# TECHNICAL REPORT

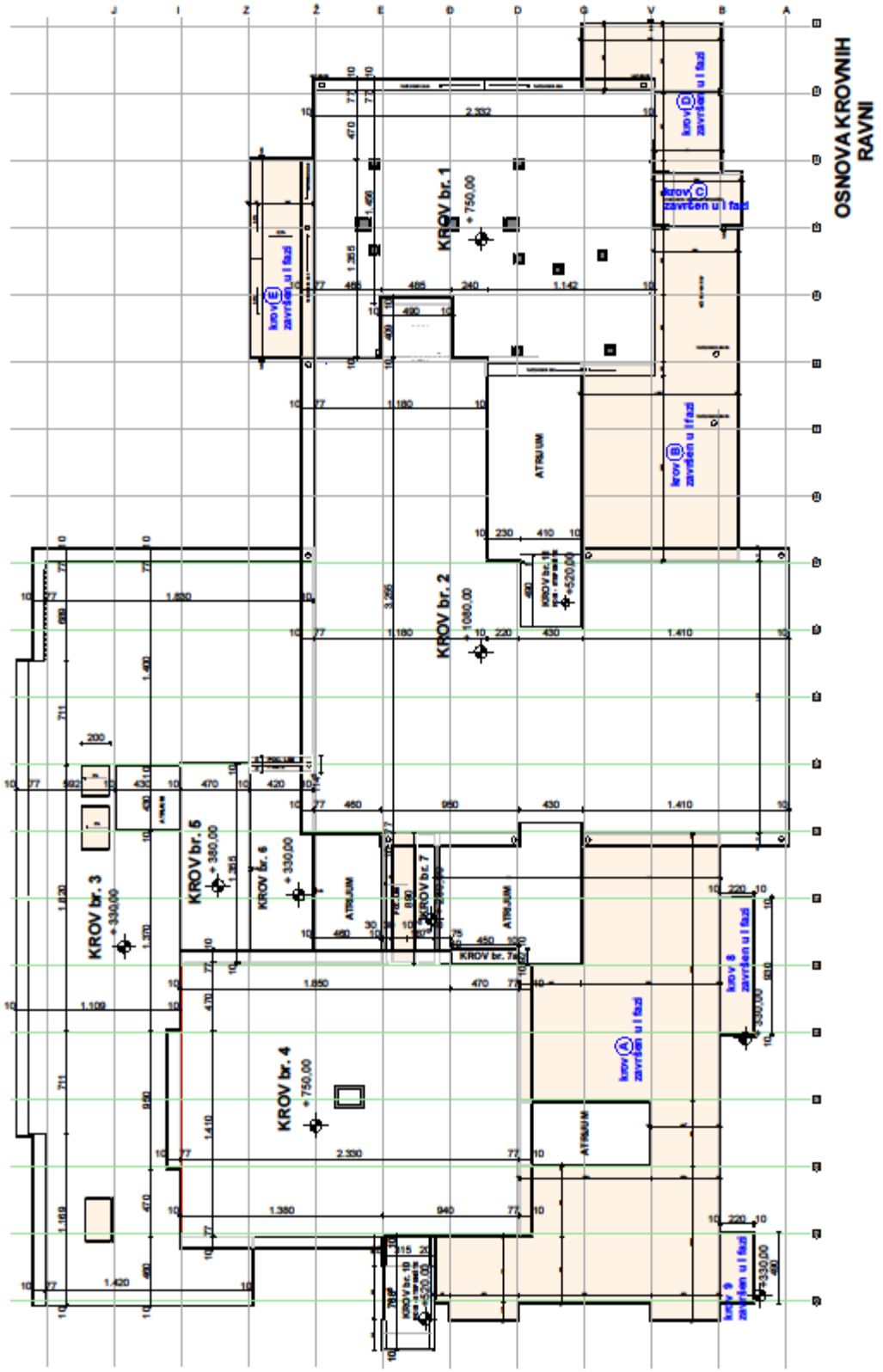
for the works on regular maintenance of the flat roof of the Novi Pazar Health Centre Administrative Building

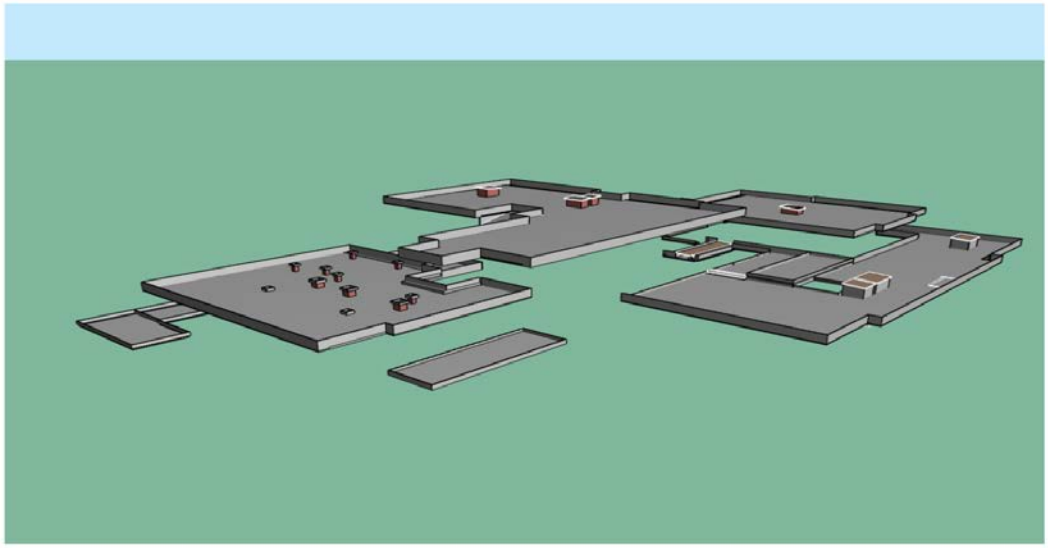
The Novi Pazar Health Centre Administrative Building, planned for regular maintenance works on existing flat roofs, was built in 1976 and is located in Genarala Živkovića Street. The building itself is designed and built in two phases, with flat roofs and thermal and water insulation that is worn out, so whenever it rains the water leaks from the roof and floods office space in the building, thus affecting work safety in the institution.

The building was designed and built on several levels (some parts of the building have only the ground floor, there are parts with one floor above ground and parts with two floors), so the roofs are at different levels and represent independent units. The majority of roof planes fall under the “non-walkable” type without any physical protection of the hydroinsulation while only one roof plane is defined as “walkable” with concrete blocks finishing laid on cement mortar (roof marked in this Design as Roof no. 1).

There are different penetrations on all roof surfaces predominantly for ventilation of rooms, in form of cast pipes Ø100 with galvanized sheet metal finishing covers or brick vent boxes of various dimensions.

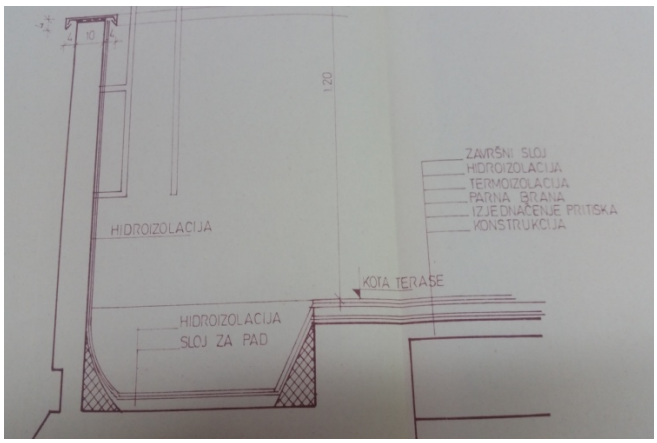
**ROOF PLANES PLAN (picture below)**

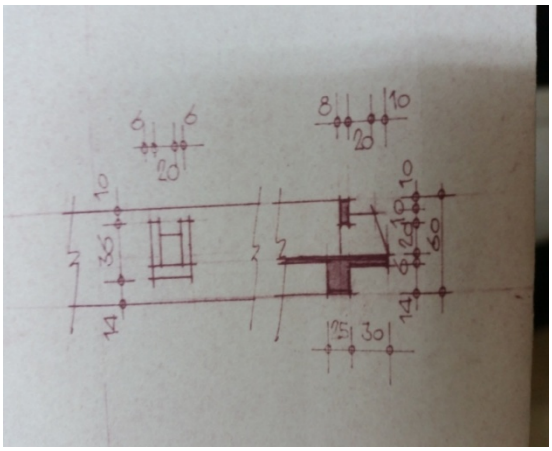




*AXONOMETRIC PROJECTION OF ALL ROOF PLANES

All roof planes end in AB perimeter walls d=10cm of different heights, which will be presented in detail for each part of the roof. The walls have galvanized sheet metal finishing, RŠ 25cm.



