



Dr. Mechtild Rossler
Director, World Heritage Centre
7, Place de Fontenoy
75352, Paris 07Sp, France

Dear Madam,

From the outset, let me express my sincere appreciation to the World Heritage Centre and personally to you for the continuous support and cooperation aimed at ensuring the implementation of the World Heritage Convention.

In line to the State of Conservation Report for the World Heritage Property “Gelati Monastery”, submitted by the State Party on January 31, 2020, I would like to provide an additional information on the recent condition deterioration at Gelati Monastery WHS, in particular, the issues and damages of roofs revealed in February-March, 2020, that led to the water infiltration into the interior of the Church and the immediate steps already taken by the State Party in this regard and to be implemented.

Taking into consideration the emergency condition of Gelati Monastery, National Agency has already implemented the first immediate actions, *inter alia* the arrangement of scaffolding and the temporary roofing, to protect the monument from further possible deterioration, while, with the aim to improve and ensure the proper State of Conservation of the Site, the multidisciplinary studies is envisaged since the temporary roofing is completed. In this regard, we would like to apply to your kind attention and for consideration of the ICOMOS, to provide us with valuable and useful recommendations and guidelines for further possible actions to mitigate the existing hazards.

I would like to reiterate the commitment of the Government of Georgia to the implementation of the recommendations of the World Heritage Committee and Advisory Bodies to ensure the proper preservation of the World Heritage Sites in Georgia.

Please accept, Madam, the assurance of my highest consideration.

Annex 1: Information on the State of Conservation of the Church of Virgin of Gelati Monastery WH Property, Georgia;

Annex 2: The implemented project documentation for the temporary roofing and scaffolding for the Church of Virgin.

Sincerely,

Director-General

SIGNED/SEALED
ELECTRONICALLY 

Nikoloz Antidze

Information on the State of Conservation of the Church of Virgin of Gelati Monastery WH Property, Georgia

Background information:

In 2008, by the order of the Ministry of Culture, Monument Protection and Sports of Georgia, the NNLE Georgian Heritage developed the Conservation Master Plan for Gelati Monastery WHS and relevant projects for rehabilitation and conservation of buildings and archaeology within the Complex. In 2015, the above-mentioned Conservation Master Plan and part of the projects were updated through cooperation between the National Agency for Cultural Heritage Preservation of Georgia and NNLE Georgian Heritage. The aforementioned documentation has been submitted and agreed with the World Heritage Committee and its Advisory Body (ICOMOS). Accordingly, since 2008, the State has been gradually implementing the large-scale rehabilitation program of Gelati Monastery Complex, which covered the conservation-restoration activities on the various buildings of the monastery, the full information has been reported already through the official SoC Reports submitted by the State Party. The implementation of the projects has been assessed, discussed and evaluated on site by several joint missions (2010, 2012, 2015).

The conservation-restoration of the Church of the Virgin *inter alia* considered the replacement of Soviet period metal roofing with handmade glazed ceramic tiles produced using traditional technology based on the archaeological findings. Rehabilitation of the roof of the Church of the Virgin was performed by NNLE Georgian Arts & Culture Center and was funded by the U.S. Ambassadors Fund for Cultural Preservation (AFCP) (2013-2018) and the Municipal Development Fund of Georgia (MDF) through the II Regional Development Project within the World Bank Loan (2018-2019).

While the whole works have been successfully completed at the end of 2019, at the end of February, 2020, information was received that the part of glazed ceramic tiles have been broken and damaged, and that there were signs of water infiltration in the West arm of the Church of Virgin. In the beginning of March, the National Agency arranged a field mission together with its Cultural Heritage Council members, independent experts, performer company and the donor organization (MDF). The mission confirmed the damages and problems related: to water infiltration, to glazed ceramic tiles and to arrangement of roofing. As a result, the comprehensive list of recommendations on initial actions to avoid further water infiltration into the interior and to improve the state of conservation of the church has been elaborated and the performer of works has been requested to start the implementation of relevant measures immediately. Unfortunately, the beginning of the immediate actions was delayed due to the state of emergency related to the Covid-19 pandemic in the country till June, 2020 while the National Agency, based on the special governmental

permissions, sustained the onsite monitoring of the state of conservation of the WH Monument and its attributes and implemented the emergency interventions.

Roof Damages:

On-site assessment revealed two main issues:

- Since 2018, within the MDF funded project, due to the time limitation of the contract terms and on the base of the certificate of quality of material, submitted by the performer company to the supervision authority a new manufacturer of the glazed ceramic tiles has been approved, which used new technology and material to produce the glazed ceramic tiles. As a result, the tiles that are used for the roofs of chapels, porches, narthex and altar, are made of white ceramic with pouring of clay in mould. Damages appeared on the roofs in 2020, and on-site assessment revealed that these glazed ceramic tiles are of low quality and are not suitable for roofing with lime mortar.
- Other identified problems and damages are related to the roofing works of West arm of the Church of Virgin performed in 2016. Significant problems have been observed: roofing defects are likely to be related to amortized fillings of lime, especially in the area of joints of the roofing and the walls.

It should be underlined, that no tile damage was observed on the upper parts of the Church (dome, arms and spaces between arms).

Wall Painting Deterioration:

The aforementioned roofing problems led to the water infiltration into the interior of the Church. On-site assessment and monitoring revealed the following condition phenomenon of wall painting:

The salt efflorescence has been detected as a main cause of deterioration, which is related to the water infiltration through damaged roofs and environmental conditions of the interior. Salt crystallization cycles have caused cohesion and adhesion failures of paint and plaster layers, loss of repair materials applied during previous interventions in the XX century as well as small wall painting fragment pieces from the original technology. The bioactivity has also been observed.

The mentioned condition phenomena have been detected in various places; however, the most critical issues are found in the Church's West arm's vault.

The regular monitoring carried out by the National Agency's specialists and interviews with the monastery representatives did not reveal the damage of mosaic and/or the loss of its any fragment.

It is worth to mention that the multi-layered wall painting of XII-XVII centuries preserved in Gelati Monastery Church of Virgin has survived to our times with a number of historical damages, including the ones caused by the water leakages in different periods. In the second half of the XX century, the last large-scale restoration and conservation works on the wall paintings were carried out, during which, among other interventions, edge repairs and fills were made to stabilise the deteriorated plaster layers.

Mitigation Activities:

Considering the historical deterioration, poor state of conservation and the requests of the WH Committee, the research and conservation of wall paintings of Gelati Monastery has constantly been in the comprehensive rehabilitation agenda, which was considered to be implemented at a later stage of the rehabilitation project, after completion the architectural and structural conservation-restoration. At this stage, the National Agency is working on the possibility of allocation of resources in order to ensure the internationally recognized standard of wall painting conservation after the elimination of roofing-related problems.

Further, the strong necessity of the gutters on the buildings of the complex has been identified to protect from the impact of the rain water on facades. The relevant project is being prepared and in accordance to the para 172 of the Operational Guidelines before the decision is made on the implementation at the National level, the project will be submitted to the World Heritage Centre and ICOMOS, Advisory Body, for approval.

Since march, 2020, the National Agency regularly carries out the monitoring to identify the current condition of wall painting and the causes and activation mechanisms of deterioration. Within the aforementioned monitoring:

- Analysis of the wall paintings condition in the Church of Virgin, St. George Church and the Southern Porch was held; condition phenomena have been identified, documented and categorized according to the:
 1. areas, which have been historically damaged/deteriorated;
 2. newly damaged/deteriorated areas (occurred after roof rehabilitation).

Apart from this, the rate and distribution of detrimental change has been determined in order to establish whether deterioration is active or not.

- According to the condition assessment of façades and interior, the possible correlation between those two has been identified;
- Recent deterioration of the wall painting has been identified through research into physical history and condition assessment. Comparative analysis has been undertaken based on visual observation aided by imaging and 3D scanned documentation, elaborated by the National Agency in 2017-2018;
- The condition monitoring of the wall paintings in the whole complex is being undertaken. The deteriorated areas are regularly being photo monitored to determine detrimental change and establish whether the problem is active or not. Dry method of mechanical salt reduction in the West arm is also regularly undertaken.
- Regular (at least once per month) monitoring missions are being carried out and relevant reports/recommendations are developed with involvement of both National Agency and external specialists.

According to the regular monitoring and their results the relevant recommendations have been elaborated to be implemented during the further steps.

At this stage, the scaffolding has been already arranged and the temporary metal roofing is being installed to ensure the long-term protection against possible water infiltration, while the comprehensive investigation for the identification of all problems and elaboration of the mitigation measures' project is being undertaken.

The Hazards Mitigation Short-Term Action Plan

Updated on: 01/09/2020

Immediate measures and actions to improve the condition caused by the problems identified on the roof of the Church of Virgin, Gelati monastery, in 2020 are determined on the basis of the National Agency’s field missions and the current condition assessment. Measures and actions may be modified/added based on the studies defined in the plan and their results, as well as according to the recommendations provided by the World Heritage Centre and ICOMOS.

Note: After completing/in parallel to the measures and activities listed below, the research and conservation of wall paintings of Gelati Monastery and the development of relevant action plan should be considered in the comprehensive rehabilitation agenda, , as well as the need to develop a rain gutter system project (documentation is being developed) and arrangement.

Action	Status
Temporary Roofing	
Arrangement of a waterproof canvas cover over the damaged sections	Complete
Arrangement of the scaffolding	Complete
Arrangement of permanent temporary roofing	Ongoing
Wall painting	
Monitoring of wall painting condition, mostly focusing on the vault of West arm The Wall painting monitoring will sustain during the whole process of mitigation activities	Ongoing Already implemented on: March 11; April 30; May, 22; June 19; July, 13; August 11; Scheduled: End of September
Mechanical salt reduction in the West arm with dry method.	
The regular photo monitoring of deteriorated areas to determine detrimental change and establish whether the problem is active or not.	Ongoing
Arrangement of environmental monitoring system	ongoing
Arrangement of the scaffolding in the West arm	Partially arranged; The scaffolding should extend to the entire wing
Elimination of problems related to roofing	
Identification of the source of damage through relevant studies, lab tasting, etc.	Not started yet:
Identify the prevalence of damages (by their graphic and textual documentation) and compile project documentation for relevant	<i>Performance should begin after arrangement of the</i>

interventions in accordance with the recommendations developed by the National Agency.	<i>Temporary roofing and scaffolding, to avoid the condition complication during research and the sampling.</i>
Improvement of the roofing problems based on the project documentation	Not started yet.
Replacement of damaged tiles	
Making replacement tile samples	Ongoing
Laboratory testing for samples of replacement tiles and obtaining an expert opinion on its durability and the possibility of its arrangement on the lime mortar.	Ongoing
Determining the cause of tile damage through appropriate examination, laboratory research and their physical and mechanical characteristics	Ongoing
Production of new, replacement tiles according to the samples positively evaluated by the expertise.	Should be carried out after the completion of the examination.
Elaboration of project documentation for replacement of tiles made of "white" ceramics	Should be carried out after the completion of the examination.
Replacement of tiles made of "white" ceramics with new ones;	The deadline for implementation will be determined by the National Agency in accordance with the permit conditions.
Temporary roofing and scaffolding	
Preparation of project documentation and obtaining a permit for dismantling of temporary roofs and scaffolding and replacement of damaged tiles.	Should be repaired after damages have been removed.
Dismantling of temporary roofs and scaffolding and replacement of damaged tiles.	The deadline for implementation will be determined by the National Agency in accordance with the permit conditions.

INFORMATION ON THE STATE OF
CONSERVATION OF THE CHURCH OF
VIRGIN OF THE GELATI MONASTERY WH
PROPERTY, GEORGIA

National Agency for Cultural Heritage
Preservation of Georgia



August , 2020.



1. Context

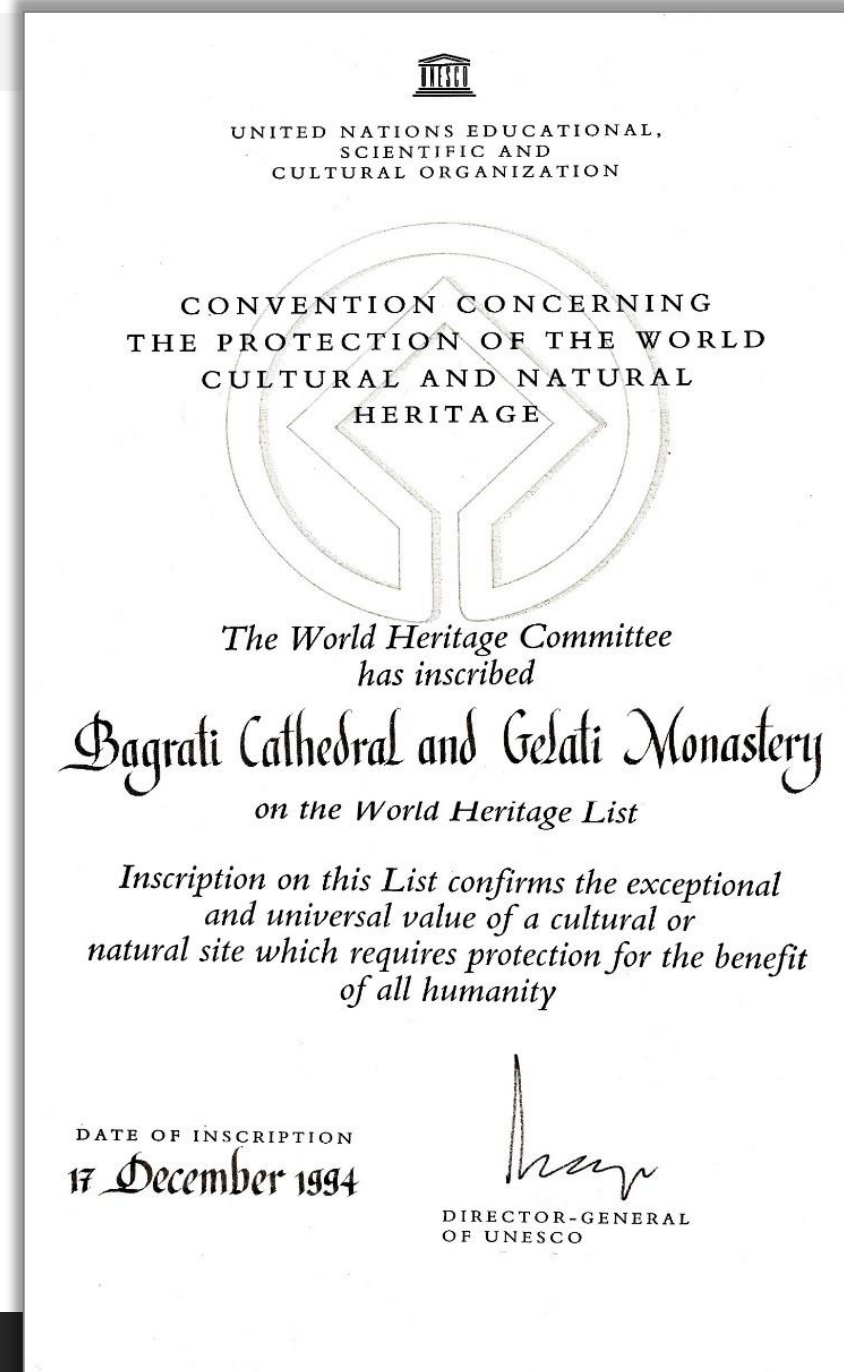
2. Roofing damages

3. Wall painting deterioration

4. Implemented actions



- 1994 Inscription in the World Heritage List as a part of the serial Property of: Bagrati Cathedral and Gelati Monastery
- 2010-2017 Site in the World Heritage Danger List;
- 2017 Significant boundary modification;
In the World Heritage List as: "Gelati Monastery"



