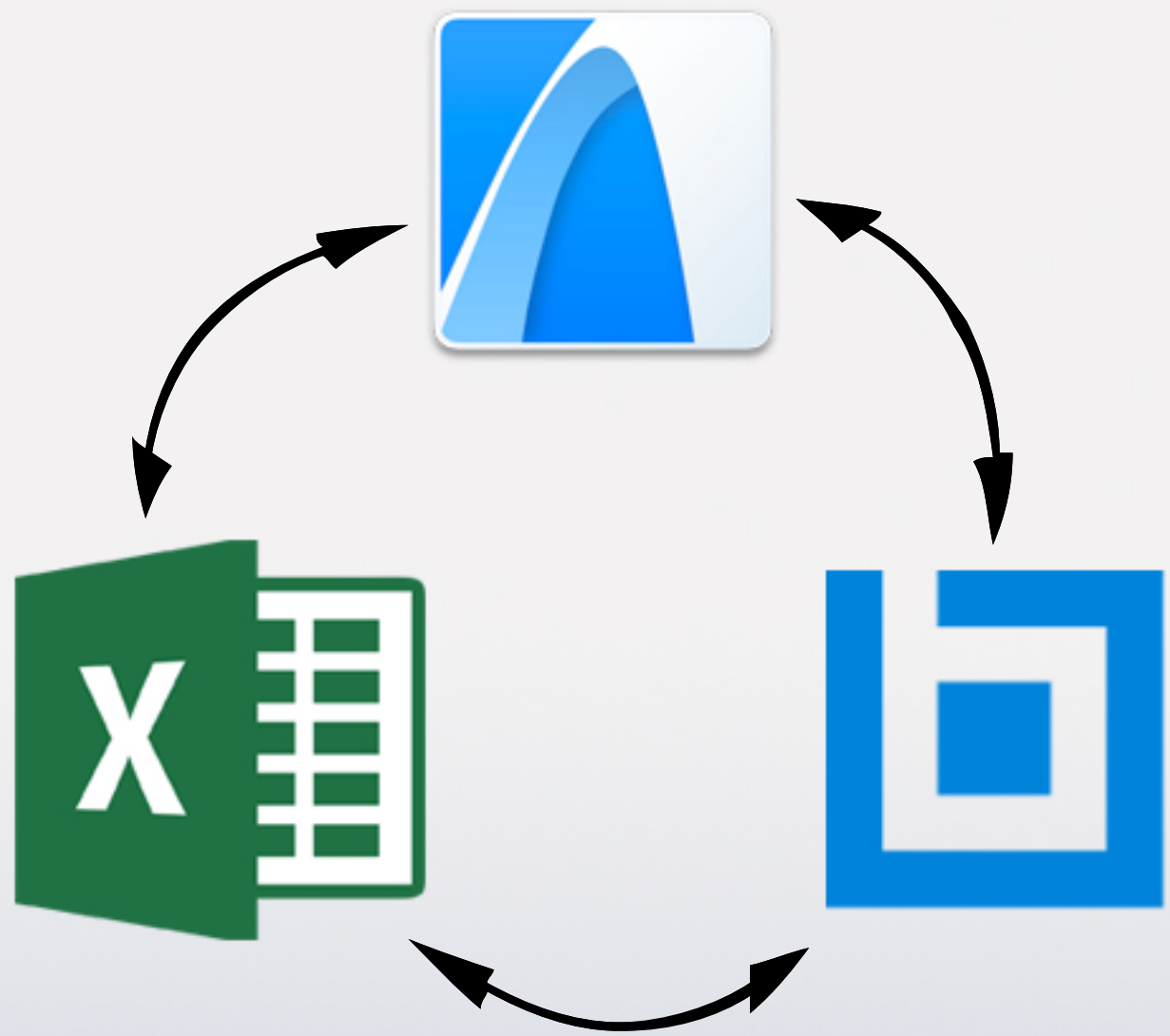


Discovering the Benefits of Integrating BIM Workflows Into Residential Construction Estimating

