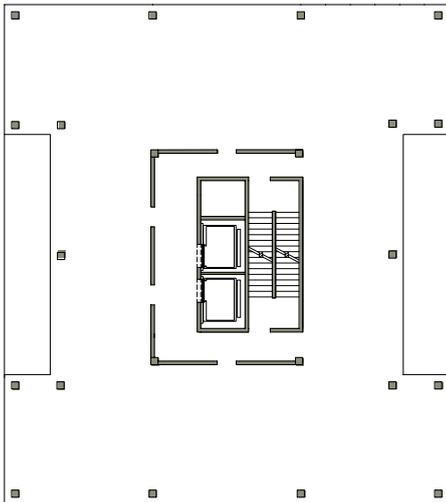


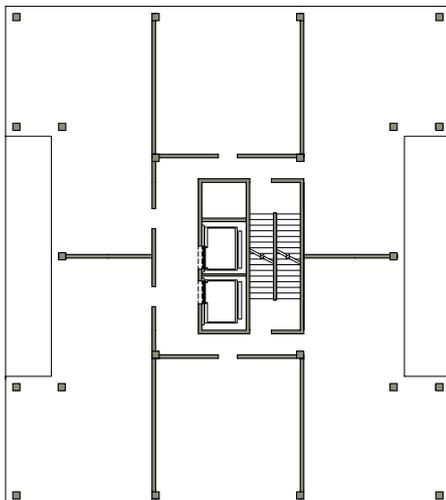
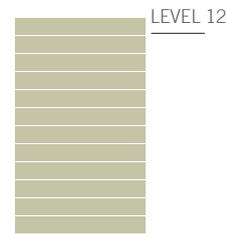
3.4 Proposed Tower Solutions - Applied and Theoretical Plans

FFTT Structural Diagrams

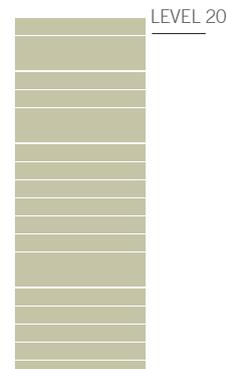
The following diagrams illustrate 4 possible structural configurations utilizing the FFTT system. With each option, the structural capacity principally determines the possible building heights. For instance, in Option 1, a building height up to 12 storeys is achievable employing structural core walls and glulam columns at the perimeter as the supporting structure. In options 2 and 3, which achieve greater building heights up to 20 storeys, additional structure is required. Structural interior walls and structural exterior walls provide this additional support in options 2 and 3 respectively. For option 4, as in option 2 and 3, structural interior walls and structural exterior walls provide additional support.

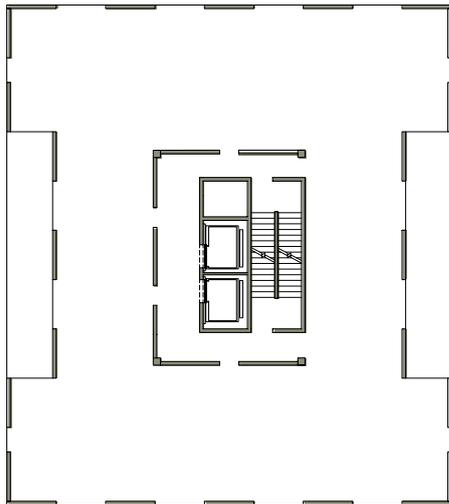


OPTION 1
Up to 12 storeys in height
Structural core
Glulam columns at curtain wall

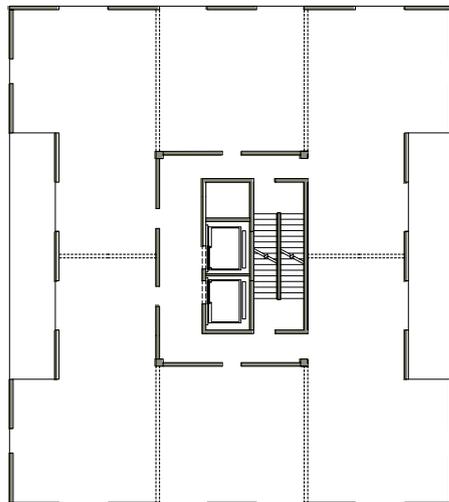
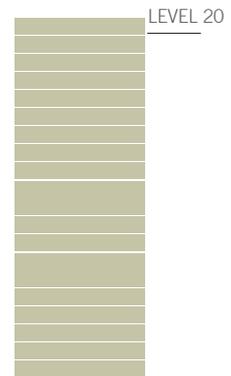


OPTION 2
Up to 20 storeys in height
Structural core and interior walls
Glulam columns at curtain wall

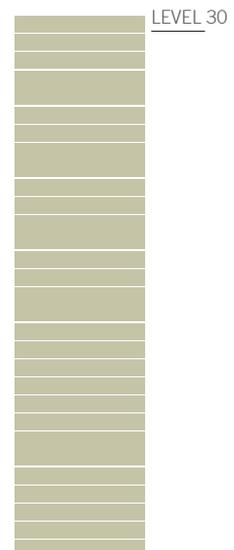




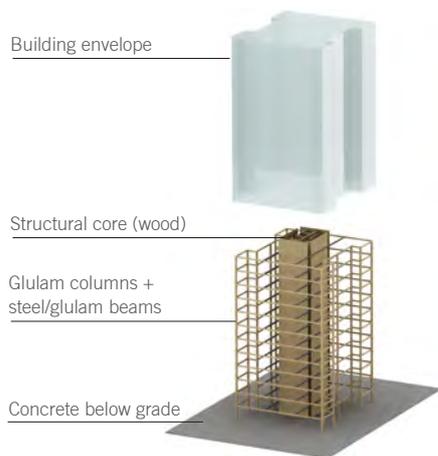
OPTION 3
Up to 20 storeys in height
Structural core and exterior walls



