

Restoration Method Statement – V2

for the Dome of the Parish Church of Saint Catherine in Żurrieq.



1. Introduction

This report provides an analysis of the condition of the dome of the Żurrieq Parish church, with a view towards providing recommendations as to how the conservation of the external facades of it are to proceed.

2. Historical Note

The Parish Church of St. Catherine in Żurrieq is one of the earliest examples of Church buildings of the baroque period in Malta, designed in the renaissance style. The construction on this church begun in 1632, and was completed almost 30 years later. It is believed that the architect was Matteolo Saliba, who was also the parish priest at that time. This same parish priest endowed the church with several paintings by Mattia Preti, of which 7 are still within the church complex. In subsequent years, the church was enlarged, with the construction of a new facade, two belfries and the lateral naves.

The dome topping the main altar is from the first phase of construction (1632-1657), and is a true renaissance gem having a hemispherical shape positioned on a well-proportioned drum. Internally the dome was re-decorated in the last century, however the original beauty of its simple ribbed structure remains.



3. Description of the Dome

The dome is a two shell structure, with a hemispherical dome on the inside sitting on a polygonal drum, with a hexagonal exterior shape covering most of the dome itself. The eight external facades of the drum are punched by an arched window on each facade. Each facade is framed between Doric pilasters, with the whole ensemble concluded with a cornice.

Internally the dome has a coffered ceiling, whilst externally it is divided with eight ribs. The dome is completed by a lantern which is composed of volutes in line with each rib, which in turn support a smaller hemispherical dome, on top of which an orb crowned with a cross lies. A stone staircase is built between the two shells of the dome, and accessed from an opening in the thickness of the wall to the side of the southern window. Here the wall below the window has 3 small holes, to aid the person climbing into the window sill to reach these stairs. The opening of the eastern window is longer than the other windows, and closed off with a timber box which accommodates an old winch which serves for lifting up the liturgical canopy over the high altar.

4. Condition.

The condition of the facade was determined by means of a number of visual inspections, as well as through the examination of photographs, especially for the higher levels which are not readily accessible.

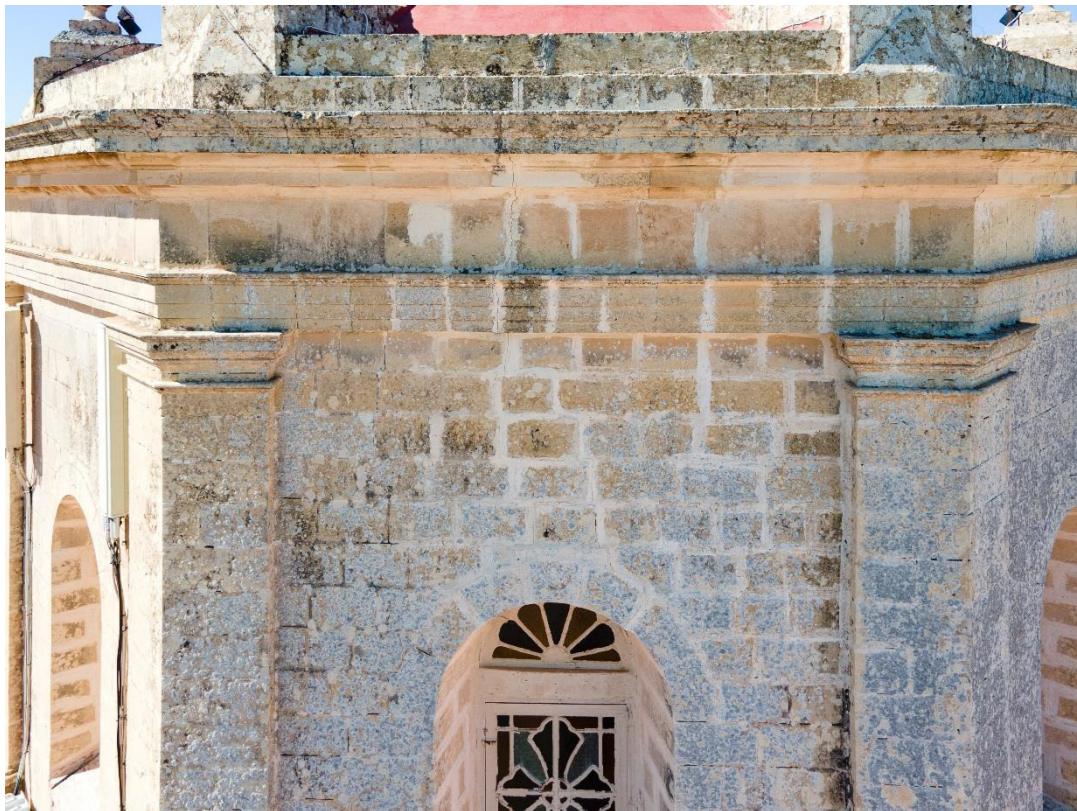
The façade is in an average condition, having localised areas of severe deterioration, which are mostly classified as:

1. Differential erosion of the stone surface especially in the case of the decorative elements,
2. Cement renders applied to open joints, or to deteriorated masonry in the past,
3. Missing stonework, mostly in the decorative elements, the result of either mechanical damage or erosion,
4. Open joints.

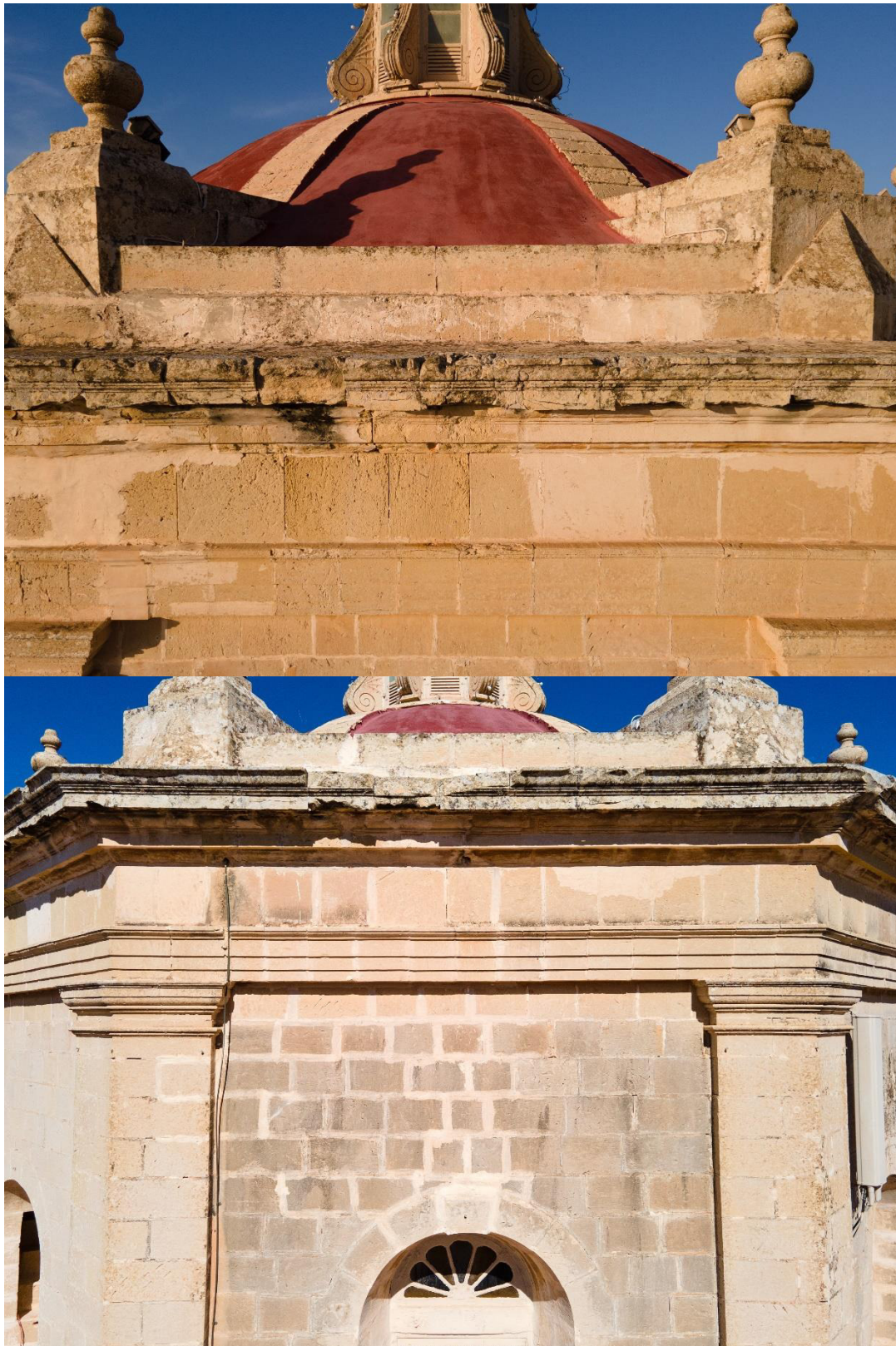
Most facades are characterised by forms of biological growth, with the northern sides practically covered with lichens. The stone surfaces have also a number of metal inserts such as nails which are rusting and damaging the stone, and a crust of bown deposits can be observed in the underside of protruding elements.

