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Tactical Preservation for Climate Emergency: Adaptive Reuse of 20th C. Public Schools in Puerto Rico

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Tactical Preservation for Climate Emergency: Adaptive Reuse of 20th C. Public Schools in Puerto Rico

Abstract
Puerto Rico has experienced three major disasters in the last five years, the hurricanes María and Irma in 2017 and earthquake swarms in the winter of 2020. Post-disaster vulnerabilities studies have concluded that municipalities in rural Puerto Rico present high exposure and risk in future disasters. Parallel to this context, thousands of 20th-century public schools were closed in the last decade due to damage and disinvestment in public infrastructure on the island. Not only has this reduced educational resources but also available emergency shelters. This thesis has studied vacant 20th-century public schools in Puerto Rico as an opportunity to reclaim these spaces for emergency response and recovery through sustainable equitable revitalization of rural communities. In order to envision a future of rural preservation and self-governance, the thesis applies a three-phase model called the PLAUSIBLE FUTURES TRIANGLE. First, it studies politics of education and extensive public school construction in Puerto Rico after the American occupation in 1898, including urban and rural typologies. Second, it explores bottom-up approaches of transformative resistance paradigms employed by grassroots organizations as first responders in post-disaster scenarios. Lastly, it applies the tactical design of the Washington Irving school in Adjuntas, a 1903 rural school that exemplifies the history of 20th-century typologies. The adaptive reuse framework builds on existing grassroots programs for autonomy in disaster emergency and post-disaster reconstruction. The proposed design consists of tactics that follow the dimensional classroom transformation, independent superstructures or roofs design, and furniture systems while maintaining the character-defining elements of the historic school.

Keywords
natural disaster, plausible futures, Puerto Rico, schools, tactical preservation

Disciplines
Historic Preservation and Conservation

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TACTICAL PRESERVATION FOR CLIMATE EMERGENCY: ADAPTIVE REUSE OF 20TH C. PUBLIC SCHOOLS IN PUERTO RICO

Hillary Morales Robles

A THESIS

in

Architecture and Historic Preservation

Presented to the Faculties of the University of Pennsylvania
In Partial Fulfillment of the Requirements of the Degree of

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MASTER OF SCIENCE IN HISTORIC PRESERVATION

2022

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ACKNOWLEDGMENTS

The birth of this thesis is part of a long-term journey of a young Puerto Rican architectural designer and preservationist in the diaspora who escaped the havoc caused by hurricane María in 2017-2018. The process of constructing new beginnings in a foreign land, language, and culture allowed me to see and understand the aftermath, the Puerto Rican culture, the colonial government, and the nature of disaster management through a new outsider lens. The results—apart from healing—are transformative in strengthening the roots of Puerto Rican architectural knowledge as a tool of resistance and autonomy.

Throughout this thesis’s research, writing, and design, I have received a great deal of support and guidance. Firstly, I would like to thank my advisors, Pamela Hawkes and Eduardo Rega Calvo, whose expertise was invaluable in sharpening my thinking and bringing my work to a higher level. Our thought-provoking conversations were enlightening and sparked the challenge of developing an unconventional preservation design thesis.

Pamela has been an incredible role model as a practitioner who is constantly and critically thinking about contemporary design in historic settings. Thank you for providing direction, not only throughout the thesis process, but to personal and professional endeavors. Your trust and reassurance have raised my confidence
and problem-solving abilities in preservation design. I feel honored to be your last advisee and wish you the best in your next chapter. You will be incredibly missed.

Eduardo’s architectural design and research approaches have been an essential influence throughout my academic formation at Penn. During these four years of my dual degree journey, we have unexpectedly crossed several times in design studios, DEI committees, and the virtual summer studio at Penn Praxis. Thank you for helping craft the core values of this thesis as a gravitating force where the proposed interventions converge. I feel fortunate to have the opportunity to meet a scholar whose values and processes thrive in the analysis of socio-spatial manifestations and the implications of more extensive socio-political networks of capitalism, colonialism, and social injustices.

A special acknowledgment is to Alexis Massol, the founder of Casa Pueblo in Adjuntas, Puerto Rico. Alexis opened the door of trust and shared the legacy of his work, a product of decades of advocacy, protests, and projects alongside his wife Tinti Deyá, children, a network of Puerto Rican professionals, researchers, and advocates, artists, and the community members of Adjuntas. This research design project was highly inspired by learning from Alexis’s wisdom and leadership. As a result, this thesis aspires to be a tribute and contribute to Casa Pueblo’s ongoing and future projects of self-governance. Casa Pueblo’s work is a model to follow, learn, and apply in multi-dimensions of architectural practice. Highlighting their
efforts opens a unique opportunity to promote bottom-up approaches and equitable practices in design education.

Thanks to the SACHS Program for Arts Innovation for giving me the honor of receiving the 2021 student research award. The award allowed me to pursue this research, alleviate the costs of visiting a remote site, and compensate the grassroots organization that dedicated their time to answer all my questions.

In addition, I would like to thank all my friends and loved ones for their endless support and encouragement in all my ambitious projects. Every single one of them had taught me the true meaning of “love,” “family,” and “community.” Finally, I would like to dedicate this thesis to all Puerto Rican people from the island and diaspora. Our resilience and transformative resistance have been a force that unites us together as a community. I hope this work may provide in the expansion of models of autonomy and self-governance, including the preservation of culture, values, and identity for the future of Puerto Rican communities.
Temporal, temporal, ¡qué tremendo temporal! San Felipe, San Felipe, ¡qué terrible temporal! ¿Qué será de Puerto Rico, cuando pase el temporal? ¿Qué será de mi Borinquen, cuando pase el temporal?

Storm, Storm, What a tremendous storm! San Felipe, San Felipe, What a terrible storm! What will become of Puerto Rico when the storm passes? What will become of my Borinquen when the storm passes?

Figure 01. Rafael Tufiño, Temporal (Storm), 1953. Source: Personal Interpretation.
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GLOSSARY

Adaptive Reuse

The process of reusing an existing or historic building for a purpose other than what it was originally designed for. Other associated terms are: ‘remodelling’, retrofitting’, ‘conversion’, ‘adaptation’, ‘addition’ or ‘refurbishment’.¹

Boricua

The Puerto Rican people, the inhabitants and citizens of the Puerto Rico and their descendants, both on the island and in the diaspora.²

Community

A community is a social group that is constantly transforming and evolving. In a collective process, people create feelings of belonging and identity through interpersonal relations and reinforce their members’ awareness of themselves as a group in unity and social potential.³

Disaster

A sudden calamitous event bringing significant damage, loss, or destruction.

³ González Massol, Casa Pueblo: A Puerto Rican Model of Self-Governance, 15.
Grassroots Organizations

Grassroots movements and organizations use collection action from the local level to effect change at the local, regional, national, or international levels. They are associated with bottom-up rather than top-down decision-making power structures. In the case of Puerto Rico, grassroots organizations have been at the front in building autonomous and self-sufficient communities.

Island Territory

Insular colony or non-sovereign entity.

Jíbaro

The countryside people in the mountains of Puerto Rico who farm the land in a traditional way. The jíbaro is a self-sufficient farmer and an iconic reflection of the indefatigable spirit of the Puerto Rican people.4

Participatory Design

Approach to design which actively involves the social actors of a place in the design process to ensure the results reflect common needs and goals. Other associated terms are ‘co-operative design’ or ‘co-design.’

**Pueblo**

The group of people who live in a town, region, or country and derive their group cultural identity from that place.\(^5\)

**Resistance**

In the context of Puerto Rico, it means social and political movements in the fight for independence and autonomy against the colonial government.

**Tactical Preservation**

Focuses on the partial reuse and incremental occupation of a larger building or historic asset in order to catalyze further development and more immediate benefits for the community.\(^6\)

**Transformative Resistance**

A proactive model of change that integrates science, culture, and community to build autonomy and self-governance.

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**Vernacular Architecture**

Local or regional construction, using traditional materials and resources of the area where the building is located. It is conditioned to its context, culture, available technologies of the time, and other factors, and thus becomes a means to reflect its own identity and character of a place.
Figure 02. Hurricane María Disaster in Puerto Rico. Source: Getty Images.
0.0 INTRODUCTION

Puerto Rico has experienced three unprecedented disasters in the last five years: two Category Five hurricanes, Irma and María in 2017, and an earthquake swarm with magnitudes ranging from 5 to 6.4 during 2019 and 2020. Post-disaster vulnerabilities studies have concluded that municipalities in rural Puerto Rico present high exposure and risk in the next disaster.\(^8\) The evolution of a disaster into a human catastrophe resulted in the death of 4,645 people and a massive migration wave of approximately 215,166 people seeking shelter and opportunities away from the island (Figure 03).\(^9\) Therefore, how can we protect vulnerable communities and existing fabric in the next disaster?

Parallel to this context, hundreds of 20th-century public school closures were performed in the last decade due to disinvestment in public infrastructure and storm damage on the island, leaving children without education, but most importantly, decreasing the number of available emergency shelters. Public school construction took place at the beginning of the 20th century in Puerto Rico from

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\(^8\) White, “Puerto Rico Is Prone to More Flooding Than the Island Is Prepared to Handle.”

1900 to 1930, representing the colonial past. It was the first large construction on the island under the American imperial regime that built approximately 3,000 schools in three decades. Though the historic schools represent colonial history, Puerto Ricans have decolonized these places by building strong communities around them for generations.

This thesis has studied vacant 20th-century public schools in Puerto Rico as an opportunity to reclaim these spaces for emergency response and recovery through sustainable equitable revitalization of rural communities.

In studies of the future, the concept of plausible futures by political scientist Sohail Inayatullah describes a design methodological approach that consists of six foundational concepts, questions, and pillars that explore models, methods, and tools of future thinking. One of his methods is the “futures triangle,” that maps today’s future views through three dimensions. The triangle envisions plausible futures by analyzing the interaction of three forces: the past’s weight, the present’s push, and the future’s pull that moves us forward (Figure 04). This method can be applied to architecture and preservation by phasing and testing variations of

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11 Inayatullah, “Six Pillars: Futures Thinking for Transforming.”
futures, adaptations, and applicability to other building typologies and spatial configurations. In the context of this thesis, plausible futures design thinking is the core structure to tell the story of a place and for the development of tactical preservation design for climate emergency.

The first phase, the “weight of the past” studies the history of massive public-school construction and politics of education in Puerto Rico after the American occupation in 1898, its typological evolution in both urban and rural areas, and its potential for adaptive reuse.

The second part—“the push of the present” —explores bottom-up approaches of transformative resistance carried out by grassroots organizations as first responders in post-disaster scenarios and the applicability of tactical preservation for the adaptive reuse of vacant 20th-century public schools in Puerto Rico. Participatory design and tactical preservation processes will support the exploration of equitable practice models to leverage the role of designers designing not for, but with the community.

Lastly, the “pull of the future” applies tactical design for school rehabilitation. The case study site is the Washington Irving School complex in Adjuntas, Puerto Rico. The site was identified as a result of mapping vulnerabilities and municipalities at risk in the post-Hurricane María context in Puerto Rico, including two criteria for selection based on school vacancy and grassroots involvement in their rehabilitation.
The Washington Irving Graded School is a 1903 building, the oldest school built in the historic urban core of Adjuntas and an example of early 20th-century public schools in Puerto Rico. In collaboration with local artists, activists, teachers, students, and neighbors, the grassroots organization Casa Pueblo has transformed the site into a community center to provide educational and social services.

The proposed adaptive reuse framework implements existing grassroots programs and uses for autonomy, referring to the capacity to be independent or self-governing in disaster emergency and post-disaster reconstruction. In this thesis, the program consists of developing a “solar campus” for a workshop school that expands upon Casa Pueblo’s existing programs. Also, the campus rehabilitation has an “emergency” center as an alternative core program and a fundamental criterion that will help envision sustainable futures for autonomous communities. The proposed design consists of tactics that follow the transformation of the dimensional classroom, the design of independent superstructures or roofs, and furniture systems while maintaining the character-defining elements of the historic school.

Architecture is a field that has evolved by learning from failures, disasters, and crisis. For example, disaster-relief housing design has focused on developing temporary shelter solutions that explore low-cost material and time-efficient assembly construction in post-disaster scenarios. In the case of building
rehabilitation projects, research demonstrates the exploration of preventive conservation methods, guidelines on flood adaptation for historic building rehabilitation, and adaptive reuse in crisis scenarios as reversible temporary conversions. For example, in guidelines on flood adaptation for historic building rehabilitation, the National Park Service generated a document that provides options for treatments to preserve historic properties located in flood-prone zones. Some of the suggestions for adaptation treatments are to move the historic building, use temporary protective measures, or fill the basement.\textsuperscript{12} Finally, in the case of sustainable design, scholars recognize existing buildings are essentially the most sustainable form of architecture. It has been explored innovative tools such as Life Cycle Analysis to test quantitative measures of the embodied energy of materials, maintenance, and operations comparing new construction or existing building typology. But also, the insertion of renewable energy systems as a form to extend the life of buildings.

