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FINAL PROJECT

URBAN REDEVELOPMENT OF THE RIVERSIDE AT GREVENMACHER (LUXEMBOURG) AND
ARCHITECTURAL REQUALIFICATION OF AN EXISTING WINE PRODUCTION FACILITY.

This report aims to illustrate briefly, but comprehensively, the architectural and structural design of the extension of Domaine Clos De Rochers building, as well as the analysis and proposal for a new urban system on the riverside of Grevenmacher. For ease of reading, it was decided to structure this memory in sections so divided:

Introduction: Proposal and objectives

Analysis of the Project Site

The urban intervention

Luxembourg Wine Industry

Architecture and Wine Industry

The Commission

Wine production considerations for the project

Fabrication Laboratories

Project Concept. Architectural, functional and structural composition

The Architectural Project

Final remarks

Bibliographic references

There have also been reported in bold the key terms that allow an immediate understanding of the concept exposed.

INTRODUCTION. Proposal and Objectives

This project has as primary objective that of respecting the main points of the program required by the commission: to design an **expansion that allows to ease the wine production within the existing building.**

It has also been studied the current situation of the riverside of Grevenmacher and implemented some ideas to potentiate a sustainable promenade along the street that leads to the project in order **to enhance the tourism in the town and to bring attraction towards the building** as people wander along the area.

Despite the limited official demand of solving and reorganizing the current wine production process in this small property, it was decided to also consider the possibility **of offering spaces to the public** in order to allow them to visit the building and experience a tour guided by their own senses and by the wine production itself. The extension, therefore, contemplated not only the relief inside the fermentation cave but also the addition of a Wine Bar, a Show Room and a Conference Room, as well as the redistribution of the existing program.

A very extensive **study of wine production processes** has made possible to understand the actual needs and how to best respond to them within the obvious existing constraints given by the characteristics of the site, the economical possibilities and the town construction regulations.

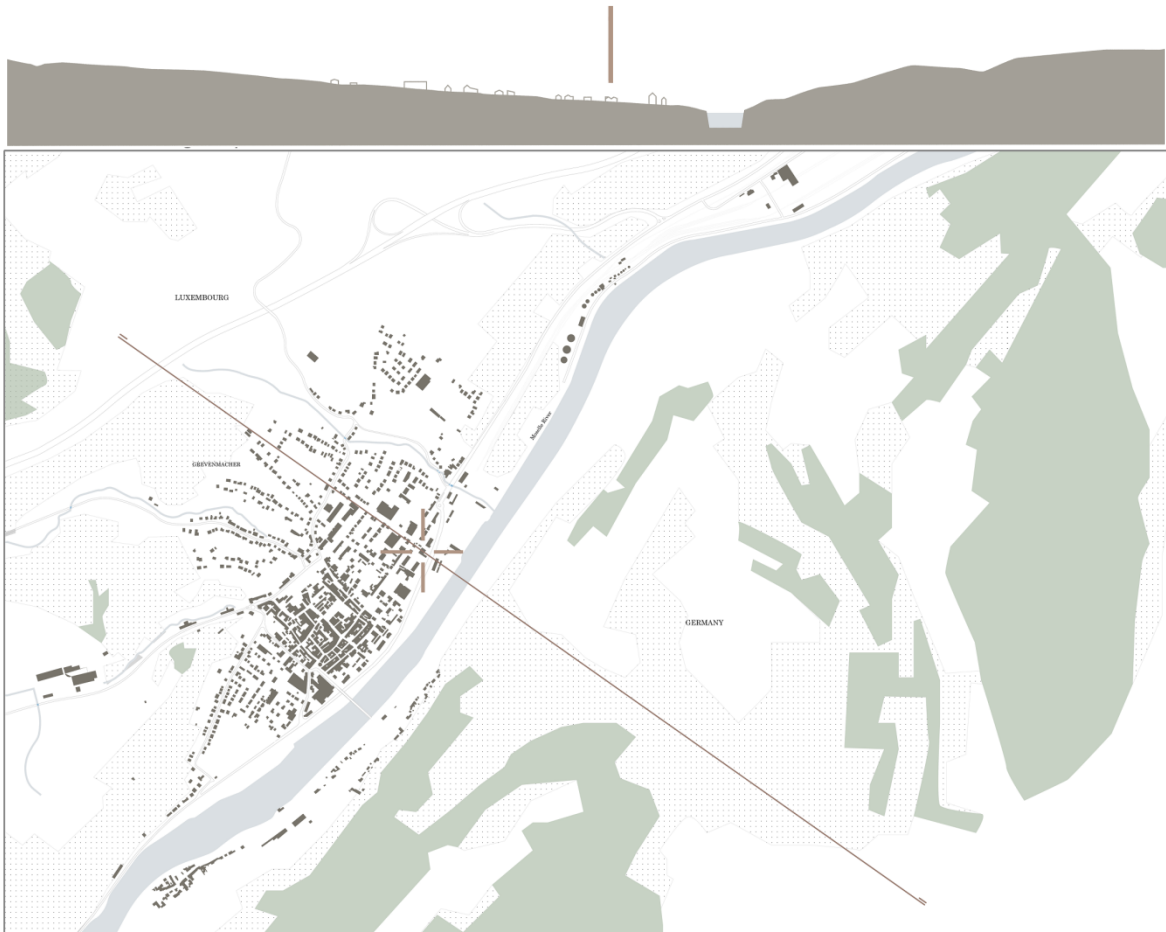
It has also been applied the study of new ways to design, and their constructive implementation through **alternative systems of production, made conceivable thanks to the machinery used in the FabLabs** (Fabrication Laboratories).

ANALYSIS OF THE PROJECT SITE



Luxembourg, this tiny, land-locked country of 999 square miles (around 2,586 km²), shares borders with Belgium, Germany and France. All of its vineyards are strung out along 40 kilometers of the river that is Luxembourg's border with Germany: this is where Germany's masculine Mosel finds its feminine side mid-stream, becoming Luxembourg's Moselle.

The Wine cellar Domaine Clos De Rochers, is located in the border town of Grevenmacher, specifically in Rue de Trèves, at only few meters from the Moselle river.



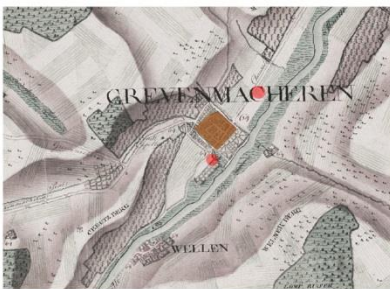
The Moselle Valley owes its richness to its proximity to the water and to its fertile lands. It is for this reason that this area was already colonized before the Roman times.

As for Grevenmacher, a first settlement was located not on the valley but close to the Roman route that connected Trèves (*Trier*, the oldest city in Germany) with Luxembourg.

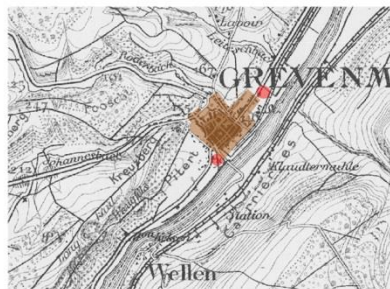
After the first millennium, the counts of Luxembourg looked for a safe place to protect their goods against the powerful archbishops of Trier. They found it in *Greffenmacher*, this time in the valley. It is here that was erected a protective fortress to be dismantled only in 1688.¹

Over the centuries, the town of *Graffenmacher* was often attacked and destroyed. However, today the small town along the Moselle, which has 4500 inhabitants and since 1769 has adopted the name of Grevenmacher, is a district capital and an administrative and commercial center oriented to a further development in the future.

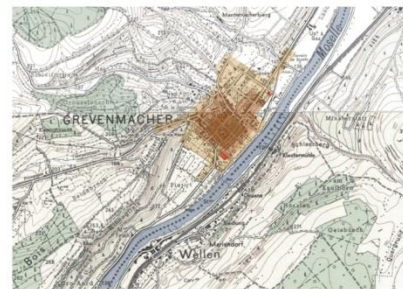
Ferraris 1778



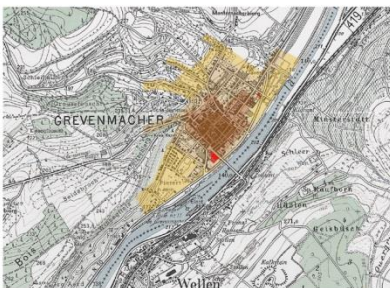
1907



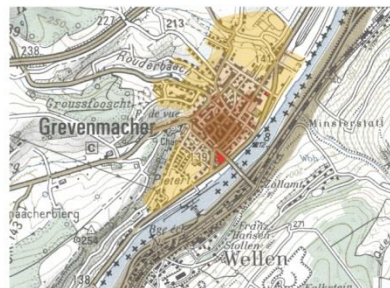
1954



1979



1993



Images source: geoportail.lu

The town has gone through various stages of expansion throughout history. It is only in the first half of the 20th century that both the headquarters of Bernard-Massard and the building that now houses Clos de Rochers winery appear on the map.

¹ HERMES, M; WELTER, J. Grevenmacher. Promenade culturelle à travers une vieille ville fortifiée.



Urban reading. Synthetic mapping of flood risk, transport system, and land uses.

BERNARD-MASSARD

Most visitors to the region will end up in the cellars of Bernard-Massard. Now producing over four million bottles annually, this company was founded in 1921 by Jean Bernard Massard, a Champagne cellarmaster, who came here to replicate the success of Champagne wines. The company now makes both still and sparkling wines, and owns the fine individual estates of Château de Schengen and Clos des Rochers.

The main cellar of Bernard-Massard and Clos de Rochers --the project site—are only 700 meters distant.



THE URBAN INTERVENTION

The street in front of the Moselle River has an enormous potential in terms of landscape quality, transport development and commercial/cultural offers to the locals and visitors of the town.

During the analysis of its situation, some facts were revealed: albeit the presence of the river and a traditional yet well maintained architecture along the riverside, there is a lack of green areas that could be solved in order to reinforce not only the quality of the street in terms of nature but also the possible success of **a boulevard to call for more tourism, outdoor activities and a proper use of the city**. There are also some voids in front of the street at each block that could be included in the open space system by profiting them to house small events (outdoor expositions, itinerant shows...) along the linear park proposed. Moreover, the actual presence of some public and institutional buildings can easily help reshape and redefine the role and new character that this street could gain thanks to the general urban requalification that is being suggested with this project.

By some simple interventions, Grevenmacher could not only get a new *façade* in front of the river that could be seen even from the German neighbors, but it would definitely boost the social activities and outdoor life development that most of the cities in Luxembourg lack. **Such interventions include light installations, new bike lanes along the riverside, the redefinition of the pedestrian path over the road, introduction of more green areas, and a simple yet efficient urban furniture design.**

In terms of aesthetics, all urban furniture, light installations and pavements for the bike and pedestrian routes would have the same language applied on the Architectural project for Clos de Rochers wine cellar, as this building has the intention to become a symbol for Grevenmacher and a tourist draw.



