agence Engasser + associés

Louis de Cormontaigne high school gymnasium in Metz

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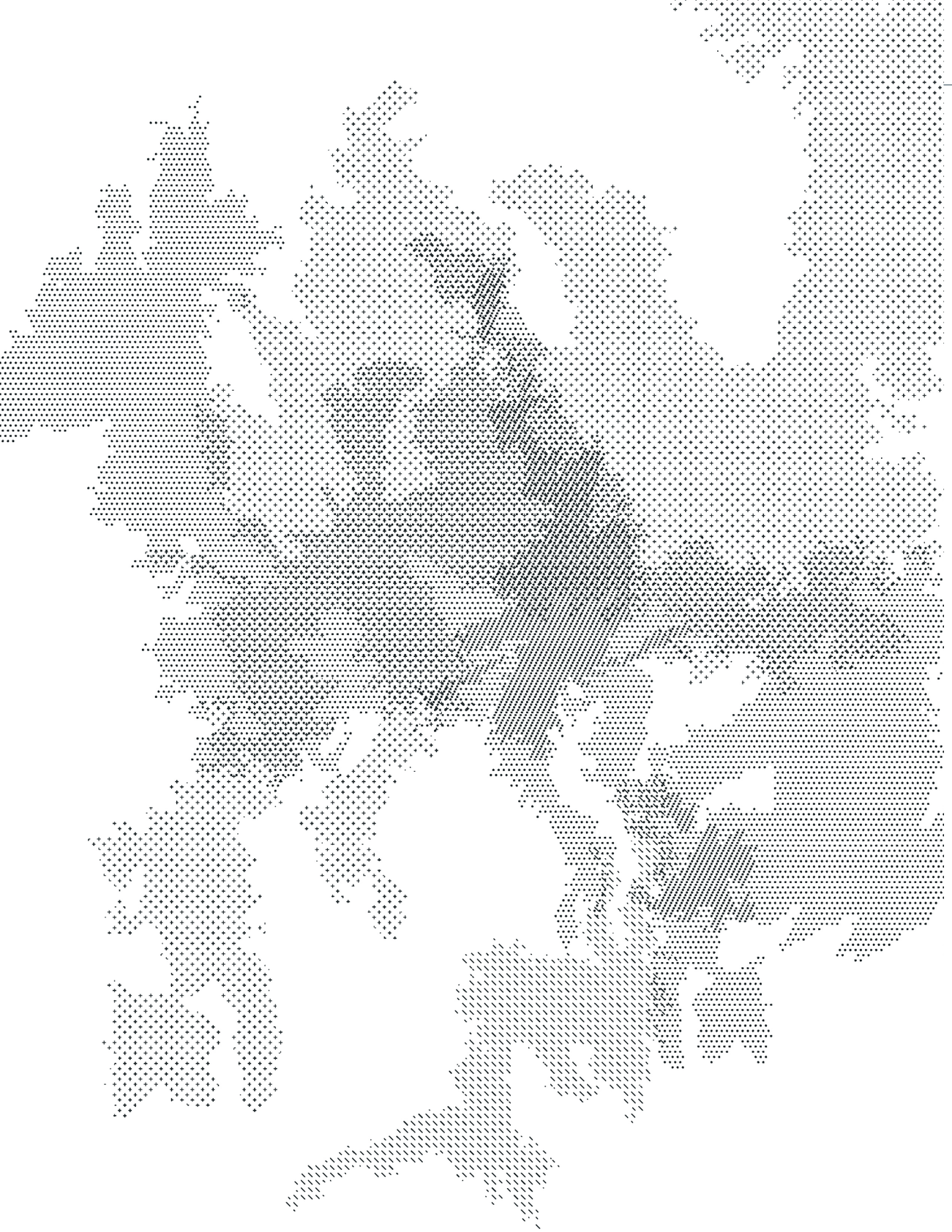