Figure 03. Hurricane María Aftermath in Puerto Rico. Source: The Intercept.
Figure 04. Plausible Futures Triangle. Source: Diagram Adapted by Author.
0.1 Mapping Vulnerabilities & Municipalities at Risk

Mapping in architecture can be a critical tool for spatial research and data visualization. It extracts significant information and identifies patterns that help establish objective conclusions and generate informed design decisions. This thesis has employed mapping as a methodology to study and analyze vulnerabilities in Puerto Rico to identify the areas at most risk in future disasters, and long-term vulnerability in the context of climate change.

In order to determine the site for case study, I looked at physical, economic, social, and environmental vulnerabilities and factors of hazard, exposure, sensitivities, and adaptive capacity on post-Hurricane María in Puerto Rico, which refers to the situations or conditions that emerged during the aftermath. I focused mostly on two of these: physical and social. Among the physical vulnerabilities are housing assistance, landslides, properties located in flood zones, and remoteness in relation to access to resources and escape routes (Figure 08, Figure 09). These physical conditions are critical since it compromises the safety of individuals living in vulnerable areas, which requires to evaluate alternatives for aid and housing assistance. Social vulnerabilities consider data about population loss, post-disaster debt, single parent, unemployment, percentage of population over 65, percentage of population under 18, and median income (Figure 10, Figure 11, Figure 12). After
the hurricane, rural municipalities experienced a decrease in younger populations compared to a higher percentage of senior populations and an increase in the poverty rate by around sixty percent, among other social vulnerabilities. Both physical and social vulnerabilities are necessary to keep in mind to understand the current landscape of problems in these areas and how the proposed new programs will address them. The analysis identified six municipalities at risk for future disasters, all located in the rural regions of the island: Yabucoa, Canóvanas, Comerío, Utuado, Juncos, and Naguabo. Thus, the site of intervention must be within a rural context since these municipalities require prioritization for disaster management plans to mitigate future impacts (Figure 13, Figure 14).

Since public schools are spaces for emergency response and recovery, I also considered looking at vacant historic public schools for rehabilitation located in these rural municipalities and identified which ones were placed in areas less vulnerable to flooding, earthquakes, landslides, and other natural disaster impacts (Figure 15). As a result, I selected the rural town of Adjuntas and the 1903’s Washington Irving School complex as the site for intervention.
This design research is a site-specific project for the Washington Irving School in Adjuntas, Puerto Rico. The Center of Spatial Analysis from Columbia University\textsuperscript{13} and other reports mapping vulnerabilities in Puerto Rico\textsuperscript{14} highlighted Adjuntas as one of the municipalities at greatest risk for the next disaster (Figure 05, Figure 06). Indeed, Adjuntas has already been greatly affected by hurricanes and earthquakes in the last five years and is in great danger for the future (Figure 07). However, despite the destructive impacts it has experienced, the organization Casa Pueblo has become a solar oasis that has addressed the unmet needs of the surrounding communities.

\textsuperscript{13} Claramunt et al., “Mapping Municipalities at Risk in Puerto Rico.”
Figure 05. Caribbean Map. Source: Map Adapted by Author.

Figure 06. Adjuntas Map Location. Source: Map Adapted by Author.
Disasters

Figure 07. Hurricane Paths Mapping, diagram. Source: Map Adapted by Author.

Economy & Aid

Figure 09. Mapping Vulnerability: Property Rights in Post-Hurricane Puerto Rico, 2020. FEMA Aid Totals by County. Source: Pulitzer Center.

Municipalities at Risk

**Population Demographics**
- Age (under 18- over 65)
- Income (% in poverty by individual)
- Employment (% Unemployed)
- Single parent household

**Migration**
- Pop gain and loss

**Debt (by Municipality)**
- Annual debt by municipality

**Environmental hazard prone zones**
- Landslide Impact
- Flood zone

**Impact in housing**
- Housing Fema Individual Assistance

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Figure 11. *Mapping Social Vulnerability at a Municipal Level*, 2019. Source: Conflict Urbanism Puerto Rico Now.

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Figure 12. *Social Vulnerability + Physical Vulnerability*, 2019. Source: Conflict Urbanism Puerto Rico Now.
Remoteness of Rural Areas

Figure 13. Hurricane Maria Aftershocks in Jayuya, Puerto Rico on October 1, 2017. Source: The Intercept.

Figure 14. Remoteness Map, diagram. Travel distance by car from the most significant metropolitan areas in Puerto Rico, San Juan, and Ponce, versus the rural town of Adjuntas. Source: Map Adapted by Author.
Figure 15. Ecological Data of Washington Irving School Complex Site in Adjuntas, Puerto Rico. Source: Diagram Drawn by Author.
0.2 Methodologies

A. Tactical Preservation

Tactical Preservation has its roots in tactical urbanism. Tactical urbanism consists of small, flexible or temporary projects that over time translates in the better use of public spaces. Some examples are PARK(ing) Day, pop-up urbanism (i.e. parks, retail, or cafes), pedestrian plazas, parklets, among other urban interventions. In 2018, Detroit’s City Planning and Development Department Director Maurice Cox, explored these principles and employed them in what is referred as “tactical preservation” to protect underutilized historic buildings. It refers to the partial reuse and incremental occupation of a larger building or historic asset. The goal is to catalyze further development and benefits for the community in the long term.\(^{15}\)

One successful example of tactical preservation that will be discussed in more detail in the next chapter is the historic public-school Bok building in Philadelphia. The project’s success relied on the incremental occupation of the underutilized and vacant 340,000 square footage building and transforming their classrooms into affordable working spaces. In addition, the revenue acquired from the rent helps in the renovation of the building in the long term.\(^{16}\)


Tactical preservation as a strategy offers an opportunity to overcome the challenges of rehabilitating large institutional stock and the financial realities that limit the traditional, full-scale preservation approaches. Tactical Preservation as a sustainable design approach also offers the potential to examine the architect’s role by including the community as a leading player and steward in long-term design processes (Figure 16).

Figure 16. Loveless School Tactical Preservation Plan, 2021, Montgomery, AL. Source: Weitzman Preservation Studio, Drawn by Author.
B. Participatory Design

Participatory design is a continual process of collaboration with users involved in the project and is defined as "hands-on democracy in action." In order to achieve a "democratic design" process it must implement techniques that are "contextual, open, experiential, substantive, and holistic." It includes design techniques that challenge standard practices by encouraging designing with, and not for, the community. Creating spaces of collaboration with active listening fosters an environment of trust and build meaningful relationships. It is crucial since the bottom-up design approach focuses on long-term project outcomes in a collective effort. Also, the tools and skills developed through the partnerships are kept within the community, which sustains their autonomy and facilitates sharing them with others. It is a "transactional process" in which community members, designers, technical experts, and other stakeholders are equally involved in a project. Everyone learns effective communication to achieve a common goal. Contrary to a top-down approach, designers’ control most of the decisions behind the projects and do not allow a place for engagement. That is why participatory design is a suitable

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18 David De la Pena, *Design as Democracy.*
strategy to implement with Casa Pueblo since their projects follow similar principles of fostering community engagement.

I was only partially able to use a participatory design method for my thesis due to limitations of travel, the constrained academic schedule and COVID-19 guidelines. Nevertheless, I worked directly with Alexis Massol González, the leader of the grassroots organization Casa Pueblo in Adjuntas, the current owner of the historic Washington Irving School. Since it was established in the 1980s, Casa Pueblo has been a leading community organization in Puerto Rico in implementing sustainable models for community self-management. One of their many goals is providing services for disaster preparedness and recovery.19

Despite the limitations, I visited the site twice during December of 2021 and March of 2022. During the visits, I documented the current physical conditions of the original school, Casa Pueblo’s building inventory, and the vacant school complex owned by the Municipality of Adjuntas, through photography and field drawings. I also carried out video and audio recordings of interviews with Alexis and other researchers working for the organization to learn about their history and

19 Hillary Morales Robles, Interviews with Alexis Massol-González from Casa Pueblo in March 2022.
future goals.

Throughout the year, Alexis Massol and I worked together to develop proposals for the rehabilitation of the Washington Irving School Complex. This thesis will be the beginning of a long-term partnership to continue reimagining the future of this place. Another non-profit organization partnering with Casa Pueblo is called *Aula en la Montaña*, an afterschool program for children living in rural municipalities. Their program aligns with Casa Pueblo’s transformative resistance model, a proactive model that integrates the values of science, culture, and community. They offer STEM classes, agriculture and gardening, folk music, and many more.

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20 Hillary Morales Robles, Interviews with Eduardo Lugo from *Aula en la Montaña* and Alexis Massol-González from *Casa Pueblo* in March 2022.

21 Hillary Morales Robles, Interview with Eduardo Lugo from *Aula en la Montaña* on March 2022.
C. Graphic Novel

Lastly, the organizations Casa Pueblo and Aula en la Montaña are interested in using the thesis to create a curriculum for a summer design school program for children to learn about architecture, nature conservation, and historic preservation to envision the future for rural autonomy.\textsuperscript{22} I have used a graphic novel as a representation method to illustrate, capture and document the architecture of disaster and resistance in Puerto Rico. Oral history and narratives of resistance are rooted in Puerto Rican cultural identity, a character that will be explained more in the next chapter.

An architectural graphic novel can provide a language and tool for architects to communicate technical and conceptual ideas more clearly than through the customary language of expertise, and thereby democratize information to benefit broader audiences. An example of an architectural graphic novel is the work by Tings Chak in \textit{Undocumented: The Architecture of Migrant Detention} (Figure 17). The author illustrates the violence and oppression of architecture through the narratives of migrant prisoners in Canada. It documents the contrast between the

\textsuperscript{22} Hillary Morales Robles, Interviews with Eduardo Lugo from \textit{Aula en la Montaña} and Alexis Massol-González from \textit{Casa Pueblo} in March 2022.
stories of resistance versus the violence of the architecture itself through the reproduction of comics, interviews, and architectural sketches. Another example of a toolkit is *Guía Ciudadana para la Conservación del Patrimonio Histórico Edificado de Puerto Rico* in collaboration with the University of Puerto Rico, the Institute of Puerto Rican Culture, and the State Historic Preservation Office in 2020 (Figure 18). The community guidebook utilizes illustrations as a communication and educational tool that facilitates community members to protect Puerto Rican heritage.

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Figure 18. *Guía Ciudadana para la Conservación del Patrimonio Histórico Edificado de Puerto Rico*, 2019. Source: Issue.
Figure 19. Carlos Raquel Rivera, "Hurricane of the North," 1955, linocut. Source: Google Arts & Culture.
1.0 COLONIAL LESSONS AND POLITICS OF EDUCATION

The first stage in reimagining sustainable futures is looking at the weight of the past. The history of any place is complex; only by identifying and examining key events from the past can the present issues be understood. The “weight” consists of barriers to the change we hope to create. These barriers often result from imbalances created by oppressive and systemic issues tied to the governance of a place. In the context of Puerto Rico, what are the deep structures that resist change?

Figure 20. Puerto Rico's timeline of politics of education, climate and disaster, and anti-colonial movements departing from 1898. Source: Drawn by Author.
1.1 The Colony in Crisis: From Americanism to Disaster Capitalism

Puerto Rico is the oldest colony in the western hemisphere. In 2022, the old city of San Juan is celebrating the 500th anniversary of its foundation. The island has experienced five centuries of colonial history, ruled by two major imperial powers: first Spain (1492-1898) and subsequently the United States (1898-present day). This has progressively led to the island’s major economic, social, and environmental crises with no sign of resolution.

This thesis begins with a timeline of Puerto Rico’s history from the American invasion of the island on July 25, 1898, during the Spanish-American War (Figure 20). In that year, Spain lost all its remaining colonies in the Caribbean and the Pacific—Cuba, Philippines, Puerto Rico, and Guam—as part of the Treaty of Paris, a peace agreement that transferred their ownership to the United States. It was an instrumental moment for the United States military, political, and economic expansion. Although the war ended in 1898, Puerto Ricans suffered from a twenty-month American military occupation, lasting until 1900. The timeline describes three overarching and interconnected themes: climate and disaster; and anti-colonial movements on the island; and politics of education.

Mapping the main events in the history of Puerto Rico will guide us to understand the present situation, including the massive school closures on the island, the aftershocks of disaster that anguish thousands of Puerto Ricans, and
their responses through resilience and socio-cultural resistance in recent years. These current issues did not occur as isolated incidents but, on the contrary, represent a succession of adverse circumstances. Mapping the history will identify patterns and gaps can help to establish priorities for alternatives and possibilities in the future, as shown in the timeline in Figure 20 and explained in the three sections below.

A. Climate and Disaster

An analysis of Puerto Rico’s colonial history, public education, and social movements must address the critical role played by climate and disaster as a force of change. The timeline of climate and disaster history in Puerto Rico allows us to understand these interconnections. For example, in 2015 thesis titled *Reconstructing early modern disaster management in Puerto Rico*, Ingrid Olivo analyses as case studies three major disasters in Puerto Rican history Hurricane San Ciriaco (1899), Hurricane San Felipe (1928), and Santa Clara (1956). The author notes these three disasters occurred particularly in historical junctures of political shifts in the island and unstable economic eras. Ingrid describes their contexts as:
San Ciriaco (1899) corresponds to the shift from Spanish to American domination; it was instrumental to weaken the option of independence and laid the ground for another form of underdevelopment. San Felipe (1928) corresponds to the immediate preamble of the first economic and civil breakdown in modern times; it extended the foundations of more underdevelopment and fueled independence demands. Santa Clara (1956) corresponds to the beginnings of the Commonwealth; it unveiled iterative dependency and underdevelopment dangerous to admit in the new political formula. Besides, it prompted the only Commonwealth’s cultural proposition to address hurricanes, widely used in the next years.\textsuperscript{26}

These three examples demonstrate disasters do not occur in a vacuum, they have influence in major political, social, and economic changes in the island. The environment in which history takes place has a significant influence on architectural construction, design, and evolution.