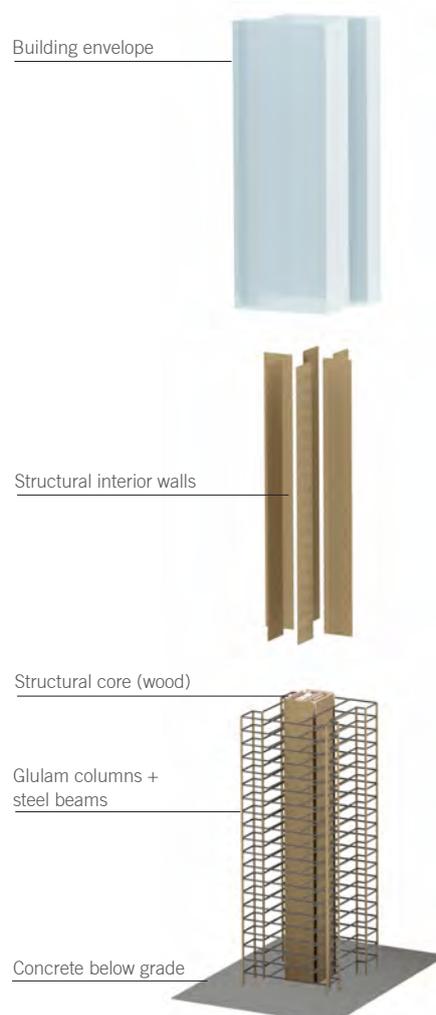
OPTION 4
Up to 30 storeys in height
Structural core, interior walls or exterior walls



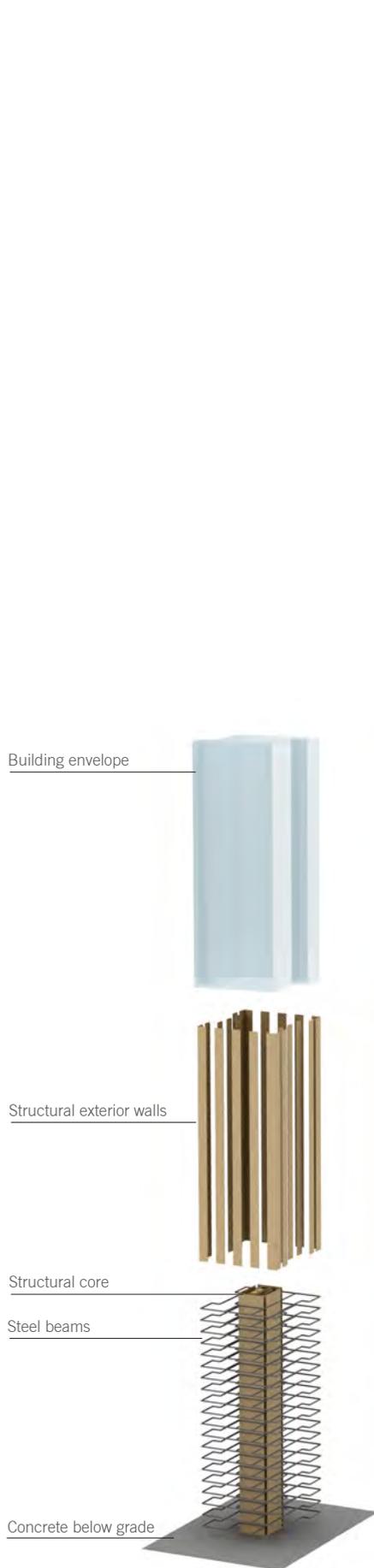
FTT Axonometric Diagrams



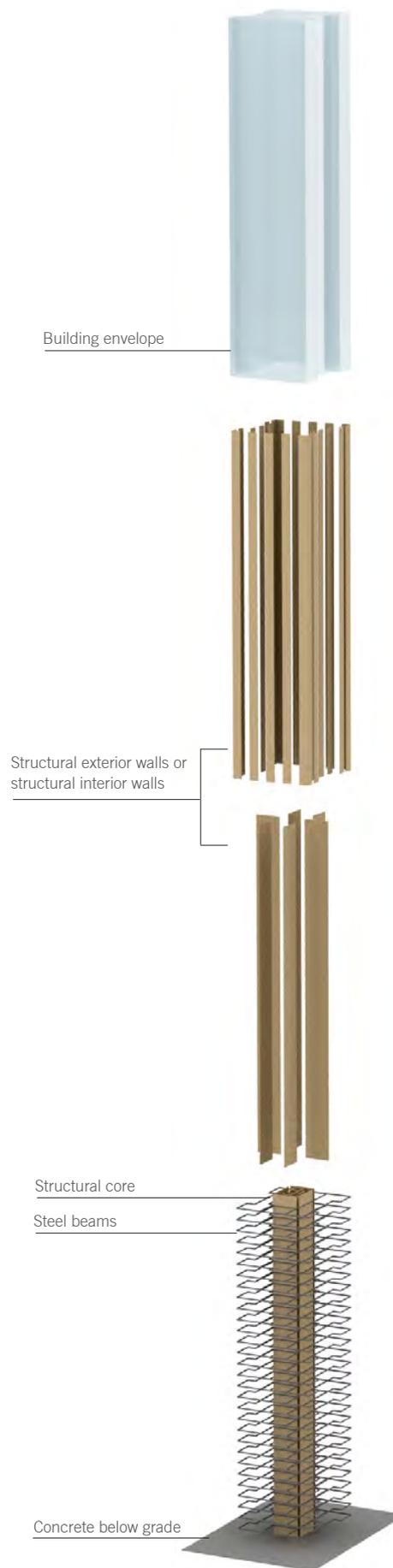
OPTION 1 - Up to 12 Storeys



OPTION 2 - Up to 20 Storeys



OPTION 3 - Up to 20 Storeys



OPTION 4 - Up to 30 Storeys

Implied Architectural Impact as Result of the Structure

The structural configurations, in addition to determining the achievable building heights will impact both the design of the envelope and floor plan of the building. For example, Option 1 offers the greatest amount of flexibility in the design of its interior partitioning. This structural configuration bears closest resemblance to the typical concrete benchmark in that it utilizes a structural core and perimeter columns that affords it a free-plan. In options 3 and 4, where additional structure is required for the increase in building height, constraints are placed on the design of either the interior partitions or envelope. As a result, these configurations can be more advantageously applied to specific uses. For instance, where interior walls are utilized as structure, a residential application would be appropriate where these structural walls could double as unit demising walls.



