3D Applications for OSM Data
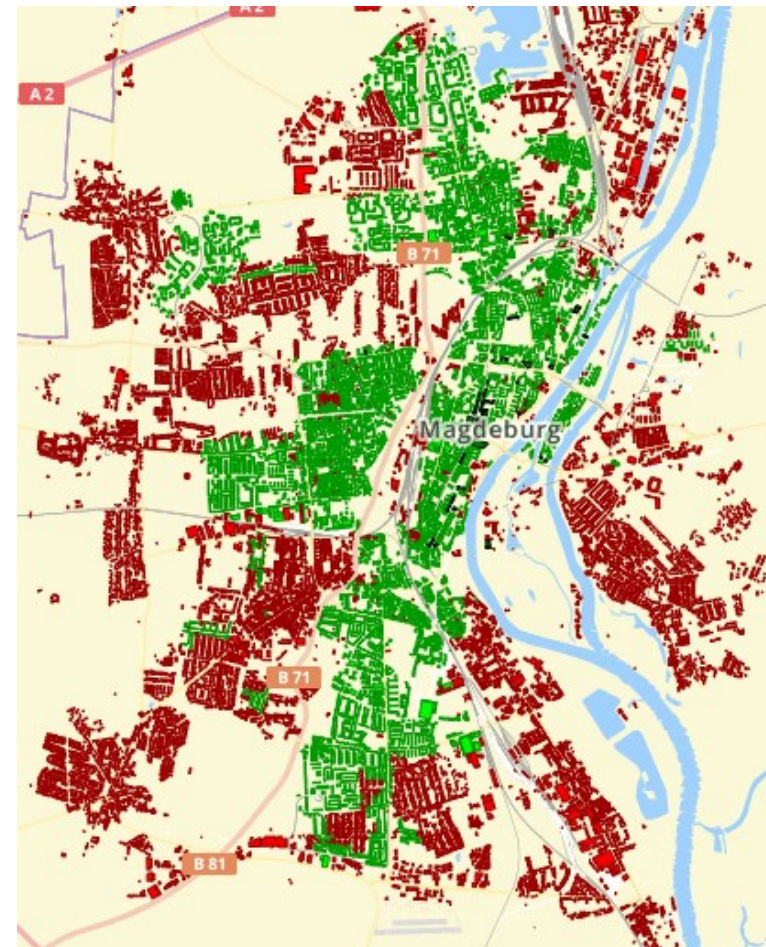
Robert Buchholz <rbuch703@gmail.com>

Me

- Robert Buchholz

- Magdeburg, Germany

- PhD in Computer Science

- Currently mapping no. levels for ~10.000 buildings

[Wikipedia, Carlarocaoporto, CC BY-SA 3.0, cropped]

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OSM is more than "O", "S", "M"

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This talk: Two applications beyond maps.

Application: Street View

- Google Street View:
  - 360° panoramas *mostly of roads and buildings*
  - Applications: curiosity, navigation/planning

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  We can do better than that!

Alternative Approach: OSM Street View

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Alternative Approach: OSM Street View

- Google Street View:

  - 360° panoramas *mostly of roads and buildings*

- OSM data: no photos, but

  - Great road coverage

  - good building footprint coverage

  - Locally good building attribute coverage
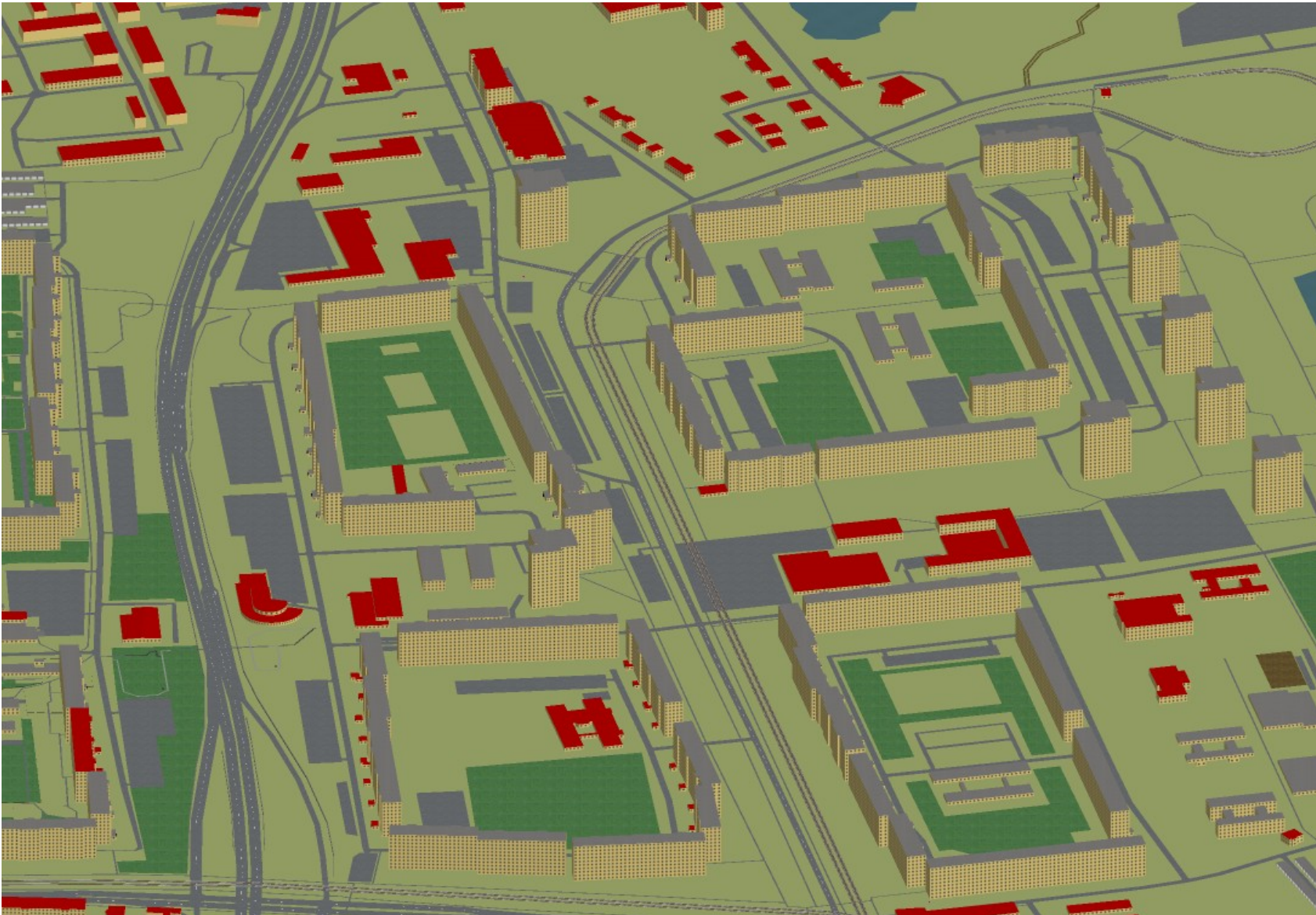   (height, roof:height, building:colour, roof:shape)

Existing 3D OSM Renderers
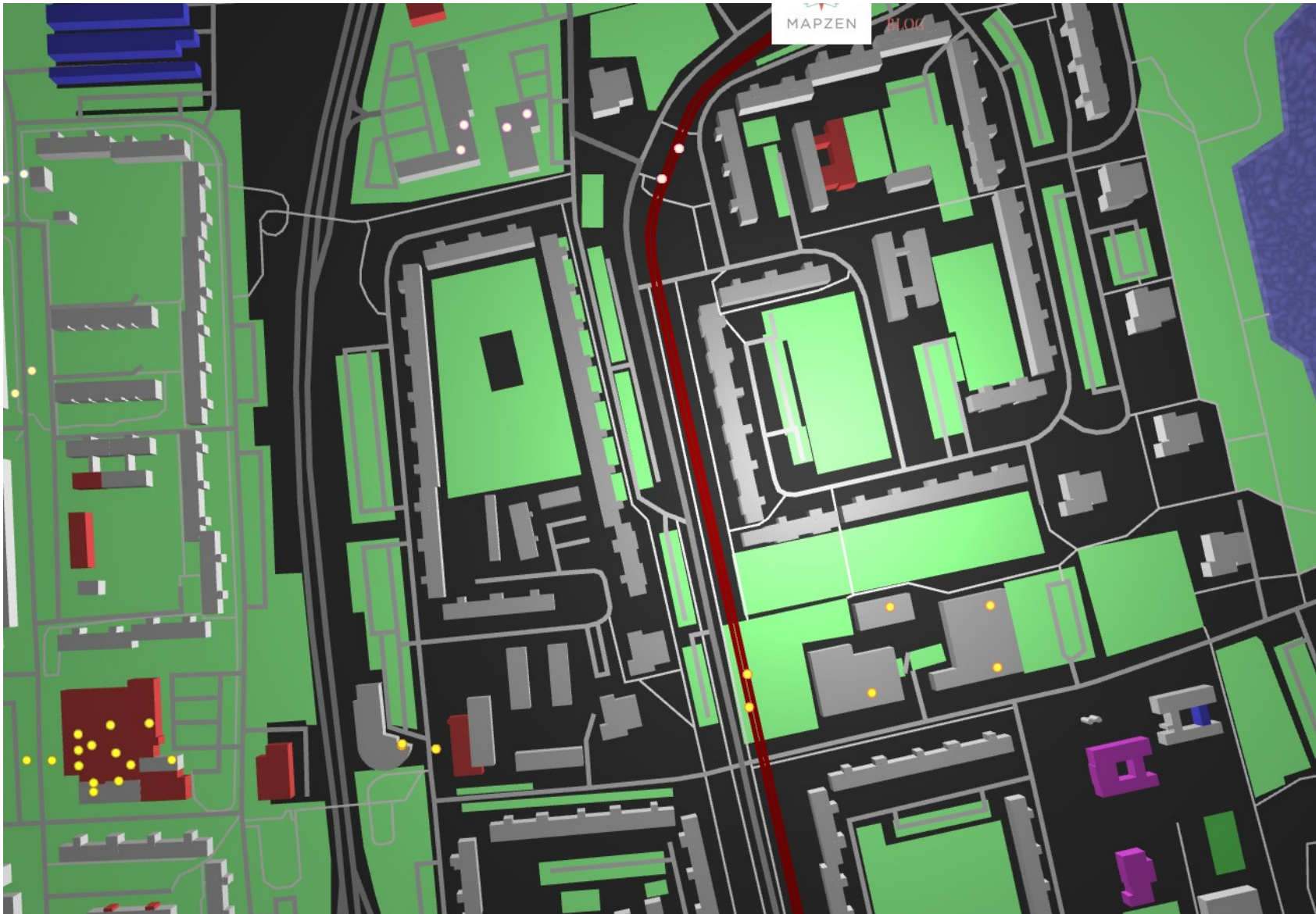
- Mostly for top-down map view: Tangram