*A.B. gutter with the perimeter wall

*Drain spout detail

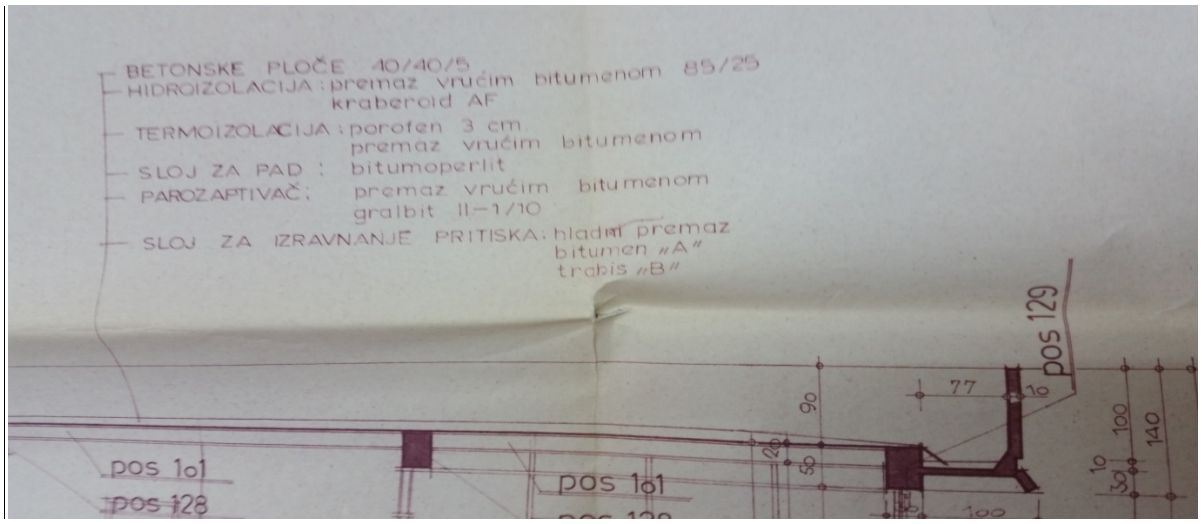
On one part of the roof planes water drainage is performed on side walls via openings – so-called “spouts”, dimensions 15x15cm, connected with vertical gutter pipes

made of galvanized sheet metal, dimensions 14x14cm, and on the other part of the roof surfaces there are A.B. horizontal gutters along the edge, built during the construction of the structure and arebelow roof surface by cca 10cm, from which water is drained through horizontal outlets connected with vertical gutter pipes made of galvanized sheet metal, dimensions 14x14cm.

Floor roof slabs are of “monta“ type, covered with the following layers of thermal and water insulation, as follows:

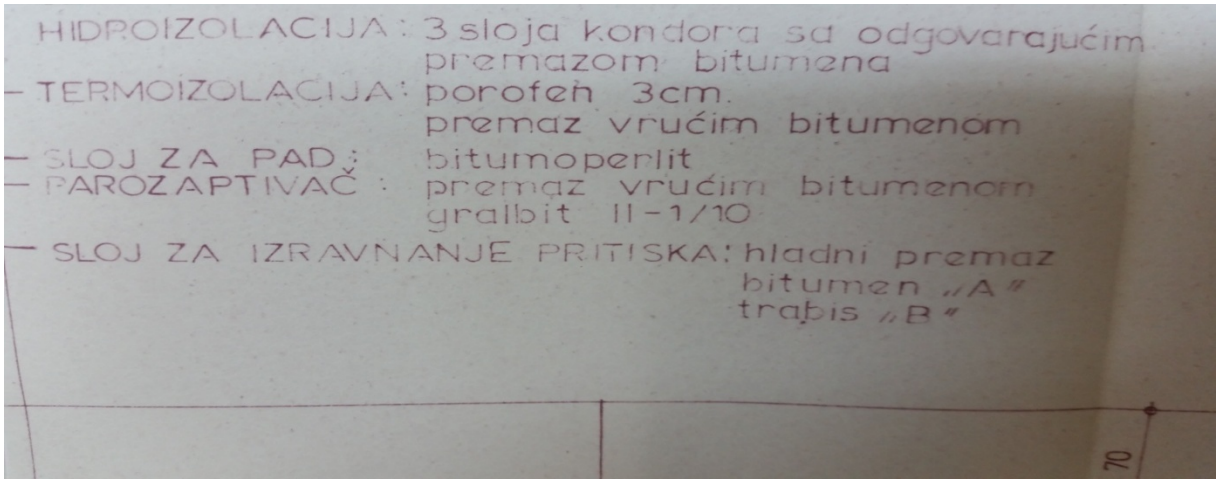
**FOR WALKABLE ROOF (picture below)*

CONCRETE SLABS 40/40/5
WATER INSULATION: hot bitumen coating 85/25
Kraberoid AF
THERMAL INSULATION: Porofen 3 cm
hot bituminous coating
SLOPE LAYER: Bitumoperlit
STEAM STOP: hot bituminous coating
Gralbit II – 1/10
PRESSURE EQUALIZATION LAYER: cold coating
bitumen “A”
Trabis “B”




**FOR UNWALKABLE ROOF (picture below)*

WATER INSULATION: 3 layers of Condor with suitable bitumenous coating
THERMAL INSULATION: Porofen 3cm
hot bitumenous coating
SLOPE LAYER: Bitumoperlit
STEAM STOP: hot bitumenous coating
Gralbit II – 1/10
PRESSURE EQUALIZING LAYER: cold coating
bitumen “A”
Trabis “B”




During building exploitation and the above mentioned leakage, repairs were made to the existing insulation partially, using cold pastes (glass mesh and Poliazbitol).

Also, because of high energy losses and leakages, the analysis of the building was performed and an Energy Efficiency Study developed. The Study provides for, in order to reduce energy consumption needed for heating, insulation of roofs to be made using thermal insulation materials d=15cm and heat conductivity coefficient λ=0.035 W/(Mk), including installing a roof membrane. The roof membrane and the thermal insulation material – Styrofoam d=15cm, must be built entirely in accordance with technical regulations, manufacturers' instructions and BoQ for works, which are an integral part of this Design.

**Due to the above mentioned, the development of the design has started, to define the scope of works by quantities and descriptions for each roof surface individually. A more detailed description of the existing situation as well as scope of works for thermal and water insulation for each roof surface separately will be provided further in this Technical Report.**

It is also important to note that water insulation was installed on one part of the roof surface in late 2015, so this part of the roof will not be included in this Design (roofs type A, B, C, no. 8 and no. 9)

**ROOF PLANE no. 1**

This roof plane is at the height level of +750.00 and is constructed as **walkable roof**, with finishing layer made of concrete blocks 60x60cm, placed on a layer of cement mortar with bituminous pointing. Water drainage is done through A.B. horizontal gutters 77cm-wide on three sides along the edge with projected 1.0% slopes.

*Gutter and railing detail

*Damaged slope layer in the gutter detail

The category – **Preparatory Works** – shall include cleaning of the existing surfaces and horizontal gutters, removal of the steel structure on the roof, a left-over part of an antenna mount, cutting metal pipes 40x30 mm of the protective railing and making it shorter by cca 15 cm (27 pcs) – only on the part of the building where there are no concrete gutters – (in the area where Styrofoam is placed next to the wall), welding them together with anchors drilled in the existing wall at a higher level. Along the edge of the roof and the mentioned A.B horizontal gutters, the finishing blocks are damaged and need to be repaired by cutting them at the width of cca 30cm along the entire edge of horizontal gutters and by making a slope using cement mortar in order to reduce the height difference between the roof surface and the mentioned concrete gutter, along cca 50.0m (**Detail C**).

