

Week 1 - Orientation phase

BOUINT01P

Berlhen (0991587), Debby (1003360), Dominic (1004606), Emin (0985933), Grätl (0914907), Mauro (1015253),

1 History

1862

Land was freed as British fortress walls were taken down in Bombay



1869

Construction was completed, the building was used as a hotel



2005

Part of the building collapse because of lack of maintenance



1867

Start construction Watson hotel

1960

Hotel was renamed to Esplanade Mansion. The building was rented as housing and offices

2019

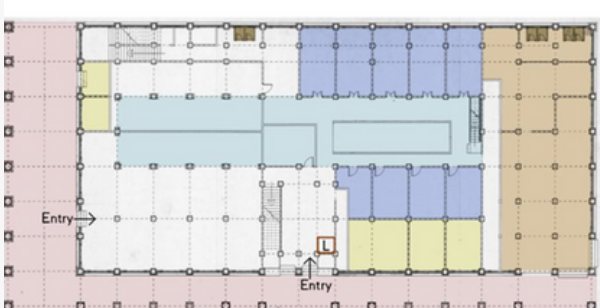
Structural the building was declared unsafe and has been unable to use ever since

Gratl Source: *(1), (2), (3).

2 Building analysis



the Watson hotel has a structure that consist of cast iron (steel) and wooden floors. The structure of the Watson hotel consists of columns (cast iron), beams (wood) and girders (cast iron). The foundation consists of brick on rubble wall foundations



The building 28000 x 56000. Often there is a cast iron pole every 4 meters. On the first floor there were different activities such as: stores (84 M2), a courtyard (80 M2) office space (24 M2), and a restaurant (224 M2), the rest of the first floor is traffic space (corridor). On the other floors (1,2,3 and 4) there were mainly office buildings. There is also a terrace on the 2nd floor (64 M2). There are also toilets available on each floor. In the middle of the building there is a void this gives a lot of architectural expression.

Mauro & Dominic Source: *(4), (5).

3 Environment analysis



A hotel like the Watson cannot be found in the area. Besides this, Mumbai has two other luxury hotels. Besides this there are many facilities in the neighborhood you can find almost everything.

Mumbai is a busy city with a large population. The many inhabitants and the crowds result in a dynamic city with many facilities. There is something for everyone. As you can see on the map to the right, the location is marked with the amenities nearby. Within a few hundred meters you can find many different things. from Library to shopping street.

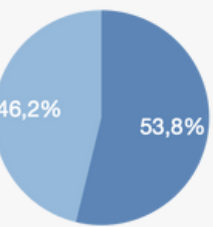
Voorzieningen

LEGENDA	VOORZIENING	AFSTAND	REISTIJD
—	School	130 m	3 min.
—	Museum	400 m	6 min.
—	Bibliotheek	100 m	2 min.
—	Restaurant	70 m	2 min.
—	Winkelstraat	50 m	1 min.
—	Treinstation	3,2 km	45 min.
—	Bushalte	300 m	5 min.
—	Bank	130 m	3 min.
—	Recreatie park	450 m	6 min.
—	Locatie	0 m	0 min.

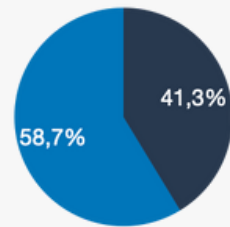
Berlhen Source: *(7), (8).

3 Destep analysis

Male Female slums other districts



Gender distribution Mumbai



District distribution

Democracy

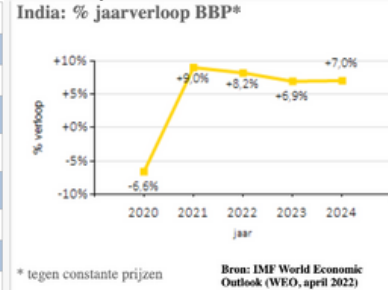
Population of 20,961,472 people. In 10 years the estimated population will be 25,664,400. Almost 70% from the people living in slums are literate. Surprisingly, at 69 per cent, Maharashtra's slums have the highest literacy rate given the size of its slum population. With a percentage of 91,48% by men and 86,45% by females. Mumbai has te largest rate of literate people in comparison to the rest of India.

Berlhen Source: *(9), (10), (11)

Economy

The Watson's hotel is in one of the good neighborhoods of India. In the neighborhood there are many cafes and restaurants, university, museum, and entertainment places (Bollywood). There are 1.4 billion people in India which a third of the working population is fully or partially unemployed (officially 8.5% in 2017). In Mumbai this is different, because a lot of import and export happens in this city and because a lot of tourists come. In short, it is India's economic hub. Mumbai's nominal GDP is estimated at US\$277,980. This is three times that of the rest of India. India has enjoyed a rapid pace of growth in recent years. Economic reforms have transformed India into the second fastest growing major economy.