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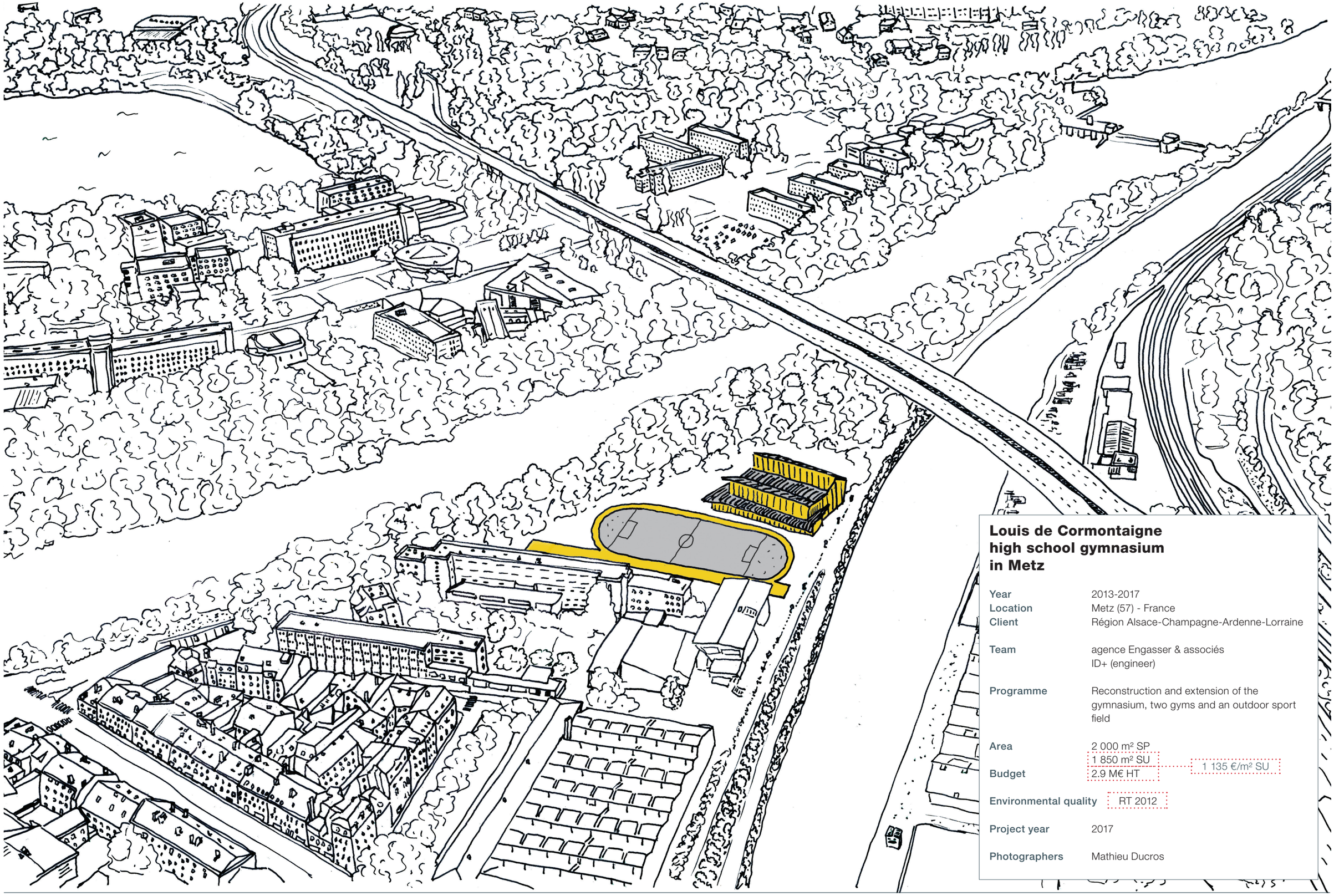


Louis de Cormontaigne high school gymnasium in Metz

Year	2013-2017
Location	Metz (57) - France
Client	Région Alsace-Champagne-Ardenne-Lorraine
Team	agence Engasser & associés ID+ (engineer)
Programme	Reconstruction and extension of the gymnasium, two gyms and an outdoor sport field
Area	2 000 m² SP 1 850 m² SU
Budget	2.9 M€ HT 1 135 €/m² SU
Environmental quality	RT 2012
Project year	2017
Photographers	Mathieu Ducros

Located along the Moselle river and the canal

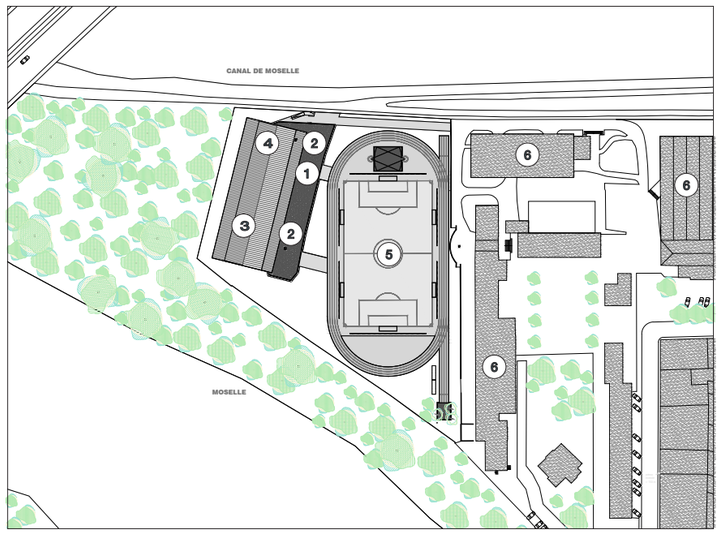
The gymnasium fits into a verdant environment between the Louis de Cormontaigne High School, the Moselle River on one side, the canal on the other and the motorway.