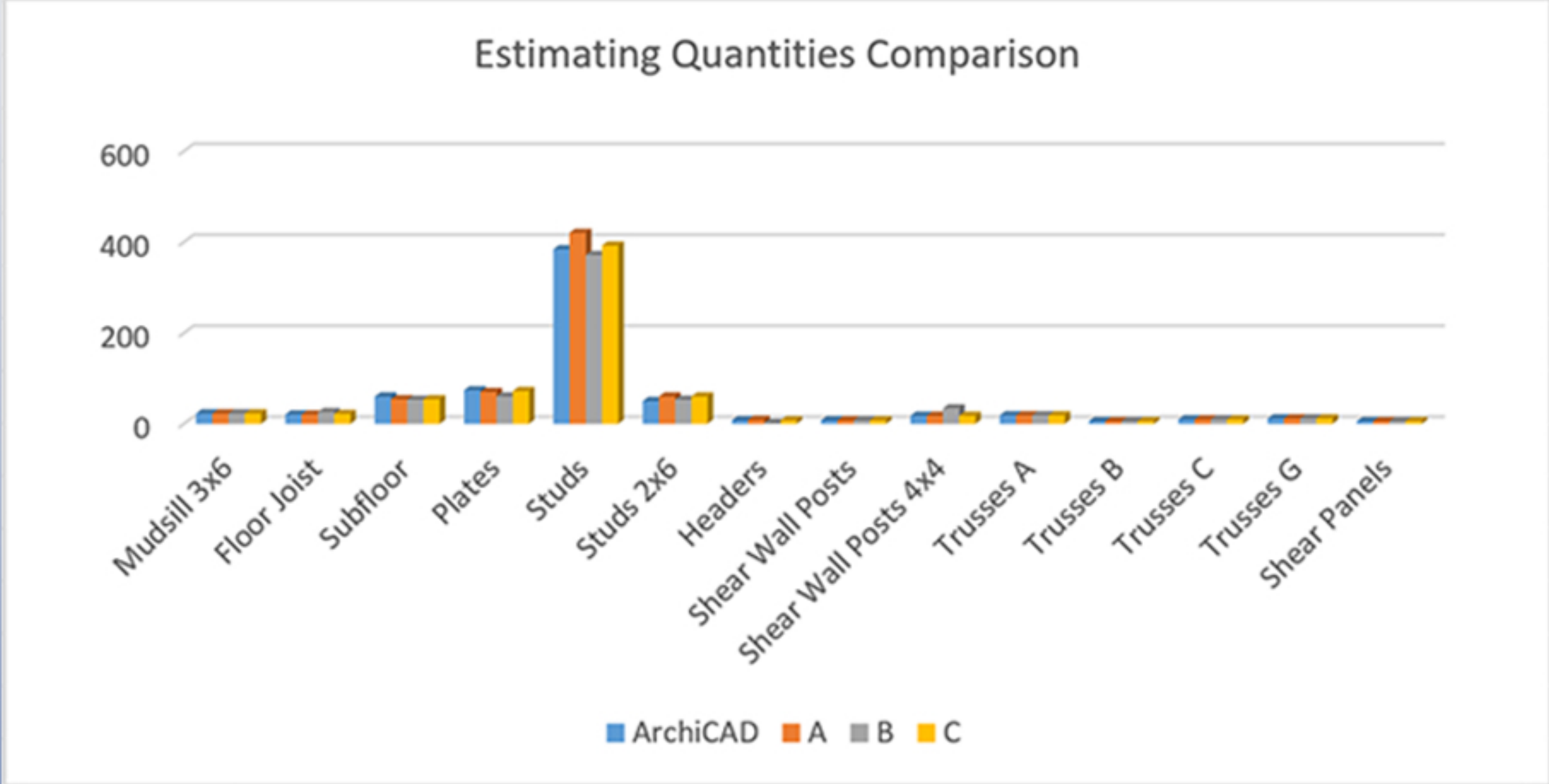
ABSTRACT:

As Building Information Modeling tools become increasingly more prevalent within the construction industry, primarily the commercial sector, it is important to recognize how it can impact and/or improve other sectors of the industry. This project focused primarily on residential construction and the potential cost benefits that could be achieved with the implementation of model-based estimating. Other benefits that the commercial sector currently thrive on will also be noted and explained for potential implementation for residential construction. The project explained in this paper has a dual purpose; which is to discover if both cost and time benefits can be developed with the implementation of model-based estimating to a residential general contractor's workflow

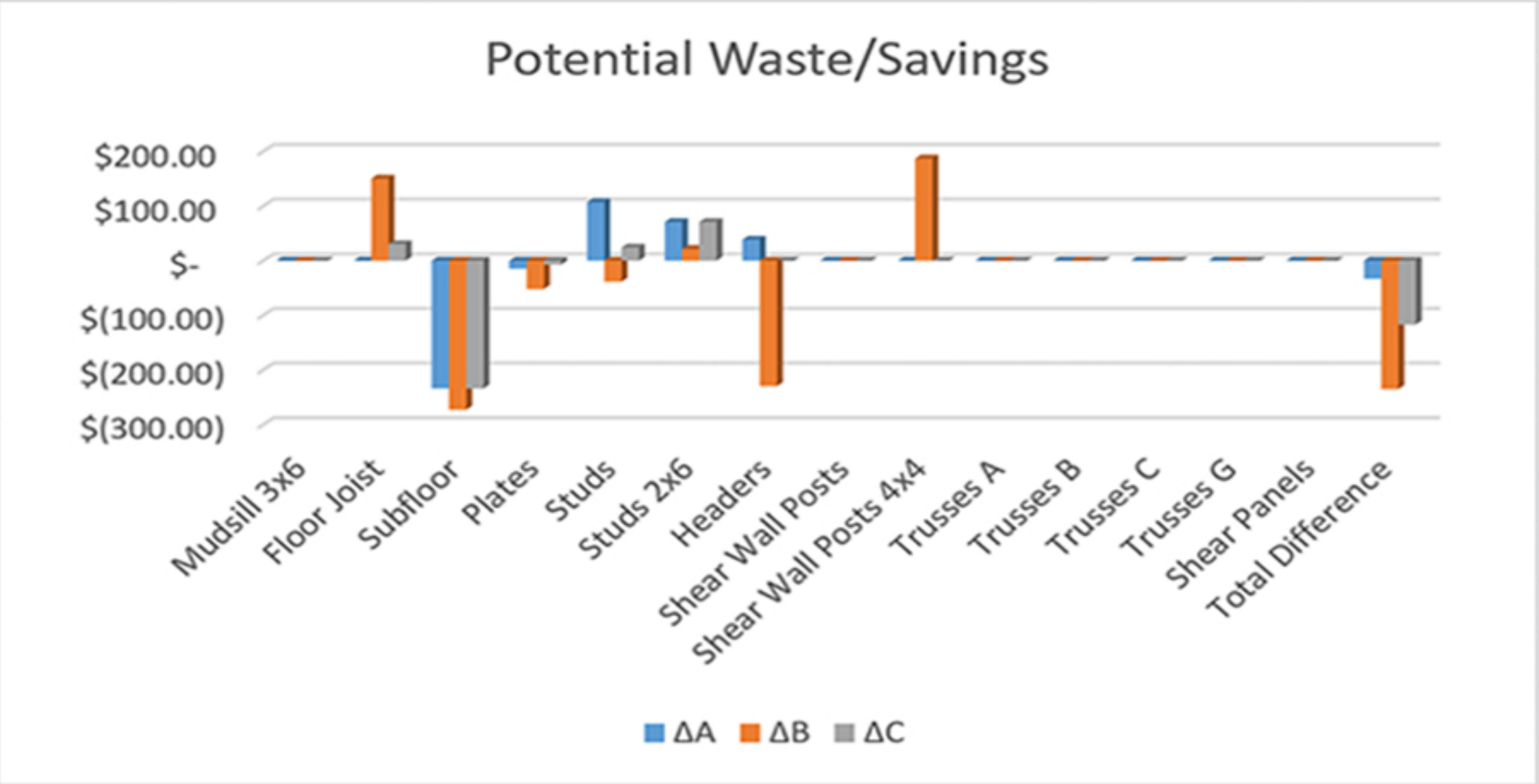


The Contractors from Northern California had varying years of experience in the industry with a range from 6 to 34 years.