Percentage Mumbai in comparison to India	
Factory employment	10%
Income tax collections	40%
Costums duty collections	60%
Central excise collections	20
Foreign trade corporate taxes	40%
Industrial production	25%
Maritime trade	40%
Capital of transactions	70



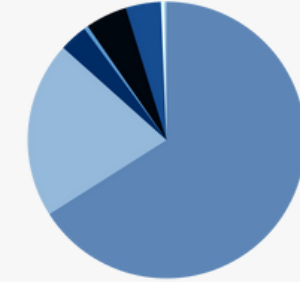
* tegen constante prijzen

Bron: IMF World Economic Outlook (WEO, april 2022)

Mauro Source: *(12), (13)

Social cultural

Religion percentage Mumbai



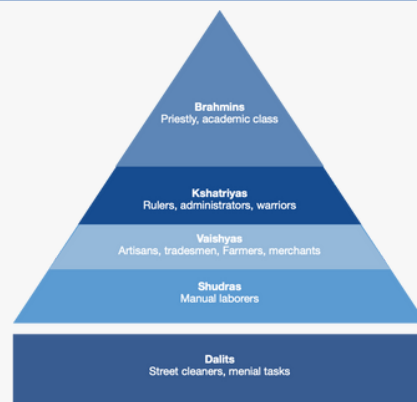
Hindu Muslim Christian Sikh Buddhist Jain Others Not stated

T

The Hindu belief says that the people are classified into 4 castes, and these castes define what jobs they can do, what duties and what privileges they have.

The culture of Mumbai is a combination of tradition, religions, cuisines, music and fine arts.

The income of the people goes, besides the basic needs, mainly to clothing, shopping and restaurants.



Debby Source: *(14), (15), (16).

Technical

Mumbai, compared to the rest of India, is a reasonably developed city in which various facilities are arranged as we know them in Europe. The infrastructure is also well organized by means of buses, subways and monorails. In terms of sustainability, Mumbai is also developing more and more. They encourage electric driving by installing charging stations and deploying electric buses. By the end of 2028, the government wants all buses to be electric.

Dominic Source: *(17).

Ecological

	maximum temperature	minimum temperature	sun hours/month	days raining per month	averagest raining per month	water temperature
januari	31°C	17°C	9	0	NHNL	26°C
februari	31°C	18°C	9	0	NHNL	25°C
maart	33°C	21°C	9	0	NHNL	26°C
april	33°C	24°C	10	0	NHNL	27°C
mei	34°C	26°C	10	1	*	29°C
juni	32°C	26°C	6	14	*****	29°C
juli	30°C	25°C	3	21	*****	29°C
augustus	30°C	25°C	3	22	*****	28°C
september	30°C	24°C	6	12	*****	28°C
oktober	33°C	24°C	8	3	***	28°C
november	33°C	21°C	8	1	*	28°C
december	32°C	19°C	8	0	NHNL	26°C

0-5 mm = NHNL, 6-50 mm = *, 51-60 mm = **, 61-100 mm = ***, 101-200 mm = ****, meer dan 200 mm = *****



- tropical monsoon climate
- 40% green was lost
- Green roof

Gratl Source: *(18), (19), (20), (21)

Political

Maharashtra is one of the twentyeight states in India, The capitol of Maharashtra is Mumbai. The state of Maharashtra is one of the six Indian states where the parlement uses a bicameral system, consisting of the Vidhan Sabha, which perform the duties of the Lower House, and the Vidhan Parishad, which performs the duties of the Upper House. The Vidhan Sabha has 288 seats, the Vidhan Parishad 78. Elections are normally held every five years. The current ruling party is a coalition consisting out of; Ss and NCP.

Partij	zetels	verschil met 2014
Bharatiya Janata-partij (BJP)	105	-17
Shiv Sena (SS)	56	-7
Nationalistische Congresspartij (NCP)	54	+13
Congrespartij (INC)	44	+2
Samajwadi-partij (SP)	2	+1
All India Majlis-e-Ittehadul Muslimeen (AIMIM)	2	—
Communistische Partij van India (Marxistisch) (CPI (M))	1	—
Maharashtra Navnirman Sena (MNS)	1	—

Emin Source: *(22).

