

# NEW SCHOOL DESIGNS

## Sustainable Growing of Schools for the Future

Lovely playground, square and boring classrooms and poker-face teachers may be the main images flowing through our heads when we recall our schooling time. What we thought about is how to be the first one running to the playground and start break games. As for the school design quality, that is not the first attention for us, even not for our parents.

However, the school is the organisation where children are trained for the future. Most people grow up with the accompanying of the school, which is the initially public space for people to communicate with and may influence the whole life of a person and the development of a time. That child playing with his/her classmates is possible to be a leader, an artist or an architect in the future. Various professional training schools are set up to meet the demand of social development such as culinary schools, dance schools and language training schools, and become a main part of school design projects besides elementary and secondary schools. Therefore, the school designs (new construction, refurbishment, renovation or expansion) are crucial and concerned with natural environment, urbanisation and urban life, which bring new and more missions and responsibilities to school designs. Schools must be the organic part of the urban life, no longer to be a closed, even isolated place to their neighbours in a city. Modern school designs present three characters: quality-control is always first, sustainability is in; schools are the new centre of community residents' life.

### Quality-control is always first

Quality reigns has been built up gradually with the development of the society, and unquestionably, it has become the key norm of school designs.

### 1. Space design quality-control under limited conditions

The social development brings the increase of population and urban expansion. A residential zone's development often accompany with the growth in school-age population, so new challenges for school administrators and architects are not simply new building space available to meet the demand of school-age children, but also look high and low for available spaces and improve facilities in an existing school to keep up with the competition for students. Effective and high-quality space design is the determinant element of school quality.

Designed by N+B Architectes, the restructuring and extension of the High School Paul Valéry (page 184 in the book) in Menton, France is "characterised by a strong duality". The exiguity of the available spaces for the extension, associated with a strict urbanistic regulations for the siting of the new buildings. This work on the relief admits a minimum of reorganisation of the programme to install the various buildings and organise spaces. Finally, "a microcosm offering a variety of landscapes" was created.



New construction projects will provide architects more opportunities to realise their ideas, comparing with renovation and expansion projects. However, how to foresee and prepare for future development with premise of realising economical and sufficient utilization of space, for instance, the growth in future school-age population is one of challenges for architects. Gray Puksand designed a primary school "around a series of culturally significant nature reserves", and created an innovative, spacious and flexible learning spaces "that would enable the facility to adapt to the changing needs of the school community as it grew with the development of the surrounding community".

### 2. Extra function value of space designs

Schools are the place where talents start their comprehensive education, and examination points are no longer the measure or decision factors of talents. More and more educators pay their attentions to inspire students' abilities of understanding, self-study and creativity, in order to train the student to get ready for unpredictable challenges. Therefore, traditional school facilities, such as classrooms, teacher offices and water closets cannot meet the requirement of new education system, and more functional spaces and facilities are required to improve the spaces' functional value for ability training, in addition to traditional knowledge education. To establish good relationship between the students and nature, society, other persons and the future and obtain the ability of understanding, appreciating and creating will be happened in new and high-design-quality schools.



Architects Martin Lejarraga from Spain transformed Our Lady of the Rosary Public School (for more information, please see page 110) as a kind of jack-in-the-box, to collect fantasies and imagination, knowledge, dreams and colours.



The corridor in Lynnwood High School (page 240 in this book, designed by Bassetti Architects) is also the gallery of the school.



Doors and floors in Munkegård School (page 76), designed by Dorte Mandrup Arkitekter, reproduced Arne Jacobsen's wallpaper. These designs provide spaces of arts and imaginations to all the students.

### **Sustainable future**

Sustainability is the most in trend in the 21st century, and it involves all the aspects of school design. Sustainability has become another norm of school design, including materials selection, daylighting, energy conservation and overall building flexibility, in order to realise “longer service life, but lower maintenance expenses and times” for serving generation to generation. That is the basic aim and architectural principle for all countries to insist and pursuit.

The first consideration of sustainable school design is daylighting and eco-materials. Good lighting effect and air quality are the basic element that ensures students and teachers staying in the space for a longer time to carry on learning activities. A healthy and comfortable learning space is what those parents and the whole society supervise and pay more attention to.

Clarke Hopkins Clarke integrated sustainable education concept and methods to designed Eltham Primary School in Australia. They created a “healthy habitable spaces and minimise environmental impact” – “provide shading to the building during summer and enable light and warmth to enter the building during winter. All timber and composite timber products were re-used timber, recycled timber or plantation/regrowth timber with Forest Stewardship Council (FSC) or PFC certification” (more information are available in page 70). Aspen Middle School in Colorado, USA, designed by Studio B Architecture is also a sustainable school. Wherever possible, sustainable materials are incorporated into the design. Those sustainable strategies have resulted in the most energy efficient building on the school campus. The Aspen Middle School received LEED Gold Certification in October 2008 from the US Green Building Council and is the first in the State of Colorado. Let's return to Australia. NOWarchitecture completed Yackandandah Primary School in 2011, and the architects extend the application of eco and sustainable concept from materials, design methods to students' education. This design “considers its environmental benefit and impact. Its efficient structure minimises the use of raw materials, while integrated water storage, passive cooling, natural light and ventilation reduce energy consumption and contribute to student awareness of their environment”.

