



POLITECNICO  
DI TORINO

Dipartimento di  
Architettura e  
Design

Master in Architecture for  
Sustainability  
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Thesis Title

**Gardella's Lost Legacy:  
The Church of Alessandria.**  
Study, 3D documentation and  
Analysis

Students

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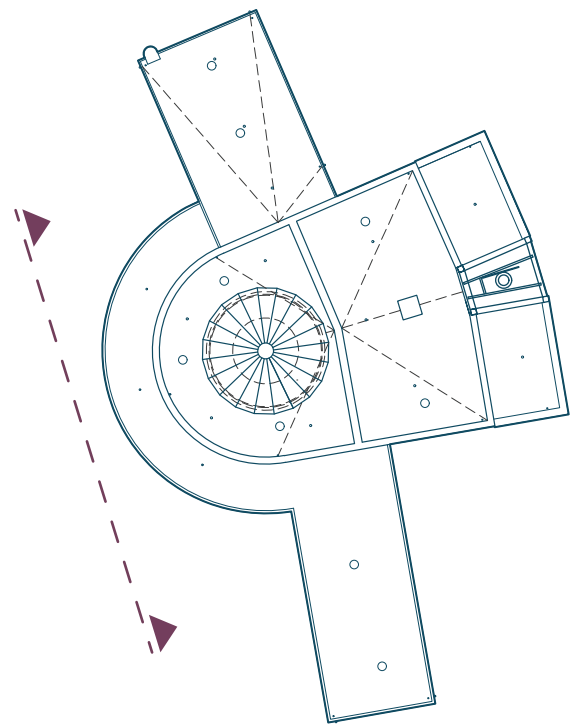
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Board No. 09

- TERRITORIAL CONTEXT
- GEOMATICS SURVEY
- 2D DOCUMENTATION
- HBIM DOCUMENTATION
- MATERIAL ANALYSIS
- CURRENT STATE OF  
CONSERVATION ANALYSIS  
AND SOLUTIONS
- THE PROPOSAL

The Church Building



Key Plan  
Scale: 1:400

## LEGEND

### DEGRADATION & SYMBOLS

- Plaster change demarcation line
- Visually blocked area
- Wall Perforations
- Scratches/abrasions on paint
- Missing Element
- Medium Intensity Cracks
- Severe Intensity Cracks

### Detachement

- D1 Minor - Peeling paint
- D2 Moderate - Exposed plaster

### Gap (Lacuna)

- Exposed bricks due to loss of continuity of mortar and paint

### Chromatic alteration

- C1 Minor - Continuous surface with tonal variations.
- C2 Moderate - Continuous surface with tonal variations.
- C3 Severe - strong discoloration stains

### Chromatic Sampling

- Testing area for Paint finishes

### Rising Damp

- Rising damp causing Detachment

### Moisture Stains & Leakage (Colatura)

- Moisture causing detachment
- Moisture Stains due to dripping (leaking) water on surface
- Moisture Stains with Biological Colonization

