

## Modelling Methodology

This computer modelling exercise comparatively assesses the approximate impact of the proposed 4m and the 1.5m frontage setbacks on the development capacity of small, medium and large development sites along the City Spine Transport Corridor. This has been modelled as per the following methodology.

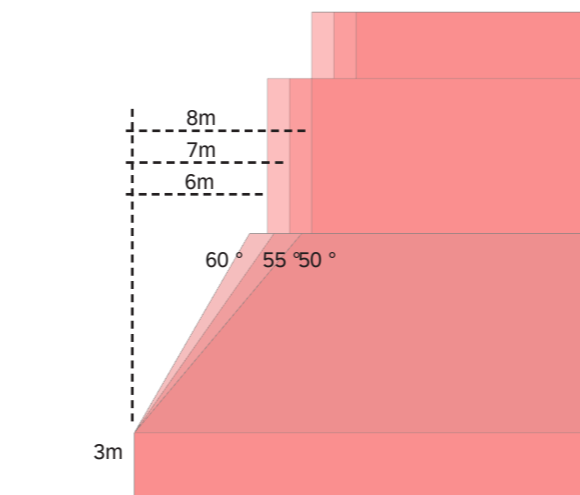
1. Selected small, medium and large size sites typical along the City Spine Transport Corridor.
  - Desktop study identified common small site dimensions of 16m by 40m, consistent for some sites along Riccarton Road and Main South Road near Church Corner.
  - Sites along Papanui Road are less consistent, however, a common site depth is between 40m and 60m, width range between 13m and 40m. Medium sites selected using an average width/depth of 30m by 50m, and maximum measurements for large sites of 40m by 60m. Noting that some amalgamation of two adjacent sites can likely result in these site sizes.
  - Noting some of typical 20m-26m by 45m-50m sites occur along the corridor.
2. Testing the impact of the 4m site frontage setback in relation to heights and recession plane scenarios in different site orientations.
  - a. North-facing - street to the north of the sites,
  - b. East/west-facing - street to the east or west of the sites,
  - c. South-facing - street to the south of the sites.
3. Potential development scenarios are modelled (using SketchUp software) according to the latest revision of the proposed PC14 rules (<https://chch2023.ihp.govt.nz/hearings/>: - Plan Change 14 Provisions - updated - s42A-Sub-Chapter-14.6-Rules - High Density Residential Zone).
4. Modelled scenarios aim to illustrate an approximated maximum yield.
5. Height between floors have been modelled at 3m.
6. Key assumptions and rules applied to models are set out below.

## Assumptions

- Assumed all building sites would maximise development yield by focusing building bulk at the front of the site (no recession plane rules for first 20m of site).
- Individual unit layouts and associated outlook spaces are not accounted for in the modelling.
- Outdoor living spaces have not been allowed for, or shown, on the modelling.
- Services, storage and waste management have not been allowed for, or shown, on the modelling.
- It is acknowledged that there may be higher development costs involved in constructing at different building heights for fire-proofing, foundations, lifts, etc. This has not been addressed in the modelling.
- Used a minimum building width of 6m.
- Roof forms have not been included.
- 14.15.1 Residential design principles have not been applied to these diagrams.

## Rules

- 14.6.2.1. Building height
  - a. max 22m.
  - b.i. Any part of the building above 14 metres is set back at least 4 metres from the road boundary.
  - b.ii For any building between 19-22 metres height above ground level, that part of the building above 19m shall be set back a minimum of 2 metres from the highest part of each façade (including balustrades or similar architectural features) at or below 19 metres; or the roof shall have a pitch of less than 45 degrees.
- 14.6.2.2 Height in relation to boundary
  - a. No part of any building below a height of 12 metres shall project beyond a building envelope constructed by recession plane (50, 55, and 60-degree angle according to Appendix 14.16.2 Diagram D) from 3 metres above ground level along all boundaries (other than street boundary, and do not apply along the first 20 metres of a side boundary measured from road boundary, or within 60% of the site depth, whichever is lesser).
  - b. Any part of a building above 12m the above recession plane shall apply unless set back 6m (Northern boundary), 7m (Eastern/Western boundary) and 8m (Southern boundary) from the respective boundary orientation (other than street boundary).