Urban intervention: analysis, concept and proposal



Gallery event for the community to come together and celebrate the work



LUXEMBOURG WINE INDUSTRY

There is a 2000-year-old tradition of winemaking here, and immaculate vineyards climb breathtaking slopes from the flower-filled villages that dot the wine route.

Five noble varieties have a strong foothold: Auxerrois, Pinot Blanc, Pinot Gris, Gewürztraminer and Riesling. A lot of this is grown for the sparkling wine industry, with many millions of bottles of Crémant de Luxembourg sold each year. But the very best, south-facing slopes of chalk, clay or slate over limestone, are reserved for much more serious table wines.

How come then, that the wines of Luxembourg are such a secret? The answer is that Luxembourg has - so far at least - felt no pressure to export. Almost half a million people live here, and happily consume the bulk of production. And yet many winemakers are painfully aware of the suppressing effect this has on their industry: outside national boundaries, the wines of Luxembourg have no reputation. So the locals - who can drive to France or Germany in half an hour - will not pay French or German prices. The result? A bottle of finely-crafted Riesling can be picked up for three or four Euros.

Luxembourg is mainly a producer of dry, varietal white and sparkling wines (about 15% of total production). This is a stark contrast to the German side of the Mosel which has a strong tradition in semi-dry and sweet wine production.

There are only around 50 producers in Luxembourg. One of the biggest and most renowned companies is, precisely, Bernard-Massard.

Company Values

QUALITY _ ENTREPRENEURSHIP _ INTERNATIONAL AMBITION

Buildings can play a role in the business

Consumers relate to a brand throughout Design and Lifestyle

BERNARD-MASSARD

More than 30,000 visitors each year

4,000,000 bottles produced per year
85% of production: Cremants (3,500,000 bottles of Cremant)

2 ore Domaines: Clos de Rochers / Thill Schengen

Expansions and constructions over the time

- 1921 Foundation
- 1966 Building extentions
- 1975 Construction of a new storage space for the maturation and aging of Cuvées
- 1992 Construction of a thermoregulated wine cellar (capacity 20,000 hl)
- 2001 Building of a new logistical center (3,500 m2)

Bernard-Massard main building in Grevenmacher:

- .Large winery
- .Cellars for storing and maturing
- .Production equipments for bottling, riddling, disgorging

- .Company administration
- .Meeting facilities (4 rooms)



Meeting facilities	M ²	I	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ecusson	147	4	100	-	-	75	200	200	✓	-	-	-
Hall d'entrée	134	3	-	-	-	100	200	200	-	✓	✓	✓
Riesling	88	3	80	-	60	60	80	80	✓	-	-	✓
Caveau	79	3	50	40	40	40	80	80	-	✓	✓	-

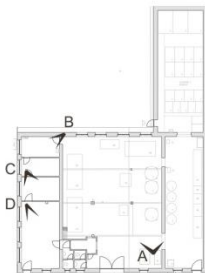
CLOS DE ROCHERS

Vineyards domain: 18 hectares

Production: 400.000 - 500.000 lt of wine

Equipment:

- steel vats
 - 1x 7,650 lt
 - 3x 12,300 lt
 - 4x 5,200 lt
 - 4x 3,600 lt
- wooden vats (expected to grow up to 10x)
 - 3x 3,000 lt
 - 1x 2,000 lt
- must cleaners 2x
- deposits
 - 3x 3,000 lt
 - 3x 2,000 lt



ARCHITECTURE & WINE INDUSTRY

A fairly new building type that sits somewhere between the pastoral and the commercial.²

In the wine business, the hospitality element is inextricably with the brand, with the profile and the image that they are trying to project for the product.

There is an expectation in the consumer's mind that there will be a compatibility, a parallel imagery between their view of the brand of the wine, what it means to them, and the experience that they have at the winery itself. For example, a wine brand that has a very modern image probably would not fit with an Old-World-style chateau.

Some factors must be taken into account when trying to epitomize a brand by means of the Architecture. Some of the so called **Bold Gestures** considered for this are as follows:

_Marketing values of the project.

_Buildings can play a role in the business.

_Aside from showcasing new Architecture and good wines, the **winery could symbolize Luxembourg's position in the market, and a tourism draw.**

_If you want to market to the world, a good Architecture piece can help do that.

_The consumers, to a certain extent, relate to a brand, both in terms of design and lifestyle.

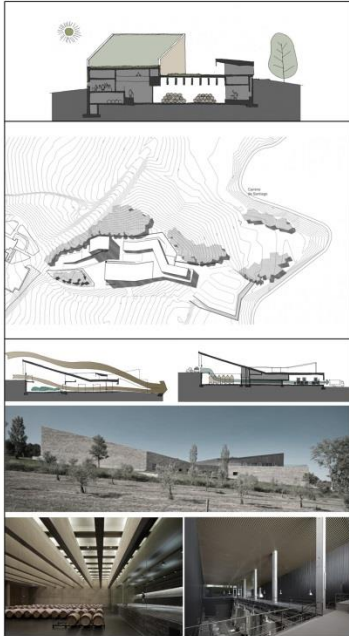
The idea with this project was to create architectural design that was very consistent with that.

For these reasons the proposal for the extension of the building includes some spaces considered essential for the reception of potential consumers and general public. This will be further developed on the next sections.

In order to understand better how to implement into good Architecture design all the initial research made about wine making and general wine facts, some architectural references had been analyzed, subsequently reaching the selection of 6 of them after having considered their relation to sustainability and light, wine production scheme, the adherence to modernization of the Architecture and the processes, and finally how the visitors play a role on these study cases.

² John Hill. Blogger to *A Daily dose of Architecture*. Post: *Half Dose #40: Novelty Hill-Januik Winery*, on December 08, 2007.

La Grajera Institutional Winery Virai Arquitectos. La Rioja, España. 6,900 m². 2009-2011



The slope of the terrain favors aspects of the production process such as the constant temperature of the ground, the use of gravity and natural ventilation.

La Ventolera Winery Francisco Inquiereño. Leyda, Chile. 1,360 m². 2008-2009

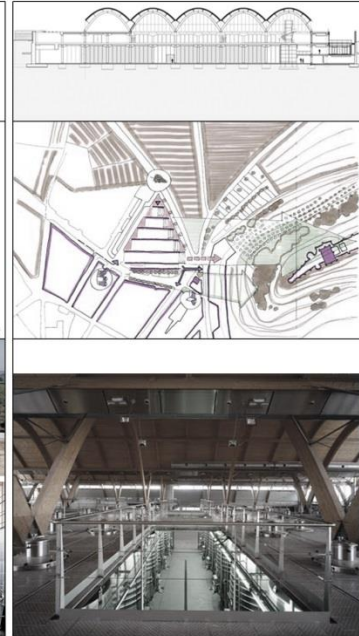


Making wines sustainably: special care in the effects of wind, slope and insulation.

Achieving high luminosity in the cellar and maximum transparency from the vintage patio over the vats.

The vintage patio is located over the fermentation room, allowing the tanks to be loaded gravitationally. Descending from the fermentation room, the barrel aging room is located underground.

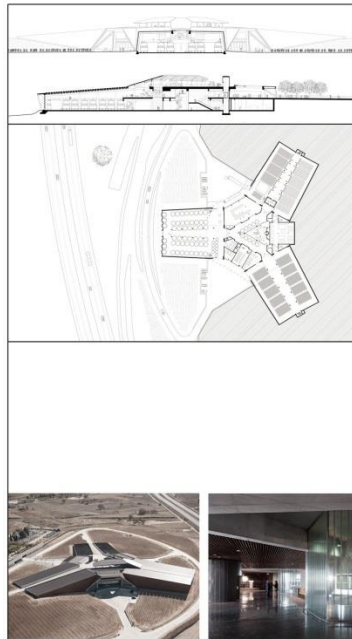
Protos Winery. Rogers Stirk Harbour + Partners.



Activating underground level, applying cross ventilation, recovering rainwater...

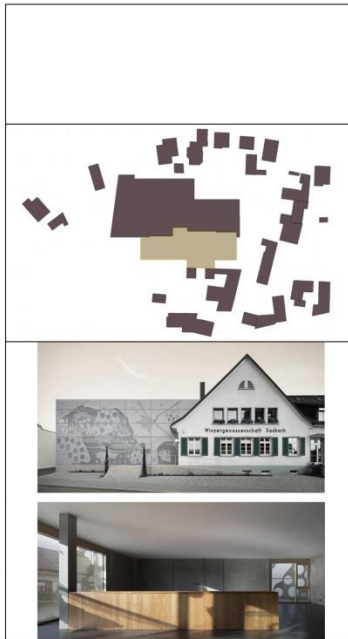
The main entrance level is for both staff and visitors. From here, visitors can view the production floor happening below.

Faustino Winery. Foster + Partners. Ribera del



A road rises to the roof of the building, where the harvested grapes are delivered. The winery is designed to take advantage of the sloping terrain, using gravity to aid movement of the grapes within the building, maximizing efficiency and minimizing damage to the grapes.

WG Extension. Amann | Bardenski | Munkol Architekten. Sasbach, Germany. 1,400 m². 2013



The extension is intended to recalibrate aesthetics aspect. The modern extension complements the facade of the existing building, which reflects the relationship of traditional methods with the latest in winemaking today.

Facade for a Wine Cellar. Gramazio & Kohler. Fläsch, Switzerland. 2006



The masonry acts as a temperature regulator, as well as filtered sunlight for fermentation.

An industrial robot places each brick after a precise definition of pre-programmed patterns

SUSTAINABILITY AND LIGHT CONTROL

_Making wines sustainably: special care in the effects of wind, slope and insolation (Ventolera Winery)

_Activating underground level, applying cross ventilation, recovering rainwater (Protos Winery)

_The masonry acts as a temperature regulator, as well as sunlight filter for fermentation area (Gantenbein Winery)

_Achieving high luminosity in the cellar and maximum transparency from the vintage patio over the vats. It was decided to repeat pillars of plywood placed every 1m, which protect the tanks from direct light. (Ventolera Winery)

GRAVITY FLOW

_The vintage patio is located over the fermentation room, allowing the tanks to be loaded gravitationally. Descending from the fermentation room, the barrel aging room is located underground (Ventolera Winery)

_A road rises to the roof of the building, where the harvested grapes are delivered. The winery is designed to take advantage of the sloping terrain, using gravity to aid movement of the grapes within the building, maximizing efficiency and minimizing damage to the grapes. (Faustino Winery)

_The slope of the terrain favors aspects of the production process such as the constant temperature of the ground, the use of gravity and natural ventilation. (La Granjera Institutional Winery)

MODERNIZING THE ARCHITECTURE AND THE PROCESSES

_The extension is intended to recalibrate aesthetics aspect. The modern extension complements the facade of the existing building, which reflects the relationship of traditional methods with the latest in winemaking today (WG Extension in Sasbach)

_An industrial robot places each brick after a precise definition of pre-programmed patterns (Gantenbein Winery)

VISITORS

_The main entrance level is for both staff and visitors. From here, visitors can view the production floor below (Protos Winery)

THE COMISSION

Monsieur Hubert Clasen and I first met at the main cellar of Bernard-Massard in the summer of 2013. The CEO of the Company and I discussed whether they would be interested in having a design proposal made by me that they would take into consideration for a potential renovation of the small wine cellar they own few blocks from the building where we met.



