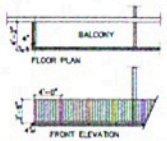
FLOOR PLAN- BALCONY RAILING
SCALE 1/8" = 1'-0"

NOTE: ALL BALCONIES ARE SAME SIZE AS SHOWN IN FLOOR PLANS ABOVE

VERIFY ON FIELD MATCH TO EXISTING



ANCHORAGE DETAIL A
SCALE 3" = 1'-0"



DETAIL - BALCONY RAILING
SCALE 1/8" = 1'-0"

ALUMINUM NOTES:

1- ALUMINUM TO BE 60 61-T6 165 PCF SHALL CONFORM TO THE AISC MANUAL 9th EDITION AND ALUMINUM DESIGN MANUAL 1994 EDITION "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF ALUMINUM"

2- WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1 ALL WELDING SHALL BE PERFORMED USING 5356 ALLOY, ELECTRODES ARE TO BE PROTECTED FROM MOISTURE.

3- NO SPLICES SHALL BE PERMITTED IN ANY ALUMINUM MEMBER.

4- NO-SHRINK GROUT SHALL BE:NONMETALLIC SHRINKAGE-RESISTANT GROUT, PREMIXED NON CORROSIVE, NON STAINING PRODUCT CONTAINING SELECTED SILICA SANDS, PORTLAND CEMENT, SHRINKAGE COMPENSATING AGENTS, PLASTILIZING AND WATER REDUCING AGENTS, COMPLYING WITH CE-CRD-C621.

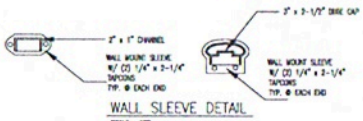
5- ERECTION

A- AFTER ERECTION, AVOID FIELD WELDING WHEREVER POSSIBLE, CONNECTIONS AND ABRAIDED AREAS WERE SHOP COAT HAS BEEN DAMAGED. SPOT AND PRIME AREAS USING SAME MATERIAL AS SHOP COAT.

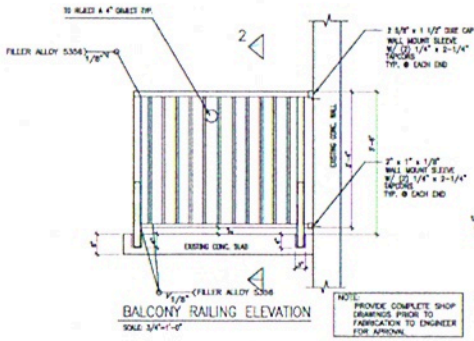
B- SET ALL MEMBERS SO THAT, IN THEIR FINAL LOCATION, LEVEL, ALL ALIGNMENT ARE WITHIN THE TOLERANCES PRESCRIBED BY A.A.I. MANUAL.

STRUCTURAL NOTES:

- DESIGN INFORMATION: F.B.C., 2017
- DESIGN LOAD: F.B.C., 2017
- DESIGN STANDARD : ALUMINUM DESIGN MANUAL.

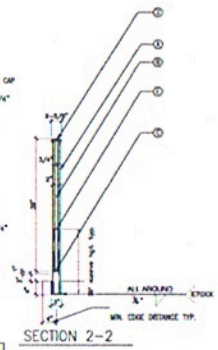


WALL SLEEVE DETAIL
SCALE : NTS

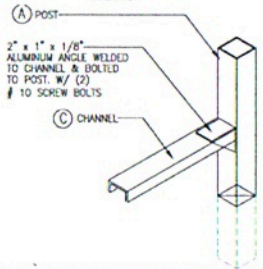


BALCONY RAILING ELEVATION
SCALE: 3/4"=1'-0"

NOTE: PROVIDE COMPLETE SHOP DRAWINGS PRIOR TO FABRICATION TO ENGINEER FOR APPROVAL



SECTION 2-2
SCALE: 3/4"=1'-0"



TYP. CONNECTION BOTTOM RAILING TO POST.
SCALE: N.T.S.