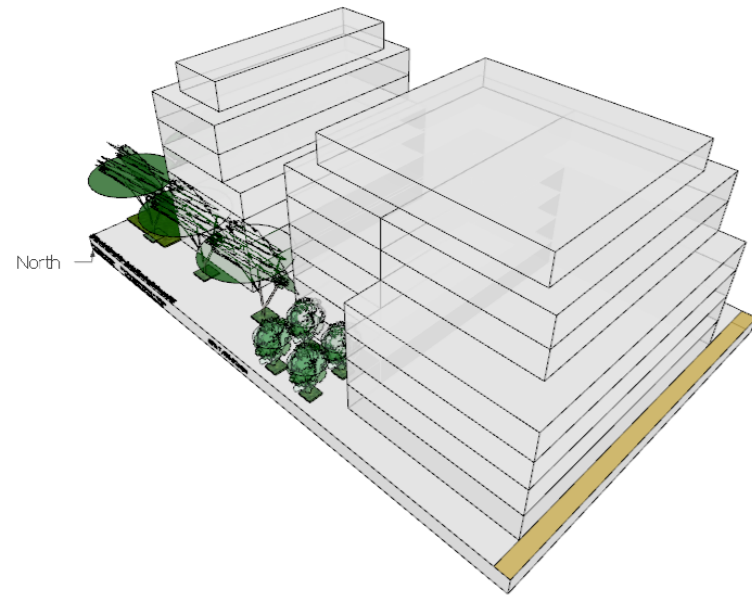


## Height in relation to boundary

- Recession plane differences in relation to orientations, at rear and side boundaries.
- Recession planes do not apply for the first 20m from the street boundary of the site.

- 14.6.2.3 Setbacks - front boundary 1.5m, side and rear boundary 1m. - Noting modelling includes 4m road boundary setback for testing.
- 14.6.2.5 Building separation - Residential units on the same site, 12m in height above ground level must be separated from another by 10m, unless joined by a common wall.
- 14.6.2.7 Landscape area and tree canopy cover - 20% tree canopy cover (including landscape areas).
- 14.6.2.12 Building coverage maximum at 50%.
- 14.6.2.18 Building length - Maximum length of a building elevation shall not exceed 30m.

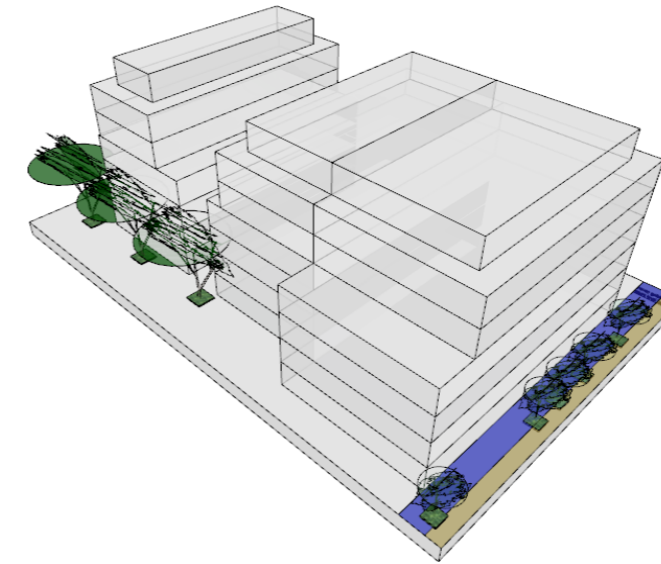
(40m x 60m, area 2,400 sqm)



**1.5m Setback**

**North Orientation (Street-facing)**

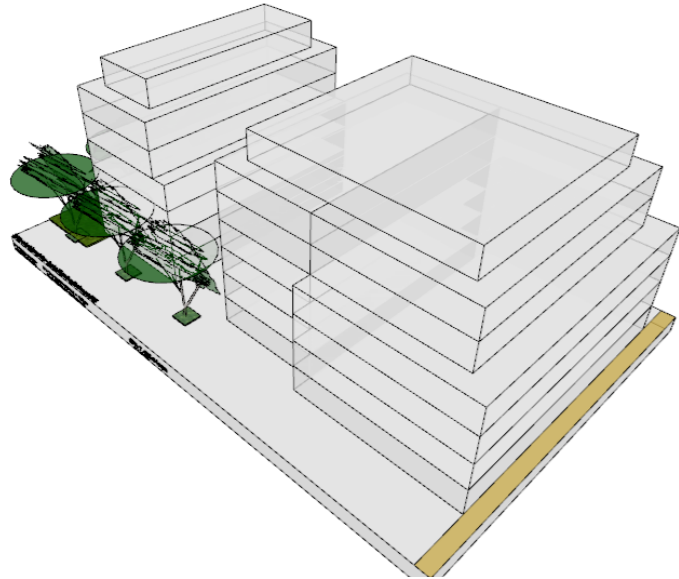
- GFA: 7,435sqm (approximately)



