San Juan National Historic Site
Quarter No. 211
Historic Structure Report

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and the San Juan National Historic Site

by

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San Juan National Historic Site
Quarter No. 211
San Juan, Puerto Rico

Historic Structures Report

2016

Approved: _____ 9/9/16

Superintendent, San Juan National Historic Site — Date

Recommended: _____ 9/22/16

Chief, Cultural Resources, Partnerships, and Science Division, Southeast Region — Date

Recommended: _____ 10/4/16

Deputy Regional Director, Southeast Region — Date

Approved: _____ 10/4/16

Regional Director, Southeast Region — Date

Foreword

We are pleased to make available this Historic Structure Report, part of ongoing efforts to provide comprehensive documentation for the historic structures and landscapes of National Park Service units in the Southeast Region. A number of individuals contributed to the successful completion of this work, but we would particularly like to thank Superintendent Walter Chavez, Felix López, and Eric López at the San Juan National Historic Site who assisted with the project by providing relevant documents from park files, logistical assistance, and general editorial review. Special thanks go to Paul Hatchett and Dr. Ali A. Miri, architect, National Park Service Southeast Regional Office, who provided helpful comments as part of their technical review and project oversight. Special thanks also go to the consummate professionals of the firms the Collaborative, inc., Atkinson-Noland & Associates, and Rodd L. Wheaton, Architectural Historian, for their outstanding work and responsiveness to the needs of Quarter No. 211 at San Juan National Historic Site. We hope that this study will prove valuable to park management in ongoing efforts to preserve Quarter No. 211 at San Juan National Historic Site and to everyone in understanding and interpreting its unique history and resources.

Dan Scheidt, Chief of Cultural Resources, Partnerships, and Science Division
Southeast Regional Office
2016

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NOTE:
There can be situations for which additional information from photographs may prove helpful in providing different views of a particular area or condition. To facilitate access to the photographic documentation, the captions for the figures include a reference to sources such as JDF 767. This notation references digital photographs taken by John D Feinberg as provided in their entirety in the Appendix Ten: Digital Photodocumentation. This notation references digital photographs taken by John D Feinberg (JDF) and the number of the photograph. Similarly there are photographs taken by Michael Schuller (MPS), Rodd Wheaton (RW), and Dean Brookie (DB). The primary documentation is provided by the John Feinberg series of photographs. The further information need should be first approached by examining the photographs taken just before and just after the photograph selected and referenced in the caption. Secondarily, additional supplementary views of the desired area or situation will potentially be available in the photographic files of the other three photographers. For select photographs another view may be referenced for viewer consideration.

A summary of the four photographer files and attributes are as follows:
JDF, camera assigned numbers 767-1110, 343 photographs, with captions, contracted documentation.
DB, camera assigned numbers 842-924, 930, and 8501-8503, 91 photographs, uncaptioned
JDF, camera assigned numbers 605-617, 13 photographs, uncaptioned
MPS, camera assigned numbers 9852-9980 and 9835, 129 photographs, uncaptioned
RW, camera assigned numbers 4536-4833, 297 photographs, uncaptioned

The Word documents provided as a part of the final submittal is searchable for key words in the captions.

Management Summary

Administrative Data

Project Identification

"Historic Structures Report Quarter No. 211"

Location Data: San Juan National Historic Park

Commonwealth of Puerto Rico

Project Statement and Purpose

The purpose of this project is to produce a Historic Structures Report (HSR) including: Management Summary; Part 1: Developmental History; Part 2: Ultimate Treatment and Use; Climate Action Plan, as well as measured drawings and photographic documentation meeting HABS standards of the Quarter No. 211. This HSR will serve to guide treatment selection and work recommendations. Presently, Quarter No. 211 is used for the residence of the superintendent and it is expected to continue in this use.

Names, Numbers, and Locational Data

Quarter No. 211 is located adjacent to Castillo San Cristóbal.

The structure and its number on the List of Classified Structures (LCS) follow:

Structure Name	**LCS #**
Quarter No. 211	006074

Inspection Team:

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Rodd Wheaton, Architectural Historian, the Collaborative, inc.
Dean Brookie, Historical Architect, the Collaborative, inc.
Mike Schuller, Structural Engineer, Atkinson Noland & Associates

Executive Summary

This Historic Structures Report was produced for San Juan National Historic Site in support of their ongoing stewardship of Quarter 211, a single-family residence. The park is listed as a UNESCO World Heritage Site, primarily due to its extensive fortifications which include scarps, bastions, Castillo San Cristobal, Castillo San Felipe del Morro ("El Morro"), and Fuerte San Juan de la Cruz ("El Canuelo"). Housing for the military in both the Spanish and American periods was accomplished by barracks within the forts and stand-alone structures such as Quarter No. 211. With the departure of the United States Military in the 1960s, and the change in stewardship to the National Park Service, many of the stand-alone residences were removed. Quarter No. 211 is one of the few remaining.

Quarter No. 211 evolved from a blacksmithing facility to housing for Spanish Military Officers to housing for United States Military officers. In due course it evolved physically as a building and a site by expansion in size through additions, wall height increases, and finishes for the building, and by retaining walls, ornate fence enclosures, gates, paving, plantings, and outdoor gardens. Currently it is used as a single-family residence, occupied by the Superintendent. The Ultimate Treatment recommends its continued use as a residence.

The preparation of this report was completed in compliance with NPS policies and guidelines. The suggested format for an Historic Structures Report per NPS-28 was followed with added emphasis in several areas as agreed, namely sequence of construction, the potential of the earlier blacksmith shop being a part of the now existing building, the developmental history and employing Non-Destructive Testing and Evaluation (NDE) to assist in these determinations in addition to provision of input to the detailed condition assessment.

The Historic Structures Report has been completed by a team consisting of John Feinberg, Architectural Conservator/Architectural Historian, Rodd Wheaton, Architectural Historian, Dean Brookie, Historical Architect, all of the Collaborative inc. and Mike Schuller, Structural Engineer of Atkinson Noland and Associates. Material analyses were performed at the laboratory of Atkinson Noland and associates, and Paint Analysis at the laboratory of the Collaborative, inc. The overall project direction for the National Park Service (COTR) was provided by Dr. Ali Miri, Senior Historical Architect, Cultural Resources Partnership and Science Division, Program Manager, HBCU Program, National Park Service, Southeast Region. The Park representative has been Eric Lopez, Historian.

The developmental history was informed by research in the Park archives, at the Technical Information Center of the Denver Service Center and limited research at the Archives of the Indies in Seville, Spain. Additional visual representations of the building and site were sourced via the Internet, namely: historic paintings, photographs, and postcards. The NDE was able to describe the typologies of walls, floors, and ceilings thereby cataloguing differences in construction for association with the evolution of the

building. The paint analysis likewise assisted in the understanding of the building's evolution.

A need for a blacksmith would have increased with the significant construction associated with the last third of the 18th century. First possible indications of a building on this approximate site appear as a vague representation of a building in the 1790s, a time when most of the construction was in the last stages. The appearance and size of the building for blacksmith use is unknown. What might have been features of such a use—hearth, chimney, coal storage area—were not in evidence. References to the use of the building during the 19th century indicate occupation by members of the Spanish Military. Most of the windows in the original main block were sized originally as doors thereby allowing access to the rooms arranged around the perimeter of the interior of the building. During this period any cooking facilities would have been located either in the courtyard or in a common mess off-site. With the opening up of the hitherto enclosed city in 1897 by removal of the fortifications adjacent to the site of Quarter No. 211, this building site was now in central view of the traffic moving into and out of the city. From the exterior view the building was altered in size and in attention to exterior details and finishes. Additional alterations after the United States occupation on October 18, 1898, were completion of the house to its current size and the evolution of the house from use as a duplex to a single unit.

Summary of Conditions Assessment and Key Treatments

1. Site: replace the wooden staircase, replace the guardrail at the southwest entry stairs, provide major repairs to the north retaining wall shared with Quarter No. 210, small repairs to the concrete fence.
2. Roofing: Repairs to the north courtyard fired clay tile roofs of replacement of broken and cracked tiles, replacement of the roof and roofing of the north entry door (#7). Miscellaneous drain inlet upgrades.
3. Wall stucco: repair of cracks at the northwest and southeast corners (including masonry substrate), cosmetic repairs of other cracks, protection of top of west elevation cornice.
4. Seismic: upgrades to the parapets for enhanced resistance
5. Concrete walls: major repairs to the south porch concrete support columns and the laundry room wall.
6. Windows: Significant deterioration of lower portions of many windows, repair or replace (not historic)
7. Interior finishes: repair cosmetic cracks and areas of previous leakage damage to plaster and paint.
8. Future Research: Back of east wall drainage system, existence and condition?

PART 1—DEVELOPMENTAL HISTORY

A. Historical Background and Context

El Morro, strategically located on the west tip of San Juan Island was the primary defense of the port of San Juan. Its initial construction replaced La Fortaleza begun in 1537. Ill placed to defend the port, La Fortaleza became the fortified governor's residence in 1544. The early fortifications of El Morro succumbed to the English attack of 1598 when San Juan and its harbor were taken. Following the withdrawal of the English, rebuilding included repairs and strengthening of the existing fortification walls of El Morro, which survived the siege and destruction of the city. Again, as a result of the Dutch invasion of 1625, El Morro was substantially improved. The construction of the Santa Bárbara Battery over earlier defense works improved the firepower of the fortification.

By far the largest reconstruction projects were the continuing improvements through the last half of the eighteenth century that included the rehabilitation construction of Castillo San Cristóbal and El Morro with their outlying defenses. The endeavors were ordered by the Spanish Sovereign, Charles III, following the report submitted by Alexander O'Reilly, Inspector General of Cuba. O'Reilly arrived in San Juan in 1765 and with Chief of Engineers of San Juan, Thomas O'Daly, planned the improvements that would make San Juan a "Defense of the First Order." Construction was not completed until the early 1790s under the direction of Juan Francisco Mestre in 1781 following the death of O'Daly.

The reconstruction of the fortifications of San Juan included not only El Morro and Castillo San Cristóbal, but also those further east, such as San Gerónimo, begun in 1646. It was rebuilt along with San Antonio at the Boquerón Inlet drawbridge separating San Juan Island from the mainland. Both were associated with Castillo San Cristóbal and the defense of the land approach to the city. To the west of the peninsula, directly across the entrance into the bay, El Cañuelo, begun in 1660, was reinforced to enhance its cross-fire power.

The long-term defense system of San Juan also included the construction of the city walls protecting the settlement that was established 1519-1521 on San Juan Island between the Atlantic Ocean and San Juan Bay. Though the original settlement began in 1508 with the arrival of Ponce de Leon and a group of colonists, the location was relocated to the more defensible island. The island had the natural barrier of the Atlantic Coast to the north. A section of city wall was built along the bay after the Dutch invasion of 1625. However, the construction project begun in 1766 ultimately completed the city wall system between the two forts at the west and east ends of the island. During this construction period the city wall along the Atlantic exposure was also completed. At the end of the eighteenth century, San Juan, by Royal decree, became a major Spanish port as well as a naval station and depot to protect commerce of the Antilles and ultimately the Spanish interests within the Caribbean. Thus, San Juan formed a strategic part of the Spanish defenses of

its trade routes in direct response to the need to deter the English, Dutch, and French incursions in the Caribbean. At the end of the century, the defense system of San Juan was fully tested in 1797 when the English Fleet and proposed invasion successfully was deterred (The Forts of San Juan and Puerto Rico and the Forts of Old San Juan).

As part of the construction program of the late eighteenth century, it appears that a decision was made to build a blacksmith shop below the west walls of Castillo de San Cristóbal. The location of the construction probably assured the fire and subsequent heat were outside the walls. Two maps of the era help establish an approximate date for the building, now identified as Quarter No. 211. A city and island map completed by Juan Francisco Mestre, dated 1783, appears to suggest the Santiago Gate Guardhouse, but no structure on the site of Quarter No. 211. A subsequent "Plano de Situación de la Plaza de San Juan de Puerto Rico" map of 1792, also by Mestre, indicates a building on the site appropriately related to what became Norzagaray Street, the Plaza Colón, and below the south gate of Castillo San Cristóbal. The block is unidentified in the accompanying map key. Therefore, the assumption is that the initial construction phase of Quarter No. 211 was certainly before 1792, possibly circa 1790 and after 1783 (1783 and 1792 maps from SAJU archives).

It would appear that Quarter No. 211 was documented by French artist Augusto Pleé during his visit to Puerto Rico 1821-1823. Pleé completed a sketch of Castillo San Cristóbal showing the buildings around the Plaza de Armas and some representation, presumably, of the Santiago Gate Guardhouse. The sketch appears to be looking northeast. On the west glacis, a minimal representation of buildings is present. A copy of a panoramic view to the north of San Juan from the bay also is possibly by Pleé. The watercolor painting seems to suggest that the sketch may have been a preliminary drawing for the larger view. A photocopy of the painting shows what may be the blacksmith shop on the fort's glacis directly above the one-story guardhouse. Both are shown as flat roofed building blocks (Pleé book and watercolor print).

The presence of the building on the west glacis of Castillo San Cristóbal is represented in a model located in the lobby of the San Cristóbal Visitor Center. This model, attributed to Don Manuel Sicardo, is reportedly based on a model of San Cristóbal. now located in the Museo del Ejército de Madrid in Madrid, Spain. According to the reverse description of the model on a modern postcard, the original model, which may be the one actually pictured, was commissioned by royal decree in 1835, though there has been discussion placing the construction of the model in the early 1840s. What is certain is that the model postdates 1830 when construction was begun on the municipal theater building south of the Plaza Colón. Comparison of the postcard view of a model and that in the lobby of the visitor center indicates that the latter appears to be a simplified version of that in the postcard. Nevertheless, the depiction of what is now Quarter No. 211 is similar. Each is a depiction of a flat roofed building with simple openings and built on the slope of Norzagaray Street. To the north of the building along the street are two small cottages and a larger structure near the ramp leading up to the Main Gate. These possibly represent the beginnings of Quarters Nos. 210 and 209.

An 1897 map delineated the intentional breach of the city walls to facilitate population expansion and provide for enhanced access. The changes included the demolition of the Santiago Gate, Ravelin, and Bastion of the historic Castillo de San Cristóbal. The new streets were designed to extend through the demolished southeast section of the fortifications to the east (A. S. Sepúlveda, pp. 240-241). Below the south elevations of Quarter No. 211 and the remaining core of San Cristóbal, San Francisco Street, north of Plaza Colón, extends east to Avenida Muñoz Rivera approximately through the site of the old city's Santiago Gate. South of the plaza, Fortaleza Street merges with Avenida Ponce de Leon/Avenida de la Constitucion, and extends east through the site of Santiago Ravelin. Both avenues outside the walls lead through Puerta de Tierra to the eastern end of San Juan Island.

Directly above the site of Quarter No. 211 is the remnant of the South Gate and ramp that leads up to the main level of Castillo de San Cristóbal. The South Gate opens into the Plaza de Armas at its south end adjacent to the one-story arcaded west officer's quarters set on an arcaded lower level above the west glacis. This structure extends north to the Main Gate accessed by a wide arced-plan ramp from the upper reach of Norzagaray Street. The two-story east barracks with its rooftop cavalier and the north rampart curtain and its terreplein define the triangular-shaped Plaza de Armas, begun as a redoubt in 1634 to protect the eastern land approach to the city of San Juan. This weakness in securing the city had aided the Dutch invasion of San Juan in 1625. A full reconstruction of Castillo de San Cristóbal was accomplished 1766-1783. The fortification included a main North Battery with terreplein-topped walls extending to the south Santiago Bastion near the shore of San Juan Bay. The battered scarps facing east overlooked the Great Moat. Beyond the moat were two major ravelins and a counterguard. To the north are the San Carlos Ravelin and Trinidad Counterguard. To the south was the Santiago Ravelin through which passed access from the Santiago Gate, the primary land access of San Juan. The structures are separated from low outworks by a narrower moat. Beyond the northern San Carlos Ravelin is a series of batteries and outworks that extend to the easternmost La Princesa Battery, all overlooking the Atlantic Coast. Below the eastern outworks is the broad, open expanse of the south and east glacises.

Quarter No. 211 was identified on the 1897 map. Demolition for the street extension was completed in the waning years of Spanish rule of Puerto Rico. The outline of the building shown on the plan is indicated as a rectangular plan with an ell-shaped east wing. Unlike Quarters Nos. 210 and 209 to the north, Quarter No. 211 is identified specifically as, "Pabellones de Artillería y Herrería Viejos." As translated, the notation refers to "Pavilions of Artillery," probably referencing the synonym "barracks," and identifies the former use as the "Old Smithy, or Blacksmith." The reference directly established the then current use and the former use of the building that at the west abuts Norzagaray Street.

Data and Approach

The three sources of data evaluated for the Development History each informed the resultant data and approach. The archival research provided both text and graphics in the form of plans, which indicated the likely locations in changes in materials assisting in the evaluation of the non-destructive testing results. The nondestructive testing (NDE) was

completed without the guidance of the research, that is, if the research indicated the east wing walls in 1900 were shorter in height for the northerly portion than today, the SPR research was not directed to this area. Instead the SPR results found the change in materials of brick/stone masonry below and concrete above, thereby independently corroborating the other research findings.

The plan graphics were significantly increased in number and impact by the addition of historic photographs sourced by Rodd Wheaton. These were found in private collections and placed for sale on eBay and consisted of photographs and photographic representations on postcards. Some of the latter were colorized versions of black and white photographs. Also accessed on public sale sites was historic artwork. Such artwork has difficulties: the Quarter No. 211 building is not the subject of the work, the building is likely to be a background building, as a background building it is unlikely to be as detailed as a focal building in the foreground, and the artist is likely to have taken some "artistic license" in the representation. In contrast, historic photographs are true depictions of the subject. Historic photographs have difficulties as well: foreground elements can obscure the subject building, the building may be out of focus, and the sun angle combined with the exposure may leave portions of a building in deep dark shadow and other portions washed out by bright reflectivity.

The earliest photography of Old San Juan found was from the 1880s. The earliest information on the configurations of Quarter No. 211, prior to the 1890s photographs presented herein, are the historic plans. However, the plans have their own difficulties for the researcher. By example most of the historic plans are of the entire peninsula of San Juan and are more focused on the overall layout of streets and configuration of the fortifications rather than on a small building. Quarter No. 211 in these early plans is often drawn in a representative manner. Dimensions are approximate, as is the location of the building on the site and relation to adjacent structures. "Roughly square" in plan view was the term selected for use in the report to describe the building's geometry depicted in most of the early plans. Later plans tended to appear more accurate, as based upon the scaled overall dimensions in the historic plan matching portions of the existing building, such as the length of the south elevation or depth of the building. Each plan's representation of the building was assessed for likely accuracy and results described in the text.

The primary non-destructive testing methods that can inform historic research are paint analysis and radar; both surface penetrating radar (SPR) and ground penetrating radar (GPR). The paint analysis results are dependent on the sample having a complete record of coatings. For Quarter No. 211, the exterior paint samples were generally incomplete leading to the conclusion that the exterior coating systems had been comprehensively redone in some locations. The expectation for complete records is that the number of layers would be the same for portions of the building of a single period, with fewer layers for later periods.

The GPR results indicated the floors' concrete slabs characteristics: thickness, presence of reinforcement, and reinforcement spacing in each direction. The slab results are found

in the Structural Analysis and indicate different typologies. The summary chart of these results is found in this section on Developmental History as well. The field analysis also searched for any areas under the slab indicative of a previous foundation of now non-existent walls. None were found. The surface penetrating radar (SPR) evaluated the materials of the walls and ceiling/roof and extent of each material. The differences between concrete and masonry are more reliably discerned than the differences between a tight masonry wall and loose masonry wall. The differences in materials are indicated on elevations of the building set forth both in the Structural Analysis and in this Developmental History.

One other nondestructive testing procedure was used to try to find differences in the plane of wall surfaces. Oblique light was played over the surfaces of each darkened room. A slight shadow was found in the dining room (room 106) consistent with the height of a picture mold. The height above floor level of this slight change in plane could be associated with repairs of the surface associated with installation of electrical conduit in the wall's surface, or more importance to the history of the building the extension in the height of the walls.

Chronology of Development and Use

The sources for information about the timeline history of the development of Quarter No. 211 have come from historic research and from on-site investigation.

Historic Research

The files at the Denver Service Center (DSC) Technical Information Center (TIC) of the National Park Service (NPS) were consulted and pertinent other documents were accessed. The archives at San Juan National Historic Site (SAJU) were reviewed for pertinent information by Felix López (NPS San Juan National Historic Site Facility Manager), Eric López (NPS San Juan National Historic Site Historian), and Rodd L. Wheaton (Chief Architectural Historian of TCI). Information in the files of the United States Army Corps of Engineers for Fort Brooke and of the National Archives in New York, Atlanta, and Maryland were sourced. For these files, finding aids were received and reviewed for possibly relevant information. In addition, the NPS files in Atlanta for Quarter No. 211 were searched under the overview of Dr. Ali Miri of the Southeast Regional Office, though most had been sent to the Atlanta National Archives and are inaccessible. Milagros Flores, retired NPS historian, was contacted to assist in tracking locations of the results of her pertinent research and other possible archival sources to examine. John Feinberg and Sarah Feinberg performed a key word search for portions of the files for the Park resources at the Archive of the Indies in Seville, Spain.

In addition, Rodd Wheaton examined the available historic photographs from the online Rodríguez Archives and sourced historic photographs, stereo photographs, and prints (lithographs, etchings, and the like). Historic postcards, stereographs prints, and books were purchased through eBay.com on the Internet. The Internet research and purchases thereby expanded the available views of Quarter No. 211. The documents of most importance were primarily from the SAJU archives and were historic map views, the majority from the Spanish Period.

Field Research

The radar evaluation was able to detect differences in the masonry, i.e., tight stone and loose stone. It was able to detect the concrete materials underlying the plaster and stucco and provide information on relative age given the presence of metal reinforcing and its patterns. The changes in these materials were visible in both vertical scans and horizontal scans. For example, the vertical scans indicated the presence of a new roof structure of concrete, built in multiple phases and extending in some places down the walls. Concrete in-fill was found below certain windows indicating their shortening from full height doors typical of San Juan architecture. Horizontal scans indicated changes in substrate likely associated with different phases of construction such as additions. Importantly, the joints in the existing masonry correspond to the visual documentation (primarily plans and historic photographs) as detailed in the timeline.

Paint analysis of the exterior perimeter balustrade, the exterior face of the building walls, and various wall surfaces of the interior provided further information on the history of the structure. In essence, the paint analysis was looking for similarities and differences in the exterior paint sample layers and the same considerations for the interior samples. Exterior colors are also reflected in the visual documentation and written documentation.

Field research included examination of other extant buildings both within the park and in the context of the city of Old San Juan for similarity in building details, window and door configuration, and balustrade details for comparison with Quarter No. 211. Similar details of the balustrade and particularly the west elevation decorative treatments of Quarter No. 211 were successfully found in Old San Juan relating to the residence.

All of this information was assembled and evaluated for confirmation across multiple sources. By example, a dated historic photograph from 1897 shows the building in the same plan configuration as shown on a map from 1880. Historic photographs of Quarter No. 211 typically had the building partially obscured by foreground elements as it was not typically the subject of the photography. In addition, early photography in San Juan, pre-1890s, was rare. For the nineteenth century, most of the information on the building's configuration was derived from historic maps.

In the following section, the observed changes are tied to the historic documentation including graphics, photographs, and written documents. The observed features and changes are as follows:

1. Site definition, moving from no definition to a retaining wall containing a flat terrace, ultimately included a perimeter balustrade on the south and west boundaries set on the retaining wall, the boundaries forming the south garden. Additional retaining walls are at the north and east boundaries forming the north courtyard.
2. The site balustrade is seen to go through several variations, from pickets between concrete piers (columns) of uniform height on top of a retaining wall to pickets replaced by concrete balusters, to the same configuration on a stepped height (southeast) retaining wall.

3. The entry gates evolved from closely spaced wood pickets to recent solid boards.
4. The building plan geometry grew in stages from a roughly square plan to a rectangular plan. It was elongated to the east with multiple additions including ultimately an ell-shaped wing. These changes in size and layout are fully discussed in the following timeline and illustrated in the evolutionary plan.
5. The height of the parapets and wing walls increased in the late 1890s and continued around the building with the additions of the 1930s.
6. A south elevation porch evolved from wood to concrete in the 1930s, now with open sides enclosed by screens.
7. The west elevation window openings were shortened by a concrete infill panel or spandrel under the west elevation street window sills. Masonry was similarly used as infill in many other locations. Some of these window openings may have acted as entry door locations particularly along the north elevation. Note that there are no photographs of the north elevation and documentation of changes comes from materials analysis and use analysis.
8. Based upon photographs and the paint analysis, the colors of the exterior walls and the balustrade have changed over time.
9. Major changes in the last 50 years subdivided the bathroom, opened up the breakfast dining area to the kitchen, and added a roofed entryway area at the northeast door.

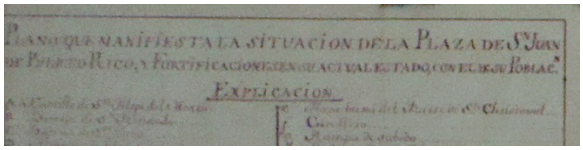
NOTE:
The site of Quarter No. 211 appears to have evolved from the grassy slope of the west glacis of Castillo de San Cristóbal. In order to be able to construct any significant buildings, flat ground was required, and accomplished principally by retaining walls. The oldest retaining wall is adjacent to the entrance of the tunnel and decorated with classical features with a spired parapet. Retaining walls on the north and east sides of the site are principally constructed of stone masonry and the exact dates of construction are not known. It is possible that the west end of the site was sufficiently flat to enable preparation of the building site for the very first phase of construction. In the historic photographs, beginning in the 1890s, the site is further contained and the west and south sides by retaining walls. There is evidence in the earliest photographs of what appears to be a wood picket fence extending from the east end of the south retaining wall. Photographs from the 1890s show piers or columns on top of the retaining wall with a balustrade between the piers composed of what appears to be steel pickets. This fence was later replaced by a concrete balustrade between the same pier locations. Later still, the piers or columns were extended in height as was the retaining wall for the five easternmost sections of the south wall in a stepped fashion. As the concrete balustrade has been the feature with the longest documentation of 100+ years, the report will refer to this feature as a "balustrade" instead of a "fence."

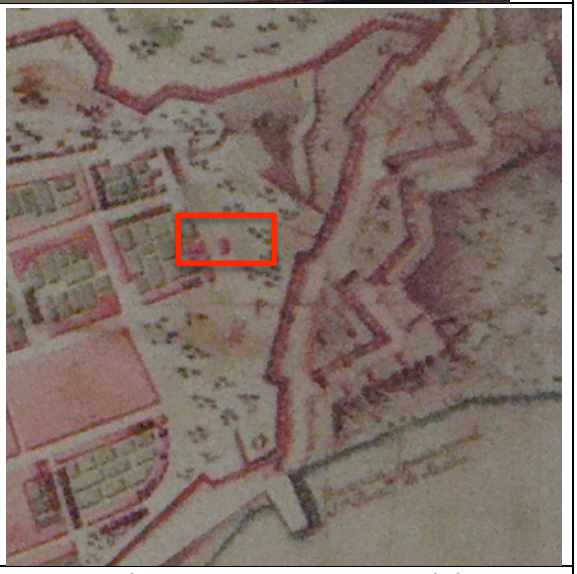
B. Chronology of Development and Use

Time Periods Showing Evidence of the Evolution of Quarter No. 211

Figure 1: Time Period: 1792





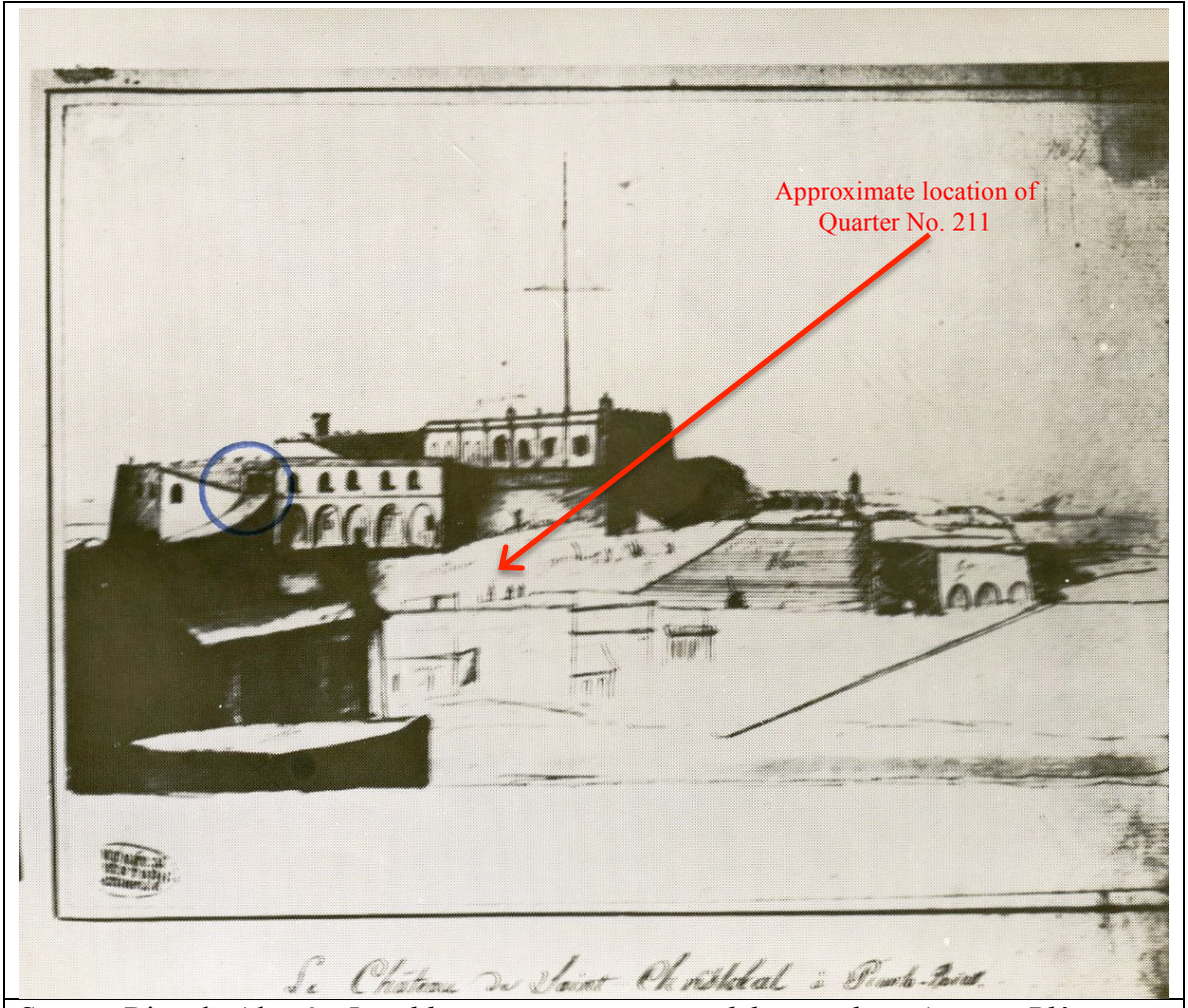


Source: "Plano de San Juan de Puerto Rico," Juan Francisco Mestre, 1783. Servicio Histórico Militar de Madrid. Upper image is scaled down full view; bottom left is close-up view of the title block; bottom right is close-up view of the structure now called Quarter No. 211. Copy located at SAJU Archives.

Shown: “Plano de Situación de la Plaza de San Juan Bautista de Puerto Rico,” 1792 (Juan Francisco Mestre), Servicio Histórico Militar de Madrid. Copy located at SAJU Archives: KD, 3.47

The 1783 map shows a building near the site of Quarter No. 211, though it is more likely the guardhouse south of the Santiago Gate. However, the 1792 map of San Juan shows a square-plan block on the site of Quarter No. 211. It is shown somewhat north of the extended line of San Francisco Street and abutting the minimal representation of what is now Norzagaray Street. The street provided connection with what became Plaza Colón opposite the Santiago Gate and uphill to the arced ramp to the Main Gate of Castillo San Cristóbal near the north city wall in the latter part of the nineteenth century. Before Norzagaray Street was completed along the north rampart, connecting San Cristóbal with El Morro, San Sebastian Street provided the most direct access west from the entrance ramp.

Figure 2: Time Period: 1821-1823



Source: Ricardo Alegría, *Los dibujos puertorriqueños del naturalista Augusto Plée (1821-1823)*. San Juan, Puerto Rico: Revista del Instituto de Cultura Puertorriqueña, No. 6 Julio-Septiembre, 1975.

The "Le Chateau de Saint Cristóbal, Puerto Rico" drawing is by Frenchman Augusto Pleé, who visited Puerto Rico in 1821-1823. It shows some indications of buildings on the west glacis of Castillo San Cristóbal. It is not discernible as to what is depicted except that possibly there may be building on the location of Quarter No. 211. This enlarged San Cristóbal view possibly may be a preliminary sketch for the following watercolor painting of the view of San Juan from the bay (unknown artist) relating the painting as having been by Pleé. (The later-added blue circle is embedded in the copy of the image.)

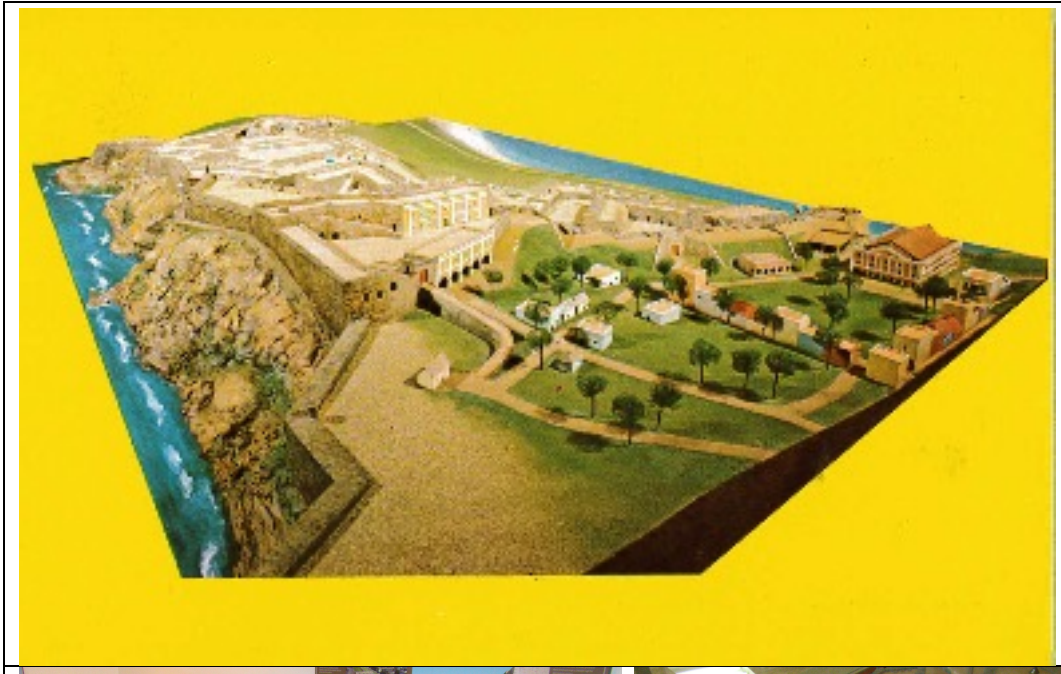




Source: Photocopy of original painting of San Juan from the bay sold by Historical Findings (Highlands Ranch, Colorado) through eBay, January 2016; owner of painting unknown. Photocopy of listing made by Rodd L. Wheaton.

This is an unattributed and untitled panoramic watercolor painting of San Juan as viewed from San Juan Bay. Though the seller suggested that the original painting was from 1824, it appears to be more closely associated with French artist Augusto Pleé, who visited Puerto Rico 1821-1823, as noted above. The view shows El Morro at the left and Castillo San Cristóbal on the right. (A companion watercolor painting panoramic view shows San Cristóbal from the east looking west.) The view from the bay is certainly before 1830 when construction began on the Municipal Theater located between Plaza Colón and the bay. The enlargement of the Castillo San Cristóbal section does show a building, somewhat near the location of Quarter No. 211. It can be seen on the fort's west glacis located behind and above the historic guardhouse of the now-demolished Santiago Gate.

Figure 3: Time Period: 1835-1840s







Detail showing location of Quarter No. 211.

Source of top view: Postcard owned by Rodd L. Wheaton. Lower photographic views courtesy of Park Historian Eric López.

The existing scale model of Castillo San Cristóbal on display in the Visitor Center at San Cristóbal shows a flat roofed, block-like building on the site of Quarter No. 211. Reportedly the construction of the scale model was based on a similar model commissioned by royal decree and located in the Museo del Ejército de Madrid, Madrid, Spain. Discussion varies as to whether the early 1840s date attributed to the original model is correct. However, the postcard view dates the "Militar" model to 1835. Each model indicates additional buildings extending north on Norzagaray Street, though they bear little resemblance to the existing buildings north of Quarter No. 211. Thus, the forms of the buildings may be anecdotal.

Of note, a sketch view of Castillo San Cristóbal on pages 62-63 of the *Official National Park Handbook, The Forts of Old San Juan,* published by the National Park Service, shows a gabled roof structure on the site of Quarter No. 211. Credit for the view is given to The New York Public Library. A similar view showing a gabled roof structure and an east wing is on display among the exhibits located in San Cristóbal.

Figure 4: Time Period: 1861



"h" on the building, on the site of Quarter No. 211, is listed above as "Edificio de fortificación."

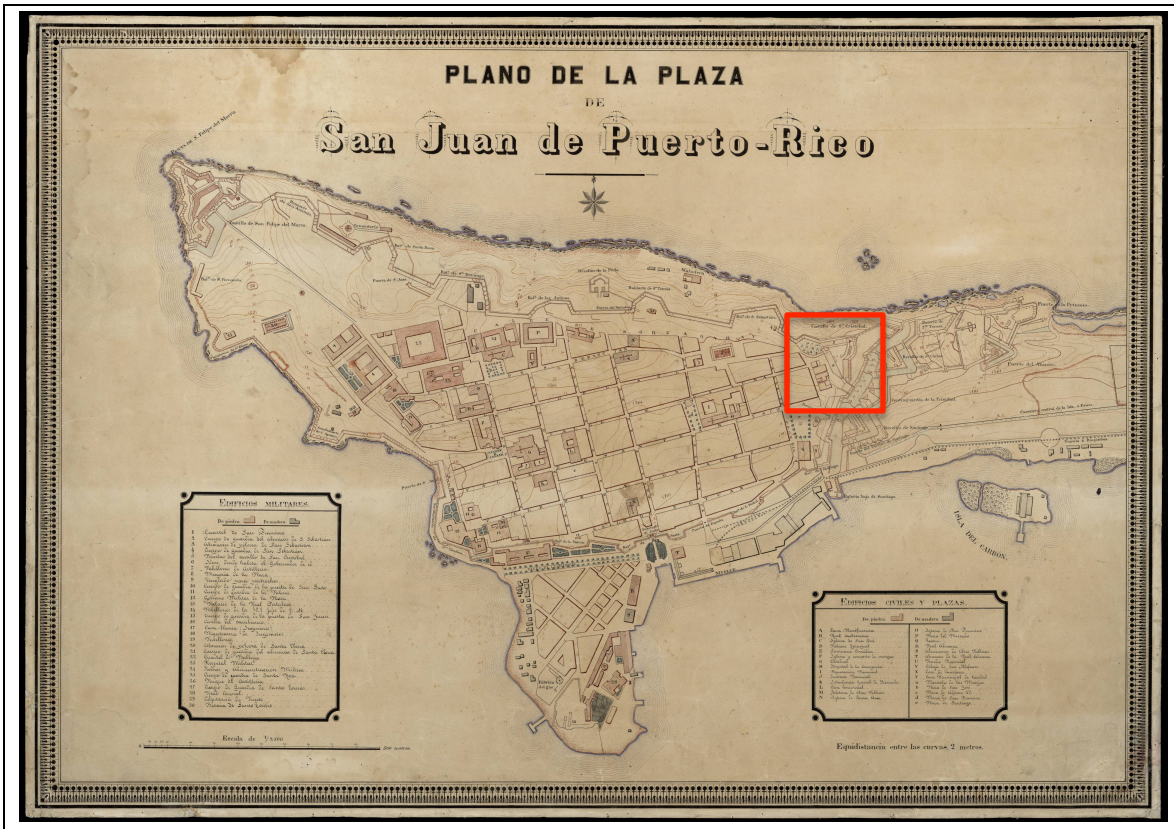
Source: "Plano de la Plaza, San Juan Bautista, Puerto Rico," 1861, Manuel J. Castro; copy at SAJU Archives, Me, APA, OMT. No. 60.

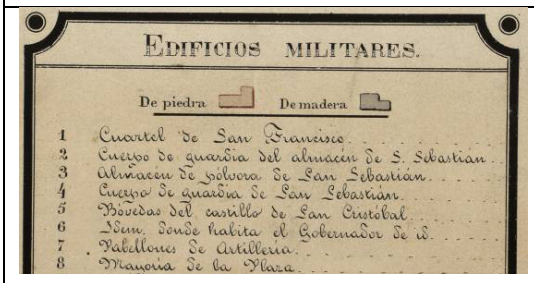
This 1861 map of San Juan and its fortifications shows representations of all four existing Norzagaray Street buildings indicating the development on the west glacis of Castillo San Cristóbal. The sites of Buildings Nos. 210 and 209 are colored gray and are indicated in the above key as artillery barracks. Quarter No. 211, indicated as a roughly square block

plan, “Edificio de fortificación,” (fortification building) is shown extending to the north boundary of the site and with a large open courtyard at the east. Depicted is a tunnel extending from the northeast corner of the courtyard underground to the Great Moat and Santiago Ravelin. This tunnel is now truncated by the post-1897 construction of what is now Avenue Muñoz Rivera extending San Francisco Street east from Plaza Colón. Though not shown on this map, the tunnel also branched to extend into Castillo San Cristóbal under the lesser South Gate ramp. The tunnel system entrance remains in the rear courtyard of Quarter No. 211 at the angled northeast corner.