Existing 3D OSM Renderers

- Mostly for top-down map view: OsmBuildings

Existing 3D OSM Renderers

- Mostly for top-down map view: Osm2World

OsmStreetView: Hybrid 1st Person Renderer

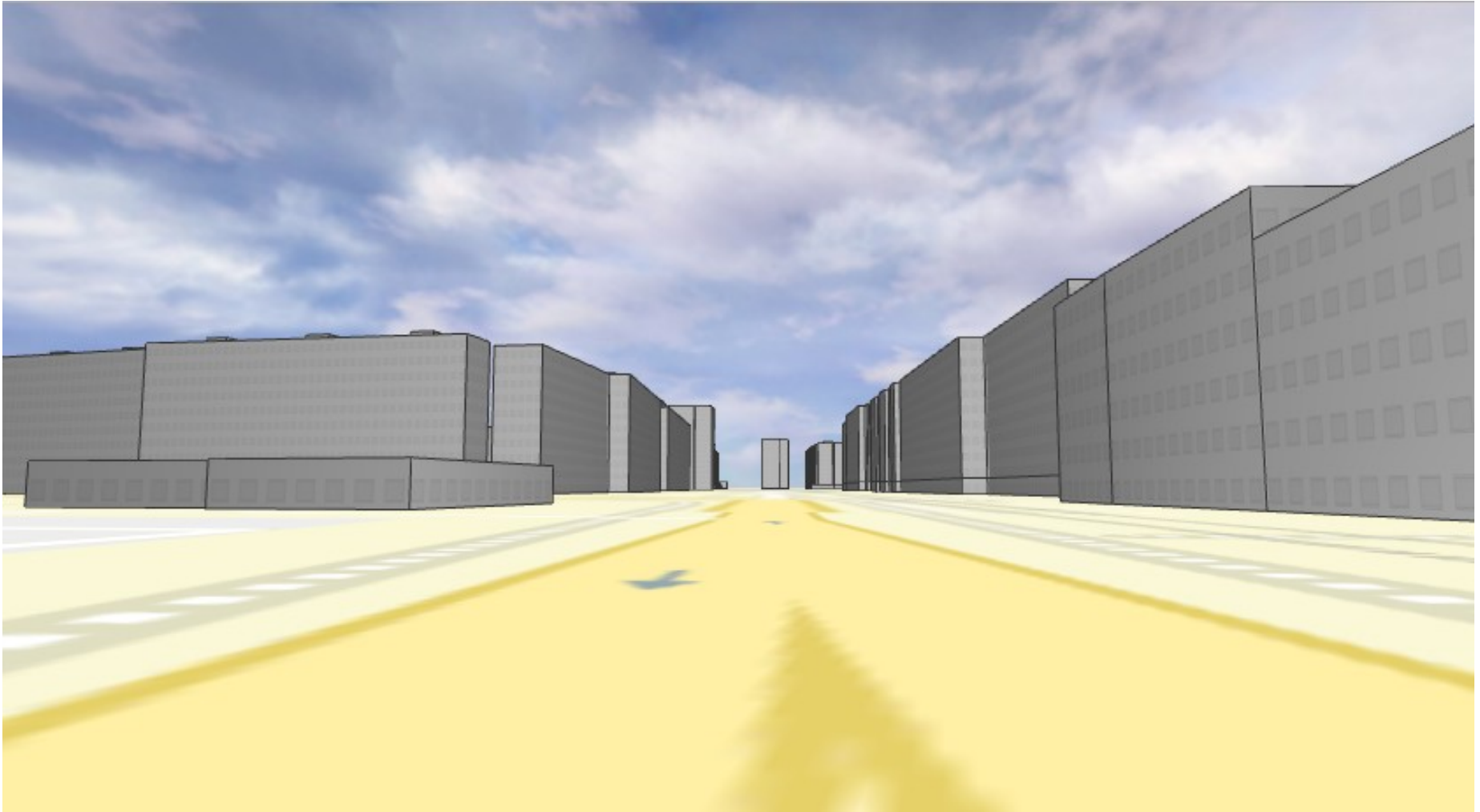# OsmStreetView: 1st Person Renderer

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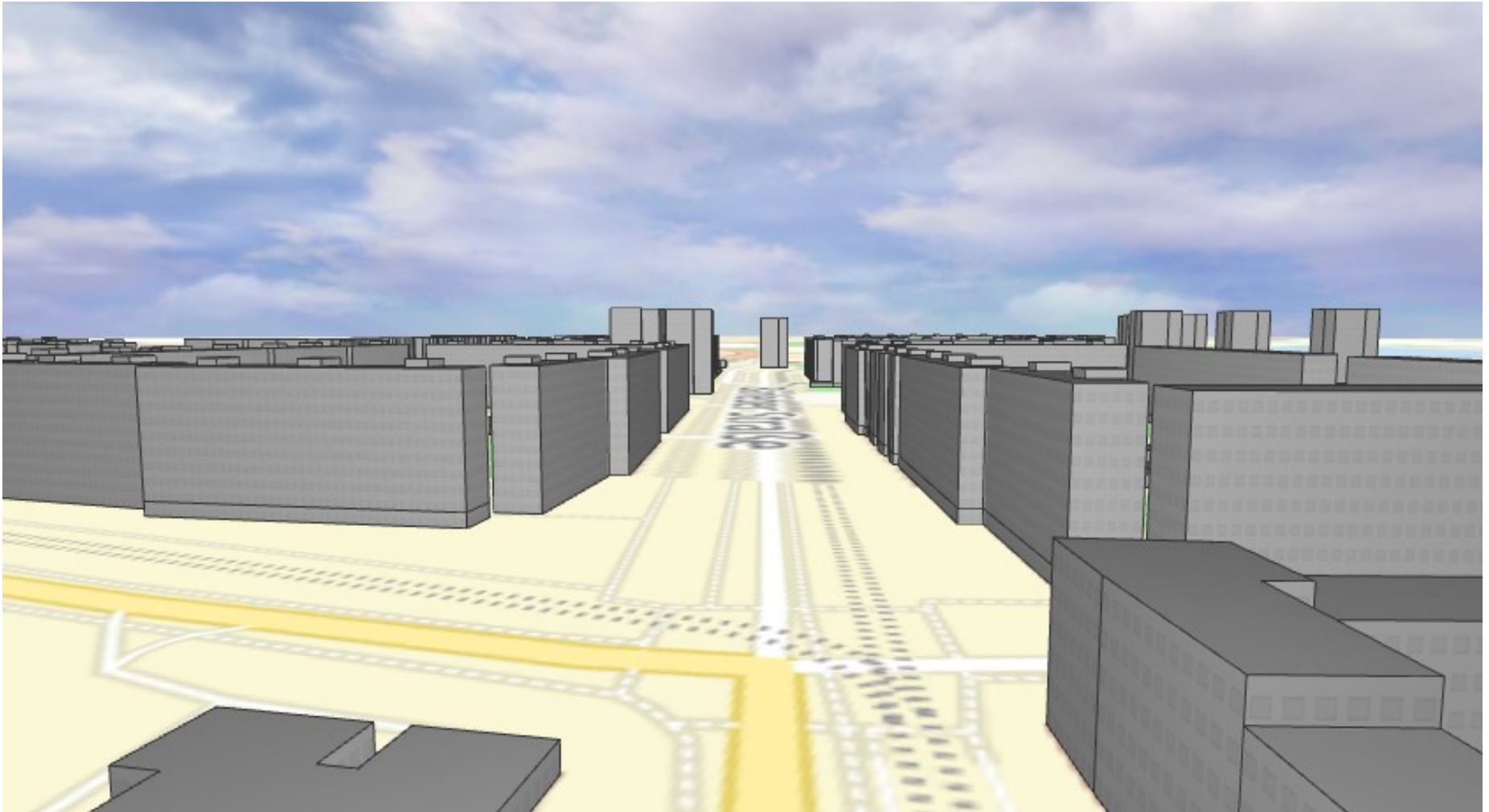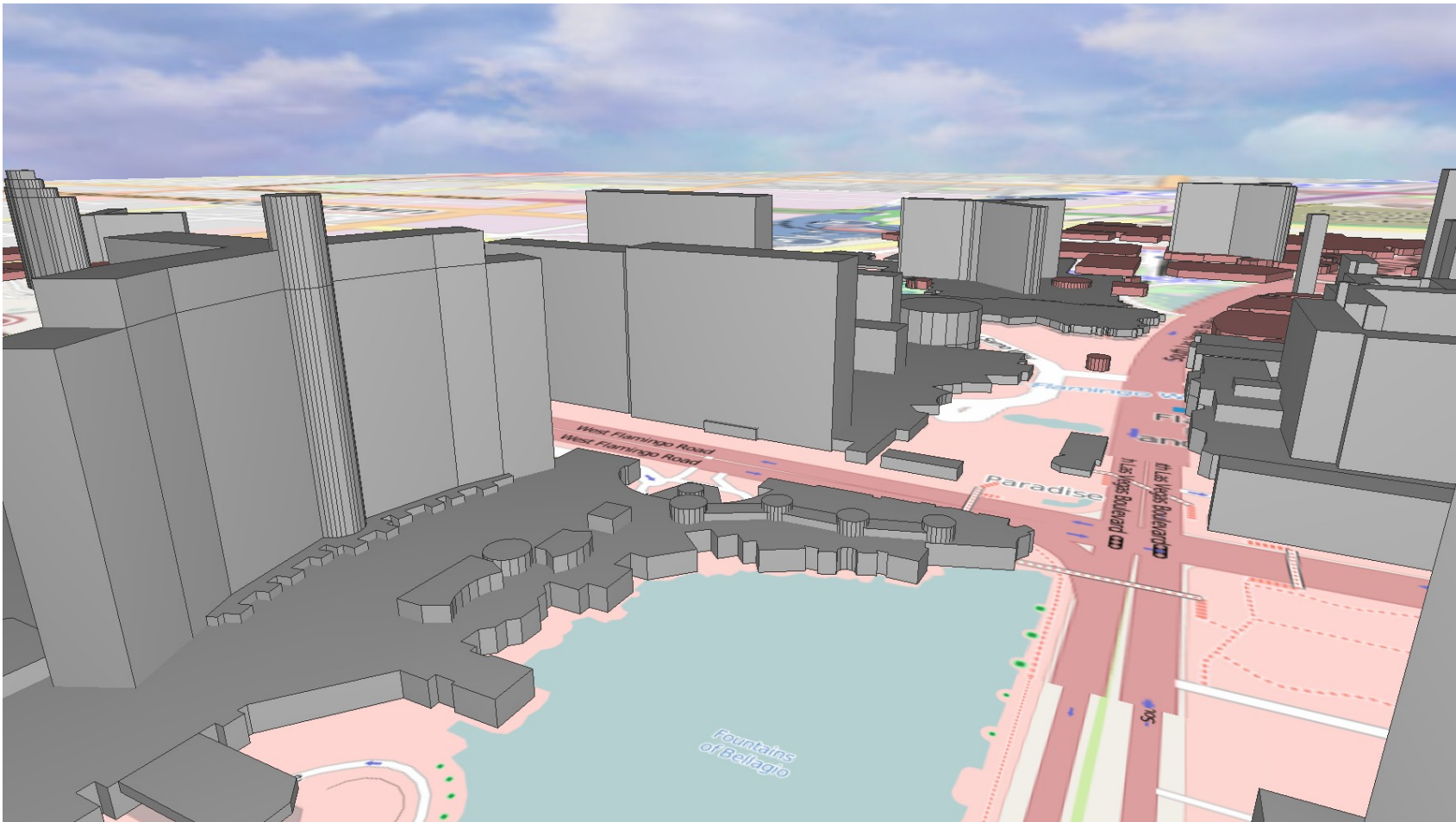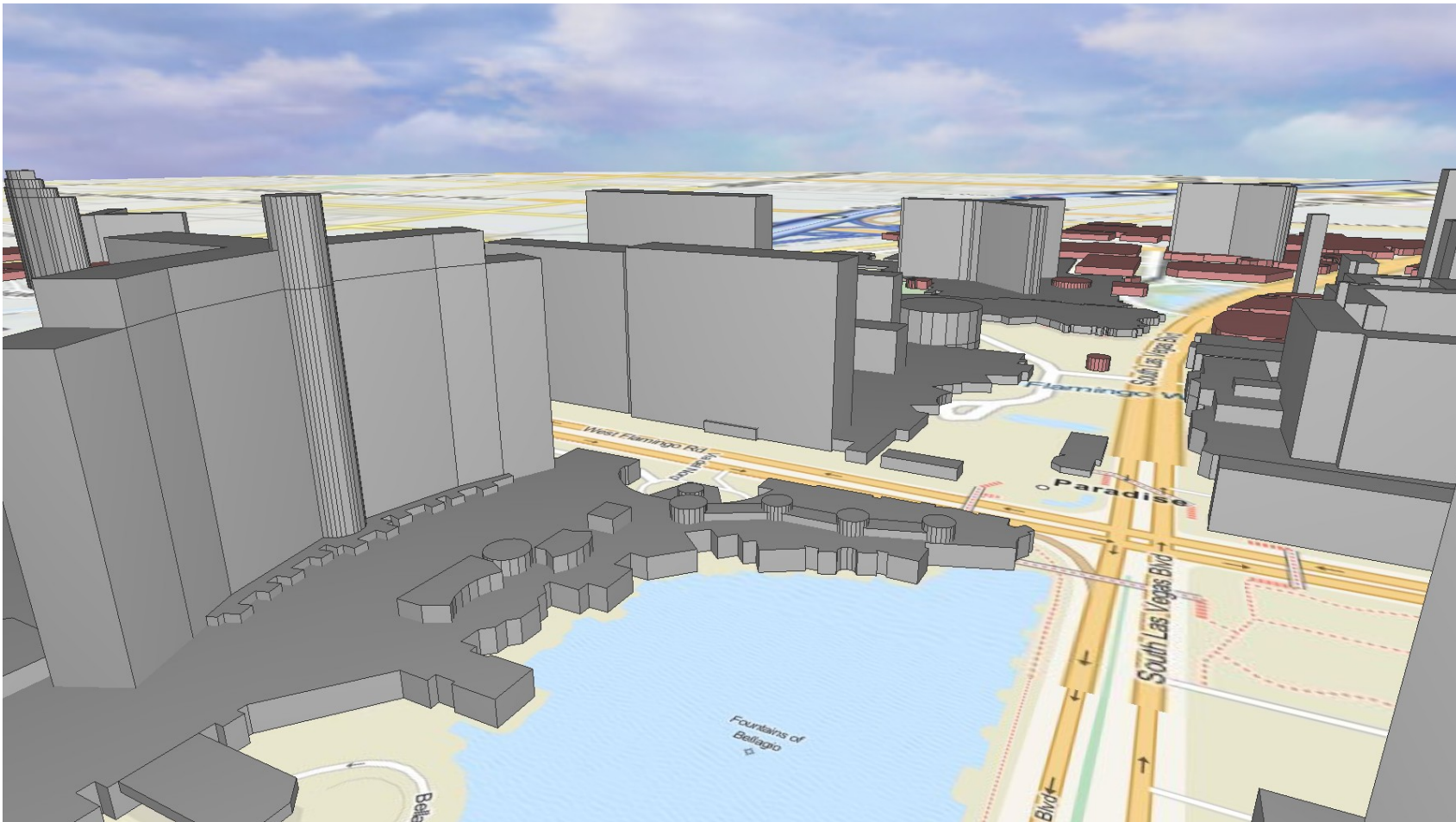
OsmStreetView: 1ˢᵗ Person Renderer