**4m Setback**

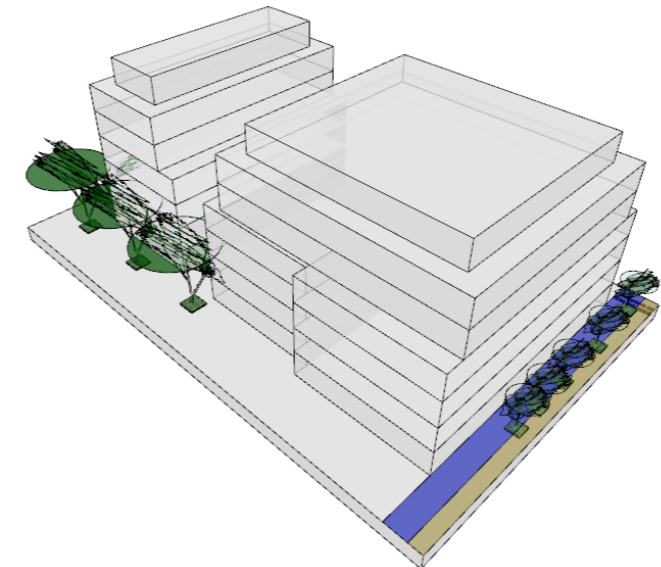
**North Orientation (Street-facing)**

- GFA: 7,435sqm (approximately)



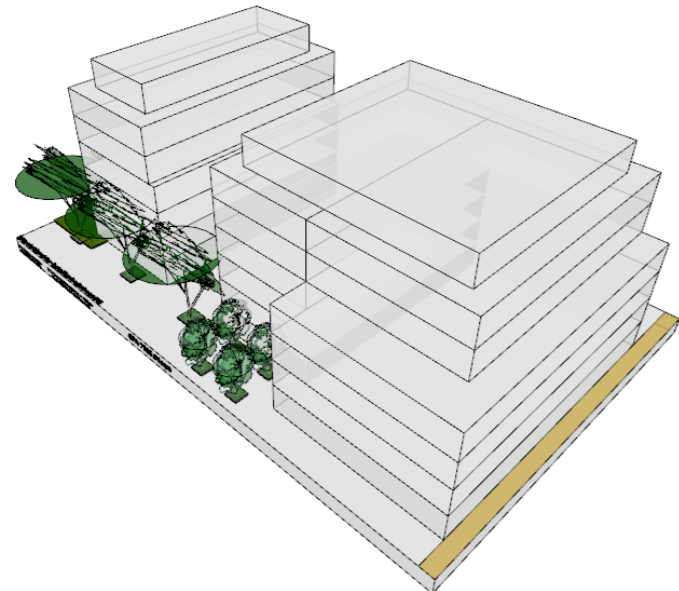
**East Orientation (Street-facing)**

- GFA: 7,510sqm (approximately)



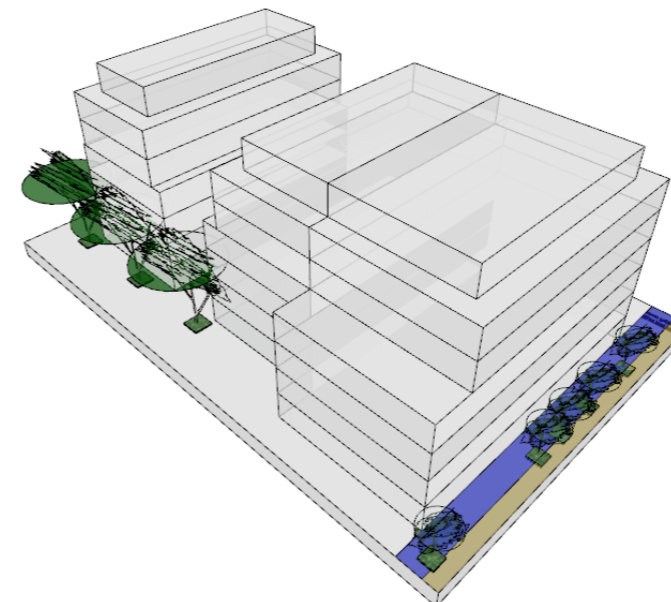
**East Orientation (Street-facing)**

- GFA: 7,510sqm (approximately)



**South Orientation (Street-facing)**

- GFA: 7,584sqm (approximately)

