GREEN ARCHITECTURE AS AN EFFECTIVE STRATEGY TO PRESERVE CULTURE HERITAGE - SPECIAL MENTION "VANCOUVER CITY- CANADA"

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ABSTRACT:

Culture heritage provides us an automatic sense of unity and belonging, which allows us to better understand previous generation and history of where we come from. The preservation of heritage is closely linked to the culture of society where culture plays a vital role in urban, economic and social development. The research aim is to overview the main principles of green architecture and identify the main heritage conservation approaches as a theoretical approach to identify the most suitable conservation approach that applies all the principles of the green architecture. The chosen approach will be applied on our case study "Vancouver city in Canada" to verity our conclusion from the theoretical study.

Scientific Addition:
Creating "Green Architecture effective Strategy" to preserve culture heritage areas and achieve balance between heritage preservation and sustainable urban development needs [1].

1. PRINCIPLES OF GREEN ARCHITECTURE

1.1 Energy efficiency

Reducing energy consumption including the energy requirements for energy usage and the utilization of sustainable energy sources.

1.2 Water efficiency

Green architecture principle makes sure that water is collected, purified, used and reused during the whole construction process.

1.3 Land use efficiency

Land use efficiency is an output of the architectural designs that identifies a suitable site development and maximizing the usage of existing local materials.

1.4 Low environmental impact

Preventing deterioration of the site during construction process and minimizing the negative impacts on the environment.

1.5 Material efficiency

Managing the material consumption in the construction process.

1.6 Low maintenance costs

Facilitating the materials usage and construction techniques that help in reducing the cost of the operation, construction and maintenance.

1.7 Waste reduction

Reducing the wastage of water, energy, and materials during and even after construction management system.

1.8 Use of renewable energy

Usage of the principles of renewable energy during all the phases of the architectural design.

1.9 Indoor environmental quality

Creating an interior space that controls temperature naturally using the architectural environmental aspects.

2. HERITAGE CONSERVATION APPROACHES

Heritage conservation process consist of different approaches that are defined and classified according to the level of intervention and the changes allowed on the historical fabrics, these approaches differs in its final product according to the

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[1] Appendino, F., Balancing Heritage conservation and sustainable development.

receptiveness of the heritage physical vocabulary.

Classification of the heritage conservation approaches:
The heritage conservation approaches could be classified according to the dealing with the heritage physical vocabulary way (Oberlander et al., 1989).

2.1 First: Maximum respect to heritage physical vocabulary

1. Preservation[2]
"A program of intervention designed to prevent further deterioration and to keep a building, "as it is" - that is, to respect its present form, material and integrity."

2. Stabilization[2]
"A minimum amount of work is done to safeguard a building from the elements and/or destruction and to protect the public from danger."

Application of the principles of Green Architecture on the preservation approach	1-Preservation 2-Stabilization	1	2
	Energy efficiency	x	x
	Water efficiency	x	x
	Land use efficiency	x	x
	Low environmental impact	O	O
	Material efficiency	x	O
	Low maintenance costs	x	x
	Waste reduction	O	O
	Use of renewable energy	x	x
	Indoor environmental quality	x	x

Table 1. Application of the principles of Green Architecture on the preservation approach: Preservation and Stabilization.

3. Consolidation[2]
"The physical addition or application of adhesive or supportive materials to ensure continued durability or to protect the structural integrity of the building."

4. Restoration[2]
"A building, structure, site or object is returned to the appearance of an earlier time by removing later material and by replacing missing elements and details."

5. Rehabilitation[2]
"The process of returning a property to a useable state through repair or alteration. Rehabilitation makes possible an efficient contemporary use while preserving historic, architectural and cultural values."

[2] https://www.conserve-energy-future.com/

Application of the principles of Green Architecture on the preservation approach	3-Consolidation 4-Restoration 5-Rehabilitation	3	4	5
	Energy efficiency	x	x	O
	Water efficiency	x	x	O
	Land use efficiency	x	x	O
	Low environmental impact	x	O	O
	Material efficiency	O	O	O
	Low maintenance costs	O	O	O
	Waste reduction	O	O	O
	Use of renewable energy	x	x	O
	Indoor environmental quality	x	x	O

Table 2. Application of the principles of Green Architecture on the preservation approach: Consolidation, Restoration and Rehabilitation.

2.2 Second: Moderate respect to heritage physical vocabulary

6. Reassembly[2]
"Reassembly is often undertaken out of structural necessity, to repair deteriorated material, or to observe historic construction techniques."

7. Replication[2]
"The making of an exact copy of an existing structure, feature or artefact. The purpose of replication is usually to replace a missing or decayed."

