MINISTRY FOR TRANSPORT,
INFRASTRUCTURE AND CAPITAL PROJECTS

Triton Fountain
Restoration & Inauguration

January 2018

TRITON FOUNTAIN

RESTORATION AND INAUGURATION

JANUARY 2018

HON. IAN BORG

MINISTER FOR TRANSPORT, INFRASTRUCTURE & CAPITAL PROJECTS

The Triton Fountain is beyond doubt one of Malta's finest monuments and consequently one of Valletta's main landmarks. It has served as a meeting place for subsequent generations and many of us are emotionally attached to this gem. Left a nameless orphan throughout the years, this fountain has now been restored to a pristine condition and will serve as a backdrop for the initial celebrations of Valletta as European Capital of Culture. This shows how the story of this prominent Maltese landmark has turned a new leaf, and is now set to begin an exciting chapter in its life.

It is indeed an honour that my Ministry was a catalyst in this grand task which will see the fountain being inaugurated for the very first time since its unofficial commissioning on Saturday the 16 May 1959. As with all the projects falling within the remit of my Ministry, the restoration of the Triton Fountain has been a journey involving serious planning methodology. The Ministry took a wider perspective when it looked at this task which was not only intended to restore this cultural asset to its original form, but also to create the right infrastructure in order to enable the fountain to retain optimum condition for the maximum time possible. In fact, a new subterranean water treatment plant and pump room connected to its complex series of underground service passages and chambers was also developed. This has been done to ensure that the quality of the water circulating in this fountain would cause the least possible harm to the sculptural group and travertine elements. Particular attention has also been paid so that the lighting scheme of the fountain will be complementary to its surroundings and for the water projections to be as faithful as possible to the original layout. The restoration of the original warped basin, and the removal of the central sculpture, which had been installed to support the structure during the previous repair intervention, goes to show the

dedication with which such works have been carried out. The work of Chevalier Vincent Apap and his collaborator Victor Anastasi has been restored in full respect to the original design and is being presented to the public in a way that most of us have never ever had the good opportunity to see it in before.

I would like to thank my predecessor, Hon. Joe Mizzi, who believed in this project during the previous Legislature, after the fountain had regretfully been subject to years of neglect. I would also like to thank the Permanent Secretary and all the Public Officers who believed in this project and worked wholeheartedly on it, leaving a decisively notable legacy. The Triton Fountain is now set to welcome all those visiting our glorious Capital City in the most honourable manner.

CHRISTOPHER CUTAJAR

PERMANENT SECRETARY
MINISTRY FOR TRANSPORT, INFRASTRUCTURE & CAPITAL PROJECTS

In this day and age, the inauguration of the Triton Fountain is intended to mark the revival of this monument located at the Capital City's entrance. This gem, which has served as a landmark for decades, has not only been restored to look like our forefathers remember it, but is being restored to be the centre piece of a new public space developed for the enjoyment of the public, linking Floriana to the Capital City, Valletta.

When we joined our administrative and technical expertise together, in order to be able to get the restoration of the Triton Fountain completed by the end of 2017, there were many sceptics who thought that we weren't in fact going to be able to deliver by the stipulated date. We had signed the contract on 12 January of the same year and it was very easy to suppose that one could not restore such a gem, which had been left in the wilderness for so long, in less than twelve months. The Public Officers working on this project were able to get this project delivered on time, because they worked as a team and were both determined and focused on getting it done.

There were issues which delayed the project's progress, such as the unearthing of historic walls during the initial phase of the project. This posed even harder challenges on us. All works on this scheduled monument were monitored on an almost daily basis. The restoration works on the travertine foliage of the fountain was well executed. At the end of July, we managed to get the triton figures transported back to Malta, and we were able to put them back into place by mid-August. At that point, I was even more convinced that we were going to make this project happen as promised.

I would like to thank the Public Officers who put in their best effort to conceive, negotiate, manage and deliver this project in a timely and professional manner.

I would also like to thank all those who worked relentlessly to bring the Triton Fountain back to its original splendour. They have now brought it back to a state that befits the Maltese people. It is now our collective responsibility to preserve it for future generations.