The two neighboring buildings’ use as barracks is clearly stated. The title for 211 of “Fortification Building” does not describe a use; it is not informative. If it was used as a barracks, the legend would so state. Perhaps the building was used for storage, something non-specific.

Figure 5: Time Period: 1880





No. 7 in the key designates that the row of buildings are "Pabellones de Artillería …" (Pavilions for Artillery). The "Military Buildings" are indicated as being constructed of stone.

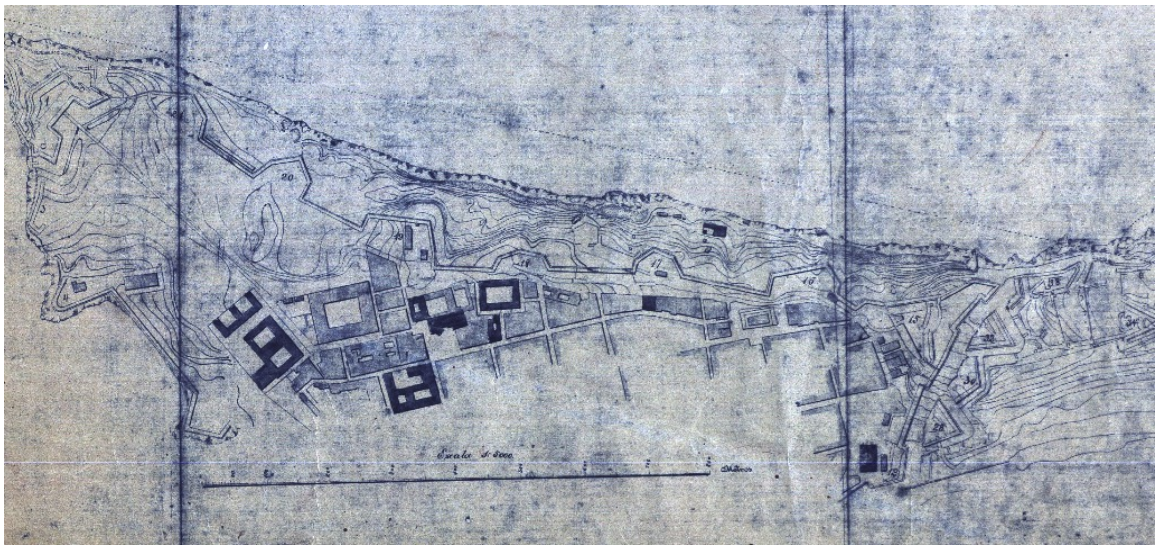


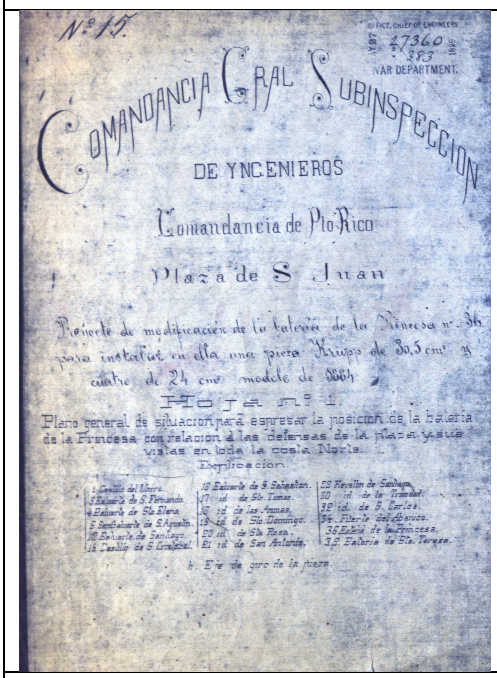
Source: "Plano de la Plaza de San Juan de Puerto Rico," assumed to be from the 1880s. Copy on file SAJU Archives, C2-62 BIS.

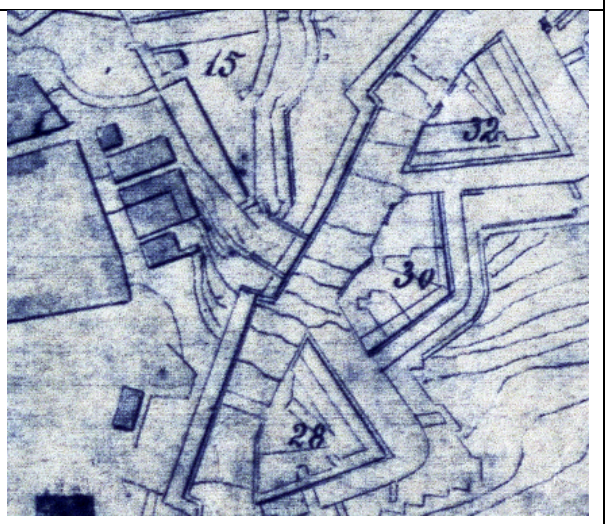
This map, probably dating from 1880, shows Quarter No. 211 as a roughly square block plan with an east wing extension terminating at the southeast corner. The drawing shows distances representationally. Note the distance between the north building wall and the north boundary retaining wall is very short; smaller than actual. The wing extension is

represented physically on Quarter No. 211 by the change in masonry type to the east of the main block existing living room. The east wing certainly contained the southeast bedroom and a portion of the existing breakfast dining area. The east wing is likely to have opened up onto the east and north courtyard. The plan views do not indicate whether the walls are full height, partial height, or non-existent.

Figure 6: Time Period: 1884







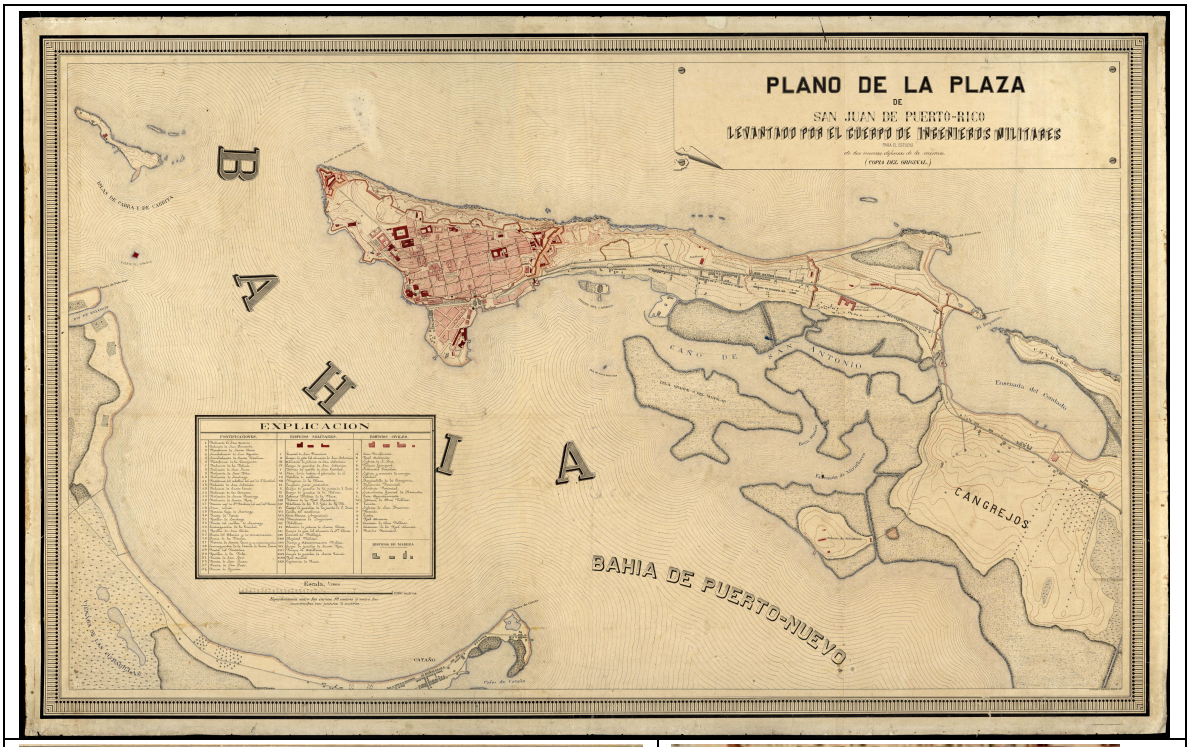
Source: Comandancia de Ingenieros. Copy on file at SAJU Archives, 13#0627-2273.

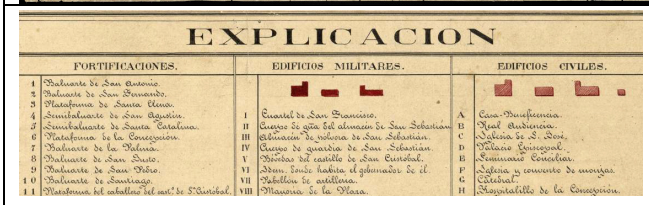
This 1884 map of San Juan shows Quarter No. 211, though unnamed, as a rectangular block plan with a lineal wing extending to the east. The lengthening of the original square block plan to the east may be graphic license. Alternatively, the east wall may have been moved outward, possibly a part of the 1880 "Project of Repairs and Reform of the Pavilions of Artillery." The eastern extension reduced the size of the courtyard, and any attendant utilitarian functions it may have supported. The expansion may have converted

the building's residential use to some other type of quarters such as for bachelor artillery officers. Certainly, it reflects the addition of the southeast bedroom and wing spaces.

Lengthening the north walls of the main block and the east wing elevations would have provided additional space for residential rooms for the building's occupants. Access to the exterior would have been available as each room would have had an exterior wall and the surface penetrating radar indicates many of the existing windows extended to the ground level, serving as entry doorways.

Figure 7: Time Period: 1887





EXPLICACION

FORTIFICACIONES.		EDIFICIOS MILITARES.		EDIFICIOS CIVILES.	
1	Baluarte de San Antonio.				
2	Baluarte de San Fernando.				
3	Plataforma de Santa Elena.				
4	Semibaluarte de San Agustin.	I	Cuartel de San Francisco.	A	Casa-Beneficencia.
5	Semibaluarte de Santa Catalina.	II	Cuerpo de gña del almacen de San Sebastian.	B	Real Audiencia.
6	Plataforma de la Concepcion.	III	Almacen de pólvora de San Sebastian.	C	Iglesia de S. José.
7	Baluarte de la Palma.	IV	Cuerpo de guardia de San Sebastian.	D	Palacio Episcopal.
8	Baluarte de San Justo.	V	Bóvedas del castillo de San Cristobal.	E	Seminario Conciliar.
9	Baluarte de San Pedro.	VI	Idem, donde habita el gobernador de él.	F	Iglesia y convento de monjas.
10	Baluarte de Santiago.	VII	Pabellón de artilleria.	G	Catedral.
11	Plataforma del caballero del sant.º de S.ª Cristóbal.	VIII	Mayoria de la Plaza.	H	Hospitalillo de la Concepcion.

The key indicates that Building VII, under the heading "Edificios Militares," is "Pabellón de artilleria," Pavilion for Artillery.



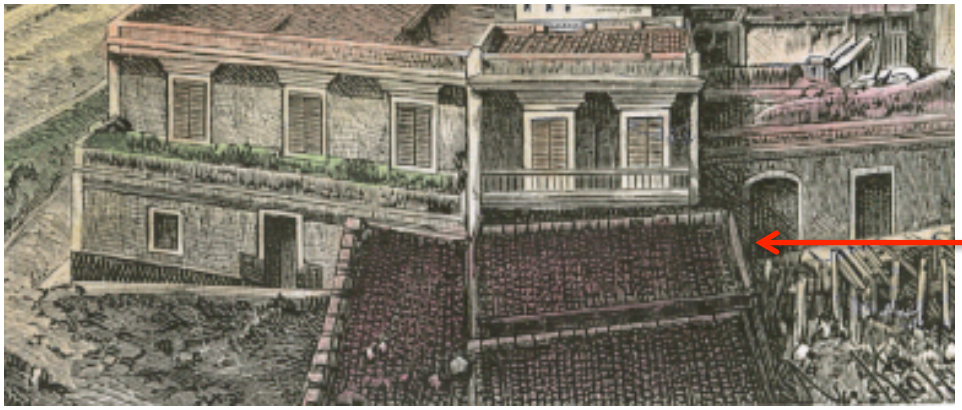
Source: "Plano de la Plaza de San Juan de Puerto Rico, Levantado por el Cuerpo de Ingenieros Militares para el estudio de las nuevas defensas de la misma. F. Roldán y Navarro, Dibujo,"1887; Cuerpos de Ingenieros del Ejército. Copy at SAJU Archives, (C2-61).

This 1887 map shows Quarter No. 211 as a rectangular block plan with the eastern wing extension that terminates at the southeast corner of the courtyard. The plan appears to suggest that the associated tunnel system extends not only towards the Great Moat and the Santiago Ravelin, but also branches into Castillo San Cristóbal. The previous maps of the 1880s appear to substantiate various references to the remodeling of Quarter No. 211 into possible quarters use. All rooms had exterior entrances either to the south, north, or east.

Figure 8: Time Period: 1891



PUERTO-RICO. — VUE GÉNÉRALE DE LA VILLE DE SAN JUAN BANTISTA DE PUERTO-RICO.
Dessin de H. Clerget, d'après une photographie communiquée par le docteur Guillermo Vives.

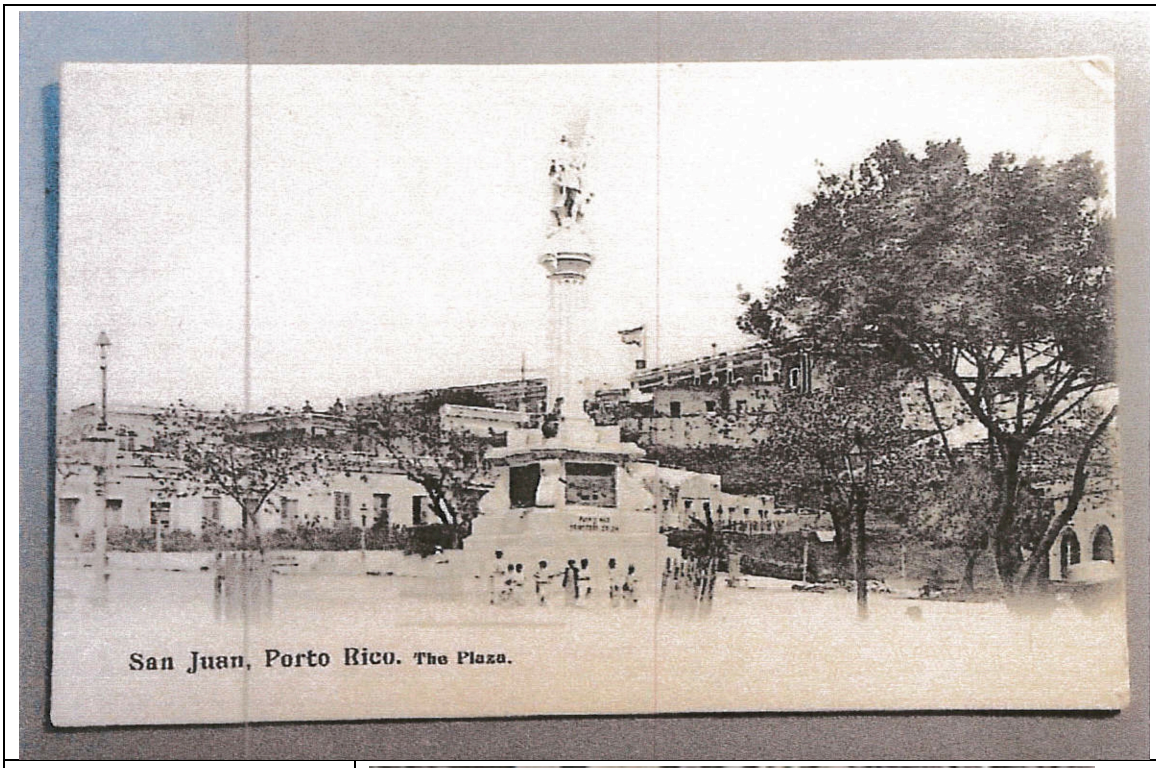


Quarter No. 211

Source: The print titled, "Puerto-Rico. - vue générale de la ville de Puerto-Rico," is a wood engraving with fine detail, hand coloring, and dated 1891. The image size is approximately 13 x 19 cm. Its source is identified as Elisee Reclus' *La Nouvelle Géographie universelle, la terre et les hommes / The Earth and Its Inhabitants.* Print owned by Rodd L. Wheaton.

The etched print of a western view, across Plaza Colón and San Juan from the west rampart of Castillo San Cristóbal shows the roof configuration of Quarter No. 211. While the view cuts off most of the east half of the building, the roof configuration clearly shows the block of northwest roof defined by very low parapets. The parapets are shown with overlapping tiles. The west wall of the south "addition" is not in plane with the west wall to the north. However, this may be an optical illusion, resulting from the artist attempting to indicate the south roof section was gabled. There are several references to a portion of the roof being gabled. The eastern block, with similar wall parapets, separated from the front block is located behind an intermediate parapet extending east-west. The roofs appear with fired red clay tile surfaces as do the tops of the parapets. At the southwest a parapet extends from the west elevation and across the south elevation of both north blocks.

Figure 9: Time Period: circa 1896





Source: eBay.com listing that ended December 27, 2015. The postcard was sold by menni2012-lu, Heisdorf, Luxembourg for $92.00. The present owner is unknown.

A circa 1896 photograph appears to have been used for this postcard probably published at the beginning of the postcard era from the late 1890s to 1905 as it has an undivided back. The pavillion of Plaza Colón appears in the similar view postcard but not in this photograph. Quarter No. 211 appears to the right of the Christopher Columbus memorial column base. The parapets of the east wing of the Quarter No. 211 have not been raised,

though those of the main block have been raised. The west elevation parapets are blocked from view. A picket balustrade seems to edge a terrace extending south from the south elevation.

This photograph shows Castillo San Cristóbal to be in a well maintained condition and still flying the Spanish ensign, thus limiting the photograph's date as prior to October 18, 1898. Of note, the view also shows the Santiago Gate and the adjacent guardhouse before the demolition of 1897. This is the last known photograph of the south elevation prior to its extensive renovation of circa 1896 and 1897.

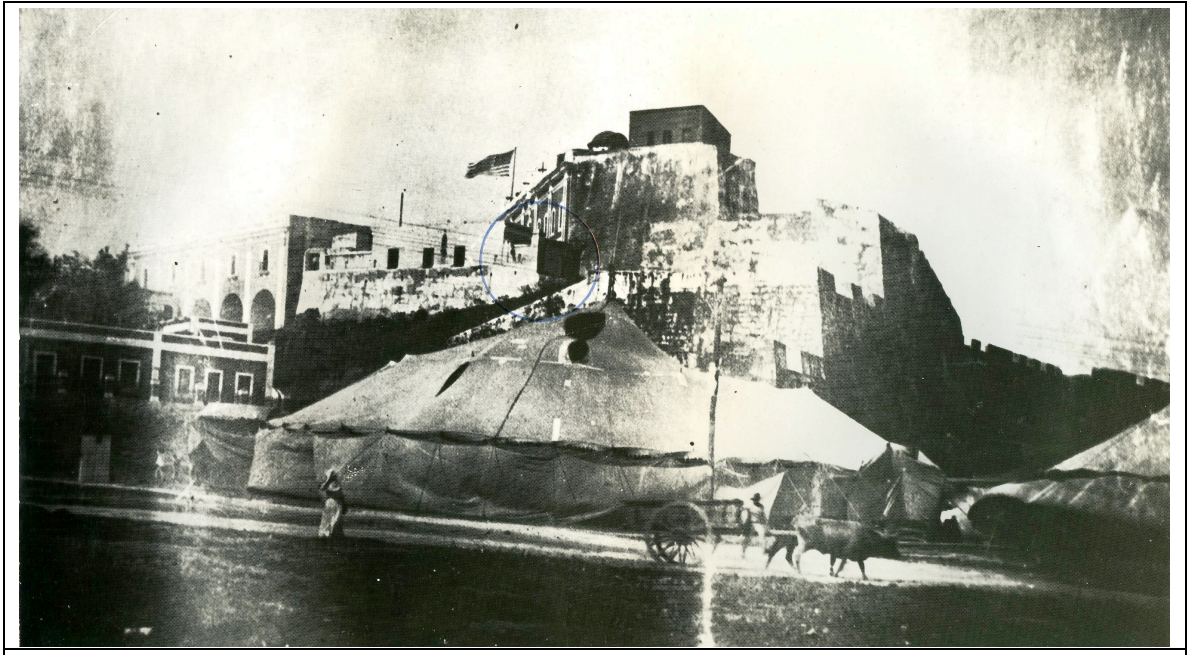
Figure 10: Time Period: 1897



Source: Aníbal Sepúlveda. *San Juan: Historia ilustrada de su desarrollo urbano, (1508-1898)*. San Juan: Carimar, 1989, pp. 240-241.

An 1897 plan for extending the eastern avenue through the Santiago Gate (now Avenue Muñoz Rivera) was identified by Aníbal Sepúlveda. A review of the plan indicates Quarter No. 211 with the notation on it stating, "Pabellones de artillería y herrería viejos." This translates as "Old pavilions of artillery and smithy." The nomenclature suggests that the function of the building had changed, though it was still remembered as the old blacksmith shop. The Quarter No. 211 building plan is clearly delineated as a slightly elongated rectangle with the narrow end facing onto Norzagaray Street. Importantly in 1897, the east wing extends from the southeast corner partially to the north forming an ell-plan around the north courtyard. The east section of the wing extending north is truncated without including all of the existing kitchen space. However, this just may be a slight drafting error as the distance shown is off from today by less than 10%. The east wall of the main block is at the same location as the current east wall of the living room (Room 103) and bedroom (Room 105). The courtyard, accessed by the north walkway, extends to the southeast corner of the Building 210 block and is enclosed by an angled retaining wall. The building plan appears to be quite accurate and thus scalable.

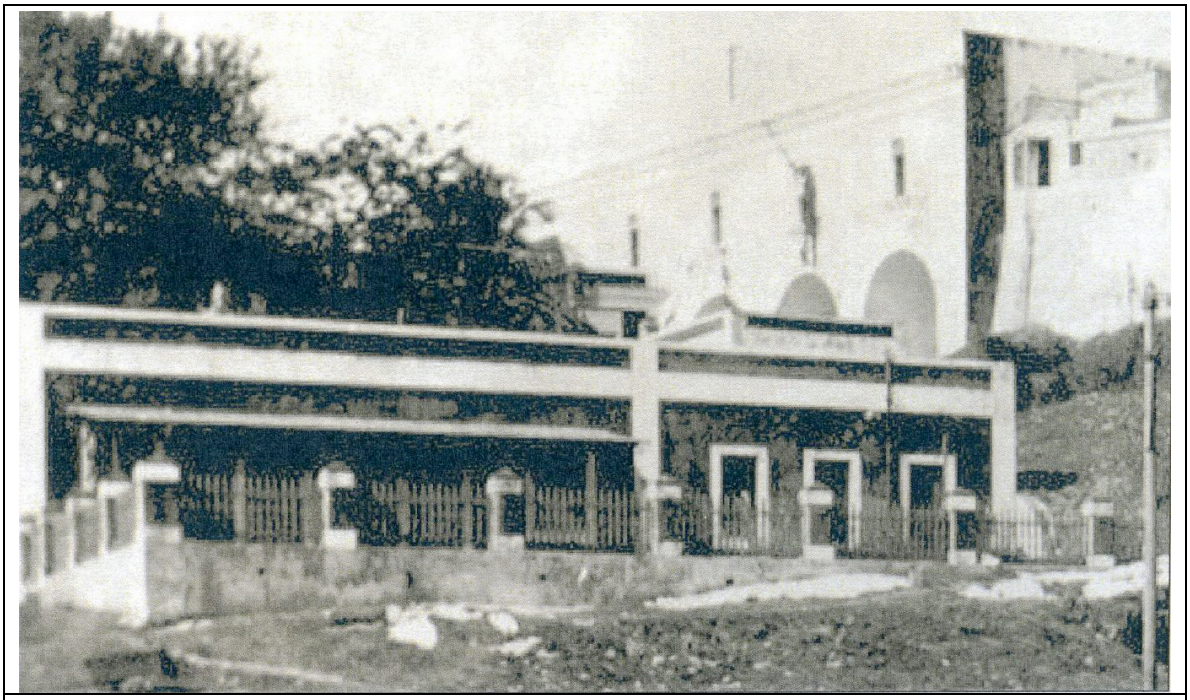
Figure 11: Time Period 1897-1898



Source: "Historic Structures Report, San Cristóbal Gates, San Juan National Historic Site," Ricardo Torres-Reyes Park Historian, October 5, 1964. Photo is noted as being from the SAJU Archives, Photograph Collection.

Identified as an 1898 photograph of San Cristóbal, the United States flag indicates the date of the photograph as post October 18, 1898. Quarter No. 211 is seen at the left and its south elevation is much altered: all parapets have been raised and are at the same height, a light and dark color scheme is exhibited (per paint analysis white and red oxide), and the banding and pilasters have been installed and accentuated by white. The south garden terrace is contained by retaining walls, with short columns, and topped by a picket balustrade. This is an excellent representation of the significant changes made to the building.

Figure 12: Time Period: 1898



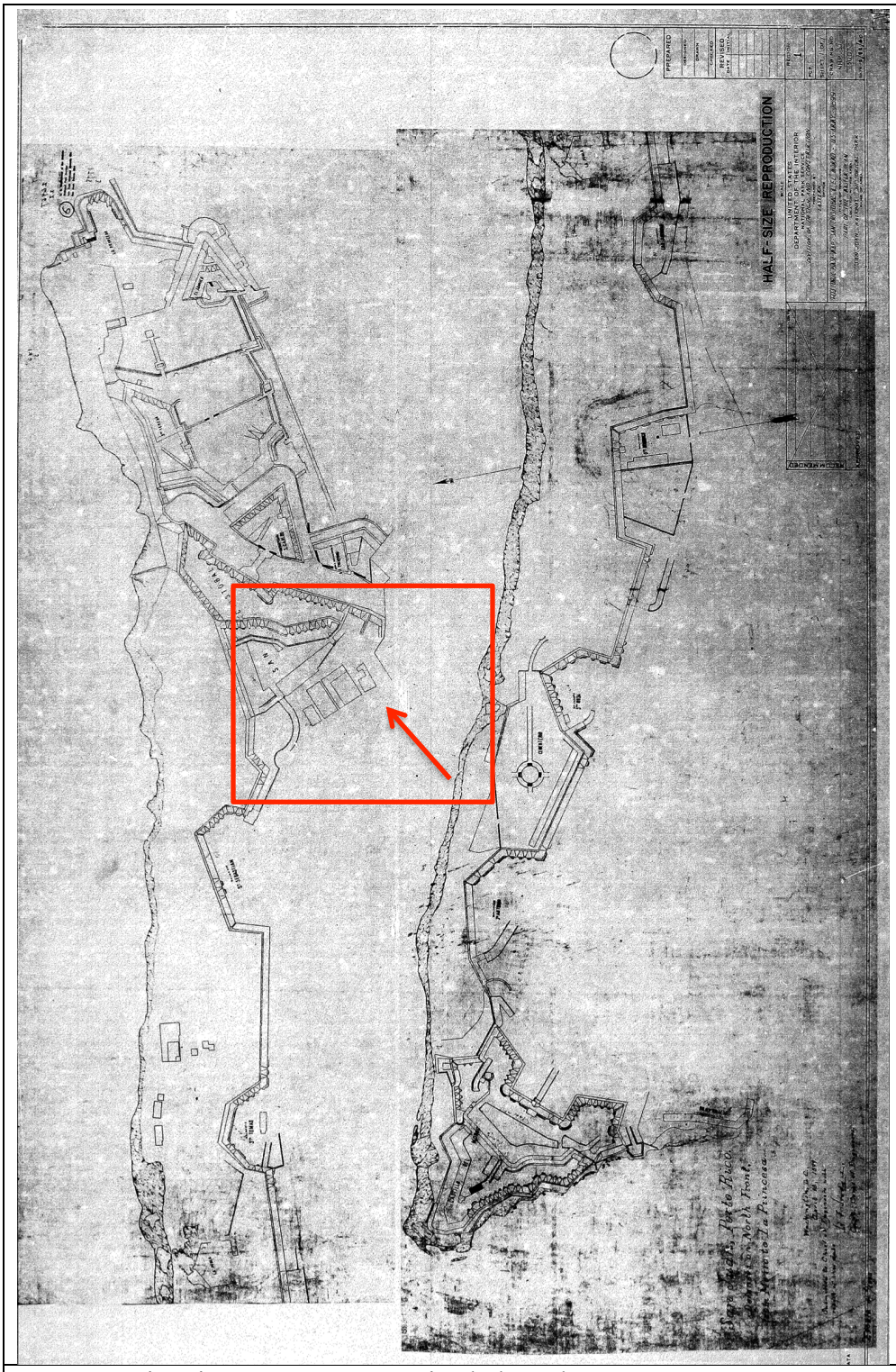
Source: *Cultural Landscape Report for the San Cristóbal Outworks*, "Detail view of central San Cristóbal Castillo taken from the former site of Santiago Bastion, 1898." Copy at SAJU Archives, photograph 2358.

The inclusion of the photograph in the "Cultural Landscape Report" detailed the wooden picket fencing within the masonry piers of the south yard area. The caption also noted that, "Architectural renderings, part of the 1861 Castro set of plans, indicate that during the mid to late nineteenth century, such picket fencing was painted green." The balustrade has a level south and west foundation apparently of a light color or was recently stuccoed. The piers have painted white bases and top moldings; the shafts and low pyramidal caps are painted, probably red. Note currently that the existing balustrade is stepped for five of its south sections and level at only the last two to the left.

The 1898 photograph shows the full south elevation of Quarter No. 211 with a continuous height parapet. The paint colors are contrasting: dark walls and light trim, per the paint sample analysis, the second layers were red with white trim. The large pilasters at the corners and between the main body of the building and its eastern wing are emphasized by the white color. Across the south elevation of the main block, a low shed roofed porch appears to have wooden columns. This porch did not show up in the previous photograph with the circus tent. The porch roof is light colored.

This photograph, dated 1898, is possibly later than the previous photograph given the wood porch.

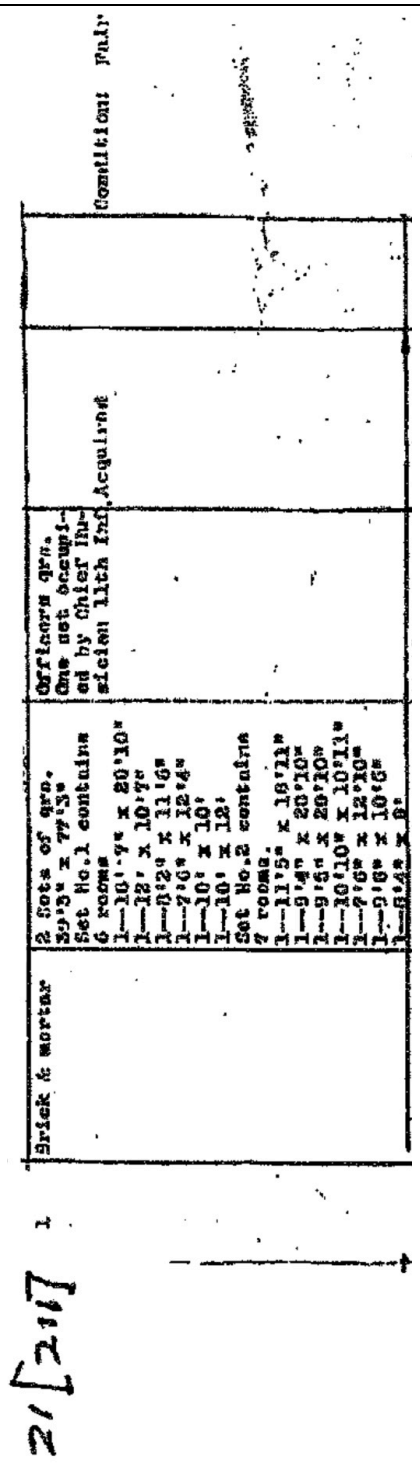
Figure 13: Time Period: 1899 (reproduced in 1960)



Source: "Historic Base Map San Cristóbal & El Morro, U.S. Army 1899, Part of the Master Plan San Juan National Historic Park." Denver Service Center, Technical Information Center, file No. SAJU 3007.

This 1899 map of Spanish facilities at San Juan is a record of the assets received by the U.S. Army in 1899. It was probably used with the below inventory. It was reproduced in 1960 as a National Park Service base map of the San Juan National Historic Site. The map shows Quarter No. 211 with an ell-shaped east wing extension open to the north. The main block of the building is somewhat rectangular. The enclosed south yard area is not shown, nor is the street.

Figure 14: U.S. Army 1899



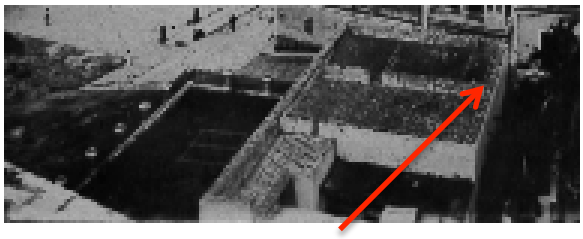
Source: Excerpt from the National Archives record group for the U.S. Army Corps of Engineers, "Report of Public Buildings, etc., Department of Puerto Rico, 1899 [December 4, 1899]." Copy on file SAJU Archives, Box 152, folder 1.

The building number was 21, the U.S. Army's number for Quarter No. 211. This inventory was prepared in 1899. The third column reads "Officer's qrs. One set occupied by Chief Musician 11th Inf." The list has two "sets" of rooms, indicating its likely use as a duplex.

Figure 15: Time Period: 1899



"6628—Columbus Square, City and Bay from San Cristóbal Fortress San Juan, Puerto Rico." Underwood and Underwood Publishers, New York, London, and Toronto; 1899.



This is the north-south intermediate parapet.

Source: Stereograph owned by Rodd L. Wheaton.

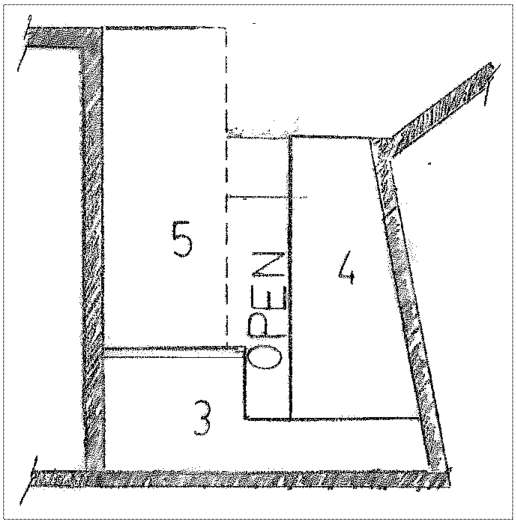
This 1899 stereograph is a view from the view from the west rampart of Castillo San Cristóbal across the roofs of Quarter No. 211 towards Plaza Colón and the city of San Juan. It shows the south yard enclosed with the balustrade with its masonry piers/posts infilled with vertical picket sections. The posts have molded caps and are set on a low level retaining wall visible above the lawn. The south section has unstepped, uniform height posts and pickets.

By 1899, the west block of the residence was enclosed within a peripheral parapet of uniform height. The main block roof structure is somewhat higher on average than the east wing roof. In this view, there are five roofs. The main block has a west section and an east section, divided by a parapet. The east wing has an ell-shaped roof that extends eastward from the main block to the east retaining wall.

The fourth roof section is 2 to 3 feet lower and extends to the north along the east line of the building. Its north terminus is cut off in the photograph. The last roof, the fifth one, extends north from the junction of the east wing and the main block to the plane of the north elevation of the main block. The area between roofs four and five is open to the sky although there appears to be a small protective roof structure to allow a dry connecting passage between the areas under roofs four and five.

The current spaces under the roofs described above as roofs three, four, and five are:

- Three, the southeast bedroom (#107) and breakfast dining area (#111)
- Four, the kitchen, at least in part (#112), and
- Five, the west 7'-5" of the dining room (#106), the bedroom closet (#108), and the storage closet (#109).



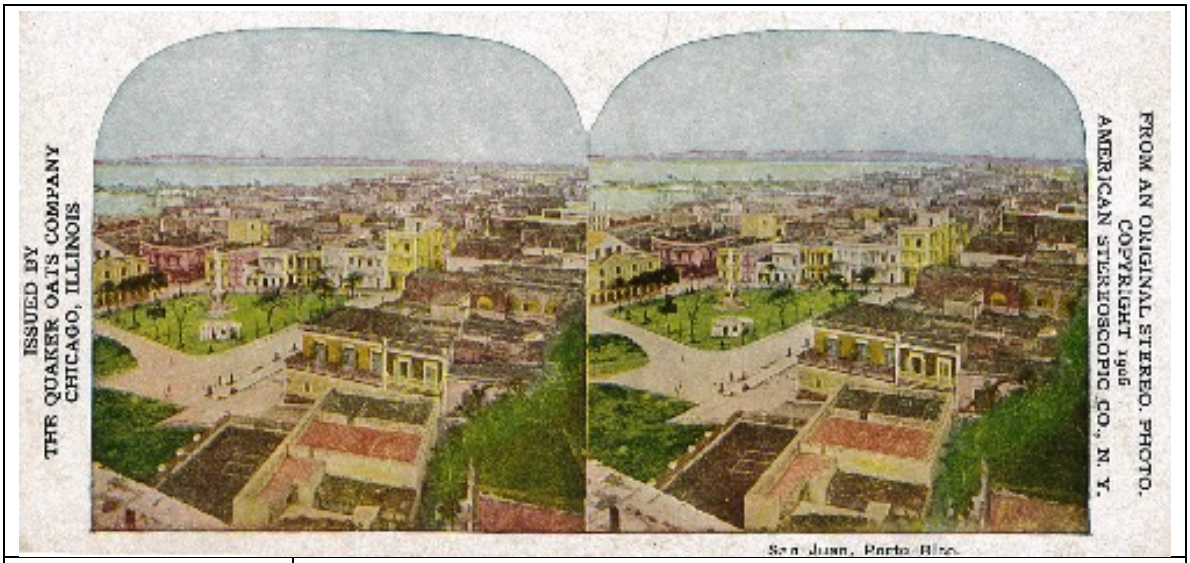
In the photograph, the east wall of the roofed section termed number five appears open, at least in part. A significant aspect of Old San Juan homes is that they have areas for dining under a roof and open to the outdoors on one or more sides, typically to a courtyard. This arrangement may be present here as well.

The parapets depicted in the 1891 engraving, running east to west, is no longer present in the photograph depiction of 1899. The north-south parapet between the two main block roofs runs all the way to the south.

The south and west parapets are photographed as being of uniform height and style. It was probably at this time, circa 1897, that the demolition of the Santiago Gate seems to have encouraged the exterior alterations to Quarter No. 211. Its proximity to the intersection of the new avenue to the east and Norzagaray Street made the residence very visible. Thus, it is believed at this time that the west street elevation was embellished with the new window surrounds and cornice below the heightened parapet with a continuous panel. The lower rail of the parapet panel receives the cornice. The corners are defined by pilasters raised slightly above the walls. The pilasters are integral with the enframement of the recessed parapet panels. The over-window decorative panels are an adaptation of Venetian Gothic detailing of raised panels flanking a central roundel similar to several other examples in San Juan. They are topped by an individual entablature. At the south elevation, pilasters define the corners and the separation of the main block and its eastern wing. There is no south cornice. Typically the trim of the windows is raised flat bands at the sills, heads, and jambs. The original elongated window openings of the west elevation have been reduced in opening height by a concrete spandrel panel, likely installed when these door height openings transitioned to windows, probably later in the twentieth century as part of a window replacement project. There are no raised perimeter bands at the bottom of these three west elevation windows. The entry door jambs and heads have raised bands. The north elevation is undecorated.

The remodeling, probably executed during or after the 1897 removal of the Santiago Gate, may have also included converting the former bachelor artillery officer's quarters into two apartments described in the 1899 inventory.

Figure 16: Time Period: 1899



"San Juan, Porto Rico" from an original stereo pair. Copyright 1906 American Stereoscopic Co., NY



Source: Original owned by Rodd L. Wheaton

Dated as 1906, this colored stereographic shows the same configuration as the 1899 stereographic and appears to be based upon it. However, there is a slightly more complete indication of the eastern wing roofs behind the east parapet as they are further defined by different colored roofs.

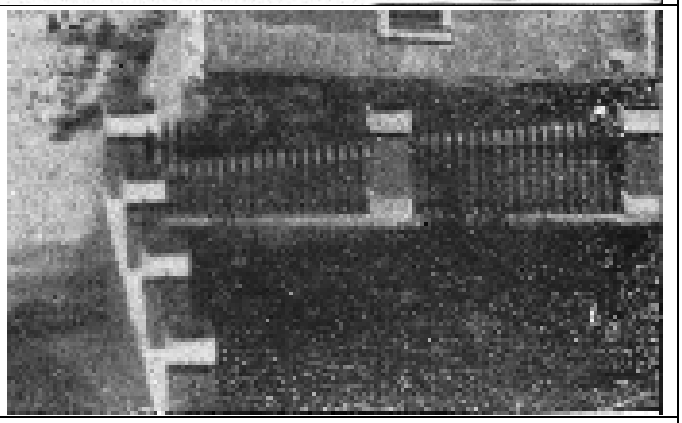
Figure 17: Time Period: 1899



BIRD'S-EYE VIEW OF SAN JUAN, PORTO RICO.

Showing the Cathedral, Palace, one of the Forts or Plazas and a general view of the city.

"Bird's-Eye view of San Juan, Porto [sic] Rico."



Source: de Olivares, Maj. Gen., Joseph; William S. Bryan Wheeler (auth.); Walter B. Albert Efout; George C. Dotter Townsend (illus). N. D. Thompson Publishing Co. 1899. *Our Islands and Their People as Seen with Camera and Pencil, vol. 1*. Illustration owned by Rodd L. Wheaton.