*(1) British fort at the port of bombay (photo from 1863 & drawing from 1600s) - the urban imagination. (z.d.). Hum54. Geraadpleegd op 20 juni 2022, van <https://hum54-15.omeka.fas.harvard.edu/items/show/1815>
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*(3) Interieur - detail van gietijzeren kolom op de eerste verdieping. (z.d.). [Foto]. Wikimedia. https://commons.wikimedia.org/wiki/File:Interieur_-_detail_van_gietijzeren_kolom_op_de_eerste_verdieping_-_Rotterdam_-_20373903_-_RCE.jpg
*(4) Brick wall, red. (z.d.). [Afbeelding]. Rebel walls. <https://rebelwalls.com/nl/fotobehang/themas/oppervlakken/stenen-en-tegels/brick-wall-red>
*(5)International Masonry Institute. (2021, 24 februari). 01.020.0216 wall system brick wall w/ rubble foundation. 3D Warehouse. Geraadpleegd op 17 juni 2022, van <https://3dwarehouse.sketchup.com/model/974b31db-21df-40a3-adb9-3f4fb6fa976b/010200216-Wall-system-Brick-wall-w-rubble-foundation>

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*(8) Snazzy maps - free styles for google maps. (z.d.). Snazzy Maps. Geraadpleegd op 17 juni 2022, van <https://snazzymaps.com>
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*(10) Mumbai population 2022 (demographics, maps, graphs). (z.d.). Worldpopulationreview. Geraadpleegd op 13 juni 2022, van <https://worldpopulationreview.com/world-cities/mumbai-population>
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*(13) EasyExpat.com. (z.d.). Economie van mumbai, overzicht om india - EasyExpat.com. dotExpat. Geraadpleegd op 17 juni 2022, van <https://www.easyexpat.com/nl/guides/india/mumbai/overzicht/economie.htm>
*(14) Mumbai (greater mumbai) city population census 2011–2022 | maharashtra. (z.d.). Census. Geraadpleegd op 20 juni 2022, van <https://www.census2011.co.in/census/city/365-mumbai.html>
*(15) Culture & heritage | mumbai city | india. (z.d.). Mumbaicity. Geraadpleegd op 14 juni 2022, van <https://mumbaiacity.gov.in/tourism/culture-heritage/>

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*(18) CNBCTV18.com. (2022, 13 juni). Mumbai is sinking by 2 mm every year, reveals study; here is why. Geraadpleegd op 17 juni 2022, van <https://www.cnbctv18.com/environment/mumbai-city-is-sinking-2-mm-every-year-on-average-chinas-tianjin-at-52-cm-says-research-13799832.htm>
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*(21) Google. (z.d.). Google maps. Geraadpleegd op 17 juni 2022, van <https://google.nl/maps>
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Week 2 - Design phase

BOUINT01P

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1 Function

As you can see on the left side there is a table in which we have tested different functions. Based on the criteria we chose a function that best fits in the environment and in the building. Some important points were that it is constructively possible and whether the function comes from the analysis. The new function had to meet these criteria in any case.

Proposal of variants					
	Building Layout	Possibility construction	Generates revenue	Relation with the environment	Outcome from analysis
Ground level	Theatre	major construction modifications	High	Yes	No
Levels	Apartments	Yes	Middle	Yes	Yes
Ground level	Cinema	major construction modifications	High	No	No
Levels	Theatre Academy	Partial adjustments to construction	Low	Yes	No
Ground level	Stores, Restaurants	Yes	High	Yes	Yes
Levels	Apartments	Yes	High	Yes	Yes
Ground level	Gym	Yes	Middle	No	No
Levels	Restaurants	Yes	High	Yes	Yes
Ground level	Event location	Yes	High	Yes	Yes
Levels	Hotel	Yes	High	Yes	Yes
Ground level	School	Partial adjustments to construction	Low	No	No
Levels	Student housing	Yes	Middle	No	No
Ground level	Stores, Restaurants	Yes	High	Yes	Yes
Levels	Student housing	Yes	Middle	No	No

Gratl & Berlhen

Sustainability Watson hotel (Mumbai)

The function of a green roof is that the roof absorbs rainwater. A green roof converts solar energy into water vapor.

As a result, the green roof has a cooling effect. It also slows down the water into the sewer system. This keeps the groundwater level stable and will help reduce the flooding in Mumbai. A green facade has the same function as a green roof.

For the climate prevailing in Mumbai, the choice was made to apply a Sedum plants. This is because sedum plants is extremely suitable to be applied in extreme weather conditions. Sedum plants can withstand dry periods and retain water longer.



Function green facade and roof

- A green roof and facade lowers the temperature of the city by about 3% °C. The plants allow about 50% of the sunlight to be absorbed and 30% to be reflected. This can provide cooling in the building.
- Green roof and facade provides noise reduction.
- Extends the life of the roof and facade because it provides protection.
- A Green roof and facade works to purify the air and improve the air quality.
- Structure must be modified. Applying a green roof and facade weighs heavy.
- The application of greenery contributes to biodiversity.

