STATE OF MINNESOTA
BOARD OF ARCHITECTURE, ENGINEERING,
LAND SURVEYING, LANDSCAPE ARCHITECTURE, GEOSCIENCE
AND INTERIOR DESIGN

In the matter of
R. Arlen Heathman, PE
License Number 16177

STIPULATION AND ORDER

Board File No. 2006-0005

TO: R. Arlen Heathman, PE
SJS Engineering Inc.
6416 West River Road
Rochester, MN 55901

The Minnesota Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience and Interior Design ("Board") is authorized pursuant to Minnesota Statutes section 214.10 (2006) and Minnesota Statutes section 326.111(2006) to review complaints against architects, professional engineers, land surveyors, landscape architects, geoscientists, and certified interior designers, and to take disciplinary action whenever appropriate.

The Board received information concerning R. Arlen Heathman ("Respondent"). The Board's Complaint Committee ("Committee") reviewed the information. The parties have agreed that the matter may now be resolved by this Stipulation and Order.

STIPULATION

IT IS HEREBY AGREED by and between Respondent and the Committee as follows:

1. Jurisdiction. The Respondent has held a license to practice Professional Engineering from the Board since July 26, 1983. Respondent is subject to the jurisdiction of the Board with respect to the matters referred to in this Stipulation.

2. Facts. This Stipulation is based upon the following facts:

a. Respondent was retained by a contractor to consult about an attached residential garage that had been built at 863 Southern Ridge Drive SW, Rochester, Minnesota because the City of Rochester inspector identified an incorrectly constructed braced wall line that needed to be corrected. A true and correct copy of the building official's requirement to fix the brace wall is attached as Exhibit 1.

b. On June 29, 2005, Respondent and the City of Rochester's Manger of Building Inspection Services (the "Manager") had a telephone conversation concerning the requirements for alternate engineered designs for portions of light frame wood construction in the city. After this conversation, the Manager sent Respondent a follow up letter describing the city's requirements and stating, "Please be aware that we can not accept narrative design descriptions that appear to blend provisions from numerous sources, without providing substantiating calculations and specific design." A true and correct copy of the Manager's June 29, 2005 letter is attached as Exhibit 1.

c. Respondent prepared a July 26, 2005 submittal ("First Submittal") which was intended to address and correct the incorrectly constructed braced wall line at the residence identified in paragraph 2.a. above. The submittal was in the form of a letter to the contractor, certified by Respondent with his P.E. stamp, containing Respondent's design and described requirements for addressing the problems with the garage wall. A true and correct copy of Respondent's First Submittal is attached as Exhibit 2. The contractor transmitted Respondent's First Submittal to Rochester Building and Safety by facsimile transmission on July 26, 2005. A true and correct copy of the contractor's fax cover sheet is attached as Exhibit 3.

d. The Manager rejected Respondent's submitted design after consulting with the City's Plan Check Engineer. Per the Manager, Respondent's submitted design was rejected because he and the Rochester Plan Check Engineer determined it was incomplete and lacking adequate information to justify the design. These city officials also found that Respondent's submitted design was inconsistent with the applicable building code provisions. Finally, the Manager noted that Respondent's submittal did not include an acceptable equivalent design justifying it. A true and correct copy of the reasons for the Manager's rejection of Respondent's submittal is contained in the Manager's subsequent letter to the Board, dated July 29, 2005, a true and correct copy of which is attached as Exhibit 4.

e. The City notified the contractor that Respondent's submission had to be changed, and the contractor subsequently notified Respondent that his submission had not been accepted.

f. The Committee alleges that Respondent was negligent and did not meet the standard of care for professional engineering when he prepared his First Submittal for addressing the problems with the garage wall, dated July 26, 2005, because:

1. The construction details and specifications were provided in a descriptive text format instead of plans, diagrams and sketches, which are the customary format for such information;

2. Respondent's design consisted of limited notes on plan sheets and did not contain any structural details, such as showing and defining existing framing conditions, providing wood header details, detailing nailing requirements at the ends of the wall opening wood header and clarification details of the specified tie down anchorage system including specific bolting and/or nailing requirements to guide the contractor and to allow verification during construction by the Building Official.

Mr. Tim Saari's June 29, 2005 letter clearly indicated that narrative design descriptions can not be accepted without providing substantiating calculations and a specific design. See, Exhibit 1. Respondent failed to use reasonable care with the July 26, 2005 design submittal which used a narrative

description of the wall modifications without clearly identifying specific details of construction. The narrative, sketches and calculations submitted made it difficult for the Building Official to determine if the design complied with the intent of the MN State Building Code (MSBC) or met the requirements of the International Residential Code Section R301.1.2 Engineered Design.

Respondent's design was so inadequate and incomplete that it could not be used for construction and verification of design. The Respondent's July 26, 2005 submittal more closely resembles a preliminary design and concept narrative/sketch rather than a final certified design to be used for construction.

3. Respondent admitted in his July 15, 2007 letter to the Board that "a complete set of drawings was not performed." To meet the appropriate standard of care, Respondent should have stamped or written "preliminary" or "not for construction" on his First Submittal. A true and correct copy of Respondent's July 15, 2007 letter is attached hereto as Exhibit 5.

g. On July 28, 2005, Respondent sent a second letter to the builder, again certified by Respondent with his certified signature. This was Respondent's second design for the project (the "Second Submittal"). The second design contained different recommendations from those provided in the July 26, 2005 letter. A true and correct copy of Respondent's Second Submittal is attached as Exhibit 6.

h. The Committee alleges that Respondent was negligent and did not

meet the standard of care for professional engineering when he prepared his Second Submittal, for similar reasons as the First Submittal. In addition, the Second Submittal did not meet the standard of care for the following reasons:

1. The Second Submittal to the builder represents other options and comments which conclude with a recommendation. See, Exhibit 6. This narrative again is an overview of preliminary design and design development concepts which does not represent specific final design details appropriate to address the Building Official concerns.

