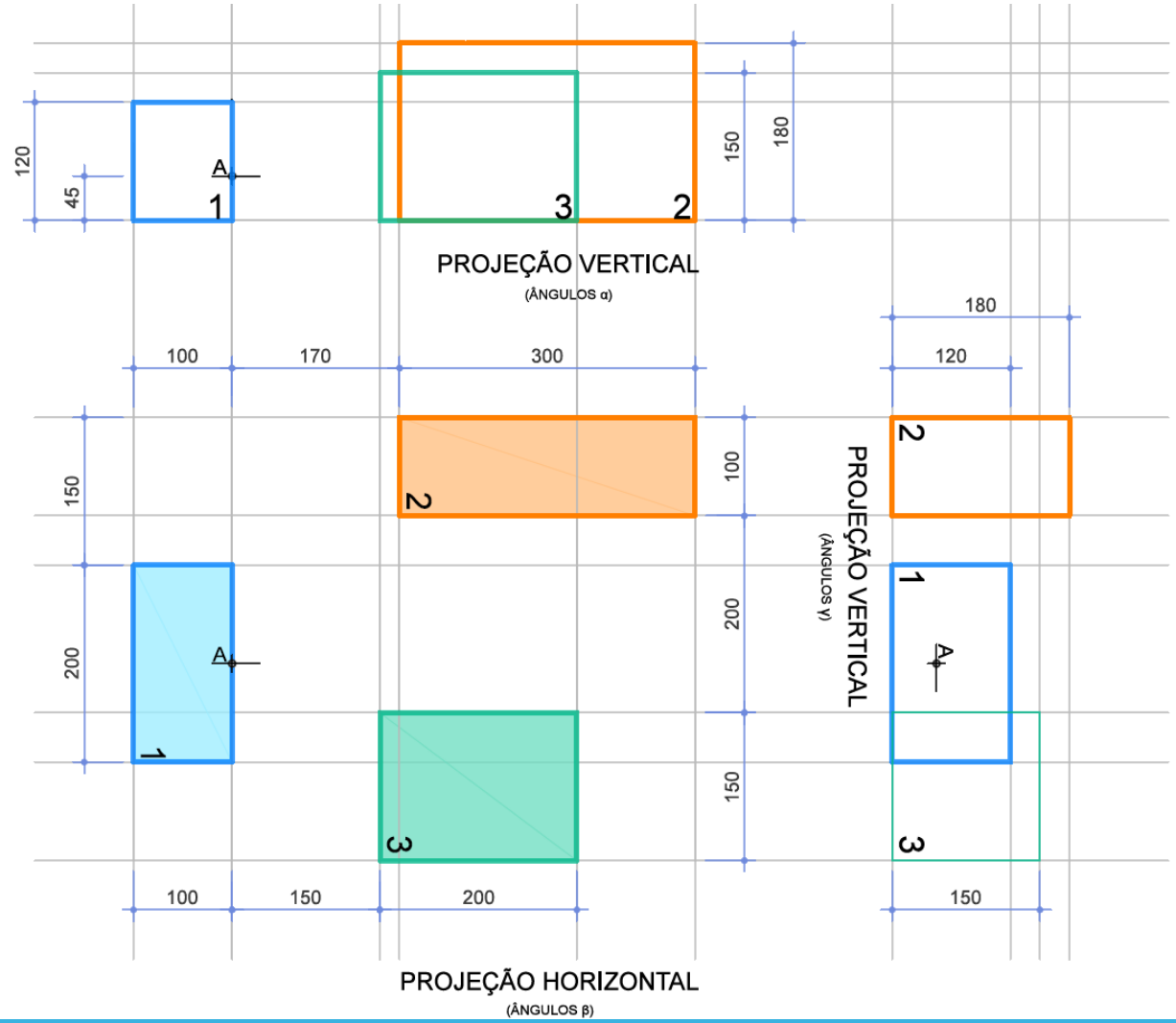
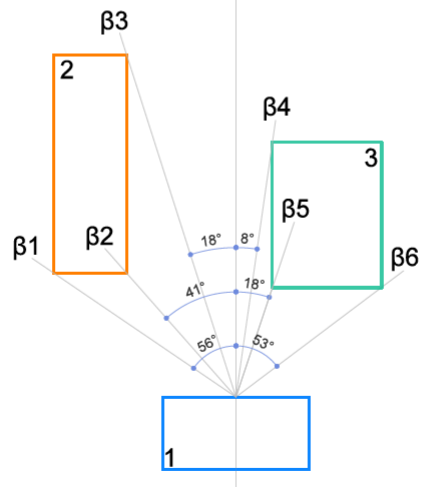
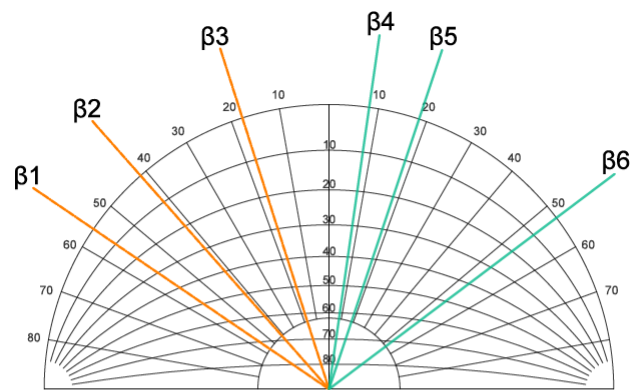


# RECAPITULANDO...

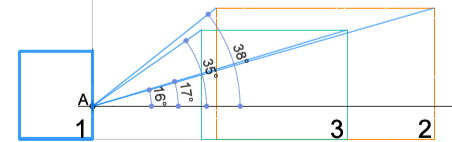
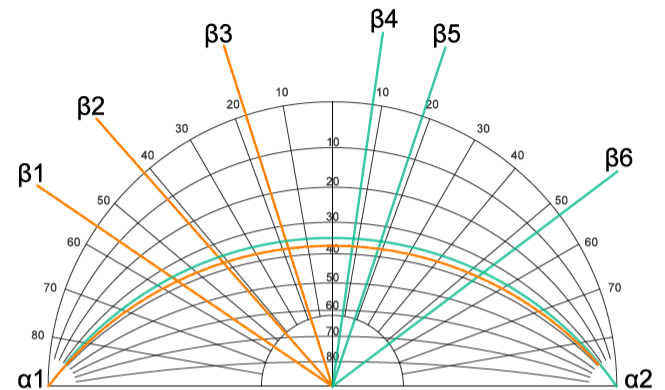
MASCARAMENTO

Faculdade de Arquitetura e Urbanismo – FAUUSP  
Departamento de Tecnologia  
AUT0272 – Sol, Arquitetura e Urbanismo

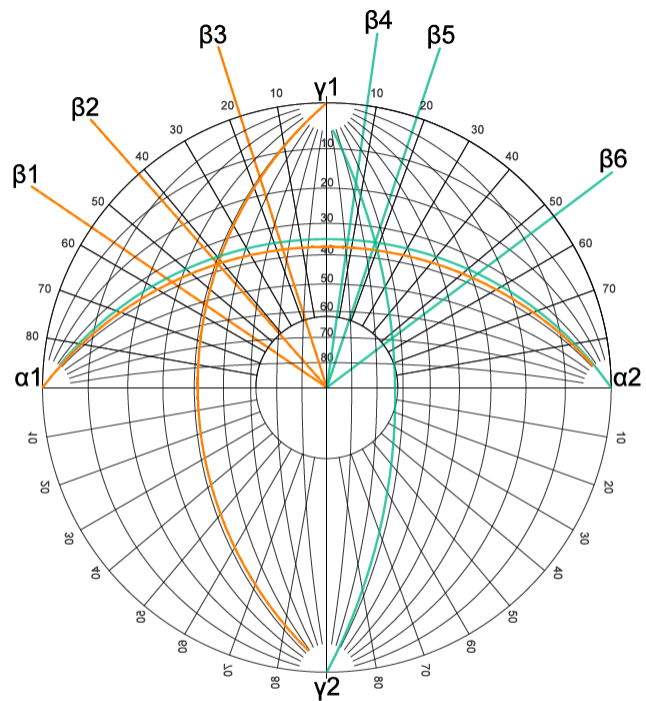




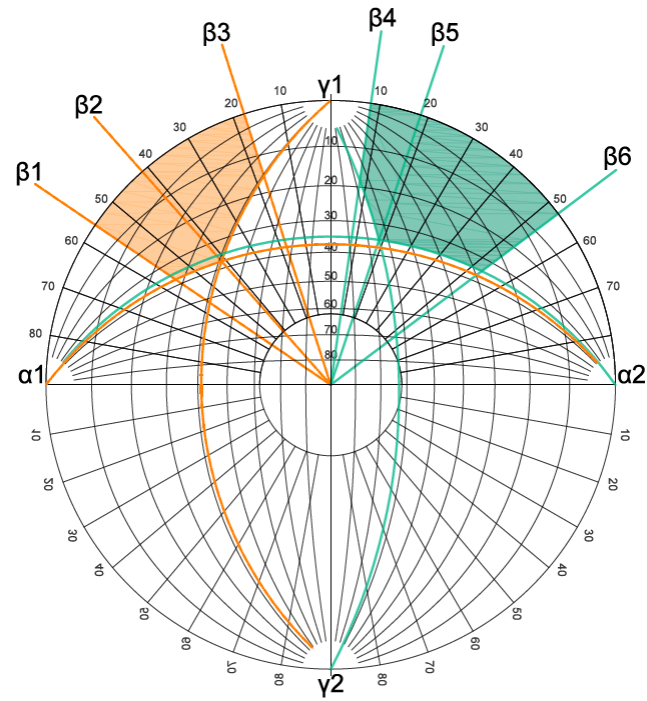
PROJEÇÃO HORIZONTAL  
(ÂNGULOS  $\beta$ )




PROJEÇÃO VERTICAL  
(ÂNGULOS  $\alpha$ )



PROJEÇÃO VERTICAL  
(ÂNGULOS  $\gamma$ )



Mascaramento final



PENETRAÇÃO SOLAR



**Áreas de transição:  
Dispositivos de bloqueamento solar e qualidade  
ambiental em edifícios modernistas**



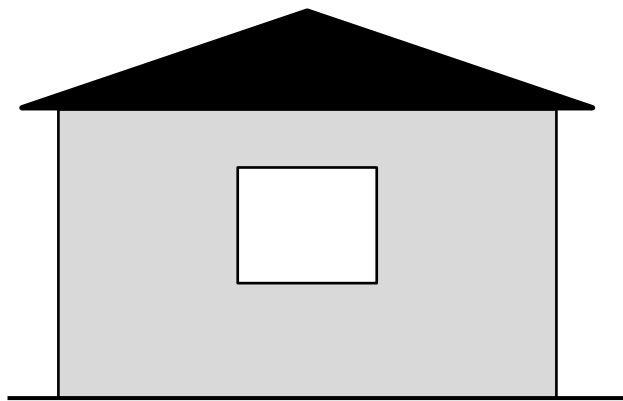


**Bercy II Shopping Center, Paris, França (1990)**



**Luís Barragan**

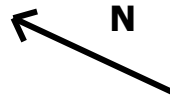




Vista Frontal

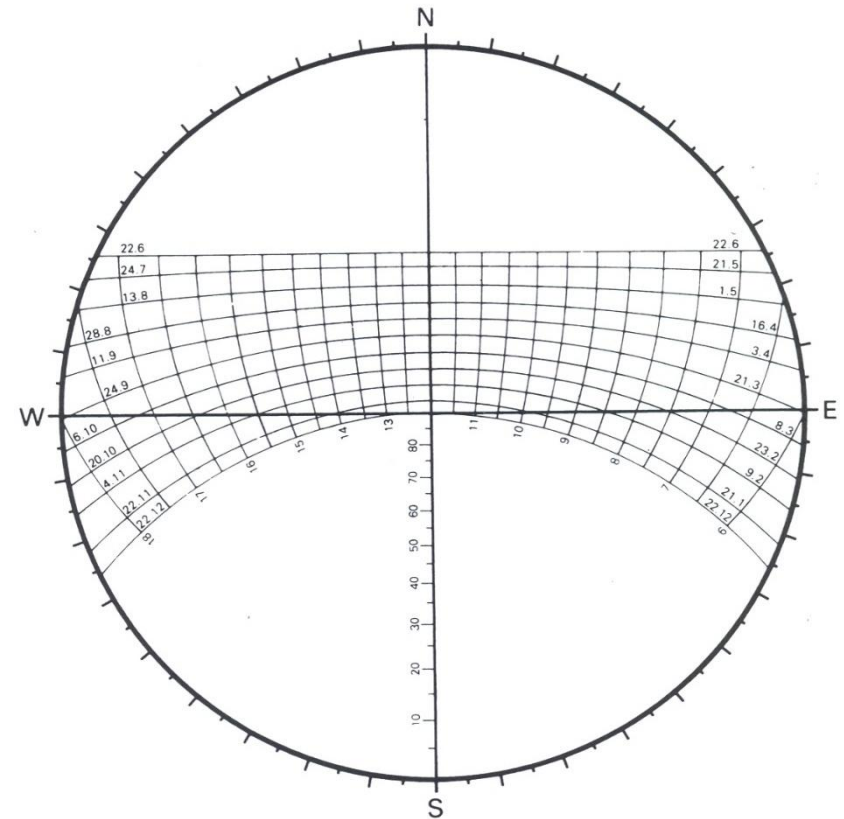


Planta



## Carta Solar

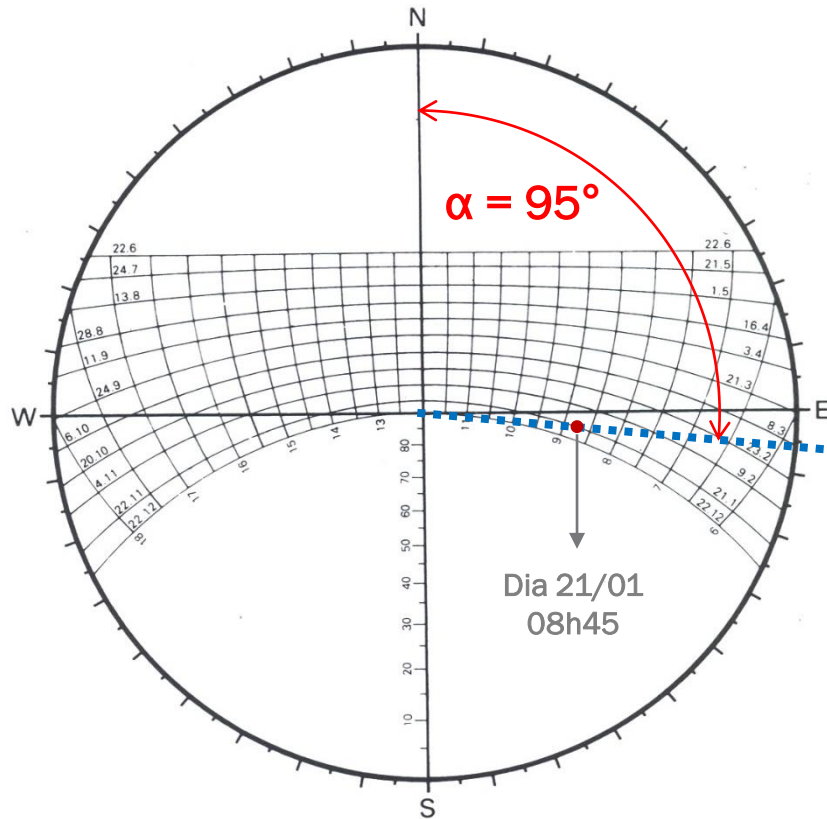
Latitude 24° Sul



**ENUNCIADO:** Traçar a penetração solar do ambiente acima representado localizado na cidade de São Paulo (Latitude 24° Sul), para o dia 21/01, às 8h45 da manhã.

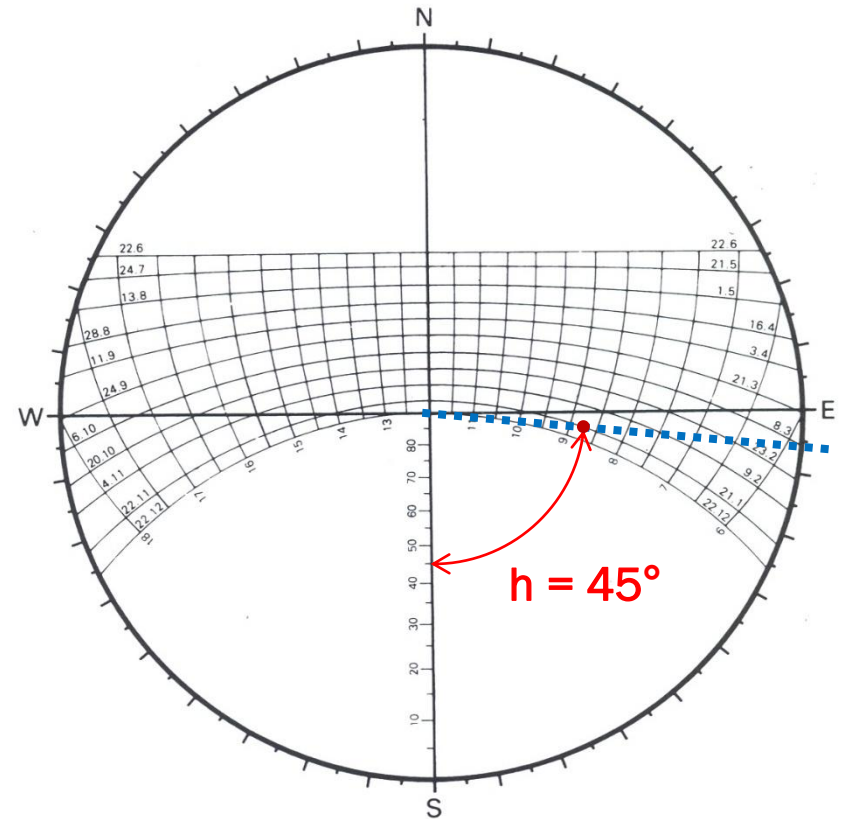
## Azimute ( $\alpha$ )

Latitude 24° Sul

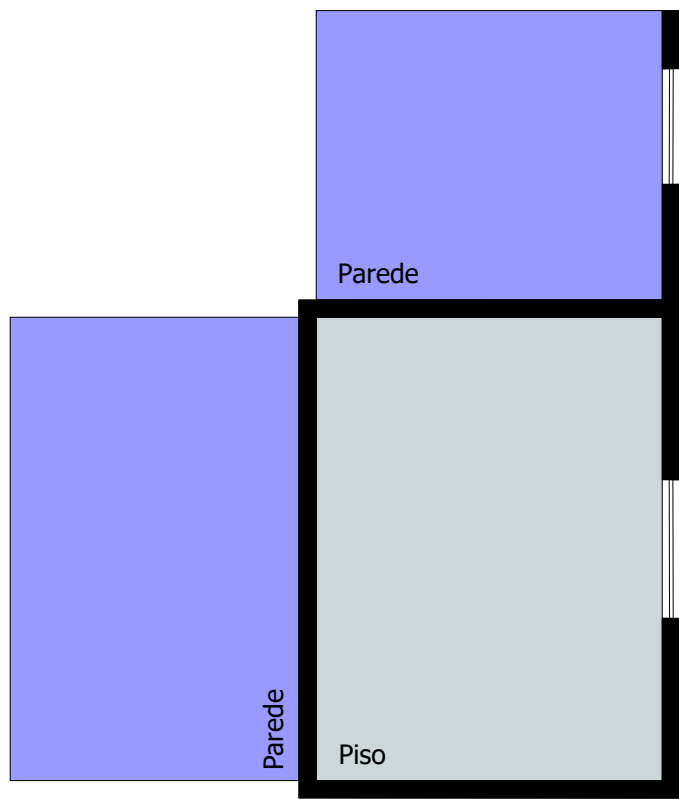


## Altura Solar (h)

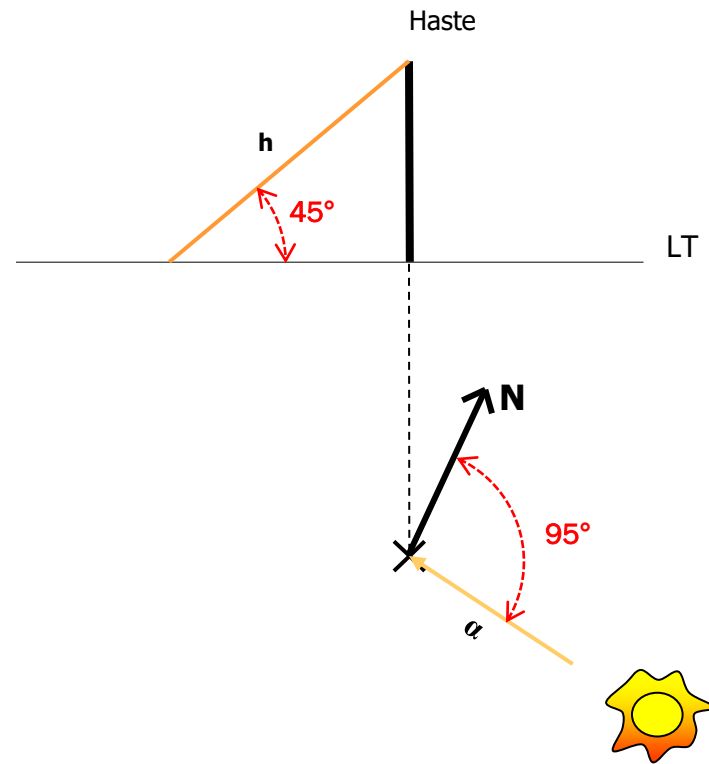
Latitude 24° Sul



**PASSO 1:** Encontrar, na carta solar, os valores do azimuth e da altura solar.

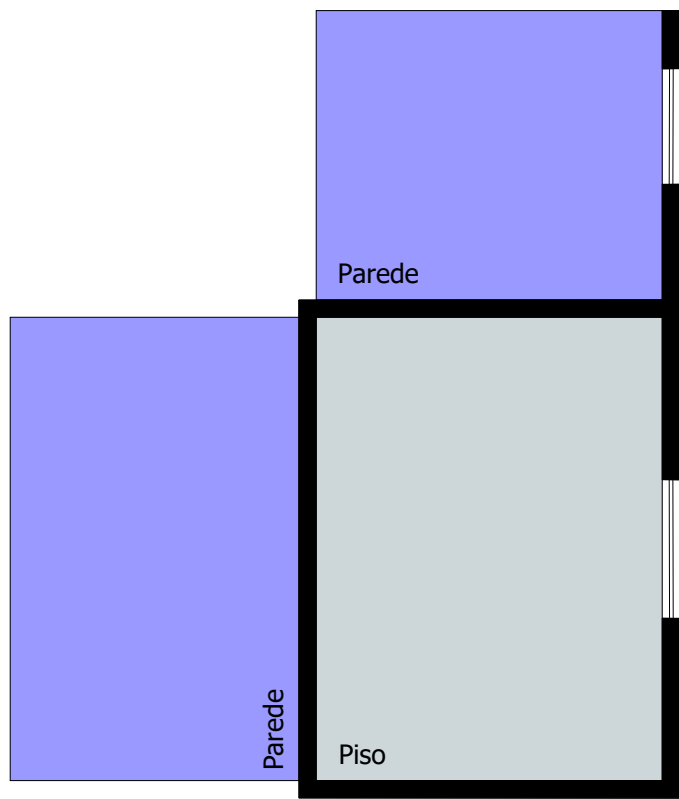


Representação explodida do ambiente analisado



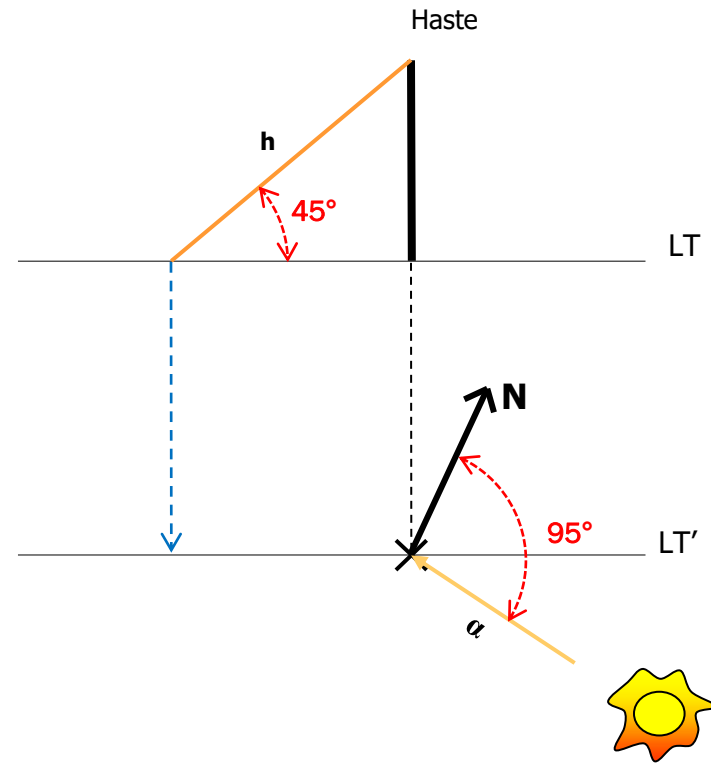
Vista Superior

**PASSO 2:** A partir de uma haste auxiliar, traçar o azimute e a altura solar.



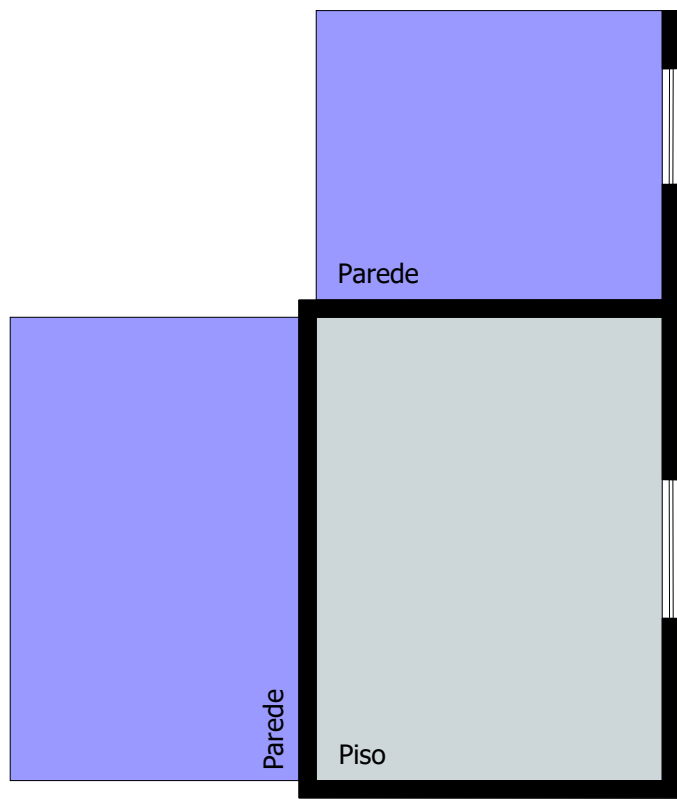
Representação explodida do ambiente analisado

Vista Lateral



Vista Superior

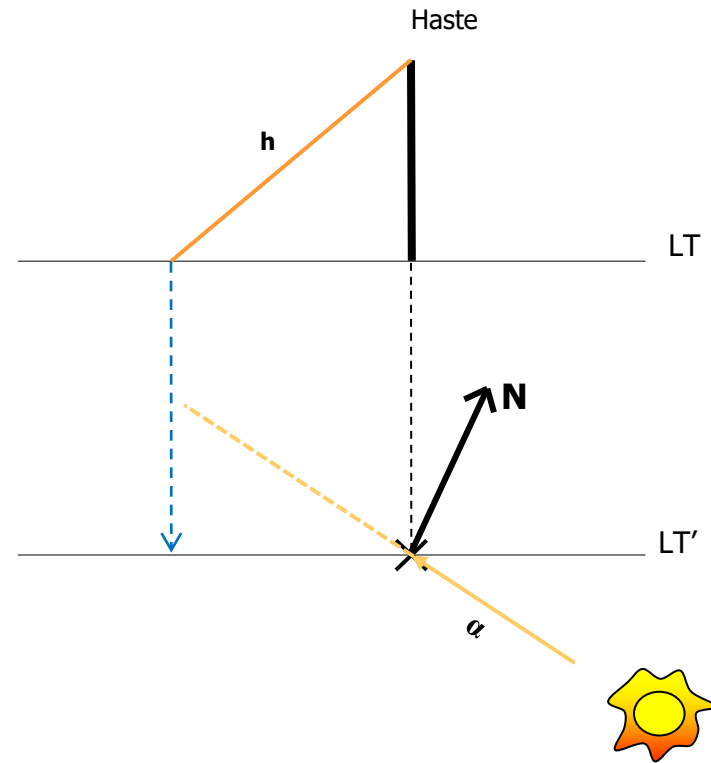
**PASSO 3:** Traçar o plano vertical paralelo a linha de terra (LT), passando pela base da haste em vista superior (Linha de Terra Auxiliar – LT'). Em seguida, traçar uma linha que passa pela extremidade da sombra até o plano vertical paralelo LT'.



Representação explodida do ambiente analisado



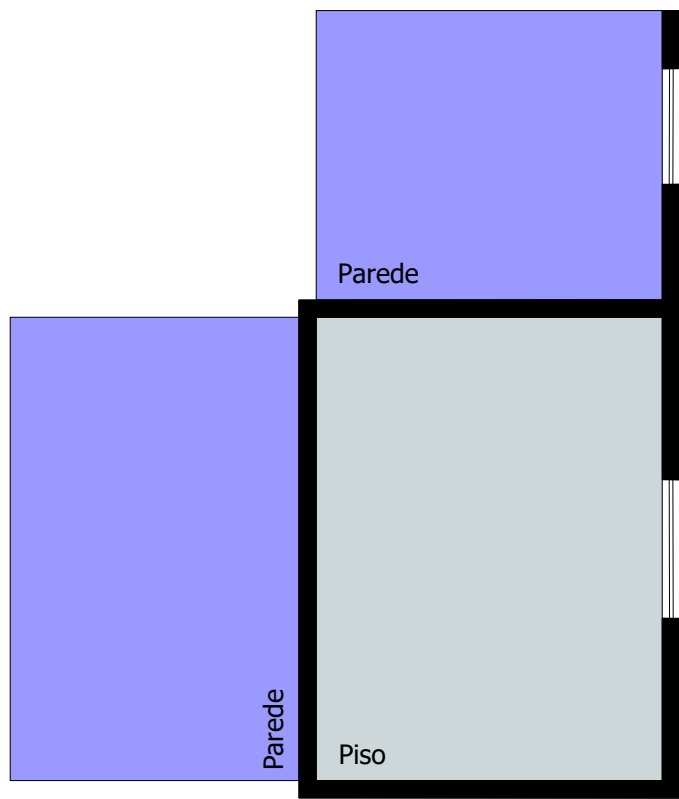
Vista Lateral



Vista Superior

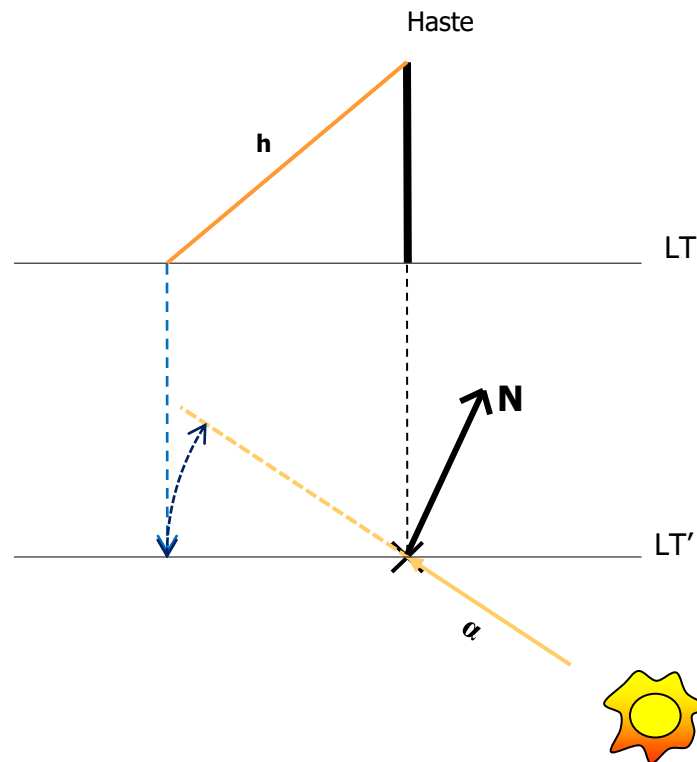
**PASSO 4:** Traçar a direção da sombra, estendendo o azimuth ( $\text{Direção} = \alpha + 180^\circ > \text{face oposta à direção do sol}$ ).