Gratl Source: *(1), (2), (3)

1 Reference

Quartier Bleu

Quartier Bleu is an apartment complex with shops and restaurants in

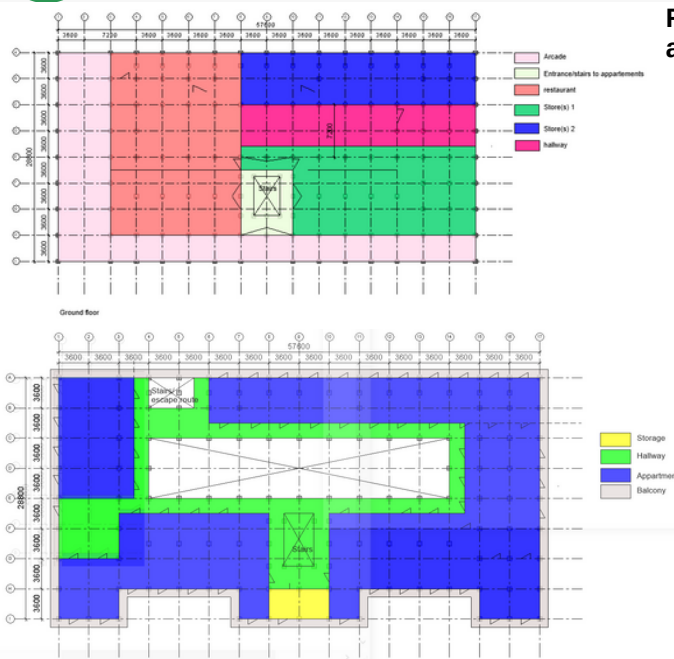
the plinth. Quartier Bleu is located in Hasselt in Belgium. As I have already indicated, there are a few restaurants in the plinth where you can eat and also a few small shops. The area is a bit like the Côte d'Azur. As you can see in the pictures on the right, it looks very luxurious and exclusive. However, many changes have to be made to make something like this in the Watson's hotel because there is a large void there that also needs to be filled. However, the area around the Watson's hotel is a good location for an occasion like this, because many rich people live there and they also have to have a luxurious house. We chose the restaurants and shops because there are many similar establishments in the area and there is therefore a demand for them.



The Arcade Provence, USA

Built in 1828, The Arcade Provence was America's first indoor shopping mall but since 2014 the top 2 floors of the total 3-story mall have been used as residential space where 48 micro apartments have been created. In the plinth there are still stores and restaurants as in the past. I chose this as a reference because it would be an amazing fill-in for the space in the Watson's hotel, only on a slightly larger scale. The micro apartments are meant for people with busy lives which is also very appropriate for the population of Mumbai. This could become an ideal place for students and businessmen to have a home in the city center within walking distance of the university, for example. For the Watson's hotel, you could consider making normal apartments in addition to these micro apartments to increase the target community.

1 Proposition



Mauro & Emin

Mauro



Dominic Source: *(4), (5)

Reasons for transforming the building into an apartmentcomplex with a restaurant and shops

- Close to schools and shops, so in the middle of the city and therefore a busy place where many people want to live
- Because there are already many shops, so there is a demand for it
- The building is already being used as appartements by people
- by updating the existing contruction and lay out we can better the situation
- mixed target demographic