### Metallic Corrosian

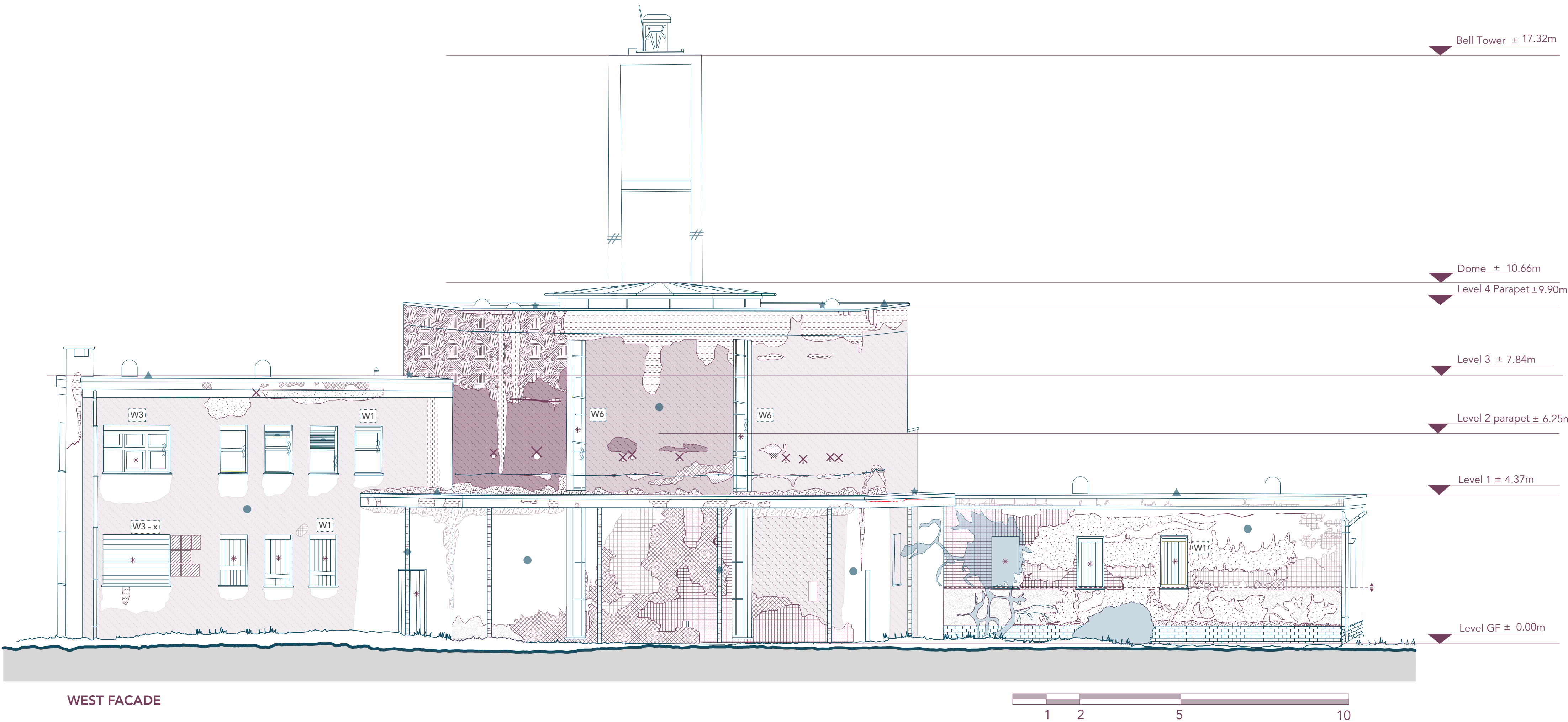
- Corrosian on Metal columns

### Biological Degradation

- Biological colonization
- Presence of Vegetation
- Microbial Growth

### Superficial Deposit

- Signs of dirt and grime



List of Materials		
Symbol	Photo	Material
●		Brick Wall with plaster and paint finish
■		Ceramic tiles
★		Bituminous water-proof membrane
▲		Metal coping
⋈		Wooden window frames
#		Concrete Columns
▵		Wooden shutters
◆		Steel Columns
		Wooden planks

Building Services & Systems		
Symbol	Photo	Material
		Anchor points
		PVC Pipes (exposed)
		Safe-line for restoration works (hypothesis)
		Technical outlets
		Chimney

Degradation Analysis			
Pattern/Symbols	Photo	Degradation and Description	Causes
West Facade Degradation		<b>Missing Elements in Windows</b>  Window (58.9 x 882 cm), indicating material loss as the <i>glass is missing</i> and they are closed with wire mesh. The wooden frame has dark greenish and black spots along the grains indicating <i>moss, algae, or fungi growth</i> . Fine cracks, particularly in areas exposed to direct sunlight and moisture are visible. <i>Peeling or flaking paint</i> , exposing raw wood underneath. <i>Moisture stains</i> can also be seen on the frame.	Biological growth is due to constant exposure to moisture and rain infiltration, with weakening or unsealed joints / lack of protective coatings. Repeated wetting and drying cycles causing cracks. Detachment of finishing paint is also due to environmental condition and aging. Missing glazing component, causing water ingress to the interior.
		Window (200 x 150 cm) are similar to other window sills in the building, the growth of algae, moss or mildew are apparent also here, as indicated by greenish and blackish spots. Extensive detachment of paint visible on the frame revealing raw wood. Hardware of the window seems to be broken leading to no proper closure of the shutter or the window casement fixtures.	Reasons of decay in W7 and W8 are similar to those mentioned for other windows.
		The size of the window is same as W7. This window is covered with wooden panels/planks, which are not part of the original design (similar to W1). The original window frame is either missing or degraded to an extent that it needs to be covered with panels to save it. The added planks are also weathered and show signs of biological growth, which is also visible in the window sill, suggesting neglect or inadequate maintenance.	
Surface Degradation		<b>Chromatic Sampling</b>  This is not considered as a degradation type, instead an intervention method used to test and match the original or intended paint layers for restoration purposes. If executed improperly, they may leave patches unprotected, which can expose the underlying plaster or masonry to weathering. However, in this case, the sampling is rightfully applied to the least degraded wall.	It often involves removing existing paint layers, leaving the plater or masonry temporarily unprotected. It is done because, as the analysis shows, almost all the building finishes have been degraded and have been exposed to chromatic alteration. However, to promptly address the issue, the final finishes must be decided sooner.
Moisture related Degradation		<b>Rising Damp Causing Detachment</b>  The degradation visible includes significant peeling and flaking of the wall's paint layer, exposing the underlying plaster. The deteriorated wall shows multiple types of detachment and growth of moss and algae.	The observed degradation can be attributed to rising damp, which causes moisture to ascend through the wall via capillary action. This phenomenon is often exacerbated by the absence or failure of a damp-proof course DPC, poorly drained soil near the structure, or a high groundwater level. If it is not treated, over time the absorbed moisture dissolves more salts within the wall materials causing further degradation.
		<b>Moisture stains Causing Detachment</b>  The moisture stain surrounding the central dark streak is lighter in color, with a grayish tone, spreading across a wider area on both sides. The irregular edges and discoloration suggest moisture has seeped into the wall's surface layers , likely saturating the plaster or paint. This area shows signs of surface deterioration, such as minor peeling or roughness.	Caused by the presence of water or moisture in the material, moisture stains are characterized by color changes, usually darker than the original material, and may be accompanied by phenomena such as efflorescence, surface cohesion loss, or biological growth. These stains indicate underlying issues like infiltration, condensation, or rising damp and usually appear irregular, depending on the source and path of the water.
		<b>Moisture stains due to dripping water (Colatura)</b>  Dark moisture stains on the upper portion of the wall, particularly concentrated beneath the metal coping. The discoloration appears as streaks and patches, suggesting water dripping. The stains are darker in some areas, indicating prolonged exposure to water.	The moisture stains are due to water dripping water from the parapet causing stain under the metal coping. This could result from inadequate waterproofing or improper installation of the coping, allowing rainwater to seep beneath or flow over its edges. Repeated exposure to dripping water leads to moisture accumulation and stains on the wall surface, and the absence of proper drainage exacerbates the problem.