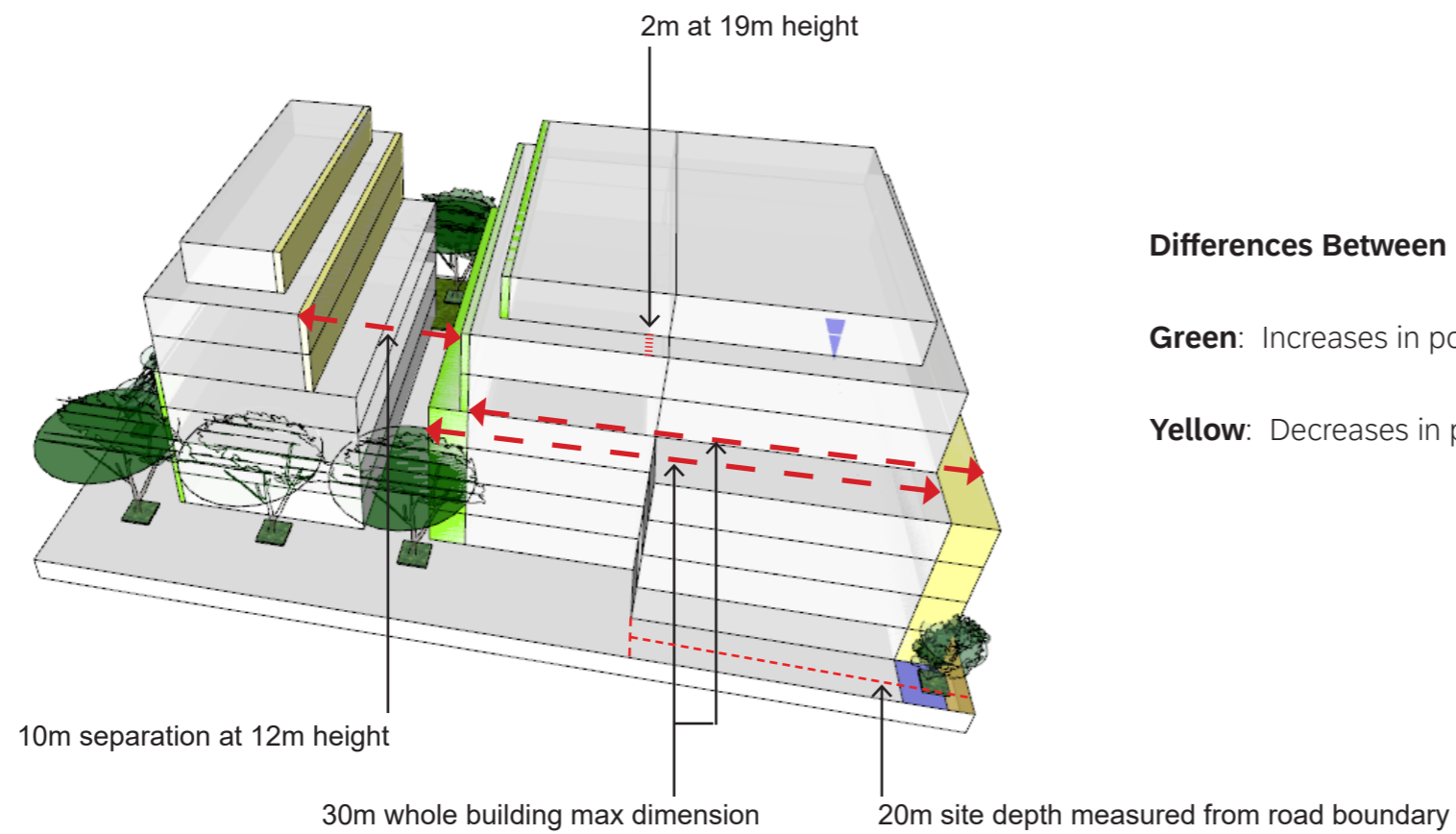


**South Orientation (Street-facing)**

- GFA: 7,583sqm (approximately)

## Typical Large Sized HRZ Development Sites

(40m x 60m, area 2,400 sqm)



### Differences Between Potential Building Areas with 1.5m and 4m setbacks

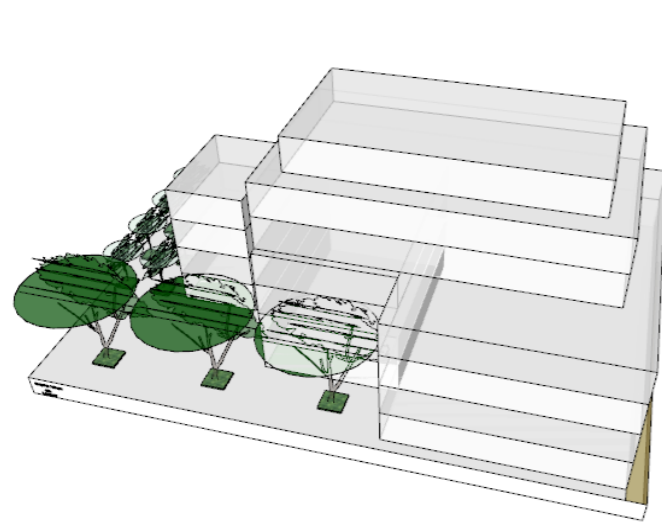
**Green:** Increases in potential building area with 4m street setback.