This 1899 photo illustration from *Our Islands* shows a corner of the balustrade around the south garden of Quarter No. 211. The masonry piers with molded caps and plain bases are set directly the foundation set level with the lawn. Each pier/post has a paint pattern similar to other views from the same era. The top rail supporting the pickets appears to be visible.

Two similar balustrade examples were observed in Old San Juan. Directly across the Muñoz Rivera Avenue, the Casino de Puerto Rico has what were probably similar piers/posts supporting iron railings. However, early photographs indicate that the balustrade may be later than the building's 1917 completion date. A second example was photographed for a 1926 postcard titled on the card as "Recinto Oeste," which seems to show the soldier's barracks in the background. The pedestal balustrade piers are set on a high foundation, have integral plinth and molded bases, and have molded caps with pyramidal tops. Vertical wooden pickets with top and bottom rails are set between the piers.



Close up of Casino de Puerto Rico (RW4545 cropped) (current) showing a balustrade configuration similar to that of Quarter No. 211 in 1899.

Figure 18: Time Period: 1900-1905

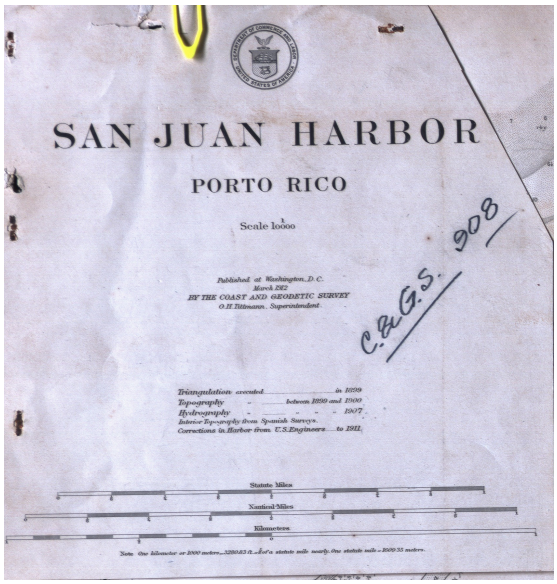


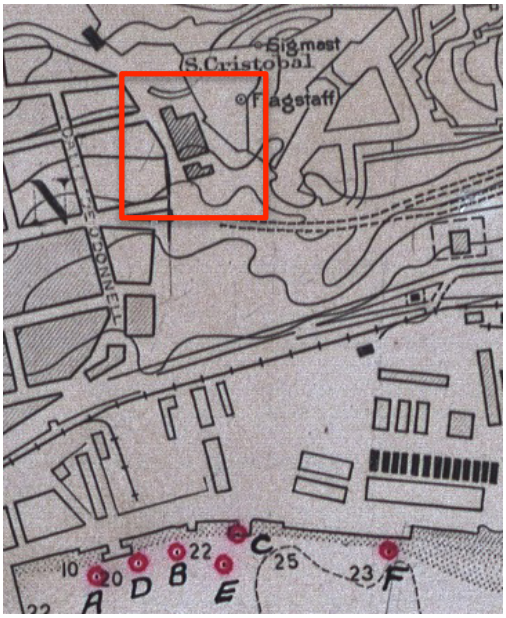
Source: Listed on eBay.com, September 1, 2015, as a 30 day listing by the seller, Togunar Postcards and Collectibles. Its current owner is unknown.

As listed, the postcard was described as "being from 1900-1905 because of its undivided back." The view is looking to the northeast across the Plaza Colón towards Castillo San Cristóbal seen to the right of the Christopher Columbus memorial column. Below to the right is what appears to be the opening of the walls around Santiago Gate, though the wall glacis appears to still be in place suggesting the date of 1897-1898. To the right of the base of the column and above the plaza pavilion in the northeast corner is the top of the south elevation of Quarter No. 211 with contrasting parapet bands. The south balustrade with its piers/posts and foundation is visible to the right of the pavilion, which is not seen in previous photographs from this viewpoint. While there is a flag flying over the Castillo, its country is not discernible.

Figure 19: Time Period: 1912



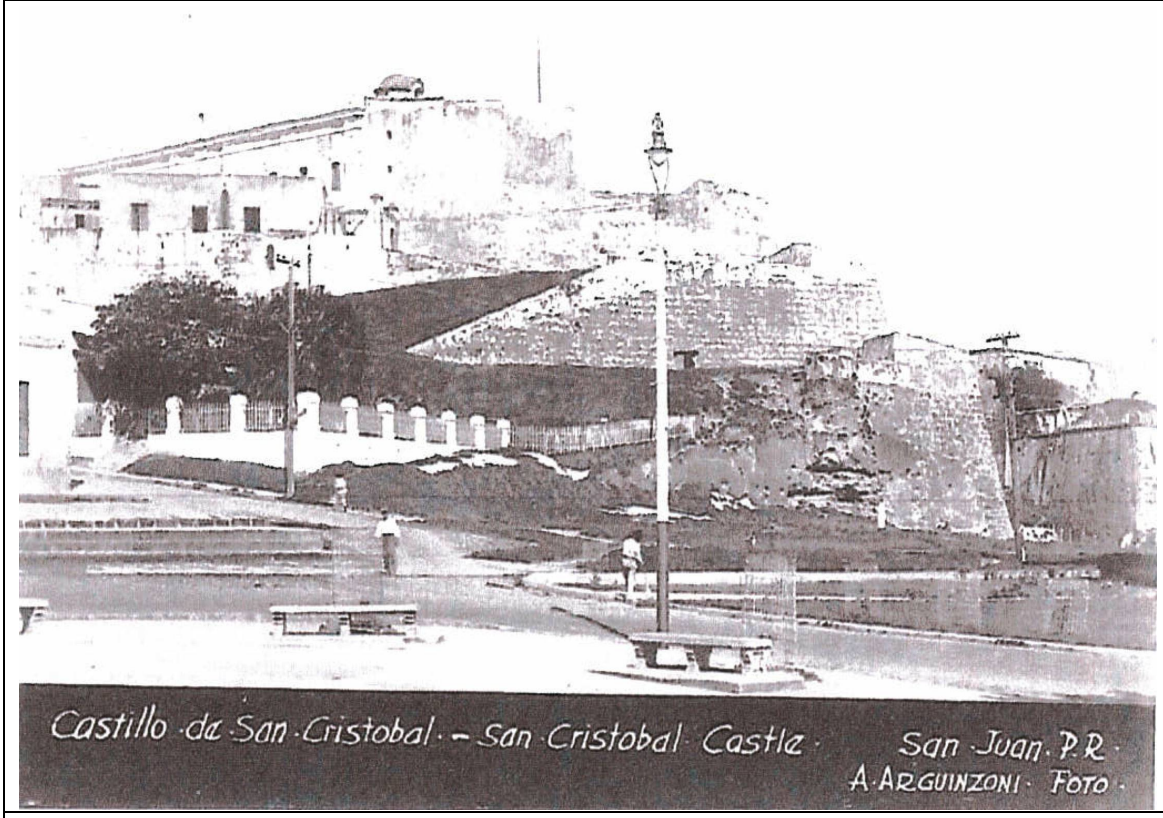




Source: United States Coast and Geodetic Survey, "San Juan Harbor, Porto Rico," March 1912. Copy at SAJU Archives, 34#5085.

This 1912 chart, showing the depths of San Juan Bay, indicates the rectangular block of Quarter No. 211 with a wide eastern wing truncated at the southeast corner. The simple outline delineation, lacking the north extension of the east wing is reflected by the suggestion that the three north buildings are all connected. The focus of these charts was on water depths, the position of markers, and the position and height of land-based tall and recognizable landmarks. Accuracy in the depiction of building footprints was not an objective of nautical charts.

Figure 20: Time Period: 1920



Source: Rodríguez Archive

This circa 1920 postcard illustrates the prominence of the south balustrade being painted a light color. The crisp look stands out against the backdrop of Castillo San Cristóbal's almost fully exposed masonry walls.

Figure 21: Time Period: 1924-1939 (During the Fort Brooke Period, the residence was identified as Building 21)

XII. IMPROVEMENTS AND REPAIRS TO QUARTERS AND GROUNDS: 1924-1939

A. Maintenance and Repair Expenditures: Fiscal Years 1924-1939

1. Comments as to Documentation

Records on file for the Quartermaster Department at the National Archives and Washington National Records Center are reasonable complete for the years 1922-1939. A prize item (the Post Record Book) is missing from the files, however. If located by a future researcher, it should provide details as to the character of the maintenance and repairs undertaken by the post quartermaster to the El Morro and San Cristobal quarters, and buildings Nos. 19-21 and 58 during these years.

2. Expenditures Fiscal Years 1924-1938

From July 1, 1923, to June 30, 1938, the Quartermaster Department continued to make disbursements for maintenance and repair of the El Morro and Fort San Cristobal quarters, along with other structures which are extant and included in the National Historic Site.

On April 8, 1924, the post quartermaster submitted a report of the structures for which he was responsible. Included in the following table is data from this report pertaining to structures located within the Historic Site:

No.	Designation	Expenditure for Repairs from 10/20/98-6/30/23	Classification of Building	Cost of Buildings to 6/30/23
17	El Morro	$14,198.40	C_1	$14,198.40
18	San Cristobal	18,538.49	C_1	18,538.49
19	Officers' Quarters	5,271.37	A_1	21,571.37
20	Officers' Quarters	2,469.39	A_1	9,869.38
21	Officers' Quarters	2,118.11	A_1	9,618.11
58	San Antonio Bastion Guardhouse	567.00	A_2	50.00

Buildings classified C_1 possessed "great historical value" and were "such in historical legends and events and are of great significance as such to Porto Rico and the United States." Structures classified A_2 were either an actual part of the old Spanish fortifications or a part of the fortification plan and as such were "inseparable from the

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fortifications in placing a valuation upon them." Structures classified A_1 did not possess historic values and were assessed at two-thirds their market value.[1]

a. *El Morro: Building No. 17*

Fiscal Year	Cost of Repair	Total Cost of Repairs Charged to QMG Since 1898
1924	1,206.76	15,405.16
1925	313.52	15,718.68
1926	1,193.10	16,911.78
1927	241.80	17,152.58
1928	404.50	17,558.08
1929	890.07	18,848.15
1930	1,068.78	19,916.93
1931	820.00	20,736.93
1932	2,092.00	22,828.93
1933	346.00	23,174.93
1934	531.98	23,706.91
1935	367.72	24,074.63
1936	615.27	24,690.00
1937	183.23	24,873.23
1938	2,211.94	27,085.17

Notes

In fiscal year 1926, Company F, 65th Infantry, was billeted in El Morro.

In fiscal year 1933, $92.50 was spent for repair of hurricane damage and $92.50 for repair of millwork.

The breakdown of the fiscal year 1934 allotment for repairs was: $196, exterior painting; $40, plastering; $22, interior painting; $8.98, hardware; and $283, miscellaneous repairs.

In fiscal year 1938, $2,211.94 was charged to exterior plastering and general rehabilitation.

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1. Special Orders No. 44, Headquarters Post of San Juan, April 8, 1924, WNRC, RG 92, General Correspondence Relating to Places ("Geographic" File), Box 23, San Juan.

Fiscal Year	Cost of Repair	Total Cost of Repairs Charged to QMG Since 1923
1934	145.36	6,075.00
1935	140.14	6,216.04
1936	87.08	6,303.12
1937	127.82	6,431.04
1938	778.18	7,215.22

Notes

In fiscal years 1924-25, the two quarters were occupied: A, Capt. Egan, and B, 1st Lt. Rotzebur.

In fiscal year 1926, Capt. Arnold was housed in quarters A and 2d Lt. Young in quarters B.

In fiscal year 1932, upon the opening of the quarters in La Princesa, building 20 was made available as warrant officer housing.

In fiscal year 1925, the roofs of buildings Nos. 19-21 were weatherproofed with a coat of tar preparation sprinkled with crushed stone. Materials employed included: 12 barrels of tar and "3 cu. M. stone."

The fiscal year 1934 allotment broke down: roofing, $27.70; hardware, $20; and miscellaneous repairs, $97.66.

e. Quarters No. 21

Fiscal Year	Cost of Repair	Total Cost of Repairs Charged to QMG Since 1923
1924	$ 396.28	$ 2,747.85
1925	311.00	3,058.91
1926	169.53	3,228.44
1927	131.91	3,360.35
1928		
1929	976.83	4,337.18
1930	207.78	4,544.96
1931	148.00	4,692.96

Fiscal Year	Cost of Repair	Total Cost of Repairs Charged to QMG Since 1923
1932	520.00	5,212.96
1933	159.67	5,372.63
1934	145.39	5,468.61
1935	133.13	5,601.75
1936	124.47	4,726.12
1937	85.93	5,812.15
1938	2,164.01	7,976.16

Notes

In fiscal years 1924-25 these quarters were occupied by Capt. Blanton and in fiscal year 1926 by Capt. Austin.

The fiscal year 1934 allotment brokedown: $32.16 for roofing, $20 for hardware, and $43.83 for miscellaneous repairs.

f. Building No. 58: San Antonio Bastion Guardhouse

Fiscal Year	Cost of Repair	Total Cost of Repairs Charged to QMG Since 1923
1924	$ 8.85	
1925	none	$ 119.09
1926	85.90	204.99
1927	60.24	323.06
1928	118.09	560.59
1929	237.51	636.59
1930	76.00	636.59
1931	none	636.59
1932	none	636.59
1933	none	700.83
1934	64.33	831.35
1935	130.52	895.36
1936	64.01	925.27
1937	29.91	1,351.91
1938	24.551	

Notes

In fiscal year 1923, the structure was employed as a golfhouse and in fiscal year 1938 as a bathhouse.[2]

2. Ibid.

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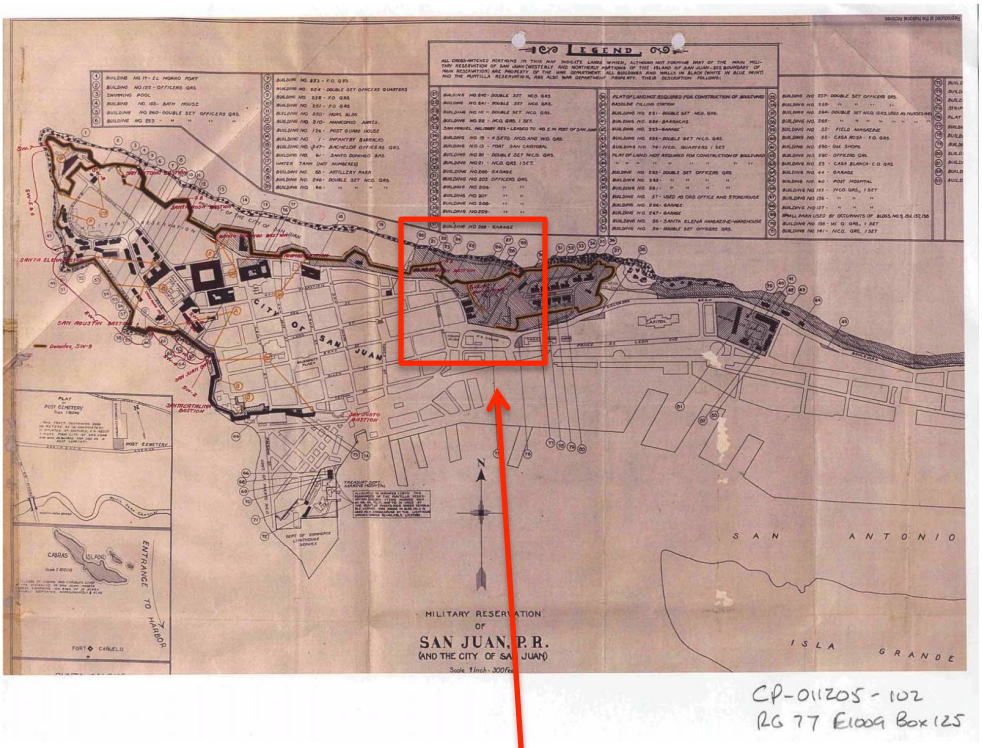
Source: "Historic Structure Report, Historical Data Section, San Juan Fortifications, 1898-1958," February 1984, pp. 307-313. Copy on file at the Denver Service Center, TIC, SAJU/393, D-2185.

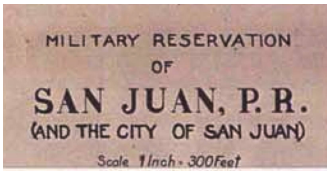
The Historic Structure Report, History Data Section, shows that the U.S. Army spent substantial funds on Quarter No. 211 during the period of 1924-1939, relative to the amount spent on the other residential military buildings along Norzagaray Street. The annotations above reference a single occupant: Captain Blanton in 1925-1925, and Captain Austin in fiscal year 1926. In 1899, the building was used by the Spanish

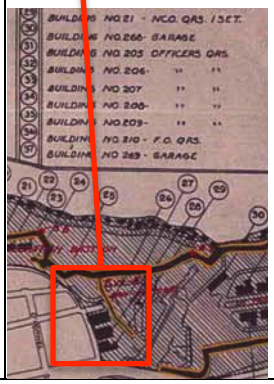
military as a duplex. Particularly in light of the significant expenditures in 1938, Quarter No. 211 appears to have been enhanced as a single-family quarters. At the exterior the alterations most likely included the construction of the concrete porch with a red Spanish tile roof on the south elevation across the main block of the residence. Elsewhere, SPR investigations have demonstrated that the walls and parapets were raised at some time to a uniform height on the east wing and the open areaway was enclosed. The remodeling accommodated the uniform roof structure of concrete, covering the additions and the existing roofs.

In addition, the balustrade surrounding the south yard was replaced with new concrete piers, concrete balusters, and handrails on plinth panels that step above the original foundation. The new balustrade design relates to the topography and steps up at the eastern two-thirds of the south boundary. Other alterations from this period probably included additional interior work. These projects are expected to have occurred in 1938, based on the previously noted large jump in expenditures for that year. The significant amount of money spent included funds from the Federal Government's New Deal Programs. It is also the same year that the Army constructed additional housing that have similar Spanish Colonial style white plaster walls and red tile roofs. These same architectural stylistic elements seem to be reflected in the porches of Quarter No. 210 that are close in design to the porch of Quarter No. 211. The construction patterns appear to follow the Quarter Master General's standard plans for architecture in the tropics.

Figure 22: Time Period: c. 1930 (undated map)



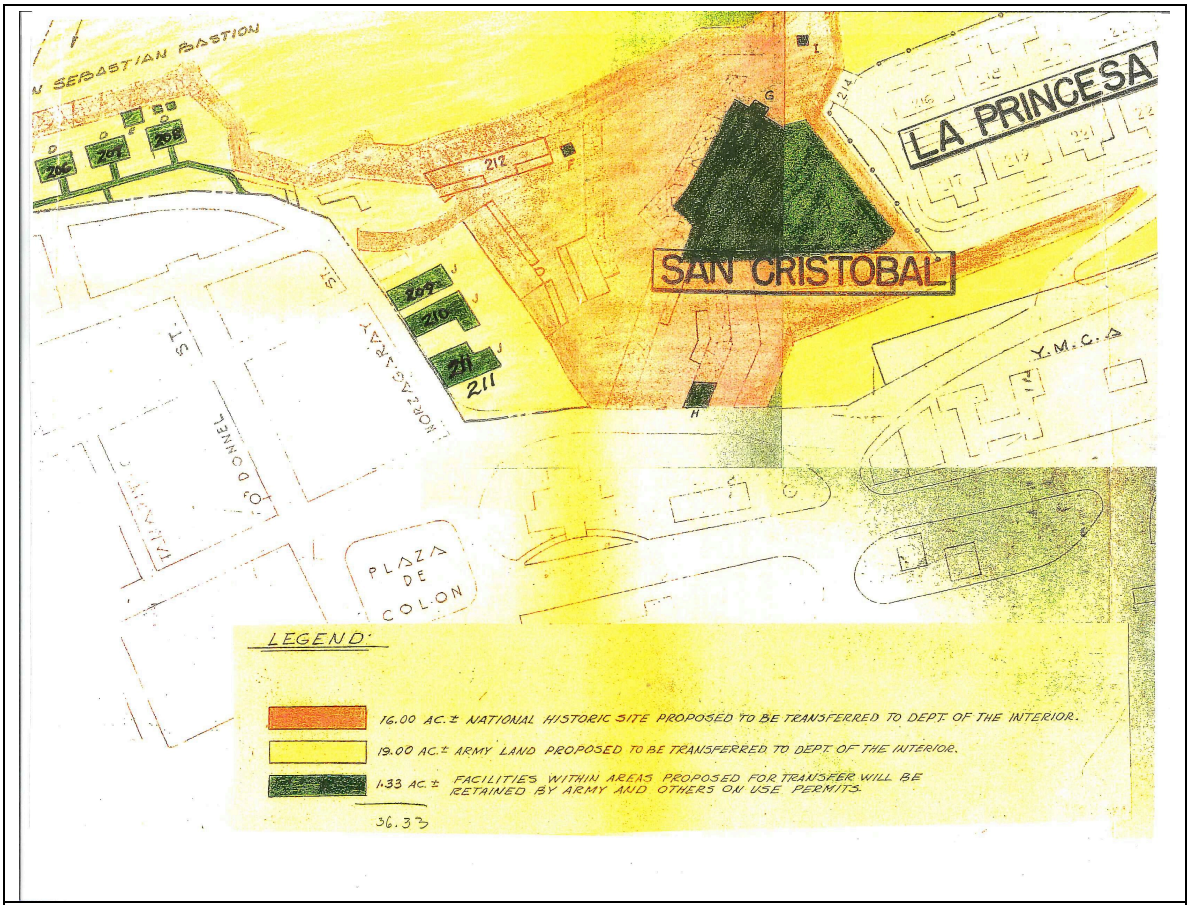




Source: SAJU Archives CP-011205-102, RG77 E1009 Box 125.

A "Military Reservation" map of San Juan shows Quarter No. 211 with an ell-shaped wing to the east, but no indication of the south porch. The Capitol of Puerto Rico is in place, so the map would date at the earliest from circa 1930, but more likely it dates from the late 1940s when transfer to the National Park Service appeared inevitable. Quarter No. 211 is identified on the map legend as 29, "Building No. 21—NCO Quarters/1 Set."

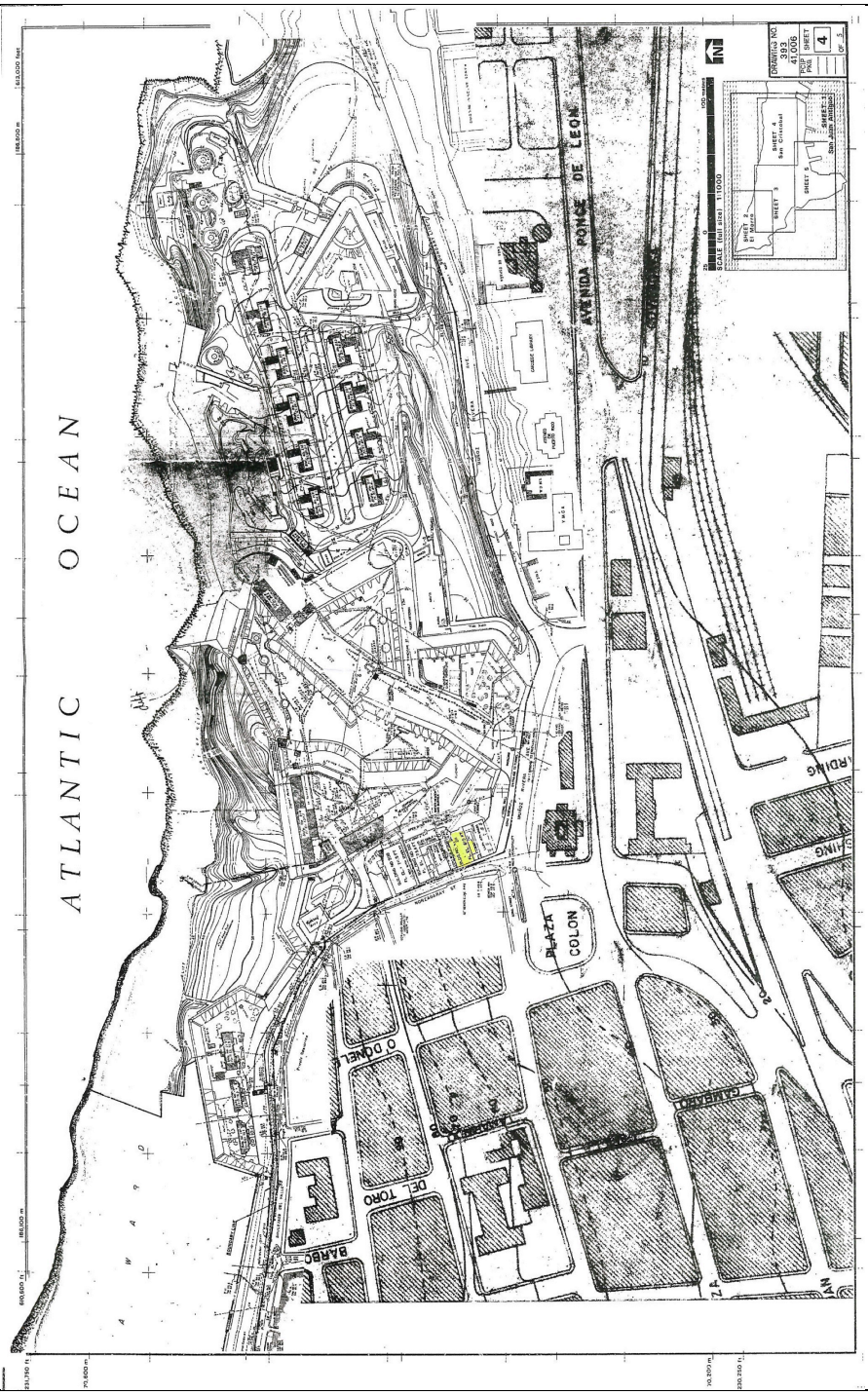
Figure 23: Time Period: 1949



Source: U.S. Army Corps of Engineers, Ft Brooke -San Cristóbal- RE Map _ Bldg 211.

A 1949 survey map delineating what Castillo San Cristóbal buildings would be transferred to the National Park Service or retained by the U.S. Army, based on a 1940 map of Fort Brooke, shows Quarter No. 211 without the south porch and south yard balustrade, though the details may have been omitted. However, most of the rear wing and courtyard is delineated as enclosed. It is depicted as a solid form stepped back slightly from the north elevation of the main block close to what it is at present. The residence appears to have been converted to a single-family use before 1940. Buildings Nos. 210 and 209 were also retained by U.S. Army, though Quarter No. 208 apparently was to be transferred to the Park Service, as it is not delineated for disposition.

Figure 24: Time Period: 1949



SAJU/393-25,900 from DSC-TIC though inscribed 1974 on the 9 sheets of dwgs. Sheet 4.

This portion of a 1949 survey map of Fort Brooke, received by the National Park Service in 1974, indicates on sheet 4 the site plan of Quarter No. 211. It was then in its present form with a "concrete" north areaway from Norzagaray Street and a small "concrete"

north courtyard. The house block is delineated with most of the east courtyard roofed and is shown with its south porch projection. The south yard balustrade encloses a "lawn with grass" and indicates a walkway to the east wing doorway and some plantings along the south side. Quarter No. 211 is shown with an elevation of 60 feet above sea level. The survey also recorded Buildings Nos. 210 (elevation 73 feet) and 209 (elevation 75.5 feet) with their areaways providing access to side and rear entrances directly from Norzagaray Street.
A similar set of 1948 Fort Brooke utility drawings (DSC, TIC, SAJU/393-9002, received by the National Park Service in 1958), indicates on sheet 8 of 13 a site plan for Quarter No. 211 with an enclosed east courtyard, south porch, and enclosed south yard. The northeast corner is stepped. It is identified on sheets 2 and 3 as "Family Qtrs. (NCO)."

Figure 25: Time Period: 1950



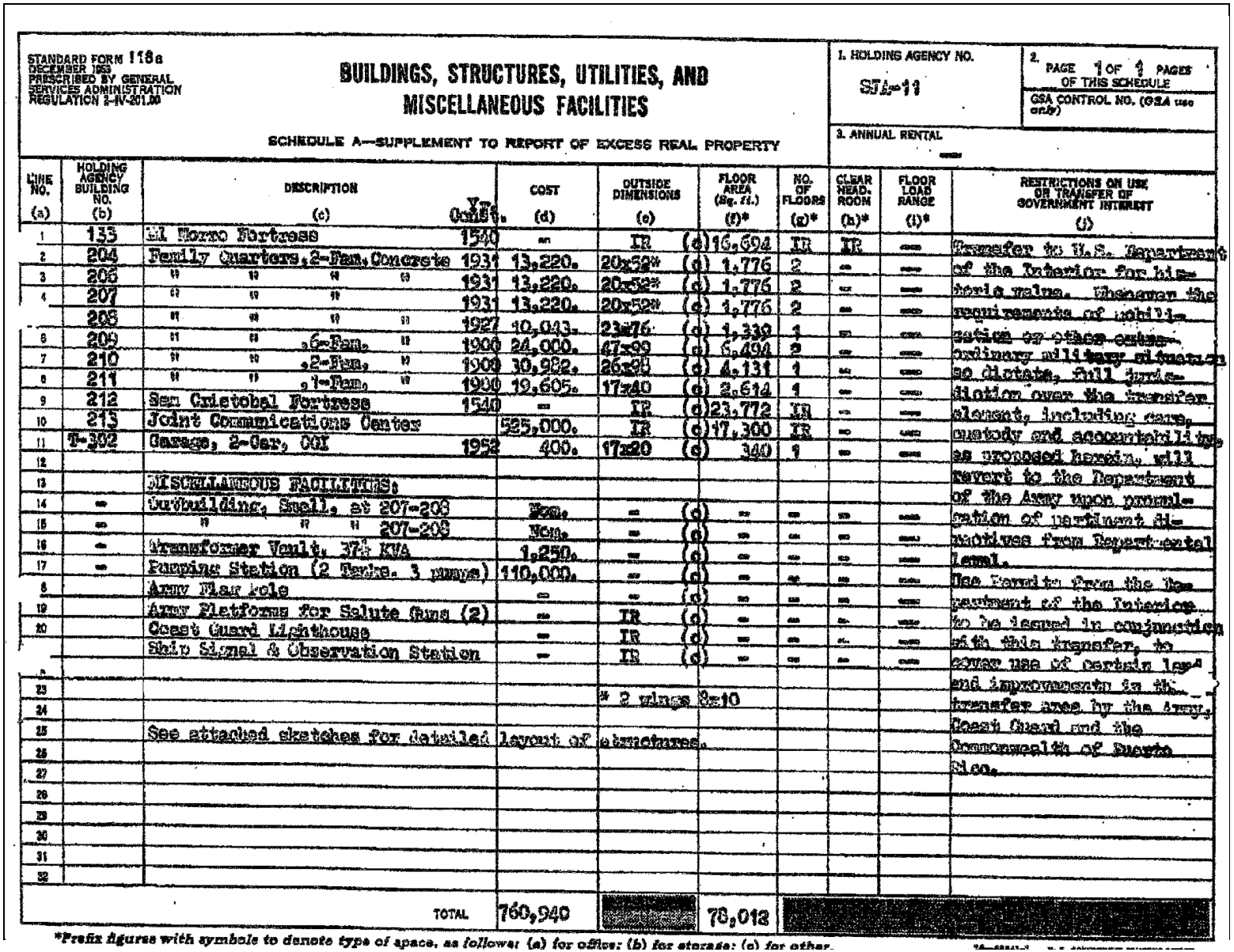
Source: Rodríguez Archives. (www.archivofotograficodepuertorico.com)



The U.S. Army-built south porch in the late 1930s, which is shown in the series of Fort Brooke site plans from the late 1940s, is in place in this 1950 photograph taken from the ramparts of Castillo San Cristóbal. It clearly shows the half-hipped, tile roofed south porch and the balusters of the west balustrade section enclosing the south yard. Previously the stairs were on the street side of the wall in a planting strip that appeared to

have a grass slope. The street was probably widened by moving the sidewalk to the wall, eliminating the grass strip. A vertical board gate, between posts, is located at the street entrance to the stairway leading up to the south yard. Palm trees edge the south balustrade section. The intermediate parapet between the main blocks of the house is visible as are two roof surfaces, which appear to be built-up tar systems.

In December 2015, SAJU Park Historian Eric López documented a visit to the San Juan National Historic Site and toured Quarter No. 211. The visitors, adult children of a civilian U.S. Army civilian employee who resided in the house in 1950-1953, reflected on the then-single-family residence. Foremost they confirmed the existing configuration of rooms, though the breakfast room was then a servant's room and how little had changed. This all affirms that the Army was responsible for converting the 1899 duplex into a single-family residence. The Historic American Buildings Survey produced measured drawings of Quarter No. 211, the first time the layout of the rooms of the residence was documented by drawings. The HABS drawings are labeled "Unedited by HABS" and are therefore considered unfinished. The five sheets appear in this HSR as Appendix 8. The work is attributed to the period of 1961-1964.



STANDARD FORM 118a
DECEMBER 1953
PRESCRIBED BY GENERAL SERVICES ADMINISTRATION REGULATION 2-IV-201.00

BUILDINGS, STRUCTURES, UTILITIES, AND MISCELLANEOUS FACILITIES

SCHEDULE A—SUPPLEMENT TO REPORT OF EXCESS REAL PROPERTY

1. HOLDING AGENCY NO. SJ-11
2. PAGE 1 OF 1 PAGES OF THIS SCHEDULE
GSA CONTROL NO. (GSA use only)
3. ANNUAL RENTAL —

LINE NO. (a)	HOLDING AGENCY BUILDING NO. (b)	DESCRIPTION (c)	YEAR Const.	COST (d)	OUTSIDE DIMENSIONS (e)	FLOOR AREA (Sq. ft.) (f)*	NO. OF FLOORS (g)*	CLEAR HEAD. ROOM (h)*	FLOOR LOAD RANGE (i)*	RESTRICTIONS ON USE OR TRANSFER OF GOVERNMENT INTEREST (j)
1	133	El Morro Fortress	1540	—	IR	(d) 16,694	IR	IR	—	Transfer to U.S. Department
2	204	Family Quarters, 2-Fam. Concrete	1931	13,220.	20x52*	(d) 1,776	2	—	—	of the Interior for hire
3	205	" " " "	1931	13,220.	20x52*	(d) 1,776	2	—	—	basis value. Whenever the
4	207	" " " "	1931	13,220.	20x52*	(d) 1,776	2	—	—	requirements of mobili-
	208	" " " "	1927	10,043.	23x76	(d) 1,339	1	—	—	zation or other emer-
6	209	" " 6-Fam. "	1900	24,000.	47x99	(d) 6,494	2	—	—	ordinary military situation
7	210	" " 2-Fam. "	1909	30,982.	26x95	(d) 4,131	1	—	—	so dictate, full juris-
8	211	" " 1-Fam. "	1900	19,605.	17x40	(d) 2,614	1	—	—	diction over the transfer
9	212	San Cristobal Fortress	1540	—	IR	(d) 23,772	IR	—	—	element, including care,
10	213	Joint Communications Center		525,000.	IR	(d) 17,300	IR	—	—	custody and accountability,
11	T-302	Garage, 2-Car, CGI	1952	400.	17x20	(d) 340	1	—	—	as proposed herein, will
12										revert to the Department
13		MISCELLANEOUS FACILITIES:								of the Army upon promul-
14	—	Outbuilding, Shell, at 207-208		Non.	—	(d) —	—	—	—	gation of pertinent di-
15	—	" " " 207-209		Non.	—	(d) —	—	—	—	rectives from Department
16	—	Transformer Vault, 37½ KVA		1,250.	—	(d) —	—	—	—	Legal.
17	—	Pumping Station (2 Tanks, 3 pumps)		110,000.	—	(d) —	—	—	—	Use Permits from the De-
18		Army Flag Pole		—	—	(d) —	—	—	—	partment of the Interior
19		Army Platforms for Salute Guns (2)		—	IR	(d) —	—	—	—	to be issued in conjunction
20		Coast Guard Lighthouse		—	IR	(d) —	—	—	—	with this transfer, to
		Ship Signal & Observation Station		—	IR	(d) —	—	—	—	cover use of certain land
22										and improvements in the
23					* 2 wings 8x10					transfer area by the Army,
24										Coast Guard and the
25		See attached sketches for detailed layout of structures.								Commonwealth of Puerto
26										Rico.
27										
28										
29										
30										
31										
32										
		TOTAL		760,940		78,013				

*Prefix figures with symbols to denote type of space, as follows: (a) for office; (b) for storage; (c) for other.

Figure 26: Time Period: 1961

Source: Excerpt from the National Archives record group for the U.S. Army Corps of Engineers, "Report of Public Buildings, etc., Department of Puerto Rico, 1899 [December 4, 1899]." Copy on file SAJU Archives, Box 152, folder 1. "Buildings, Structures, Utilities, and Miscellaneous Facilities, Schedule A—Supplement to Report of Excess Real Property."
Undated, the form refers to Fort Brooke properties that were transferred from the U.S. Army through the General Services Administration to the Department of the Interior's National Park Service in 1961.
This inventory illustrates that the 1899 duplex had been converted to a single-family residence by the U.S. Army. Following the establishment of San Juan National Historic Site in 1949, the U.S. Army continued to maintain a presence at Fort Brooke and retained use of various military buildings, including housing, as indicated by the above exhibit, while letting the National Park Service assume control over the primary historic fortification structures. In 1961, the Army transferred all properties to the Park Service through the General Services Administration. Included in the transfer was Quarter No. 211 identified as "Family Quarters, 1-Fam, Concrete." The single-family residence was shown to be appraised at $19,605. It was listed as 17 feet by 40 feet with a total floor area of 2,614 square feet, a mathematical impossibility. The building is 40 feet north to south, and 76 feet east to west at its south elevation. The net square footage in 1899 was tabulated from the room dimensions as 1,916 square feet.

Figure 27: Time Period: circa 1960s

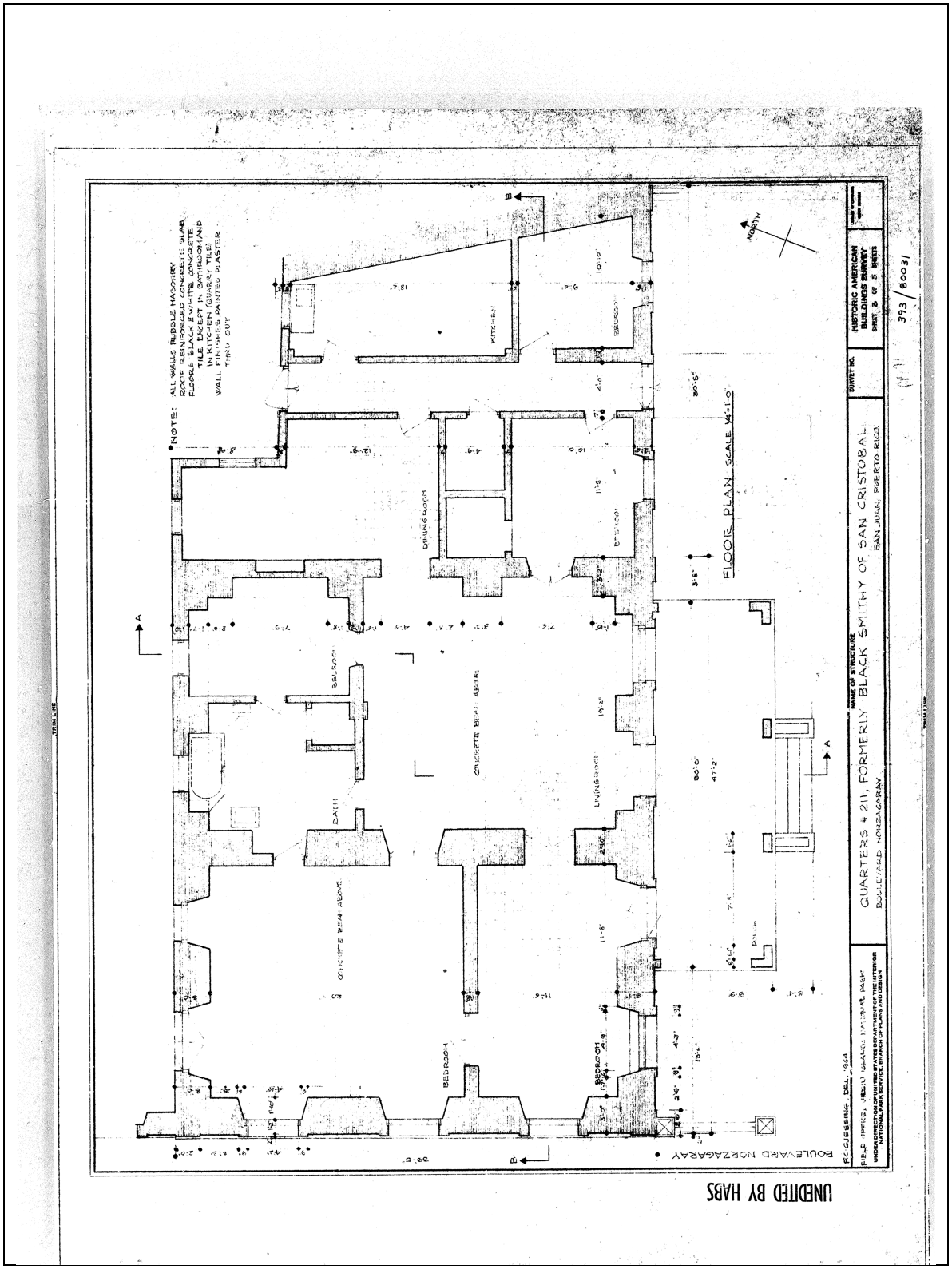


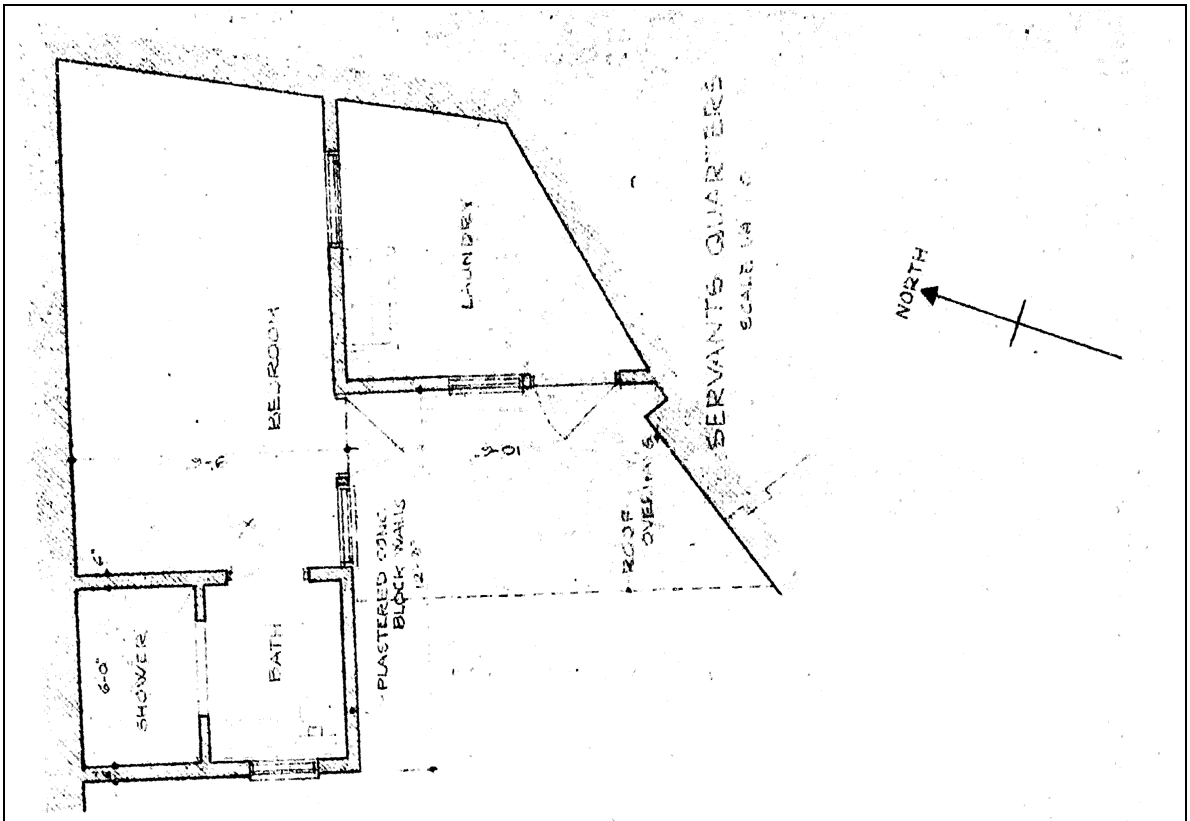
Source: SAJU photograph collection

This view of the west elevation of Quarter No. 211 probably dates from the property transfer by the U.S. Army to the Department of the Interior's National Park Service in the 1960s. Clearly the exterior has been left unmaintained and the surfaces of the walls and decorative wall elements have deteriorated as has the west section of the balustrade at the south yard entrance. The color appears to be a light monochromatic hue. The photograph documents the door opening into the north areaway as having 10 panels with vertical spindles in each and a vertical barred transom to allow for air circulation. The jambs set on a raised foundation extend to a canted cap diverting drainage to the street. Importantly, the photograph illustrates that it was probably the U.S. Army that raised the sills of the three Norzagaray Street windows probably for security reasons. Patches on the three window jambs reveal the locations of top and bottom grills in each window opening. As elsewhere, and particularly for the south elevation, the foundation is almost flush with the corner pilasters. The trim of the window jambs are set back slightly from the plane of the foundation and extends to window head entablatures below a horizontal parapet section that forms a frieze space for the cornice projection. Above is a continuous narrow horizontal recessed panel. The parapet typically is set with a cordon (an expressed string course). The cornice at the north end is flush with the north elevation and has a short return at the south elevation.

