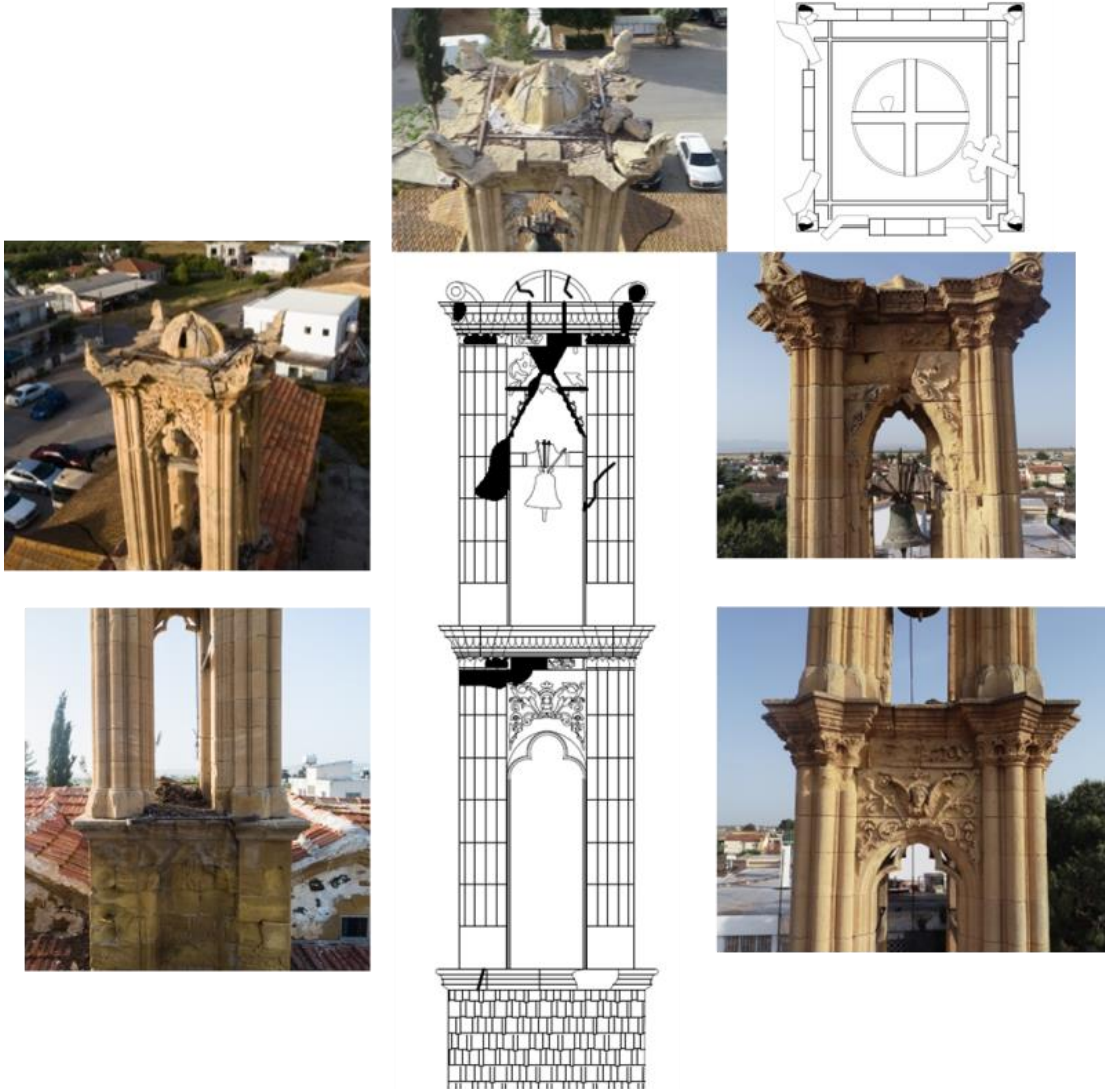


Terms of Reference – Emergency works at the belfry of Panagia Evangelistria church

I. Brief description and Condition assessment

Panagia Church is located in Katokopia/ Zümrütköy. The height of its Bell tower is 15.8 meters from the base 8.2 meters from the roof of the church, where the bell tower becomes a cantilever member. The bell tower has approximately 1.85 x 1.85 meters square plan. Above the roof the bell tower is composed of three parts, solid base, first level and second level with the dislocated cross and the bell. Extensive carvings are present in all facades of the bell tower.