Emin

2 Reference



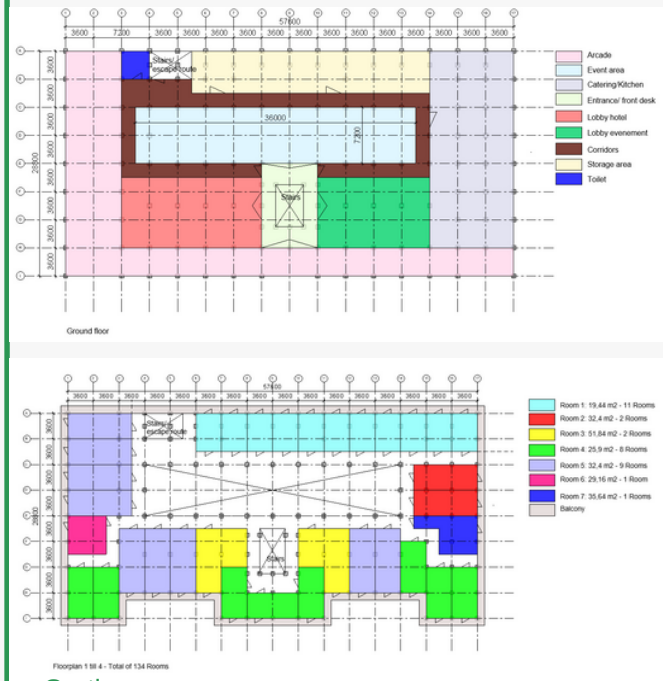
Berlhen

The Jakarta Hotel Amsterdam

The Jakarta Hotel in Amsterdam is a unique and sustainable building. This reference is mainly about the design of the rooms and the hotel. The top images shows that the hotel has an atrium with the hotel room doors attached. This gives an open appearance and can be well applied in the Whatson building. The other images shows a hotel room in the Jakarta hotel. Here it is easy to see that a sustainable and luxurious style can be created with an open view of the balcony.

Debby

2 Proposition



Gratl

Stifle theatre

Stifle theatre is a theatre and event location in St. Louise USA. The pictures on the left are from the Lobby area. The lobby is a wedding venue. This area can be rented for a wedding or other events. As you can see the area looks very luxurious and chique. A perfect place for high end events. With a couple of changes in the current construction and floorplan it would be possible to realize a area like this. In the current floorplan the atrium seems like a good place. Mumbai has the highest number of millionaires and billionairs among all the cities in India. Those wealthy people look for the most beautiful location for events or weddings. The building is in a central location with many facilities around it. The perfect place to make such a thing happen.

Source: *(6), (7), (8), (9), (10)



Source: *(11)

Reasons for transforming the building into an event Venue and Hotel

- Generates a lot of income to maintain and preserve the building.
- There are not many event spaces like this in the area.
- Little competition in the area.
- Lots of potential with lots of millionaires and billionaires around.
- Something innovative in the area.
- additional employment opportunities for people in the area.
- an eye-catcher in the neighborhood
- located in a central location that is easily accessible.
- Bring the original purpose of the building back

Berlhen

*(1) Sedumdak 123 lichtgewicht systeem. (2022, 5 januari). Sedumworld. Geraadpleegd op 20 juni 2022, van <https://www.sedumworld.com/product/sedumdak-1-2-3-systeem/>

*(2) Sedumdak. (z.d.). [Foto]. Sedumworld. <https://www.sedumworld.com/product/sedumdak-1-2-3-systeem/>

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*(6) Theatre, S. (z.d.). History. Stifel Theatre. Geraadpleegd op 20 juni 2022, van <https://www.stifeltheatre.com/history>

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*(9) Southern soiree at the peabody opera. (z.d.). [Foto]. Southern soiree at the peabody opera. <https://mnc-photography.com/wedding/southern-soiree-at-the-peabody-opera-house/>

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*(11) Hotel Jakarta Amsterdam. (2022b, april 11). Hotel Jakarta Amsterdam • by WestCord. Geraadpleegd op 22 juni 2022, van <https://hoteljakarta.com/>

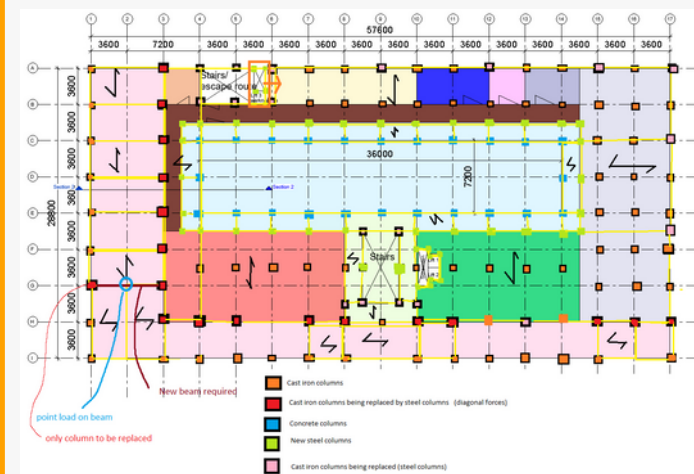
(12) Quartier Bleu. (z.d.). Quartier bleu. Geraadpleegd op 23 juni 2022, van <http://www.quartierbleu.be/>