In the photograph, vegetation is visible above the west balustrade and palm trees are visible above the roof of Quarter No. 211. Barely visible across Muñoz Rivera Avenue at the far right is the historic Puerto Rico Casino completed in 1917.

Figure 28: Time Period: 1964





Source: Denver Service Center, Technical Information Center, (SAJU/393-80031)

The 1964 HABS drawings show the Quarter No. 211 as it was received by the National Park Service in 1961 following its conversion to a single-family residence. Five sheets of drawings were prepared that included a title page, roof plan, so-called "Servant's Quarters" plan, the main block floor plan, the west and south elevations, and two sections through the main block. As recorded in 1964, the floor plan has changed very minimally since then. The single bathroom configuration has been reconstructed to include one full bath and one three-quarter bathroom spaces. An archway was inserted into the wall between what in 1964 was a small southeast corner bedroom space and the kitchen to create a breakfast room. Finally, for the interior the doorway between the two west bedrooms was reduced in size and infilled with a hollow-core modern door. On the exterior, the roof over the servant's suite was altered to the present shed roof configuration and a new roof was installed to shelter the northeast entry.

The HABS recorded plan noted two concrete beams that extended west to east across the northwest corner bedroom and similarly across the center of the existing living room space. These reflect the buildings early configuration shown in the 1891 print of the roof of Quarter No. 211. In addition there is an embedded column in the north wall of the existing living room space opposite the vertical masonry joint adjacent to the main entrance doorway shown in the radar penetration survey noted earlier. The sections illustrate the use of interior mahogany doors typically having two vertical panels above two horizontal panels.

Figure 29: Time Period: 1964-1967



Source: SAJU Archives, Photographic Collection

This photograph illustrates the completion of the painting of the walls and balustrade of Quarter No. 211. The view may have been taken as part of the Historic American Buildings Survey that began in the summer of 1964. Note that the light colored trim is discolored. The north window lintel is showing signs of deterioration probably from the water run-off from the cornice and its fascia at the soffit. The pedestal piers of the balustrade are painted red with only the caps and balusters being white. Behind the balustrade, the vegetation has been reduced, whereas previously it overtopped the balustrade.



Source: SAJU Archives, Photographic Collection

This photograph, taken from the southwest looking northeast shows the south yard balustrade including the unpainted south elevation. Of note, the sections of the concrete handrail on the west elevation are painted red on the canted tops. At the south elevation, the first two west sections are set directly on the level of the retaining wall. The east extension of the balustrade steps up in five more sections to the west glacis of Castillo San Cristóbal. The original balustrade was constructed in six sections set directly on the level foundation. At the stepped sections of the south elevation, an additional concrete base has been inserted to raise the two-step bases seen at the southwest corner. Two of the east sections are level. The adjustment allowed for the concrete handrail sections to meet the block caps of the piers. The lengthening of the balustrade seems to relate to providing better security. At least one historic postcard illustrated that the transition from the end of the original balustrade to the glacis was infilled with a picket balustrade. The existing balustrade, probably from the late 1930s era of construction, extends to a concrete retaining wall that extends from the south to the north where it intersects with the south face of the southeast corner of the east wing.

Figure 30: Time Period: circa 1965-1975



Source: SAJU Archives, Photograph Collection, img-917171245-0001

The above photograph appears to date from the post-U.S. Army period and the initial rehabilitation of Quarter No. 211 by the National Park Service. The construction of the west elevation of the south yard balustrade and the original entrance gate is documented before recoating and before the gate was replaced recently with a solid vertical panel door. The pedestal piers have bases that are integrated with the foundation of the wall. The pedestal shafts extend to a block forming a capital with a pyramidal cap. At this elevation the block receives canted sections of concrete handrails. Below the handrail sections are short concrete balusters set on a double stepped plinth panel relating to the height of the bases of the piers and recessed slightly from the foundation. The closely spaced balusters are symmetrical in profile with bottom plinths top caps. The center urn of each is bulbous with a center torus.

The photographed gate, now replaced, was constructed of vertical slats with open spaces between each to aid airflow. The replacement existing gate and north alleyway door were constructed of vertical boards to aid in security.

Of note, the southwest window of the street elevation shows that there were louvers in the window opening.

Figure 31: Time Period: circa 1990



Source: SAJU Archives, Photograph Collection, June 6, 1999 or 1995.

In this photograph of the west elevation looking south, the paint scheme has been changed from iron oxide red to pale green-gray with lighter trim, a change that probably dates from circa 1975. It appears that the sidewalk along Norzagaray Street has been replaced, allowing for the dating of the photograph. The photograph documents that the north section of the balustrade adjacent to the gate is under restoration. Of note is the fact that because the street and sidewalk are steep, the walls are discolored by hand prints and/or exhaust from the buses. Following this color scheme, the State Historic Preservation Officer recommended that Quarter No. 211 be painted historic Old San Juan colors, pink with white trim. It appears that this was a short-lived decision before the exterior walls were restored and then painted the present blue-gray color with white trim.

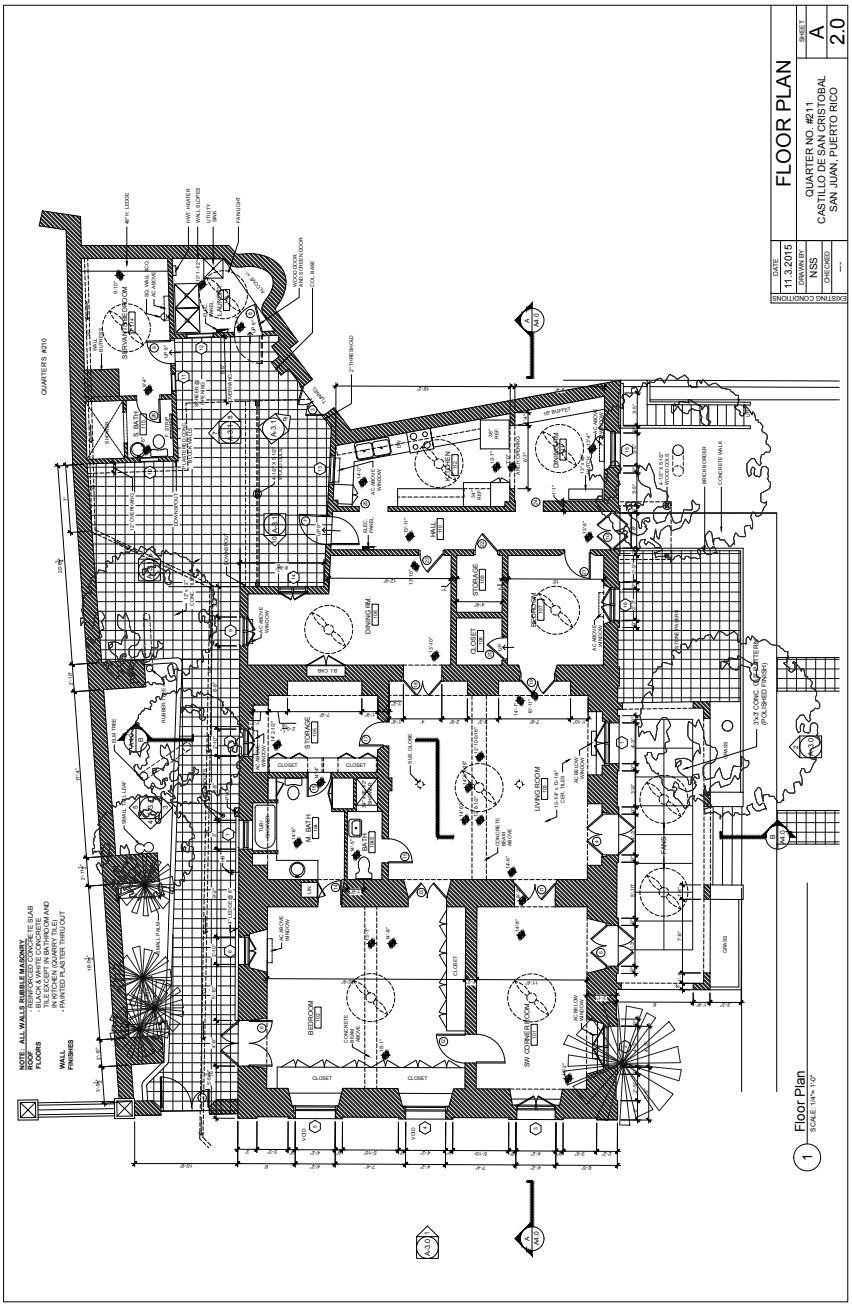
Figure 32: Time Period: 1995



Source: SAJU Archives, Photographic Collection, June 6, 1999 or 1995.

Taken in 1995, this photograph illustrates the roofing as replaced by the U.S. Army and then the National Park Service. The intermediate north-south parapet of the main block has been eliminated and a parapet remains between the main block and the enclosed east wing. Both roof surfaces are at the same approximate height. Also shown is the raised concrete parapet of the east and north wing exterior walls. The clipped corner corresponds to the intersection of the east wing with the historic tunnel entrance opening into the truncated northeast courtyard area. A retaining wall extends around the courtyard and intersects at the north with the retaining wall of Quarter No. 210. The north corner is infilled with the former Servant's Quarters and the laundry room. The structures are roofed with Spanish tiles. A corrugated metal shed roof covers the north entrance into the east wing.

Figure 33: Time Period: 2015



Source: The Collaborative, Inc.	2015 existing conditions drawings

Results of Non-Destructive Testing and Evaluation

The two primary NDE techniques with important results relative to the developmental history of the Quarter No. 211 were radar and paint analysis. The radar results for walls are indicated on the plans that follow. The radar results for the floors and ceilings/roofs are provided in tables. A synopsis of the paint analysis is provided as text.

Please note: the boundaries between materials found by radar are approximate and may vary somewhat from the depictions in the elevation plans. By example, in adding concrete to the existing walls for the increase in height, the top of the masonry may have been left ragged to provide better toothing for the concrete added to the tops of the wall.

Figure 34: Reinforced Concrete Floor Slab Characteristics, Based on SPR Analysis. (Appendix 3, Figure A3-16.)

Location	Reinforcement				Slab Thickness (inch)	Notes
	East-West		North-South			
	Spacing (inch)	Cover (inch)	Spacing (inch)	Cover (inch)		
Front entry porch	18	2.25-2.75	18	3.25-3.5	4.75-6.25	Typology 1
Master bedroom	21-26	4.75-6.25	21	6.25	5.5-7	Typology 2
Living room, dining room	24	4.75-7.5	16-20	4.75-6	5.25-7.5	Typology 2
Kitchen	22	3.5-4.75	22	4.25	5.25-6.75	Typology 3
Breakfast room (at southeast)	17.5-24.75	3.5-4	18-19.25	3.75	5.25-6.5	Typology 4
Servant's room	23	7-8.25	18	6.5-7.25	8.4-10	Typology 5 Top slab of 5 ¼" over bottom slab of 4 ¾"?

Figure 35: Reinforced Concrete Roof Slab Characteristics, Based on SPR Analysis. This figure is also Appendix 3, Figure A3-17.

Location	Reinforcement				Slab Thickness (inch)	Notes
	East-West		North-South			
	Spacing (inch)	Cover (inch)	Spacing (inch)	Cover (inch)		
Front entry porch	12	2.75	7	2.25	5	Typology A
Master bedroom	12-13	2.25	4-4.5	2	5	Typology B With 2 ¾" topping slab?
Living room	12	2.75	7	2.25	7	Typology A
SW corner room	6.5-7	2.5	12	2	7	Typology C
Hall near kitchen	6.5-8	1.75-2.75 (2 layers)	7.5	2.5	6.75	Typology D Strong reflections @ 9, 15" also
Breakfast room (at southeast)	6.75-8.75	2.25-3.75 (2 layers)	9.5	2.6	5	Typology E Strong reflection @ 9.6" also
Servant's room	7-11.4	2.125	8-10	2, 7.75-8 (2 layers)	10	Typology F

The two new measured drawings for Quarter No. 211 on the following pages were prepared as part of the contract for the Historic Structure Report. Two sheets of the exterior elevations were used as base drawings upon which were illustrated the results of the radar penetration project completed in 2015. Of note is the insertion of concrete below the sills of the street window openings of the west elevation and different masonry below the sills of the north window openings. Originally the openings appear to have extended to floor level, typical of masonry openings in San Juan. On-site evidence illustrates the change that included anchoring window grills to the new sills and embedding top and bottom rails into the jambs. The raising of the sills of the west elevation windows may have been accomplished when the National Park Service replaced the original windows with jalousie glazed sash, probably for security, or prior to this by the U.S. Army Corps of Engineers.

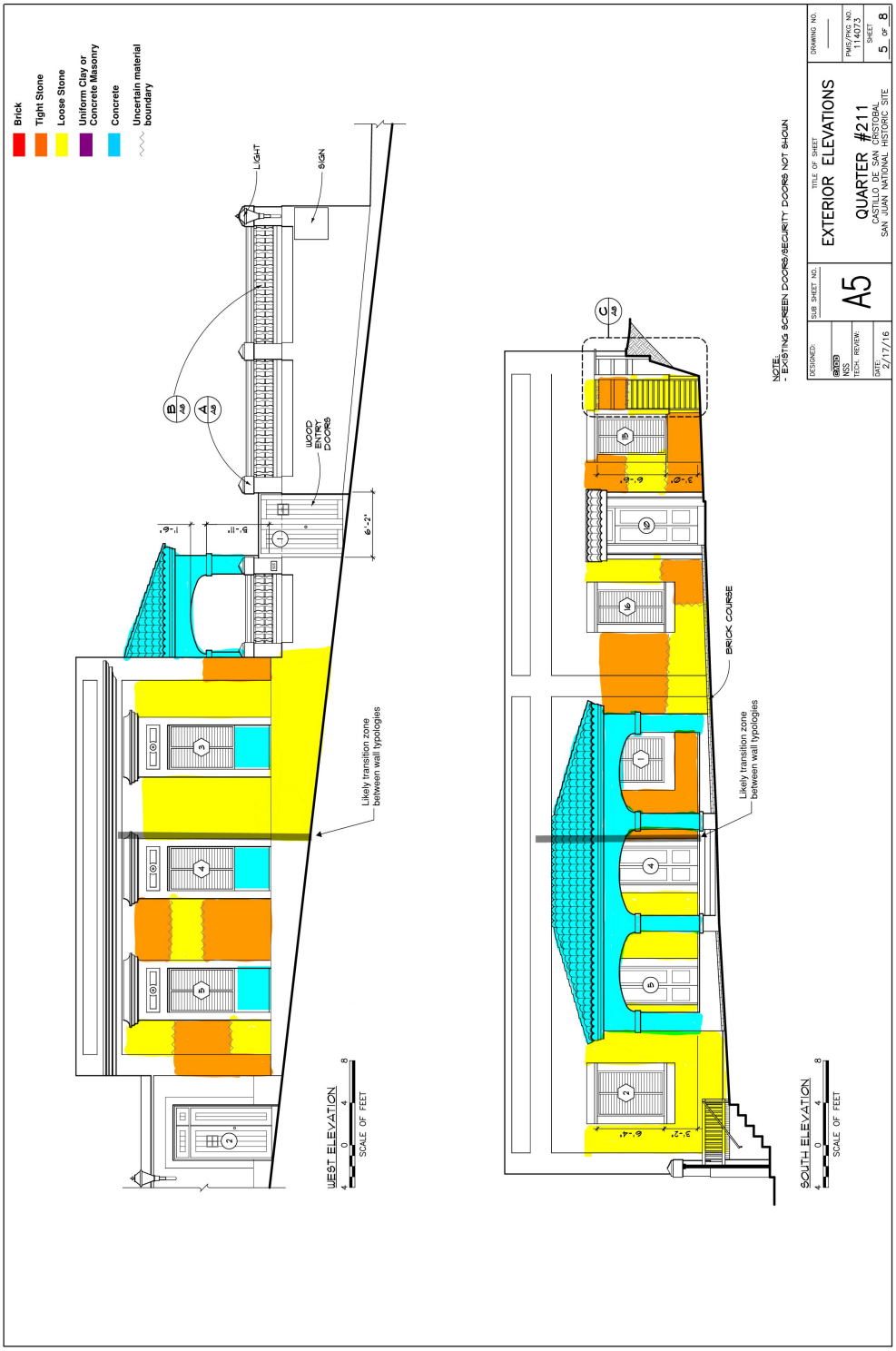


Figure 36: Quarter No. 211's west and south elevations with results of investigative testing. Source: The Collaborative, Inc. 2015

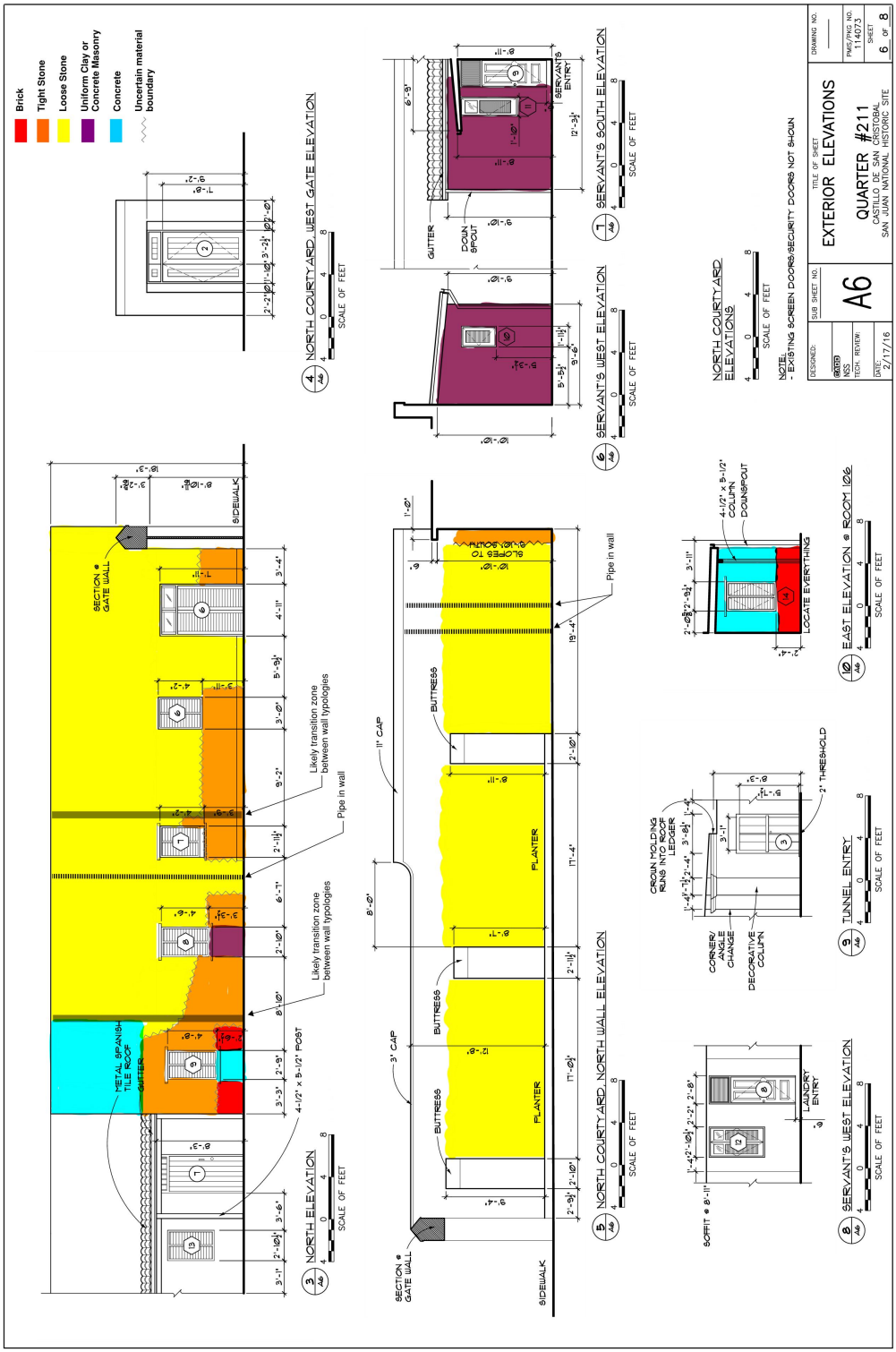


Figure 37: Quarter No. 211's exterior elevations with results of investigative testing. Source: The Collaborative, Inc.

More subtle was the revealing of vertical joints between abutting masonry of different types that define much of the growth of the residence. Adjacent to the south jamb of the center window opening of the west elevation there is a vertical joint indicating the south extension of the residence seen in the 1891 print. At the south elevation a vertical joint extends to the right of the central doorway into the existing living room. This suggests the lengthening of the square block plan to a rectangular block plan that encroached on the open courtyard patio at the east. At the north elevation two vertical joints in the masonry wall suggests the east addition and certainly construction of the present dining room. Other areas show the reconstruction of deteriorated stone work above the foundation as well as additional concrete used for the porch construction and heightening of the east wing walls probably from the 1930s.

Evaluation of the Paint Analysis Results Relative to Developmental History

Site

The balustrade evolved from pickets to concrete balustrade with both iterations sitting on top of a retaining wall. In the early 1890s, the pickets were set between columns (piers) of unknown material. Later photographs show the columns still in place although they may have been extended in height along with the wall height of the below retaining wall. Along the south perimeter, the east two-thirds was extensively changed by extending the balustrade sections to a stepped configuration. Modifications to the balustrade columns indicated by the paint analysis (Samples 1-7): the bead (banding) was altered after initial construction, the initial color scheme was the iron oxide color with white for the columns, and white for the concrete balustrade (balusters and rails).

Exterior Walls

The earliest color of the north elevation was green, the south elevation's earliest color scheme was red iron oxide with white on the highlighted elements (expressed from the wall plane), and the west elevation has many different colors—typical of major repair campaigns, none of which are the north elevation's green nor the south elevation's red oxide.

Interior

There are many colors with little consistency from room to room. The most pervasive first layer is a creamy yellow seen in rooms 103, 106, 107, and 111. The colors of the first three layers of each sample as set forth in the summary chart below and in Appendix 1 are from the period of significance. Additional layer colors are recent layers.

Figure 38: Paint Analysis Summary

Site

NOTE: The term fence within this figure refers to the site boundary enclosure comprising the retaining wall's plinth, piers, and balustrade.

Location	Sample ID #	1st Layer	2nd Layer	3rd Layer	Total # of Layers
Balustrade: Top Rail	1	White	White	—	2
Balustrade: Baluster	2	White	White	—	2
Balustrade: Bottom Rail	3	White	White	—	2
Balustrade: Column Cap*	4	Deep Rust Red (10R3/8)	Green (10Y7/2)	Salmon (7.5YR8/6)	6
Balustrade: Column Bead	5	White	White	—	2
Balustrade: Column shaft	6	Deep Rust Red (10R3/8)	Green (10Y7/2)	Salmon (7.5YR8/6)	6
Balustrade: Column Base	7	Deep Rust Red (10R3/8)	Green (10Y7/2)	Salmon (7.5YR8/6)	6

*Good sample, typical

Exterior Walls

Location	Sample ID #	1st Layer	2nd Layer	3rd Layer	Total # of Layers
Porch: Exterior Wall, NW Corner	8	Yellow (2.5Y8/4)	White	—	2
Porch: Exterior Wall, Band	9	Traces of Yellow (2.5Y8/4)	White	—	2
Porch: Exterior Wall, North Wall	10	Deep Rust Red (10R3/8)	Green (10Y7/2)	Salmon (7.5YR8/6)	6
Window at Breakfast Nook—Shutter Vane	11	Dark Brown (10YR2/2)	—	—	1
Window at Breakfast Nook—Frame/ Sash	12	Black	—	—	1
Window at Porch Interior—Vane	13	Black	—	—	1
Window at Porch Interior—Frame/ Sash	14	Black	—	—	1
North Elevation Exterior Wall East of Door 6 (see Key Map)	15	Green (10Y7/2)	Deep Rust Red (10R3/8)	Salmon (7.5YR8/6)	6
North Elevation Exterior Wall East of Window 6 (see Key Map)	16	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
North Elevation Exterior Wall East of Window 7 (see Key Map)	17	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
North Elevation Exterior Wall East of Window 8 (see Key Map)	18	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
North Elevation Wall North of Window 14 (see Key Map)	19	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
Elevation Exterior Wall West of Door 7 (see Key Map)	20	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6

Location	Sample ID #	1st Layer	2nd Layer	3rd Layer	Total # of Layers
Elevation Exterior Wall SW of Door 3 (see Key Map)	21	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
Elevation Exterior Wall NE of Door 3	22	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
Door 3 (see Key Map)	23	Black	—	—	1
Exterior panel above window of Room 102 (see Key Map)	33	White	Light blue gray (5PB7/1)	White	7
Exterior panel above window of Room 102, background, right side raised element (see Key Map)	34	White	White	White	3
Exterior panel above window of Room 102, background, center ornament (see Key Map)	35	Light blue gray (5PB7/1)	Salmon (7.5YR8/6)	Gray (5PB8/1)	4
Exterior panel above window of Room 102, background, (see Key Map)	36	Possibly specks of Salmon (7.5YR8/6)	White	White	3+
Exterior panel above window of Room 102, entablature (see Key Map and drawing)	37	Gray tint white	White	White	3+
Exterior panel above window of Room 102, entablature	38	White	Gray tint white	White	3+
Cornice	39	Gray (5Y7/1)	White	White	3
Cornice at “soffit” (see drawing on sheet)	40	Near white	Near white	Near white	5

Interior Walls

Location	Sample ID #	1st Layer	2nd Layer	3rd Layer	Total # of Layers
"Hearth" NE (see Key Map)	24	Traces of Yellow (2.5Y8.5/3)	Light gray green (5GY9/1)	White	3
"Hearth" SE (see Key Map)	25	Light gray green	Yellow (2.5Y8.5/3)	Green (10Y7/2)	5
Room 103 (see Key Map)	26	Yellow (2.5Y8.5/3)	Green (10Y7/2)	White	4
Room 105 (see Key Map)	27	Touch of Yellow (2.5Y8.5/3)	Green (10Y7/2)	Gray Green (2.5Y8/2)	6
Room 103 (see Key Map)	28	White	A bit of creamy white	White	3
Doorway between Rooms 102 and 103 (see Key Map)	29	Aqua green (7.5GY7/2)	Light Butterscotch (7.5YR8/4)	Creamy White	4
Room 102 (see Key Map)	30	Green (5G7/2)	Putty (2.5Y8/2)	White	5
Room 102 (see Key Map)	31	Creamy white	White	—	2
Room 101 (see Key Map)	32	Red (10R3/4)	Green (5G7/2)	Red (10R3/4)	8
Wall below hearth in laundry room	41	Salmon (7.5YR8/6)	Gray (10Y8/1)	Gray white	6
East wall of Room 102 (see Key Map)	42	Cream (10YR7/1.5)	White	White	3
East wall of Room 103 (see Key Map)	43	Creamy yellow (10YR9/3)	Green (10GY6/2)	White	6
East wall of Room 103 (see Key Map)	44	Creamy yellow (10YR9/3)	Green (10GY6/2)	Brown (7.5YR7/2)	5
East wall of Room 106 (see Key Map)	45	Creamy yellow (10YR9/3)	Green (10GY6/2)	Blue green (10GY6/2)	5+
West wall of Room 106 (see Key Map)	46	Creamy yellow (10YR9/3)	White	White	5
West wall of Room 107 (see Key Map)	47	Creamy yellow (10YR9/3)	White	White	3
East wall of Room 107 (see Key Map)	48	Brown coat of plaster	Creamy yellow (10YR9/3)	—	1

Location	Sample ID #	1st Layer	2nd Layer	3rd Layer	Total # of Layers
West wall of Room 111 (see Key Map)	49	Creamy yellow (10YR9/3)	Green (10GY6/2)	Brown (7.5YR7/2)	7
East wall of Room 111 (see Key Map)	50	Green (10GY6/2)	Brown (7.5YR7/2)	White	6

Timeline Showing Conclusions Regarding the Evolution of Quarter No. 211

Figure 39: Timeline 1792-1840s

This time period's documentation is primarily historic plans. The building's size, configuration, and location are indicated on these historic plans in a representational manner. The size is not likely to have been measured for what was then a secondary utility building. The configuration of the building in the plans was of a near-square or rectangular shape. The location varies; generally, the building is depicted near the west boundary and close to the current north site boundary. The location of a smaller than the current size building within the existing site boundaries is possible, without the current retaining walls at only the west end. The slope of the surface of the west glacis of Castillo San Cristóbal indicates a possible extension beyond the current east-to-west length. The accompanying plan has the northwest corner of the building highlighted in blue. Its east-to-west length is 24 feet. It would have been able to be constructed on the westerly portion of the existing site without the construction of the east boundary retaining wall, assuming a 25% slope to the glacis.

The west site boundary abuts the now-artificial grade of Norzagaray Street, constructed circa 1897. The natural grade prior to road construction was probably close to the current grade as there were some buildings along the route in the 1790s and the land filled in with buildings as the 1800s progressed. Stepping up into the building provides drainage protection. Stepping down does not. The grade at the northwest corner of the blue indicated first phase would have been the closest to the level of the finish floor elevation. This is still the case today.

Quarter No. 211 appears to precede Quarter No. 210, therefore only a short retaining wall was needed along the north boundary. When Quarter No. 210 was constructed, this in-common retaining wall height was increased to provide a level building pad for Quarter No. 210.

For Quarter No. 211's site, only with the building expansion, as depicted for the next two construction phases, are retaining walls required to be built to create a level building pad for a greater than the approximately 24' x 24' sized first phase building.

The first phase of construction is believed to be represented in the current building's northwest corner, designated room #102, with approximate dimensions of 24' x 24', built of mixed masonry, with two splayed jamb openings in each wall. The current internal dividing wall, the dividing wall between current rooms 101 and 102, is not as thick as the other three walls (14 inches versus 36 inches), indicative that its function was an internal wall and not original. Other possibilities are that the original was replaced, or the original was modified, or the first phase of construction went further south and included currently designated room 101.

The current room 102 has an east-west concrete abeam to carry a portion of the roof loads. It may have been a replacement of a wood roof beam or be located where there was a bearing wall, at the north-south midpoint of the room.

Modifications have been made to the openings in the three near original walls. The north elevation's entry doorway is slightly wider than the others, consistent with its modification for primary entry to the room. Other doorways have been shortened by concrete infill below the current window sills (west elevation) or brick infill (north elevation).

The splayed jamb detail is an important period identifier. The paired doors were intended to lay back onto the jambs when the doors were opened, allowing for unobstructed / unrestricted passage. Later period paired doors were set into perpendicular to wall face jambs. However, in some locations there are splayed jambs where there is no purpose to the configuration (numbers 19 and 21). The original doorway opening size has been altered at door #14, leading from bedroom #102 to the bathroom, by the addition of a linen closet within the space of the original north splayed jamb.

From an historic perspective, the major period of construction of the larger site was the last third of the 18th century, a time when the demand for iron fittings would have peaked. Demand for construction-related ironwork would have been reduced after 1800. The iron working function likely changed to support the daily functions of life in the fortifications and support for the military functions, such as the canon carriages and trucks. As the iron working needs were in less demand, and the housing of officers was in greater demand, these together would cause the alteration of the building use and stimulate the building's size increase.

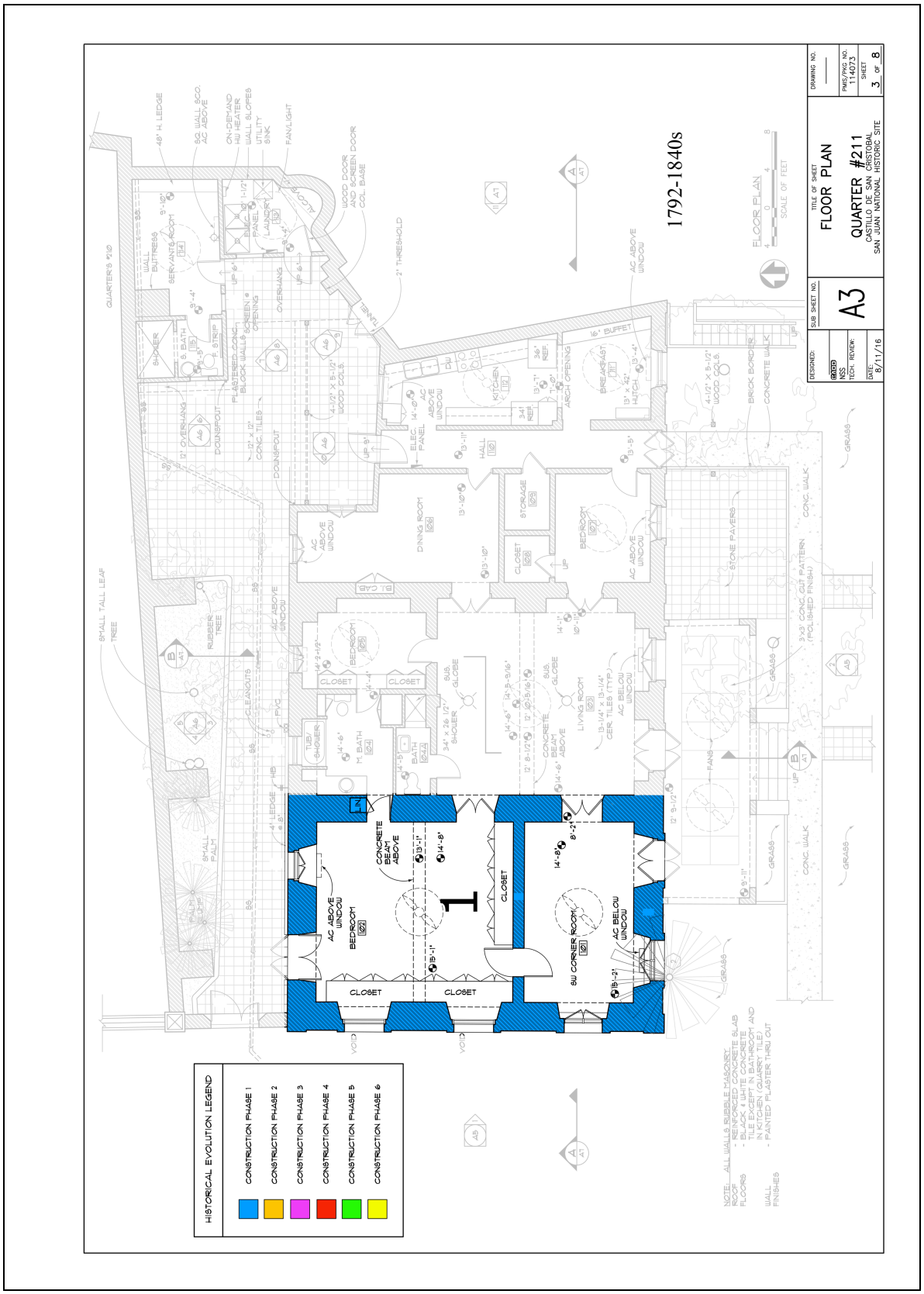

HISTORICAL EVOLUTION LEGEND
CONSTRUCTION PHASE 1
CONSTRUCTION PHASE 2
CONSTRUCTION PHASE 3
CONSTRUCTION PHASE 4
CONSTRUCTION PHASE 5
CONSTRUCTION PHASE 6
1792-1840s
FLOOR PLAN
QUARTER #211
CASTILLO DE SAN CRISTOBAL
SAN JUAN NATIONAL HISTORIC SITE
A3
8/11/16
PMIS/PKG NO. 114073
SHEET 3 OF 8

Figure 40: Timeline 1860s-1880s

By 1880, the original northwest structure, outlined in blue, appears to have been expanded into a larger roughly square block. The supposition is that an east addition, outlined in orange, was constructed. This expansion may have been divided into three rooms by tow partitions. One partition location is represented in part by the concrete beam spanning the present living room, aligning with the partition wall of the original northwest building.

A second partition wall location may align with the concrete beam currently dividing the northwest room (#102). If this layout of six rooms was indeed accurate, each room would have had at least one exterior entry.

Quite understandably, most blacksmith shops have the living quarters separated from the forge with its attendant heat and smoke. For the same reason, in hot climates, the forge was often placed outdoors, with just a small roof over the forge hearth to keep rain from putting out the fire. With the transition from the blacksmith shop to the quarters for officers, the site's functions would change and the site needed to expand the area upon which a larger building could be built.

For the building to expand to the east, retaining walls were required. The large 36-inch-thick mixed masonry walls were modified in details for the expansion to the east. Mestre's 1792 plan does show a rectangular shaped building in the approximate locatino of Quarter No. 211. Seeking corroboration of the original building being rectangular, the drawing attributed to Augusto Pleé from 1821-1823 does seem to indicate a building with three wests-facing windows.

The 1840's model of the fort provides a representation of a one-story, almost-square-shaped building, at the current location of Quarter No. 211. Sometime between 1792 and 1835-1840, the building appears to have been expanded to the east. Retaining walls are not indicated in the model, for this site specifically and throughout the model generally.

Steep slopes are graphically represented in the current retaining wall locations in an 1861 drawing. These graphic representations may be retaining walls, may be rip-rapped slopes, or just steep slopes. In any case, the site walls were necessary for building expansion.



Developmental History: 76

Figure 41: Timeline 1880-1887

The square-block plan was extended east with a small east wing probably in 1880 as part of a project to convert the building into officers' quarters. The three eastern rooms access the courtyard principally by the north and east doorways. It was indicated in the penetrating radar survey that the north window openings had been filled below the window sill to wall sill level by material different than the adjacent wall material. This infill indicates the likelihood the openings once were doorways.

The remodeling of the 1880s may have included the construction of the dining room to the east within the east courtyard (seen in the stereo photograph). Though these walls are now constructed of concrete, it is possible that the original partitions were frame as the photograph shows a roof but not an east wall, leaving the room open to the courtyard. Later, in the 1930s, the U.S. Army reconstructed much of the area, extending concrete walls to provide suitable support for the concrete roof slab that covered the area.



To provide room to expand the building to the east, a retaining wall was required. To provide lateral support to the retaining wall, there was constructed a return at the southeast corner. Perhaps later, this return was integrated with the south wall of the east wing. Also later, the height of the south wall was increased, and the corner was likewise increased (see east wall photo at left). The roof project of the 1930s further raised the east wall, across a portion of its thickness.