\textbf{B. Anti-Colonial Movements}

Resistance is embedded in Puerto Rican culture; many scholars from the island have described the \textit{sui generis} character of Puerto Rican culture as a fight against injustice and oppression. One of the most notable forms of resistance is evident in Puerto Rican folk music genre \textit{Plena}. \textit{Plena} is a Puerto Rican music style of Afro-Caribbean origins dating back to the early 1900s, made by a culturally diverse popular class and recorded in “Sung Newspapers” that narrate local life events and

\footnote{\textsuperscript{26} Ingrid Olivo, “Reconstructing Early Modern Disaster Management in Puerto Rico,” 16.}
protests with satirical lyrics and syncopated rhythm. During the 1950s, the Puerto Rican artists Lorenzo Homar and Rafael Tufiño published a book documenting twelve popular *plenas* as illustrative engravings with music scores and lyrics dedicated to the “King of Plena” Manuel Jiménez (El Canario) (Figure 24, Figure 25).\(^{27}\)

As plena reflects cultural identity and collective memory of “resistance” through the use of music to deliver political messages during protests. Anti-imperial movements such as the *Puerto Rican Nationalist Party* in the 1920s, the *People’s Army* in the 1950s, or the *Boricua Popular Army* at the 1970s, used resistance as a tool to “shorten the distance” between everyday people, the missions of political or grassroots organizations, and a common struggle.\(^{28}\) Is in the realms of collectivity and cooperation where all social actors meet with each other and unite by common interests. For example, the leader of the *Puerto Rican Nationalist Party*, Pedro Albizu Campos, described resistance against the imperial system in Puerto Rico and Latin America as a fight that affects the “common interests as a people united by the same bonds.”\(^{29}\)

Grassroots organizations in contemporary Puerto Rico, such as Casa Pueblo or Junte Gente, have employed Puerto Rican culture as a tool of resistance to build community organization, solidarity, and support to reach a national level impact by using music to deliver messages in protests or plan cultural events as a call for action.\textsuperscript{30} In the case of Casa Pueblo, the organization began in the 1980s as a community self-management organization, which refers to grassroots level governance, committed to appreciating and protecting natural, cultural, and human resources. It was initially formed to stop a proposal by the government of Puerto Rico to mine seventeen deposits of silver, gold, and copper in the central region of the island.\textsuperscript{31} Their anti-mining campaign was a fight against displacement, advocating for human rights and preserving the natural resources of water and land through the development of an alternative model of community self-governance. The fight had the ultimate goal of impact at a national level by shaping the existing colonial policies and laws.

Another great recent example of resistance in Puerto Rico is the famous “Verano Boricua”, the “Summer of 2019.” The summer of 2019 was considered one

\textsuperscript{30} Hillary Morales Robles, Interviews with Alexis Massol-González in December of 2021.
\textsuperscript{31} González Massol Alexis, Ashwin Ravikumar, and Paul A. Schroeder, Casa Pueblo: A Puerto Rican Model of Self-Governance (Amherst, MA: Lever Press, 2022), 47.
of the most outrageous moments in Puerto Rico’s modern history. Governor Ricardo Rosselló triggered the indignation of the Puerto Rican people when text messages, he sent to cabinet officials mocking the thousands of victims who died in Hurricane María were leaked to the public. In response, massive protests were carried out across the island over the span of a week by students, artists, activists, everyday people, and Puerto Ricans in the diaspora. It caused the first resignation of a governor in Puerto Rican history.\footnote{Mivette Vega, “Verano Del 19: The 15 Days That Ended Rosselló’s Government,” The Americano, July 28, 2020, https://theamericanonews.com/2020/07/28/verano-del-19-the-15-days-that-ended-rossellos-government/.


In the book \textit{Against Muerto Rico: Lessons from the Verano Boricua}, Puerto Rican sociologist Marisol LeBrón highlights six significant political lessons from the resistance against the “forces of death”, in Puerto Rico, referring to the death toll post-Hurricane María, during the summer of 2019. Among these are: the struggle must be intersectional; the criollo elite are a murderous class; debt is death, protest is life; protests are sites of pleasure; the police ≠ el pueblo (people); and the diaspora must be a part of the struggle for Puerto Rico’s future.\footnote{LeBrón Marisol, Against Muerto Rico: Lessons from Verano Boricua (Cabo Rojo, PR: Editora Educación Emergente, Inc., 2021).}
C. Politics of Education

Under the American military government, schools and education became a primary tool of colonization and a symbol of imperial power in Puerto Rico. During the first three decades of the twentieth century was the period of massive public school construction in the island, and the first and most extensive civic building strategy. In these spaces, Americanization took place through the instruction of English as a first language and the celebration of patriotism through the history of the United States. The goal was to teach Puerto Rican schoolchildren to support and advocate for American colonialism on the island as a new generation of “patriots” to build the U.S. nation (Figure 21, Figure 22).34 In the article Colonial Lessons: Politics of Education in Puerto Rico 1898–1930, Solsiree del Moral described the Americanization (Figure 23) and U.S. colonial policies as follows:

Americanization as an educational ideology was not new to the Progressive Era. It had been applied by U.S. education in different ways to recent European immigrants, as well as African Americans and Native Americans. It had also been practiced by U.S. missionaries and educators in the Hawaiian school system for almost a full century before it was implemented in Puerto Rico. In none of these examples did Americanization imply the formation of full-fledged U.S. citizens who enjoyed equal protection under the law. The Americanization of brown and black Puerto Rican children meant teaching them to aspire to a version of liberalism and citizenship that, in practice, did not exist.35

The historian of modern Latin American and Caribbean studies, noted that educators imagined to transform “colonial subjects into second-class citizens”, since Puerto Ricans acquired citizenship status through the Foraker Act in 1918 and considering that Puerto Rico was an “unincorporated territory” until it was achieved the status of a Commonwealth in 1948.³⁶

While this thesis does not focus on extensive research on architectural history, it is vital to understand the value of early twentieth-century public schools beyond their aesthetics, including the social and cultural impacts of their design intent for Puerto Ricans. Americanization was intended to erase and assimilate native Puerto Rican culture into an American one,³⁷ but it did not succeed for three reasons. First, English teachers in the early twentieth-century public schools were Puerto Rican native Spanish speakers, which teachers did not necessarily master the foreign language. In addition, during this period, the Comisión de Instrucción Pública, the Public Instruction Commission, a department created by the Federal government, reinforced English as the primary language and prohibited Spanish from being spoken in the classrooms. Despite the potential disciplinary consequences, children

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stopped attending school since they had to decide what was more important, which affected the Americanization process. As a result, the authorities had to reinstate Spanish as the primary language taught in elementary schools.

Around the 1910s, the president of the House of Representatives of Puerto Rico, the lower house of the Legislative Assembly of Puerto Rico, Cayetano Coll y Cuchi, recognized that the American government intended to actively control the people through education and culture. Cayetano noticed the US interests as he expressed: “We knew perfectly well that the soul of a people is embodied in its language. We would have preferred to remain without a country than to remain without our language. For this matter we joined the battle and my friends, and I engage in that fight.”

The second reason was the emergence of the Asociación de Maestros de Puerto Rico (AMPR), the Teachers Association of Puerto Rico, the first island-wide union and professional organization. The union leadership had different objectives or goals from the colonial administrators. The teachers viewed modern education as the pathway for Puerto Rican societal “regeneration” to help families achieve

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progress. The Puerto Rican teachers used the classrooms to promote health, hygiene, sanitation, physical education, home economics, and literacy in the school and homes. They also introduced Puerto Rican culture, history, and heritage, a practice that remains in today’s educational system.

Third, the Americanization campaign came to an end in 1930 in the havoc caused by the Great Depression, which diverted the US government’s attention from the colonies to focus on the interests of the states.

Today, the school system in Puerto Rico faces systemic pressures similar to those faced by teachers, parents, and children in the early twentieth century. Through resistance, Puerto Ricans’ intangible and cultural values have been preserved and passed throughout the generations. In 2017, the Puerto Rican political party of El Partido Nuevo Progresista, the New Progressive Party, won the elections under the leadership of Ricardo Rosselló. The party’s political ideology advocates for the island’s statehood and aligns with shared interests of Americanization of Puerto Ricans, which is contested by other political parties advocating for independence or to maintain Puerto Rico’s status as a commonwealth. In his first year in office on 2017, the Financial Oversight & Management Board of Puerto Rico (FOMBPR) was created under the federal law PROMESA to resolve the government debt crisis. It took over control of Puerto Rico’s government budget. Although the “Summer of 2019” resulted in Rosselló’s resignation, his leadership and corruption had already
been detrimental to the already fragile public infrastructure on the island. The restructuring process included labor and tax reforms, the widespread sale, privatization, closure, and disinvestment of major public infrastructures, such as the water and power authorities; and the closures of public schools. The economic bankruptcy, and FOMBPR’s extreme restructuring of laws, policies, and economy, have impacted the lives of Puerto Rican citizens.

In 2017, the newly appointed Secretary of the Puerto Rico Department of Education (PRDE), Julia Keleher, carried out an educational structural reform that led to the closure and privatization of hundreds of schools. Once again, the government’s education policies were in opposition to the vision of the Teachers Federation of Puerto Rico and the Puerto Rico Teacher’s Association. The injustices, corruption, and inequalities have provoked the people’s uprising in the Summer of 2019 that revealed to the world the difference in power from the government and the Puerto Rican society.
Figure 21. American Occupation of La Fortaleza 1900s. Source: The Intercept.
Figure 22. Jack Delano, *Pledging Allegiance to the Flag in a School in Puerto Rico*, 1946. Source: Rare Book & Manuscript Library, Columbia University Libraries.

Uncle Sam (to his new class in Civilization). -Now, children, you've got to learn these lessons whether you want to or not! But just take a look at the class ahead of you, and remember that, in a little while, you will feel as glad to be here as they are!
Figure 24. Rafael Tufiño, *La Plena*, 1952-1954, mural. Source: Museo de Arte de Puerto Rico, San Juan.

1. Temporal (Storm)
2. Cortaron a Elena (They Stabbed Elena)
3. Tintorera del Mar (Shark of the Sea)
4. Fuego, Fuego, Fuego (Fire, Fire, Fire)
5. Santa María (Saint Mary)
Temporal, temporal, ¡qué tremendo temporal!
San Felipe, San Felipe, ¡qué terrible temporal!
¿Qué será de Puerto Rico, cuando pase el temporal? ¿Qué será de mi Borinquen, cuando pase el temporal?

Storm, Storm, What a tremendous storm! San Felipe, San Felipe, What a terrible storm! What will become of Puerto Rico when the storm passes? What will become of my Borinquen when the storm passes?
1.2 Public Schools Evolution in Puerto Rico

Under the Spanish colonial regime, between 1492 and 1898, schools were scarce, especially in rural areas of Puerto Rico, and predominantly only accessible to children from Spanish criollo families living in the urban centers, which refers to people of Spanish descent born in the colonies. During the sixteenth century, education was primarily provided by the Catholic Church. Around 1512, Bishop Alonso Manso established the first school as part of the Cathedral Church in San Juan. In 1529, Fray Antón de Montesino founded the second school in the Convent of the Dominican Friars and in 1642 at the Convent of San Francisco. These schools concentrated primarily on religious education, reading, and writing.\(^\text{39}\)

Around 1770, there were efforts to establish public schools, but attendance was still low in numbers. Private schools, such as one run by the first free Black educators Rafael Cordero Molina and his sister Celestina in their house on Luna Street in Old San Juan. Their school provided free, equal access to brown, black, and white boys and girls from low-income families. Rafael and Celestina’s work

\(^{39}\) Ana Helvia Quintero, “Historia De La Educación En Puerto Rico,” EnciclopediaPR, August 1, 2009, https://enciclopediapr.org/content/historia-de-la-educacion-en-puerto-rico/\#:\#:text=As%C3%AD%2C%20una%20de%20las%20primeras.de%20San%20Francisco%20en%201642.
represented the first public education reform in Puerto Rico (Figure 26).\(^{40}\)

At the end of the Spanish regime, schools remained a scarce resource. There were only two “normal schools” established in the capital, one for boys and one for girls, serving for teachers’ training. In addition, a total of approximately 500 schools operated in small houses around the island. Consequently, by the end of the nineteenth century, 79 to 85% of the total population on Puerto Rican was illiterate.\(^{41}\)

After the change to colonial rule in 1898, the United States military government closed the “normal schools” to institute educational reforms in line with the U.S. colonial policies. The Organic Act of 1900, also known as the Foraker Act, created the Department of Public Instruction and the position of Commissioner of Instruction. The *División de Edificios Públicos del Departamento del Interior Insular*, the Public Buildings Division of the Insular Department of the Interior, led by architect Adrian C. Finlayson, directed the design and construction of early twentieth-century public schools across the island.\(^{42}\)

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\(^{41}\) Ana Helvia Quintero, “Historia De La Educación En Puerto Rico,” EnciclopediaPR, August 1, 2009, https://enciclopediapr.org/content/historia-de-la-educacion-en-puerto-rico/#!:~:text=As%C3%AD%2C%20una%20de%20las%20primeras,de%20San%20Francisco%20en%201642.