A challenging context

The new gymnasium is located on the site like a ship's bow, facing the Louis de Cormontaigne High School building, a three-story structure housing the classrooms between the Moselle River and the canal and facing the motorway, which is the site's main acoustic challenge. The decision to place the playing field between the two buildings creates a welcome distance between them. It makes it possible to suitably meet the need for working continuity with the present gymnasium and the entire high school having to continue to operate until the new complex is delivered.

The geometric composition reproduces the high school's orientation, perpendicular to the canal, with a slight concentric zone rotation up to the bridge, which itself is a part of the design. It incorporates the outdoor areas like full-fledged elements of the entire layout.

To limit the motorway noise, the southwest facade has been designed very opaque like a shield, a purposely elevated acoustic screen to both create a shed in the north and to protect it from the motorway noise. This facade is covered by cladding over insulation on the outside, then another wooden sound-proofing layer on the inside. It thereby ensures both thermal and acoustic quality inside both sport halls.



1. Hall
2. Changing rooms
3. Main gym
4. Small gym
5. Outdoor sport field
6. Louis de Cormontaigne high school

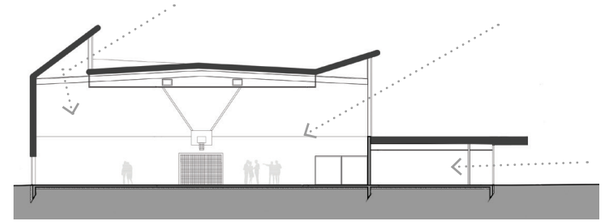
A play of roofs and volumes

Composed of varying volumes defined by a play of roofs, the gymnasium is a nod to the shed structures in the area.

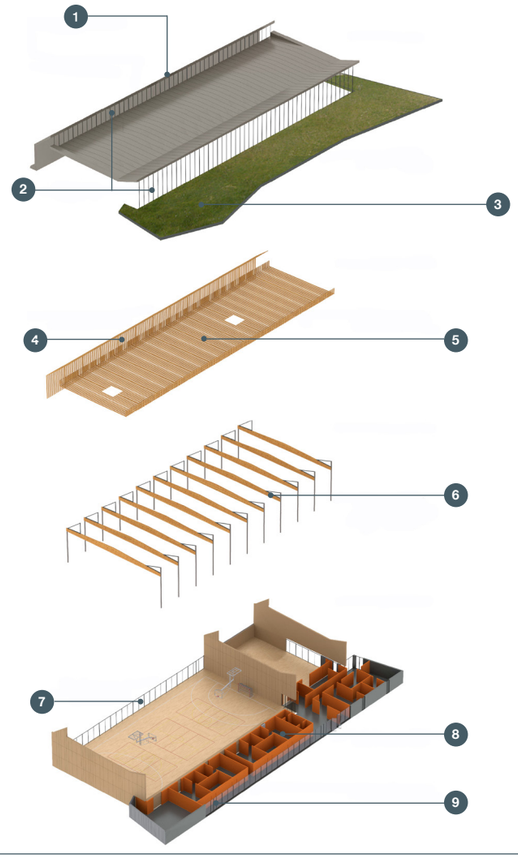
Three layers three roofs

The sport halls call for imposing volumes that are often difficult to incorporate into an urban setting. Here, we have carved the building up into several layers. It includes a low, telluric foundation; this is the volume of the annexes. Above it three ledges form 3 layers that cut through the top of the big halls through which abundant natural light flows in.

This composition creates 3 ledges for 3 roofs:
The first roof caps the low volume of the annexes. It is landscaped because it is visible from the school building, the classrooms, and motorway. It is extended by a slight overhang of the roof between the annexes and the outdoor areas.
The second roof covers the large halls. A slight inflection translates the sectioning, a two-layer sealant placed onto a steel base.
The third roof serves as an acoustic screen facing the motorway. Its curve enables a third contribution from the north, partially vertical light, and completes the luminous scheme. It is clad in continuous metal between the roof and its vertical part.