OsmStreetView: Hybrid Renderer

Can use any tiled map as ground layer
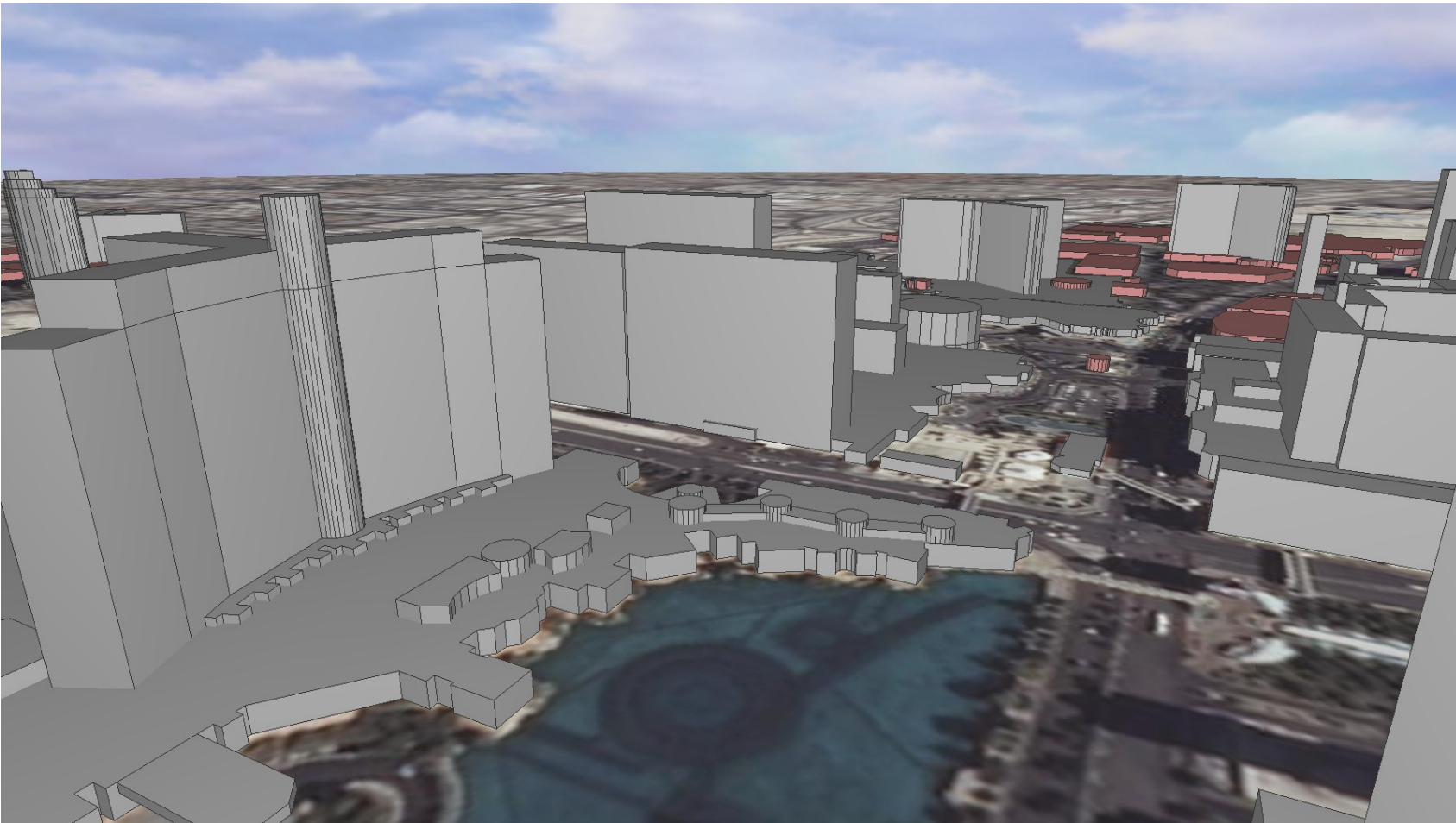
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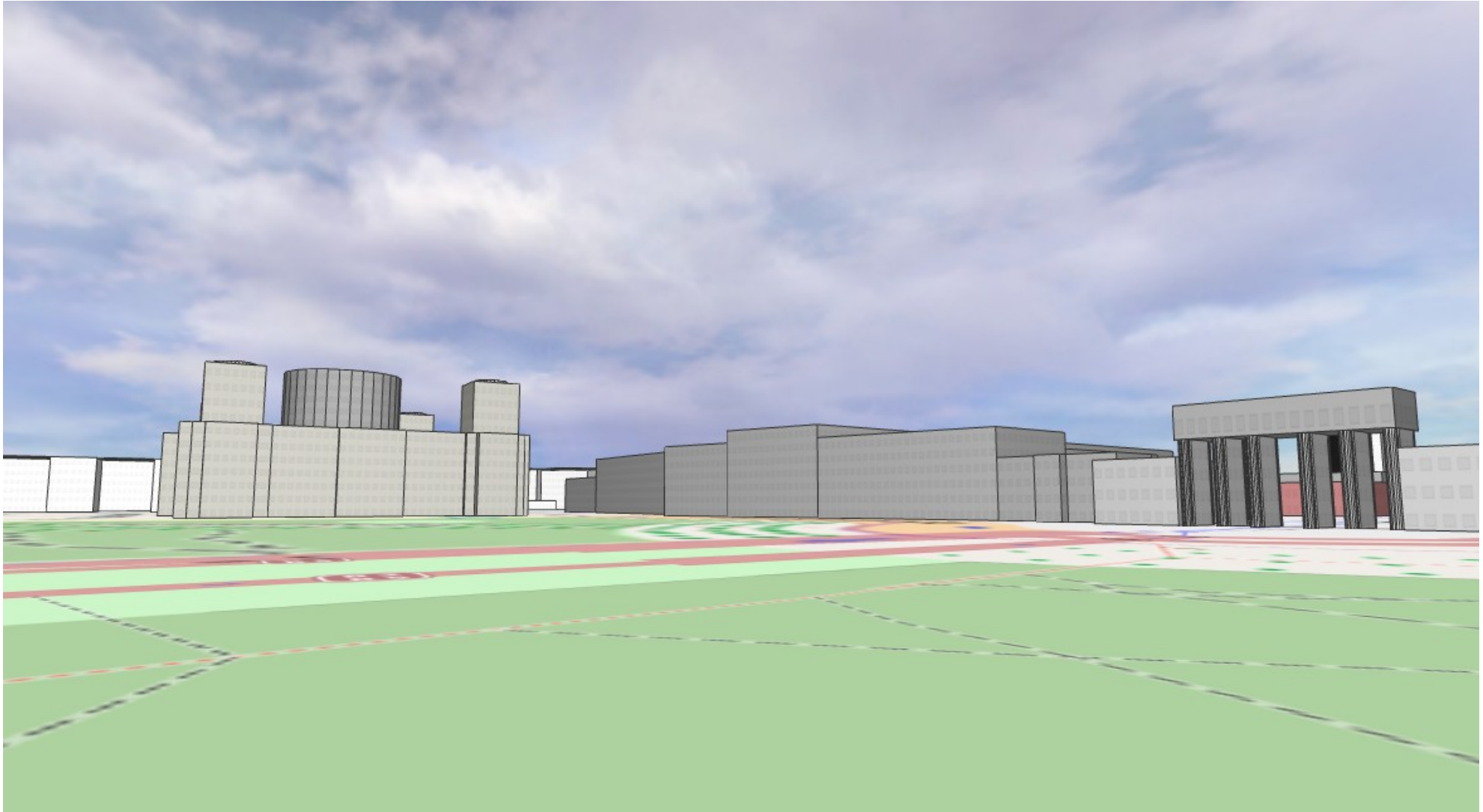