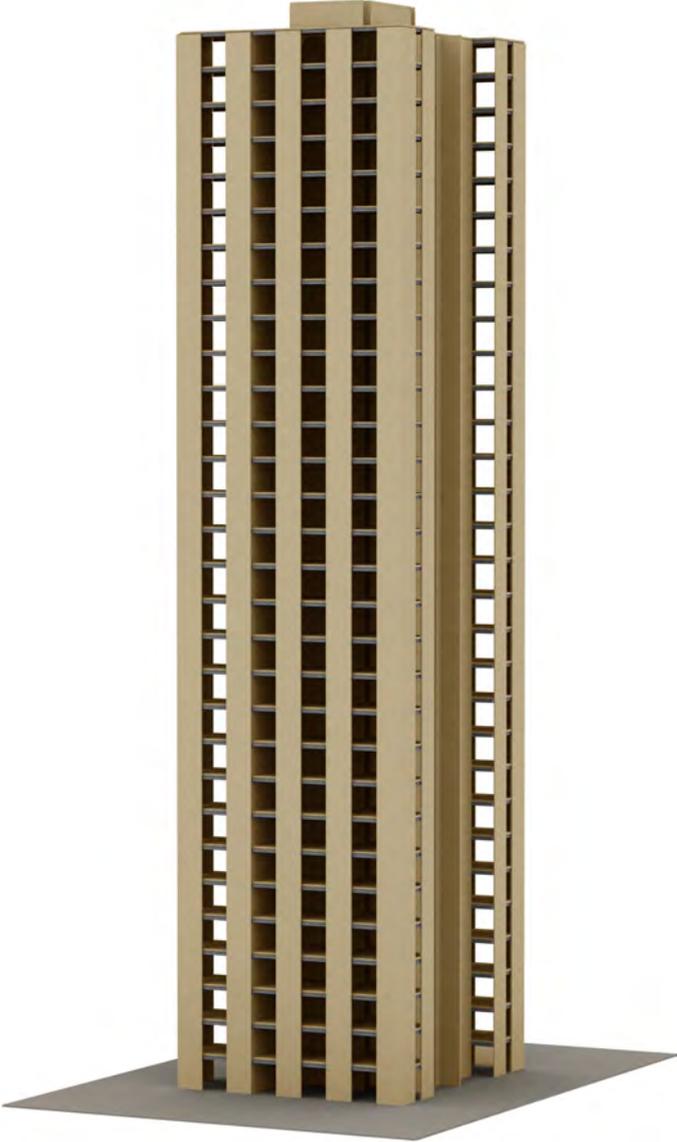
OPTION 1 - Up to 12 Storeys



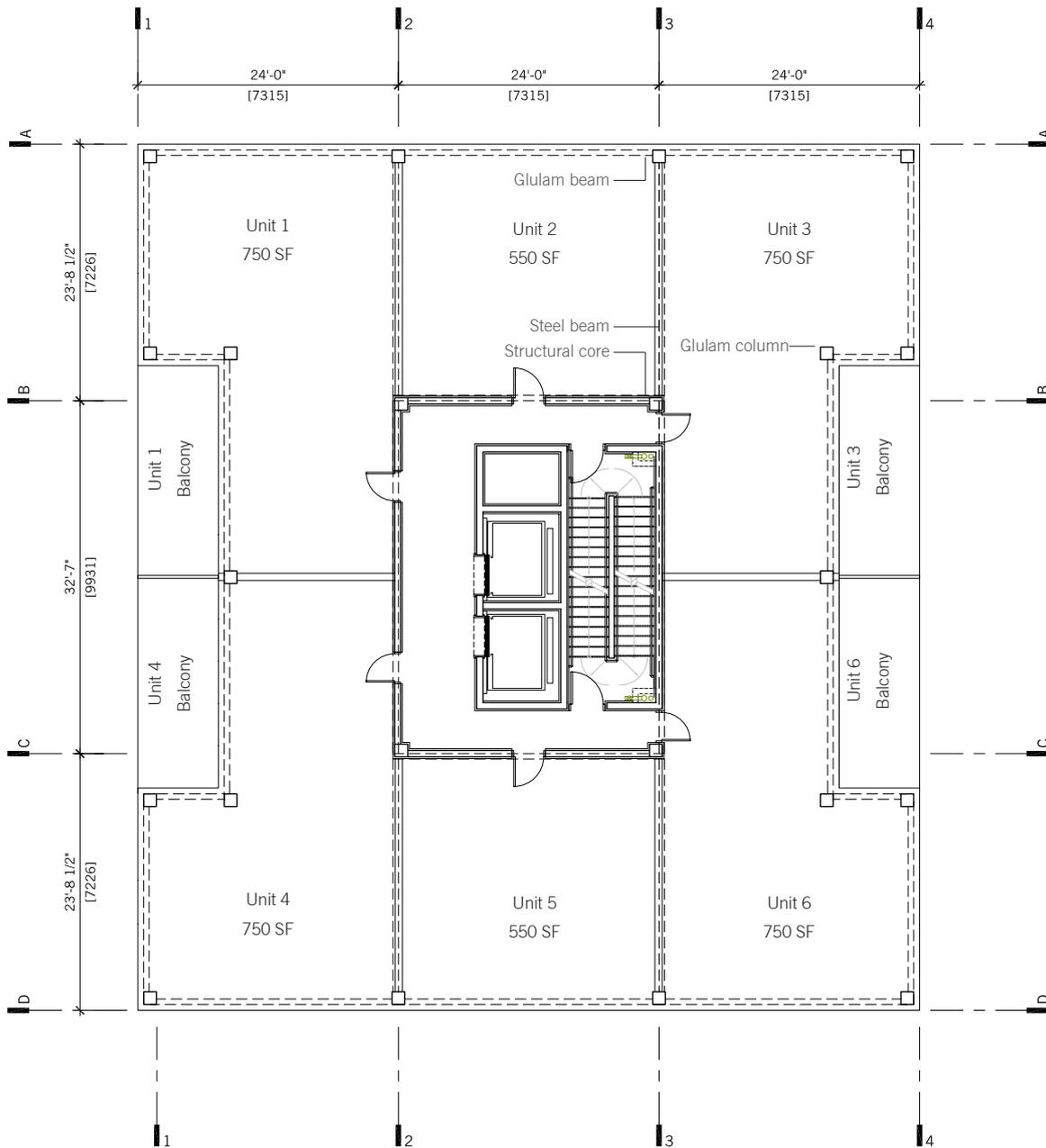
OPTION 2 - Up to 20 Storeys



OPTION 3 - Up to 20 Storeys



