

6 STOREY MID-RISE COST COMPARISONS

BETWEEN WOOD, STEEL AND CONCRETE STRUCTURES



INTRODUCTION



- QS Online Cost Consultants Inc. from Halifax completed a Class C cost estimate for a six storey building that is currently being built in Kamloops, British Columbia.
- The purpose of this estimate was to
 - analyze a real-life wood mid-rise structure built by an experienced builder,
 - apply Atlantic Canadian cost and structural engineering conditions and
 - to generate a comparative cost analysis for four different construction methods.

ALL MODELS ARE 6 STOREYS AND ESTIMATES WERE COMPLETED FOR THE FOLLOWING CONFIGURATIONS:

- one base model that is comprised of 1 level of concrete construction and 5 levels of wood construction above;
- one model with all wood construction;
- one model with all concrete construction; and
- and one model with all structural steel construction







SOURCE OF INFORMATION AND STARTING POINT

- Tri-City Contracting from Kamloops, B.C. has provided a base model, described below.
- This was the basis for considering costs for three additional structural configurations at the maximum allowable area limits for Group C, NBCC sprinklered combustible construction.
- BMR Engineering from Halifax provided high level structural interpretations of the models as applicable to the Halifax area, and these directives were included in the logic of the cost estimates.



SOURCE OF INFORMATION AND STARTING POINT

- All models are based on a 4-foot-deep frost foundation, without basement, slab on grade (SOG).
- The ground floor is considered as vacant shell space for commercial tenants, while the upper five floors are residential.



SOURCE OF INFORMATION AND STARTING POINT

- Bluegreen Architecture Inc., from Vernon and Kamloops, BC, provided the architectural drawings.
- G.L. Bevan Pritchard Engineering Ltd., from Vancouver, BC, provided the structural drawings.



ENGINEERING COMMENTS - FOUNDATIONS

- Wood structure – total load 460 PSF
- Steel structure – total load 573 PSF = + 20%
- Concrete structure – total load 934 PSF = + 51%
- The footing area required is directly proportional to the total load being supported
- From the above list, the foundation system for a wood framed structure would require less area than a comparable concrete or steel structure

ENGINEERING COMMENTS - SUPERSTRUCTURE

- The wind load in Halifax is quite a bit higher than Kamloops, roughly 45%.
- The seismic load is roughly 30% lower in Halifax as compared to Kamloops
- When designing the lateral load resisting system for a building, the most stringent condition controls the design
- For the wood shear walls, use of the Kamloops model structural details would be suitable for Halifax

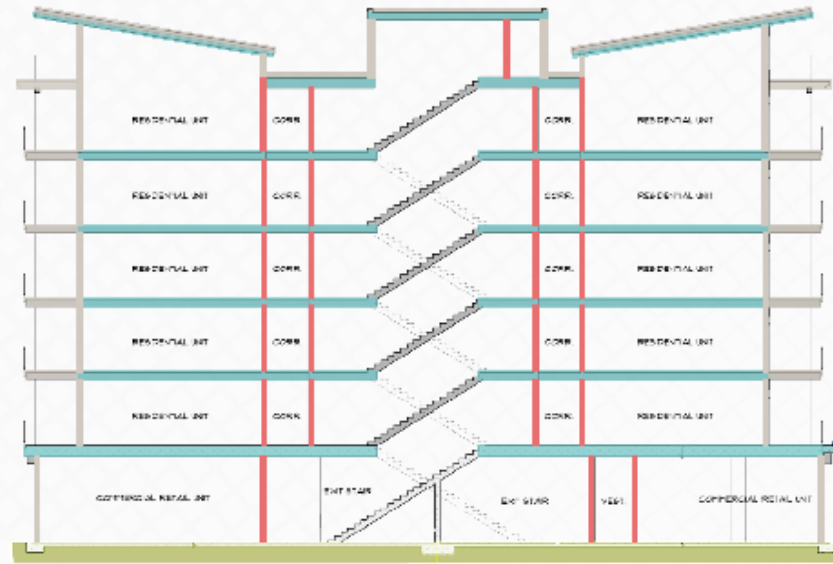
CONCLUSION



- The cost analysis findings indicate that wood construction models are the least expensive to build.
- The cost estimate is based on an initial capital cost perspective and has not included any impacts from a detailed life cycle costing analysis.
- Also excluded are soft costs, demolition of any existing items and site costs including landscaping and hook up of services for M&E.







	6 Levels Steel GFA: 113,380 SF	6 Levels Concrete GFA: 113,380 SF	1 Level Concrete 5 Levels Wood GFA: 113,380 SF	6 Levels Wood GFA: 113,380 SF
Sub-Structure	\$/SF GFA	\$/SF GFA	\$/SF GFA	\$/SF GFA
	3.23	3.88	3.37	3.11
Structure				
	33.88	29.76	32.29	31.49
Exterior Enclosure				
	32.01	32.45	31.97	31.50
Partition & Doors				
	13.61	13.61	4.22	4.54
Total Unit Rate				
	165.23	160.49	148.75	147.28
Total Building Cost				
	18,733,499	18,196,575	16,864,845	16,515,400

CONCLUSION



- There are a number of minor cost differences between the Kamloops region and Halifax in regards to material supply and labour costs.
- This estimate does not provide a detailed breakdown of these differences.
- Specialty lumber such as mass timber is less expensive in the Kamloops area, while standard dimensional lumber, depending on grade and
- Species, such as Douglas Fir versus SPF #1 & #2, is without significant cost variations as it is available in each respective region.
- Electrical wiring is recognized as being less expensive in wood framed structures



CONCLUSION



- The fixed price differences of the materials can be off-set in both regions by various levels of crewing, productivity, and payroll levels.
 - Buying power / discounts on material, union or non union, Contractor or Developer
- Construction cost differences in this type of construction are within a range that could be considered generally congruent to each region.
- Further detailed analysis would be required to determine specifics.

END