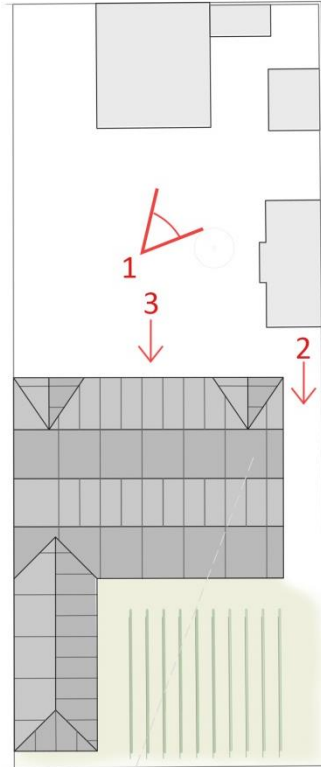
Bernard-Massard main cellar



Clos de Rochers

Mr. Clasen immediately made his priorities clear: the focus was to be on **reorganizing the process and possibly extending the building in order to have additional space** for a couple of more vats. He was not first interested in building a showplace, as for him true gravity-flow facilities come at a premium, respecting the relatively low budget they count with for this intervention. Based on what Mr. Clasen had said, he was not looking for something so conspicuous.

This site did have its disadvantages: It was not situated at the middle of a vineyard (so no striking views) and the slope was practically inexistent, so it was impossible to come up with a multi-level process development. This was a very tiny cellar in the middle of the town, without any initial intentions to be opened to the public but rather to produce a small amount of wines, while the heavy load would remain managed at the Company's main facility. However, due to its position close to the river, in front of a main road and having a Luxembourgish traditional construction presence in the courtyard at the opposite side, it gathered some special urban and architectural qualities that made worth taking advantage of. The building surely had for me some hidden potential.



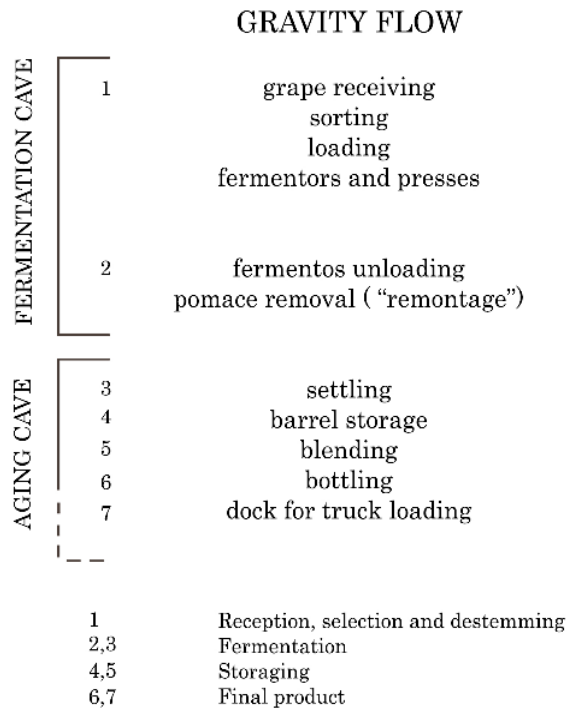
Therefore it was decided not only to solve his concerns but also to **propose some spaces to receive general public, promote the brand thanks to the new Architecture and boost the tourism draw in the area** by promoting an urban requalification and enhancement of the street that links the project site with the Company's main building. (read more at *The urban intervention* section)

WINE PRODUCTION CONSIDERATIONS FOR THE PROJECT

GRAVITY FLOW SCHEME

When making wine, first the grapes have to be moved and then, after pressing, the wine has to be moved through the steps of the winemaking process. But once the grapes are trucked from the vineyards to the winery it can get more complicated. Old wineries are built on a flat site, on just a single level. As a consequence, moving the grapes from a receiving area or hopper to a fermenting tank (for red wines) or to a press (for whites), requires that those wineries use some sort of conveyor³ to get tons and tons of grapes from one place to the next.

By contrast, in a gravity-flow winery, moving grapes and then the resultant wine by gravity means moving it simply and naturally by letting first the grapes, then the wine, drop, slide, or flow downward (by gravity) rather than having to be moved or pumped mechanically (by force). To be able to do that you need several different levels, with the grape receiving level being the highest up the hill and the bottling line at the bottom.⁴ The desire for the highest quality, through gentle, natural handling, is the main reason many of wine makers prefer simple gravity to move their grapes and wine.

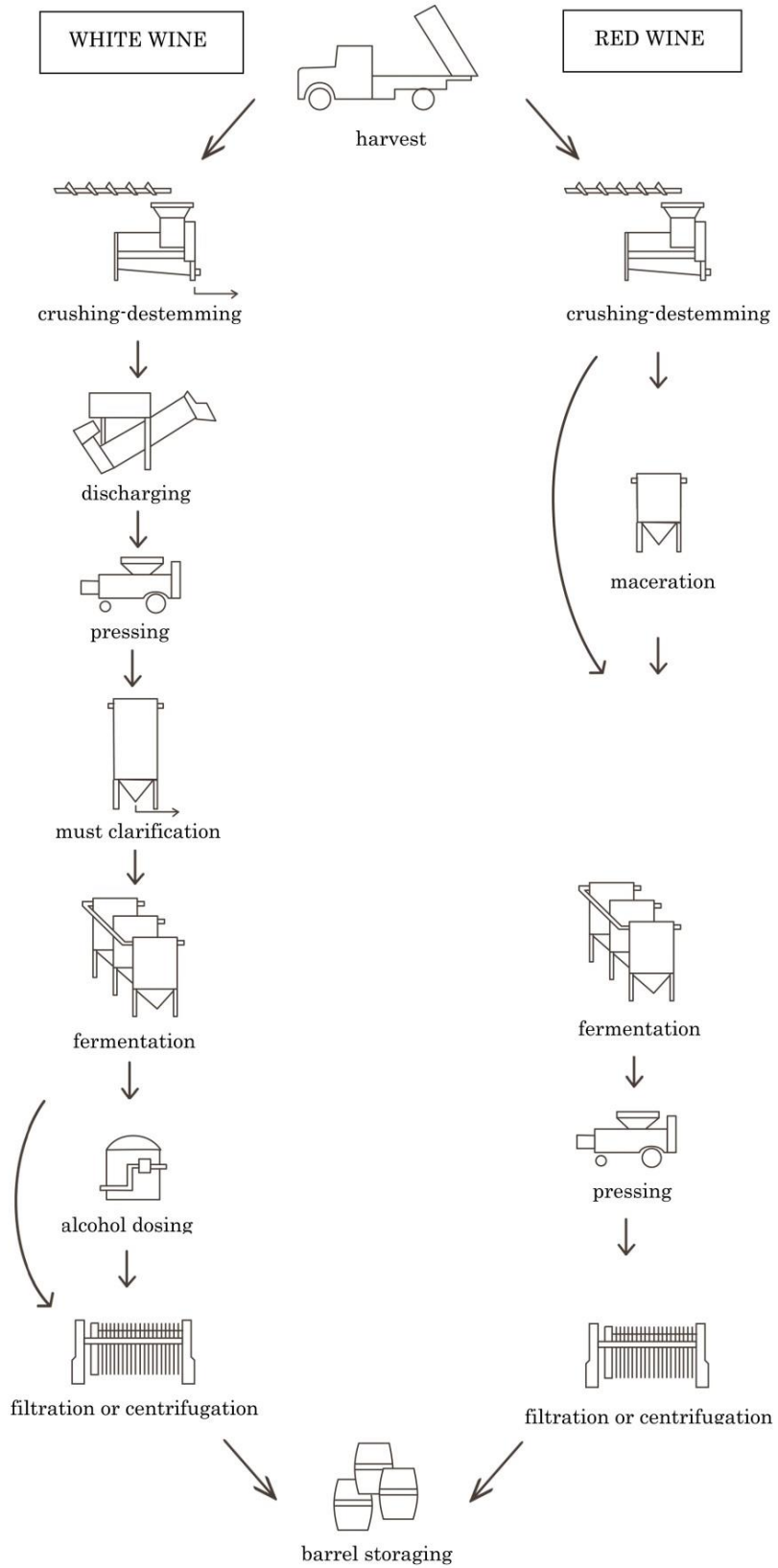


³ such as a screw conveyor, a cleat conveyer, a rubber conveyor belt, or large must pumps that whoosh the grape solids along with the grape juice.

⁴ Gravity flow winemaking is a practice that is becoming well recognized by wine makers and vino fanatics. The process in gravity flow winemaking, allows for the wine to stream from winery levels. Unlike traditional one-level cellars there is no use of pumps or mechanical force, enabling the wine to gently extract colour, flavour and tannin.