[Tile Layer from MapQuest Open]

OsmStreetView: Hybrid Renderer

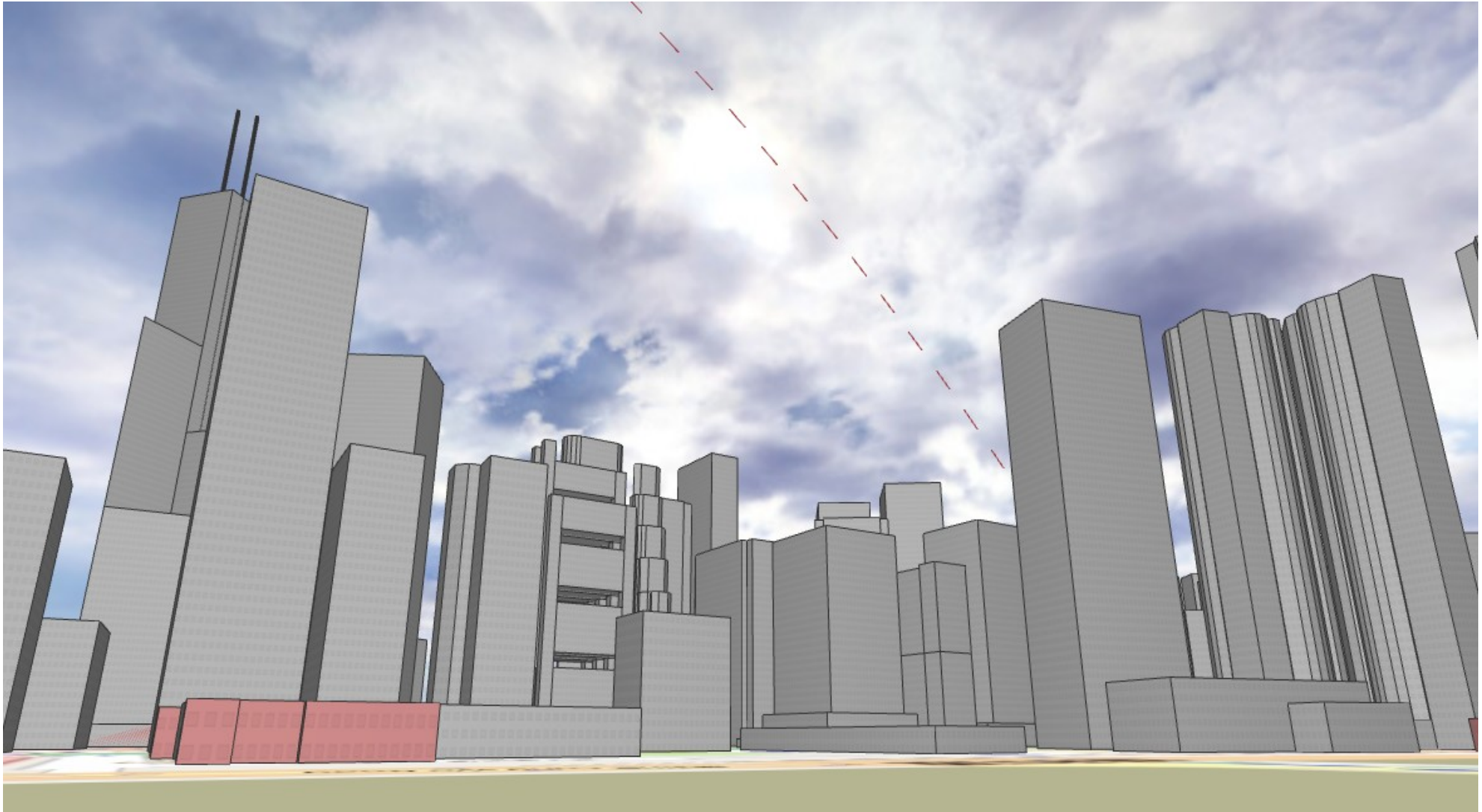## Can use any tiled map as ground layer

[Tile Layer from MapQuest Open]

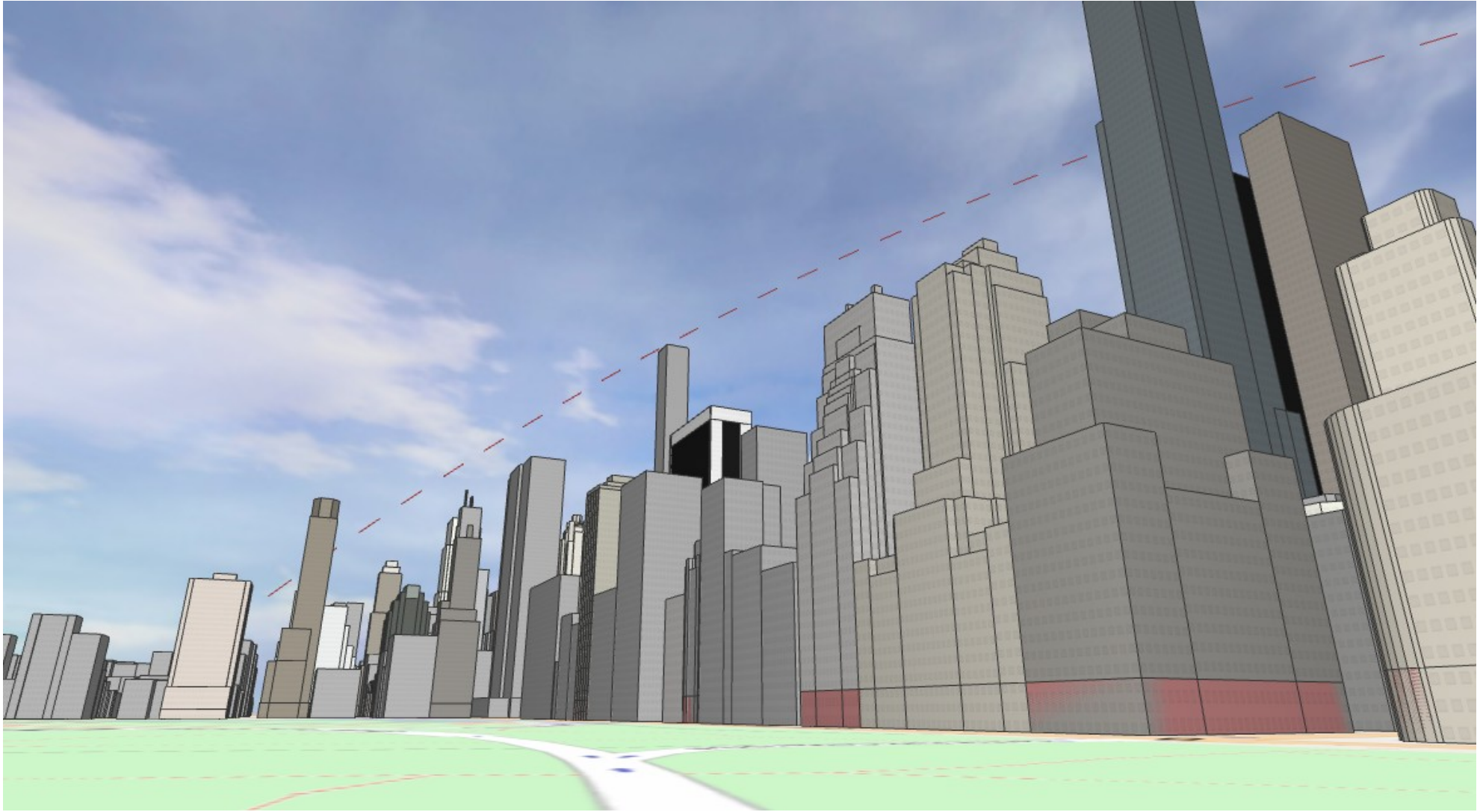# OsmStreetView Impressions

Berlin, Germany

OsmStreetView Impressions

Hong Kong, China

OsmStreetView Impressions

New York City, USA

OsmStreetView – Unique Features

- interactive (movement)

- fast (smartphone)

- easy setup (no custom backend)
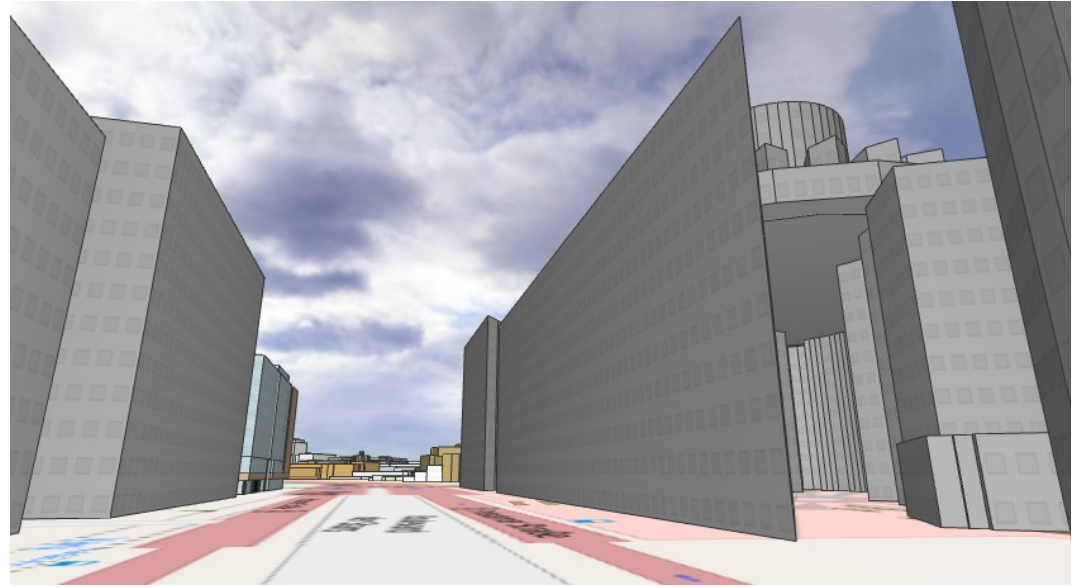
- up-to-date (Overpass/osm3s)

