

Giving new life to historic towns: Rehabilitation of Malta's walled towns



MDINA – A CASE STUDY



EUROPEAN REGIONAL DEVELOPMENT FUND
MALTA 2007-2013

ANNEX I

Project for EU Structural Funding 2007-2013

Restoration and Rehabilitation of the Historical Fortifications of Malta and Gozo



Operational Programme I - Cohesion Policy 2007-2013
Investing in Competitiveness for a Better Quality of Life
Project part-financed by the European Union
European Regional Development Fund
Co-financing rates: 42.5% EU Funds; 7.5% National Funds; 50% Private Funds



Investing in your future



The Funding Context

Project for EU Structural Funding 2007-2013

Restoration and Rehabilitation
of the Historical Fortifications of
Malta and Gozo



Priority Axis 2 – Promoting Sustainable Tourism Operational Programme I -

*Maltese fortifications offer a unique and extensive wealth of historical significance. No other island in the Mediterranean basin has such a vast array of fortifications and their restoration and revalorization is an integral and focal part of Malta's cultural-tourism product. **Priority interventions are required in Valletta, Vittoriosa, Mdina and the Citadella (Gozo) fortifications** in order to avoid such heritage from being lost forever.*

TOTAL PROJECT VALUE: 42 MILLION EURO



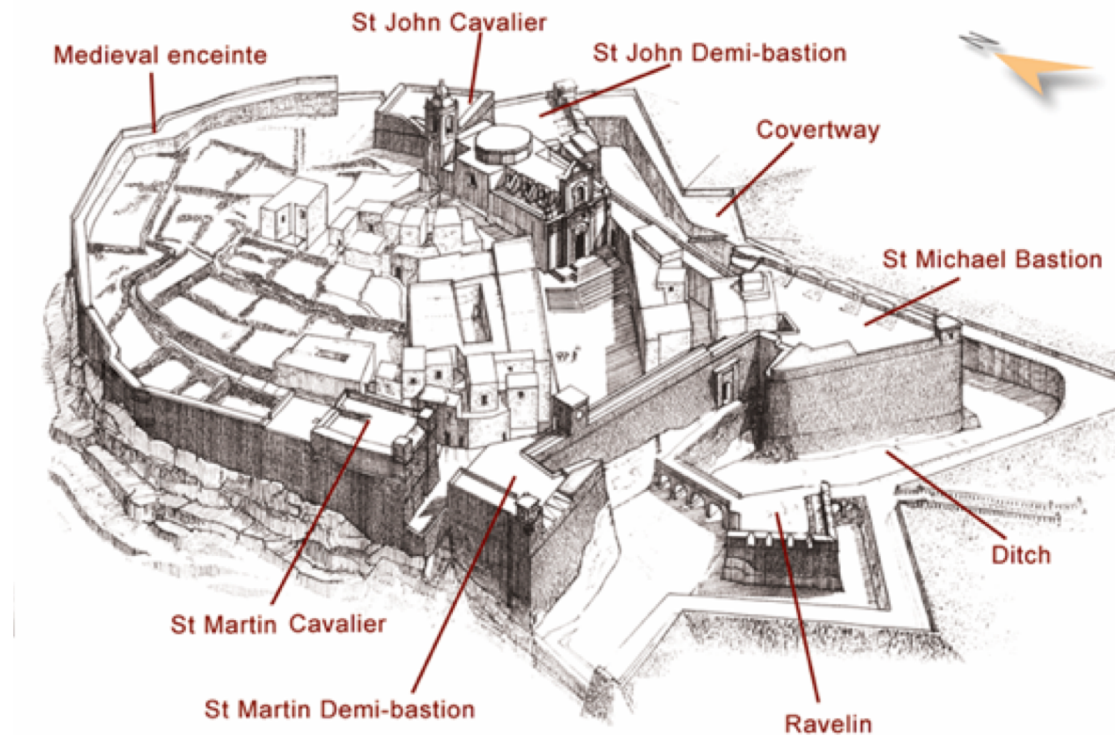
The Funding Context



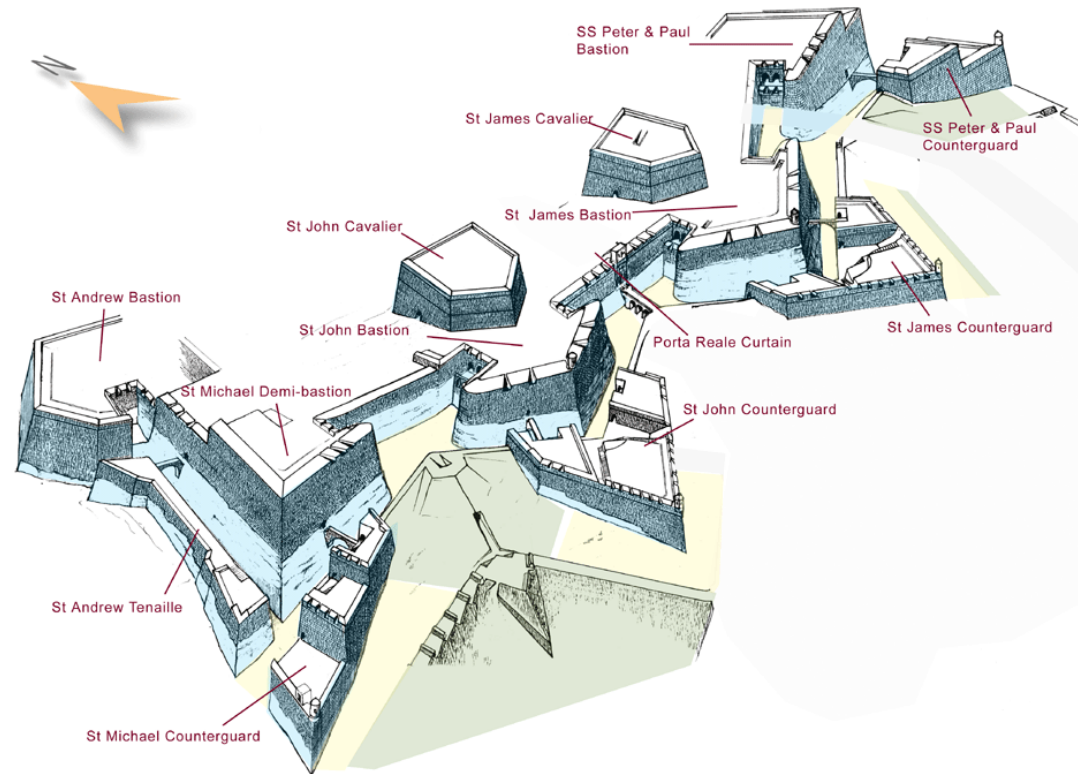
These three examples of early 20th-century postcards show that the fortifications of Mdina, Valletta, and the Cittadella in Gozo have always been important and renowned landmarks defining the Maltese cultural landscape, iconic sites greatly sought after by all visitors to the Maltese islands. (Images source: Courtesy of A. J. Abela Medici, Maltese Picture Postcards).



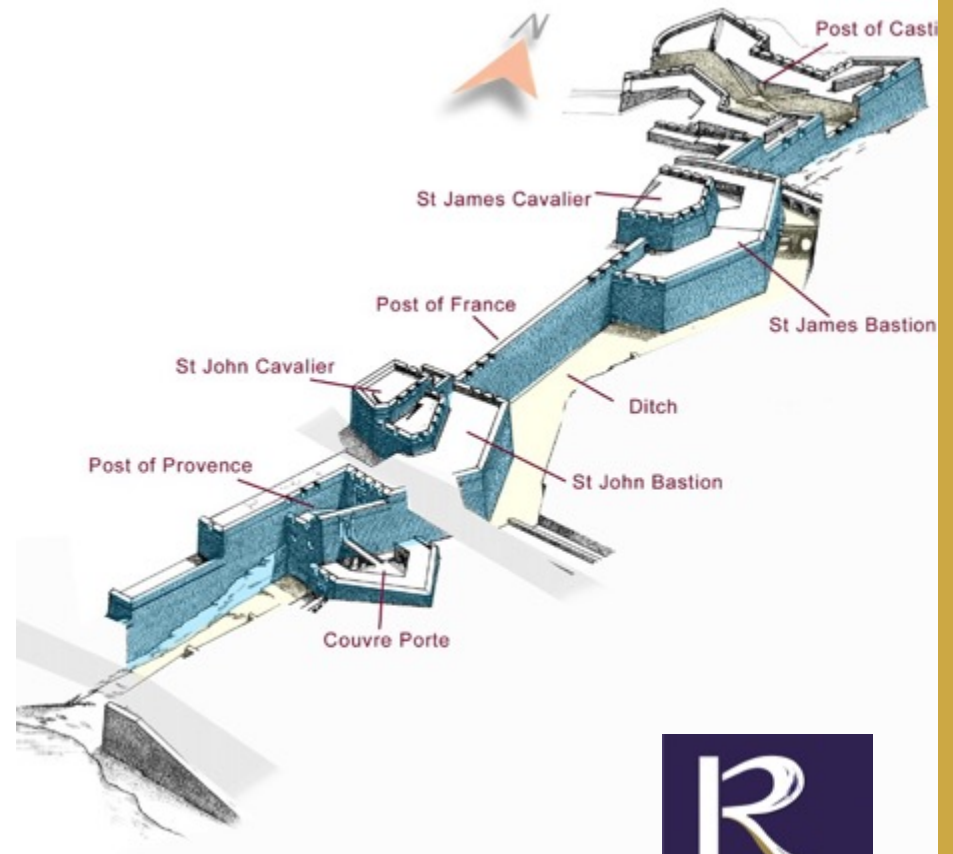
“one of the finest collections of military architecture to be found anywhere in the world and constitutes a monumental heritage for sheer concentration and majesty quite unmatched”



