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STRUCTURAL CALCULATIONS FOR LATERAL AND FOUNDATION DESIGN

October 14, 1981

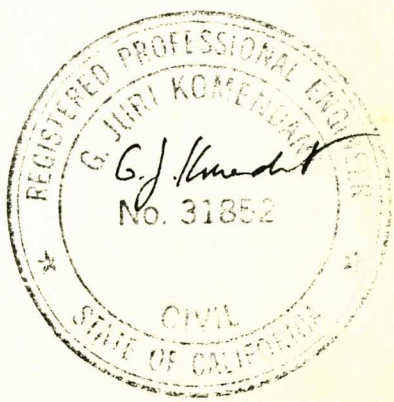
PROPOSED LIGHTLY RESIDENCE

LOT 171

BERRYESSA ESTATES SUBDIVISION

NAPA COUNTY, CALIFORNIA

Design is based on information supplied by the "Center for Environmental Structure, Architects, and Contractors" and the Project Soil Investigation prepared by Donald Herzog & Associates, Inc., Santa Rosa office.



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STRUCTURAL NOTES

1. All details of construction shall conform with the 1979 edition of the Uniform Building Code.

2. All site grading, footing excavation, backfill, etc. shall be supervised by a qualified Soils Engineer. The Contractor shall coordinate all such work with the Soils Engineer so that necessary tests and inspections can be made.

3. Concrete shall obtain an ultimate compressive strength of 3000 psi after 28 days.

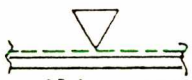
4. Reinforcing steel shall be ASTM A615, Grade 40, deformed bars. Lap length, other than indicated on plans, shall be (for the bar sizes shown) as follows:

#3 - 2'0"	#5 - 3'0"
#4 - 2'6"	#6 - 4'0"

5. Unless otherwise noted, all posts and beams shall be D.F.#1 and better F.O.H.C. All other framing lumber shall be D.F.#2 and better. Subfloor roof decking and shear wall sheathing shall be Structural II CDX plywood. Mudsills shall be pressure treated D.F.

6. Metal connectors, holdowns, straps, etc. designated on plans are Simpson "Strong Tie". Equivalent hardware may be used. All hardware shall be installed in accordance with manufacturer's recommendations and standards.

7. Unless otherwise noted, all plywood subfloor, roof decking, wall sheathing and paneling shall be nailed with 8d @ 6-in. o.c. on edges and 10-in. o.c. in field. Subfloor shall be glued in addition to nailing. Wall paneling and sheathing shall have all edges blocked and nailed.

8. Plywood shear walls are shown thus;  . See typical details included on plans for sheathing and nailing requirements. Also shown on plans are typical holdown and framing details.

9. Gypsum wallboard shall be applied in accordance with Section 4713 of the Uniform Building Code and shall be nailed to all studs, plates, and blocks with 5d cooler nails @ 7-in. o.c.

10. All site drainage, including downspouts, shall be collected in closed pipes with periodic clearout and discharged into an approved area storm sewer system.

11. The Contractor shall have a qualified engineer do onsite inspection of all structural elements, including but not limited to footing excavations, concrete reinforcing, framing, framing hardware, shear nailing, etc., prior to concealment.

12. If conditions different from those described in these calculations are encountered during construction, the Engineer should be notified immediately.

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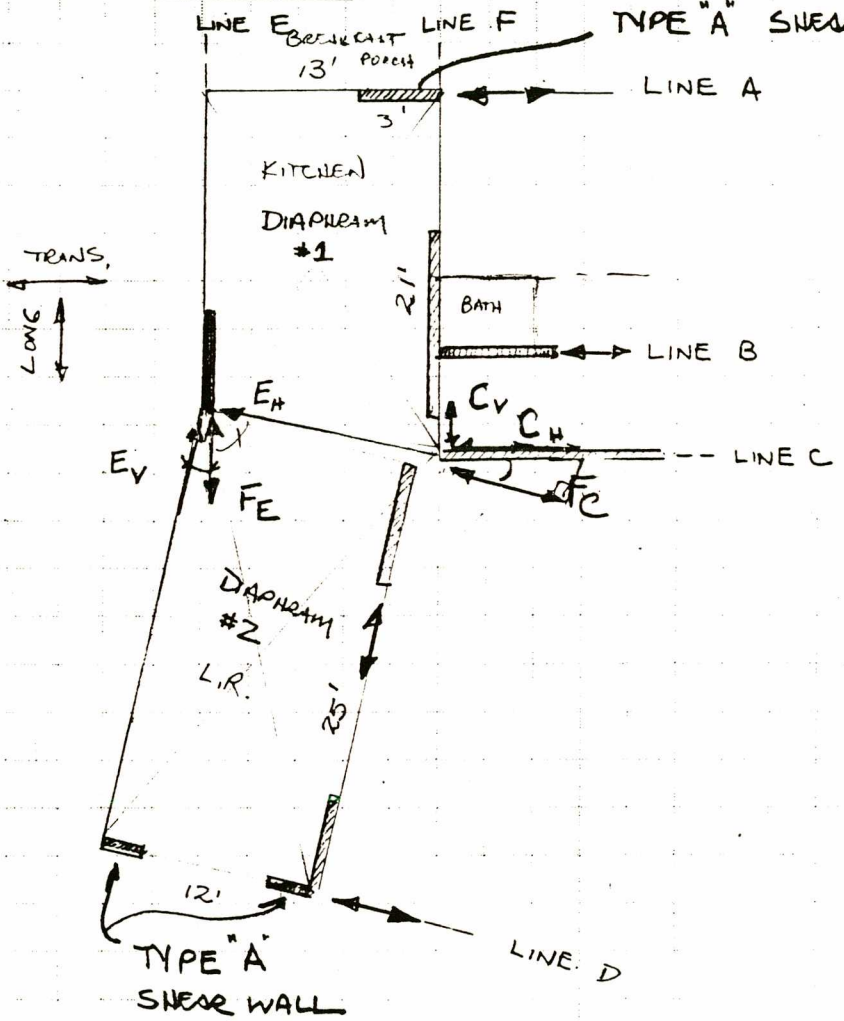
JOB BARRYESSA ESTATES 81-85
SHEET NO. L1 OF 2
CALCULATED BY DATE
CHECKED BY DATE
SCALE

LATERAL DESIGN

TOTAL
$(21+25)/12 = 3.83 < 4$ PLYWOOD, NAILED ALL EDGES

KITCHEN - LIVING RM



DIAPHRAM #1 $21/13 = 1.62$
DIAPHRAM #2 $25/12 = 2.08$

SEISMIC GOVERNS BOTH DIRECTIONS

	V	DIA. SHEAR	DRAG FORCE
LINE A	2.22	171	$2.22 - 3(.171) = 1.7^K$
LINE B	2.15	165	2.15^K

LINE $F_E = 2.2 + \cos^{-1}(10)(2.13) = 4.36^K$ (2.16^K) DIA #1

$E_V = 2.13^K$

$E_H = 4.36(\sin 10°) = .76^K$

$v_u = \frac{.42(4.36)}{6} = 305$ lb/ft. $\times 1.7 = 518$

TYPE "A" CONCRETE

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JOB BERRYESSA ESTATES 81-85
SHEET NO. L2 OF 3
CALCULATED BY DATE
CHECKED BY DATE
SCALE

SHEAR

LINE C $F_C + E_H = 2.05 + .75 = 2.8^K$

$C_H = \cos^{-1} 10 (2.8^K) = 2.84^K$ $2.84 \div 13 = 218$ 2.84^K

DRAG FORCE

LINE D 2.17^K 181 lb/ft $\frac{2.17}{3} - 2(.181) = .73^K$

CHORD FORCE

DIA #1 $w = [(.25 \times 2) + 13(.0029)^{"}] .186 = .163$ K/ft

$C = T = \frac{.163(21)^2}{8(13)} = .69^K$ LINE E & F

DIA #2 $C = T = \frac{.163(25)^2}{8(12)} \frac{12}{18} = .98^K$ LINE E & F

DIA #1 & #2 ACTING TOGETHER

$C = T = \frac{.163(46)^2}{8(12)} = 3.59^K$ @ LINE E, F

LOCATION LINE C

DESIGN TO RESIST THIS FORCE

LATERAL ANALYSIS *** SEISMIC V= [illegible]
W= 29 [illegible]

DIRECTION: KITCHEN - TRANS. LEVEL: ROOF

AVERAGE WALL HEIGHT = 5 FT AT 30 [illegible]

AREA PROFILE FOR SEISMIC

REF. COORD.	AREA LEFT	AREA RIGHT
-6	0	13
20	13	13
21	1	0

LINE	WALL LENGTH (FT)	TRIB. AREA (SQ.FT)	SHEAR FORCE (KIPS)	SHEAR INTENSITY (LBS/FT)	
A @ 0	3	175.5	2.22	[illegible]	TYPE "A" SHEAR WALL
B @ 15	3	169.5	2.15	[illegible]	" "
	TOTAL	345	4.37		

LATERAL ANALYSIS FOR WIND WIND PRESSURE = 20 PSF

DIRECTION: KITCHEN - TRANS. LEVEL: ROOF

ELEVATION PROFILE FOR WIND

REF. COORD.	HEIGHT LEFT	HEIGHT RIGHT
-6	0	5
20	5	0

LINE	WALL LENGTH (FT)	TRIB. AREA (SQ.FT)	SHEAR FORCE (KIPS)	SHEAR INTENSITY (LBS/FT)	
A @ 0	3	67.5	1.35	450	} SEISMIC GOVERNS
B @ 15	3	62.5	1.25	417	
	TOTAL	130	2.6		

LATERAL ANALYSIS *** SEISMIC V= .100 K
W= 42. FT.

DIRECTION: KITCHEN - LONG. LEVEL: ROOF

AVERAGE WALL HEIGHT = 8 FT AT 50 PSF

AREA PROFILE FOR SEISMIC
REF. COORD. AREA LEFT AREA RIGHT
0 0 25
12 25 0

LINE		WALL LENGTH (FT)	TRIB. AREA (SQ.FT)	SHEAR FORCE (KIPS)	SHEAR INTENSITY (LBS/FT)	
E	@ 0	5.5	137.5	1.74	~~316~~	← TYPE "A"
F	@ 12	10	250.0	3.16	~~316~~	← TYPE "B"
	TOTAL	15.5	387.5	4.90		

LATERAL ANALYSIS *** SEISMIC V= .100 K
W= 42. FT.

DIRECTION: L.R. - LONG. LEVEL: ROOF

AVERAGE WALL HEIGHT = 8 FT AT 50 PSF

AREA PROFILE FOR SEISMIC
REF. COORD. AREA LEFT AREA RIGHT
0 0 25
2.5 20 20
9 29 29
8 29 29
9.5 28 28
12 26 0

LINE		WALL LENGTH (FT)	TRIB. AREA (SQ.FT)	SHEAR FORCE (KIPS)	SHEAR INTENSITY (LBS/FT)	
E	@ 0	5.5	137.5	1.74	~~316~~	} TYPE "A"
F	@ 12	10	250.0	3.16	~~316~~	
	TOTAL	15.5	387.5	4.90		

LATERAL ANALYSIS *** SEISMIC V= .106 K
W= 29. FT.

DIRECTION: L.R. - LONG. LEVEL: ROOF

AVERAGE WALL HEIGHT = 8 FT AT 50 PSF

AREA PROFILE FOR SEISMIC
REF. COORD. AREA LEFT AREA RIGHT
0 0 25
2.5 20 20
9 29 29
8 29 29
9.5 28 28
12 26 0

LINE		WALL LENGTH (FT)	TRIB. AREA (SQ.FT)	SHEAR FORCE (KIPS)	SHEAR INTENSITY (LBS/FT)	
E	@ 0	5.5	167	2.11	~~384~~ + E kitchen = 4.36	TYPE "A"
F	@ 12	10	168.3	2.13	~~213~~	↳ TYPE "B"
	TOTAL	335.3		4.24		

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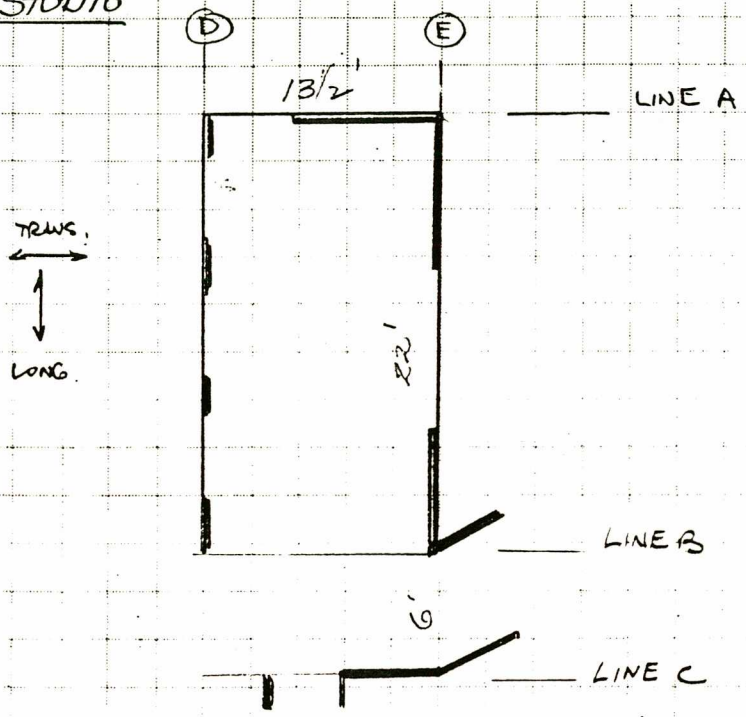
JOB BERRYESSA ESTATES 81-85
SHEET NO. L5 OF 6
CALCULATED BY DATE
CHECKED BY DATE
SCALE

LATERAL DESIGN

STUDIO



		V	w	DRAG FORCE
LINE	A	1.88	140	1.88 - 6(.14) = 1.04 K
LINE	B	2.51		

L6 81-85
7

LATERAL ANALYSIS *** SEISMIC	V= .186 W
	W= 27 PSF

DIRECTION: STUDIO-TRANS. LEVEL: ROOF

AVERAGE WALL HEIGHT = 5 FT. AT 30 PSF

AREA PROFILE FOR SEISMIC

REF. COORD.	AREA LEFT	AREA RIGHT
0	0	13.6
22	13.6	16
[illegible]	16	16
27	11	6
31	0	0

LINE		WALL LENGTH (FT)	TRIB. AREA (SQ.FT)	SHEAR FORCE (KIPS)	SHEAR INTENSITY (LBS/FT)
A	@ 0	6	[illegible]	[illegible]	~~[illegible]~~ TYPE "B"
B	@ 22.	5	170	[illegible]	~~[illegible]~~ TYPE "A"
C	@ 27	6	36	[illegible]	~~[illegible]~~ TYPE "B"
		TOTAL	[illegible]	[illegible]	

LATERAL ANALYSIS *** SEISMIC	V= .186 W
	W= 29 PSF

DIRECTION: STUDIO-LONG. LEVEL: ROOF

AVERAGE WALL HEIGHT = 5 FT. AT 30 PSF

AREA PROFILE FOR SEISMIC

REF. COORD.	AREA LEFT	AREA RIGHT
0	0	29
2	29	31
8	31	29
13.5	27	7
16	7	7
18	1	0

LINE		WALL LENGTH (FT)	TRIB. AREA (SQ.FT)	SHEAR FORCE (KIPS)	SHEAR INTENSITY (LBS/FT)
D	@ 0	9	205.3	2.6	~~[illegible]~~ TYPE "A"
E	@ 13.5	8	223.8	2.83	~~[illegible]~~ TYPE "B" ok
		TOTAL	429.1	5.43	

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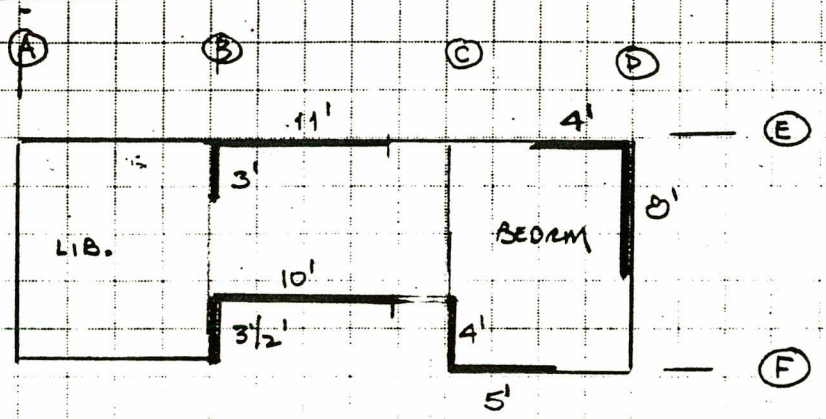
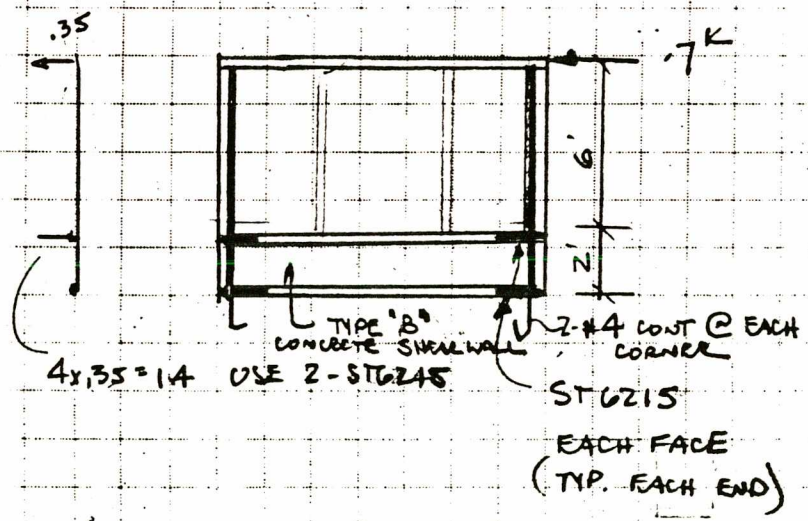
JOB BERRYESSA ESTATES
SHEET NO. 47 OF 81-85
CALCULATED BY _____ DATE 8
CHECKED BY _____ DATE _____
SCALE _____