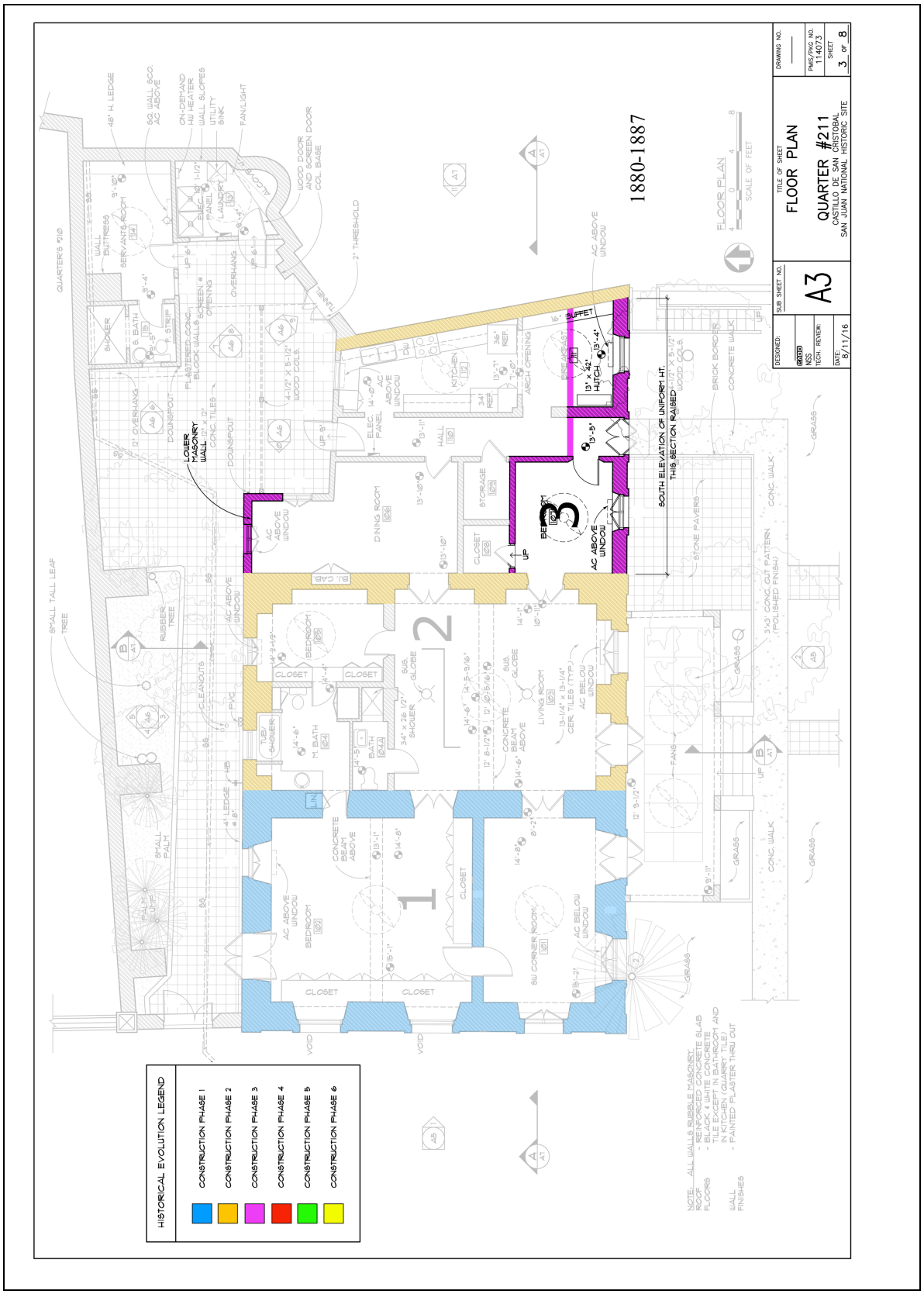
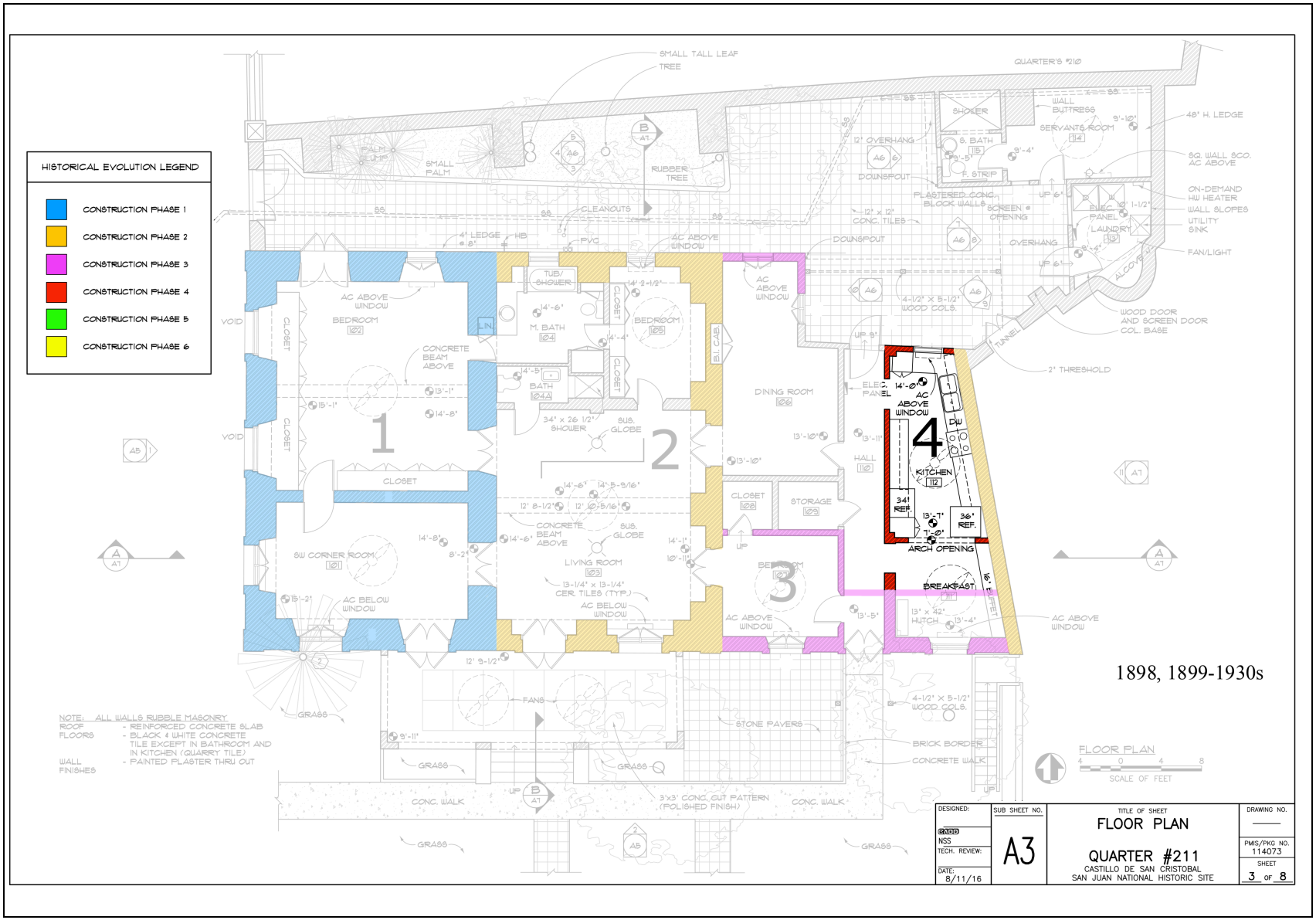

HISTORICAL EVOLUTION LEGEND
CONSTRUCTION PHASE 1
CONSTRUCTION PHASE 2
CONSTRUCTION PHASE 3
CONSTRUCTION PHASE 4
CONSTRUCTION PHASE 5
CONSTRUCTION PHASE 6
1880-1887
FLOOR PLAN
QUARTER #211
CASTILLO DE SAN CRISTOBAL
SAN JUAN NATIONAL HISTORIC SITE
A3
8/11/16

Figure 42: Timeline 1898, 1899-1930s

During this era, Quarter No. 211 was converted to duplex officers' quarters, probably around 1897 when the nearby Santiago Gate was demolished. An inventory of 1899 completed by the U.S. Army confirmed the new use of the building where the room sizes of the two units were recorded. It is impossible to confirm the exact plan from the given dimensions for the two units that had six rooms and seven rooms. The north extension of the east wing created additional space with a narrow section of the courtyard between it and dining room addition.

One of the best photographs is the stereoscopic pair attributed to the year 1898, although it could be a few years later. It has a viewpoint of Castillo San Cristóbal and looks down on the roofs and east wing. There is a great deal of information of merit in the photograph, which is set out on the floor plan timeline. The open sided extension with the lower roof appears to have been used for dining.

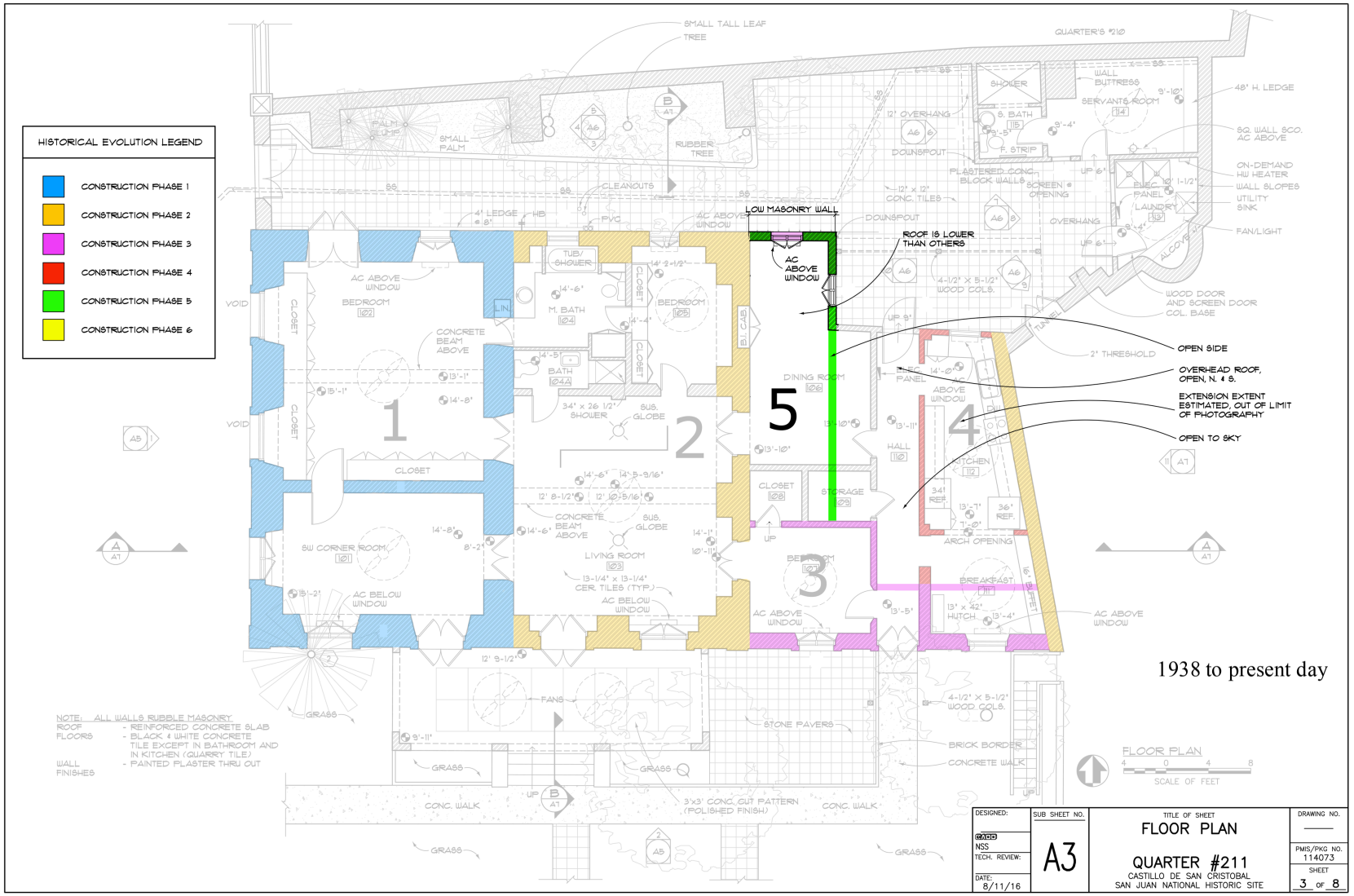


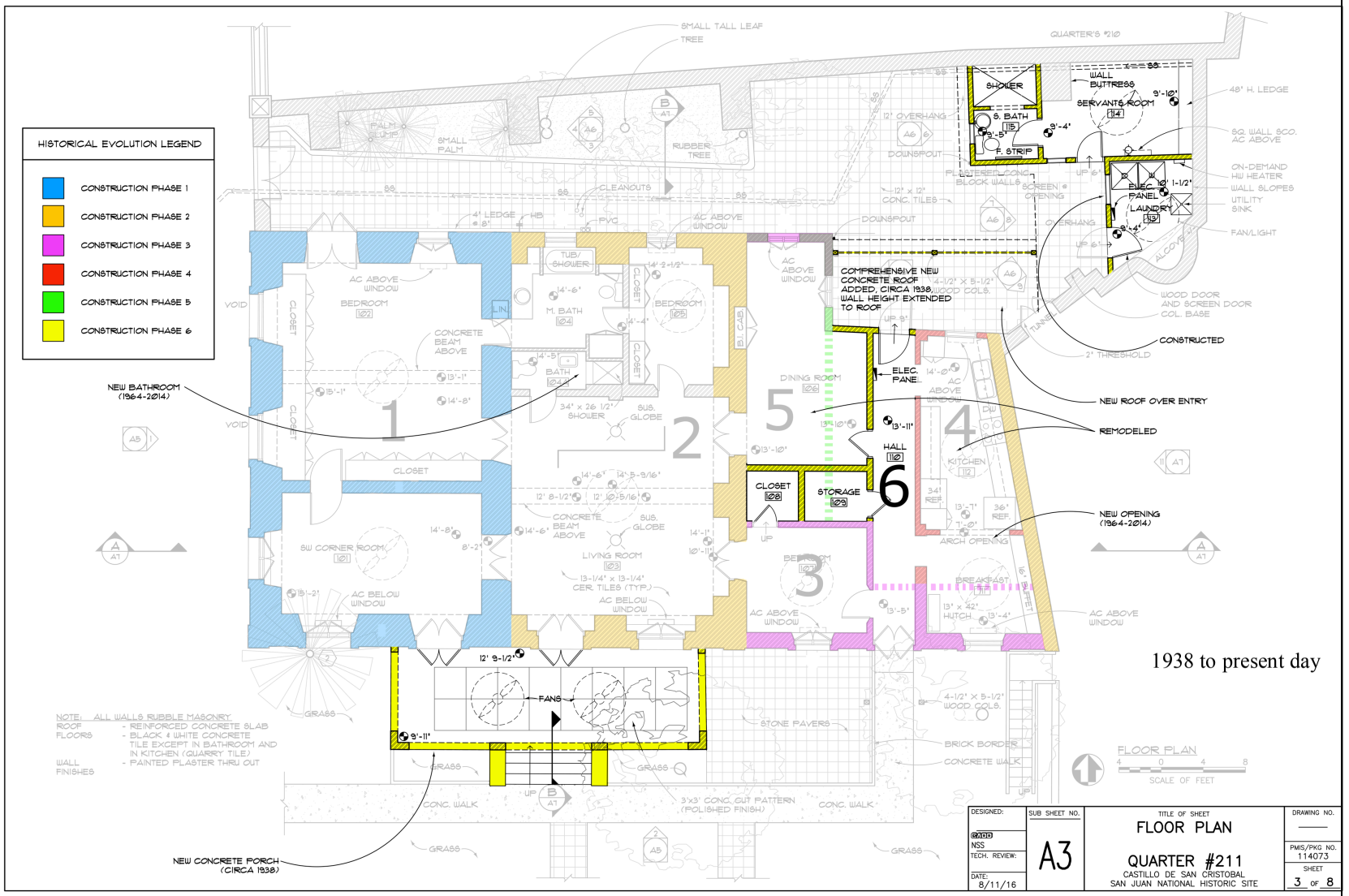
Developmental History: 80

Figure 43: Timeline from circa 1938 to Present Day

The concrete south porch was constructed in about 1938, at which time the walls of the east extension were completed in elevation and expanded in plan to form an interior corridor. It is also likely that the servant's quarter was constructed at this time.

Since 1964, the breakfast room was created from a southeast bedroom, with a doorway to the kitchen, a bathroom was added by subdividing the main bathroom, and the kitchen was remodeled. The northeast entry into the courtyard from the house was protected by a roofed entry area.


HISTORICAL EVOLUTION LEGEND
CONSTRUCTION PHASE 1
CONSTRUCTION PHASE 2
CONSTRUCTION PHASE 3
CONSTRUCTION PHASE 4
CONSTRUCTION PHASE 5
CONSTRUCTION PHASE 6
1938 to present day
OPEN SIDE
OVERHEAD ROOF, OPEN, N. & S.
EXTENSION EXTENT ESTIMATED, OUT OF LIMIT OF PHOTOGRAPHY
OPEN TO SKY
LOW MASONRY WALL
ROOF IS LOWER THAN OTHERS
AC ABOVE WINDOW
NOTE: ALL WALLS RUBBLE MASONRY
ROOF - REINFORCED CONCRETE SLAB
FLOORS - BLACK & WHITE CONCRETE TILE EXCEPT IN BATHROOM AND IN KITCHEN (QUARRY TILE)
WALL FINISHES - PAINTED PLASTER THRU OUT
FLOOR PLAN
SCALE OF FEET
DESIGNED: NSS
TECH. REVIEW:
DATE: 8/11/16
SUB SHEET NO. A3
TITLE OF SHEET FLOOR PLAN
QUARTER #211
CASTILLO DE SAN CRISTOBAL
SAN JUAN NATIONAL HISTORIC SITE
DRAWING NO.
PMIS/PKG NO. 114073
SHEET 3 OF 8


HISTORICAL EVOLUTION LEGEND
CONSTRUCTION PHASE 1
CONSTRUCTION PHASE 2
CONSTRUCTION PHASE 3
CONSTRUCTION PHASE 4
CONSTRUCTION PHASE 5
CONSTRUCTION PHASE 6
NEW BATHROOM (1964-2014)
NEW CONCRETE PORCH (CIRCA 1938)
COMPREHENSIVE NEW CONCRETE ROOF ADDED, CIRCA 1938. WALL HEIGHT EXTENDED TO ROOF
CONSTRUCTED
NEW ROOF OVER ENTRY
REMODELED
NEW OPENING (1964-2014)
1938 to present day
NOTE: ALL WALLS RUBBLE MASONRY
ROOF - REINFORCED CONCRETE SLAB
FLOORS - BLACK & WHITE CONCRETE TILE EXCEPT IN BATHROOM AND IN KITCHEN (QUARRY TILE)
WALL FINISHES - PAINTED PLASTER THRU OUT
FLOOR PLAN
SCALE OF FEET
DESIGNED: NSS
TECH. REVIEW:
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SUB SHEET NO. A3
TITLE OF SHEET FLOOR PLAN
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SHEET 3 OF 8

With Regard to Mostly NPS Maintenance

U.S. Army Period

Commencing in 1898, the U.S. Army began the maintenance of Quarter No. 211, and the modifications into quarters for its own officers. In the 1930s, the U.S. Army installed a concrete slab roof. The masonry walls were brought up to a near uniform height with concrete and roof slab connected into the bearing walls. The SPR evaluation indicates a variance in the roof slab characteristics of the east wing, a likely indication that the roof slab was constructed in two phases. The concrete south porch was believed to have been constructed in 1938, a year when New Deal Money was available at the park. In 1950, the U.S. Army repainted Quarter No. 211.

NPS Period

In 1965, the NPS replaced the windows. The "Rehab of Qtrs. No. 211" was started in June 1965, according to the Superintendent's report. In 1977-1979, the National Park Service undertook renovations of the interior and exterior of Quarter No. 211. In 1984, Quarter No. 211 was repainted; the replastering of the interior and exterior was an extensive project. Also in 1984, the bathroom cabinets were installed and possibly this is when the claw foot tub was replaced by a tub/shower. In 1985, Quarter No. 211 was rehabilitated, including adding screens to the porch. In 1986, the electrical system of Quarter No. 211 was replaced and conduit was installed. The roof of Quarter No. 211 was replaced in 1988 and the porch's roof tile was replaced in 1996. In 1997, the sidewalk on Norzagaray Street was rebuilt and the windows were replaced. In 1998, Quarter No. 211 was painted "peach with white trim." Before that it was red with white trim, probably from 1965. The peach color was painted over with gray paint and white trim.

C. Physical Description

Construction materials encountered throughout building and site elements include the following.

1. Mamposteria masonry: the majority of masonry construction throughout Quarter No. 211 appears to be a form of masonry termed mamposteria. Mamposteria is coursed construction containing a mix of large and small stone units interspersed with occasional pockets of brick or regular small stone construction. This construction typology is represented throughout the local area as shown in Figure 44 and Figure 45. The majority of the building's exterior walls, interior walls, and retaining walls exhibit mamposteria construction.

   Radar scans often showed a distinct change in mamposteria construction at some areas (see radar section and notes on building elevations). These changes are subtle but indicate either a different construction crew or a different construction era. Sometimes the size of the masonry unit changes, but more typically it is a change in wall solidity, from very solid with complete mortar fill behind stones (termed "tight" masonry construction) to wall sections having some gaps and voids in mortar fill (termed "loose" masonry construction).

2. Reinforced concrete: concrete reinforced with regularly spaced steel bars was detected throughout the floors, roof, and at some wall sections. Floors are reinforced concrete slabs on grade throughout. Slabs throughout the house are of similar thickness (ranging from 4.75 to 7.5 inch thick) and with similar reinforcement layout. There is a change in slab construction at the servant's room, where the slab is much thicker (up to 10 inches thick) and reinforcement placed much deeper in the slab than throughout the rest of the home. These differences indicate the floor slab at the servant's room is of a different era than slabs throughout the rest of the home.

   Concrete roof slabs at the porch and throughout much of the home have similar construction characteristics, with roof slab thickness in the range of 5 to 7 inches and reinforcement spacing varying from 4 to 7 inches in the main span direction, to 12 to 13 inch spacing for transverse reinforcement. Roof slabs at the kitchen hall and breakfast room have different characteristics, most notably having 2 layers of reinforcement in the main span direction. This reinforcement layout could be interpreted as a more modern design, or a design originating from a different engineering office, and suggests these roof slabs were constructed in a different era than roofs throughout the rest of the home. The roof at the servant's room also has 2 reinforcement layers, and the slab here is 10 inches thick. Both of these construction characteristics point to a possible 3rd construction era at the servant's room roof.

   Reinforced concrete was also used at site walls to the south and west of the south yard, and at isolated areas throughout the building walls. Reinforced concrete was used to infill below present window openings at the west elevation, extending from the window sill to the first floor. The porch roof structure at the south side of the building is constructed entirely of reinforced concrete, including the roof,

pillars, and arched areas above openings. Portions of the north and east dining room walls are also built of reinforced concrete.

3. Brick masonry: regularly coursed brick masonry construction appears to have been used as infill at isolated locations of the north and east dining room walls.
4. Clay and/or concrete masonry construction: nondestructive scans detected regularly-coursed, unreinforced hollow-unit masonry construction at the servant's room and a section of the east hallway wall between the breakfast room and the hallway. The exact type of masonry unit could not be determined using nondestructive diagnostic methods.



Figure 44: Exposed masonry at the fortress, showing highly variability of mamposteria masonry construction. Construction includes coursed stone masonry and rubble masonry interspersed with occasional brick leveling courses.



Figure 45: Exposed masonry construction at a local home near Quarter No. 211, showing highly variable masonry wall construction with large dressed stones, small rubble stone, and occasional brick infill.

Site

Boundary Enclosure

Site Boundary Enclosure Description: Boundary enclosure is the term used in this report for the pier (column) and connection balustrade that sit on top of and are a part of the retaining wall on the site's south and west boundaries. The boundary enclosure begins at the southeast site corner, proceeds westerly to the southwest site corner and then northerly to the southwest corner of the house. This notable site feature is penetrated at the west run by a wood entry gate. The south run of boundary enclosure is in seven approximately equal length sections. Numbering the sections from east to west, sections one through five step down from one down to two and so on. Section five steps down to the level of sections six and seven, which are at one level. The west run has three sections, numbers eight, nine, and ten all at the same level as six and seven. Sections eight and nine run from the southwest site corner to the entry gate. Section ten, which is substantially shorter in length than the others, runs from the north edge of the entry gate to the southwest corner of the house (see figures on the following pages for exterior views). The contained site behind the boundary enclosure is essentially level and the step downs in the boundary enclosure are more emphasized in the interior view of the retained area. At the east portion of the flat site, the retaining wall and the boundary enclosure are considerably above ground level, creating a sense of privacy that is reduced at the west portion where the site elevation is above the ground outside the boundary enclosure.

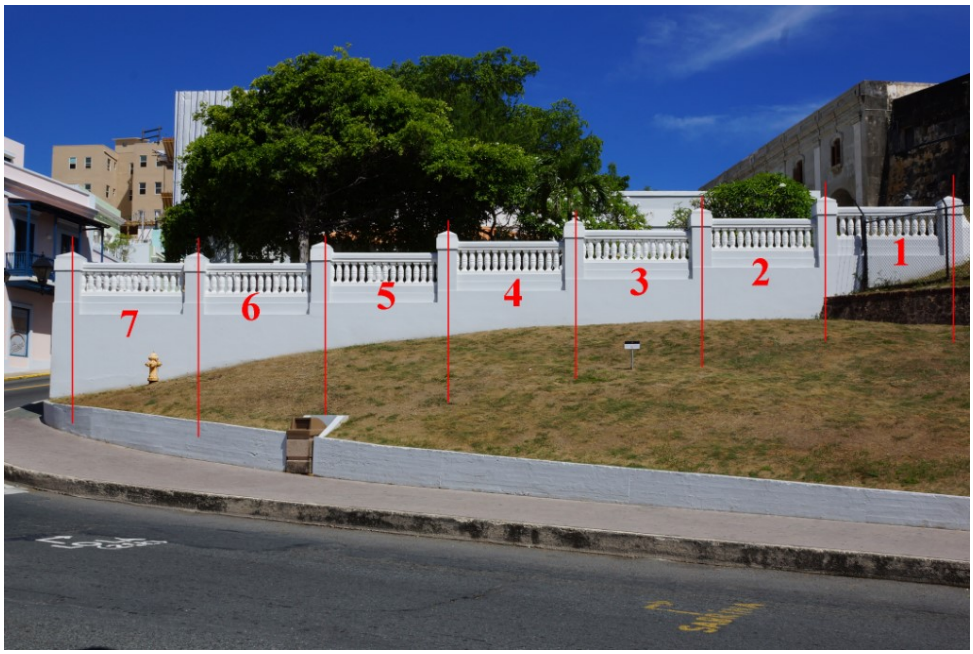

Figure 46 (JDF772): Overview of the south face of the boundary enclosure with seven sections. Number of sections has #1 at photo right.



Figure 47 (JDF775): Southwest corner of boundary enclosure.



Figure 48 (JDF777): West boundary enclosure: Overview, with section ten at left, then entry gate, and sections nine and eight at photo right.



Figure 49 (JDF783): Interior of boundary enclosure, north face, sections one through four (left to right).

The boundary enclosure sections are each composed of columns (or piers), a top rail, balusters, and a supporting plinth that sits on top of the retaining wall and supports the bottoms of the balusters. The balusters of each section commence and end with an engaged half baluster on the columns. The typical number of full balusters is thirteen, however section one has twelve, sections eight and nine have fifteen, and section ten has nine. The difference in numbers of balusters is a reflection of the variations in the length of the sections. Both the balusters and base exhibit coatings of multiple layers as analyzed in the paint analysis Appendix 1.

The material of the boundary enclosure, also termed **"**balustrade," is concrete. Whether the concrete has metal reinforcing was evaluated using surface penetrating radar (SPR). No remnants of metal pickets were found in radar scans. Reinforcement is found in infrared (IR) scans below balusters (see the table in figure below). Historic black and white photographs indicated that the concrete top rail and the balusters replaced vertical pickets. It was a possibility that the pickets were metal and had been embedded in the concrete plinth but the SPR did not detect any regular pattern of metal in the plinth, only in two of the scans were metal remnants found vertically oriented with 5-inch spacing. Regular metal reinforcing was not found for the plinth nor the top rail, such as: a consistent pattern, of near uniform size, and embedded to a set depth. Reinforcing of the concrete retaining wall that serves as the base for the balustrade, and possibly the columns, was present, however fewer reinforcing bars were found to have been used than current practice would recommend. Given the small surface area of the columns, SPR is difficult to employ at these locations. Of future interest would be to understand how the balusters are connected to the plinth and to the top rail, and how the top rail and half balusters are attached to the columns.

Figure 50. Site wall radar scanning.

Location	Radar Scan No.	Vertical Reinforcement		Horiz. Reinf.	Notes
		Spacing	Cover		
East retaining wall (RW)	029	None		None	Very loose masonry, rubble
South wall, at base of balusters	024	12" to 16"	5.7" to 6.2"	None seen at scan	
South wall, 12" below balusters	025	> 24"	5.25"	Bar at 4.75" depth detected	
South wall, 18" below balusters	026	12"	11.5"	None seen at scan	Core looks rougher: 3" cement plaster over masonry?
West wall, at base of balusters=RW	027	30"	1" to 1.2"	Bar at 1.3" depth detected	3 total minor reflections, possible metal fence remnants
West wall, 12" below balusters	028	30"	4" to 4.1"	None seen at scan	Very faint, possible reflection from metal fence remnants

NOTE: The shaded areas of the table indicate retaining wall.

Site Boundary Enclosure Condition: Overall the boundary enclosure is in good condition. The examination focused on surface irregularities: chips, cracks, bulges, vegetative growth, and staining, particularly brown stains indicative of subsurface rust. The observed ridges in each baluster were attributable to the seam in the mold or possibly the balusters were cast in two halves and joined together. (See close up of the three balusters on the right side of Figure 51 of section six with visible seams). If there were previously repaired cracks, they were not generally visible; given the many layers of thick coatings, this is understandable. The exterior face of baluster #6 of section four, numbering from right to left (in this case east to west), has a possible earlier crack repair. Section three exterior face has a brown stain at the base of baluster #1; a previously repaired crack, still open, for #3: and a crack and latent spall for #10. There is a small crack at section seven's west column that runs diagonally from the upper level of the plinth across and ending in the column (see the close up of this area in Figure 52). There is a rust stain on the interior face of baluster #10 (again counting from right to left on the exterior, or south to north) of Section Eight. Other than a few surface deposits of soil and just a few areas of coating loss, the other balusters appear to be in good condition. In addition, there are no apparent areas of concern for the top rail, the plinth, or the columns except as noted below. At the interior face of the column between Sections Four and Five, there are four holes left by mounting fasteners for what appears to have been a garden hose rack. These are notable by their brown stain indicating rusting and that these fasteners were not stainless steel.



Figure 51 (JDF771, cropped): South face of boundary enclosure: Section 6 to the right and Section 7 to the left. Close up shows visible seams of balusters.



Figure 52 (JDF771, cropped): South face of boundary enclosure: small crack at section seven's west column that that runs diagonally from the upper level of the plinth across and ending in the column.

There is a crack in the west exterior face of the southwest column between sections seven and eight. This crack originates behind the surface mounted light fixture (Figure 53) and continues down the wall into the retaining wall and goes behind the surface mounted sign. There is no evidence of the crack continuing below the lower edge of the sign. The crack appears to be more than just a surface crack (shallow) as there is displacement evident. Removal of the sign would allow determination of the exact extent and depth of the crack, and any displacement out of plane. One possible cause of the crack may be the use of mild steel fasteners for the light fixture, the sign or both, and consequent rust

jacking. The crack may also be due to some disturbance to the ground below as the lower portion of the retaining wall at the corner has a section of lost stucco and the extension of the short southern site retaining wall has a point of repair at this corner. These can all be seen in Figure 53.



Figure 53 (JDF776, cropped): Showing crack in the west exterior face of the southwest column between sections seven and eight, and repairs at the base.

Retaining Walls

There are three retaining walls: the boundary enclosure retaining wall, the east retaining wall, and the north retaining wall. Each wall is described individually and each wall's condition is set forth individually. The boundary enclosure retaining wall is under the balustrade and appears in historic photographs to have been constructed at the same time as the boundary enclosure columns. The east retaining wall is at the east end of the south garden and retains the glacis behind to the east and extends north to become the east wall of the house, laundry room, and servant's quarter. The north retaining wall is at Quarter No. 211's north site boundary and retains the neighboring Quarter No. 210 and site to the north, and extends into the servant's quarter. The three examples retain differing soil and superimposed loads in different ways.

Boundary Enclosure Retaining Wall Description: The south and west concrete walls under the fence retain the flat south site or garden area of Quarter No. 211. It is a fairly thick wall and gains stability near the southwest corner to some degree as it is ell-shaped in plan.

The boundary enclosure retaining wall height varies from 33.3 to 8.33 feet, it is 53 feet in length for the long south leg and 28.5 feet in length for the west leg.

East Retaining Wall Description: The east retaining wall at the flat south site (the "garden") is 7 feet high, 53 feet long, and its thickness and complete cross section is obscured. However the section through this wall as seen for its exposed top and south face is as shown in Figure 52. The concrete overlay is unreinforced and the underlying mixed material masonry is unreinforced according to the results of the radar survey.

The east retaining wall retains the soil of the steep slope of the glacis above the wall top and to the east. At the south garden location, this wall has a battered face, a continuous buttress seen at the lower 62% of the wall, and is buttressed by both the south retaining wall and the south wall of the house. For the remaining portion of this wall, it is part of the house, the north courtyard, and the laundry and servant's quarter, all of which have perpendicular connecting walls acting in some degree as buttresses.

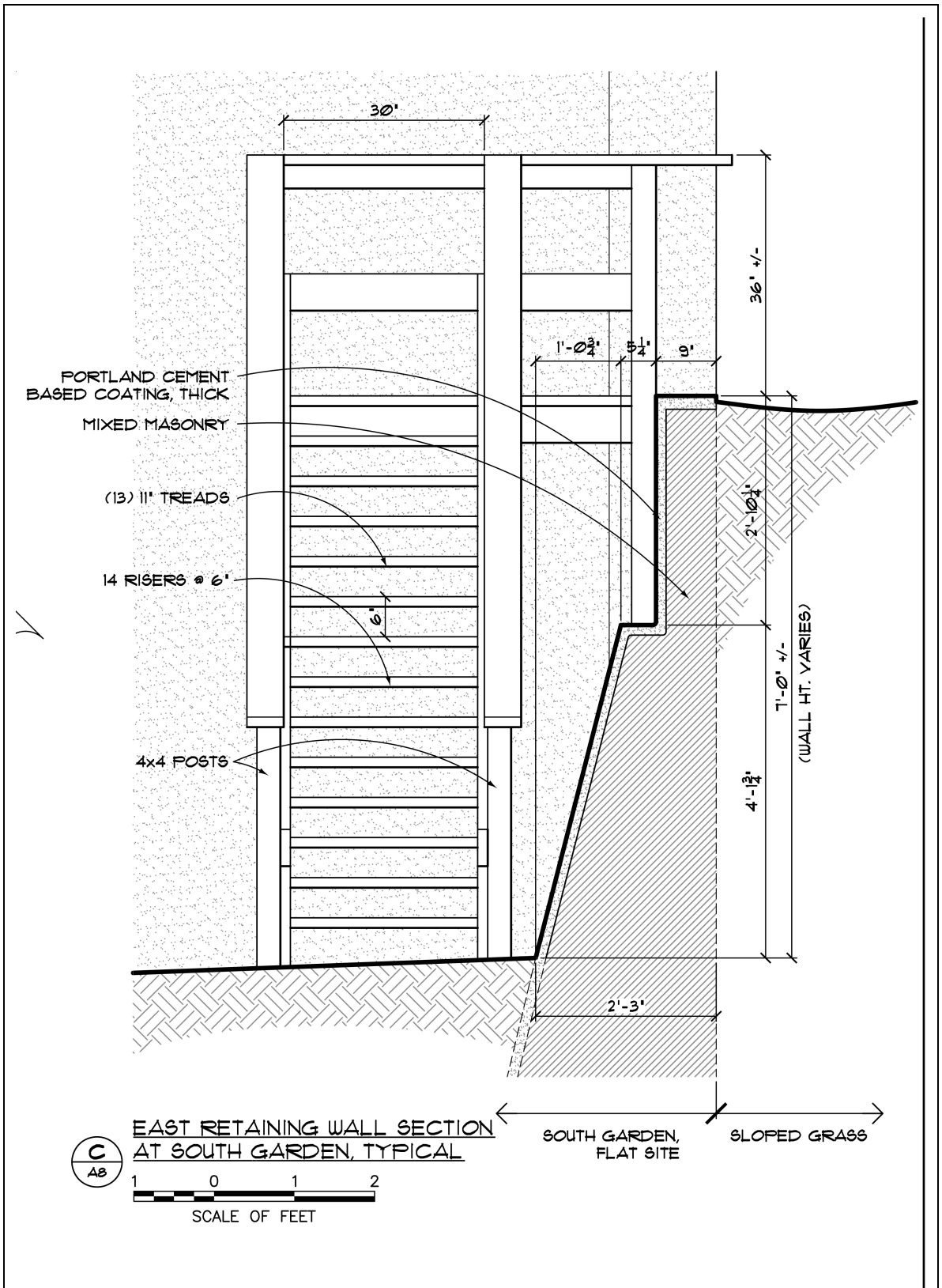

Figure 54: Section through east retaining wall at the flat south site

The visible face of the east retaining wall is concrete, however it appears to be constructed of concrete overlay of an earlier mixed material masonry wall. Examination by surface penetrating radar indicates the masonry as being fairly loose, exhibiting significant voids or containing a significant mortar fraction. Examination of the short section of the backside of the wall that is exposed due to the loss of the overlying concrete (see Figure 55), a small area of less than 1 square foot, exposed is the underlying mixed material masonry of stone and some brick. While only this area may have been constructed of these materials, in order to execute the stepped decorative end modeling as seen in the photograph, the radar results indicate a consistent condition in the scan along the upper 38% of the entire wall. The east wall has a bottom (lower 62%) section constituting a continuous battered buttress. The face of the concrete is rough, unlike the smooth faces of the fence retaining wall. The overlaying layer of concrete may have been shot on to the wall similar to “shotcrete” (patented in 1911).



Figure 55 (JDF795): Exterior corner of join between south fence and retaining wall. Note decorative treatment of south terminus of east retaining wall.

Based upon the historic plans of the area, it appears that some form of retaining wall extended to the north of the east end of the south garden. The entrance to the tunnel is likely to have been within the face of a retaining wall.

Further to the north at the top of the wall above the tunnel entry with the spires, mixed masonry is visible under the overlay of concrete parge coat, where there are missing areas of parging.

North Retaining Wall Description: The north retaining wall is the highest and retains the loads of the soil of Quarter No. 210's yard, plus the load of a portion of Quarter No. 210, and must resist the lateral pressure of the roots of the trees in Quarter No. 210's yard. This historic masonry wall has buttresses spaced along its front in the north courtyard and one additional is in the suite of rooms known as the servant's quarter.

The north retaining wall extends from the northwest gate easterly to the west elevation of the servant's quarter's bathroom wall, and beyond as an interior wall, while still acting as a retaining wall. The wall serves as the north border of the north courtyard and is in variable condition. In the courtyard, three buttresses divide the wall into four sections (see the diagram in the figure below). They are between 2.83 and 1.96 feet in width, and average approximately 9 feet in height. The north retaining wall is 66.5 feet in length. The additional portion inside the servant's quarter is 21 feet. The wall is between 12.67 and 14.5 feet in height and is of unknown thickness except where exposed above grade at the yard of Quarter No. 210 where it is 11 inches. Buttresses are three in number (plus one in the servant's suite).

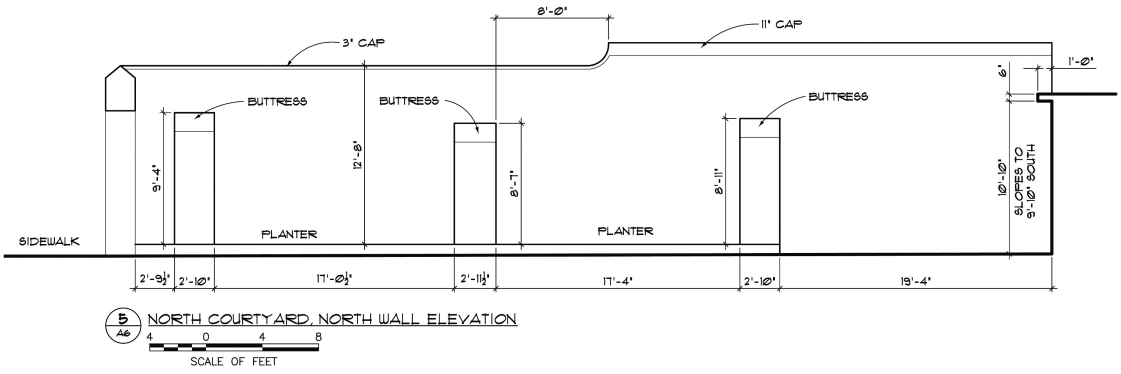

Figure 56: North courtyard's north wall elevation

Surface Penetrating Radar Results for Retaining Walls

The existence and dimensions of any foundations for all three retaining walls are not known. The SPR results for aspects of reinforcement metal for two sample sections of the boundary enclosure, and the south and west boundary enclosure retaining walls are provided below.