Another reason of promoting sustainability is cost. The most acceptable way of lower cost is renovating, and the users of the building would be willing to stay in a familiar space, but not a new structure needing them to get used to gradually. The public's supervision to public project budget also make renovation project, especially a school project being with the least argument. Ross Barney Architects reorganised an old building of 1900s into a new school for 646 students. In crowded Philadelphia, its outstanding sustainable features won LEED Gold for the school (see more information in page 20). It's definitely yes that new structures also have excellent sustainable design. C+S ASSOCIATI design a completed new primary school in Italy (page 34). Series strategies including a green roof, geothermal heating, natural ventilation chimneys, building automation system and the like make the project correspond to “Class A+ of Italian law with a building cost of 1,030 Euros per square metre including furniture”.



Ponzano Primary School's green roof (more information are available in page 34)

### **Community's centre – school's another value for the society**

Modern but busy urban life makes people gradually isolate with other persons, and become sensitive and nerve. School as the necessary public building in a residential zone – community, has gradually open its gate to its neighbours and become a new place where the community residents gather for social life. More surprising to all of us, the safe problem that some people worried about after opened the school facilities to the public has not appeared. On the contrast, reasonable time arrangement and space design enhance the safety of school campus in nights and vacations. School facilities, such as gym, cafe, and auditorium become the place where local residents and parents gather to communicate with each other after work. That is also a new and direct feedback of public schools to the public and society.

Designed by Div.A Arkitekter, Hundstund School & Community Centre (page 134) in Norway is the first school that serves a hot lunch in Norway. The school café on is also open to the local community in the evenings several days a week, so there is the favourite place of working parents who in Norway have to bring and pick up children from the nursery school. The sports the “school's outdoor areas including areas for skateboards, basketball, volleyball etc. are open all week for the use of everyone”. Lynnwood High School, designed by Bassetti Architects has a school centre – “Agora”, “it's where students, staff and community gather to socialise with friends, eat lunch, admire fresh bouquets from the Floral Shop or smell appetisers baking in the Food Lab” (page 240). The school Principal thought that the students can all see each other and be together in this open place, so the school environment is excellent with fewer problems.



Lynnwood High School, details are available in page 240

School designs has not been a simple project, which just divide classrooms, offices and water closets. Archites are in a new eco time - a time of sustainability and nature and humanity returning. Most countries pay more attentions to students' ability training and future sustainability. The interaction of human and nature, human and society, human with each other will definite the development of the future. School rojects should also improve its social value - feedback to the society and to be the sample of future's sustainable development.

We selected 42 school designs by world architects and interior designers, including primary and secondary schools and professional training schools. Let us invite you to enjoy these wonderful works.

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## De Schatkamer – Primary School and Child Care Centre

**Designer:** Bekkering Adams Architecten **Location:** Zwolle, The Netherlands **Completion date:** 2010  
**Photos:** Digidaan (DD) **Floor area:** 3,200 square metres

The primary school 'De Schatkamer' is located in the district Stadshagen in Zwolle, and is bounded by the Belvederelaan, the Wildwalstraat and a rail track. On the site is a series of magnificent oak trees. The building follows the contours of the land in a kind of bow shape, so that the historic oak trees could be maintained.

The programme consists of a primary school in two layers for approx. 500 pupils. The school is set up according to the educational concept for a new way of learning, called "natural learning". Also located in the building is a children's centre with nursery, kindergarten and after school care on the ground floor.

The school is divided into five units, surrounding a central hall. The big stairs in the central hall can also function as a theatre. Around the hall several special functions are located, such as kitchen, playroom and meeting rooms, so that the space can be used in many ways and is the beating heart of the school. Roof lights and windows ensure that the hall is filled with light. Through the adjacent rooms the surroundings can be seen, and specifically the view to majestic oak trees brings nature into the building.

From the central hall, all units can be reached, and views through the hall ensure a spatial and transparent appearance. The units each have a quiet area with computer workstations and areas for quiet work and a busy area where a workshop space, atelier and kinder-cafe are located. The ambiguous form of the building and the orientation within the building ensures each unit has its own quality and identity, which is further reinforced by differentiation in material and colour.

Every unit has its own colour scheme with bright fresh colours, which gives the space its own character and identity. Specially designed interior elements are incorporated in the building, for sitting, playing and storage. Custom-made low windows make it possible for even the smallest children to have a look through the building, a glance through their learning landscape.



1. Outside view from the side of the Wildwal Street
2. Outside view of the entry side of the building
3. Outside view from the playground side
4. Outside view from the side of the Wildwal Street







1



- 1. Entry
- 2. Central hall/theatre hall
- 3. Play-hall
- 4. Children's cooking area
- 5. Office
- 6. Classroom, unit room
- 7. Study room
- 8. Children's centre playroom
- 9. Kindergarten
- 10. Sleeping-room



2

1. Entrance area and schoolyard  
 2. View to the playroom connected to the central hall





1



3



2

- 1. View from the interior, the central hall with the theatre stairs
- 2. View from the balcony with the workshop space of one of the units, to the central hall
- 3. View from the balcony of the central hall with see-through to the unit spaces and classrooms
- 4. Children cooking in kitchen connected to the central hall