Consolidation of Terrain and Historic Ramparts of Cittadella Gozo



Restoration of Valletta Landfront Bastions



Restoration of Birgu Landfront Bastions

The structural problems of the Mdina bastions, in particular in the area underlying Vilhena Palace, had long been recorded. In the past, various attempts to resolve this delicate situation were undertaken and, although several reports were drawn up, no interventions had been carried out.

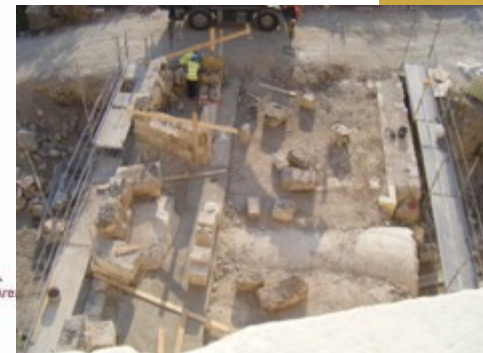
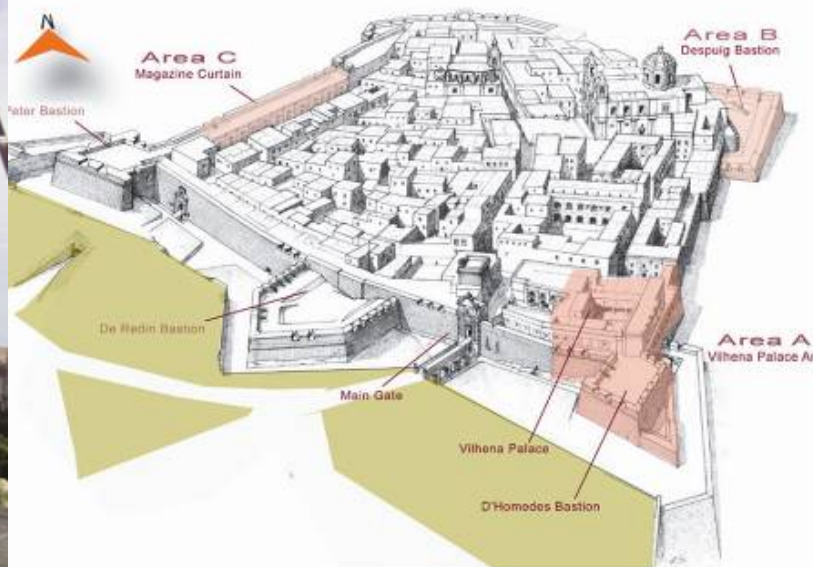
Identification of the damage



In 2009, following a two-year period of fresh investigations to better understand the causes of the unstable foundations of localised areas in Mdina, a pilot project was undertaken to consolidate and restore a stretch of 30-metres of the historic ramparts located underneath Council Square (EEA Funding Mechanism).