OPTION 4 - Up to 30 Storeys



PLAN OPTION 1

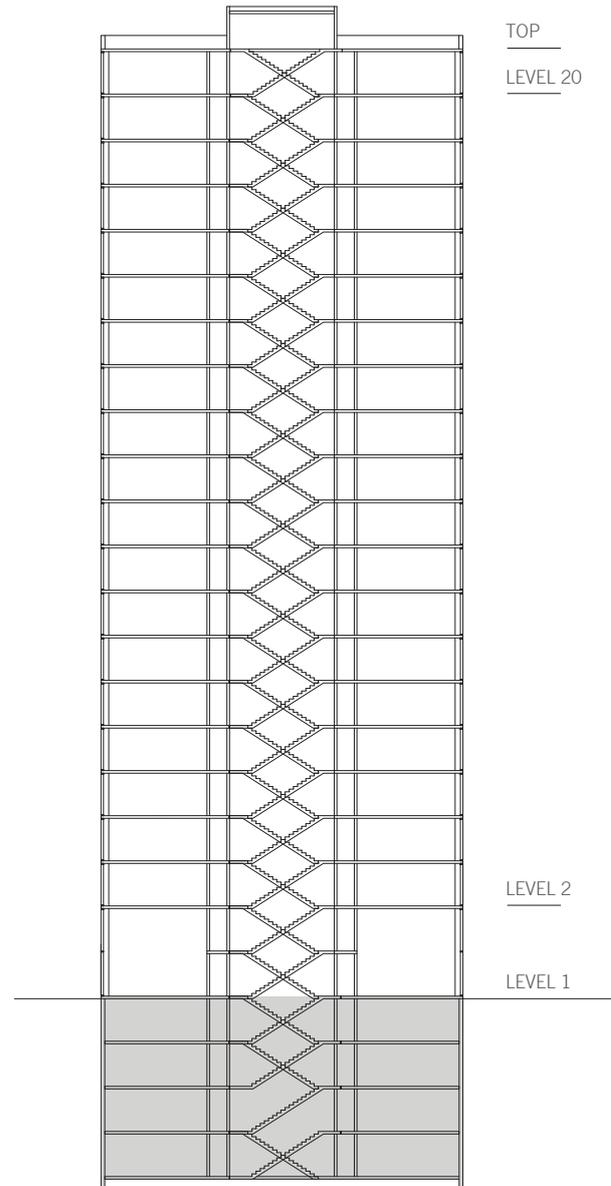
Refer to [Section 3.6 Structural Intent](#) for structural information