Rehabilitation Process of Gelati Monastery

Since 2008, the State has been gradually implementing the large-scale rehabilitation program of Gelati Monastery Complex in coordination with the World Heritage Committee and its Advisory Bodies:

- 2008 Conservation Master Plan and the relevant projects were developed for rehabilitation conservation of the different components of the complex;
- 2010-2019 With support of various donors, step-by-step implementation of the project started for various structures of the complex;
- 2013-2015 The Management Plan for Gelati Monastery was elaborated and agreed with WH Committee and its Advisory Bodies;
- 2015 The Conservation Master Plan was updated;
- 2008
2010
2012 Joint World Heritage Centre/ICOMOS Reactive Monitoring Missions;
- 2015 ICOMOS/World Bank Advisory Mission.



Rehabilitation Process of the Church of Virgin

According to the project, developed by N(N)LP “Georgian Heritage”, on the basis of the permit, issued by the National Agency, complex rehabilitation of Gelati Monastery was carried out in 2013-2019 by N(N)LP “Georgian Arts and Culture Center”.

2013-2018	Rehabilitation of the roofing of the Church of Virgin (dome, arms, altar, inter-arm spaces) – funded by U.S. Ambassadors Fund for Cultural Preservation (AFCP);
2015-2017	Conservation works of the building material (stone) of the Church of Virgin – funded by Municipal Development Fund of Georgia;
2018-2019	“Rehabilitation of Roofing of Chapels, Socle and Drainage Systems of Church of Virgin” – funded by Municipal Development Fund of Georgia;
2019	Urgent conservation works of wall paintings in the North arm of Gelati Church of Virgin– funded by Municipal Development Fund of Georgia.



Problems of Roofing of the Church of Virgin

At the end of February, 2020, information was received that the part of glazed ceramic tiles have been broken and damaged, and that there were signs of water infiltration in the West arm of the Church of Virgin.

On March 11, 2020, for the purpose of assessment of the situation, field mission of the working group of the National Agency was arranged.

Together with the National Agency, the following entities participated in the meeting:

- The members of the Cultural Heritage Council;
- Municipal Development Fund of Georgia;
- The implementing company;
- The group of authors of the project



The Problems Identified in the Roofing

Problems of the roofing arrangement:

The problem is identified on:

West arm;
presumably the North arm.

Roofing defects are likely to be related to amortized fillings of lime, especially in the area of joints of the roofing and the walls.

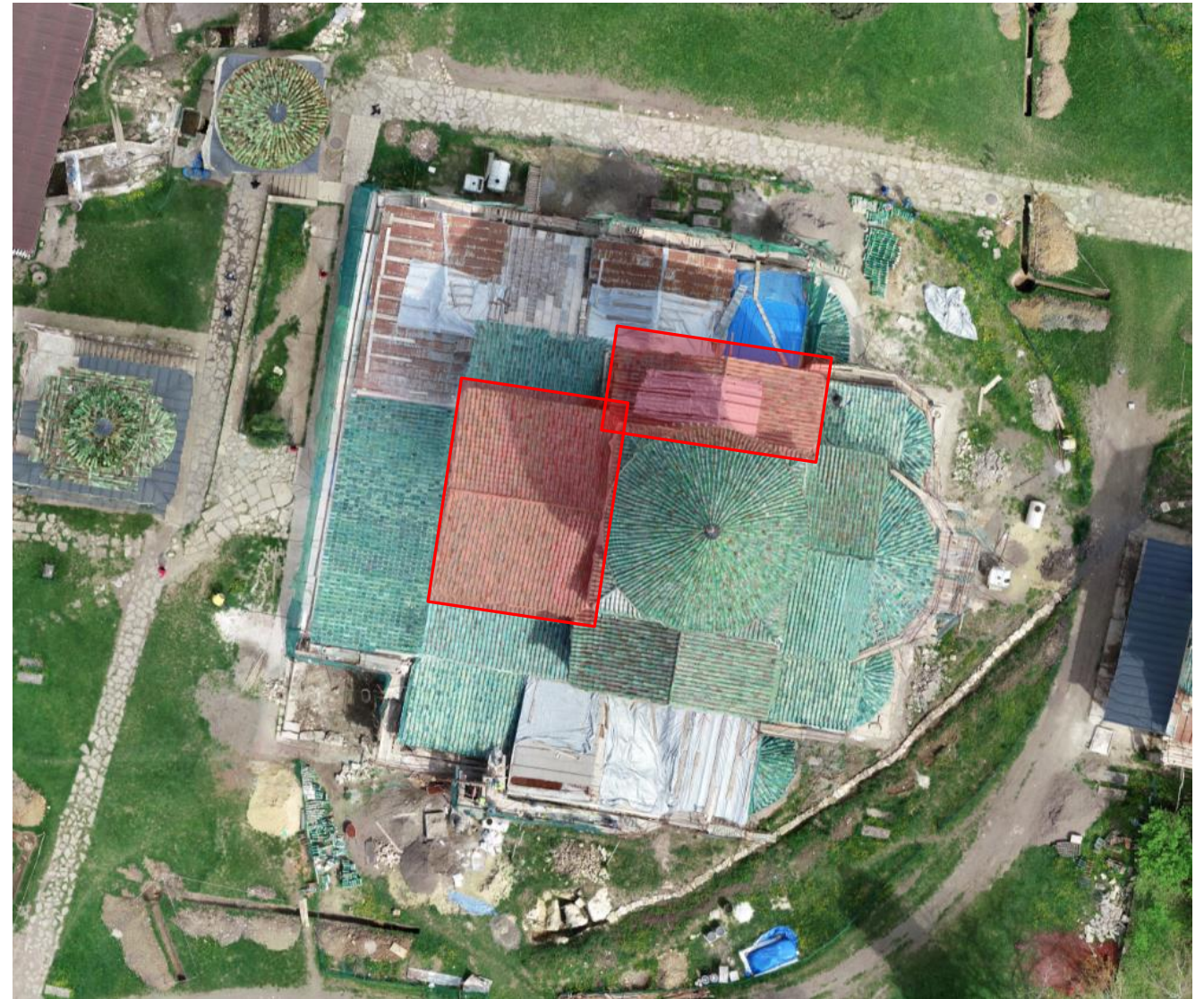


Photo 2019.



The Problems Identified in the Roofing

Problems of the roofing arrangement:

The problem is identified:

On the West arm;
Assumedly on the North arm.

As a result, the following damages are observed locally:

- Salt efflorescence;
- Bioactivity;
- Stone color alteration (assumedly moisture);
- On the fillings made during the stone conservation: color alteration (assumedly moisture) and loss of cohesion and adhesion;
- On the joints between the tiles: 1. Loss; 2. Cracks; 3. loss of adhesion;



The Problems Identified in the Roofing

Problems related to glazed ceramic tile:

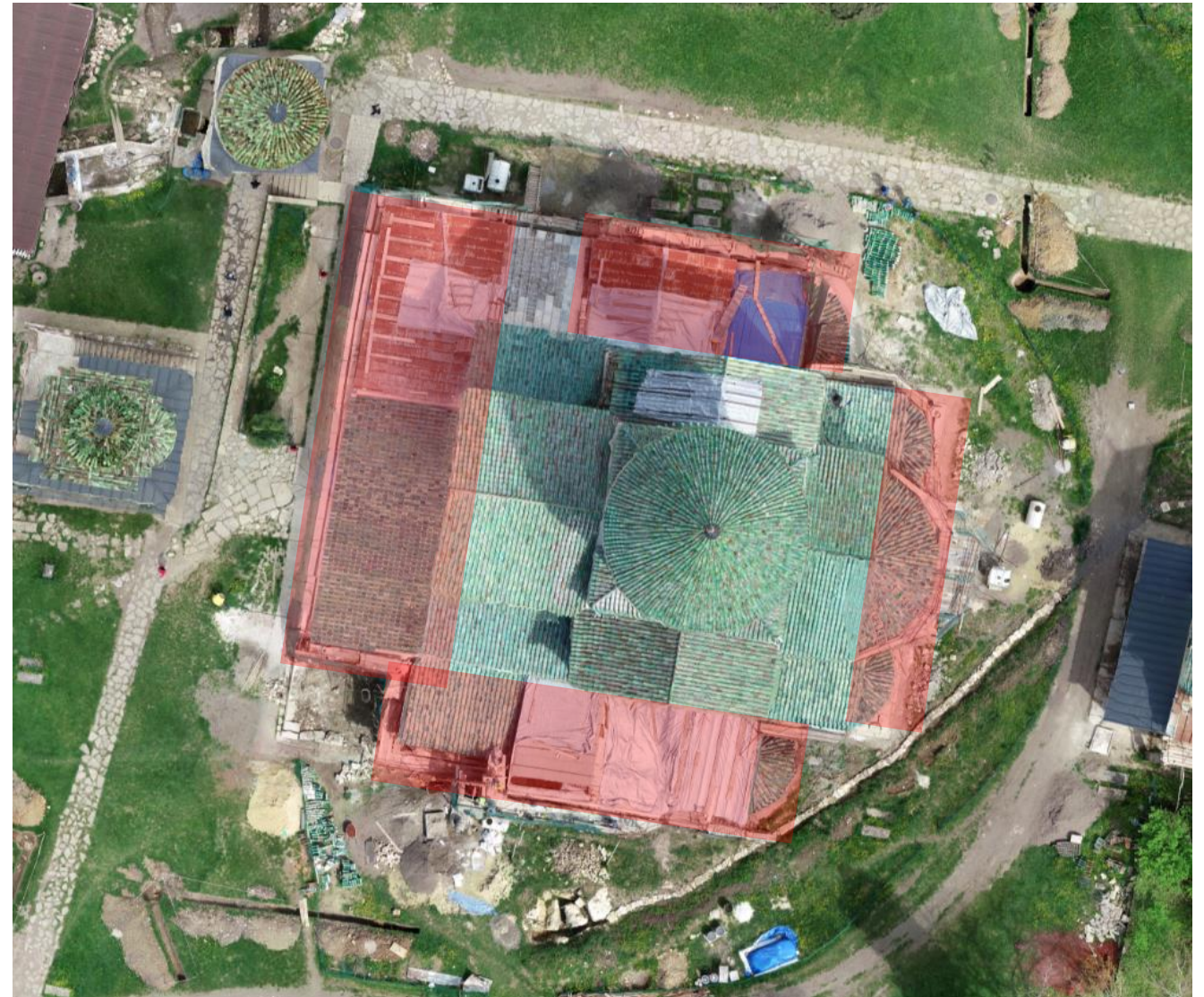
The problem is identified:

- On chapels;
- Porches;
- Narthex;
- Altar;

Full and partial loss of roofing tiles, cracks and micro-cracks are observed;

Damages appeared on the roofs in 2020, and on-site assessment revealed that these glazed ceramic tiles are of low quality and are not suitable for roofing with lime mortar.

The gravest damages appear on the roofing of St. Marine Chapel (south-west chapel).