LATERAL DESIGN



LINE "A" (FRAME)

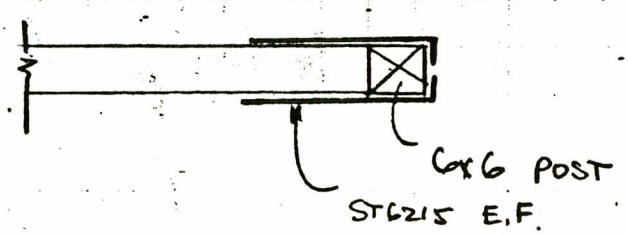


6x6 POST

$M = \frac{.7}{2}(6) = 2.1^{IK}$

$f_B = 910$ psi
$f_V = 52$
$\Delta_T = .47$

STRAP TOP OF BEAM TO STIFFEN CONNECTION



LB 81-85
9

*** SEISMIC V= .186 W
W= 29 PSF

DIRECTION: LIB - TRANS. LEVEL: ROOF

AVERAGE WALL HEIGHT = 5 FT AT 50 PSF

AREA PROFILE FOR SEISMIC

REF. COORD.	AREA LEFT	AREA RIGHT
0	0	11
10	11	0
15	8	0

LINE	WALL LENGTH (FT)	TRIB. AREA (SQ.FT)	SHEAR FORCE (KIPS)	SHEAR INTENSITY (LBS/FT)
A @ 0	4	55	.7	~~175~~ FRAME
B @ 10	6.5	95	1.2	~~185~~ ← TYPE "A" & TYPE "B"
	TOTAL	150	1.9	

LATERAL ANALYSIS *** SEISMIC V= .186 W
W= 29 PSF

DIRECTION: LIB. - LONG. LEVEL: ROOF

AVERAGE WALL HEIGHT = 5 FT AT 50 PSF

AREA PROFILE FOR SEISMIC

REF. COORD.	AREA LEFT	AREA RIGHT
0	0	15
8	15	10
11	10	0

LINE	WALL LENGTH (FT)	TRIB. AREA (SQ.FT)	SHEAR FORCE (KIPS)	SHEAR INTENSITY (LBS/FT)
E @ 0	11	60	.76	~~69~~ TYPE "B"
F @ 8	10	90	1.14	~~114~~ TYPE "B"
	TOTAL	150	1.9	

LATERAL ANALYSIS *** SEISMIC V= .186 W
W= 29 PSF

DIRECTION: BDRM - TRANS. LEVEL: ROOF

AVERAGE WALL HEIGHT = 5 FT AT 50 PSF

AREA PROFILE FOR SEISMIC

REF. COORD.	AREA LEFT	AREA RIGHT
-9	0	8
0	8	12
10	12	0

LINE	WALL LENGTH (FT)	TRIB. AREA (SQ.FT)	SHEAR FORCE (KIPS)	SHEAR INTENSITY (LBS/FT)	
C @ 0	4	132	1.67	~~110~~	TYPE "A"
D @ 10	8	60	.76	~~95~~	TYPE "B"
	TOTAL	192	2.43		

LATERAL ANALYSIS *** SEISMIC V= .186 W
W= 29 PSF

DIRECTION: BDRM - LONG. LEVEL: ROOF

AVERAGE WALL HEIGHT = 5 FT AT 50 PSF

AREA PROFILE FOR SEISMIC

REF. COORD.	AREA LEFT	AREA RIGHT
0	0	10
12	10	0

LINE	WALL LENGTH (FT)	TRIB. AREA (SQ.FT)	SHEAR FORCE (KIPS)	SHEAR INTENSITY (LBS/FT)	
E @ 0	4	60	.76	~~190~~	TYPE "B"
F @ 12	5	60	.76	~~152~~	TYPE "B"
	TOTAL	120	1.52		

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JOB Beverly Estates 81-85
SHEET NO. ____ OF ____
CALCULATED BY LJO DATE 11
CHECKED BY ____ DATE ____
SCALE ____

SHEAR WALLS

$f_c' = 3000$
$2\sqrt{f_c'} = 110$ psi

TYPICAL CONCRETE WALL TYPE "A"

$v_{u\,max} = 10\sqrt{f_c'} = 540$

EFFECTIVE WALL THICKNESS 3½"

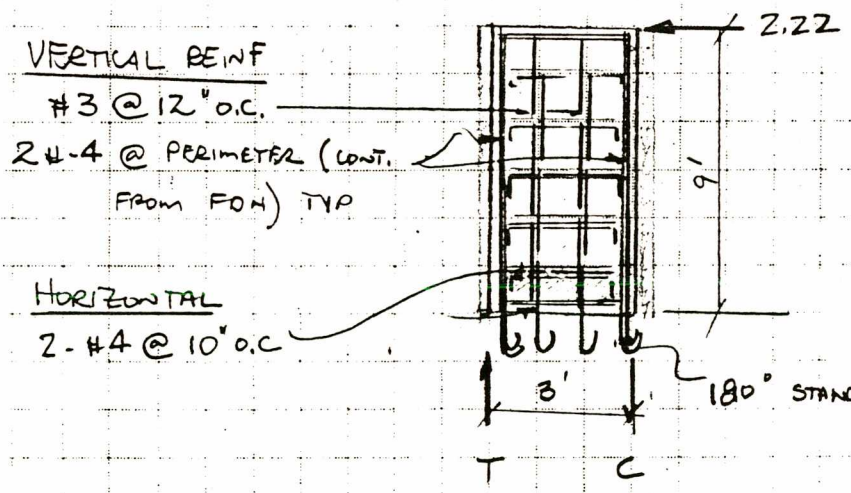
$P_n = .0025(3.5 \times 12) = .1\ in^2$

$$v_u = \frac{V_u}{\phi h d} = \frac{V_u}{0.85(3\tfrac{1}{2})(.8\,l_w)} = .42\,\frac{V_u}{l_w}$$

KITCHEN	l_w	V_u	v_u	A_v
LINE A	3'	3.77	528	$\frac{(528-110)(3\frac{1}{2})(12)}{40{,}000} = 0.44$

USE 2-#4@10" o.c. X

$P_n = .0025 + 0.5(2.5 - \frac{9}{3})(.01 - .0025) \cong .0025$



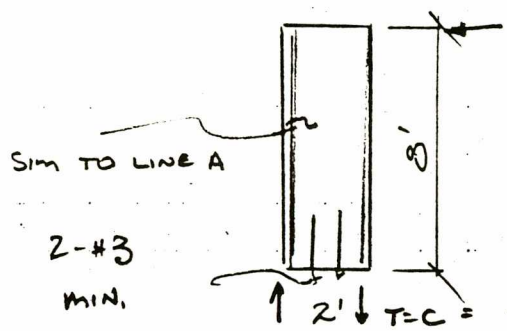
$T = C = 3(2.22) = 6.66^k$

- #4 $A = .2$ $f_y = 40$ $P_A = 4.8^k$
- #4 $V_A = 2.8^k$
- #3 $V_A = 1.4^k$

180° STANDARD HOOK - EMBEDD 12" INTO SLAB BEAM

LIVING RM	l_w	V_u	V_y	A_v
LINE D	2x2'	3.69k	387	$\frac{(387-110)(3\frac{1}{2})(12)}{40{,}000} = .29$

USE 2-#4@12" o.c.



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JOB BERRYESSA ESTATES 81-8
SHEET NO. ____ OF ____
CALCULATED BY LII DATE 12
CHECKED BY ____ DATE ____
SCALE ____

SHEAR WALL

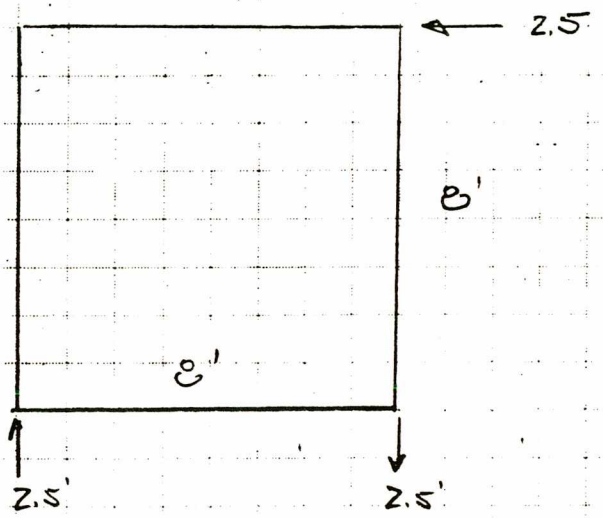
$$v_u = \frac{.42\,V_u}{l_w} = \frac{1.7(2.5)(.42)}{8'} = 223$$

$$A_v = \frac{(223-110)(3\tfrac{1}{2})(12)}{40{,}000} = .118$$

#4 @ 14" OK.

$\rho_n = .0025\,(3.5\times12) = .1$ #3 @ 12" OK

OVERTURNING:



1 #4 ← USE:
OR 2 - #3 OK

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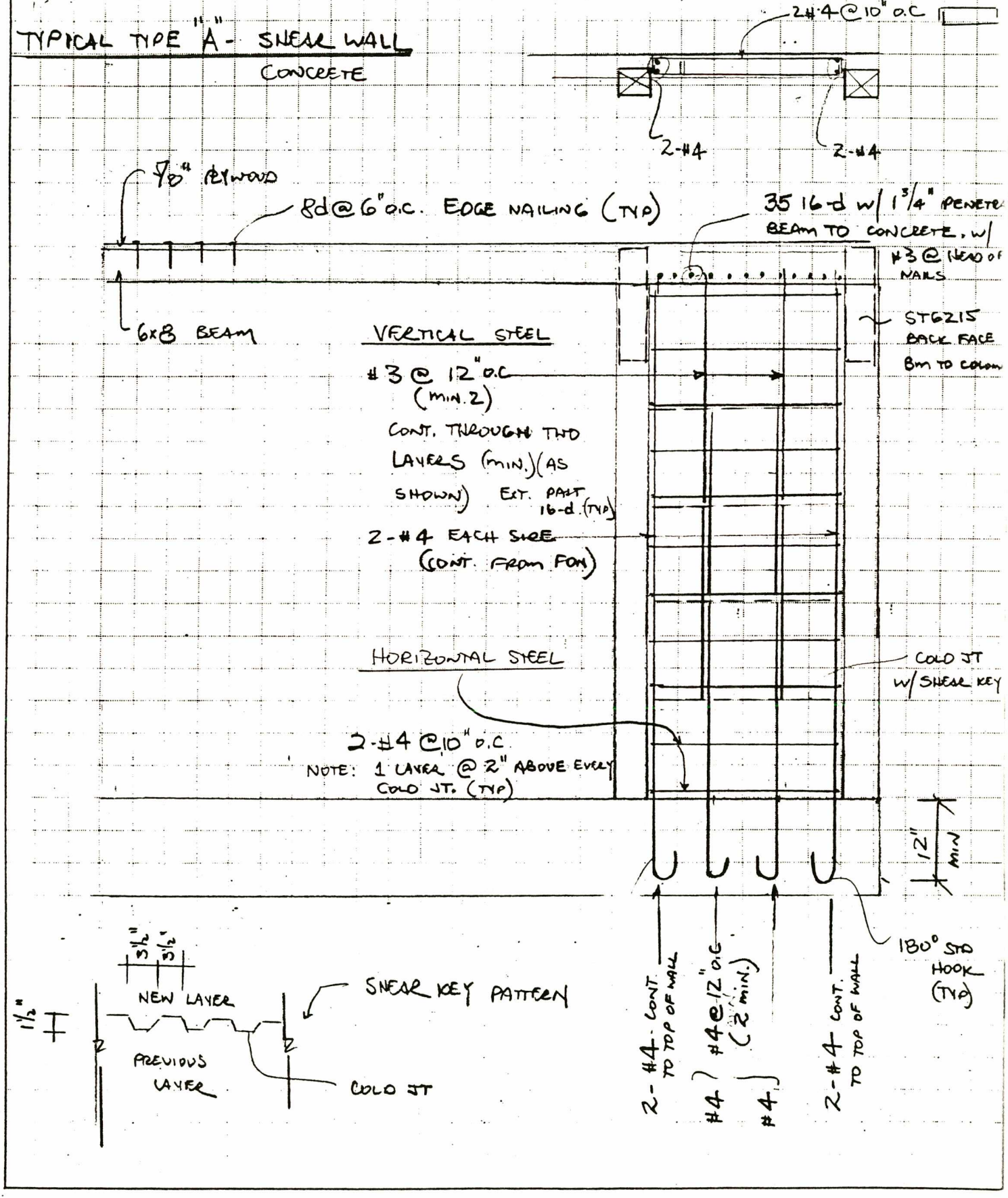
JOB BERRYESSA ESTATES B1-85
SHEET NO. ____ OF ____
CALCULATED BY LIZ DATE 13
CHECKED BY ____ DATE ____
SCALE ____