Screnn roof | Roof big room | Roof annexes



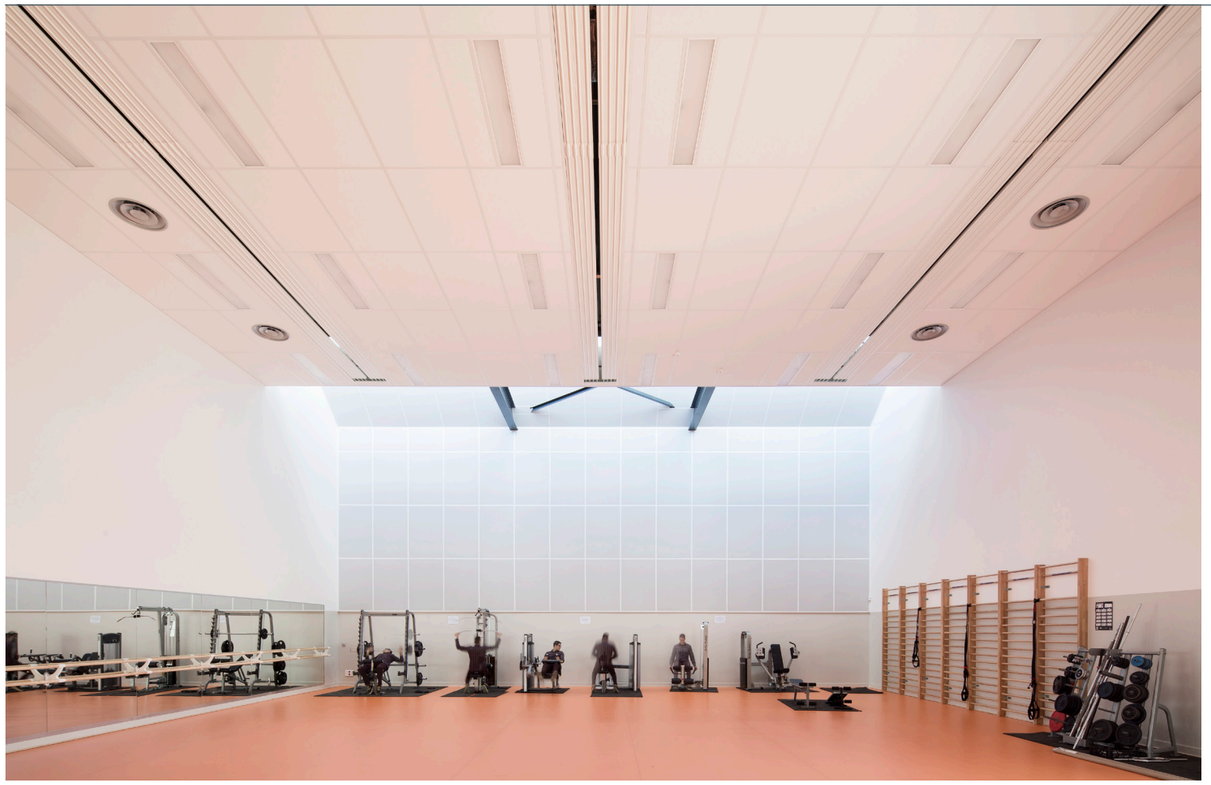
1. The acoustic shield on the motorway side
2. The polycarbonate northern facade
3. Green roof on the annexes
4. Two-layer acoustic interior, wooden open-work planks
5. A wooden suspended ceiling, double flow ventilation and radiant heating panels
6. Metal poles, glue-laminated beams, metal brackets and shed shaped
7. South-facing glass band: an atmosphere of woodland undergrowth
8. Changing rooms with direct access to the main gym
9. Windows running along the outdoor space

The main gym space measures 44 metres long, 25 wide and 7.05 meters high. A magnificent volume adapted to all indoor sports.

The multisports gym

Daylight and the warmth of wood

The warmth of wood and indirect natural light provides a special atmosphere for sporting activities.



Bright spaces

With a view to visual and environmental comfort it is essential for gymnasiums to choose the best orientation in relation to the sun. In this case the gym's north/south position highlights the quality of natural light.

The vertical, abundant northern light provides the uniformity good for sports because it isn't too dazzling. The translucent Reglit glass of the northern facades provides generous, harmonious light in the main gym's remotest corners.