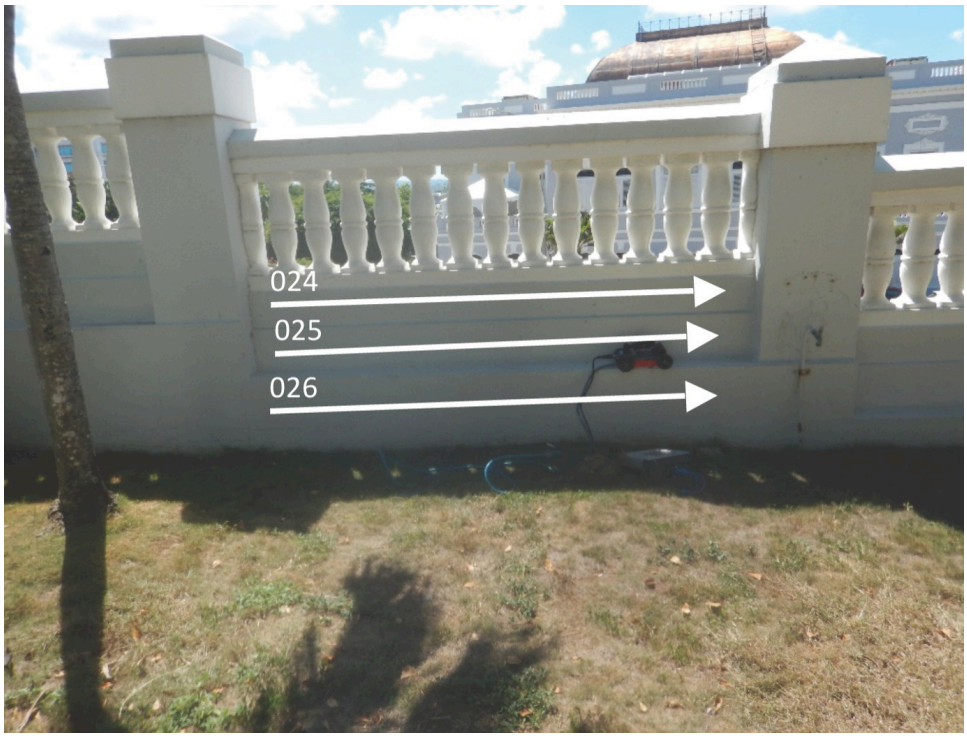

Figure 57 (MPS867, annotated): North side of south wall at lawn. Radar scan locations as shown.

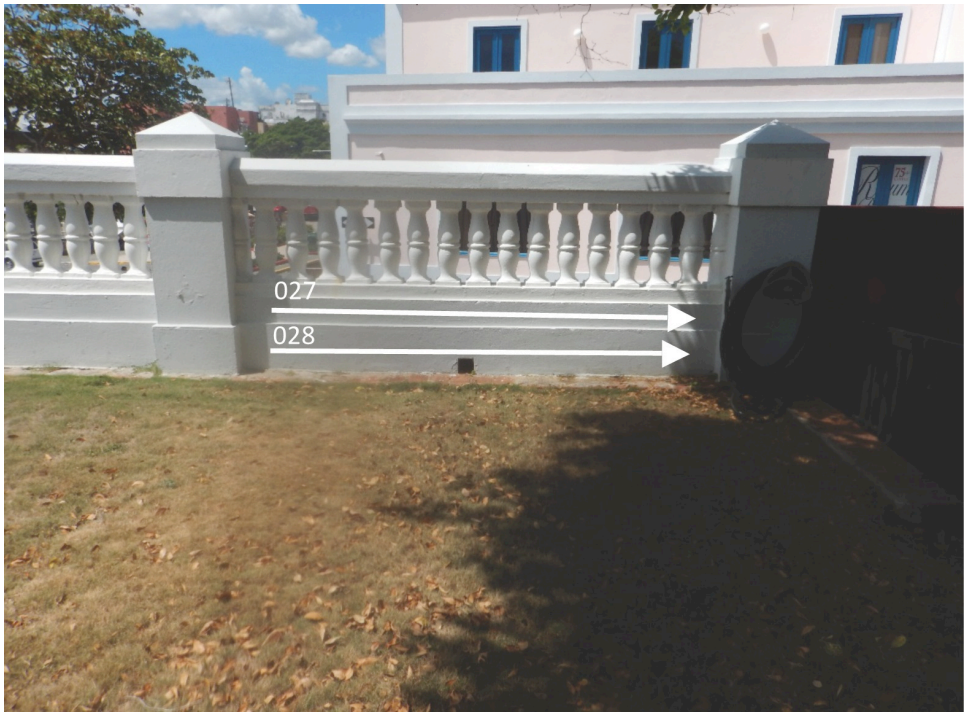

Figure 58 (MPS869, annotated): East side of west wall. Radar scan locations as shown.

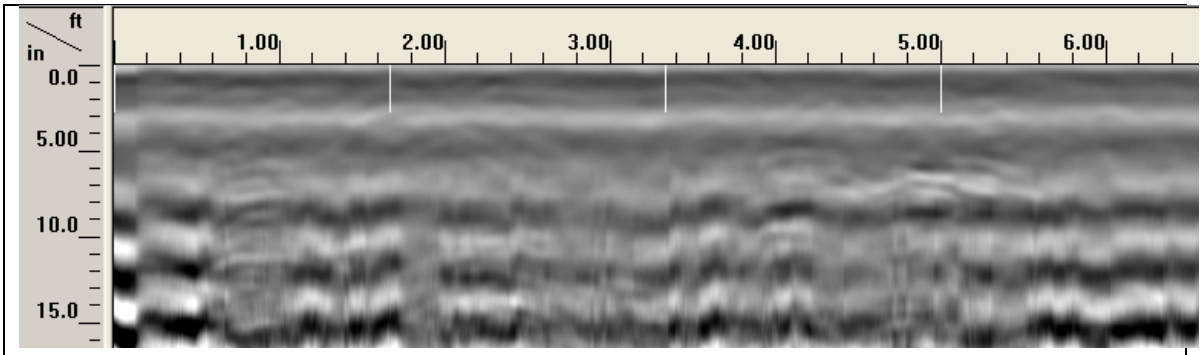

Figure 59 (Radar scan 029): east retaining wall, upper part above buttress. Scan area representative of very loose masonry, indicating rubble stone masonry with poorly consolidated or debonded mortar.

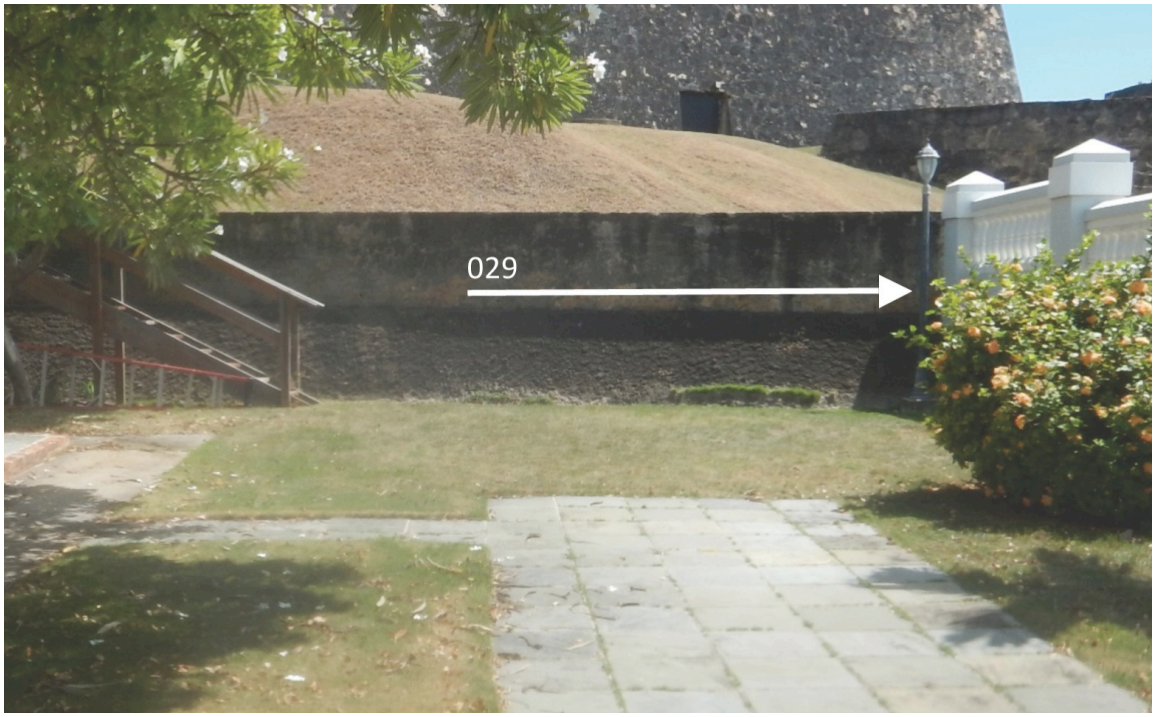

Figure 60 (MPS870, cropped + annotated): East retaining wall in courtyard. Location of radar scan 029 shown at arrow.

Boundary Enclosure Retaining Wall Condition: The retaining wall under the boundary enclosure sections is in good condition. Other than the crack at the southwest corner discussed above, the wall only has some minor cracks and a few small rust stains. The minor cracks are at the south wall exterior descending from the shelf upon which the plinth rests at the two columns bracketing section three. A horizontal minor crack is seen at section five. However, the biggest crack of any possible significance is at the southwest corner's west elevation, and on the south elevation there is evidence that there

was a previous repair of a diagonal crack and a vertical crack. The area should be monitored for crack reappearances, new cracks, and existing crack expansion (Figure 61).

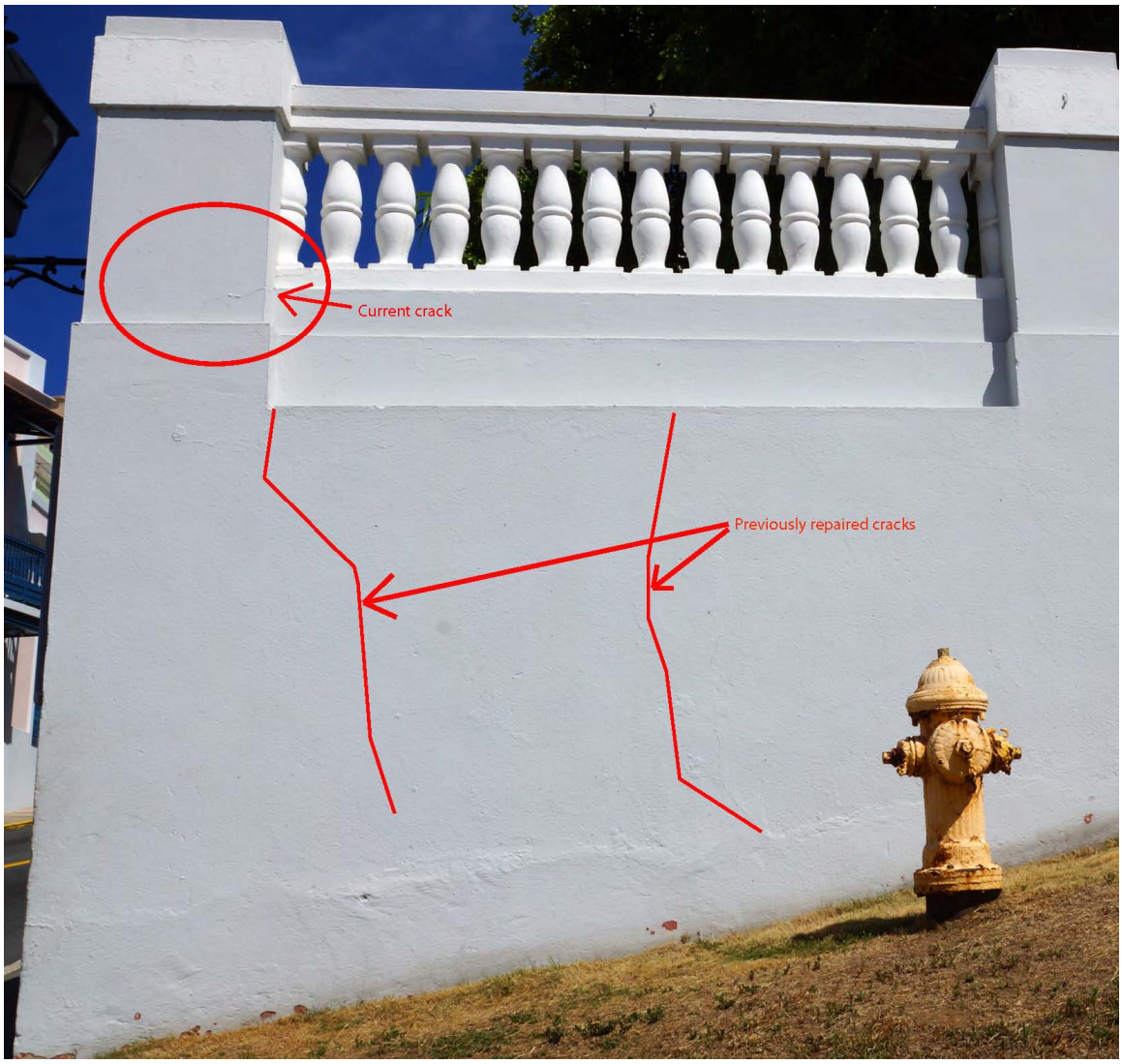

Figure 61 (JDF771, cropped + annotated): South face of retaining wall along south boundary, west end.

East Retaining Wall Condition: The condition of the east retaining wall is good. The only apparent crack is located a few inches above ground level, is horizontal in orientation, extends for about half the length of the wall, and does not appear to be active. Due to the roughness of the face of the wall, it is difficult to determine if the wall plane shows differential movement along the crack. It is possible that the crack is a cold joint resulting from the concrete placement, however, at the crack in the concrete face, one can observe what appears to be red brick in one location. The crack is between 1 and 1-1/2 inches in depth, further supporting the alternative that the concrete is an overlay. If the core of the wall is mixed material masonry, the gap is of insufficient width to observe the condition of the masonry at this location and make a determination of whether the crack

continues back into the masonry core. The crack appears as a gap in some places open and in other places it is supporting grass growth (see Figure 62).



Figure 62 (JDF1057): Condition Issues: Base of cast retaining wall.
Note longitudinal crack.

North Retaining Wall Condition: Due to the extensive cracking and wall bulge, the condition evaluation techniques focused on this section, using radar scans, out of plumb and plane measurements, and mortar sampling and analysis.

Retaining Wall Displacement

Laser Plumb Survey: A laser plumb was used to quantify lateral wall displacement along three vertical lines and one horizontal line at the north retaining wall (see Figure 63 for locations). Results of the laser plumb survey are included in figures 64 and 65. The section had the most cracking and was therefore selected for supplementary displacement measurements.

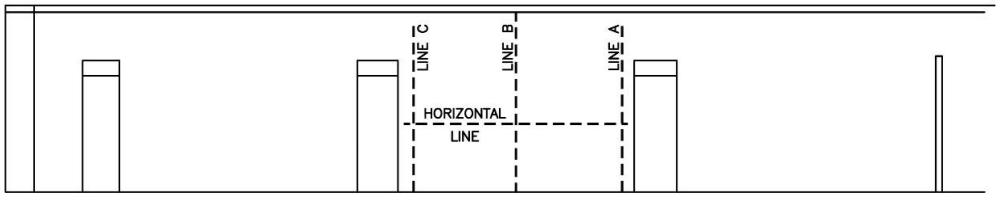

Figure 63: Locations of laser plumb measurements at the north retaining wall.

At Line A, the wall is essentially plumb up to the top of the buttress; above that point, the wall displaces sharply to nearly 2 inches outward. Displacements along Lines B and C are dominated by horizontal flexure of the wall panel between buttresses, with a

maximum displacement of 0.75 and 1.5 inches above mid-height, returning to negative 1 and 0 inches at the top of the wall. Vertical profiles reflect cracking and confirm outward bulging of the wall.

Horizontal displacement shows classic flexure curvature between buttresses, with a maximum displacement of nearly 3 inches midway between buttresses.

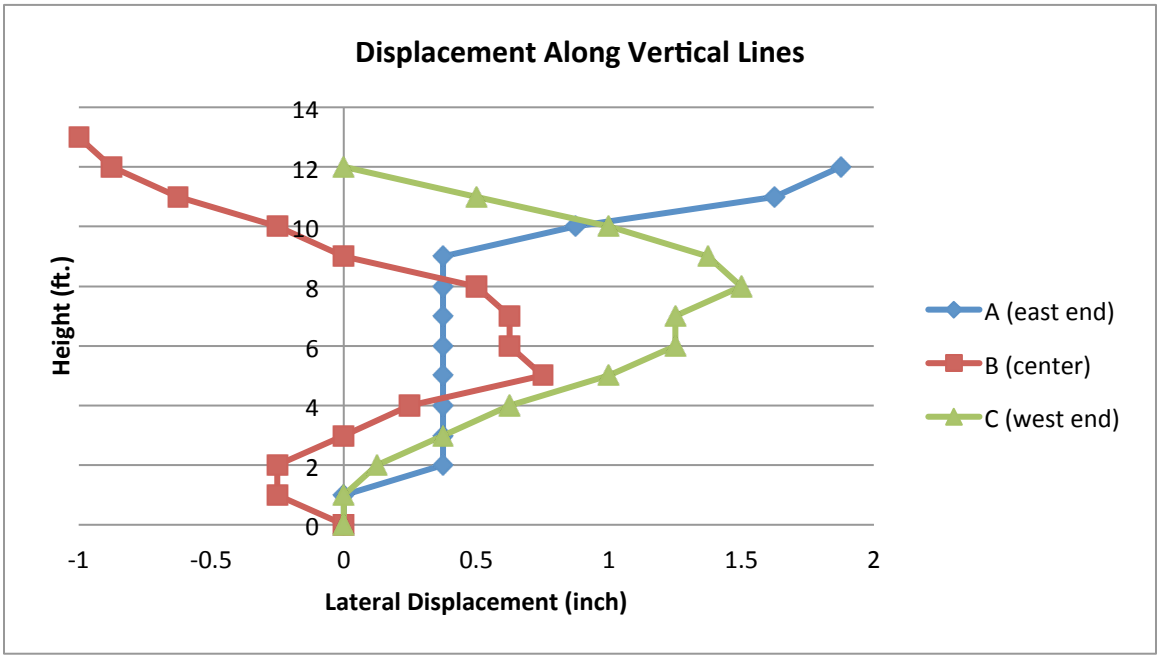

Figure 64: Horizontal displacement measured at the east end, center, and west end of the center panel at the north retaining wall. Positive measured displacement represents movement outward.

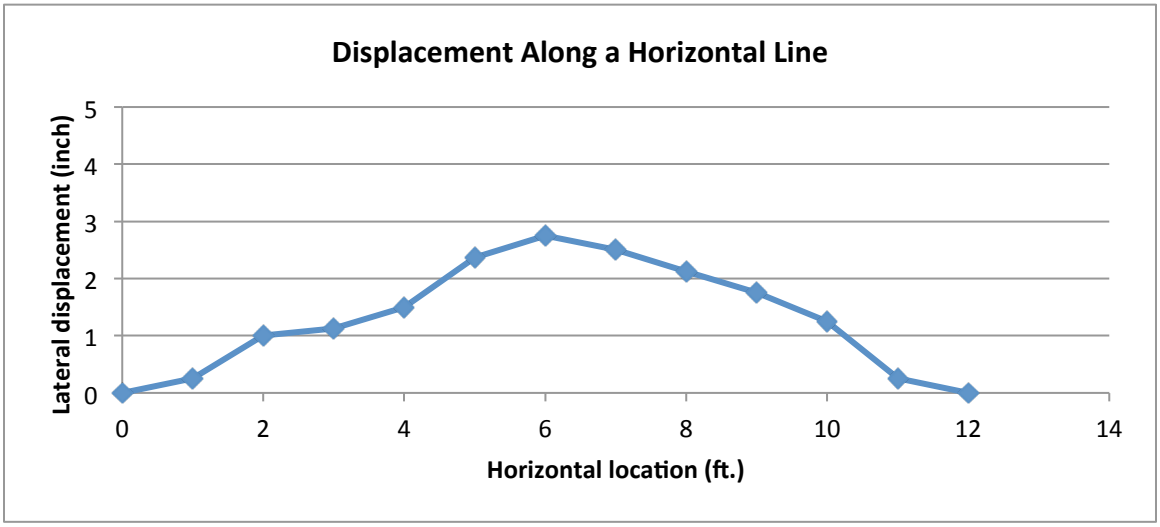

Figure 65: Horizontal displacement measured at the north retaining wall, center panel, at an elevation of 4'-11" above grade. Outward movement is represented as positive displacement.

Laser Plumb Survey – Discussion: Significant lateral movement was recorded at the north retaining wall. Displacements appear related to vertical and horizontal flexure action rather than rigid-body rotation of the wall. Movement is most likely caused by overloading as a result of soil loads and surcharge loads from Quarter No. 210, located directly to the north of Quarter No. 211. The south wall of Quarter No. 210 is built into the top of the retaining wall, partially compromising wall thickness. Retaining wall movement may be exacerbated by vegetation growth within the wall and in close proximity to the wall at its base and on the grounds of Quarter No. 210. Movement may also have been caused by past seismic events. Structural analysis is required to determine adequacy and the need for any retrofit or strengthening.



Figure 66 (MPS969): Vegetation growth at Quarter No. 210, north of the Quarter No. 211 retaining wall (which is seen painted yellow at right in this image).



Figure 67 (MPS942): Horizontal and diagonal cracks at the center retaining wall panel

Stairs

Stairs Description: There are three sets of site stairways: a concrete set of stairs at the west entry to the south gardens (3 feet, 11 inches in height), concrete entry steps to the enclosed porch (1 foot-6 inches to 1 foot-10 inches in height), and a wooden staircase and landing platform (average 7 feet in height) at the northeast corner of the south gardens, which appears to have been installed in the last 20 years.

These features are depicted on Sheet A2 "Site Plan," on the exterior elevation sheet A5, and details of the staircase on sheet A8. The documentation drawings are in Appendix 9.

West Entry Stairs: This entry begins at the wood doors set between the sidewalk and the concrete entry platform and continues up four steps (four treads, five risers) to the site walkway above. The sunken entry platform is at sidewalk grade and a short concrete retaining wall encloses the area. On top of the wall is an approximately 30-inch high wooden fence with a gate. The wood fence has dark brown painted spaced square wooden pickets set between a top and bottom rail (Figures 68 and 69).



Figure 68 (JDF605, cropped): Wooden fence with a gate at photo left.



Figure 69 (DB894): Guardrail at west entry.

Entry Stairway to the Porch: This stairway extends from the entry walkway to the enclosed porch. It has three stairs (three treads, four risers), concrete cheek walls, and no entry platform. The lower edge of the bottom riser is at or near grade at its eastern end and about 4.5 inches in height at its western end, reflective of the site gradient. The surfaces are coated: white for the stair risers, a dark gray for the stair treads, a blue gray for the vertical surfaces of the cheek walls below the cap, and white for the cap of the cheek walls (see figure 70).



Figure 70 (JDF791): South elevation of enclosed porch and Quarter No. 211 (The wall above the porch roof is blocked from view by tree.)

Wooden Staircase and Guardrail at the Northeast Corner of South Gardens: The wooden staircase extends from the east end of the garden up to a landing platform, which extends to the east over and beyond the east retaining wall to the glacis. The stairs have 13 treads and 14 risers, and the bordering wood railings have a top rail of a flat two by six and an intermediary rail of a vertically placed two by four (see figures 71 and 72). The height of the railing is 36 inches at the stairs and the top landing. The adjacent tree to the west has branches that overhang the staircase creating limited head clearance. The wood may have had a stained coating at one time but at best it is now partial in coverage.



Figure 71 (JDF789, cropped): South elevation of Quarter No. 211, east portion: east end of south lawn. Note upper landing and stair railings (36 inches in height) do not meet code requirements (see detail “C” on plan sheet 8).


Figure 72 (JDF787): Wood stairs. See sheet 8 of plans, detail C.

Stairs Conditions: The west entry area components are in good condition. Code requires a guardrail system if the top of the entry wall to the entry platform distance is greater than 30 inches in height. If greater, the current guardrail would need to be brought into compliance. Such code requirements include height of 34-38 inches, baluster spacing of 4 inches or less, and more stable connections installed to resist lateral pressure. The gate in this wood fence should be strengthened by a tension rod to reduce the current sag.

The entry stairs to the porch are in good condition, although the riser heights vary.

The wood staircase is in fair condition. It has had some recent replacements of deteriorated treads, indicative of the likely end of service life issues. Monitoring of condition is recommended. Overall this stairway has a temporary feel to its construction; meant to serve a short-term access need. The railings are not to code and it lacks spaced (maximum 4-inch spacing balusters or equivalent). The open risers require a closure per code and will require replacement. The overhanging tree branches should be pruned to provide the required head clearance. The lower ends of the stringers appear to be in sufficient contact with surface water and soil to provide a suitable environment for wood deterioration from rot. While the stringers are not stained, there is the possibility that they are of wood treated with a preservative (pressure treated lumber, for example), but have lost their characteristics green tinge associated with such treatments.

Patios/Courtyards and Internal Walks

Patios/Courtyards and Internal Walks Description: Three types of materials have been used for site-located hard surfaces: poured-in-place concrete for the entry walk to the two south elevation entry doors; natural stone in blue color for the two patios of the south garden and the two connecting walks to the east patio; and concrete tiles for the north courtyard. In addition, brick has been used as edging or borders between walks and planting beds, and between planting beds and grassed areas. Typically the brick edging is of two single-wythe courses with mortar. These hard surfaced areas are shown on the site plan.

Patios/Courtyards and Internal Walks Condition: All of these elements are in good condition.

Vegetation

Vegetation Description: Trees are noted as to location and represented on the site plan. Most of the trees had metal shields around their trunks to discourage climbing by green iguanas (*Iguana iguana*).

Vegetation Condition: The trees are in good condition. The previously described pruning recommendation for the tree at the wooden stairway is a maintenance issue. As the trees get larger headroom clearance can change, creating clearance problems as can rubbing of tree branches against the structures.

Entry Doors

Entry Doors to the Site Description: There are three entry doors to the site. Two entry doors come from the sidewalk: one into the north courtyard and one into the south garden. A third door provides access to the tunnel and from the tunnel at the east portion of the north courtyard. These doors and their descriptions are all set forth in the door schedule (Appendix 5). Of note is that the two sidewalk located entry doors are new and replace early doors with spaced vertical slats. A comparison of the two periods is shown for the north courtyard entry door (see figures 73 and 74).



Figure 73 (JDF842): Current new door.



Figure 74 (JDF632): Older door, photographed June 4, 2015.

Entry Doors to the Site Conditions: The two entry door pairs are of new Dominican mahogany, are in as-new condition, and are in good condition.

The tunnel entry door is 67.5 in height. It comprises two leaves, each leaf is 18.5 inches wide, for a total of 37 inches. The two leaves, each with two wide vertical boards over two wide vertical boards, are painted dark brown.



Figure 75 (JDF969): Site Door 3, Exterior of tunnel access door.



Figure 76 (JDF1022): Interior view of one leaf of the two-leafed door that provides access to the tunnel.

Site Entry Door Hardware

There are three site doors, all of which have modern hardware; brushed metal finish deadbolts.

Infrastructure Systems

Infrastructure Systems Description: Quarter No. 211 has both underground water and sewer systems connected to municipal systems. Per discussions with NPS park maintenance personnel, these site-located systems are under the concrete paving tiles of the north courtyard. Discussion described that similar utilities, or perhaps only the sewer lines, came from the adjacent to the north Quarter No. 210. This was confirmed in the evaluation of the north courtyard wall by thermographic imaging in which two vertical pipes can be seen in Section Four (the easternmost section).

Infrastructure Systems Condition: The condition of these subsurface utility systems was not investigated due to access considerations.

Site Drainage

Site Drainage Description: In general the site drains from east to west. Contributing flows onto the site are only likely from the east, off the glacis of Castillo San Cristóbal. These surface flows pass over the grassy slope with interruption by a stone-lined channel, the bottom of which slopes south, following the secondary slope of the glacis. Interruption of subsurface water may occur by a hidden system, such as a French drain set parallel to the back of the wall. Suspecting that the presence of a French drain was possible, a search was undertaken to find an outlet for the pipe of a French drain. None was found. The possibility of the presence of a French drain still exists and warrants further on-site research, as by an exploration pit.

The north courtyard drains west to the street. The south garden also drains toward the west although it appears the water is generally absorbed in the lawn area. There are small relieving drains through the base of the perimeter concrete plinth/retaining wall top. However, there are no drip tracings on the exterior surface of the retaining wall as evidence of flow through the relieving drains.

Site Drainage Condition: In the search for effects of saturation of the east site wall and the retaining wall as it enters the building interior, material problems were found in two areas that are likely attributable at least in part to moisture uptake in the east wall. In the breakfast room, mold was found behind a framed print hung on the east wall. This specific area would experience less air movement over the wall surface due to the presence of the print, and thus less surface evaporation.

With the drainage flow from the adjacent site glacis being generally east to west, the east boundary of the Quarter No. 211 site boundary interrupts the flow. The four sections of the east boundary, moving from south to north are: site retaining wall, Quarter No. 211 main building east wall, tunnel entry portal wall, and east wall of the servant's quarter's two rooms. The effect of site drainage on these four sections of the boundary indicated:

1. A gap along the base of the retaining wall is attributed to incomplete coating of the face with concrete rather than a structural issue related to drainage pressure.
2. Within the building, two rooms abut the east boundary: the breakfast room and the kitchen. Mold was found behind a framed print hung on the east wall in the breakfast room. The relative humidity generally must exceed 65% to support mold. Air flow over the wall surface from the air conditioning unit will lower the humidity below this point, however, the area behind the print would not receive the same flow as the adjacent wall surface. The rest of the wall is being dehumidified by the air conditioner's airflow (expected relative humidity of 50%). The wall itself is a likely contributor to the moisture. The kitchen is the second room, however, its east wall is principally covered by cabinetry. Condensation from the back side of the cabinetry was seen, but on-going observation is recommended.
3. No evidence of moisture saturation of the face wall of the tunnel portal was seen.
4. Two rooms in the servant's quarters have their east wall as the east site wall: the bedroom and the laundry room. The former had no suspected site drainage related deterioration.

In the laundry room, the east wall concrete was deteriorated and upon removal of the deteriorated concrete the reinforcement bar was observed to be significantly rusted.

Site Lighting

Site Lighting Description: There are three different types of site lighting defined by type of location: at the southeast corner of the south garden is a pedestal-based lighting standard (see figure 77); at the sidewalk zone there are two wall-mounted sconce fixtures, one at the south termination of the fence on the southwest corner column, and one beside the north entry gate mounted on the gate wall's north portion; and there are building wall mounted sconces at the interior and exterior of the enclosed porch (See figures 78-81 for a view of the light at the exterior of the porch at night); and there is a pendant fixture at the underside of the protective roofs of the entries of the north and south elevations of the east portion of the house. These fixtures are located on the building and site drawings.



Figure 77 (JDF788): Light standard, southeast interior corner; the east retaining wall has multiple faces and batter.



Figure 78 (JDF1108): Exterior of enclosed porch, south elevation, west end wall sconce.



Figure 79 (JDF1109): Exterior of enclosed porch, south elevation, east end wall sconce.



Figure 80 (JDF1110): Exterior of southeast entry, south elevation, ceiling mounted pendant.



Figure 81 (MPS9895): A view of light on the exterior of the porch at night.

Site Lighting Condition: The overall condition of the fixtures is fair. There is surface corrosion principally attributed to salt air (see Figure 82). In addition there is concern about the type of metal used for fasteners given the one observable crack at the southwest corner fence column. Should rust stains appear, replacement of the fasteners with stainless steel fasteners is recommended. Also rust can be seen on the exterior of what appears to be a junction box of the pictured wall sconces. The required connection per the electrical code varies by type of fixture, its rating for outdoor use, and the cable type. In order to determine compliance, these fixtures would need to be dismounted, examined for compliance, and the connections and cable examined. It is recommended this be done for all of the exterior light fixtures to more fully evaluate condition and code compliance.



Figure 82 (JDF1109, cropped): Showing rust on the exterior of what could be a junction box for the light fixture on the exterior of enclosed porch, south elevation, east end. Note loss of black finish on the fixture.

Exterior

Roofing

Roofing Description: There are three roofing types on the structures. On the main house there is a membrane roof that appears to be Danosa SBS modified asphalt rolled roofing, laid on the low slope "flat" roof. On the most recent low slope shed roof addition over the northeast entry door from the north courtyard, and over the higher sloped shed roof entry of the southeast, there are pressed sheet metal roofs in a Spanish tile profile. The remaining sloped roofs in the north courtyard and the sloped roof of the enclosed porch are covered with fired clay tile in a Spanish tile profile (see Figure 83). These latter two roofs, located in the north courtyard, are over the servant's suite and over the laundry room/area of the tunnel entry. These roofs are indicated on the "Roof Plan" drawing A4 of the plans.



Figure 83 (JDF801): View of northeast corners of the main building and adjacent roofs: the far red roof is the metal roof over the entry, near left clay tile roof is over the laundry room and tunnel entry area, and the roof at right is the clay tile roof over the servant's suite.

The slopes of these roofs are:
Main roof = 4% or 1 inch in 24 inches
Enclosed porch roof = 4.5:12
Servant's suite = 1.25:12
Laundry room and area of tunnel entry = 1.25:12
Northeast entry area = 1.15:12
Southeast entry area = 3:12



Figure 84 (JDF1064): Cracks and chips (coatings?)



Figure 85 (JDF1061): Close up of metal roof at north courtyard. Note extensive rust.

Roofing Condition: Various roofing materials have recommended minimum slopes upon which the product can be laid; if flatter, the manufacturer does not warranty the installation. Roof slopes of 1.5:1 are the minimum roof slope for one manufacturer (Met-

Tile) of a pressed sheet metal Spanish tile. Note the slope of the roof over the northeast entry is 1.15:1. The recommended minimum slope for fired clay tiles is 2:12. All of the roofs with fired clay tiles, except the entry enclosed porch roof, are below this minimum.

A comprehensive evaluation of a roofing system typically involves material testing of the roofing system components, disassembly of portions of the roof as by exposure windows, characterization of fasteners by type/condition/pattern, investigation of substrate condition, and testing of encountered other materials such as roof mastic and tars for the presence of asbestos. This level of inquiry is considered by owners when the roofs are extensive enough in size to warrant the expenses of the investigation. For small roofs, often the owner will evaluate the roof by easily observable condition issues, such as leaks or number of broken tiles. This latter approach is the one used here.

By example, evidence of previous leaks, appearing as water stains on the wall and ceiling, can be seen in room 102 (see Figure 86). The other areas of stains appear to be of previous leaks. In wet areas, like bathrooms, any staining may be due to condensation.



Figure 86 (JDF624): Water stained wall and ceiling in room 102.



Figure 87 (JDF1100): Close up of stained area in Room 102.

Observable condition problems of the roofing materials were:
Main roof = None
Enclosed porch roof = None
Servant's suite = Broken roof tiles, nineteen
Laundry room and area of tunnel entry = Broken roof tiles, eleven for upper level, eleven for lower
Northeast entry area = Prevalent surface rust and perforations throughout, wood deck deterioration
Southeast entry area = None

The significantly deteriorated condition of the metal roof tiles of the roof over the northeast entry has led to extensive staining and rot of the roof deck and roof structure (see figure below).



Figure 88 (JDF817): Staining and rotted areas of the roof deck and roof structure at the northeast entry.

From a maintenance standpoint, the Spanish roof tiles shapes have valleys that tend to trap debris on lower slope roofs such as these. Debris blockage of flow channels was observed to be prevalent (see figure below). On the flat roof of the main house debris areas were seen in a few roof corners where eddies may concentrate airborne detritus from the vegetation. This condition was observed at the time of the late September field visit, was not prevalent, and was only seen in select locations, for example as seen in the photographs (see figures on the following pages).

Certain other times of the year may have greater concentrations.



Figure 89 (JDF1062): Debris blocking flow channels in roof tiles.



Figure 90 (JDF905): East portion of roof, looking north. Note overhanging tree and leaf piles.



Figure 91 (JDF922): Tree detritus gathers in the lee of the parapets.

Roof Drainage:

Roof Drainage Description: The main roof has two areas partially separated by a north-south oriented parapet wall into the west roof and the east roof. The west section flows (slopes) from west to east. The east section flows from north to south (see Figure 92). In the 1964 HABS drawings, the west section flowed through a passage in the separation parapet to the east roof from which all drainage exited through a pass-through in the south parapet. Currently, both of these pass-throughs have been closed up. The current drainage flows of the west section pass through an internal drain without an inlet screen at the upstream end, located at the previous pass-through. This internal drain is located in the east wall of the living room, room #103. The east roof's internal drain is located in southwest corner of the breakfast room, room #111.



Figure 92 (JDF900): Roof, looking from east to west. The east roof slopes to the south.

The pitched roofs of the north courtyard are served by gutters and downspouts, the latter exiting onto the surface of the north courtyard. The south porch direct drains; there are no gutters.

Roof Drainage Conditions: The east roof's drain appears—now or previously—to have been the source of leaking water. The effects appear as area stains and brown drip stains in the southwest corner of the breakfast room (see Figure 93). The blockage potential of interior drain systems is particularly high, and the potential is significantly increased by the lack of inlet drain covers over both of these main roof drain inlets, that can filter out tree leaves, twigs, blossoms, and fruit. With such covers the detritus can be separated from the water before it enters the drain system, but the removal of the gathered material must be done on a regular basis.



Figure 93 (JDF876, cropped + annotated): Arrows indicate areas of stains and rust drip traces.

Another issue is the capacity of the drains when clean, and the reduction in capacity when partially clogged or fully blocked. Without regard to the recent years of intensification of rainfall, nor to the future intensification predicted as an effect of Global Climate Change, the west roof would require a 5-inch diameter pipe or a minimum of 16.7 square inch opening to handle the flows. The surface penetrating radar of the living room wall with the internal drain indicated its diameter to be in the 3" to 4" diameter range. The conditions inside both internal drains should be assessed by a video camera.

The building code requires any flat roof to have emergency overflow drainage to handle unexpected amounts of drainage requirements due to rainfall intensity, clogged drains, or blocked drains. The flat roofs of Quarter No. 211 do not have any emergency drains. These through-wall exits are required to be placed within 2 inches of the inlet height of the current drains, and in close proximity laterally.

Roof Appurtenances

Roof Appurtenances Description: There are toilet vent stacks and an electrical supply riser. The main flat roofs have several short height (3"-6") pedestals upon which air conditioning condensers are placed. One without an air conditioning condenser is located just east of the north-south parapet wall.

Roof Appurtenances Condition: All of the roof appurtenances appeared to be in good condition.

Wall Decorative Elements

Wall Decorative Elements Description: All of the decorative elements of the three areas described below have a parge coat with colored finish coating except the bare brick of the top of the west cornice, and the spired parapet associated with the tunnel entry has the parge coat but no color coating.

The most decorated elevation is the west. From the top, there is raised banding defining the parapet, a cornice, raised banding under the cornice extending down at the corners, entablatures at the windows, and decorative panels over the windows with banding around the windows. The south elevation has raised banding defining the parapet zone and dividing the front (earlier “main block”) from the back section (earlier “east wing”). There is decorative banding around the enclosed porch columns and a decorative soffit and fascia. Banding also surrounds the window and door openings (See figures 94 and 95). There is also a wall decorative feature close to the entry to the tunnel in the vicinity of the servant’s suite (see figure 96).



Figure 94 (JDF814): View from north looking south along west elevation parapet shows raised decorative banding around the windows.



Figure 95 (JDF779): Fence along west boundary: west elevation, middle third, showing decorative banding around windows and porch columns.

On the wall portion that is to the northwest of the tunnel entry is an attached column and banding as seen in Figure 96.



Figure 96 (JDF817, cropped + annotated): Decorative half column attached, as pilasters and string mold.

The top of the wall above the tunnel entry has an unusual assembly of decorative treatments: a central spire and decorative gable end and two flanking shorter spires. These appear to be constructed from brick with a cementitious coating; a parge coat. This wall has an axis of northeast-southwest (see figures below and on the next page).



Figure 97 (JDF798): Parapet of tunnel entry, spired parapet, southeast face.


Figure 98 (JDF803, cropped): Northwest face of parapet above tunnel entry.

Wall Decorative Elements Condition

Overview of Diagnostic Methods: The primary methods used in the condition evaluations of the building walls were also used for the smaller decorative features as possible. For example, the west elevation window entablatures do not present flat surfaces of sufficient size for the surface penetrating radar (SPR) that was used on the walls in general. The overall list of techniques used included the evaluation of historic photographs for damage and changed conditions, thermography, selective pachometer readings, selective sounding by special hammers for delamination discovery, and visual observation in the field and by later close examination of the high resolution digital photography. Other techniques were used in select areas: detailed out of plane measurements for the north retaining wall, and observation of the interior walls at night using oblique light on the surfaces to reveal anomalies. The conditions of the decorative elements of the exterior walls and of the exterior walls are presented as one joint evaluation except where specific techniques revealed information from the select techniques.

West Elevation: The top surface of the cornice is brick (see figure on the next page). Historic photos indicate the cornice, the over-window panels, and entablatures as having had missing pieces, today these elements are intact. The condition of the coated face of the cornice is good and the condition of its top surface of exposed brick is fair. The top surface has the most exposure to rain, and therefore requires special attention to

maintenance, particularly of the mortar joints, and the integrity of the individual bricks. The top surface is the most vulnerable. The photograph indicates visible open mortar joints, eroded bricks, and previous Portland cement patches; the condition is poor. The overall condition of the west elevation decorative elements is good.



Figure 99 (MPS9945): Top of west cornice is exposed brick masonry. Open mortar joints, eroded brick faces, and concrete patches are evident.

South Elevation: Significant damage was found at various elements of the concrete of the enclosed porch particularly at the column shafts. Spalls or delaminations were found at the raised vertical banding of the joint between the earliest west block of rooms and later additions of the east. These issue areas are described more fully in the walls condition evaluation below. The overall condition of the decorative elements of the south elevation is fair.