The Problems Identified in the Roofing

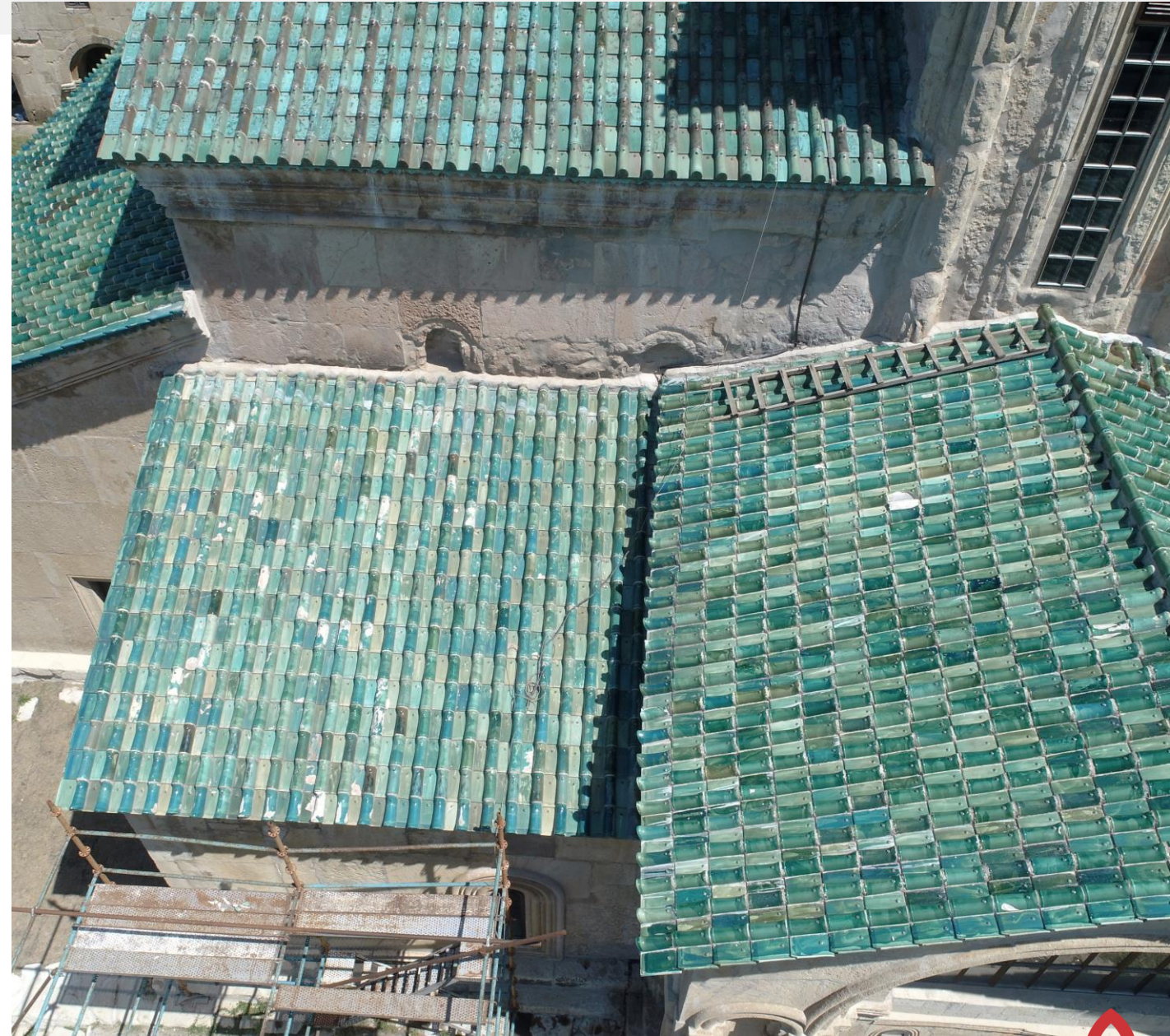
Problems related to glazed ceramic tile:

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Chapels;
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Narthex;
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The Problems Identified in the Roofing

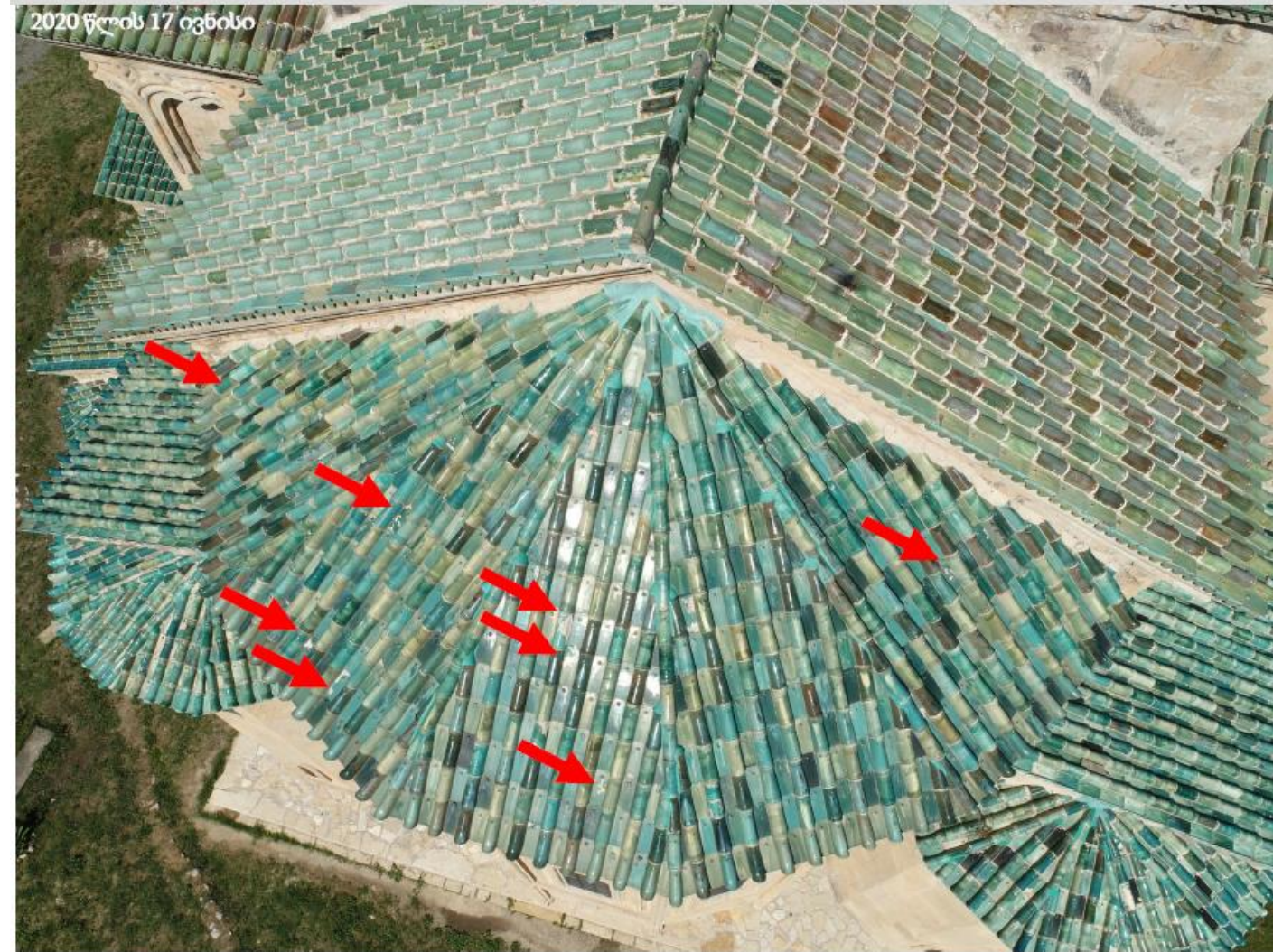
Problems related to glazed ceramic tile:

The problem is identified on:

- Chapels;
- Porches;
- Narthex;
- Altar;

As a result, the following damages are observed locally:

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- On the joints between the tiles: 1. Loss; 2. Cracks; 3. loss of adhesion;



The salt efflorescence has been detected as an main cause of deterioration, which is related to the water infiltration through damaged roofs and environmental conditions of the interior. Salt crystallization cycles have caused cohesion and adhesion failures of paint and plaster layers, loss of repair materials applied during previous interventions in the XX century as well as small wall painting fragment pieces from the original technology. The bioactivity has also been observed.

The mentioned condition phenomena have been detected in various places, however, the most critical issues are found in the Church's West arm's vault.

*The regular monitoring carried out by the National Agency's specialists and interviews with the monastery representatives **did not reveal the damage of mosaic and/or the loss of its any fragment.***



The South wall of the West arm

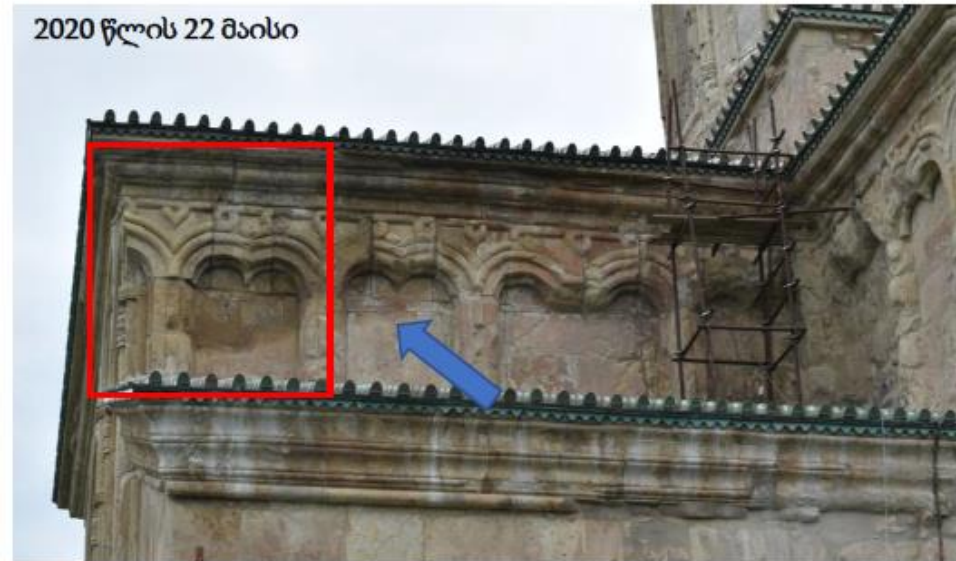
In the photo, dated April 30, 2020, the darkened surface of the stone in the red frame is preserved. Darkness is caused by high amount of humidity. The wetness of the wall is reflected in the interior mirror wise.

In the photos dated June 17-18, 2020 the darkened spot of the stone is enlarged (the blue arrow). In the interior, in the area, indicated by the blue arrow, determination of the exact spreading of moisture is difficult, as the platforms of the scaffolding prevent visibility of the general picture.

Photos:

Upper part: May 22, 2020

Lower part: June 17, 2020



The South wall of the West arm - fragment loss

An amount of fallen fragments of plastering with original paintings were observed on the platforms of the scaffolding, arranged in the West arm of the main church.

Falling of the above-mentioned fragments occurred between May 22 and June 17, 2020 from the South wall of the vault of the West arm (the left scene, upper register).

In addition to fragments, great amount of salt crystals are fallen on the platform of scaffolding.



Photos:
Upper photo on left: May 22, 2020
Middle photo on left: with direct light; June 19, 2020
Lower photo on left: with indirect light; June 19, 2020
Both photo on right: June 19, 2020



Actions implemented by the National Agency

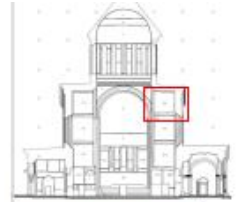
Since march, 2020, the National Agency regularly carries out the monitoring to identify the current condition of wall painting and the causes and activation mechanisms of deterioration. Within the aforementioned monitoring:

- Analysis of the wall paintings condition in the Church of Virgin, St. George Church and the Southern Porch was held; condition phenomena have been identified, documented and categorized according to the:
 1. areas, which have been historically damaged/deteriorated;
 2. newly damaged/deteriorated areas (occurred after roof rehabilitation);Apart from this, the rate and distribution of detrimental change has been determined in order to establish whether deterioration is active or not.
- According to the condition assessment of façades and interior, the possible correlation between those two has been identified;
- Recent deterioration of the wall painting has been identified through research into physical history and condition assessment. Comparative analysis has been undertaken based on visual observation aided by imaging and 3D scanned documentation, elaborated by the National Agency in 2017-2018;
- The condition monitoring of the wall paintings in the whole complex is being undertaken. The deteriorated areas are regularly being photo monitored to determine detrimental change and establish whether the problem is active or not. Dry method of mechanical salt reduction in the West arm is also regularly undertaken;
- Regular (at least once per month) monitoring missions are being carried out and relevant reports/recommendations are developed with involvement of both National Agency and external specialists.



Example of wall painting condition analysis

The East wall, Church of Virgin



Visible difference can't be seen based on visual observation

2017-2018



May 22, 2020



June 18, 2020



Analysis of the wall paintings condition in the Church of Virgin, St. George Church and the Southern Porch was held; the historically damaged areas and the areas with active damages were identified; damage types were recorded and the process of activation of damage was defined.

Recent deterioration of the wall painting has been identified through research into physical history and condition assessment. Comparative analysis has been undertaken based on visual observation aided by imaging and 3D scanned documentation, elaborated by the National Agency in 2017-2018.