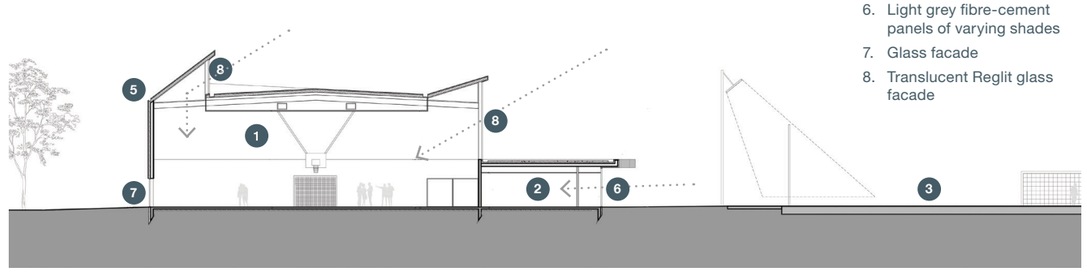
The sheds make it possible to increase the light cone throughout the entire volume of the two gyms that avoids shadowy or overly bright areas. They also add to the indoor decor and the design of sport areas.

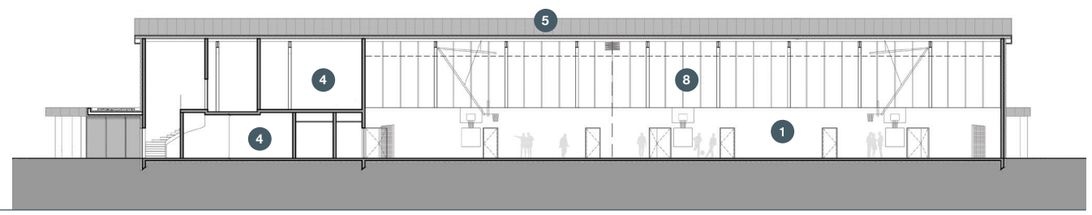
The soft, controlled southern light provides the gyms with added heat from the sun. This intentionally soft opening gives a direct view to the surrounding plant life and woodlands, creating a warm, friendly undergrowth-like atmosphere.

The presence of a «hat» at the upper level makes it possible to avoid overheating from sunlight in the summer while still taking advantage of the winter sun.

The gyms thereby enjoy excellent lighting and add to the building's heating performance while providing a pleasant view.

1. The main gym
2. Annexes and changing rooms
3. The outdoor sports field
4. Service room
5. Dark grey metal cladding
6. Light grey fibre-cement panels of varying shades
7. Glass facade
8. Translucent Reglit glass facade





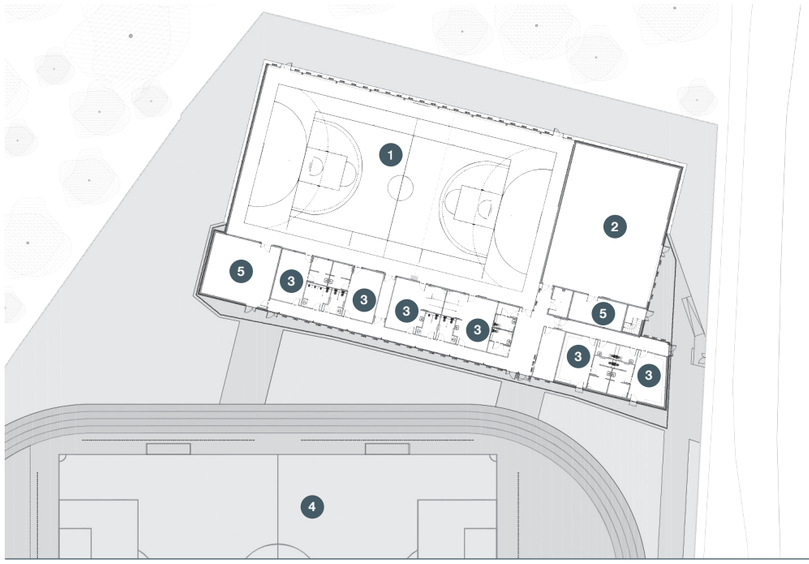
Simple, readable functionality

The annexes' low volumes open onto the athletics track and outdoor football pitch. It revolves around the volume of the main gym by circling it on the northern and southeastern corners. A large glass facade in this low volume makes the foot traffic friendly, pleasant and bright. Interaction with the outdoor areas is therefore clear-cut. This entire low volume is topped by a green roof to limit the volumes in rainwater retention, improve heating and offer a pleasant view from the classrooms which have an uninterrupted view of the new gym.
This base condenses the many access points, i.e. from the path along the embankment for outdoor users, from the high school's buildings and from the outdoor track and pitch.
The inside has been organised to enable several uses of the annexes and access points:

- The smaller gym has a dedicated changing room. It is located across from it and also opens onto the outdoor areas
- the main gym has two dedicated changing rooms, also accessible through the glass band
- the main access to the centre gives onto both gyms with a second access point into the main gym
- a secondary access point from the embankment for sporting associations and clubs (evenings and weekends)
- outdoor access to the service and storage rooms

The entry hall for the general public can easily be seen from the school and outdoor areas. It communicates with the entrances of the two gyms, the reception, the toilets, the changing rooms for teachers and the service areas. A friendly space that, weather-permitting, extends to the outdoor space. The changing rooms are walk-through in order to adhere to the ideal layout:

- dirty feet/clean feet
- street shoes/sport shoes



1. Main gym
2. Small gym
3. Changing rooms and office
4. Outdoor sport field
5. Service room and annexes

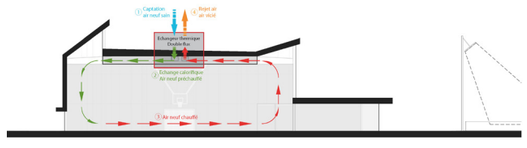
Energy principles

CHARACTERISTICS OF THE ENVELOPE		Losses U in W/m2.K
Thermal insulation	Heavy solid concrete walls + 14 cm mineral wool Roof terrace: steel tray + polyisocyanurate 17 cm + steel tray Terrace roofing Gym: steel tray + 12 + 3 + 12 cm mineral wool + Cladding Low concrete floor + 12 cm of insulation below	0,21 0,17 0,17 0,22
Glazed surfaces	Aluminum joinery + low emission double glazing with thermal break and reinforced thermal insulation	1,6
Thermal bridge treatment	Reduction of thermal bridges (continuous peripheral insulation between facade and roof around acroteria)	
Airtightness	Objective permeability to 1,7 m³/h.m² at 4 Pa	measured at 0,80 m³/h.m², much better than the goal

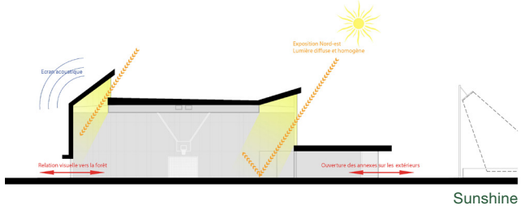
PERFORMANCE OF THE ENVELOPE	**BBIO = 65.10** FOR BBIO MAX = 66.00	**NAMELY RT 2012**

TECHNICAL PROVISIONS		Consumption in kWhep/m².year
Heating	Substation, city network Radiant panels, underfloor heating	31.20
Ventilation & auxiliaires	Double flow with heat recovery	15,40
Ventilation & auxiliaries	Dito heating with balloon	1,40
Lighting	Natural lighting favored in the rooms (shed and North orientation) Movement in natural light on the football stadium	16,10

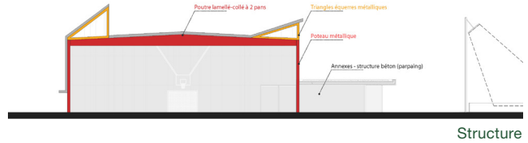
TOTAL CONSUMPTION		64.10 kWhep/m².year
ENERGY CONSUMPTION	**CEP = 64.10 KWHEP/M².AN** FOR CEP MAX = 66	**NAMELY RT 2012 -5%**