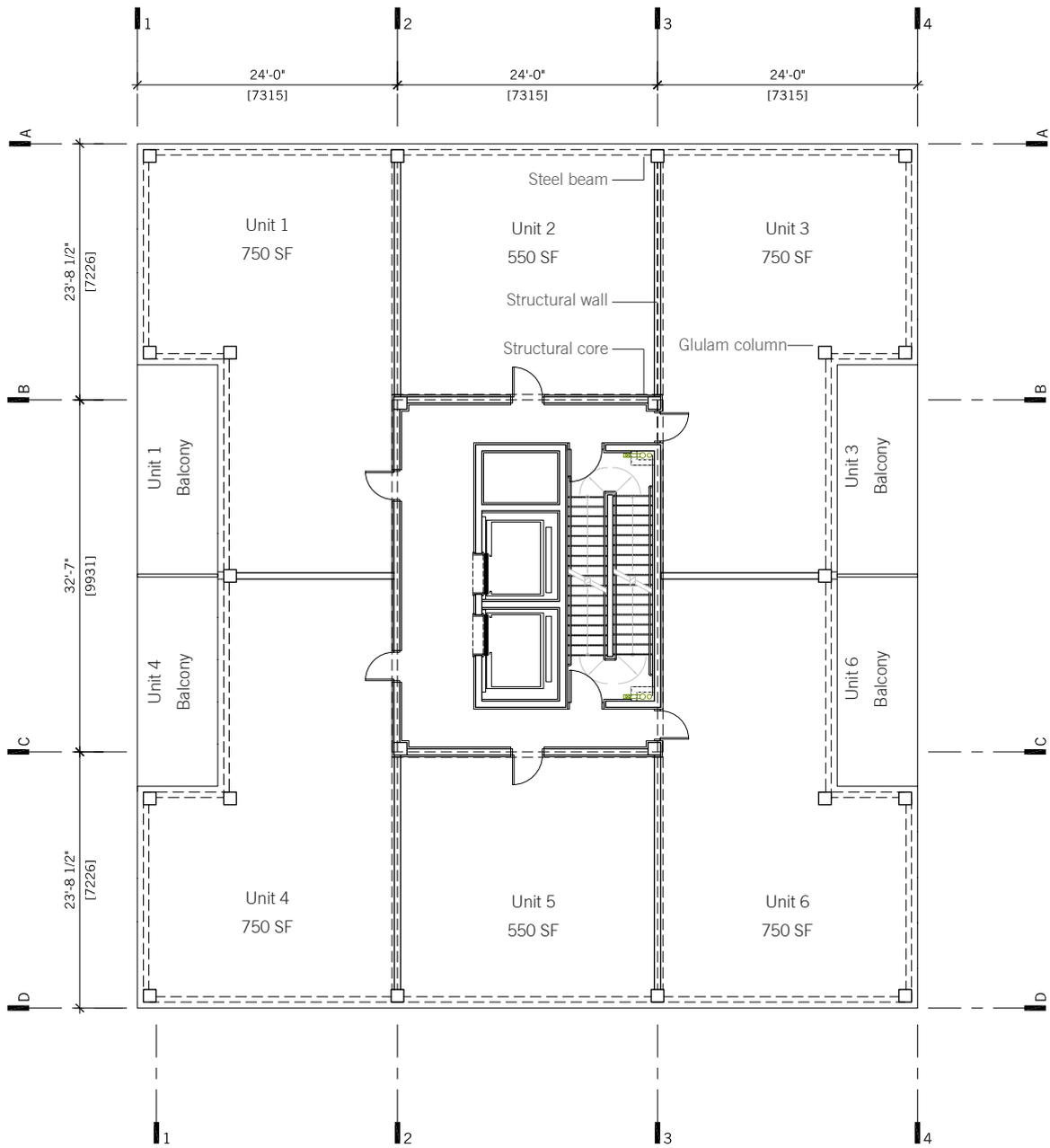
CASE STUDY - OPTION 2

Up to 20 storeys in height
Structural core and interior walls
Glulam columns at curtain wall

Here, in addition to the structural wood core walls and glulam perimeter columns, interior structural walls are introduced in order to increase the possible building height up to 20 Storeys. Similarly to Option 1, in the absence of exterior structural walls, this option also allows great flexibility in the design of its facade, supporting an entire curtain wall if desired. In terms of interior planning, the introduction of interior load bearing walls diminishes some flexibility in floor plan layout and future changes as optimized in Option 1. However, these interior structural walls can be located accordingly, for specific uses such as demising walls between units.

This structure lends itself to being more suitable for a residential application, as it does not offer the open plans desirable of office layouts. However, because of its structure, it offers a competitive building height, pushing it from a mid-rise to a high-rise structure.





PLAN OPTION 2

Refer to [Section 3.6 Structural Intent](#) for structural information.