<http://blog.winecollective.ca/2013/07/12/gravity-flow-winemaking/>

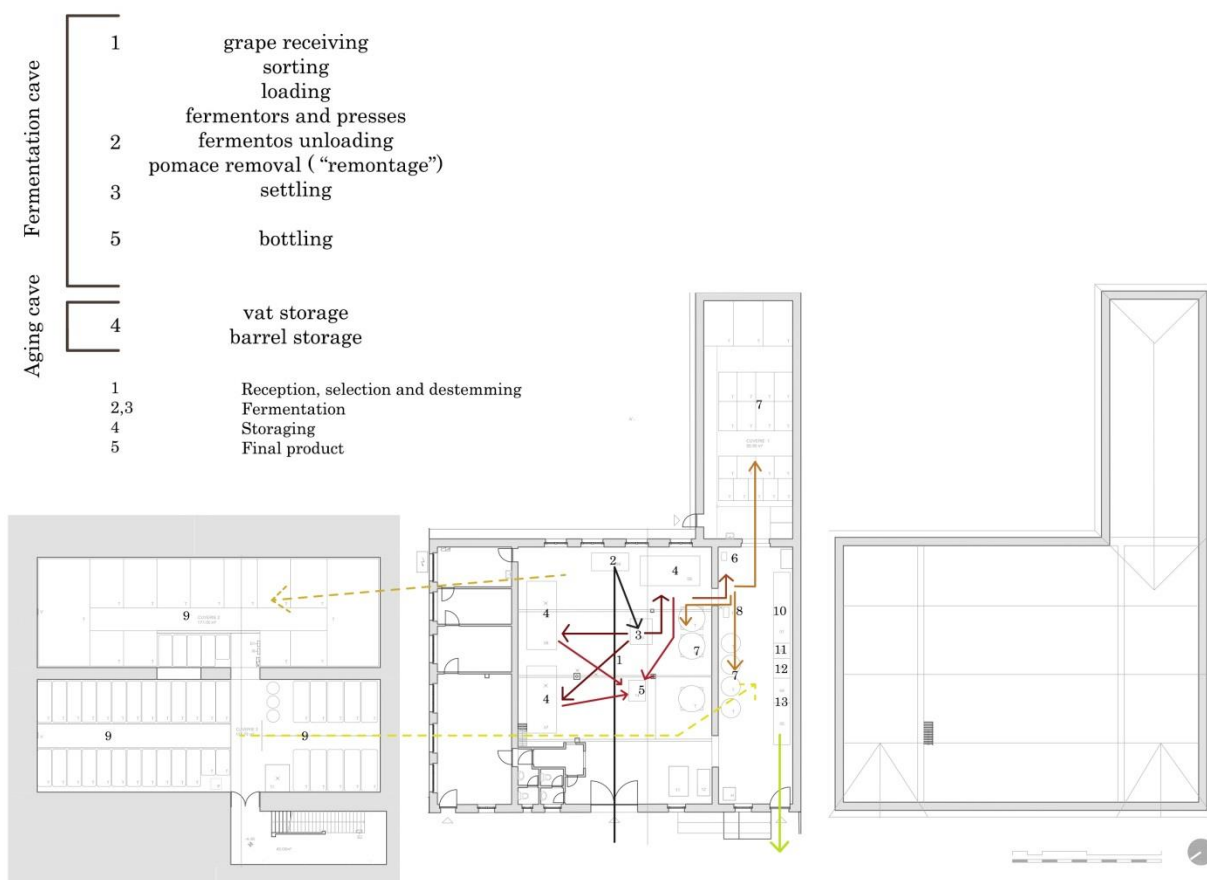
Main machinery for white wine and red wine productions










It was clear that the Gravity Flow scheme for winemaking would be impossible to follow in such a flat and small terrain. Also, the construction of “gravity flow” wineries typically starts with massive excavation followed by construction of a very tall retaining wall. Lateral (earthquake) loads increase dramatically with depth. As the retaining wall gets taller, the concrete required to hold back the lateral forces increases exponentially, especially if the slope rises on the back side. This is the primary reason that “gravity flow” winery facilities are more expensive.

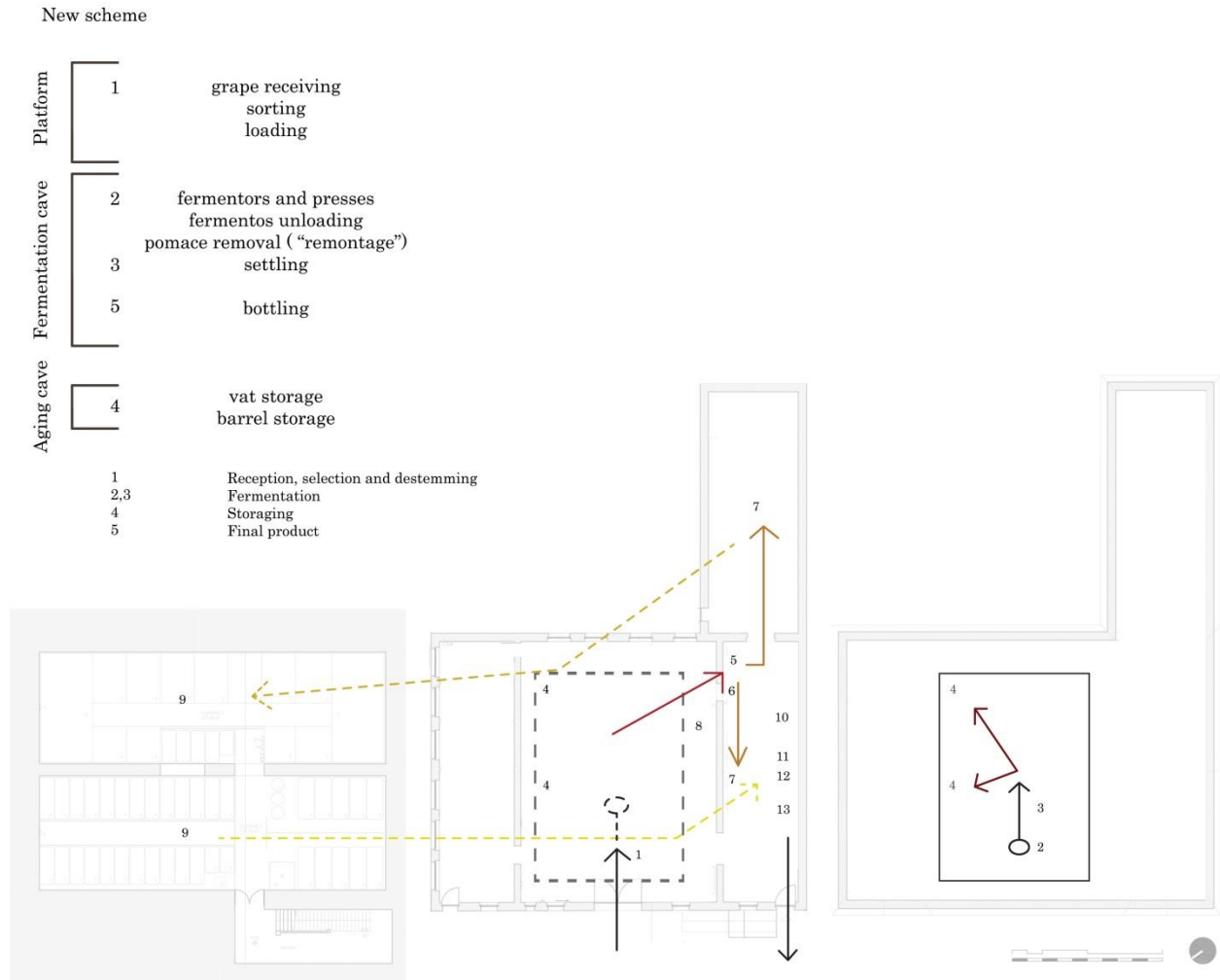
When analyzing the current process and organization inside the cellar, I realized some changes had to be made in terms of redistribution of the machinery and a further division of the steps which were too concentrated.

Current scheme



Flow	Machines placement	
	1 uploading area	8 yeast filter
	2 grape stripper - mill	9 aging tank
	3 bascule	10 filler
	4 wine press	11 corker
	5 Kieselgurfilter	12 labeler
	6 separator	13 capper
	7 fermentation tank	

By implementing a sorting platform over the center of the fermentation cave, the scheme would get every time closer to the Gravity Flow basic scheme, and would allow relieving the ground floor. A redistribution of the machines would also be facilitated because of this.



The idea was to work mainly with the roof, sublimating the term *Architecture* (arkhi-tekton⁵). This would consent two things principally: 1) giving more height to the first floor (which was unpremeditated, with a deprived structure and poor set up) hence allowing an actual profit of this level; and 2) modernizing the look of the building from all its fronts without compromising those traditional facades that were well maintained (not worth demolishing) and which kept a harmonious dialogue with the context.

⁵ The Ancient Greek noun *tektōn* (τέκτων) is a common term for an artisan/craftsman, in particular a carpenter or wood-worker or builder. <http://en.wikipedia.org/wiki/Tektōn>

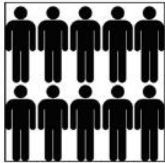





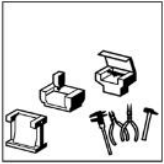





FABRICATION LABORATORIES

A FabLab (Fabrication laboratory) is a small-scale workshop offering **personal digital fabrication**. It is generally equipped with an array of flexible computer controlled tools that cover several different length scales and various materials, with the aim to make "almost anything". This includes technology-enabled products generally perceived as limited to mass production. They have already shown the potential to empower individuals to create smart devices for themselves. These devices can be tailored to local or personal needs in ways that are not practical or economical using mass production.

INTERNATIONAL FABLAB CONFORMITY RATING

The FabLab conformity rating is a code that describes how closely a lab meets the conditions for use of the FabLab label. It should be taken as a quick summary of the lab "now" and understood to be able to change over time. The conformity rating is self-assessed or community-assessed (ie, perceived rating by others)⁶

- _Access to the FabLab
- _Adherence to the FabLab charter
- _Common set of tools and processes
- _Participate in the larger, global FabLab network

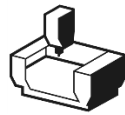
				<ul style="list-style-type: none"> -at least some free/open public access (but may assess real material costs) -charter explicitly on site and website -has all core tools and processes and possibly more -members actively contribute or collaborate with members from many other labs lab takes part in or leads network initiatives
				<ul style="list-style-type: none"> -paid public access only, but anyone can join -"in the spirit" of the charter -very close to but missing at least one core machine or process -members actively contribute or collaborate with a few other labs lab keeps up with network initiatives and discussions
				<ul style="list-style-type: none"> -closed or restricted user group -no mention of charter -difficult to do most fab projects or follow fab tutorials -very little, only passive, or no participation outside of local lab

⁶ http://wiki.fablab.is/wiki/Fab_Lab_conformity_rating

FABLABS WORK WITH:



3D modeling software



Computer numerical control machines



Machine tools (wood, metal, plastics...)