  Demo: rbuch703.de/osmsv

  Source: github.com/rbuch703/osmstreetview

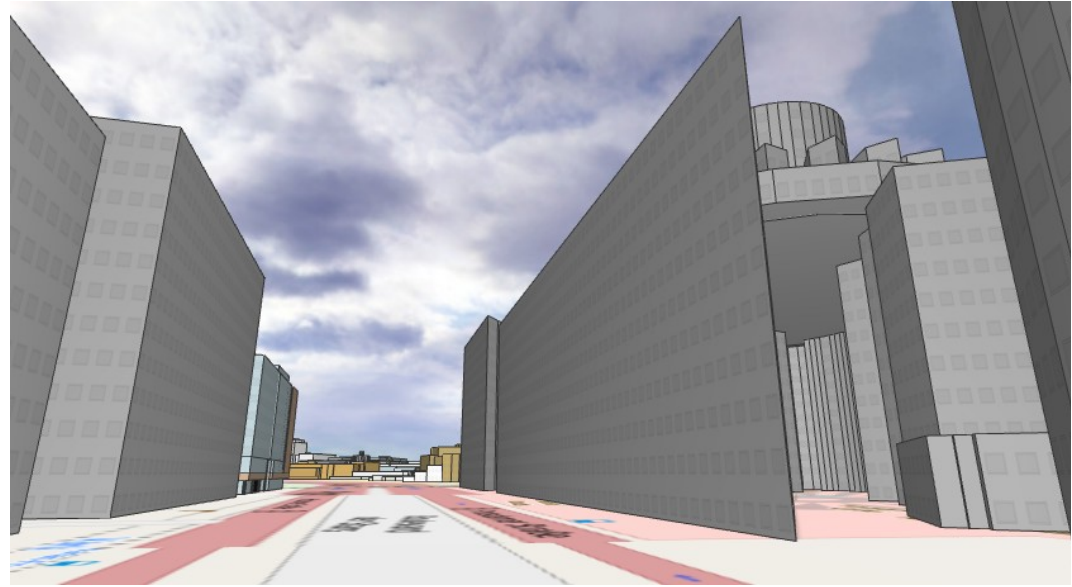# A Google StreetView Alternative?

[Google StreetView]

OsmStreetView:

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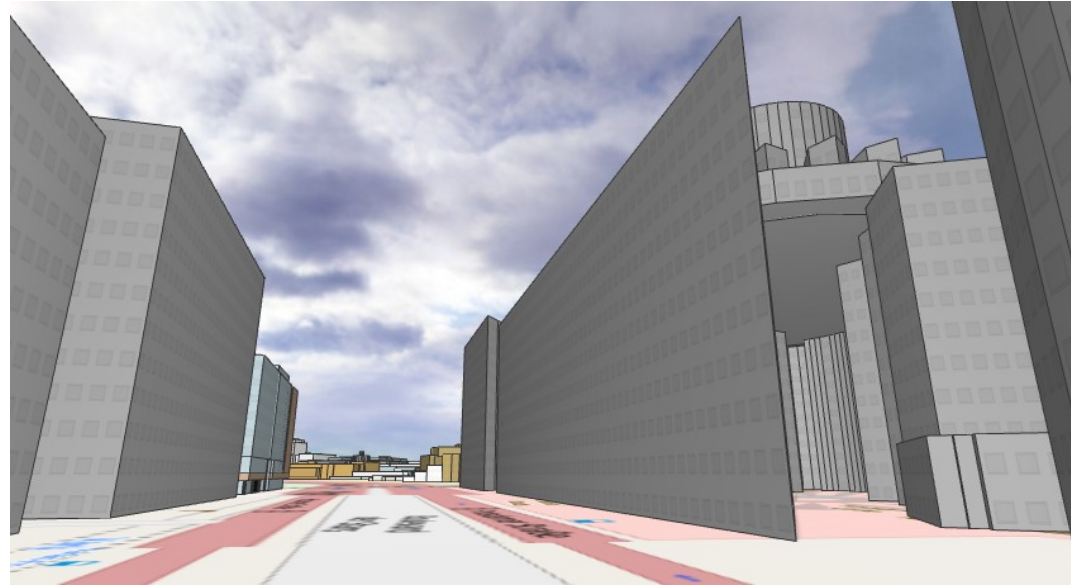

[Google StreetView]

OsmStreetView:

– less detailed (but also no random occluders)

A Google StreetView Alternative?
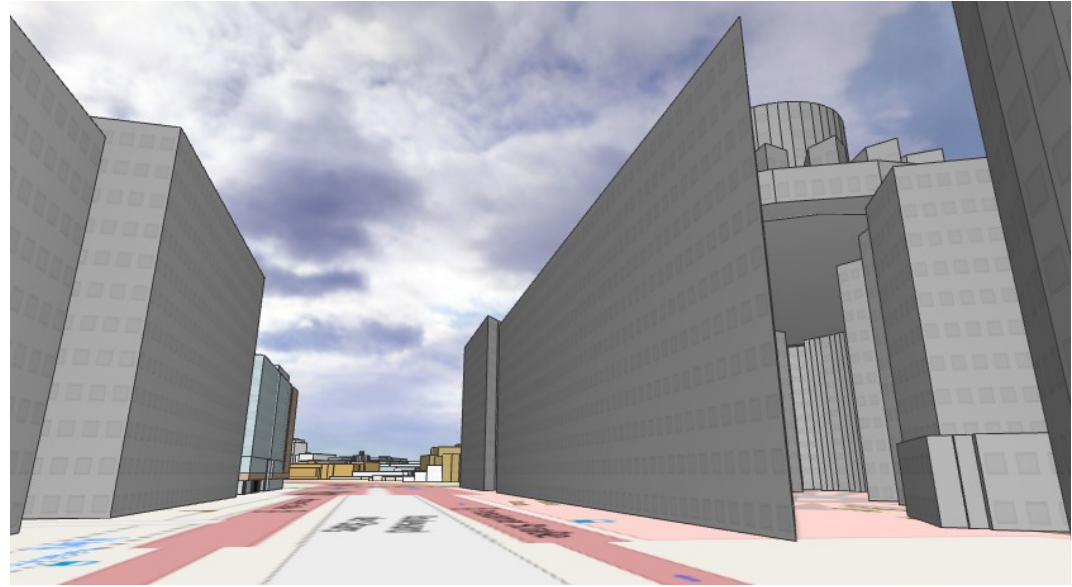

[Google StreetView]

OsmStreetView:

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A Google StreetView Alternative?

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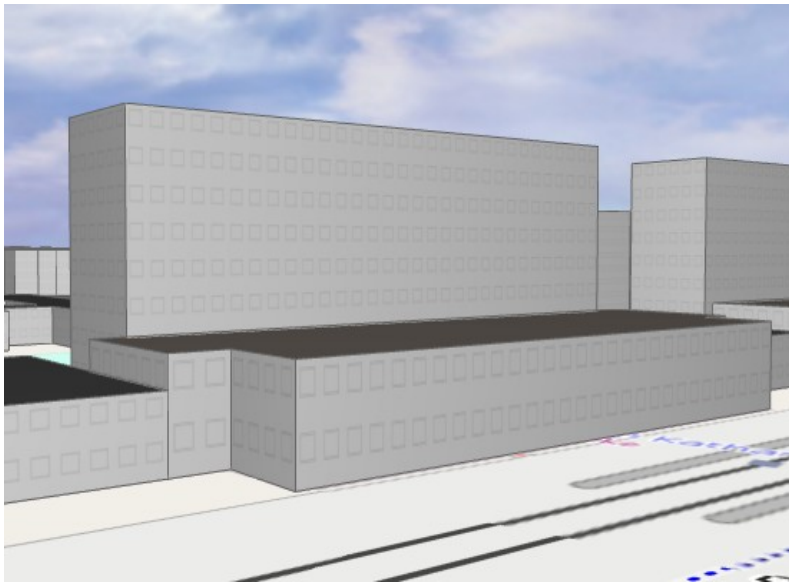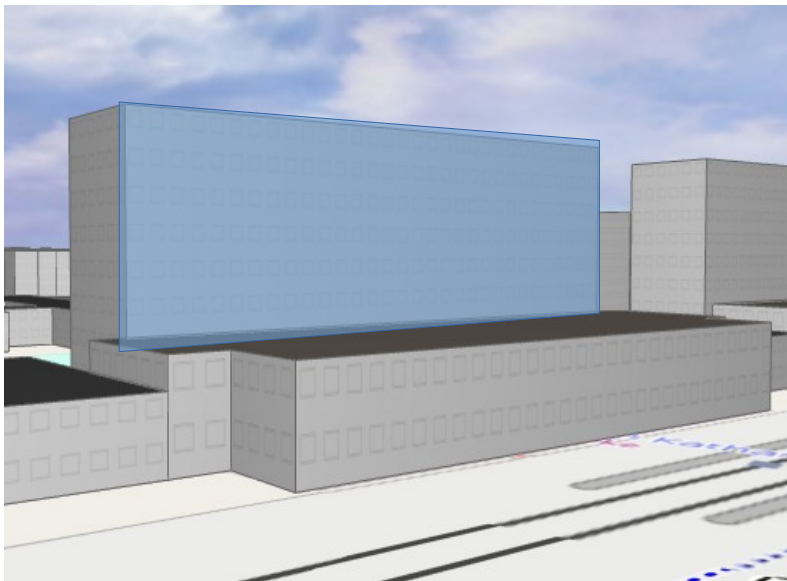– more freedom (any place, any height)