2. On July 29, 2005, Respondent completed computer calculations for the design. The computer calculations indicate Respondent's apparent completion of his design and analysis work. See, Exhibit 7.

3. Based on the July 29, 2005 date printed at the top of Exhibit 7, the date of the computer calculations, the Respondent's July 26, 2005 and July 28, 2005 designs were prepared and submitted before the Respondent completed the design and analysis work.

4. Because the computer calculations were not completed until July 29, 2005, Respondent submitted an apparent incomplete and inadequate design lacking adequate justification for the Second Submittal.

5. Respondent inappropriately placed a certified signature on the Second Submittal dated July 28, 2005 prior to the analysis and design completion. The Second Submittal again represents a preliminary design and concept rather

than a final design for construction.

3. Violations. Respondent admits that the facts specified above constitute violations of Minnesota Statutes section 326.111 subdivision 4 (a) (3) (2006), and Minnesota Rules Chapter 1805.0200, subp. 4.D. (2007) and are sufficient grounds for the action specified below.

4. Enforcement Action. Respondent and the Committee agree that the Board should issue an Order in accordance with the following terms:

a. Reprimand. Respondent is reprimanded for the foregoing conduct.

b. Civil Penalty. Respondent shall pay to the Board a civil penalty of Three Thousand Dollars ($3,000.00). Respondent shall submit a civil penalty of Three Thousand Dollars ($3,000.00) by cashier's check or money order to the board within sixty (60) days of the Board's approval of this Stipulation and Order.

c. Additional Education. Respondent shall take ten (10) hours of live instruction on Minnesota Building Code Requirements and submit to the Board written documentation of successful completion of such instruction within twelve (12) months of the date the Board Chair signs this Order.

5. Additional Discipline for Violations of Order. If Respondent violates this Stipulation, Minnesota Statutes Chapter 326 (2006), or Minnesota Rules Chapter 1800 (2005) or Minnesota Rules Chapter 1805 (2007), the Board may impose additional discipline pursuant to the following procedure:

a. The Committee shall schedule a hearing before the Board. At least thirty (30) days prior to the hearing, the Committee shall mail Respondent a notice of the violation alleged by the Committee and of the time and place of the hearing. Within fourteen (14) days after the notice is mailed, Respondent shall submit a written response to the allegations. If Respondent does not submit a timely response to the Board, the allegations may be deemed admitted.

b. At the hearing before the Board, the Complaint Committee and Respondent may submit affidavits made on personal knowledge and argument based on the record in support of their positions. The evidentiary record before the Board shall be limited to such affidavits and this Stipulation and Order. Respondent waives a hearing before an administrative law judge and waives discovery, cross-examination of adverse witnesses, and other procedures governing administrative hearings or civil trials.

c. At the hearing, the Board will determine whether to impose additional disciplinary action, including additional conditions or limitations on Respondent's practice or suspension or revocation of Respondent's license.

6. Waiver of Respondent's Rights. For the purpose of this Stipulation, Respondent waives all procedures and proceedings before the Board to which Respondent may be entitled under the Minnesota and United States constitutions, statutes, or the rules of the Board, including the right to dispute the allegations against Respondent, to dispute the appropriateness of discipline in a contested case proceeding

pursuant to Minnesota Statutes Chapter 14 (2006), and to dispute the civil penalty imposed by this Agreement. Respondent agrees that upon the application of the Committee without notice to or an appearance by Respondent, the Board may issue an Order containing the enforcement action specified in paragraph 4 herein. Respondent waives the right to any judicial review of the Order by appeal, writ of certiorari, or otherwise.

7. Collection. In accordance with Minnesota Statutes section 16D.17 (2006), in the event this order becomes final and Respondent does not comply with the condition in paragraph 4(b) above, Respondent agrees that the Board may file and enforce the unpaid portion of the civil penalty as a judgment without further notice or additional proceedings.

8. Board Rejection of Stipulation and Order. In the event the Board in its discretion does not approve this Stipulation or a lesser remedy than specified herein, this Stipulation shall be null and void and shall not be used for any purpose by either party hereto. If this Stipulation is not approved and a contested case proceeding is initiated pursuant to Minnesota Statutes Chapter 14 (2006), Respondent agrees not to object to the Board's initiation of the proceedings and hearing the case on the basis that the Board has become disqualified due to its review and consideration of this Stipulation and the record.

9. Unrelated Violations. This settlement shall not in any way or manner limit or affect the authority of the Board to proceed against Respondent by initiating a

contested case hearing or by other appropriate means on the basis of any act, conduct, or admission of Respondent justifying disciplinary action which occurred before or after the date of this Stipulation and which is not directly related to the specific facts and circumstances set forth herein.

10. Record. The Stipulation, related investigative reports and other documents shall constitute the entire record of the proceedings herein upon which the Order is based. The investigative reports, other documents, or summaries thereof may be filed with the Board with this Stipulation.

11. Data Classification. Under the Minnesota Government Data Practices Act, this Stipulation is classified as public data upon its issuance by the Board. Minnesota Statutes Chapter 13.41, subdivision 5 (2006). All documents in the record shall maintain the data classification to which they are entitled under the Minnesota Government Data Practices Act, Minnesota Statutes Chapter 13 (2006). They shall not, to the extent they are not already public documents, become public merely because they are referenced herein. A summary of this Order will appear in the Board's newsletter. A summary will also be sent to the national discipline data bank pertaining to the practice of Professional Engineering.