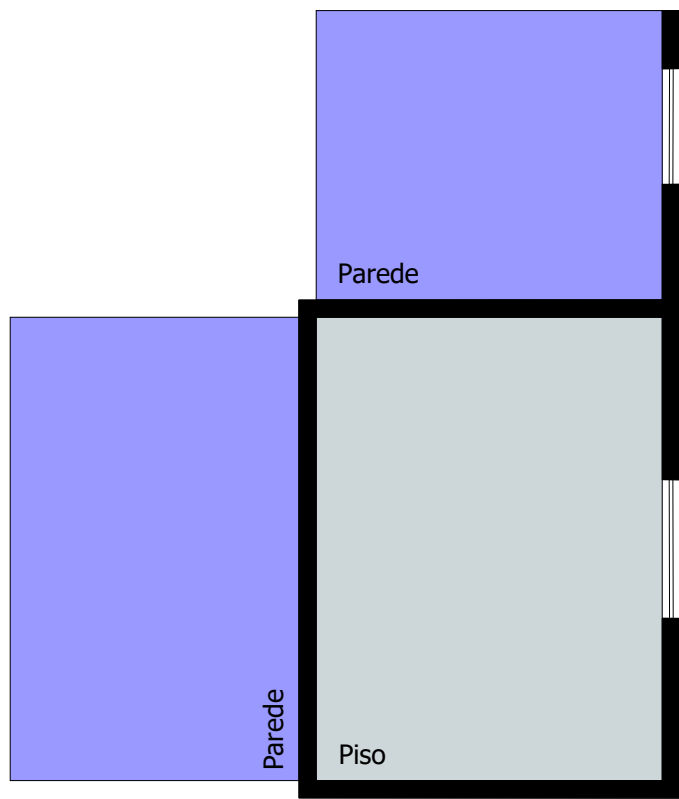
Representação explodida do ambiente analisado

Vista Lateral

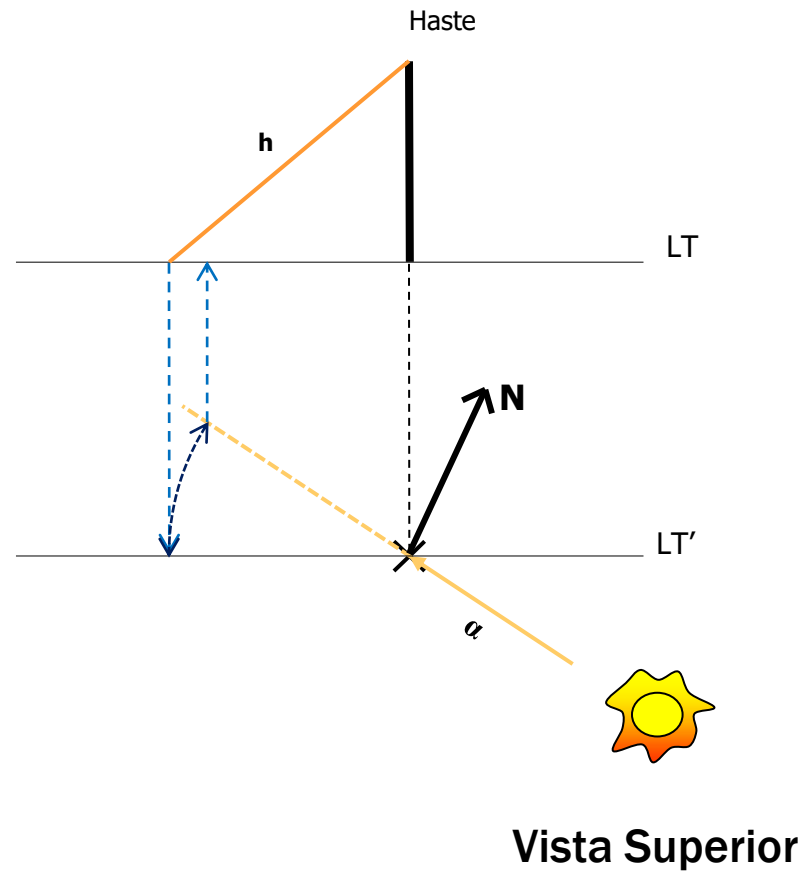


Vista Superior

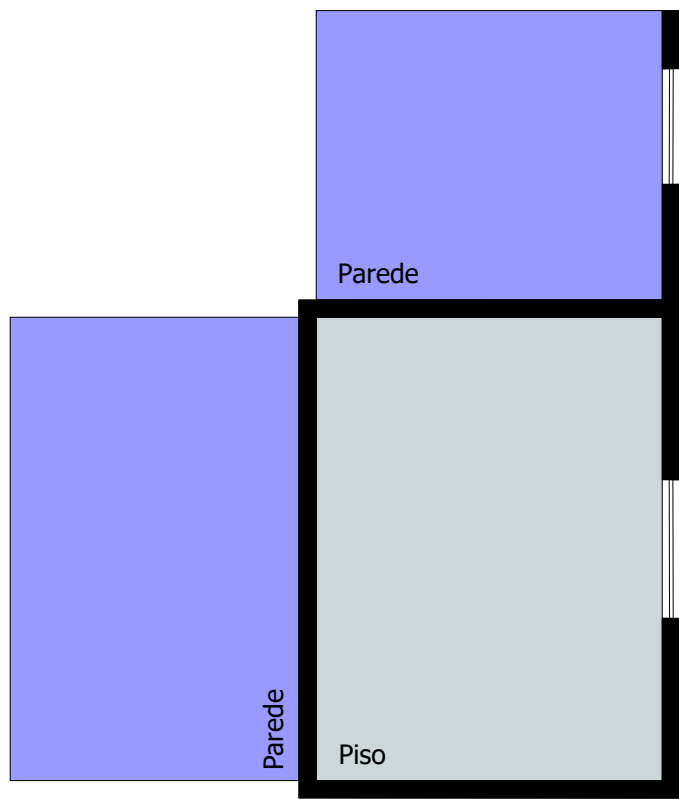
**PASSO 5:** Rebater o plano vertical até encontrar a extensão do azimuth.



Representação explodida do ambiente analisado



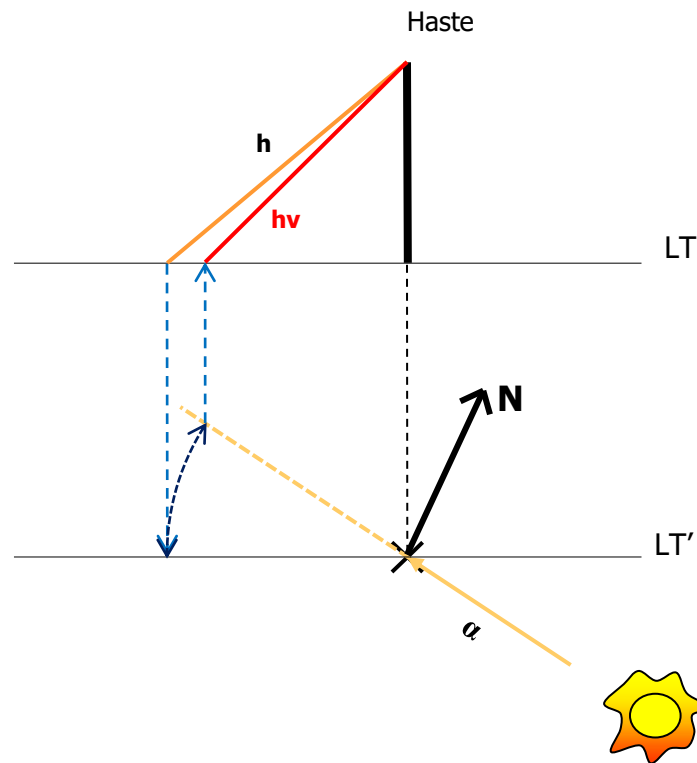
**PASSO 6:** Projetar o ponto encontrado até o plano vertical LT.



Representação explodida do ambiente analisado

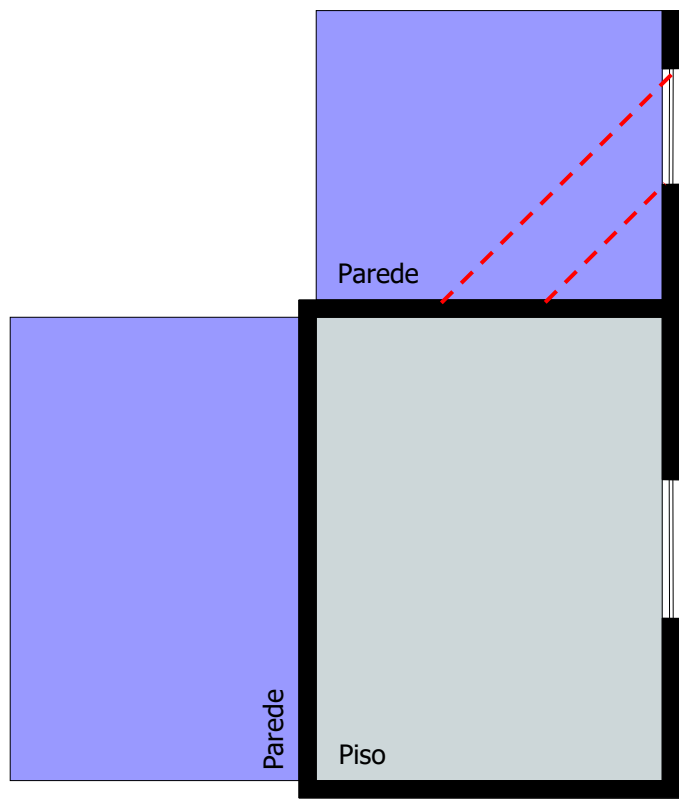


Vista Lateral

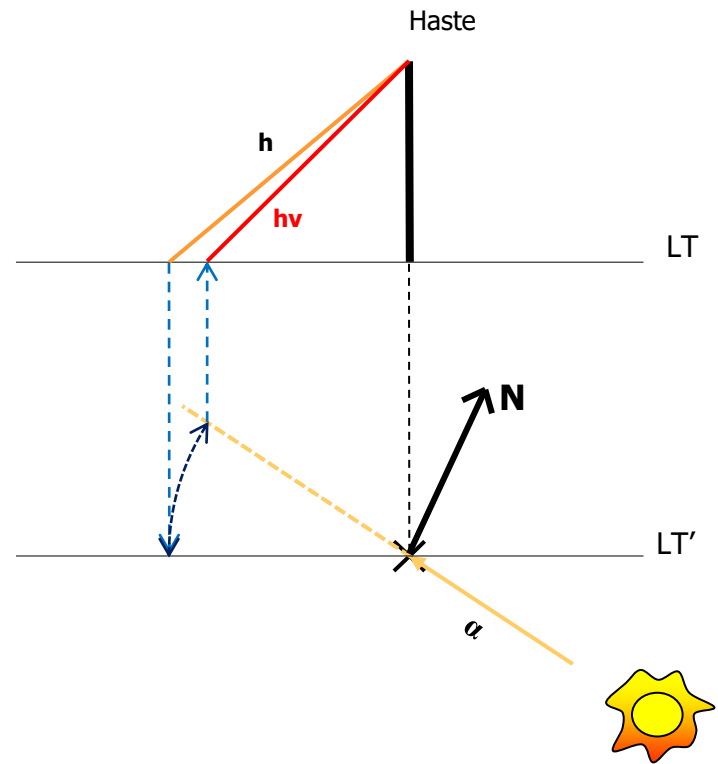
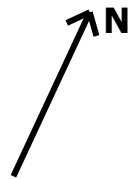


Vista Superior

**PASSO 7:** Traçar a altura projetada ( $h\nu$ ) no plano vertical.

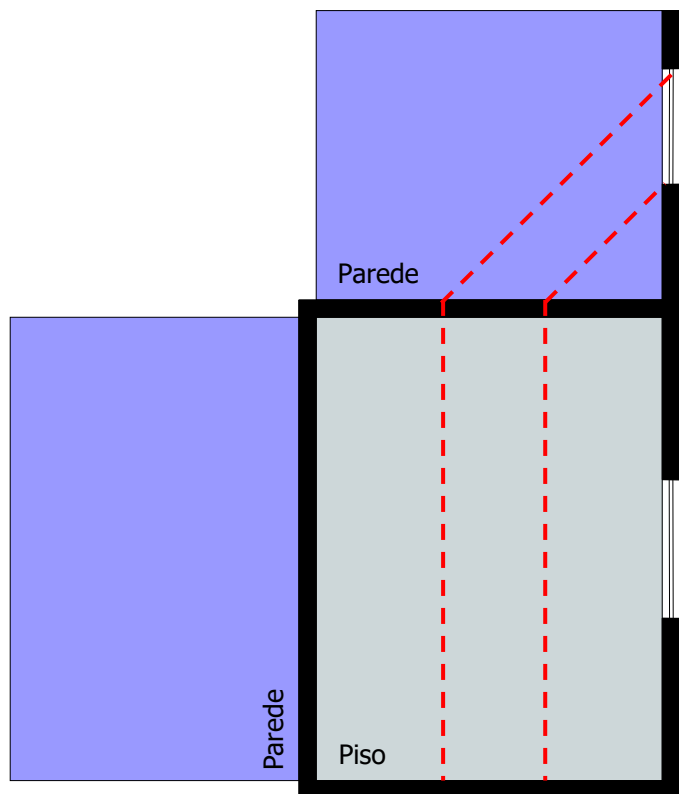


Representação explodida do ambiente analisado

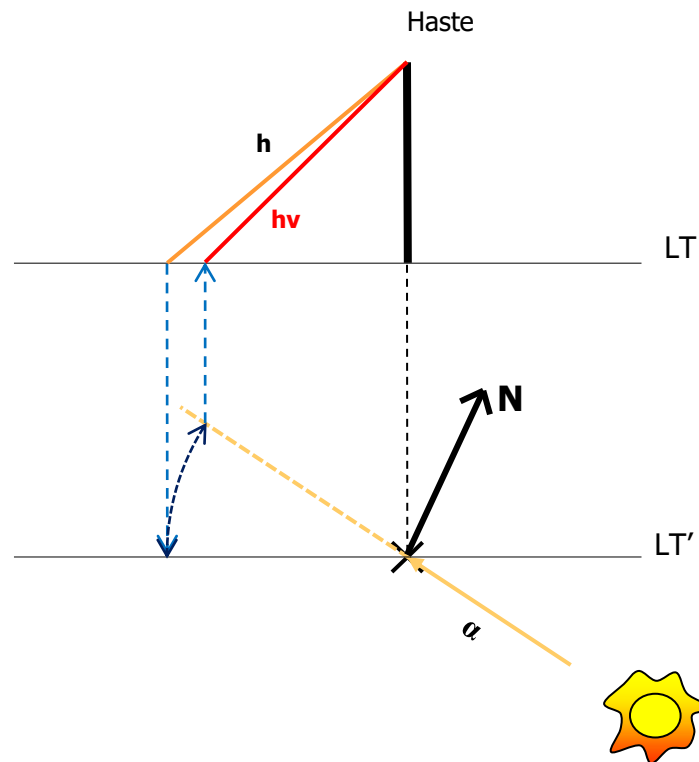


Vista Superior

**PASSO 8:** Transferir a altura projetada para a janela em corte.



Representação explodida do ambiente analisado

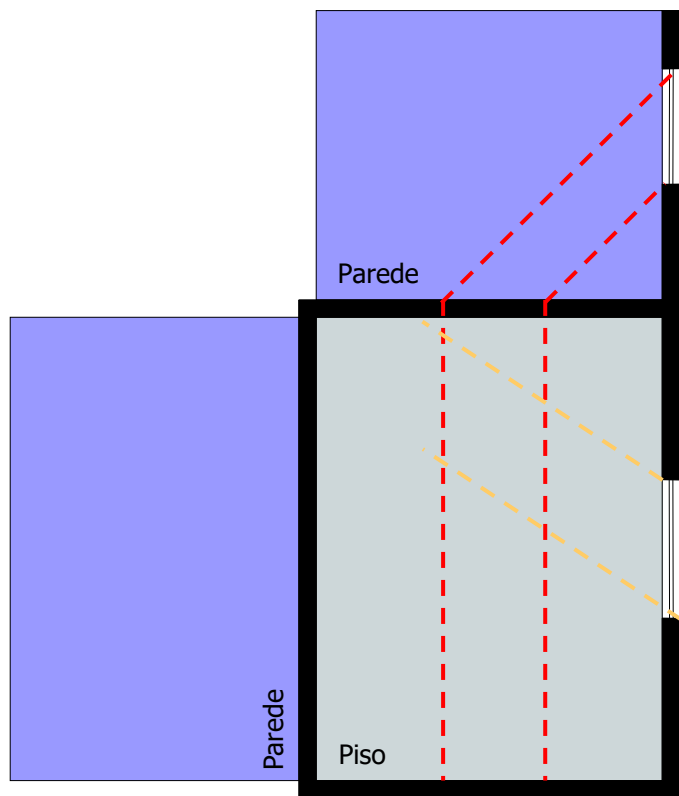


Vista Lateral

Vista Superior

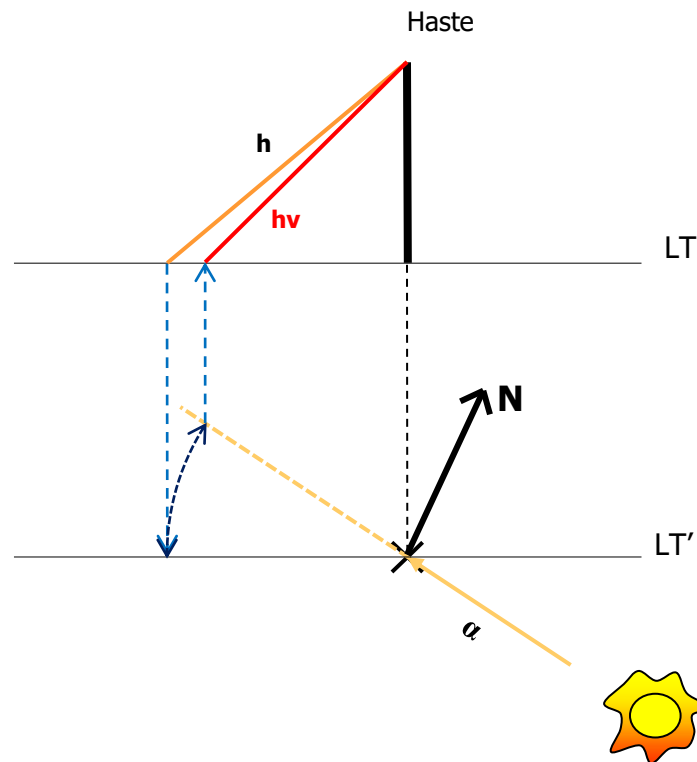
**PASSO 9: Marcar a projeção no piso.**





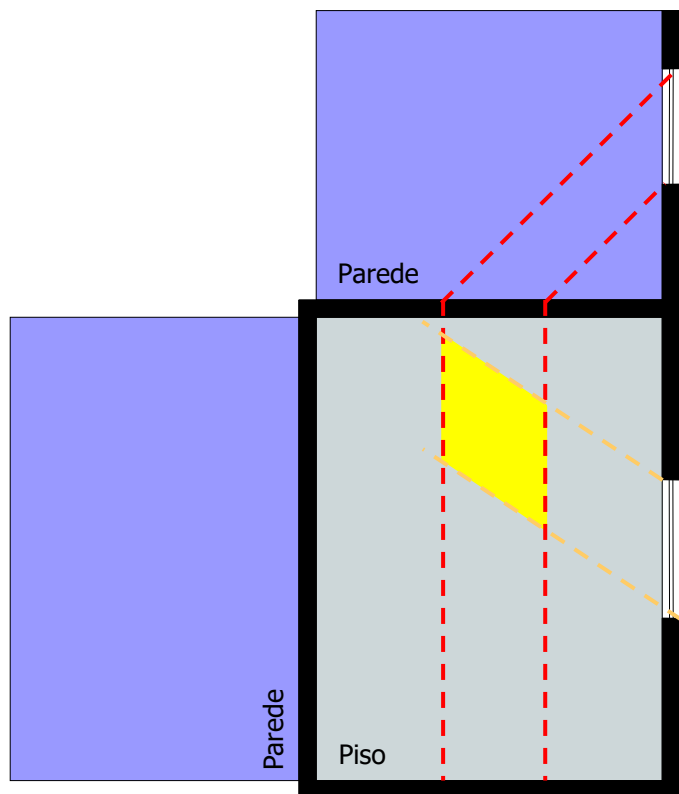
Representação explodida do ambiente analisado

Vista Lateral



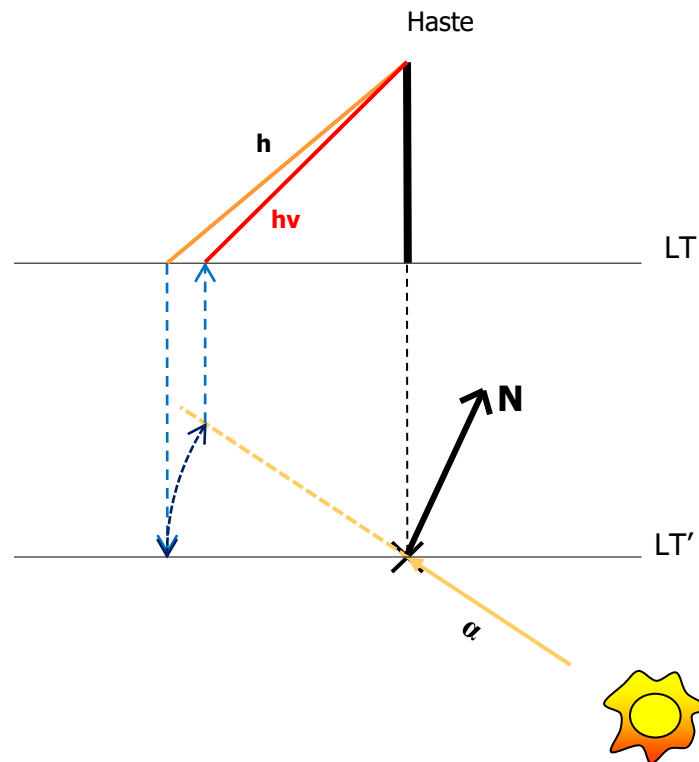
Vista Superior

**PASSO 10:** Transferir a direção da sombra em planta.



Representação explodida do ambiente analisado

Vista Lateral

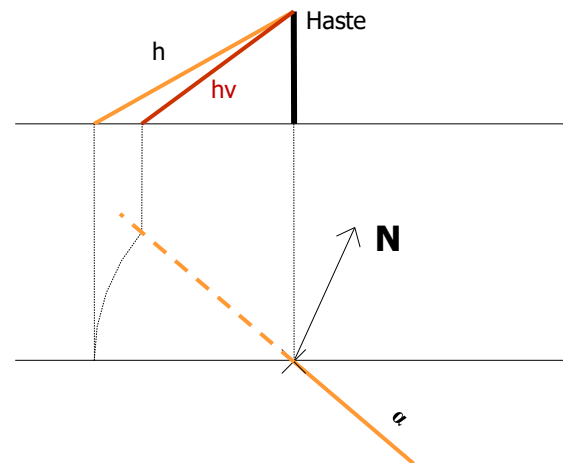
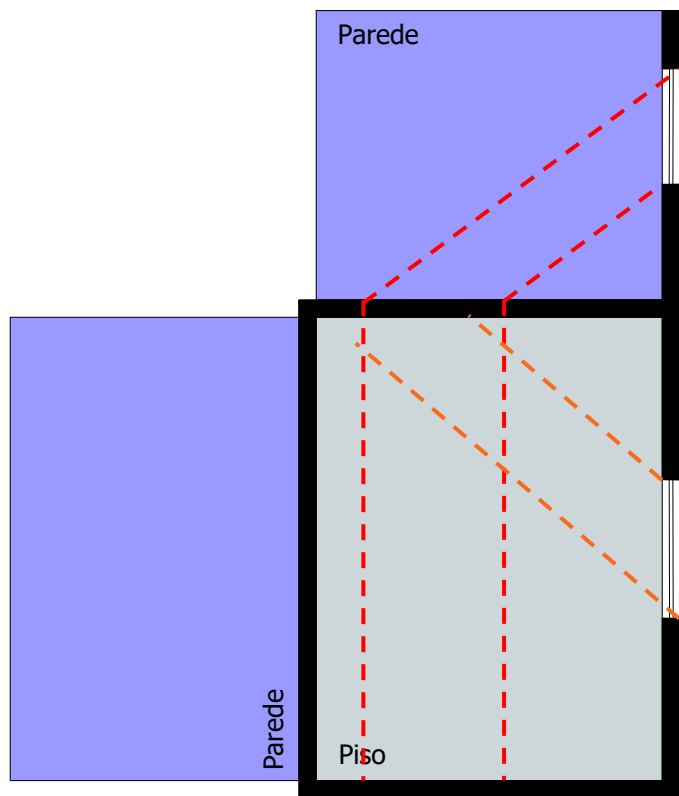


Vista Superior

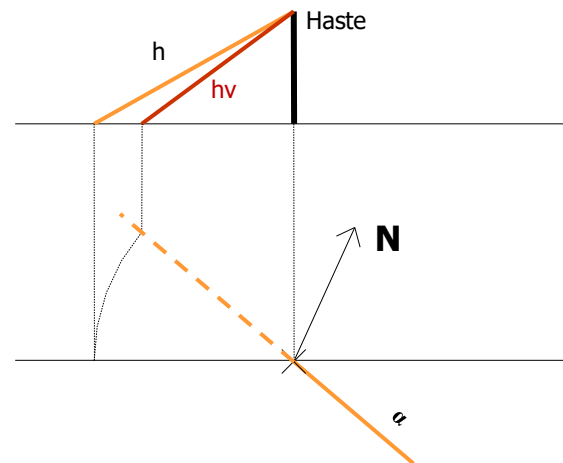
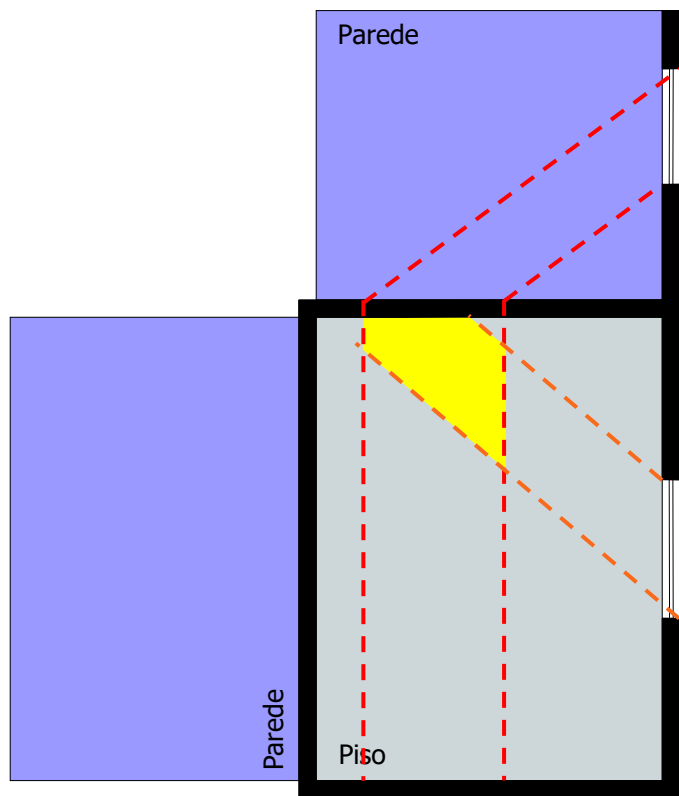


# E SE...

**... a projeção não cair  
inteiramente no piso?**

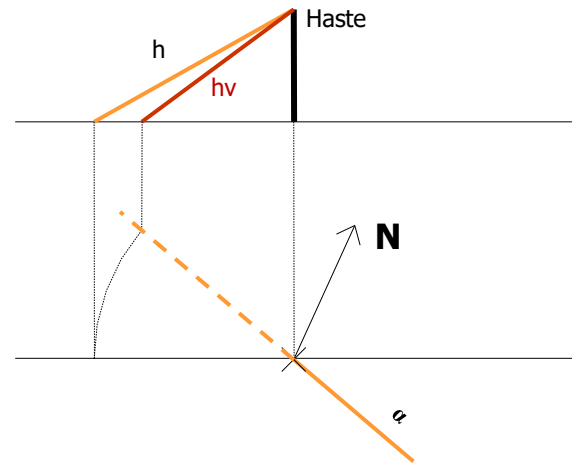
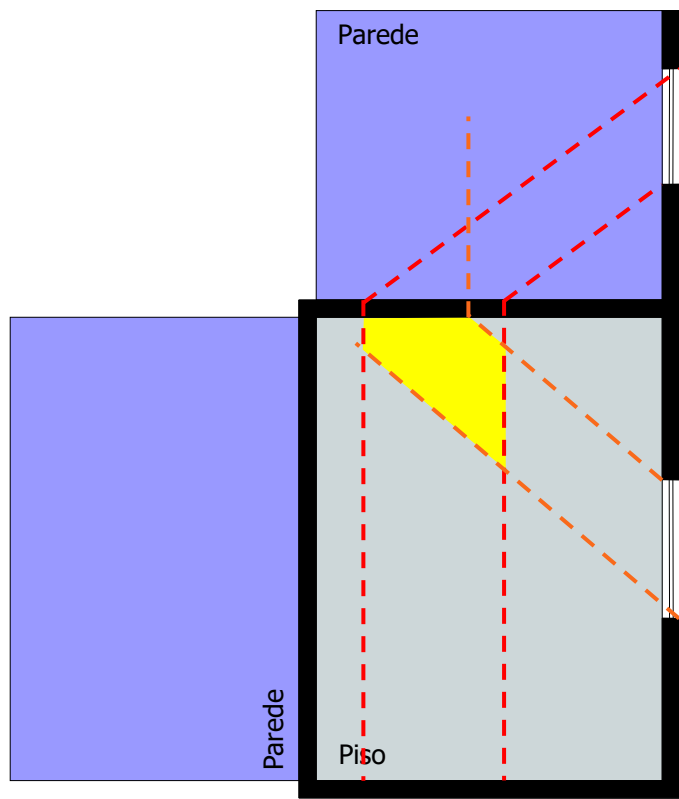


Representação explodida do ambiente analisado

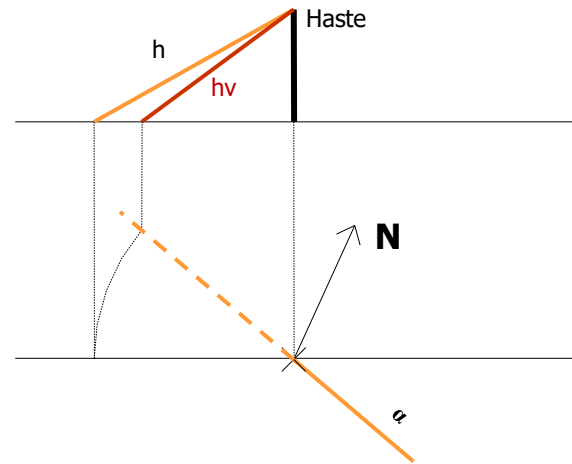
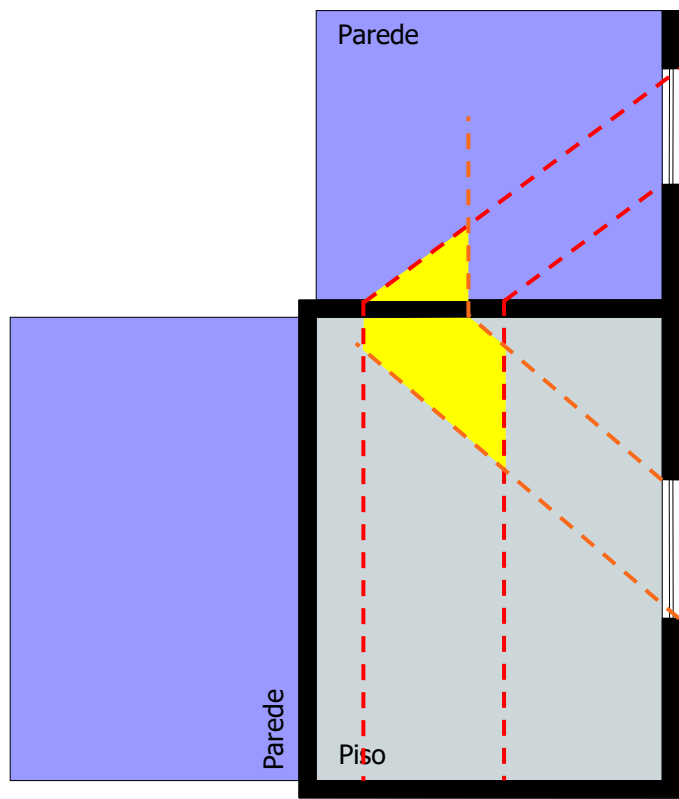


Representação explodida do ambiente analisado





Representação explodida do ambiente analisado



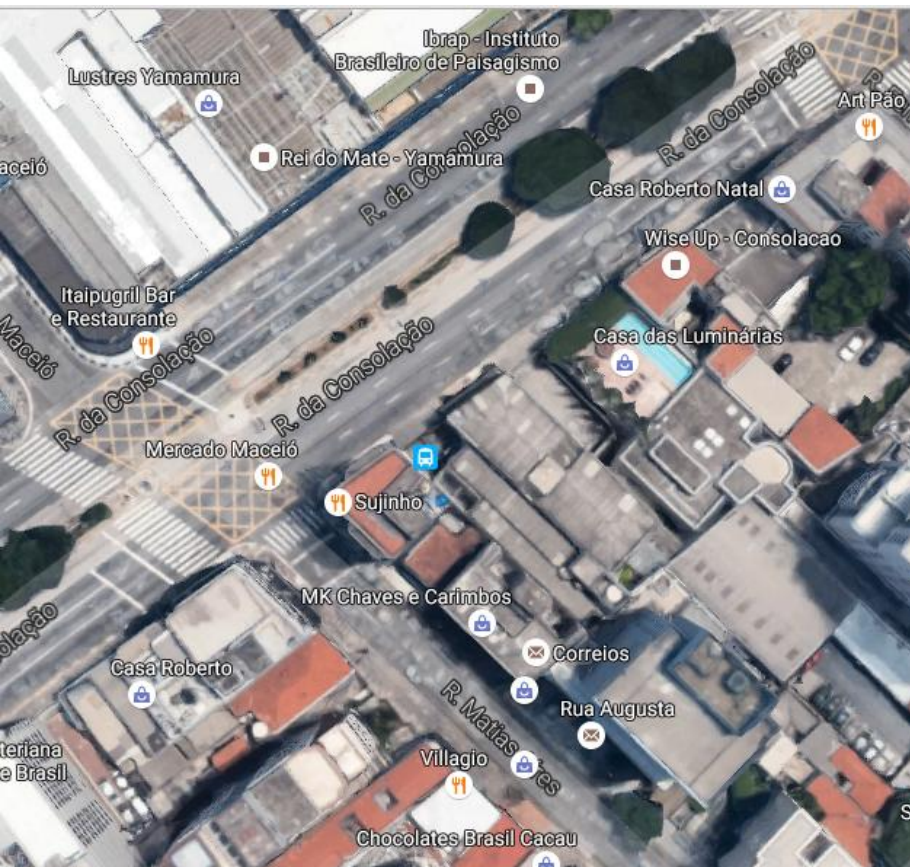
Representação explodida do ambiente analisado