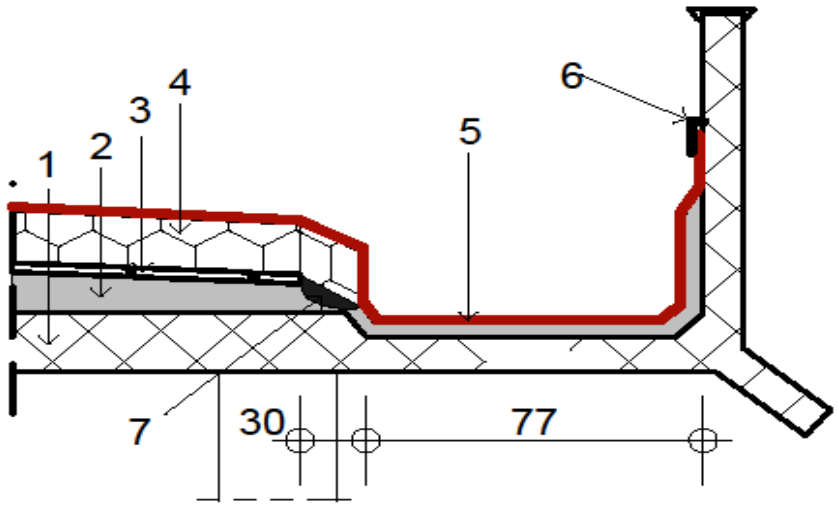
**DETAIL “C” (picture below)**

**Detail for the repair of the joints between blocks and horizontal A.B. gutters**

1. Existing A.B. floor structure
2. Existing water and thermal insulation
3. Existing concrete blocks on the roof
4. New thermal insulation – Styrofoam d=15cm
5. New PVC membrane, laid over the Styrofoam and folded along the existing cove
6. Finishing aluminum “L” strip
7. Repaired part of the damaged edge using cement mortar

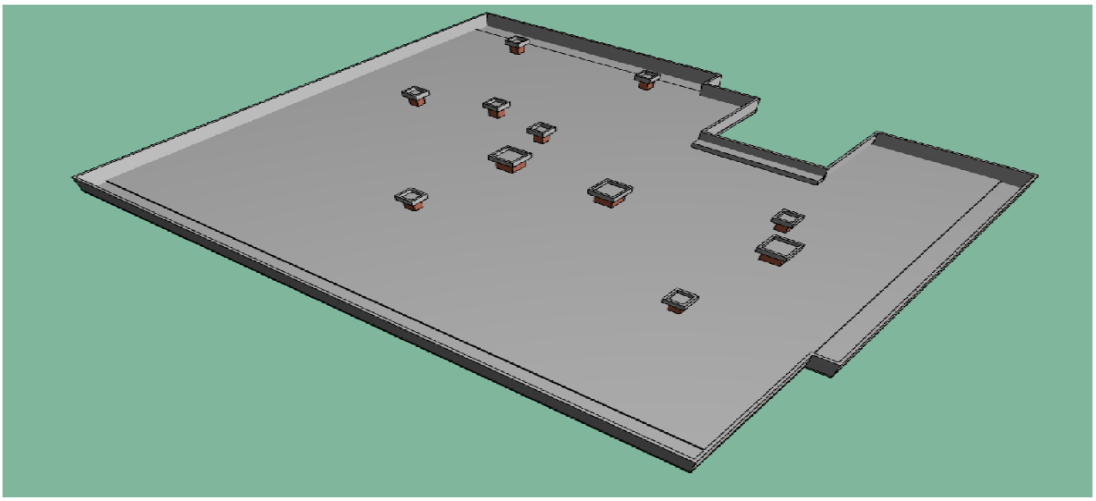
# DETALJ "C "

Detalj sanacije spoja ploča i horizontalnog A.B. oluka

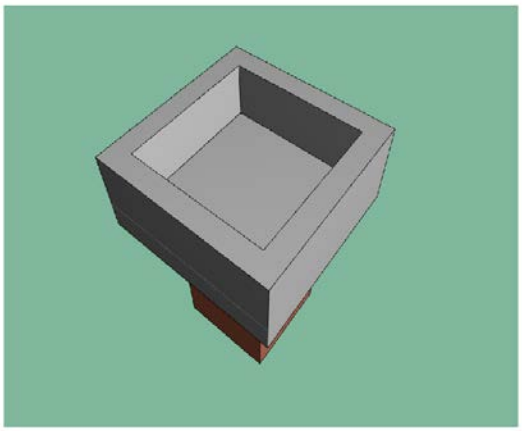



1. Postojeća A.B. medjuspratna konstrukcija
2. Postojeća hidro i termo izolacija
3. Postojeće betonske pločena krovu
4. Nova termo izolacija- stiropor d=15cm
5. Novo-postavljena PVC membrana, položena preko stiropora koja se povija uz postojeći holker.
6. Završna aluminijumska " L " lajsna
7. Sanirani deo oštećene ivice cementnim malterom

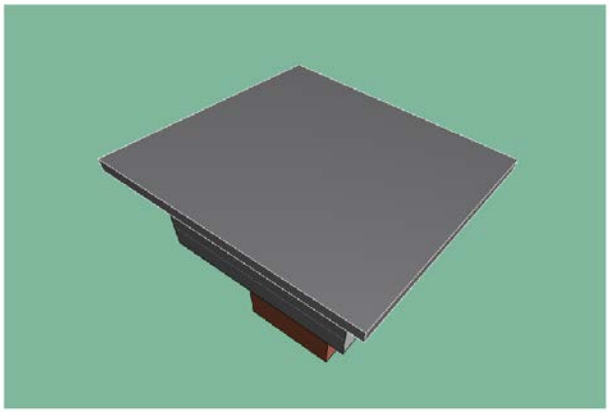
On the part of the gutter l=750cm long, 80cm wide, the damaged slope layer needs to be repaired using cement mortar d=4cm.



- AXONOMETRIC PROJECTION OF THE ROOF



Existing vents



New design of the vents

The vents need to be covered by making square A.B. covers using plastic coated steel sheet metal, d=0.6mm, on a substructure of wooden scantlings 5x5cm and OSB blocks (8+3 pcs). The exterior walls of A.B. covers on three vents need to be mortared using cement mortar (cca 4.0m$^2$).

In the middle of the roof plane a bending of concrete blocks has been noticed (in the past, repairs were made to the insulation and they were not put back in accordance with the original slope), so it is necessary, before laying thermal insulation, to **even out** the sloping (repair existing bends in the roof planes) using lean cement mortar, 5 cm thick on average, in the amount of cca 50.0m$^2$. If there is need to even out elsewhere, it should be done using a layer of sand, d=3cm thick on average, in the amount of 20% of roof plane surface (the surface to be evened out using sand is cca 75.0m$^2$). Evening out shall be done in accordance with the slopes as shown in the design of roof foundation and existing slopes on the spot.

Thermal **Styrofoam** insulation d=15cm (the following characteristics: heat conductivity coefficient 0.035W/Mk, volumetric mass min. 22kg/$m^3$ and compressive strength min. 133kPa) shall be placed on the part of the roof above the building (420.0$m^2$), while on the rest of the horizontal concrete gutter only PVC membrane shall be laid, and coves made at the height of 30cm (80.00$m^2$) (**Detail C**). Also, coves shall be made on existing vents (11 pcs) made of PVC membrane, h=30cm.