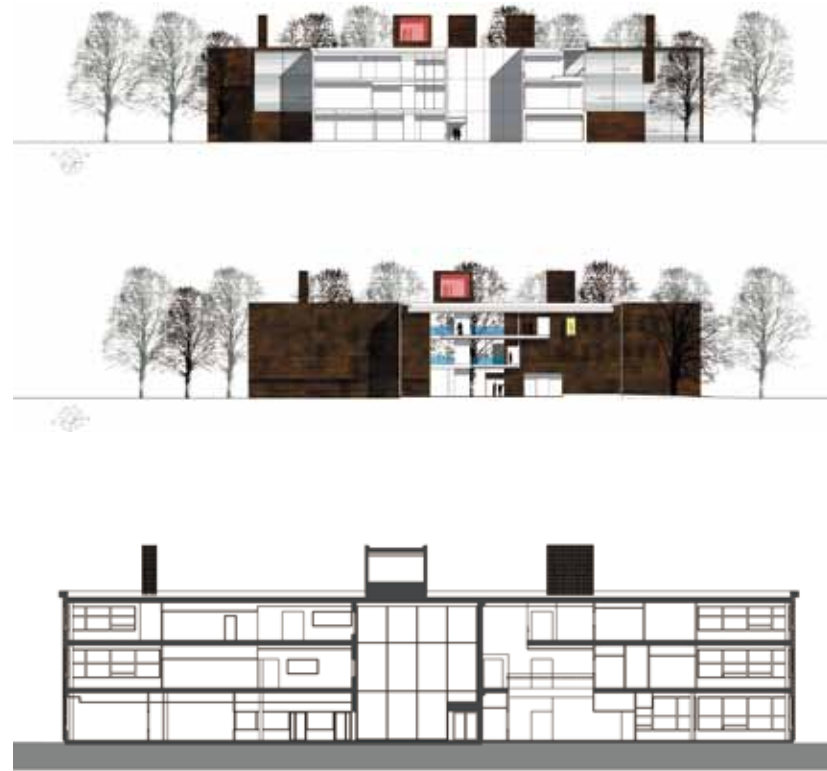
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## Joensuu Primary School

**Designer:** Arkkitehtitoimisto Lahdelma & Mahlamäki Oy / Ilmari Lahdelma (author) **Location:** Joensuu, Finland **Completion date:** 2008 **Photos©:** Jussi Tiainen, Pekka Agarh

The new primary school in Joensuu is an important addition to the series of public buildings located on the central axis of the city. The windmill layout of the building attaches it to this loosely chain of significant buildings. The layout of the school provides easy access from all approaches. The central atrium of the school is visible to four directions and thus well presented in the cityscape. The goal of the internal layout has been spatial clarity. The functions of the buildings are separated by the spatially interesting central atrium. The four different wings of the building have been marked with colours for easy orientation. Each wing consists of a cell. In each cell the functions are gathered around the cell lobby. There is a visual connection between the cell lobby and the central atrium. The main elements of the external architecture of the school are sculptural forms and the use of simple yet high-quality materials. The Joensuu Primary School's façades are mostly made using double skin façade principle. This double skin is planned to be a buffer zone against the cold weather at winter time. The first beams of spring sun are efficiently collected between the skins of the facade by using dark brown steel plate in the inner skin. The outer skin is made of glass. Class rooms are ventilated to this space by ventilation windows. At the same time when one opens the ventilation window in the class room also opens a similar part of outer façade to make ventilation efficient. At late spring time and early months of autumn a large horizontal parts of outer façade are opened to speed up the air circulation between two façades and at the same time lower the temperature between the skins. The main façade materials are oxidised copper and horizontally divided silk-screen printed glass.