# ÁREAS DE ESTUDO

EXERCÍCIOS 2 A 5

# AVENIDA PAULISTA

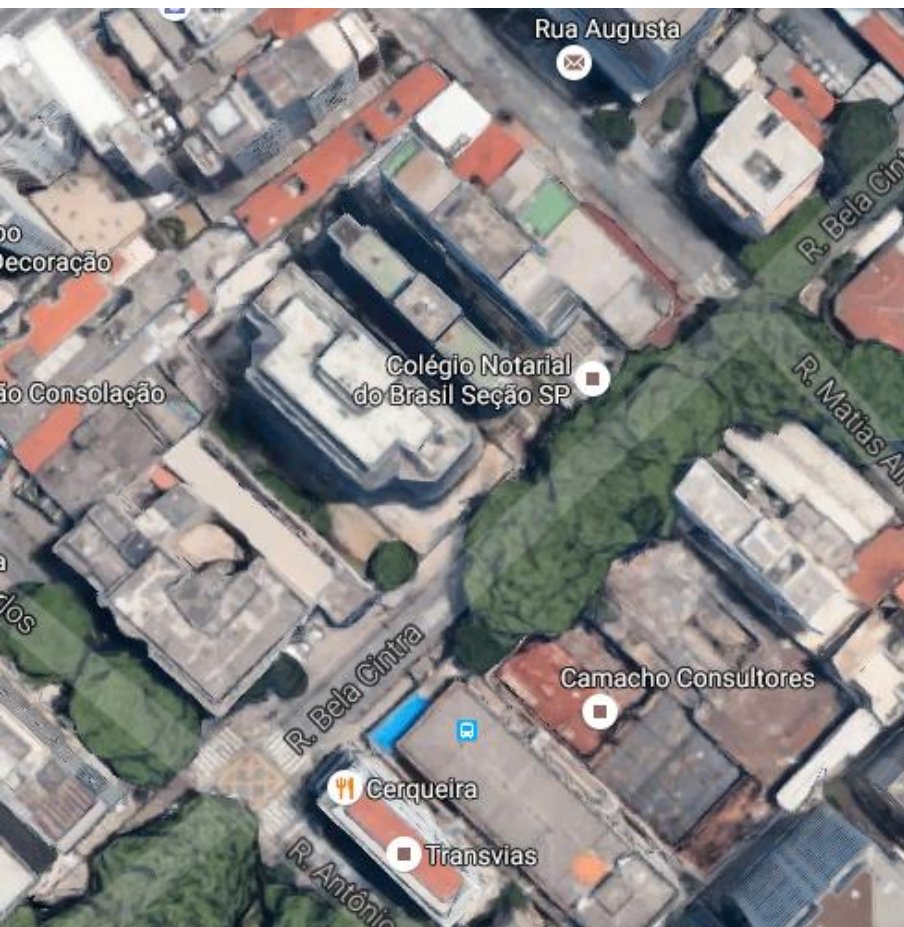
ÁREA PARA OS EXERCÍCIOS 2 A 5



# ÁREA 1A

Cruzamento da Rua da Consolação com Rua Matias Aires





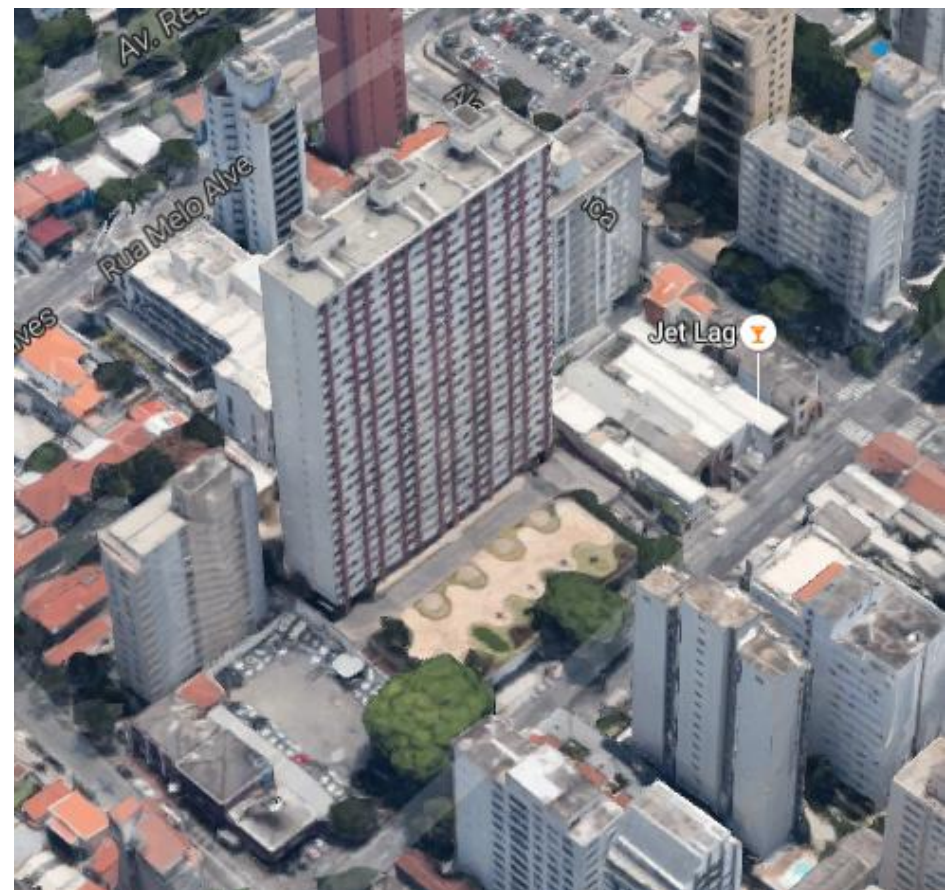
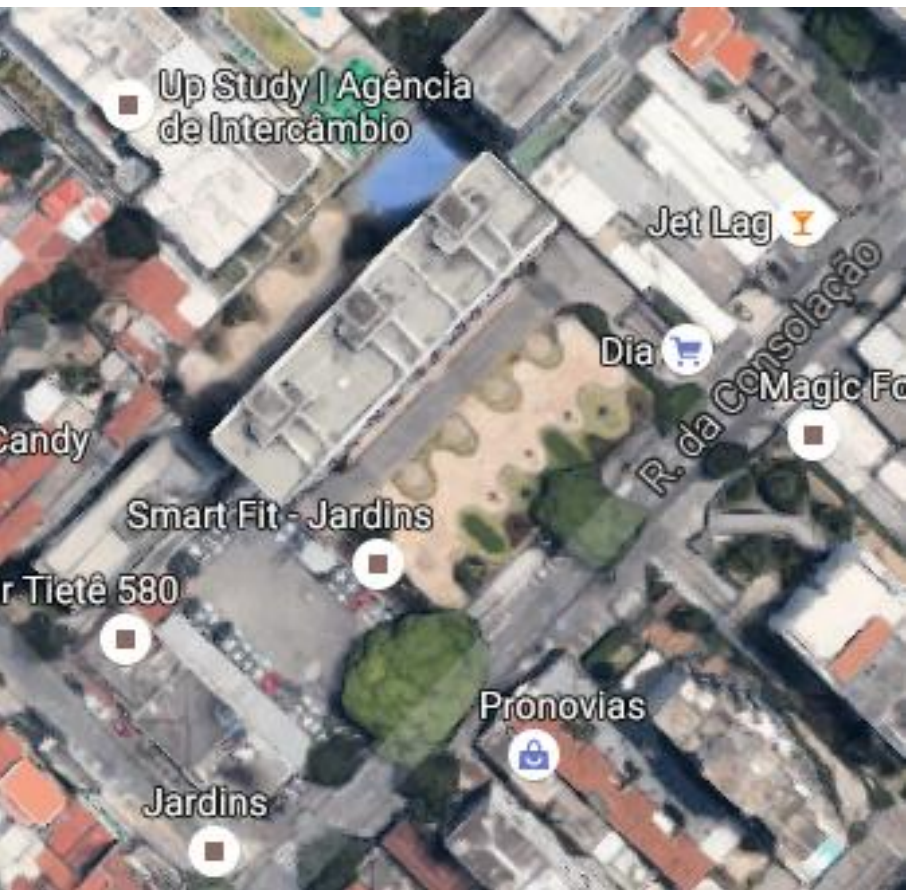
## ÁREA 2A

Rua Bela Cintra – Entre Ruas Matias Aires e Antônio Carlos





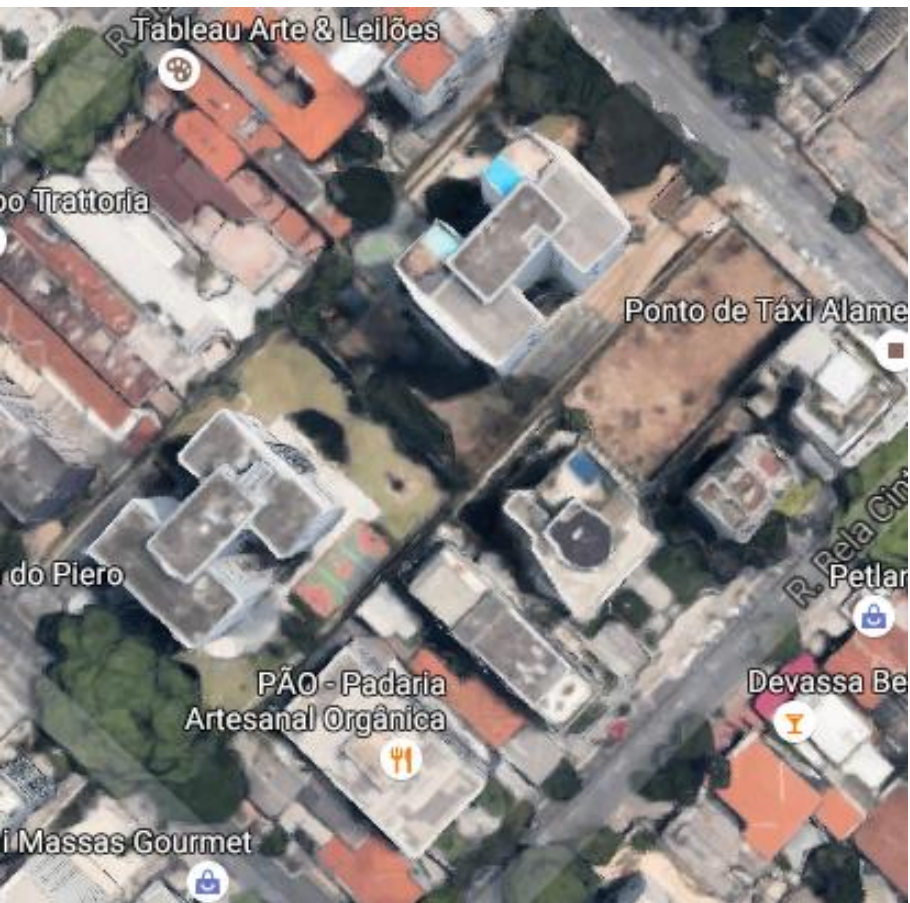




## ÁREA 4A

Rua da Consolação – Entre Alamedas França e Tietê

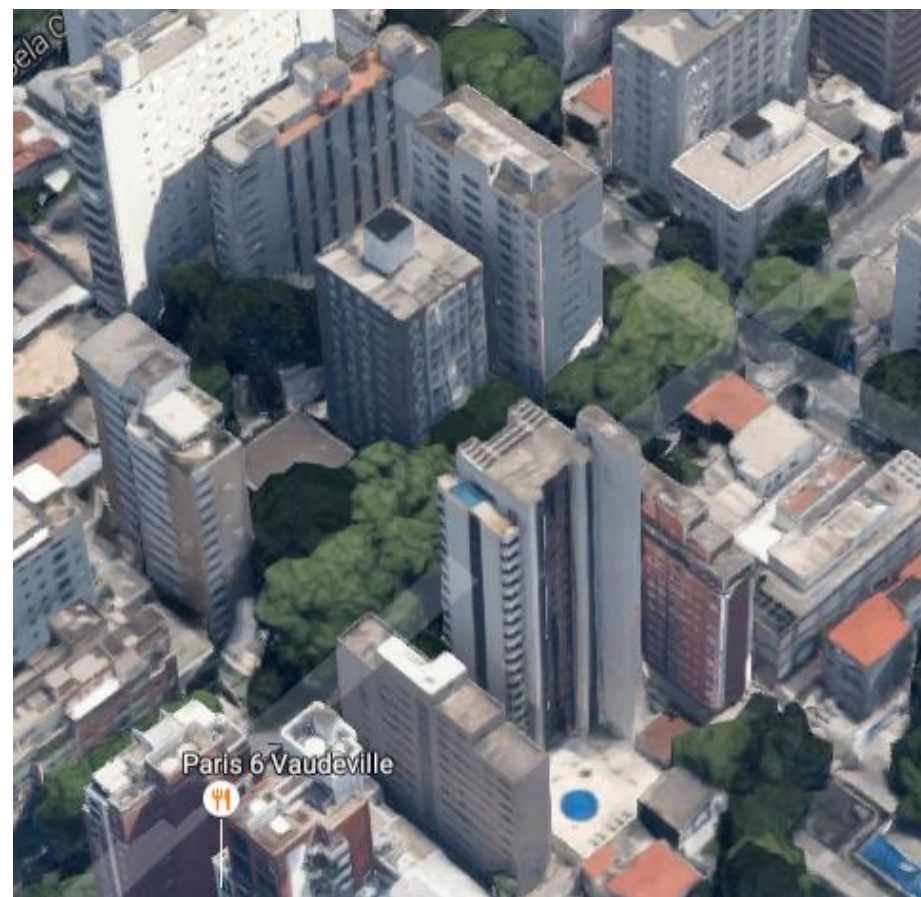
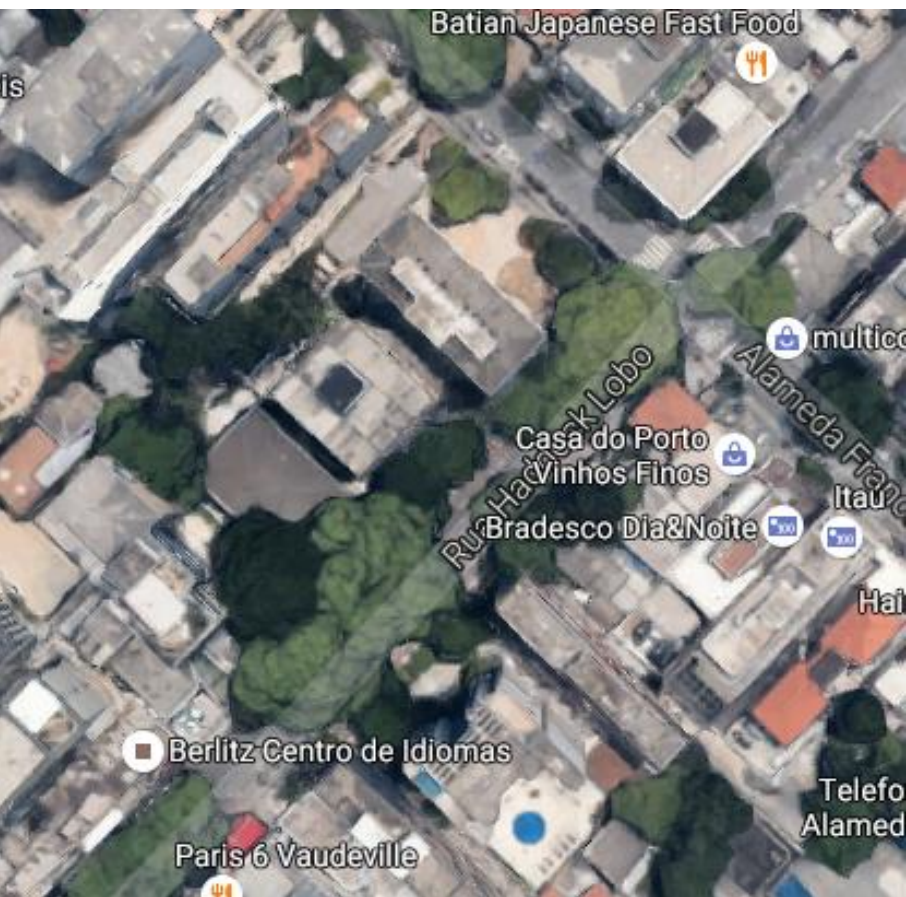




## ÁREA 5A

Rua Bela Cintra – Entre Alamedas Itu e França





## ÁREA 6A

Cruzamento da Rua Haddock Lobo com Alameda França

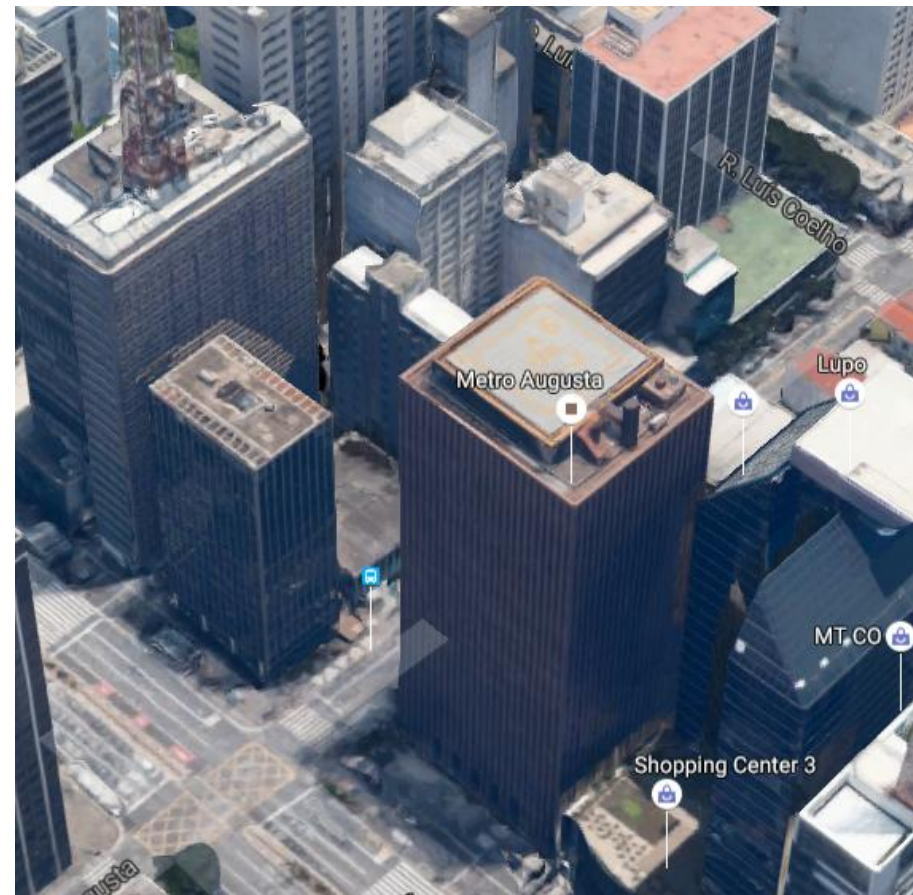
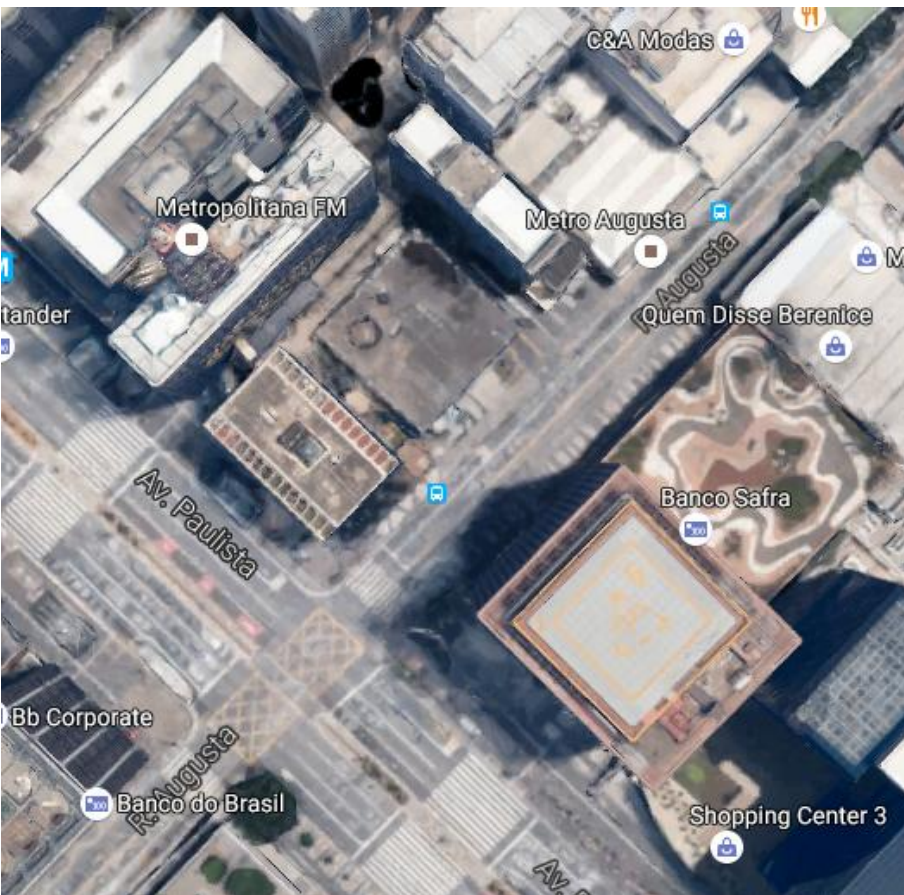




## ÁREA 7A

Cruzamento da Alameda França com a Rua Padre São João





## ÁREA 8A

Cruzamento da Rua Augusta com Av. Paulista

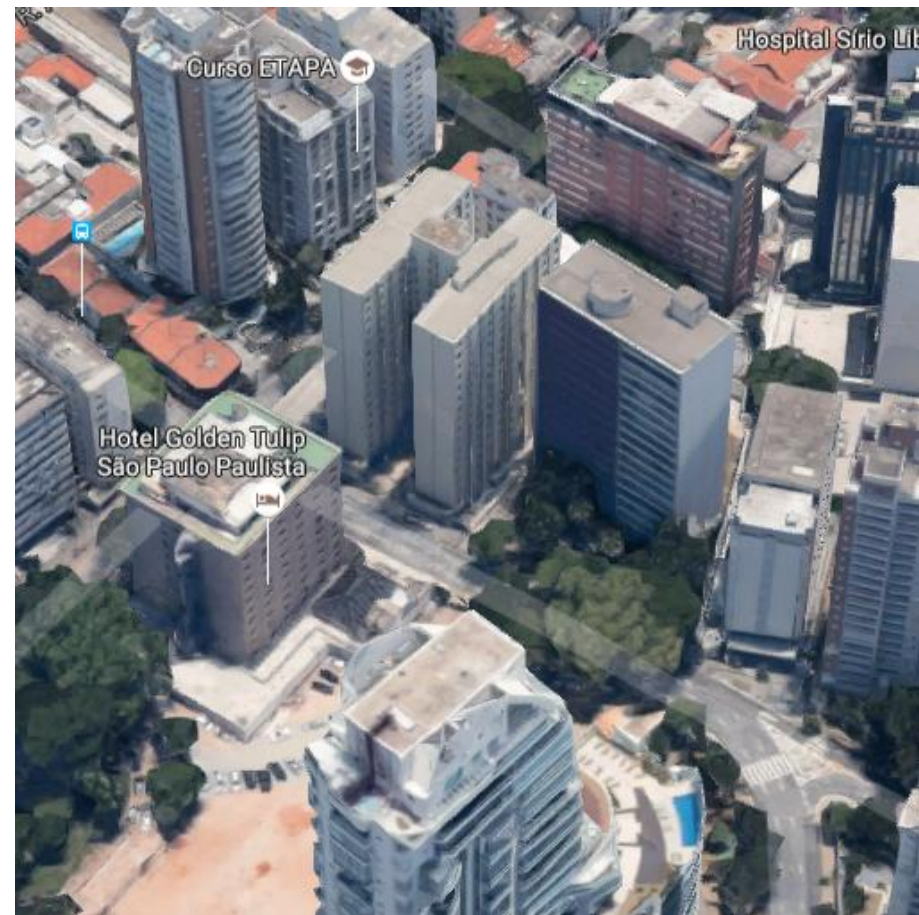
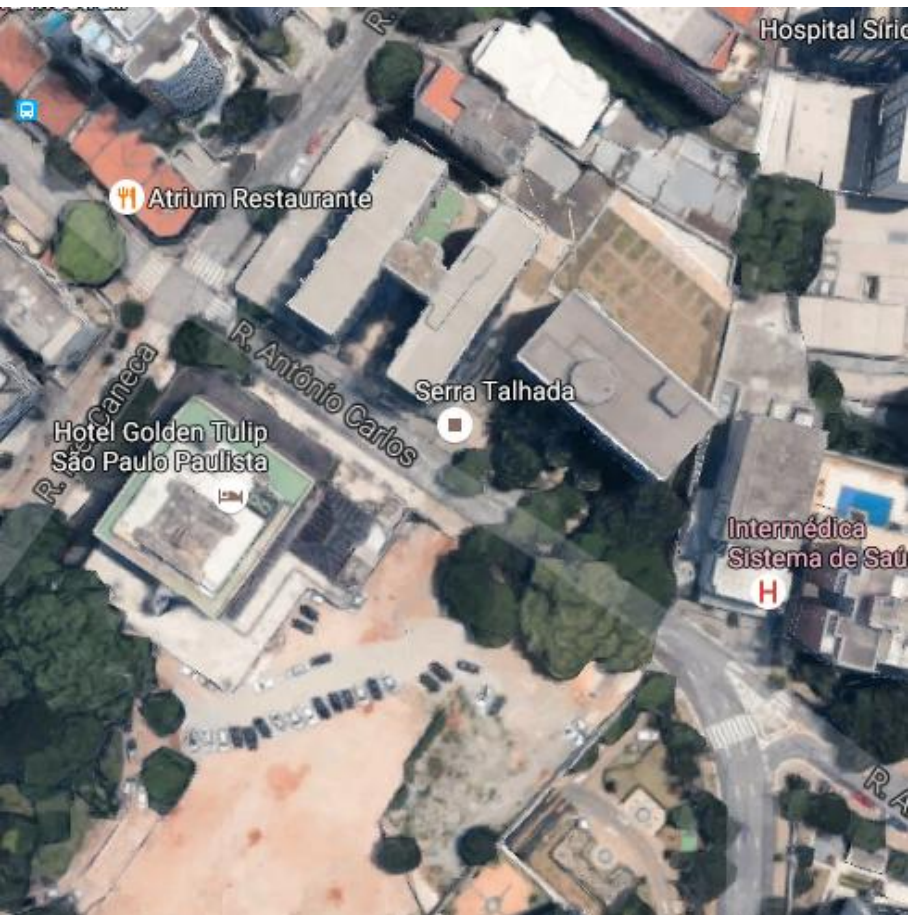




## ÁREA 9A

Cruzamento da Rua Padre João Manuel e Alameda Santos

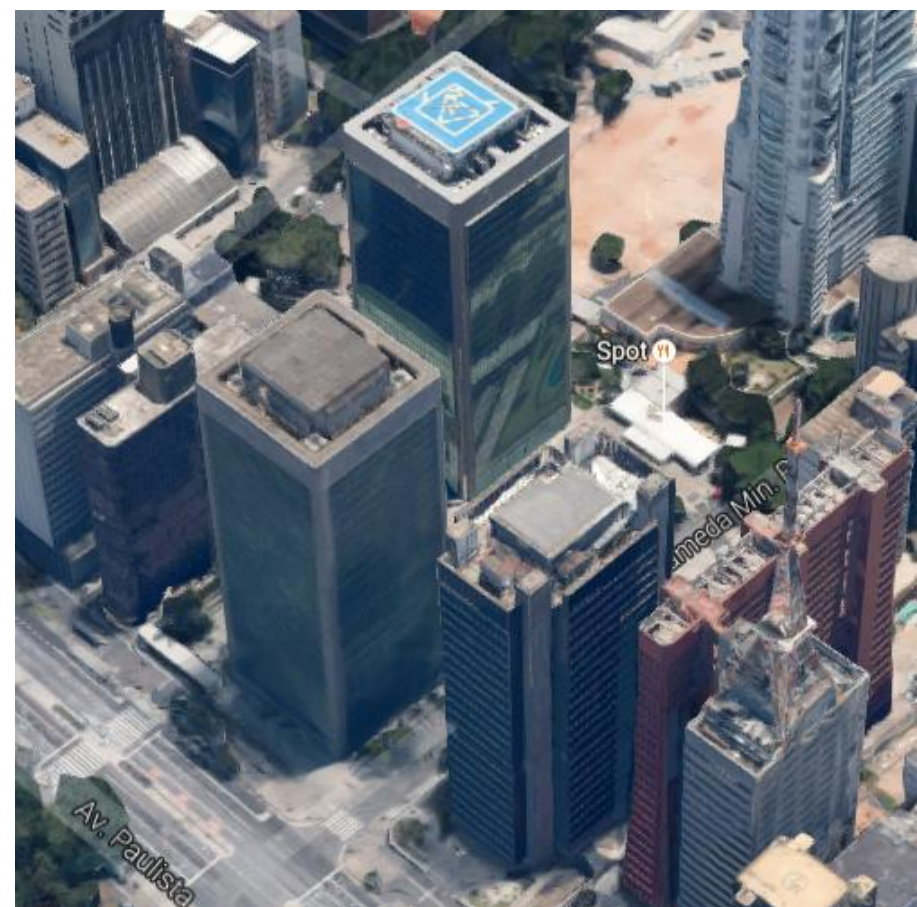
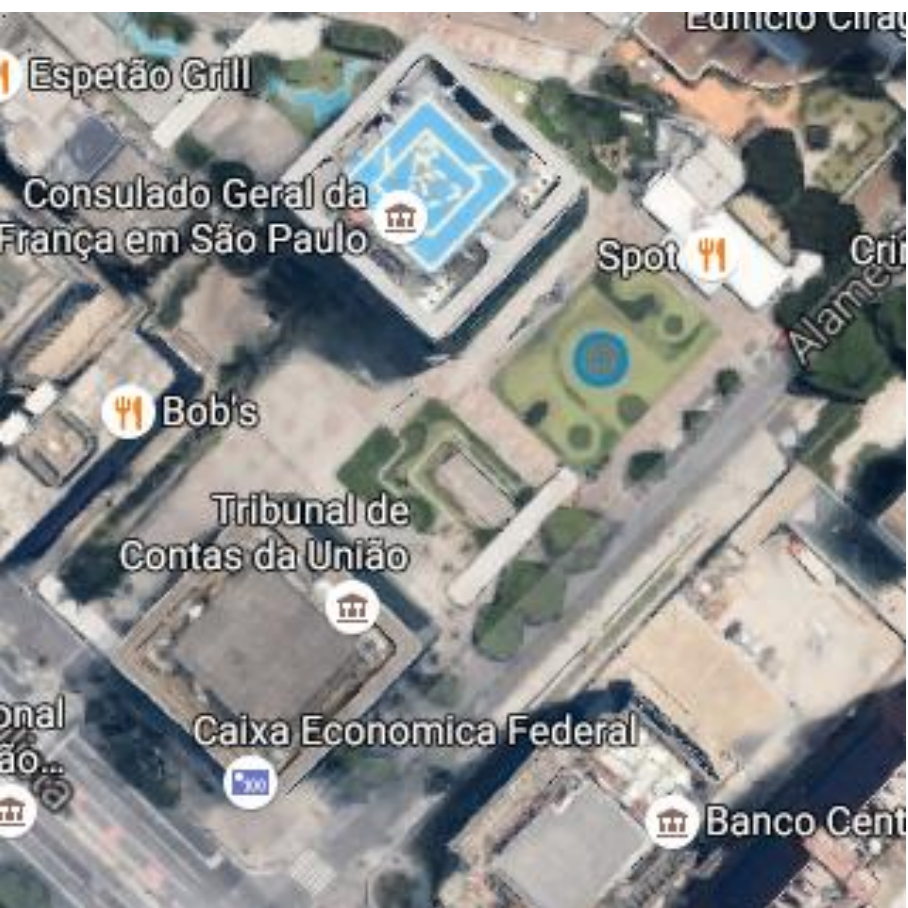




## ÁREA 10A

Rua Antônio Carlos – Entre Ruas do Pinhal e Frei Caneca

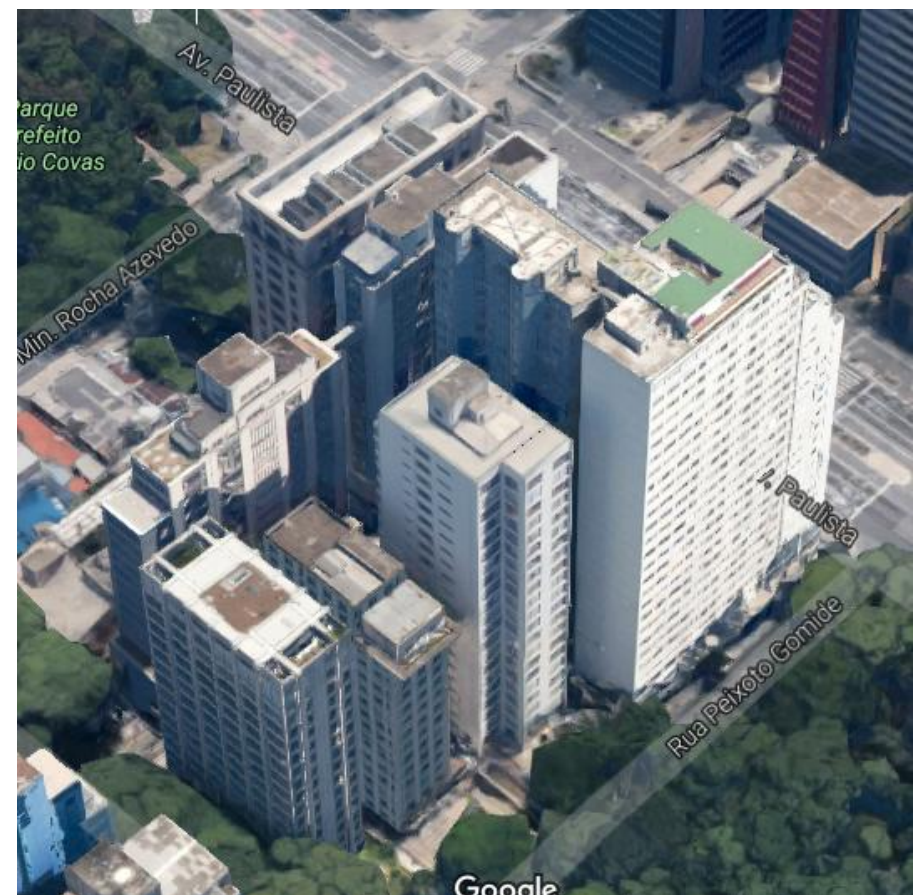




## ÁREA 11A

Alameda Min. Rocha Azevedo

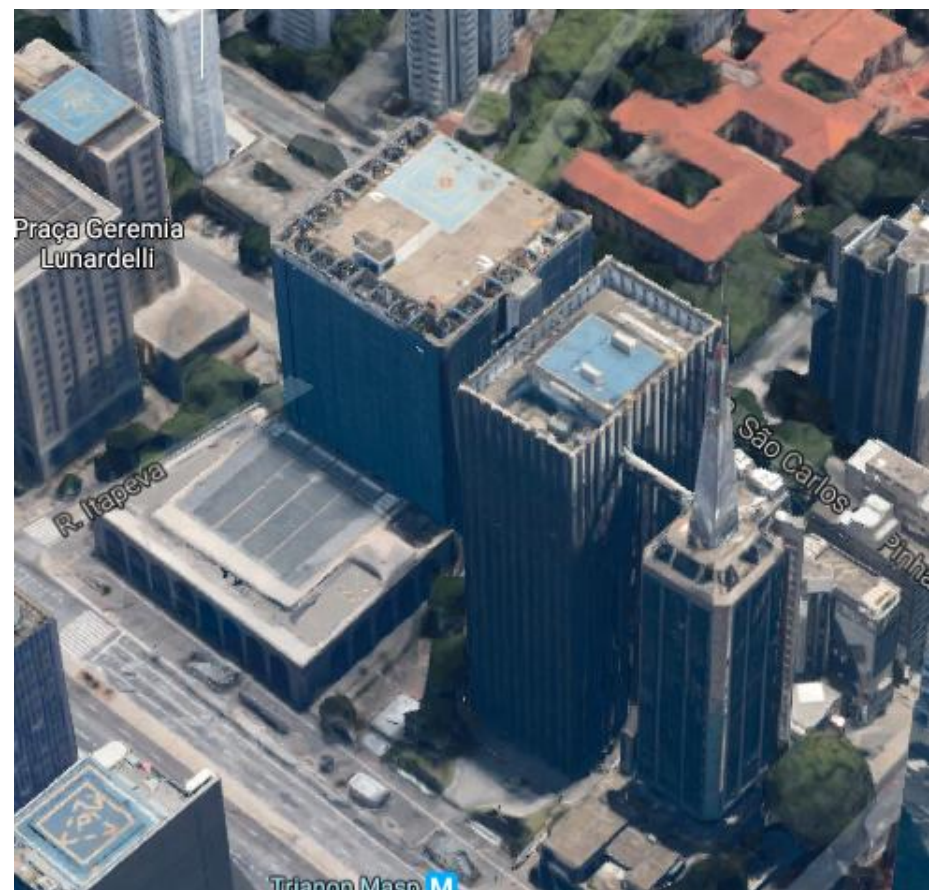
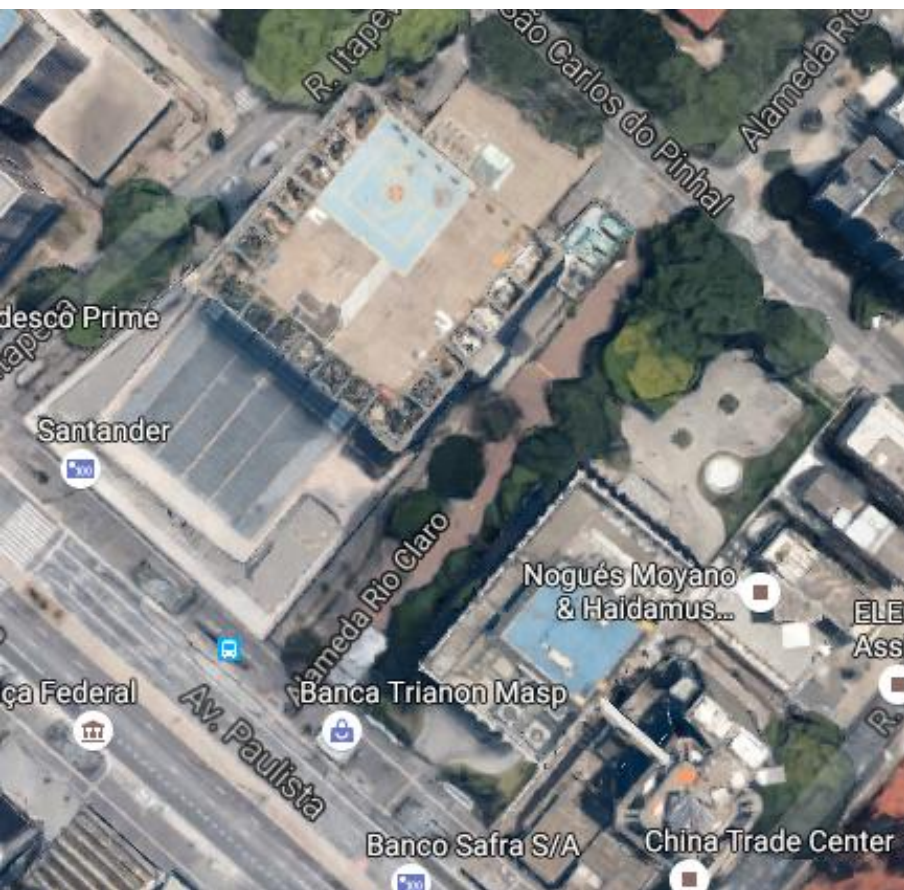