**Yellow:** Decreases in potential building area with 1.5m street setback.



## Typical Medium Sized HRZ Development Sites

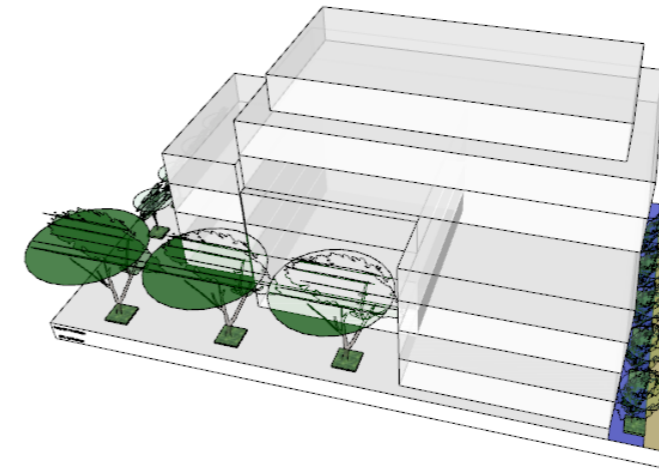
(30m x 50m, area 1,500sqm)



### 1.5m Setback

#### North Orientation (Street-facing)

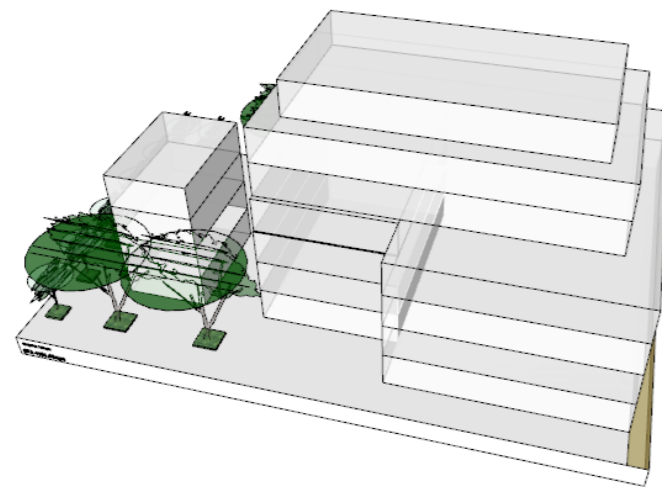
- GFA: 4,162sqm (approximately)



### 4m Setback

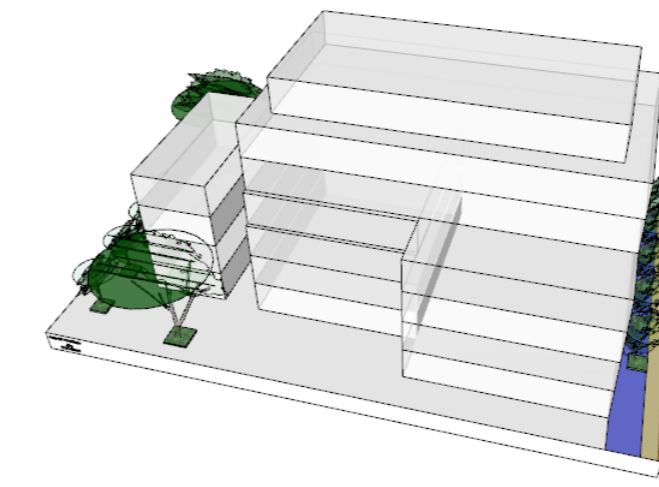
#### North Orientation (Street-facing)

- GFA: 4,271.8sqm (approximately)



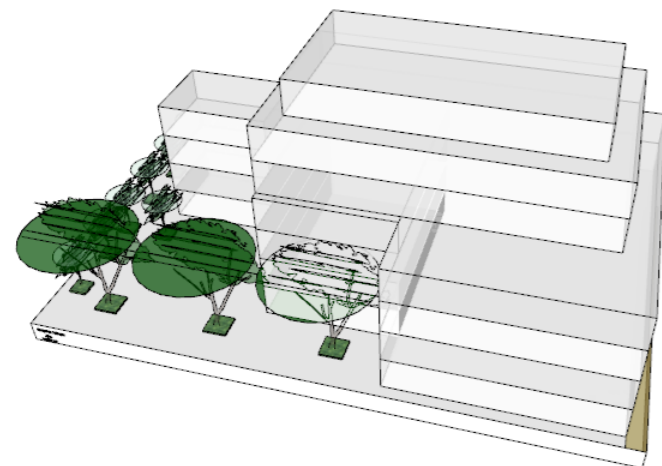
#### East Orientation (Street-facing)

- GFA: 4,155.4sqm (approximately)