The construction materials are local cut limestone, ornamented limestone, wooden beams, hidden iron reinforcement in between stones of the bell tower, exposed iron reinforcement at the top level and one bronze bell.





Picture 1

Extensive cracking and dislocation between the stones are seen especially on the uppermost cornice level where the iron structural reinforcement is exposed and corroded.

Original cross is also fallen from its place but still present on the top level



Picture 2

There is stone loss at the dome creating a void for water infiltration.



Picture 3

Superficial material deterioration is seen especially on the carved areas of the Bell Tower.

There are iron stone connecting members exposed after these deteriorations.



Picture 4

Superficial material deterioration is seen especially on upper parts of the pillars



Picture 5

There are material loss at the original pointing of the stones at the solid base level and at the base stones of the pillars.



Picture 6

Rusting is noted on the iron clamps at the basis of the bell tower. Some material loss on the stones of the basis is also noted.

II. Interventions

The building technique of the bell tower exhibits differences from many other village churches in Cyprus. The stones are interconnected with metal connecting elements in all levels creating earthquake resistant structural system. The metal tying elements are embedded within the stones. Only exception is the top cornice level where the metal connecting elements are exposed.

Main Interventions are proposed on the cornice level. i.e replacement of the corroded iron elements with same size iron elements protected with water resistant, anti – corrosive primer such as (sika Armatec 100 master seal 300) or equivalent. After replacement the coated iron will be covered with lime mortar. All the exposed iron elements in the facades and levels will be coated after mechanically removing the superficial rust and then covered with 2 cm thick lime mortar. The existing cross will be placed on the dome and the missing stone on the dome will be replaced. Pointing will be done as specified on the solid base level and until the ground on southern façade of the bell tower. Rusted metal elements on the belltower will be treated for rust. All the wooden and iron mechanisms of the existing bells will be mechanically cleaned and treated against deterioration.

Scaffold and Detail Drawings:

Support and scaffold setup will be done as required by regulations. Method statement has to be submitted for the approval of the UNDP Engineer relating this item.

III. Description of Works

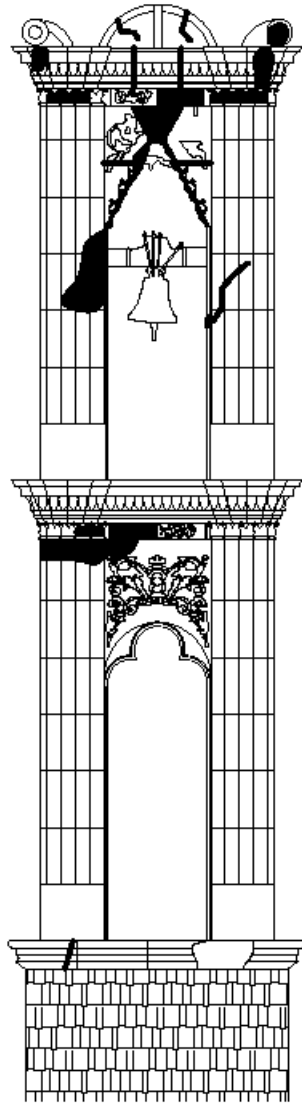
No.	Work Item	Description
1	Site mobilization and demobilisation	Mobilization consists of basic site facility for sanitary and resting needs of personnel and other incidentals at the project site. Removal of items and demobilisation from the site.
2	Health & Safety items	All required health & safety elements and items
3	Scaffolds for works	Support and scaffold setup will be done as required by regulations. Method statement has to be submitted for the approval of the UNDP Engineer relating the design and the construction of this item. Scaffolds to be erected under the supervision of the HS Officer and certifies by the HS Officer; no access on scaffolds until the HS Officer approves the scaffolds.
4	Structural Reinforcement Upper Cornice level and	Main Interventions are proposed on the cornice level. i.e replacement of the corroded iron elements with same size iron elements protected with water resistant, anti – corrosive primer