## ÁREA 12A

Av. Paulista – Entre Al. Min. Rocha Azevedo e R. Peixoto Gomide





## ÁREA 13A

Alameda Rio Claro – Entre Av. Paulista e Rua Carlos do Pinhal

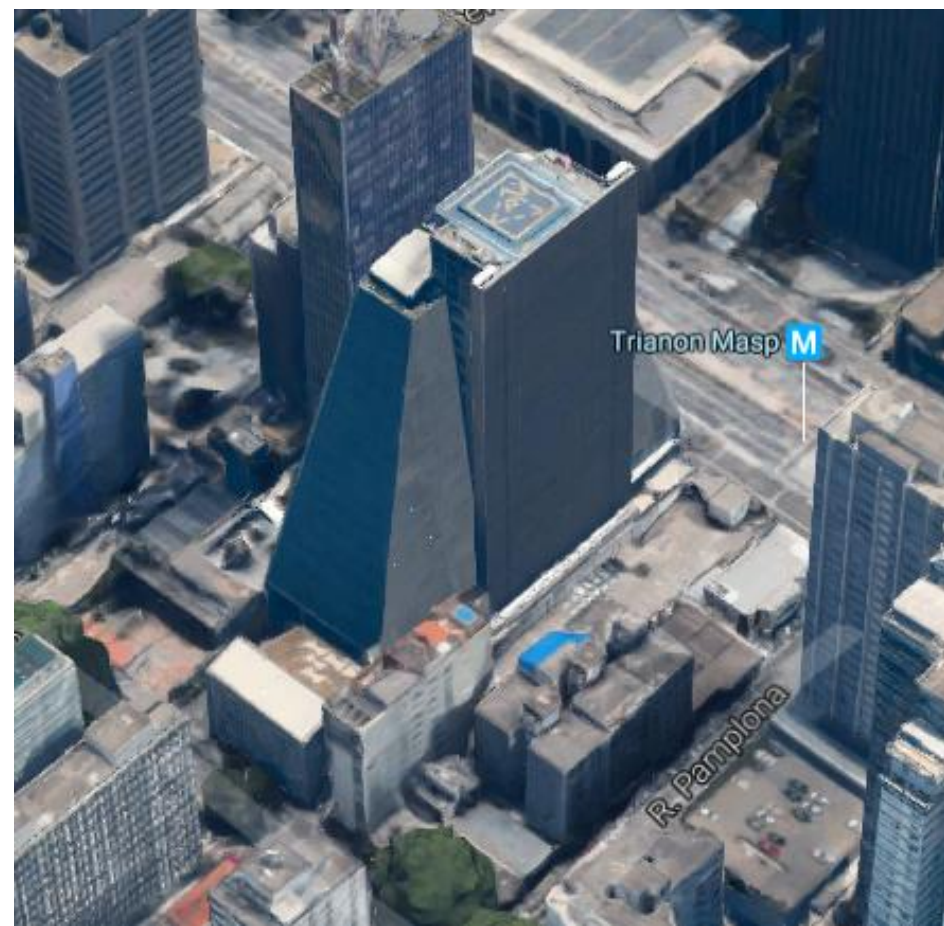
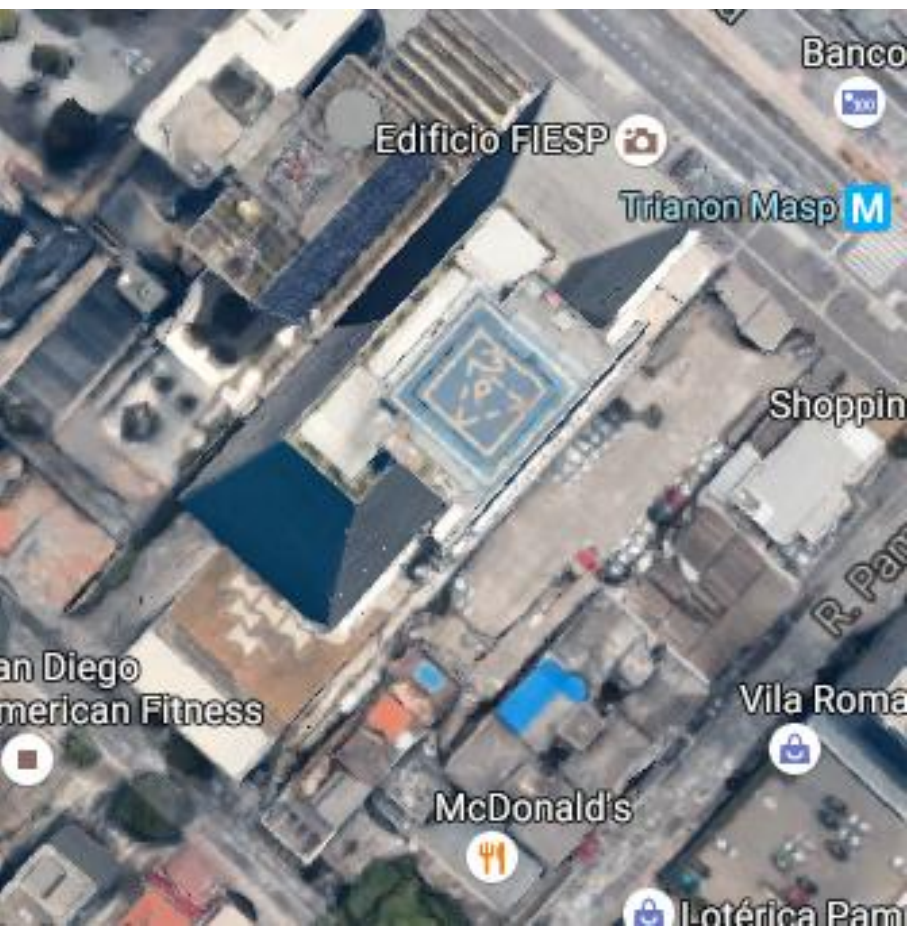




## ÁREA 14A

Quadra entre Ruas Pamplona, Carlos do Pinhal e Al. Ribeirão Preto





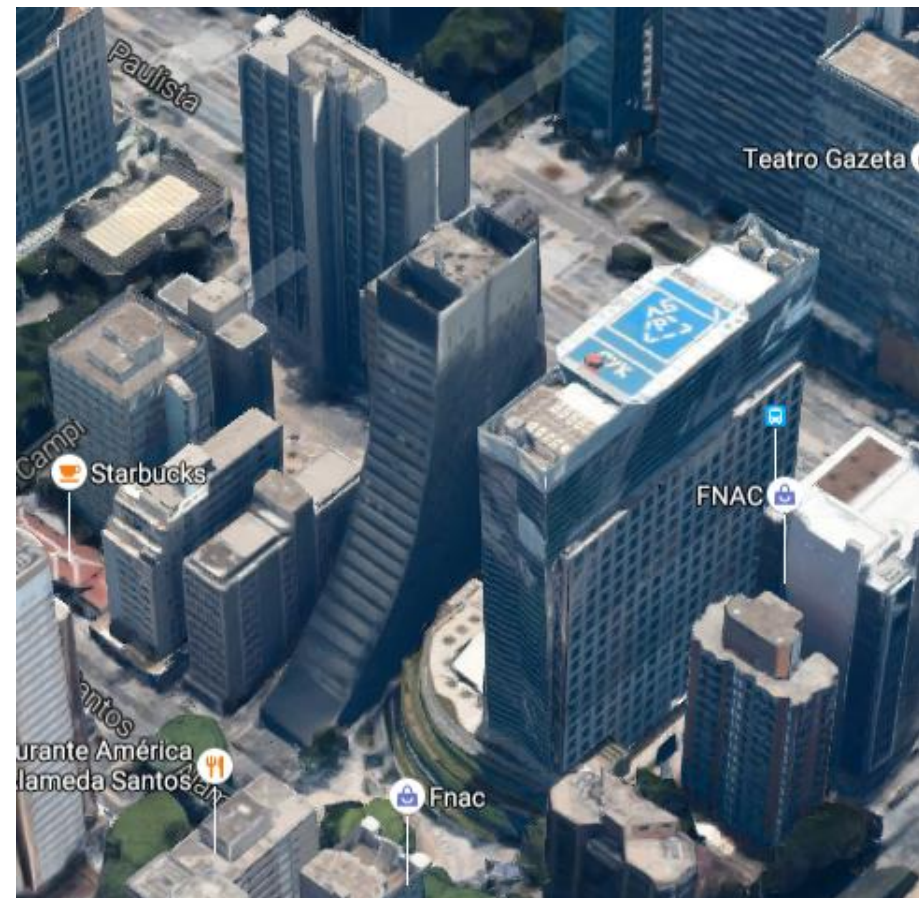
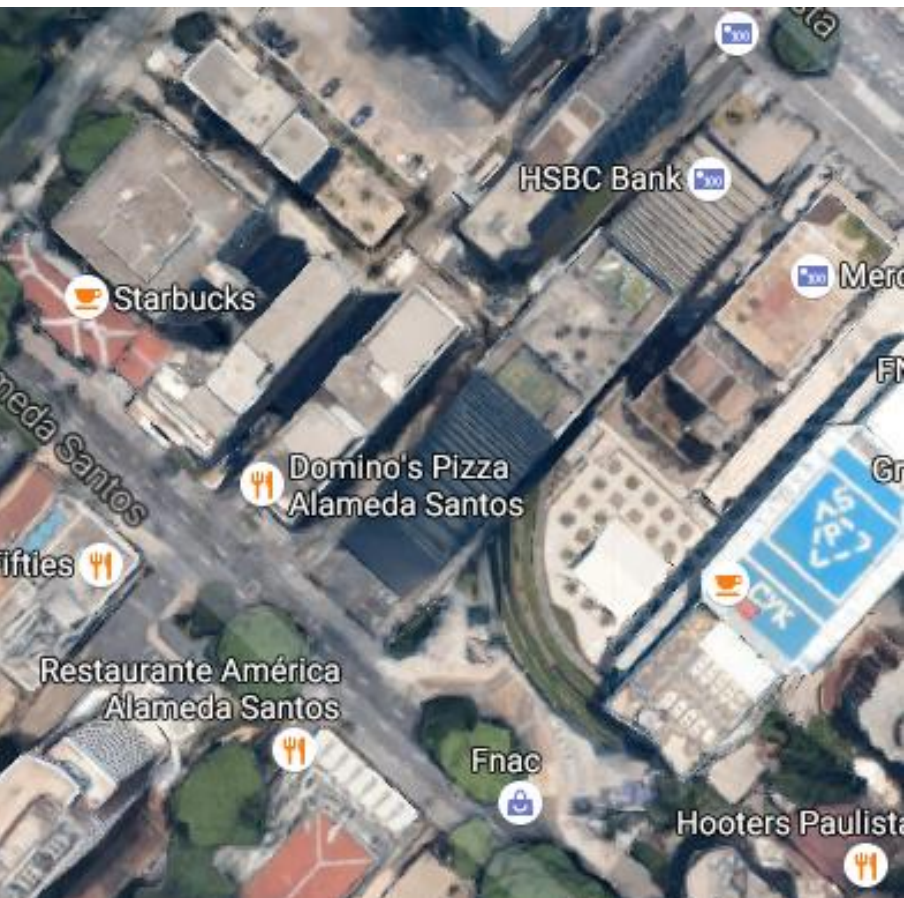
## ÁREA 15A

Av. Paulista – Edifício da FIESP





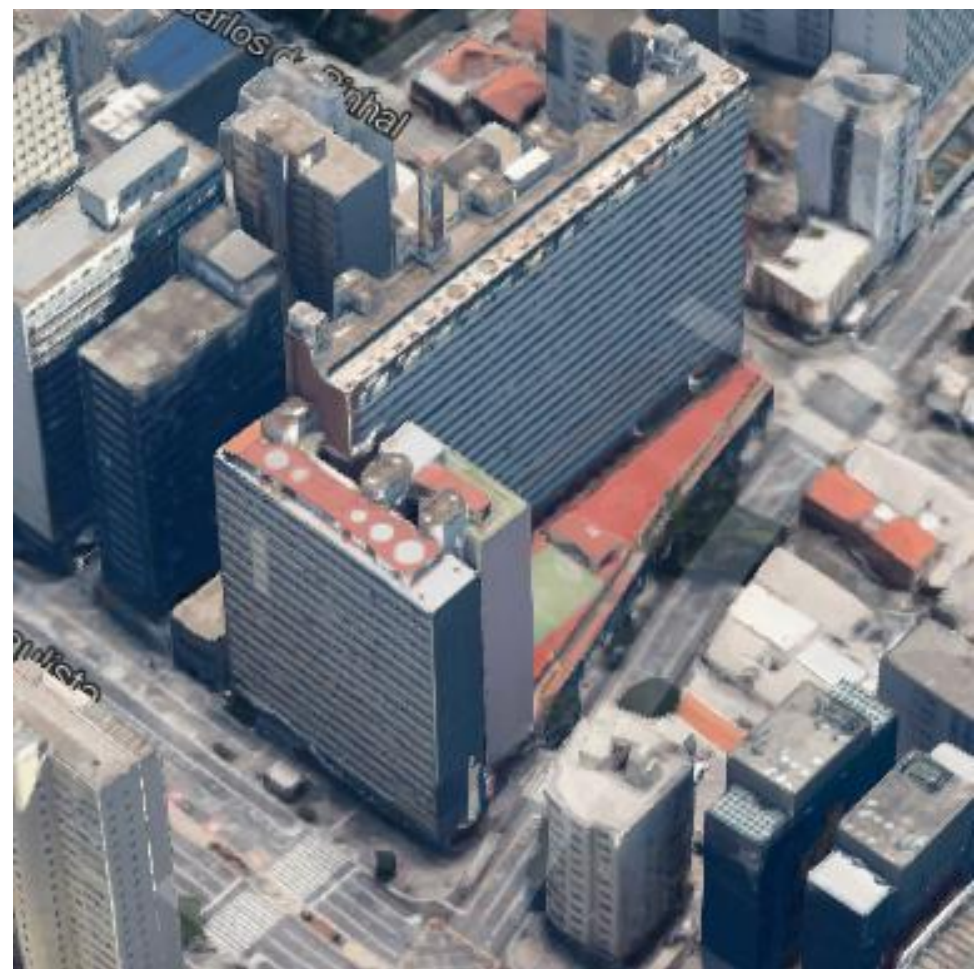




## ÁREA 17A

Al. Santos – Entre Al. Joaquim Eugênio de Lima e Al. Campinas

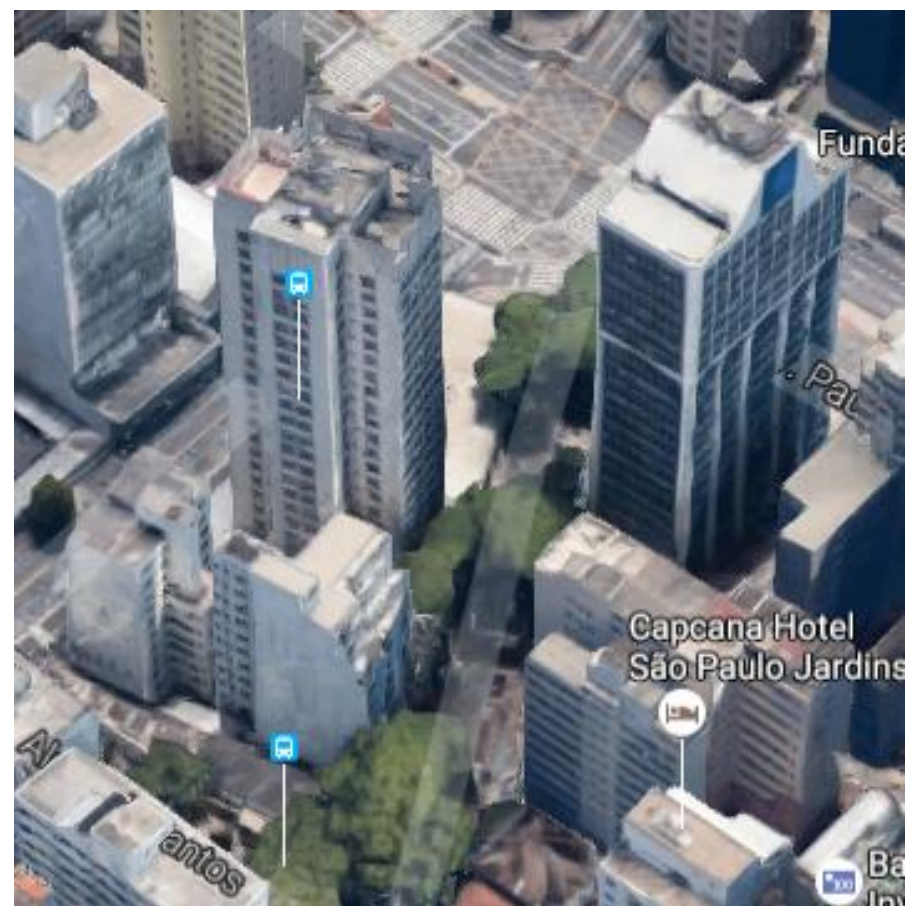




## ÁREA 18A

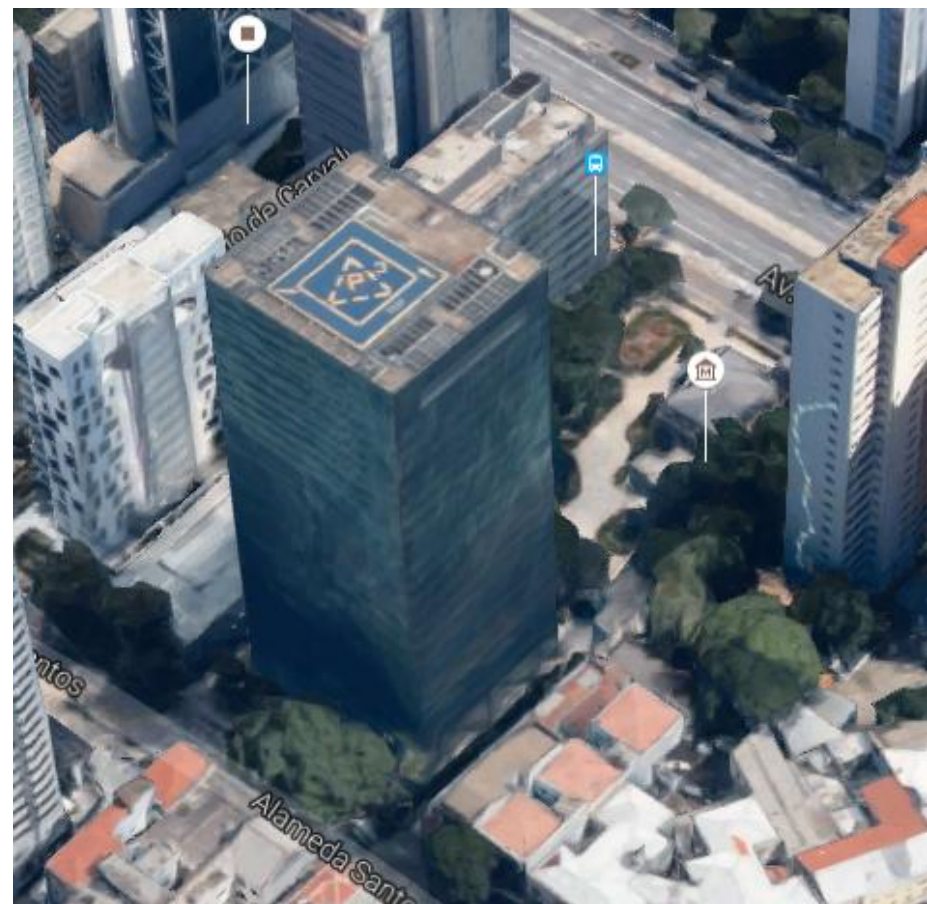
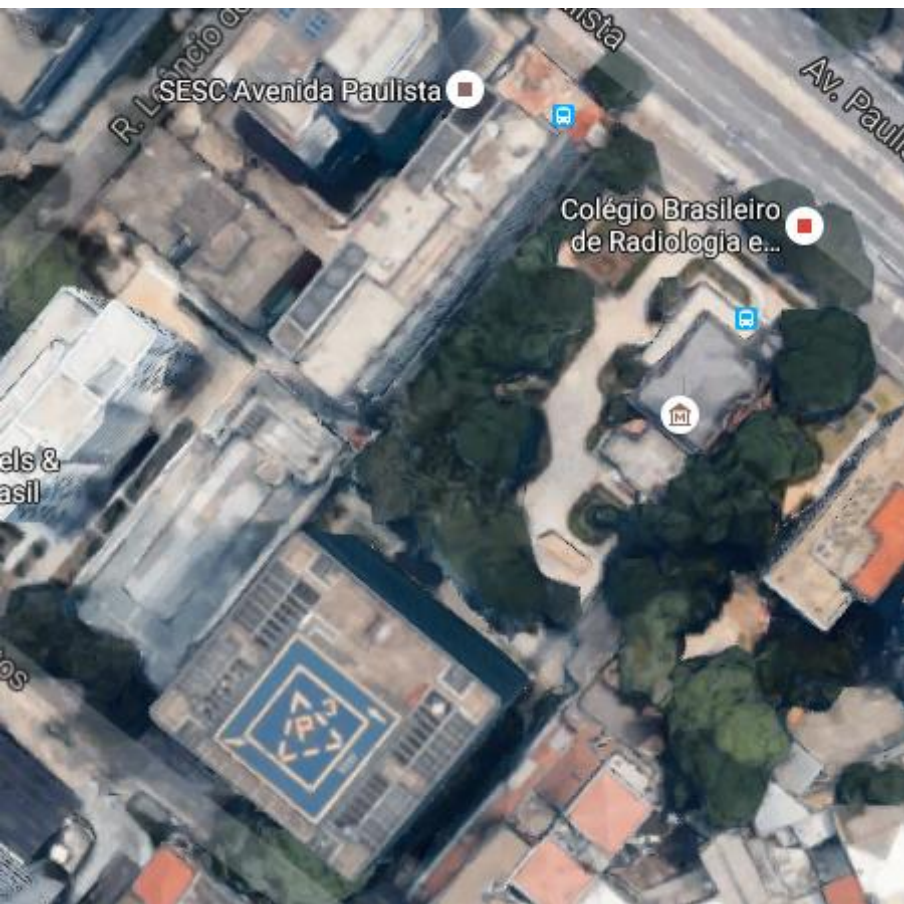
Av. Brigadeiro Luis Antônio – Entre Av. Paulista e R. São Carlos do Pinhal





## ÁREA 19A

Rua Manuel da Nóbrega – Entre Al. Santos e Av. Paulista



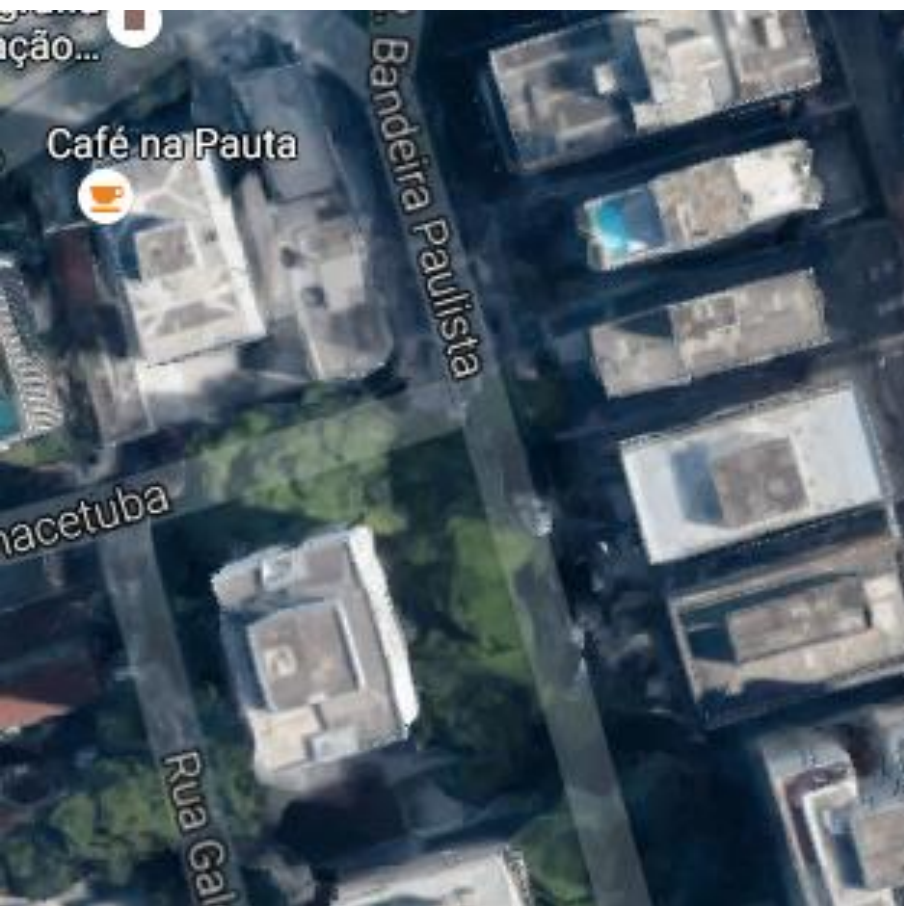
## ÁREA 20A

Av. Paulista – Casa das Rosas

**FARIA LIMA**

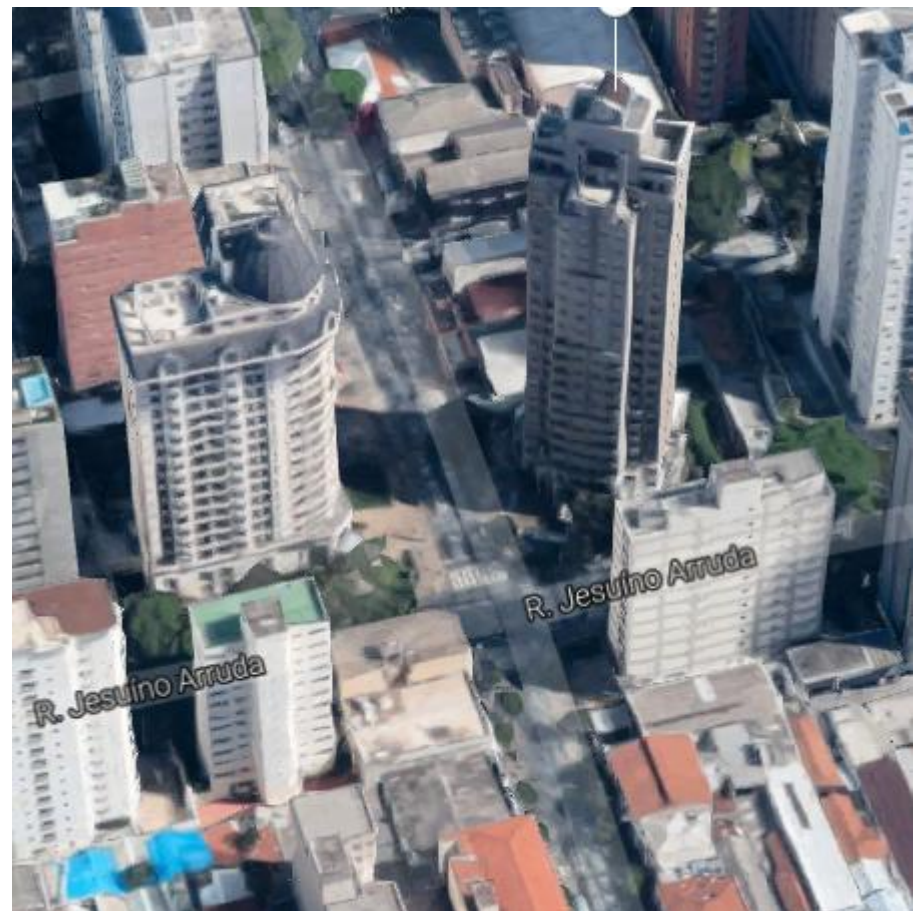
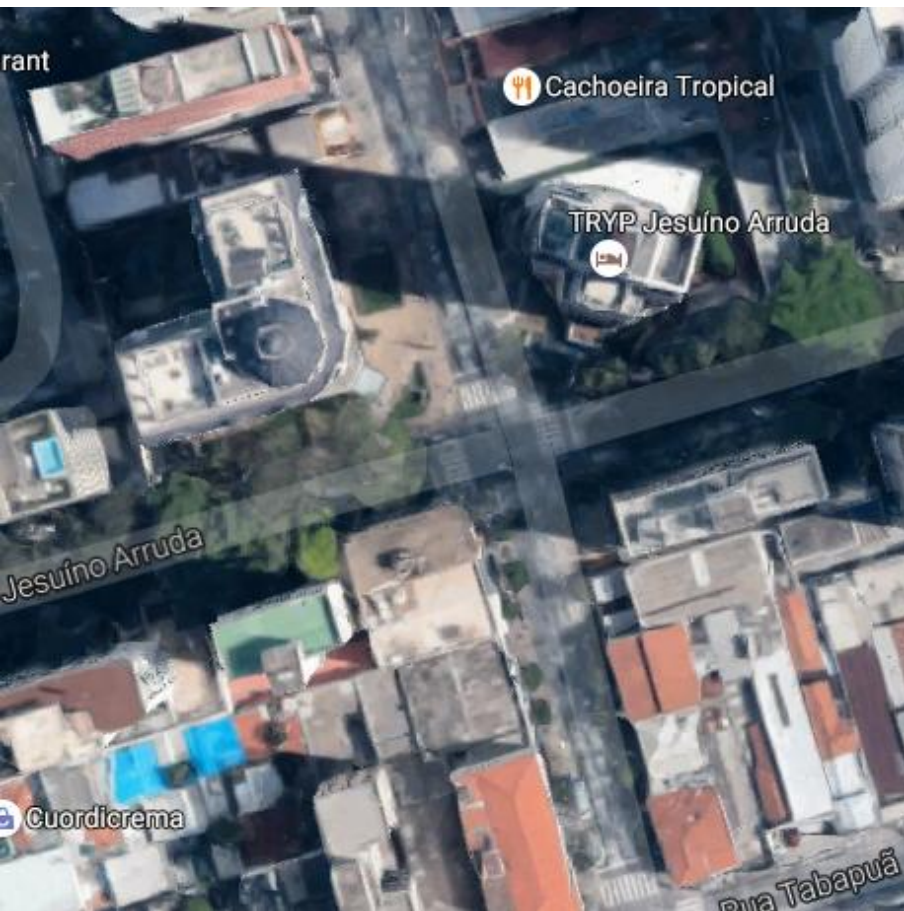
ÁREA PARA OS EXERCÍCIOS 2 A 5





## ÁREA 1B

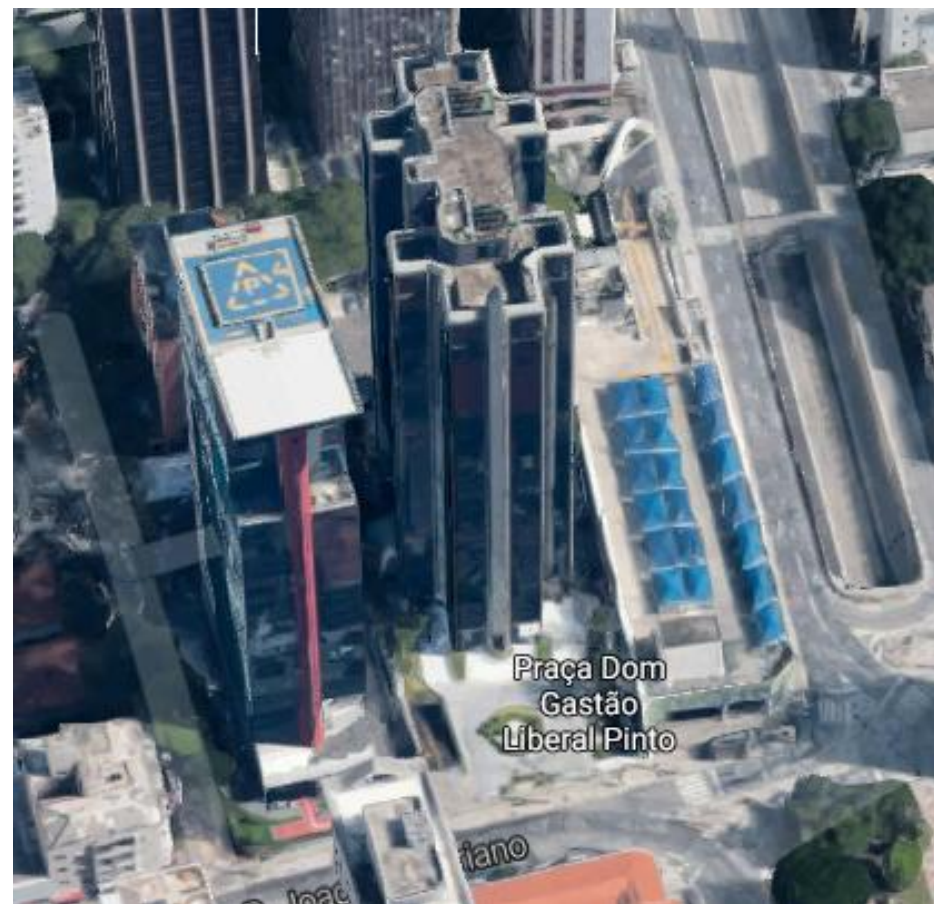
Cruzamento da Rua Anacetuba com Rua Bandeira Paulista