Fountain Competition Exhibition (General view)

Model of the Triton Fountain at the Competition Exhibition

THE TRITON FOUNTAIN

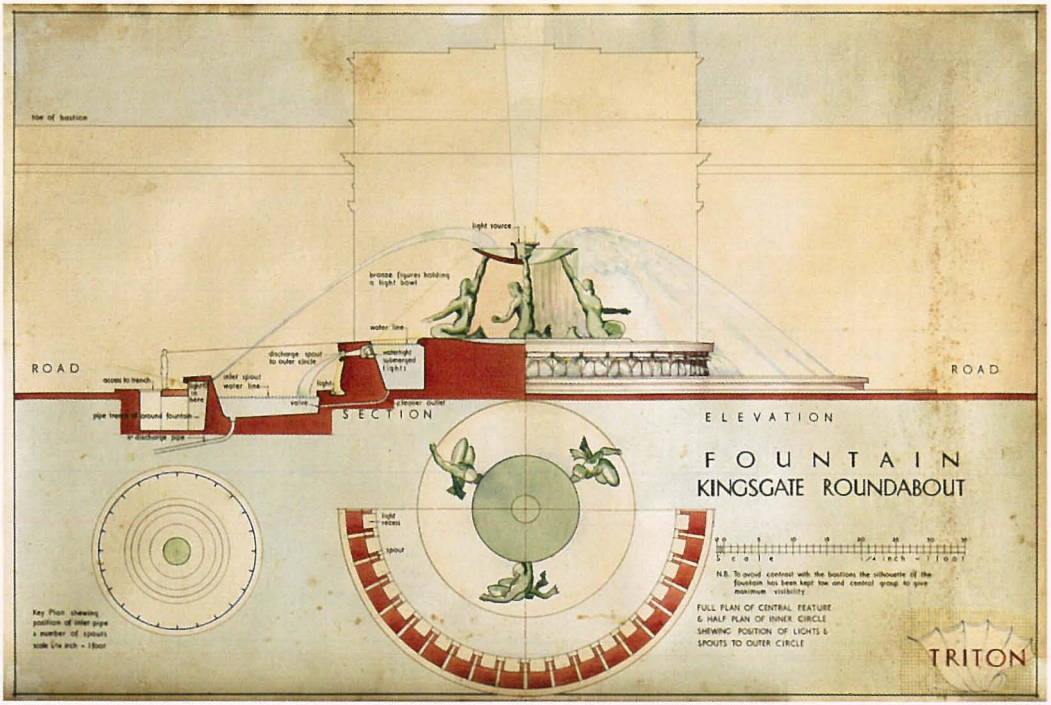
The erection of the Triton Fountain between 1952 and 1959 was executed under three governments. It was the brainchild of a prominent sculptor and his collaborator, the Chief-Draughtsman of the Public Works Department, who won the competition for the design of a monument just outside the principal entrance to Valletta. The result was indeed a crowd puller. However, its splendour was short lived, due to inappropriate technical decisions, as well as misuse and neglect, which led to its rapid decay.

Watching one's monumental *chef-d'œuvre* being abused and neglected for many years must have been a sore trial to its creators, especially given the prominence of the site. The repair works undertaken some years later were not much consolation, since they failed to preserve the intrinsic quality of the monument. The dynamic grace of the monument, produced by the fluid sculptural group that links the florid base to the lofty basin, was reduced to a static display of figurative art by the addition of a solid central column. This appendage, combined with a lack of effective maintenance in an environment which was rapidly degrading, did much to erase the collective memory of the fountain's golden years.

To add insult to injury, an ill-advised proposal to Government aimed at displacing the Triton Fountain from its carefully selected and strategic position was put forward. Thankfully, common sense prevailed and the proposal was soon dismissed. Although this threat was deflected, the road to its full restoration was still long and arduous.

Having overcome this hurdle, a detailed report regarding the restoration of the fountain to its original state was drawn up and submitted to government. Besides the restoration of the monument, the aim

of the proposal was also to render justice to the two gentlemen who designed it, to pay a merited tribute to Valletta, and to return a delightful reminder to the people of Malta and its visitors.