8. Reconstruction[2]
"A building, site feature or artefact that no longer exists is reproduced with new construction that exhibits the shape, material and detailing."

Application of the principles of Green Architecture on the preservation approach	8-Reconstruction 9-Moving 10-Fragmentation	8	9	10
	Energy efficiency	x	x	x
	Water efficiency	x	x	x
	Land use efficiency	O	O	x
	Low environmental impact	O	O	O
	Material efficiency	x	x	x
	Low maintenance costs	x	x	x
	Waste reduction	O	O	x
	Use of renewable energy	x	x	x
	Indoor environmental quality	O	x	x

Table 3. Application of the principles of Green Architecture on the preservation approach: Reconstruction, Moving and Fragmentation.

9. Moving[2]
"An historic building, structure or site-related artefact is relocated to another site, often as a last-resort alternative to demolition."

10. Fragmentation[2]
"Portions of a building are retained, either on the original site or reassembled elsewhere, usually as a compromise between conservation and demolition."

3. VANCOUVER'S HERITAGE PRESERVATION

Vancouver has tremendous value in its historically and culturally significant buildings, monuments, and other sites. Because of this, Council oversees a comprehensive heritage management program to protect, restore, and rehabilitate as many sites as possible. Vancouver is a vibrant city with numerous parks, gardens, beaches, and community centres and a growing arts and culture scene. So the city council proposed a heritage management program which based on three main Sequential stages:[3] Heritage management plan / Heritage register / Public education efforts.

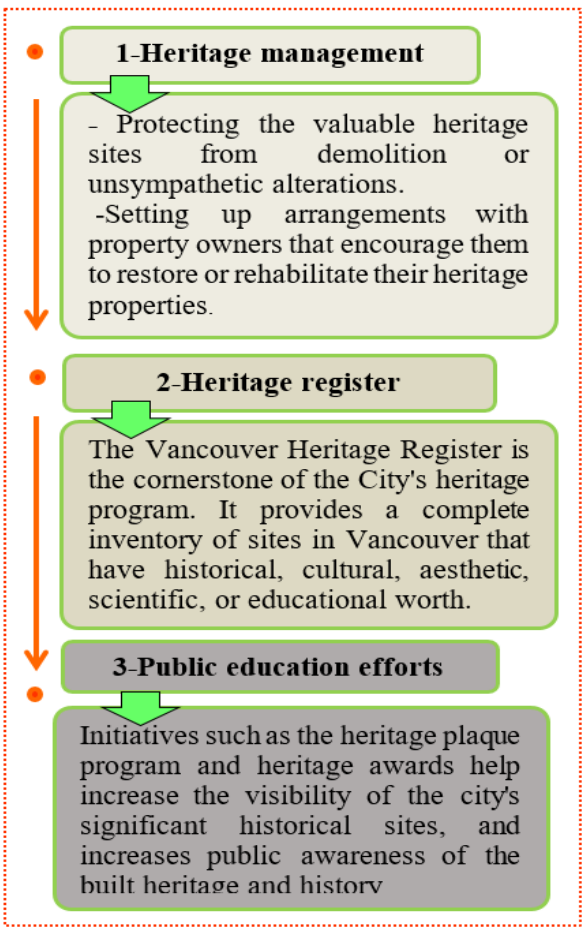

Figure 1. Three main Sequential stages of the proposed heritage management program. Source: The Authors.

3.1 The program

The program has been proposed "The Heritage Building Rehabilitation Program" (HBRP) for a five-year period (2003-2008) to facilitate the upgrading of heritage buildings and foster economic. The City has recently been recognized with an Outstanding Achievement Award for the Program from the Heritage Society of British Columbia.

3.2 The program objective

The objective of the Heritage Building Rehabilitation Program is to encourage the full upgrading of heritage buildings to ensure their long-term conservation while also stimulating economic development within the incentive area.

