Report No 68:
Pilot study on inventory and condition of stock of materials at risk at United Nations Educational, Scientific and Cultural Organization (UNESCO) cultural heritage sites. Part I Methodology.

November 2011

PREPARED BY THE SUB-CENTRE FOR STOCK OF MATERIALS AT RISK AND CULTURAL HERITAGE

ENEA
Italian National agency for new technologies, Energy and sustainable economic development (ENEA), Rome, Italy
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Part I

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Summary

The International Co-operative Programme on Effects on Materials, including Historic and Cultural Monuments (ICP Materials) started in 1985. It was initiated in order to provide a scientific basis for new protocols and regulations developed within the Convention on Long-range Transboundary Air Pollution. The main aim is to perform a quantitative evaluation of the effects of multi-pollutants such as S and N compounds, O₃ and particles as well as climate parameters on the atmospheric corrosion of important materials, including materials used in objects of cultural heritage. The primary objective is to collect information on corrosion and environmental data in order to evaluate dose/response functions and trend effects and use the results for mapping areas with increased risk of corrosion, and for calculation of cost of damage caused by deterioration of materials.

Cultural heritage is very sensitive to air pollution resulting in corrosion and soiling on the materials which was used to create the artefacts. Applying the dose/response functions developed in ICP Materials to the specific monument, will permit us to evaluate the corrosion and to calculate the cost of damage due to deterioration of materials of the monument. This was performed for some important monuments in Europe.

In this report we describe the methodology which will be applied and which consist of a real in-the-field inventory, facade by facade, building by building, and monument by monument, based on maps at the available scales. The nature of the materials employed will be determined by direct examination of the building facade (limestone, rendering/mortar/plaster, painting, brick, metal, modern glass) and their proportions will be roughly evaluated in percentage. After that the dose response functions will be applied to determine the corrosion and soiling of the materials used for the construction of the monuments.

In this report we selected five important UNESCO Cultural Heritage sites: Greece, Athens, Acropolis, (The Parthenon); France, Paris, The Facades in the Centre of City; Czech Republic, Prague, The National Library; Germany, Berlin, The New Museum; and UK, Bath, Royal Crescent. Some of them are very complex.

In this first part of the report we collect and present - the most important information of the sites, their exact co ordinates, maps, photos and drawings.
1. Introduction

Air pollutants, together with climatic parameters, are of major importance for the deterioration of many materials used in cultural monuments. They are emitted by industrial activities and by the transport sector. These pollutants create problems on the local scale but they are also transported in the air over long distances.

One of the international organizations and institutions which study these effects is the UN ECE Convention of Long Range Transboundary Air Pollution (CLRTAP) under which operate the International Cooperative Program on effects on Materials including Cultural Monuments (ICP Materials) that started in 1985. This is one of several effect-oriented International Co-operative Programmes (ICPs) dedicated at studying the harmful effect of air pollution on materials. It was initiated in order to provide a scientific basis for new protocols and regulations developed within the Convention on Long-range Transboundary Air Pollution.

To reduce the harmful effects of pollutants on human health and the environment, the European Directive 1999/30/EC has been issued relating to limit values for sulphur dioxide, oxides of nitrogen, particulate matter and lead in the ambient air. These limit values have been established with reference to health and ecosystem effects but not to effects on building materials and cultural monuments. The European cultural heritage is very large and cost billions of euro to maintain. It is important to understand the fact that such materials from which the cultural monuments are created are sensitive to pollution at even lower levels than biological systems.

The costs for deterioration and soiling of different materials due to air pollution are huge and the damage to culture targets endangers seriously the cultural heritage. Effective policy making requires environmental impact assessment, cost benefit analysis and risk management. All these techniques need a serious scientific basis to support the assessment and the calculation of the effects of pollution.