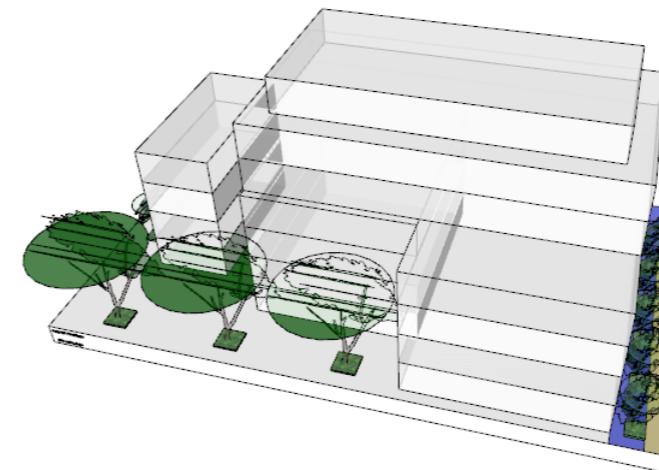
#### East Orientation (Street-facing)

- GFA: 4,266.9sqm (approximately)



#### South Orientation (Street-facing)

- GFA: 4,162sqm (approximately)

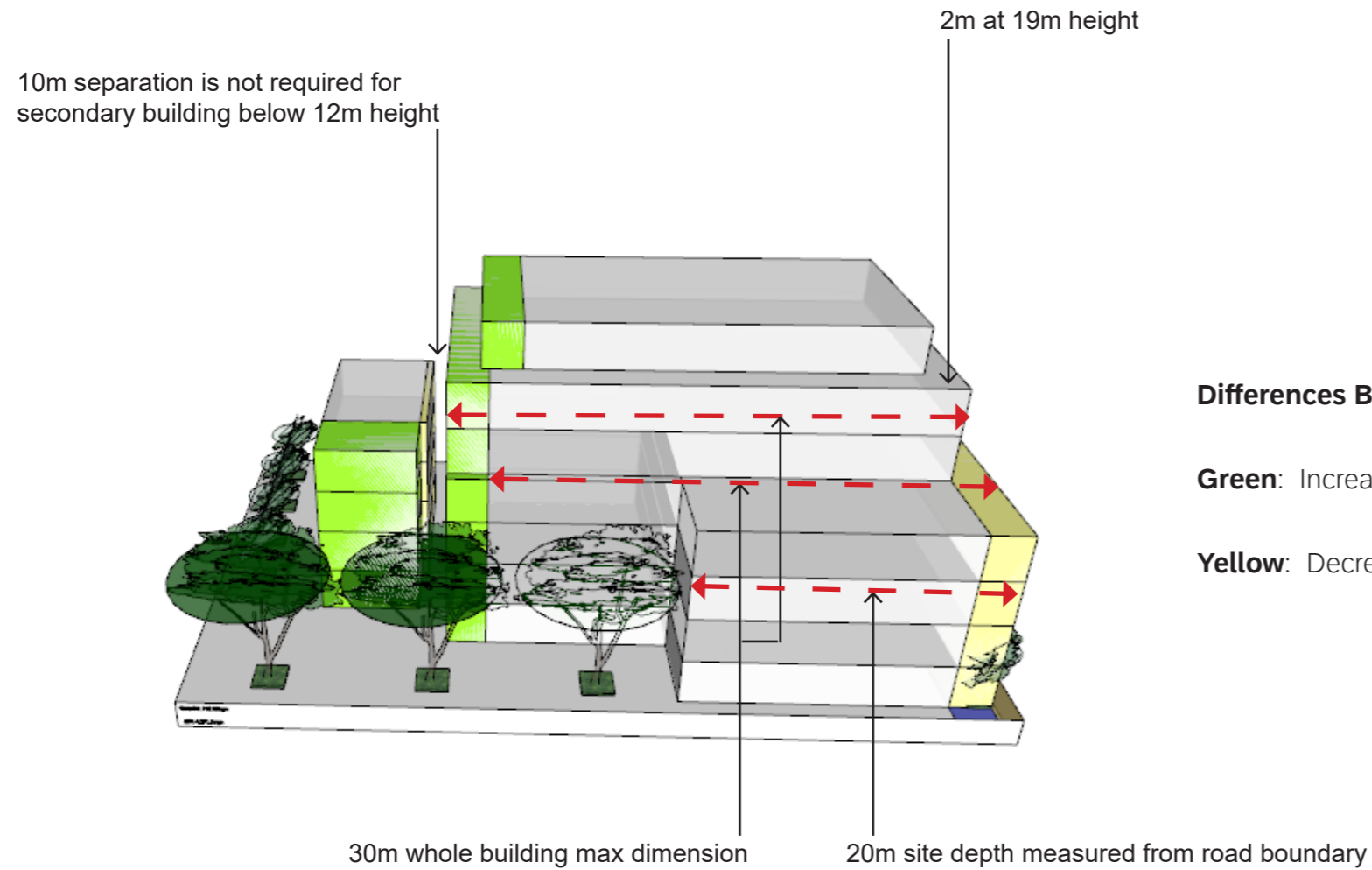


#### South Orientation (Street-facing)

- GFA: 4,271.8sqm (approximately)