- Contractor A, with the most experience, did hand take offs and formatted all of the information in a well-developed and easy to read excel spreadsheet for their deliverable. A also utilized a PDF viewer.
- Contractor B, with about 25 years of experience, required a paper plan set also did hand take offs with a note pad.
- Contractor C, with the least experience, utilized Bluebeam for both PDF viewing and estimating procedures.



- An Excel spreadsheet was developed to communicate directly with ArchiCAD values.
- 6 hours to estimate (including modeling).
- Contractor A completed their estimate in 12 hours
- Contractor B in 20 hours
- Contractor C in 14 hours
- Even though the model-based estimate was much quicker, it is important to keep in mind is implementing this software cost money and takes time to learn.



Item #	Material Use	ArchiCAD	A	B	C	Material Price	ArchiCAD	A	B	C	Material Type	ΔA	ΔB	ΔC
1	Mud sill 3x6	23	23	23	23	\$ 10.00	\$ 230.00	\$ 230.00	\$ 230.00	\$ 230.00	Mud sill 3x6	\$ -	\$ -	\$ -
2	Floor Joist	21	21	26	22	\$ 30.00	\$ 630.00	\$ 630.00	\$ 780.00	\$ 660.00	Floor Joist	\$ -	\$ 150.00	\$ 30.00
3	Subfloor	60	54	53	54	\$ 39.00	\$ 2,340.00	\$ 2,106.00	\$ 2,067.00	\$ 2,106.00	Subfloor	\$(234.00)	\$(273.00)	\$(234.00)
4	Plates	74	70	60	72	\$ 3.70	\$ 273.80	\$ 259.00	\$ 222.00	\$ 266.40	Plates	\$ (14.80)	\$ (51.80)	\$ (7.40)
5	Studs	384	420	371	392	\$ 2.97	\$ 1,140.48	\$ 1,247.40	\$ 1,101.87	\$ 1,164.24	Studs	\$ 106.92	\$ (38.61)	\$ 23.76
6	Studs 2x6	50	60	53	60	\$ 7.05	\$ 352.50	\$ 423.00	\$ 373.65	\$ 423.00	Studs 2x6	\$ 70.50	\$ 21.15	\$ 70.50
7	Headers	8	9	2	8	\$ 38.26	\$ 306.08	\$ 344.34	\$ 76.52	\$ 306.08	Headers	\$ 38.26	\$ (229.56)	\$ -
8	Shear Wall Posts	8	8	8	8	\$ 12.98	\$ 103.84	\$ 103.84	\$ 103.84	\$ 103.84	Shear Wall Posts	\$ -	\$ -	\$ -
9	Shear Wall Posts 4x4	18	18	34	18	\$ 11.67	\$ 210.06	\$ 210.06	\$ 396.78	\$ 210.06	Shear Wall Posts 4x4	\$ -	\$ 186.72	\$ -
10	Trusses A	19	19	19	19	\$ 300.00	\$ 5,700.00	\$ 5,700.00	\$ 5,700.00	\$ 5,700.00	Trusses A	\$ -	\$ -	\$ -
11	Trusses B	6	6	6	6	\$ 300.00	\$ 1,800.00	\$ 1,800.00	\$ 1,800.00	\$ 1,800.00	Trusses B	\$ -	\$ -	\$ -
12	Trusses C	10	10	10	10	\$ 300.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	Trusses C	\$ -	\$ -	\$ -
13	Trusses G	12	12	12	12	\$ 250.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	Trusses G	\$ -	\$ -	\$ -
14	Shear Panels	6	6	6	6	\$ 8.77	\$ 52.62	\$ 52.62	\$ 52.62	\$ 52.62	Shear Panels	\$ -	\$ -	\$ -
*Note that not all building materials are present. They were eliminated for extreme quantities (over 30%) and or left out of material take off by contractors							\$19,139.38	\$19,106.26	\$18,904.28	\$19,022.24	Total Difference	\$ (33.12)	\$ (235.10)	\$ (117.14)