Small tools

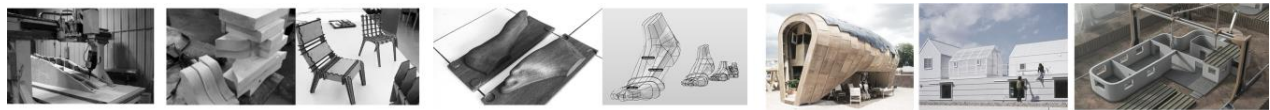


Electronic equipment



Sharing, open reflection

There are many types of products one can get working in a FabLab. Some examples are: models, inverse modeling, small definitive products, electrical components, prosthesis, rapid prototyping, functional prototyping for proof of concept testing... But those key to this project are the possibility to **produce small structural and ornamental elements, furniture, and even buildings.**



Machines in FabLabs work in 3 main different ways. These processes enclose several techniques, shown as follows:

Production processes

Products. Some examples

Subtractive processes

ADDITIVE

- 3D printer
- layer-by-layer deposition
- stereolithography
- selective laser sintering
- deposition modelling
- polymer jetting
- selective laser melting
- direct metal deposition
- engineered net shaping

SUBTRACTIVE

- CNC mill
- CNC router
- CNC lathe
- laser cutter
- waterjet cutter
- drilling
- grinding
- boring
- cutting
- rounding
- engraving
- marking

TRANSFORMATIVE

- CNC punch
- CNC press
- CNC roller
- CNC bender
- vacuum former
- bending
- straightening
- fretting
- corrugating
- pressing
- punching

robotic arm

- addition
- subtraction
- transformation
- assembly



- LASER CUTTER MACHINES
- VINYL CUTTERS
- WATERJET CUTTERS
- DESKTOP CNC MILLING MACHINES
- CNC MILLING MACHINES

Overlapping of the machines' occupying volumes and their work areas

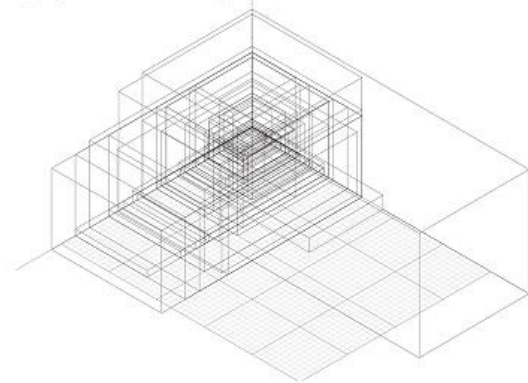


Table of materials subtractive machines can work with

Material	Laser Cutter	Vinyl Cutter	Waterjet	Desktop CNC	CNC Milling
Aluminum					
Steel					
Brass					
Copper					
Carbon Fiber					
FR4					
PCB					
FR1					
FR2					
FR3					
FR4					
FR5					
FR6					
FR7					
FR8					
FR9					
FR10					
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CASE STUDIES: CONSTRUCTIONS MADE BY SUBTRACTIVE TECHNIQUES

In 2008, the Museum of Modern Art (MoMA) in NYC featured five digitally fabricated houses that were installed on site at the Museum. To one degree or another, these houses all relied on CNC for precise cutting of components, **cost reduction** and **simplification of assembly**.

BURST*008 is cut out of plywood with a CNC machine, but there the similarity ends. They describe it as a tension-based structure. The ribs provide the sub-structure but are not complete without the skin to lock them down. The skin—the floors, the walls, and the roof—is made of insulated panels which are pre-cut to accommodate the ribs very accurately.



Images sources: www.momahomedelivery.org/

SYSTEM3, by Austrian architects Oscar Leo Kaufmann and Albert Rűf [olkruf.com], boasts the elongated shape of a shipping container. Inside, its austere bearing gives way to a more luxurious simplicity, thanks to amenities like an elegant dining set, luxe appliances, and circular windows that create intriguing light effects. The design takes advantage of existing prefab technologies like CNC milling, which allows an incredible level of accuracy and customization too; clients can choose the position, shape, and size of every window.

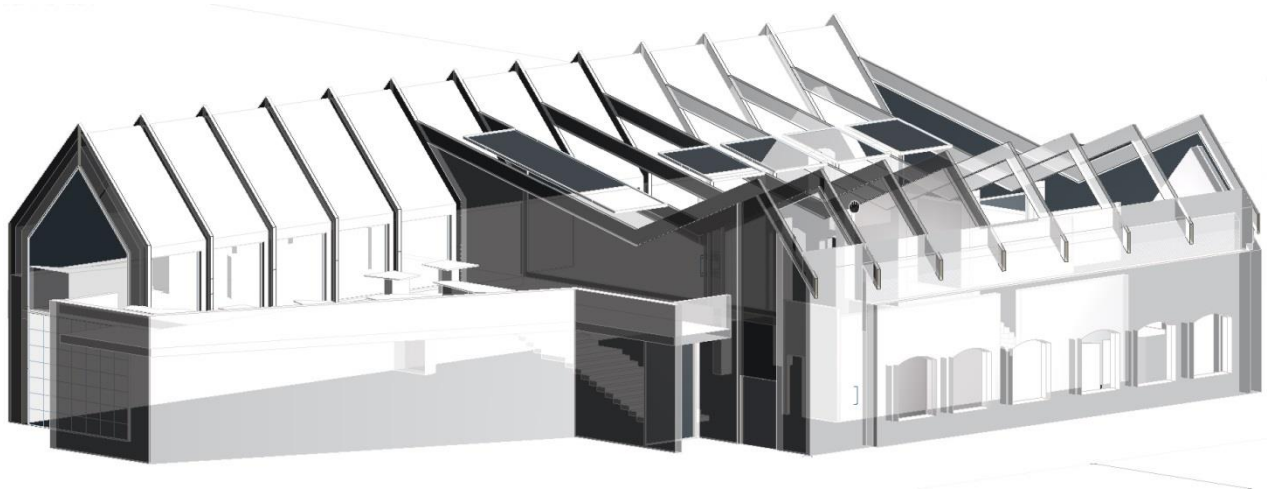


Images sources: www.momahomedelivery.org/

After the study and the understanding of the different machines usually found in any FabLab, and mainly those present at the FabLab of Luxembourg (*Technoport/FabLabLux*), their respective processing techniques and the range of different materials they operate with, it has been chosen, for the Architectural composition, to set a special regard on the development of design and manufacturing criteria through the action of **subtraction, motivating that way the different aesthetics, constructive choices and structural features that identify the proposal.**

In terms of the constructive composition starting from a simple volume, by performing the action of the subtraction, the starting form has been sectioned in a systematic way constituting a series of portals that succeed one another regularly.

The role of these portals for the composition of the open space has been already mentioned, but it is stressed here as the extension of the design language into the building identifying the route of arrival.



CASE STUDIES: MATERIALS AND NEW TECHNIQUES TO WORK WITH THEM

PRINTED GLASS

New technologies allow **showcasing creativity through digital glass printing**. Advanced Screening Technology (AST) is a unique production process that ensures dynamic, quality graphic and photographic reproduction on glass. They are fully incorporated into the surface of the glass and provide the products with exceptional durability and stability over time. They can either be an opaque coloured glass obtained by the uniform deposit of a layer of enamel on one face, or a glass that has been screen printed with coloured mineral enamel, which can be opaque or translucent.⁷



Image source: <http://img.archiexpo.com/>

CARVED CONCRETE

The Laposa Winery, designed by Atelier Peter Kis in Hungary, is composed of connected panel elements which were cast as monolithic visible concrete. **Its homogeneous covering is made of fabricated fine concrete facing panels, with slightly transformed patterns of grapevines climbing them.**



Images source: Laposa Winery, Atelier Peter Kis. <http://www.archdaily.com/>

⁷ The aesthetic and technical characteristics of EMALIT EVOLUTION and SERALIT EVOLUTION mean the products are suitable for a wide range of applications. Their aesthetic appeal, range of colours, durability and safety features mean that they are the obvious materials of choice for facades, street furniture and the interior décor buildings. Source: www.archiproducts.com

CORK FAÇADE

Logowines Winery, in Evora, Portugal and designed by PMC Arquitectos, assumes itself as an element *that establishes a **formal link between the traditions of the place and the dynamics of our days**. The rhythm given to the facades, with a strong definition of horizontal lines, using various thicknesses of cladding panels of cork, where they fuse the openings for natural lighting inside is reinforced by the natural behavior of the chosen material.*⁸



Images source: www.architizer.com

CORTEN STEEL

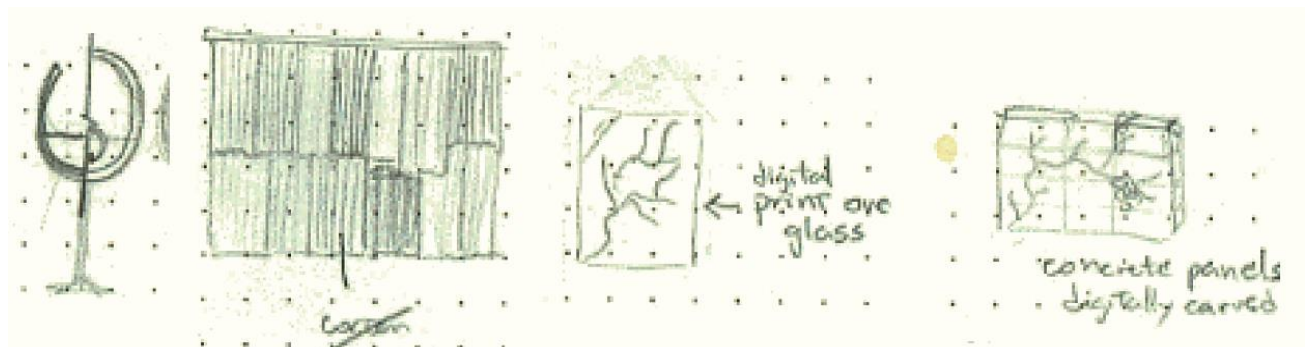
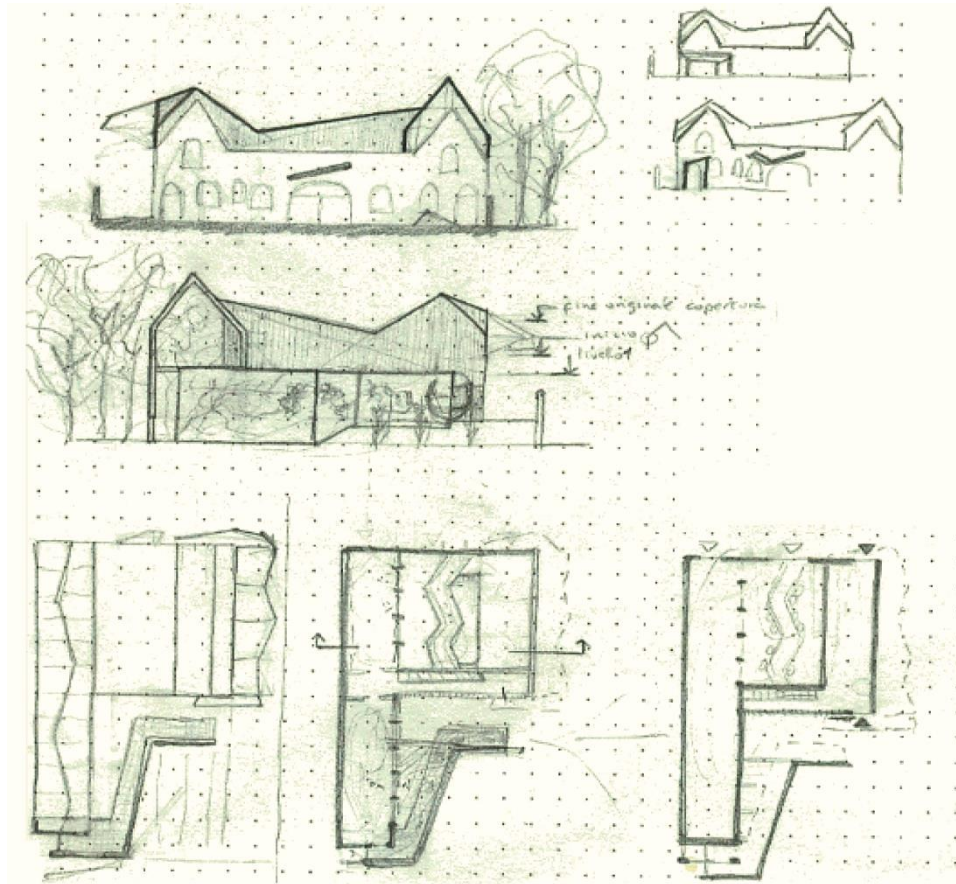
The Chateau Barde-Haut, in Gironde, France by Nadau Lavergne Architects, is the representation of a Contemporary Architecture that **reflects the contradiction between the tradition of the place and technical advances**. Two volumes emerge in the existing site, covered in **Corten steel**, which gives them a **metamorphic aspect according to the climates**.