TYPICAL TYPE "A" - SHEAR WALL CONCRETE



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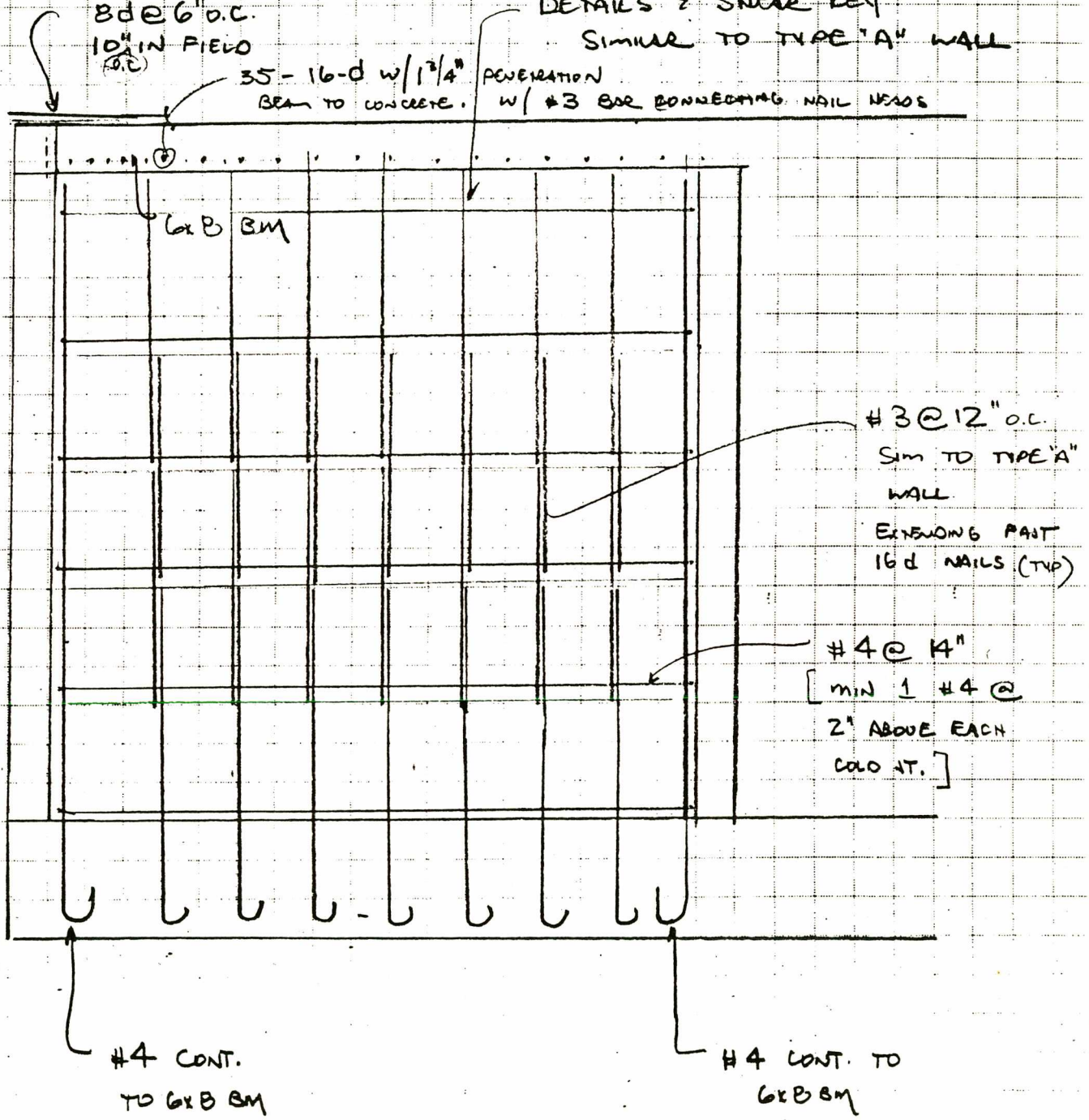
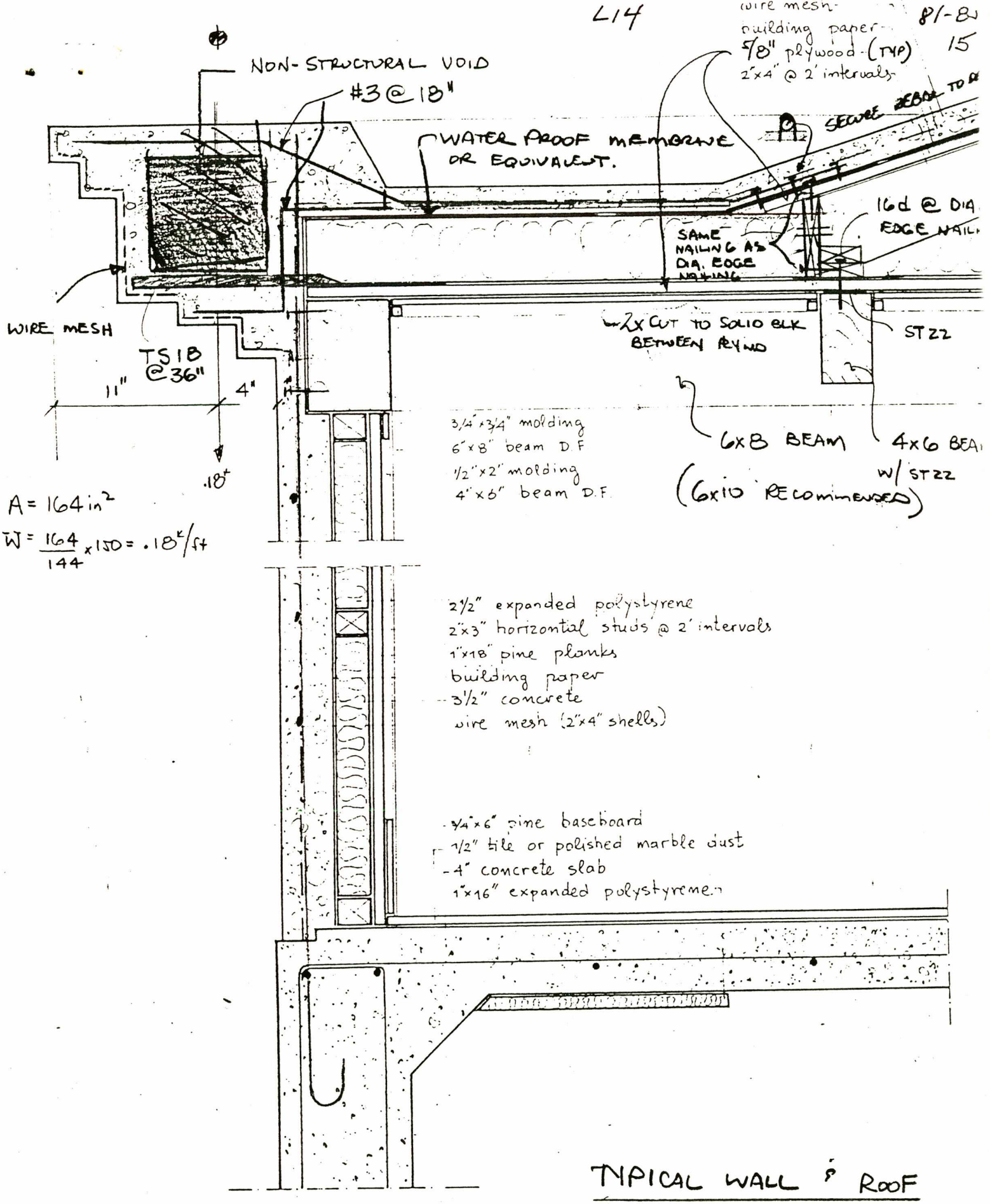
JOB ~~BERRYESSA ESTATES~~ 81-8
SHEET NO. _____ OF _____
CALCULATED BY LJ3 DATE 14
CHECKED BY _____ DATE _____
SCALE _____

TYPICAL TYPE "B" - CONCRETE SHEAR WALL



L14

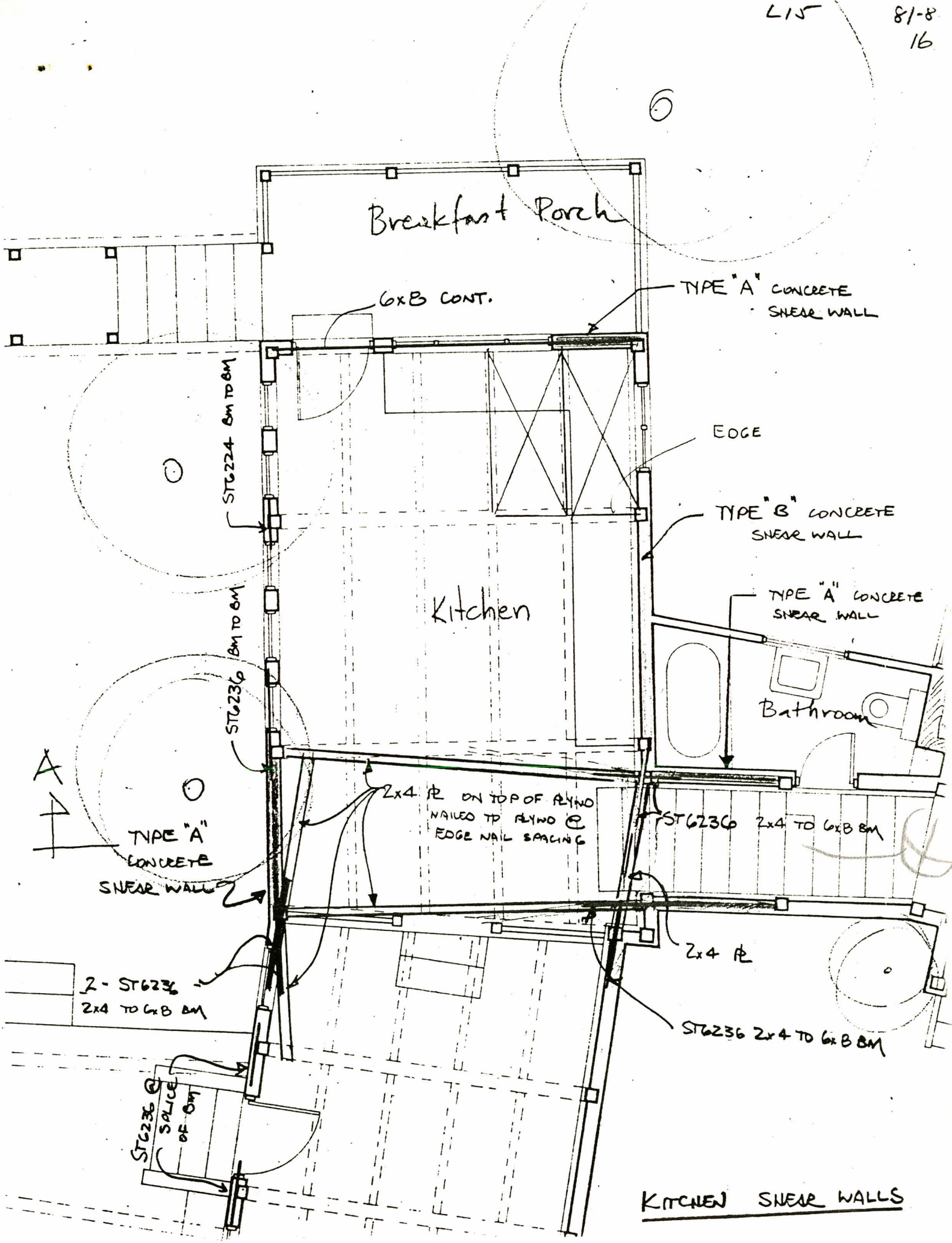


$A = 164\ in^2$

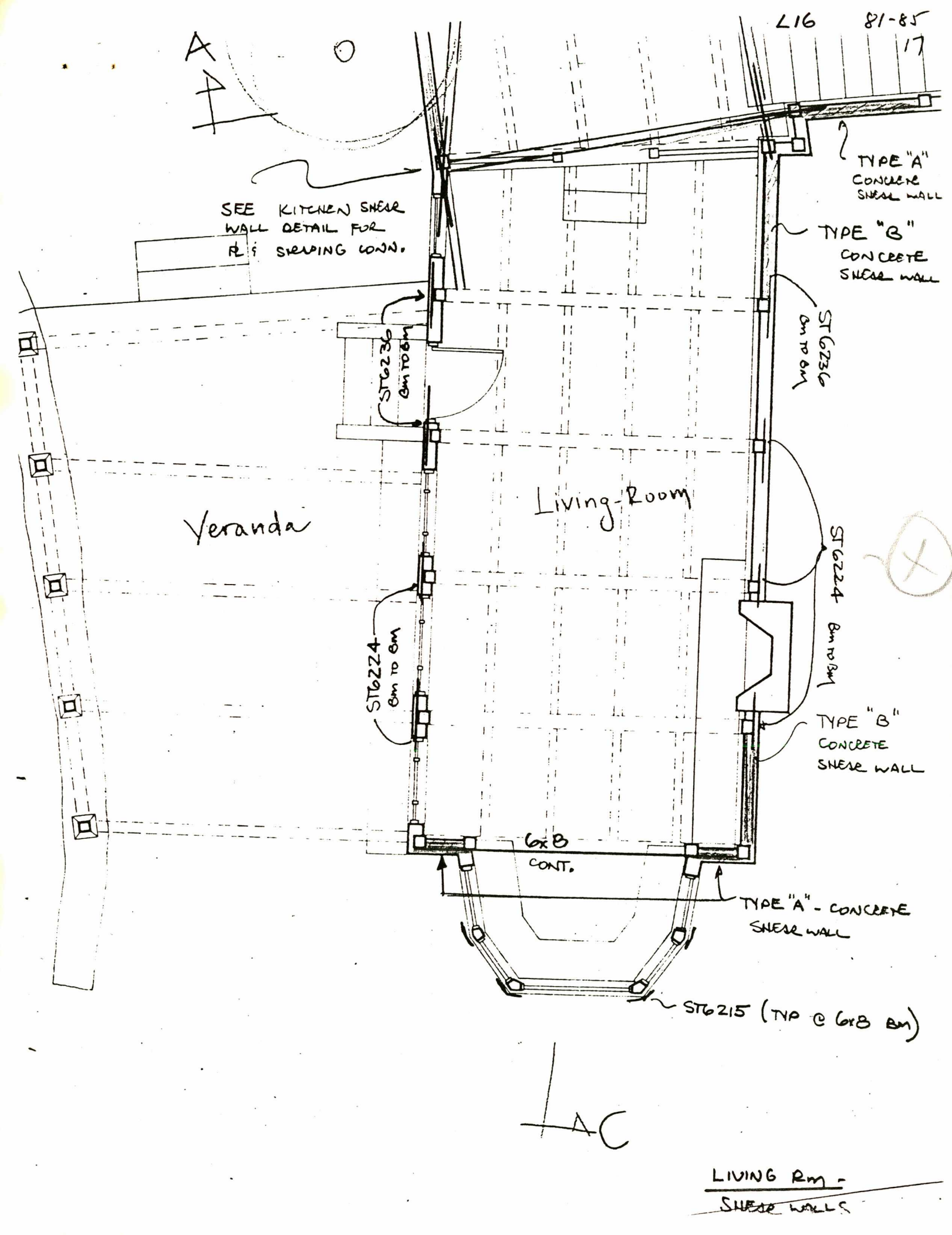
$W = \frac{164}{144} \times 150 = .18^{k}/ft$