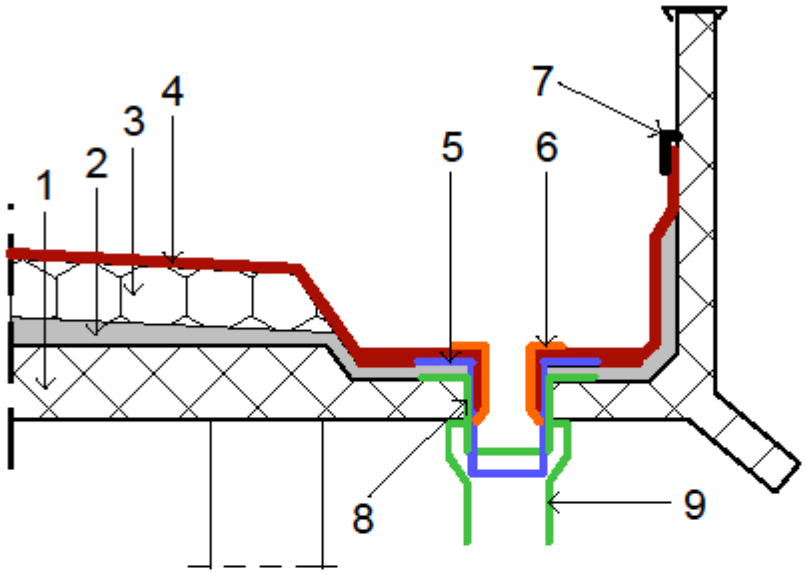
PVC membrane strips (500.0$m^2$) shall be laid over Styrofoam, welding laps over the width of 10cm and fixing-anchoring them to the base structure of the floor slab, using anchors between 15 and 30 cm long, 30 cm apart, entirely in accordance with the description provided in the BoQ and manufacturer's instructions.

Also, considering that the roof was meant to be a walkable terrace, a railing was made along the edge, using metal pipes 30x40mm and a handrail made of steel sheets dim. 200x40mm. The railing is corroded, so it is necessary, before installing the water insulation made of PVC membrane, to clean and degrease it, then apply a double coating of foundation paint and two finishing coats – the finishing shall be grey (81.0$m^1$).

Because it is not possible to assess the condition of vertical water drainage outlets, it is necessary to make new outlets with covers made of galvanized sheet metal d=0.6mm (the joints shall be done by soldering), 13x13cm L=25cm (measures for new outlets with cover must be taken on the spot), which shall be built in the existing ones (there are 4 of these), laying PVC membrane over them (the membrane shall be put in the new outlet at the depth of 10 cm), and this joint shall be coated with PMMA-based resins (polymethil methacrylate – "triflex" or similar coats). Also, PMMA-based resins shall be used as flashing the joints between coves around vents (11 pcs) as well as the ends of the PVC strip to drip tray left by the roof exit R.Š. 30cm, length cca 11.0m.

**OUTLET DETAIL (picture below)**

# DETALJ SLIVNIKA



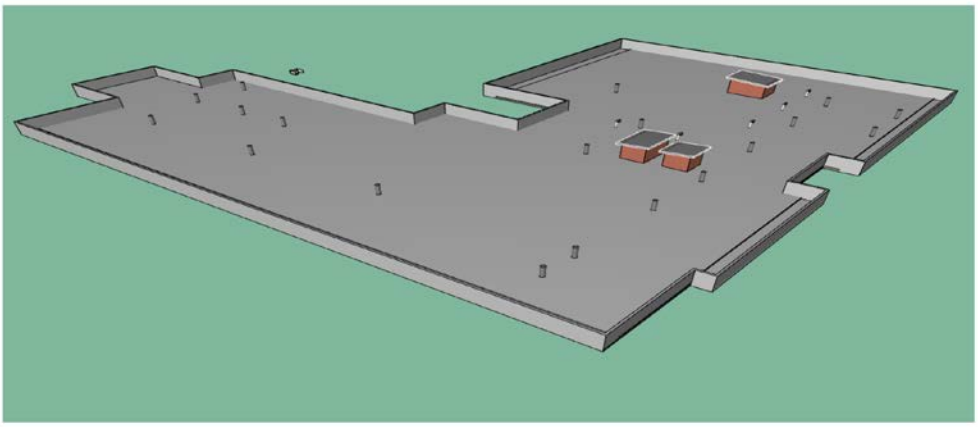

1. Postojeća A.B. medjuspratna konstrukcija
2. Postojeća hidro i termo izolacija
3. Nova termo izolacija- stiropor d=15cm
4. Novo-postavljena PVC membrana, položena preko stiropora koja se povija u novi slivnih u dubini od 10cm sa varenjem toplim vazduhom
5. Novo-postavljeni slivnik sa šeširom od pocinkovanog lima d=0,6mm čiji se elementi spajaju lemljenjem .
6. Premaz na spoju membrane i novog slivnika smolama na bazi PMMA
7. Završna aluminijumska " L " lajsna
8. Postojeći slivnik
9. Postojeći sabirnik vertikalnog oluka

LAYERS ON THE DETAIL
1. Existing A.B. floor structure
2. Existing water and thermal insulation
3. New thermal insulation – Styrofoam d=15cm
4. New PVC membrane, laid over the Styrofoam, folded into the new outlet at the depth of 10cm, with hot air welding
5. New outlet with cover made of galvanized sheet metal d=0.6mm, the elements of which soldered together
6. Flashing at the joint of the membrane and new outlet with PMMA-based resins
7. Finishing aluminum “L” strip
8. Existing outlet
9. Existing vertical gutter collector

**ROOF PLANE no. 2**

This roof plane is at the height level +1,080.00, representing a **non-walkable** roof plane with finishing layer made of cold Poliazbitol coating, with no protective Puroflex coating. Drainage is conducted via A.B. horizontal gutters 77cm wide on three sides along the edges, with projected 1.0% slopes.

The surfaces are relatively clean, without debris or foreign objects that would need to be removed.



There are three brick vents on the roof (Type A, dim. 150x200, Type B, dim. 120x200, Type C, dim. 120x120) covered with galvanized sheet, with insulation folded along the walls at the height of cca 30cm. Coving shall be finished at the corners by welding and overlapping PVC membrane (12 pcs). Considering the sheets are in quite good condition they only need to be protected and coated with protective paint for sheet metal in two layers (12.0m$^2$).

Brick and galvanized vents

PVC vents

There are also cast plumbing vent pipes Ø100 on the roof, with vent covers made of galvanized sheet metal (19 pcs). Certain vent covers made of galvanized sheet metal are corroded and need to be replaced (7 pcs). Finishing round the pipes shall be done using PMMA-based resins (e.g. “triflex” and materials with similar characteristics), at the height of a minimum of 40 cm (19 pcs). In addition to these, there are also PVC pipe vent outlets Ø70 on the roof, which, considering they are low and will be even lower after laying Styrofoam, are necessary to extend by cca 30cm using the same pipes (insert 30cm PVC pipes in the vertical part and keep the existing spout – 5 pcs).

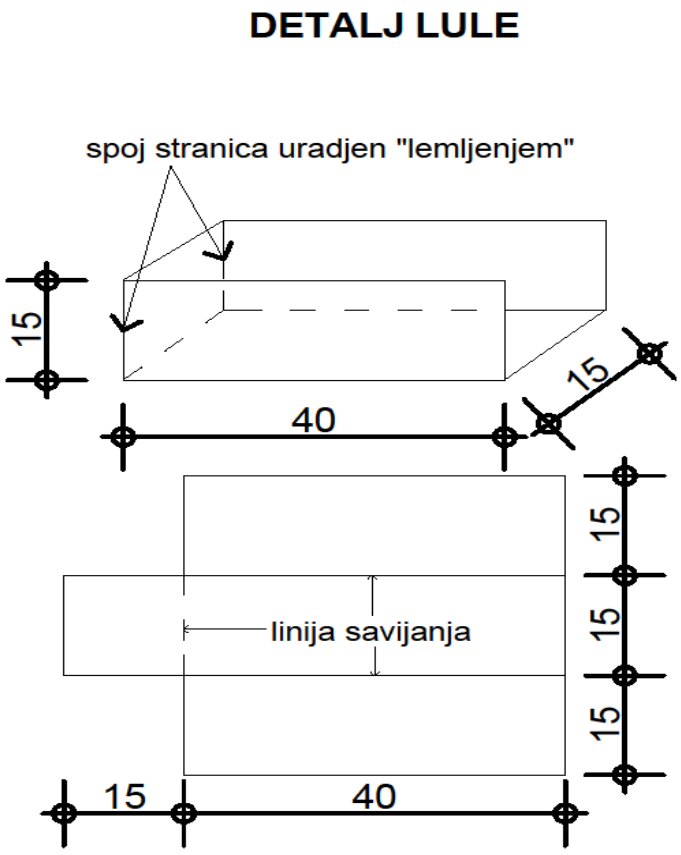
Considering that the slopes are kept as originally built with there being very small “pockets”, this Design envisages to even out uneven parts by filling them with sand, 3cm thick on average, where the “pockets” are, in the total amount of 10% of the total roof surface (79.0m$^2$).