## Typical Medium Sized HRZ Development Sites

(30m x 50m, area 1,500sqm)



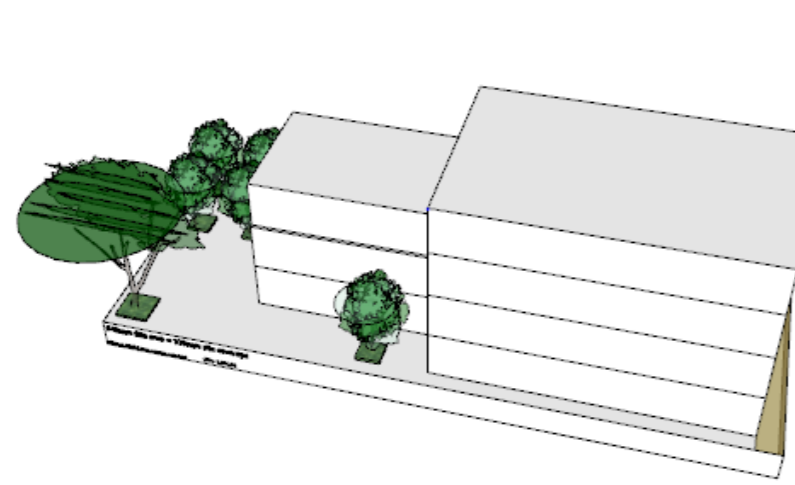
### Differences Between Potential Building Areas with 1.5m and 4m setbacks

**Green:** Increases in potential building area with 4m street setback.

**Yellow:** Decreases in potential building area with 1.5m street setback.

# Typical Small Sized HRZ Development Sites

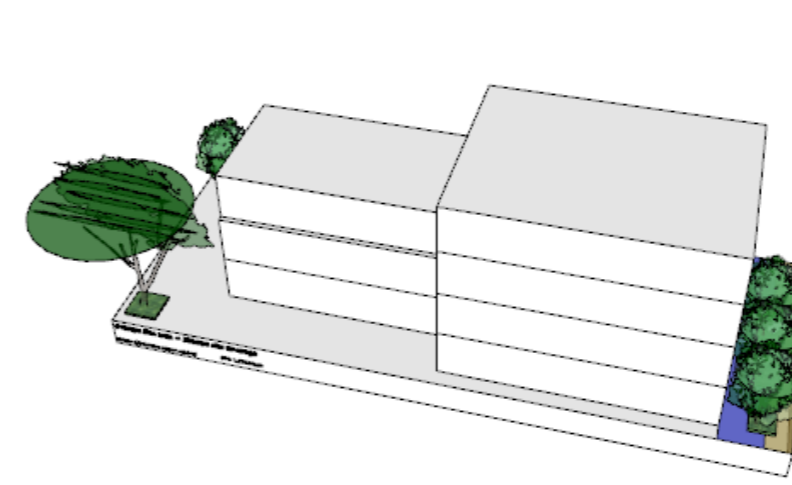
(16m x 40m, area 640sqm)



## 1.5m Setback

### North Orientation (Street-facing)

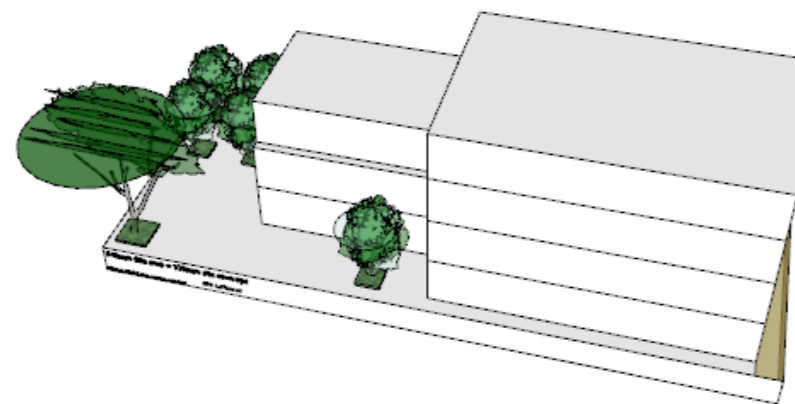
- GFA: 1,171sqm (approximately)