Week 3 - Development phase

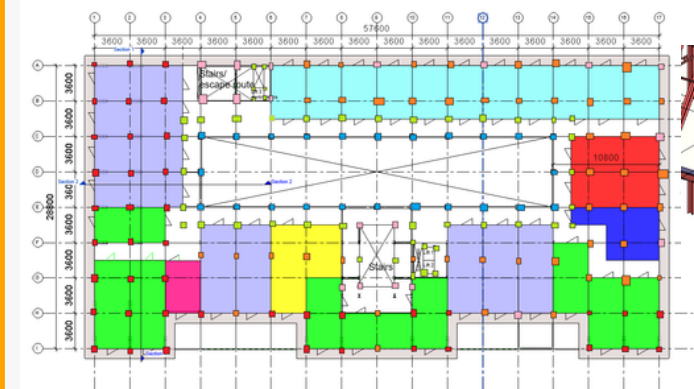
BOUINT01P

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1 Construction



New construction and the replacement construction (green, red and pink) will be made out of steel. The quality of steel that will be used is the S355. This allows the construction to be designed as slim and strong as possible. The blue columns have been replaced with concrete columns to meet the current function in the new building and because around the recess many forces come down. This makes the cast iron unstable. The red columns are the columns where the diagonals carry the weight of the roof and bring the forces to the columns in the façade. The new construction carries the weight of the green roof. The columns in the façade are hidden by walls. By using diagonals the monumental value is not affected (the views).

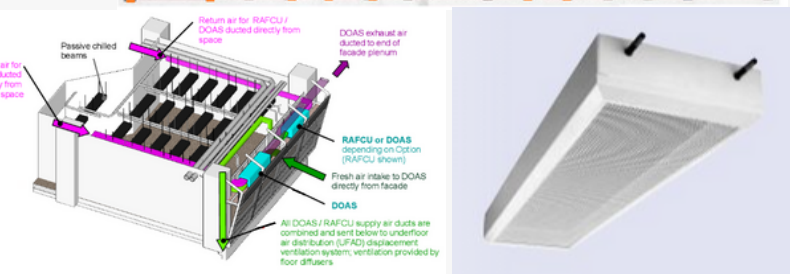


The new structure is connected to each other with moment fixed connections. This construction is not placed directly on the frame but a few centimeters next to the frame so the new construction can be connected above the current construction and the beams of the new construction can be incorporated in the floor so they are not in sight.

Ventilation



Decentralized ventilation ensures that the temperature per room is controllable. The reason for applying this ventilation system in the Watson hotel is to avoid excessive insulation in the hot climate in Mumbai, ventilating according to system D needs a heavy air handling unit on the roof and large shafts. Therefore, this is an excellent choice. Decentralized ventilation is great to apply in transformation and improve the indoor climate. Decentralized ventilation can be attached to the window, ceiling or facade.



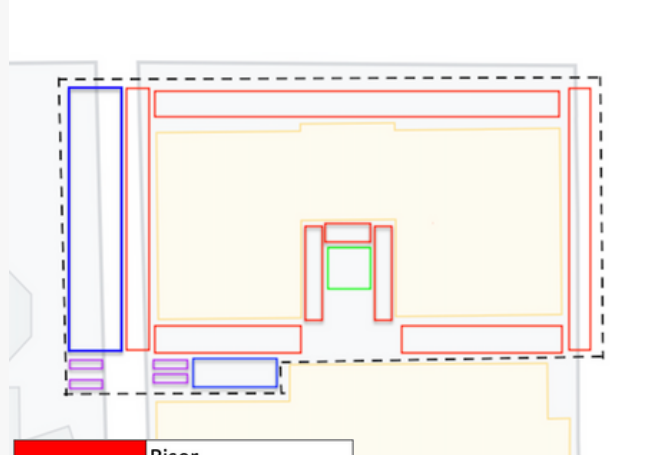
Decentralized ventilation is a local ventilation system. Ventilating in this way avoids the need for air ducts. Air from outside enters through the (duct) facade and exits through another duct. The ground floor is also decentrally ventilated in combination with passive cooling vectors. In large rooms this has less effect therefore passive cooling vectors are used which are attached to the ceiling. These cooling vectors can dissipate high internal heat loads and save energy.

The atrium will have roof windows, so the warm air is possible to escape without any required systems.

Gratl Source: *(1), (2), (3), (4)