Thermal Styrofoam insulation d=15cm (the following characteristics: heat conductivity coefficient 0.035W/Mk, volumetric mass min. 22kg/m$^3$ and compressive strength min. 133kPa) shall be placed on the part of the roof above the building (785.0m$^2$), while on the rest of the horizontal concrete gutter only PVC membrane shall be laid, and coves made at the height of 30cm (110.00m$^2$). Also, coves shall be made on existing vents (3 pcs) made of PVC membrane, h=30cm.

PVC membrane strips (895.0m$^2$) shall be laid over Styrofoam, welding laps over the width of 10cm and fixing-anchoring them to the base structure of the floor slab, using anchors between 15 and 30 cm long, 30 cm apart, entirely in accordance with the description provided in the BoQ and manufacturer's instructions.

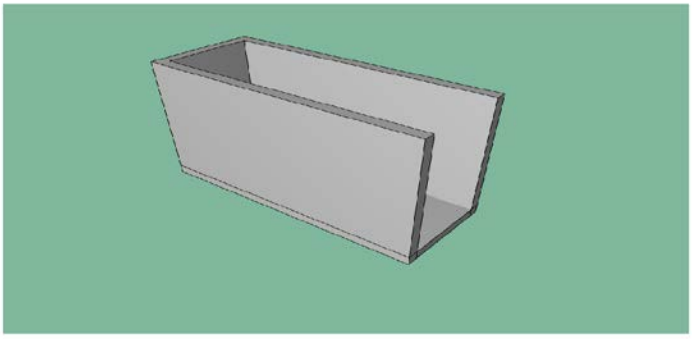
Because it is not possible to assess the condition of vertical water drainage outlets, it is necessary to make new outlets with covers made of galvanized sheet metal d=0.6mm (the joints shall be done by soldering), 13x13cm L=25cm (measures for new outlets with cover must be taken on the spot), which shall be built in the existing ones (there are 8 of these), laying PVC membrane over them (the membrane shall be put in the new outlet at the depth of 10 cm), and this joint shall be coated with PMMA-based resins (polymethil methacrylate – "triflex" or similar coats). There are also two outlet spouts on the roof located in the vertical wall (marked in the plan), and as such, after the Styrofoam is installed they will be "sunk" so a fitting needs to be made for them using galvanized sheet metal (joints shall be done by soldering), into which PVC membranes shall be folded at a depth of 10cm, and the joint with the PVC membrane finished using PMMA-based resin (2 pcs – **Detail E**).

**SPOUT DETAIL**

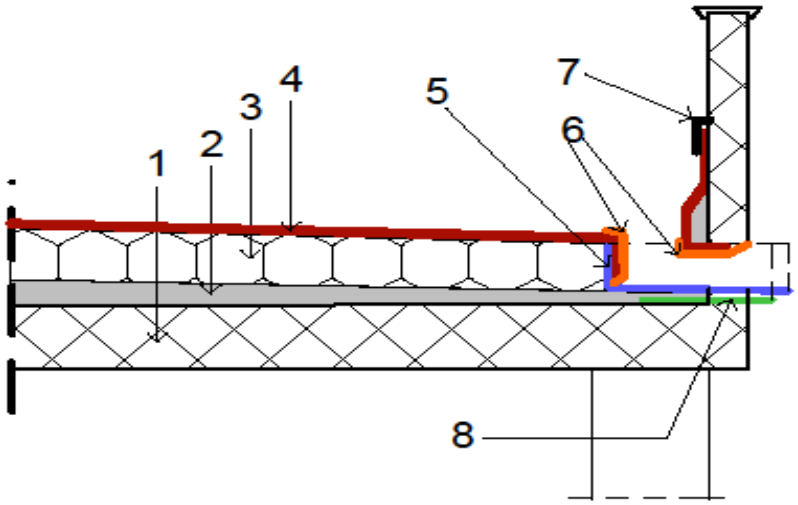



sides soldered together (comment on the first drawing)

folding line (comment on the second drawing)



# DETALJ POLOŽAJA " LULE "




1. Postojeća A.B. medjuspratna konstrukcija
2. Postojeća hidro i termo izolacija
3. Nova termo izolacija- stiropor d=15cm
4. Novo-postavljena PVC membrana, položena preko stiropora koja se povija u novi elemenat lule u dubini od 10cm sa varenjem toplim vazduhom
5. Novo-postavljeni elemenat " lule" od pocinko-vanog lima d=0,6mm čiji se elementi spajaju lemljenjem .
6. Premaz na spoju membrane i novog slivnika smolama na bazi PMMA
7. Završna aluminijumska " L " lajsna
8. Postojeća lula

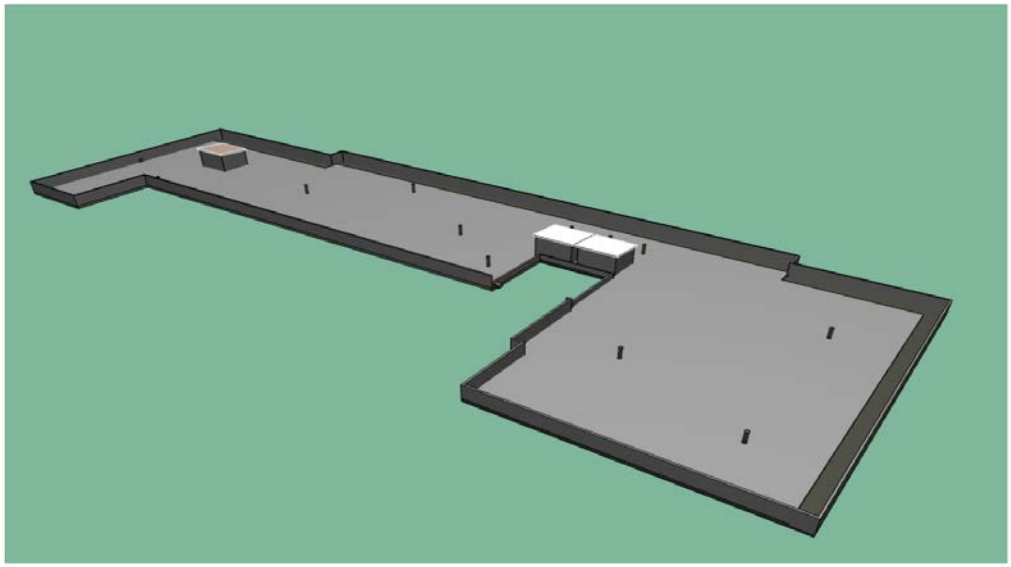
**SPOUT POSITION DETAIL (drawing above)**

1. Existing A.B. floor structure
2. Existing water and thermal insulation
3. New thermal insulation – Styrofoam d=15cm
4. New PVC membrane, laid over the Styrofoam, folded into the new outlet at the depth of 10cm, with hot air welding
5. New spout element with cover made of galvanized sheet metal d=0.6mm, the elements of which are soldered together
6. Flashing at the joint of the membrane and new outlet with PMMA-based resins
7. Finishing aluminum “L” strip
8. Existing spout

## ROOF PLANE no. 3

This roof plane is at the height level +330.00, representing a **non-walkable** roof plane with finishing layer made of cold Poliazbitol coating, with no protective Puroflex coating. Drainage is conducted via A.B. horizontal gutters 77cm wide on three sides on the edges, with projected slopes of 1.0%

The surfaces are relatively clean, without debris or foreign objects that would need to be removed.