All the timber apertures are in a poor condition, with some having broken panes, and missing ironmongery.

The top part of the dome, seems to have been covered with a torch welded membrane in the past, and painted over with a red roofing compound. This is affecting the breathability of the internal structure.



Biological growth, cement pointing and cement rendering to deteriorated elements.



Missing parts in the cornice, and cement pointing and rendering of joints/ gaps.

5. Details of proposed interventions

The interventions consist in:

1. Removal of accretions/metal inserts
2. Removal of renders
3. Rake-out weak joints (only)
4. Cleaning of the facade
5. Plastic repair to stone
6. Replacement of severely deteriorated stone (if necessary), as well re-building of features as indicated in the drawings
7. Pointing
8. Restoration of Apertures

5. General Notes

All the necessary measures shall be taken to ensure that masonry elements are not damaged, chipped, soiled stained or contaminated by salts and/or other deleterious substances during the works.

The contractor shall ensure that the stability of all of the structure is maintained throughout work. Any defects, including signs of movement that develop or become apparent during the course of works shall be immediately reported to the Perit in charge.

The contractor shall protect works against damage by rain. Necessary precautions shall be taken by the contractor to prevent the masonry bedding from drying out too rapidly in hot conditions and in drying winds.

5.1 Removals of Additions/Accretions

Redundant cables and wires, and other accretions are to be removed from the facade. Care shall be taken to remove all metallic inserts, (especially iron and steel fixings) from the stonework.

Corroding metal fixings shall be carefully cut so as to cause the least possible disturbance to the surrounding masonry; the associated rust debris shall also be carefully removed.

Resulting holes shall be filled-in using a suitable lime-based mortar when the break is small or by piecing-in stone, if the gap is large, as per specification.

5.2 Removal of Cement Renders

The removal of such renders shall be done carefully by hand tools using manual methods so as to contain damages to the underlying masonry work. Electrical tools as well as tipped metallic instruments with sharp edges or corners, power tools (such as rotating disk cleaners) and sand blasting (dry or wet) shall not be permitted.

5.3 Removal of membrane and roof paint

The water proofing membrane shall be carefully removed from the dome, first by pulling the loose parts by hand, and then by scraping off the parts which remain attached. Throughout the process special care should be taken to avoid damaging any old deffun which is presumed to be found beneath the existing membrane.

5.4 Cleaning

Cleaning methods will be discussed with SCH monitoring officials once scaffolding is erected on site.

5.4.1 Brushing by Hand

Prior to commencing any cleaning method, loosely adhered deposits and growths shall be removed using suitable corrosion resistant brushes and micro scalpels that do not damage the stone surface. Nylon brushes are to be used. The use of brushes with steel bristles shall not be permitted.

5.4.2 Water cleaning by Hand held Systems

General cleaning shall be carried out by means of low pressure washing (less than 2 bar) using water with a conductivity inferior to 60µS and hand-held mineral/nylon fibre brushes. Chlorinated mains water shall not be used. In the process, care shall be taken to ensure no damage is caused to mortar joints and original plasters. Stubborn deposits shall be removed first. Softened deposits shall be removed with suitable brushes that do not damage the surface. Any debris shall be thoroughly rinsed.