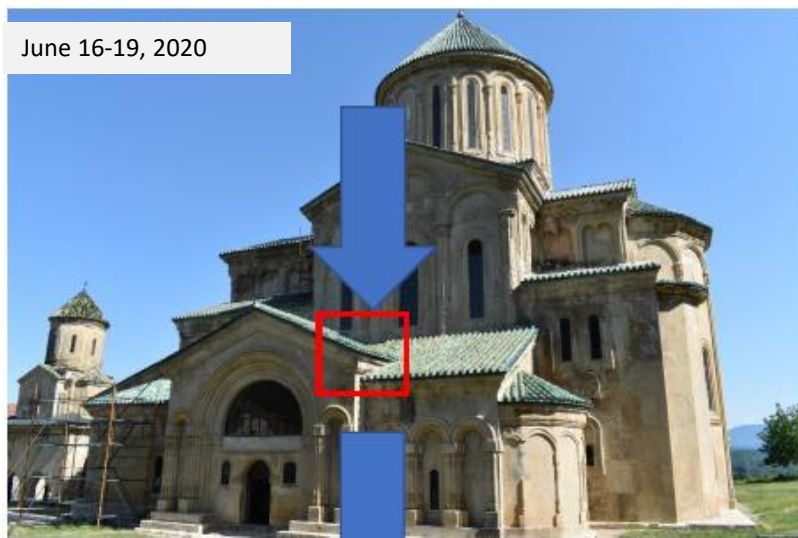
4. Implemented actions



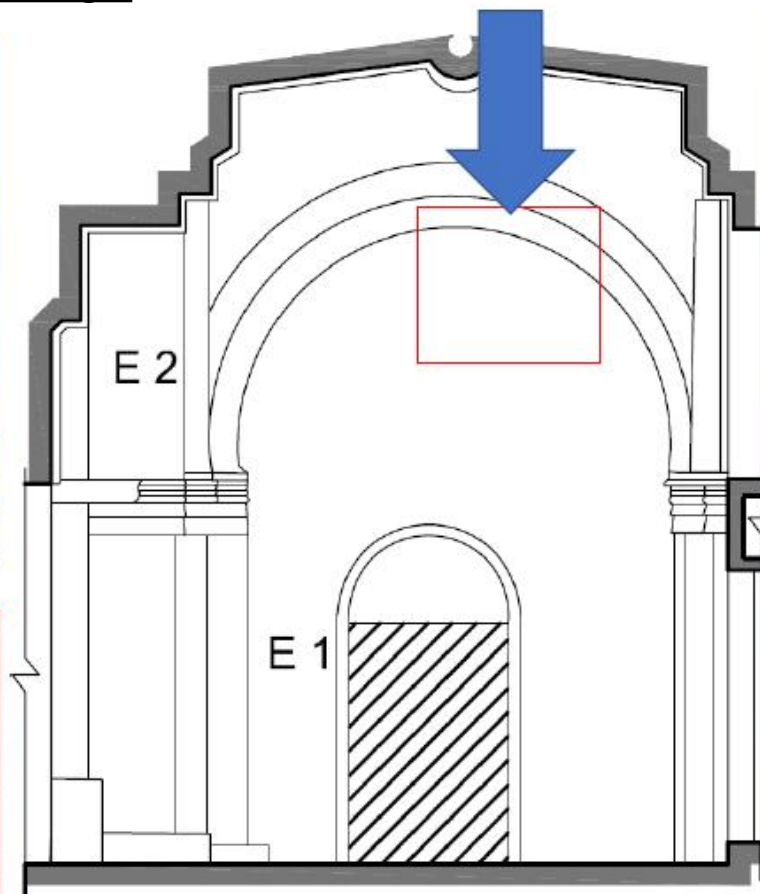
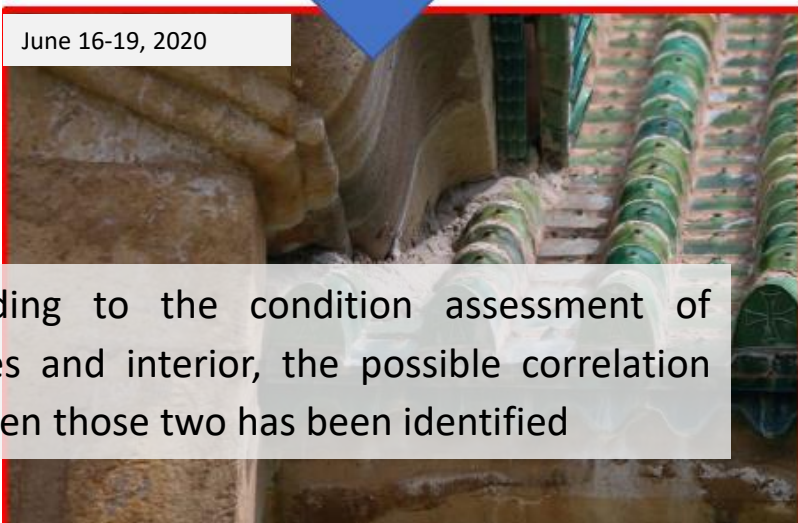
Example of the condition assessment of façades and interior

Location: the East wall, South porch, Church of Virgin

June 16-19, 2020



June 16-19, 2020



June 16-19, 2020



According to the condition assessment of façades and interior, the possible correlation between those two has been identified

The types of damage, identified on the roofing and façades (Salt efflorescence, color alteration/moisture) indicate to the impact of water. The damaged areas, identified on the façade were examined from interior; darkening of the stone surface (assumedly, the trace of moisture) and bio-activity between 2018-2020 was noticed in the interior, which might be related to the damages, existing in the roofing and façades (damage source and activation mechanism).



Example of the condition monitoring

According to monitoring, based on 50 days interval, activity of salt efflorescence process is observed after April 30, on June 19.

Condition as per March 11, 2020

Condition as per April 30, 2020, before partial removal of salt

Condition as per April 30, 2020, after partial removal of salt

Condition as per June 30, 2020, before partial removal of salt



The condition monitoring of the wall paintings in the whole complex is being undertaken. The deteriorated areas are regularly being photo monitored to determine detrimental change and establish whether the problem is active or not. Dry method of mechanical salt reduction in the West arm is also regularly undertaken;

More salt efflorescence

More salt efflorescence, the shape of spreading/ distribution is changed

4. Implemented actions

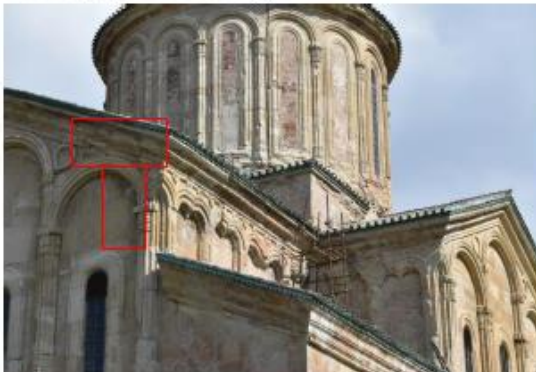


Example of the condition monitoring

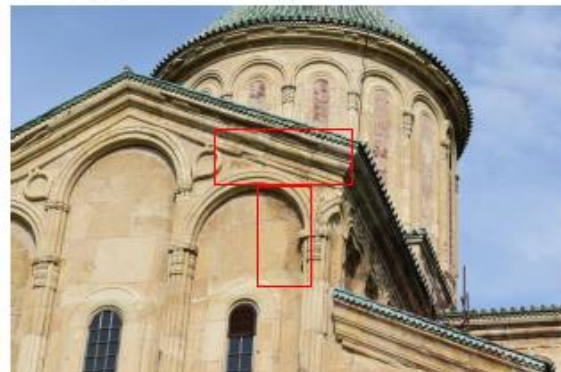
West wall, Church of Virgin

- March 11, 2020 – color alteration of the stone and repaired areas (humidity content), salt efflorescence;
- April 30, 2020 – unlike March 11, 2020, salt deposit is significantly reduced;
- May 22, 2020 – as compared with April 30, there is no salt deposit, the humidity stain is enlarged;
- June 16, 2020 – as compared with May 22, the humidity stain is preserved.

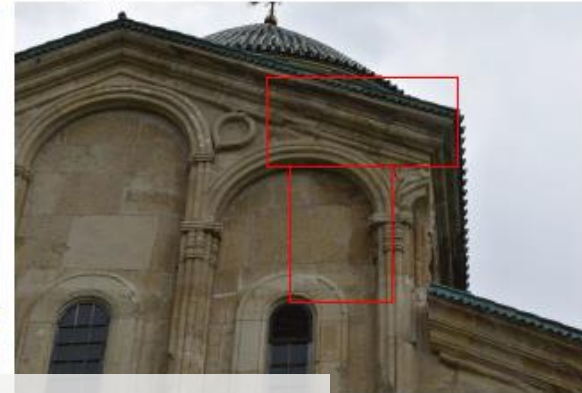
March 11, 2020



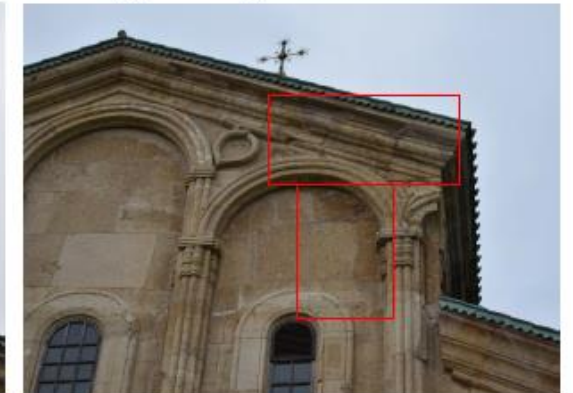
April 30, 2020



May 22, 2020



June 17, 2020



The condition monitoring of the deteriorated areas are regularly being photo monitored to determine detrimental change and establish whether the problem is active or not.

Like March 11, moisture is still noticeable, however, on April 30 **much less salt deposit** then during the previous monitoring

Salt crystals are not observed, only moisture is noticeable

Still only moisture is noticeable



2020

Temporary Roofing and Scaffolding Design for Gelati Main Church
(Church of Virgin)

Ordering customer [NNLE Georgian Arts&Culture Center]
Performer [NNLE Georgian Heritage]

Album Composition

Theoretical part

Explanatory Note 1

Drawings

Plan of arranging the roof scaffold 1

Temporary roofing plan 2

East facade 3

South facade 4

West facade 5

North facade 6

Sketch of temporary roofing and placement of
supports on the Church south extension 7



Explanatory Note

Introduction

Within the framework of the design, arrangement of working scaffold and segmental temporary roofing are planned in order to eliminate the defects at Gelati Monastery Church of Virgin

The design is based on the following documents:

- Application of NNLE Georgian Arts&Culture Center (design assignment)
- Letters N19/1123 of March 19, 2020 and N09/1662 of May 27, 2020 of the LEPL National Agency for Cultural Heritage Preservation of Georgia.
- Architectural design of Gelati Church of the Nativity of the Virgin;

Arrangement of working scaffold and temporary roofing at Gelati Monastery Church of Virgin is needed in order to eliminate (by the request of the National Agency) the defects identified in the Church in 2020, stop the process of water infiltration into the interior and damaging the wall painting until all the identified defects are eliminated.

Scaffolding and segmental temporary roofing are designed for the period required for rectification of revealed defects. The timing of remedial actions should be determined in conjunction with the National Agency. At this stage, it is difficult to say exactly how long it will take to rectify all identified defects, and therefore for how long it will be necessary to use the structures specified in this design, although by preliminary estimates, it is likely to take two calendar years. However, as the condition of roofing has not yet been thoroughly inspected due to lack of scaffolding, the categories of works to be performed through the scaffolds specified in the design have not been determined. To the best of the knowledge of NNLE Georgian Heritage, the negotiations between LEPL -National Agency for Cultural Heritage Preservation of Georgia and NNLE Georgian Arts&Culture Center are underway. Based on preliminary data, the LEPL - Georgian National Agency for Cultural Heritage Protection requested, by letter N19/1123 of March 19, 2020 and its annex, to perform the following works for the purposes of elimination of identified defects:

„Recommendations:

The following measures should be taken to address the problematic issues related to roofing:

- Considering that spring is a rich in precipitation period in Gelati, arrange temporary roofing on the sections of the roofing where the tiles are damaged, as well as on the western arm (completely), in order to prevent further infiltration of water;
- Determine the cause of tile damage. For this purpose, it is advisable to conduct laboratory research of the tiles in order to determine and evaluate their physical and mechanical properties;

- Considering the severity of damage, complete replacement of the tile made of white ceramics (preferably with tiles made of red ceramics which have already been tested and used on the upper parts of the Church); first of all, it is necessary to carry out a laboratory test of the new, replacing tile and obtain an expert opinion on its durability and the possibility of arranging it on a lime mortar solution; as well as the consent of the design author group concerning compliance with the tile characteristics specified in the design; upon submission of these documents, replacement of tile coating should be initiated in stages (damaged tiles should be removed in such a way that the works do not cause vibration and in case of drilling, it is inadmissible to use the so-called perforator mode); in addition, the works should be carried out under the supervision of the wall painting conservation specialist);
- Re-filling of failed mortar at the tile joints, as well as filling the opened tile joints. It is necessary to discuss the alternative filling method/material for the joints in advance;
- Replacement of the green-painted fillings applied on the joints located in the areas of tile binding;
- Cleaning the roughly applied fillings of joints located in the areas of tile binding;
- Replacement of rusted tile securing nails with noncorrosive nails;
- Correcting improperly arranged slugs in accordance with the design, and adding in the lacking areas;
- Replacement of improperly applied fillings at the wall/roofing abutment sites;
- In order to completely eliminate water-related problems and determine the source of wetting of walls (exterior and interior) and cornices, conduct relevant studies (including geophysical surveys, determination of salt typology, etc.), resulting in identification of further steps,
- In addition, the facade sections covered with white deposit (presumably salt) should be reduced by stone conservation specialists in order to avoid further damage of stone surfaces;
- Prepare a scaffolding design (for exterior and interior), based on which an operational scaffold will be arranged in accordance with labor safety standards with an appropriate amount of decking, railings and protective nets to perform the above works.
- On the roofing of the apses, at the spots of tile abutments, special dome-like adapters should be arranged.

*Following recommendations should be considered for **damaged wall painting**:*

- *Identify the source of deterioration (salt-related studies: micro core-sampling (distribution of salt according to stratigraphic section); identify the salt through ion tests and chemical analysis. Possible sources of salt origin: e.g. original technology; previous restorative intervention/roofing material (e.g. tile, insulation layer, solution); atmospheric precipitation.*
- *Determine moisture content of original technology according to stratigraphy*
- *Determine create a baseline data for assessing rates of detrimental change in order to establish whether or not the problem is active. study of physical history of the church and regular photo monitoring*
- *Determine the activation mechanism of deterioration by monitoring the environmental conditions.*

- *Ensure dry mechanical removal of crystallized salt located on the wall painting, with the relevant documentation attached. The intervention should be done by a wall painting conservation specialist. (The above-mentioned monitoring and salt removal works will be carried out by the Georgian National Agency for Cultural Heritage Preservation)*
- *Arrange the operational scaffold in accordance with labor safety standards in the western arm, with an appropriate number of decking, railings and protective nets for performing the works listed above. The scaffold should completely go to the south wall of the west arm so that it can reach the west wall as well; in addition to the cupola level floor, it is desirable to arrange a second floor beneath it. "*

Due to the specifics of the above works, it is not necessary to supply a large amount of materials on site (lime mortar, tile, tin or copper elements); on the contrary, this process is dynamic; during the works, the obtained materials are quickly expended and then the supply of new ones from the winch shafts located on both sides of the Church is ensured.

Description of the main structure of the scaffold envisaged by the design

The metal scaffold segments are connected to each other by stairs. Working personnel in some cases uses the decking arranged on the main segments of scaffold. Since the access to virtually every point of the roof is necessary to correct existing defects, the relevant personnel mostly has to move along the existing tile lining. Railings arranged on scaffold ensure safe work on roofing slopes.

The scaffold supports are mounted on a corresponding elastic node arranged on the flat tiles on tile coating (see note). It should also be noted that resting the scaffold supports on the existing flat tiles and walking on them carries the risk of breaking those tiles, although given the current situation it is otherwise impossible to eliminate the defects. Therefore, possibility of damaged tile replacement after dismantling the scaffold should be considered.

At the ridges, the upper parts of scaffold are connected to each other; therefore, in case of correctly performed works, their sliding is excluded. In addition, the scaffolds arranged on the single slope roofing are fixed to the walls with self-expanding galvanized anchors, eliminating the risk of their possible sliding.

The metal structure depicted in the design consists of 48 mm pipes and system of factory fasteners with the appropriate profile. Accordingly, in the case of works performed under the submitted design (all the specified characteristics must be observed), its sustainability complies with the requirements set by the construction norms.

