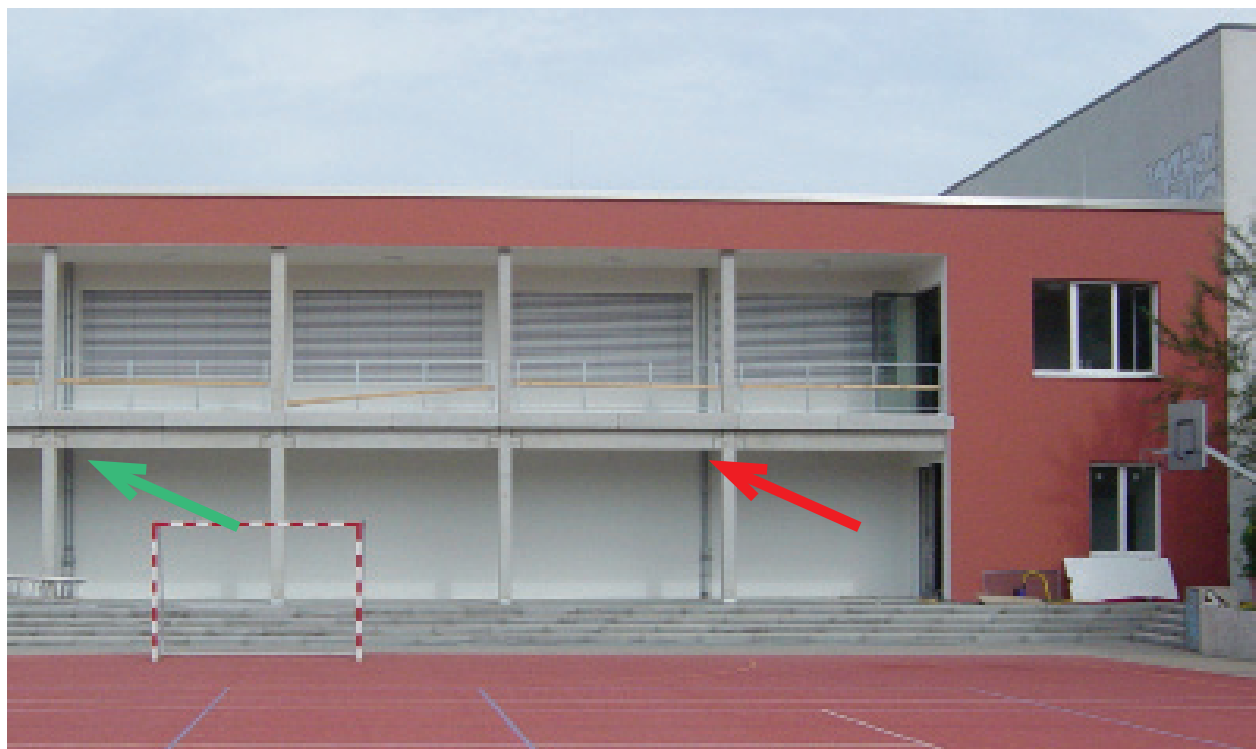


## **From 14 to 2: Innovative and economical with LORO-X roof drainage systems**

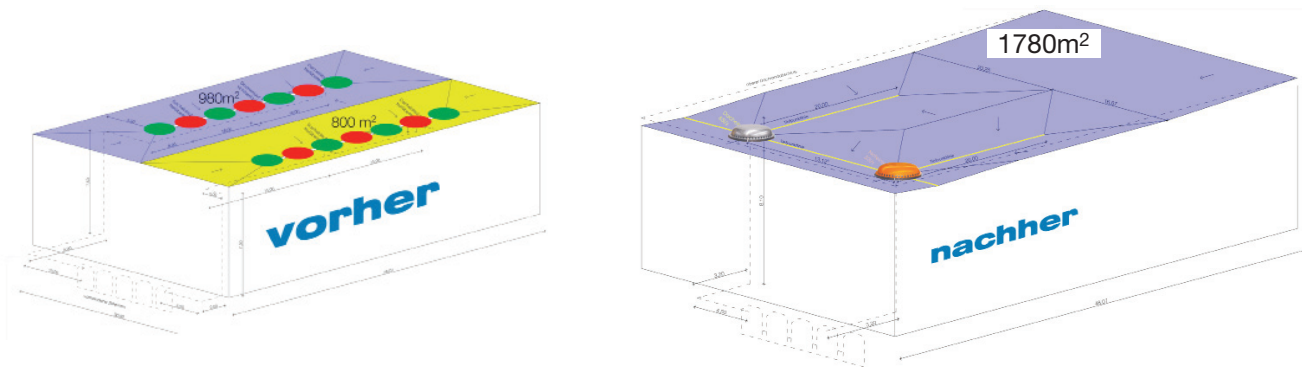
### **The meaning of “price per litre” based on a new build with a roof area of 1780m<sup>2</sup>**

In flat roofs, the design of the roof drainage depends particularly on the planning of the roof fall. Architects, designers and contractors should start to work with the manufacturer on the roof drainage systems at an early stage therefore. Together with the manufacturer's technical service team, the use of high quality and high performance complete systems has huge economic benefits.