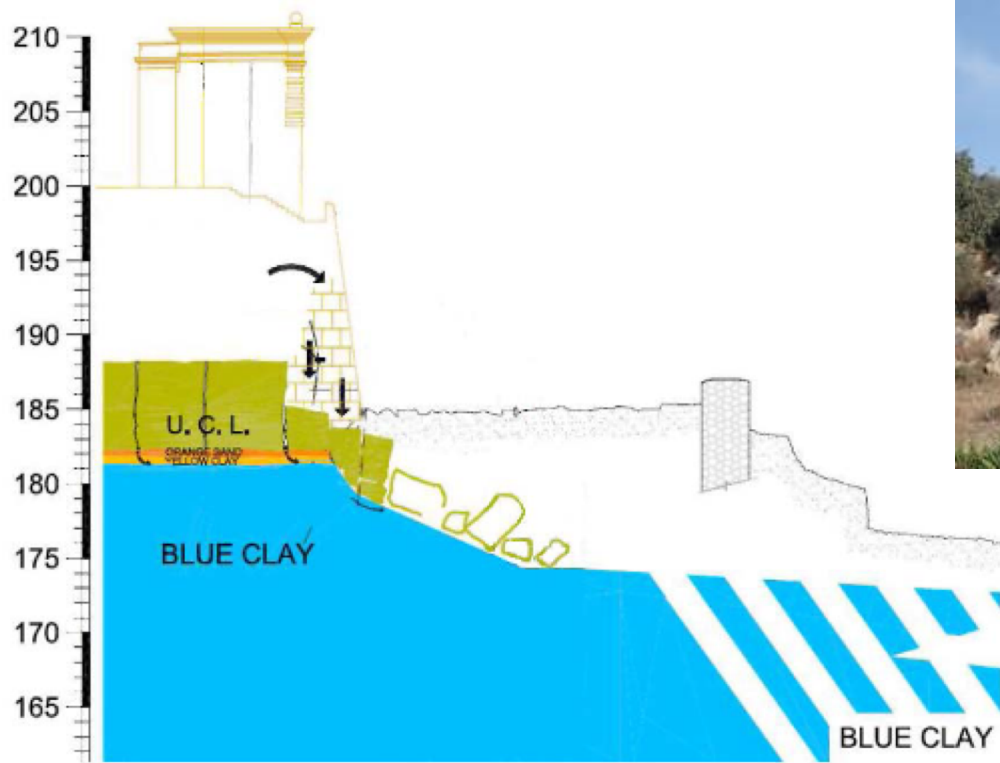
The Pilot project proved to be a very important basis in the preparation of a much larger European Regional Development Fund (ERDF) project which covered 6km of the Forts and Fortifications of Mdina, Cittadella, Valletta and Birgu which the Restoration Directorate completed in 2015.

Managing the funds and strategising the project



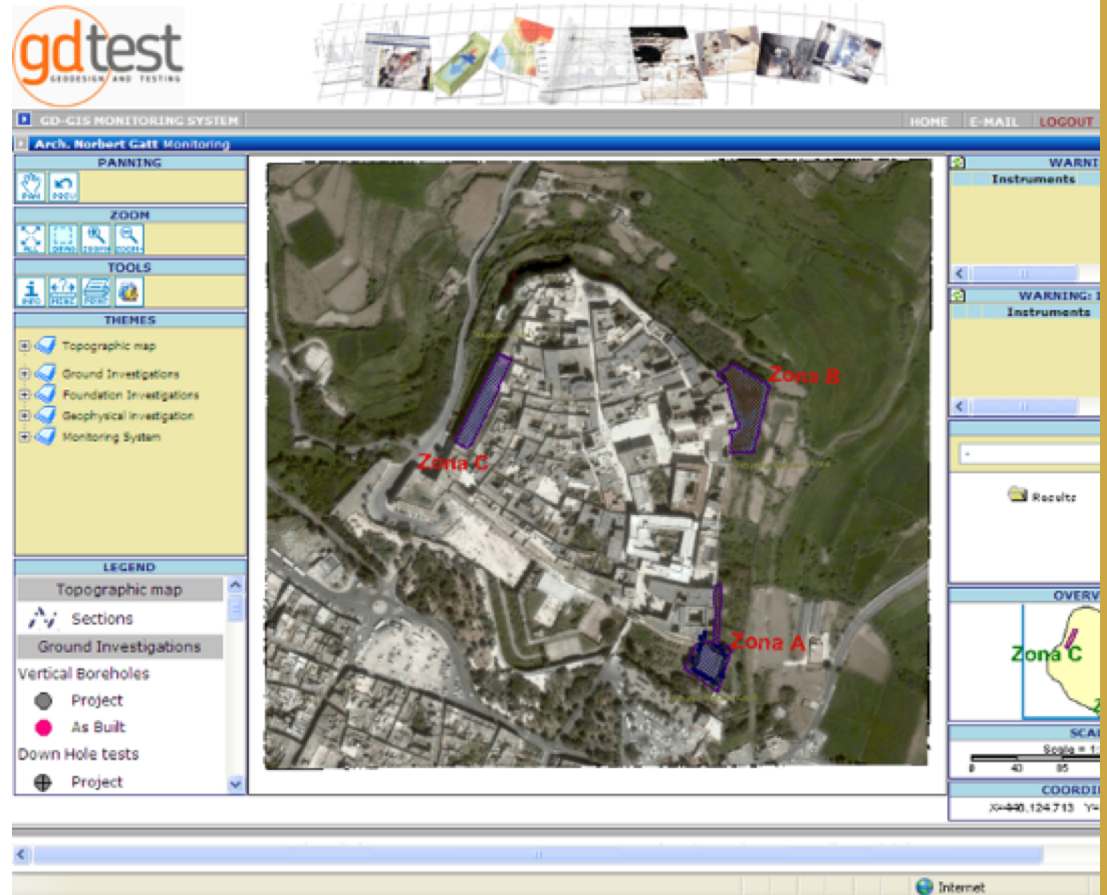
In Mdina interventions were limited to the most endangered areas, namely the areas underlying Vilhena Palace and St. Paul's Bastion (Intervention Area A) , Despuig Bastion (Area B) and Magazine Curtain (Area C).