	treatment of all partially exposed iron elements	such as (sika Armatec 100 master seal 300) or equivalent. After replacement the coated iron will be covered with lime mortar All the exposed iron elements in the facades and levels will be coated after mechanically removing the superficial rust and then covered with 2 cm thick lime mortar (MasterEmaco® N 275 TIX Formerly known as Albaria® Intonaco). The existing cross will be placed on the dome and the missing stone on the dome will be replaced. The iron used will be protected with water resistant, anti – corrosive primer such as (sika Armatec 100 master seal 300) or equivalent.
5	Original Wooden member treatment	Remove Original wooden members, treat with colored Silvanol 726 or equivalent and replace at their original position
6	Deep Pointing-solid base part and until the ground on south facade	Clean the joints with stone dressing tools with care so that the surrounding stone is not scratched, and joints are not widened. All cutting out of mortars should leave a square face in the back of the joint. Cleaning should be done in 5cm depth. Remove deteriorated material and loose deposits with soft bristle brushes. Clean the joints with air and water under pressure. Mix mortar whereby aggregates are mixed dry, and the binder is separately mixed with the pigments. All constituents are mixed together, and the optimum amount of water is added. Point joints by careful packing of the mortar in layers according to original form/profile. Protect mortar from rapid drying by covering with PVC membrane or damp cloth. Regular spraying with water in order to keep the mortar humid should take place for a minimum of 15 days. New mortars should be mixed according to manufacturer's specifications. The joints should have the final appearance of the original ones, subject to the engineer's decision both in the solid base part and the rebuilt first and second levels. For pointing purposes MasterEmaco® N 275 TIX (Formerly known as Albaria® Intonaco) or equivalent will be used.
7	Iron clamps/elements at the base of belfry	The exposed steel bars located at the basis of the belfry shall be cleaned from corrosion (rust) by using wire brushing, taking care not to damage the stone. - If corrosion has reduced the cross section of the steel bar to less than 80% of its original diameter then the contractor should provide a method statement for the removal of the steel bars or part of the steel bars to the UNDP Engineer for approval. - For the protection of all existing exposed steel bars, they shall be painted with an active primer (sika Armatec 100 master seal 300 or equivalent) which contains active corrosion inhibiting additives.

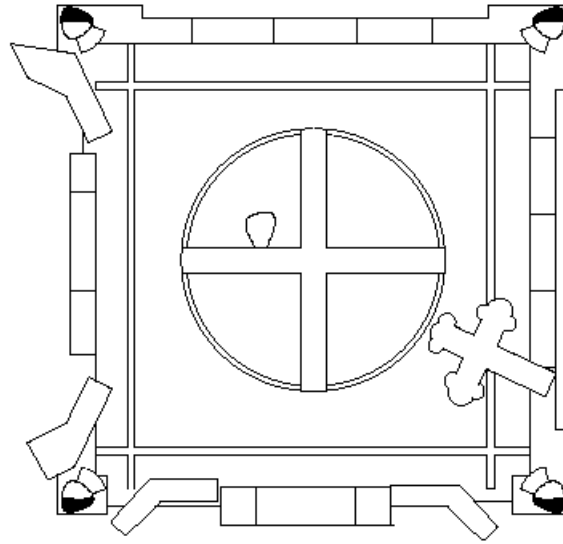
		- Provide and apply special protective paint on the exposed reinforcement bars – at least 2 coats - Hydraulic mortar should be used to cover the iron elements as previously described in section 6.
8	Replacement of stones in the basis of the bell-tower where necessary	Stones in the basis of the bell tower which are heavily weathered - over 50% of material loss – should be replaced. The exact number of stones to be replaced will be specified by the engineer after cleaning. New stones should be of similar characteristics as the stone to be replaced (colour, texture, hardness, size etc). For the stone replacement this method should be followed: Careful removal of decayed block using metal chisel avoiding any damage to the neighboring stones. Cleaning and wetting of the area that will house the new stone. Insertion of new stone, to be fixed with lime mortar (same used for pointing). Where possible new stones must be 1cm recessed from original surface. In case stone/s need to be replaced from the areas where the iron clamps are positioned the contractor has to provide a method statement for the approval of the Engineer for the stone removal and replacement with new stone.

IV. Annex:

Drawings



South Elevation



Top plan view

Photo Album