In the first part of this report we present the methodology which we elaborate to study the real surface of the selected monuments, the materials from which they are created, in percentage. After that the dose-response functions elaborated in the ICP Materials, will be applied. This will permit to evaluate the corrosion and soiling effect of air pollutions on the monuments and to calculate the cost of damage due to deterioration of materials of the monument.

In this report we selected five important UNESCO Cultural Heritage sites: Greece, Athens, Acropolis, (The Parthenon); France, Paris, The Facades in the Centre of City; Czech Republic, Prague, The National Library; Germany, Berlin, The New Museum; and UK, Bath, Royal Crescent. Some of them are very complex.

In this first part of the report we collect and present the most important information of the sites, their exact co ordinations, maps, photos and drawings.

In this part of the report we describe the methodology which will be applied
2. The Methodology

The methodology which we will apply consists of a real in-the-field inventory, facade by facade, building by building, and monument by monument, based on maps at the available scales. The nature of the materials employed will be determined by direct examination of the building facade (limestone, rendering/mortar/plaster, painting, brick, metal, modern glass) and their proportions will be roughly evaluated in percentage. The height of each building will be estimated by counting the number of floors and attributing them an individual average height of 3 m. A control of this arbitrary height of 3m per floor will be performed using a laser beam measurement: the error will not exceed - 10%.

The determination of the length of the facades will be obtained by measurement on the available city maps. Having height and length, the surface will be easily deduced. This entire surface will be attributed to the constituting materials according to their proportions. The surface of the apertures (windows, doors), classically considered by the architects equal to half of the total surface of the facade, will not be deducted because it compensates for the roughness of the facade (sculptures, decoration, balconies...). In summary, the total calculated surface will be attributed to the constituting materials and half of this surface arbitrarily attributed to the modern glass of the windows. Only the street facing, external facades will be taken into account due to their direct exposure to pollution from traffic and the inaccessibility of interior private courts.

The height and length of the monuments (the Parthenon, the new Museum in Berlin and the National library in Prague) will be obtained from the official technical documents which are available.

The real surface of historical monuments is theoretically available from the architect in charge of the different monuments, but it was impossible to obtain this information for reasons of confidentiality. Thus, it was decided to measure these surfaces directly in the field according to the same methodology employed for the private buildings.
3. UNESCO Cultural Heritage Sites

a) Greece, Athens, Acropolis, (The Parthenon)\(^{(1)}\)

- Coordinates : N37° 58’ 15” 132, E23° 43´ 34” 248
- Included in UNESCO CH list in 1987.

- Historic data :

The Acropolis hill (acro - edge, polis - city), so called the "Sacred Rock" of Athens, is the most important site of the city and constitutes one of the most recognizable monuments of the world (fig.1). The first habitation remains on the Acropolis date from the Neolithic period. Over the centuries, the rocky hill was continuously used either as a cult place or as a residential area or both. The inscriptions on the numerous and precious offerings to the sanctuary of Athena (marble korai, bronze and clay statuettes and vases) indicate that the cult of the city's patron goddess was established as early as the Archaic period (650-480 B.C.). During Perikles' Golden Age (5th B.C), ancient Greek civilization was represented in an ideal way on the hill and some of the architectural masterpieces of the period were erected on its ground. During the Classical period (450-330 B.C.) three important temples were erected on the ruins of earlier ones: the Parthenon, the Erechtheion, and the Temple of Nike, dedicated to Athena Parthenos, Athena Polias, and Athena-Apteros Nike, respectively. The Propylaea, the monumental entrance to the sacred area was also constructed in the same period.

Fig. 1 The Acropolis hill

The monuments on the Acropolis reflect the successive phases of the city's history. Some of them were converted into Christian churches, houses of the Franks and later on, of the Turks. After the liberation of Athens from the Turks, the protection, restoration and conservation of the monuments was one of the first tasks of the newly-founded Greek state. This major effort is continued until today, with the large-scale restoration
and supporting of the monuments, which started in the 1970's and is still in progress. The first excavations on the hill were conducted between 1835 and 1837. More systematic work was carried out in 1885-1890 by Panagiotis Kavvadias.