\(^{42}\) Vega Díaz Astrid and Osiris Delgado, Arquitectura De Puerto Rico: Libro Enciclopédico y Glosario Arquitectónico (San Juan, PR: Art Designs, 2015), 92.
In 1987, Puerto Rican architect Jorge Rigau developed a thematic nomination for *Early 20th Century Schools in Puerto Rico* to the National Register of Historic Places. The statement of significance highlights the schools’ architectural value, historical significance, and present urban relevance.\(^4^3\) The period of significance is 1900 and 1940, when hundreds of schools were built following various stylistic, formal, and technical approaches to climate and health concerns. Rigau emphasized:

> Schools were instrumental for teaching English and "Americanism"; Commissioner of Education Juan B. Huyke would speak in 1921 of schools as agencies for the process of Americanization. Another Commissioner, Samuel M. Lindsay, as early as 1902, would describe schools as “military barracks” for the peaceful colonization of the island." The argument is made stronger upon knowledge of the American government’s insistence on building “an American school at each valley and on each hill”; “with the building facing an important street,” making its presence evident and only comparable to that of church and city hall in each of our towns.”\(^4^4\)

Rigau also notes their importance as critical elements in the urban civic configuration of each town. Schools became the third civic element in the city, succeeding the churches and city or town halls inherited from the pre-existing Spanish town planning model of the “Law of Indies” (Figure 27, Figure 42). Thus, unlike many Latin American cities which grew from that model, Puerto Rico’s towns

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\(^4^4\) Rigau, “National Register of Historic Places Inventory Nomination Form: Early XXth Century Schools in Puerto Rico (Thematic Group)”, 6.
have developed an additional layer of American planning which gives them a unique character.

Local architects also had opportunities to participate in constructing institutional buildings around the island. These included: Francisco Porrata Doria, Luis Perocier, Rafael Carmoega, Pedro de Castro, Antonin Nechodoma, and many other designers. However, their work was strongly influenced by American architects in terms of craftsmanship and design response to the tropical context.45

Like American and European schools built around this period, schools in Puerto Rico responded to the climate, the nuances of context, and contemporary notions of children’s health and education. According to Fred A.H. Schroeder, the designs had to address:

“practical interior related to illumination, sanitation, ventilation, furniture, equipment and, in urban schools, special-purpose rooms. Improved interior designs were justified on the basis that good architecture was supposed to contribute a moral influence on the formation of character. Exteriors tended to mirror current stylistic tastes”.46

The buildings were one to three stories high, with typical classrooms measuring 25 by 35 feet, all directly connected to an adjacent playground or

athletic field. The open-air school movement highlighted the importance of large windows and high ceilings for natural light and fresh air circulation. Providing individual desks for each student and open spaces for recreation also were believed to enhance productivity in school learning.47

In Puerto Rico, typological variations of building plans were developed to serve as models that could be replicated in both urban and rural areas. The plan typologies described various letter forms—I, L, T, C, E, V, Y, or O (Figure 28)—and were typically symmetrical, with cellular classrooms connected to enclosed or open air single-loaded corridors. They were executed in a range of stylistic revival approaches including Georgian, Neo-Classical, Art-Deco, Spanish Revival, Eclectic, among others. Construction materials followed modern principles of permanence and durability by incorporating concrete and brick, with floor, ceiling, and roof framing of wood. The facades were austere, with minimal ornamentation, and original fenestrations were covered by wood louvers and shutters.48

Schools became vital spaces for community engagement and social welfare work. In addition to classrooms, schools provided small libraries for reading and

consultations for teacher-parent relationships and playgrounds with benches and recreational furniture.

Near the end of this period of construction, Katherine M. Cook, Chief of the Division of Special Needs of the United States Department of the Interior, wrote the *Bulletin of Public Education in Puerto Rico* (1934) "based on personal observation of the schools and the school systems made early 1933". She identified two distinct school organization types for urban centers and rural areas, with different classifications. For urban schools, there were high schools, continuation schools, and urban elementary schools; for rural schools were rural elementary schools and second-unit rural schools.

### A. Urban Centers

In general, public schools constructed in urban centers during this period were "both qualitatively and quantitatively better" than the ones located in rural areas. A higher percentage of children attended the urban schools, which had more high schools and higher teachers' salaries and qualifications. Urban schools taught traditional academic subjects from American curriculum, with emphasis on

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51 Ibid, 20.
health, music, social studies, etc. High school curricula typically focused on scientific, commercial, and vocational topics.\footnote{Katherine M. Cook, \textit{Public Education in Puerto Rico} (Washington, DC: U.S. G.P.O., 1934), 20-26.} The urban schools were considered to be “school palaces,” constructed of two to three levels with an imposing scale in relation to the existing urban landscape. Four of the main school buildings in San Juan—the Central High School (Figure 30, Figure 31), Roman Baldorioty de Castro school, Rafael Cordero school, and Rafael María de Labra school—were designed by Adrian C. Finlayson, chief architect of the Public Buildings Division of the Insular Department of the Interior and author of the school design principles.\footnote{Jorge Rigau, “National Register of Historic Places Inventory Nomination Form: Early XXth Century Schools in Puerto Rico (Thematic Group)” (Washington, DC: National Park Service, 1987), 9.}

\textbf{B. Rural Areas}

In rural areas, public schools were almost the opposite—one-room buildings—with undeveloped and experimental curricula (Figure 32, Figure 33). Commissioner of Education, Dr. José Padín, explained in 1931:

\begin{quote}
Since I took the office about a year ago, I have devoted most of my time to the promotion of rural education. Our peasants [sic] constitute about 80 percent of the population. For hundreds of years, they have lived scattered over the mountainsides, neglected, forgotten, out of touch and out of step with the rest of the island... The future of Puerto Rico depends appreciably on our ability to bridge the gap that separates the retarded mountaineer from his more fortunate brothers.\footnote{Cook, \textit{Public Education in Puerto Rico}, 28.}
\end{quote}

Unlike the during the Spanish occupation, the new regime prioritized

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investing in rural school building construction. The goal was the “regeneration” of these populations and alignment with the modern nation and citizen-building efforts of Puerto Rico’s progress.\textsuperscript{55} The experimental educational reforms had the intention of “civilizing” \textit{jíbaro} populations, low-income farmer workers who were essential human capital during the agricultural economic era in Puerto Rico, which was transformed in early 20th century by US sugar corporations,\textsuperscript{56} and ended in 1940s with the Operation Bootstrap, the birth of the industrialization of Puerto Rico.\textsuperscript{57, 58} The \textit{jíbaros} (“people of the forest” in the indigenous \textit{Taíno} language) are a Puerto Rican sub-culture that had existed since the 16th century, predominantly in the heart of the island. In the chapter titled “\textit{The Country and the People},” Katherine Cook described the “mountain peasants or \textit{jíbaros}” as living in isolation from modern society, in bohío houses made of straw and wood in the inland highlands and inaccessible from improved roads.\textsuperscript{59} Qualitative and quantitative information presented in the bulletin for the US Department of the interior revealed that rural populations of schoolchildren were significant in numbers, thus the need for

\textsuperscript{56} del Moral, “Rescuing the Jíbar: Renewing the Puerto Rican Patria through School Reform.”  
\textsuperscript{57} Osvaldo García, Fotografías Para La Historia De Puerto Rico 1844-1952 (Río Piedras: Eds. Huracán, 1993).  
\textsuperscript{58} Jíbaro populations migrated from rural towns to larger urban areas at the beginning of the industrial economic era in Puerto Rico. The shift of populations has reached the conclusion that Puerto Rican culture is identified in many ways as jíbaro culture, which is rooted in indigenous taino heritage, language, and tradition.  
\textsuperscript{59} Katherine M. Cook, Public Education in Puerto Rico (Washington, DC: U.S. G.P.O., 1934), 5.}
development of adequate school facilities in small towns.

The educational system for rural schools consisted of two units. Elementary school lasted six years and led to the second-unit rural schools, which offered three years of work. The second units did not have vocational objectives, but in addition to the traditional subjects, offered classes on agriculture, home economics, and trades. Boys could learn agriculture, tin work, carpentry, shoe repair, electrical, auto mechanics, and other trades or industries. Girls studied embroidery and other types of needlework, lace-making, cooking, and other home-making subjects.

Both urban and rural public schools survived the years of the Great Depression. During the administration of President Franklin D. Roosevelt (1932-1944), the “New Deal” was extended to the island, and in 1933 the Puerto Rico Emergency Administration, known as PRERA, was created (Figure 29). It created jobs by building schools, aqueducts and sewers, roads, public buildings, etc. As a result, most of the schools in Puerto Rico were expanded into larger school complexes that included more classrooms, kitchens, food halls, administrative offices, covered sports fields, and bathrooms. These facilities were free-standing and built in

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61 Cook, Public Education in Puerto Rico.
63 Hillary Morales Robles, Interview with Alexis Massol-González about Washington Irving School development.
concrete, with similar scale and spatial configurations to the original buildings. Minor alterations and renovations were also made to the historic schools, such as replacement of wood windows with aluminum, wood floors with concrete, structural reinforcement to resist disasters, modern HVAC systems, and other service spaces.\(^{64}\)

Jorge Rigau’s National Register nomination included seven significant schools: *Aguayo Aldea Vocacional High School* (Caguas, PR), *Central High School* (San Juan, PR), *Ponce High School* (Ponce, PR), *Rafael M. Labra High School* (San Juan, PR), *Eleuterio Derkes Grammar School* (Guayama, PR), *Escuela Brambaugh* (San Juan, PR), and *Escuela Graduado José Celso Barbosa* (San Juan, PR). Four of the seven schools are located in the capital, and the other three are within the largest towns on the island. Critical limitations of the nomination are that it only protects the best-known examples, and those are mostly concentrated in urban areas.\(^{65}\) After the nomination was accepted in 1987, other historic public schools were added to the Register, such Washington Irving School in Adjuntas (2015)\(^ {66}\) and Madame Lucchetti School in San Juan (2022). The fact that only 10 of 1,200 schools are protected by preservation recognition makes clear the need to increase documentation, interpretation, and rehabilitation proposals for rural public schools.

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\(^{64}\) Physical conditions assessment and archive photographs and plan drawings comparison from various schools over time.


Figure 26. Francisco Oller y Cesteros, *La Escuela del Maestro Rafael Cordero*, 1890. Source: La Cámara del Arte.

Figure 27. American School Construction was the third largest building stock in 1900s Puerto Rico following the Spanish colonial church and civic buildings. Source: Diagram Drawn by Author.

Figure 29. Aerial Map of Puerto Rico at Puerto Rico Reconstruction Administration (PRRA) in Puerta de Tierra, 1936. Source: PRRA Collection at the Puerto Rican Digital Library from the University of Puerto Rico Archives.
Figure 30. Rafael María de Labra School in San Juan Puerto Rico. Urban School Model, 1919. Source: Library of Congress.

Figure 31. "Special Methods" Second Year class in Urban Public School in Rio Piedras, San Juan, 1906. Source: Puerto Rican Digital Library from the University of Puerto Rico Archives.
Figure 32. Construction of a one-room Rural School Building, 1938. Source: National Archives and Records Administration, Record Group 69.3.1.

Figure 33. Young sons of resettlers in an outdoor class of the agricultural school. La Plata project, Puerto Rico. Rural School Model, 1938. Source: Library of Congress.
1.3 The Battle Against School Closures

Between 2007 and 2020, 673 schools around the island were closed.67 Decades of neglect created deteriorated infrastructure, followed by the bankruptcy of the Puerto Rican government in 2017. Hurricane María in 2017 caused more physical damage and the vast migration of Puerto Ricans afterward caused a decrease in population.

A map from *Directorio Comprensivo de Escuelas Públicas 2007 y 2019* from *Open Data Puerto Rico* (Figure 34), shows that over 1,200 schools have been built around Puerto Rico. Between 2012 and 2022, 44% of them—approximately 600—have been closed. With no use, maintenance or proper mothballing, these schools are often exposed to severe deterioration, vandalism or conversion into clandestine horse stables.68 The 2020 report, *Puerto Rico’s Public School Closures*, created by the *Centro para la Reconstrucción del Hábitat*, highlighted the lack of management and planning for the future of public school rehabilitation.69 They noted a pattern of transforming these spaces in community centers carried out by grassroots organizations.70 In my interview with Luis Gallardo Rivera, executive

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68 Rubiano, “Puerto Rico’s Public School Closures,” 17.
69 Ibid.
70 Hillary Morales Robles, Interview with Luis Gallardo Rivera on February 23, 2022.
director of the organization *Centro para la Reconstrucción del Hábitat*, he mentioned the need for creativity in adaptive reuse proposals. While community centers or cultural programming are better than leaving the properties vacant, they are not the only solution nor a sustainable economic model for extend the buildings’ lives. Gallardo identified the need to explore affordable housing and co-working space programs as two possibilities for abandoned schools in Puerto Rico.  