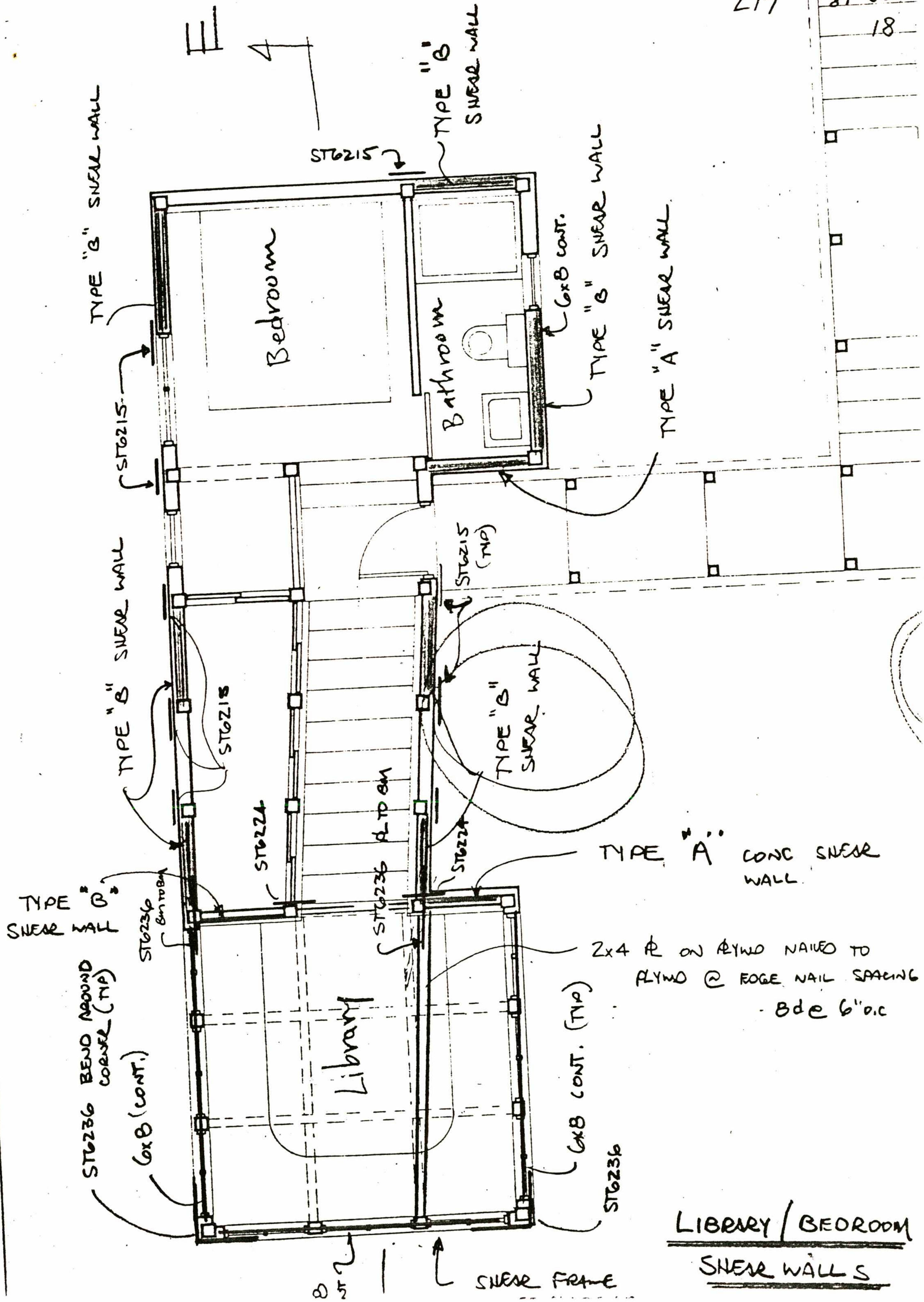
81-84
15

TYPICAL WALL & ROOF SECTION

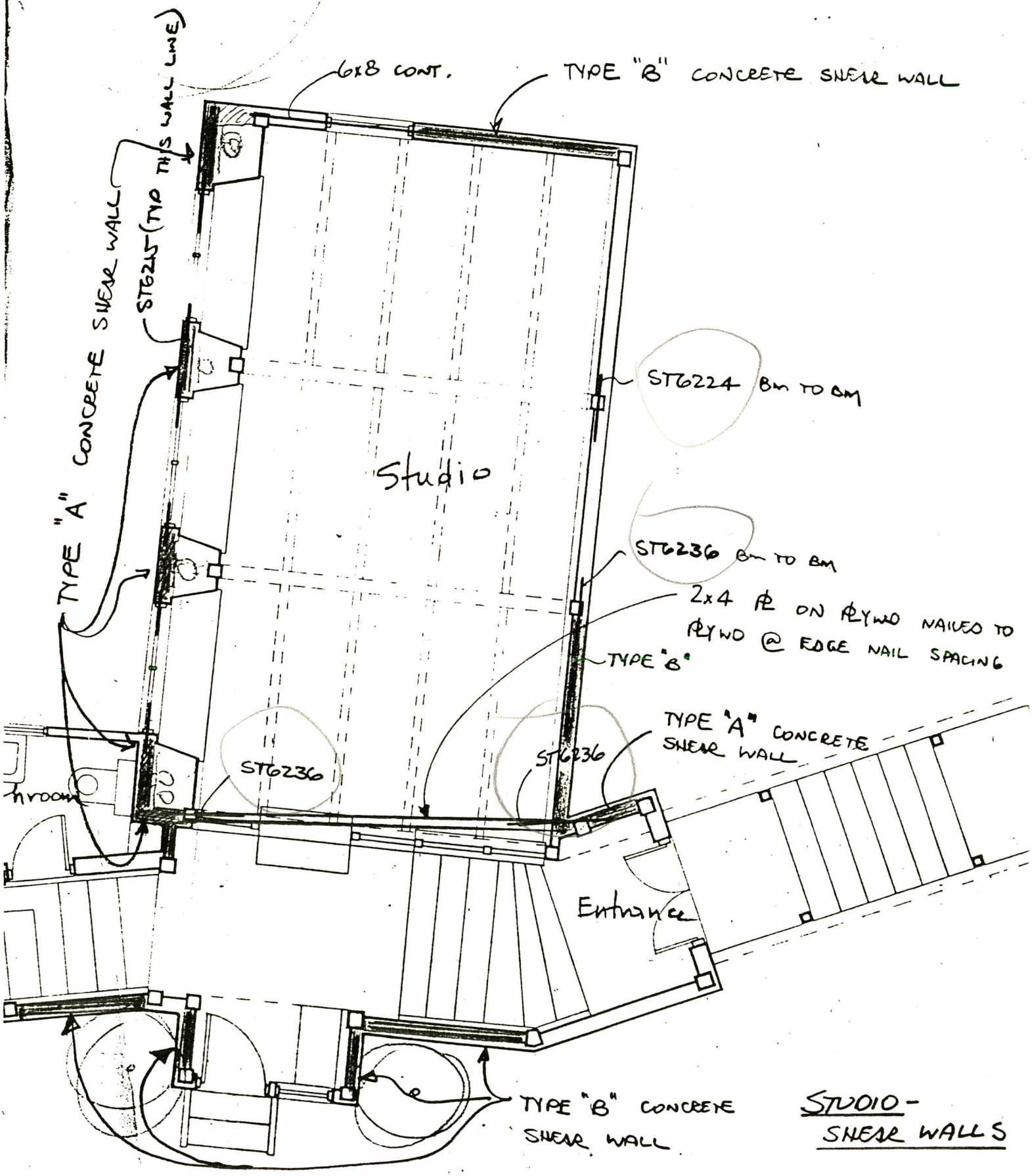


KITCHEN SHEAR WALLS


L16 81-85
17
A
SEE KITCHEN SHEAR WALL DETAIL FOR RE SHEARING CONN.
TYPE "A" CONCRETE SHEAR WALL
TYPE "B" CONCRETE SHEAR WALL
ST6236 Bm TO Bm
ST6236 Bm TO Bm
Veranda
Living-Room
ST6224 Bm TO Bm
ST6224 Bm TO Bm
TYPE "B" CONCRETE SHEAR WALL
6x8 CONT.
TYPE "A" - CONCRETE SHEAR WALL
ST6215 (TYP @ 6x8 Bm)
LAC
LIVING Rm - SHEAR WALLS



LIBRARY / BEDROOM
SHEAR WALLS



STUDIO - SHEAR WALLS

SHEAR WALL SCHEDULE

TYPE	PLYWOOD THICKNESS (MIN.)	EDGE NAILING (ALL EDGES & ENDS)	A35 SPACING
A	3/8"	8d @ 6"	24" O.C.
B	3/8"	8d @ 4"	16" O.C.
C	1/2"	10d @ 6"	16" O.C.
D	1/2"	10d @ 4"	16" O.C.
E	1/2"	10d @ 2 1/2"	12" O.C.
F	1/2"	10d @ 2"	8" O.C.

NOTES:

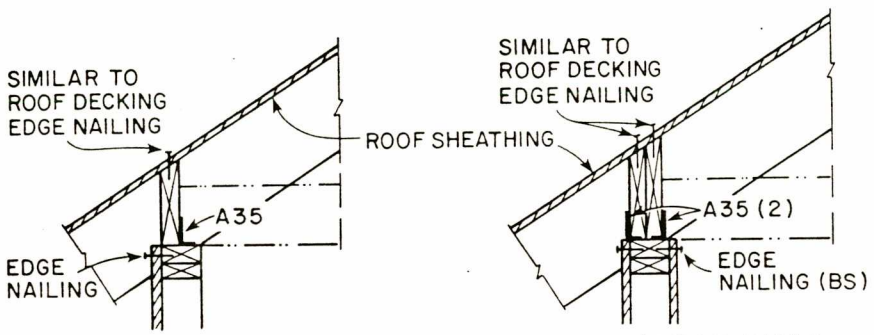
(1) PLYWOOD SHEATHING SHALL BE CDX OR EXTERIOR PANELING.

(2) LEAVE 1/8" SPACE AT ALL PLYWOOD PANEL EDGE JOINTS AND 1/16" AT ALL PLYWOOD PANEL END JOINTS.

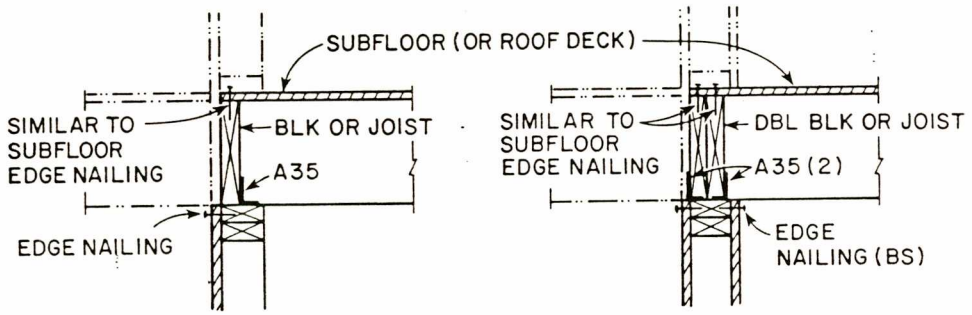
(3) IN SHEAR WALL TOP PL'S, BOTTOM PL'S OR MUDSILLS, HOLES (FOR PIPING ETC.) SHALL NOT BE GREATER THAN 2" IN DIA., SHALL BE CENTERED ON PL AND BE A MIN. OF 6" FROM ANY ADJACENT HOLE.

PLYWOOD SHEATHING ONE SIDE

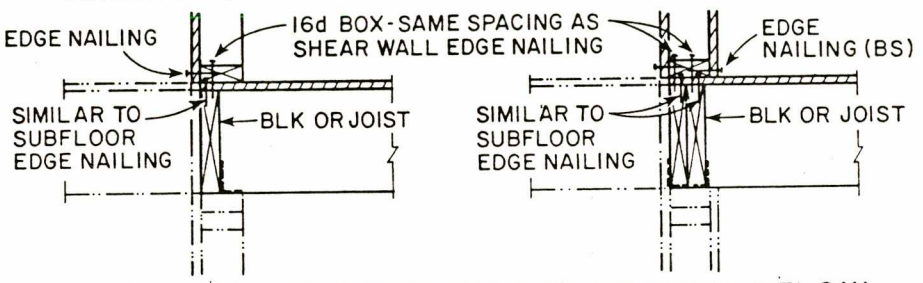
PLYWOOD SHEATHING BOTH SIDES (BS)



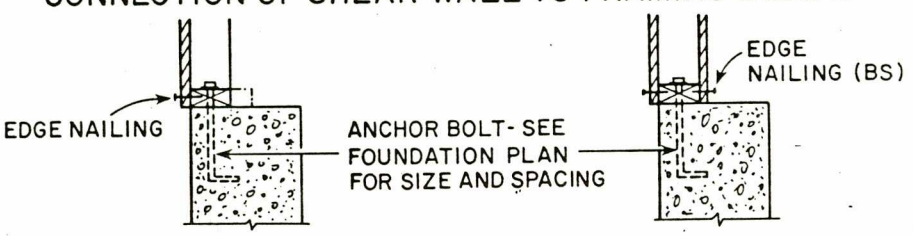
CONNECTION OF ROOF SHEATHING TO SHEAR WALL



CONNECTION OF SHEAR WALL TO FRAMING ABOVE



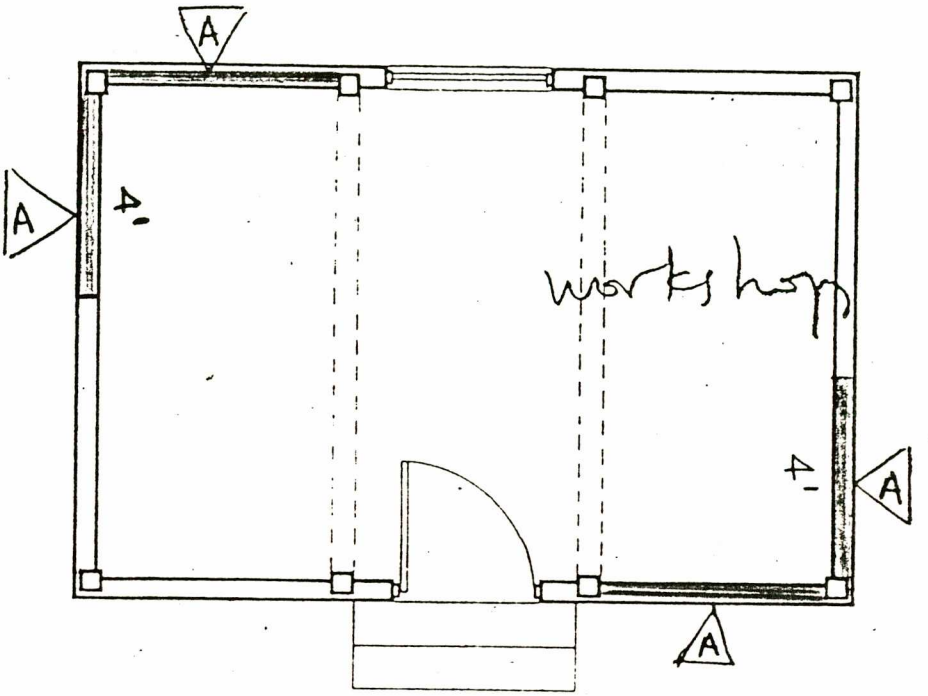
CONNECTION OF SHEAR WALL TO FRAMING BELOW



CONNECTION OF SHEAR WALL TO FOUNDATION

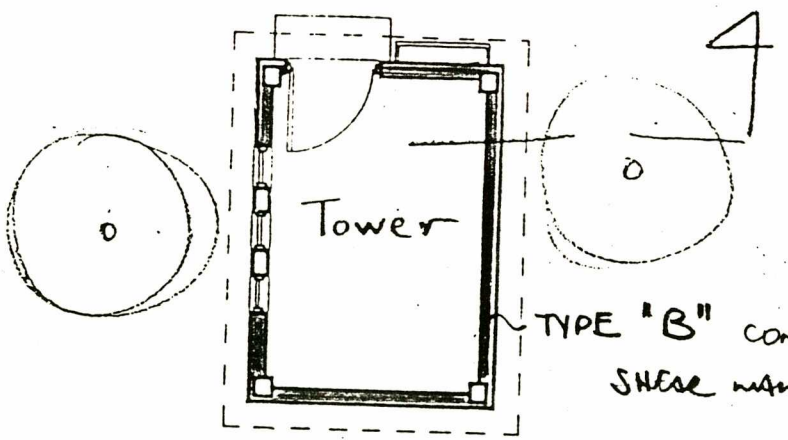
PLYWOOD SHEAR WALL DETAILS

F



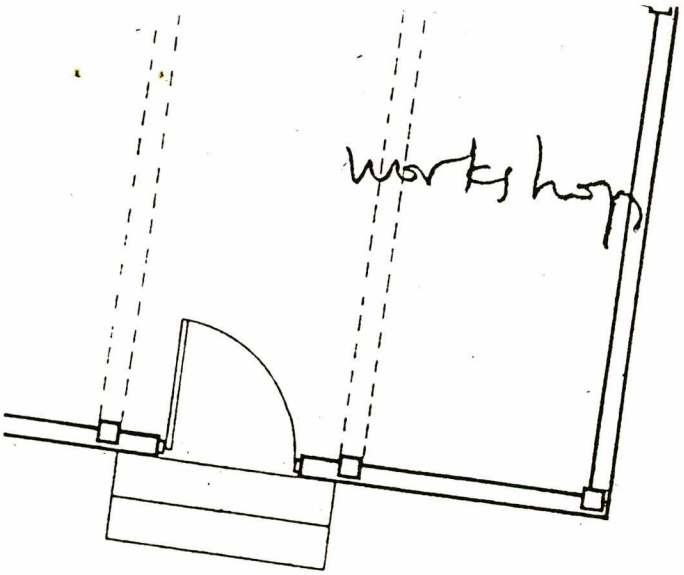
PLYWOOD SHEAR WALLS

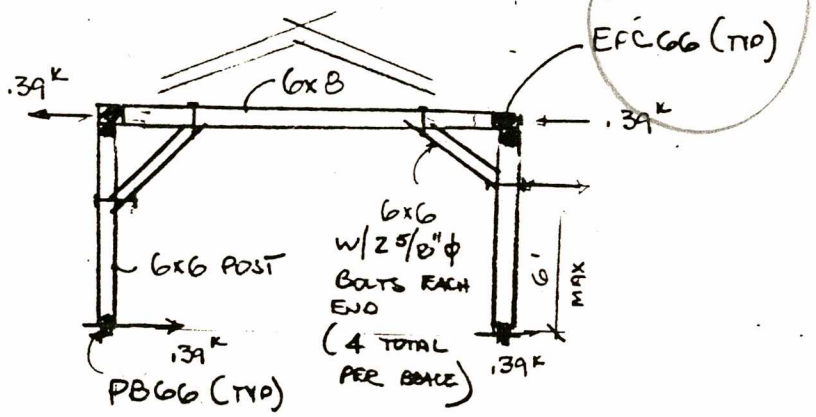
D



M 4

WORK SHOP & TOWER





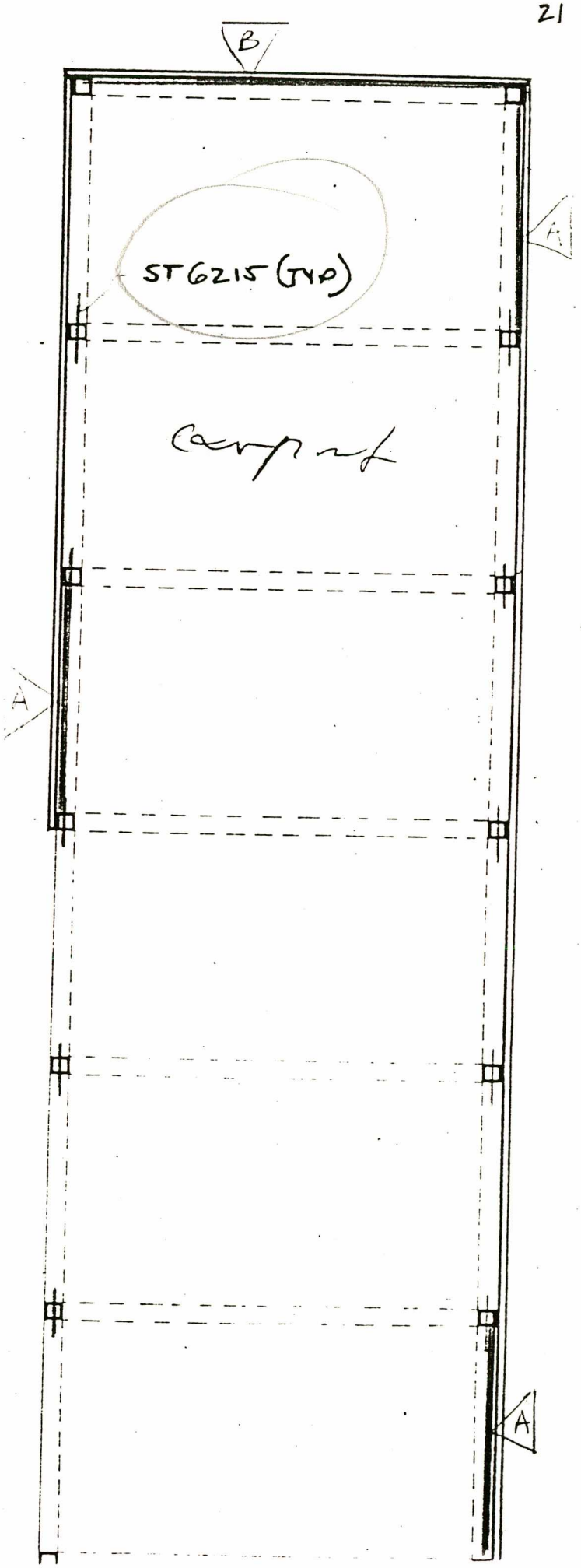
W_W = 20 psf

HEIGHT = 6'

TRIB. WIDTH = 6.5'