Sectional Elevation and Plan of the Triton Fountain

Commissioning of the Triton Fountain on Saturday 16th May, 1959

Structural Collapse on Wednesday 1st March, 1978

Damage

Conservation-restoration projects present a unique scenario of problems and constraints. The Triton Fountain was no exception and in particular, the project had to consider its unique location and its use. Apap's tritons presented a challenge concerning the redressing of past mishaps and restoring them to former glory. Thorough graphic and photographic documentation of the sculptural group was drawn up. This included a 3D-scan of both the exterior and the interior inspection passages and chambers to ensure that a full record of them was available for future reference. This was also undertaken to ensure that the precise position of each part of the sculptural group is documented.

Although extensive surface damage was clearly visible, the internal decay of the sculptures was concealed. The most evident damage had been sustained by trauma and inappropriate repair. The casting quality of the statues left much to be desired. They are replete with manufacturing defects such as pores and steam cracks. Despite these defects, the importance conserving the original castings was paramount and therefore not negotiable. The badly warped basin had fared worst and its complete replacement by means of a new cast was seriously considered.

As with other sculptural groups that perform a structural role, the tritons were meant to have an internal structural armature. This had been limited to a steel channel passing horizontally from the elbow of the uplifted arm to the shoulder of the opposite arm of each figure. Steel bars were also placed within the base of each statue to reinforce the concrete base intended to stabilise the figures. This reinforced concrete was the main cause of the subsequent damage that resulted in the lower torso of each statue, which cracked as a result of the differential expansion occurring between the statues and the concrete.

Other damage consisted of stress cracks in the shoulders of the uplifted arms, which had been repaired by oxy-acetylene

welding and left proud of the surface of the castings. A less evident problem was caused by the considerable number of ferrous chaplets (consisting mainly of nails inserted to anchor the outer and inner moulds) that were left in the castings by the original foundry. These had deteriorated badly due to electrolytic corrosion. Their decay led to the formation of a spotted non-homogenous patina, which had a very disturbing visual effect. Some of them were completely corroded and had left a lacuna in the statue surface which only served to permit water ingress to the already compromised interior of the tritons. The patina of the statues was irreversibly ruined by these conditions and exacerbated by the sulphurous atmospheric pollutants and calcareous deposits from the constant use of untreated water. Traces of the original patina applied by the foundry were detected in sheltered areas, such as the nostrils, ears, mouths and armpits of the figures. This was a carefully analysed and compared to contemporary photographic documentation in a bid to establish the original patina's hue. Thirteen samples were taken from the bronze surfaces and sent to a diagnostic service laboratory in Florence to establish the alloy composition of the castings, the welding joints and the repair welds. Results confirmed that the sculptural group was cast in brass (an alloy of copper and zinc) and not bronze (an alloy of copper and tin), as was generally thought.

The basin on top of the tritons was badly warped: by over 300mm at certain points, and was having a negative effect on its function as a water retaining and cascading element. To level the edge of the basin, a brass border had been welded to the lip, however this proved not to be sufficient and a second brass border had been soldered to the entire circumference of the basin. This again was not as effective as it was intended to be and this was corrected by the casting of a levelled reinforced concrete border along the irregular circumference of the basin.

Damaged Tritons (detail)

Dismantling

No references to previous similar works have been traced. The proposed restoration method statement was drawn up and approved specifically for this task. The nature of the damage incurred in the statues specifically dictated that on site dismantling of the triton statues and basin for transport to a specialised foundry was the only available option. The challenge was therefore how to address this and causing the least damage to them. The tritons had been cast in smaller pieces and welded together. The meant that it was possible to dismantle the statues by cutting the numerous welding seams.

This practice was also specifically applied during the removal of the additional central sculpture to avoid cutting it into two. An oxy-acetylene torch was inserted through the basin to cut through the ferrous pipe within. This released the basin from the mountings binding it to the sculpture. The central sculpture was consequently released safely after the basin was lifted off. Each of the tritons was subsequently cut into two main parts: upper and lower torso. Removal of the former was straight forward, however the latter prove trickier. This was due to the concrete infill contained therein. Removal proceeded through careful digging around their base to release the castings complete with their concrete infill. They were eventually shipped to Florence *tale quale*.