## ÁREA 2B

Cruzamento da Rua Jesuíno Arruda com Rua João Cachoeira

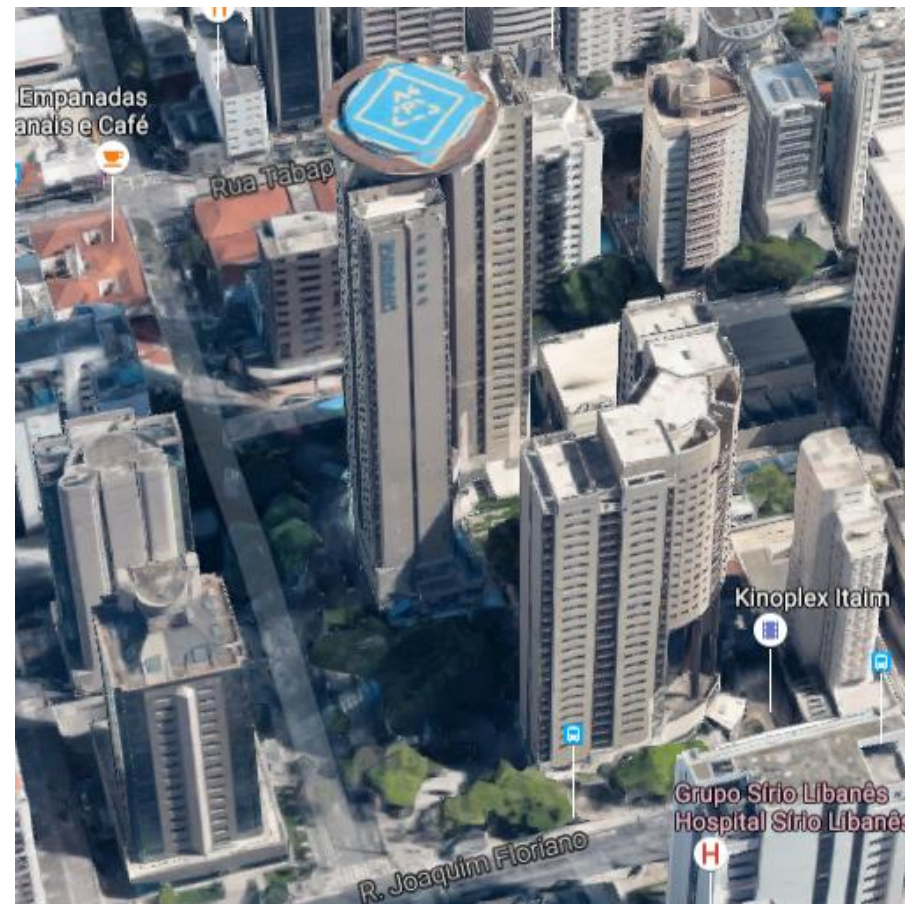
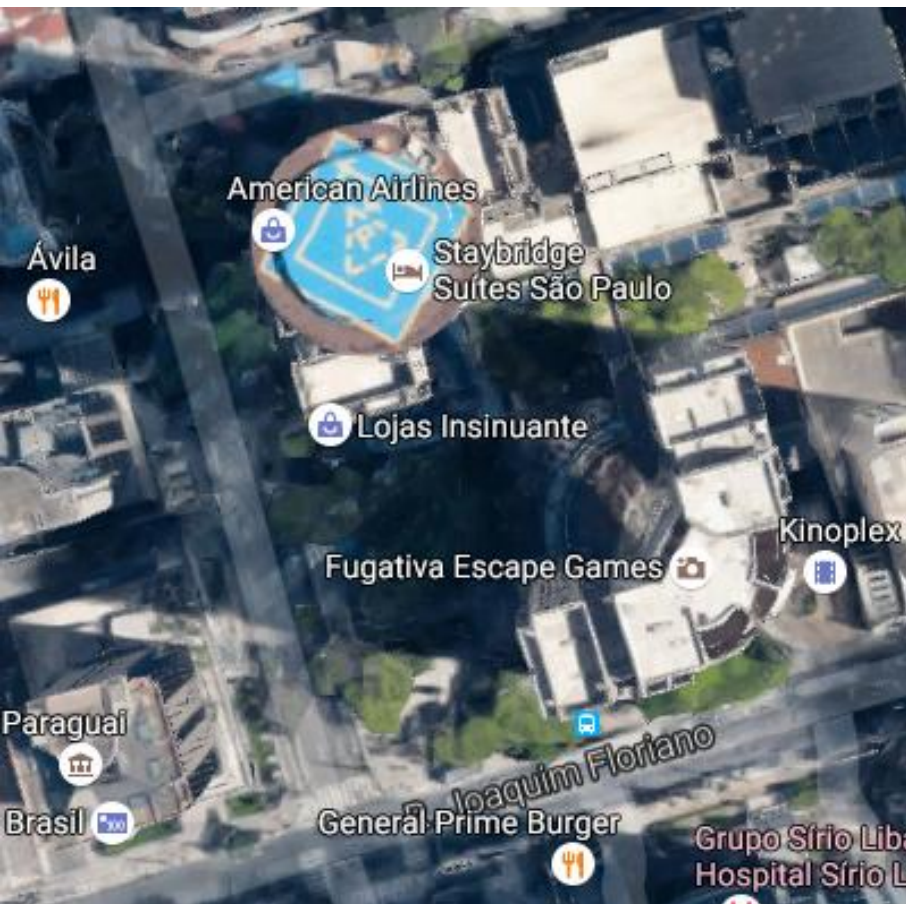




## ÁREA 3B

Cruzamento da Rua Joaquim Floriano com Av. São Gabriel

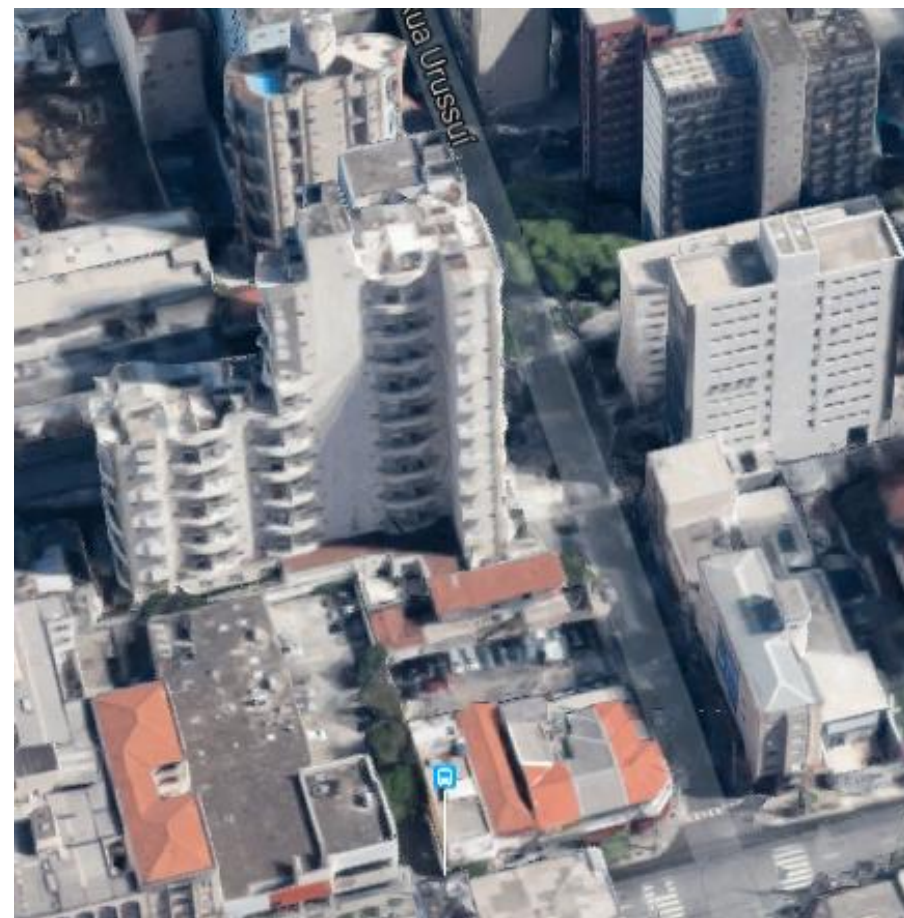
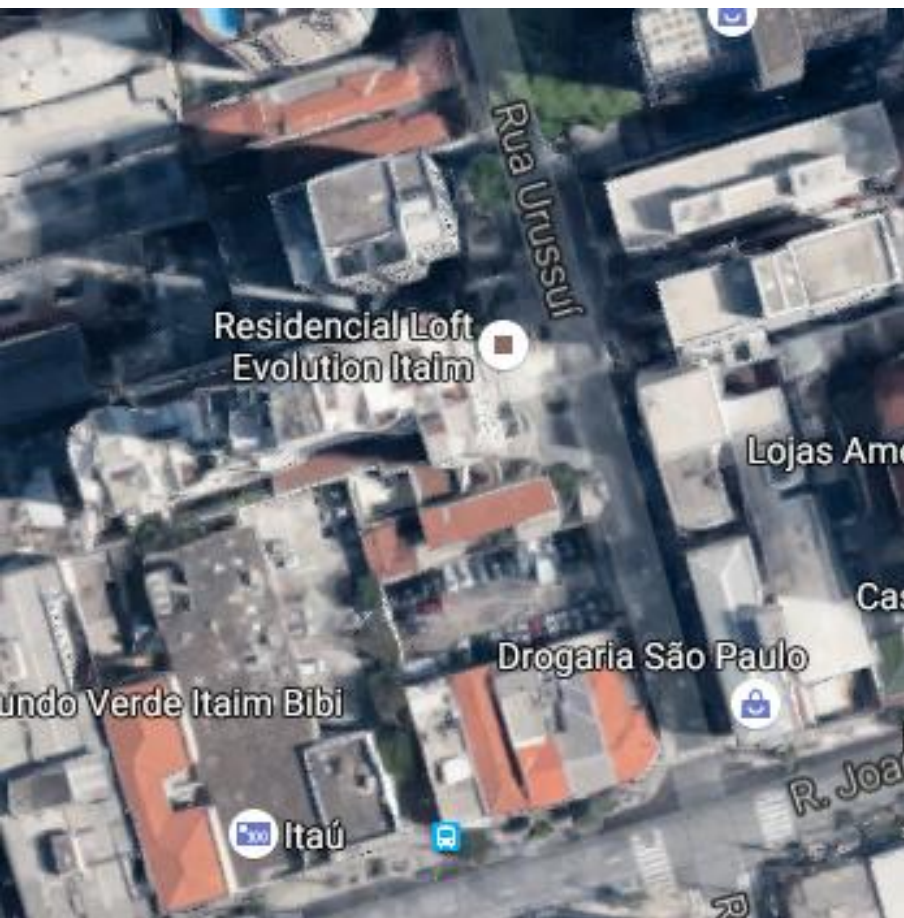




## ÁREA 4B

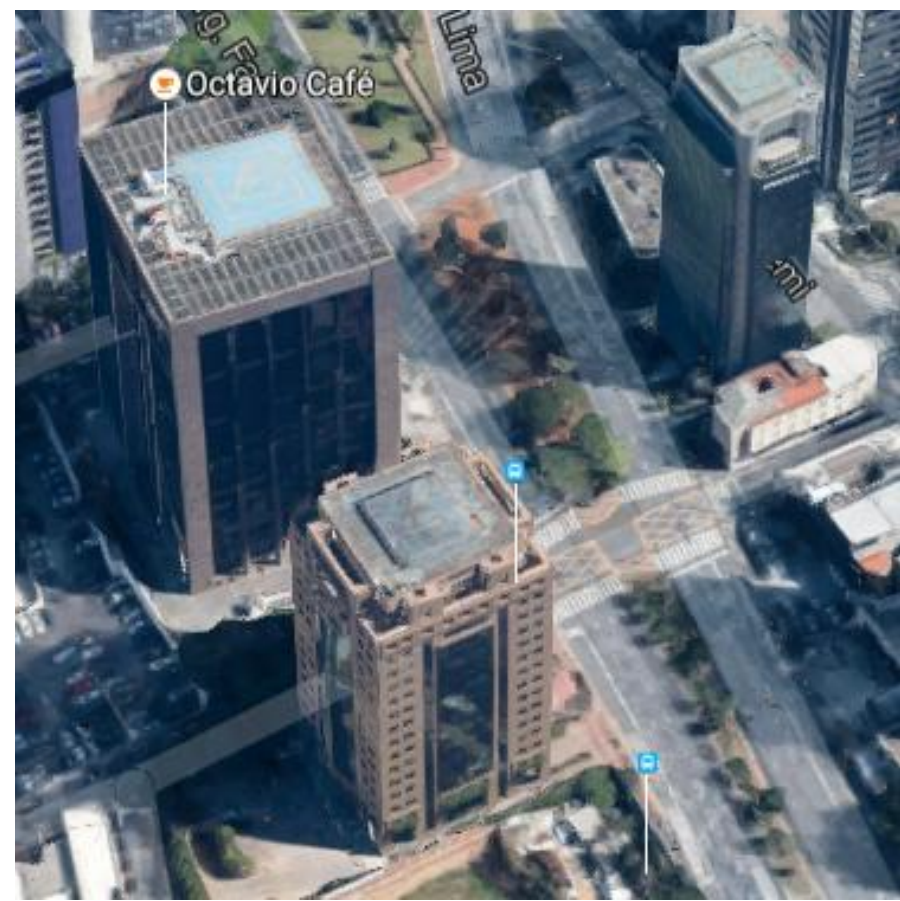
Cruzamento da Rua Joaquim Floriano com Rua Bandeira Paulista





## ÁREA 5B

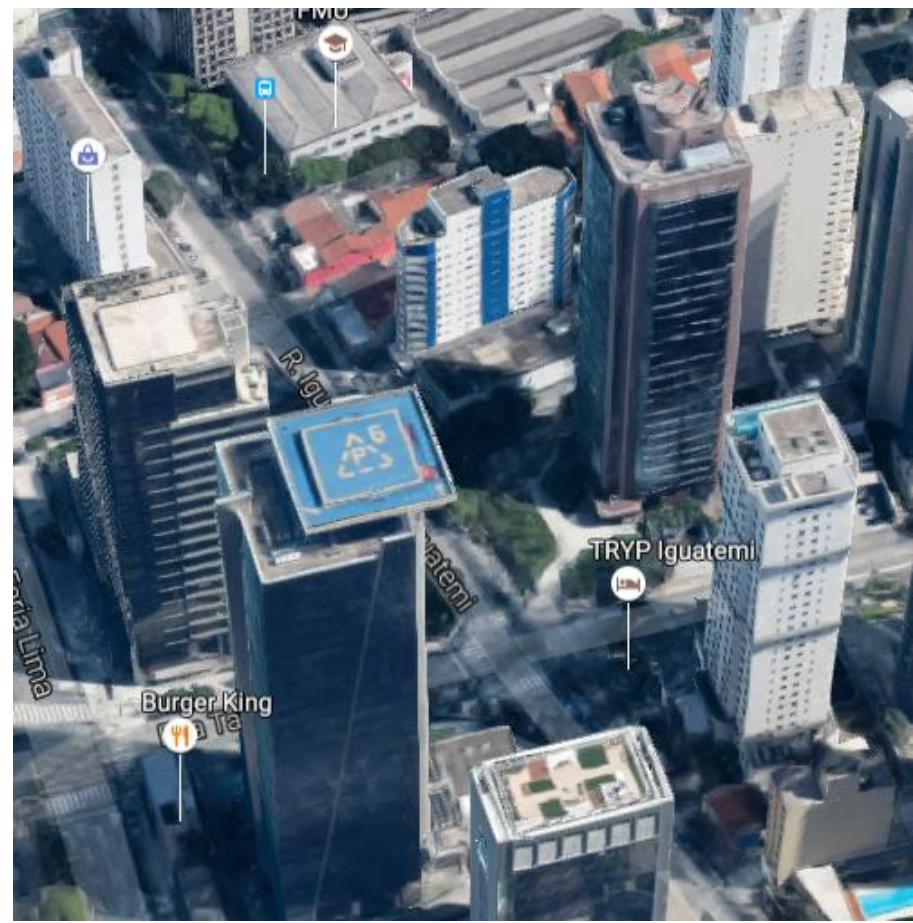
Cruzamento da Rua Joaquim Floriano com Rua Urussuí



## ÁREA 6B

Cruzamento da Av. Brig. Faria Lima com Rua Adolfo Tabacow





## ÁREA 7B

Cruzamento da Rua Tabapuã com Rua Iguatemi



## ÁREA 8B

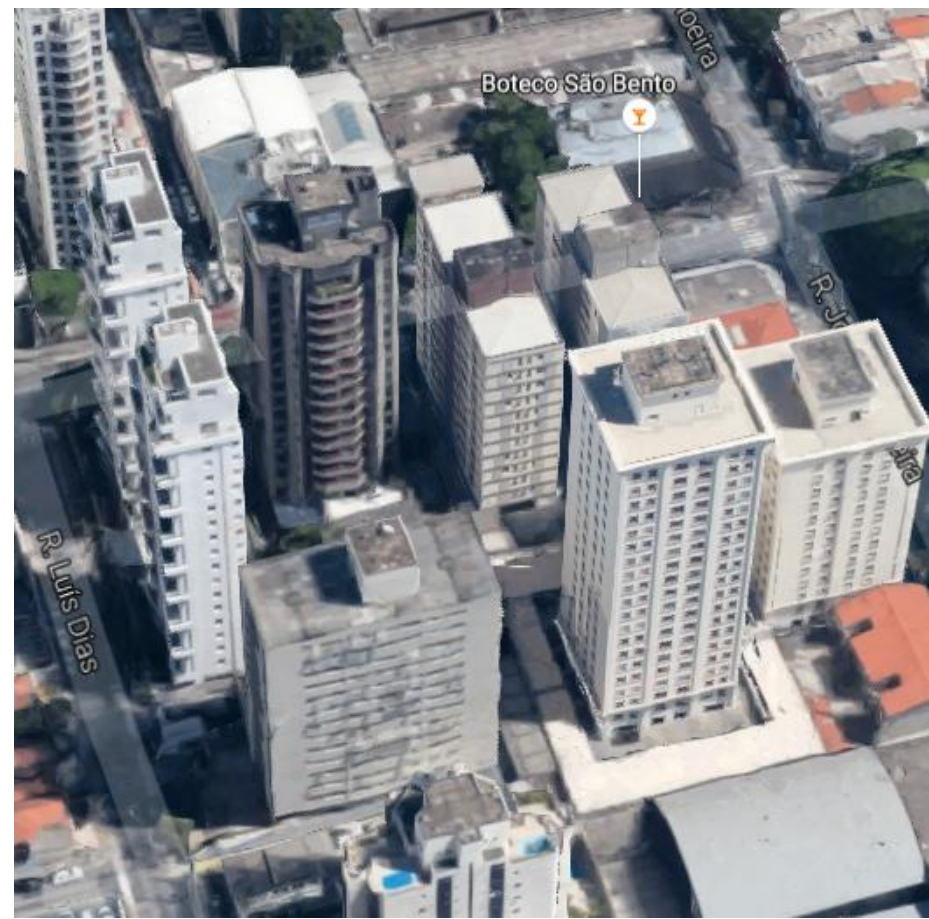
Cruzamento da Rua Joaquim Floriano com Rua Iguatemi





**ÁREA 9B**

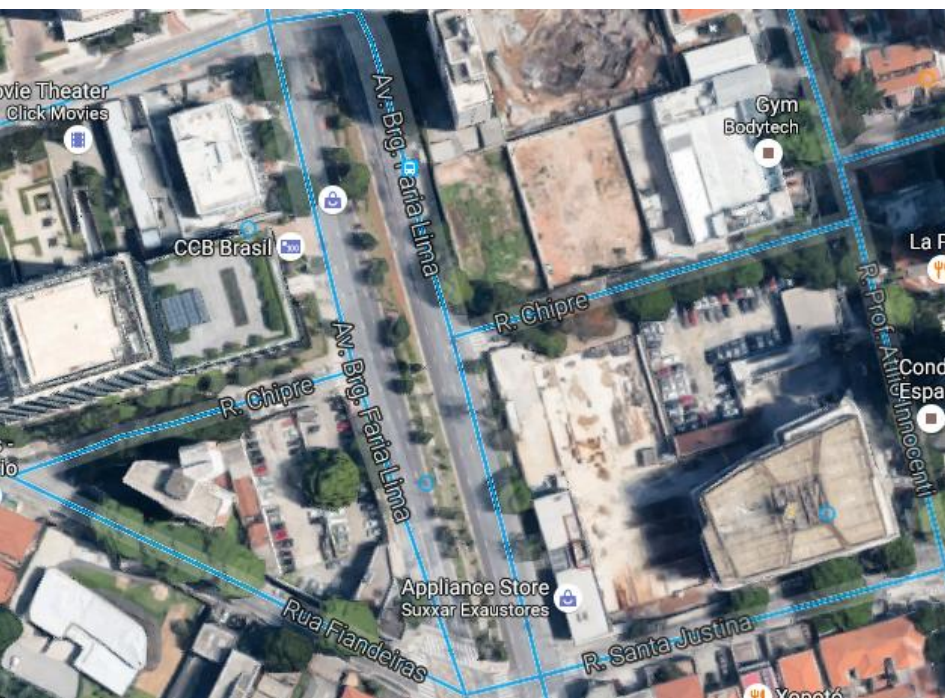
Rua Fernandes de Abreu



## ÁREA 10B

Rua Leopoldo Couto de Magalhães Júnior – Entre Ruas Luís Dias e João Cachoeira

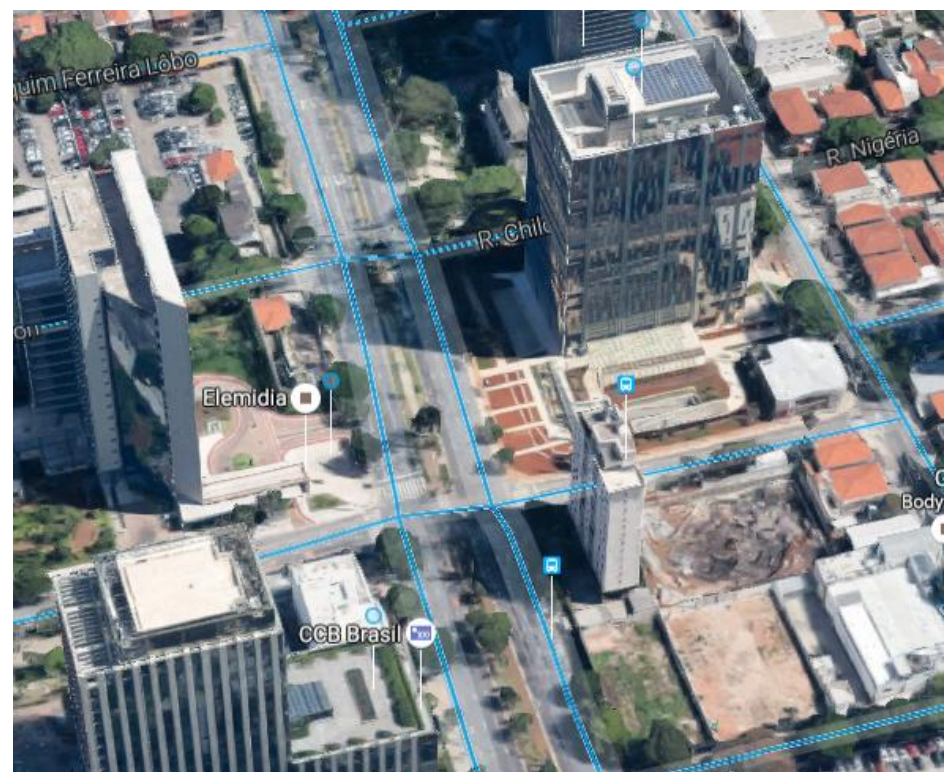




## ÁREA 11B

Cruzamento da Rua Chipre com Av. Brigadeiro Faria Lima

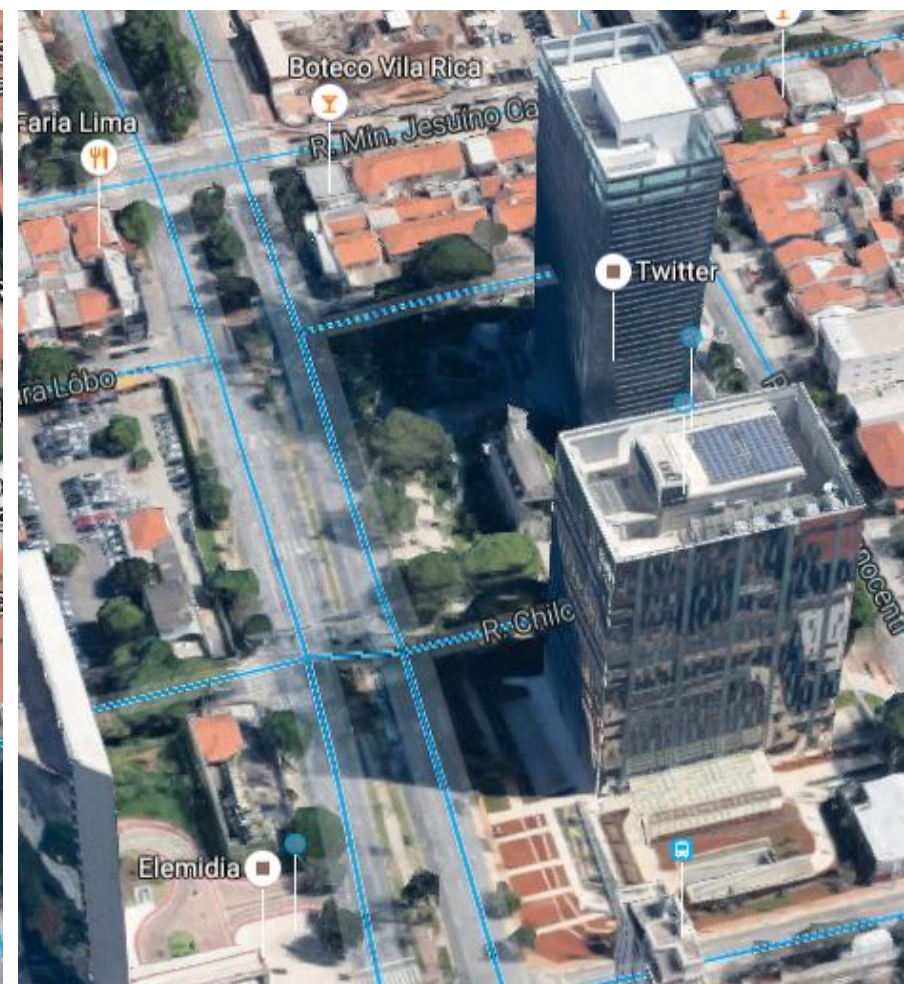
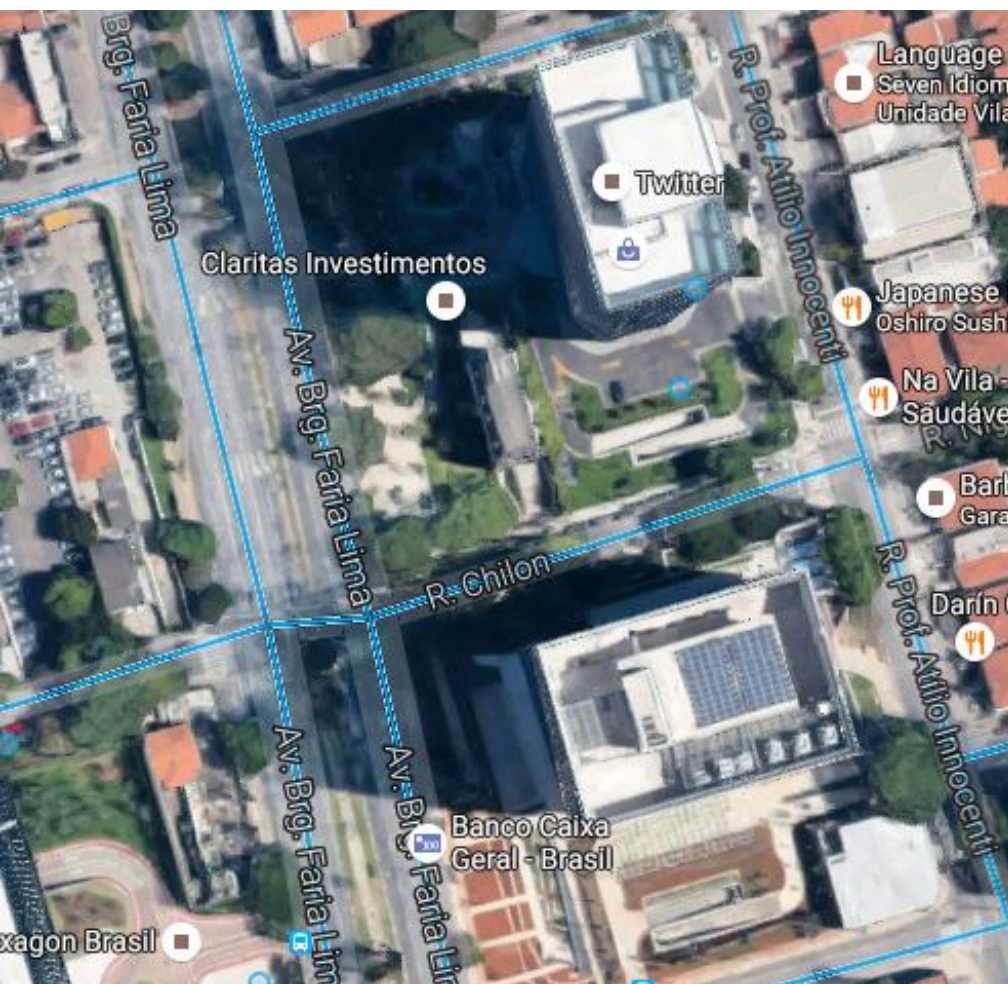