Photo Textures (Mock-up!)
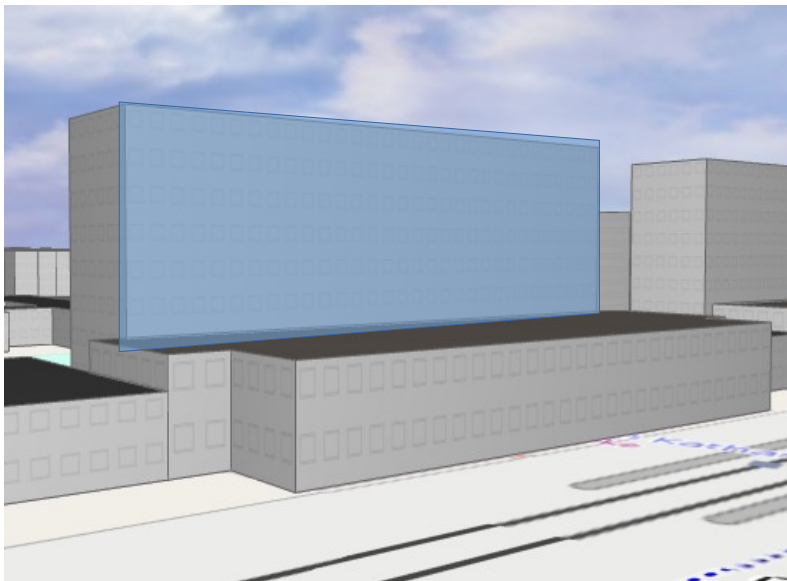
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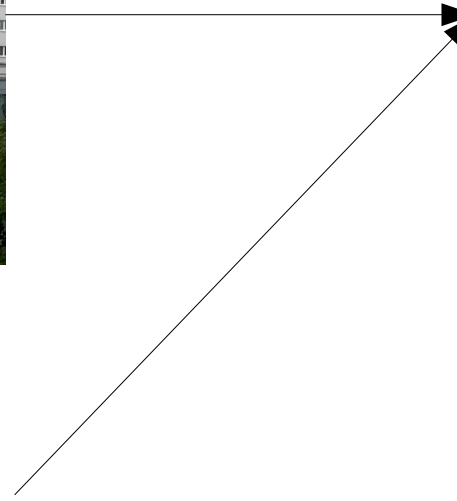
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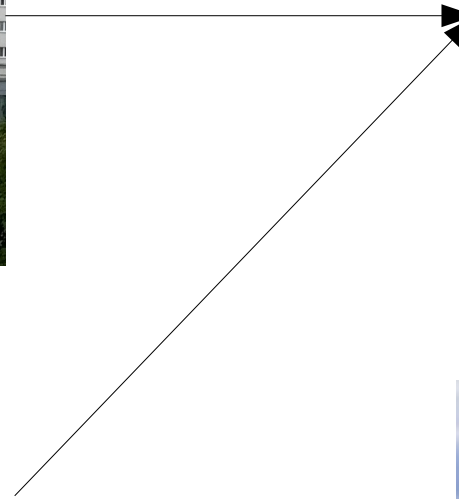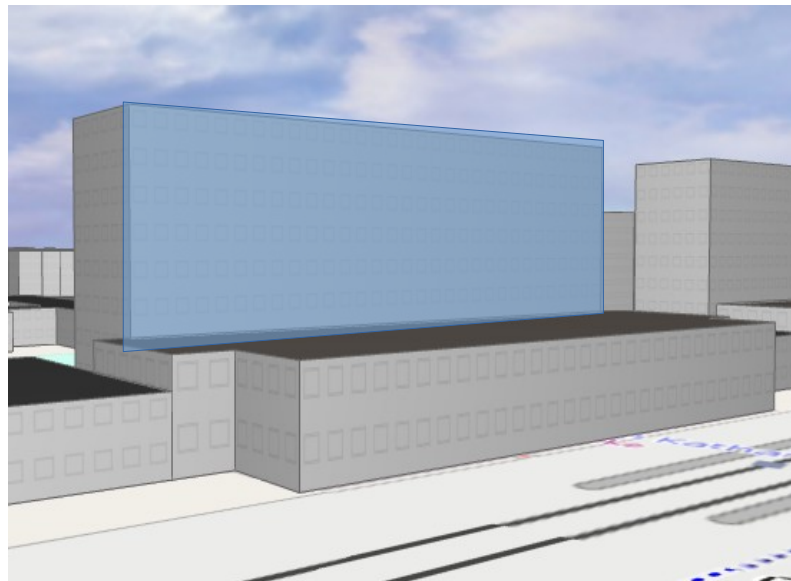# Photo Textures (Mock-up!)

Photo Textures – Applications

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Benefits: StreetView with free movement

Worth the effort?

Base on Mapillary imagery?

Application: Apartment Rental

When looking for a new apartment online, the information you usually get is this:

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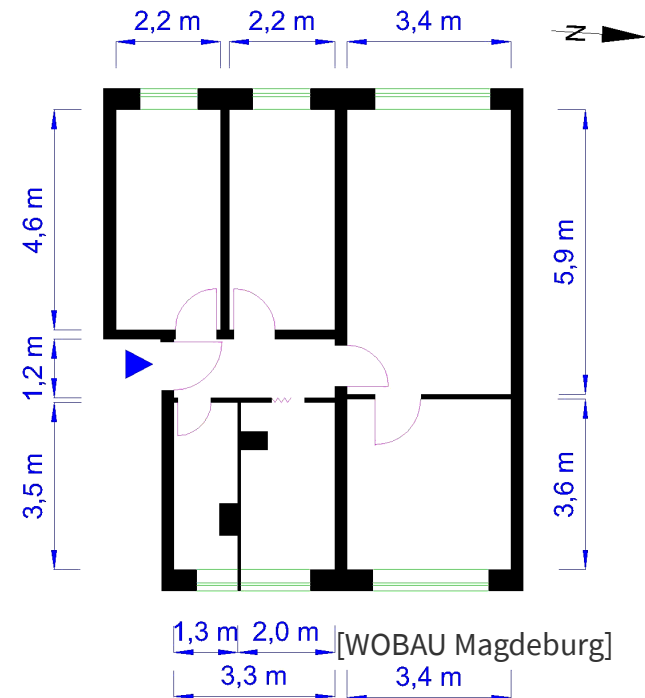"Hauptstraße 21, 65m^2, 4th floor, 500€/month"

[LocoBurger, CC-BY-SA 2.0, cropped]

Application: Apartment Rental

When looking for a new apartment online, the information you usually get is this:

"Hauptstraße 21, 65m^2, 4th floor, 500€/month"

2,2 m 2,2 m 3,4 m N

4,6 m

1,2 m

3,5 m

5,9 m

3,6 m

1,3 m 2,0 m [WOBAU Magdeburg]

3,3 m 3,4 m

But what you also want to know is:

- Does the layout suit my needs?

- Will I get any direct sunlight? (where? when?)

- Will it be loud? (main roads? railway lines?)

- Will it be crowded? (skyscrapers?)

- What is the view like? (green spaces, or just buildings)?

- Are playgrounds/schools nearby?

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Geographical Information (Surroundings)

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But what you also want to know is:

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→ Layout image

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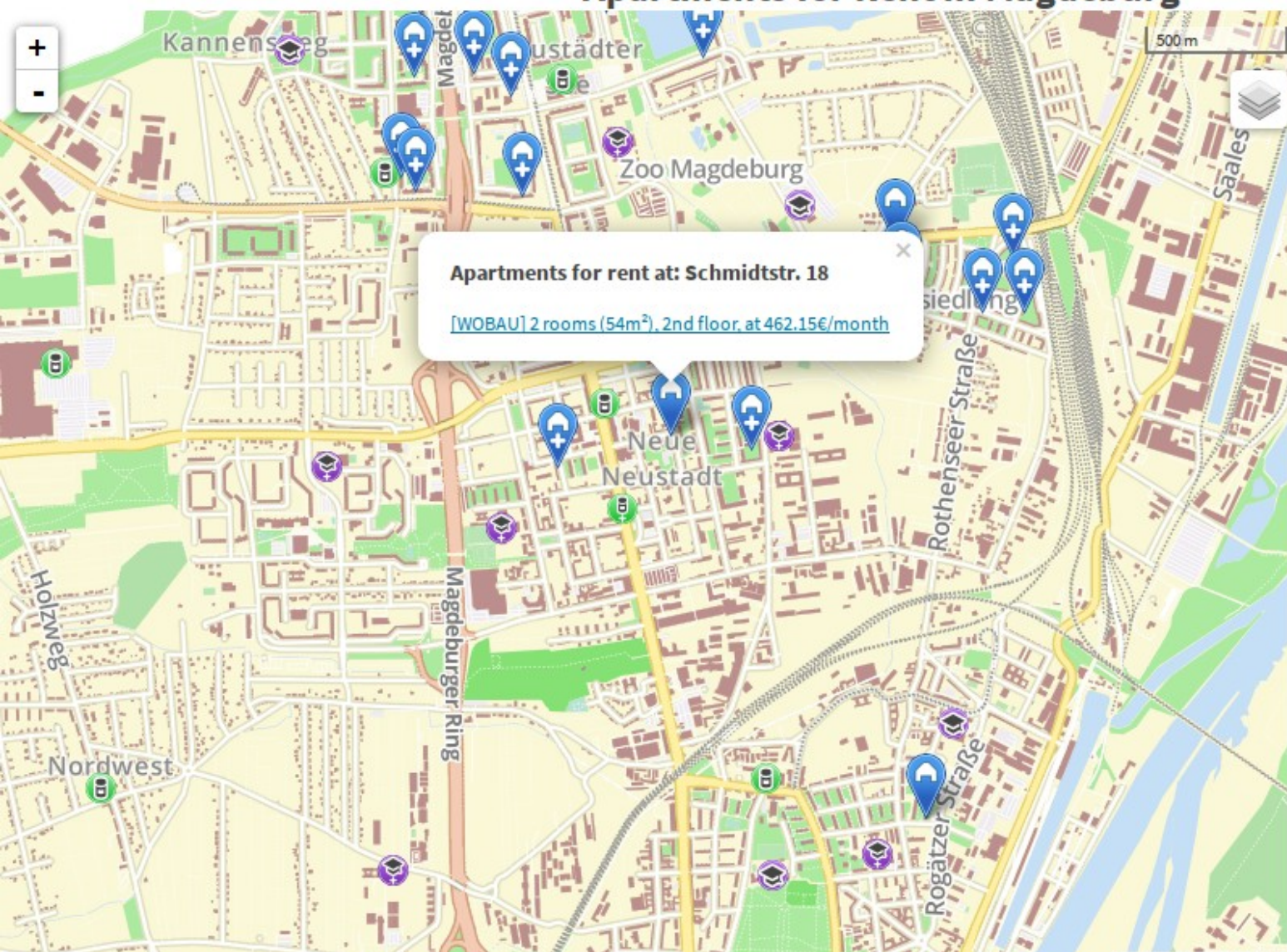
Geometric Information (Apartment)
→ Layout image

Geographical Information (Surroundings)
→ OSM

But what you also want to know is:

Geometric Information (Apartment)
→ Layout image

Geographical Information (Surroundings)
→ OSM

The data is there, we just need to combine it!