Hoisting part of a dismembered upper torso

Detaching the steel reinforcement from the concrete screed

Conservation treatment

Upon arrival in Florence, further minute samples were taken from different parts of the surface patina of the tritons. These were sent for elemental and chemical analysis at a Florence based diagnostic laboratory. The results confirmed that the orange non-homogenous surface patina was predominantly composed of rust from the deteriorated water pipes. The patchy staining did nothing to enhance the appearance of the sculptures. Furthermore, it was found to be unstable and exacerbated by the surrounding polluted atmosphere. The proposed way forward was eventually decided on gentle micro-blasting.

Apart from removing the surface pollution, this cleaning method was aimed at exposing all the ferrous chaplets that had to be removed.

The initial operation was the removal of the concrete infill of the lower torso of each figure. Small openings were made in the limb surfaces to enable the operation. Each was appropriately marked to ensure faithful reconstruction. Concrete removal was completed in just over a week. This was followed by drilling out of the chaplets. The resultant holes were filled by welding metal plugs of the same alloy composition of the castings. The surfaces were then burnished to homogenize them. Tool marks were incised in the bronze surface by cold working techniques. The lower torso of each figure presented a less easy task since these were more fragile. All fragmented parts were reconstructed together while brass patches were welded inside the tritons to consolidate the castings. These were similarly welded and appropriately burnished.

The basin was divided in two halves during which process the casting was revealed to be sound and devoid of porosity and other defects that plagued the tritons. The good quality of the casting was probably due to a different casting technique employed for the basin owing to its relatively plain profile, unlike the tritons. The main problem in the basin was the very serious deformation from warping.

This proved to be excellent news since the foundry confirmed that it was feasible to address the warping issue through fairing. Although this is an arduous job, it was worth the effort since ensured the conservation and the retention of the original basin. A healthy section of the basin was identified and a template was designed to faithfully record its profile. Each warped portion of the basin was cut through its welding seams and subsequently pushed and pulled as necessary to fit the template.

Subsequently the sculptural group was sent to an engineering works in Vicenza to be fitted with a high-grade stainless steel armature. This was designed as a structural skeleton for the triton figures and the basin itself.

In order to ensure that the border of the basin was perfectly level the border was extended by welding a brass extension to it.

The basin was eventually placed on a jig and slowly rotated against a grinder set at a fixed point. This process created a perfectly level surface along the entire diameter. The basin was fitted with a double bottom (in high-grade stainless steel) to reduce the volume of water retained. A 50mm hole was drilled at the bottom of the basin to drain any water that may find its way in between the two shells.

The armature within each figures was specially designed to follow the internal contours of the figures. The structure within was designed to be both a load bearing element and to transport the water up to the basin. Furthermore, the interior of the arms also had to serve as a passage for the electrical connections needed for lighting. Once set, each of the statues' detached parts were re-fitted. The sculptural group was eventually assembled in the engineering works according to the dimensions recorded on 3D-scan. Once deemed satisfactory, the group was dismantled and the patina was applied according to the scientifically determined original samples.

The *Bacino Superiore* being re-formed from warping

Patinated sculptural group being positioned in Vicenza, Italy

Assembly

The process of erecting the sculptural group *in situ* followed more or less the same procedure that had been performed in the workshop. The main difference was that it had to be located in accordance with the original precise position recorded by the 3D scanning. The base plates welded to a template were prepared by the Vicenza based engineering works. These were shipped to Malta and set in the form-work base of the tritons. Once set, the tritons were lifted and placed on their respective base plates. Their position was then calibrated by means of a template which ensured that their position was identical to the original position and orientation. The basin was then lifted, set in place and its position calibrated.

Calibrating the tritons according to template

The sculptural group being reassembled

Top left: Micro-sandblasting of *vaschetta* travertine
Top right: Diagnostic testing
Bottom left: Plastic repair
Bottom right: Re-alignment of travertine blocks on *Sedia Belvedere*

Travertine

Works on the base and the other parts of the fountain were ably carried out by a Rome based firm specialising in such works. The fountain geometry is based on the multiples of eight. Each concentric ring of the fountain has 32 travertine blocks having aligned mortar joints. This is also reflected in the number of water jets and associated lighting. The outermost part of the fountain is constructed in a mosaic border, which is referred to as the *pavimento davanti la sedia belvedere*. The next ring is the *sedia belvedere* which surrounds the *vasca inferiore*, the *vaschetta*, *fogliame travertina*, *vasca intermedia* (having 32 *zampilli* flowing by gravity into the *vaschetta*) and *bacino centrale* (base of the sculptural group).