## Solutions & Interventions

- Use biocidal solution or essential oil to clean the moss, algae or fungi (such as, quaternary ammonium compounds or natural thyme oil.
- Natural wood fillers can be used for superficial cracks and for structural cracks, low viscosity epoxy consolidant can be used. It is necessary to ensure structural integrity and replacing any broken or loss wooden sections.
- Removal of flaking paint with non-abrasive chemical stripper or scraper.
- Sand the surface of the frame to prepare for new coatings. It should be protected by application of linseed oil based primer followed by breathable micro-porous paint.
- Finally to replace the glass and re doing the seal between frame joints and masonry opening.

- Same solutions as above for treating the wood
- The existing glazing condition must be checked in order to decide if it needs replacement.
- The hardware of the window must be replaced in case the existing hardware are no longer workable.

- Ensuring that sampling areas are finalized by matching the appropriate paint or coating as determined by the testing process.
- Application of the chosen finish uniformly across the facade to restore aesthetic and functional integrity.

- Gently cleaning the wall using dry-brushing method. Water based cleaning must be avoided as it can dissolve salts and push them further into masonry.
- A temporary superficial layer of lime based plaster maybe applied to absorb the salts and protect underlying masonry.
- Drainage around the base of the building should be improved by sloping the ground away from the structure and installing channels to divert water away. This is feasible also in case of flooding.
- It is necessary to introduce a chemical damp proof course by injecting hydrophobic silicone resins or lime compatible injection mortars into masonry to create a barrier against rising water.
- Finally, removing degraded plaster and using salt resistant and breathable plaster. Paint finish should be mineral based.

- After resolving the main source of moisture in the wall, in this case, rising damp, the surface should be cleaned using mild detergent solution or pH neutral cleaning agent. For this building, since the walls are structurally compromised, manual brushes should be used to avoid further damage.
- After the wall completely dries, a hydrophobic, breathable treatment like silane or siloxane-based water repellents can be applied to prevent further water penetration.
- Breathable plaster should be used, such as lime based systems to allow trapped moisture to evaporate- Lime wash or mineral based paints for finishing will allow vapor permeability.

- Replacing the existing coping with a design that includes a minimum overhang of 3-5 cm beyond the wall surface. A drip groove underneath the coping is necessary to break the surface tension and redirect water. Materials should be weather resistant, such as terracotta, zinc or stone with proper sealing. Coping should have a slope of 5-10 degrees to direct rainwater away from the parapet. Drip edge can be designed along the underside of the parapet (while keeping the integrity of the original design) to avoid direct water contact with the walls.
- The surface should be cleaned and protected with hydrophobic coating (after testing its compatibility with plaster) as explained in the steps earlier and finally the plaster and paint finishes should be applied as explained.

\* The degradation types and solutions continue on the next boards