Scaffold arrangement locations are given in the attached graphic documentation.

Description of temporary roofing to be arranged on the main design structure

The design team, along with Ikorta 2007 Ltd., considered several alternative roofing options and selected the fastest and most financially viable one. The approximate financial

value of the options under consideration, which provided almost 100 percent protection from the expected precipitation, exceeded, or almost equaled to, the amount already spent on rehabilitation of the Church roof. Accordingly, the presented design solution was selected, with understanding the real picture and finding a quick executable decision.

Arrangement of temporary roofing on the design structure is envisaged as follows: roof decking (which will be later covered with the tin sheets) similar to the scaffold ones should be placed segmentally on the existing structure. However, in the areas with uneven planes it will be necessary to use polyvinylchloride fabric (so-called fabric tent). Also, the fact that after the commencement and in the course of the works, the above-mentioned roof decking will often be dismantled and installed, should be considered. In such places it is desirable to use polyvinylchloride fabric (so-called fabric tent). (For distribution diagrams, see the graphic part of the design).

It should be noted that the roofing method proposed by the design does not guarantee protection of tile and wall abutment and other conjugated nodes from expected precipitation, although it will play an important role in terms of prevention.

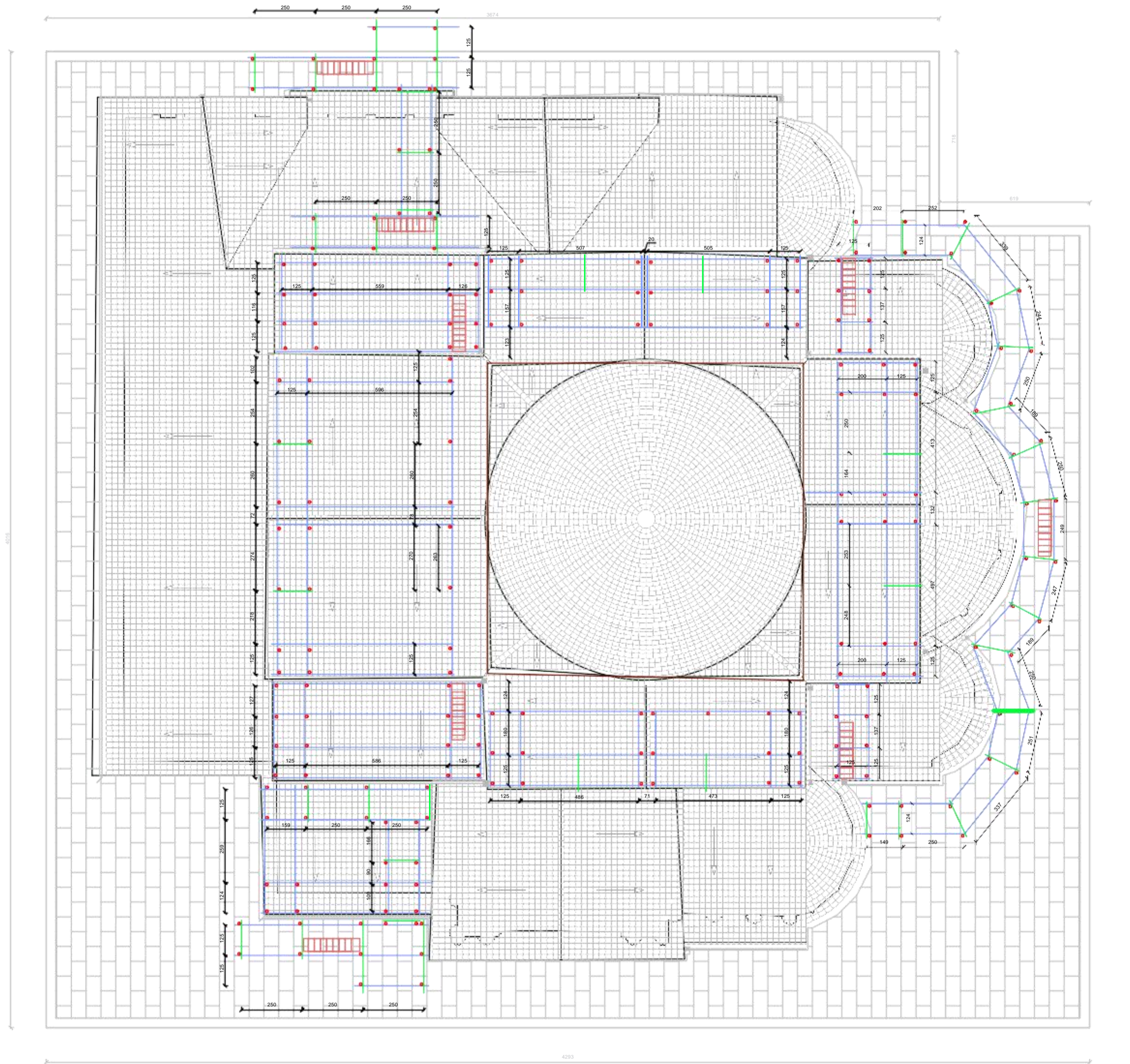
The wind load on the roofed segments is high, so in the previous design presented by us, only partial roofing of the slopes was envisaged in order to reduce the wind load on the structure and minimize the likelihood of water getting into the tile/wall abutment areas, which is the greatest threat in terms of water infiltration. The Letter N09/1662 of May 27, 2020 of the National Agency for Cultural Heritage Preservation of Georgia additionally requests to ensure full roofing of the west arm's south slope and roofing of southwest chapel. Given the large loads, it is advisable to use polyvinylchloride fabric for roofing the south slope of the west arm, and as we know, the relevant on-site arrangement process is already underway.

As for the roofing of south-west chapel, the design envisages arrangement of roofing on this section.

The locations of temporary roofing are given in the attached graphic documentation.

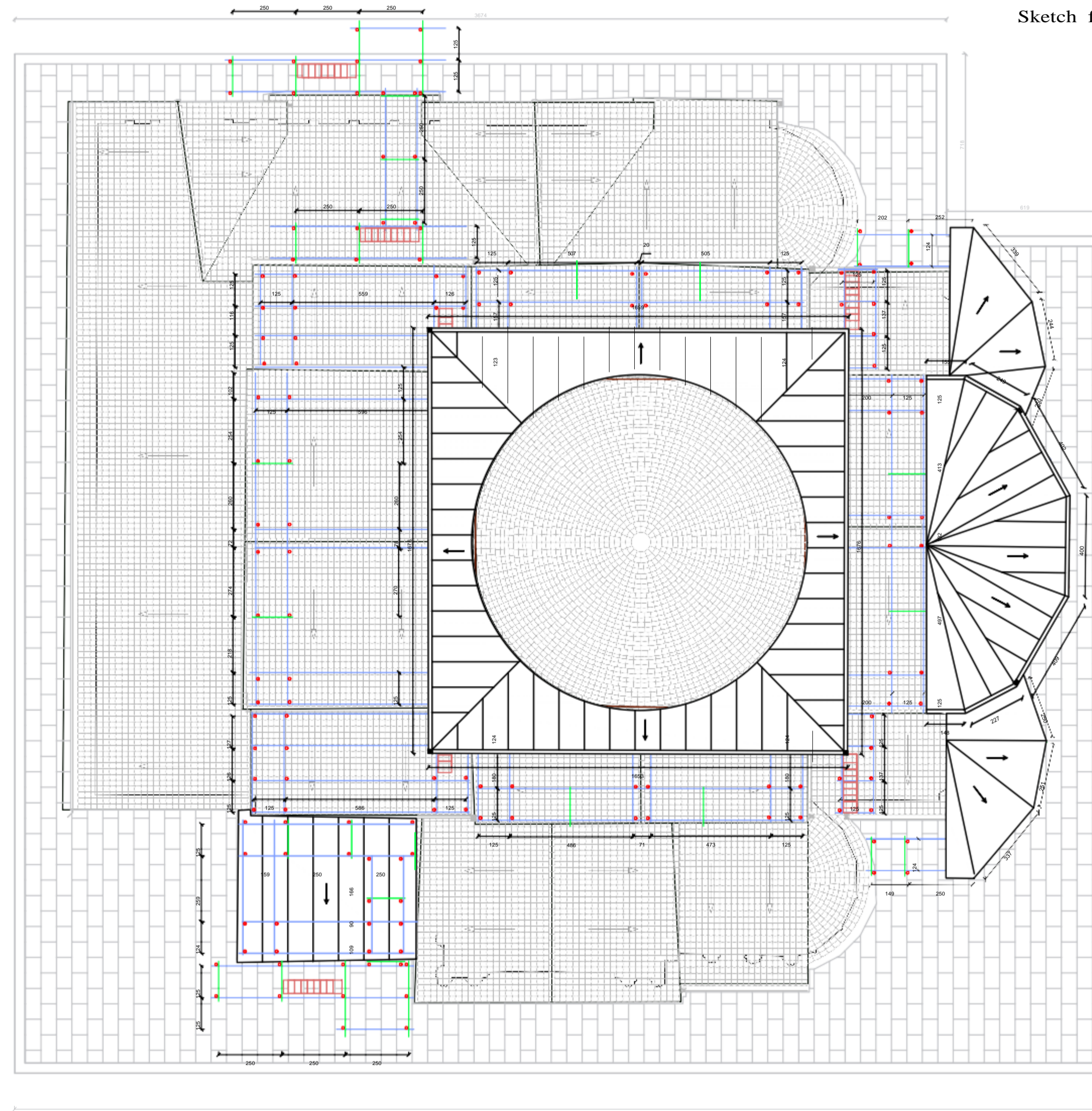
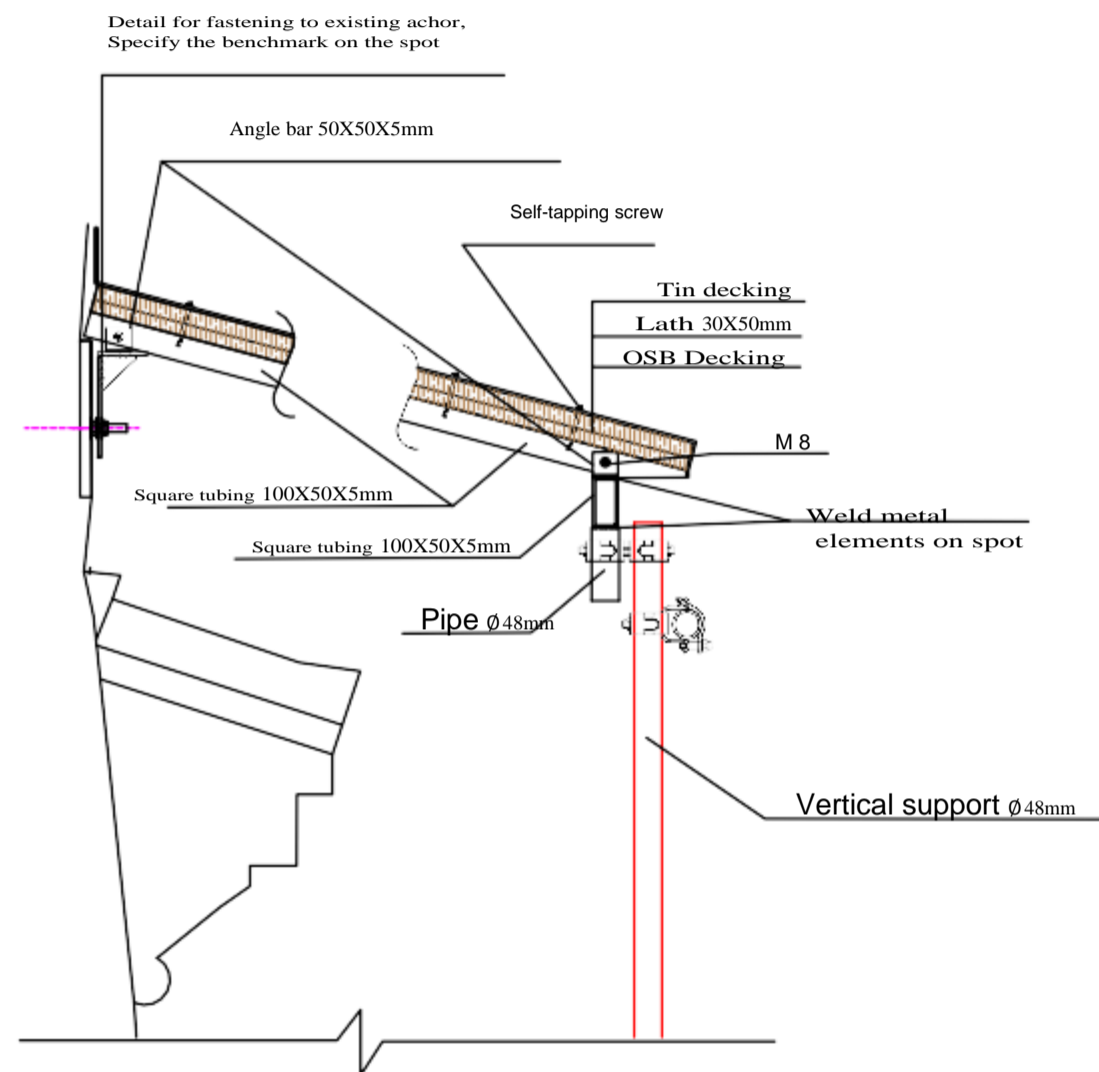
Church of Virgin

Plan for arranging a temporary
scaffold on the roof
S. 1:100



- Vertical supports —
- Horizontal connection —
- DIAGONAL CONNECTION —
- Conjugated connection —
- RAILING —
- Stairs ▨