The Spired Parapet: The spired parapet has a variety of observable condition issues as seen in the photographs (figures 100-104). These observed condition issues are: parge coat cracks, vegetation/biological growth, loss of material at the top of the northeast spire (point gone), mechanical system tubing and wires as visual intrusions on the northwest face, and miscellaneous embedded fasteners. The cracks in the parge coat do not appear to extend into the underlying brick as based upon crack patterns and crack width. The spired parapet is in fair condition.



Figure 100 (JDF1071): Top of tunnel entry parapet, at crown, has a crack and is debonded.



Figure 101 (JDF1072): Condition: Loss of render, detail



Figure 102 (JDF1073): Condition: Loss of render, detail



Figure 103 (JDF1074): Condition: Details of cap on parapet. Note small cracks.


Figure 104 (JDF1075): Condition: Detail of small spire

Wall and Roof Structure and Wall Finish

Wall and Roof Structure and Wall Finish Description: The exterior walls of the building are predominantly constructed from a mixed material masonry. This masonry is largely composed of stones of many sizes, with pieces of and whole bricks, set in a soft mortar that constitutes a high proportion of total wall volume. The structure of the wall is not visible and was revealed by the use of surface penetrating radar, and four exposure windows (from which mortar samples and one parge coat sample were also taken). An entire wall without surface coatings and of similar heterogeneous construction was observed in an historic home in Old San Juan and provided a rare exposure for the team to view the details and variety of the common construction over which a parge coat is otherwise typically applied.

The other wall material is concrete, as located by the SPR investigation. The tops of many of the walls are concrete, connected down into the walls by reinforcing bar, and into the roof slabs by additional reinforcing. The roof slabs have different construction characteristics, primarily in the spacing of reinforcing in the two directions. This typology characterization is set forth in the radar report in Appendix 3 and several tables from the report are presented below. The reinforced concrete around the top of the walls creates an important structural feature, termed a bond beam or ring beam. It strengthens the top of the wall's masonry, spreads out any point loads, and assists in connecting the roof to the walls. The new concrete roof slab likely replaced the typical historic roof structure found in Old San Juan: fired clay flat tiles sitting on wood supports sitting on large wood beams.



Figure 105 (MPS9835, cropped): Typical historic roof construction in Puerto Rico.

Figure 106: Reinforced Concrete Roof Slab Characteristics, Based on SPR Analysis.

Location	Reinforcement				Slab Thickness (inch)	Notes
	East-West		North-South			
	Spacing (inch)	Cover (inch)	Spacing (inch)	Cover (inch)		
Front entry porch	12	2.75	7	2.25	5	
Master bedroom	12-13	2.25	4-4.5	2	5	With 2 ¾" topping slab?
Living room	12	2.75	7	2.25	7	
Family room	6.5-7	2.5	12	2	7	
Hall near kitchen	6.5-8	1.75-2.75	7.5	2.5	6.75	Strong reflections @ 9, 15" also
Dining room (at southeast)	6.75-8.75	2.25-3.75	9.5	2.6	5	Strong reflection @ 9.6" also
Servant's quarters	7-11.4	2.125	8 8-10	2 7.75-8	10	2 layers reinf. in N-S direction

Figure 107: Reinforced Concrete Beam Characteristics, Based on SPR Analysis.

Location	Dimensions		Horiz. Reinf.	Shear Stirrups	Roof Slab
	Ht. (in.)	Width (in.)			
Living room beam	19	12 1/4	2 layers, @ 2" and 6" from bottom. 3 bars across bottom	@12" nominal spacing, varies from 10" to 13"	8 ¼" thick; may be 5" with topping slab
Master bedroom beam	19	12 1/8	2 layers, @ 2 ½" and 4 ½" from bottom. 3 bars across bottom	@ 5" nominal spacing to 43" from supports, 8.5" spacing beyond. 1 ½" side cover	7.8" thick, appears to be 5" slab with topping

Figure 108: Reinforced Concrete Characteristics at Entry Porch Structure, Based on SPR Analysis.

Member	Geometry	Reinforcement		Notes
Column at porch entry	8 5/8 in. x 18 ¾ in.	Vertical reinf.: 3 ½" cover, bars at each corner	Column ties @ 10 to 11 in., 2 ¾" cover	Vert. reinf. possibly #6 bars
Exterior wall at south, above arches	8 ¼" thick wall (incl. surface plaster)	Vertical: @ 12" spacing, 2 ¼" cover	Horizontal: @ 8" spacing, 1 7/8" cover	Approx. #4 bars

In one series of walls, SPR found that the concrete extended further down from the roof slab. For these walls the new concrete was placed upon the historic masonry extending up to the roof height, a distance well beyond the height of 1 foot or so of a bond beam. These walls are on the north exterior east of a point at which the west wall of the dining room intersects (Room #106). Another location where the concrete wall is on top of a masonry wall is at the east elevation, the interior face is in one plane, the exterior face has a step back in plane (see figure below). Radar traces indicated concrete beginning 2 feet above finish floor level, with horizontal reinforcement at 36 inches on center and verticals at 24 inches on center.


Figure 109 (JDF797): East elevation of Quarter No. 211.

From the historic research, the building was expanded in multiple phases with additions of new exterior walls, the extensions in height to even out the level of the tops of the parapets, and to create one roof plane in each of the two sections previously described. After October 18, 1898, the United States Army took over occupation and most new subsequent wall construction used concrete, and concrete was used in repair projects. The mortar analysis report, which is presented in Appendix 2, includes results for the analysis of the exterior parge coat for which Portland cement is a significant component and percentage of the mix. Portland cement was not present in either the mortar of the mixed materials masonry wall of the building nor that of the north retaining wall. The United States Army Corps of Engineers (USACE) has, based on other mortar analyses for the southwest fortification walls, indicated extensive and intensive use of Portland cement in their mortars and parge coats for repair and construction efforts from an early point in the twentieth century, circa 1910, while the lime-based mortars are associated with all of the earlier construction by the Spanish military authorities. Whether Spanish period masonry construction or United States period concrete construction, almost all surfaces were coated with a Portland cement rich parge coat.

Significant Surface Penetrating Radar (SPR) observations include the following. See Appendix 3-1 of Appendix 3—Investigative Testing for elevation drawings annotated with SPR observations, also previously provided in the Developmental History.

1. Exterior walls of Quarter No. 211 are of highly variable construction with different concrete and masonry materials mixed throughout. Masonry construction appears to be predominately mamposteria throughout, with

variations in construction quality. Small localized wall sections appear to be coursed brick with some areas of coursed clay or concrete masonry construction.

2. Exterior wall construction appears different below the approximate sill height at the north and west elevations, and portions of the south elevation.

3. North and west elevation windows likely extended to the first floor line at one time. Areas beneath current windows are infilled with reinforced concrete or different forms of masonry construction.

4. Concrete roof slabs appear to be anchored into masonry walls using steel bars approximately 12 inches on center and extending 12 inches down into walls.

5. The upper portion of the north dining room wall is reinforced concrete; the lower portion is masonry construction.

6. Occasional areas of brick infill exist throughout. These areas are localized, measuring less than 4 square feet each.

7. Walls of the servant's quarters are of more recent reinforced masonry (or irregular reinforced concrete) construction.

Wall and Roof Structure and Wall Finish Condition: The overall condition of the roof structures is good. The overall condition of the walls structures is good. However, there are a number of locations with issues. These are:

1. The northwest corner, crack (see figure 110).
2. The southeast corner, crack (see annotated figure 111).
3. The enclosed concrete porch west columns and south elevation, rust jacking and material loss (see figures 112 and 113).
4. The east wall of the laundry room, rust jacking and material loss (see figures 114 and 115).
5. The south wall by the door (#9) into the servant's suite bedroom (room #114), crack (see figure 116, close up of lower left corner of the door).

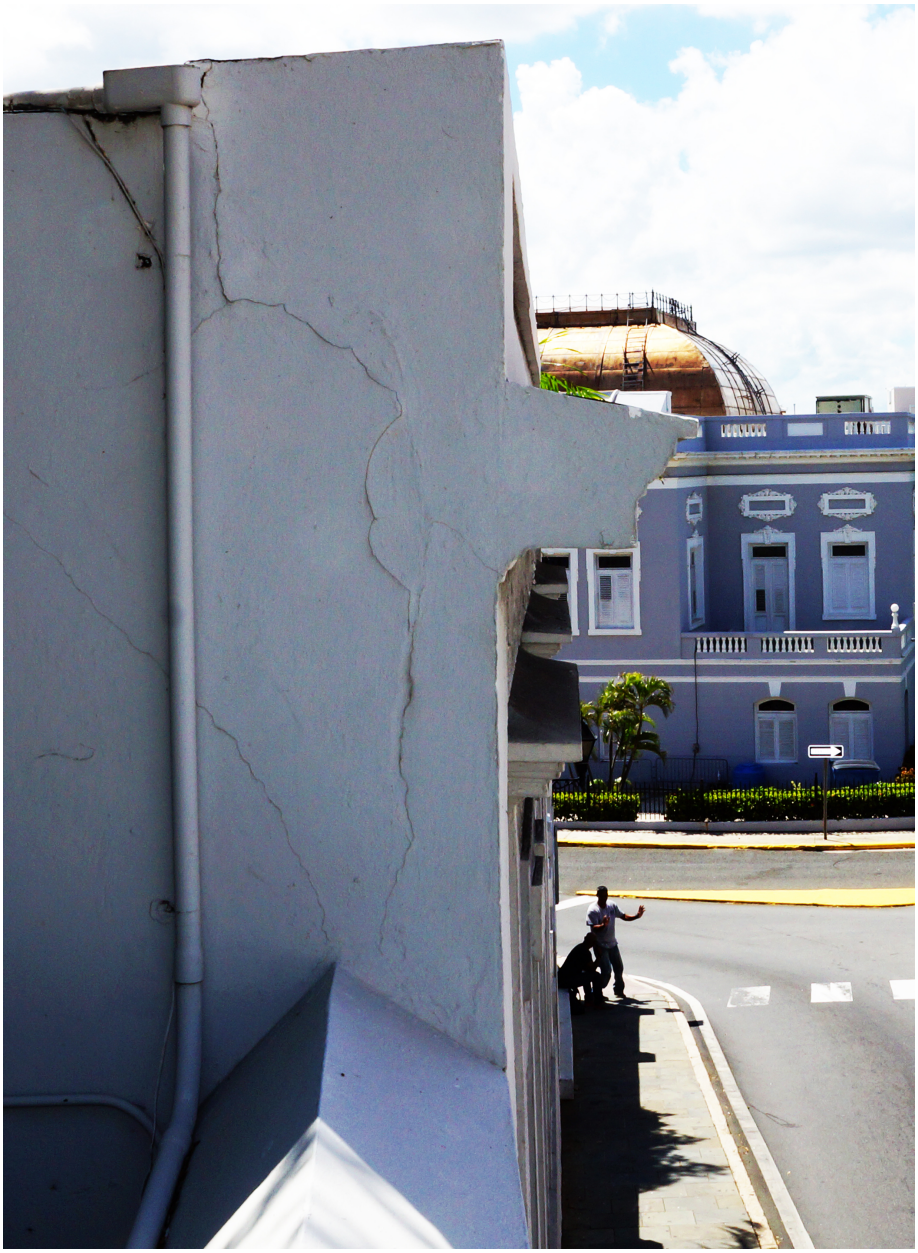

Figure 110 (JDF813, cropped): View from north looking south along west elevation parapet. Close up shows crack.

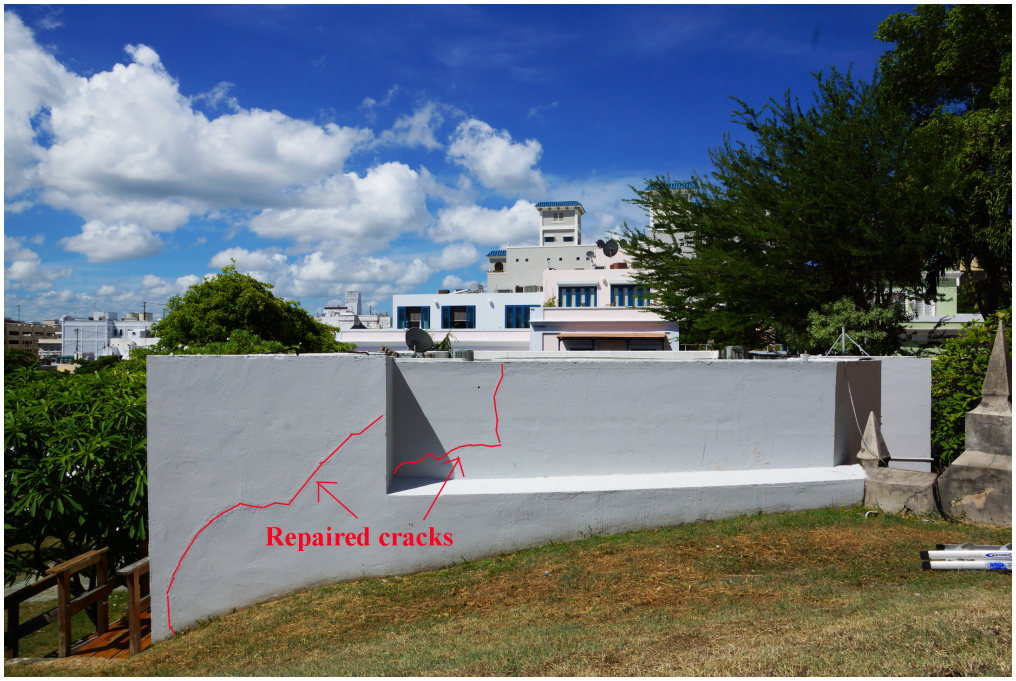

Figure 111 (JDF797, annotated): East elevation of Quarter No. 211. Red lines indicate repaired cracks.



Figure 112 (JDF1054): Porch—spalling concrete due to rust jacking, northwest corner of interior.



Figure 113 (JDF1055, cropped + annotated): Enclosed porch at the southwest corner of building's exterior. The red oval indicates area of rust jacking and material loss.



Figure 114 (JDF815, cropped): Close up showing cracks and spall at the lower left of the door.



Figure 115 (JDF888): Room 113, southeast wall of laundry room behind shelf unit has rust jacking and materials loss.



Figure 116 (JDF889): Overview of Room 113's (laundry room's) southeast wall with shelf unit removed, with rust jacking and materials loss, incipient spalling prevalent.

Delaminations of the parge coat are perhaps indicative of below surface issues typically where the interface with the substrate has deteriorated, causing the loss of adhesion. These areas were found by sounding, SPR, and thermographic imaging and are indicated on the below exterior elevation sheets.

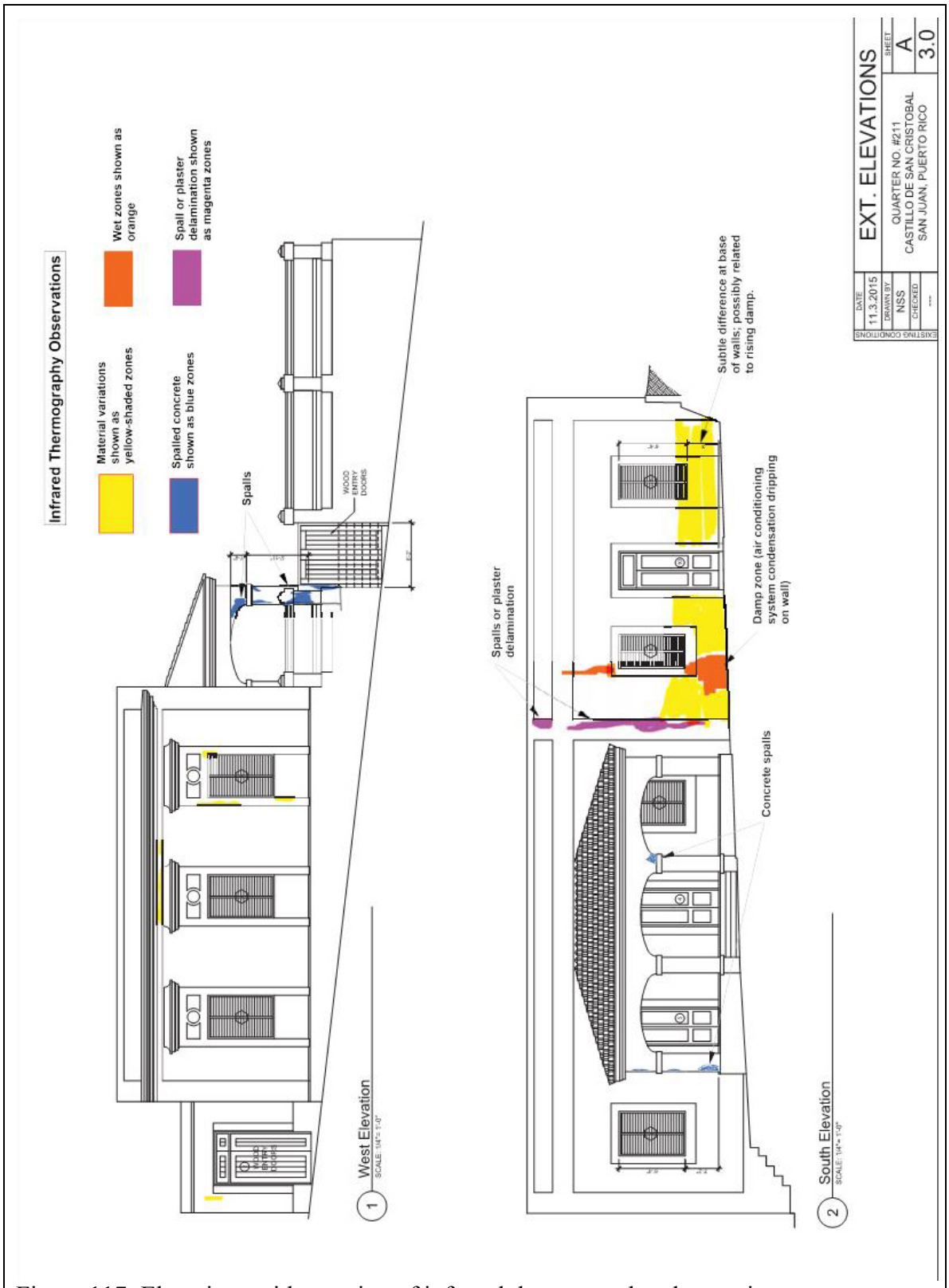

Figure 117: Elevations with notation of infrared thermography observations.

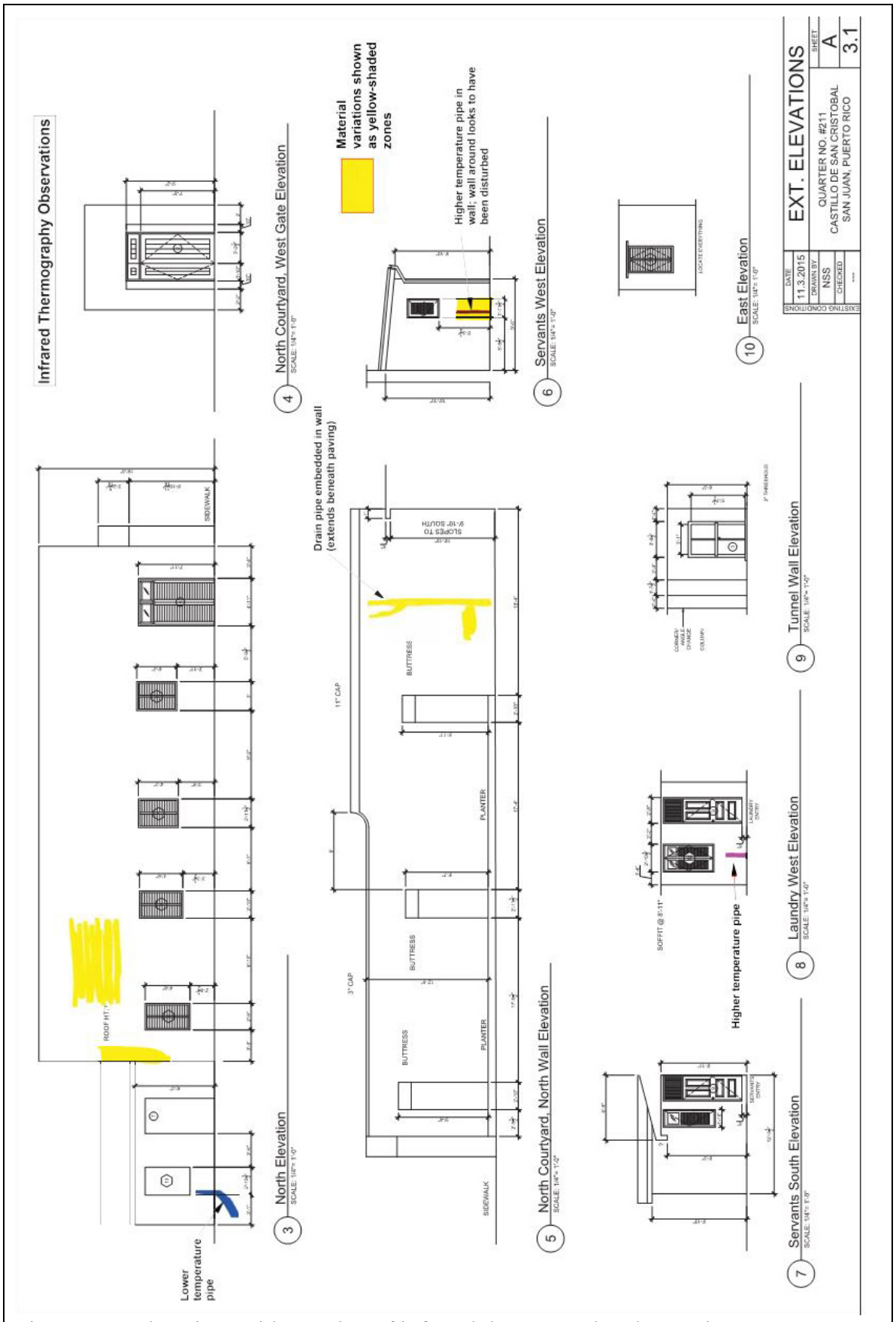

Figure 118: Elevations with notation of infrared thermography observations.

Moisture saturation at the base of the wall was noted on the south elevation below window #16, located to the west of the southeast entry door. This same area is supporting a rather healthy clump of native grass, suggesting there is a water source in this specific area. The east flat roof section drain runs in the wall to the east some six to eight feet away, and where it is led was not discovered. Perhaps there is a break in the pipe causing ground saturation and rising damp in the wall.

Exterior Doors

Exterior Doors Description: All of the doors have been set out as to descriptions, photographs of both sides, and condition in the Door Schedule in Appendix 5. The individual doors are numbered on the floor plan, drawing A3, in Appendix 9.

Exterior Doors Condition: Door condition issues include deteriorated varnish, as indicated in the photograph for entry door #4 (see figure below). The overall condition of the doors is good, and the varnish finish is fair to good. Other doors have minor chips in the varnish coating.



Figure 119 (JDF970, cropped): Door 4, exterior. Close up of deteriorated varnish.

Windows

Windows Description: All of the windows have been set out as to descriptions, photographs of both sides, and condition in the Window Schedule in Appendix 6. The individual windows are numbered on the floor plan, drawing A3, in Appendix 9.

Windows Condition: The overall condition of the windows varies from good to poor. Inoperable shutter hardware is predominant. Deteriorated wood of the frame and sash can be seen for many windows (See figures 120-122).



Figure 120 (JDF936, cropped): close up of the condition of Window 9.

A summary of the condition ratings of each window are provided below:
Poor: Windows 1, 8, 9, 15, 16
Fair: Windows 2, 3, 6, 7
Obscured, partially or fully, such as by exterior fixed overglass, stuck shutter louvers, or interior built-ins: Windows 4, 5



Figure 121 (JDF1025, cropped): Interior close up of the condition of Window 1. Awl inserted in center mullion, note discoloration of wood.



Figure 122 (JDF1034, cropped): Interior close up of the condition of Window 15. Note the awl was able to penetrate the frame due to rot.

Interior

Floors

Floors Description: The floors are constructed of concrete with a ceramic tile surface. The concrete slabs were evaluated by SPR to determine thickness and reinforcement spacing. The results are presented in the table below.

Figure 123: Reinforced Concrete Floor Slab Characteristics, Based on SPR Analysis.

Location	Reinforcement				Slab Thickness (inch)	Notes
	East-West		North-South			
	Spacing (inch)	Cover (inch)	Spacing (inch)	Cover (inch)		
Front entry porch	18	2.25-2.75	18	3.25-3.5	4.75-6.25	Typology 1
Master bedroom	21-26	4.75-6.25	21	6.25	5.5-7	Typology 2
Living room, dining room	24	4.75-7.5	16-20	4.75-6	5.25-7.5	Typology 2
Kitchen	22	3.5-4.75	22	4.25	5.25-6.75	Typology 3
Dining room (at southeast)	17.5-24.75	3.5-4	18-19.25	3.75	5.25-6.5	Typology 4
Servant's quarters	23	7-8.25	18	6.5-7.25	8.4-10	Typology 5 Top slab of 5 ¼" over bottom slab of 4 ¾"?

The ceramic tiles are square, with dimensions of 13.25 by 13.25 inches (see figure 124). These were installed in the last 20 years per Edwin Colon-Rios. Decorative floor and wall tiles are seen for each of the three bathrooms.

Floors Condition: The floors are in good condition.



Figure 124 (JDF846): Floor of Room 103, adjacent to the north wall. This same floor tile is used for the floor and wall in Room 104A (subdivided from 104).

Interior Wall and Ceiling Finishes

Interior Wall and Ceiling Finishes Description: Wall and ceiling surfaces are painted "plaster." The wall finish exceptions are in the three bathrooms with tile-covered walls in areas subject to water exposure (figures 125-129). The wall tiles are a combination of ceramic tiles used for the floors, a white ceramic raised panel tile, and a horizontal band of decorative tile.


Figure 125 (JDF847, cropped): Bathroom wall tile, Room 104A.



Figure 126 (JDF848): Room 104A (subdivided from 104), west wall.



Figure 127 (JDF850): Room 104A (subdivided from 104), east wall



Figure 128 (JDF895): Room 115, west wall. The wall tiles are white 4-inch by 4-inch, without a base tile.



Figure 129 (RW4644): Room 104. Floor and wall tile treatments.

The floor tiles in Room 104 have been laid with an offset, the gap filled by a black square tile. The wall tiles are white rectangles laid with the axis in the vertical position, and highlighted by an accent strip in patterned blue.

Interior Wall and Ceiling Finishes Conditions: The interior wall finishes display stains in specific areas that appear related to moisture intrusion through the walls and ceilings. In just one wall area, the moisture penetration has been sufficiently consistent to support mold growth, this is the east wall of the breakfast room. Moisture intrusions evidence can be observed below and around windows, such as window #8 in room #105, the northeast bedroom. These intrusions appear to be intermittent as there was no mold, no crystallization of material, nor salts development. The following documentation photographs indicate the types of wall staining observed. The overall condition is fair.



Figure 130 (JDF1029, cropped): Room 105, Window #8. Rust stains.



Figure 131 (JDF1032, cropped): Room 106. Rust stains at window.



Figure 132 (JDF863, cropped): Room 107, plaster sugaring west of lower portion of window in wall. Also some base of wall deterioration.



Figure 133 (JDF876, cropped + annotated): Room 111 (on this page and on the next), rust drips. Once again, the photo with arrows pointing to rust drip stains indicates that there is something inside the wall that is deteriorating.



Figure 134 (JDF877, cropped): Room 111, close up showing previous repairs and current rust stains.



Figure 135 (JDF880, cropped): Room 112, south wall repair; water/rust stains over north window.



Figure 136 (JDF882, cropped): Room 113, close up of cracks in the ceiling and upper wall and associated stains.

Moldings

Moldings Description: At the junction of the wall with the floor tiles, there are base moldings in room #103, approximately 3.5 inches in height, with a modest profile and executed in what appears to be mahogany. The other rooms in the main house have no baseboards. There are no window or door casings. In lieu of casings, the window frame is set in the masonry wall, and has been brought out to the plane of the wall surface and bright finished, probably with varnish. The wood appears to be mahogany, and the finished surface of the frame appears as a finish detail. The same treatment has been used for the door frames in lieu of casing. There are no picture molds nor crown molding.



Figure 137 (JDF989, cropped): Base molding in room #103, and door wood frame expressed as decorative treatment.

The base molding has been applied over the top surface of the floor tile (see the floor tile photograph above taken in room #103), and attached to the wall with fasteners that have been countersunk and plugged. The floor tile was a replacement of the last 20 years, according to a previous facilities director. The base molding appears to have not been removed and re-used; it is of the same period as the floor tile replacement. It has a clear finish.

The nighttime oblique light investigation of the walls indicated one horizontal ghost line at the south wall of the dining room, room #106. It was at a height appropriate to the location of a picture rail, however, the ghost line was not seen on the other walls of the room. Instead of the picture mold, this line may have been the join line of the upper concrete topping wall with the lower wall of mixed material masonry.

Moldings Condition: The overall condition of the moldings is good.

Doors

Dating the Age of the Doors

Documentation of the National Park Service having changed out any previous doors for newer doors was not found in the files. Most of the doors pre-date the early 1960s when the NPS took over full management of the property from the United States Army. A new door was placed in the wall between rooms 101 and 102, door number 12. The draft HABs drawing of circa 1962 indicates the doorway as having a pair of doors. Pairs of doors are currently seen for exterior doors 4, 5, 6, 10 and interior doors 11, 13, 18, and 19. Doors 14-17 are associated with the development of the first bathroom space and its subdivision post circa 1962 into two bathrooms. The circa 1962 HABs drawings are an important record of the building's configuration indicating the predominant door configuration of the main block was paired entry doors into each room.

Earlier than the date of the HABs drawings, other alterations in door locations and scale were made, and are documented by other plans, an historic photograph, and NDE results. Specific modifications to the door configurations, executed earlier than the bathroom floor plan reconfigurations, are related to the shortening of exterior door entries transforming each into a window opening. The doors along the public right of way (west elevation) would logically have been the first to be so shortened, given the development of the street along this elevation circa 1897, and the resultant noise and privacy considerations. The built-in cabinet in the west wall of the dining room (east wall of the main block) is likely located where an exterior door previously existed. The cabinet's depth is almost that of the full wall depth. The modifications to entry points and doors are logical responses to changes in plan configuration and internal uses, and contextual factors.

The doors that may be of the earliest period appear the same as later periods in panel configuration, species, cut, and other distinguishing characteristics. The door hardware is not all of a kind or of a period, so hardware is not a distinguishing characteristic. Hardware may be removed from one door and added to another, therefore its interchangeable aspect does not necessarily tie earlier period hardware to the door in which it is currently installed. Most of the earliest hardware is installed in the doors of the main block.

Wholesale change out in all the doors in any one year was not expected for there was no real reason to cause such a need: fire, flood, or major change in room configuration. In addition, based upon visible observation, these door styles are common in San Juan and tend to be used over and over again as designs for at least the past century. Still, research in NPS files was done but no plans were found for Quarter No. 211 doors replacement. A set of plans was found in the NPS files for Quarter No. 210, the building to the north, undated, that details changes in doors. NPS records do show Quarter No. 211 windows have been changed out twice during the NPS era. Procedurally it appears that the NPS replaces doors on an as-needed basis, providing a highly appropriate match in design and in-kind materials, or replaces the door with a spare on hand. The oldest doors are likely to be those double doors associated with the main block.

Doors Description: The doors of the site, exterior, and interior are set out in the door schedule, Appendix 5. Each door is numbered on the floor plan (sheet A3 in the 2015 Drawing Packet in the Appendix 9). There are three site doors (#s 1-3), seven exterior doors (#s 4-10), and sixteen interior doors (#s 11-26). Each of the doors in the schedule has photographs of both the interior and exterior surfaces, and some typical hardware details. Some of the doors have supplementary screen doors and/or metal security gates that are also set out in the photographic documentation and indicated on the floor plan. The wood doors are typically finished bright, appearing to be varnish. The exceptions are the tunnel door and the entry door to the master bedroom with a dark brown paint coating. The metal security doors are painted white.

Recent alterations for the three site doors comprise the replacement of the two sidewalk entry doors. The earlier doors were configured with spaced vertical wood slats. The replacement doors are solid mahogany. The dates of the other doors of the exterior and interior are not known but do appear to vary in age. For example, the door between rooms 101 and 102, respectively used currently as the music room and the master bedroom, is a newer slab door. The date of this door is post HABS drawings date of circa 1962, as then shown as double doors. Of an expected earlier period, the entry doors to room 103 are solid mahogany, paneled (two vertical, over two horizontal), set as a pair, and completed by a three light transom above. This panel configuration is typical of many of the interior doors, whose transoms are present. These are set with vertical spaced wood bars to provide a path for breezes.

Doors Conditions: The overall condition of the doors is good. Some doors require refinishing, such as entry door set #4. Ultraviolet deterioration of the bright finish of the lower half of the door's varnish is seen as bubbles and coating loss. Many doors have small chips in the varnish. The overall condition of the steel security doors is fair, due to rust.

Doors Hardware Description and Condition: There appear to be three different periods of door hardware. The most recently installed hardware has a brushed chrome finish and is exemplified by the deadbolts. Other modern hardware, as designated in the Door Schedule, is likely to date from the middle of the twentieth century and is exemplified by brass finish, sometimes in an oiled brass finish. Door hardware that appears to date from the 1930s can be seen on the doors of the living room with a silver finish and rectangular back plate. Overall, only two manufacturer identifications were seen, one from Schlage and one from Perko. Detailed evaluation of each piece and comparison to historic hardware catalogs is a recommended future avenue of research. The finishes on many of the hardware pieces are worn and would require professional plating for restoration.

Light Fixtures

Light Fixtures Description: All the various types have been photodocumented, many of the light fixtures are located on the floor plan (not all as the plan was getting crowded), and all of the fans are located on the floor plan. Below is presented a table of Light and Fan Locations and Numbers by Room. The following types are present: four and five bladed fans, combination fan and light fixtures, pendant fixtures with white globes, pendant fixtures with acorn shaped white globes, and wall sconces. Specialty fixtures are present in the three bathrooms such as fluorescent strip and over mirror strip lights.

Light Fixtures Condition: The fans and light fixtures are all operational and finishes for most fixtures are fully intact. Some rust was seen on fluorescent light fixtures, likely due to the high moisture environments.

Figure 138: Interior Light and Fan Locations and Quantities by Room

Room #	Fan	Fan/Light Combo	Round Globe	Acorn Shaped Globe	Wall Sconce	Other
101		1			1	
102		1	2			
103		1	2		2	
104						A
105		1			1	
106	1			2		
107		1				
108						
109						
110				2		
111		1				
112		1				
113		1				
114		1				
115						B

A = Over sink/mirror light
B = Fluorescent strip



Figure 139 (JDF1087, cropped): Typical acorn shaped pendant, translucent, white, chain hung.



Figure 140 (JDF1097, cropped): Typical four blade fan with globe light combo.



Figure 141 (JDF1090, cropped): Typical white round globe pendant, chain hung.



Figure 142 (JDF1098, cropped): Room 101—Fan has five blades, grey metal finish, built-in light, manufacturer “Hampton Bay.”



Figure 143 (JDF1100, cropped): Room 102—Pendant light fixture has round globe shape.



Figure 144 (JDF1102, cropped): Room 102—Second pendant light fixture with round globe shape.



Figure 145 (JDF1101, cropped): Room 102—Fan / light combination: Fan has five blades, grey metal finish, built-in light, manufacturer “Hampton Bay.”



Figure 146 (JDF1091, cropped): Room 103—Fan / light combination: Fan has five paddles, black finish, and four lights.



Figure 147 (JDF1092, cropped): Room 103's round globe pendant light.



Figure 148 (JDF1093, cropped): Room 103's wall sconce is typical of all wall sconces in the building in that it is an uplight with an iridescent glass and decorative arm and canopy plate.



Figure 149 (JDF1099, cropped): Second wall sconce in Room 103, also with uplight and iridescent glass.



Figure 150 (JDF1104, cropped): Light fixture above mirror in Room 104.



Figure 151 (JDF1094, cropped): Room 105 fan/light combination has four wood paddle blades, a white globe, and a slotted cast iron motor housing.



Figure 152 (JDF1088, cropped): Room 106 has a fan/light combination with four blades, cast iron motor housing, and is currently without a light.



Figure 153 (JDF1103, cropped): Room 107 has a fan/light combination with five blades, globe light, and cast iron metal motor housing.



Figure 154 (JDF1085, cropped): Hallway (Room 110)—one of two pendants, acorn shaped, translucent white globe, chain hung, light fixtures.



Figure 155 (JDF1086, cropped): Hallway (Room 110)—The other of the two pendants.



Figure 156 (JDF1084, cropped): Breakfast nook (Room 111). Fan / light combination with four brown paddles, round globe light, and cast iron motor housing.



Figure 157 (JDF1083, cropped): Room 112 has a fan / light combination with four brown paddles, a round globe light, and metal cast iron motor housing.



Figure 158 (JDF1105, cropped): Westernmost of two porch five bladed fans. Originally fan/light combination, the light socket has a cover plate.

Electrical System

Electrical System Description: The major components of the system are indicated on the floor plan (sheet A3 in Appendix 9) and shown in the photodocumentation and are described in the FMSS (Facility Management Software System) of the park. The renewal of the electrical system was completed by the facilities staff in 1986 who reworked the service and distribution system. As seen in photographs of the time of rewiring, replacement of surface strung wires was completed with wiring buried in the walls and ceilings. The photographs did not fully indicate the replacement wiring, although some photographs show the wiring was in conduit. Other wiring conduit can be seen surface mounted on the interior walls. For example, see the photograph of the north end of the west wall of the kitchen hall, room 110 (Figure 158).



Figure 159 (JDF875, cropped): north end of the west wall of the kitchen hall, room 110. Close up shows electrical conduit, and one of the two acorn light pendants.

Electrical System Condition: The electrical system is assumed to be in good condition given its fairly recent renewal and of appropriate capacity. However, electrical use in many residences has increased due to the increase in the number of electrically powered appliances. At the same time electrical use can be decreased by the use of LED versus incandescent light bulbs and transitioning to the most efficient Energy Star rated appliances.

HVAC System

HVAC System Description: The climate system is electrically powered air conditioners. The condensing units are mainly roof mounted and are shown on the roof plan, sheet A4 in Appendix 9. One condensing unit is not on the roof; rather, it is located on a concrete pad behind (to the southeast) the spired parapet wall. It serves the servant's suite. The terminal units are wall mounted, most are placed high on the interior walls and some below the windows. The locations of these units is shown on the floor plan, sheet A3 of the Drawings in Appendix 9. There are nine units in total. The National Park Service maintains a database for these units, each of which has an inventory number. Contained in the database are manufacturer, model, and age (FMSS).

HVAC System Condition: The units are maintained by the facilities crew and changed out on an as-needed or scheduled basis. While the overall assessment of condition rating is good, the remaining service life and efficiency ratings for the nine units are variable.

Plumbing System and Fixtures

Plumbing System and Fixtures Description: The building is serviced with water and sewer. The areas serviced by water are: outside water spigots, three bathrooms, the laundry, and the kitchen. None of the fixtures appear to be over 50 years of age with the possible exception of the utility sink in the laundry. The fixtures are indicated on the floor plan, sheet A3, as are the sanitary sewer lines located in the north courtyard. All of these fixtures, except the water spigots, are served by sanitary sewer.

Plumbing System and Fixtures Condition: The fixtures appear to be in overall good condition, however, not all fixtures were operated individually nor was flow quality investigated by operating all fixtures at the same time (adequate pressure, adequate quantity of hot water, and surges).

Part II—Ultimate Treatment and Use

Quarter No. 211 is a part of a group of extant support buildings providing residences and administrative office space for the San Juan National Historic Site. Three of the four buildings are not accessible to the general public. Quarter No. 211, the subject of this Historic Structure Report, with its current use as a residence for the Superintendent is not accessible to the general public. The portions of the complex that are visible from the public right of way are portions of the building walls and roof; the open garden area of the south site; and the east, south, and west retaining walls, and concrete balustrades situated along the west and south site boundaries. The four buildings are situated in an area that was within the City's fortified walls. After 1897 the perimeter wall was opened up by partial removal.

Quarter No. 211 is historically significant in its purported first iteration as a blacksmith shop, for which there is no current evidence nor given historic reference as a citation. The only evidence of this prior and initial use is a small building represented in the area of the current Quarter No. 211 on the historic model of the fortifications. The model is located in Madrid and a copy is in the park. Possibly this building dates from the 1790s. In about the same location, Quarter No. 211 is seen on historic plans and its growth in size is documented in the Developmental History. The first designation of the new use of the building, seen in the referenced historic plans, is seen in the Key of the individual plans. The building is designated as Quarters and housed officers of the Spanish Military during the nineteenth Century. It continued to be used as Quarters for the United States Military after October 18, 1898. In the last years of the occupation of the Fort complex by the U.S. Military, the Quarter No. 21 (the then numeric designation) building housed a single family. With full control of the site by the National Park Service occurring in 1961, the Quarter No. 211 building continued as a single-family residence. Its historic importance for the last few centuries is in its use as support housing. The building is not considered significant due to its association with any individual in turn considered to be of historic significance.

With regards to the Visitor Services program, the 1984 General Management Plan for the park was clarified by a Long Range Interpretive Plan approved as a Draft in 2004. These plans do not include Quarter No. 211 as an interpretive resource nor is there any expression of interest in opening the building to public visitation.

The Quarter No. 211 building and site have been substantially altered throughout the nineteenth and twentieth centuries and, to a lesser extent, the twenty-first century, such as for the building: increases in size, increases in wall heights, changes in roof form, differences in roof materials, reduction in window sizes, and alterations in the configuration of the interior. Changes to the site have included enclosure by retaining walls to create an essentially flat area, initial site boundary enclosure development and later changes in balustrade detailing and scale, changes to gates, and vegetation evolution in size and species.