12. Entire Agreement. Respondent has read, understood and agreed to this Stipulation and is freely and voluntarily signing it. The Stipulation contains the entire agreement between the parties hereto relating to the allegations referenced herein. Respondent is not relying on any other agreement or representations of any kind,

verbal or otherwise.

13. Counsel. Respondent is aware that he may choose to be represented by legal counsel in this matter. ~~Respondent knowingly waived legal representation.~~ I HAVE NOT WAIVED REPRESENTATION. RAH

14. Service. If approved by the Board, a copy of this Stipulation and Order shall be served personally or by first class mail on Respondent. The Order shall be effective and deemed issued when it is signed by the Chair of the Board.

RESPONDENT

R. Arlen Heathman, P.E.

Dated: 27 MAY, 2008

COMPLAINT COMMITTEE

By: Billie Lawton

Billie Lawton, Public Member,
Committee Chair

Dated: 5-29, 2008

ORDER

Upon consideration of the foregoing Stipulation and based upon all the files, records and proceedings herein, all terms of the Stipulation are approved and hereby issued as an Order of this Board on this the 12th day of June, 2008.

MINNESOTA BOARD OF
ARCHITECTURE, ENGINEERING,
LAND SURVEYING, LANDSCAPE
ARCHITECTURE, GEOSCIENCE AND
INTERIOR DESIGN

By: Duane A Blanck

Duane Blanck, Professional Engineer
Board Chair

ROCHESTER

Minnesota

BUILDING SAFETY DEPARTMENT
2122 Campus Drive S.E., Suite 300
Rochester, MN 55904-4744
(507) 281-6133
FAX (507) 287-2240
www.rochestermn.gov

June 29, 2005

Mr. R. Arlen Heathman, P.E.
SJS Engineering Incorporated
6416 West River Road
Rochester, MN 55901

Dear Mr. Heathman,

You asked me to follow up our conversation today with documentation of what the expectations of the Rochester Building Safety Department are regarding alternate engineered designs for portions of light-frame wood construction in the City of Rochester.

If a residential building is designed in accordance with the 2000 International Residential Code (IRC) and portions of that design will not comply with the conventional requirements of the code, those portions must be designed in accordance with IRC Section R301.1.2.

R301.1.2 Engineered Design. When a building of otherwise conventional light-frame construction contains structural elements not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of non-conventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system.

The two major design features that we typically see not meeting these conventional requirements are inadequate designs for wall bracing in accordance with IRC Section R602.10 and wall framing elements in excess of the height and spacing limitations of IRC Section R602.3.1 and Table R602.3 (5).

There are many acceptable alternatives to these requirements, which are either recognized by model codes, or meet the definition of accepted engineering practice.

Submitted designs that meet the requirements of the 2000 International Building Code (IBC) Section 2305, and include complete construction details, will be accepted. There needs to be a sufficient amount of information in those designs to guide the contractor during construction, and to provide a specific design that can be verified during the inspection process by this department.

There are also numerous pre-engineered systems available to deal with either of these concerns such as, Simpson Strong-Brace™ Wall or Trus Joist MacMillan's Timberstrand LSL studs. Any product that has gone through an accepted evaluation process, as the products mentioned above have, will be accepted as an alternate design.

EXHIBIT 1, pg. 1

We also recognize and accept the most current version of the APA Narrow Brace Wall Method as it has been recognized by the International Code Council and will become part of the 2006 International Residential Code when printed. We are able to approve this design under Minnesota State Building Code Chapter 1300.0110 Subp. 13. *Alternative materials, design, and methods of construction and equipment. The code is not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by the code, provided that any alternative has been approved. An alternative material, design, or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the code, and that the material, method, or work offered is, for the purpose intended, at least the equivalent of that prescribed in the code in quality, strength, effectiveness, fire resistance, durability, and safety. The details of any action granting approval of an alternate shall be recorded and entered in the files of the code enforcement agency.*

Please be aware that we can not accept narrative design descriptions that appear to blend provisions from numerous sources, without providing substantiating calculations and a specific design.

I hope this letter has served to clarify our expectations, and to make it understandable and concise for all parties involved in this process. If these design decisions are made early in the planning stages, they are fairly easy to deal with and to achieve code compliance.

I would welcome your cooperation in helping us make this process successful.

Please call me if you have further questions.

Sincerely,

Tim Saari
Manager of Building Inspection Services
507.281.6125
tsaari@ci.rochester.mn.us

EXHIBIT 1, pg. 2

ENGINEERING
incorporated

5416 West River Road NW • Rochester, Minnesota 55901
Phone: (507) 280-7808

26 July 2005

Mr. Les Radcliffe
Radcliffe Homes, Inc.
6885 County Road 6 S.W.
Stewartville, Minnesota 55976

Re: 863 Southern Ridge Drive S.W.- Garage Door Walls

Mr. Radcliffe,

I have reviewed the information given to me on the drawings and thru our phone conversations about the garage wall which includes the two overhead doors. Based on the information at hand and the Code requirements for braced walls I have the following comments:

1. The front and rear wall of the garage may be used as shear walls for a wind that blows lateral to the garage. In this case the door side of the garage has only short walls each side of the doors to carry the loads to the foundation. The simplest modification is to check the panels for shear and construct as per the following and as per the enclosed noted sketch.
2. The headers were analyzed as wind collectors and found to be adequate as sized. They do not need to be extended to the corners of the garage as that would create a hinge in the wall constructed as such.
3. The vertical column on either side of both doors must be at least a double 2 x member. This would probably be the normal construction anyway. Two members are required, more may be placed. At least one of the members is to be installed from the bottom to the top plates as balloon framing.
4. On one side of this double or more vertical column at the four door side locations install a Simpson HD2A tie down or a UPS KST224 strap type tie down with at least 3 each 10d nails at the plate and 3 each 10d nails on the vertical 2 x column. This is in addition to your normal toe-nailing schedule.
5. The OSB sheathing for the garage wall with the doors is to be nailed using 8d nails at 6 inches on center at sheathing perimeters and 12 inches on center at the intermediate stud locations.
6. The roof sheathing nailing requirements have no special nailing schedule beyond that listed in Table R602.3 for roof sheathing attachment under the IRC.