Node for arranging the support on the tiles
S 1:10



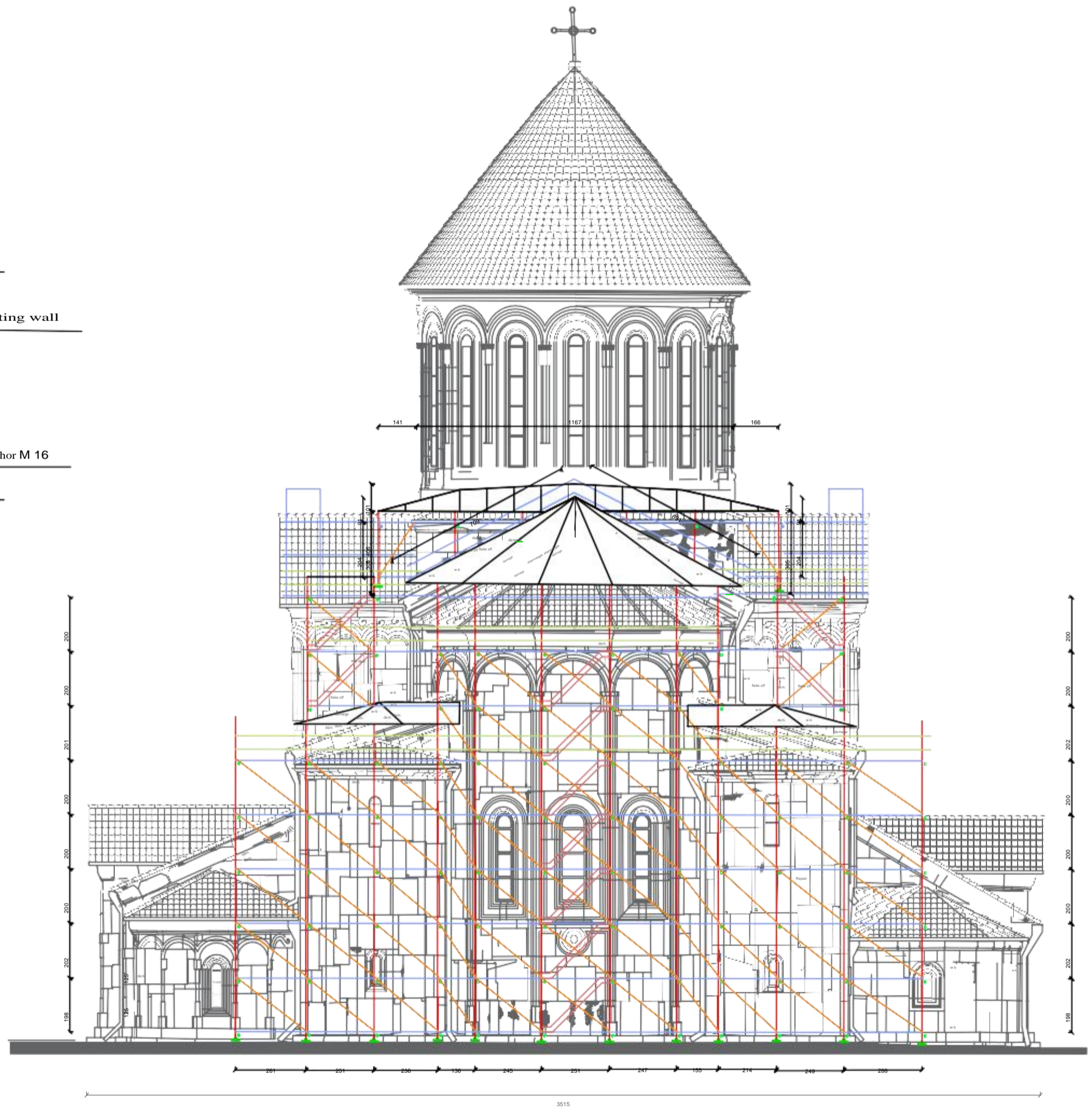
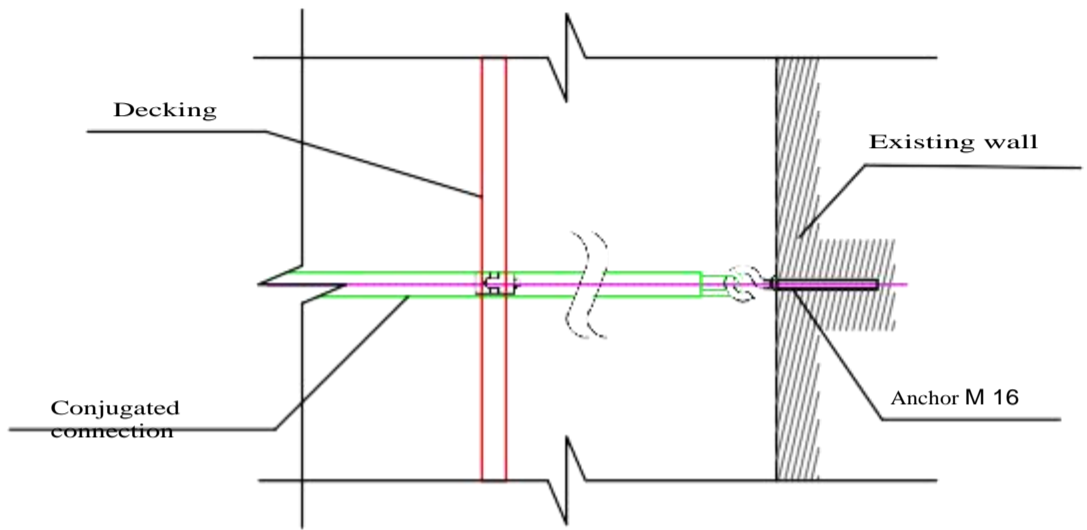
- Vertical supports —
- Horizontal connection —
- diagonaluri 4avSiri —
- Conjugated connection —
- RAILING —
- Stairs —
- Water drain pipes ■



Church of Virgin

East facade
S. 1:100

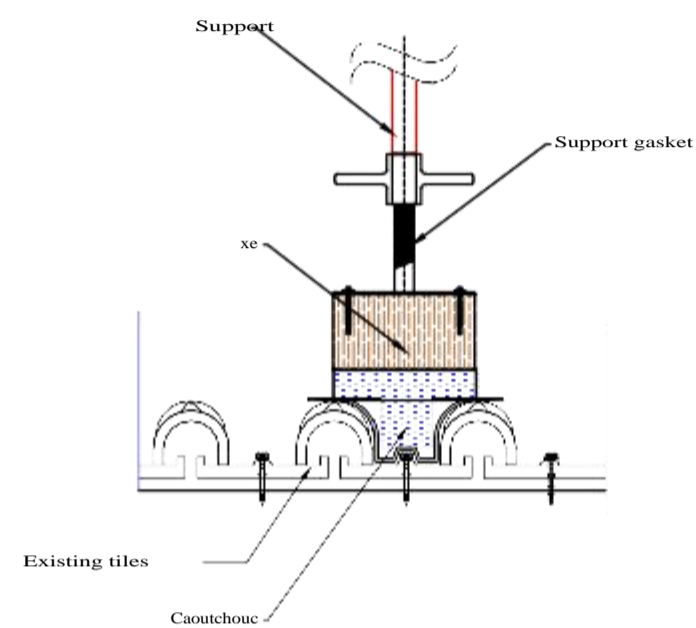
Scaffold fastening knot
S 1:10



- Vertical supports —
- Horizontal connection —
- Diagonal connection —
- Conjugated connection —
- Railing —
- Stairs —