The travertine covering the base and the basins around the fountain had deteriorated over the years from atmospheric exposure, sea spray contamination, contact with pollutants from vehicles moving around the fountain, biological growth, human intervention and structural defects. The restoration of the travertine commenced after a comprehensive assessment of its condition. The travertine slabs were mapped so that all interventions could be recorded. A detailed analysis of the material and defects was carried out on site and in specialised laboratories with the help of experts who carried out the microscopically and chemical analysis. Before the actual cleaning and repair of the travertine were undertaken, a series of trials were carried out to determine the best combination of chemicals to be used in the poultices for cleaning. Trials were also carried out to find the best composition and colour of the plastic repair. The tests had to be repeated a number of times since the extent and type of stains and biological growth varied around the fountain.

Stains were removed by means of poulticing that extracts the salts and other pollutants from the pores of the travertine and by micro-blasting that removes stains from the surface of the travertine. The former was used for the carved relief

in the foliage band, which represents stylised lilies, while the latter was used for the flat areas which cover the remainder of the slab.

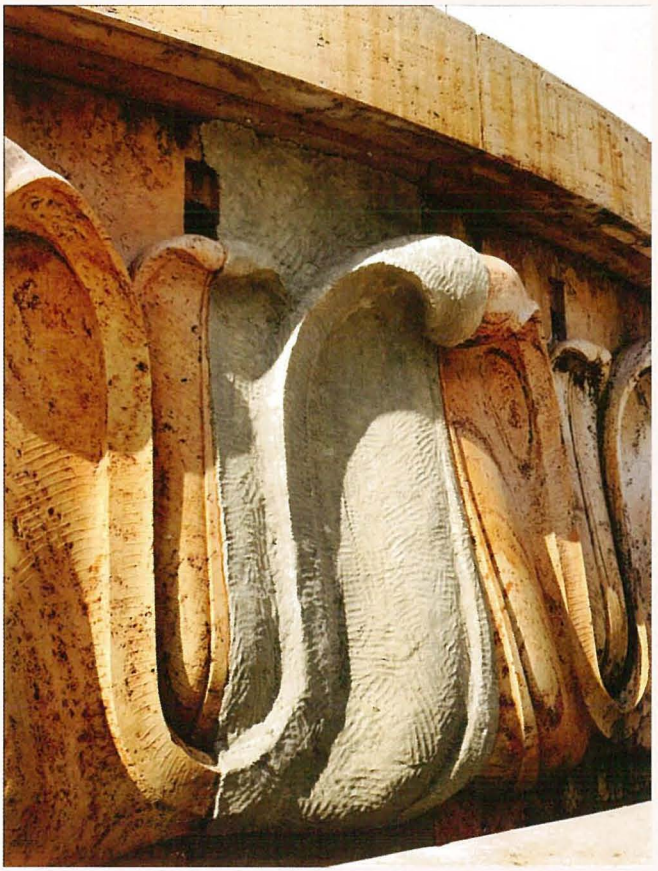
Detached parts of the travertine were generally noted at the edges of the carved slabs, as this is the most fragile part of the blocks. Most losses occurred in the centre of the small stylised lilies in the foliage band. The lost material was recreated using plastic repair techniques reinforced with carbon fibre. Broken parts of the *vaschetta* were rebuilt by piecing-in, care being taken to match the vein and geomorphology of the original travertine.

The main characteristic of natural travertine is its numerous cavities and pores of differing sizes. The larger cavities had already been filled in with travertine shards embedded in a cement-based mortar. Detached mortar was removed and re-applied using a water resistant lime-based mortar. Only the larger holes were filled in. On the horizontal surfaces even the smaller holes were filled in to prevent water ingress, since these receive large quantities of water. Algal growth had been removed by the application of a biocide and impervious water repellent was applied to all surfaces of the travertine slabs to inhibit new growth.