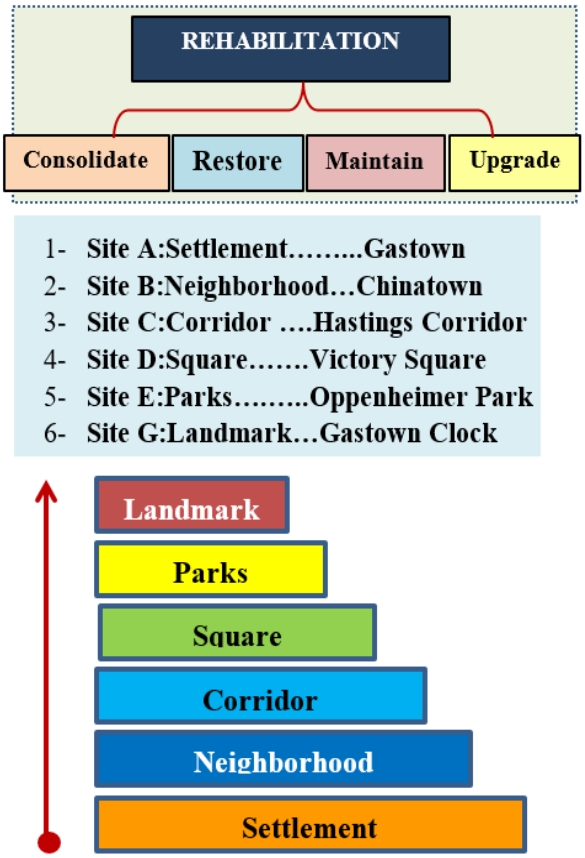

Figure 2. Levels of urban hierarchy that applied the program of heritage and rehabilitation. Source: The Authors.

3.3 Policy Criteria [4]

The main criteria of the program is achieving rehabilitation throw 4 main concepts (Consolidate – restore – maintain – upgrade). The program has been applied to the most important heritage and vital areas in Vancouver with different scales for all levels of urban hierarchy according to green architecture principles which represented in: Settlement, neighborhood, corridor, square, parks and landmark.

[3] City of Vancouver, 2019.

[4] *f*City Of Vancouver Administrative Report, Supports Item No. 1 CS&B Committee Agenda July 26, 2007, Heritage Building Rehabilitation Program (HBRP) and Transfer of Density Program – Current Status and Proposed Strategy.

3.3.1 Site A: Settlement… Gastown:

It is the original settlement that became the core of the creation of Vancouver. Today, it's a national historic site and quickly became a general centre of trade and commerce. Citizens became concerned with preserving Gastown's historic architecture. Gastown was awarded "A key to the city", Gastown was designated a National Historic Site of Canada in 2009. Gastown is a mix of "hip" contemporary fashion and interior furnishing boutiques, tourist-oriented businesses, restaurants. Gastown has become a hub for technology and media

3.3.2 Site B: Neighborhood… Chinatown:

Chinatown is the oldest neighborhood in Vancouver. This historic neighborhood is a part of Vancouver's past, and will continue to play an important role in its future.[5] These vibrant neighborhoods host a huge variety of interesting arts and cultural events, festivals, facilities, and services. Not all structures contained therein relate to Chinatown nor are all older buildings.

Figure 3. Chinatown

Rehabilitation of Chinatown based on comprehensive strategy to achieve the user needs:

- Solving social problems (more life on the streets at night and on weekends).
- Providing better restaurants -the heart of Chinatown- as they are keys for improving its business sector.
- Modernizing the cultural center and museum as a viable attraction while keeping its neighbourhood aspects.
- Taking advantage of its fine-grained streetscape pattern, which offers a unique sidewalk experience compared to newer auto-oriented suburban areas.
- Renovating its 20 heritage buildings, creating a historic district unparalleled in Western Canada, which will increase tourists and residents, leading to more local Spending.
- Clean and safe in order to reduce negative images, such as illegal drug use and panhandling, associated with the Downtown Eastside in general.

3.3.3 Site C: Corridor…Hastings Street:

It is one of the most important east-west traffic corridors in the cities of Vancouver.[6] The street forms one of the commercial cores for Vancouver's Italian community. It used to be a part of the decommissioned Highway it joins the recently built Burnaby Mountain Parkway and diverges from the continuation the street runs past such well-known Vancouver landmarks as the Marine Building, the Vancouver Club, Sinclair Centre, Harbour Centre and Victory Square.

The street forms the heart of Vancouver's historic original downtown, once known as the Great White Way because of its neon displays, and which is today the troubled Downtown Eastside and a notorious open-air drug market.

[5] Historic places initiative, standards and guidelines for the conservation of historic places in Canada, 2011.

[6] 101 West Hastings Street: Urban Design Guidelines Administrative Report, City of Vancouver, April 6, 2004.