Images source: www.nadaulavergne.com

⁸ source: Logowines Winery by PMC Arquitectos. <http://www.archdaily.com>

These 4 materials were studied in order to apply them to the project, as they perfectly fit the aesthetical needs desired. The idea for the facades was to make them recall the wine making, the natural evolution of wine (from the grapes and vines until they become wine to be poured into a glass) and the mutation of natural materials throughout the time. In other words, **details that would contribute to the idea of evolutionary building, that mutates over time, in a clear allusion to the maturation of the wine during the period of production.**



Formal efforts have been focused to the most exposed fronts, generating activated perimeter from the program and leaving the production and storage activities protected in the interior.

PROJECT CONCEPT

ARCHITECTURAL AND FUNCTIONAL COMPOSITION

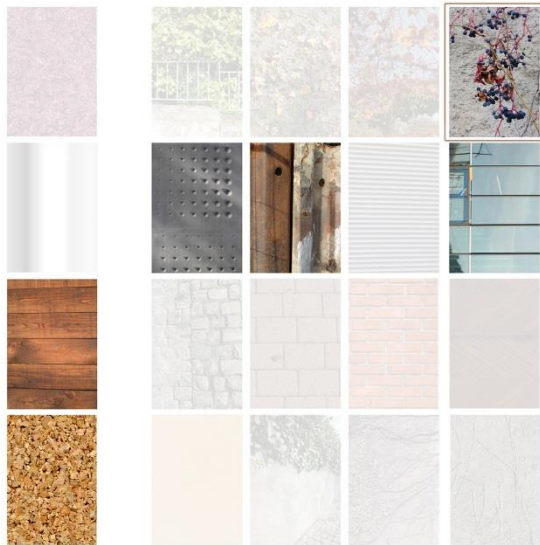
REFERENCES

For the project concept different design references were taken into account.

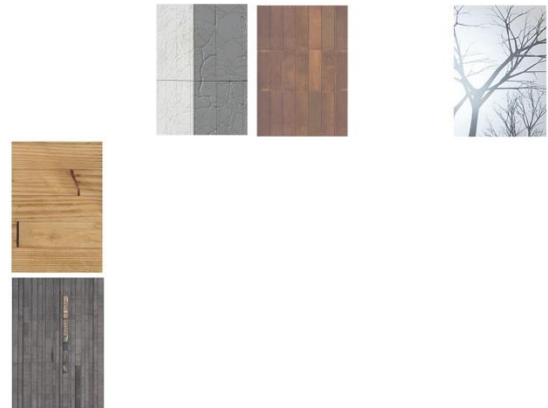
Wineries references allowed comprehending how to include technical requirements into a good Architecture and gave the main facts to consider for the distribution scheme of the wine making process, which would inevitably govern most of the programmatic distribution within the building.

The FabLab cases studied gave the references to develop a structure made of repeated elements in section and make it become a symbol of the building itself.

The observation and registration of the colors, materials and textures present in the building as well as in the surroundings provided a list that was necessary to keep a logic in the decision making when it came to the new materials and aesthetics to add to the existing. For this part, some materials used in the FabLabs were also included.



Materials found in the area (in bold, those of interest)



Specific materials/technologies introduced

The introduction of new spaces for general public entails some changes on the current distribution of the existing functions: the office gets bigger and is placed up on the first level together with the deposit; the staff facilities also take a wider space and move to the northern side of the building to let its original area (right where the new entrance has been planned) to be adjudged to the reception in order to allow a continuous flow of the visitors from this side of the building up the stairs to get to the showroom, the wine bar and the terrace.

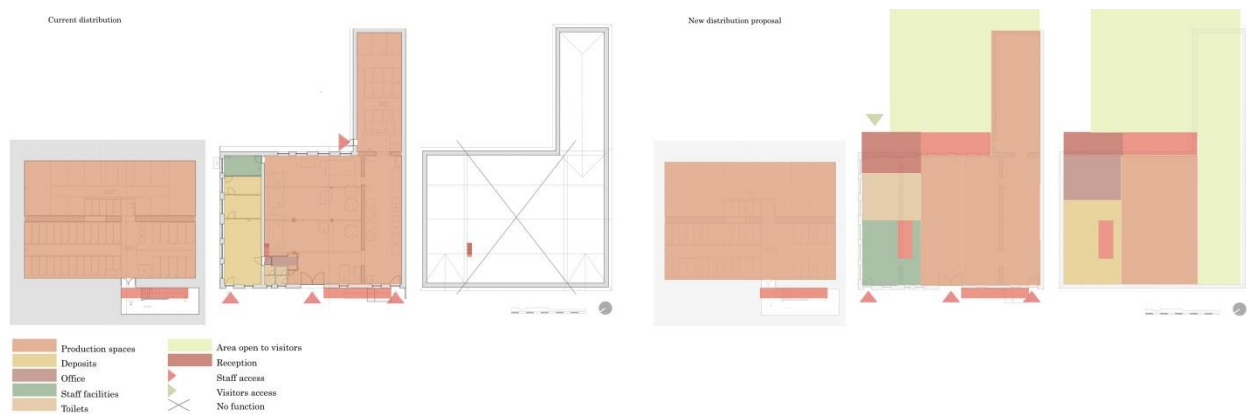
NEW SPACES TO INTRODUCE:

Wine bar

Conference and conventions room

Showroom/ center for wine documentation

Terrace



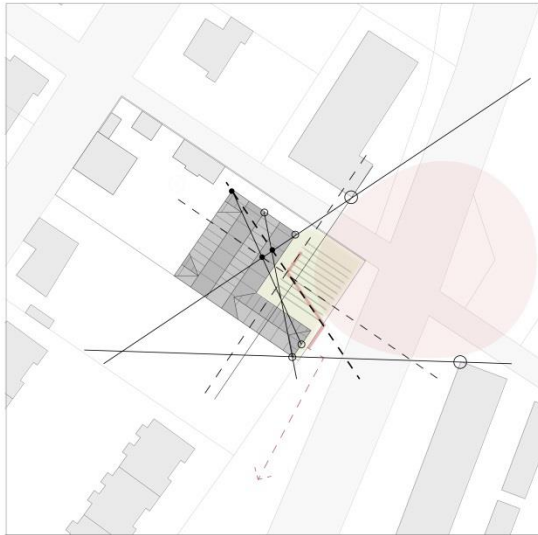
Current and new programmatic distribution

ONE BUILDING, TWO VOLUMES

The main entrance serves as a gathering of the general public who come to the site through various means of transport and from different traffic directions. The back door (currently the only entrance) leads to the production areas, so it remains exclusive to the staff. From the functional point of view, the building, albeit unitary, can be read as a building consisting of two bodies that intersect each other and produce on the corner a plan open to the context: the terrace.

To compose the final shape of the building, some **guidelines** were put into action: orientation towards the open area, avoidance of main views towards the residential buildings at the front and geometrical relationships within the building's current plan.

CURRENT SITUATION: GUIDELINES: ORIENTATION, VIEWS, STRAIGHT LINKS



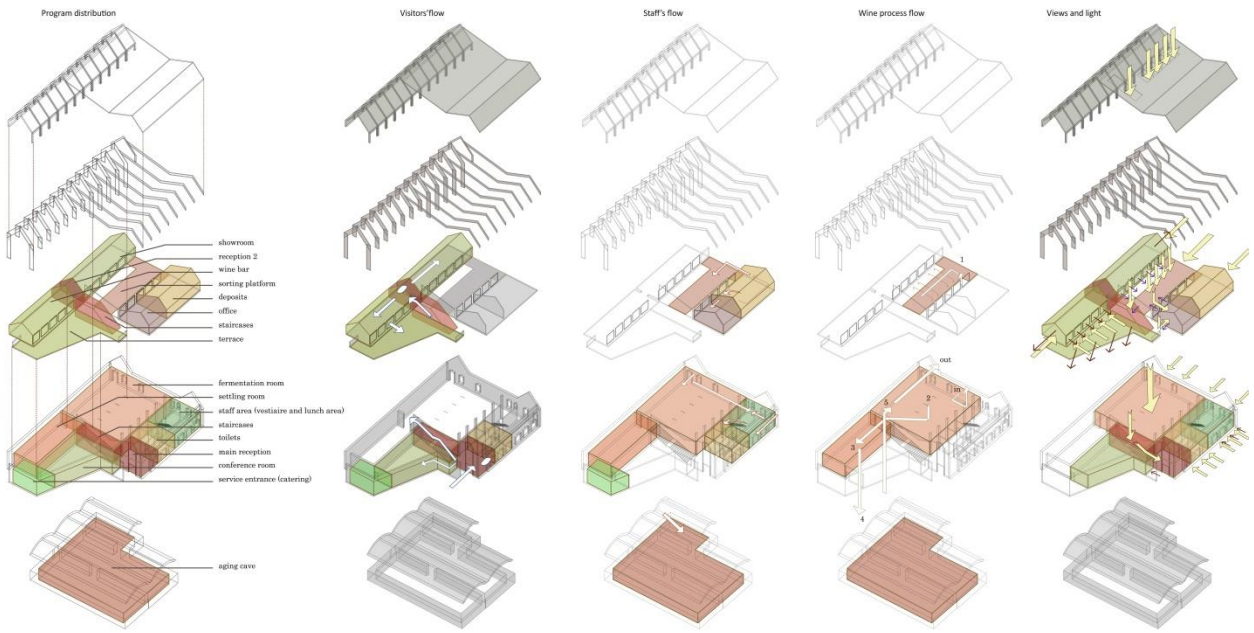
Current site plan

NEW SITUATION: INSERTION TO THE URBAN PROPOSAL



New site plan

The new distribution responds to a system of **flows**. It has been tried to respect the best possible a continuous and logical fluidity in the way the visitors and staff perform they way through the spaces conceived and intended for each of them. Also the very *Gravity Flow* scheme for wine production played a big part for the distribution final result.



