

Intercluster Workshop

“Sustainable Retrofitting of Buildings in Urban Areas”

Les Isnes (Wallonia, Belgium) - 27/May/2019



Designing buildings retrofitting in Portugal

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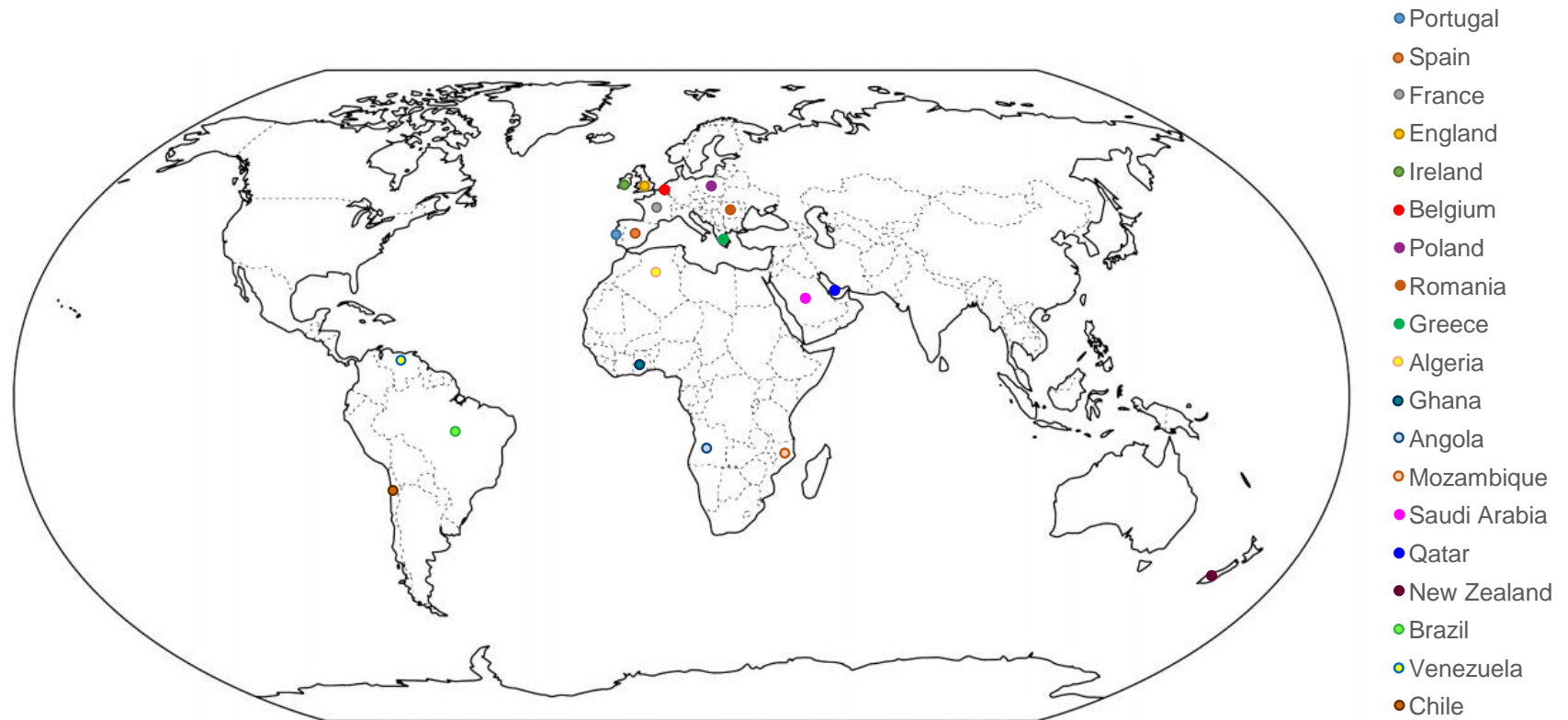
History

Evolution

- **1988 – Company foundation – 4 employees;**
- 1989 – 6 employees – 1st office relocation;
- 1997 – 21 employees – 2nd office relocation;
- 2000 – 40 employees – Relocation to current HQ;
- 2002 – ISO 9001 Certification;
- 2003 – Internationalisation towards Angola;
- 2005 – Lisbon Office;
- 2006 – Change to Joint Stock Company, 70 employees;
- **2007 – BIM is introduced to company workflows;**
- 2011 – SOPSEC Azores;
- 2012 – Algeria Office;
- **2018 – 30th anniversary, 100 employees**
- **2019 – Belgium Office**


International Presence

SOPSEC is present in several worldwide locations, besides Portugal, providing services wherever it considers of strategic importance or wherever its Customers and Partners challenge it to help create value.



Key Costumers and Partners





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Services



Design Services

SOPSEC has experience in the traditional areas of Building Engineering, but also in new fields.

In the area of Civil Engineering it has experience in the design of roads, urbanizations and requalification of public spaces, as well as in special structures (bridges and viaducts) and networks.

SOPSEC has extensive experience in the use of traditional materials / processes, as well as non-traditional and innovative materials.

Environmental concerns, energy efficiency, water reuse,

safety, use of BIM and life cycle analysis are already standard practices.

SOPSEC's experience is relevant in new construction, as well as in the rehabilitation of public spaces, infrastructures, buildings, monuments and urban spaces. SOPSEC technical team is subjected to a permanent process of continuous training and has a high capacity to develop projects, in a national or international context.



Management and Site Supervision

Management and Site Supervision includes fundamentally all the management activities associated with the execution phase of the work, assuring the realization of the projects in compliance with execution projects. This compliance is guaranteed surveying Costs, Milestones, Environmental Management, Work Safety Coordination and Quality Control.

By hiring SOPSEC for the Management and Supervision of its projects, the Promoter reduces the

risks, with emphasis on the estimated cost and compliance with the estimated deadlines, always ensuring the perfect quality of the work built.

In many situations, SOPSEC assures the Coordination of Contractor retaining and Procurement processes, involving the definition of RFPs, receipt and analysis of proposals and support to the negotiation and conclusion of contracts for the supply of goods or services.




Consulting and Project review

SOPSEC has high expertise in the field of Consulting, Peer Review and Project Management. SOPSEC has the capacity to provide consultancy services, with emphasis on the evaluation of the condition of buildings and civil engineering works, the diagnosis of anomalies in monuments and rehabilitation projects and infrastructures.

In building physics, SOPSEC has the ability to conduct measurements, simulation and analysis of the acoustic and thermal behaviour of building elements and building facade components, through advanced numerical

SOPSEC has the capacity to study complex situations, involving various types of phenomena and actions, such as modelling as mechanical, thermal or linked to fluid flows. In the area of hydraulics and environment, the aspects related to the reuse of water are highlighted.