Two of the larger travertine blocks of the *sedia belvedere* were lifted to remove rusty metal spacers that had dislodged 17 of the 32 slabs. All were re-aligned to form a perfect circle.

The fountain is constructed on a concrete base with a central chamber under the tritons and two concentric tunnels running around the fountain through which the electrical cables for the lighting and the water pipes for the water features pass. The central chamber and the concentric tunnels were interconnected to an underground pump room at the edge of the fountain. Works were carried out to clean and consolidate the concrete structure and extend the lifetime of the fountain. Two critical concrete roofs were replaced since these deemed to be beyond repair. Cracks in the concrete structure of the *vasca inferiore*, the *vaschetta*, the *vasca intermedia* and the *bacino centrale* were closed and waterproofing was applied

to protect the concrete structure against water leaks. Special attention was given to the numerous water and electricity pipes that run through the concrete to provide for the lighting, water features and fountain drains.



Cleaning the travertine: poulticing


Before and after cleaning the travertine

The restored travertine foliage

Water and light display

The function of a fountain is dependent on a dynamic water display. The water quality must by sufficiently high so as not pose a sanitary danger to the public and to prevent staining of the bronze elements and the travertine. This has been assured by the installation a state-of-the-art water treatment plant to ensure that the water quality is up to the required sanitary standards and free from rust particles and aggressive chemicals. This means that all the water in the fountain, including that in the upper basin, is constantly filtered and conditioned by appropriate dozing with chemicals.

Each of the water features now installed have been designed in a manner that they are now individually operated by separate duty and stand by pumps. In total 10 new pumps were installed for the water features and water treatment. Each of these pumps is equipped with an inverter to regulate its pressure and the length of the jets of water on the fountain. A special water feature has been installed to work on windy days when the operation of the water dome feature above the top basin has to be toned down or switched off depending on the strength of the wind. On such days only a uniform cascade of water will descend from the basin's lips.

In order to prevent staining of the bronze and travertine, all of the original water pipes were replaced. The original water pipes were made of steel and over the years had corroded and were the main source of rust stains that had coloured the travertine and parts of the bronze elements. New water pipes have been installed using plastic heat weldable pipes, except for the pipes inside the Tritons and on the basin, which are made of stainless steel.

The lighting of the fountain has also been designed to enable the creation of special light effects. All the original light features have been reinstated: under the *sedia belvedere*, in the *vaschetta*, *vasca intermedia* and in the basin using more efficient luminaires. All lamps can provide controllable coloured light, except for

those illuminating the sculptured elements which will be illuminated with white light. Furthermore, the jets around the periphery and the water in the *vasca inferiore* itself have been illuminated with 32 new lights in accordance with the original configuration of the fountain. New lighting was also installed under in the *vasca inferiore* to illuminate the water. A further nine new lights have been installed inside the *bacino centrale* to illuminate the hidden lower limbs of the tritons, which previously were always in total darkness.

A new plant room was constructed underground to house all the equipment and plant necessary for the water and light displays. The plant was constructed underground so that it does not obstruct the view of the Valletta bastions. The plant room is connected to the fountain.

A state of the art control system was installed to automate and monitor the operation of the water treatment plant and of the water features and architectural lighting.