## ÁREA 12B

Cruzamento da Rua Elvira Ferraz com Av. Brigadeiro Faria Lima

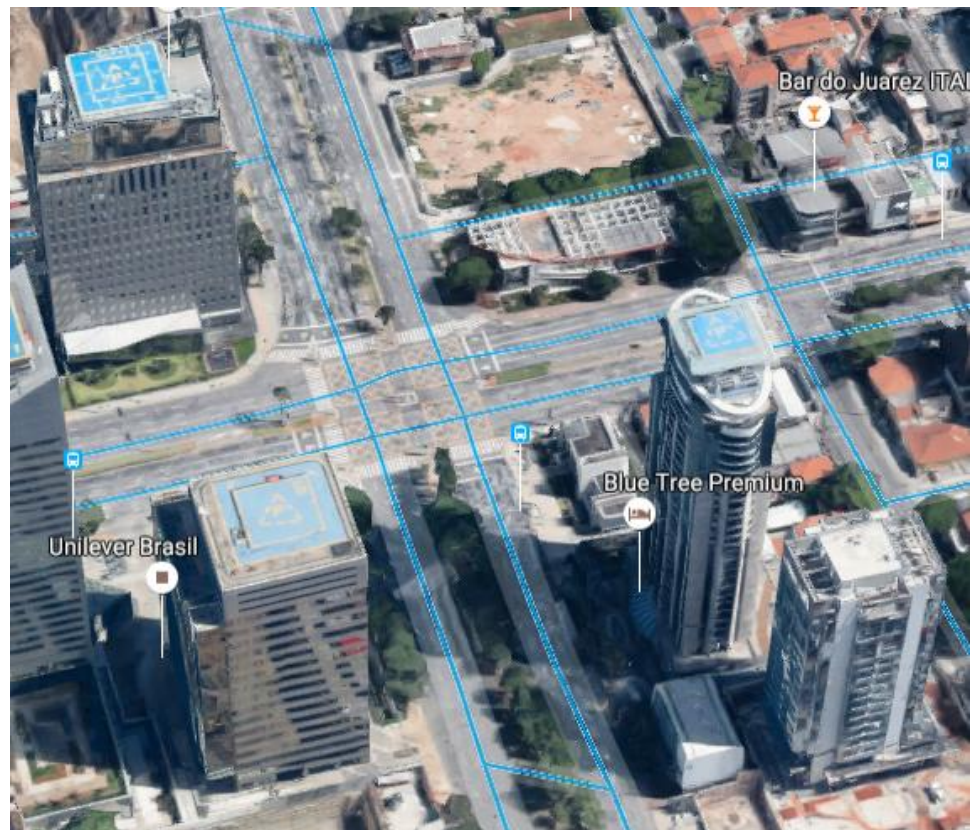




## ÁREA 13B

Cruzamento da Rua Chilon com Av. Brigadeiro Faria Lima

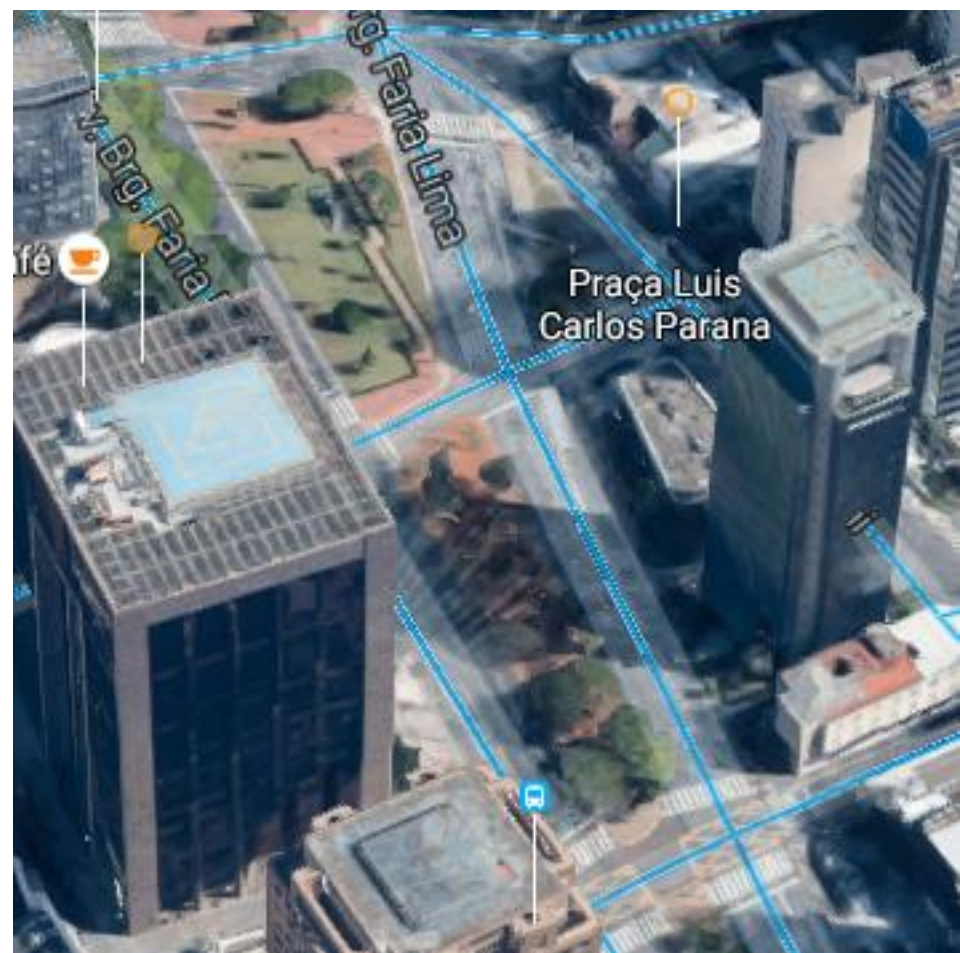
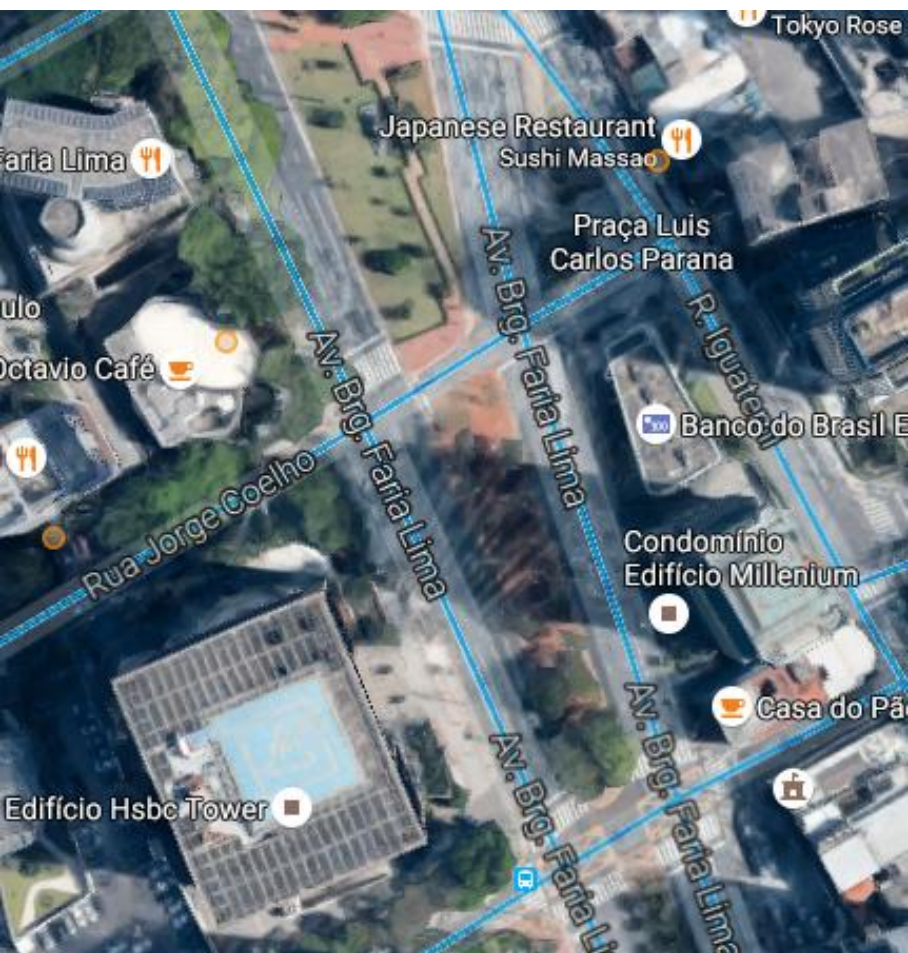




## ÁREA 14B

Cruzamento da Av. Pres. Juscelino Kubitschek com Av. Brigadeiro Faria Lima

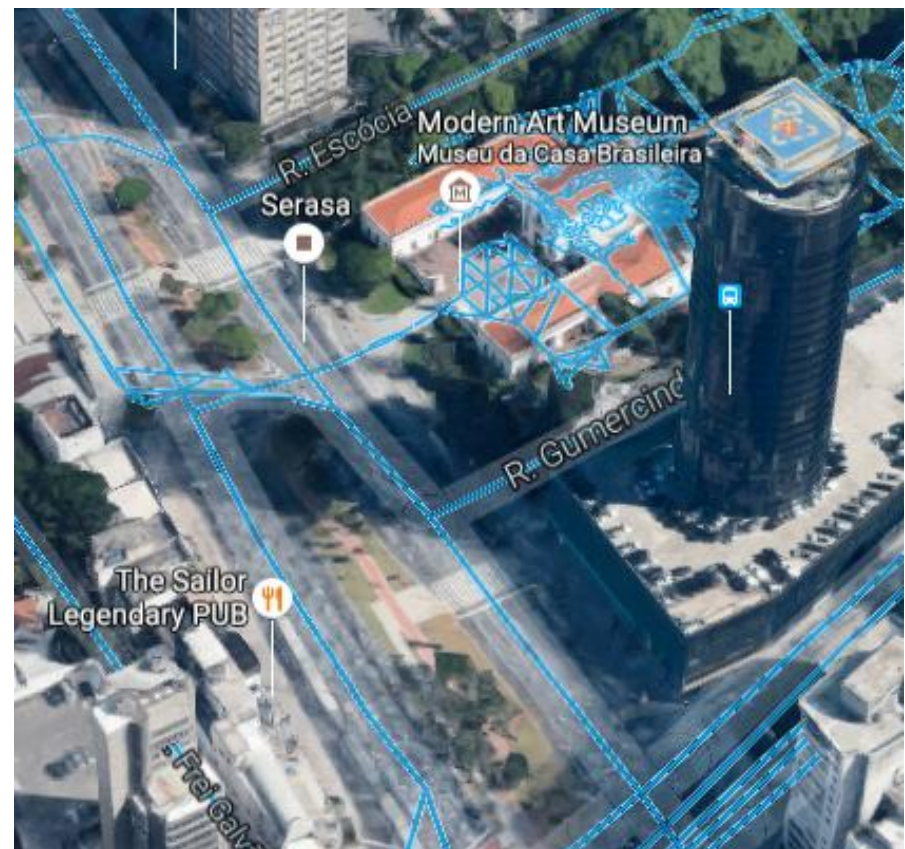
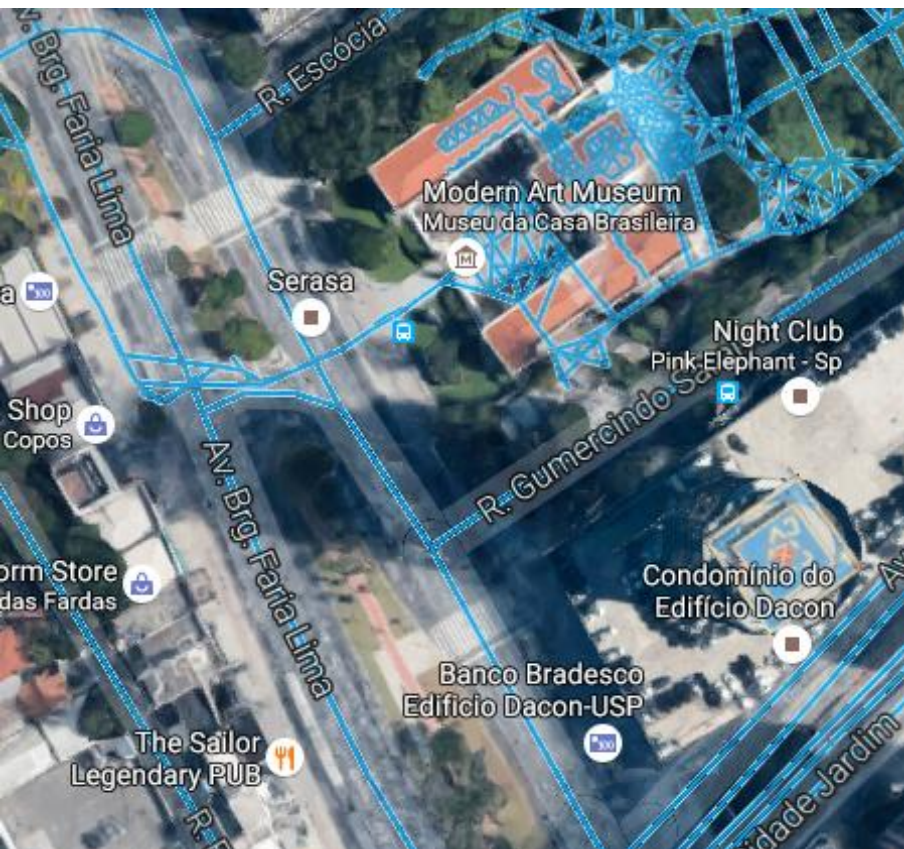




## ÁREA 15B

Cruzamento da Rua Jorge Coelho com Av. Brigadeiro Faria Lima

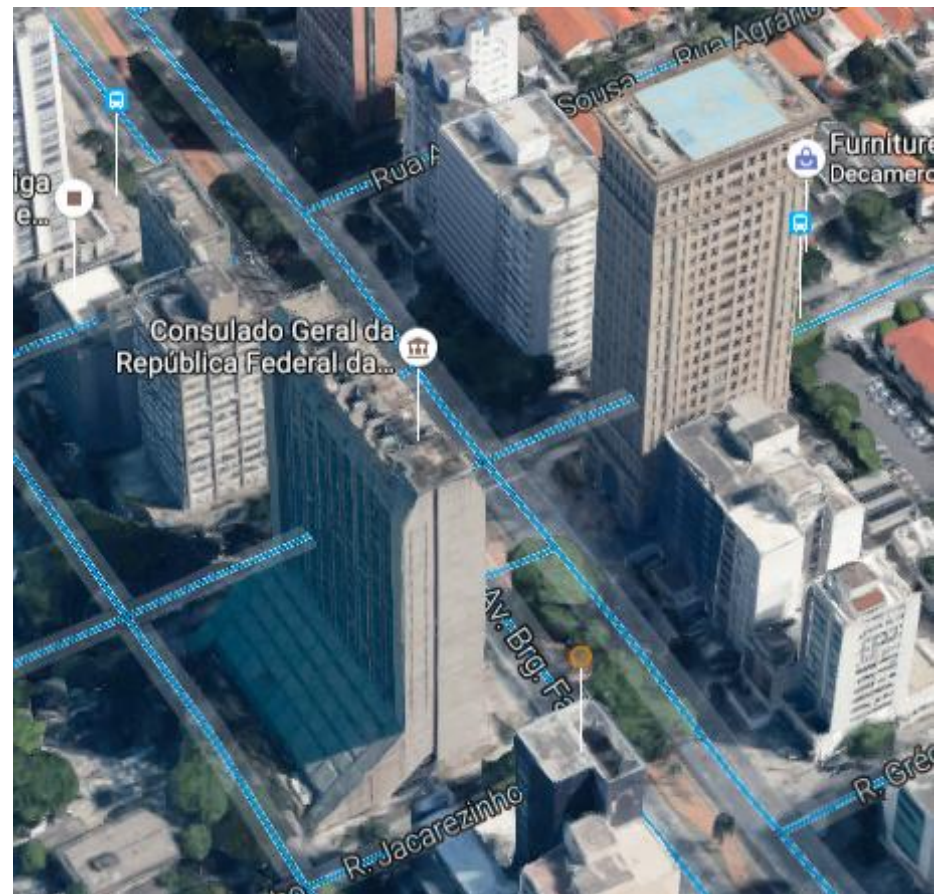
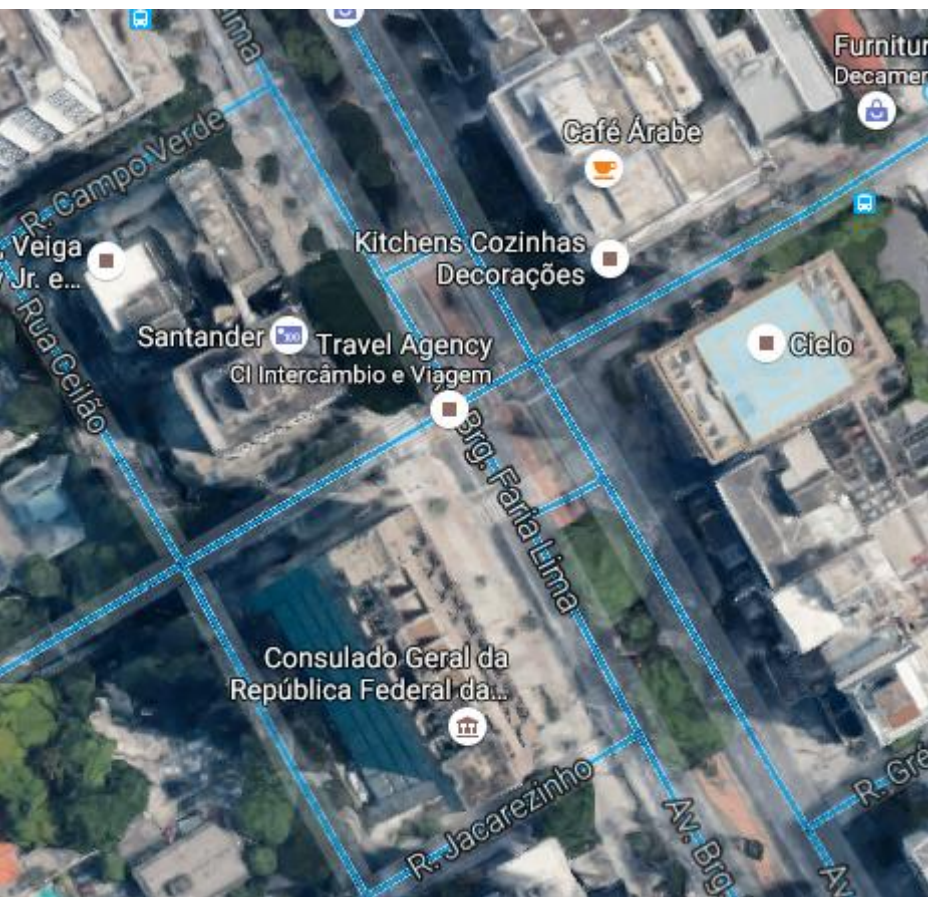




## ÁREA 16B

Cruzamento da Rua Gumercindo Saraiva com Av. Brigadeiro Faria Lima

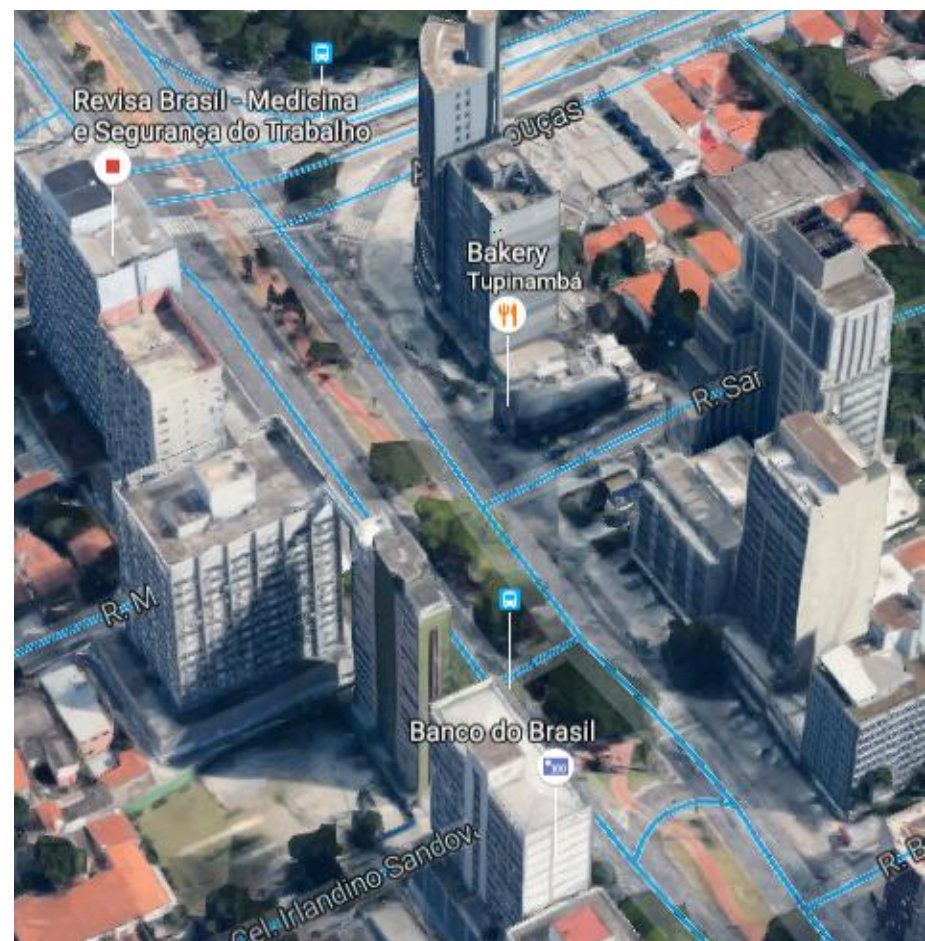
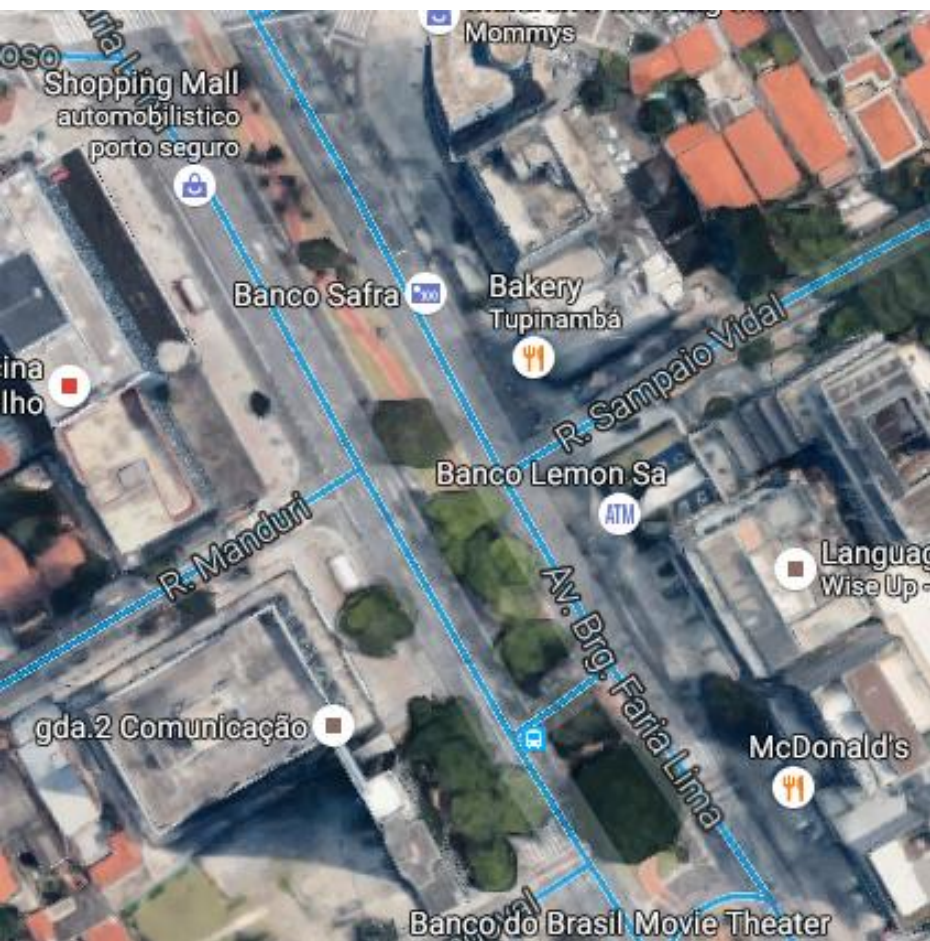




## ÁREA 17B

Cruzamento da Al. Gabriel Monteiro da Silva com Av. Brigadeiro Faria Lima





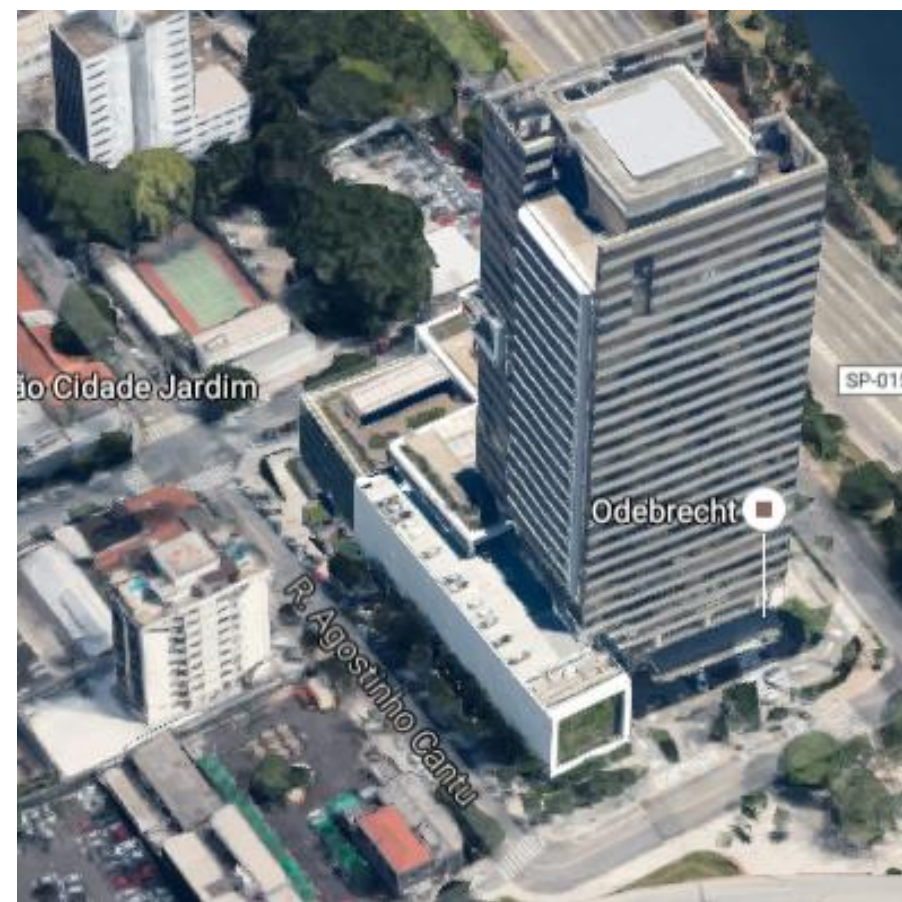
## ÁREA 18B

Cruzamento da Rua Manduri com Av. Brigadeiro Faria Lima



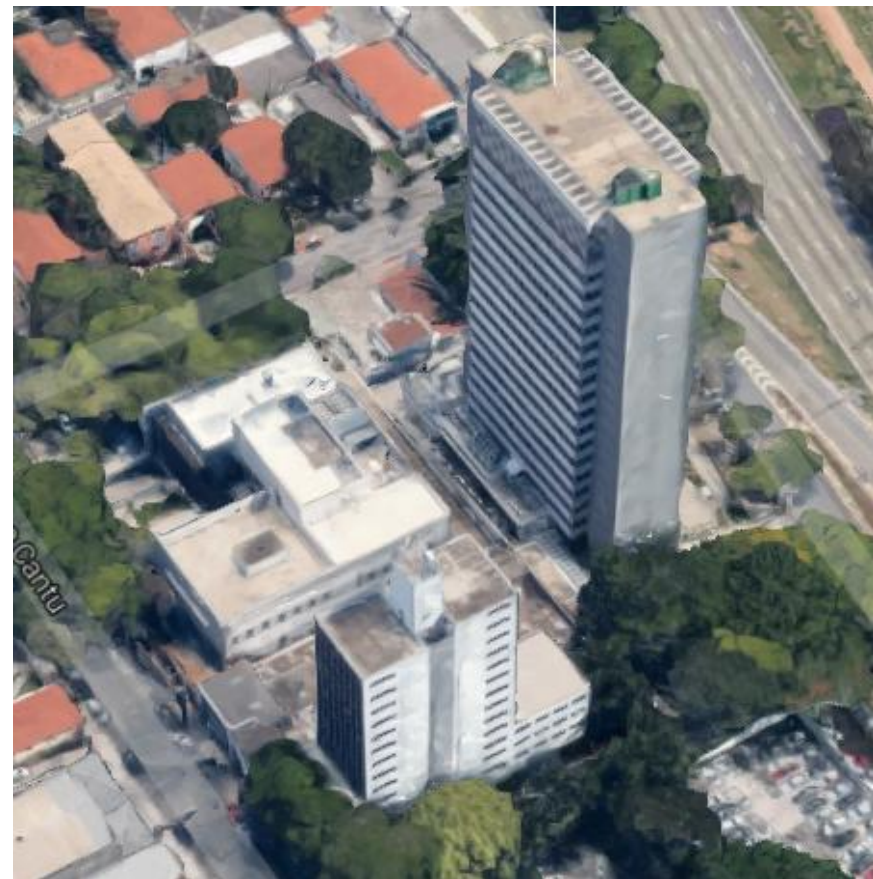
# VITAL BRASIL

ÁREA PARA OS EXERCÍCIOS 2 A 5



## ÁREA 1C

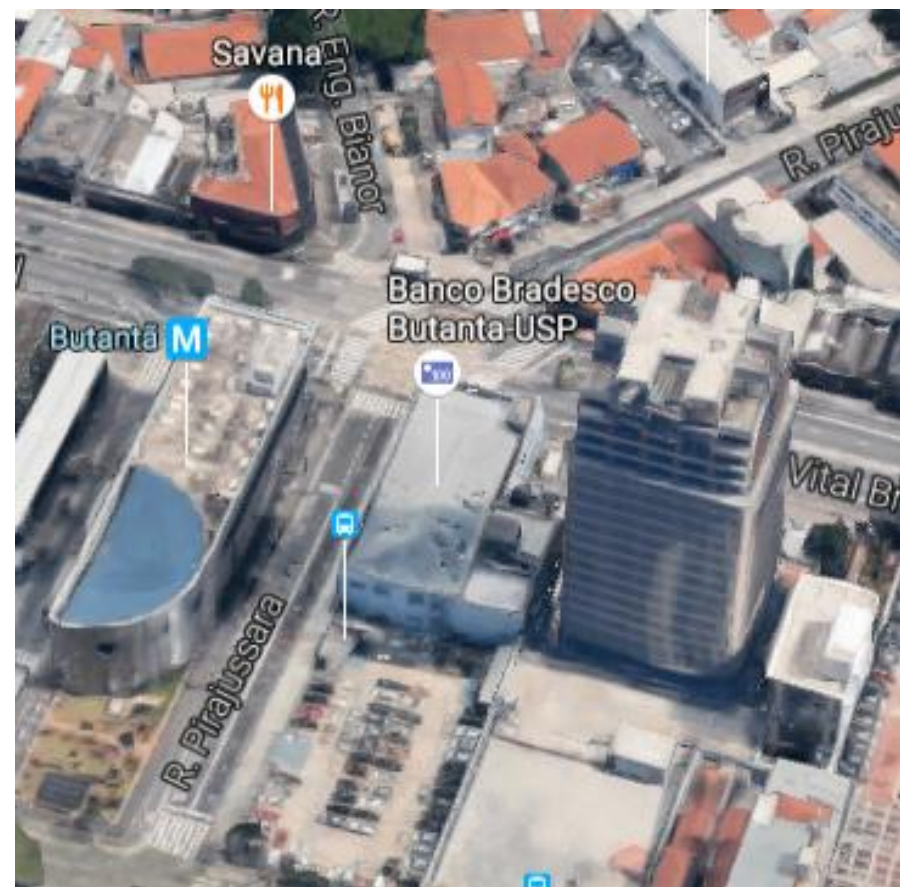
Rua Agostinho Cantu – Ed. Odebrecht



## ÁREA 2C

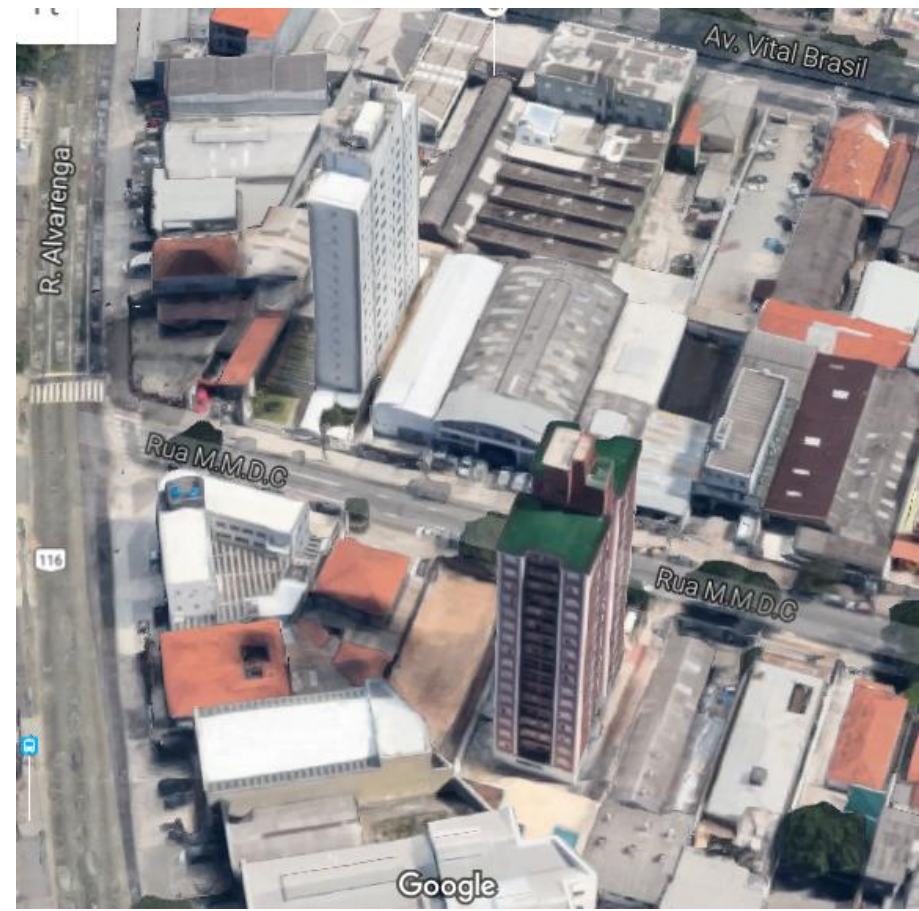
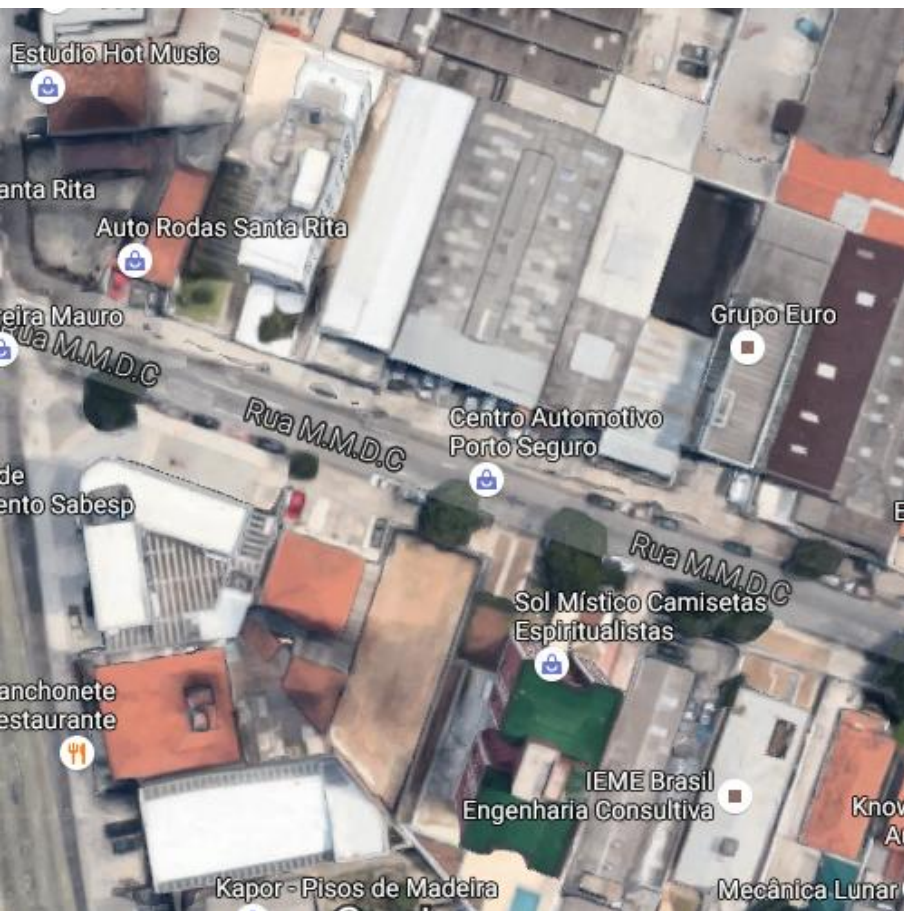
Rua Agostinho Cantu – Entre Ruas Pirajussara e Des. Armando Fairbanks