The Propylaea, the monumental gateway of the Acropolis was designed by the architect Mnesikles and constructed in 437-432 B.C. It comprises a central building and two lateral wings. The colonnades along the west and east sides had a row of Doric columns while two rows of Ionic columns divided the central corridor into three parts. The walls of the north wing were decorated with painted panels or wall paintings and that is why it was called the "Pinakotheke". The ceiling of the Propylaea had coffers with painted decoration and a perforated sima around the roof (fig.2).

The Parthenon. It is the most important and characteristic monument of the ancient Greek civilization and still remains its international symbol. It was dedicated to Athena Parthenos (the Virgin), the patron goddess of Athens. It was built between 447 and 438 B.C. and its sculptural decoration was completed in 432 B.C. The construction of the monument was initiated by Perikles, the supervisor of the whole work was Pheidias, the famous Athenian sculptor, while Iktinos (or Ictinus) and Kallikrates (Callicrates) were the architects of the building. The temple is built in the Doric order and almost exclusively of Pentelic marble (Fig.3). It is peripteral, with eight columns on each of the narrow sides and seventeen columns on each of the long ones. The central part of the temple, called the cella, sheltered the famous chryselephantine cult statue of Athena, made by Pheidias.

The rest of the sculptural decorations, also by Phidias, were completed by 432 BC. The sculptural decorations of the Parthenon are a unique combination of the Doric metopes and triglyphs on the entablature, and the Ionic frieze on the walls of the cella. The metopes depict the Gigantomachy on the east side, the Amazonomachy on the west, the Centauromachy on the south, and scenes from the Trojan War on the north.
The Erechtheion is located on the north of the hill of the Acropolis. It is an elaborate building in the Ionic style, constructed between 421 and 405 BC. It has a prostasis on the east side, a monumental propylon on the north, and the famous porch of the Caryatids on the south (fig.4). The main temple was divided into two sections, dedicated to the worship of the two principal gods of Attica, Athena and Poseidon-Erechtheus. A relief frieze, bearing a representation possibly of the birth of Erechtheus, decorated the exterior of the building.

To the south-west is the famous porch with the Caryatids, of which one is exhibited in the British Museum; the remaining are on display in the Acropolis Museum.

The Temple of Athena Nike (Featherless Victory) is situated southwest of the Entrance, on a rampart protecting the main entrance of the Acropolis. It was constructed in ca. 420 B.C. by the architect Kallikrates. It is built in the Ionic order, and it is amphiprostyle with a row of four columns in front of each of its narrow sides. The relief frieze on the upper section of the walls depicts the conference of gods on the east side, and scenes from battles on the other three. A marble parapet decorated with the relief representation of Nikae (Victories), protected the edge of the Bastion on which the temple was erected (fig.5).
South of the platform that forms the top of the Acropolis there are also the remains of an outdoor theatre called **Theatre of Dionysus** (Fig.6). A few hundred metres away, there is the now partially reconstructed the **Odeon of Herodes Atticus** (Fig.7).

2. Dimensions: **3.045 ha**
3. Types of main external materials used in percentage: **limestone** -pentelic marble- (95%), **porous stone, sandstone**
4. Info regarding area in which the monument is (urban)
Fig. 8, The map of the Acropolis with the monuments and periods of creation.