There are three brick vents on the roof (Type D, dim. 225x200) covered with galvanized sheet metal, with insulation folded along the walls at the height of cca 30cm. Coving shall be finished at the corners by welding and overlapping PVC membrane (12 pcs). Considering the sheets are in quite good condition they only need to be protected and coated with protective sheet metal paint in two layers (15.0m$^2$).

There are also cast plumbing vent pipes Ø100 on the roof, with vent covers made of galvanized sheet metal (12 pcs). Certain vent covers made of galvanized sheet metal are corroded and need to be replaced (4 pcs). Finishing around the pipes shall be done using PMMA-based resins, at the height of a minimum of 40 cm (12 pcs).

Considering that the slopes are kept as originally built with there being very small “pockets”, this Design envisages to even out uneven parts by filling them with sand, 3cm thick on average, where the “pockets” are, in the total amount of 10% of the total roof surface (65.0m$^2$).

Thermal Styrofoam insulation d=15cm (the following characteristics: heat conductivity coefficient 0.035W/Mk, volumetric mass min. 22kg/m$^3$ and compressive strength min. 133kPa) shall be placed on the part of the roof above the building (650m$^2$), while on the rest of the horizontal concrete gutter only PVC membrane shall be laid, and coves made at the height of 30cm (120m$^2$). Also, coves shall be made on existing vents (3 pcs) made of PVC membrane, h=30cm.

PVC membrane strips (770.0m$^2$) shall be laid over Styrofoam, welding laps over the width of 10cm and fixing-anchoring them to the base structure of the floor slab, using anchors between 15 and 30 cm long, 30 cm apart, entirely in accordance with the description provided in the BoQ and manufacturer’s instructions.

Because it is not possible to assess the condition of vertical water drainage outlets, it is necessary to make new outlets with covers made of galvanized sheet metal d=0.6mm (the joints shall be done by soldering), 13x13cm L=25cm (measures for new outlets with cover must be taken on the spot), which shall be built in the existing ones (there are 5 of

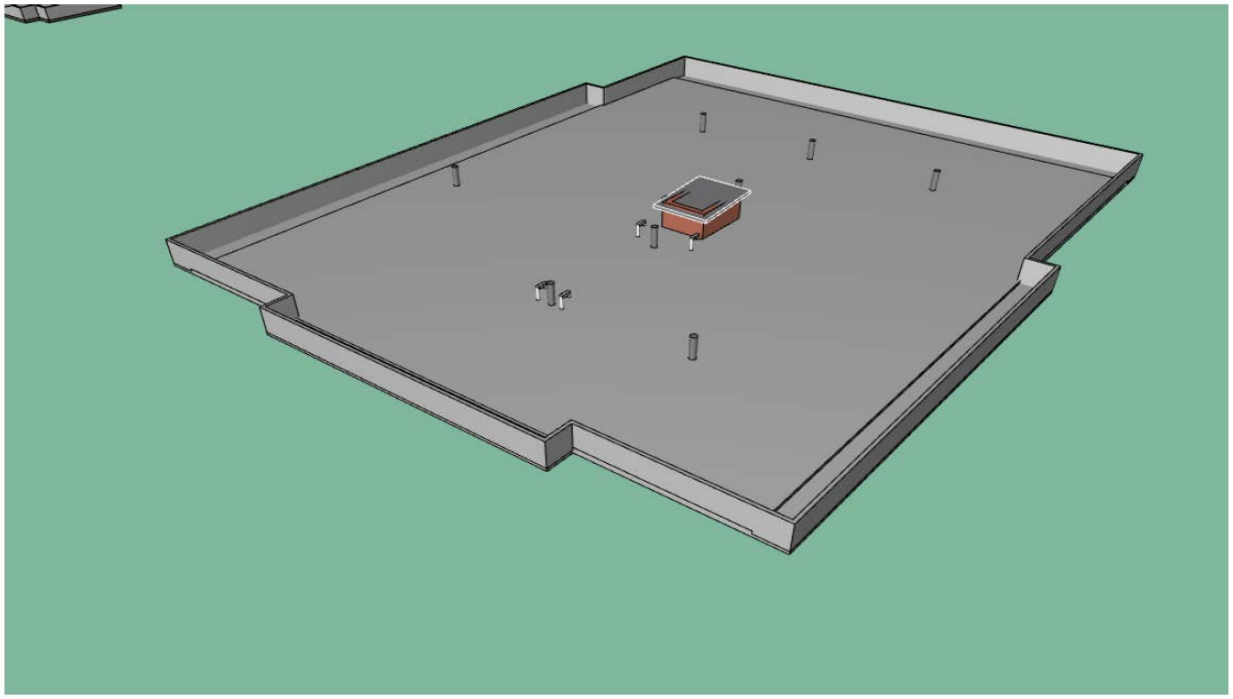
these), laying PVC membrane over them (the membrane shall be put in the new outlet at the depth of 10 cm), and this joint shall be coated with PMMA-based resins (polymethil methacrylate – “triflex” or similar coats). There are also two outlet spouts on the roof located in the vertical wall (marked in the plan), and as such, after the Styrofoam is installed they will be “sunk” so a fitting needs to be made for them using galvanized sheet metal (joints shall be done by soldering), into which PVC membranes shall be folded at a depth of 10cm, and the joint with the PVC membrane finished using PMMA-based resin (3 pcs – **Detail E**).

**ROOF PLANE no. 4**

This roof plane is at the height level +750.00, representing a **non-walkable** roof plane with finishing layer made of cold Poliazbitol coating, with no protective Puroflex coating. Drainage is conducted via A.B. horizontal gutters 77cm wide on three sides on the edges, with projected slopes of 1.0%




The surfaces are relatively clean, without debris or foreign objects that would need to be removed.



There is one brick vent on the roof (Type A, dim. 150x200) covered with galvanized sheet metal, with insulation folded along the walls at the height of cca 30cm. Coving shall be finished at the corners by welding and overlapping PVC membrane (4 pcs). Considering the sheets are in quite good condition they only need to be protected and coated with protective sheet metal paint in two layers (6.0m$^2$).

Galvanized vents

PVC vents

There are also cast plumbing vent pipes Ø100 on the roof, with vent covers made of galvanized sheet metal (8 pcs). Certain vent covers made of galvanized sheet metal are corroded and need to be replaced (4 pcs). Finishing round the pipes shall be done using

PMMA-based resins, at the height of a minimum of 40 cm (8 pcs). In addition to these, there are also PVC pipe vent outlets Ø70 on the roof, which, considering they are low and will be even lower after laying Styrofoam, are necessary to extend by cca 30cm using the same pipes (insert 30cm PVC pipes in the vertical part and keep the existing spout – 5 pcs).

Considering that the slopes are kept as originally built with there being very small “pockets”, this Design envisages to even out uneven parts by filling them with sand, 3cm thick on average, where the “pockets” are, in the total amount of 10% of the total roof surface (45.0$m^2$).

Thermal Styrofoam insulation d=15cm (the following characteristics: heat conductivity coefficient 0.035W/Mk, volumetric mass min. 22kg/$m^3$ and compressive strength min. 133kPa) shall be placed on the part of the roof above the building (450$m^2$), while on the rest of the horizontal concrete gutter only PVC membrane shall be laid, and coves made at the height of 30cm (80$m^2$). Also, coves shall be made on existing vents (1 pc) made of PVC membrane, h=30cm.