SOPSEC also has experience and skill in the constitution of independent and coordinated peer review teams that can carry out the work with different levels of depth. The skills required in the different production areas also empower SOPSEC to carry out the global and integrated management of projects.



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Areas of Expertise

Residential and Office Buildings



1

1| Quinta da Seara – V.N. Gaia, Portugal

2| Vilamar – Porto, Portugal

3| Rehabilitation of Building 1904 in Rua José Falcão – Porto, Portugal



2



3

Residential and Office Buildings



1

1| Ordem dos Engenheiros Headquarters, Saudi Arabia

2| Sakumono Residential Complex, Ghana

3| Building “Destilaria do Álcool” – V.N. Gaia, Portugal



2



3

Commercial Buildings



1

1| Shopping Center in Constantine, Algeria

2| Alegro Setúbal, Portugal

3| Conforama Store, V.N. Gaia, Portugal



2



3

Retail



1

1| Continente Store and Shopping Center, Matosinhos, Portugal

2| E.Leclerc Store, Viana do Castelo, Portugal

3| Bagga Stores, Portugal



2



3

Health



1

1| S. João Hospital – Expansion of South/West wing, Portugal

2| Comendador Manuel Moreira de Barros Hospital – V.N. Gaia, Portugal

3| IPO (Portuguese Oncology Institute) Porto – New Radiotherapy Unit, Portugal



2



3

Education



1

1| Soares dos Reis High School – Porto, Portugal

2| Agostinho Neto University Library, Angola

3| Asprela University Campus Central Building – Phase II – Porto, Portugal



2



3

Hotels



1

1| Bessa Hotel Liberdade 4* – Lisboa, Portugal

2| Moov Porto Centro Hotel – Rehabilitation of former Cine-Theater –
Porto, Portugal

3| The Yeatman Hotel 5* – V.N. Gaia, Portugal

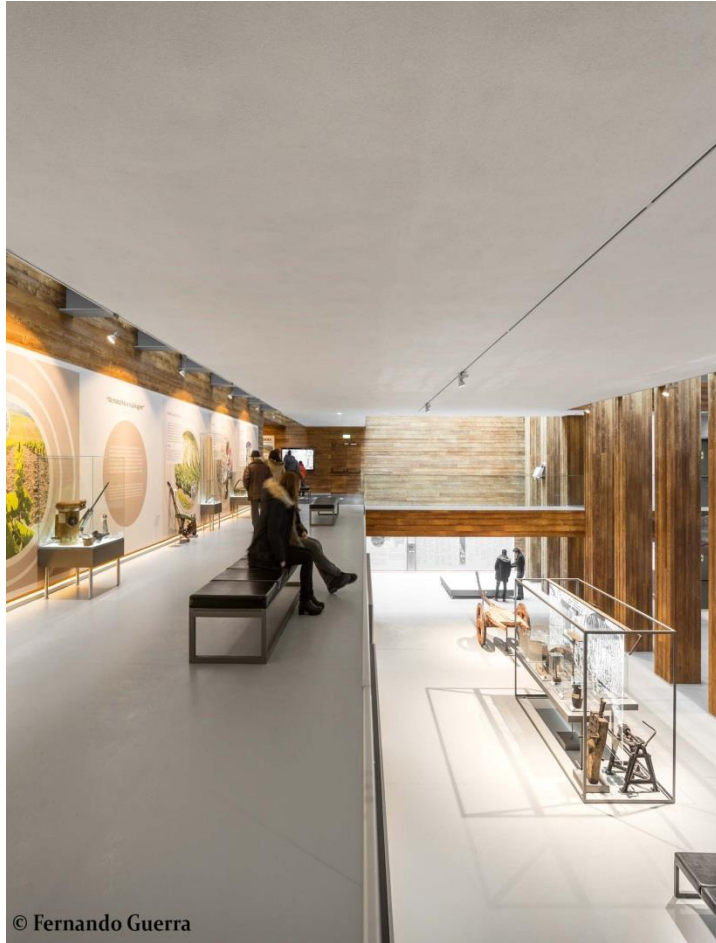


2



3

Social-Culture



© Fernando Guerra

1

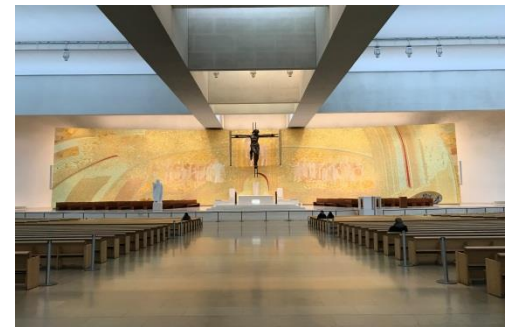
1| Núcleo Museológico do Vinho – São João da Pesqueira, Portugal