## ÁREA 3C

Cruzamento da Av. Vital Brasil com Rua Pirajussara



## ÁREA 4C

Cruzamento da Rua M.M.D.C. com Rua Alvarenga





**ÁREA 5C**  
Rua Santa Rosa Júnior



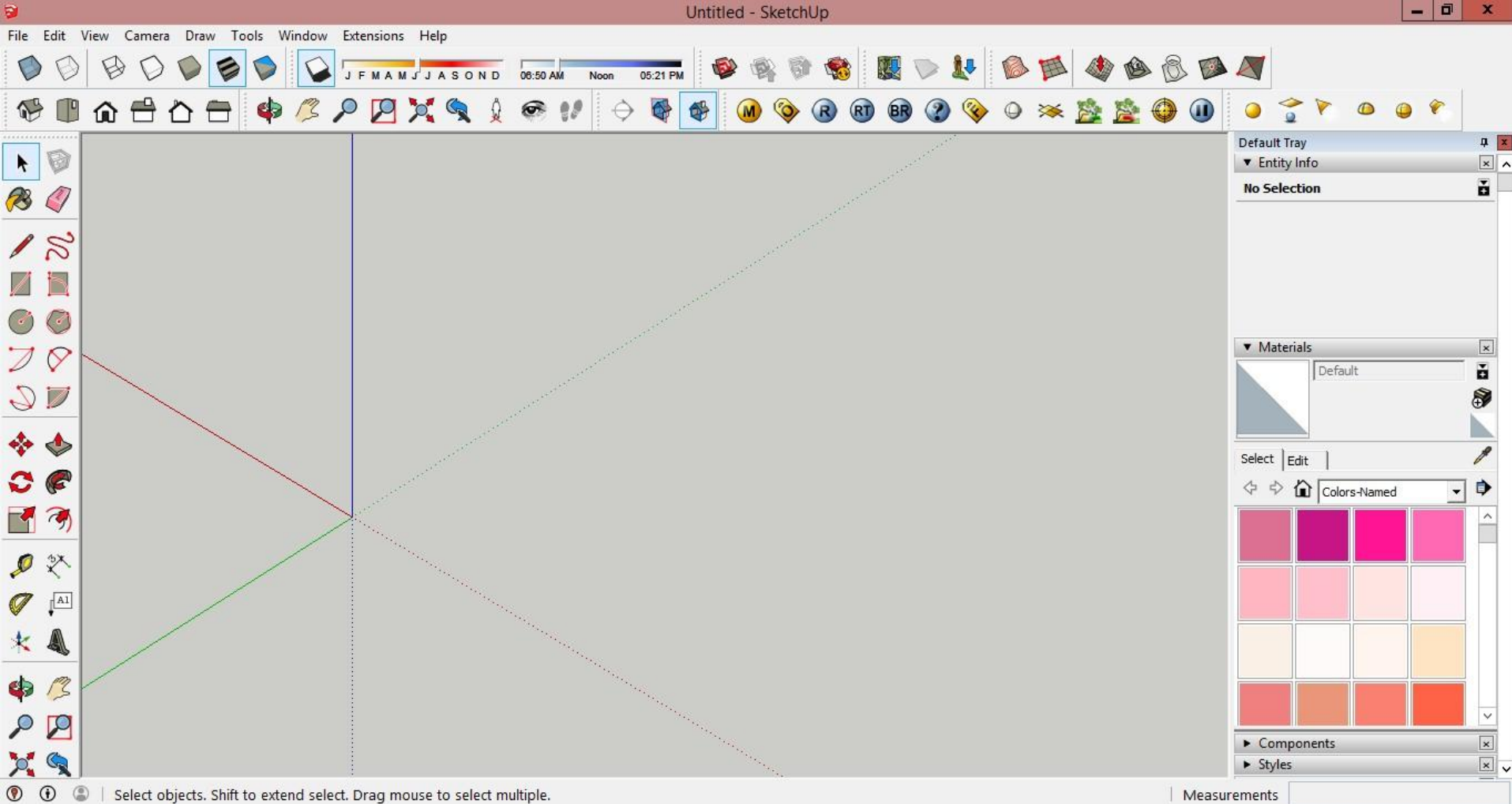


## ÁREA 6C

Cruzamento Av. Vital Brasil e Rua Caxingui

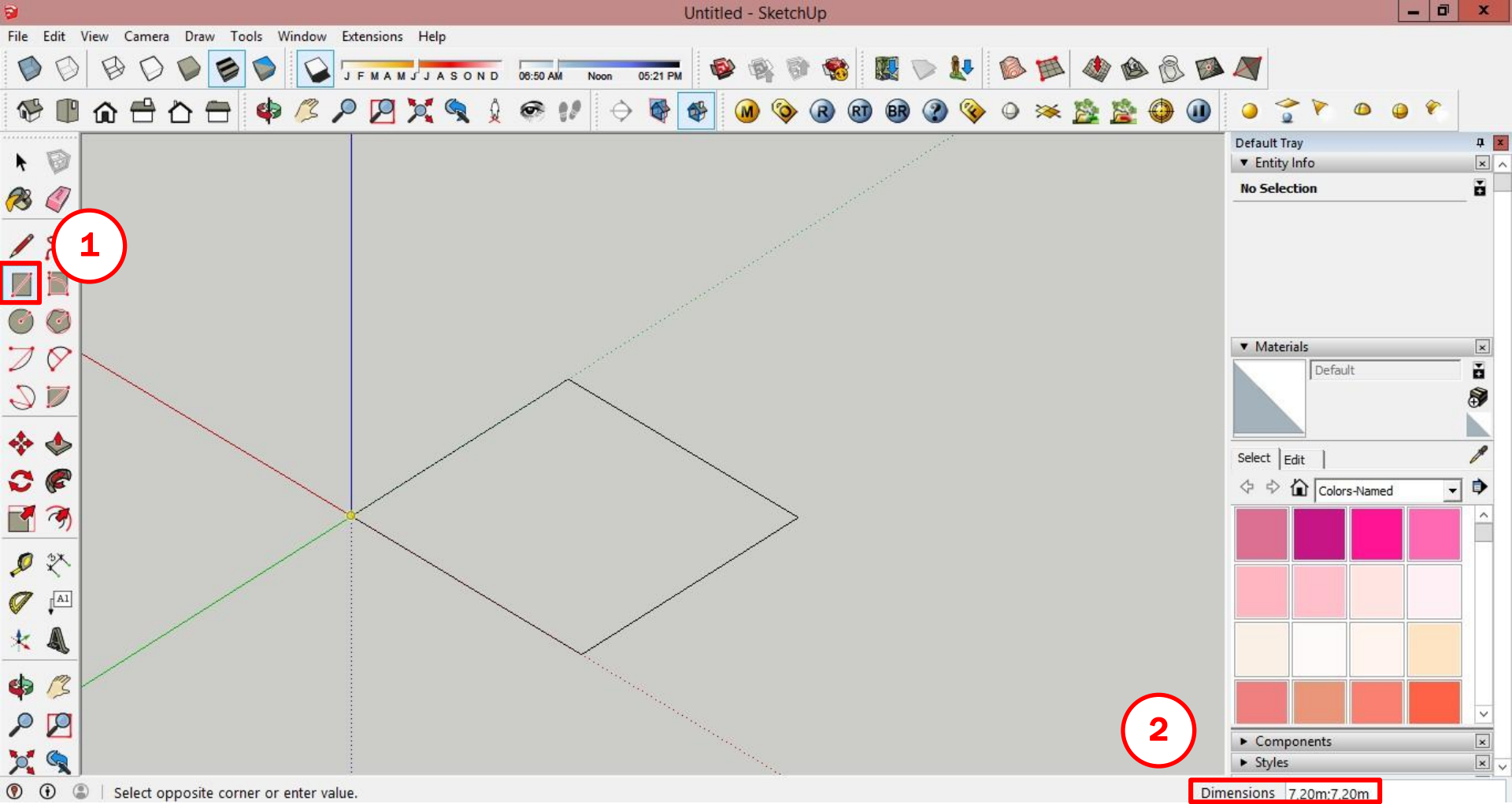
# TUTORIAL BASE - SKETCHUP

SIMULAÇÕES DE PENETRAÇÃO SOLAR NO AMBIENTE INTERNO



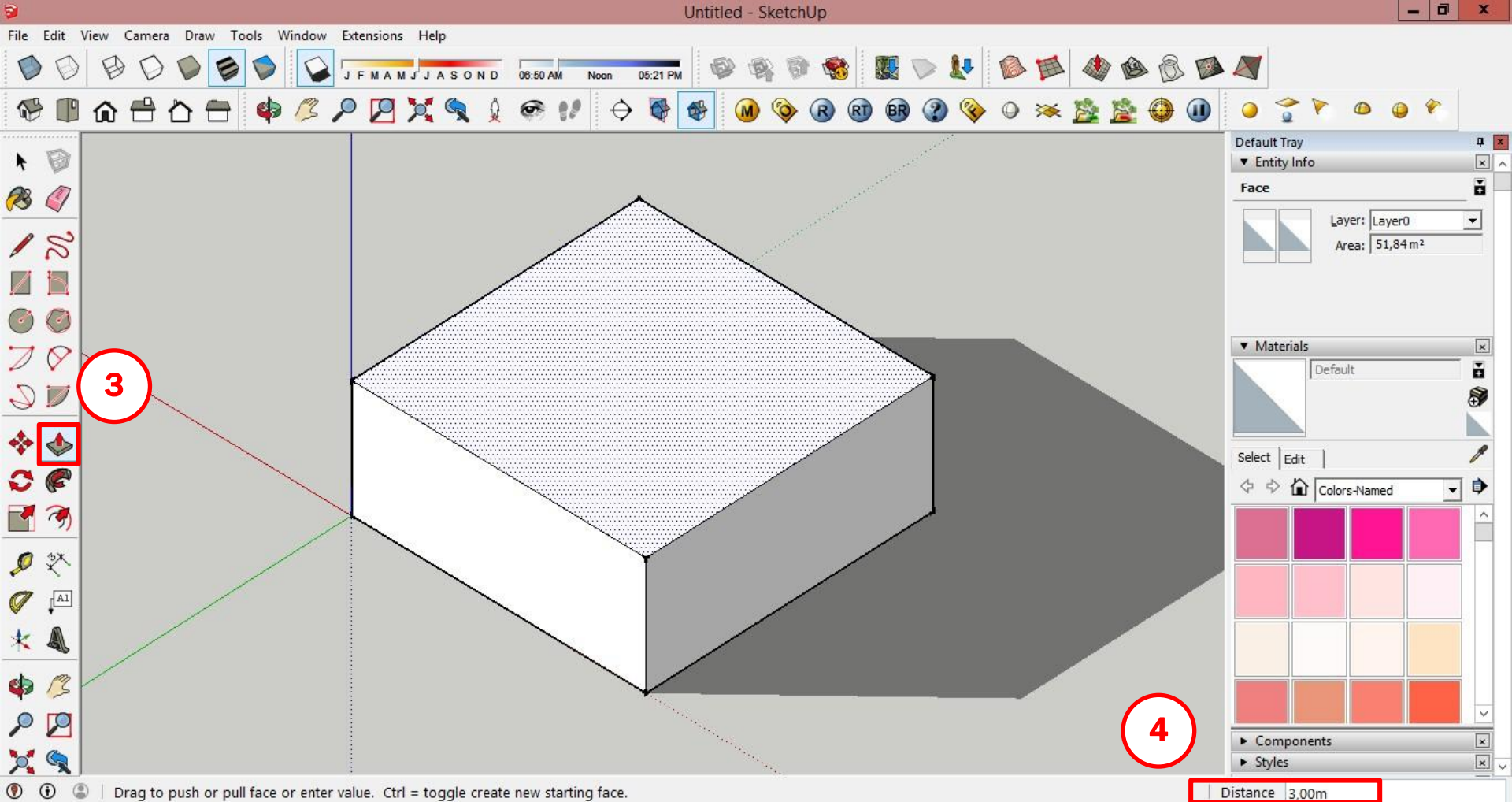
A tela inicial do programa SketchUp pode ser diferente da exibida neste tutorial conforme o template selecionado e as ferramentas nos menus rápidos. Para exibir ferramentas 'avançadas' de modelagem é necessário habilitar as opções no menu superior View > Toolbars





## Para construir o modelo:

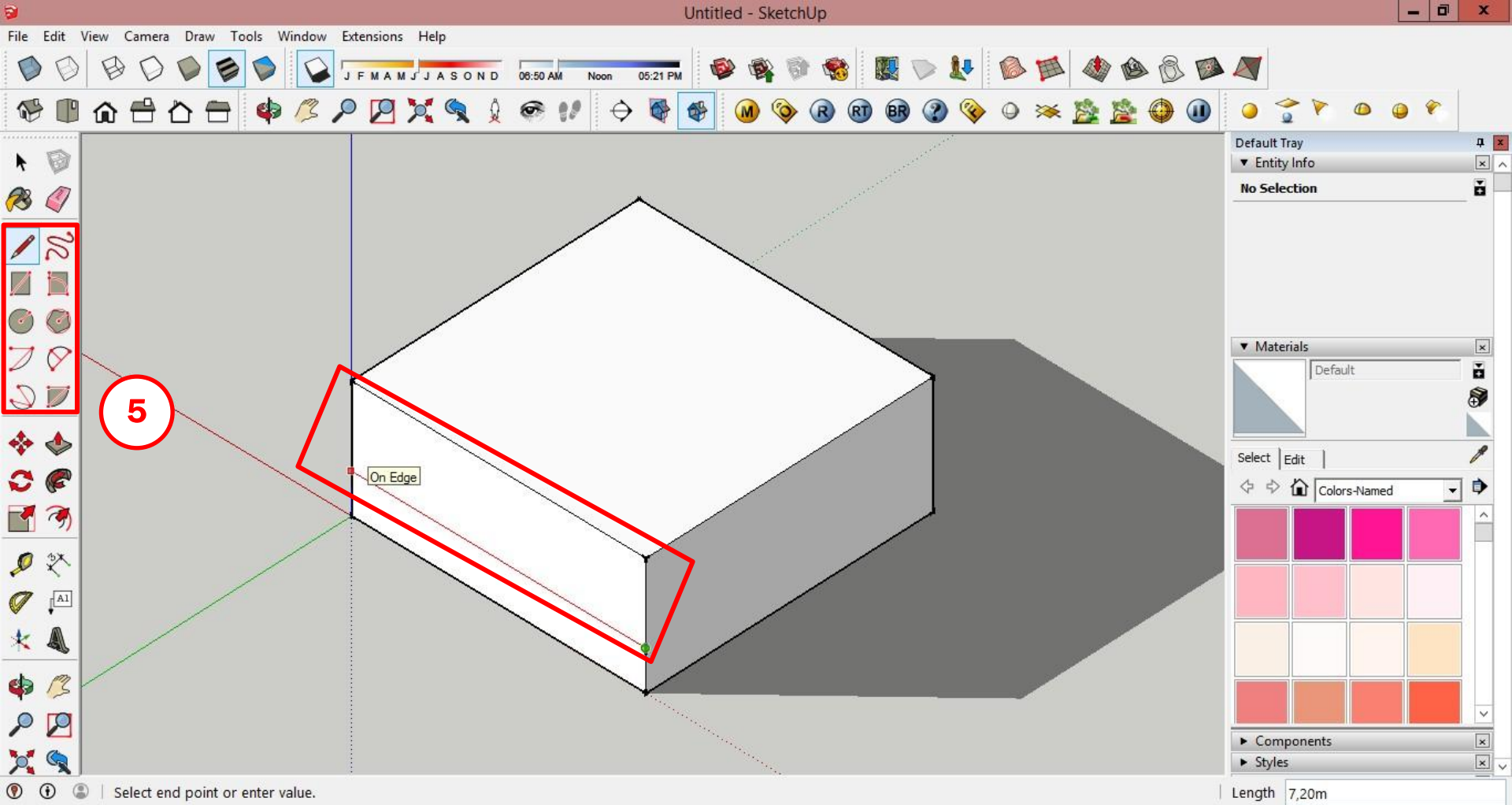
1. Selecionar a ferramenta de *Rectangle*
2. Digitar as dimensões desejadas: 7,2 X 7,2 m



**Para determinar a altura do volume:**

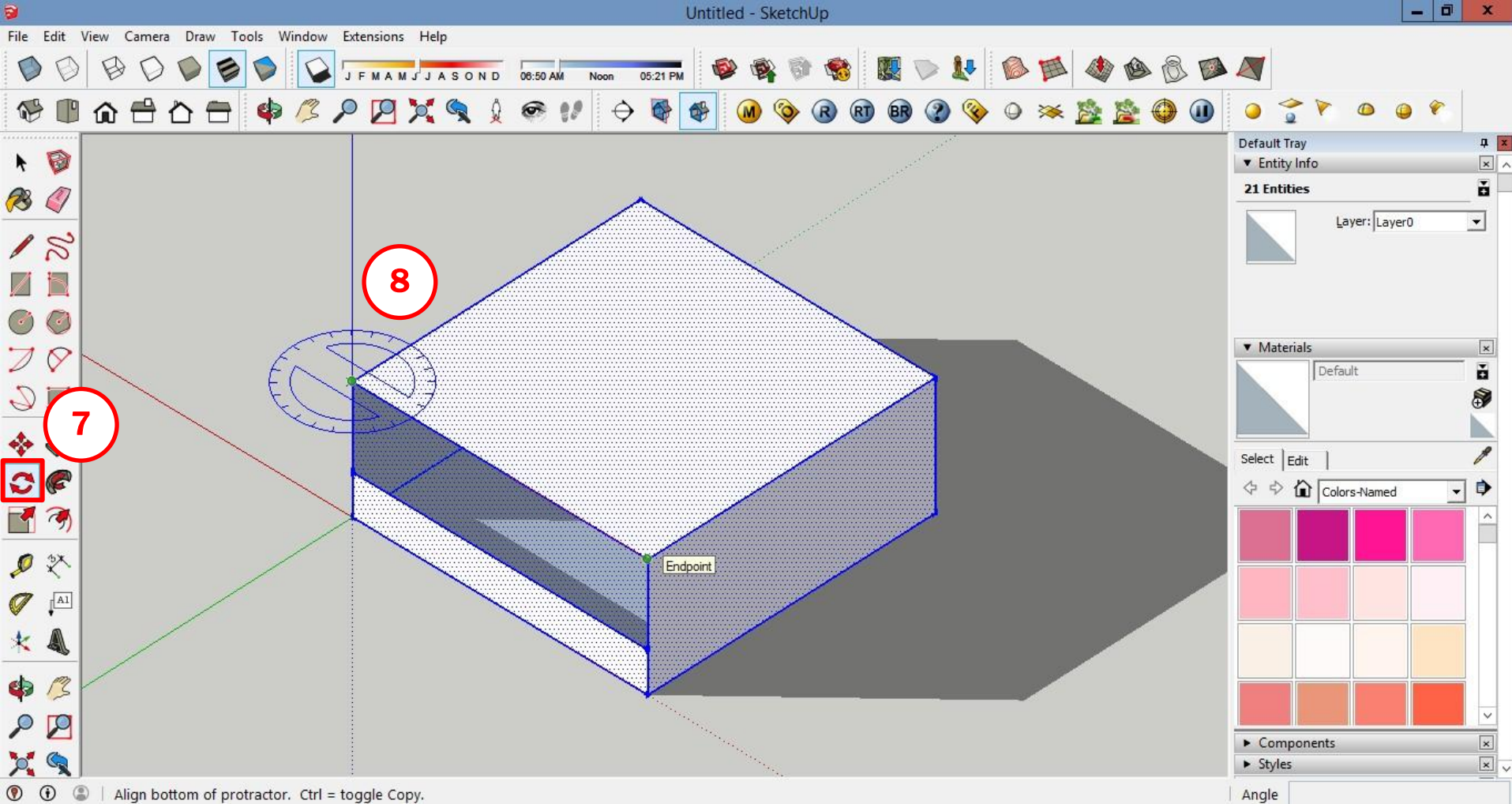
3. Com a ferramenta push/pull
4. Criar um volume com 3m de altura





### Para inserir aberturas:

5. Traçar o contorno da abertura no local desejado, com o auxílio das ferramentas de desenho
6. Deletar a superfície gerada > Delete



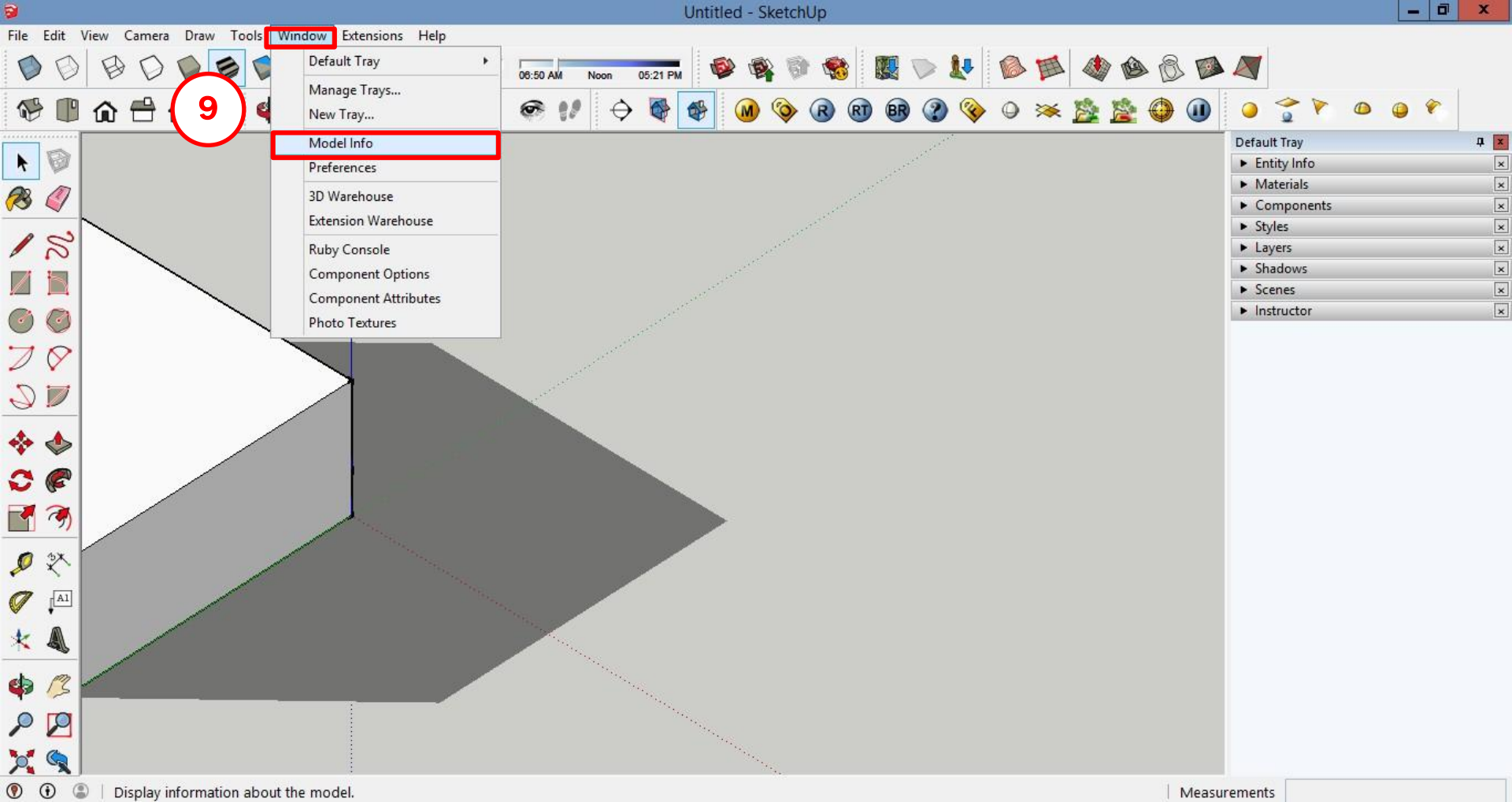
Obs: a cor do transferidor representa o eixo ao qual ele está alinhado.

**IMPORTANTE** no SketchUp o Norte é alinhado ao eixo verde (Y)

Para casos em que haja necessidade de alterar a orientação do modelo:

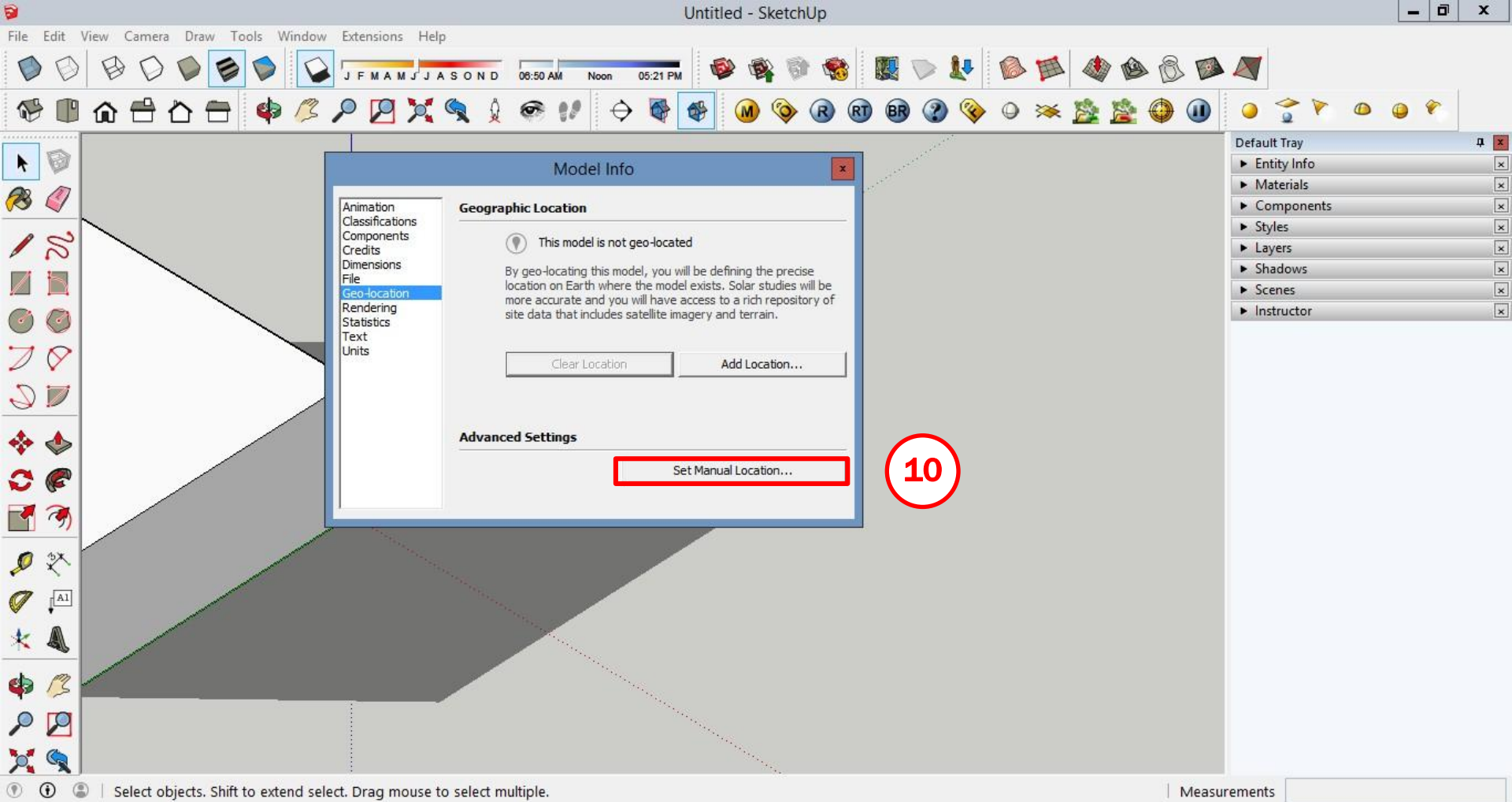
7. Selecionar todo o modelo e utilizar a ferramenta Rotate
8. Mova o cursor até o ponto de inserção do transferidor e clique para fixá-lo