Program distribution

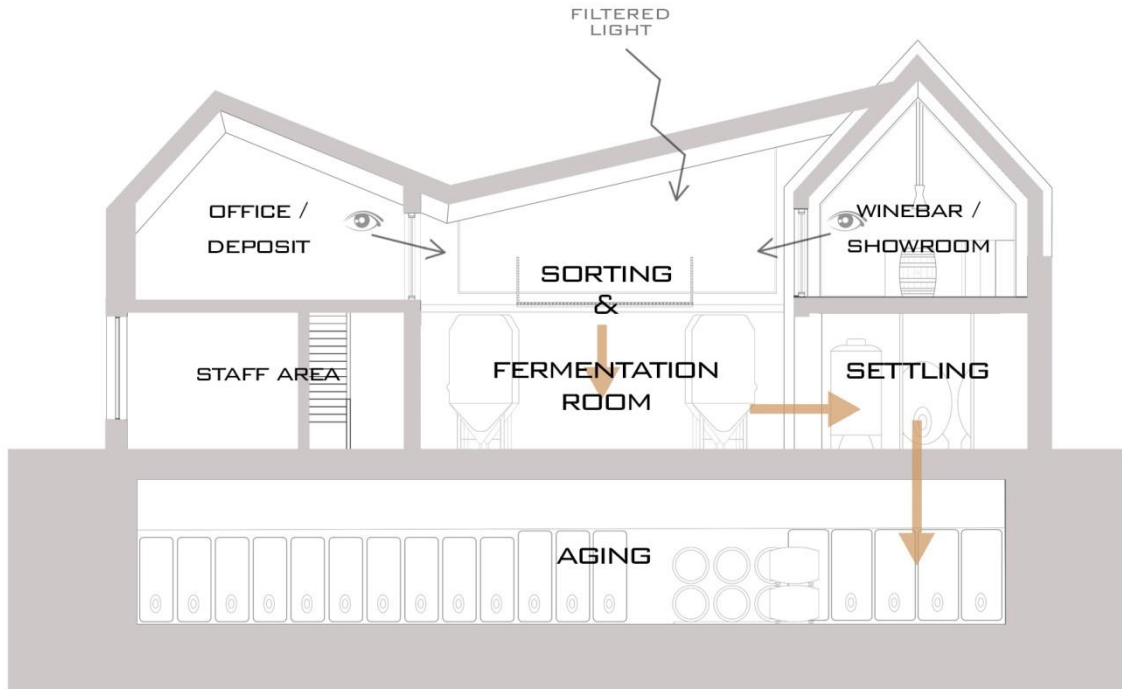
visitors' flow

staff's flow

winemaking flow

views and light

BUILDING LAYOUT



_Sorting and Loading:

Under these circumstances, it was obviously impossible to develop a scheme that accommodated all the desired levels. It was necessary to determine where the use of gravity would be most cost-effective and also to translate anticipated production into the number of presses and fermenters that they use in this cellar, plus the couple more to be introduced.

Some research about the key question of how grapes are best sorted, destemmed, and loaded into the fermenters. Two basic methods were found⁹: an array of movable equipment servicing rows of fixed fermenters, and movable fermenters filled on a fixed crush pad. The first method involves lots of equipment to be moved each time a fermenter is filled, and often need to employ an inclined conveyor in addition to a sorting table, which adds to the challenge of creating an efficient set-up. The second option, the fixed crush pad, has the problem of having to move large fermenters, and space being reduced, would bring chaos at the ground floor circuit.

⁹ Lemelson Winery, Oregon. Their "Lunar Landing Module" combines a sorting platform with a crane-rail-mounted device, putting a sorting/destemming equipment array on a gantry-type crane. Source: www.oregonmag.net



Image source: www.oregonmag.net

For the grape-delivery system, it seemed to make the most sense to install an equipment mounted on a track that would keep everything aligned at the top of the fermenters. There had to be a way to accomplish fermenter loading by gravity (using a forklift) without building a mezzanine. A platform that would allow direct loading was the best idea.

_The fermentation room:

In the fermentation room, fermenters and presses would line both sides of a center aisle. There is a range of fermenter sizes from three to eight tons to accommodate various vineyard lots. Fermenters are equipped with jackets for cooling or heating.

A large door, which accommodates delivery to the sorting platform and tanks, services the press end of the room for efficient processing of white grapes. The sorting platform can also be used to load white grapes as whole clusters into the press.

Making the most careful selection by hand of the grapes when picking, the grapes are brought to the cave in small baskets in refrigerated trucks. Grapes arrive from the vineyard on pallets of 40-lb lug boxes. These can be stockpiled, out of the rain, under the large canopy designed right on top of the entrance. Then the pallets would be forklifted to the sorting platform.

Two people at the loading phase would alternate: one dumps lugs until the pallet is empty, while the other carefully sorts (no necessity of moving conveyor belts). Additional people can sort the fruit before clusters spill into the destemmer and finally into fermenters. The tops of the fermenters and presses would be level (or almost level), so the destemmer just clears the rims, minimizing fruit maceration.

_Tank level (settling room):

Settling and blending occur on the ground floor. After pressing the grapes, the wines go to the fermentation tanks. Here they stay until the end of their malo-lactic fermentation. After fermentation, wine is drained into settling tanks on this level through fixed stainless steel wine lines. After pouring the

juice off of the lees, the wines then go down to the aging cave at the underground level, the deeper and colder cellar. This is where they stay until they are bottled.

_The aging cave:

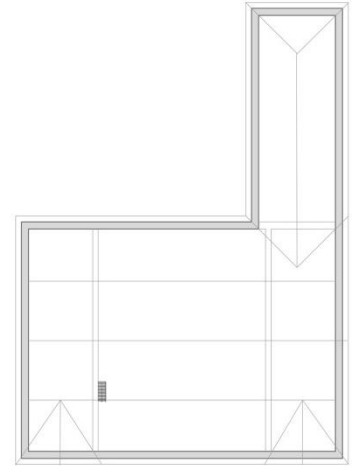
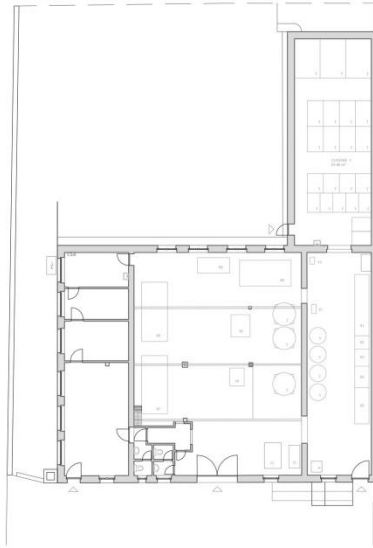
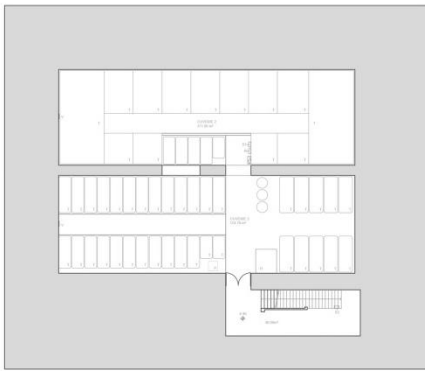
Stainless steel wine lines connect the barrel rooms, on the ground floor, to the settling/blending area. Additionally, capped six-inch PVC sleeves are provided for hose drops directly from the fermentation area above. This level has not been modified in the project.

STRUCTURAL COMPOSITION

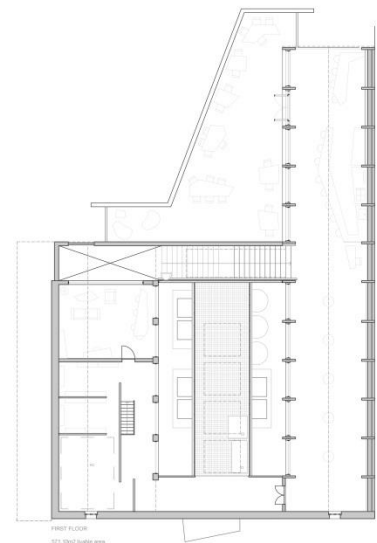
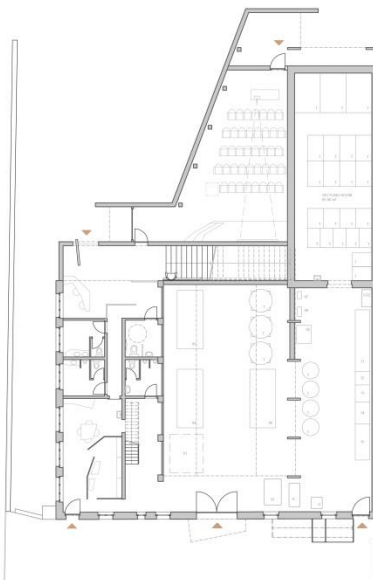
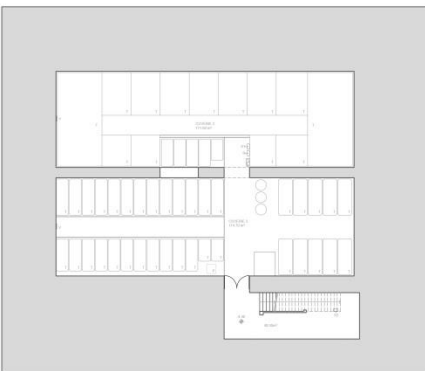
The main structural elements, the portals with three hinges, are made of laminated wood with a constant section of 100cmx20cm, with a distance from each other equal to 3m. This choice results consistent both at the conceptual level and at the functional level as the wood is a primary material used in the FabLab and extensively implemented in Luxembourg's Architecture. These structural elements, perimeter columns and roof beams, jut out both externally and internally, allowing the vertical perimeter wall to be built within that thick and thus "animating" the building with the daylight changes throughout the hours and the shadow projections that filter the amount of natural light that gets into the fermentation room. If the protrude outwards can be exploited as continuity of the components that structure the composition of the open space along the street, the protrude inwards allows the integration of the interior with the furniture, assumed to be built also by the FabLab present in the country.