F_W = 6 x 6.5 x .02 = .78K

CAR PORT



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JOB BERRYESSA ESTATES 81-85

SHEET NO. FNO 1 OF 22

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

LIVING ROOM - KITCHEN FOUNDATION - PRELIMINARY

LOADS

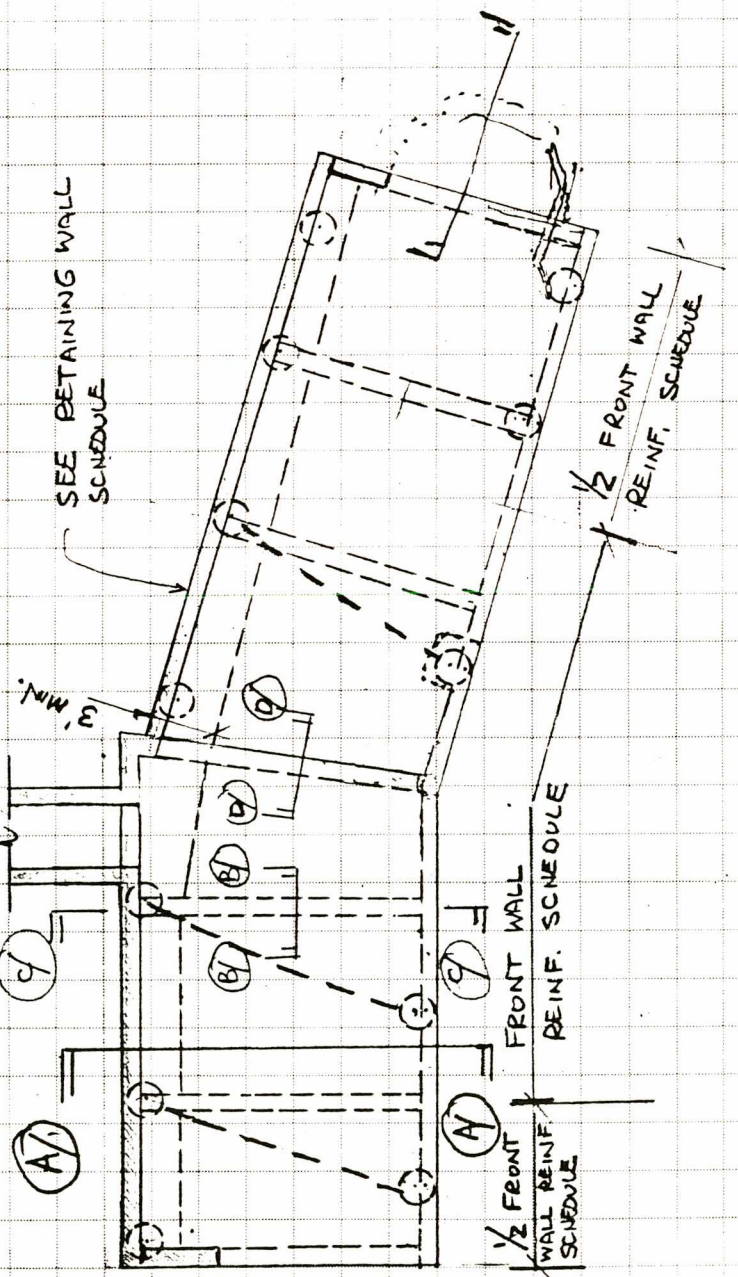
CONCRETE ; 150 lbs/ft²

FL - LIVE LOAD = 40 lbs/ft²

ROOF " " = 20 lbs/ft²

16 lbs 4:12 7

SECTION



LIVING RM - KITCHEN FOUNDATION LAYOUT

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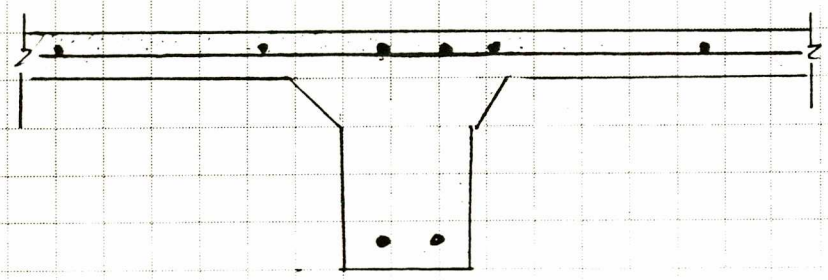
SHEET NO. FDN 2 OF 23
CALCULATED BY DATE
CHECKED BY DATE
SCALE

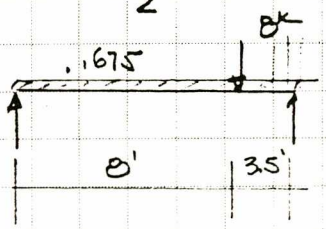
RIB - REINF - PRELIMINARY



$w = .675$ k/f

$\ell = 13' - \left(\frac{8+9}{12}\right) = 11.5'$

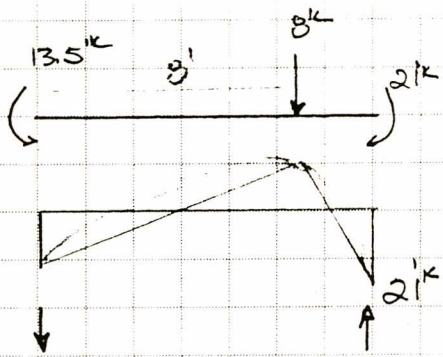
$P_c = \frac{.5 \times 4 \times 8}{2} = 8^K$



(A) NON-FIXED END

$M_w = \frac{.675 \times 11.5^2}{8} = 11.2^{IK}$

$M_p = \frac{19.5^{IK}}{30.7^{IK}}$



(B) FIXED END

$M_w = \frac{.675 \times 11.5^2}{12} = 7.5^{IK}$

$M_p = \frac{8(8)^2(3.5)}{11.5^2} = \frac{13.6^{IK}}{21.1^{IK}}$

(A) $M_{ULT} = 30.7 \times 1.55 = 47.6^{IK}$

(B) $M_{ULT} = 21 \times 1.55 = 33^{IK}$

.67	.67
2.4K	5.6K
3.9K	3.9K
	10.2K

$M_{ep} = 10.2 \times 3.5 - 21 - .675\frac{(.375)^2}{2} = 10^{IK}$

DESIGN MOMENT IN RIB

@ LEFT END $13.5 \times 1.55 = 20.92^{IK}$ ← GOVERNS

@ CENTER $-13.5 + \frac{8^2(.675)}{2} + 5.63(8) = 9.94 \times 1.55 = 15.4^{IK}$

@ RIGHT END = 33^{IK} RESTRAINED BY REMAINING WALL / PROVIDE ADDITIONAL STEEL IN SUB REINF. ADJACENT TO RIB SEE SECTION C

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JOB BERRYESSA ESTATES 81-85
SHEET NO. FDN 3 OF 24
CALCULATED BY ____ DATE ____
CHECKED BY ____ DATE ____
SCALE ____

LIVING RM - KITCHEN - PRELIMINARY

WALL REINF. - RETAINING

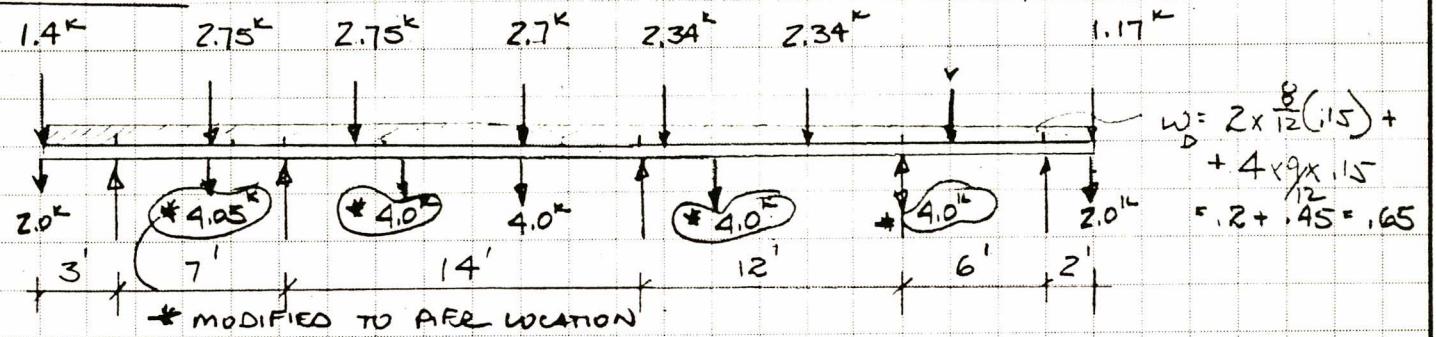
HORIZONTAL .0025 x VERTICAL
.0015 x AREA = .0015 x 9 x 12 = .162

$\frac{.2}{.162} \times 12 = 14''$ ok

$\frac{169}{144} \times 2.34 = 2.75^K$

$\frac{12 \times 12}{4} \times .965 = 2.34^K$

FRONT WALL



$\frac{12 \times 15}{4} \times \left[\frac{4}{12}(.15) + .04 \right] = 4.05^K$ (.05)

K/L			.11	.07			.07	.08			.08	.125							
DIST.			.61	.39			.47	.53			.39	.61							
FEM	+7.2	-6	+6	-13.9			+7.7	-2			+.2			-6.34					
	+2.9	-2.7	+2.7	-7.7			+13.9	-6.8			+2.3			-1.3					
				-10.6			+10.6	-1.3			+4.0	-2	+2						
	-1.4	→ -.7					+4.7	-7.8			+7.8	-2.1	+1						
			+14.7	+9.4				-24				+2.32	+4.64						
				-3.9			-7.8	-6.8			-4.9	-7.6							
			+2.4	+1.5			+.8	+.8			-4.4								
							-.8	-.8			+1.7	+2.7							
	+10		-10	+25.1		-25.2		+29.1		-29.1		+6.7	-6.7	+7.6		-7.6			

$M_{ULT} = 29.1 \times 1.55 = 45^{IK}$

.29 .29
6.75 6.75
4.55 4.55
11.6K

$M = 11.6 \times 5 - 29.1 - \frac{.65(5)^2}{2} = 21^{IK} \times 1.55 = 33^{IK}$

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JOB BRAVESSA ESTATES 81-08
SHEET NO. FND 4 OF 25
CALCULATED BY _____ DATE _____
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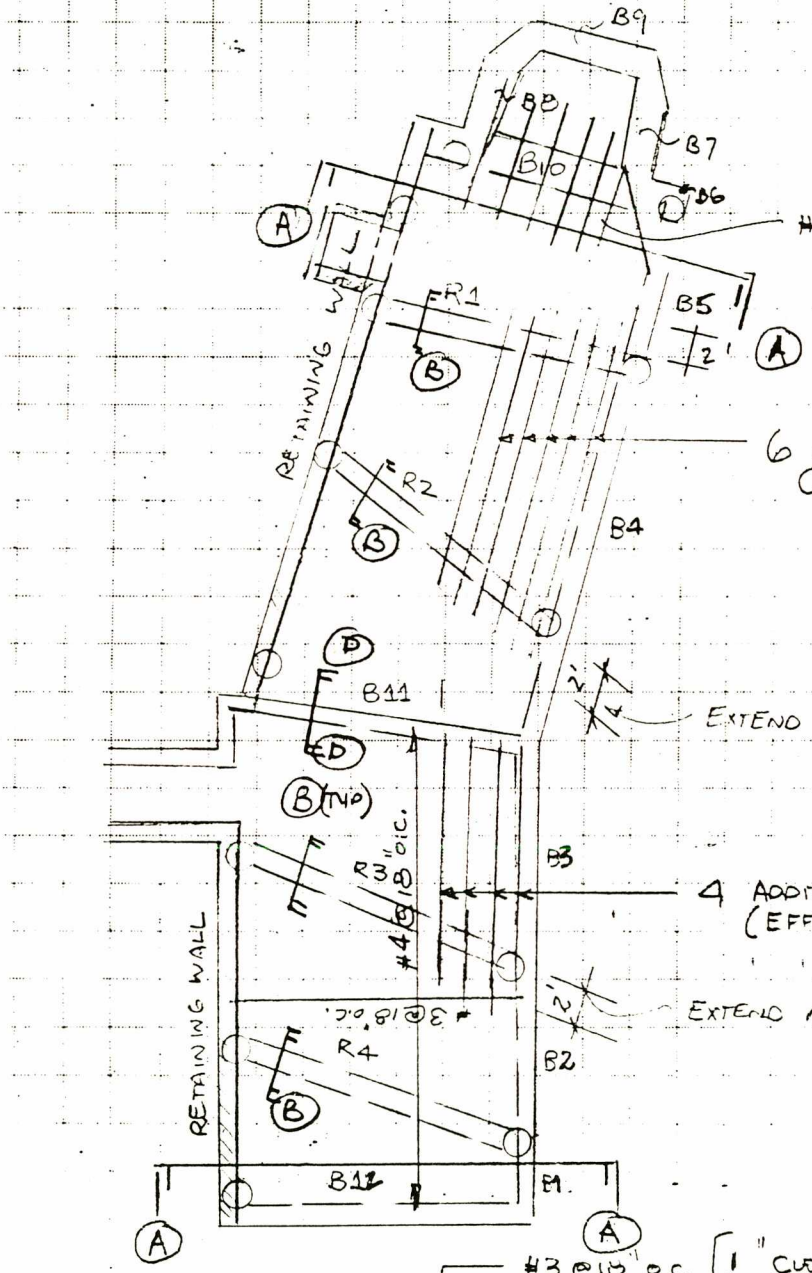
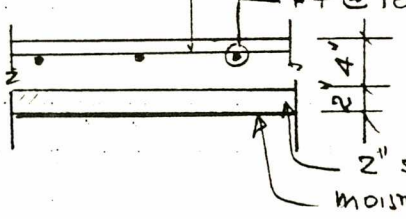
SCALE _____

LIVING ROOM - KITCHEN FINAL DESIGN

- DESIGN REVIEW BASED ON DRAWING "A" - KITCHEN / L.R FOUNDATION PLAN - AS SUPPLIED BY CENTER FOR ENVIROMENTAL STRUCTURE, ARCHITECTS AND CONTRACTORS.



TYPICAL SLAB



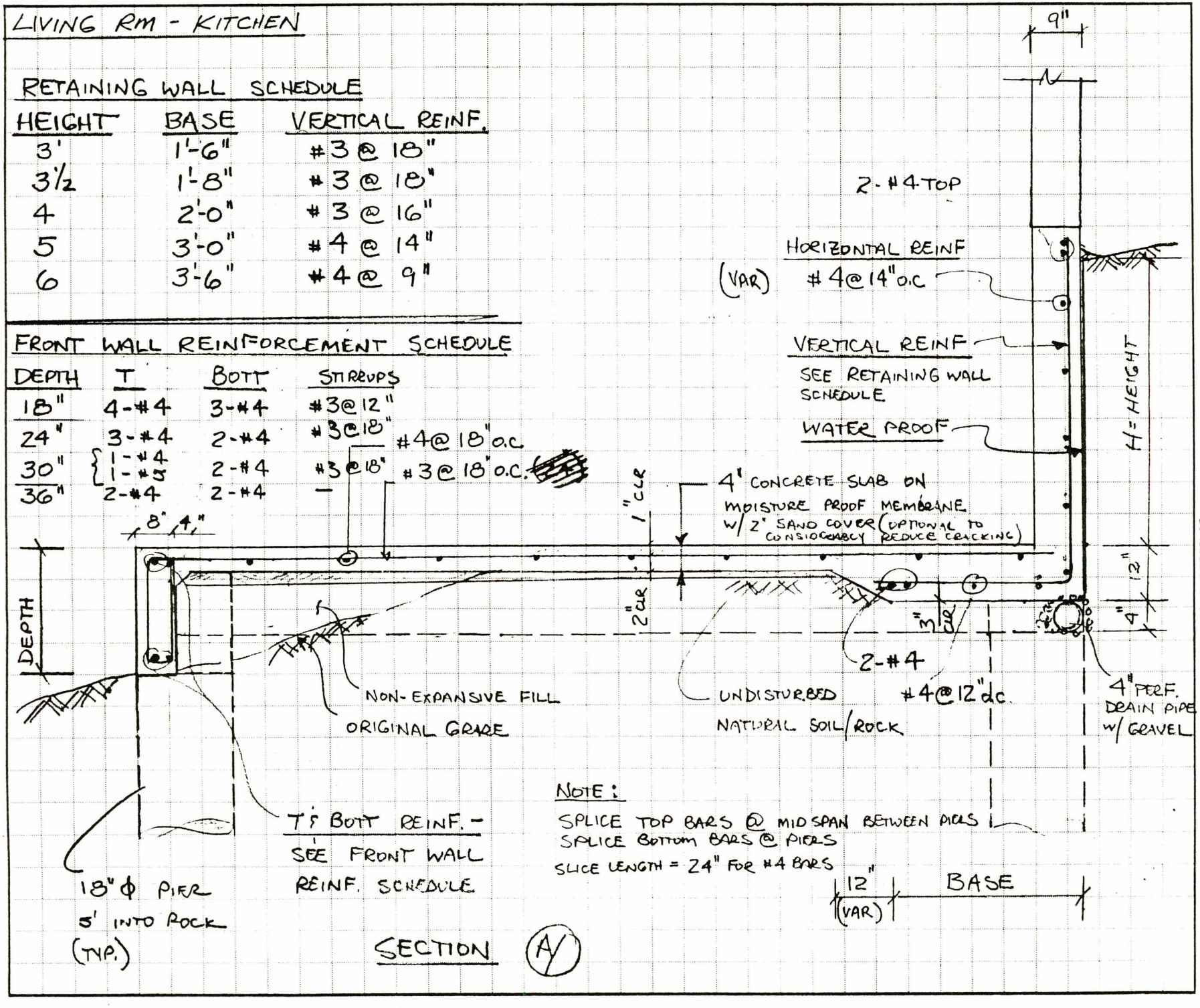
LIVING RM - KITCHEN

RETAINING WALL SCHEDULE

HEIGHT	BASE	VERTICAL REINF.
3'	1'-6"	#3 @ 18"
3½	1'-8"	#3 @ 18"
4	2'-0"	#3 @ 16"
5	3'-0"	#4 @ 14"
6	3'-6"	#4 @ 9"