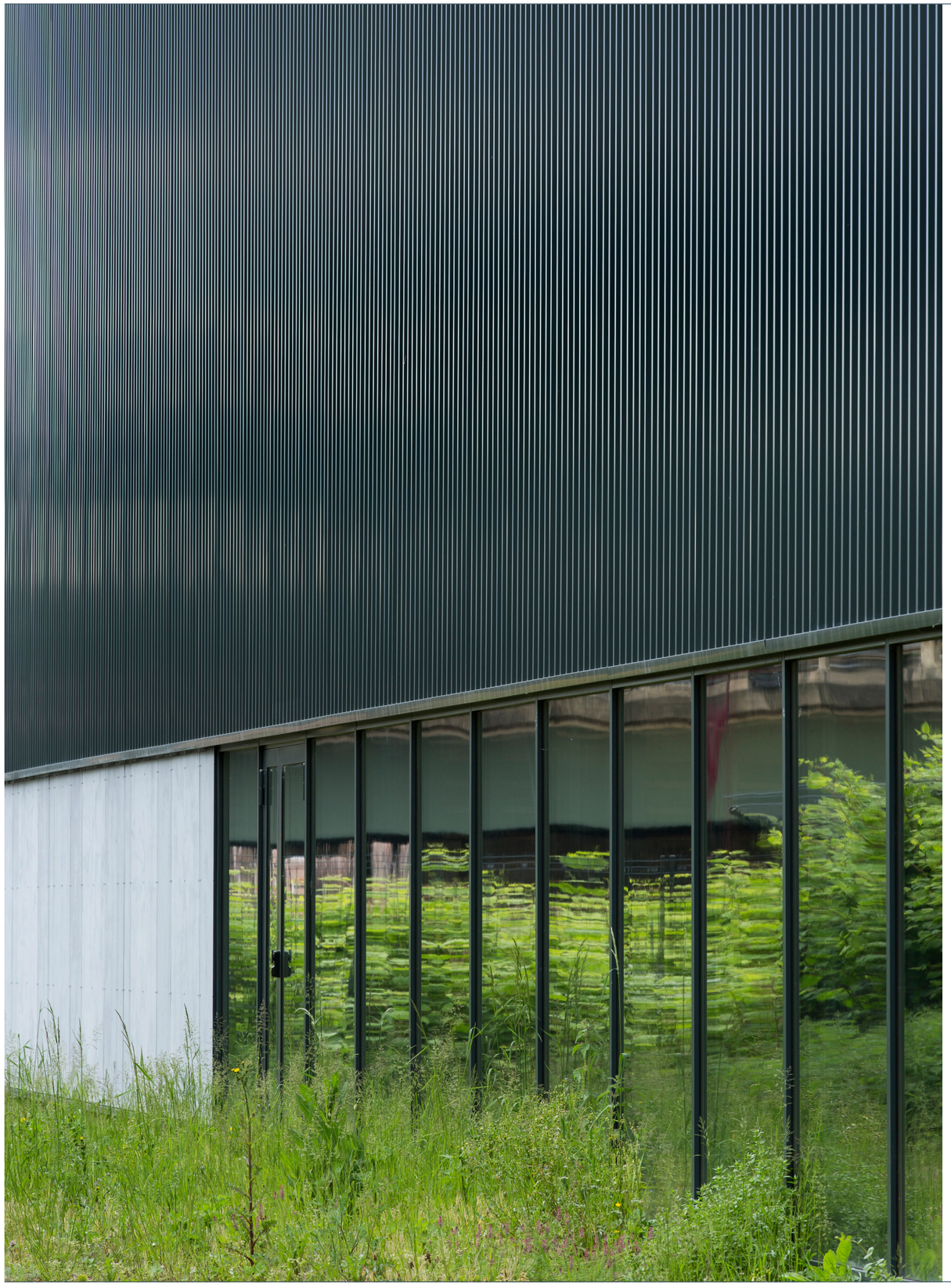
Double flux ventilation



Sunshine



Structure



Gaétan Engasser interview

by Jean-Philippe Hugron

The agency specialises in designing sports facilities, more specifically gymnasiums. How did you work on this one in particular?

To design this particular gymnasium we designed our project in sections. We had to study the northern light. To do so we studies ideas making it possible to offer, among other things, natural overhead light. Which led us to suggest creating sheds on the roof, a kind of fan-like structure rather in the style of Alvar Aalto.

Aren't you tempted to use the same model for every gym project?

Our idea of architecture resides in the context. Every project is inserted into an environment from which it derives its specificity. The site in Metz led us to observing the flow of the Moselle River that runs along the plot and the neighbouring industrial buildings. Having said that, although we haven't got a model per se, we do have principles that we ap-ply to each new project.

What are these principles?

Our take on the site on one hand and our take on light on the other. These two principles enable us to go beyond the simple portico-pillar-beam that every gymnasium requires. Beyond that, each plot of land calls for a different approach, a unique expression.

How did you imagine this gymnasium would be expressed?

We had severe budget restrictions for doing this facility, so we couldn't design with traditional ma-sonry. So we turned to Eternit facades.
Inside we opted for wood finishings for both the walls and the ceiling. This for aesthetic rea-sons as well as acoustics. Gyms all too often neglect good acoustics.