1: Parthenon  
2: Erechtheion  
3: Pandroseion  
4: Statue of Athena Promachos  
5: Propylaia  
6: Altar of Athena  
7: Sanctuary of Pandion  
8: Temple of Athena Nike  
9: Chalkotheke  
10: Brauroneion  
11: Arrephorion  
12: Approach of Classical times  
13: Odeion of Herod Atticus  
14: Stoa of Eumenes  
15: Asklepieion  
16: Ionic stoa  
17: Nikias monument  
18: Thrasyllos monument  
19: Sanctuary of Dionysos Eleuthereus  
20: Odeion of Pericles  
21: Peripatos  
22: Theater of Dionysos
**Orange**: Monuments of the 5th century BCE  
**Rose**: Monuments of the 4th century BCE  
**Blue**: Hellenistic and Roman monuments

Considering that the Acropolis is extremely complex regarding periods of construction and materials used and that it is very difficult in so short time to evaluate with reasonable level of certainty the surfaces of the different buildings it was decided to concentrate our efforts on the most important monument of the complex, the Parthenon.
b) France, Paris, The Facades in the Centre of City

Coordinates: N48 51 30 E2 17 39

The banks of the Seine have been included on the UNESCO List of the World Cultural Heritage (Fig. 8) since 1991. We should have to considered that in this area are situated many important monuments as Notre Dame Cathedral and Sainte Chapelle, Louvre, Palais de l’Institut, Invalides, Place de la Concorde, Ecole Militaire, La Monaie, Grand and Petit Palais des Champs Elyse`es, the Eiffel Tower, Palais de Chaillot and Trocadero gardens.

Notre Dame and Sainte Chapelle were definite references of Gothic construction. The eastern and central parts of Paris, the Marais and the Ile Saint Louis have architectural ensembles of Parisian constructions of the 17th and 18th centuries. The western part is expression of Haussmann urbanism.

This study consists in the evaluation of the stock of materials at risk of degradation (corrosion, soiling) due to atmospheric pollution, between the Sully Bridge on the eastern side, and the Pont-Neuf on the western side. It include, the Ile Saint Louis, the Ile de la Cite’ and the right bank of the Seine facing these two islands (Fig. 8). This sector is the very centre of Paris. The territory inscribed on the UNESCO List, extends towards West as far as the Eiffel Tower. This study, include roughly one-third of this territory and contains buildings dating from the 17th and 18th centuries, Haussmannian buildings (end of 19th and beginning of 20th centuries), as well as important monuments like Notre Dame and Sainte Chapelle dating from the Middle Ages.

In the Ile de la Cite’, the quantity of historical monuments and official buildings is very high: Notre Dame Cathedral (Fig. 9), Paris Police Headquarter, Commercial Court, Sainte Chapelle, ecc.

On the right bank of the Seine, there are three important monuments: the Town Hall (Ho`tel de Ville de Paris) and two theatres: the The`a`tre de la Ville and the The`a`tre du Cha`telet.

There are only two historical monuments in the Ile Saint Louis: the Church Saint Louis-en-l’Ile and the Ho`tel de Lauzun both belonging to the Paris City Patrimony. All the other historical buildings in this island are private property.

Quays and bridges were not taken into account in this evaluation.
Fig. 8. Satellite view of the centre of Paris

Fig. 9 The eastern part of the Ile de la Cite’ with the Notre Dame Cathedral (100% limestone) in the background. On the first plan, the Quai aux Fleurs with, on the left,
c) Czech Republic, Prague, The National Library (3)

- The Klementinum (National cultural heritage object)

- Included in UNESCO CH list in 1992.

- Coordinates: 50° 5'11.874"N, 14° 24'57.809"E

Large complex of the Klementinum is situated next to the Charles Bridge, right in the historical centre of Prague.

Fig. 10. The air view of The Klementinum
The Klementinum, a former Jesuit college, is the largest Jesuit building in the Czech lands. Its history dates from the existence of a chapel dedicated to Saint Clement in the 11th century.

The first written report about this locality is from 1227 when a Dominican monastery was founded here. A Dominican monastery was destroyed by the Hussies in 1420.