THE ARCHITECTURAL PROJECT

PLANS

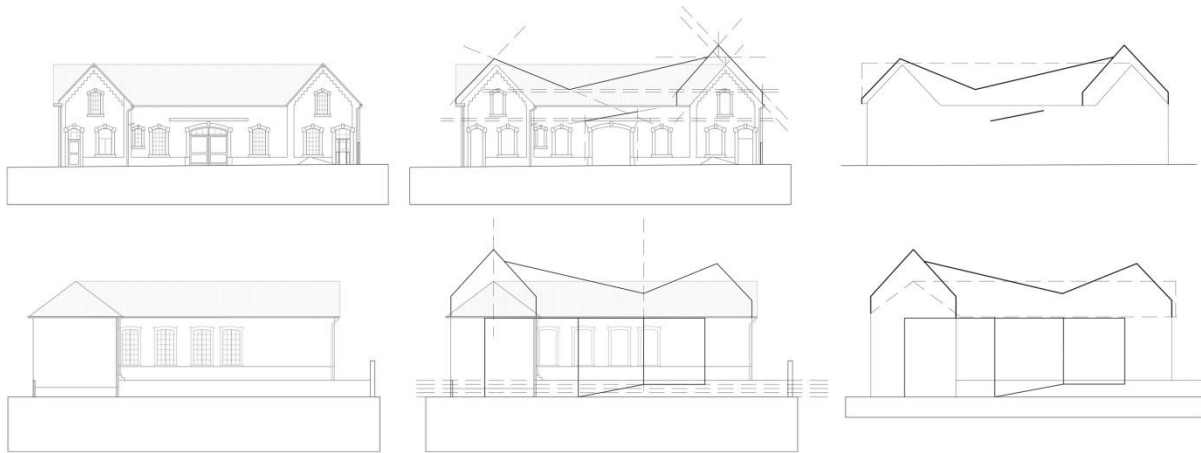


Current plans

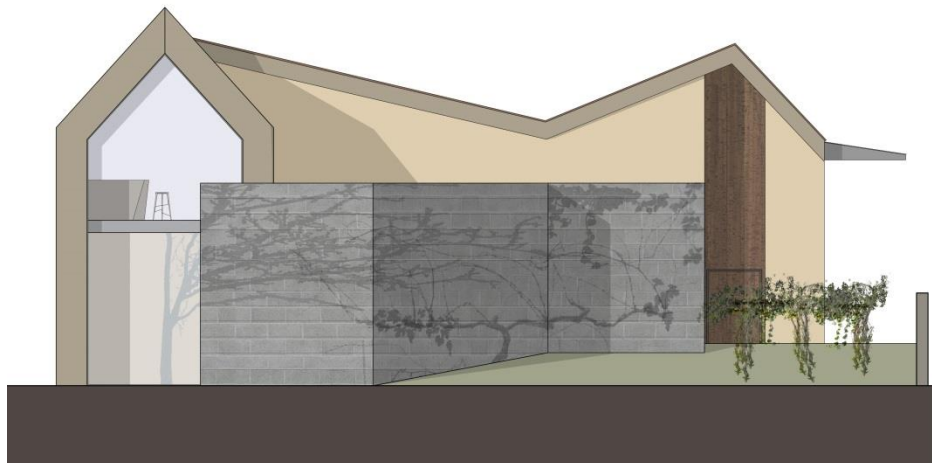


New plans

FACADES: COMPOSITION FROM OLD TO NEW

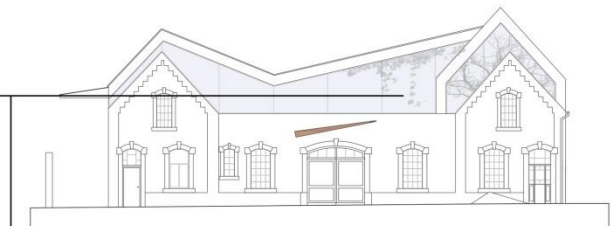


FRONT VIEWS

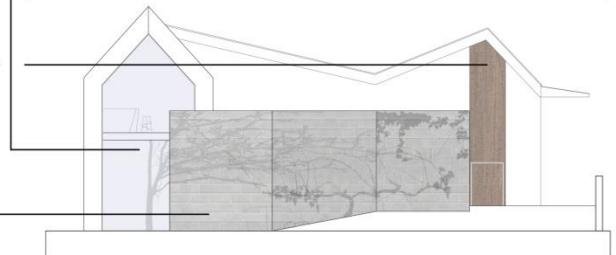




Printed glass at both extremes of the long volume



Cork stripe for the new main entrance

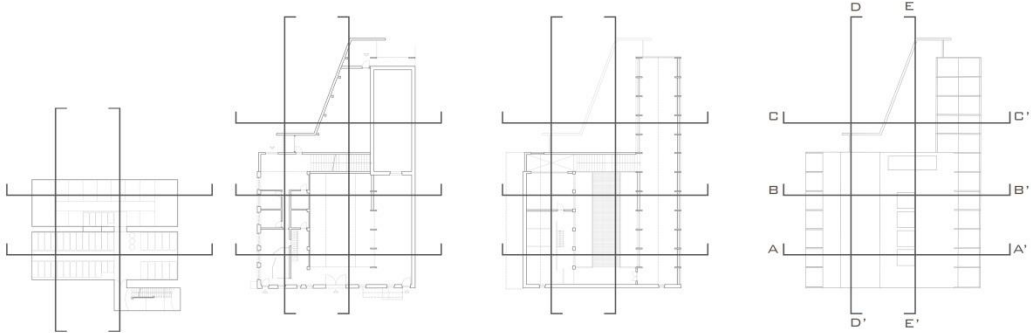


Carved concrete for the wall

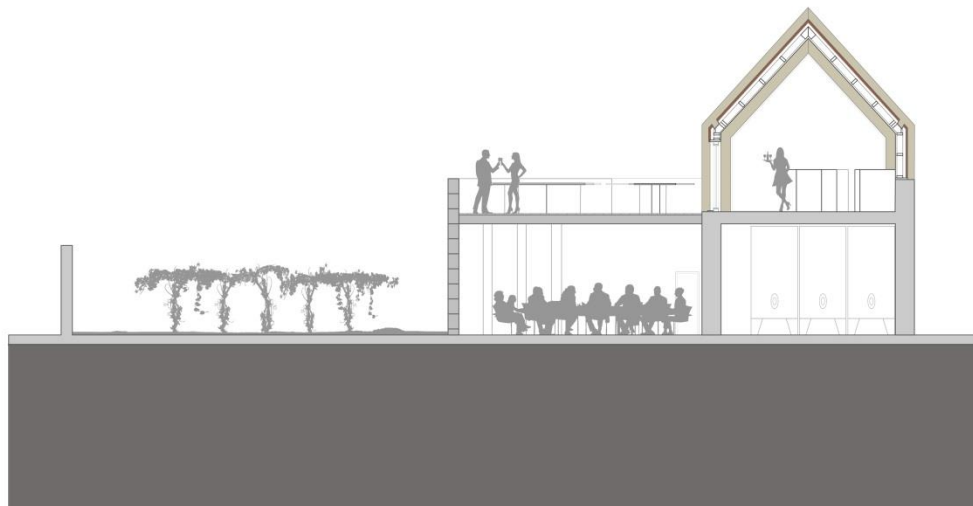
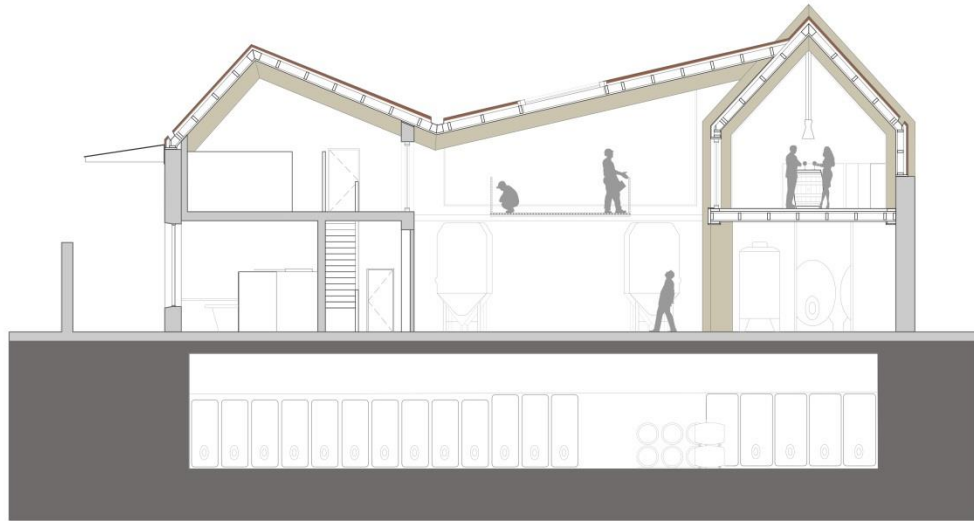
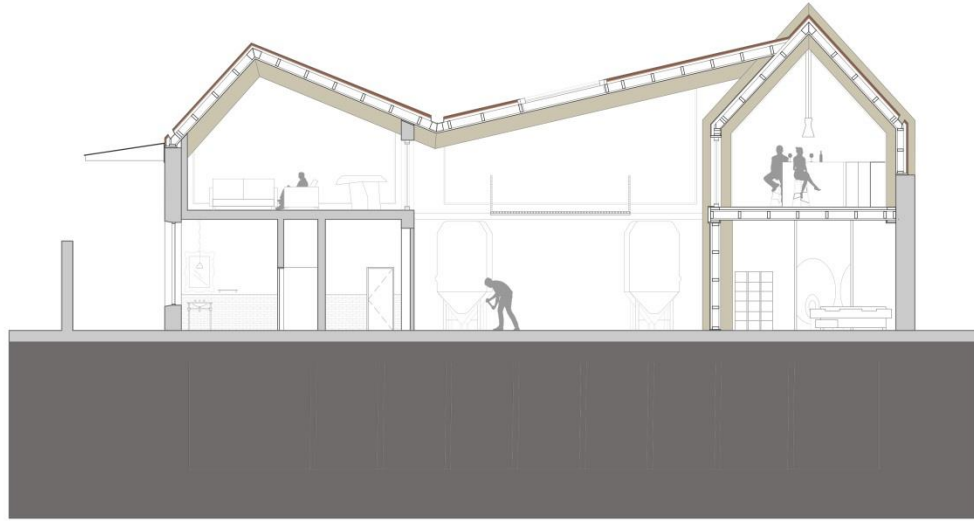


Corten steel for the new roof

SECTIONS



Sections D-D' and E-E'



Sections A-A' B-B' and C-C'

RENDERS

THE WINEBAR



THE SORTING PLATFORM AND FERMENTATION ROOM



VIEW FROM THE STREET



THE TERRACE



FINAL REMARKS

The project meets the objectives and the initial concept, that of being linked to the Company main office through the requalification of the road to enable a more adequate pedestrian use, to enhance the tourism in the town and to bring attraction towards the building as people wander along the area. The new centrality created by the project is well emphasized in the architectural and material composition of the building, as well as the aesthetics considerations that make direct reference to the process of wine production that is held in the inside.

The dynamics produced by the structural rhythm, evident from the outside, as well as by the different directions in facade (both on the roof and with the concrete wall that directs people to the entrance) stands as a metaphor for the continuing fluidity in winemaking.

This unexpected closeness between a contemporary building and a traditional construction creates an interesting dynamic, an interaction that authorizes a new history. The identity of each sequence is created by the unusual presence of the architectural temporality of the other. It is a special focus on temporality inspired in alchemy, in what shapes the character of wine: the structural lines of the project are inspired on the simplicity and dynamics of the vines, and the rusted Corten steel creates a visual consistency with mutation.

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