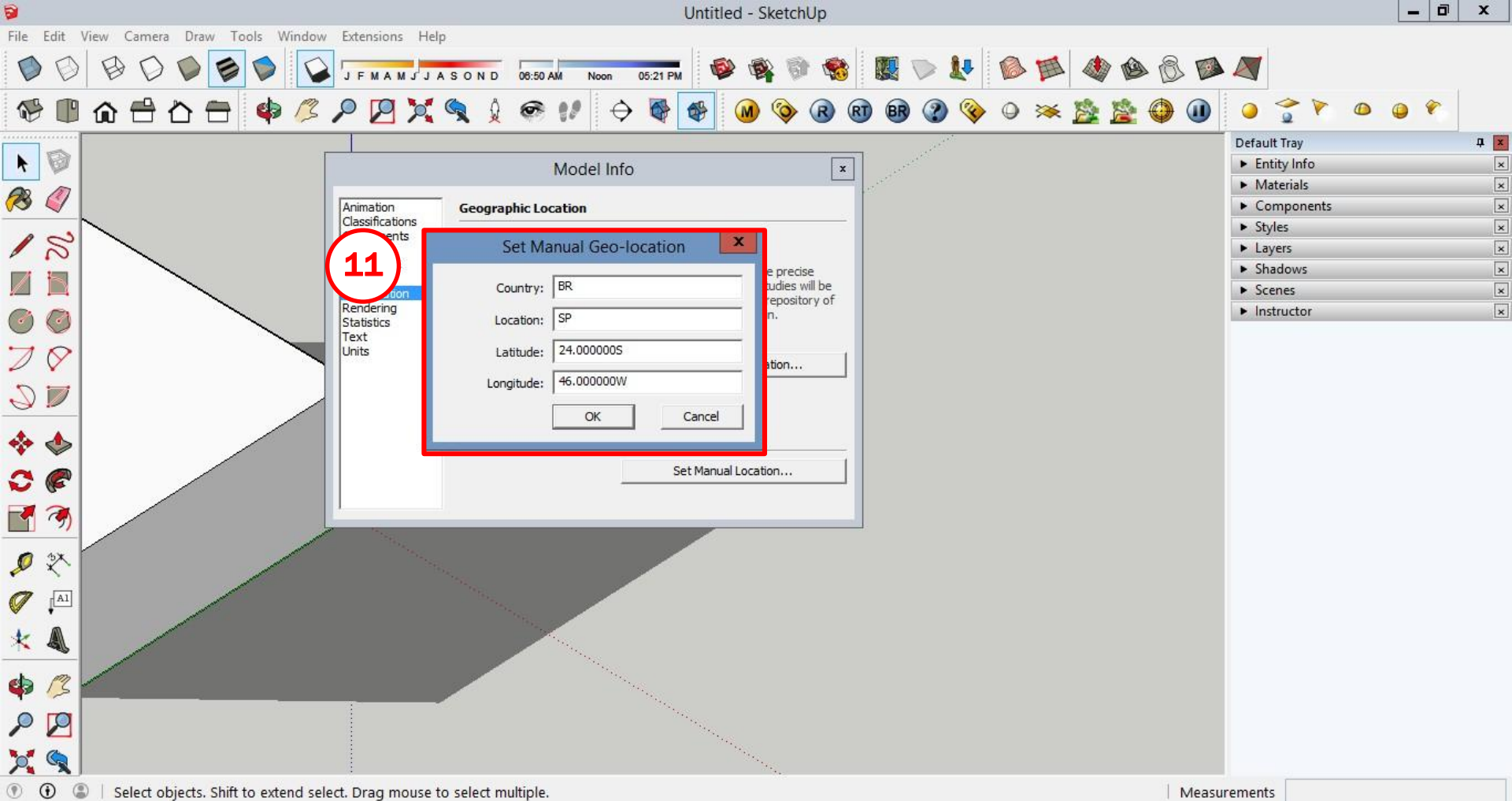
**Para Geo-referenciar o modelo:**

**9. No menu superior Window, abrir a opção Model Info**



**Na opção Geo-location :**  
**10. Clicar na opção Set Manual Location...**

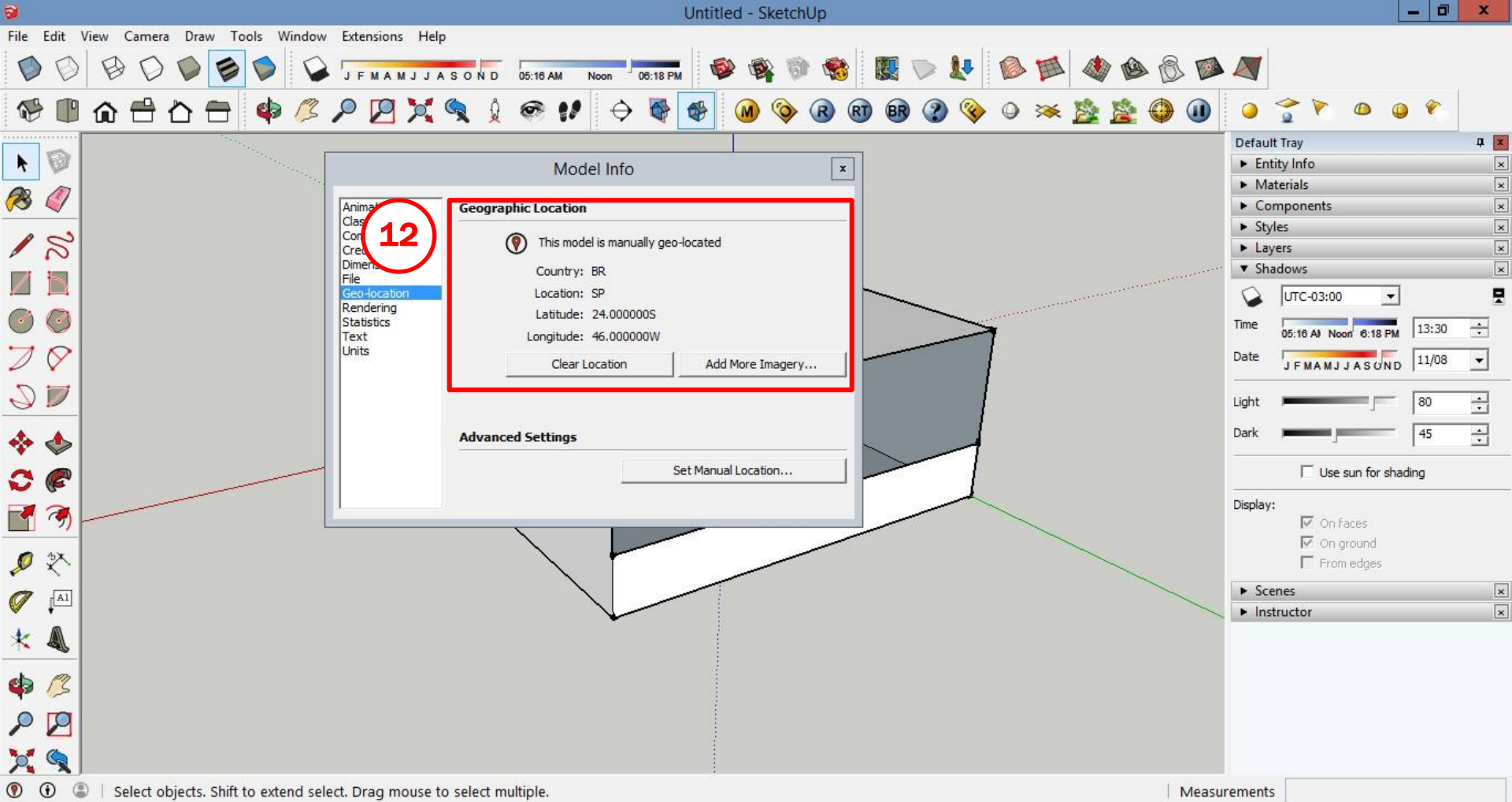




**\*As coordenadas da cidade de São Paulo são:**  
**Latitude: -23.5489**  
**Longitude: -46.6388**

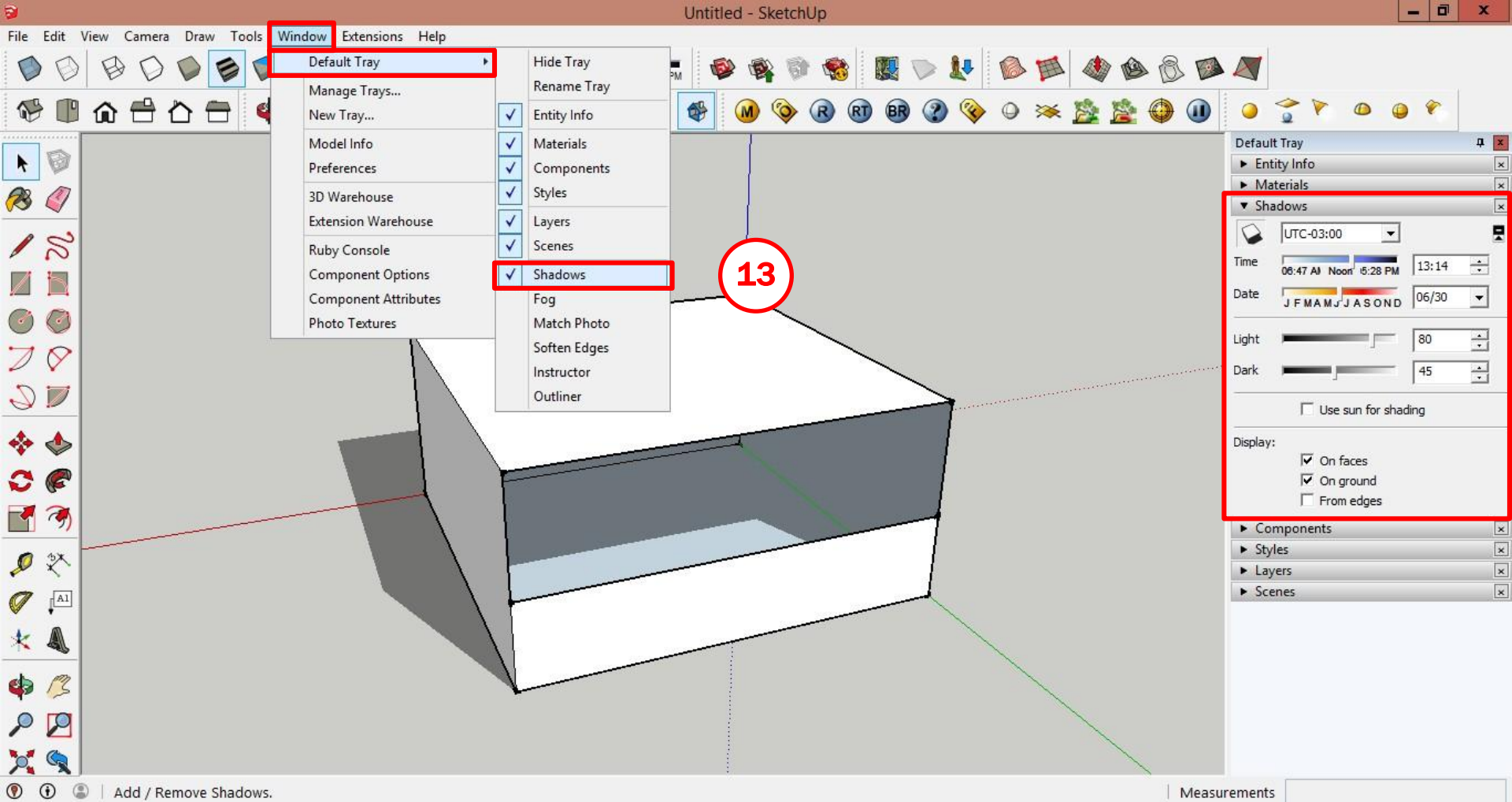
**Na janela set Manual Geo-location:**

**11. preencher os campos com a correta latitude e longitude como no exemplo: Latitude: 24S e Longitude: 46W**



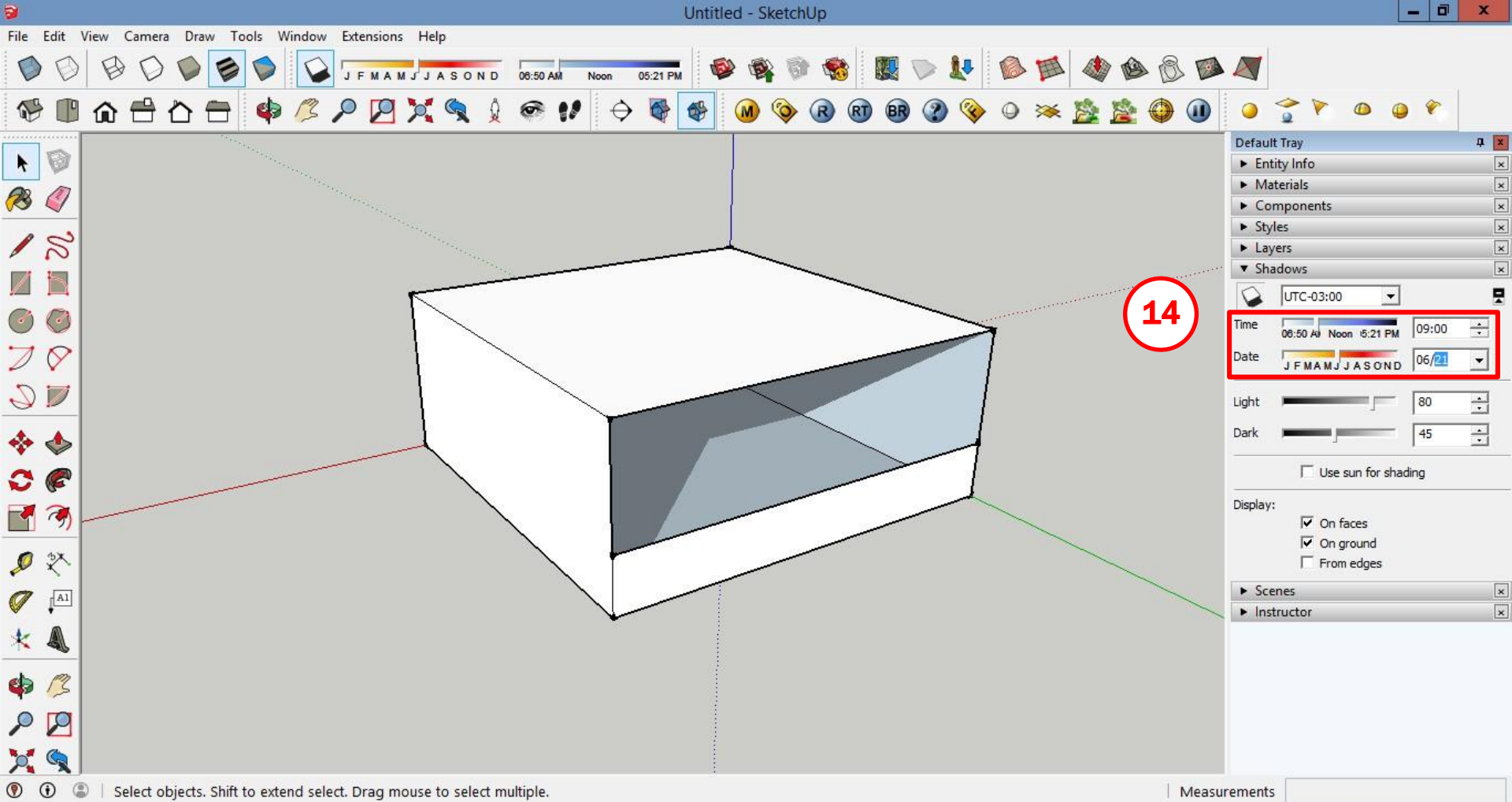
12. Na tela de Confirmação dos dados de geolocalização é só confirmar se está tudo correto e fechar a janela.





**Para os estudos do efeito das sombras e penetração de sol pelas aberturas:**

**13. Ativar o menu Shadows através do menu superior  
Windows > Default Tray > Shadows**



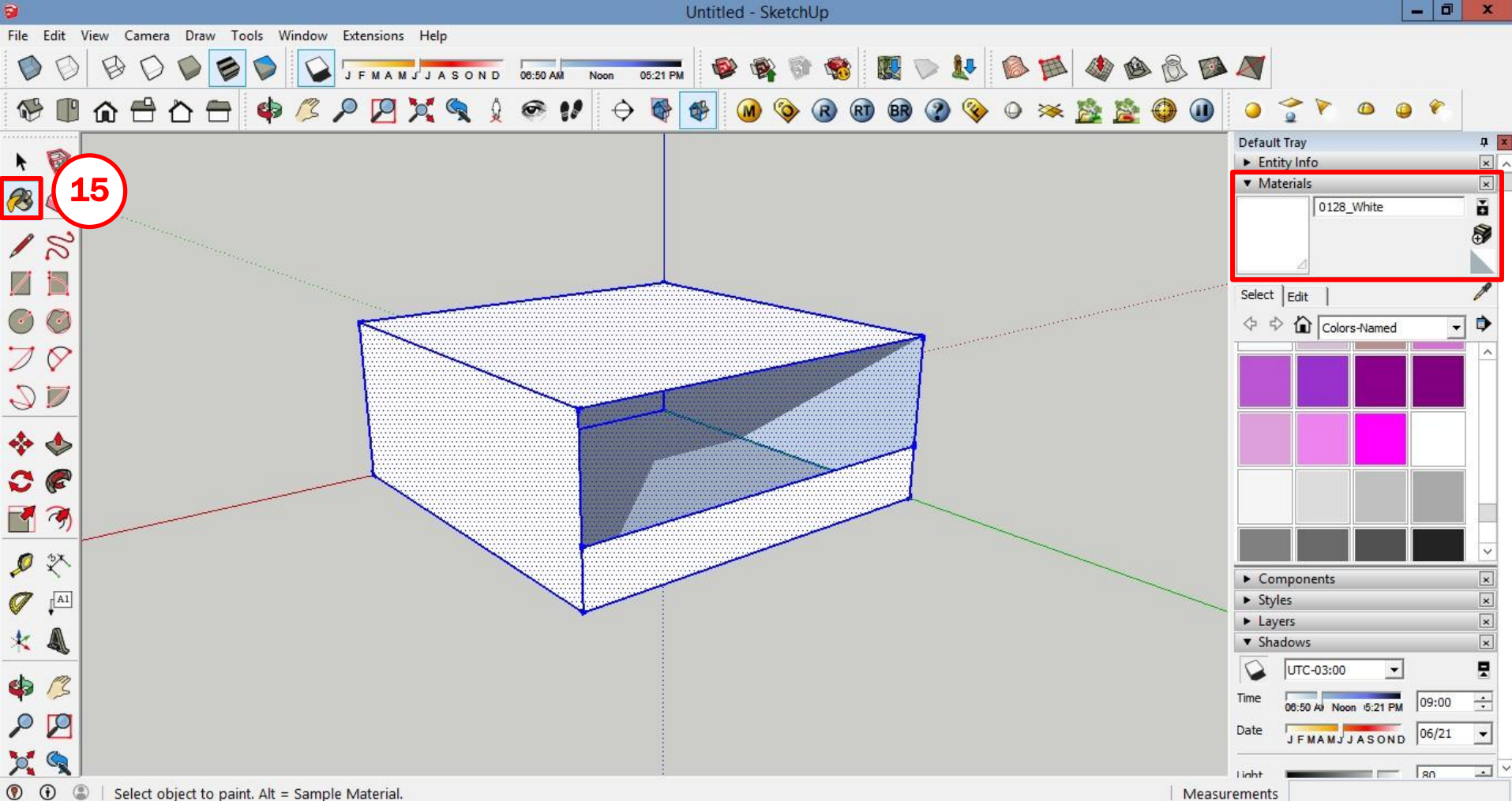
Para gerar as imagens de insolação de acordo com a hora e data desejada:

14. Preencher as configurações de sombra da seguinte forma:

Time: 09h00      Date: 06/21 (mês/dia)

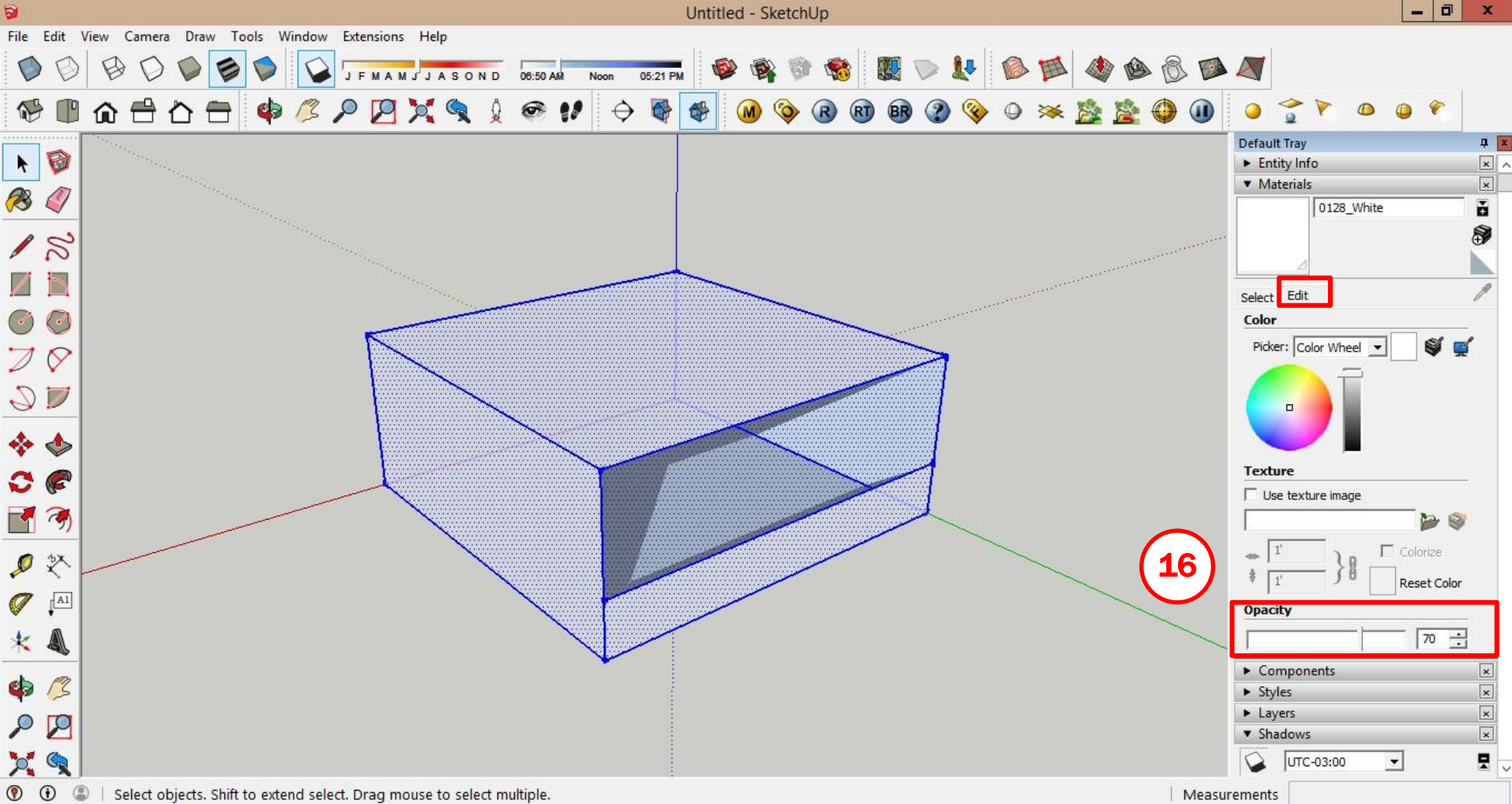
**\*Solstício de Inverno no hemisfério sul**





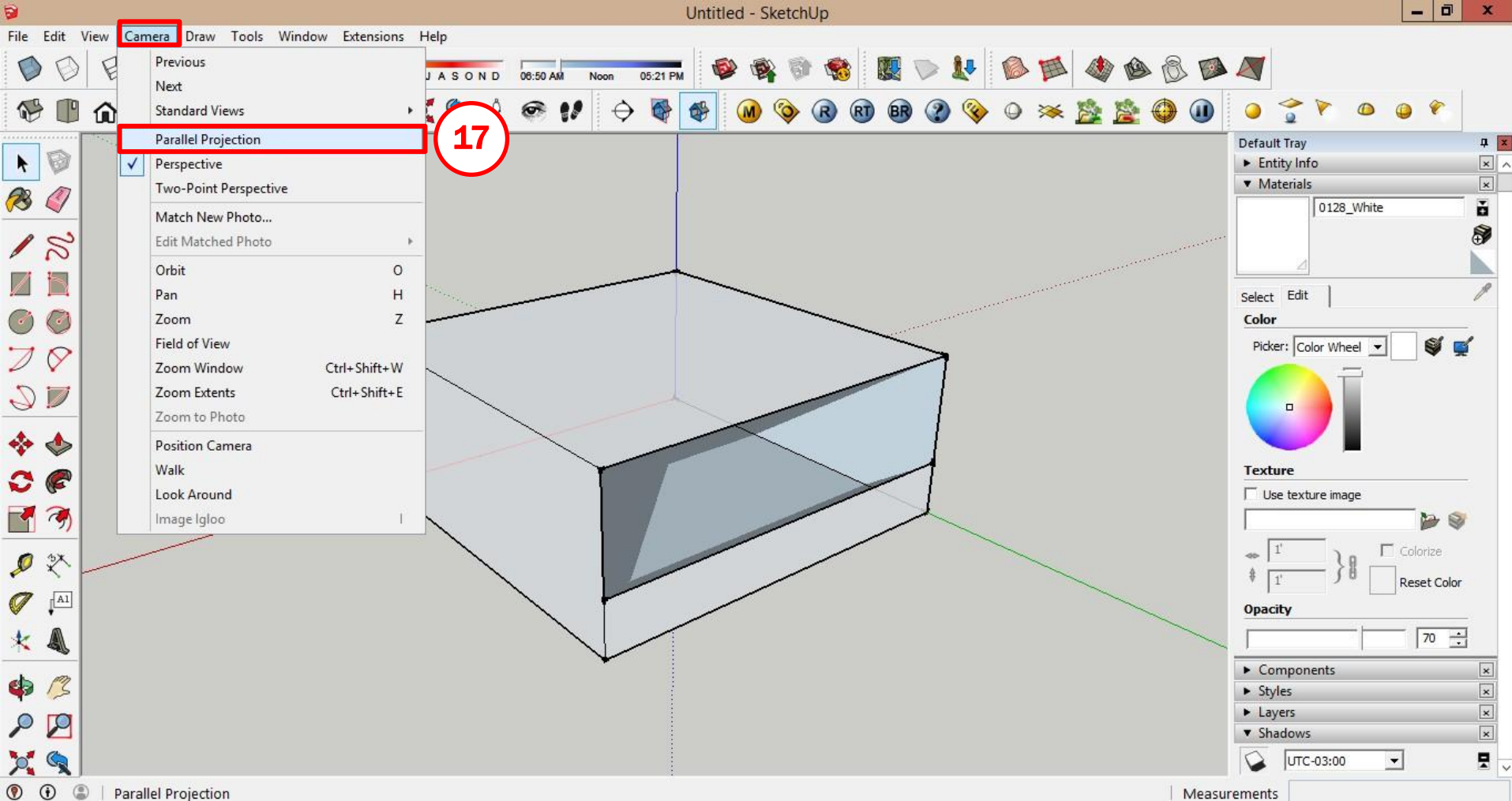
Para poder visualizar a penetração solar pelas aberturas em planta e vistas é necessário deixar o modelo com alguma transparência, para tanto:

15. Com a ferramenta Paint Bucket, selecionar todo o modelo e colorir as faces externas de branco através do menu Materials e clicando em um dos planos do modelo

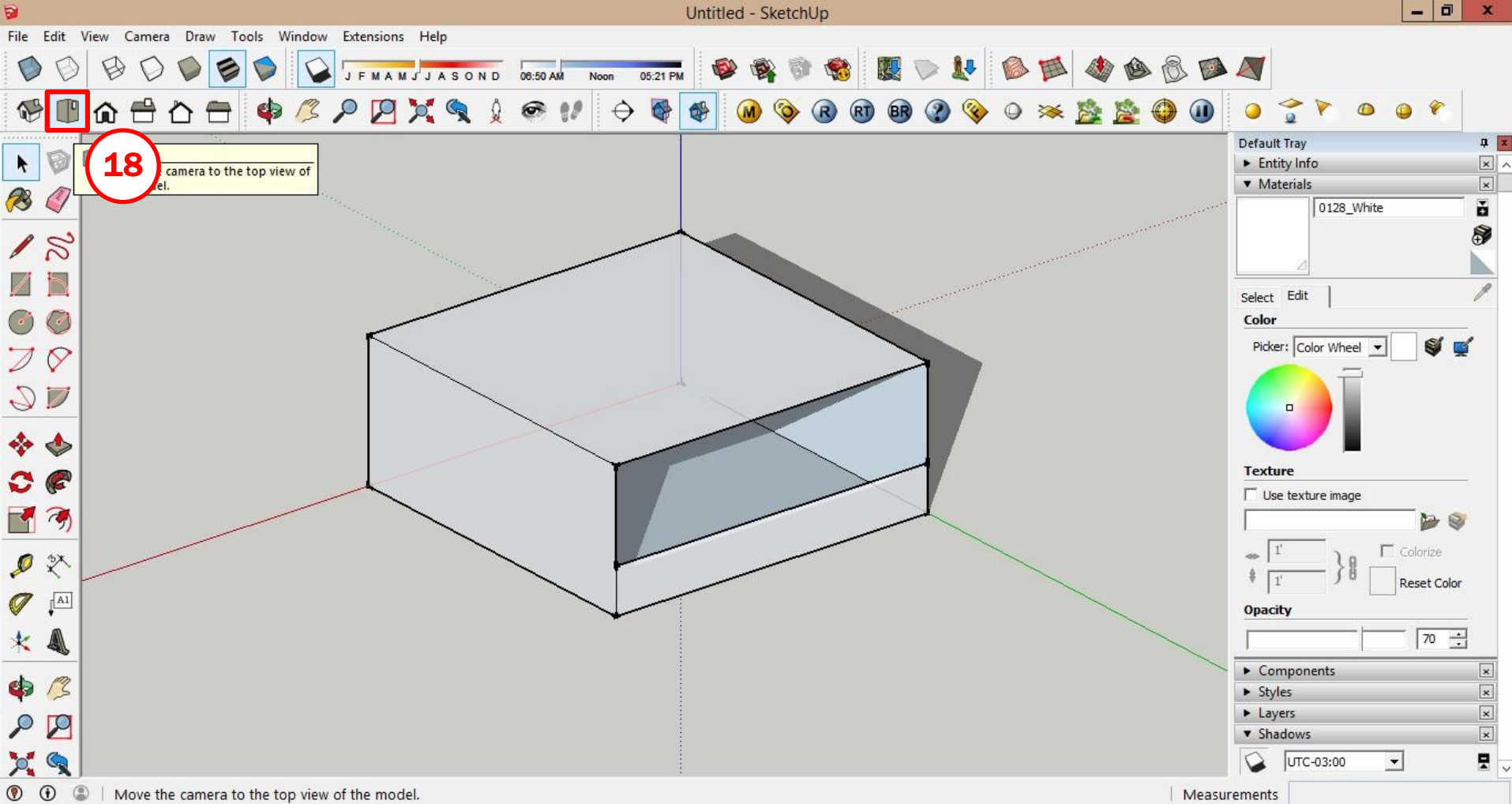


**16. Ainda no menu Materials, abrir o submenu Edit e alterar a opacidade das faces para 70%**



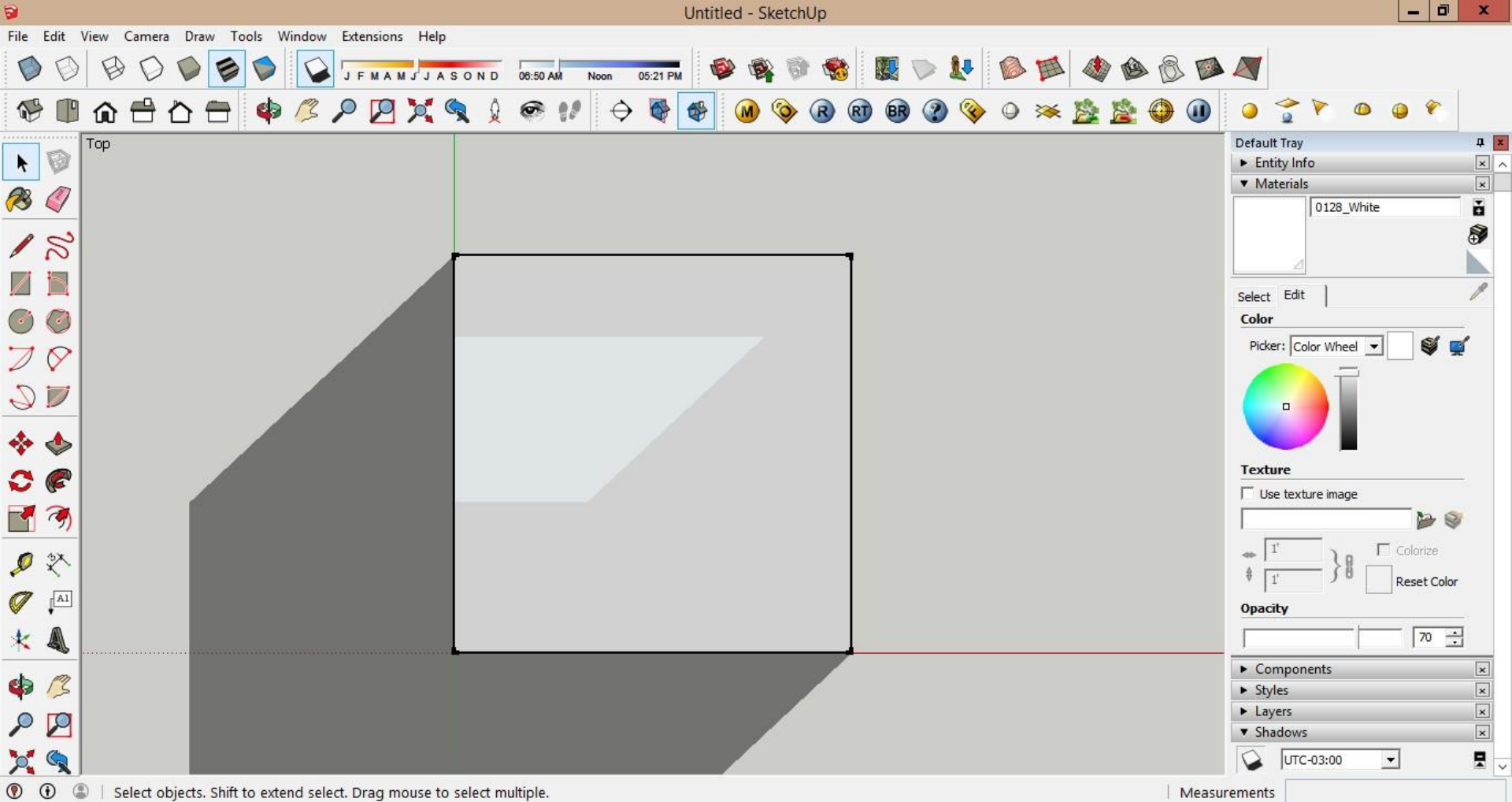


**17. Ativar o modo Parallel Projection no menu Camera para visualizar o modelo sem distorções de perspectiva**



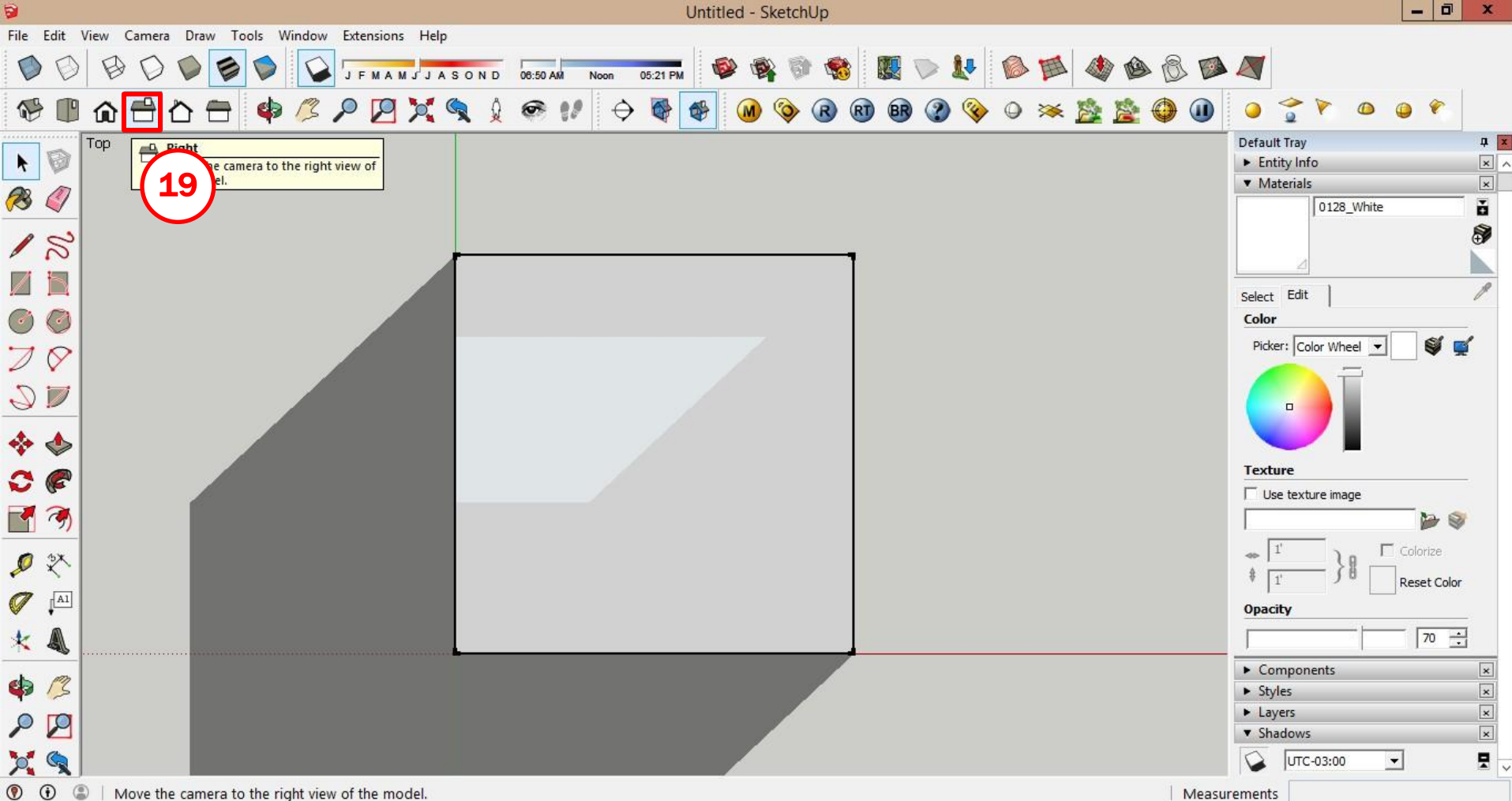
**18. Selecionar a visão de modelo Top (sic) para visualização em planta das sombras no ambiente interno**

**\*Caso a opção não esteja aparente, basta ir ao menu superior Camera > Standard Views**



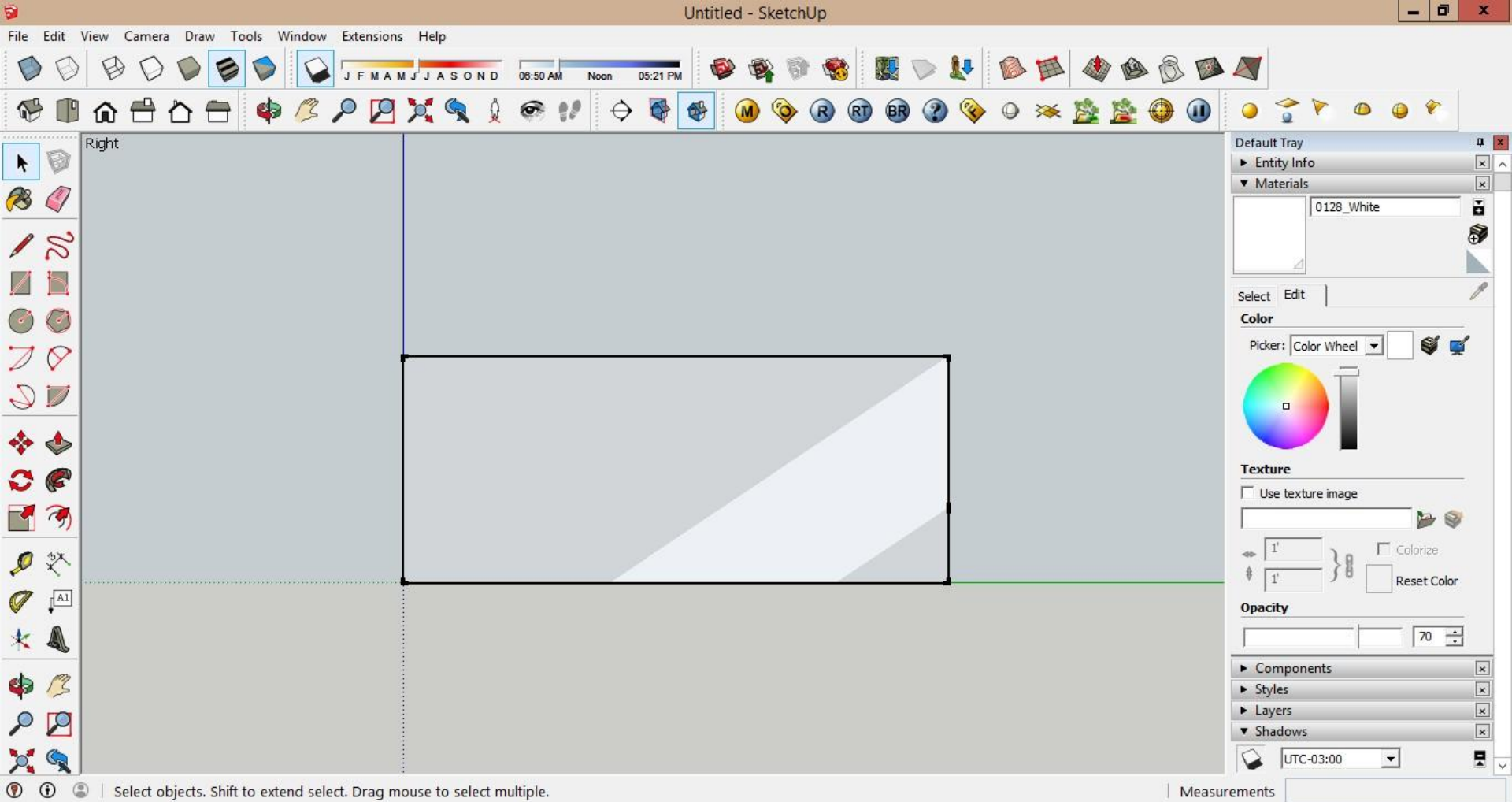
Efeito da sombra visto em planta





**19. Selecionar a visão de modelo Right para visualização em corte das sombras no ambiente interno**

**\*Caso a opção não esteja aparente, basta ir ao menu superior Camera > Standard Views**



**Efeito da sombra visto em corte na face esquerda do modelo**