2| House Andresen Rehabilitation e Botanic Garden – Porto, Portugal

3| Santíssima Trindade Church – Fátima, Portugal



2



3

Sporting venues



1

1| Football City – Oeiras, Portugal

2| Gymnastics Academy – Guimarães, Portugal

3| Bessa Stadium – Porto, Portugal



2



3

Bridges and Viaducts



1

1| Foot bridge over the Ave river – Santo Tirso, Portugal

2| Foot bridge on the canals of S. Roque and Botirões – Aveiro, Portugal

3| Braçais Viaduct (Post tension application project), Portugal



2



3

Roads



1

1| Antas Area Public Space – Porto, Portugal

2| Aecessibility to Bessa Stadium – Porto, Portugal

3| Gaiapolis – Vila Nova de Gaia, Portugal



2



3

Infrastructures



1

1| Hydraulic Infrastructures, Portugal

2| Hydraulic Infrastructures, Portugal

3| Urban allotment, Portugal



2



3

Industry and Fuels



1

1| Continental Mabor Factory Expansion – Vila Nova de Famalicão, Portugal

2| Leica Industrial Unit – Vila Nova de Famalicão, Portugal

3| GALP Petrol Stations (multiple interventions), Portugal



2



3

Environment and Energy



1

1| Thermal Stations (partnered with CMI), Chile

2| Water Treatment Plants, Portugal

3| Wind Farms, Portugal

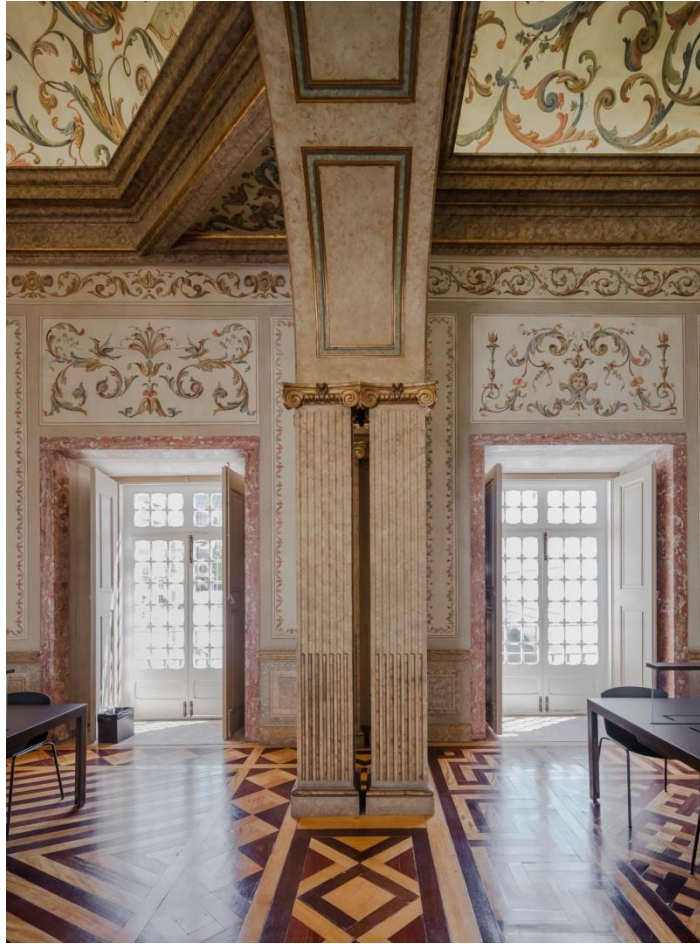


2



3

Rehabilitation and Heritage Sites



1

1| Galveias Palace Library – Lisboa, Portugal

2| Mosteiro da Batalha Rehabilitation, Portugal

3| Contemporary Art Center– Azores, Portugal



2



3

Urban Requalification



1

1| Requalification of Avenida da República – Lisboa, Portugal

2| Regeneration of Vila Nova de Milfontes, Portugal


3| Requalification of the Carlos Alberto neighborhood – Porto, Portugal



2




3



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**Examples of refurbishment and
special works**



Building Dreams
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Modern art museum

BUILDING DATASHEET:

Client:

Presidência do Governo Regional dos Açores
Direcção Regional da Cultura

Budget:

10.250.000 €

TECHNICAL STAFF:

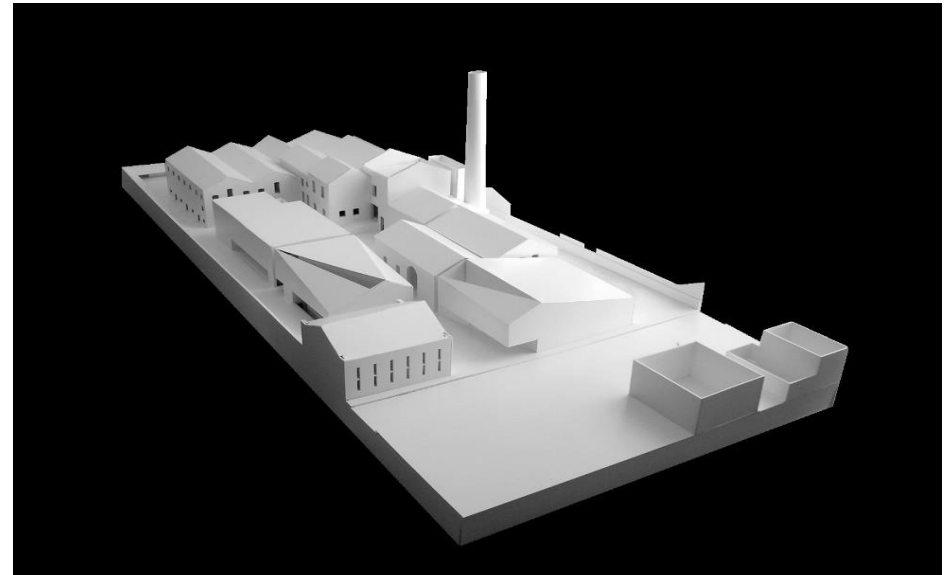
Architects:

Partnership Menos é Mais Arquitectos Associados,
Lda and João Mendes Ribeiro Arquitecto, Lda
Architects: Francisco Vieira de Campos, Cristina
Guedes, João Mendes Ribeiro

Structural Engineer, Hydraulic Services Engineer and
Acoustics
SOPSEC, SA

Contractor:

Partnership Somague – Marques - Tecnovia



General Framework– the Archipelago

Site location constrained design options

Area with very high seismic activity (triple junction of North-American, Eurasian and African plates)

North Atlantic Weather Front with strong exposure to weather agents

Endogenous materials and traditional techniques were required due to economical and environmental sustainability requirements