5.5 Plastic repair

The top and vertical edges of the repair area shall be undercut to provide sufficient bonding and reduce the formation of visible shrinkage joints. The contractor shall ensure that all repairs are built up in layers not exceeding 10mm in thickness or as recommended in cases where the use of ready-mixed lime mortars is permitted.

Suitable non-ferrous reinforcement and epoxy rods may be required depending on the size of the area of application. The plastic repair mortar shall be based on a lime binder with the addition of approved admixtures and micro fibre strands as specified in this document to enhance bonding and limit cracking. Aggregates used shall vary from coralline sand, to marble and globigerina limestone sand (xaħx) and to pozzolanic additives. The mixes shall approximate a 1:3 binder to aggregate ratio, unless otherwise agreed with the perit.

The contractor shall ensure that repair mortar is not stronger than the adjacent fabric.

5.6 Replacement of Deteriorated Masonry

Every effort shall be made to retain as much as possible of the original masonry structure, and will be permitted only if upon closer inspection, it is clear that this would be the best course of action.

Stone replacement will be limited to individual badly deteriorated stone blocks and the total number of stone replaced shall be kept to the minimum possible. All new stone work used shall be similar in material colour size and configuration to the original and shall match with the existing course height.

Methodology employed for the cutting away of the deteriorated masonry sections may vary depending on the particularities of every individual case. Nonetheless, care shall be taken to ensure that only hand-held tools and small power tools (jiggers) which do not cause damage to the structure and/or immediate stone blocks will be used.

Replacement stone shall be cut and shaped with such a manner as to ensure the minimum loss of the original material, yet provide a firm seating for the replacement. The new stone work shall be left proud of the original to ensure adequate finishing on site. All existing joint widths shall be respected and bridging of joints will not be permitted.

It is foreseen that in most cases **Piecing-in** will be carried out in most areas, in which a piece of stone is added to fill in a missing area or replace a part of a deteriorated stone by the insertion of an appropriately cut stone piece, attached using structural adhesives (e.g. epoxy or polyester adhesives).

5.7 Grouting Joints

Grout mix shall be based on lime, fine coralline and globigerina limestone sand (xaħx). Joints around replacement masonry units shall be thoroughly grouted wherever joints cannot be fully filled with bedding mortar.

The grout shall be kept back from the exposed face to allow for the depth of pointing specified; this shall be achieved using an approved temporary sealing material. The Contractor will ensure that the grout does not stain the exposed face.

The replacement masonry shall not be pointed until all the work has settled-in. The pointing of the outer 25mm (as a minimum) shall be left until all bedding work has settled.

5.8 Preparation of Masonry Structure for Pointing

The existing mortar shall be carefully removed without damaging the adjacent masonry or widening the joints using a bent spike or small hand-held chisels to a minimum depth of 25mm and never to a depth less than their width. Impact tools shall not be used. Power tools such as rotary discs (chasers) will not be allowed. Where mortar has failed to such an extent that the joints are largely empty, then the joints will be deep tamped and, if necessary, hand grouted to fill the voids up to the distance required for pointing.

The joints shall be cleaned and dampened. The work shall commence at the top of the wall moving downwards. If joints exhibit biological soiling, a biocide should be applied prior to flushing out. Dust and loose debris shall be removed, the joints shall then be dampened with clean de-ionised water to control suction as necessary.

5.9 Pointing

All mixes to be used shall be hydraulic lime mixes, and compatible with the stonework in colour, strength and permeability; they will also be as close as possible in colour, composition and properties to the original mortars.

Prior to pointing/re-pointing, all open joints shall be cleaned from dust and loose materials, and the surrounding stones adequately wetted by de-ionised water. All pointing shall be carried out in layers not exceeding 10mm thickness. Fresh pointing shall be allowed to dry slowly and be adequately protected from excessive heat and direct sunshine by a tarpaulin, and should occasionally be wetted to avoid cracking. When laying new stonework, all vertical and horizontal joints shall be adequately buttered with mortar.

5.10 Restoration of Apertures

The existing timber apertures will be restored, and only those which are beyond repair will be replaced, replicating the same timber features as existing. All apertures will be painted in a light beige colour similar to the existing.

6. Appendix A

Deterioration Maps & Intervention Maps
(*uploaded separately*)