Tunnel connecting plant room to fountain

Water nozzles installation in bacino centrale superiore

Conclusion

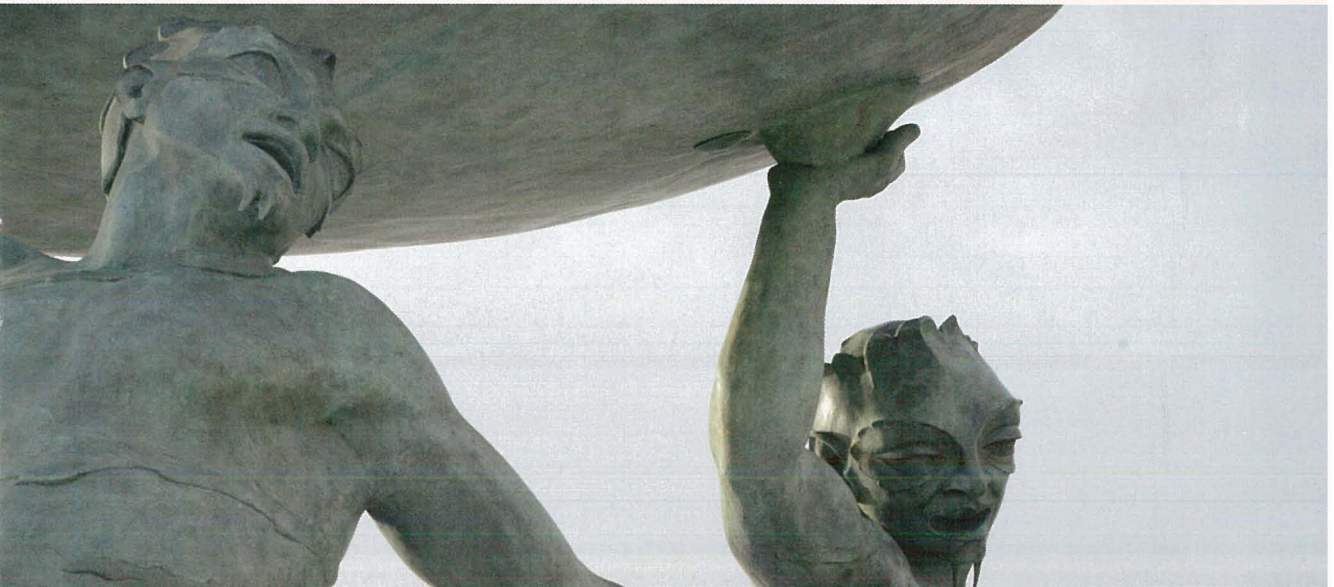
The success of this prominent landmark is merit to its creators, Chevalier Vincent Apap and Victor Anastasi. Also worthy of mention is Carmelo Grech, the original civil contractor. Merit is also due to all those involved in the recent conservation intervention and its restoration.

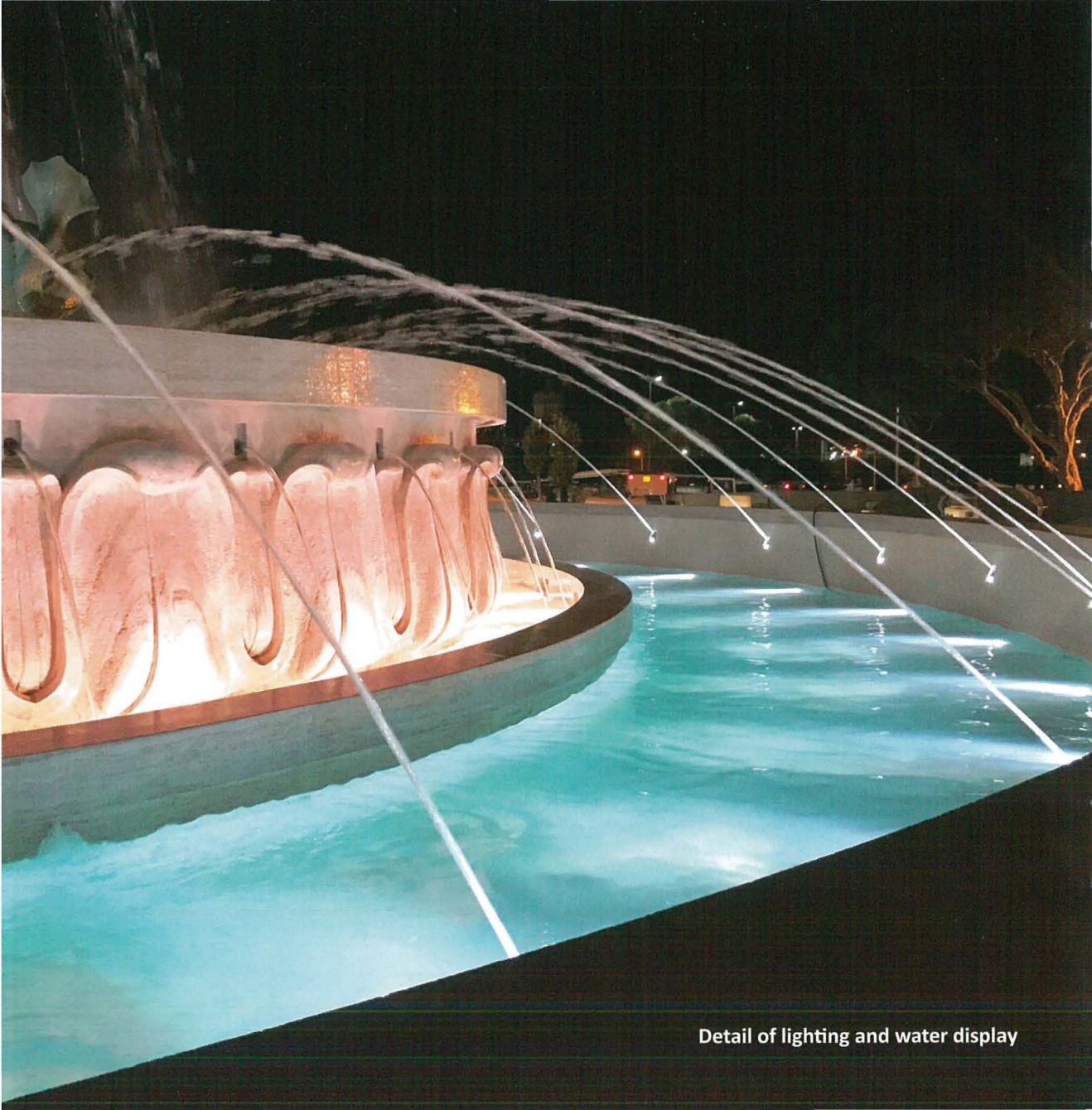
This case is unique especially because it involves the inauguration of a prominent landmark almost 60 years after its completion. However, the unfortunate and upsetting events that the Triton Fountain has undergone are now history.