To summarize, the nailing requirements and the tie-downs are the modifications that need to be made for this garage door wall only. All other framing is standard construction under the current building code. If there are questions and/or comments about the above or the enclosed please refer them to my office.

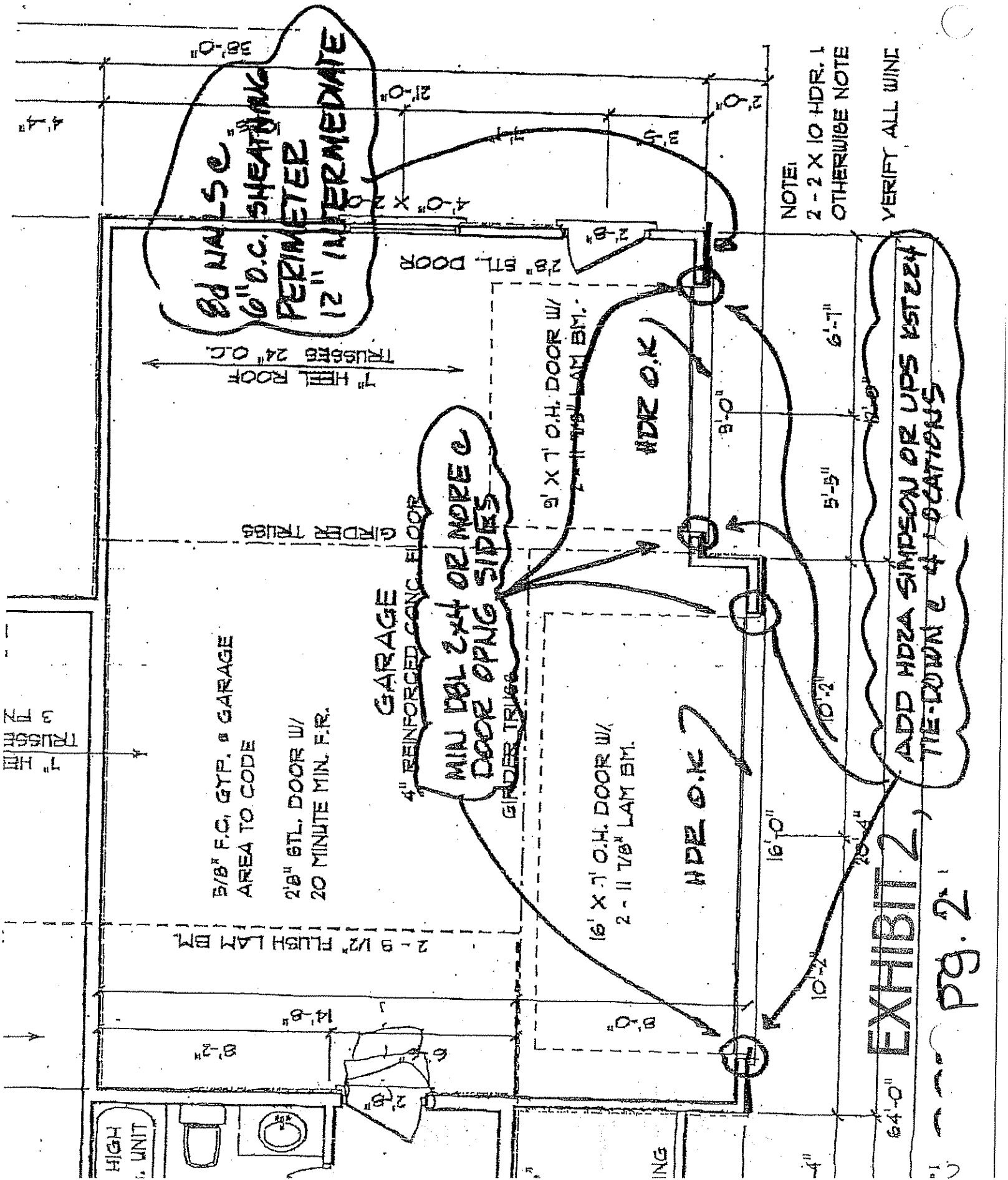
Sincerely,

R. Arlen Heathman
Structural Engineer

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

REG. NO. 18177 DATE 26 Jul 05

EXHIBIT 2, PG 1


8d NAILS @ 6" O.C. SHEATHING PERIMETER 12" INTERMEDIATE
NOTE: 2 - 2 X 10 HDR. UNLESS OTHERWISE NOTE
VERIFY ALL WINDOW
ADD HDZA SIMPSON OR UPS MST224 TIE-DOWN @ 4 LOCATIONS
HDR O.K.
HDR O.K.
MIN DBL 2x4 OR MORE @ DOOR OPNG SIDES
GARAGE
4" REINFORCED CONC. FLOOR
GIRDER TRUSS
GIRDER TRUSS
1" HEEL ROOF TRUSSES 24" O.C.
2'8" STL. DOOR
2'8" STL. DOOR W/ 20 MINUTE MIN. F.R.
3/8" F.C. GYP. @ GARAGE AREA TO CODE
16' X 7' O.H. DOOR W/ 2 - 11 7/8" LAM BM.
9' X 7' O.H. DOOR W/ 2 - 11 7/8" LAM BM.
2 - 9 1/2" FLUSH LAM BM.
HIGH UNIT
64'-0"
38'-0"
21'-0"
16'-0"
14'-8"
8'-0"
6'-7"
5'-5"
EXHIBIT 2
pg. 2

CJS ENGINEERING incorporated

ENGINEERING DEPT.

