

I. GENERAL NOTES

1. ALPHA DETAILER'S SCOPE WILL BE LIMITED TO THE STRUCTURAL DESIGN OF...
2. THE STRUCTURAL DESIGN WILL BE BASED OFF OF APPLICABLE CODES THE DESIGN CODES AISC

II. LATERAL LOADS

LATERAL LOADS - WIND

COMPONENTS AND CLADDING

ASSUME 130 MPH WIND SPEED

WIND LOAD = 40 PSF

III. Check Wall Studs & Masonry

CHECK STRENGTH AND DEFLECTION REQUIREMENTS

Wall Height, $H =$	12	ft
Stud Spacing, $s =$	12	in
Wind Load, $w =$	40	psf
Deflection Limit, $H/360 =$	0.4	in
Applied Moment $wl^2/8 =$	720.00	lb-ft
	8.64	kip-in

Bending Capacity, $\phi M_n = 0.9 S_e F_y$

Try member	6J18	"Marino Ware"	600S200-43	"SSMA"
	$F_y =$	33	ksi	
Allowable Stress	$.6F_y =$	19.8	ksi	$N =$ 1 in
	$E =$	29500	ksi	$R =$ 0.0712 in
	$S_e =$	0.873	in ³	$t =$ 0.0451 in
	$I_x =$	2.683	in ⁴	$h =$ 5.7 in
				Gauge = 18
	$\phi M_n =$	15.56	kip-in	
		>8.64	ok	

CHECK DEFLECTION LIMIT

$$DEFLECTION \Delta = \frac{5wL^4}{384EI_x}$$

$\Delta =$ 0.24 in

Sec. A3.1 "Wall Stud Standard", $.7 \Delta =$ 0.165 in
 < 0.4 ok

CHECK SHEAR

APPLIED SHEAR = $1/2 wL$

240 lbs
 0.24 kips

ALLOW SHEAR = 1.24 kips
 < 0.24 ok

CHECK WEB CRIPPLING

$$p_N = Ct^2 F_y \sin \theta \left(1 - C_R \sqrt{\left(\frac{R}{T}\right)}\right) \left(1 + C_N \sqrt{\left(\frac{N}{T}\right)}\right) \left(1 - C_h \sqrt{\left(\frac{h}{T}\right)}\right)$$

$C = 4$
 $C_R = 0.14$
 $C_N = 0.35$
 $C_h = 0.02$
 $\theta = 90 \quad \text{Deg}$
 $\Omega_w = 1.75$
 $\phi_w = 0.85$

Design Thickness = 0.0451 in

$R/t = 1.6$
 $h/t = 126.4$
 $N/t = 22.2$

$P_n = 0.454 \quad \text{kips}$
 $P_n / \Omega_w = 0.260 \quad \text{kips}$
 $P_n \phi_w = 0.386 \quad \text{kips}$
 $> 0.24 \text{ ok}$

ALTERNATIVE - 6" BLOCK CMU

$f'm =$	1500	psi	Compression Strength
$F_B = 1/3 f'm =$	500	psi	Bending Strength
$f_y =$	60	ksi	Yield Strength
$F_s = 0.4 f_y =$	24	ksi	Allowable Stress
$b =$	12	in	Block Width
$d =$	4	in	Block Depth
Bar =	4	#	Bar
Bar Spacing =	16	in	Spacing
$A_s =$	0.15	in/ft	Area of Steel / ft
$\rho =$	0.00307		Reinforcing Ratio
$n =$	21.5		Modular Ratio - Modulus of elasticity from steel to masonry
$k = \frac{\sqrt{(pn)^2 + 2pn} - pn}{0.30317}$			
$j = 1 - \frac{k}{3}$			
$M_{steel} = F_s A_s j d$	12.706	kip-in/ft	
$M_{masonry} = \frac{1}{2} F_b j k b d^2$	13.081	kip-in/ft	
	>8.64	ok	