Identifying the failure mechanism

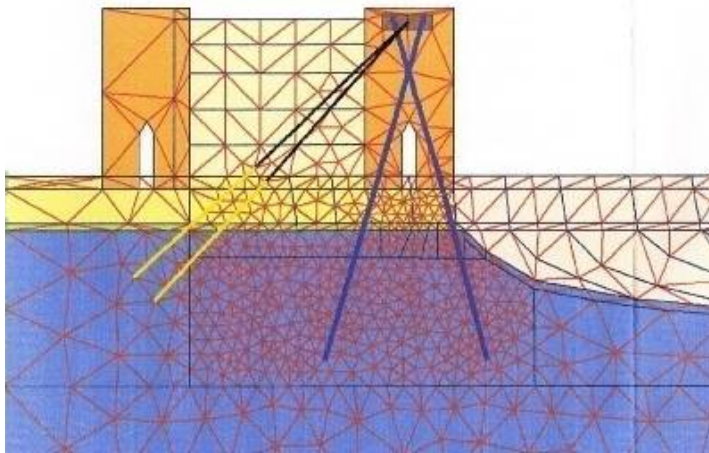


THE GEOLOGY OF THE AREA

A monitoring strategy

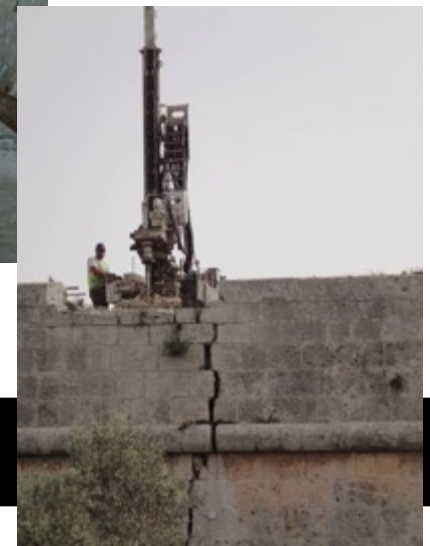
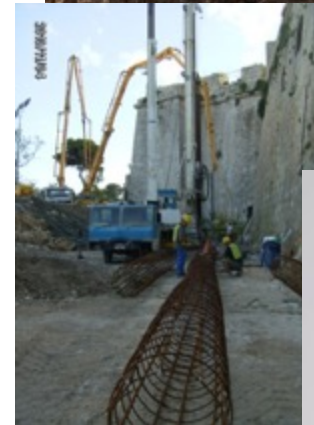