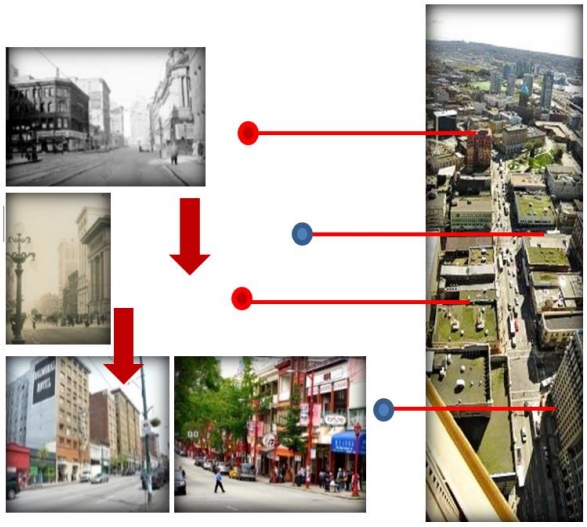

Figure 4. Rehabilitation at Hastings street.
Source: The Authors.

3.3.4 Site D: Squares …Victory Square:

Victory Square is a park in Vancouver, bordered by West Hastings Street to the northeast, West Pender Street to the southwest, Cambie Street to the southeast, and Hamilton Street to the northwest. Of the monument faces; one side faces Hastings Street, the others Pender and Hamilton Streets, and was designed thus by Major G.L. Thornton Sharp, architect, town planner, and park commissioner, to conform to the triangular shape of the park. It is so placed that, when approached from the east, it appears in the distance centrally at the end of busy Hastings Street. A firestorm destroyed the city and the site has had a negative impact on its historical and architectural value[7], but has been rehabilitated and developed to preserve its heritage features.

Figure 5. Victory Square.

3.3.5 Site E: Parks… Oppenheimer Park: The Vancouver Park Board and the Oppenheimer Park Commemorative Task Force are working together to develop commemorative projects in the park that celebrates the rich cultural history of the park and help build connections for the community in the future.

Figure 6. Oppenheimer Park

[7] 60 Years! Vancouver's Diamond Jubilee.

Red Cedar: Tree of Life. The cedar tree is central to Coastal First Nations' traditional and ceremonial life. Every part of the tree is a resource for clothing, utensils, pole carving, and ceremonial objects, and the tree plays an integral role in first Nations' spiritual beliefs. As such, the cedar tree was a key element in the commemoration of the First Nations' presence in the park. The First Nations' sub-committee hosted a traditional ceremonial in the park which supported by the community and by the Vancouver Board of Parks and Recreation.

3.3.6 Site G: Landmark…Gastown Clock: The Gastown Steam Clock is a famous landmark in Gastown. Part of Vancouver's distributed steam heating system, as a way to harness the steam and to prevent street people from sleeping on the spot in cold weather (Robertson, 1999). The steam mechanism was completely restored with the financial support