It is important to note that public school closures have not occurred only in Puerto Rico. This issue is part of a broader trend of public school closures in districts across the United States due to declining urban and rural populations and the desire for school district consolidation. However, the number of closures and rate of change and in Puerto Rico is unprecedented: 673 schools (44%) in 11 years. That surpasses Chicago, where 200 schools (33%) were closed in 16 years.  

Everywhere, school closures are detrimental to the health and vitality of their neighborhoods, since they have become integral parts of their surrounding community. Therefore, numerous proposals for adaptive reuse of historic public schools have occurred in the last decade. Some examples are the 1936 Bok

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71 Interview with Luis Gallardo Rivera on February 23, 2022.
73 Rubiano, “Puerto Rico’s Public School Closures; Community Effects and Future Paths,” 1.
Vocational High School in Philadelphia, converted into affordable workspaces for small businesses, artists, and makers.\textsuperscript{74} The eight stories building occupies an entire block, which scale made its rehabilitation a challenging one. It was through the renovation of classrooms for small businesses incrementally over time that allowed the building’s preservation a successful outcome. Another example is the 1926 McDonogh 19 School in New Orleans, which became the first New Orleans Civil Rights Museum to provide education about Civil Rights history and accommodate affordable housing for senior populations.\textsuperscript{75}

All these schools are located within neighborhoods, and their closure affects equitable access to education for children as well as community integration (Figure 35, Figure 36). Since Puerto Rico is car-dependent with no public transportation system, it affects families who need to drive their kids to the next school nearby, which could be located in districts far from their neighborhoods and municipalities. Families will have to spend longer commute times before and after their work, putting in jeopardy the ability for children to attend school. As the Centro para la Reconstrucción del Hábitat report states: “The closing of a school means more

than the closing of a number of classrooms, a public library, or cafeteria, but also the loss of theaters, playing fields, and other recreational and sports facilities,“76 the closures affect in the loss of public and cultural spaces in the community. Schools are also places where intergenerational relations occur, connecting children with elders who attended the same schools’ decades earlier and have unique knowledge of their community’s history.

School closures also decrease available shelters for emergency response and recovery, aid distribution, voting centers, and health clinics.77 In the period after Hurricane María, there were not sufficient schools to accommodate people who lost their homes. The number of schools being used as housing also required that the Department of Education begin the school year months after the hurricane.78

A critical consequence of school closures has been the deterioration of massive mural paintings made by famous Puerto Rican painters. During the ‘60s, Dr. Ricardo Alegría, Director of the Institute of Puerto Rican Culture (ICP) under the government of Luis Muñoz Marín, created a public program for artworks situated

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Rubiano, “Puerto Rico’s Public School Closures; Community Effects and Future Paths.”

in educational institutions around the island. The murals, mosaics, and sculptures have become part of the country’s artistic heritage. An example is “El Río Grande de Loíza,” the mural by Puerto Rican painter José Antonio Torres Martinó (Figure 37), inspired the poem by Julia de Burgos. Therefore, the closure of almost 673 schools is a threat to important pieces of Puerto Rican heritage, including the loss of generations of school design that possess historical and architectural significance.

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Figure 35. Ariel Bierbaum, Conceptual Framework for understanding the diverse types of value that schools provide to communities. Source: Shifting Landscapes of Power and Privilege: School Closures and Uneven Development in Philadelphia (PhD diss., University of California, Berkeley, 2016), pg. 58.

Figure 37. Destroyed mural of famous Puerto Rican painter José Antonio Torres Martínó, 2018. Source: Puerto Rico Art News.
1.4 Site of Intervention: Washington Irving School

The *Washington Irving Graded School*, built in 1903, is a one-story, C-shaped, Neoclassical building, brick, and masonry with a flat concrete roof and four-classrooms (Figure 40). It is the oldest school constructed in Adjuntas and one of the earliest schoolhouses on the island,\(^8^0\) the first institutional facility in the municipality built after the American colonization in 1898 (Figure 38). Unfortunately, it suffered severe destruction caused by the 1918 San Fermín earthquake. By 1919, a seismic building retrofit had been carried out under the direction of Adrian C. Finlayson, chief architect of the Public Buildings Division of the Insular Department of the Interior. The work involved the addition of anchors to the brick masonry cracks and reinforcement of columns in all the classrooms.\(^8^1\)

During the 1940s, an annex was added for bathrooms on the south façade of the historic structure. At the same time, two stand-alone, Art-Deco-style concrete buildings were constructed to accommodate one-story classrooms and a bell tower. In the 1970s, another school complex was built within the grounds of the *Irving School* (Figure 39). Twelve buildings were constructed in concrete and placed

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across the mountainous landscape east of the historic building. They are distant from the original building and primarily oriented towards the north of the site (Figure 42).82

Despite these alterations, the resource retains its main character-defining elements and physical integrity. The school was nominated to the National Register of Historic Places in 2015 due to its significance relative to the thematic designation of Early Twentieth Century Schools in Puerto Rico, a nomination sponsored by the Oficina Estatal de Conservación Histórica (OECH), the State Historic Preservation Office (SHPO).83 The school closed in 2016, but some structures within the complex are still in use. Casa Pueblo acquired ownership of the original building and the 1940s building in 2015 through a partnership between the organization and the school principal, representing the Department of Education (Figure 41).84 Five of the 1970s buildings are still owned by the municipality of Adjuntas and operated as part of a Head Start program. The rest of the complex is also owned by the municipality and is not in use, which provides an opportunity for an intervention to expand the current programming from Casa Pueblo and transform the complex into a “solar campus” for the future rural revitalization of Adjuntas.

84 Hillary Morales Robles, Interview with Alexis Massol-González in December 2021.
Figure 38. Site Map of Adjuntas. Source: National Register of Historic Places Nomination, 2015.

Figure 40. Washington Irving Graded School as agricultural school, 1903. Source: National Register of Historic Places Nomination, 2015.

Figure 41. Current condition of Washington Irving School, 2022. Source: Personal Photograph.
Figure 42. Aerial Perspective of the town of Adjuntas Puerto Rico. It shows the spatial and topographic relationships of the Law of Indies town planning and the early 20th century public school. Source: Drawn by Author.
Figure 43. Patrick McGrath Muñiz, Diasporamus, 2018, oil on canvas. Source: Pasatiempo.
The second stage in reimagining sustainable futures is looking at the “push” or the pressures or current trends that are pushing us towards particular futures.

Puerto Ricans live in a continuous debt and austerity system from decades ago, which made Puerto Rico exponentially more vulnerable to the hurricane María disaster in 2017. The post-disaster scenarios proposed in Puerto Rico revealed two different visions for the island’s future. One vision is rooted in “disaster capitalism,” defined by Naomi Klein as what “occurs when private interests descend on a particular region in the wake of major destabilizing events, such as war, government upheaval, and natural disaster.” Foreign real estate investors and entrepreneurs with blockchain and cryptocurrency wealth viewed the drastic population loss as a window of opportunity to construct a new “Puertopia” and transform the island into a “visitor economy” (Figure 44). Naomi Klein interviewed one “Puertopian”, the British real estate developer Keith St. Clair who moved to Puerto Rico to take

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advantage of the tax breaks and start investments in the hotel industry. After establishing relationships with the governor in turn, Clair shared his conversations:

> “And I said, ‘I’m gonna double down, I’m gonna triple down, I’m gonna quadruple down, because I believe in Puerto Rico.’” Looking out at the virtually empty Isla Verde Beach in front of one of his San Juan hotels (“a 90 percent tax-exempt property”), he predicted, “This could be Miami, South Beach. … That’s what we are trying to create.”

For Puerto Rican citizens, however, Hurricane María became the new teacher, revealing tragic disparities, injustices, and vulnerabilities in facing the adverse impacts of climate change. Their goal is to transform communities through collective sovereignty over their land, energy, food, water, and other essential systems for survival.

While the present of Puerto Rico projects a future of despair, there is hope in looking at past and current collective efforts of resistance and autonomy. There have always been countless efforts carried out by grassroots and community level organizations that challenge the system through transformative resistance paradigms, including valuable knowledge inherited from previous generations.

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87 Naomi Klein and Lauren Feeney, “Puerto Ricans and Ultrarich ‘Puertopians’.”
Figure 44. 2022 anti-gentrification protests in Old San Juan posters of crypto millionaires Brock Pierce and Logan Paul. “This is what our colonizers look like”. Source: New York Times.
2.1 Taíno: Indigenous Knowledge about Climate

In recent studies of climate change, there has been an increased appreciation for the value of indigenous knowledge in understanding and responding to the environment, climate, and disasters. Traditional Ecological Knowledge (TEK) is vastly different from other scientific methodologies, since it evolves from generations of observation and experience related to climate, cultural behaviors, population patterns, adaptation, and utilization of natural resources. The Cherokee and environmental scientist Dr. Samantha Chisholm Hatfield describes TEK as “a base that is incomparable in terms of the depth, breadth, and holistic perspectives that it provides for a given ecosystem.”

Puerto Ricans or Boricuas, refers to a native person born in Puerto Rico, have always been carriers of Traditional Ecological Knowledge (TEK) related to disasters and their impacts, tracing back to the Taíno. The word hurricane has its root in the Taíno word Juracán. Juracán was a minor deity in Taíno mythology, ordered by the goddess Guabancex, the Supreme storm deity known as the lady of the winds. She was depicted with her face in the center with her arms moving clockwise, as the

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90 Hatfield, “The Importance of Traditional Ecological Knowledge.”
winds move in hurricane systems. Taínos understood the behavior of these catastrophic systems, and their knowledge has become part of our current meteorological understanding and symbols (Figure 45, Figure 46). Chronicles of the Spanish colonizers mention how Taínos could foresee catastrophes three days in advance by observing the behavior of animals and specific aspects of the environment, such as the:

- hazy atmosphere, the red aspect of the sun, a dull, rumbling, subterranean sound, the stars shining through a kind of mist which made them look larger, the Norwest [sic?] horizon heavily clouded, a strong-smelling emanation from the sea, a heavy swell with calm weather, and sudden changes of the wind from east to west.\(^91\)

Thus, TEK is crucial in the context of Puerto Rico; Taínos have made valuable contributions to climate and disaster knowledge and must be acknowledged in present conversations about reimagining suitable futures on the island. For an island territory with limited land, scarce resources, and the inability to recover quickly in the face of frequent and detrimental exposure to climate impacts, Taíno Traditional Ecological Knowledge offers essential strategies for combatting environmental crises and implementing mitigation solutions.

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Figure 45. Depiction of Juracán with "S" Shaped Arms Representing the Direction of the Winds, and the Face as the Eye of the Phenomenon. Source: Powhatan Museum.

Figure 46. Contemporary Meteorological Representation of Hurricanes, diagram.
2.2 *Jibaro and Tormenteras: Hurricane Shelter Construction*

In the early 1900s, disaster management structures emerged in rural areas of Puerto Rico. Archetypal structures known as *tormenteras* or *barracas* were “temporary” solutions constructed by the Puerto Rican *jibaro* adjacent to their houses and farmlands. They were small, semi-underground structures with high-pitched roofs made of wood, palm thatch, zinc panels, or other discarded materials and reinforced with knots or nails to withstand strong winds and rain. Entire families inhabited these hurricane shelters to pass the night, which also stored essential goods such as canned foods, candles, kerosene lanterns and stoves, as well as materials and tools for rebuilding.92

After the ambitious 1950s Puerto Rico modernization project called *Operation Bootstrap*, that put an end to the economic agrarian era to an economic industrial era in Puerto Rico, new variations of the *tormenteras* evolved in more permanent materials such as concrete (Figure 47, Figure 48). The *tormenteras* or *barracas* demonstrate the benefits of vernacular or traditional architectural responses to disaster. With low cost, locally-sourced materials and low-tech, time-efficient

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92 Ingrid A. Olivo (Columbia University, 2015), 208.
construction, they are ideal for post-disaster recovery and reconstruction. In designing for contemporary pre or post disasters interventions, this existing vernacular construction knowledge offers two critical lessons.

First, utilizing existing construction knowledge and locally sourced materials offers locals self-determination and autonomy. It enables locals to have the ability to repair, replace, and reconstruct in post-disaster contexts. One example is the Primary School in Gando by Francis Keré (Figure 70). The project’s success can be attributed to the close involvement of the local villagers in the construction process and the fact that the architect is a member of the community. Traditionally, members of a whole village community work together to build and repair homes in rural Burkina Faso. In keeping with this cultural practice, low-tech and sustainable techniques were developed and improved, so that the Gando villagers could participate in the process and provide autonomy for future maintenance or restoration needs.