Introducing "FlatMatch"

Apartments for Rent in Magdeburg

Apartments for rent at: Schmidtstr. 18

[WOBAU] 2 rooms (54m²), 2nd floor, at 462.15€/month

Search Criteria

Price: **at most 1000€**

Rooms: **any**

Size: **at least 25m²**

345 apartments meet these criteria:

Breiter Weg 20
Size: 121m², 3 rooms
Rent/Month: 882,28 €
Floor: 5th floor
Landlord: WOBAU
Details and 3D-View

Dr.-Grosz-Str. 4
Size: 106m², 4 rooms
Rent/Month: 795,31 €
Floor: 14th floor
Landlord: WOBAU
Details and 3D-View

Hartstr. 1

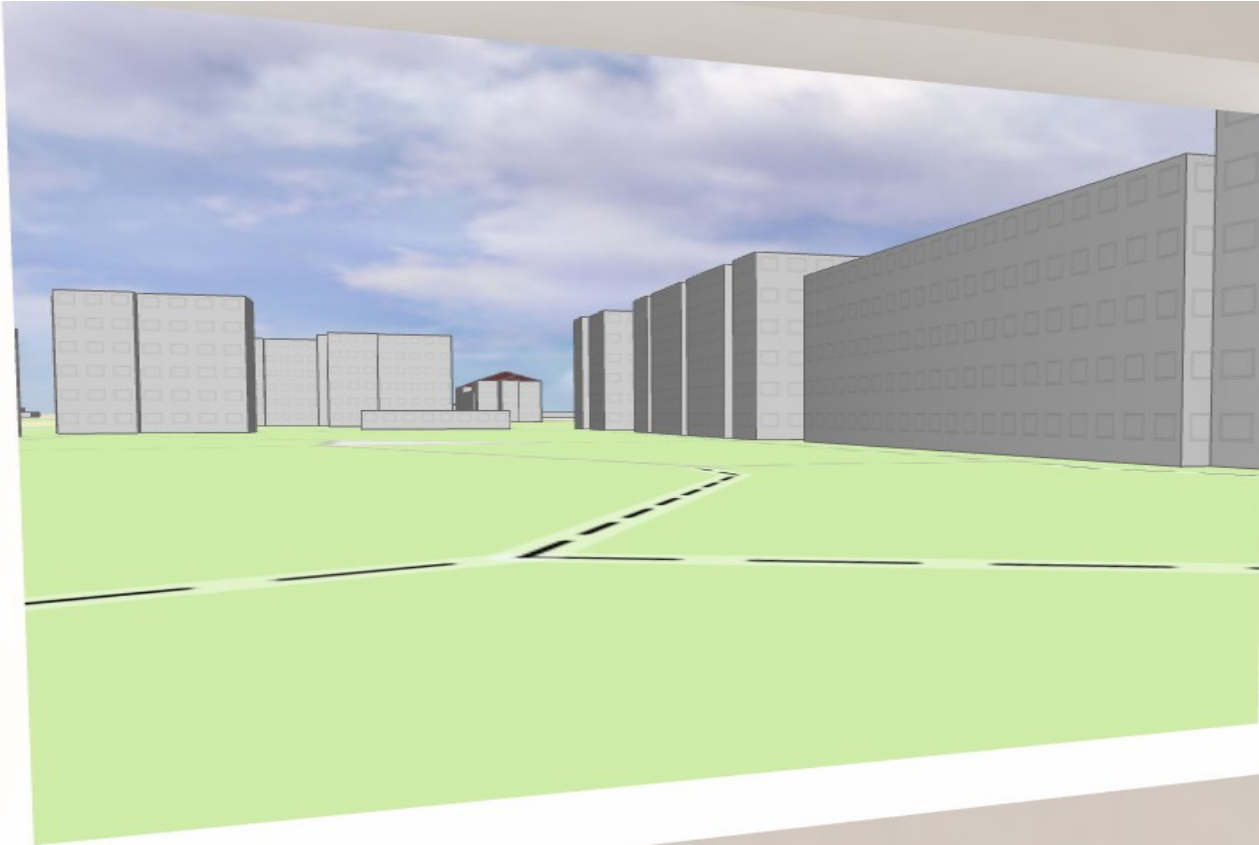# Introducing "FlatMatch"
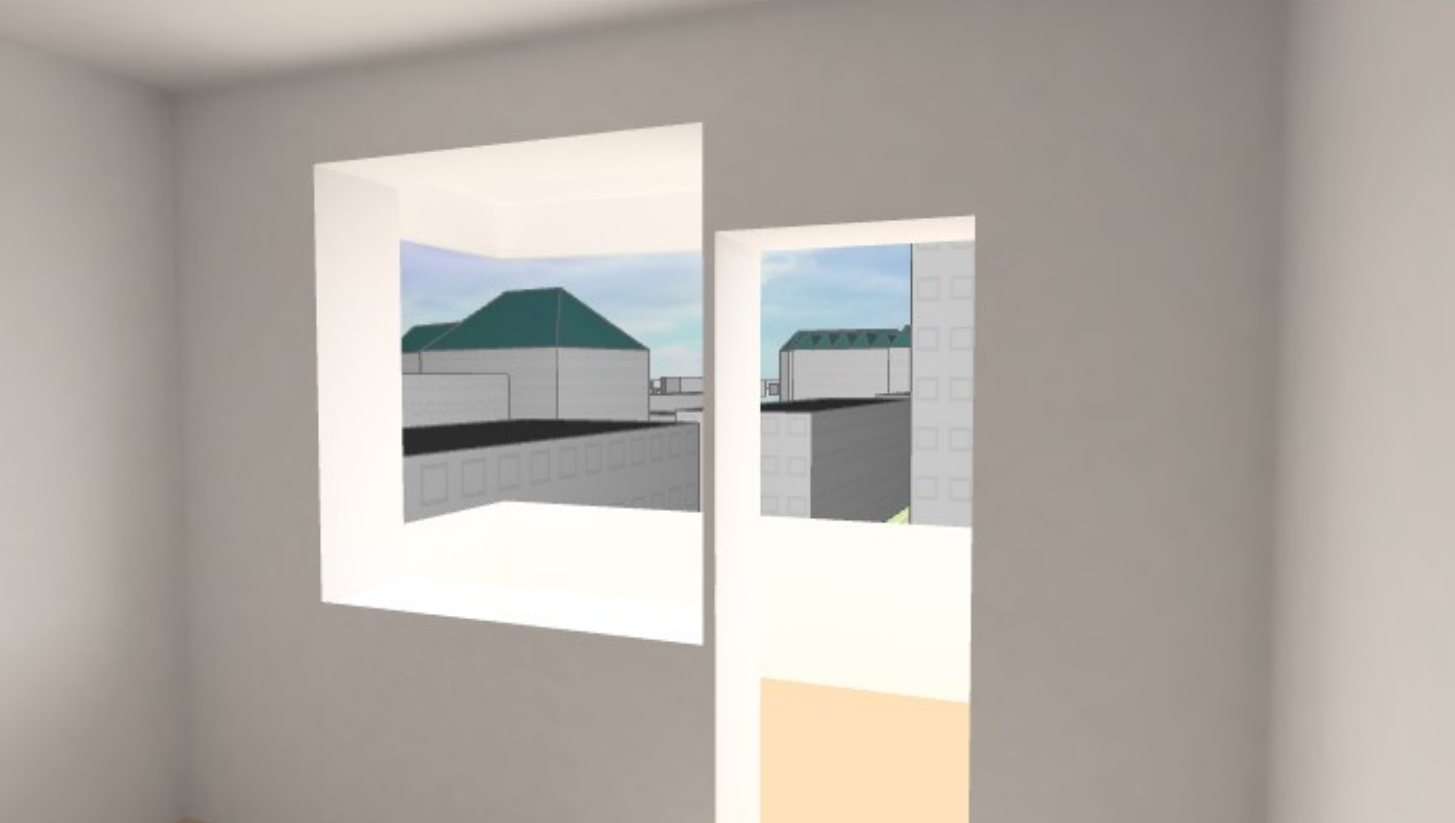
A web-based 3D interactive apartment view

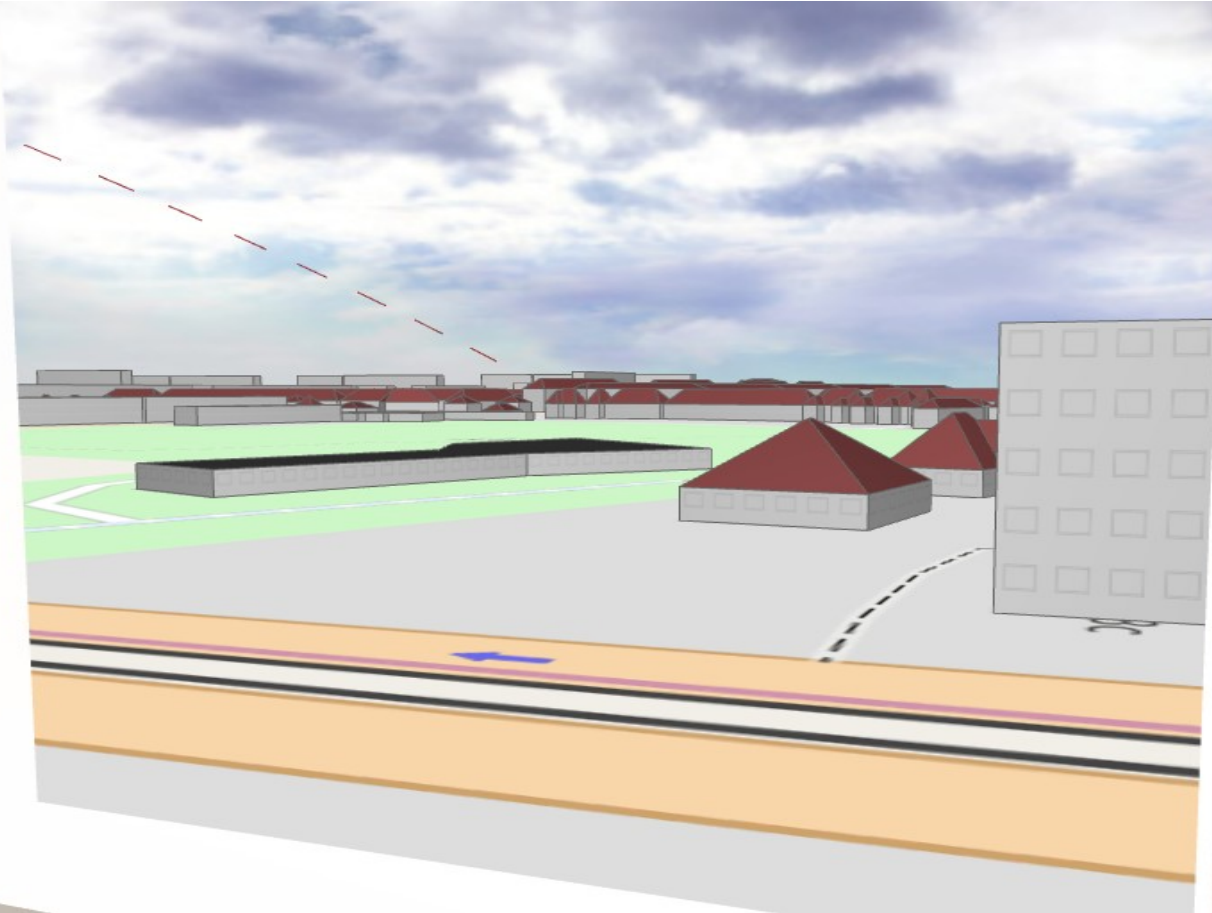# FlatMatch - Apartment
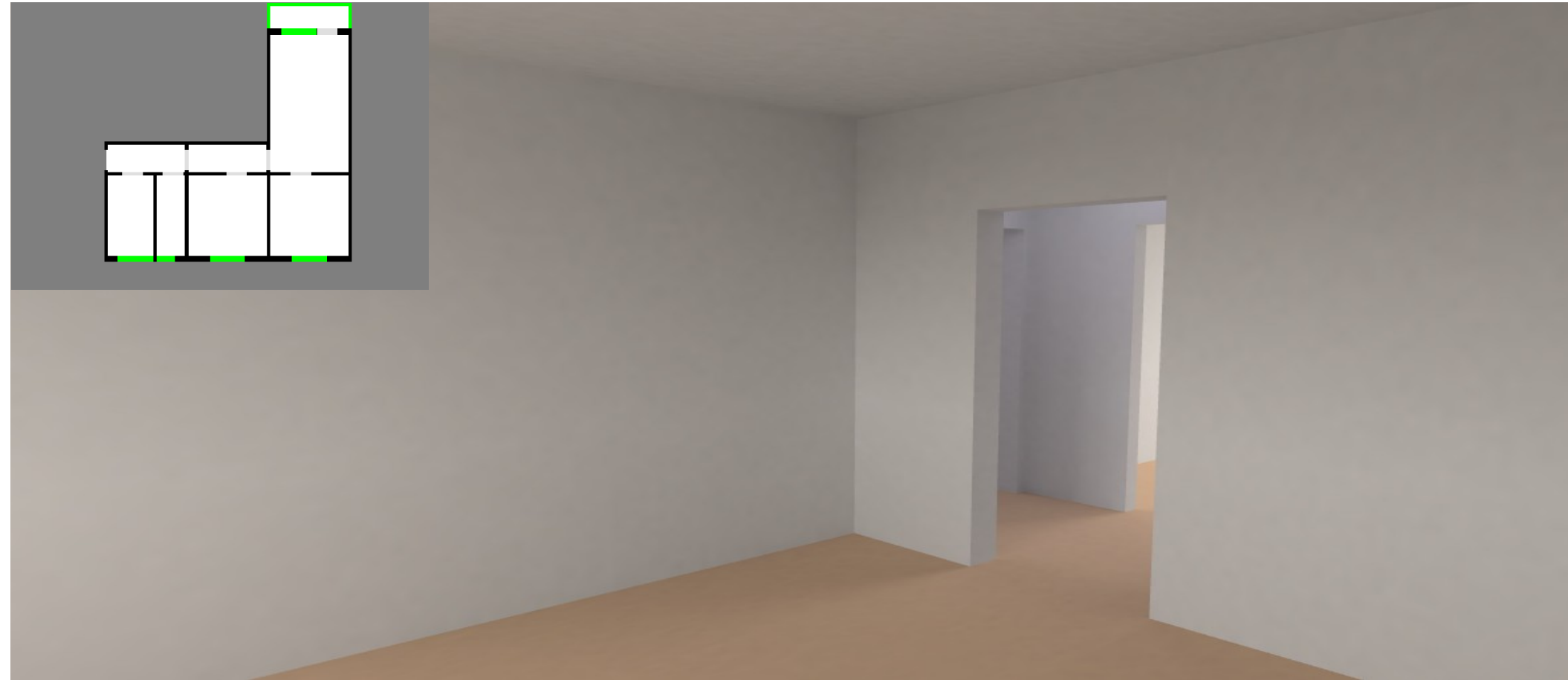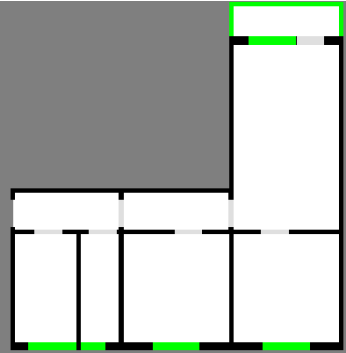
3D apartment geometry from layout image