The Jesuits arrived in Prague in 1556 on the invitation of Habsburg Emperor Ferdinand I. The royal master builder Bonifac Wohlmut realized the first reconstruction of former Dominican monastery at the first half of 16 century. The Jesuits bought or got as gift houses and lands near the monastery – 32 houses, 3 churches, monastery, 7 yards and two large gardens were demolished due to expansion of the Klementinum. For more than 200 years they built up their college, a complex of buildings between four streets and two squares and divided by five courtyards. The ground plan of old buildings had been drawn by don Jan Miller in 1710.
In 1620 the University Library of the Charles University moved at the Klementinum.

The Astronomical Tower was erected in 1722 together with the completion of the Baroque library and of the Mirror Chapel, all of this undertaken under the direction of the university’s chancellor Frantisek Retz. Originally the tower served only as an outlook spot but Josef Stepling, a study director at the Philosophical Faculty, equipped the tower with astronomical instruments and thus transformed it into an astronomical observatory for both scientists and students. The computation and designs necessary to construct these instruments were provided by a Professor of mechanics, a Jesuit, Jan Klein.

In 1773 the Jesuit Order was abolished by Pope Clement XIV and the monks were forced to leave the Klementinum, when the Klementinum was established as an observatory, library, and university by the Empress Maria Theresa of Austria.

In 1882 the philosophical and theological faculties of the Charles University had been placed at the Klementinum.

No significant building activity of the Klementinum occurred for whole 18. and 19. centuries. In 1924-1936 architect L.Machon realised new construction work for the needs of national, university and technical library when the third floor had been built for new reading rooms.

At present, the Klementinum is home to the National Library and many valuable collections of books can be found here.
- Photos of the monument (Fig. 13 - 21)

The oldest building, Krizovnicka street
Marianske square, Karlova street and inside yards (Fig. 22 - 30)
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d) Germany, Berlin, The New Museum

Coordinates: N52 31 11 E13 23 55
Included in the UNESCO list in 1999.

situated in the Museum Island

Fig. 31 Map of Museum Island (in red)

**Museum Island** is the name of the northern half of an island in the Spree river in the central district of Berlin, Germany, the site of the old city of Cölln. It is so called for the complex of five internationally significant museums, all part of the Berlin State Museums, that occupy the island's northern part:

- The Altes Museum (Old Museum) completed on the orders of Karl Friedrich Schinkel in 1830.
- The Neues Museum (New Museum) finished in 1859 according to plans by Friedrich August Stüler, a student of Schinkel. Destroyed in World War II, it was rebuilt under the direction of David Chipperfield for the Egyptian Museum of Berlin and re-opened in 2009.
- The Alte Nationalgalerie (Old National Gallery) completed in 1876, also according to designs by Friedrich August Stüler, to host a collection of 19th century art donated by banker Joachim H. W. Wagener.
- The Bode Museum on the island's northern tip, opened in 1904 and then called *Kaiser-Friedrich-Museum*. It exhibits the sculpture collections and late Antique and Byzantine art.
- The Pergamon Museum, the final museum of the complex, constructed in 1930. It contains multiple reconstructed immense and historically significant buildings such as the Pergamon Altar and the Ishtar Gate of Babylon.

In 1999, the museum complex was added to the UNESCO list of World Heritage Sites.
History

A first exhibition hall was erected in 1797 at the suggestion of the archaeologist Aloys Hirt. In 1822, Schinkel designed the plans for the Altes Museum to house the royal Antikensammlung, the arrangement of the collection was overseen by Wilhelm von Humboldt. The island, originally a residential area, was dedicated to "art and science" by King Frederick William IV of Prussia in 1841. Further extended under succeeding Prussian kings, the museum's collections of art and archeology were turned into a public foundation after 1918. They are today maintained by the Berlin State Museums branch of the Prussian Cultural Heritage Foundation.

Fig. 32 Museum Island with Pergamon and Bode Museum, 1951

Museum Island further comprises the Lustgarten park and the Berlin Cathedral.