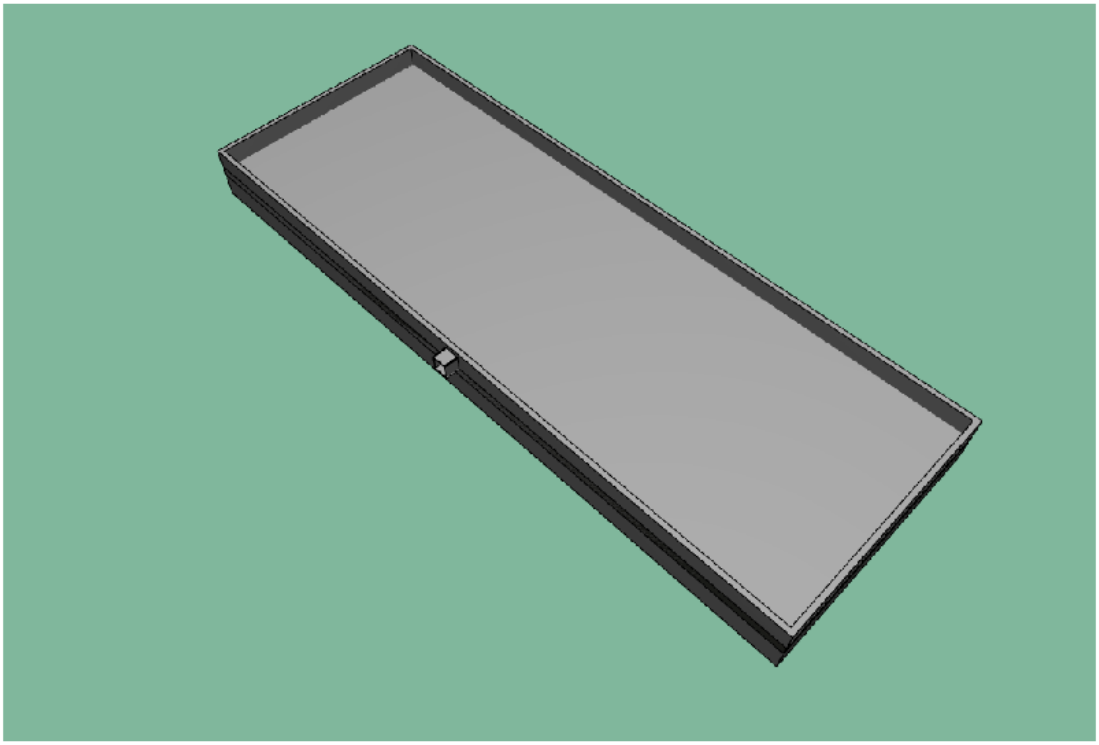
PVC membrane strips (530.0$m^2$) shall be laid over Styrofoam, welding laps over the width of 10cm and fixing-anchoring them to the base structure of the floor slab, using anchors between 15 and 30 cm long, 30 cm apart, entirely in accordance with the description provided in the BoQ and manufacturer’s instructions.

Because it is not possible to assess the condition of vertical water drainage outlets, it is necessary to make new outlets with covers made of galvanized sheet metal d=0.6mm (the joints shall be done by soldering), 13x13cm L=25cm (measures for new outlets with cover must be taken on the spot), which shall be built in the existing ones (there are 5 of these), laying PVC membrane over them (the membrane shall be put in the new outlet at the depth of 10 cm), and this joint shall be coated with PMMA-based resins (polymethil methacrylate – “triflex” or similar coats).

## ROOF PLANE no. 5

This roof plane is at the height level +750.00, representing a **non-walkable** roof plane with finishing layer made of cold Poliazbitol coating, with no protective Puroflex coating. Drainage is conducted via a side wall through a spout draining the water from this roof to roof no. 6.

The surfaces are relatively clean, without debris or foreign objects that would need to be removed.



Thermal Styrofoam insulation d=15cm (the following characteristics: heat conductivity coefficient 0.035W/Mk, volumetric mass min. 22kg/$m^3$ and compressive strength min. 133kPa) shall be placed on the part of the roof above the building (70.0$m^2$), and coves shall be made using PVC membrane along the edge at the height of 30cm (10.0 $m^2$).

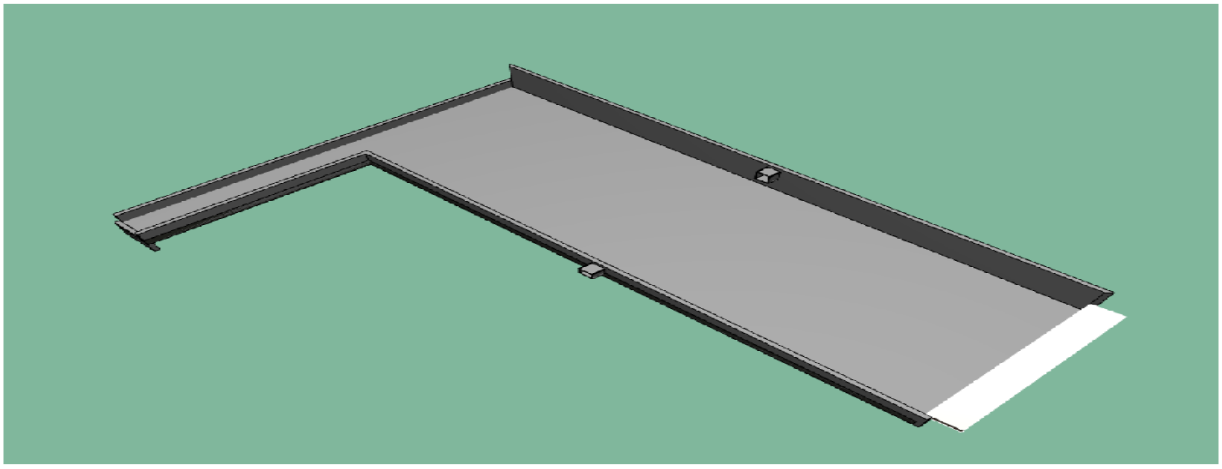
PVC membrane strips (80.0$m^2$) shall be laid over Styrofoam, welding laps over the width of 10cm and fixing-anchoring them to the base structure of the floor slab, using anchors between 15 and 30 cm long, 30 cm apart, entirely in accordance with the description provided in the BoQ and manufacturer's instructions.

There is also an outlet spout on the roof located in the vertical wall (marked in the plan), and as such, after the Styrofoam is installed it will be "sunk" so a fitting needs to be made for it using galvanized sheet metal finishing the joint with the PVC membrane using PMMA-based resin (1 pc – **Detail E**).

## ROOF PLANE no. 6

This roof plane is at the height level +750.00, representing a **non-walkable** roof plane with finishing layer made of cold Poliazbitol coating, with no protective Puroflex coating. Drainage is conducted via side wall through a spout draining the water from this roof to the vertical gutter of the atrium and drain channel towards roof no.7.

The surfaces are relatively clean, without debris or foreign objects that would need to be removed.



Thermal Styrofoam insulation d=15cm (the following characteristics: heat conductivity coefficient 0.035W/Mk, volumetric mass min. 22kg/$m^3$ and compressive strength min. 133kPa) shall be placed on the part of the roof above the building (65.0$m^2$), and coves shall be made using PVC membrane along the edge at the height of 30cm (13.0 $m^2$).

PVC membrane strips (78.0$m^2$) shall be laid over Styrofoam, welding laps over the width of 10cm and fixing-anchoring them to the base structure of the floor slab, using anchors between 15 and 30 cm long, 30 cm apart, entirely in accordance with the description provided in the BoQ and manufacturer's instructions.

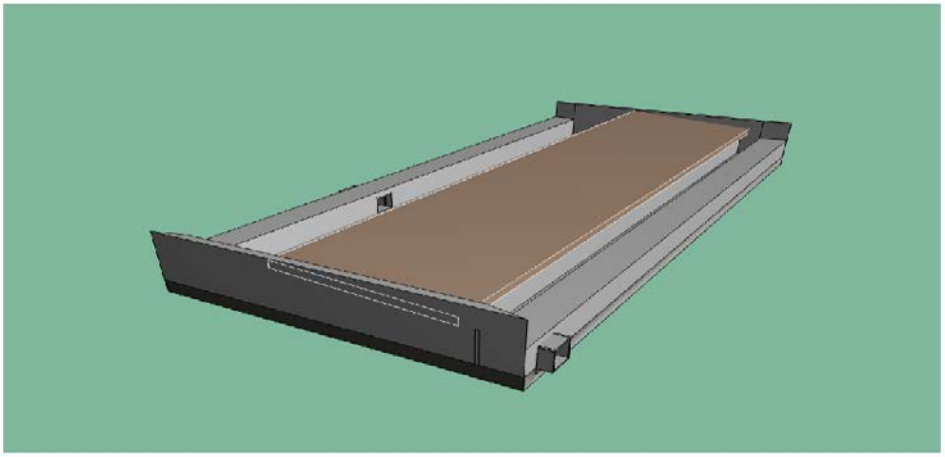
There is also an outlet spout on the roof located in the vertical wall (marked in the plan), and as such, after the Styrofoam is installed it will be "sunk" so a fitting needs to be made for it using galvanized sheet metal finishing the joint with the PVC membrane using PMMA-based resin (1 pc – **Detail E**).