PAGE 1

CLIENT RADCLIFFE

FILE 05-066

PROJECT 863 SO. RIDGE DR.

DATE JUL 2005

WIND TO STRUCTURE

10½' WALLS ±

@ 6/12 21' + 2' = 23' = 5.75' RISE + 0.4

5.75(½)23' = 66.1 FT²

6/12 · 32.33' = RISE = 6.77'

6.77'(11.5'/2) + 3.04(.5)1.52 = 41.2 FT²

(6.77 - 5.25') = 1.52'/6 - 4/12

(19 - 11.5/12)6 = 3.75' RISE (11.5)/2 = 21.6

5.75(11.5)(.5) = 33.1

TOTAL ROOF SF = 162 FT²

½ WALL = 23(5.25) = 120.75

TOTAL = 282.75 ~ 283

49.6 × 283 = 5541.9# ½ D FRT

2771#/32.33' = 85.7 PLF ON ROOF

EXHIBIT 2, pg 3.

JGINEERING
corporated

ENGINEERING DEPT.

PAGE 2

CLIENT RADCLIFFE

FILE 05-018

PROJECT 863 SO. RIDGE DR.

DATE JUL 2005

COLLECTORS.

85.7(9')/2(1 3/4)11 7/8 = 19 PSI
O.K BY INSPECTION

85.7(10')/2(1 3/4)(11 7/8) = 33 PSI
O.K BY INSPECTION

BOTH BEFORE 1.6 INC.

STUDS & 1

85.7(10) 7'/16 = 599.9 ~600#/1.33 = 451#

Hold ~ 50#/TOENAIL.

2x6
451/1.5(5.5) = 55 PSI TOP C
O.K BY INSPECTION.

2x6 UNDER.
2x4
451/1.5(3.5) = 86 PSI TOP C

/2 = 43 PSI TOP C.

DBL 2x4 @ SIDES TIE-DOWN
HDZ4 OR UPS EST 224

451 - 4(50) = 251# - 3 hdrs 10d.

2771/7.33/1.33 = 284 PLF SHEATHING
6" O.C. 8d blocked edge

EXHIBIT 2, pg. 2.

FACSIMILIE COVER SHEET

Radcliffe Homes, Inc.
6885 County Road 6 SW
Stewartville, MN 55976

Phone Number: 1-507-533-8295
Fax Number: 1-507-533-7865

SEND TO: ROCH BLD & SAFTY	Date: 7-26-05
Attention:	
Fax Number: 287 - 2240	Total pages, including cover sheet: 5

☐ Urgent ☐ Reply ASAP ☐ Please Comment ☐ Please Review ☐ For your Information

COMMENTS:

ENGINEERING FOR 863 SOUTHERN RIDGE DRIVE SW
HEADER DID NOT EXTEND WALL TO WALL
FRAMING INSPECTION CALLED OUT TO BE CHANGED
OR HAVE IT ENGINEERED
PLEASE SEE ATTACHED ENGINEERING AND
ADVISE IF ACCEPTABLE

THANKS

TIM,
REVIEW SUBMITTED ENGINEERING AND CALL BUILDER BACK. BUILDER WANTS TO KNOW IF ENGINEERING IS ACCEPTABLE.

MIKE

EXHIBIT 3

RECEIVED

AUG - 3 2005

ROCHESTER

Minnesota

BUILDING SAFETY DEPARTMENT
2122 Campus Drive S.E., Suite 300
Rochester, MN 55904-4744
(507) 281-6133
FAX (507) 287-2240
www.rochestermn.gov

July 29, 2005

Patricia Munkel-Olson
Investigator
Minnesota Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience & Interior Design
85 East 7th Place – Suite 160
Saint Paul, MN 55101

Dear Patricia,

I am forwarding you a design that was submitted to the City of Rochester Building Safety Department by:

Mr. R. Arlen Heathman, P.E.
SJS Engineering Incorporated
6416 West River Road
Rochester, MN 55901

This submittal was an attempt to address an incorrectly constructed braced wall line per the submitted and approved APA Narrow Braced Wall Method. Upon review by Randy Johnson, Plan Check Engineer and me, we concurred that the submitted design did not provide adequate information to justify the design. We also felt that the submittal did not provide for a complete design in accordance with IRC Section R301.1.2, or an equivalent design in accordance with Minnesota State Building Code Chapter 1300.0110 Subp. 13. *Alternative materials, design, and methods of construction and equipment.*

We are requesting that the board review this submittal for compliance with the Minnesota Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience & Interior Design rules and for professional competency. Upon completion of that review we would appreciate a determination be sent to us for our records.

Thank you for your attention to this matter and please call me if you have questions, or need additional information.