- Insular Industrial Architecture of the late 19th century











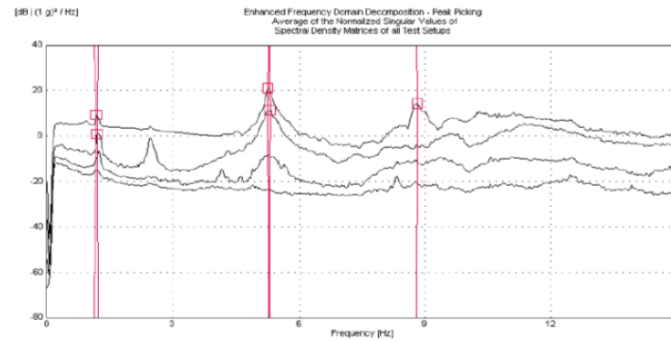
Inspection and Diagnosis



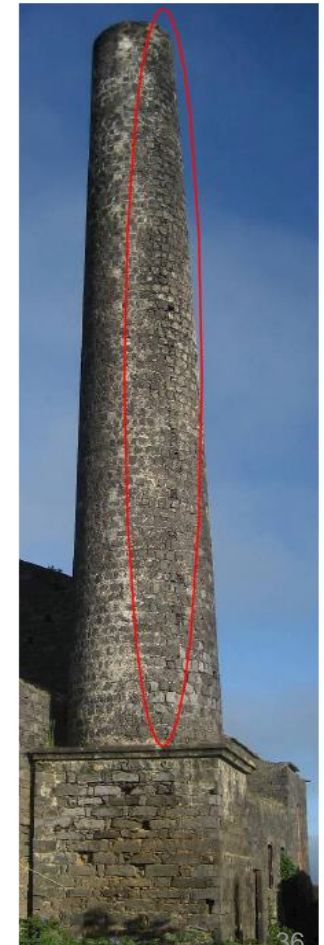
Foundation pits



Environmental vibration

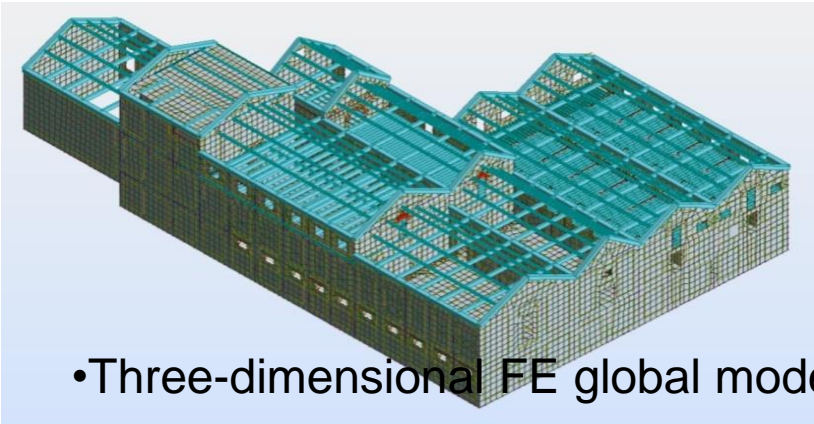


Main vibration modes

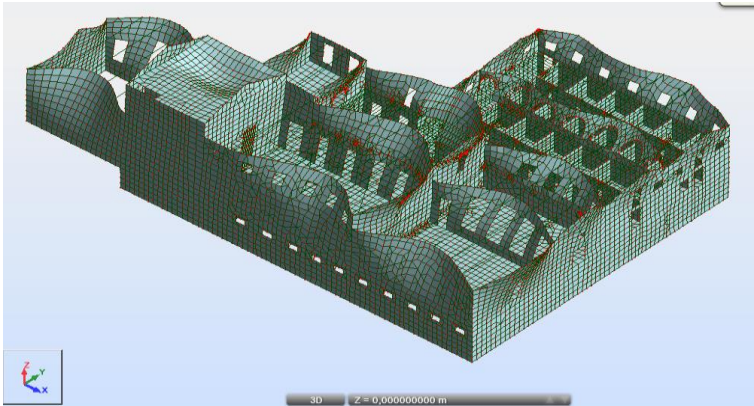


Geotechnical survey

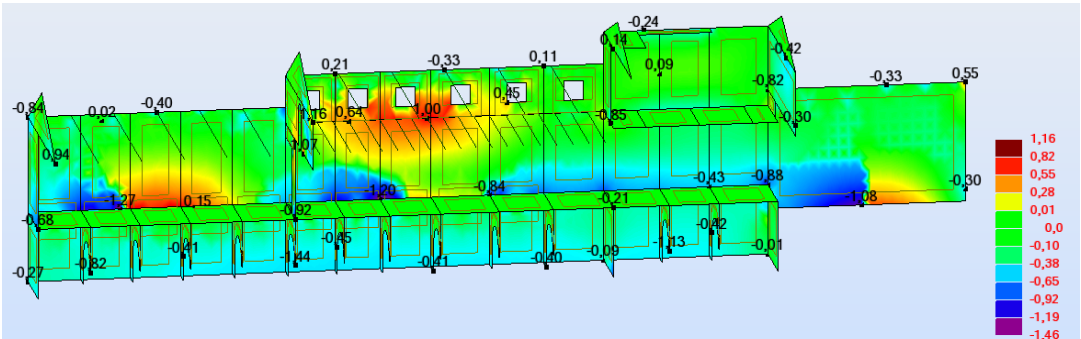
DESCRIPTION OF THE INTERVENTION – Structural Analysis



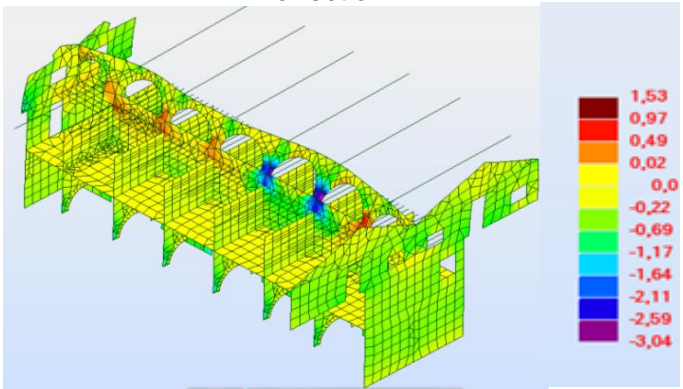
•Three-dimensional FE global model



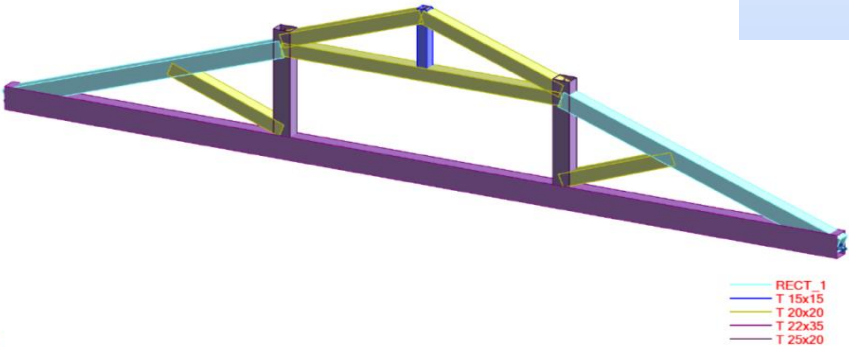
Structural deformation – Earthquake action on YY direction