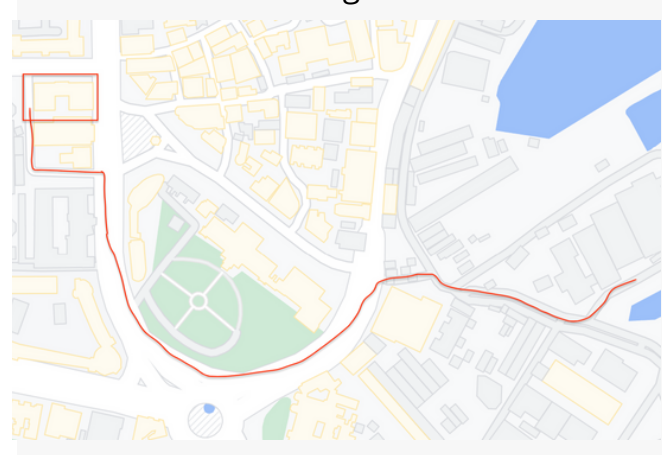
2 Implementation

Construction site



Riser
Crane
Waste bins
Material storage
Construction fences

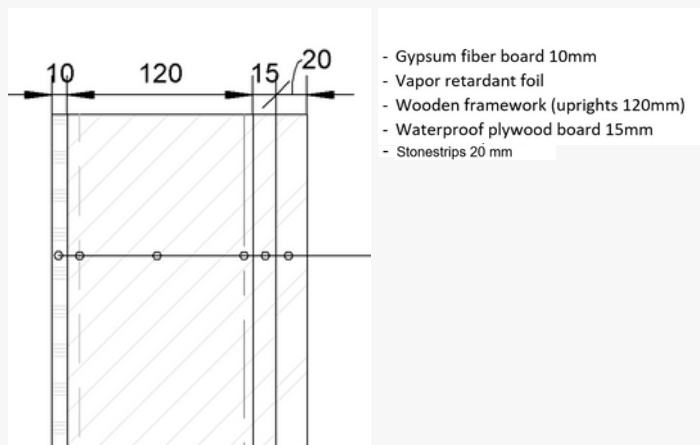
Logistics



Mauro

Construction method

For the construction of the renovated hotel we use assembly building with steel columns and beams and the atrium is reinforced by a concrete structure consisting of columns and beams. We start the renovation by demolishing the interior walls so that we are left with only a cast iron skeleton. The cast iron structure that remains is not everywhere sufficient to carry the new floors. For this reason, our structural engineer has devised a steel structure with wind bracing that can provide the required strength. The columns and girders are delivered prefabricated and put into place by crane. The same applies to the concrete structure. This is also delivered prefabricated and assembled on site. In order to preserve the authentic look of the building, the cast iron columns that are still in good condition will be retained. The building is built per floor. We first place the steel structure by means of a crane which is placed in the atrium. The facade finishing will be made of thin HSB walls containing ventilation. These are also placed per floor.



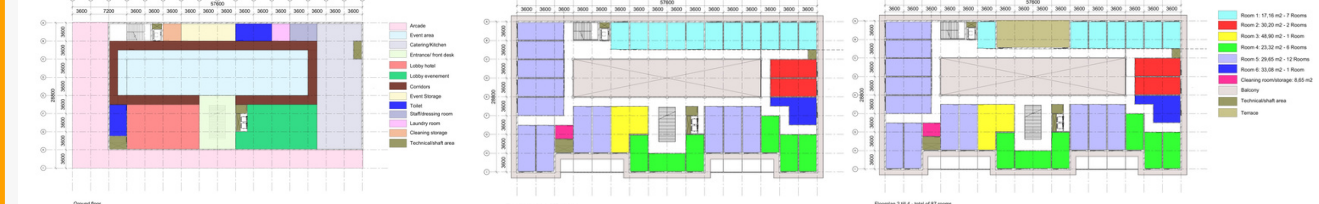
Facade

The inner walls are also HSB, however, these are placed last. The axis to axis distance of the wooden uprights in the HSB walls is 500 mm. The distance between the columns is 3.6m so you can exactly place 5 uprights of 120mm between the cast iron columns of the outer wall. The floors consist of wooden beams with plywood boards on top, a softboard layer for sound insulation and a hardboard screed. For the roof we use a green roof to promote the sustainability of the building. As vegetation we decided to use sedum, because this is one of the lightest green roofs which minimizes the pressure on the steel structure.