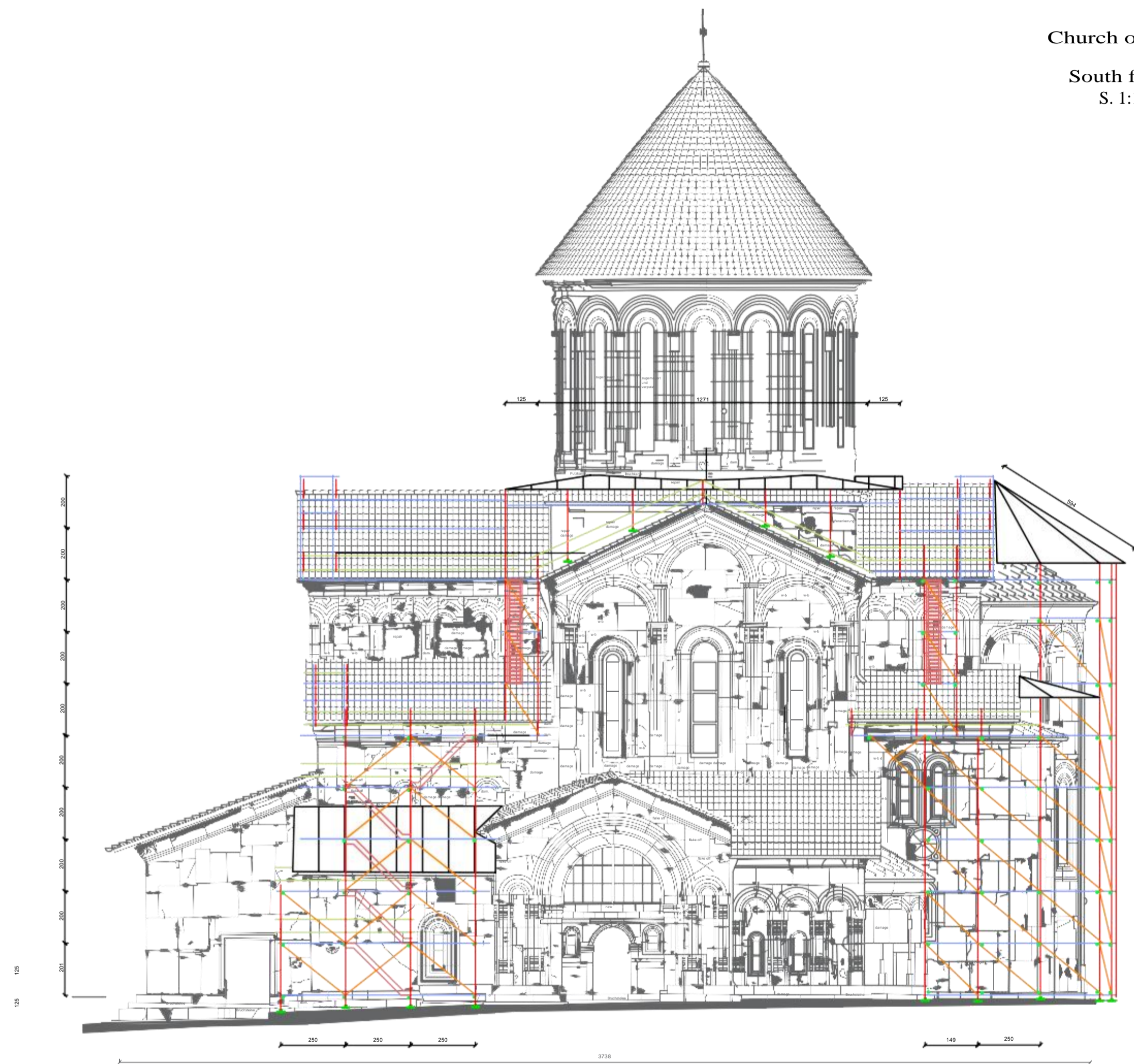
Node for arranging the support on tiles

S 1:10



Church of Virgin

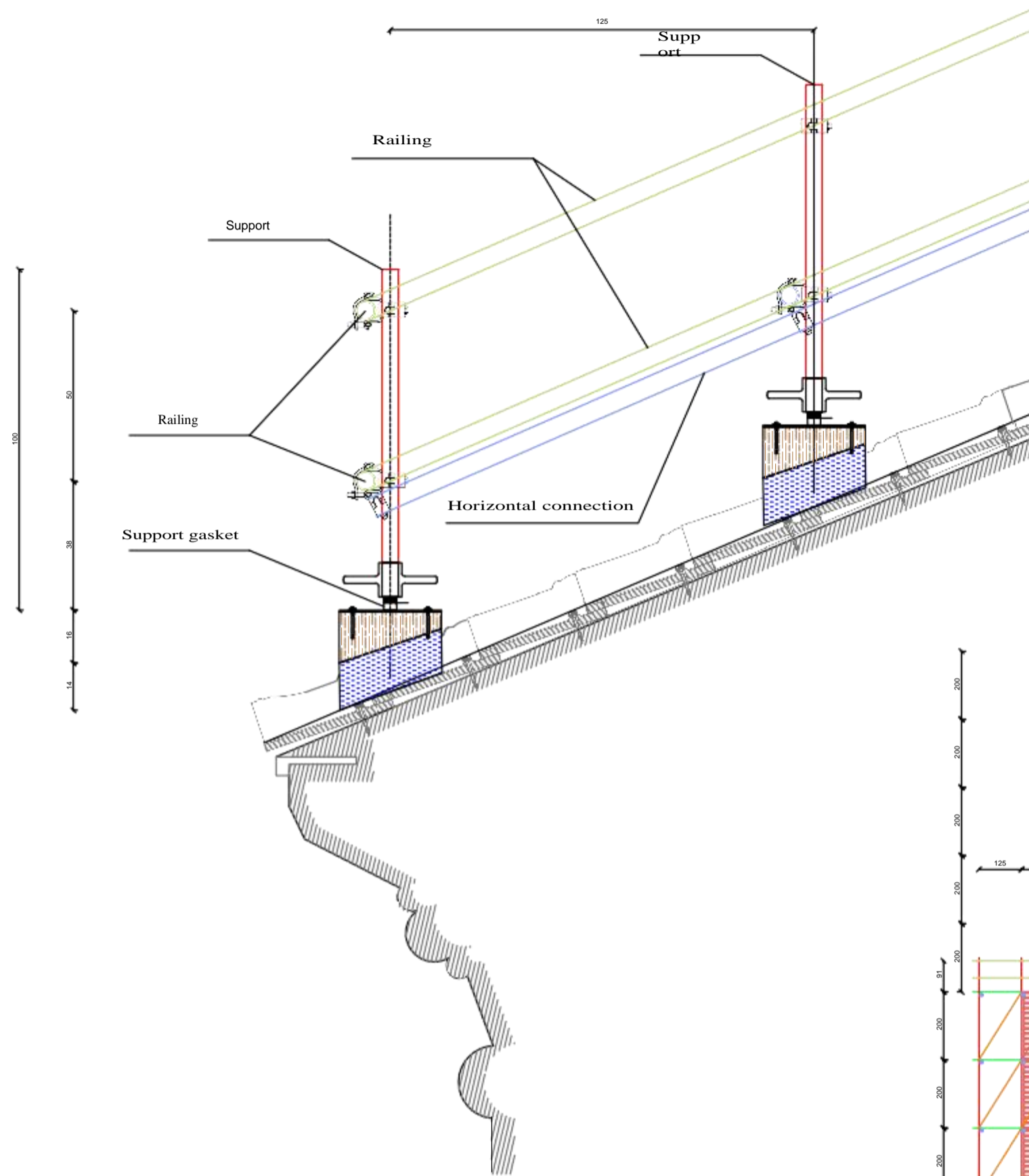
South facade
S. 1:100



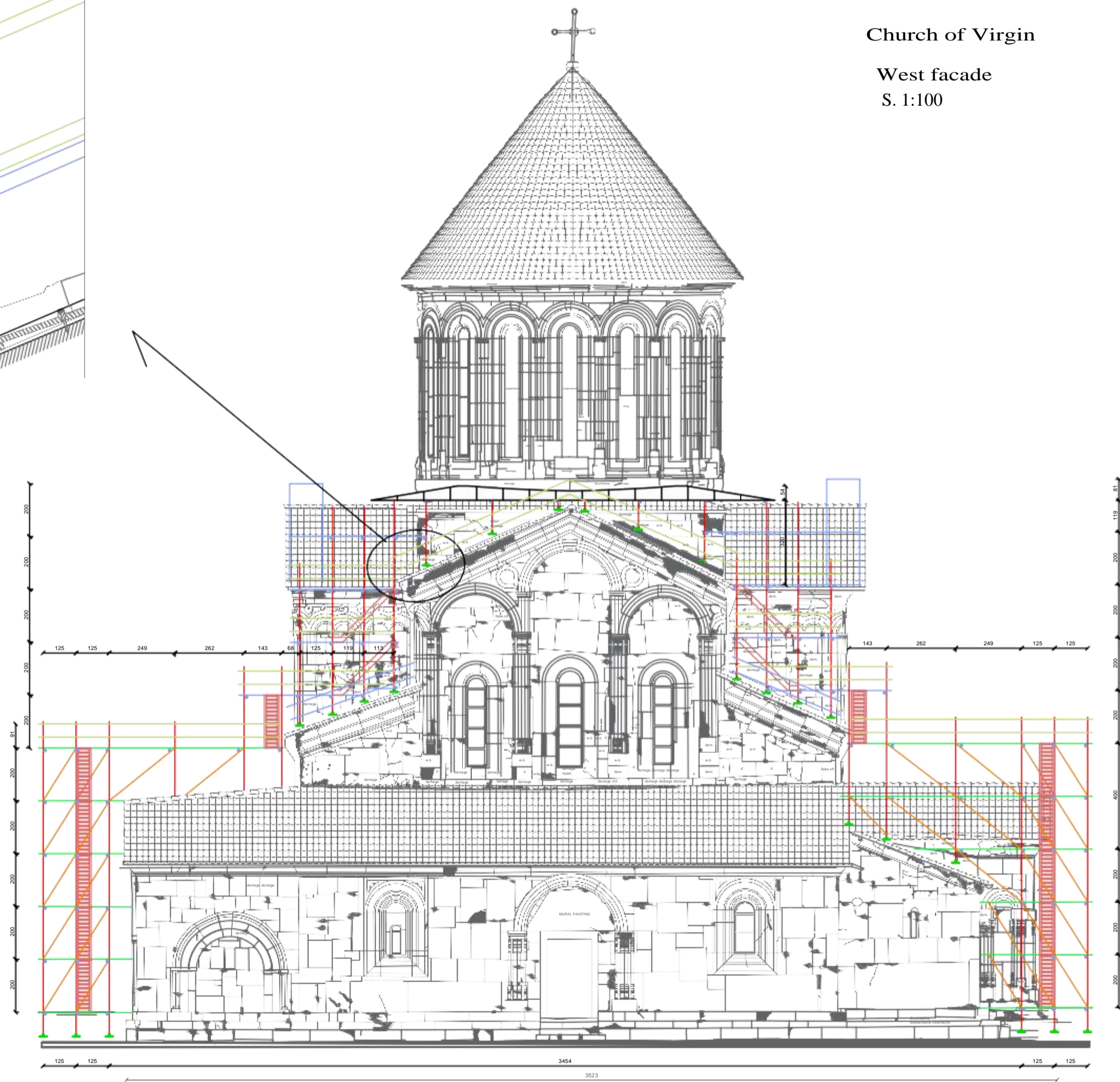
- Vertical supports —
- Horizontal connection —
- Diagonal connection —
- Conjugated connection —
- Railing —
- Stairs —



Node for arranging a scaffold
on the Church arms
S 1:10



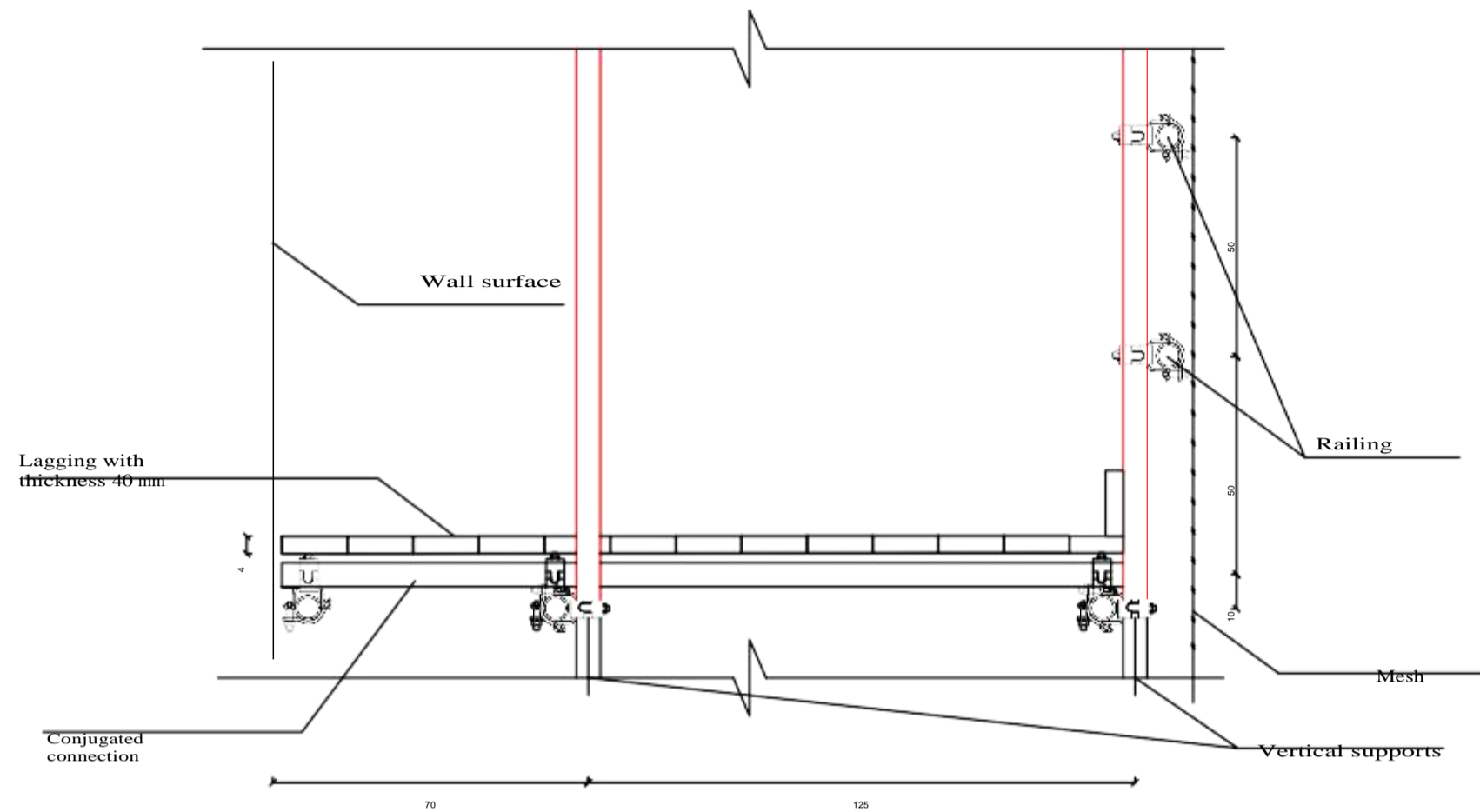
Church of Virgin
West facade
S. 1:100



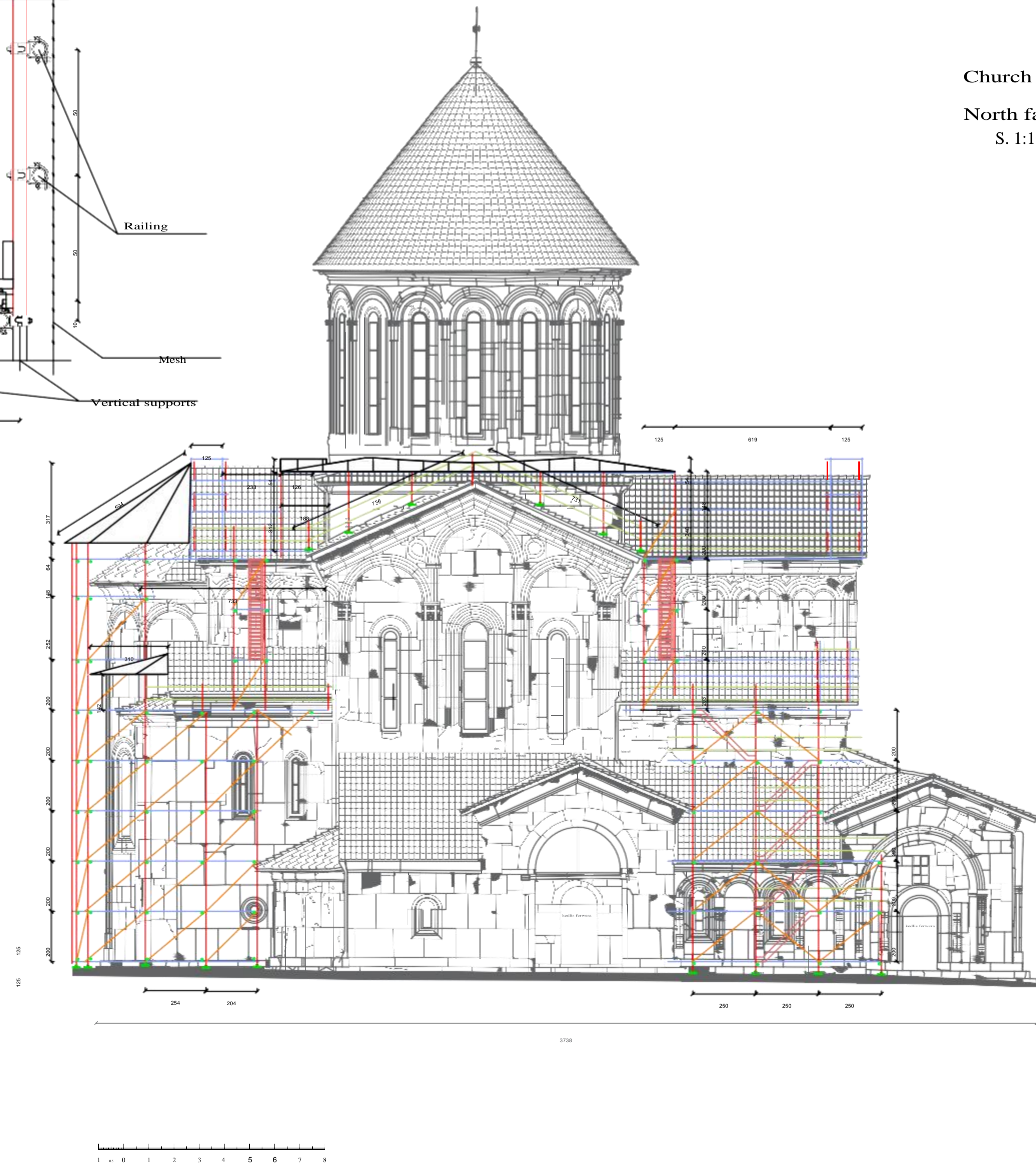
- Vertical supports ————
- horizontaluri kavSiri ————
- Diagonal connection ————
- Conjugated connection ————
- Railing ————
- Stairs ————