FRONT WALL REINFORCEMENT SCHEDULE

DEPTH	T	BOTT	STIRRUPS
18"	4-#4	3-#4	#3@12"
24"	3-#4	2-#4	#3@18"
30"	1-#4 & 1-#5	2-#4	#3@18"
36"	2-#4	2-#4	—



NOTE:

SPLICE TOP BARS @ MID SPAN BETWEEN PIERS
SPLICE BOTTOM BARS @ PIERS
SLICE LENGTH = 24" FOR #4 BARS

SECTION (A)

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SHEET NO. FON 5 OF 26
CALCULATED BY DATE
CHECKED BY DATE
SCALE

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JOB BORREGA ESTATES 81-85
SHEET NO. FNO 6 OF 27
CALCULATED BY _____ DATE _____
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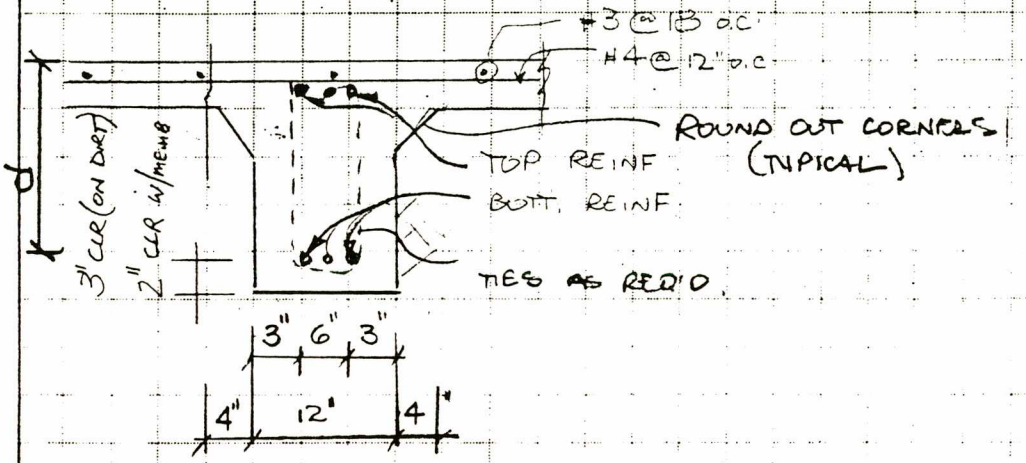
LIVING ROOM - KITCHEN
REINFORCING SCHEDULE RIBS



SECTION B - TYPICAL

	d	b	M_{ULT}	V_{ULT}	V_{CAP}	REINF TOP	REINF BOTT	TIES REQ'D
R1	12"	14"	20.92	6.0^K	7.82^K	3 - #4	3 - #4	No.
R2	9"	12"	20.92	6.0^K	5.02^K	4 - #4	4 - #4	#3 @ 9" o.c.
R3	15"	12"	20.92	6.0^K	8.4^K	3 - #4	3 - #4	No.
R4	21"	15"	13.1^{K-FT}	4.0^K	10.45^K	2 - #4	2 - #4	No

2 - #4 T & BOTT $\phi = .9$ BENDING

	d = 12	d = 10	d = 8
M_{ULT} K-FT	15.65^{K-FT}	12.98^{K-FT}	10.31^{K-FT}
ϕM	14.08	11.68^{K-FT}	9.28
V_{ULT} K	19.3	16.1^K	12.9^K
ϕV_{ALLOW} NO WEB REINF.	8.2	6.84^K	5.48^K

3 = #4 TOP

d = 12"
23.47
21.12^{K-FT}

4 - #4 TOP

d = 9"
23.29
20.93^{K-FT}

R4 $M_4 = 5/8\ M_{ULT\ 3} = 5/8(20.92) = 13.1^{K-FT}$

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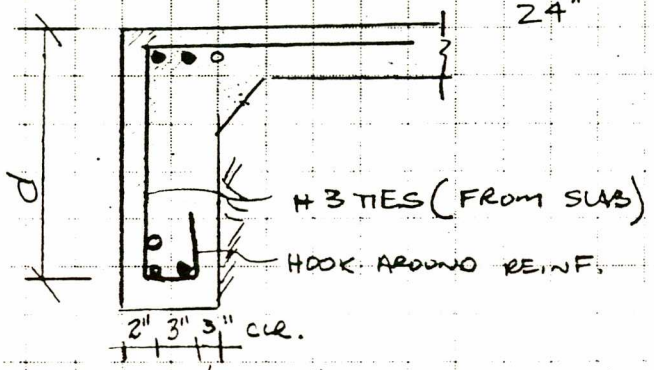
JOB BERRYESSA ESTATES
SHEET NO. FOR 7 OF 28
CALCULATED BY DATE
CHECKED BY DATE
SCALE

LIVING ROOM - KITCHEN

d	ϕM_n 2-#4	3-#4
24"	28.1'K	42.2'K



SECTION C - TYP. PERIMETER BEAM ON PIERS

	d	b	M_{ULT}	V_{ULT}	T & BOTT REINF	V_{CW} NO WEB REINF.	
B1	24"	7"	15.5 FT-K	8.29K	2-#4	7.82K	#3 - @18"
B2	24"	7"	21.7		2-#4		"
B3	24"	7"	36.8		3-#4		#3 @ 9"
B4	24"	7"	10.4		2-#4		#3 @ 18"
B5	24"	7"	11.8		2-#4		"
B6	24"	7"	11.3		2-#4		"
B7 CANT	13"	7"	17.7'K		4-#4		
B8	13"	7"	4.0'K		2-#4		
B9 CANT	13"	7"	17.7'K		4-#4		
B10	10"	8"	20.92		4-#4		
B11	15"	7"	20.92'K		3-#4		
B12	24"-7"	7"	12.4'K		2 #4 @ 24" DEPTH 4 #4 @ 7" DEPTH		#3 @ SPACING = DEPTH IF d LESS THAN 12"

$$M_{ULT.(7)} = \frac{6^2}{2}\left(.108 + [.04 + .04]^{*4} + 4(.038)\right) = 10.44 \times 1.7 = 17.75^{K}$$

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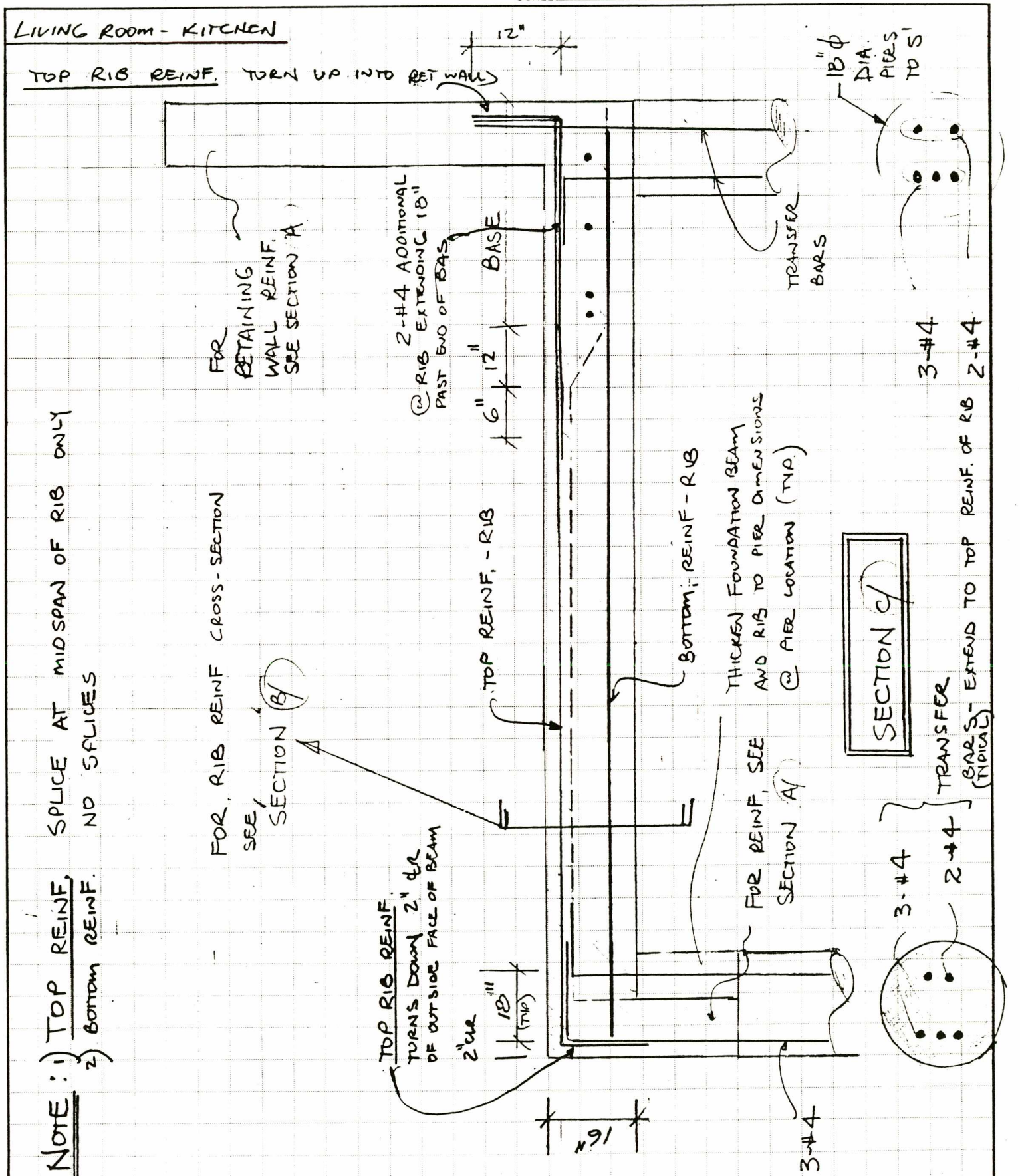
SCALE



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CALCULATED BY _____ DATE _____
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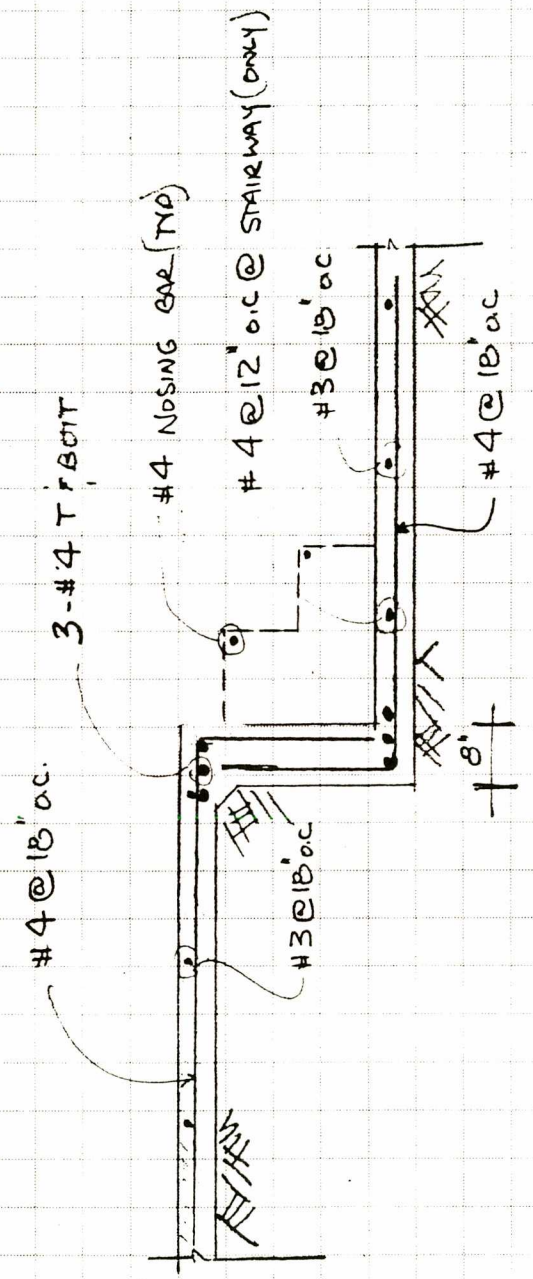
SCALE _____



SECTION A/

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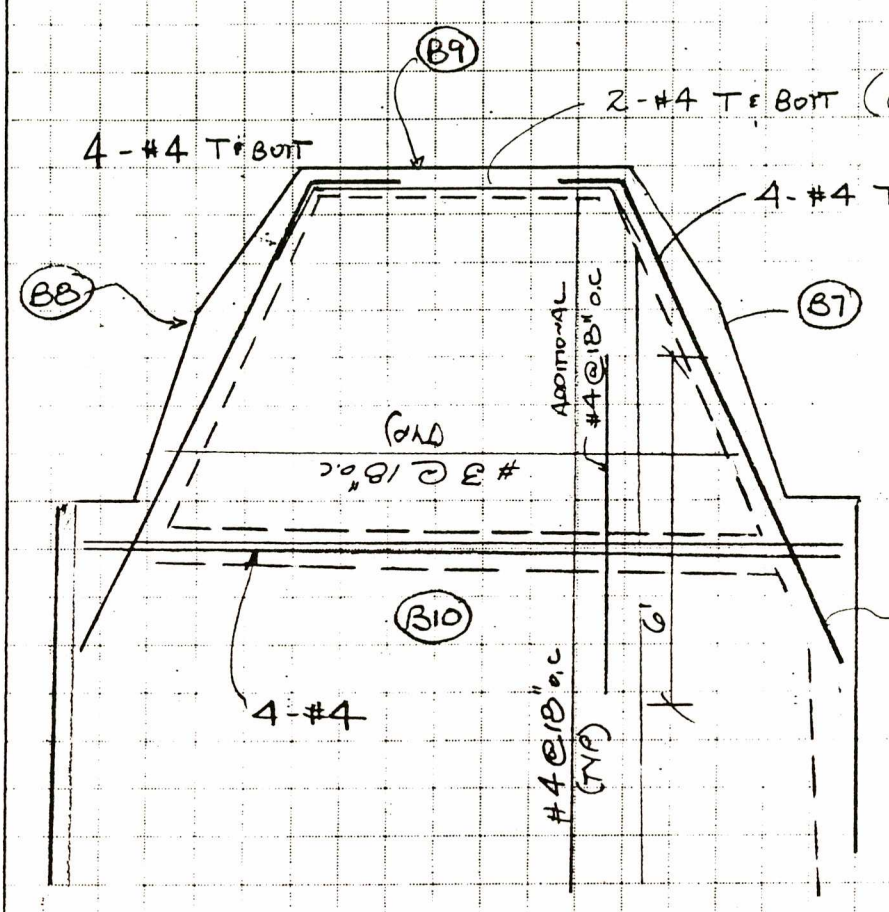
JOB BERRYESSA ESTATES 81-85
SHEET NO. FON 10 OF 31
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____



DETAIL E

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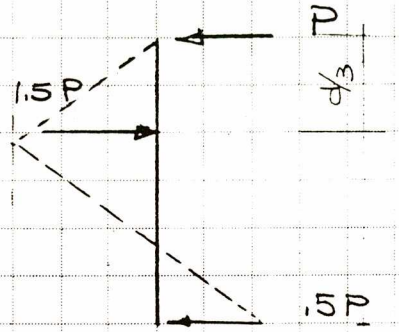
JOB 81-85 BERRYESSA ESTATES
SHEET NO. FON 11 OF 32
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

LATERAL RESISTANCE OF PIERS

ALLOWABLE LATERAL LOAD PER PIER



$1.5P = \frac{2}{2}\left(\frac{d}{3}\right)^2 (P_p) \Rightarrow P = \frac{5^2}{9(1.5)} P_p$

$= 1.85\, P_p$

18" PIER $P_p = 400$ pcf $\Rightarrow$ $P = 1.5 \times .4 \times 1.85$

$= 1.11^K$

$\sim 2^K$ OVER 2 PIER ϕ

18" PIER $P_p = 1000$ pcf $\Rightarrow$ $P = 2.5 \times 1.11 = 2.78^K$

$\approx 5^K$ OVER 2 PIER ϕ

OK

CHECK:

$S_1 = 1500$ ALLOW AVG. SOIL STRESS lbs/ft²

$S_1 BD^2 - 2.37 PD - 2.64 PH = 0$

$P = \frac{S_1 BD}{2.37} = \frac{1.5 \times 1.5 \times 5}{2.37} = 4.75^K \sim 5^K$ ok

$B = 1.5'$ 18" ϕ
$D = 5'$
$P =$ SOLVE FOR
$H = 0$, HEIGHT OF P

PIER REINF.