Stress analysis – Earthquake action on YY direction



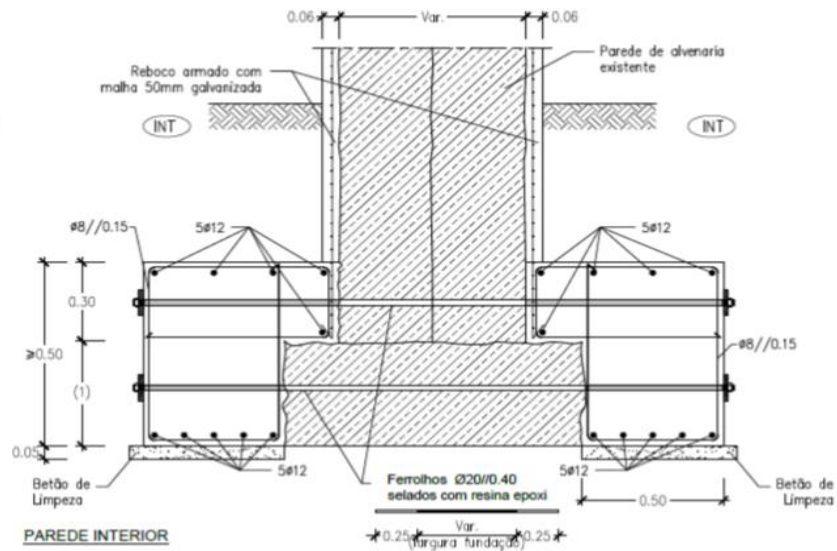
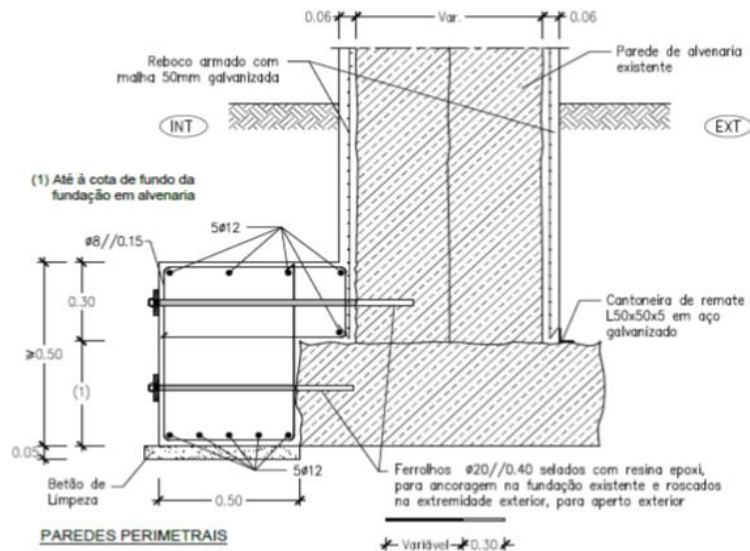
Earthquake action on YY direction



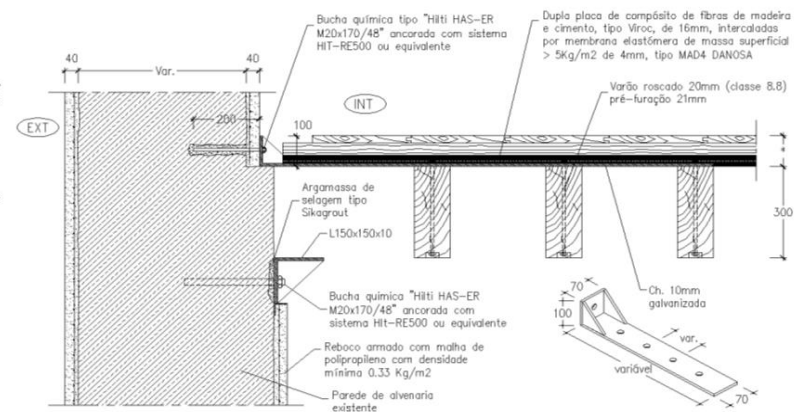
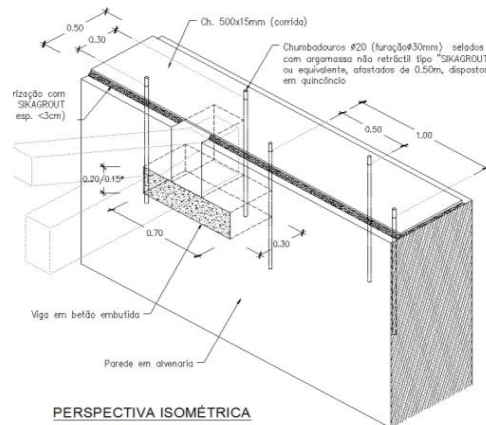
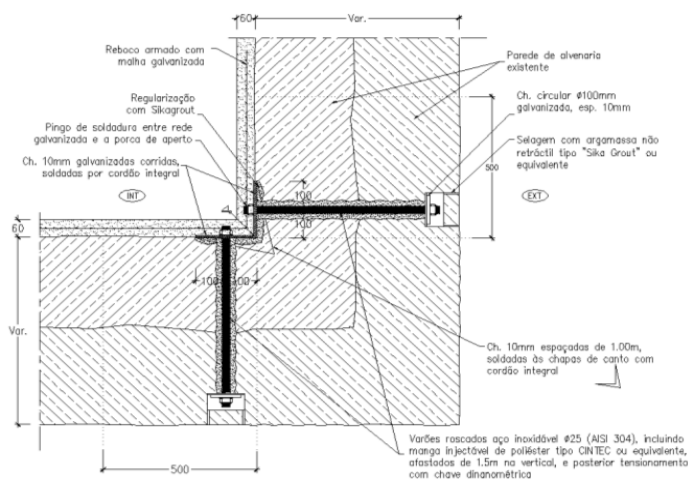
Reinforcement of foundations



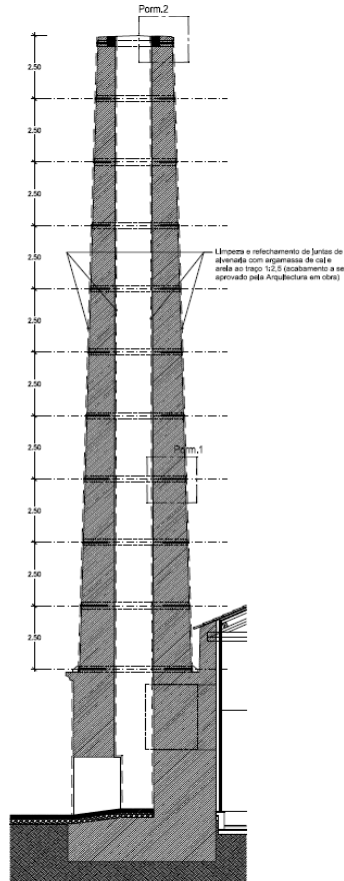
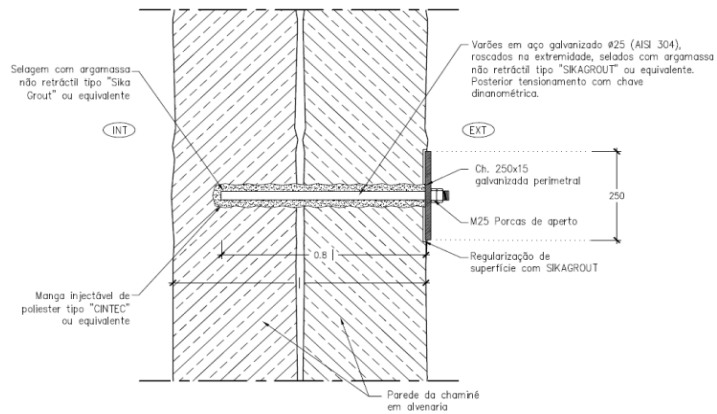
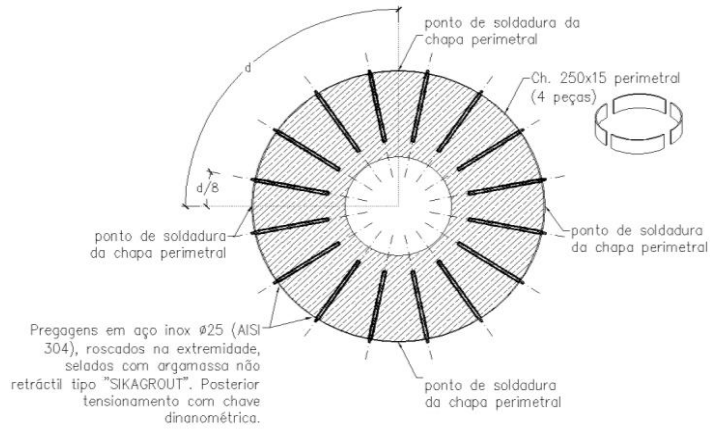
NOTA:
Solução a validar pelo projectista após observação "In Loco" das condições reais.