The Prussian collections became separated during the Cold War during the division of the city, but were reunited after German reunification, except for the art and artefacts removed after World War II by Allied troops and not yet returned; these include the Priam's Treasure, also called the gold of Troy, excavated by Heinrich Schliemann in 1873, then smuggled out of Turkey to Berlin and today kept at the Pushkin Museum in Moscow.

Currently, the Museumsinsel and the collections are in the process of being reorganized. Several buildings were destroyed in World War II and some of the exhibition space is in the process of being reconstructed.
Architecture of Neue Museum

Fig. 33 The New Museum

Built from 1841 to 1859, the Neues Museum was designed by Friedrich August Stüler as the second museum on the island in the River Spree.

The museum was badly damaged after suffering a series of hits in the aerial bombardment of the Second World War and underwent reconstruction from 2003, overseen by the British architect David Chipperfield.

The aim was to restore the building (listed as a UNESCO World Cultural Heritage Site since 1999) to its original glory while at the same time taking strict conservation requirements into account.

The architect met these challenges by brilliantly anchoring the main body of the museum in the architectural idiom of the present day.

By adhering to the concept of restoration laid down by the Venice Charter, he carefully incorporated into his designs each of the building’s individual parts, some still largely in tact, others substantially damaged. Missing sections were repaired and at times supplemented with new parts.

The inherent qualities of preserved sections are thus accentuated, while the newly constructed parts reflect the losses incurred in the original, without necessarily imitating them. The result is that the resplendent richness of Stüler’s late classicism and historicism is now brought into a charming dialogue with Chipperfield’s own strict language of forms.
Frederick William IV, King of Prussia, orders the construction of the museum, on the grounds that there is not enough space in the Altes Museum to display the growing collections. He assigns Ignaz Maria von Olfers, General Director of the Royal Museums, and Friedrich August Stüler, Privy Councillor for Construction, the task of coming up with the necessary plans to be submitted to him.

Building work commences led by construction superintendent Carl Wilhelm Hoffmann. Existing buildings on the site are demolished, their foundations excavated. A grillage consisting of 2344 piles is created and set in place using a steam-powered pile driver imported from America especially for the purpose.

The first foundation stone is laid. Construction of the outer walls and the roof of the main building are completed by the end of the year.

Wilhelm von Kaulbach begins the task of painting the rooms, a process which will eventually involve numerous Berlin artists from the Late Classicist period. The first sections of the Neues Museum are opened to the public on the ground floor: the Egyptian Collection and Kupferstichkabinett (now the Museum of Prints and Drawings).

The walkway to the Altes Museum is completed.

Hoffmann hands supervision of construction work over to Friedrich Adler, who will ultimately oversee the building’s completion.

Situated on the third floor of the building, the next section to open its doors to the public is the Kunstkammer, an ‘art cabinet’ of architectural models, furniture pieces and various vessels made of clay and glass.

On the main floor of the building, the Collection of Germanic Antiquities (or ‘Antiquities of the Fatherland’) and the Plaster Cast Collection are opened to the public. The erection of four cast-zinc figures on the roof and the group of sculptures in the western tympanum marks the completion of the museum’s exterior.

The last collection to open to the public is the Ethnographic Collection on the ground floor.

The vestibule is converted into the Neues Museum’s main entrance – access had previously been via the southern vestibule and the passageway from the neighbouring Altes Museum.

The Greek Courtyard is converted into the Egyptian Collection’s Amarna Room.

A walkway is created, linking the Neues Museum with the Pergamonmuseum. The various collections are closed to the public and many of the artefacts removed for safe storage. The Egyptian Collection’s objects, many of which are heavy and difficult to transport, remain in the building. Measures to seal them off with bricks and sandbags are hoped to protect them from the expected bombardment.

Incendiary devices and explosive bombs cause severe damage to the building and to the objects stored within.

Several ruined parts of the building are torn down.

Work commences on developing a technological process to replace the foundations and safeguard the partial ruins of the structure.