## 4m Setback

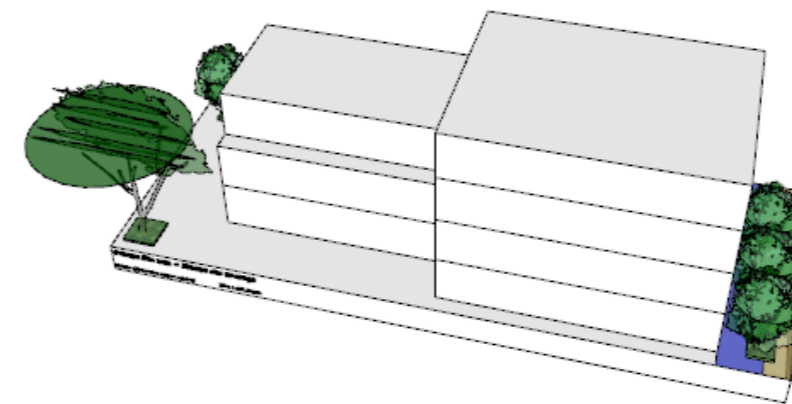
### North Orientation (Street-facing)

- GFA: 1,130sqm (approximately)



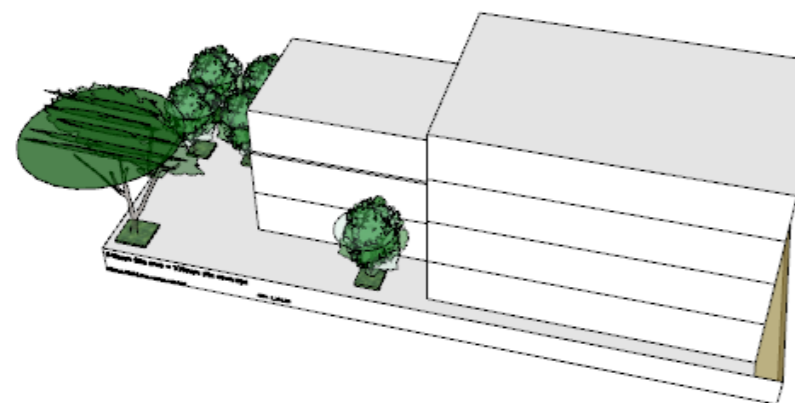
### East Orientation (Street-facing)

- GFA: 1,170sqm (approximately)



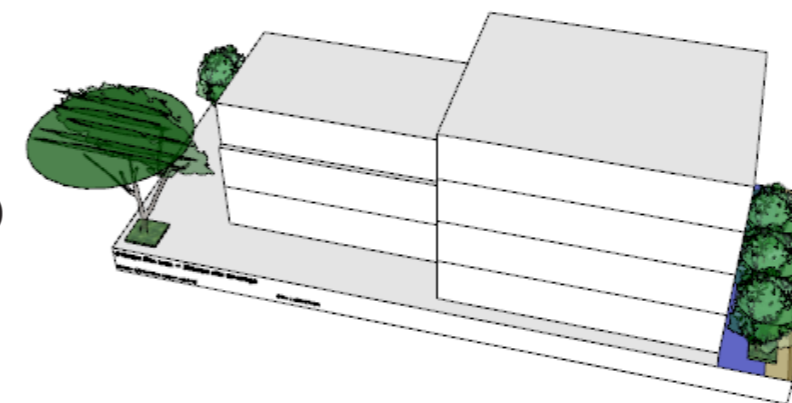
### East Orientation (Street-facing)

- GFA: 1,129sqm (approximately)



### South Orientation (Street-facing)

- GFA: 1,171sqm (approximately)

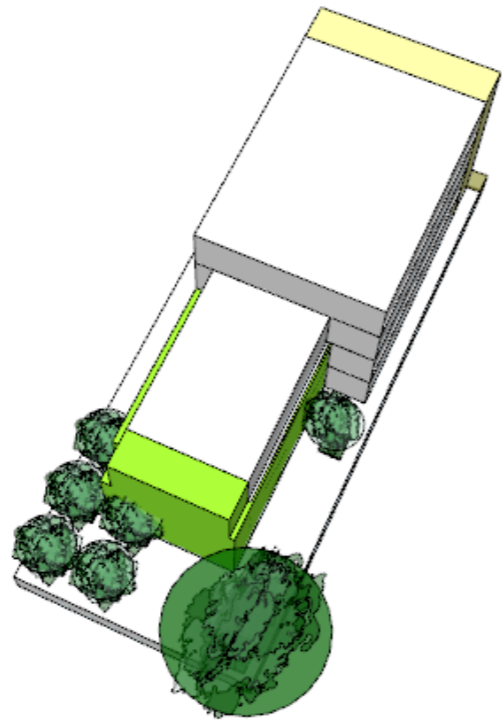


### South Orientation (Street-facing)

- GFA: 1,130sqm (approximately)

## Typical Small Sized HRZ Development Sites

(16m x 40m, area 640sqm)



### Differences Between Potential Building Areas with 1.5m and 4m setbacks

**Green:** Increases in potential building area with 4m street setback.

**Yellow:** Decreases in potential building area with 1.5m street setback.