LEGEND:

- (A) 2" x 2" x 1/8" ALUMINUM POST @ 4'-0" O.C. MAX. 4" EPOXY GROUTED INTO EXISTING CONC. SLAB
- (B) 3/4" x3/4" x0.062 ALUMINUM PICKETS @ 4" O.C. (MAX.).
- (C) 2" x 1" x 1/8" ALUMINUM CHANNEL BOTTOM .
- (D) 2-5/8" " x 2 1/2" DIXIE CAP
- (F) 1-3/4"x1-3/4"x18" REINF. SUPPORT INSERT TYP. @ THE BOTTOM OF EA. POST TYP.

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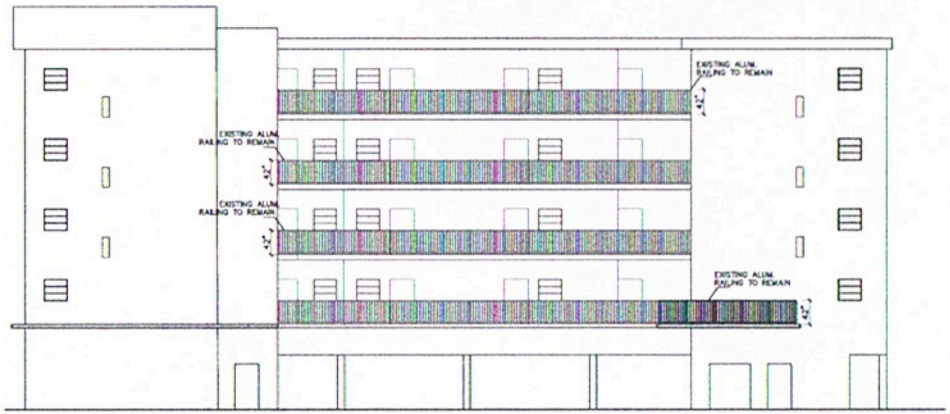
PROJECT NAME: REPAIRS DUE TO 40 YEAR RECERTIFICATION
OWNER: MERIDIAN MANOR CONDOMINIUM
ADDRESS: 851 MERIDIAN AVENUE, MIAMI BEACH FL. 33139
PHONE:

Date 05/08/2018
Scale NOTED.
Drawn E.F.
Job 18-29
Sheet

S-1'



REAR ELEVATION

SCALE 1/8" = 1'-0"

NOTE:
EXISTING ALUM. RAILING TO REMAIN.

IMAGE REAR

IMAGE REAR

REVISIONS	BY

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Date	05/08/2018
Scale	NOTED.
Drawn	E.F.
Job	18-29
Sheet	A-3

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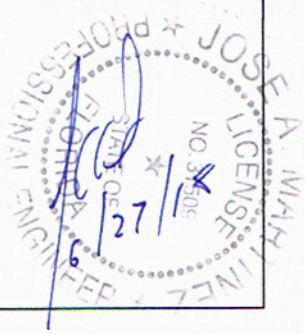
DESIGN FOR ALUMINUM RAILING

FOR

18-29 851 MERIDIAN AVE, MIAMI BEACH, FL



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Phone: (305)887 4417
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STRUCTURAL CALCULATIONS

CONTENTS:

1.) MATERIALS

1.a) Members: Aluminum Alloy 6061-T6

Reference: Aluminum Design Manual 2005 Edition Table 2-22 6061 - T6

Allowable Stress for components:

Bending:

-Round or oval tubes:

Fb = 24000 psi Unwelded Metal

Fb = 10500 psi Welded Metal

-Symetric Shapes:

Fb = 19000 psi Unwelded Metal

Fb = 12000 psi Welded Metal

Shear

Fs = 12000 psi Unwelded Metal

Fs = 5000 psi Welded Metal

Elasticity Modulus E = 10100 Ksi

1.b) Welding: Aluminum Filler Alloy 5356

Allowable Stress for Welding:

Fw = 7000 psi

2.) DESIGN INFORMATION

- Florida Building Code 2014

-Alumninum Design Manual, 2005

-Minimum Design Loads for Building and Others Structures, ASCE 7- 10

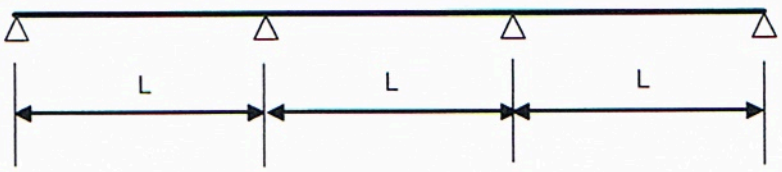
3.) DESIGN LOADS

-Handrail Design Loads: (FBC 2014)
Concentrated Load = 200 lbs applied at any point in any direction.
Uniform Load = 50 plf applied in any direction

-Guardrail System Loads: (FBC 2014)
Uniform Hor. Load= 25 psf over the gross area of the guard, including the area of any openings in the guard.

4.) HANDRAIL DESIGN

Consider three equal continuos Span $L := 4 \cdot ft$ (Maximum Span)



4.a) Maximum Moment:

Concentrated Load $P := 200 \cdot lb$

$$Mpmax := \frac{P \cdot L}{5} \qquad \boxed{Mpmax = 160\,ft \cdot lb}$$

Uniform Load $\omega := 50 \cdot plf$

$$M\omega max := 0.1012\omega \cdot L^2 \qquad \boxed{M\omega max = 80.96\,ft \cdot lb}$$

$$Mmax := \max(Mpmax, M\omega max) \qquad \boxed{Mmax = 160\,ft \cdot lb}$$

4.b) Maximum Shear:

Concentrated Load $P := 200 \cdot lb$

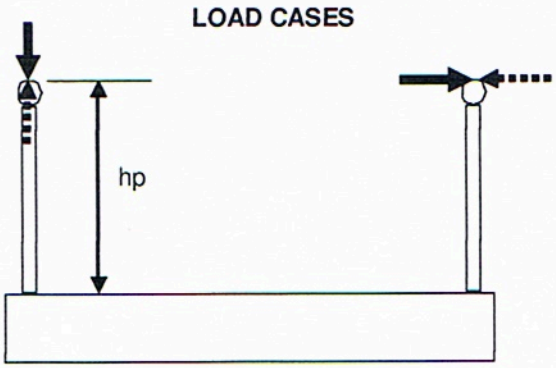
$$Vpmax := P \qquad \boxed{Vpmax = 200\,lb}$$

Uniform Load $\omega := 50 \cdot plf$

$$V\omega max := 0.6\omega \cdot L \qquad \boxed{V\omega max = 120\,lb}$$

$$Vmax := \max(Vpmax, V\omega max) \qquad \boxed{Vmax = 200\,lb}$$

5.) POST DESIGN



5.a) Maximum Reaction

Concentrated Load $Rpmax := P$ $Rpmax = 200\,lb$

Uniform Load $R\omega max := \omega \cdot L$ $R\omega max = 200\,lb$

$Rmax := if(Rpmax > R\omega max, Rpmax, R\omega max)$ $\boxed{Rmax = 200\,lb}$

5.b) Maximum Moment

$hp := 42 \cdot in$

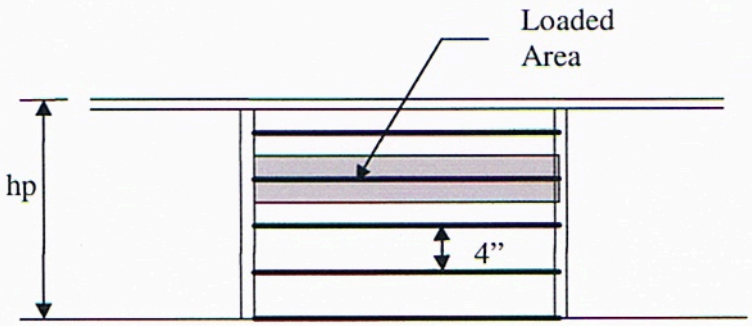
$Mpost := Rmax \cdot hp$ $\boxed{Mpost = 8400\,lb \cdot in}$