$\frac{.4(5)^2}{2} = 5^K$ $M = \frac{2(5)^2}{3} = 16.7^{1K}$ $M_{ULT} = 16.7 \times 1.7 = 28^{1K}$

USE: 3 - #4 TRANSFER BARS DOWNSLOPE
2 - #4 TRANSFER BARS UPSLOPE SIDE

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JOB 81-85 BERRYESSA ESTATES
SHEET NO. FON 12 OF 33
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

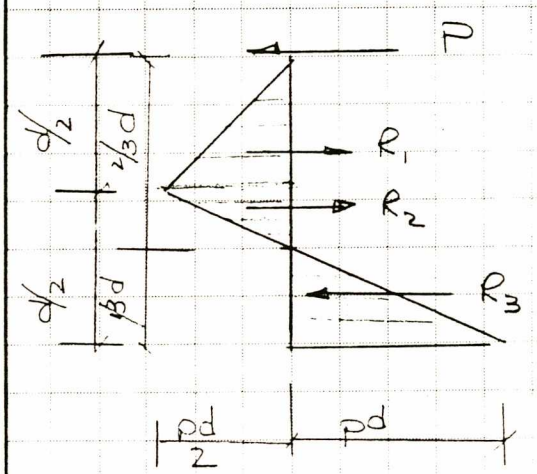
FOUNDATION DESIGN

ALLOWABLE LATERAL LOAD ON PIERS

EMBEDMENT W/ RESTRAINT $\quad d^2 = 4.25 \dfrac{Ph}{S_3 b_2}$ $\qquad S_3 = pd = 1000(5) = 5000$ $\qquad b_2 = 1.5\ ft$

$$Ph = \frac{5000(5)^2(1.5)}{4.25}$$

$$= 41.6^{K}$$



$d = 5'$

$pd = 1000(5) = 5^{K}$

$\frac{pd}{2} = 2.5^{K}$

$d/2 = 2\frac{1}{2}'$

d

$$R_1 = \frac{1}{2}\left(\frac{d}{2}\right)\left(\frac{pd}{2}\right) = \frac{1}{2}(2\tfrac{1}{2})(2.5^{K}) = 3.125^{K}$$

$$R_2 = \frac{1}{2}\left(\frac{2}{3}d - \frac{d}{2}\right)\left(\frac{pd}{2}\right) = \frac{1}{2}(3.33-2.5)(2.5^{K}) = 1.037^{K}$$

$$R_3 = \frac{1}{2}\left(\frac{d}{3}\right)pd = \frac{1}{2}(1.67)(5) = 4.175^{K}$$

4.162^{K}

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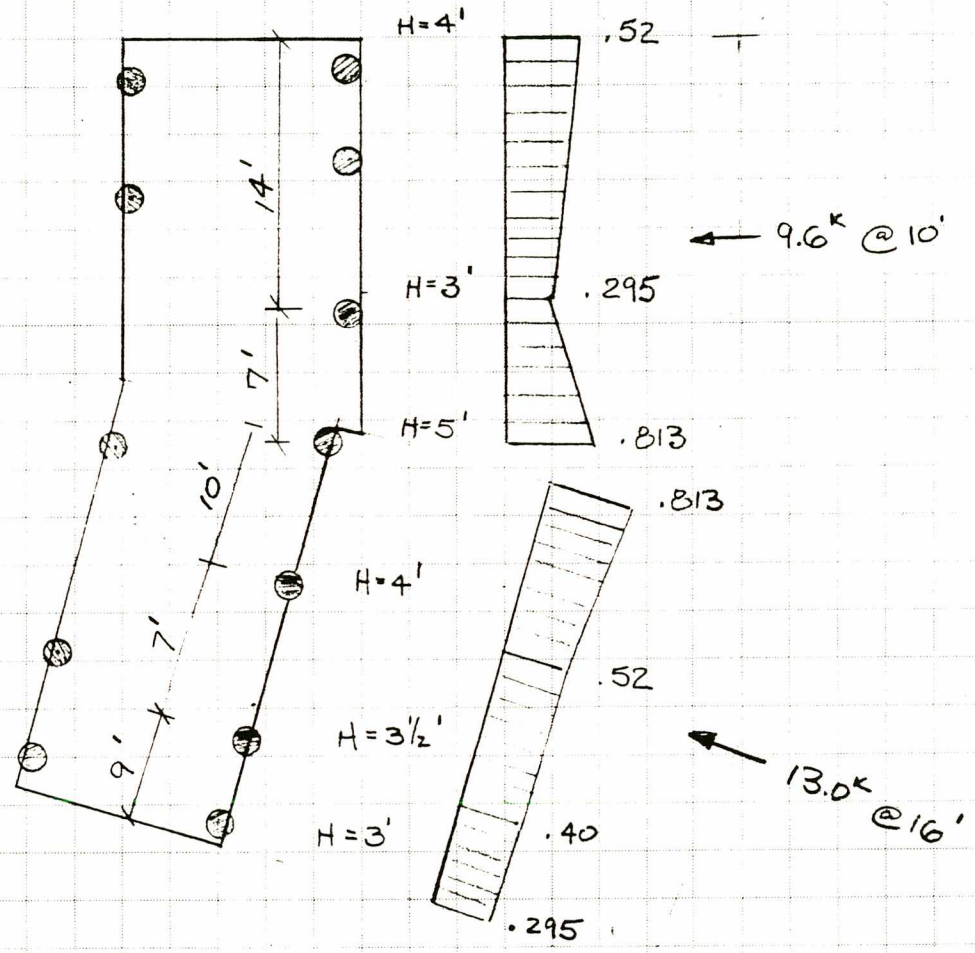
JOB 81-85 KITCHEN - LIVING RM
SHEET NO. FON 13 OF 34
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

FOUNDATION DESIGN



RETAINING WALL

SLIDING FORCE / FT

HEIGHT	F	As	P@TOE	As @4" (8' SPAN)
3'	.295	.03	.50 @ 2'	.38
3½	.400	.05	.51 @ 2.5'	
4	.520	.08	.34 @ 3'	
5	.813	.16	.37 @ 4'	
6	1.17	.28	.33 @ 5.5'	

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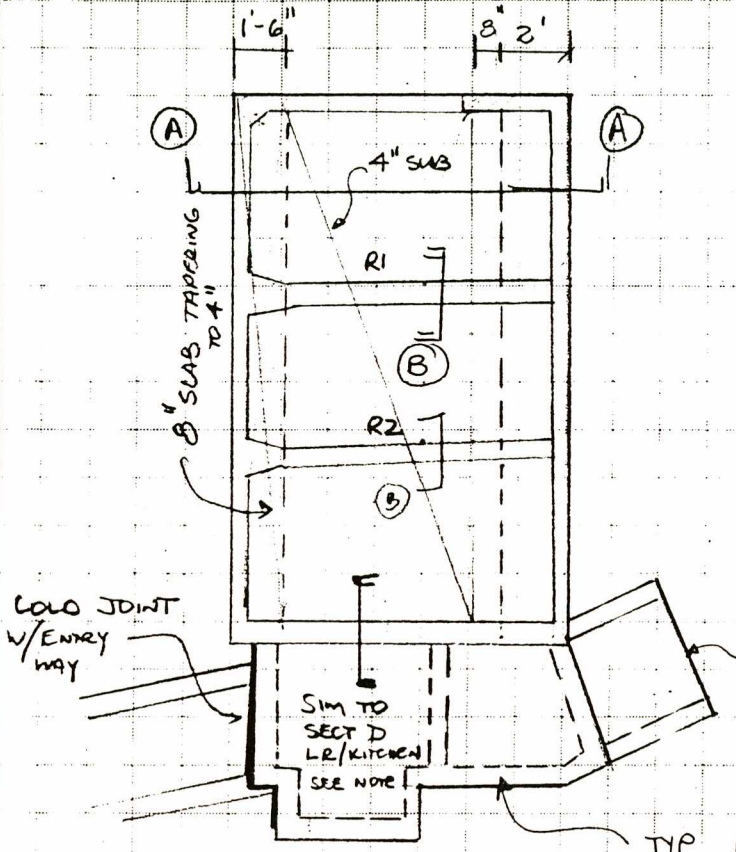
JOB BERRYESSA ESTATES 81-8
SHEET NO. FON 14 OF
CALCULATED BY DATE 35
CHECKED BY DATE
SCALE

STUDIO FOUNDATION

DESIGN REVIEW BASED ON DRAWING "B" - STUDIO FOUNDATION PLAN - AS SUPPLIED BY CENTER FOR ENVIROMENTAL STRUCTURE, ARCHITECTS, AND CONTRACTORS



SECTION (B) - SIMILAR TO LIVING RM KITCHEN SECTION (B)

SECTION (D) - SIM TO L.R. KITCHEN SECTION D W/ 2-#4 T & BOTT AND 1 #4 @ MID HEIGHT

RIB REINFORCING

	d	b	M_{ULT}	V_{ULT}	REINF. T & BOTT	ϕM_n	V_{CAP}	w/o WEB
R1	9"	7-10"	9.94 IK	4.6 K	3-#4 T & BOTT	10.3 IK	2.9	#3 @ 9" o.c.
R2	21"	7-10"	11.05 IK	6.6 K	2-#4 T & BOTT	24.6 IK	6.8 K	NONE

w_D = 38 psf
w_L = 40 psf
w_T = 78 psf

$w_D^{9\times7}$ = .083
$w_D^{21\times7}$ = .150

TRIB. AREA
$\frac{14'}{2} = 7$ $w_e = 7(.078) = .546$ k/ft + .083 + .150

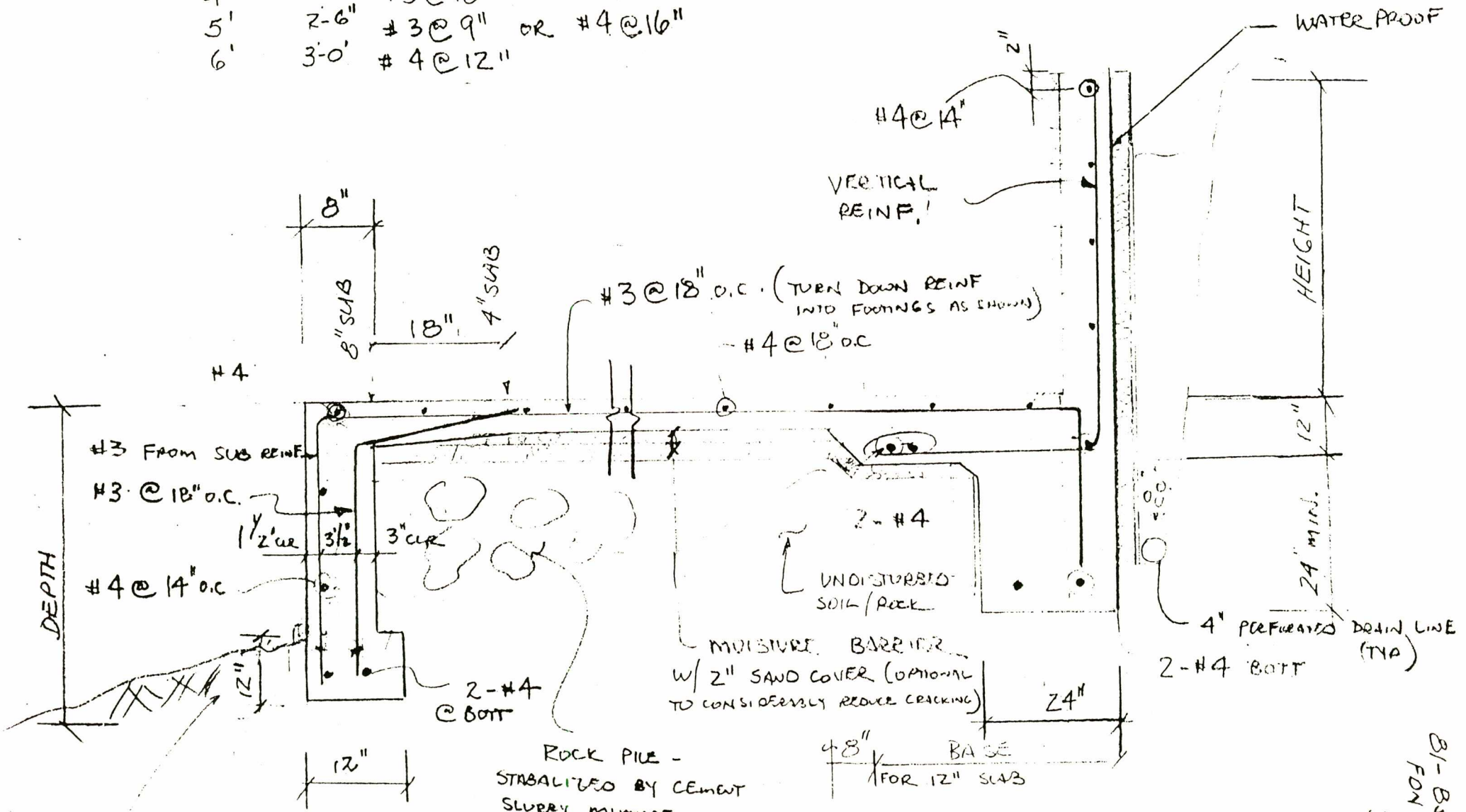
SPAN 9½'

$M = \frac{1}{8}(.546)(9.5)^2 = 6.2^{IK} + 1.1^{IK}\ (1.8^{IK})$
$M_{ULT} = 1.55 \times 6.2 = 8.54^{IK} + 1.4^{IK}\ (2.5^{IK})$
$V = 2.54^{K}$
$V_{ULT} = 1.55 \times 2.54 = 4.0^{K}$

SECTION A - STUDIO

REINF. SCHEDULE

HEIGHT	BASE	VERT. REINF
3'	2'-0"	#3@18"
4'	2'-0"	#3@18"
5'	2'-6"	#3@9" OR #4@16"
6'	3'-0"	#4@12"



NOTE:

FOOTINGS ARE NOT BOTTOMED AT THE MIN RECOMMENDED PENETRATION INTO BEDROCK.

B1-B5 FON 15 36

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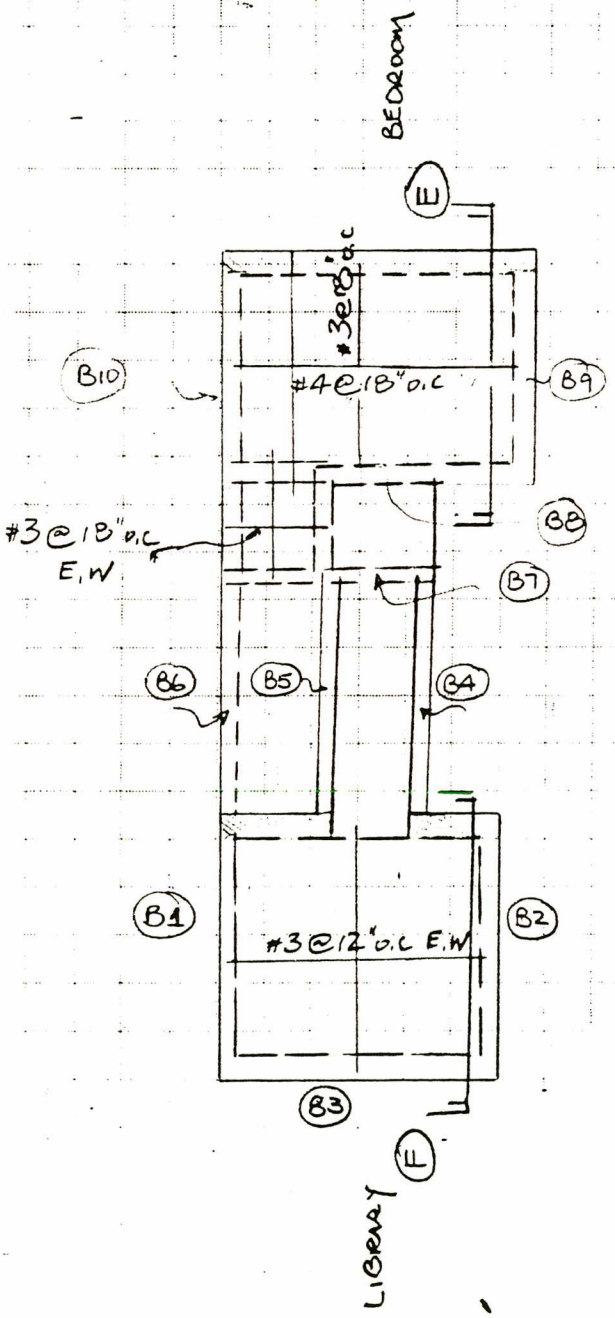
JOB DERYESSA ESTATES B1-B5
SHEET NO. FON 16 OF
CALCULATED BY DATE 37
CHECKED BY DATE
SCALE