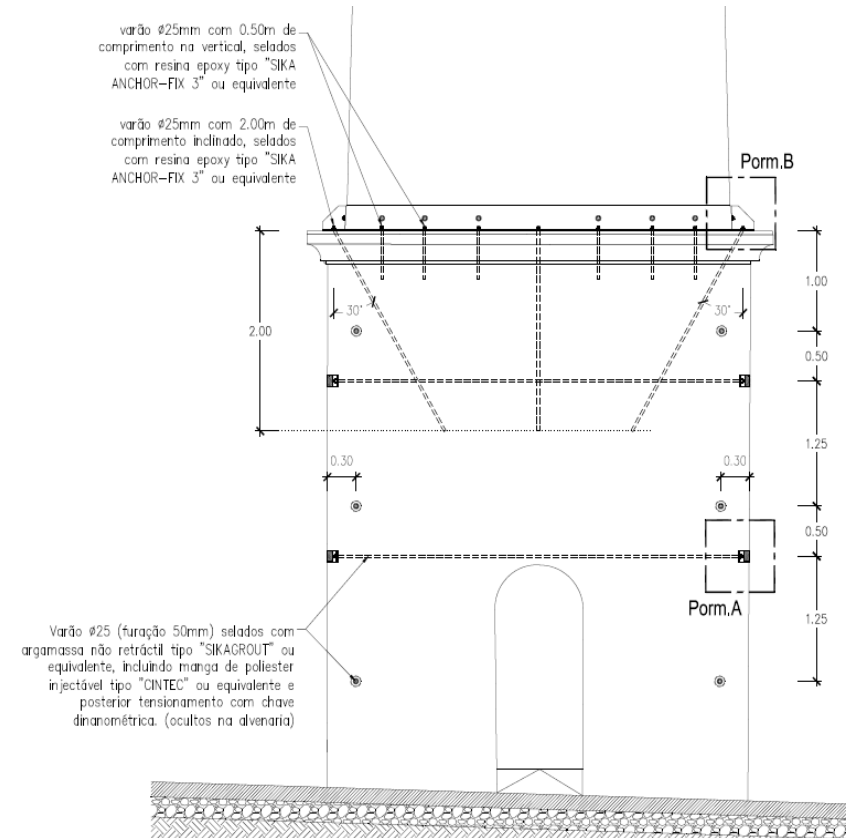
Reinforcements of walls



Reinforcement of the chimney



REFORÇO DAS PAREDES DA CHAMINÉ
PRCAI A 1-100



Reinforcement of the chimney



Work concluded



Work concluded



Work concluded



Work concluded



Work concluded



Work concluded



Work concluded



Work concluded



Work concluded



Work concluded



Work concluded




Work concluded



Work concluded



https://www.youtube.com/watch?v=be_8mDQisIU




Urban Dreams
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**Urban Market refurbishment of
the 50's**







Urban Dreams
engineering your dreams

**XIX's urban building refurbished
to an hotel**





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**Carillon and Bell Towers
Rehabilitation**



Mafra National Palace

Carillon and Bell Towers Rehabilitation



BRIEF DESCRIPTION OF THE CARILLONS AND THE PALA

- Built on the 18th century (1717) by King D. João V in Lioz Stone
- Major barroque monument in Portugal
- About 38.000 m2 and 1200 rooms
- Two bell towers, 50 m high with 58 bells each – Bells from 2.7 kg to 10 ton.
- 98 bells create one of the largest historic carillons in in the world
- North Carillon – from Liège, Nicolau Levache's workshop
- South Carillon – from Antwerp, foundry of Willem Witlockx



Today:

- **Inoperable Carillons**
- **Shored bells**
- **Timber and metal components highly decomposed and corroded**