From the outset the focus of the new build of the Catholic Theresienschule in Berlin-Weißensee was on sustainability, durability and economy in all areas. In talks with LORO field service, therefore, optimisation potentials in terms of roof drainage were discussed at an early stage.

The price per litre or the price per square metre of the roof surface to be drained was optimised by an innovative planning approach. From the first discussions it was clear that high-performance LORO-X complete systems made of galvanised steel should be used to reduce costs and better exploit the interior space of the building.



### A. The starting point

Beforehand the roof surface was divided into 2 sections, each with its own low point line for drainage. 5 main drains + 9 emergency drains were arranged along the low point lines, some of which were connected by a horizontal collecting pipe inside the building. This design however was labour-intensive, required corresponding core holes through the roof, extensive sealing work and long pipework inside the building.

### B. The new design

Together with the responsible designers, goals were set to reduce the number of drains and roof penetrations, to simplify the pipe layout and if possible to bring the pipes from inside the building to the outside. Roof penetrations were to be kept to a minimum and the fall kept as simple as possible. The challenge lay particularly in combining the two surface sections to form a single low point line for the entire roof to minimise the number of drainage points required. This required cooperation with the manufacturer of the sloped insulation.

#### B. 1. Step 1: The calculation of the necessary discharge rate

for the entire roof surface (e.g. via [www.loro.de](http://www.loro.de): Online calculator). The calculation for the roof surface of 1780 m<sup>2</sup> with a local typical rainfall of 371/668 l/s/ha, gave a drainage capacity for the main drain of at least 66 litres per second and for the emergency drainage of at least 53 litres in accordance with the standard.

**LORO-X Online Berechnung (für Flachdachentwässerung)**

1. Berechnen Sie die zu entstehende Regenwassermenge Ihrer Dachfläche.  
 2. Sie bestimmen Ihr nächstes Schritt eine Auswahl von LORO-X Astika-Dachentwässerungssystemen, mit der notwendigen Abflussleistung.  
 3. Ausschreibungstext vom Anbau bis zum Standrohr mit LORO-X Leistungsanweis (LX-Datenblatt)

**Dateneingabe der (Teil-\*\*) Dachflächen des Bauvorhabens**

Name (D/I Bauvorhaben):   
 Ihr Vor-/Nachname:   
 Ihre e-Mail-Adresse:   
 Dachfläche in m²:  m² (Pflichtfeld)  
 Dachaufbau (D):  m  
 Normal-Regenspende:  (0,5, 5 l in Liter/Second/10.000m²)  
 Jahrhundert-Regenspende:  (0,5, 100) in  
 Liter/Second/10.000m²

**Berechnen**

**Dachfläche**

- Bergeometrie muss Wasserfluss zu den Abflüssen gewährleisten
- Fälligkeit der Dachentwässerung mindestens 4 mm/h
- Jeder Anbau der Notentwässerung muss geprüfbar sein