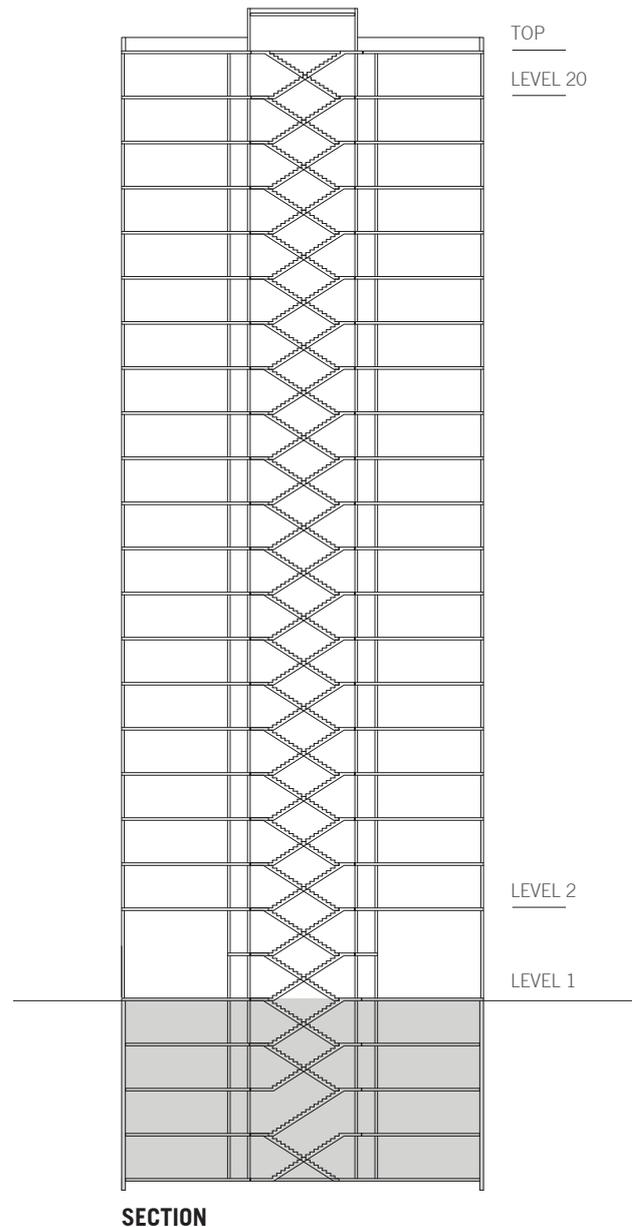
CASE STUDY - OPTION 3

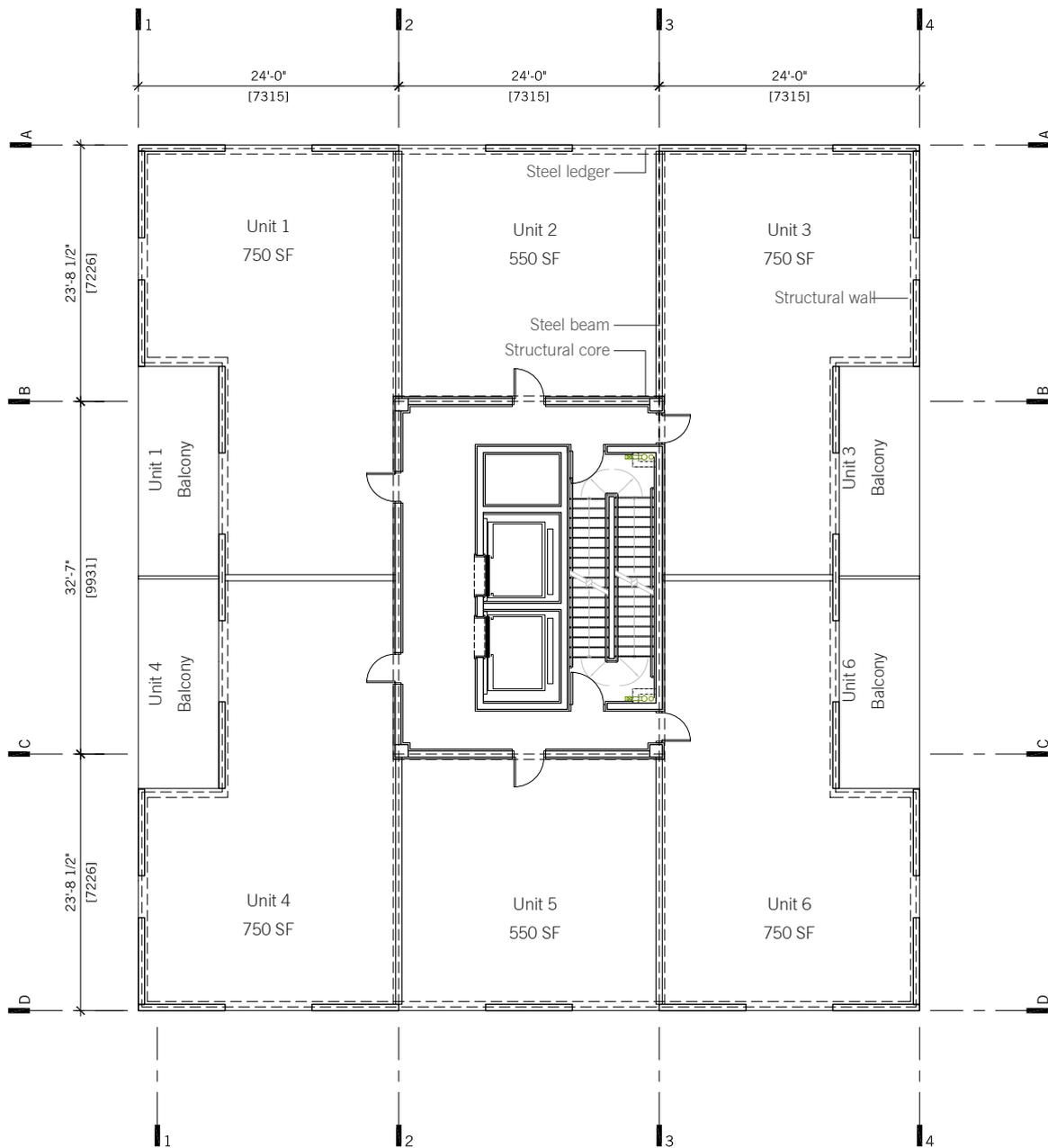
Up to 20 storeys in height
Structural core and exterior walls

This option is similar to Option 2, with a maximum achievable building height of 20 storeys. This is accomplished utilizing structural wood core walls and introducing exterior structural wood walls. Here, the exterior structural walls have replaced the interior structural walls and perimeter glulam columns in Option 2.

The impact of this is that the plan is now structure free, again allowing flexibility in terms of interior partitioning and allowing future interior modifications. On the other hand, the presence of the exterior structural walls now limits the flexibility of the facade. For example, where solid structural walls occur, it would not be possible to have vision glass. As a result of this structure, punched or bay windows would be most suitable. Additionally, from a thermal performance point, these exterior walls provide opportunities for greater insulating assemblies.

This structure would be particularly suitable for residential applications in consideration of its exterior structure and facade composition. While, its open interior plan would be suitable for an office arrangement, it would be challenged in the office market because of its obstructed views and amount of daylight the interior receives relative to its concrete benchmark which can utilize a completely glazed curtain wall. Again, like Option 2, it offers a competitive building height at 20 storeys.