1. Front view in winter
2. North view
3. Front façade

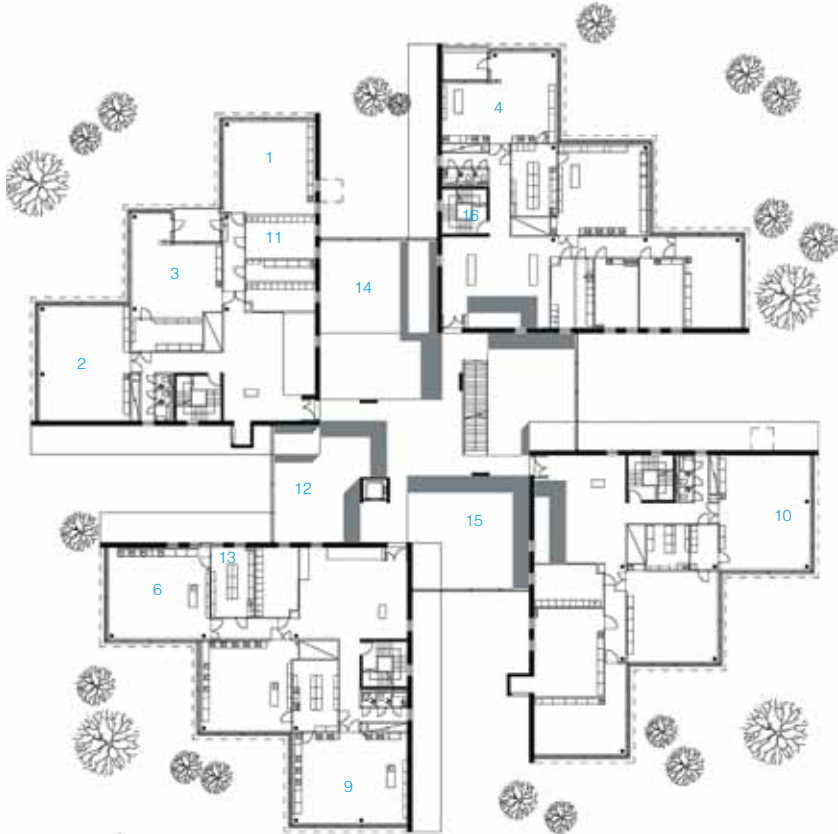






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1.2. Resting place

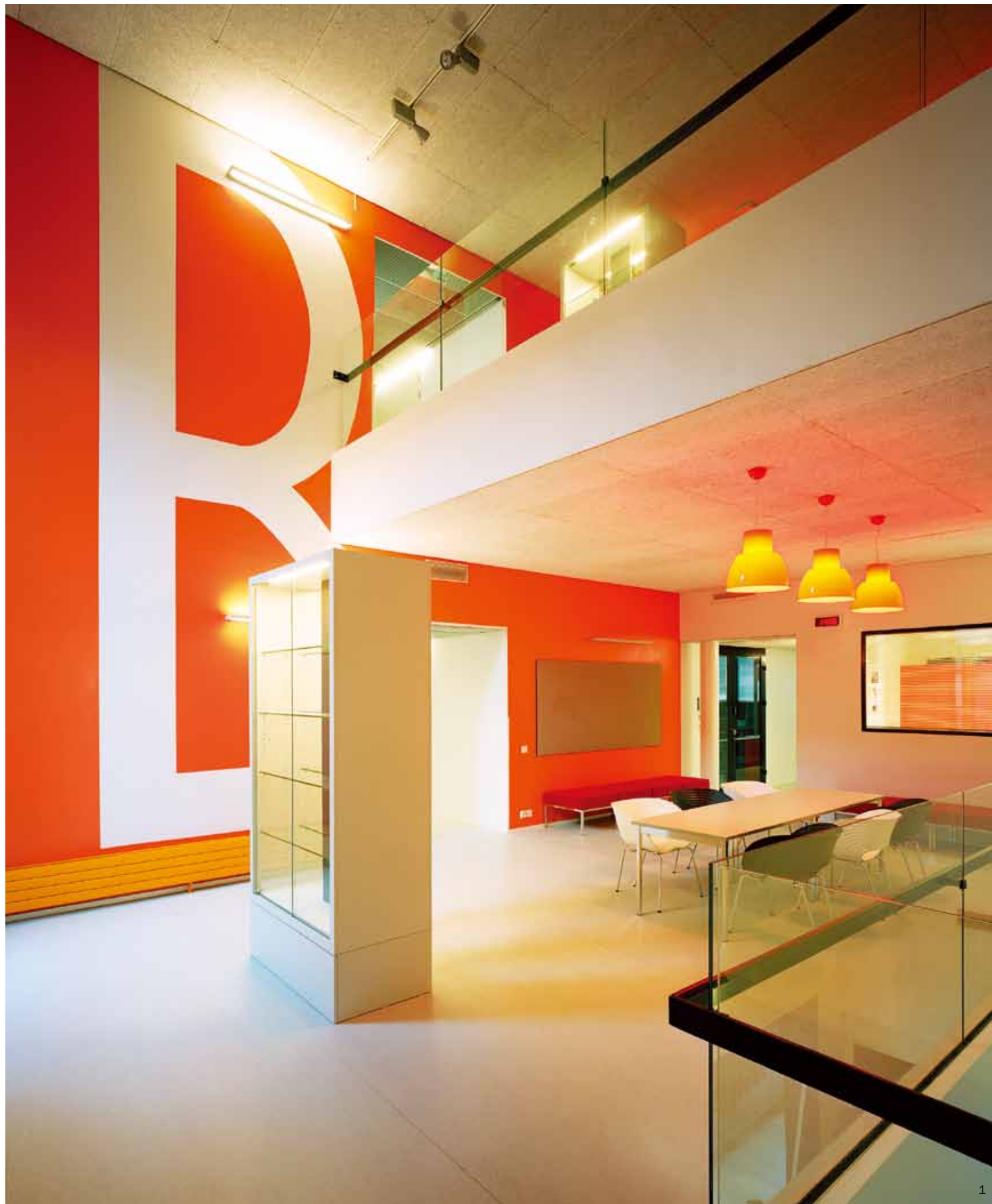


- 1. Classroom
- 2. Classroom
- 3. Classroom
- 4. Classroom
- 5. Classroom
- 6. Classroom
- 7. Classroom
- 8. Classroom
- 9. Classroom
- 10. Classroom
- 11. Resting place
- 12. Hall
- 13. Resting room
- 14. Platform
- 15. Platform
- 16. Stairs