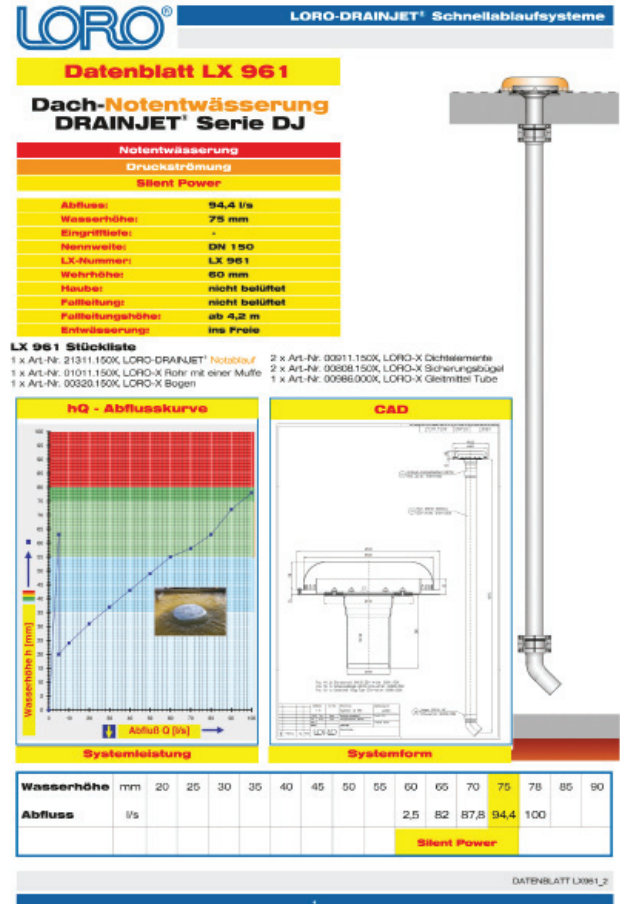
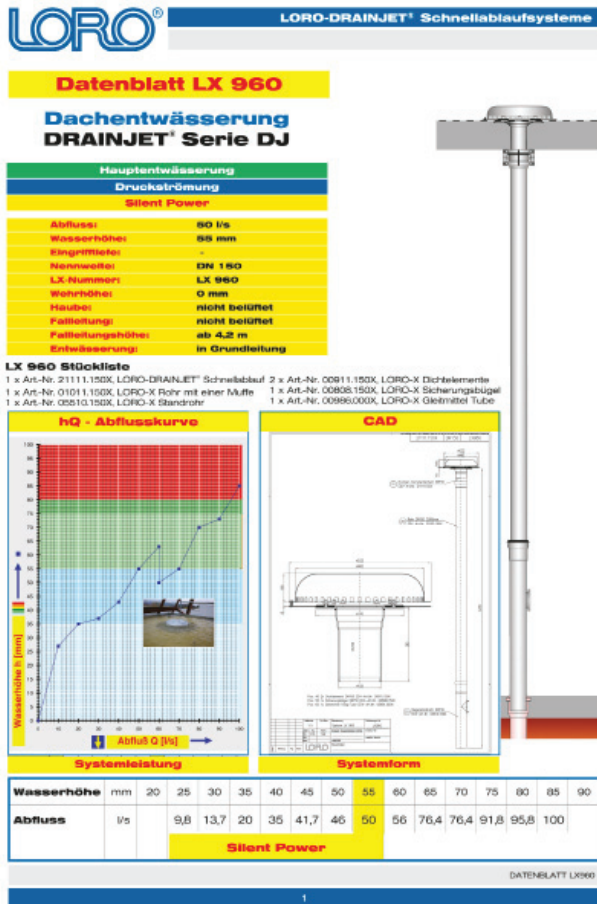
**B.2. Step 2: Considering key data of the roof structure** to select the right roof drains. The selection of the right system quickly led to a staggering conclusion: the whole surface of 1780 m<sup>2</sup> required respectively 1 LORO-X DRAINJET® rapid drain system for the main drain and 1 rapid drain for emergency drainage with only 1 roof drain each. The most important change was the redesign of the fall on the roof which results in rainwater being fed from the roof surface safely to the high-performance drainage systems.

The fact that the proposed LX961 emergency drainage system can handle up to 94.4 l/s at a water level of 75 mm on the roof means increased safety in the case of unforeseeable heavy rain as compared to the standard calculation based on the average century rainfall.



**B.3. The new fall design** - a single U-form low point line - answered several needs. Labour was significantly reduced. Instead of 14, the new roof surface needs just 2 LORO-X drains. The drains are positioned directly above the downpipe so the building requires no horizontal collecting pipe. The original position of the connection of the downpipe to the rainwater collecting tank at ground level could be retained. The weather resistant, sturdy, backflow safe and visually attractive downpipe made of galvanised steel is attached to the outside of the front of the building rather than the inside as previously.

B.4. The system form and system performance of the proposed solution were compared directly with the structural conditions in the project on the basis of the LX-datasheet. The features of the roof drainage system are visible at a glance in the practical features bar in the LX datasheet. The summary of features in the features bar in the LX datasheet together with the head-discharge curve and system CAD drawings gives the designer not only optimum performance verification for customers and insurance but also clearly illustrates the roof drainage system for the processor on-site.



## C. The installation

The installation of the two roof drainage systems took place completely outdoors thanks to the independent covered access. The downpipe made of weather resistant, unbreakable LORO-X steel discharge pipe was fitted without problem. To ensure that the LORO-X DRAINJET® roof drains with their practical clamping flanges (loose and fixed flange design) provide optimum access for water, the low point line was widened at the drain points to ensure all-round inflow. The new low point design enabled the required height of the sloped insulation to be reduced considerably because the distances between the low and high points could be reduced.



### Conclusion

The optimum collaboration of the designers and the LORO-X service team meant that the total outlay for the roof drainage system was considerably reduced. The key factor here is the “price per litre” for the overall drainage solution. The high-performance systems from LORO offered completely new fall design opportunities so that the position of the drains in the pipework could be simplified for the rectangular roof area. As it is not necessary to penetrate the roof through to the fire protection zone in the interior of the building, potential thermal bridges are prevented and no special fireproofing measures are needed. The high-quality complete systems made of galvanised steel offer long-term reliability and also contribute to the sustainability of the building.