PLAN OPTION 3

Refer to [Section 3.6 Structural Intent](#) for structural information

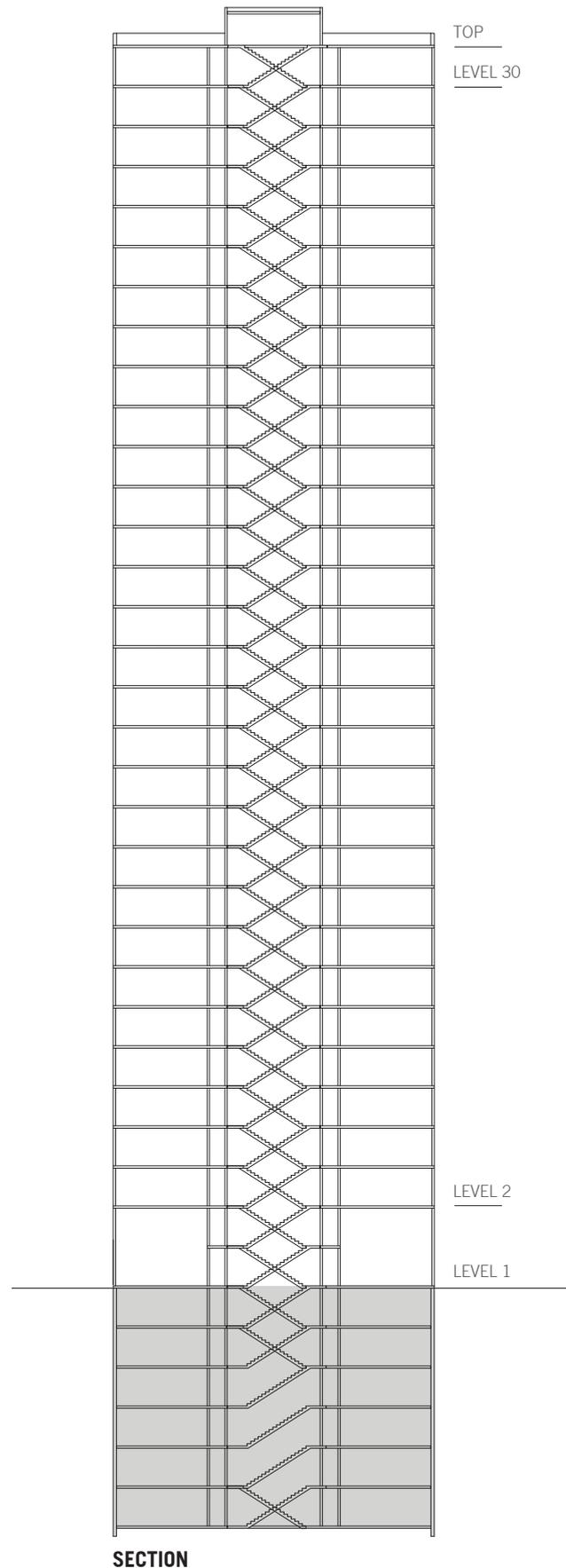
Note: Our analysis has shown that a 30 storey model performed adequately with either the interior partition walls or perimeter frame.

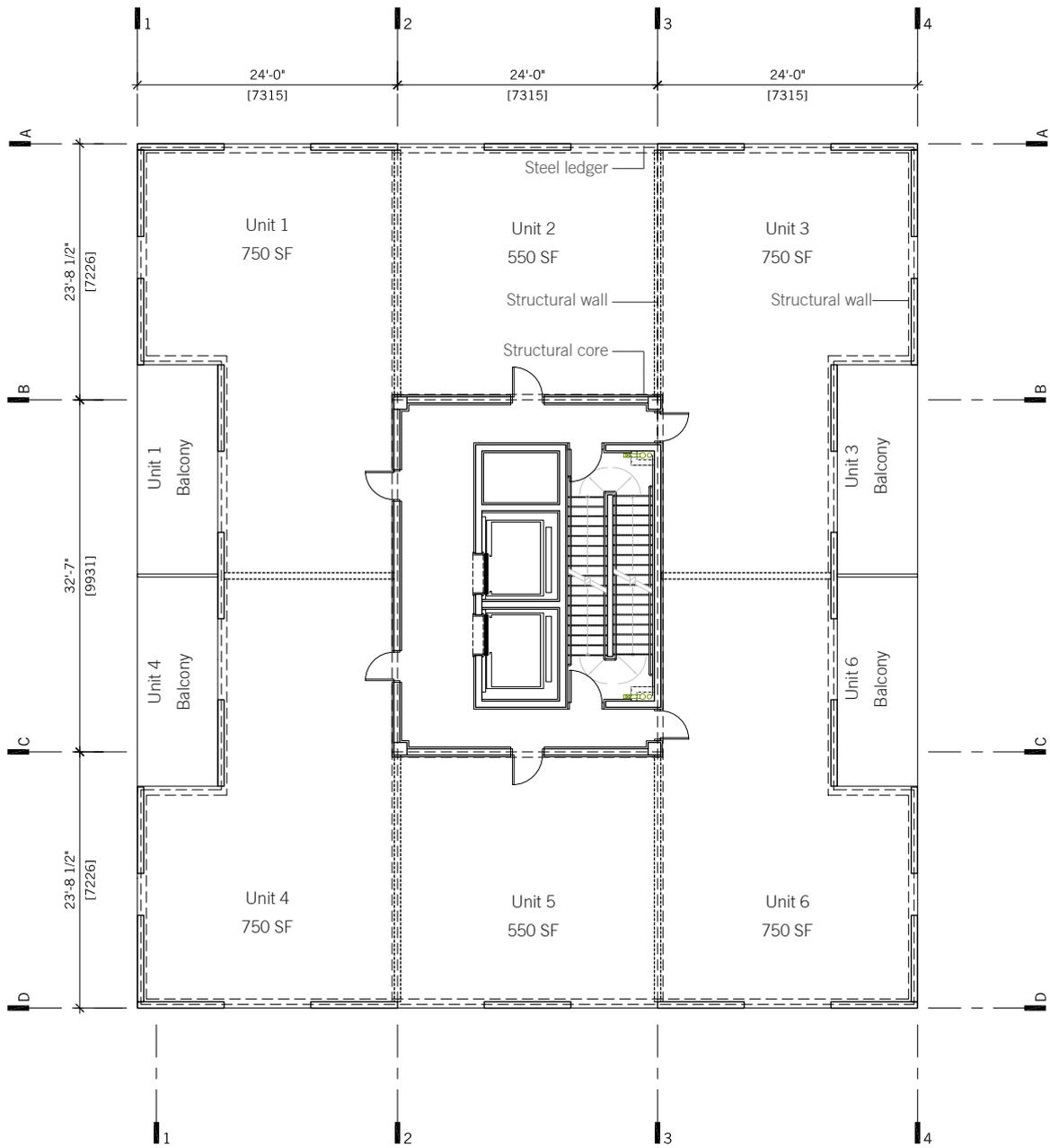
CASE STUDY - OPTION 4

Up to 30 storeys in height
Structural core, interior walls and exterior walls

This option pushes the maximum building height to 30 storeys. To do so, it utilizes structural core walls, structural interior walls and structural exterior walls. As a result, it offers the least flexibility of the four options. Its interior structural walls would limit it to residential use, as in Option 2, its exterior structural walls would limit the envelope options as discussed in earlier in Option 3.