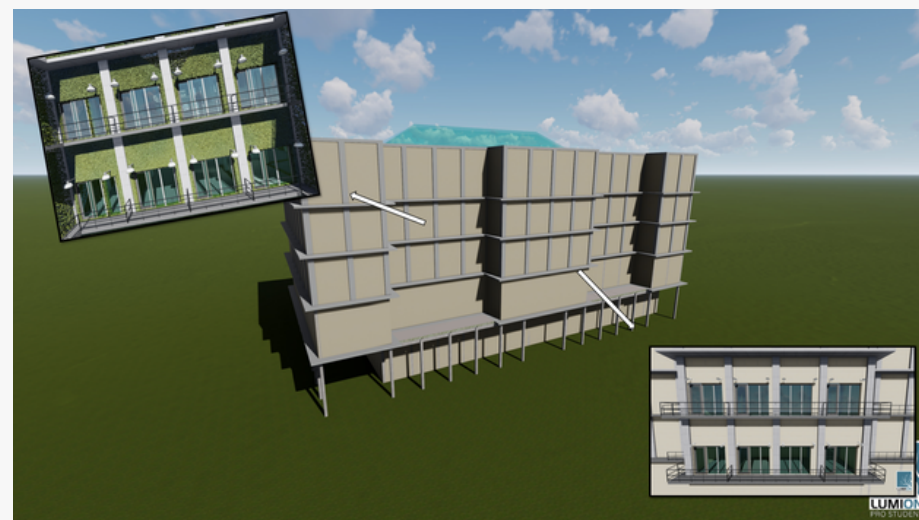
Dominic

3 Design

The floor plans show a number of changes and additions compared to week 2. Firstly, the technical areas and shaft areas. These have been placed at certain spots in the building, so that the installations can be placed vertically there. For horizontal installations, a lowered ceiling will be installed; this is easily done due to the current storey heights of approximately 5 metres. Furthermore, the terrace on the 2nd to 4th floors will be retained.



Debby



Emin



Visualisation

On the visualisation you can see renders of the event venue located in the atrium and a hotelroom. The event space is accessible for event such as weddings and conferences but is also rentable for other uses. A hotel room has also been rendered. this represents what it should look like.



Berlhen

*(1) Buiting, E. (2017, 21 december). ClimaRad krijgt zijaansluiting. Installatie.nl. Geraadpleegd op 1 juli 2022, van <https://www.installatie.nl/nieuws/climarad-krijgt-zijaansluiting/>

*(2) DOOR REDACTIE LIVIOS, Tom Mondelaers. (z.d.). Decentrale ventilatie: Het overwegen waard? Livios. Geraadpleegd op 1 juli 2022, van <https://www.livios.be/nieuwsinformatie/techniek/ventilatie/ventilatiesystemen/297720/decentrale-ventilatie-het-overwegen-waard?authid=6fed17f2-0341-43d1-b720-7b80586cb911&referer=https%3A%2F%2Fwww.google.nl%2F%2F&refer=https%3A%2F%2Fwww.google.nl%2F%2F>

*(3) Redactie Installatie. (2016, 1 november). Ventilatie met opbouwkanalen. Installatie.nl. Geraadpleegd op 1 juli 2022, van <https://www.installatie.nl/artikelen/ventilatie-met-opbouwkanalen/>

*(4) Weringsprincipe. (z.d.). ClimaRad. Geraadpleegd op 1 juli 2022, van <https://www.climarad.nl/actueel/artikel/weringsprincipe/>

Bijdrage Berlhen

1 week 1

De eerste week hebben we ons vooral bezig gehouden met het voorbereiden voordat we kunnen beginnen met het project. De voorbereiding was het maken van een samenwerkingscontract en een plan van aanpak. Daarna zijn we begonnen met de oriëntatie fase. Ik stelde voor om dit te doen aan de hand van een destep analyse en een locatie analyse te doen. Daarnaast is er een tijdlijn gemaakt en een gebouw analyse.

Mijn bijdrage

- samenwerkingscontract
- locatie analyse
- Demografie(destep analyse)
- Poster layout gemaakt
- bronnen in apastijl omzetten

2 week 2

De tweede week hebben we ons bezig gehouden met het ontwerp fase. Hier hebben we onderzoek gedaan naar verschillende functies die het gebouw kan bekleden. Dit hebben we visueel gemaakt in een tabel en uiteindelijk leek het mij het best om 2 verschillende functies te onderzoeken, daar referenties bij te zoeken en te onderbouwen. Dit hebben we uiteindelijk ook gedaan. Gratl heeft toen de de vlekkenplan gemaakt op revit zodat Mauro en Emin hier ook gebruik van konden maken.

Mijn bijdrage

- **Tabel variant keuze**
- referentie stifle theatre
- onderbouwing keuze variant
- layout poster
- bronnen apastijl omzetten

3 week 3

Week 3 ook de laatste week zijn we bezig geweest met het uitwerken van een variant die ons het meest geschikt leek voor de locatie. Iedereen is toen bezig gegaan met het onderdeel dat valt onder zijn specialisatie. Gratl deed constructie en bouwfysica. Mauro en Dominic deden de uitvoering en Debby, Emin en ik deden het ontwerp. Ik heb de visualisaties gemaakt van de hotelkamer en van het atrium aan de hand van de constructie wijzigingen die Gratl moest maken heb ik die uiteindelijk zo kunnen uitwerken. Ter verduidelijking heb ik voor de presentatie een 3d filmpje gemaakt. Voor het inleveren van de poster heb ik de puntjes op de i gezet en bij alle onderdelen de naam toegevoegd van de maker.

Mijn bijdrage

- 3D visualisatie atrium en hotelkamer
- 3D filmpje
- Poster layout gemaakt
- bronnen in apastijl omzetten