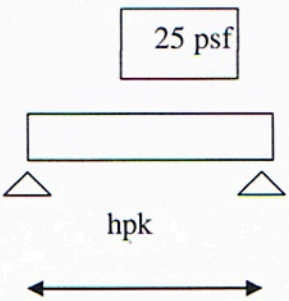
5.c) Maximum Shear

$Vpost := Rmax$ $\boxed{Vpost = 200\,lb}$

6.) PICKET DESIGN:

$hpk := 48 \cdot in$ $hpk = 48 \cdot in$





$psf := \frac{lb}{ft^2}$

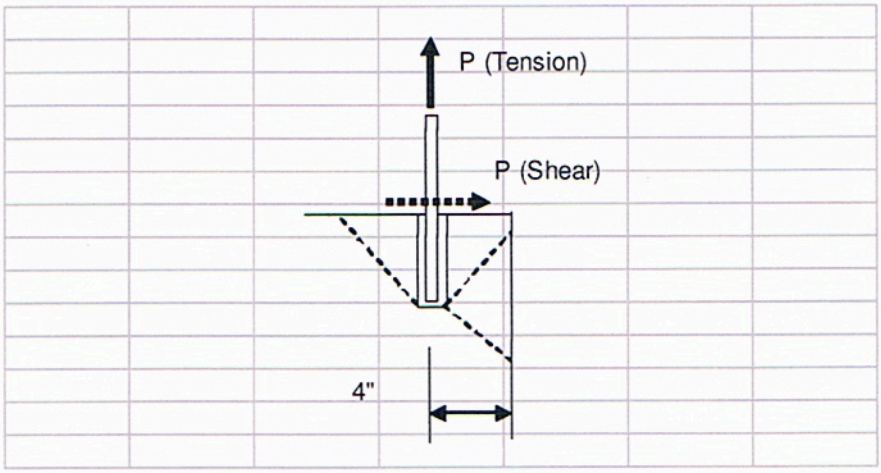
$w := 25 \cdot psf \cdot 4.75 \cdot in$ $w = 0.82 \cdot \frac{lb}{in}$

$Mmaxpk := \frac{1}{8} \cdot w \cdot hpk^2$ $Mmaxpk = 237.5 \cdot lb \cdot in$

$Vmaxpk := \frac{w \cdot hpk}{2}$ $Vmaxpk = 19.79 \cdot lb$

7.) ANCHORAGE, WELDING AND CONNECTIONS.

7.a) POST ANCHORAGE TO CONCRETE



Concrete Strength: $fc := 3000 \cdot psi$

Minimum Embedment: $emb := 4 \cdot in$

Hole Diameter: $hd := 2 \cdot in$

Post Heigth: $hp := 42 \cdot in$

Horizontal or Vertical Load: $P := 200 \cdot lb$

Minimum Edge Distance: $dedge := 4 \cdot in$

a) Concrete Breakout (Tension)

$ANo := 9 \cdot emb^2$ $\quad ANo = 144 \cdot in^2$

$AN := 3 \cdot emb \cdot (1.5 \cdot emb + dedge)$ $\quad AN = 120 \cdot in^2$

$ANfinal := \min(ANo, AN)$ $\quad ANfinal = 120 \cdot in^2$

$\psi 2 := \text{if}\left(dedge < 1.5 \cdot emb, 0.7 + 0.3 \cdot \frac{dedge}{1.5 \cdot emb}, 1\right)$ $\quad \psi 2 = 0.9$

$\psi 3 := 1.4$

$Nb := 17 lb^{.5} \cdot in^{-0.5} \cdot \sqrt{fc} \cdot emb^{1.5}$ $\quad Nb = 7449.03\ lb$