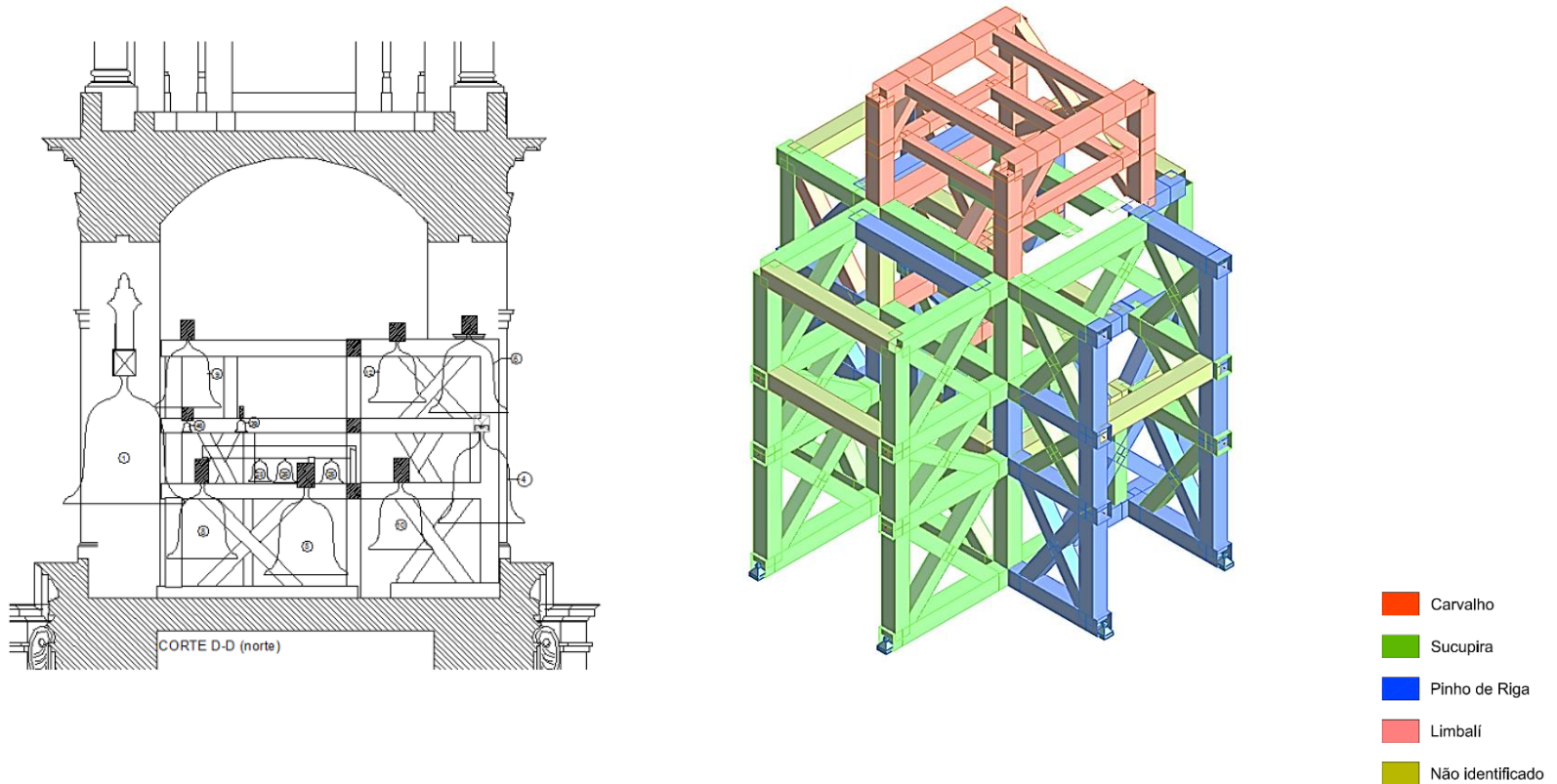
- Ongoing works:



Degradation of the bells timber support structures

INTERVENTION AND CONSTRUCTION MONITORING

- Numerical models of the timber structures of the carillons and connections and metallic components



Carillon bells timber support structure and 3D model for numerical analysis

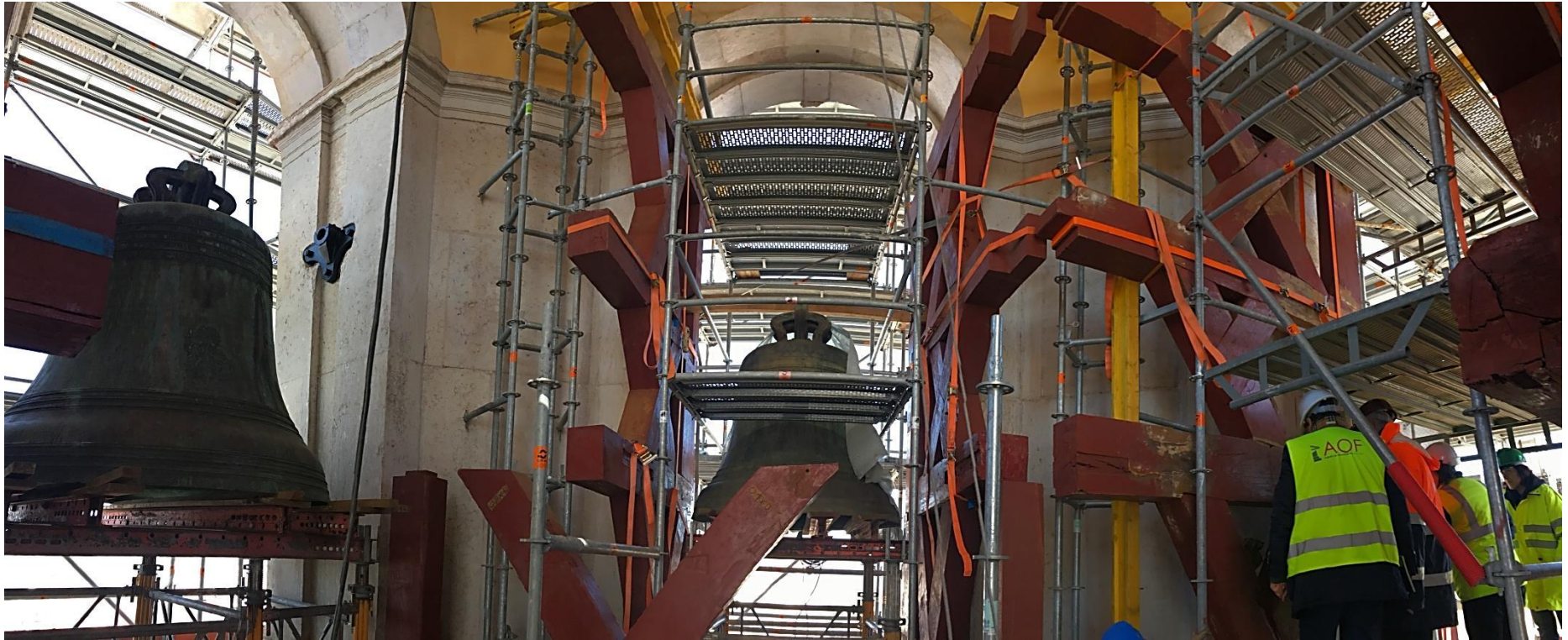
INTERVENTION AND CONSTRUCTION MONITORING



Rehabilitation of the bell heads and bell support structures


INTERVENTION AND CONSTRUCTION MONITORING

- Ongoing works:



Rebuilding of the North Tower bells timber support structure

<https://vimeo.com/306382505>



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New net zero building



Guimarães Gymnastics Academy -“Nearly Zero-Energy”