What was once a neglected monument on the point of being cast aside, has now reasserted itself as one of Valletta's main landmarks.

The pedestrianisation of the open space in front of Valletta's main entrance provides a most welcome complement to the fountain and antithesis of its past misfortune.

From today the Tritons will break their long endured silence.





Detail of lighting and water display

The Triton Fountain in the late 1960s

Acknowledgements

The Ministry for Transport, Infrastructure and Capital Projects (MTIP) would like to express its appreciation to those who believed in this project and have contributed to the successful completion of the restoration of the Triton Fountain. In particular, the MTIP would like to acknowledge the contribution of Mr Kenneth Cauchi for his persistence in pushing forward the need to restore this monument and his contribution during the planning and implementation phases of the project.

The MTIP wishes also to express its appreciation for the support and cooperation provided by the following Ministries and Entities:

Grand Harbour Regeneration Corporation
Planning Authority
Heritage Malta
Superintendence for Cultural Heritage
Transport Malta
Cleaning Directorate
Government Property Department
Department of Contracts
Malta Police
Malta Public Transport
Enemalta Corporation
Water Services Cooperation
Parks Afforestation, Countryside Restoration and Initiatives Directorate
Phoenicia Hotel

Negotiating Team

The MTIP acknowledges the contribution of the negotiating team who had the difficult task of going through the offers, meeting with the bidders and selecting a suitable contractor for this specialised project

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Special thanks to all supporting staff

Contractor and Main Subcontractors

The MTIP acknowledges the work carried out by the Contractor and its main subcontractors entrusted with the work

Main Contractor

Sea Fountain One Joint Venture

Partners of the Joint Venture

Impresa Antonio De Feo Restauri (Lead Partner)
Fonderia Artistica Ferdinando Marinelli
COGE Impianti

Main Subcontractors

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CASCADE S.a.s.
Digitarca s.n.c.
En-Sure Ltd
Lanaro s.r.l.
SAUTER Group
Schembri Barbros Ltd
Siemens s.r.l.
Swaey Bros Ltd
Teclumen s.r.l.

Production

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Funtana tal-ħolm u tal-għana,
funtana sabiħa, daħkana,
li tiżfen... u tiżfen, waħdija, ħemdija,
iż-żifna tal-ferħ u ż-żgħorija.

Mill-poeżija 'Lill-Funtana tat-Tritoni' ta' Rużar Briffa
(12 ta' Lulju, 1959)