Similarly, the construction of Tuskegee University Campus in Alabama over – years in the 20th century was carried out by Black students from the Architecture department (Figure 74). The students learned how to make brick using the locally sourced soils and to use them in masonry construction, while gaining a sense of pride as being involved in the process of building their own academic environment.
Second, vernacular architecture offers a sense of familiarity and memory. Japanese architects such as Atelier Bow-Bow, Toyo Ito, and Sou Fujimoto were part of housing reconstruction after the 2011’s great east Japan earthquake (Figure 78, Figure 79). The designers adopted vernacular construction built with minimum cost using local resources. Comparably, at Quinta Monroy in Chile, Alejandro Aravena understood the importance of expanding their homes to the community’s self-determination (Figure 71) and designed a supporting framework that allows self-construction. These projects were successful because the design adopted spatial conditions familiar to the local population and preserved the values and memory of the place. Familiarity is extraordinarily important in post-disaster scenarios, providing a sense of belonging and safety for those who experienced loss.

In conclusion, understanding the values of vernacular architecture is the most sustainable model in future disaster scenarios. The use of existing construction knowledge, locally-sourced materials, and familiar spatial configurations provides a sense of belonging, provides self-determination and increases populations’ opportunities to survive and recover at a higher rate.
Figure 47. Tormentera, 1928. Source: Library of Congress Collection.
Figure 48. Tormentera located in Morovis, Puerto Rico, 2012. Source: Lugares Históricos Abandonados en Puerto Rico.
2.3 Transformative Resistance as a Model of Self-Governance

Traditional Ecological Knowledge about climate from the Tainos and the construction of tormenteras by Jibaros reflects a continuum of knowledge that has been passed down through generations. Similarly, Puerto Rican culture has inherited resistance as a catalyst to create change. As noted in the section on "Anti-Colonial Movements" in the previous chapter, resistance is manifested in Puerto Rican culture through the folk music of plena or national art like the engravings of Lorenzo Homar and Rafael Tufiño. It is also evident in the development of numerous political organizations fighting for Puerto Rican nationalism or grassroots organizations advocating for human rights and environmental justice. This resistance becomes visible on a national scale when Puerto Ricans from the island and diaspora unite and go to the streets in demands for justice, like in the events from summer of 2019. While resistance has served as a vehicle to fight against oppression and injustice, in order to enact change in Puerto Rico, it must propose solutions for the future, it needs to be transformative.
In my recent conversations with Alexis Massol-González, he described “transformative resistance” as a proactive model of change that integrates science, culture, and community. Transformative resistance relies upon the power of community efforts in self-governance projects. These projects focus on finding sustainable solutions the communities’ current needs. Alexis believes that there are currently two different realities present in Puerto Rico: that of the government and that of the communities (Figure 49, Figure 50). The former is a reality prescribed and imposed by the colonial government that benefits from disaster capitalism, as described in the introduction of this chapter. The latter is a succession of small projects that create what Massol-Gonzalez calls the “ladder of self-governance.”

These self-governance models are unique to the place and it is difficult to visualize how they will play out in the future, since they are in constant processes of change and innovation. However, by looking at how these organizations have explored and implemented tactics over decades, there is no doubt about their effectiveness. Casa Pueblo and other grassroots organizations such as Brigada Solidaria del Oeste and Rayo de Luna have successfully achieved sensitive and democratic management of resources for their surrounding communities.

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93 Hillary Morales Robles, Interviews with Alexis Massol-González on December 2021.
94 Interviews with Alexis Massol-González on December 2021.
Brigada Solidaria del Oeste, or Solidary Brigade of the West, is a non-profit organization comprised of various groups on the island’s west coast. In the aftermath of Hurricane María, they created the Finca Solidaria, a coalition of farmers that donated their land to harvest crops and distribute food to the surrounding communities. The hurricane taught them the value of agriculture for self-sustainability and food security. Rayo de Luna, another non-profit organization, united forces with Brigada Solidaria to install a water storage and filtration tower in an elementary school to provide potable water for drinking and sanitation serving children and nearby residents.95

Figure 49. Two current parallel realities in Puerto Rico, diagram. Source: Drawn by Author.

Figure 50. Alexis Massol-González and Tinti Deyá, Founders of the Non-Profit Organization Casa Pueblo in Adjuntas, Puerto Rico. Source: Casa Pueblo.
2.4 Grassroots Case Study: Casa Pueblo

In the last four decades, Casa Pueblo’s short and long-term projects have built upon an overarching vision of developing “self-sustaining initiatives” to achieve community self-governance. To appreciate how Casa Pueblo developed into a model of community governance, the following is a summary of its history, context, and evolution with emphasis on architectural and preservation interventions throughout different phases of their growth.

There are three phases in Casa Pueblo’s development, described in the book Casa Pueblo: A Puerto Rican Model of Self-Governance as: Chronicles of an anti-mining campaign (1980-1995); A territorial approach to water and forests (1996-2017); and Self-sustainability with a planetary agenda (2017-present).\textsuperscript{96} The interventions flourished because they aligned with the mission and strategic operations at the time.

Figure 51. Panoramic of the urban area of Adjuntas and solar panels installation projects. Pink circles mark solar projects carried out by community self-management, blue circles for government facilities, red circles for the Red Cross and yellow circles for independent facilities. Source: Casa Pueblo.

“We look at crisis as an opportunity to change.”

-Dr. Alexis Massol-González, Casa Pueblo Founder
Figure 52. Regional Map of Casa Pueblo location nearby the highest three major forest lands of Guilarte in the southwest, La Olimpia in the south, and People’s Forest in the east. Source: Map Adapted by Author.
A. Anti-Mining Campaign & Birth of Community Autonomy

*Casa Pueblo* is a community self-management organization that began as the *Arts and Culture Workshop of Adjuntas* in 1980 (Figure 53). The Workshop was inspired by the environmental movement of the 1960s, with a framework that advocated for the protection of non-renewable resources and against environmental colonialism, US companies profiting from land exploitation and extraction of natural resources while causing environmental destruction.97 The *Arts and Culture Workshop* was started by Mrs. Tinti Deyá Díaz, who passed away recently, and the civil engineer Alexis Massol González, who remains as leader with an exemplary corps of volunteers.

While forming alliances with the community and carrying out the anti-mining campaign, the organization decided to establish a “social territory” through the acquisition, preservation, and restoration of an old Spanish *casona* located near the historic town center, which became their headquarters in 1985.98 The anti-mining campaign and the preservation of the old house supported an extensive network of anti-colonial groups such as *Misión Industrial, Movimiento Pro Independencia*,

Partido Independentista Puertorriqueño, Vanguardia Popular, and the Liga Socialista Puertorriqueña, among others. These political groups were fighting with a larger national agenda for the independence of Puerto Rico that aligned with Casa Pueblo’s environmental campaign. In addition to the antimining campaign, significant protests carried out in the first fifteen years included: the clearance of asbestos in all public schools in Adjuntas and removing the US Navy from the neighboring island of Vieques. Furthermore, they advocated for the repatriation of a Taíno monolith called the Sun of Adjuntas and placed it in the central public plaza as a historic monument and created a sustainable economic model for coffee production agriculture called Madre Isla and focused on reinforcing community gatherings to address their needs.

100 Hillary Morales Robles, Interviews with Alexis Massol-González in December 2021 and March 2022.
1980 1995
Casa Pueblo Organization Begins
First Phase

1988-1990
Café Madre Isla
Protest Against Landfill in Tanamá River

1991
Casa Pueblo Acquisition & Restoration
of Old Casona

1995
Antimining Campaign Victory

1996
Casa Pueblo Second Phase

Antimining Protest and Birth of Community Autonomy
Figure 53. Diagram series of first phase of Casa Pueblo evolution from 1980 to 1995. Source: Drawn by Author.
B. Forest Water and Land Protection: Protest Evolution by Promoting Sustainable Alternatives

After fifteen years of struggle, Casa Pueblo achieved a great victory, forcing the government to discard the mining project. Its actions evolved from protest to proposal in 1996, when the *Bosque del Pueblo*, the proposed mining area, became the first forest reserve in Puerto Rico managed by a community institution in agreement with the Department of Natural Resources. Recognizing these achievements, in 2002, Alexis Massol and Casa Pueblo were awarded the 2002 Goldman International Prize, equivalent to the Nobel Prize for the environment.¹⁰¹

From 1996 to 2017 (Figure 54), Casa Pueblo focused on forest land and water protection, creating educational models, workshops, and programs associated with biodiversity and culture. In addition, they continued a strategic initiative to achieve legal protection and community management of *Bosque La Olimpia* and the creation of Puerto Rico’s first biological corridor connecting five forests: Guilarte, La Olimpia, and the People’s Forest in Adjuntas; Tres Picachos in Jayuya; and Toro Negro in Villalba. They developed the Forest Schools, an afterschool program that teaches kids how to protect forest land and agriculture (Figure 52).

¹⁰¹ Hillary Morales Robles, Interview with Alexis Massol-González in December 2021.
In the 1990s, the Washington Irving School was closed due to the presence of asbestos. Casa Pueblo partnered with the school principal, took on the challenge of asbestos removal and reused the building as the Biodiversity and Culture Community Institute. Another major transformation was the alteration of the school façade facing Casa Pueblo’s headquarters, removing the gate dividing both properties and building a bridge to connect the gap. The direct connection between buildings allowed students to build relationships with the organization and learn about the value of coffee manufacturing. Additionally, Casa Pueblo constructed a radio station, WOQI 1020 AM, and a butterfly farm, further descriptions of their programs are discussed in the next chapter.
Bosque del Pueblo
Protection & Community-Based Management

Butterfly Farm
Indigenous Ceremonial Land Retrieval

School Rehabilitation as Biodiversity & Culture Community Illustrator

Bosque La Olimpia
Protection & Ecological Corridor Law

Forest School as National Model in Puerto Rico

Forest, Water, & Land Protection
Projected Evolution by Promoting Sustenance Alternatives
Figure 54. Diagram series of second phase of Casa Pueblo evolution from 1996 to 2017. Source: Drawn by Author.
C. Sustainable Local Development with Global Agenda:

The Solar Insurrection

Beginning in 2017, the organization has taken the lead in focusing on infrastructure modernization projects in the town of Adjuntas—a “solar insurrection” with local business owners to transition to solar energy, and help to protect the local economy and services from future disasters (Figure 51, Figure 55). They also have helped low-income and elderly neighbors install solar panels in their homes with a vision of creating an independent energy cooperative. At this moment in 2022, they have finalized the construction of a “solar park,” four solar-paneled posts, which will feed surrounding houses.

They also learned the value of strengthening an international network. Casa Pueblo knew the impact of their work had reached international spheres, aligning with other islands and nations to fight for autonomy and self-governance. By the end of 2021, they acquired a new property and renovated it into housing for researchers or artists-in-residence, currently hosting four young researchers from San Juan, Switzerland, Colombia, and United States. Their contributions will expand

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the legacy of Casa Pueblo in addressing the challenges of agriculture, sustainable economic development, film education, and engineering. These examples are not the only ones; people donate money, instruments, or services at their doors every day.\textsuperscript{103}

Since its closure in 2016, the Washington Irving School has a new use. The classroom was renovated as a “solar movie theater” where the community gathers to watch free films and documentaries and attend classes on film and other topics. The other three classrooms are: a science laboratory for researchers, graduate students, and scientists that offers free access to technological tools such as computers, desks, and the internet; the Community School of Music of Casa Pueblo, with instruments for students interested in music, a choir, and a community band; and an art gallery Joaquín Parrilla. Antonio Martorell is in charge of that space renovation; he covered the existing brick masonry walls with painted wood panels that have intentional perforations revealing the historic construction materials as evidence of the building’s evolution. In addition to the four 1903 classrooms, Casa Pueblo owns one structure from the 1940s with administrative offices and storage spaces.\textsuperscript{104}

\textsuperscript{103} Hillary Morales Robles, Interview with Alexis Massol-González in December 2021.
\textsuperscript{104} Hillary Morales Robles, Interview with Alexis Massol-González in December 2021 and March 2022.
Butterfly Farm
Solar Oasis
Sustainable Local Development with Global Agenda
The Solar Insurrection

2007
2008
2011-2016
2017
2019-2020
2021
2022

Bosque del Pueblo Protection & Community Based Management
Radio Casa Pueblo WOQI 1020 AM
Hurricane Maria & 2020 Earthquake
Protests Gas Pipeline
International Forestry & Cultural Agreements
Protests Sea Pier with International Freighter & Cultural Agreements
Sustainable Local Development with Global Agenda
The Solar Insurrection

Radio Casa Pueblo
Adjuntas Solar Oasis
Residence for International Researchers
Solar Forest - Public Park

Energy System Modernization
Adjuntas Solar Oasis
Adjuntas Solar Oasis
Solar Panel Installation to their buildings & for nearby residences
First house with solar power in Adjuntas

Radio Casa Pueblo
Butterfly Farm
Solar Oasis
Classroom Transformation
Solar Theater
Solar Panel Installation to their buildings & for nearby residences
First house with solar power in Adjuntas

Radio Casa Pueblo
Residence for International Researchers
Solar Forest - Public Park
Adjuntas Solar Oasis
Solar Panel Installation to their buildings & for nearby residences
First house with solar power in Adjuntas

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Figure 55. Diagram series of third phase of Casa Pueblo evolution from 2017 to present.
2.5 The Nature of Disaster Management

Although tainos and other local cultures have demonstrated extraordinary wisdom in combating disasters, it is imperative to place ourselves in the current national framework of disaster response. FEMA’s *National Disaster Recovery Framework* has defined recovery as a continuum (Figure 56). Delivery of the right post-disaster resources to populations in need can significantly reduce recovery time and cost. The distribution of these resources can occur over short time frames after the disaster (days to months) through Individual Assistance Program (I.A.) housing grants, National Flood Insurance Program (NFIP) insurance payments, Small Business Administration (SBA) home loans, and in a delayed fashion (months to years) through Community Development Block Grant Disaster Recovery (CDBG-DR) rebuilding grants.\(^{105}\)

According to the *Puerto Rico Hurricane María (DR-4339-PR)* report from FEMA, the agency approved 475,317\(^{106}\) applications under the Individual & Households Assistance Program, but these numbers do not reflect those who were approved and underfunded and the 79 percent of denied appeal claims.\(^{107}\) As a

\(^{105}\) “Puerto Rico Hurricane Maria (DR-4339-PR).”