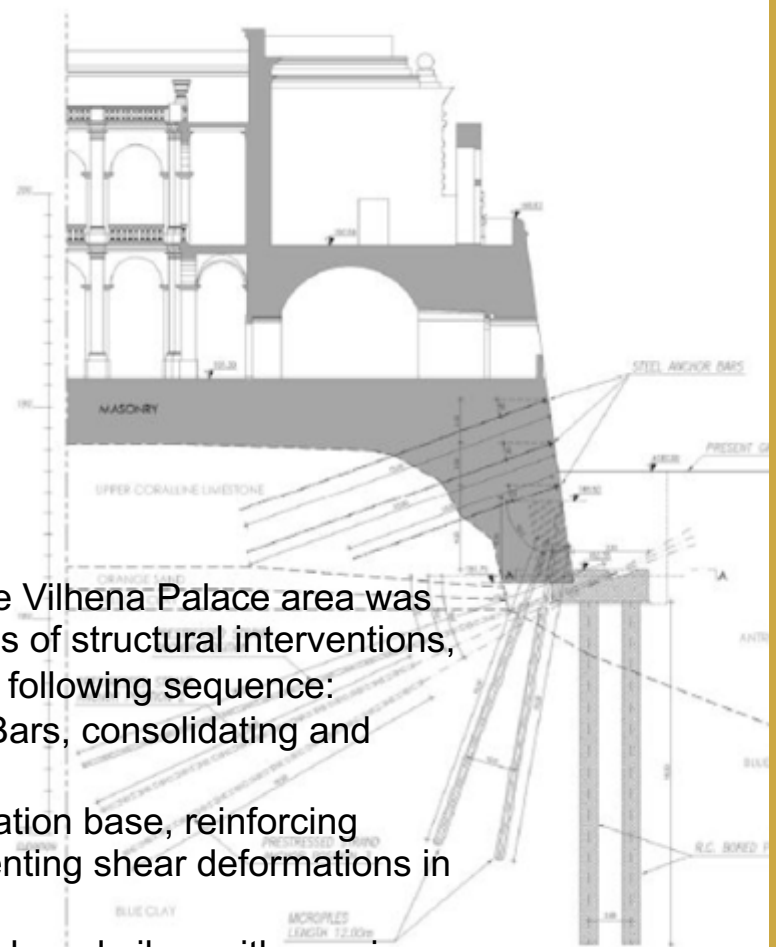
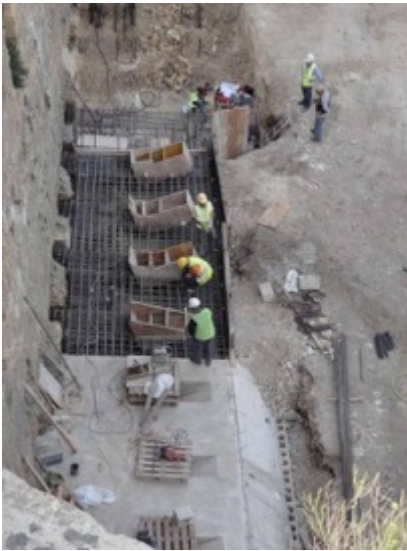
All the tests confirmed the existence of active ground. In particular areas both ramparts and the overlying structures, particularly those located along the peripheral areas with their foundations resting upon the hidden cliff-face, were all being subjected to hidden pressures from the shifting ground. The principal mode of failure was observed to be rigid body rotation about the foot of the ramparts' foundations, with toppling at the top due to yielding of the underlying clay strata.



Structural Modelling

...and so the the work began....



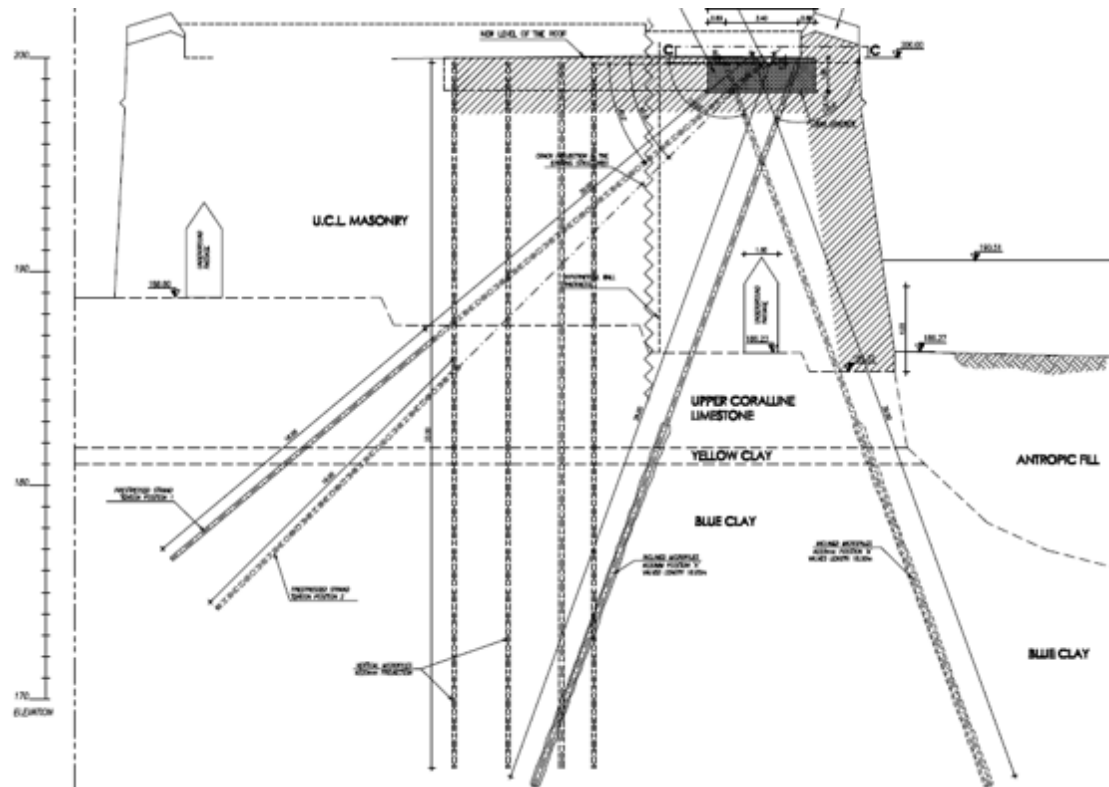


Ground Consolidation of the Vilhena Palace area was based on four different types of structural interventions, which were executed in the following sequence:

- 16m deep Steel Anchor Bars, consolidating and anchoring wall masonry;
- 15m Micropiles, at foundation base, reinforcing foundation soil and preventing shear deformations in surface layers
- 16m deep large diameter bored piles, with capping beam to transfer loads from upper layers to deeper stiffer soil;

Mdina ground consolidation – Vilhena Palace Area

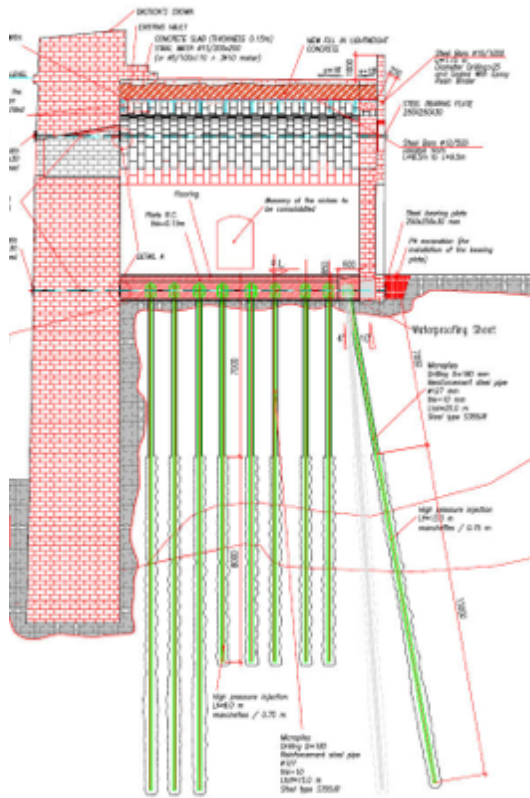
- 26m deep post-stressed anchors, connecting the piles to more stable ground, preventing further movement



In the St. Paul's Bastion area, ground consolidation works were therefore carried out from the top of the bastion level, and included the insertion of vertical and inclined micropiles to a depth of 36m and prestressed strand tendons reaching a depth of 16m. A capping beam 1.5m deep transfers the forces created in the micropiles and in the strand anchors to the masonry structure of the historic walls.



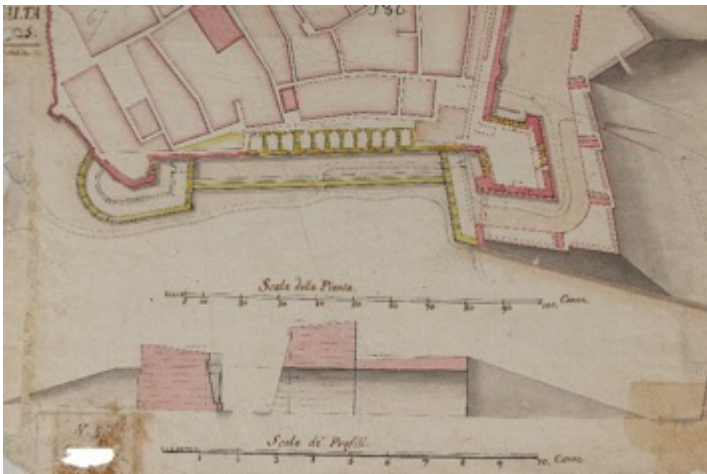
Mdina ground consolidation – St. Paul's Bastion