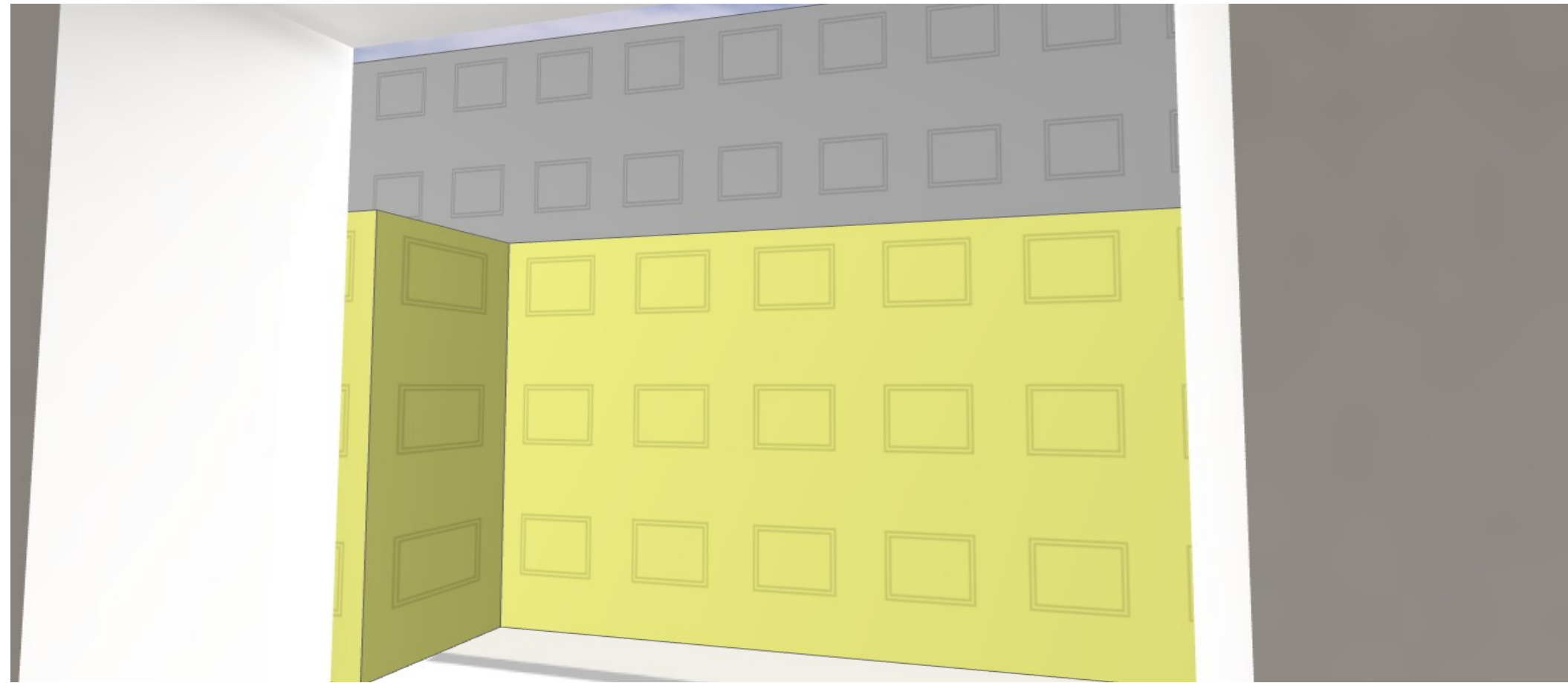Realistic diffuse lighting (Photon Mapping)

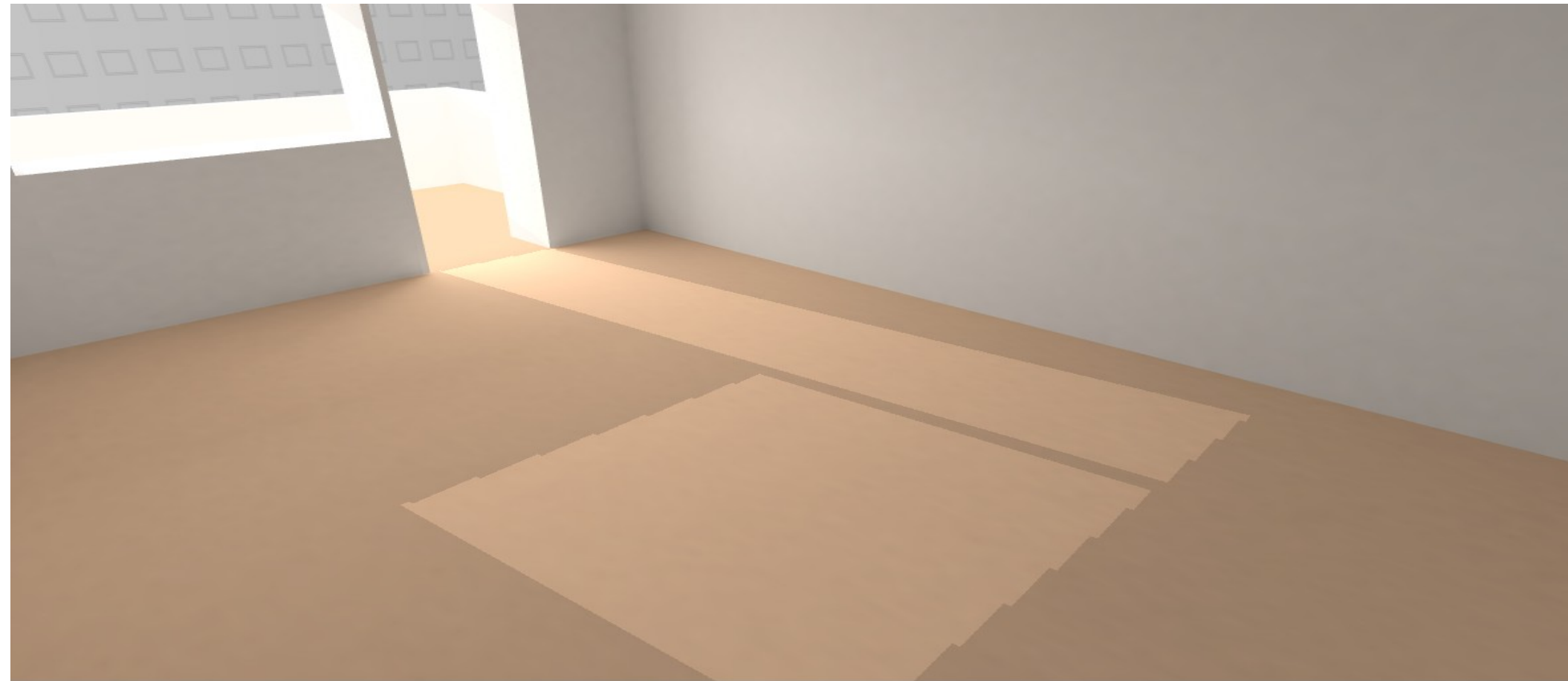# FlatMatch - View

Map and geometry from OSM

FlatMatch - View

Map and geometry from OSM

FlatMatch - View

Map and geometry from OSM

FlatMatch - Sunlight

Direct sunlight simulation through shadow mapping

FlatMatch - Benefits

- "Visit" tens of apartments a day without making a single appointment

- Find your perfect apartment faster and more reliably

- Demo: http://rbuch703.de/flat_en

- No commercial applications (yet)

Conclusions

- 3D interactive web graphics are cool :-)

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- OSM is a huge repository of geographical facts about our physical world, not just a map

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- 3D interactive web graphics are cool :-)

- OSM is a huge repository of geographical facts about our physical world, not just a map

- Combine these for great new applications!

Thank you for your attention! Questions?

All demos (and link to GitHub page) online:

http://rbuch703.de

Getting in touch (questions, suggestions, collaboration, ...):
rbuch703@gmail.com