2





1



2

1. Communication area  
 2. Green-tone classroom, full of vitality  
 3. Interior corridor



3



## Commodore John Barry Elementary School

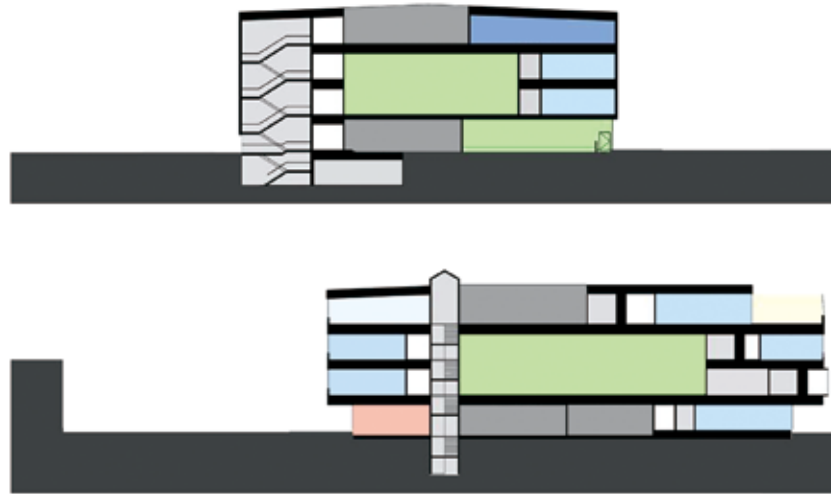
**Designer:** Ross Barney Architects **Location:** Philadelphia, USA **Completion date:** 2008 **Photos©:** Matt Wargo **Site area:** 3,995 square metres

The new pre-K-8 in West Philadelphia for 646 students was built on site of the original school in a residential neighbourhood of 2-storey brick row houses circa early 1900s. The new school was designed in 8 months and constructed in 16 months. Community involvement throughout the process allowed completion on an abbreviated schedule. The four-storey solution, unusual for elementary education, provided over 40% of the approx. 3,995 square metres site as outdoor play space.

Conceptually, the design comprises three horizontal zones. The base zone: the lobby, cafetorium and administrative offices, creates a public commons for the students and the community. Pre-kindergarten, kindergarten and special needs classrooms are also on grade. The middle zone contains two identical floors with 1-8 grade classrooms around a two-storey Gymnasium creating "small schools within a school" or grade related instructional clusters. A roof level "learning garden" has special spaces for all the students. Art, music, science, computer, vocational classrooms, and the library include outdoor decks for hands-on learning experiences. Glazed brick is used at grade for durability. The metal wall panel system creates a high performance building enclosure while minimising construction time. Wire mesh enclosures give the roof gardens an open and inviting feel.

The school was designed for a LEED Silver rating, but actually received a LEED Gold. Sustainable features include porous paving, grey water capture and reuse, outdoor views for 95% and day light harvest for 90% of occupied spaces. The design challenge for this project was to provide a first rate academic facility on a tight urban site. To maximise outdoor play area and neighbourhood green space, a four-storey school was designed.

The new school has 46 classrooms. Additional instructional spaces for art, science, vocal music, and technical education were included. The building contains a cafetorium with a stage area and warming kitchen, a gymnasium with locker and shower areas and an Instructional media centre, with a computer classroom, conference rooms and a library.