Working scaffold
Section S 1:10

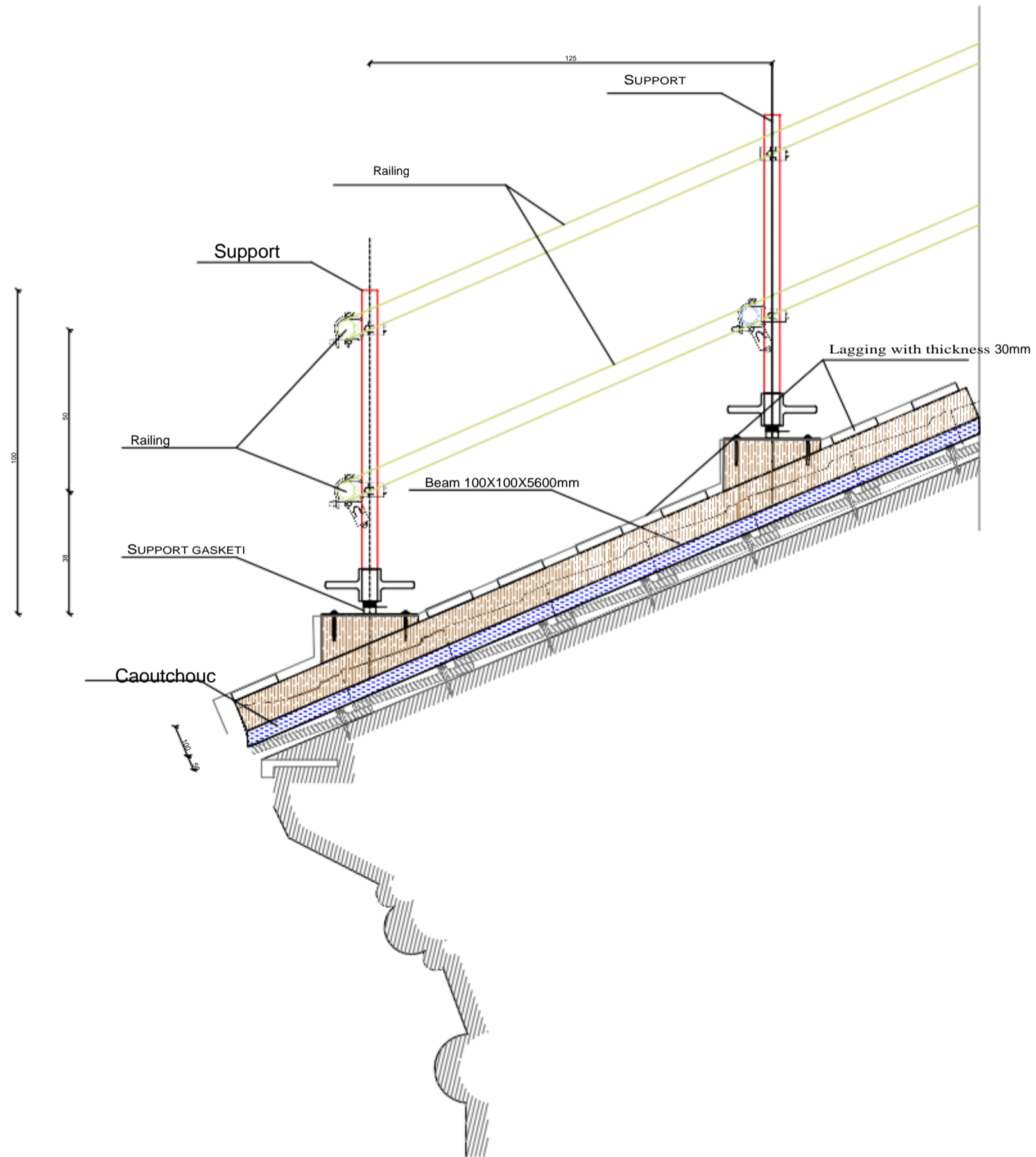


Church of Virgin
North facade
S. 1:100

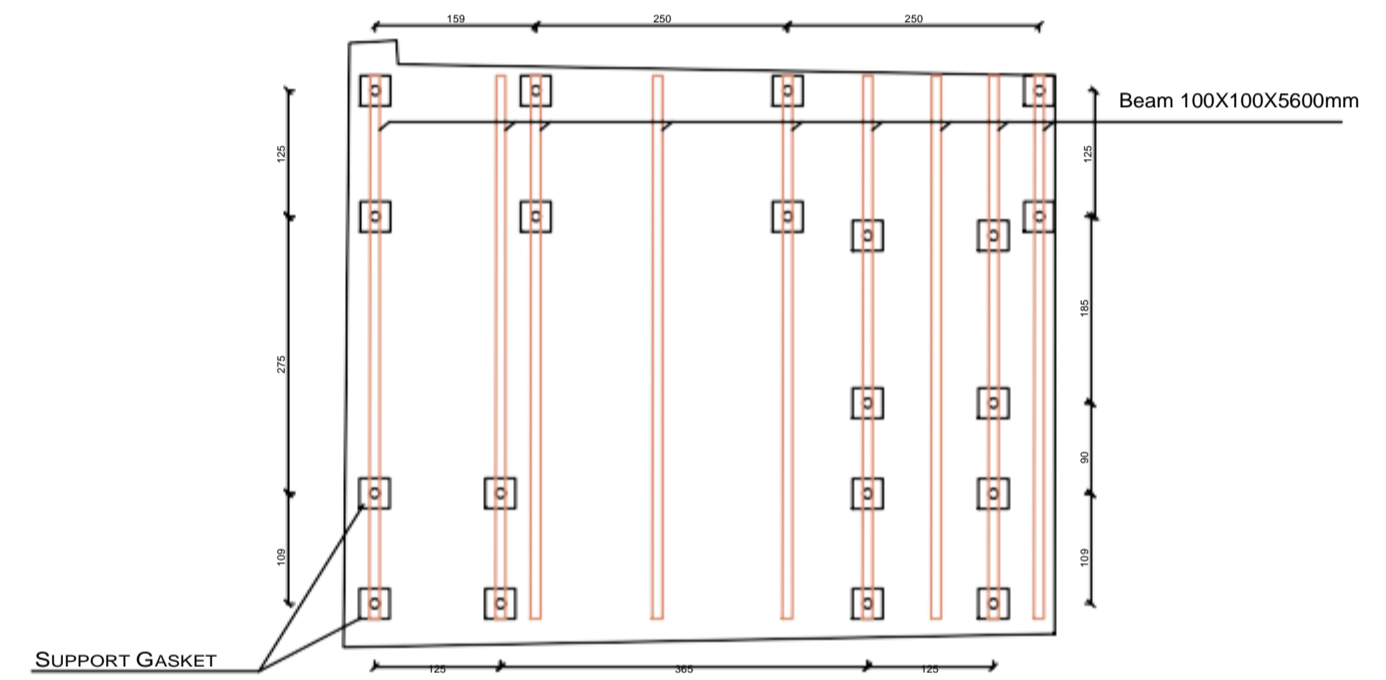


- Vertical supports
- horizontaluri kavSiri
- Diagonal conneciton
- Conjugated connection
- Railing
- Stairs

Sketch of temporary roofing and placement of supports on the Church south extension
S 1:10



Sketch of arrangement of wooden beams on the Church extension S 1:50



Scaffolding and Temporary Roofing Construction Executive Management Project

Description of the site and facility

The site is located in Tkibuli municipality, Gelati Monastery Complex. Within the framework of the project, scaffolding and segmental temporary roofing are planned to eliminate the gaps in the Church of Virgin in Gelati.

Rules, methods and instructions for carrying out the construction

Arrangement of scaffold and construction of temporary roofing in Gelati Church of Virgin as well as future restoration works must be carried out in compliance with the current construction norms and rules.

The design organization NNLE Georgian Heritage will provide consultations during the construction process.

Listed below are the current construction norms and rules, resolutions and other normative documents that should be followed by the construction organization during the construction and installation works:

- Resolution N 62 of the Government of Georgia of March 28, 2007 On Approval of Construction Safety Rules;
- Order N449 of the Minister of Internal Affairs of Georgia of March 27, 2007 On Approval of Fire Safety Rules in Force in Georgia;
- Law of Georgian on Protection of Cultural Heritage;
- All the normative standards of construction norms and rules that apply to various ongoing works.

Engineering preparation for construction and separate stages of construction management

The presented Construction Project is developed on the basis of Construction Norms and Rules 3.01.01-85 Construction Operations Arrangement and Resolution of the Government of Georgia N57 of March 24, 2009 On Issuance of Construction Permits and Permit Conditions.

The project is based on the following documents:

- Application of NNLE Georgian Arts&Culture Center (project assignment)
- Various normative documents;
- Architectural design of Gelati Church of Virgin

The Construction Project is performed in accordance with current construction norms, rules and state standards. Immediately upon the reception of design documentation approved by the ordering customer, the construction organization will elaborate the

Work Execution Design which will be drawn up in accordance with decisions envisaged by the Construction Arrangement Design.

Commencement of construction will be allowed upon obtaining a construction permit from the relevant authorities. Construction should be carried out in accordance with the calendar schedule.

The facility construction works may be commenced only after arranging the necessary fencing of construction site.

During the facility construction, the observance of construction norms, rules and standards, special instructions of the working design and technical conditions are ensured. It is prohibited to carry out the construction and installation works without the Construction Arrangement Design and the Work Execution Design. It is not allowed to deviate from the approved design without the agreement of their design and approving organizations.

During the construction process, the following documents must be prepared according to the typical forms:

- Work log;
- Scaffolding and temporary roofing arrangement report;
- Instruction log on construction safety rules;
- Technical supervision log.

The construction site must be timely cleared from the temporary buildings and structures. In addition, special attention should be paid to the timely shutdown and dismantling of temporary networks.

Duration and deadlines of works

Since, according to the classifier, the type of work does not fall under the category of standard construction works and we are dealing with the World Heritage Site, aiming to arrange a scaffold and temporary roofing to correct the identified defects, we do not use the current norms to determine the duration of construction; it is defined by comparing it with other works of similar nature.

Depending on the complexity and scale of production as well as considering the local climatic conditions, the construction duration will be 120 (one hundred and twenty) calendar days.

Sequence and stages of construction process

The construction process is divided into the stages and sub-stages. Depending on the planned duration of construction as follows:

First Stage - Preparatory works

- Preparatory work, procurement, logistics;
- Tracking and specifying on-site measures;

Second Stage – Main works

- Arrangement of scaffold with metal structure and appropriate profile fasteners
- Arrangement of temporary so-called tent and solid decking roof on the structure;
- Connecting the facility with the temporary technical network;

Third Stage - Documenting and reporting to the relevant agency

- Preparation of documents and submission of report to the relevant agencies;

General safety instructions

- Presence of strangers, as well as the people not employed in construction operations is not allowed on the construction site.
- The staff should be instructed on construction safety issues; the tests are held as well.
- Occupational safety measures for the employees must be observed at all stages of construction and installation works in accordance with Construction Norms and Rules III-4-80 Occupational safety in Construction and in accordance with the instructions of other normative legal documents.
- Workplaces should be provided with collective protection and alarm equipment, taking into account working conditions and technology.
- Working personnel should wear overalls, respirators and headgear if necessary.
- The engineer responsible for complying with safety regulations should be assigned to the construction site. The workers as well as engineering and technical personnel must wear helmets while on the construction site, and special works must be conducted using appropriate equipment.
- All construction facilities should have the first aid facilities.
- Arrangement of construction site and area should ensure prevention of potential injuries.

Construction site and safety of construction process

- Prior to the commencement of major construction works, the construction site and its surrounding area shall be arranged;
- The construction site area and its boundaries are defined by the construction document;

- The boundaries of construction site should be within the boundaries of the land plot;
- In case if the boundaries of construction site are not sufficient for conducting the construction activities and there is a justified need for this, the use of the adjacent land or public space that is not owned by the construction permit holder shall be determined by an agreement between the construction permit holder and the owners of the land plots, public spaces or territories. Local self-government bodies establish the rules for temporary use of public space;
- In case of reasonable necessity, the owners of the adjacent land do not have the right to restrict the construction activities of construction permit holder;
- Arrangement of the construction site should be carried out in compliance with the requirements of construction activities regulations;
- All areas on the construction site where third parties may be injured due to construction activities should be demarcated and marked with warning signs;
- Measures carried out on the construction site must comply with the requirements of the regulations on relevant construction activities, including:
 - a) Ensuring its cleanliness and prevention of contamination of surrounding land plots and streets, as well as damage to the pavement of these streets;
 - b) Protection of major and public engineering communications facilities on the construction site;
 - c) Fire safety;
 - d) Observance of proper occupational hygiene conditions;
 - e) Safety of works;
 - f) Prevention of environmental pollution (including streets and public spaces) by industrial waste, wastewater and air dustiness;
 - g) A notice board perceivable from public spaces shall be placed on the construction site in accordance with the requirements of this resolution.

Operation of technical equipment and tools

- All technical equipment and tools used during construction must be in working condition, they must be operated in accordance with the rules specified by the manufacturer;
- It is not allowed to use non-factory (homemade) parts or spare parts during the operation of technical equipment and tools,
- Disc construction tools must be equipped with protective casing.

Loading-unloading works

- Fastening of load for lifting must not be performed with improvised fastener or special load fastening device. The fastening method should exclude the possibility of the load falling or slipping.

Installation works

- Presence of technical personnel or workers on the elements of structure and equipment during their movement is strictly prohibited;
- The elements installed in the design condition must be removed after their temporary or permanent reliable fastening;
- It is not allowed to perform installation works at height in open places if wind speed is 15 m/s or more, during thunderstorms and fog when visibility within the working front is limited. Movement and installation of panels and metal load-bearing structures as well as similar structures shall be stopped at wind speed of 10 m/s and above;
- It is not allowed to leave construction materials and equipment in a suspended position during the termination of works;
- If the presence of workers under the equipment is necessary during its installation, social measures should be taken to ensure the safety of workers;
- During installation works, the operating power supply must be switched off;

Electric installation works

- Appropriate measures must be taken to prevent unintended switch-on (circuit breakers must be removed) or shut-off during any electric installation works;
- It is necessary to observe the relevant rules when supplying electricity for testing the electrical circuit and equipment;
- When laying cable lines, it is necessary to follow the rules for cable-laying.

Fire safety instructions

All fire safety measures must be observed at all stages of construction and installation works

General requirements:

- All buildings and structures within firefighting distances must be removed from the construction site prior to construction. Otherwise fire-fighting measures must be elaborated for them.

- The layout of warehouses as well as industrial and ancillary buildings on the construction site must comply with the master plan approved in accordance with the established procedure, these rules and the requirements of design norms.
- Construction and fire protection plans shall be posted at the entrance to the construction site, indicating the location of ancillary buildings and structures, entrances, accesses, water sources, fire extinguishers and communications facilities.
- Free access should be provided to all buildings, open storages of construction materials, structures and equipment.
- The area occupied by the open warehouses of combustible materials as well as the warehouses, manufacturing and auxiliary facilities built of combustible and flash-resistant materials should be cleared of dried grass, weeds, bark and slivers. Combustible building materials designed for storage in open areas (sawn timber, roofing felt, Ruberoid, etc.), goods and structures made of combustible materials as well as equipment and loads placed in combustible packaging, shall be kept in stacks or in groups not exceeding 100 m² area.
- It is not allowed to arrange temporary warehouses (storerooms), workshops and administration and amenity facilities in the buildings constructed with metal load-bearing structures not protected from fire as well as combustible polymer heat insulated panels.
- Prior to the commencement of major construction works, construction shall be provided with fire-fighting water supply from fire hydrants or reservoirs installed in the water supply network.

Instructions on environmental protection measures

During the production process on the construction site, it is necessary to carry out environmental protection measures and works in accordance with the current legislative acts and normative documents concerning environmental protection and anti-air pollution measures.

General requirements:

- Commencement of works will be allowed after issuance of a permit by the relevant service. The works must be carried out in compliance with environmental protection and anti-air pollution measures.
- It is not allowed to contaminate existing sewage wells with construction waste.
- When performing facade works, the facades should be covered with the curtain to prevent dust from scattering in the residential zone.

Notes:

- The Calendar Scheduled Plan of Intended Works is attached to the design in form of annex.
- The design does include additional scaffolding and roofing sketches, as the mentioned design includes the same type of information.