Sincerely,

Tim Saari
Manager of Building Inspection Services
507.281.6125
tsaari@ci.rochester.mn.us

Attachments

CC: Dan Kelsey, Structural Engineer, Minnesota Building Codes and Standards Division

EXHIBIT 4

ENGINEERING
incorporated

6416 West River Road NW • Rochester, Minnesota 55901
Phone: (507) 280-7808

JUL 18 2007

15 July 2007

Ms. Patricia J. Litchy, J.D.
Minnesota Board of AELSLAGID
85 East 7th Place
Suite 160
St. Paul, Minnesota 55101

Re: File no. 2006-0005

Ms. Litchy,

The enclosed documents, copies of which you sent to me were submitted to the Rochester Building Safety Department by a contractor who is a long time client of mine, Mr. Les Radcliffe. The documents copied to me however are incomplete and do not include all the engineering that was accomplished for this project. Per your itemized list I will try to answer as completely as I can the items outlined in your letter of 17 April 2007.

Item no. 1 – a complete set of drawings was not performed. The engineering was withdrawn before any further submittals were made. The letter to Mr. Radcliffe dated 4 August 2005 from Mr. Saari was never received at my office. Such correspondence would be in the file. I did know from Mr. Radcliffe that my submittal was being discussed and that probably would not be accepted. By joint agreement between myself and Mr. Radcliffe, it was decided rather than delay the project that he would try getting this through the local code jurisdiction using another engineer, which he did.
Item no. 2 – I was hired to perform an engineering analysis for the garage door wall and the modifications if any to the existing in place structure. The engineering was submitted, refused, and discarded. I withdrew from the project and the garage structure braced wall issue was resubmitted by another licensed engineer.
Item no. 3 – I will add the pages submitted that you do not have and another letter dated 28 July 05, that was missing from the documents you sent me.
Item no. 4 – The items enclosed or in your possession constitute the depth of the engineering performed. It was never completed as noted above.
Item no. 5 – Please note the enclosed and the documents you have in hand.
Item no. 6 – No changes were made based on any engineering I performed for the project. Other engineering was submitted. I can only assume that any modifications were based on that submittal.
Item no. 7 – As I was not the engineer of record for what was changed or modified, no corrections were made that I have knowledge of.

While I do not wish comparisons between engineering companies I am enclosing a letter that was passed around by the contractors, given to me by another client and asked if it could be used in other projects. My response to this client was that I can't use the document for any purpose other than maybe reference to read. There were no computations performed, nor any drawings submitted for what appears to be a similar braced wall type issue and there were no questions and/or comments that came back according to my information. Duffy Engineering is a reputable

EXHIBIT 5, pg. 1

5

firm and my only point is to show the difference in submittals that one engineer has to provide vs. other engineers to the Rochester Building Safety Department for acceptance in similar issues.

I do have a copy in my file of a letter dated 29 June, 2005 written to me by Mr. Saari. By the time it arrived, I was off this particular project and on to another. I never responded to Mr. Saari's letter as I had no further involvement on the project. Mr. Radcliffe had already hired another engineer for the purposes of obtaining permission to continue the already framed garage. I have performed a dozen or more engineering analyses and submittals since this date in 2005 on similar issues of braced wall theory. Some have required a question answered or a clarification but in all cases were accepted and the structures built and performing as designed under the current Minnesota State Building Code.

The Board has my permission if it wishes to talk with Mr. Radcliffe. His phone number is (507) 533-8295 in Stewartville, Minnesota. The other engineer whose submittal was used was Mr. Jeffrey H. Gisi, P.E. His phone number is (507) 529-5303. He is a professional colleague located also in Rochester, Minnesota.

I appreciate the Board's patience and the information sent to me. It is unclear why this particular project was under scrutiny when the engineering performed was withdrawn and not used, and since this time a number of braced wall designs have been analyzed, performed, and reviewed without such scrutiny and apparently to the satisfaction of the Rochester Building Safety Department.

Sincerely,

R. Arlen Heathman, P.E.
SJS Engineering, Inc.

EXHIBIT 5, pg. 2

ENGINEERING
incorporated

6416 West River Road NW • Rochester, Minnesota 55901
Phone: (507) 280-7808

28 July 2005

Mr. Les Radcliffe
Radcliffe Homes, Inc.
6885 County road 6 S.W.
Stewartville, Minnesota 55976

Re: 863 Southern Ridge Drive S.W. – Braced Walls at Garage

Mr. Radcliffe,

Based on my most recent conversation with the Building Safety Department it is my understanding that they have some criticism of the "math" used in the design of the walls for the above garage. Based on what little information I could obtain and without having any correction letter which may or may not be forthcoming, I have decided to look at your garage wall from three different points of view, all of which are based on engineering principles used for any structure. I have the following comments:

1. The garage wall with the doors can be viewed as a **perforated wall panel**. Based on the numbers using either the shear load ratio definition or the perforated total shear on the wall using a opening adjustment factor yields basically the same resulting framing. The wall panels on the garage door wall are to be sheathed with 7/16 minimum OSB or plywood and the nailing pattern to be 8d nails at 4 inches on sheathing perimeter and 12 inches on intermediate framing members. This sheathing must be on both the outside and the interior of the walls for the garage wall with the overhead doors. The extreme corner columns at the end of the 32'-4" wall are to have a Simpson type HD-2A tie down installed on the corner column. No other tie-downs are needed. The corner columns must be a double 2 x 4 minimum.
2. The garage wall can be viewed as a **conventional shear wall** with actually 4 full length panels although the wall on the interior side of the 16 foot door and the 9 foot door at the jog can be assumed to be acting as one width panel. This method also requires the wall to be sheathed with 7/16 minimum sheathing and the nailing pattern as per above on one side of the wall only. Tie-downs are required however at the sides of each full length panel which means both sides of each door and at the corners also. The tie downs should be capable of carrying approximately 2582 lbs of vertical tension assuming you use 16d toe-nails, minimum of 4 each per stud member in addition at the bottom of the columns either side of the doors and the corners of the garage.
3. In both cases above, the collectors or headers sized above the door are adequate as shown. The jack columns on either side of the doors should be 3 each 2 x 4's at the 9 foot door which is carrying roof trusses and 2 each 2 x 4's at the 16 foot door which is a gable type end. At least one of the plies is to extend beyond the header from the bottom plate to the top plate of the wall.
4. The third evaluation of the wall would be to consider the garage as **an open sided structure** with only three walls, both side walls and the back wall with the door side wall being the open side. This design is based on requirements in section 2305 of the IBC. The aspect ratio of L/W is less than one which most attached garages are and the depth is