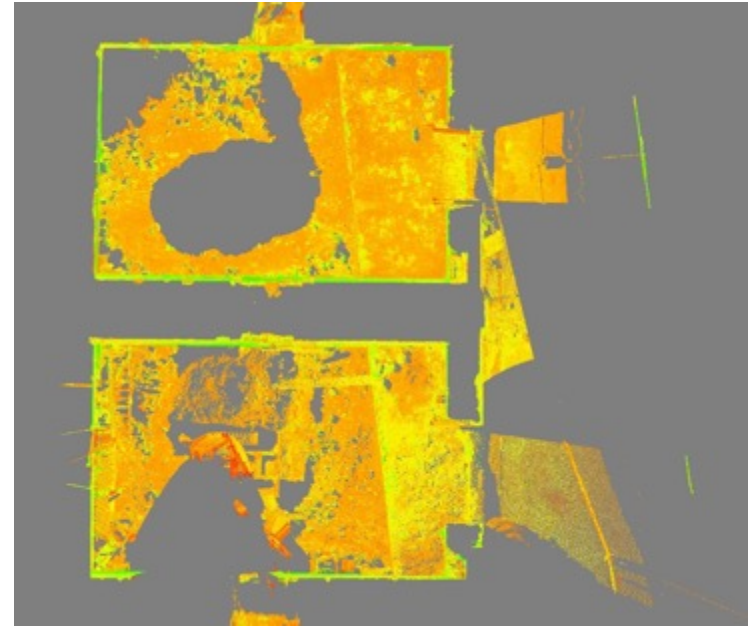
Magazine Curtain represented perhaps the most dangerous section of the ramparts. Huge fissures cutting through barrel vaults were threatening to bring down many of the magazines. A series of piles inserted on either side of the Vault walls were stitched together by means of capping beams running the perimeter of the magazines. The barrel vaults were also stitched and consolidated from above.

Mdina ground consolidation Magazine Curtain

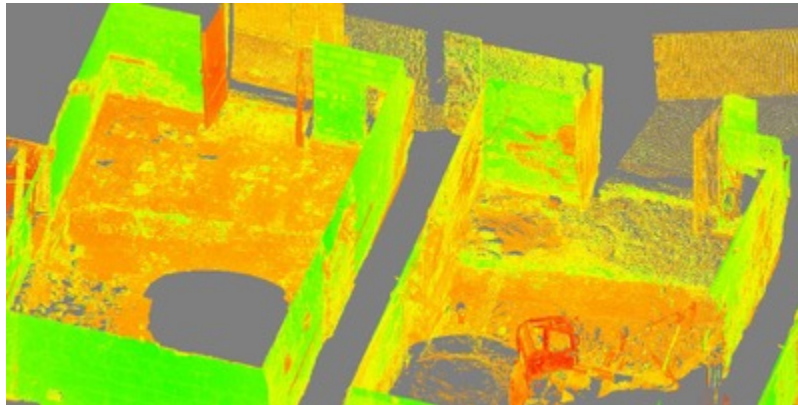
**The old fortification
wall was discovered
during the
excavation for trial
pits**



**Mdina ground consolidation
Magazine Curtain**



**Laser scans of
the
archaeological
finds where
carried out**



**Mdina ground
consolidation
Magazine
Curtain**

Restoration of the fabric



As the consolidation works progressed, the restoration works on the stone fabric followed soon after.



Each section of each and every, wall, rampart and bastion was surveyed, drafted, and painstakingly mapped for deterioration processes and interventions before it was brought into the state of restoration and preservation it is in today.

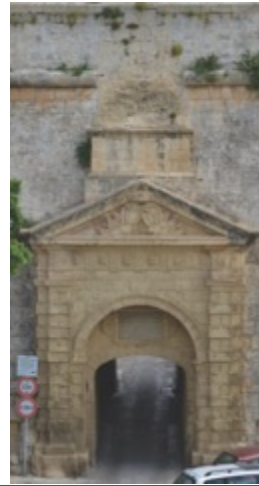


Restoration of the fabric

Restoration at St. Mary's Bastions

In 2013, the Restoration Directorate put forward another request for funds to Managing Authority to be able to complete the perimeter of the Medieval city within the latest possible phase of application. This request was accepted and the tenders for the restoration of St. Mary's bastion and the adjoining medieval ramparts as well as St. Peter's Bastions were published and awarded.





Restoration at St.Peters bastions and Greek's Gate



The restoration of the fortifications gave rise to other government initiatives and projects such as the rehabilitation of the Mdina ditch, the introduction of the horse shelters as well as the railings overlooking the ditch from Howard gardens

Spin-offs



Thus the whole perimeter of fortifications of Mdina was finally completely restored and consolidated by January 2016. The Restoration Directorate has brought together its own maintenance team, made up mainly of abseiling personnel trained in restoration techniques, to be able to maintain the restored ramparts.

The maintenance team



A Valorisation Process

The restoration and consolidation of the fortifications has increased private sector involvement in the management of cultural assets (e.g. visitor and conference centres, museums, restaurants, cafeterias, etc.). Upgraded key heritage sites to improve their interpretation accessibility, conservation and promotion.



THANK YOU