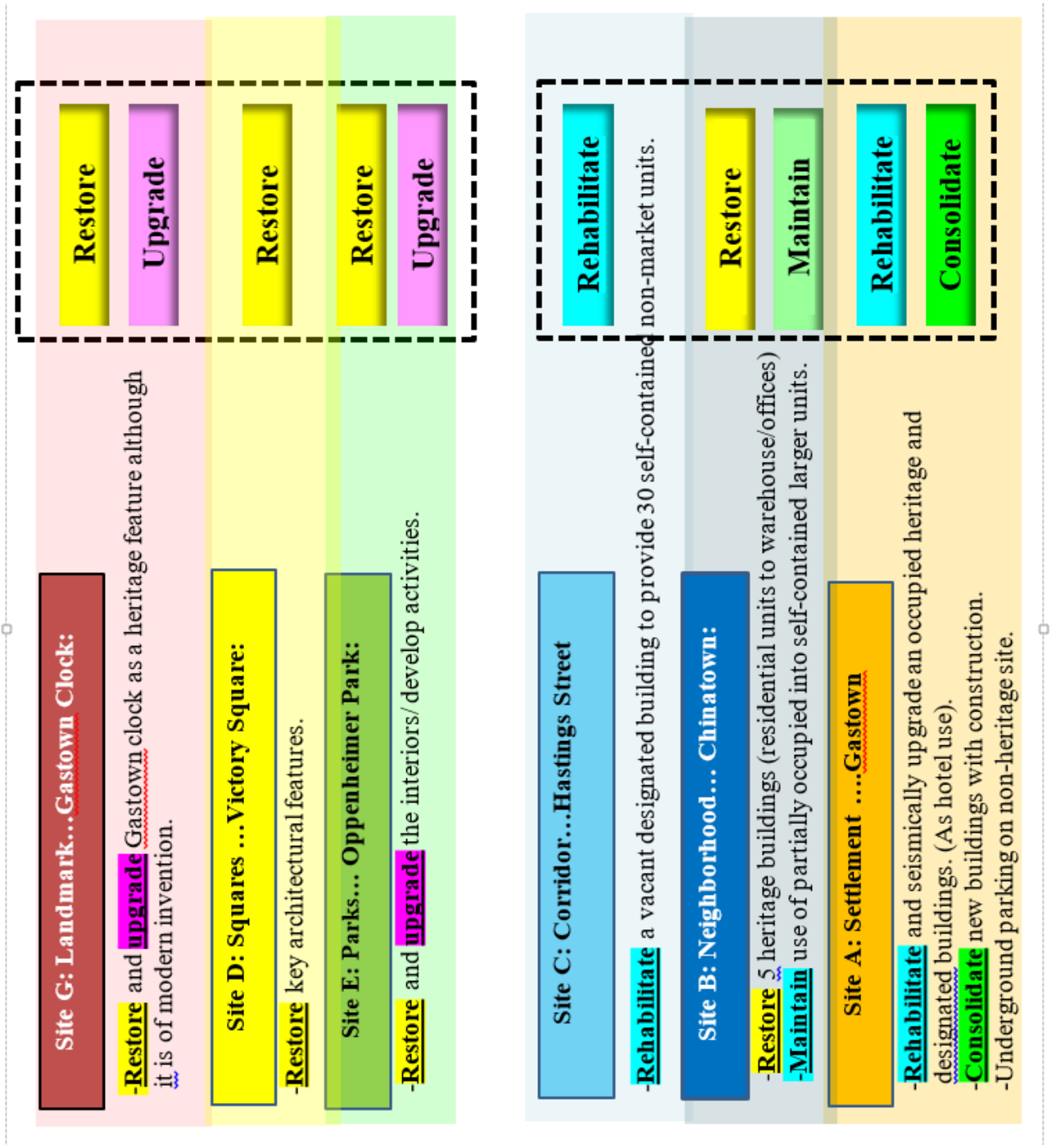

Figure 7. Conclusion. Source: The Authors.

of local businesses as it had become a major tourist attraction, and is promoted as a heritage feature although it is of modern invention. In October 2014 the clock was temporarily removed for major repairs by its original builder, and was reinstalled 2015 [8].

4. CONCLUSIONS

The research shed light on the main principles of green architecture and identify the main heritage conservation approaches as a theoretical approach and identify that the most suitable conservation approach that applies all the principles of the green architecture is "rehabilitation" which has been applied on our case study to confirm its role to achieve sustainability.

REFERENCES

Appendino, F., Balancing Heritage conservation and sustainable development.

https://www.conserve-energy-future.com/

Oberlander, J., Kalman, H., Lemon, R., 1989. Principles of heritage conservation, *Technical Paper Series*, (9 and 10), Victoria: British Columbia Heritage Trust, 1989.

Dale A., Hills S.B., 2001. At the edge: Sustainable Development in the 21 St Century, Vancouver, UBC press.

City of Vancouver, 2019.

*f*City Of Vancouver Administrative Report, Supports Item No. 1 CS&B Committee Agenda July 26, 2007, Heritage Building Rehabilitation Program (HBRP) and Transfer of Density Program – Current Status and Proposed Strategy.

Historic places initiative, standards and guidelines for the conservation of historic places in Canada, 2011.

101 West Hastings Street: Urban Design Guidelines Administrative Report, City of Vancouver, April 6, 2004.

60 Years! Vancouver's Diamond Jubilee.

Robertson, M., 1999. Administrative Report: RTS MP/ 00474. Former Website of the City of Vancouver. City of Vancouver, B.C., Canada. Retrieved 1 January 2015.

"Gastown landmark steam clock getting an overhaul". *Global News. Shaw Media*. Retrieved 1 January 2015

"Gastown Steam Clock undergoes repairs". City of Vancouver. City of Vancouver (B.C., Canada). 2014-10-08. Retrieved 1 January 2015. The mechanical moving parts of the Steam Clock's device for loading the metal balls have worn over the last 37 years and can no longer be reliably maintained. Mechanical failures have been a common occurrence in the past year, and the proposed repairs to the ball loading device will restore reliability to the Steam Clock while maintaining its historical integrity. Baker, Paula (2014-11-19).

[8] "Gastown Steam Clock undergoes repairs". City of Vancouver. City of Vancouver (B.C., Canada). 2014-10-08. Retrieved 1 January 2015. The mechanical moving parts of the Steam Clock's device for loading the metal balls have worn over the last 37 years and can no longer be reliably maintained. Mechanical failures have been a common occurrence in the past year, and the proposed repairs to the ball loading device will restore reliability to the Steam Clock while maintaining its historical integrity. *Baker, Paula (2014-11-19).*