EXHIBIT 6, pg. 1

less than 25 feet. Based on this analysis, the roof sheathing will carry the total shear of wind on the garage to the back wall of the garage. The roof sheathing should be attached using 8d nails at 6 inches on sheathing edges and 12 inches on intermediate truss framing unblocked. The wall on the rear of the garage shall be standard framing using studs at 16 inches on center and the sheathing may be 5/8 gypsum as shown on the drawings for the entire length of the inside of the back wall. In lieu of the gypsum the 13 foot of wall extending outside the residence can be sheathed on one side using 7/16 inch OSB with 8d nails at 4 inches on center on panel edges and 12 inches on panel intermediate framing. The door side wall would not require any modification to the standard framing details normally used per Code sections. See Table R502.5 for header support and Section R602 for standard wall framing details and connections.

The use of the APA standard detail for narrow walls cannot be used with the header at the top of the overhead doors as it creates a hinge effect if the header is extended beyond the doors as shown to the corner or jog in the garage wall. This detail is also based on test results rather than a detailed mathematical analysis. It is not a Minnesota Code adopted detail at this time. It is being accepted by the local code jurisdiction as an alternative framing method for narrow walls.

It is my recommendation that the structure be viewed as an open front structure. This requires the least modification to a structure in place and has been allowed on previous residential projects in the City of Rochester.

Questions and/or comments should be referred to my office.

Sincerely,

R. Arlen Heathman, P.E.
Structural Engineer

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

REG. NO. 16177 DATE 28 Feb 05

EXHIBIT 6, pg. 2

ENGINEERING
incorporated

ENGINEERING DEPT.

PAGE 1

CLIENT BADCLIFFE

FILE 05-068

DATE JULY 2005

PROJECT 863 SO. RIDGE RD.

PERFORATED.

$q = 175 / 10.5(32.33') = .516$

$\beta = \frac{32.33 - 14' - 9'}{32.33} = .226$

$r = \frac{1}{\left(1 + \frac{q}{\beta}\right)} = .304/6$

$F = r/3 - 2r = .127 \times 270(32.33) = 1109 \times 2 = 2218$ (Ed @ 6")
$\times 290(\text{"}) = 1190 \times 2 = 2380$ (2d)

SHEAR CAPACITY OF SHEATHING, NAILED @ 6" P. 12" E
= 270 6d NAILS @ 4" = 360 $\times 2 = 2956$#

% FULL HT SHEATHING = 22.6%
54/6 - 8'-4" DOORS 10' WALL

EFF. SHEAR CAPACITY .45 54/6 = 8'-4"
.36 FULL HEIGHT
.56 24/3 = 6'-8" .50 REASONABLE

$V_p = .50\left(\frac{270}{360}\right) 7.53' = 990$#
$= 1319$# $\times 2 = 2638$#
95% O.K.

$2771(10.5') / 32.33' = 900$# UP OR
LHT @ ENDS.

TIE-DOWN @ CORNERS.

EXHIBIT 6, pg. 3

CONVENTIONAL SHEAR WALLS.

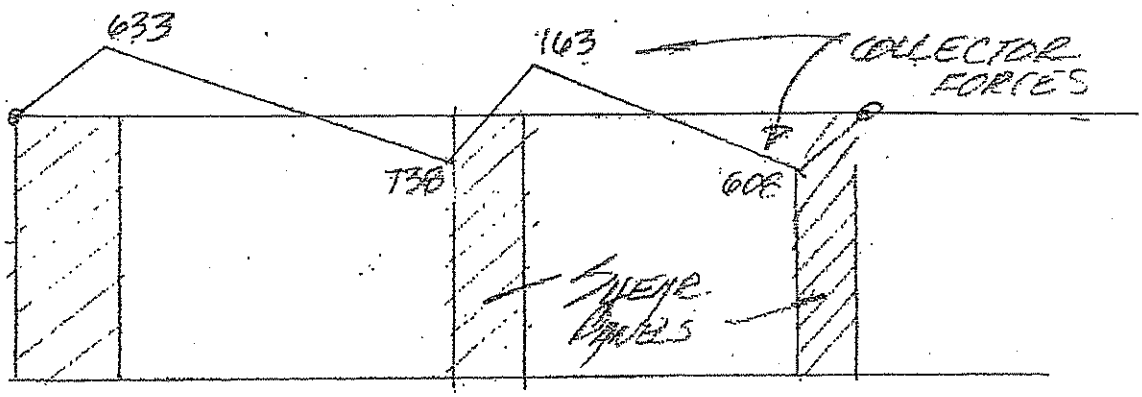
TOTAL SHEAR = 2771# 1/2 TOTAL. 65.7 PLF

UNIT = 2771/7.33' = 378 PLF - FULL HT PANELS

378(2.165') = 818#
SIDES OF BIG DOOR (18')

818(10.5)/2.165 = 3967#

2.165' 2.165' .92' 2.08' = 7.33'



378 - 65.7 = 292.3 × PANEL WIDTH.

MAX COLLECTOR = 736/2(1.75)11 7/8 = 18 PSI O.K.

818# 1166# 786# = 2770#

EXHIBIT 6, pg. 4.