\(^{106}\) Ibid.

\(^{107}\) Bonilla and LeBrón, *Aftershocks of Disaster: Puerto Rico Before and After the Storm.*
result, thousands of Puerto Rican families were living without roofs for months, weeks, and years, revealing the vulnerabilities and inequalities of colonial disaster assistance and recovery measures. In the article titled *Authenticating Loss and Contesting Recovery*, Sarah Molinari describes some of the factors that contributed to the failures of FEMA in Puerto Rico: pre-storm understaffing, lack of Spanish-speaking workers, inability to deliver water and other essential resources, and big contracts let to inexperienced contractors.\(^{108}\)

American psychologist Abraham Maslow proposed a theory that humans have five needs for self-actualization. Among the five, three of them are considered disaster survival requirements: physiological (food and sleep), safety (shelter, water, warmth, and protection from injuries), and social (social interaction and trust) (Figure 57). Maslow’s hierarchy of needs can be applied to the prioritization of disaster response: if the recovery process is prolonged, it increases the levels of urgency and agony. In the context of Puerto Rico, the post-disaster living conditions lasted for months and included (Figure 58):

\(^{108}\) Molinari, “Authenticating Loss and Contesting Recovery”.

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• no electricity

• no electricity affects food and medicine refrigeration needs

• food scarcity due to crop loss and ports closure (Jones Act)

• no potable water

• no accessible health services due to overcapacity in hospitals

• dependency on gas to feed cars and electric generators

• no road access due to flooding, landslides and fallen infrastructure such as trees

• car dependency on resources access

• no communication caused by the destruction of cell towers

• no financial access to banks and unequal distribution of aid assistance

• no flights available due to inoperable airports and massive inflation of flight tickets

• damaged homes (FEMA tarps) and limited shelter availability (coliseums, schools, and community centers) (Figure 59)

The aftershocks listed above are just some of the challenges experienced by Puerto Ricans. The main takeaway while these circumstances are experienced one at a time, they are interconnected issues and can compound the impact.

Since the government failed to meet primary needs for disaster survival, people in the community and grassroots organizations became the first responders
for aid assistance. Their role was critical, since some remote municipalities were completely isolated for weeks without assistance.

*Casa Pueblo’s* leader Alexis Massol-González described how the hurricane was a learning lesson. While committed to sustainable self-governance, Casa Pueblo’s did not anticipate that its headquarters in the old rose-colored Spanish *casona* could have been transformed into an oasis for the community. After the hurricane, they were the only place in Adjuntas with solar-powered electricity and this energy independence allowed them to “coordinate and provide direct and immediate assistance to communities”.109 They could refrigerate medicine and food and assist the elderly that required ventilators, oxygen, and diuresis. *Casa Pueblo* transformed one classroom of the Washington Irving School into a solar movie theater that provided entertainment for families. They could not offer shelter, so they prioritized social and mental needs and health services assistance.110

Another essential resource was communications. *Casa Pueblo’s* radio station was the only operating tower in the town, allowing neighbors to communicate with their families, emergency assistance providers, and their relatives living in the

---

United States. Communications with relatives living in the diaspora became one of the most powerful forces of change and survival in the aftermath and one of the main lessons learned from the hurricane. The vital role of the diaspora in bringing resources to the island was needed in the aftermath. Casa Pueblo as a mediator between the community and the diaspora facilitated the acquisition of solar-powered mini-refrigerators to store medicine for patients and the elderly and solar-powered bulbs for every neighbor (Figure 60, Figure 61).

Solar power transformed the town’s energy landscape to provide food security, health, and communication services, among other essential services. The hurricane taught them that the next step in the ladder for community autonomy resides in “solar insurrection”. “Solar insurrection” is the transformation of the energy model for community empowerment and achieve their resiliency through the education of solar energy systems. Ultimately, they are committed for the democratization of resources in Puerto Rico.

Figure 56. FEMA, Recovery continuum and federal recovery programmes. Source: FEMA.

Figure 57. Prioritization of needs for disaster survivors based on Maslow’s Hierarchy of Needs. Source: Grit Magazine.
The Aftershocks of Disasters

Car Dependency  Landslides  Electricity  Health  Crop Loss  Death
Stranded Island  Flooding  Refrigeration Needs  Financial Access & Aid  Food Scarcity  Housing Crisis
Jones Act  Fallen Infrastructure  Gas  Communications  Potable Water  Loss & Safety

“*A disaster is never a singular event, but always an unfolding process.*”
— Yarimar Bonilla in *Aftershocks of Disaster*
TYPES OF SHELTERS

Damaged Properties

Coliseums

Schools & Community Centers

FEMA tarps

Figure 59. Current Types of Shelters in Puerto Rico.
Figure 60. Casa Pueblo’s community assembly for solar lamps distribution and solar power education. Source: Scenario Journal.

Figure 61. Casa Pueblo’s radio station WOQI 1020 AM during the aftermath. It was used by the community to communicate with their families and for aid assistance. Source: Scenario Journal.
Figure 62. Rafael Trelles, *Exodus II*, 2000, oil on canvas. Source: Museo de Arte Puerto Rico.
3.0 REIMAGINING RESILIENT FUTURES

What is next? Casa Pueblo has a clear set of values and vision for the present and future of Adjuntas, focusing on sustainable local development through "solar insurrection". This thesis proposes interventions that extend from existing models and programs for autonomy. To envision the future of this place, the proposal tests one scenario for the rehabilitation of the vacant school buildings of the Washington Irving School complex. Providing alternative design scenarios based on existing models will help to embrace the uncertainties of the future.

1. What is pulling us towards particular futures?
2. What are the compelling images of the future?
3. Are there competing images of the future?\textsuperscript{113}

3.1 Expanding the Seeds of Autonomy

This thesis proposes the future scenario of a decolonial, autonomous, self-governed community in which Casa Pueblo transforms into a solar campus with two core programs. The first, a “solar campus”, is a workshop-school for the training of building trades, particularly those related to renewable energy systems. The workshop-school model recalls the origins of Casa Pueblo in the 1980s as the *Arts and Culture Workshop of Adjuntas*. The second program transforms the campus transformation in time of emergency. Both scenarios build upon the idea of sustainable and democratic management of locally-sourced and locally-produced resources such as electricity, food, communications, and other essential services (Figure 63).

The achievements resulting from their “self-sustaining initiatives” are a process considered “sowing the seeds of hope” (Figure 64). The seeds or self-sustaining projects are diverse as they serve different missions and functions at a given time (Figure 65). They operate differently based on their present use circumstances or as alternative programs in emergency contexts (Figure 66). The seeds of autonomy can work independently, but together as a network, they hold an incredible power to effect change. The current and emergency uses of the seeds based on their building inventory are the following (Figure 67, Figure 68):
1. Casa Pueblo headquarters:

The old casona is the heart of the organization and community assembly. Also, it serves as a gallery exhibiting its history, ongoing projects, and available services to visitors. Additionally, it contains an artisanal shop that sells handicrafts from artisans and their coffee Madre Isla. Finally, in the case of an emergency context, it remains as the community center to provide health services, aid distribution, and food storage.

2. Washington Irving School (original building):

The four classrooms follow science, arts, and cultural programs such as an art gallery, research, music classes, and a solar movie theater. These programs transform into entertainment activities to satisfy psychological needs in an emergency scenario.

3. WIS 1940's art deco building:

It functions as an administrative office and storage space.

4. Butterfly Farm:

It serves as an educational activity to learn about biodiversity.

5. Radio Casa Pueblo WOQI AM 1020:

The radio station is an instrument to share to an audience their ongoing and future projects and to perform a call for action at times of resistance.
It is also the space that recognizes the efforts of the organization’s contributors. In post-Hurricane María, it was the only form of communication to reach families and request aid.

6. Researcher’s Residence:

The residence is a new housing program to accommodate local and international researchers exploring topics associated with Casa Pueblo’s interests of the future. Despite being new, it has the opportunity to become a shelter or to bring external experts in post-disaster circumstances.

7. Solar Forest:

The solar public park is generating locally-sourced energy that feeds surrounding houses. In the future can be expanded throughout the campus grounds to expand the micro grid.

An extensive network of professionals has enhanced the success of Casa Pueblo through the Scientific and Technical Commission of Casa Pueblo (Figure 69), professionals from different industries and academic settings from the University of Puerto Rico and other institutions in the United States. Some of them give free courses to the youth or take on specific projects. In the context of this proposal, the network of professionals could become vital contributors to the preservation, reuse, and development of the existing school infrastructure and to help in the capacity building of the proposed new programs.
To design for a future post-disaster scenario in Adjuntas, I studied several contemporary case studies of self-organizing movements and autonomy, including architecture and adaptive reuse interventions that leverage expertise as a designer, rural revitalization, value of local knowledge in trades, and educational frameworks of liberation. The case studies collected are the following:

- Francis Kéré’s Primary School in Gando (Figure 70).
- Alejandro Aravena’s Quinta Monroy in Chile (Figure 71).
- The Zapatista Movement in Chiapas, Mexico (Figure 72).
- Xu Tiantian’s Architectural Acupuncture as a Driver for Progress in Rural China (Figure 73).
- Tuskegee University Campus Construction history (Figure 74).
- CLEA Latinoamerica’s Collective Classroom in Ecuador (Figure 75).
- Raum labor’s Schools of Tomorrow in Germany (Figure 76).
- Liliane Wong’s Host Structure Types (Figure 77).
- Toyo Ito, Sou Fujimoto, Akihisa Hirata, and Kuniko Inui’s House for All in Japan (Figure 78).
- Atelier Bow-Bow’s Itakura Core House in Japan (Figure 79).
Figure 63. Proposed expansion of current program for the adaptive reuse of vacant buildings.
Figure 64. Casa Pueblo’s Headquarters as the core.

Figure 65. Casa Pueblo’s Current Seeds of Autonomy.
Figure 66. Emergency Response Program Adapted from Existing Programming.
<table>
<thead>
<tr>
<th>BUILDING</th>
<th>STORIES</th>
<th>SPACES</th>
<th>MATERIAL</th>
<th>USE</th>
<th>STYLE</th>
<th>YEAR</th>
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</thead>
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<td>4</td>
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<td>classrooms; auditorium; bathrooms</td>
<td>neoclassical</td>
<td>1903/1919/1940/2000s/2010s</td>
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<td>2</td>
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<td>kitchen; food hall</td>
<td>art deco</td>
<td>1940</td>
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<td>modern</td>
<td>1970</td>
</tr>
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<td>2</td>
<td>concrete</td>
<td>classrooms</td>
<td>modern</td>
<td>1970</td>
</tr>
<tr>
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<td>1</td>
<td>3</td>
<td>concrete</td>
<td>classrooms</td>
<td>modern</td>
<td>1970</td>
</tr>
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<td>modern</td>
<td>1970</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>4*</td>
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<td>administrative; bathrooms</td>
<td>modern</td>
<td>1970</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>5</td>
<td>concrete</td>
<td>classrooms</td>
<td>modern</td>
<td>1970</td>
</tr>
<tr>
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<td>1</td>
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<td>classroom</td>
<td>modern</td>
<td>1970</td>
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<tr>
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<td>1</td>
<td>2</td>
<td>wood; zinc</td>
<td>classrooms</td>
<td>modern</td>
<td>1970</td>
</tr>
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<td>1</td>
<td>3</td>
<td>concrete</td>
<td>classrooms</td>
<td>modern</td>
<td>1970</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>2</td>
<td>wood; zinc</td>
<td>classrooms</td>
<td>modern</td>
<td>1970</td>
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<td>14</td>
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<td>concrete</td>
<td>classroom; storage</td>
<td>modern</td>
<td>1970</td>
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<td>15</td>
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<td>1</td>
<td>steel; zinc</td>
<td>basketball court</td>
<td>modern</td>
<td>1970</td>
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<td>16</td>
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<td>6</td>
<td>concrete</td>
<td>classrooms</td>
<td>modern</td>
<td>1970</td>
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<td>concrete; wood</td>
<td>community center housing</td>
<td>colonial</td>
<td>1930</td>
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<td>steel; glass</td>
<td>butterfly farm</td>
<td>vernacular</td>
<td>2001</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>4</td>
<td>wood; zinc</td>
<td>radio station</td>
<td>vernacular</td>
<td>1930/2008</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>2</td>
<td>concrete; wood; zinc</td>
<td>housing</td>
<td>vernacular</td>
<td>1940*</td>
</tr>
</tbody>
</table>

**total classrooms = 37**

Figure 67. Building Inventory.