**ROOF PLANE no. 7**

This roof plane is at the height level +1,080.00, representing a combination of concrete gutters and roof clad with galvanized sheet metal on a wooden substructure.

Drainage is conducted over side walls of the channel through spouts letting the water out to vertical atrium gutters.

The surfaces are relatively clean, without debris or foreign objects that would need to be removed.



Thermal Styrofoam insulation d=15cm (the following characteristics: heat conductivity coefficient 0.035W/Mk, volumetric mass min. 22kg/$m^3$ and compressive strength min. 133kPa) shall be placed on the part of the roof above the building (15.0$m^2$), and coves shall be made using PVC membrane along the edge at the height of 30cm (15.0 $m^2$).

PVC membrane strips (30.0m$^2$) shall be laid over Styrofoam, welding laps over the width of 10cm and fixing-anchoring them to the base structure of the floor slab, using anchors between 15 and 30 cm long, 30 cm apart, entirely in accordance with the description provided in the BoQ and manufacturer's instructions.

There are also two outlet spouts on the roof located in the vertical wall (marked in the plan), and shall only be finished using PMMA-based resins (2 pcs) on the joint with the PVC membrane.

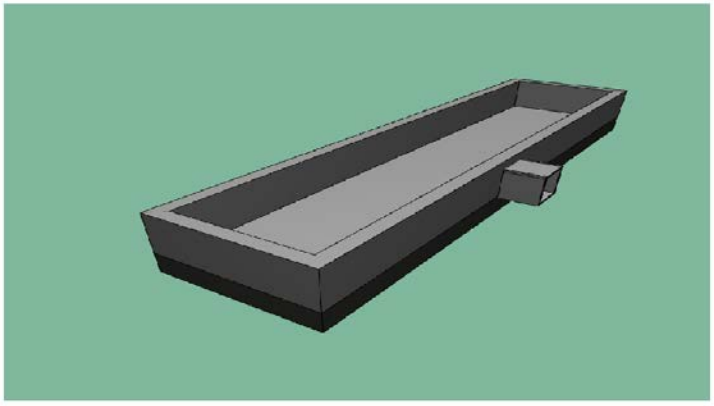
On the roof there is another single roof covered with galvanized sheet metal on a wooden sub-structure, from which water drains into an A.B. horizontal gutter.

Considering that the sheet metal is in quite poor condition, it should be replaced with new plastic coated sheet metal (18.0m$^2$) with all the necessary flashing.

Galvanized drip tray on the left side is in quite poor condition and needs to be protected and coated with sheet metal paint in two layers, previously cleaning and degreasing the surface R.Š. 50cm (6.0m$^2$).

**ROOF PLANE no. 7a**

This roof plane is at the height level +310.00, representing an independent unit, dim. 92x450cm.



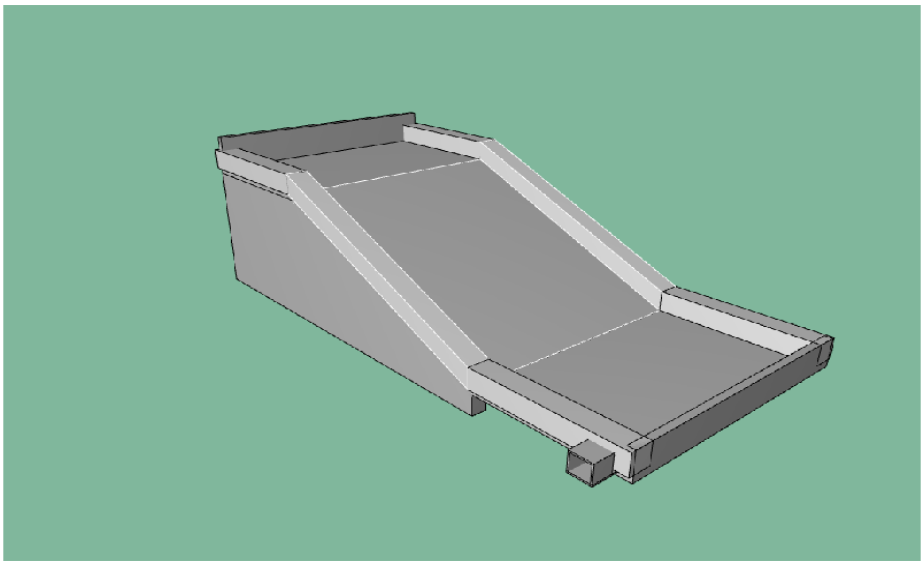
Thermal Styrofoam insulation d=15cm (the following characteristics: heat conductivity coefficient 0.035W/Mk, volumetric mass min. 22kg/m$^3$ and compressive strength min. 133kPa) shall be placed on the part of the roof above the building (5.0m$^2$), and coves shall be made using PVC membrane along the edge at the height of 230cm (10.0 m$^2$).

There is also an outlet spout on the roof located in the vertical wall (marked in the plan), and as such, after the Styrofoam is installed it will be "sunk" so a fitting needs to be made for it using galvanized sheet metal finishing the joint with the PVC membrane using PMMA-based resin (1 pc – **Detail E**).

**ROOF PLANE no 10.**

This roof plane represents a broken roof plane consisting of an A.B. oblique roof slab with flat ends (in the form of oblique stairway slab with rests) and serves as roof above entrance stairs. At the lowest part of the roof plane on the left, there is a spout letting the water out from this roof into a vertical gutter made of galvanized sheet metal. There are A.B. walls along the edges of this surface, d=10cm h=30cm, with flashing (cover) on top using drip tray made of galvanized sheets R.Š. 25cm.

Functionally, this roof plane represents cover above the entrance and wind stop for access to the children's clinic.



Thermal Styrofoam insulation d=15cm (the following characteristics: heat conductivity coefficient 0.035W/Mk, volumetric mass min. 22kg/$m^3$ and compressive strength min. 133kPa) (30$m^2$) shall be placed on the on the entire surface, and coves shall be laid using PVC membrane along the edge at the height of 20cm (37.0 $m^2$).

There is also an outlet spout on the roof located in the vertical wall (marked in the plan), and as such, after the Styrofoam is installed it will be “sunk” so a fitting needs to be made for it using galvanized sheet metal finishing the joint with the PVC membrane using PMMA-based resin (1 pc – **Detail E**).

**The calculation for this item shall be made according to actually used quantities measured on the spot, without flattening surfaces in any way.**

**In order to have a more complete overview of all the works, it is the Contractor’s duty to learn about the existing situation by visiting the building.**

**Annexes:**

- **Photographs of existing situation**
- **Roof plans with details**
- **BoQs**

## ROOF PLANE – galvanized sheet metal POZ 2

Sheet metal roof, dividing the roof plane no. 3 and no. 6 is actually a dilatation between the two parts of the building, which is not provided in the original design, but is probably built as a double-pitched roof covered with galvanized sheet metal because of leakage of rain on the dilatation itself.

Dimensions of the said double-pitch roof are 120x420cm. The sheet metal itself is in quite poor condition (it is corroded)  so it should be replaced with new plastic coated sheet metal (8.0m$^2$) with all the necessary flashing.

## GUTTER VERTICALS

All the water runs through vertical roof outlets or spouts, from all roof planes, through **vertical gutter pipes**, made of galvanized sheet metal d=6mm, dim. 14x14cm, further into the existing network of rainwater sewers. On the part of the roof where the water flows down from the roofs through the spouts, there are the so-called collectors on the gutter vertical with fittings at the ends of all verticals – spouts. Gutter verticals are attached to the existing building walls via brackets.

In time, one part of the verticals was replaced, while another is bent or torn, so it is necessary to replace the part of the damaged verticals, fully in accordance with the existing elements (10.0m[1]).

When developing this concept, the Designer has taken into account all the works that would be needed to make the thermal and water insulation for flat roofs of the mentioned buildings, so that after the insulations are finished there are no works that could potentially damage it.