3

1. East elevation of school
2. Main entrance canopy
3. Main entry view
4. South side of school



1



2



4

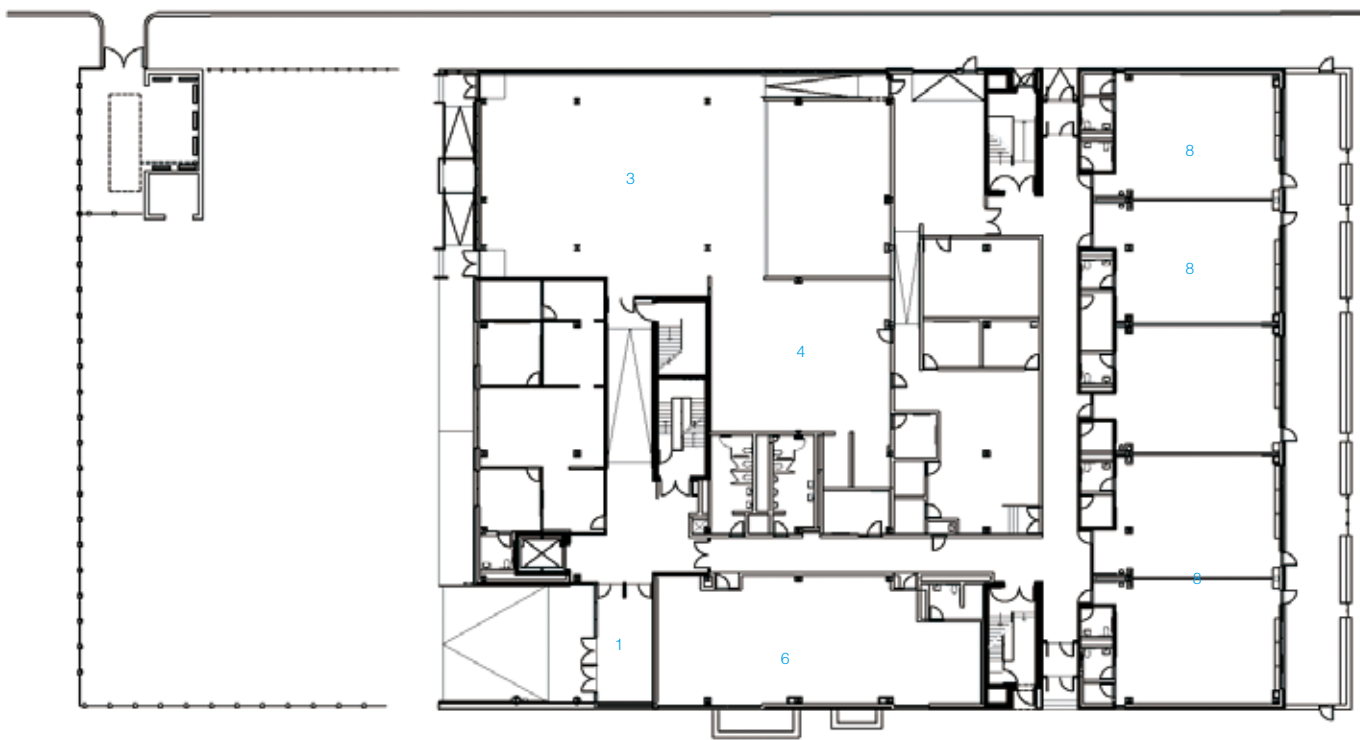




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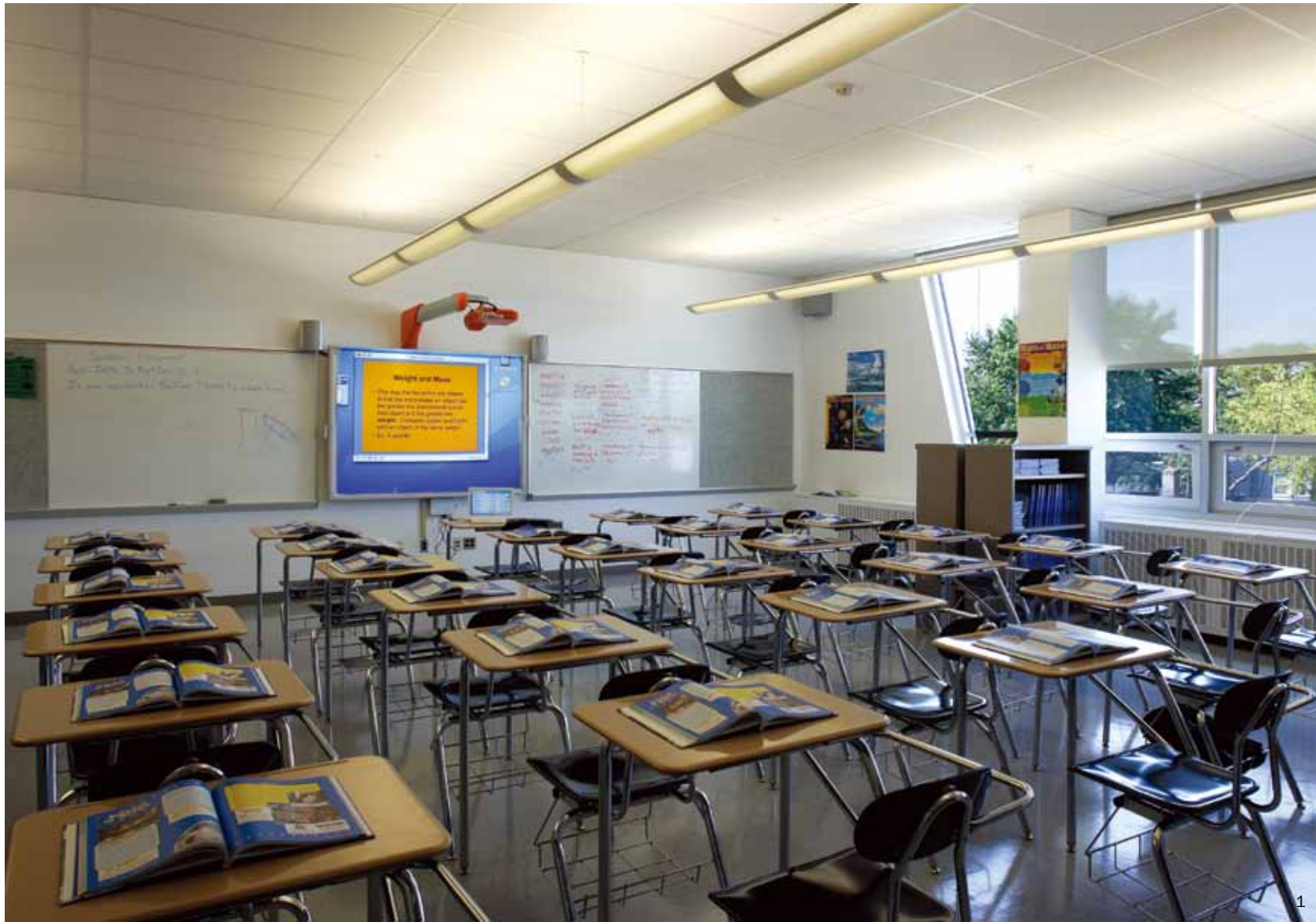
- 1. Vestibule
- 2. Lobby
- 3. Cafeteria
- 4. Kitchen
- 5. Offices
- 6. Multi-function room
- 7. Storage
- 8. Classroom

- 1. South elevation
- 2. Vestibule showing outdoor classroom
- 3. Circulation hallway looking out to neighbourhood



3





1. Classroom with views out to neighbourhood  
 2. Cafetorium  
 3. Gymnasium  
 4. Main circulation stair with skylights





## ISW Hoogeland

**Designer:** RAU **Location:** The Netherlands **Completion date:** 2009 **Photos©:** Ben Vulkers **Floor area:** 13,300 square metres



The Westland has a number of schools in the region between The Hague and Rotterdam. One of these, ISW Hoogeland, combines schools that used to be at three separate locations. The building's unique Z-shaped floor plan is divided into three main areas but also has other specialised areas. Each main area has two study centres, one with and the other without IT facilities. The centrally located seventh area, intended to encourage creativity, is equipped as an art area.