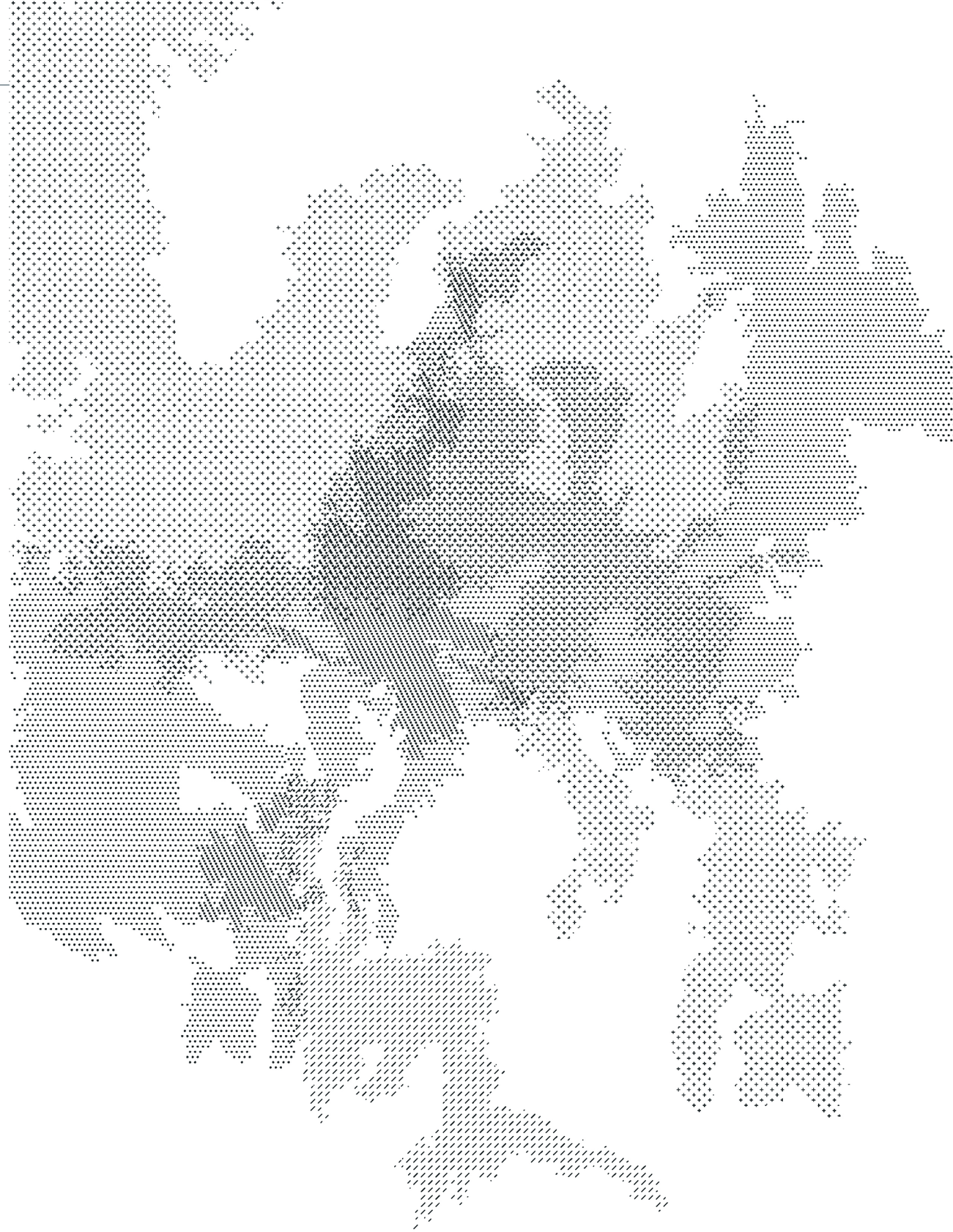
Ventilation is also often neglected. So what did you come up with for this project?

This working in sections was also relevant for designing the best ventilation system. Here in Metz we used dual flow. Up in the sheds we inserted automated casements, We also thought about air input lower down with a long glass band that runs along the whole length of the gym at the sports field level.

aEa

10 bis rue Bisson
75020 Paris
T 01 82 83 59 40
F 01 82 83 59 41

agence@agenceengasser.com
agenceengasser.com



Louis de Cormontaigne's new gymnasium is located on the tip of the island between the Moselle River on one side and the canal on the other, a bow-shaped structure across from the day school and the motorway, the location's major acoustic challenge. The building reproduces the orientation of the high school building and is perpendicular to the canal. It has also been designed according to the input of light with broad openings in Reglit glass on the north-by-northeast side to offer unified, ideal natural light. The south-by-southwest side has been designed as very opaque, like a mask – a large acoustic shield to counter the motorway noise. Work on the volumes and roofs, reproducing the shed-like appearance, also adds to the indoor staging and the design of the sport areas. Composed of a main all-purpose gym entirely clad in wood and a secondary gym for body-building, the new gym offers the best possible conditions for all sporting activities.

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