David Chipperfield is awarded the task of planning the reconstruction of the Neues Museum.
The Museum Island Berlin is declared a UNESCO World Heritage Site. It is agreed that all subsequent renovation work is to be geared towards an overall concept, the Museum Island Masterplan, devised by the various planners of the individual buildings on the island.

1999:

2003: Work commences on the reconstruction of the Neues Museum.

21. September 2007: The topping out ceremony is held.

5. März 2009: The keys to the Neues Museum are handed over to Michael Eissenhauer, General Director of the National Museums in Berlin.

16. Oktober 2009: A grand ceremony is held to mark the reopening of the Neues Museum.

Fig. 34 Plan of the New Museum in Berlin.
**e) UK, Bath, Royal Crescent**

Included in the UNESCO CH list in 1987.

This urban site (51° 23′ 13″ N, 2° 22′ 6″ W) is located in the City of Bath. The surrounding area consists mainly low rise urban buildings, with parkland/open space to the East, the immediate area has a low intensity of traffic. The monument originally contained 30 houses, most of the houses have remained as residential dwellings (some of them converted into flats), the remaining houses have been converted into offices, a museum and a hotel.

![Fig. 35 Background and History, source: The City of Bath: World Heritage Site, Management Plan 2010-2016](image)

The Woods’ Royal Crescent (1767-75) combined Palladian architecture with the emerging Romantic movement and created a dialogue between building and landscape. This followed on from the tradition established at Versailles (1620s-70s) of placing buildings in direct contact with nature. The principle of nature brought into the city and integrated into the architecture can also be seen at Place de la Concorde in Paris (Jacques-Ange Gabriel, 1763) and the Piazza del Popolo in Rome (Guiseppe Valadier, 1816-20).

In the great tradition of his father, John Wood the Younger contrived one of the most outstanding pieces of Georgian architecture. However, whilst construction began thirteen years after Wood the Elder’s death, the idea for Royal Crescent may be his. The approach along Brock Street is deliberately subdued architecturally, and the magnificence of the Crescent is only apparent as the end is approached. The situation of the Crescent, the formality of the buildings, the huge front lawn and the views across the city to the rural hills beyond, combine to match any of John Wood the Elder’s plans.

In contrast to the Circus, the Royal Crescent is severe in its restraint, relying on scale and proportions for its elegance. The thirty houses differ in size and plan but form a uniform, semielliptical facade. The first house, number 1 on the eastern end, was started in 1767, with the last completed in 1775.
As with so many of the Georgian buildings, the sash windows have been altered. But other than this, little has changed. Two of the houses, numbers 2 and 17, were gutted during the bombing raids of 1942, but the remaining interiors are largely original. The retention of green open space in front of the lawn of the Royal Crescent, now part of Royal Victoria Park, is of crucial importance for its setting and views.

There are few other crescents that have had such impact on architecture or held such an iconic reputation for so long. The Royal Crescent directly influenced architecture both in Bath and on a national and international scale. It marks the introduction in Britain of the Picturesque to urban architecture, and is equal to any composition in Europe.
4. Conclusions

The description of the methodology which will be applied and which consist in a real in-the-field inventory, facade by facade, building by building, and monument by monument, based on the maps at the available scales, was reported.

It was decided that the nature of the materials employed for creation of the single monuments will be determined by direct examination of the building facade (limestone, rendering/mortar/plaster, painting, brick, metal, modern glass) and their proportions will be roughly evaluated in percentage. After that the dose - response functions will be applied to determine the corrosion and soiling of the materials used for the construction of the monuments.

Five important UNESCO Cultural Heritage sites was selected: Greece, Athens, Acropolis, (The Parthenon); France, Paris, The Facades in the Centre of City; Czech Republic, Prague, The National Library; Germany, Berlin, The New Museum; and UK, Bath, Royal Crescent. Some of them are very complex.

The most important information regarding the sites, their exact co ordinations, historical, cultural and architectural information, maps, photos and drawings was reported.
6. References

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