Despite the division into main areas, there are no physical separations dividing the various groups of pupils. The daily routes taken by pupils in the various groups cross each other at various locations in the building. In addition, the specialised areas such as the labs, multimedia library and the two indoor gymnasiums at the far ends of the building are used by all the pupils. Both gymnasiums are equipped with a partition that can be raised and lowered so that each gymnasium can be used as one large or two smaller areas for sports activities.

For recognisability, each kind of space has its own accent colour, and each study centre has its own colour. The walls of the circulation corridors are covered in panelling having three different backgrounds that were designed in consultation with Buro Braak, a graphic design studio. These are typical scenes of the surrounding Westland overlain with balls and butterflies corresponding to the background colour of the study centre towards which the corridor leads. The shapes on the panels also increase in frequency and colour intensity as they approach a study centre. The grey basic colour of the self-levelling screed used as flooring in the circulation corridors acts as a visual compensation for the coloured walls.

Contrasting colours and materials are also used on the exterior. Sections of the school building's dark brick façades are clad with corten steel. Within just a few weeks after construction was completed, this weather-resistant steel had already taken on its characteristic orange-brown colour. The combination of corten steel and dark brick makes an attractive contrast for the "constructed bridge" clad largely in glass that connects the two wings of the building.

1. Distance overall view of the building and parking area
2. Side façade and outside stairs







- 1. Auditorium
- 2. Music lab
- 3. Arts and crafts lab
- 4. Document room
- 5. Gymnasium
- 6. Lobby
- 7. Entrance
- 8. Drama
- 9. Lecture hall
- 10. Study centre
- 11. Classroom

1. Overall view of water bank building  
 2, 3, 4. Contrasting colours and materials are also used on the exterior; dark brick façades are clad with corten steel







1



3



2

1, 2. Reading area in library  
 3. Computer room  
 4. Main entrance of the floor



4





1



3



2

- 1. Lounge area with rich natural light
- 2. Corridor with colourful wall painting
- 3. Dining room
- 4. Quiet study room



4

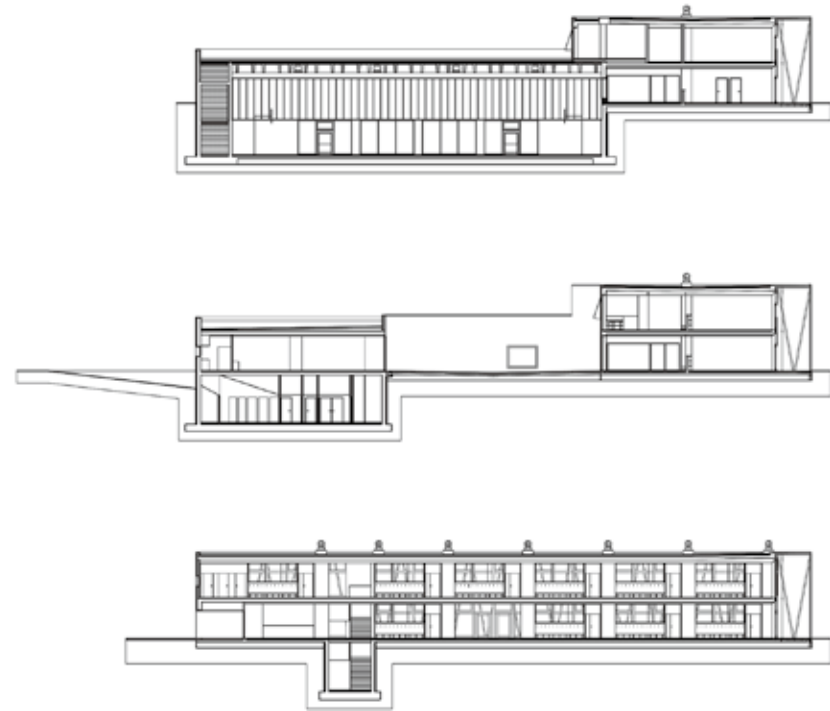


## Ponzano Primary School

**Designer:** C+S ASSOCIATI **Location:** Ponzano Veneto, Italy **Completion date:** 2009 **Photos©:** Alessandra Bello, Carlo Cappai, Pietro Savorelli **Construction area:** 4,102 square metres **Award:** Sde 2009 Prize from the Italian Ministry of Landscape and Environment

The Ponzano Primary School is designed for 375 children aged from 6 to 10. It has 15 classrooms and special classrooms for art, music, computer, language and science, a gymnasium space, a canteen and a library. The Ponzano Primary School is a sustainable building in energetic, social and cost control meaning. Thanks to a judicious orientation, a thick insulation, a green roof and some sophisticated technologies (geothermal heating, photovoltaic panels, natural ventilation chimneys, building automation system) the school consumes only 3.6 kWh/mc/year, corresponding to Class A+ of Italian law with a building cost of 1,030 Euros per square metre including furniture.