The primary advantage of this option is its building height. However, the structure that is required to achieve this height becomes disadvantageous to its planning and design flexibility. As a result, this option is limited in its flexibility and use.





PLAN OPTION 4

Refer to [Section 3.6 Structural Intent](#) for structural information.

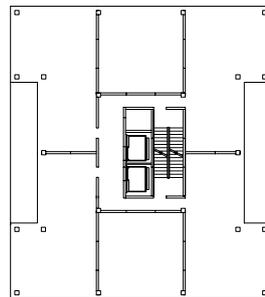
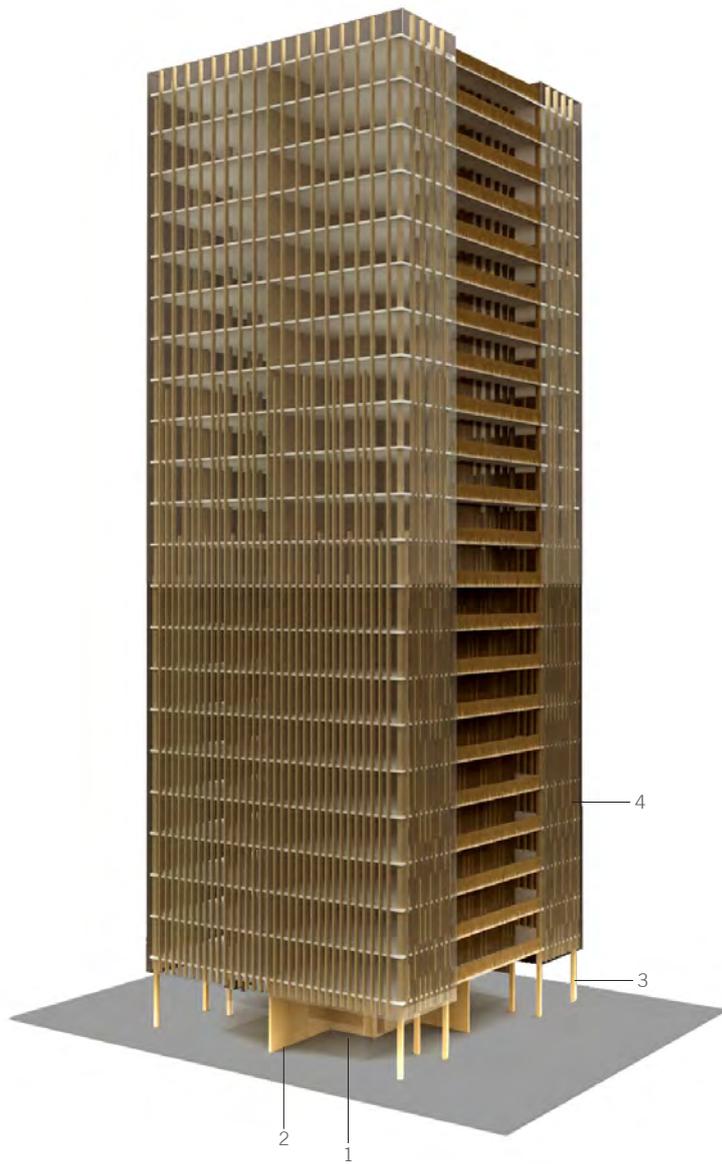
Note: Our analysis has shown a 30 storey model performed adequately with either the interior partition walls or exterior frame.

3.5 Architectural Application of an Idea

The FFTT system is designed and considered as a universal structural system to engineer Tall Wood buildings. However, it is important to understand that it has also been driven by a number of architectural issues pertinent to tall buildings that are crucial to the system's success. The FFTT system allows for flexibility in tower planning and facade design with some decrease in flexibility once the system is utilized in applications above 20 storeys. Above this height, an FFTT tower would likely be limited to residential use. The flexibility in tower planning is important for a number of reasons:

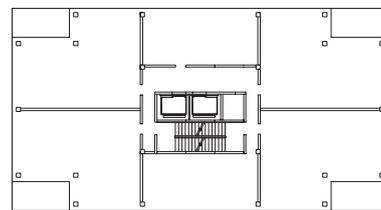
1. An open plan (where there are no interior structural partition walls) allows for a variety of uses including office or residential.
2. An open plan (where there are no interior structural partition walls) allows for future modifications as uses and tenants change.
3. Developers typically look to flexibility in the structural system to ensure they can manipulate the solution to meet their market goals. Open plans give enormous design flexibility to the developers and architects.
4. Exterior character and massing are important to adjust to the specifics of a given site, setback requirements, views and view corridors, shadowing conditions or architectural expression.

In addition to these considerations, a review of acoustic and vibration conditions, systems integration, life safety, fire and finishing relevant to tower construction follow in subsequent sections. In summary, what we have found is that there are no obstacles with FFTT to satisfying the typical needs of a tower design leaving possibilities open to the imagination of all architects.



OPTION 2 - Illustrated with a glulam curtain wall

- 1 Structural core
- 2 Structural unit partition walls
- 3 Glulam columns
- 4 Protective envelope



OPTION 2 - Illustrated with a glulam curtain wall and corner balconies

- 1 Structural core
- 2 Structural unit partition walls
- 3 Glulam columns
- 4 Protective envelope
- 5 Corner balcony