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Figure 68. Building Inventory Axonometric.
Figure 69. Social Actors Map.
Figure 70. Francis Keré. *Primary School in Gando*, 2001. Gando, Burkina Faso. Source: ArchDaily.

Figure 71. Alejandro Aravena. *Quinta Monroy*, 2003. Iquique, Chile. Source: ArchDaily.
Figure 72. The Zapatista Movement in Chiapas, Mexico. Source: “People without Faces”. Youtube.

Figure 73. Xu Tiantian, DnA, The Sonyang Story: Architectural Acupuncture as Driver for Progress in Rural China, 2018. Source: The Architectural Review.
Figure 74. Tuskegee University, *Brick Masonry Class*, 1928. Source: Tuskegee University.

Figure 75. CLEA Latinoamerica, *Collective Classroom*, 2016, Canoa, Ecuador. Source: Taller Social Latinoamericano.
Figure 76. Raumlabor, *Schools of Tomorrow*, 2018, Berlin, Germany. Source: Raumlabor.


3.2 Land and Building Use

The land and buildings of the Washington Irving School Complex have different ownership (Figure 80). Casa Pueblo’s six structures include the Casa Pueblo’s headquarters, the researchers house, the radio station, butterfly farm, the 1903 historic structure of the Washington Irving School, and the 1940 school building for administrative offices.

The Municipality of Adjuntas owns fourteen out of the sixteen school buildings. From the fourteen, only five have been rehabilitated and operate as the municipal “Head Start” program, an early education program for young children from low-income families. These five buildings are placed in the boundary of Casa Pueblo and is demarcated with a wall that divides the site. The remaining nine structures are abandoned. Some are in good condition, but those built in wood or with exposed structure are in fair condition (Figure 81).
Figure 80. Land Ownership and Buildings Use.

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Period</th>
<th>Current Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Municipality of Adjuntas</td>
<td>1970 Zone, Vacant</td>
</tr>
<tr>
<td>B</td>
<td>Municipality of Adjuntas</td>
<td>1970 Zone, Municipal Head Start</td>
</tr>
<tr>
<td>C</td>
<td>Casa Pueblo</td>
<td>1903 + 1940 Zone, Organization Headquarters</td>
</tr>
</tbody>
</table>
Figure 81. Diagram series of site evolution timeline from 1903 to 1980. Source: Drawn by Author.
3.3 Character-Defining Elements

*The Secretary of the Interior’s Standards for the Treatment of Historic Properties* describes the character-defining elements as the “visual aspects and physical features” that comprise the distinctive character of an existing or historic building.\(^\text{114}\) The character-defining elements for the Washington Irving School complex are the identification of visual aspects present in the design and evolution of 20th century public school buildings as an aid to preserving their character. Public schools’ evolution throughout the 20th century in Puerto Rico shows signs of shared character and identity defined by their aesthetic and physical elements. Despite the variations of plan typology, architectural styles, and construction materials, the school buildings have common aspects that are present in rural and urban school building types. In particular, the character-defining elements of the Washington Irving School buildings are:

1. Low Density:

   One or two stories high, which do not impose in relation to the monumental landscape (Figure 82).

---

2. Massing Orientation:

All the buildings follow an organic relationship with the landscape. The buildings are orientated facing north, which does not align with the site’s boundaries (Figure 83). Its orientation responds to passive design principles to minimize solar heat gain and maximize natural ventilation coming predominantly from the trade winds in the northeast.

3. Fragmented Hosts or Fragmented Existing Infrastructure:

The school complex is comprised of multiple, stand-alone buildings separated from each other (Figure 84).

4. Ground as Connector:

The ground serves as the connector between buildings (Figure 85).

5. Horizontal Massing and Symmetry:

The massing is predominantly horizontal and symmetrical (Figure 86).

6. Horizontal Articulations:

Flat roofs which project from the main façade and row of window placements cast strong shadows and reinforce the horizontal character of the massing (Figure 87).

7. Envelope Fenestrations:

The typical buildings’ structure consists of concrete short columns and beams, which in between, allows the use of different variations of infill
materials. Also, it enables the placement of operable windows and doors for natural ventilation and light entrance (Figure 88).

8. Cellular Classrooms:

The dimensions of all classrooms fit similar class size, width, length, and height (Figure 89).

9. Economic Use of Materials and Ornamentation:

buildings were constructed with minimal ornamentation and simple materials for the structure, infill, and operable elements. For example, the structural open frame with reinforced concrete, infill with concrete blocks, bricks, or wood, and operable aluminum windows and doors (Figure 90).
Figure 82. Low Density.
Massing Orientation

Figure 83. Massing Orientation.
Figure 84. Fragmented Hosts.
Ground as Connector

Figure 85. Ground as Connector.
Horizontal Massing & Symmetry

Figure 86. Horizontal Massing and Symmetry.
Horizontal Articulations

Figure 87. Horizontal Articulations.
Figure 88. Envelope Fenestrations.
Figure 89. Cellular Classrooms.
Figure 90. Economic Use of Materials.
3.4 General Intervention Analyses

Before discussing the “tactics” for the buildings’ tactical preservation, there are four site analyses that describes the general characteristics for interventions or spatial tactics.

1. Group Hosts:

Liliane Wong’s book Adaptive Reuse: Extending the Lives of Buildings, the author describes the “host” building as “an entity unto itself”, “a thing with defined and independent existence”, an entity that has “its own character.”115 The Washington Irving School complex is comprised of multiple stand-alone buildings disconnected from each other. The proposed new intervention serves as a tactic to group the hosts to unify the complex as a whole (Figure 91).

2. Host Shell:

The large span frame and open plan of the basketball court is considered a shell-type host and offers the opportunity to insert suspended architectural interventions (Figure 92).

3. Additions:

There are two types of additions. One is an independent protective superstructure over the existing roof. The second type expands or accommodates specific uses that will require a second-level or a lateral space (Figure 93).

4. Component Replacement:

Where the existing roof is not adequate, a replacement necessary for the building’s preservation provides an opportunity for a new component (Figure 94).
Figure 91. Group Hosts.

Figure 92. Host Shell.
Figure 93. Additions.

Figure 94. Component Replacement.
3.5 Tactics

The proposed design interventions utilize three tactics for the school complex as a method to group the hosts. The “dimensional classroom” is the DNA existing on the site and can be expanded as a strategy to perform alterations, of maximum, one face of the building’s enclosure. Second, tactics of roof and ground configurations are conditioned to the proposed new use to expand the seeds of autonomy. Lastly, the installation of micro-infrastructure for solar energy generation and water collection, and integrated furniture systems will facilitate the adaptability of the programs.

A. Dimensional Classroom

The proposed intervention for adaptive reuse departs from the dimension of the classroom. This character-defining element from 20th-century public schools shares similarities with the dimensional character of Casa Pueblo’s assembly space. This finding is a significant aspect of tactical preservation, since Casa Pueblo sought these spaces easy to adapt for a range of uses, the “seed” programs, a strategic model of the rehabilitation and connection across the vacant buildings in the site. As seen in Figure 97, the modification of the space translates into the alteration of one façade to provide direct access to the community and bridge the gap between disconnected buildings. As noted earlier, one example of bridging is the alteration of one of the Washington Irving School facades that are now connected directly to Casa Pueblo through a ramp.
B. Roof and Ground

Each roof configuration is conditioned to expand the “seed programming” and address the existing building conditions. The proposed roof design is not focused on based on formal studies, but rather on the relation between interior and exterior spaces (Figure 110, Figure 111). Roofs are the most vulnerable components during a hurricane. For that reason, the proposed roofs are superstructures that do not compromise the existing building, but rather add a protective element (Figure 95, Figure 96).

1. Gallery:

The gallery roof is inspired by vernacular houses with a roof projected from the main façade supported by columns. The seed program is communications from the radio Casa Pueblo; the intervention creates a second level for a new tv station to become an emergency communications center and broadcast Casa Pueblo’s programming to other towns and countries (Figure 98).

2. Independent Superstructure:

The independent superstructure works as an independent protective roof that creates a second level transformed into a greenhouse, creating food security and its distribution to the existing food hall, local farmers, and members of the community in need (Figure 99, Figure 100).

3. New Construction + Seismic Retrofit:
As a formal exploration strategy for potential new construction, the design strategy is based on the CDEs to maintain the scale, and proportions of the complex. The intervention maintains its intended use as a classroom, follows a horizontal massing with an open enclosure that allows the placement of operable devices. The roof is cantilevered and supported by a clerestory of windows (Figure 101).

4. Detached Roof:

The detached roof configuration is similar condition as the previous. A cantilevered roof supported by a clerestory of windows, but instead for new construction, it would be for an existing building (Figure 103).

5. Connective Canopy:

The connective canopy joins two independent buildings with a separate superstructure supported by columns (Figure 105).

6. Broken Pitch:

Two separate angled roofs covering two detached houses which reads like a one broken pitch from a distance. This form offers a variation for the use of a light superstructure that allows the entrance of air from the ceilings and walls. The new use for the two facing buildings is co-working spaces and aid storage (Figure 106).

7. Inhabited Shell:

The host shell’s large span structural frame has suspended two walkways
for inhabitation. The new intervention maintains the host intended use as a sports facility and as an entertainment and aid distribution center (Figure 107, Figure 108).

8. Louvered:

Louvered configuration is for the only two-story school building in the site. It encloses the exposed staircases, so people can mobilize within the building in a disaster. In addition, it provides shade and ventilation access through their openings. The two-story building will become a housing program for researchers (Figure 109).

C. Micro-Infrastructure and Furniture

The smaller interventions are micro-infrastructure and furniture. Micro-scale interventions provide solutions for the generation and storage of essential resources such as water, electricity, food, communications, among others. Water storage systems are connected to the roofs and underground. Solar energy would be generated by the extension of the solar forest. Additionally, mobile furniture systems can adapt the spaces to different uses. For example, mobile furniture of the classrooms can be placed in the exterior to become an outdoor classroom, or in an emergency context, to create space for beds under cover (Figure 102, Figure 104). Another essential furniture is storage walls. Since classrooms are typical, walls dividing them can be transformed into storage walls with cabinets.
Figure 95. Nodes of Emergency Response.
Figure 96. Ground as a Concept for Internal Circulation.
Figure 97. Dimensional Classroom.
Figure 98. Communications Program. Gallery Roof Type.
Figure 99. Food Program. Independent Superstructure Type.

Independent Superstructure

use: head start (current), greenhouse
alternative: food storage and distribution
Figure 100. Interior View of Greenhouse. Independent Superstructure Type.
Figure 101. Classroom Program. New Construction Type.
Figure 102. Interior View of Classroom with Mobile Furniture and Storage Walls.
Figure 103. Classroom Program. Detached Roof Type.
Figure 104. View of Outdoor Classroom.
Figure 105. Classroom Program. Connective Canopy Type.
Figure 106. Co-Working Spaces Program. Broken Pitch Type.
Inhabited Shell

use: athletic court; theater
alternative: aid distribution area

Figure 107. Inhabited Shell Type.
Figure 108. Interior View of Inhabited Shell Type.
Figure 109. Housing Program. Louvered Type.

use: housing for researchers
alternative: housing for assistance workers
Figure 110. Superstructure Types.
Figure 111. Plan Oblique.
CONCLUSION

Tactical preservation of 20th century in public schools in Puerto Rico offers excellent potential to provide community empowerment and address climate emergency, yet is an unexplored area in architectural and preservation design. Most of the post-disaster reconstruction case studies examined in this thesis focused on new construction techniques, or addressed the rehabilitation of vacant public schools, but not in the context of disaster. Building on this design research must become a priority, since island nations and rural territories are experiencing frequent exposure to natural and human catastrophes. To envision a future of survival and self-preservation, preservation design must incorporate a sustainable and equitable approach that considers formal, aesthetic, social, economic, political, and environmental factors in a participatory design processes.

One of the most important learning lessons from this thesis is the value of intergenerational knowledge in communities. Learning from Casa Pueblo wisdom acquired over decades of efforts in strengthening their community and advocating for human rights, nature conservation, and democratization of resources is a legacy that must be protected and continued towards the future of Puerto Rico. In addition, Casa Pueblo and other grassroots opens countless opportunities for contemporary design and the preservation of historic schools. It must be acknowledged that the
preservation of Washington Irving School preservation has relied upon the power of community self-governance and the development of a sustainable and autonomous economic model around agriculture. Their current emphasis on solar insurrection will also influence the expansion of an economic model around renewable energy systems. The potential of this factor in the preservation of historic schools around the island can be significant, though more exploration of alternatives is needed.

This thesis only poses one potential scenario of what the future of the historic public school and Adjuntas might be or would look like. Further explorations of formal approaches, systems thinking, and structural studies must be considered. The adaptive reuse of public schools has the potential to promote community participation and social integration. As I mentioned in the introduction, the end of this research is just the beginning of a long term partnership with Casa Pueblo. The proposal is just a point of departure which the summer design program can use as a tool to connect with a diverse audience in the process of imagining plausible futures.
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