NGINEERING
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ENGINEERING DEPT.

PAGE 3

FILE 05-068

DATE JUL 2005

CLIENT RADCLIFFE

PROJECT 863 So. RIDGE DR.

TIE-DOWNS.

370(2.105) = 618# × 10.5/2.105
= 1166# 10.5/3.085
= 786# 10.5/2.06

= 3967
"
"
/1.33 = 2982# w/4 × 2 × 50 TOE-NAILS. ~400#

370/1.33 = 284 PLF

2562# — USE!

4054 = 3705# ×
3967 - 400 = 3567#

425 TSPF#2 × 2 × 1.5 (3.5) = 4462.5# O.K.
TAKES 1-2×4 IN TENSION w/ INC.

COLUMNS & DOORS.

3967# W.L.
S.L. @ 9' DR — 3622.5# 23'(35 PSF)(4.5')
DL. @ 9' DR — 1552.5#

16' DOOR - GABLE END
3-2×4 COL. @ DOOR SIDES 9' DR.
2-@ 16' DR.

EXHIBIT 6, pg. 5

WoodWorks® Sizer SOFTWARE FOR WOOD DESIGN

July 29, 2005 15:31:29

WoodWorks® Sizer 2000d

Column1

COMPANY | PROJECT

DESIGN RESULTS - NDS-1997

Column DESIGN DATA:

Type: Pinned base; Loadface = width(b)
Material: Lumber n-ply Built-up fastener: nails;
Ke x Lb: 1.00 x 0.00= 0.00 [ft];
Ke x Ld: 1.00 x 10.00= 10.00 [ft];
Total length: 10.00 [ft]
Repetitive factor: applied where permitted(refer to online help);
Load Combinations: ASCE 7-95

LOADS: (force=lbs, pressure=psf, udl=plf, location=ft)
>>Self-weight of members has NOT been included<<

Load	Type	Distribution	Magnitude Start	Magnitude End	Location Start	Location End	Pattern Load
1	Wind	Axial	-3967	(Eccentricity =	0.0 in)		

SUGGESTED SECTIONS that PASSED the CODE CHECK:

	Species Grade	ply-bxd in	Axial ft/Ft'	Bending fb/Fb'	Comb'd	Shear fv/Fv'	Disp./ Allow.
1	S-P-F No.1/No.2	1- 2x4	0.70				

>>For more detailed output, select a Suggested Section from the Data Bar.<<

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.

TENSION
W.L.
MAX

EXHIBIT 7, pg. 1

WoodWorks® Sizer SOFTWARE FOR WOOD DESIGN

July 29, 2005 15:35:48

WoodWorks® Sizer 2000d

Column1

COMPANY | PROJECT

DESIGN RESULTS - NDS-1997

Column DESIGN DATA:

Type: Pinned base; Loadface = width(b)
Material: Lumber n-ply Built-up fastener: nails;
Ke x Lb: 1.00 x 0.00= 0.00 [ft];
Ke x Ld: 1.00 x 7.00= 7.00 [ft];
Total length: 10.00 [ft]
Repetitive factor: applied where permitted(refer to online help);
Load Combinations: ASCE 7-95

LOADS: (force=lbs, pressure=psf, udl=plf, location=ft)
>>Self-weight of members has NOT been included<<

Load	Type	Distribution	Magnitude Start	Magnitude End	Location Start	Location End	Pattern Load
1	Wind	Axial	3967	(Eccentricity =	0.0 in)		
2	Dead	Axial	1552	(Eccentricity =	0.0 in)		
3	Snow	Axial	3622	(Eccentricity =	0.0 in)		

SUGGESTED SECTIONS that PASSED the CODE CHECK:

	Species Grade	ply-bxd in	Axial fc/Fc'	Bending fb/Fb'	Comb'd	Shear fv/Fv'	Disp./ Allow.
1	S-P-F No.1/No.2	3- 2x4	0.69				

>>For more detailed output, select a Suggested Section from the Data Bar.<<

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.

EXHIBIT 7, pg. 2

WoodWorks® SOFTWARE FOR WOOD DESIGN	COMPANY	PROJECT
	July 29, 2005 15:36:56	Column1

Design Check Calculation Sheet

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
1	Wind	Axial	3967	(Eccentricity =		0.0 in)	
2	Dead	Axial	1552	(Eccentricity =		0.0 in)	
3	Snow	Axial	3622	(Eccentricity =		0.0 in)	

MAXIMUM REACTIONS (lbs):

Lumber n-ply, S-P-F, No.1/No.2, 2x4", 3-Plys

Pinned base; Loadface = width(b); Built-up fastener: nails; Ke x Lb: 1.00 x 0.00= 0.00 [ft]; Ke x Ld: 1.00 x 7.00= 7.00 [ft]; Repetitive factor: applied where permitted(refer to online help); Load combinations: ASCE 7-95

SECTION vs. DESIGN CODE NDS-1997: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Axial	fc = 460	Fc' = 669	fc/Fc' = 0.69
Axial Bearing	fg = 460	Fg' = 2256	fg/Fg' = 0.20

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	CV	Cfu	Cr	LC#
Fc' =	1150	1.60	1.00	1.00		1.15	(Cp = 0.316)			3
E' =	1.4 million		1.00	1.00						0
Fg' =	1410	1.60		1.00						3

Axial : LC# 3 = D+.75(S+W), P = 7245 lbs Kf = 1.00
(D=dead L=live S=snow W=wind I=impact C=construction)
(All LC's are listed in the Analysis output)

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. BUILT-UP COLUMNS: nailed or bolted built-up columns shall conform to the provisions of NDS Clause 15.3.

EXHIBIT 7, pg. 3