Inside the sprawl city of Ponzano in the north Italian Region of Veneto, the Primary School constitutes a new node, a meeting place for the whole community. Part of the building (the gymnasium) is in fact accessible by everybody in the after-school-hours. Collective spaces are very important in the school project. First, in the general outline: all spaces are gathered around a central square, memory of monastic cloisters, which, in the past were the places of knowledge conservation. Then, also in the building's section: all spaces face each other and are reflected by the transparent and coloured walls. This complexity reminds the model of the industrial districts in Veneto where people are incited to learn from each other by exchanging experience. The threshold space with its red coloured steel columns is a reminder to the typical "barchessas" of the Veneto Region with their arcades opened towards south: all the ground floor classrooms facing south-east and south-west are directly opened to this arcade paved in wood in order to possibly invent special open air classes. At the same time the building is firmly contemporary and converses with the nearby Benetton Factories, their culture of good design and their philosophy of spreading colour democracy all over the world.



3

1. The courtyard
2. The green roof and the ventilation chimneys
3. The roof terrace outside the art classrooms
4. Detail of the south-west elevation



1



2



4





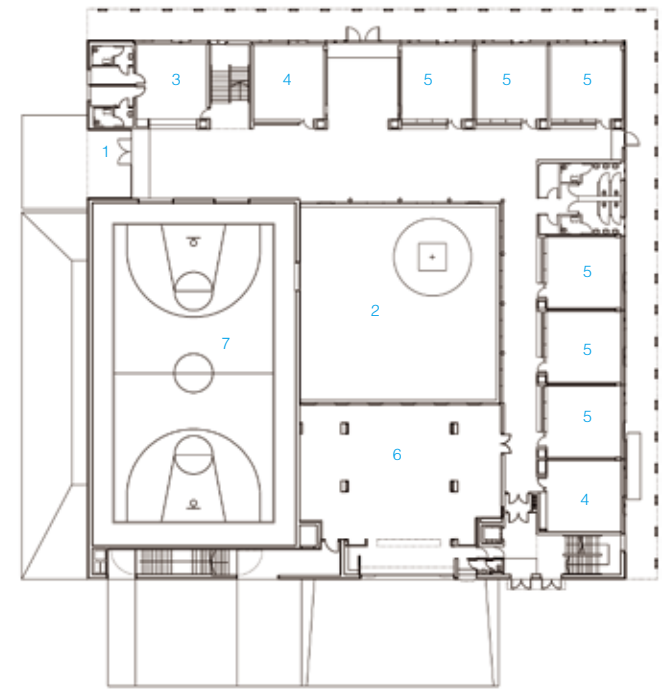
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1. The outside arcade, the wood and glass façade

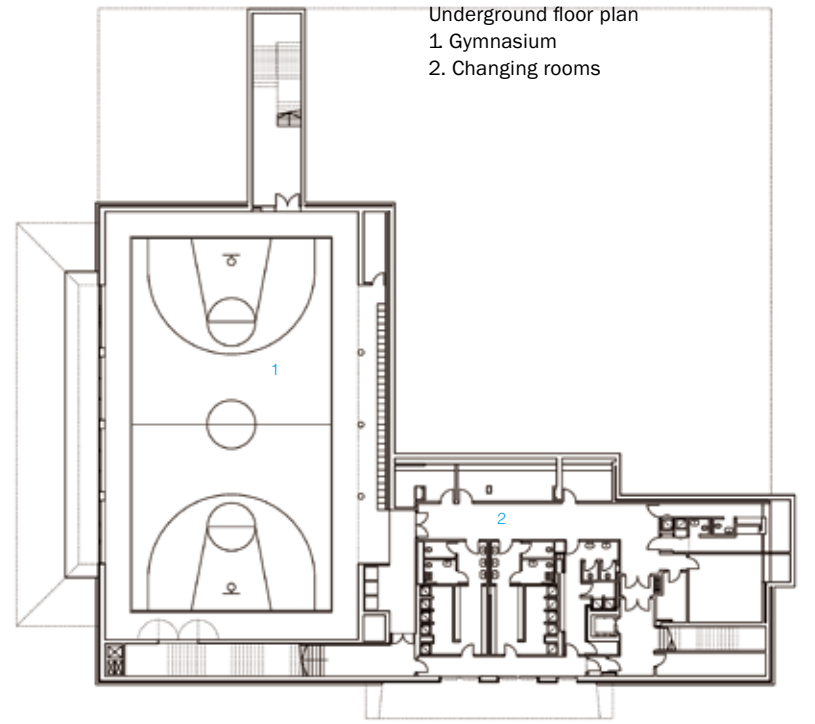


2

2. The entrance and the courtyard during an outdoor class



Ground floor plan  
 1. Entrance      5. Classroom  
 2. Central courtyard   6. Canteen  
 3. Teacher's room   7. Gymnasium  
 4. Lab



Underground floor plan  
 1. Gymnasium  
 2. Changing rooms





1



3



2

- 1. Internal view of a classroom
- 2. The library on the first level
- 3. Reading table and chair in the library at the first level