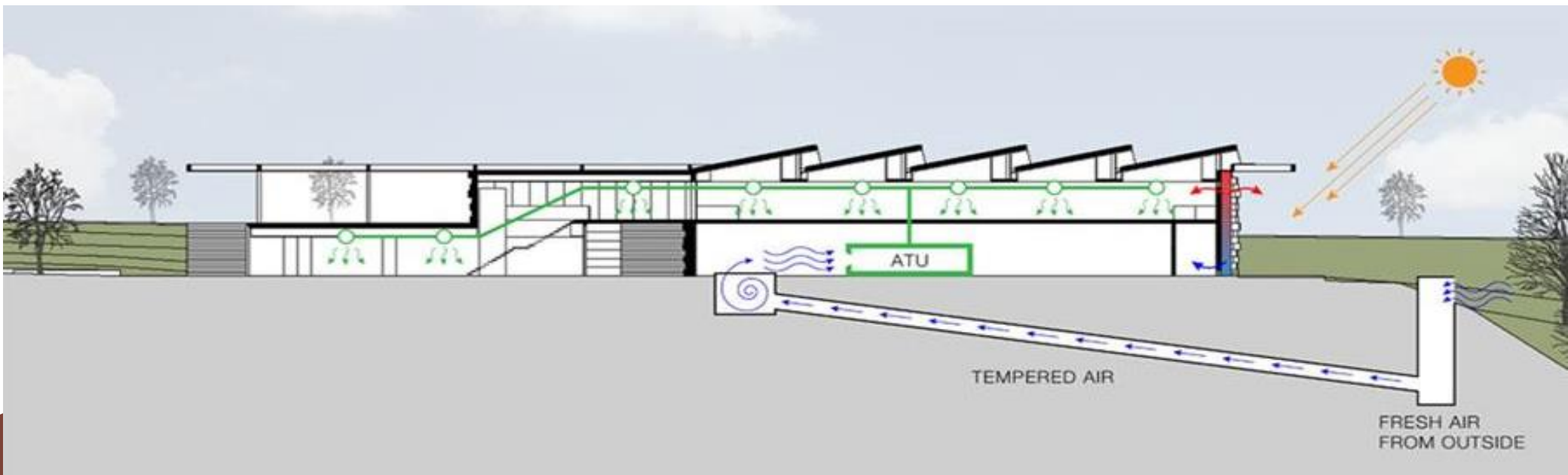
<https://www.youtube.com/watch?v=QfUoNfW3R2w>

- **Active and Passive climatization**

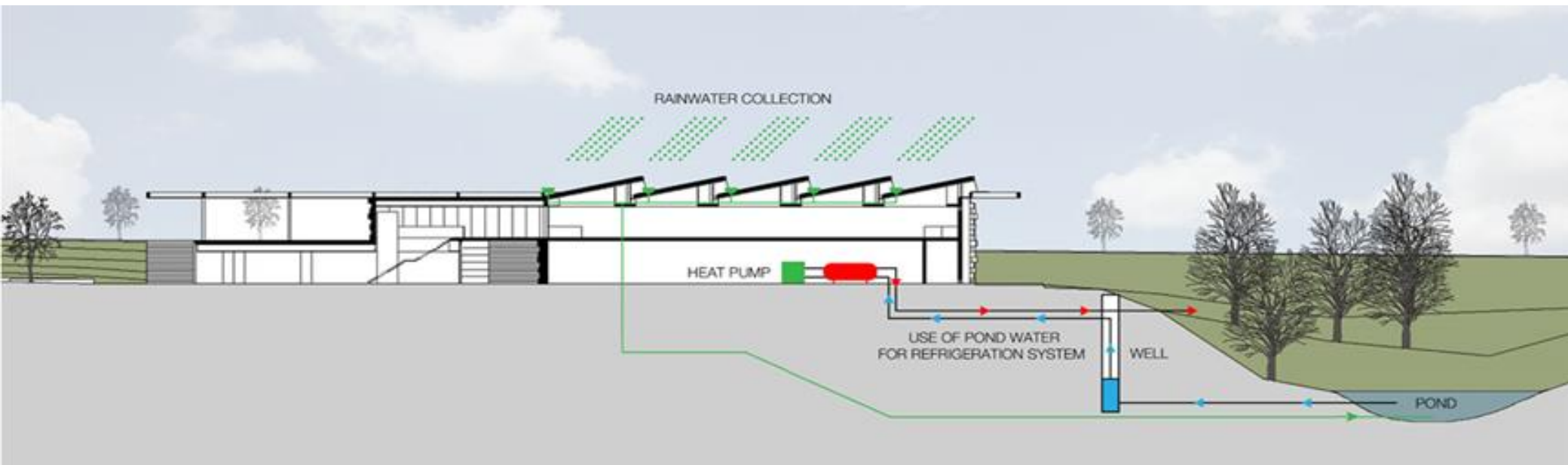
- Thermo active slab



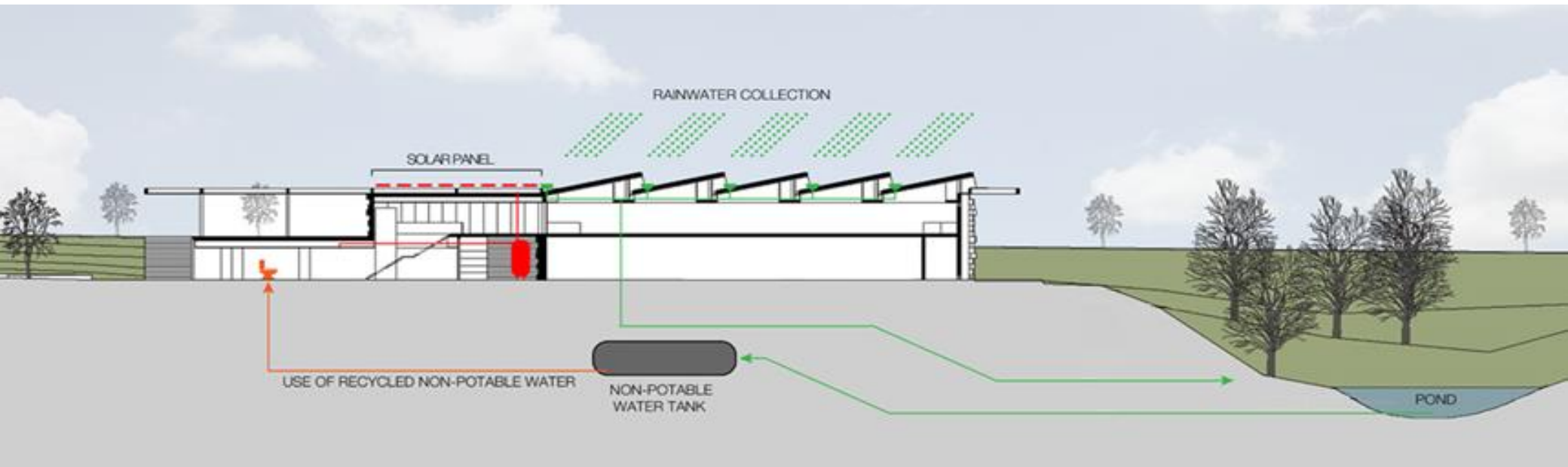
- Geothermics.
 - Trombe wall;



- Water cooling of HVAC equipments



- **Non-potable water supply**





Thank you for your attention

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