BEDROOM - LIBRARY FOUNDATION

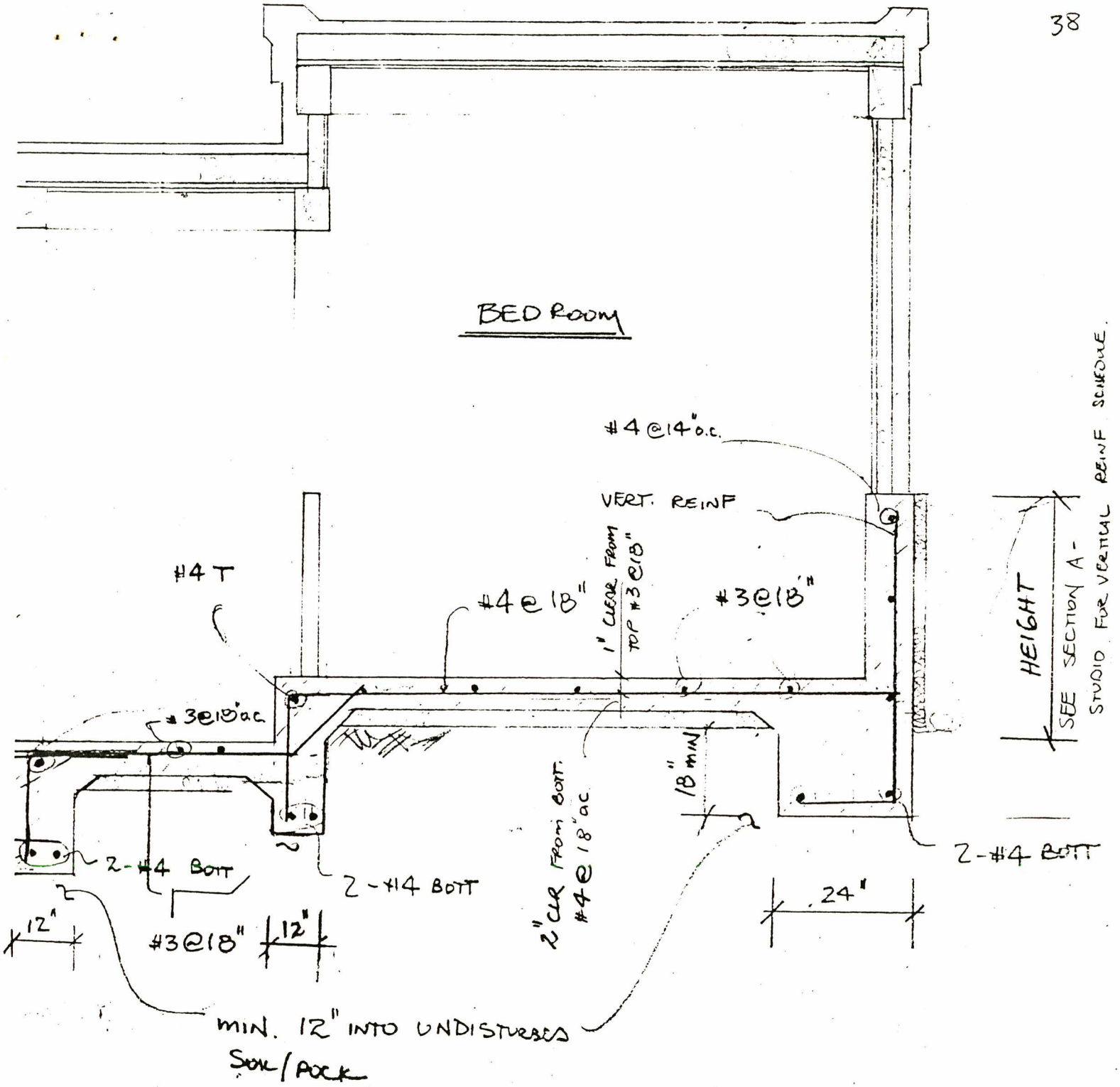
DESIGN REVIEW BASED ON DRAWING "C" - LIBRARY / BEDROOM FOUNDATION PLAN - AS SUPPLIED BY CENTER FOR ENVIRONMENTAL STRUCTURE, ARCHITECTS, AND CONTRACTORS



d = DISTANCE FROM FINISHED SURFACE TO STEEL (TYP)

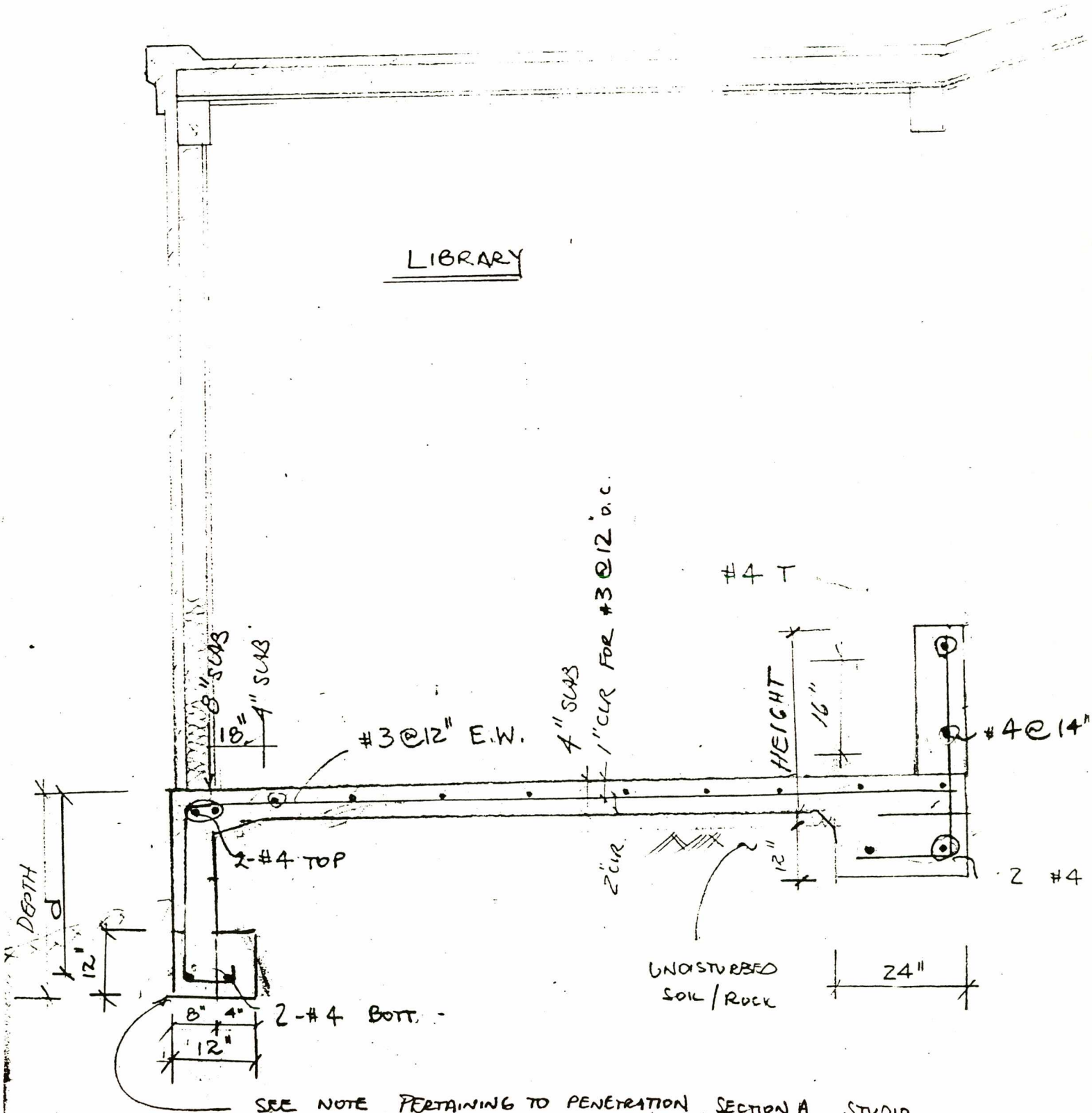
REINFORCING SCHEDULE

	d	b	TOP REINF	BOTT REINF
B1	24+8"	7"	2-#4 UP TO 14" 4 #4 @ 8'-14"	2-#4
B2	24	7"	2-#4	2-#4
B3	24+8"	7"	2-#4 UP TO 14" 4-#4 8" TO 14"	2-#4
B4	8"	9"	2-#4	2-#4
B5	8"	9"	2-#4	2-#4
B6	8"	9"	2-#4	2-#4
B7	24"	7"	1-#4	2-#4
B8	24"	7"	1-#4	2-#4
B9	12"	8"	2-#4	2-#4
B10	9"	8"	2-#4	2-#4



SECTION E - BEDROOM

SECTION F - LIBRARY



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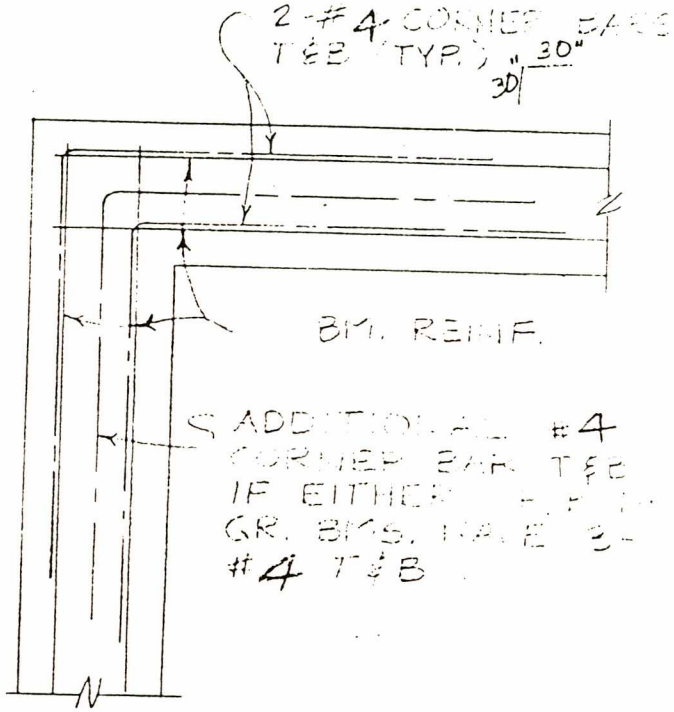
SHEET NO. BERRYESSA ESTATES OF 81-85
CALCULATED BY FON 19 DATE 40
CHECKED BY DATE
SCALE



TYP. CORNER DET.

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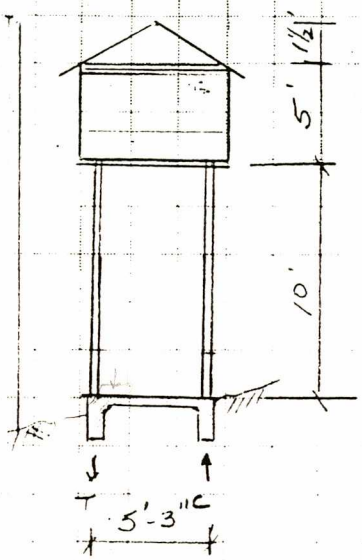
JOB ~~BERKESSIA ESTATES~~ 81-85
SHEET NO. FON 20 OF 41
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

TOWER FOUNDATION -



LOAD TO FOUNDATION / FT.

			D.L
ROOF :	$\frac{5\frac{1}{2}}{2} \times (16+15) =$	85	41
FLOORS	$3(\frac{5\frac{1}{2}}{2}) \times (40+15) =$	460	125
WALLS	$5 \times (.08) =$	~~40~~ ?	~~40~~
WALLS	$10 \times (44) =$	44	44
		629 lb/ft.	250 lb/ft
			608

WIND W_L = 20 psf

OVERTURNING MOMENT = $\frac{.020(16\frac{1}{2})^2}{2} = 2.72^{k}$

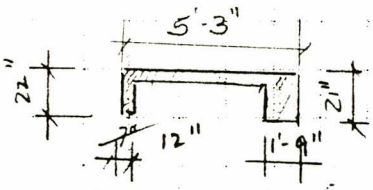
STABALIZING MOMENT = $\frac{1}{2}(.25)(5.3) = .66^{k}$ 1.59

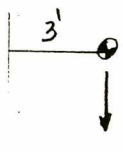
$T = C = \frac{2.72}{5} = 0.544^{k}$

0.629^{k}

$\Sigma\ 1.177^{k}$ N+L

FOUNDATION LOAD





$\frac{735}{144} \times .150 = .765^{k}/ft.$

FOUNDATION STAB MOMENT = $.765(2.25) = 1.72^{ik}$ $\Sigma = .66 + 1.72 = 2.38^{ik}$

NOT SATISFACTORY

INCREASE SLAB TO 7" $.765 \times \frac{924}{735} = .962(2.3) =$

SAY 10" SLAB $1.159(2A) = 2.78 + .66 = 3.44$ $\frac{3.44}{2.72} = 1.3$ LOW -

SAY 12" SLAB OK $\frac{1317}{144}(.150)(25) = 3.43 + .66 = 4.08$ $\frac{4.08}{2.72} = 1.5$ OK

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JOB CYPRESS A ESTATES 81-85
SHEET NO. FDN 22 OF 42
CALCULATED BY DATE
CHECKED BY DATE
SCALE

ISOLATED
SPREAD FOOTINGS - WORK SHOP & CARPORT

W_L = 20 psf
W_D = 15 psf
W_T = 35psf

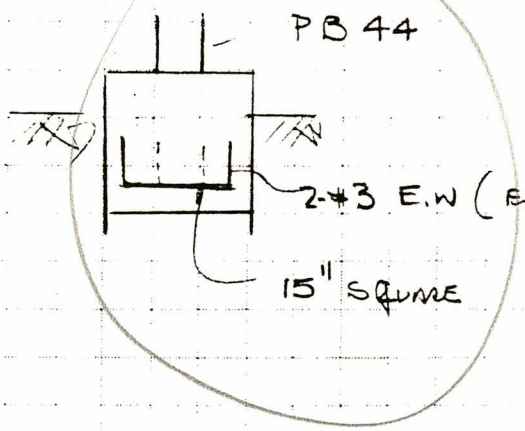
CARPORT FOOTING GOVERNS

TRIB. AREA = $6.6 \times \frac{12'}{2}$ = 40 sq. ft

LOAD TO COLUMN = 40 (35) = 1,400 #

MAKE FOOTING 15x15" = $\frac{225}{144}$ = 1.56 sq ft

$P_{\text{BEARING}} = \frac{1.4}{1.56} = .89 < 1^K$ OK



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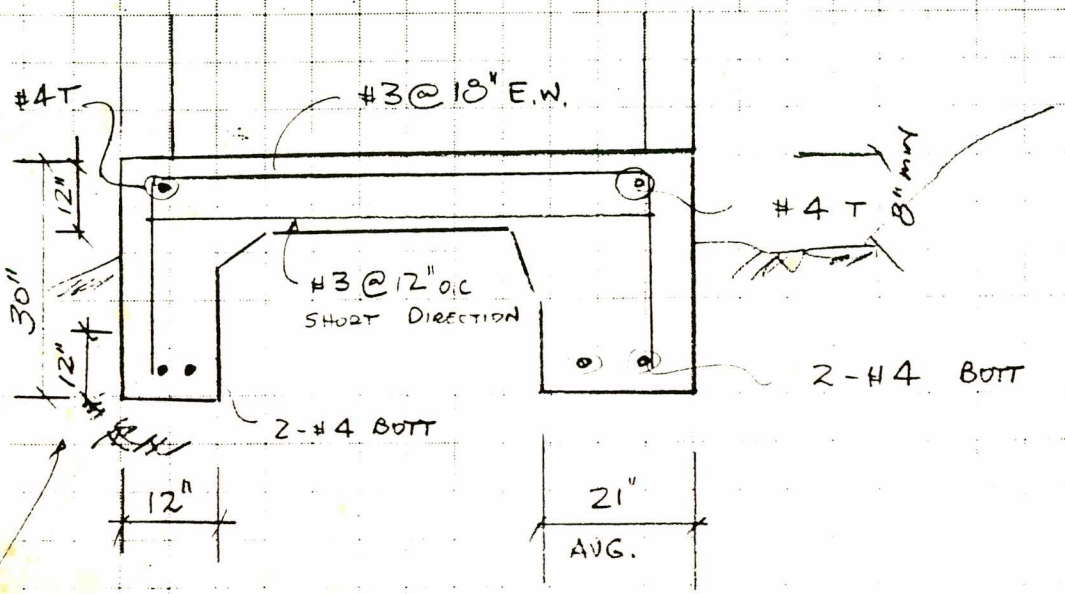
JOB ~~BERKESSA ESTATES~~ 81-85
SHEET NO. FON 21 OF
CALCULATED BY DATE A3/4
CHECKED BY DATE
SCALE

FOUNDATION - TOWER



FOOTINGS ARE TO BOTTOM 12" INTO TUFFACEOUS BEDROCK -

WHERE FOOTINGS ARE NOT BOTTOMED AT THE MIN. RECOMMENDED PENETRATION INTO BEDROCK, SOME HEAVE, SETTLEMENT OR LATERAL YIELDING SHOULD BE ANTICIPATED.