The Recommended Ultimate Treatment for the house is preservation of the exterior of the house, and of the general configuration of the site and its features. The Recommended Ultimate Use is as a residence.

Period of Significance

Commencing with initial construction, possibly circa 1792, to the full control of the National Park Service circa 1964.

Character Defining Features

Site

Bounded by retaining walls
North courtyard
South garden with terrace
Boundary of south garden defined by retaining wall, piers, and concrete balustrade with plinth.
Two entry points from public right-of-way; one to north courtyard, one to south garden.
Tunnel portal with attached columns and spired parapet.

Exterior

Essentially flat roofs of main residence, pitched roofs of servants quarters.
Fired clay tiles in Spanish Mission form on pitched roofs of front porch and servant's quarters
West elevation: cornice, over window panels, and articulation by raised banding.
South elevation: articulation by raised banding, screened in porch.
Overall: colored stucco finish, window and door positions.

Interior

Plan layout of the main block masonry walls: rooms 101, 102, and 103.
Plain plaster finishes for ceilings and walls.
Solid wood panel doors with clear finish.
Wood windows, casement style, with louvered shutters.

Requirements for Treatment

The primary requirements for treatment are derived from the necessity of maintaining the site and its structures: **Preservation Needs.** The conditions assessment portion of this report carefully articulates the conditions, and the treatments necessary to preserve the building are defined and set forth. Additional treatments may be considered to meet requirements of various **Codes.** All treatments are reviewed and refined to achieve maximum feasible compliance with both the codes and various **Guidance Documents**

that apply to all projects and treatments. Finally, the park has **Planning Documents** that typically provide broad based potential future uses. These four categories with the applicable documents are described in summary below.

1. Preservation Needs: The building's needs are discovered by detailed condition investigation set forth in this report, as are the treatments necessary to meet these needs. These treatments are proposed in response to the requirements of the other three categories articulated below.
2. Codes: Accessibility, Uniform Federal Accessibility Standards (UFAS); building codes, International Building Code (IBC current version is 2015); fire codes, National Fire Protection Association NFPA Codes; Engineering analysis for seismic performance requires specification of a building performance objective. The minimum acceptable performance objective for Federal buildings, when evaluation is triggered, is based on life safety in a large earthquake. We believe that the life safety performance objective is appropriate in this case: seismic evaluation considering a greater performance objective will likely require significant retrofit that will compromise historic integrity. Seismic analysis should follow requirements of ASCE/SEI 41-13, Seismic Evaluation and Retrofit of Existing Buildings, in conjunction with ASCE/SEI 7- 10, Minimum Design Loads for Buildings and Other Structures, which provide the basis for defining performance objectives, evaluation procedures, and, if necessary, mitigation criteria; Hazardous Materials Mitigation, various parts of above codes plus those of EPA for the specific materials (asbestos, lead, mercury, and so on); and Energy Codes, as part of building codes and specifically the 2015 International Energy Code, to be issued after revision in the fall of 2016, and overarching guidance (42 U.S.C. § 8259b(b)).
3. Guidance Documents: General policy, National Park Service administrative policies and memoranda; historic preservation, Section 106 of the National Historic Preservation Act, and the Secretary of Interior's Standards for the Treatment of Historic Properties.
4. Planning Documents: The General Management Plan, Long Range Interpretive Plan, and Climate Action Plans as adopted. Other planning documents, current or future, are likely to be of importance relative to future actions and such actions should be accordingly reviewed.

Of note, codes may often be in conflict with preservation, however, most codes provide some latitude in applicability for historic buildings and in general seek maximum feasible compliance with the code requirements. Typically, these conflicts are resolved through dialogue between the code officials, the owner's representative, and the design team and through creativity in solutions development. The primary objective is the preservation of historic materials and features and therefor the first category of preservation needs and treatments is hierarchically the most important.

The second category of Codes is addressed as follows for each specific code type.

1. UFAS. Quarter 211 is an existing private residence and enhancements to make it more accessible are possible but not required. Such enhancements for future consideration are the provision of an accessible pathway, likely through the north

courtyard; a short ramp at the east hallway north end; and to meet bathroom accessibility standards by modification of the largest bathroom (currently room 104), changes to another bathroom by enlargement, or construction of an accessible bathroom in an existing space.
2. IBC. The review of the building per the IBC.
3. NFPA. The review of the building per the NFPA.
4. Seismic. The building was reviewed for seismic concerns and the recommended treatments are in the Structural Report.
5. Hazardous Materials. Hazardous materials investigation is recommended for completion by a certified industrial hygienist. Cursory review indicates the likelihood of lead paint as being the primary concern.
6. Energy Codes. Recommendations as to the increases possible in the area of energy efficiency have been set out in the Climate Action Plan.

The third category of Guidance Documents are well understood by the park as these documents guidelines, standards, and procedures are integral for all projects executed by the park. Of similar import are the fourth category of planning documents in their provision of actions guidance and review.

Alternatives for Treatment

In an effort to consider alternate treatments for the agreed ultimate treatment described above, other alternatives were explored. Each treatment had as a primary objective the preservation of the resource.

Alternative #1: House Museum Interpreted as Housing for Spanish Officers of the Nineteenth Century

This alternative would be somewhat conjectural in the layout of the house due to significant alterations post 1898. If the house were to remain in its current configuration and not be returned to a specific time period, then the building's importance as a period artifact supporting the interpretive theme would be diminished. In essence, there is insufficient evidence to support a period restoration, and the interpretive story would be dependent on small artifacts and exhibits. In addition as a building serving the public, the entire house would have to meet UFAS requirements thus altering the historic fabric and spaces as seen today.

Advantages

1. Provide public benefit by providing interpretation of the living quarters of the Spanish military officers.

Disadvantages

1. A lack of knowledge about the interior layout from the time period would not allow for any interior space layout alterations to accurately represent the living conditions.
2. The building would require UFAS compliance, altering somewhat the historic fabric.
3. Costs for the interpretive research, artifacts acquisition, interpretive design, exhibits, and alterations would constitute a significant expense.

Alternative #2: Administrative Offices

This alternative would not require returning the feel of the house and a sense of time and place suggested for the Alternative #1. It would require minor alterations in layout and significant alterations for UFAS compliance.

Advantages

1. Such alteration would provide additional offices.

Disadvantages

1. The new offices would not be adjacent nor connected to the existing administrative offices.
2. The building would require UFAS alterations to achieve compliance, altering somewhat the historic fabric.
3. Costs for the alteration in use could be significant.

Recommendations for Treatment

Site

1. Investigation to determine if there is a sub-drainage system beyond and in back of the east retaining wall, and east walls of the building (rooms 111, 112, 113, and 114). No outlet was seen down gradient. Observation of the area during and after a significant rain event is advised. Extent of water penetration into these walls may be observed by visual observation, thermal imaging, and moisture meter readings. The presence of a sub-drain may be detected by the use of ground penetrating radar if it is within the unit's depth range, about eight feet with accuracy for a 400-megahertz antenna.
2. If there is a sub-drain system but water is still entering the wall, the system should be replaced. If there is not a sub-drain system a new system should be installed. The purpose of the system is to interrupt the flows, and redirect the flow away from the structure to a suitable down gradient location or into a dry well or a storm sewer.
3. Fence repairs: fill minor cracks. Perform subsurface investigation at one rust spot to get to source of problem. Based on results, decide if it is important to fix all such rust spot areas embedded metal corrosion and concrete deterioration.
4. South and west retaining wall repair. Stitch and fill crack at southwest corner. Confirm fastener types for light fixture and sign; should be stainless steel.
5. East retaining wall. Continue monitoring of base of wall horizontal crack. Measure depth every 2 feet and create log. Monitor quarterly and after major storm events or seismic events.
6. North retaining wall (See Structural Considerations, Appendix Four). Many alternatives including ones with visual aspects and the invisible, such as tie backs to dead men, tie backs to duck bill anchors. Vegetation removal at Quarter No. 210 site is recommended. Observation during major rain events as to drainage is recommended. When the cracks are fixed, and if ground water exits through cracks now, will need to install weep holes to relieve pressure. Study of local soil and drainage conditions required before finalizing design of structural interventions and new weep hole drainage. Adding a buttress is visually intrusive and thus not recommended.

7. Stairs, wood: Install new railings to code. Install closure pieces to open risers. Prune tree back for head clearance. Apply uniform preservation treatment. Review bottom of stringer contact with ground surface to prevent moisture uptake.
8. Southwest site entry: recheck vertical distance if greater than 30 inches reconstruct wood rail and gate system to code; height and lateral resistance to required force.
9. In association with roof drainage. Determine condition, size and outlet of the two main roof drains. Are these attached to a subsurface drain system, a dry well, the sanitary sewer, or how is the flow handled? Determine by TV camera if the lines are intact. Suspect possible leak in south line.

Building Exterior

1. Roof drainage. Confirm size of drains and calculate capacity. If under capacity, either install a second drain or increase the first, whichever is easier.
2. Install overflow scuppers with canales.
3. Install debris screens on inlets of drains (means having an inlet structure).
4. Clean detritus from roof.
5. Clean drain pipes.
6. Prune tree limbs back away from roof.
7. Clear detritus from north roofs.
8. Reroof metal roof with materials recommended for this low slope. Multiple choices.
9. Reconstruct the roof structural system for the metal roofed entry cover due to rot.
10. Repair fired clay Spanish tile roofs: several possible levels of repair from replacement of broken and cracked tiles to comprehensive. As these are laid on a too shallow a slope roof, installation of a new membrane under replaced roof tiles should be one of the alternatives. Sound tiles can be re-used if they pass the tests typically employed for this purpose.
11. Examine all roof to wall joints of the north courtyard for consideration of flashing. Flashing may be there but only visible when roof is partially disassembled.
12. Delaminations repairs of parge coat
13. Spalled area repairs
14. Crack repair and adjacent masonry reinforcement at the southeast and northwest corners.
15. Repairs to the top of the cornice exposed brick masonry.
16. Either repair (20% or less loss) or replace (21% plus loss) windows damaged due to rot. Detail the windows differently to reduce the deterioration issue.
17. Install sill flashing and caulking backup.

Building Interior

1. Ceiling: Repair cracks by filling with like material. Stains should be repainted after the cause of the stain has been found and repaired for active situations, and confirmation of inactive. Prime subject area and paint in concert with the recommended comprehensive painting of the interior (ceilings and walls).
2. Walls: Repair the specified areas of concrete spalling: porch, laundry room, and servant's quarters. As for ceiling treatments, determine that the cause of the problem has been first remediated prior to commencing interior repairs or application of new finishes. Consider the application of antimicrobial paint on the interior exposed portions of the building exterior's east wall (breakfast room, kitchen, laundry, and

servant's quarter). Painting of areas with rust staining, such as around deteriorated window frames and the east roof drain in the wall, should be completed only after the windows have been replaced and the drain pipe situation resolved (repaired or replaced). Areas exhibiting any mold should be washed down with a solution of 75% water and 25% Clorox. Rust stains can penetrate paint but not shellac, the recommended primer in those locations with rust staining.

3. Floors: There are no current conditions recommended for treatment.
4. Moldings: The few moldings do not require comprehensive revarnishing. However, at select areas there is evidence of impact damage where spot treatment of varnish touch-up is required.
5. Doors: The treatments for the doors is focused on the varnish finish. Some doors, such as the south entry doors, are recommended for stripping of existing finish, sanding, and application of two coats of new finish. Other doors could be returned to a comprehensive coating by touching up the existing finish. Alternatively, the doors with significant chips and scratches may be comprehensively refinished. Doors exist as both totally interior elements and shared elements with the exterior. The steel security doors exist on both the exterior and the interior. The steel doors show rust to a significant enough degree to warrant a comprehensive refinishing: grit blast to bare metal, prime, and two coats of paint.
6. Door hardware: The oldest sets are likely to be at least 50 years of age. Their restoration is warranted. The primary visible issue is loss of finish, typically the plating. The internal workings appeared to function satisfactorily, however, springs replacement is a typical low cost treatment.
7. Lighting: There are many modern fixtures with the only possible older fixtures being the wall sconces. No treatment is currently recommended for the interior fixtures. The exterior fixtures finishes are recommended for restoration. The age of the fixtures is not known.
8. Electrical System: There are no current condition issues with the electrical system.
9. HVAC System: There are no current condition issues with the HVAC system.
10. Plumbing system and fixtures: There are no known current condition issues with the plumbing system nor plumbing fixtures.

Climate Action Plan

This plan sets out the likely impacts from climate changes over the near future, the likely effects on this structure and site, remedial treatments to reduce these effects, and efforts that might be considered to make the building more sustainable by reduction in the use of resources that contribute to climate change. In addition, a National Park Service objective is to "share successes and educate the public" ("NPS, San Juan National Historic Park Climate Friendly Parks Workshop Summary," page 4).

Climate Change and Its Likely Effects

As greenhouse gases such as carbon and methane continue to load the atmosphere, there will be increases in the effects of climate change. These effects are expected to be: an increase in the severity of weather events, a possible increase in the number of severe weather events, changes in the acidity of rainwater, increased heat, greater water table fluctuation, and increases in components of the context atmosphere such as salt aerosols. In addition, sea levels are expected to rise, a consideration of considerable potential effect on both the island, supplied infrastructure, and the park.

By example, sea level rise would flood the international airport in San Juan and many of the islands power production facilities are located close to the shore (Bueno et al. 2008). In addition, storm water drainage system outlets are generally located at just above high tide levels. As sea levels rise, the outlets will be submerged more frequently and although it would seem that one would only have to raise the height of the outlet, it is the lowest point in the system. The whole system would require alteration in grade or pump stations be installed or increased in number. Sewage treatment plants are also located just up gradient from the outlets, and will experience similar back-ups in flow and requirements to redevelop the system. With both of these two systems there is currently infiltration of ground water that can overload the system. With water table fluctuation and increased storm intensity the infiltration problem is intensified, typically overloading the system. Such overload condition is already present in the park during high intensity rainfall events for the sanitary sewer system.

Most of the population lives in or near coastal zones, and most economic activity is located there as well, including most hotels, hospitals, and electric power plants; some power plants are less than 160 feet from the waterline and less than six feet above sea level. More than half of the population lives in the San Juan metropolitan area, a coastal city that is very close to sea level. A rise of three feet (almost a meter) in sea level would flood large parts of the city. The University of Arizona, Department of Geosciences, Environmental Studies Laboratory, has mapped the effect of sea-level rise between 1 and 6 meters.

The other effects of climate change will be of significance individually, in tandem, and as a cluster. As described for the sanitary sewer, the tandem causes are the rise in sea level and the increase in storm intensity. It is equally important to look not just at the specific site related impacts—Quarter No. 211—but to also look at the effects in the larger context. Past experiences provide guidance for future events. Puerto Ricans are familiar with the extensive issues caused by intense storm events such as hurricanes. If storms

increase both in intensity and frequency, there is less recovery time, less potential to restock vital supplies, and even potentially less availability of essential supplies due to the interrupted supply network such as shutdowns in the port off loading facilities, the airport, and highways. This is an event-based scenario superimposed on the longer-term trends of other climate change effects.

The economic effects of climate change are cumulative. As heat levels increase, the intensity of the use of air conditioners rises in tandem. The local electrical utilities typically cannot keep pace with increased demand, as they do not have sufficient reserve capacity. In due course, brownouts occur. This is followed by a rise in rates in order to develop sufficient capital to construct new power plant capacity. As an island there is no broad national power grid from which to draw when demand exceeds supply due to a local need. All of this is on top of the fragile economic condition in 2016 of the power suppliers of the island. They are at risk now and so are the customers.

The effect on an individual residential customer of the purchase of increased electrical power for increased air conditioning use is significant. The effect on the budgets of owners of a large number of buildings is multiplied and so affected are governmental entities that must offset increased expenses by an increase in taxes. Everyone pays. The National Park Service is the steward of a significant amount of buildings with air-conditioned space. It does not pay taxes but it does pay for its electricity, and is quite budget conscious. This budget consciousness is in tandem with its environmental consciousness and the further need to be a model of sustainability.

One other recent circumstance may be tied to climate change. Parts of Puerto Rico and almost all of San Juan have been on water restrictions for extended periods of 2015. Climate change models indicate the strong potential of changes in the intensity of rainfall events, and their frequency. Relative to frequency, the events can be less frequent. Having water on a sporadic basis can move people to seek storage solutions. Having electricity sporadically can move people to consider electricity storage solutions but find these to be quite expensive. As utility systems begin to fail to deliver their product in reliable and cost effective ways, consumers will increasingly consider independence. This consideration is a central premise of the park's climate action plan.

Individual buildings are affected by climate change. Quarter No. 211 will be affected in many ways, such as:

1. Severity of Rain Events: NOAA has indicated in their research that Puerto Rico is projected to have an increase of 37% in severe storms over the average of the years 1960-2014. In tandem, the ground water levels tend to rise significantly. Roof drainage and surface drainage systems may not be of adequate size to contain the flow. Subsurface drainage systems may likewise be over capacity, although it may be as likely that these systems do not exist given the potential lack of history of the problem. Saturation of the ground adjacent to a wall will saturate the wall itself if there is no groundwater interruption system, the wall has not been treated with water repellants, or there is no waterproof barrier in place. As a consequence a saturated wall will allow through-wall leakage and will

provide the right conditions for the growth of mold (plus 65% relative humidity). In addition, wet saturated soils and the hydrostatic pressure of retained water causes significant lateral pressure on buried high house walls (211's east wall) and high retaining walls (211's north courtyard retaining wall) resulting in structural problems.

Intense storm events tend to clearly indicate capacity issues of roof drainage. Downspouts and scuppers are unable to handle the experienced flows, backups occur, and the water finds an alternate route. The building code recognizes this problem for flat (low slope) roofs and requires an overflow scupper with its inlet set higher than that of the primary scupper. Otherwise the roof with its parapets continues to fill when the amount of rain falling on the roof exceeds the scupper capacity. It becomes a bathtub. Quarter No. 211 needs overflow scuppers.

On gutter and downspout equipped sloped roofs, when the system's capacity is exceeded, the water sheet flows over the gutter. For the flat or sloped roof drainage systems, the ground at the discharge point is of concern. This area needs to drain rapidly and with great capacity away from the building and critical site features such as retaining walls, and it cannot be easily erodible. In essence, do not transfer the problem, from roof to site with any expectation that the problem will go away. Roof drainage needs to be controlled at the level of the site as well. Site-based drainage systems must be able to handle the new levels of flow of the higher intensity rain events of the site and in addition accepting the roof drainage discharges at their above normal levels.

There is one other complicating factor associated with these higher intensity events and that is significant: wind. The effect of high winds can be to strip trees of leaves, blossoms, fruits, and small twigs. This is a potent mix of materials for the creation of small dams in pipes and around the mouth of inlets of drainage structures. Similar piles of plant detritus have piled up in the corners of the flat roof sections, in the crevices of the Spanish tile roofs, and in gutters. These all get flushed during intense rain events downstream to at least to the point of constriction. All of these complicating factors are present at Quarter No. 211.

2. Extended Periods of Infrequent Rain: In contrast, infrequent rain means too little water for maintaining plants and potential curtailment of water supplied by the water utility. Quarter No. 211 does not have a roof drainage water storage system, such as a cistern.

3. Increases in the Acidity of Rainwater and Salt Water Aerosols: Such acidity affects acid soluble materials, such as concrete, stucco, limestone, and coquina (coral stone). Acid rainwater can affect metals such as metal roofing, gutters, and downspouts; metal railings and other exposed elements; and non-exposed elements such as steel reinforcing in concrete. The sloped pressed sheet metal roofing over the northeast entry while laid at a slope lower than recommended has deteriorated to an extent much faster than would be expected. This rate of

deterioration may be in part attributable to its exposure to the salt aerosols and acidity in rainwater.

Over time the exposed acid soluble elements of the building and site will experience faster than previously expected etching of the surface. The exposed concrete site elements are concrete stairs and the east retaining wall. All of the building stucco has coatings and roofing materials protecting the concrete roof deck. Likewise an intact coating mostly protects the concrete fence site element. There is not any exposed limestone or coquina stone associated with either the building or site. Where acid rain can penetrate an otherwise intact surface coating, deterioration can occur, including for stone masonry with typical lime and/or Portland cement-based mortars. Such penetration of concrete will cause deterioration of any steel reinforcing, which will in turn expand the diameter of the metal element causing a condition known as rust bursting. This bursting will force out the face of the concrete causing spalls. An early indication may be the presence of brown rust stains. This specific issue may be observed for elements of the concrete fence.

At some point moisture has saturated the house exterior walls, in specific locations, and concrete spalling has occurred. An extreme example is at the west end of the enclosed porch. These locations are most likely attributable to long-term water penetration rather than acid rain, but there is no way to visually differentiate, the effect is the same. The wall locations have been identified in the report and noted on the exterior elevations.

4. Rises in Sea Levels: The effects as discussed above will primarily be on those infrastructure systems serving the house, such as storm water drainage systems and sanitary sewer systems. The location of Quarter No. 211 is above the area designated by various studies as being inundated by rising ocean levels. See the following graphic (Figure 159). Such predictions will be subject to change by climate scientists as they gain more current and recent data to understand the rate and degree of rise in the sea levels. Both 2014 and 2015 were the hottest years on record worldwide so the effect may be adjusted accordingly.

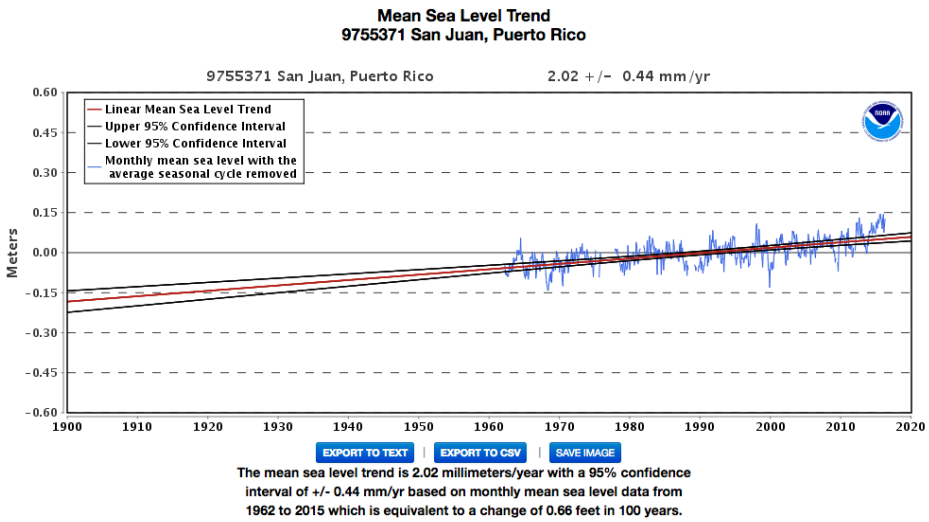

Figure 160: Mean Sea Level Trend, San Juan, Puerto Rico.
Source: https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=9755371.

5. Increases in Temperatures: The single most significant likely effect is in the increase of air conditioning. Condensation may become more prevalent as an issue with greater difference in temperature between the interior and exterior surfaces of a wall. The difference in a desired interior temperature of say 75 degrees with an exterior daytime high of 90 degrees is 15 degrees. If the high is 105 degrees, the difference is 30 degrees. Condensation contributes to mold growth; a concern. Warm air condenses on cool walls. The subsurface east wall of the house is one notable example where condensation may be a current problem, although it is difficult to separate subsurface contributing factors from condensation. The wood around door and window openings may become saturated more often as these lack the mass of the adjacent walls.

   Areas protected from rainfall but in contact with the air can be coated with salt aerosols from the sea air. These aerosols contain moisture absorbing salts, exacerbating the potential moisture problems of the window frames that are set back from the face of the thick walls, thus mostly protected from rain water. Of note, moist wood is attractive to termites as well as rot spores. The extensive problem of this type of damage is seen in the window sashes and frames.

Remedial Treatments to Treat the Effects of Climate Change

Vulnerability = Exposure + Sensitivity + Adaptive Capacity, where:

- *Exposure refers to whether an asset or system is located in an area experiencing impacts of climate change*
- *Sensitivity describes how an asset or system fares when exposed to an impact*
- *Adaptive Capacity refers to an asset's or system's ability to adjust to cope with existing climate variability or future climate impacts*

—Dr. Robert Young at SAJU's Climate Conference
and in the Climate Friendly Parks Workshop Summary, p. 9.

Many of the recommendations that are made below are the same as would be recommended to address building conservation issues. For example, the need to address site drainage issues of the east site boundary is both a conservation issue and a response to the effects of climate change. Weather is always working its effects on structures, the climate change effects become an overlapping intensifier of weather issues. Climate change effects may change both the intensity of the treatment and its urgency. Climate change with the increase in the effects on a building are pushing treatments to the top tier of the list as the needs for treatments are more urgent from a time standard, a rate of deterioration standard, and from the consideration of the acceleration of deterioration of context materials. For example, a breach in the stucco coating may now be seen as a more serious problem leading to accelerated deterioration of the concrete, the reinforcing bar, and those other materials in contact with the concrete such as window frames. The dual attacking forces of weather and climate change work together to develop more significant effects on building materials.

1. Install overflow scuppers for the drainage from the main roof.
2. Review the size of the main roof interior drain in terms of capacity. This is not directly observable, some disassembly is required.
3. Install debris guards at the inlet end of drains.
4. Direct down spouts to subsurface drains of sufficient size,
5. Clean roofs of accumulated detritus from vegetation on a regular basis with particular attention to the schedule of impending significant storm events.
6. Clean all drainage lines on a regular schedule.
7. Fully inspect all drain lines by video camera to check on condition issues (breakage, blockage, and sag) on a schedule of at least once every five years after an initial evaluation.
8. Observe roof and storm drains during major storm events to determine their effectiveness.
9. Install back of wall (upslope side) subsurface drain system at the east building wall, extending further south along the back of the site's east retaining wall. Please note: field examination did not indicate the presence of an outlet from a drainage system in this location, however, such system may possibly be present and have an outlet to an even more remote downhill location or feed into an underground system. Design of new drain: west side and bottom of 5-foot deep trench, 1.5 feet wide lined with MiraDrain 9000, with 6-inch diameter drainpipe led to daylight, backfilled with 1 inch to 1-1/2 inch washed gravel, topped by filter media and top soil with grass.
10. For the high retaining wall of the north side of the north courtyard, no drainage weep holes were observed. To relieve water pressure install weep holes at three levels: the lower third, middle third, and upper third. The other source of lateral pressure is likely from roots of the trees in the above site, that of Quarter No. 210. If the weep holes do discharge water during storms, then water will have been an issue. If they do not discharge water, then the trees will have been the primary

source of lateral pressure and their removal should be considered.

11. Spalled areas of concrete in the fence and house need to be repaired.
12. Maintenance of wall coating systems for the exterior building walls and concrete site features is important as a barrier to moisture intrusion. The character of the rainwater will continue to change with increased acidity.
13. Replace the sheet metal roofing with a product suitable for the roof slope and with a resin-based coating system or other system with similar corrosion resistant coating.
14. Consider installation of a rainwater capture system to allow for increased resilience to drought conditions. In the systems installed in the Caribbean, the rainwater is filtered, stored in tanks, and pumped for use in the house.
15. Consider installation of rooftop photovoltaic panels of a size to allow them to be obscured behind the parapets.
16. Consider battery storage to allow for power outages as well as regular use. A backup system connection may currently exist as well.
17. Consider the installation of an evacuated tube solar hot water system on the roof.
18. Regularly review the existing air conditioning system for the availability of improved equipment that can reduce total load of the electrical use. Current designs feature variable refrigerant flow from a single condensing source; however, as the existing the AC units are operating most of the time, some efficiencies can be gained, not the highest advertised for these systems. Efficiencies may be gained by controls. By example, the high mass walls can work well with reduction in room temperatures during the night. Nighttime is when the compressors will work more efficiently due to the relatively cooler nighttime temperatures. The cooler walls will provide the ability to "coast" through the days with higher daytime set points for the AC system.

Sustainability Efforts

The improvements suggested in #s 14 through 18 are relative to the utility systems as a whole. The following are specific actions beyond the direct effects of climate change and are in response to the primary objective in the desire to reduce demand by reducing the consumption of electricity in running the house and in the efficiency of the shell.

19. Shell Efficiency: This series of treatments looks to ways to reduce the loss of cooled air to the outside and reduction of heat gains through the shell. All of these recommendations also take into consideration historic preservation principles and compliance. At the next re-roofing, increase the insulation under the roof membrane. At the next replacement of windows, use the best quality insulating glass available. For doors and windows, provide weatherstripping. For doors, install closure mechanisms. Assess the ventilation systems to be certain they are not exhausting more air than required for the use, bathrooms and kitchen, and the system controls are tied to the use.

20. Systems Efficiency and Controls: This series of treatments looks to ways to reduce energy consumption through efficiency in the energy using equipment and appliances. These are in addition to the discussions of the systems themselves described above. First, for each new appliance purchase, evaluate the Energy Star rating. Examples include dishwashers, refrigerators, washers, dryers, and entertainment systems. While everyone's individual circumstance will vary, consider the possible installation of automatic timers to turn off computers and entertainment systems.

21. Lighting, Natural Daylighting, and Ceiling Fans: In electric lighting, the three areas are the bulbs, the numbers of fixtures to provide the desired level of light, and the controls. The most efficient bulbs are LEDs with improvements in light quality and reduced costs marking the last five years. Replacement bulbs for virtually all fixtures are available, including strip fluorescent. Reduction in the number of fixtures can be accomplished after assessment of what amount of light is required in which location. The almost universally favored type of lighting control is the occupancy sensor that automatically turns on a light when someone enters a room, and turns it off upon their departure. The most sensitive type of occupancy sensor is the human who can judge if a light is needed for the task to be accomplished in the subject space. This decision takes into account the amount of light in the space and if supplemental electric lighting is required. Therefore natural daylighting can be an input factor into the decision.

    Most windows in the house are equipped with horizontal vaned mechanically operated shutters. Unfortunately, the mechanisms are inoperable on most of the windows, and therefore tend to be left in the closed position. These shutters are intended to control light transmission through the windows, as well to assist in privacy, and should be made fully operable. Consideration may be given to changing the color of the vanes to a lighter more reflective color on their top surface instead of the current dark brown.

    Ceiling fans are present in the occupied spaces to provide a light breeze and as a destratifier; mixing the air from different levels in the room. Typically fan controls regulate speed, and in some units, fan blade direction. In general, fans use little energy for the comfort provided. New fan purchases should be evaluated with respect to the Energy star ratings.

22. Incidence of Mold Reduction: The best method for reducing the incidence of mold is to maintain conditions at below 65% relative humidity. As referenced in many of the treatments above, an objective is to keep moisture from entering the house and to keep humidity lower in the interior. In the interior surface coating selection process, the use of what are called biocide or antimicrobial paints may be considered. Recently the Vice President of Facilities Planning and Design at health care giant Kaiser Permanente has banned the use of antimicrobial paints as being ineffectual and has banned their use ("Kaiser Permanente Rejects Antimicrobials for Infection Control," Dec. 11, 2015). The Centers for Disease

Control has also "found no evidence to suggest the products offer any enhanced protection." The CDC has made this observation in several of its publications; see, for example, "Guidelines for Environmental Infection Control in Health-Care Facilities, 2003." To review the effectiveness of a coating system in inhibiting mold growth, the manufacturer should have results available that indicate testing per ASTM D-3273. Antimicrobial paint may still be the best option.

23. Water Use Reduction: Both low flow toilets and dual flush toilets consume respectively on average 1.26 gallons per flush and 1.0 gallon or less on averaging the number of flushes. EPA issues Water Sense ratings to be reviewed prior to purchase. The same review can be used for water-using appliances such as dishwashers and clothes washers. Flow restrictors on showerheads and faucets are standard features as well. In terms of control, the occupants are the use control mode that mostly are instituted when awareness rises due to water restrictions; for example, the length and frequency of showers, running only full loads of the clothes washer and the dishwasher, selecting the most water frugal cycles, and so forth.

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Glossary

Balustrade	An entire railing system (as along the edge of a balcony) including a top rail and its balusters, and sometimes a bottom rail.
Column	**1.** In structures, a relatively long, slender structural compression member such as a post, pillar, or strut; usually vertical, supporting a load which acts in (or near) the direction of its longitudinal axis. **2.** In classical architecture, a cylindrical support consisting of a base (except in Greek Doric), shaft, and capital; either monolithic or built up of drums the full diameter of the shaft. **3.** A pillar standing alone as a monument.
Cordon	A stringcourse of belt course.
Courtyard	An open area partially or fully enclosed by buildings or other walls, adjacent to or within a castle, house, or other building.
Entablature	**1.** In classical architecture, the elaborated beam member carried by the columns, horizontally divided into architrave (below), frieze, and cornice (above). The proportions and detailing are different for each order, and strictly prescribed. **2.** A similar feature as the crown of a wall.
Fence	An enclosing or dividing framework for land, yards, or gardens.
FMSS	Facility Management Software System (US NPS)
Glacis	A sloped embankment in front of a fortification, so raised as to bring an advancing enemy into the most direct line of fire.
GPR	Ground penetrating radar
IR	Infrared
Mampostería	Stonework, stone masonry, concrete block construction
Parapet	**1.** A low guarding wall at any point of sudden drop, as at the edge of a terrace, roof, battlement, balcony, etc. **2.** A defense wall. **3.** In an exterior wall, the part entirely above the roof.
Pier	**1.** A column designed to support concentrated load. **2.** A member, usually in the form of a thickened section, which forms an integral part of a wall; usually placed at intervals along the wall to provide lateral support or to take concentrated vertical loads.
Pilaster	**1.** An engaged pier or pillar, often with capital and base. **2.** Decorative features that imitate engaged piers but are not supporting structures, as a rectangular or semicircular member used as a simulated pillar in entrances and other door openings and fireplace mantels; often contains a base, shaft, and capital; may be constructed as a projection of the wall itself.

Plinth	**1.** A square or rectangular base for column, pilaster, or door framing. **2.** A solid monumental base, often ornamented with moldings, bas reliefs, or inscriptions, to support a statue or a memorial. **3.** A recognizable base of an external wall, or the base courses of a building collectively, of so treated as to give the appearance of a platform.
Rail	**1.** A bar of wood or other material passing from one post or other support to another; a hand support along a stairway. **2.** A structure consisting of rails and their supporting posts, balusters, or pillars, and constituting an enclosure or a line of division, as a **balcony rail**. **3.** A horizontal piece in a frame or paneling as a **door rail**, or in the framework of a window sash.
Roundel	**1.** A small circular panel or window; an **oculus**. **2.** In glazing, a bull's-eye or circular light like the bottom of a bottle. **3.** A small **bead molding** or **astragal**. **4.** In stage lighting, a glass or gelatin color filter used in a **borderlight**.
Site boundary enclosure	The term used in this report for the pier (column) and connection balustrade that sit on top of and are a part of the retaining wall on the site's south and west boundaries.
Spandrel panel	**1.** An area, roughly triangular in shape, included between the extra-doses of two adjoining arches and a line approximately connecting their crowns (or a space approximately equal to half this in the case of a single arch); in medieval architecture, often ornamented with tracery, etc. **2.** In a multistory building, a wall panel filling the space between the top of the window in one story and the sill of the window in the story above. **3.** A surface, roughly triangular in shape, as below a stair string.
SPR	Surface penetrating radar
Tapia	An adobe-like building material, consisting mainly of earth or clay.
Torus	A bold projecting molding, convex in shape, generally forming the lowest member of a base over a plinth.

Appendix 1—Paint Analysis

Paint Analysis

Scope: Take paint samples from 36 locations representing the key site features, exterior surfaces, and interior spaces. Locations shall be selected in the field. Laboratory Analysis shall identify the first three layers as to match with the Munsell Color Notation System, with total number of layers quantified and general color noted.

Results: Each sample's result is individually articulated on a separate sample sheet.

Summary: An overview of all results is shown in a summary sheet.

Please Note: The Contractor opted to increase the number of samples from 36 to 50 in an attempt to learn more about the interior finishes and colors.

Introduction to the Process of Paint Analysis

The process of paint analysis is in four stages:
1. PRE-FIELD: Given the specifics of the building, project objectives, and budget constraints a sampling plan is formulated. There may be an emphasis or determining sequence of construction, the determination of relative ages of an addition ton the main structure, and/or the originality of various elements such as windows. One difficulty in setting a budget is a lack of detailed familiarity with the structure to allow comprehensive sampling. Another difficulty is that during historic research, questions may have arisen for which the answer may be provided by paint sampling or the research may indicate a documented comprehensive change such as all windows were replaced.

2. FIELD SAMPLING: Paint sampling in the field begins with the review of the potential locations conceived in the sampling plan and adjustments to the plan to deal with actual situation. Such adjustments will typically include the results of the first rounds of research and associated questions for which the paint analysis may provide answers. Specific locations are chosen for the subject element from areas on the element subject to the least amount of ultraviolet deterioration and the most apparent paint layers. The samples are taken by a knife plunged into the surface at an angle to a depth that will allow the sample to include substrate. The paint sample is placed into an envelope, each of which is sequentially numbered. The element and paint sample location are referenced on the envelope or on a sketch for complex elements with multiple sample locations, and further noted as to location on the drawings of the buildings; that is, on the floor plans and/or elevations. Often, there is a question of the integrity of a sample—did the substrate become detached is a common concern—and other samples are taken and put in the same envelope.

3. LABORATORY ANALYSIS: In the laboratory the sample is evaluated using a microscope. The sample is viewed flat, with substrate side up, and on edge. Each of the first three or more layers is matched to the Munsell System of Color Notation, a widely recognized international system of color notation with specific intervals around the color wheel for hue, chroma, and value. There are specific additional tables for neutral colors: whites, grays, and blacks. The light source for viewing is natural daylight from the north,

per ASTM D 1729 Standard Practice for Visual Evaluation of Color Differences of Opaque Materials. The color matching to the Munsell System is per the procedures set forth in ASTM D 1535-68 (Reapproved 1974) Specifying Color by the Munsell System. The results for each sample are recorded on individual forms on which each of the layers is identified to the desired amount and the total number of layers is estimated. For projects in which the historic color scheme is the key objective, color matching the first three layers is critical. Other objectives may include the matching for additional layers. A common language name may be used to identify a color, such as "Gray Avocado" along with the Munsell color notation of 10GY8/2. This common name designation serves two purposes: the reader gains a sense of the color, and it becomes easier to read the common names than to pick through the Munsell notations to see patterns. Our office has created the common names to ease understanding of what the color looks like.

4. REPORT: As part of the contract, we will summarize the results and address the project objectives. Examples of response to project objectives are: all windows but one had the same number of layers (7), window #9 had two layers; the first three layers indicate the following earliest color scheme; or the earliest of the five layers of the addition was Gray Avocado, and this was layer four of the eight layers of the main structure.

The report should also note if any sample was a "mongrel," a sample with very different number of layers and colors than its "neighbors: (adjacent) or cousins (same element different location). A mongrel does not seem likely to have been a replacement element, for example a sample in a sequence of wall samples with many more layers. There are various explanations for such a mongrel: mislabeled sample, all of the rest of the wall was re-stuccoed, the rest of the wall was stripped of paint, or this area was the spot where different colors were tried out for owner approval. Wall colors in interior spaces may be changed regularly so the definition of mongrel may change for the interior. Frequent changes on exteriors may occur at a commercial storefront with tenant turnover. In essence, these are judgment calls.

Results of the Paint Analysis for Quarter No. 211: Site, Exterior, and Interior

Per the above procedures, a budget was set for the paint analysis of 40 samples. After an initial round of analysis of the samples in October 2015, of the samples taken in September 2015, it was determined that more samples would enhance the paint research. Accordingly, more samples were taken in November 2015 and analyzed in December 2015. In total, 50 samples were taken and evaluated. The sample locations are provided in this Appendix 1, as are the individual paint sample analysis results sheets.

Historic photographs indicate that the site boundary enclosure was originally pickets between columns that appear to be integral with the site boundary enclosure retaining wall. The expectation is that the paint analysis would indicate early layers for the columns not present for the concrete balustrade between the columns that had replaced the pickets. See the results for samples one through seven.

Later historic research accessed some early black and white photographs that indicated, for both the exterior and the columns of the site boundary enclosure, a contrasting color

scheme with certain elements picked out in a lighter color. Later color photographs indicated that not only did the practice continue, but also the picked out elements remained the same. The historic research also indicated by name different colors at different time periods. By example, it was found that "pink" was a color specified. Earlier color schemes are likely to have included the standard issue colors of the United States Army. With standard colors the sequence may not appear as "pure" as one might hope: the same green could show up as an early layer and several layers later show up again. See the results under exterior walls category for the walls as other features are also amongst the 24 samples; windows, cornice, and other wall decorative features.

On the following pages are presented a summary of the results divided into Site, Exterior Walls, and Interior Walls. Below are the analyses of these results.

Site Boundary Enclosure

The paint design for the site boundary enclosure reflects the photographic evidence: column shaft and base being of one color, and the column bead of a contrasting lighter color. Of note, the column bead (or band), bottom rail, top rail, and baluster all had just two layers of white. One possibility is that when the concrete balustrade replaced the picket and rail configuration, the column bead was either comprehensively redone or repaired and repainted. The early photograph of this site boundary enclosure does show light colors for the column base and band. See the two photographs below. The dark color is Deep Rust Red, 10R3/8.



Figure A1-1: Early photograph of the fence showing light colors for the column base and band. Note that the fence is an earlier iteration before the base was heightened and the pickets replaced by a concrete balustrade. The columns (piers) may be the same today as for the time period of the late 1890s shown by the photograph.



Figure A1-2: The concrete balustrade that replaced the earlier picket and rail configuration.

Exterior Walls

The exterior walls are consistently indicating six layers, see #s 15-22. Sample #10 appears to have been mislabeled, instead of north porch wall it appears as if it is the south wall west of the north porch wall. The enclosed concrete porch was added to this elevation, estimated construction was the late 1930s. Note that the earliest layer color was a green as was the third layer. The deep rust red between the greens is the same as for the fence columns. Sample #15 (north elevation east of the door to the master bedroom) did not show the third layer as being green, it was salmon. Incomplete layers are expected as in preparation for applying a new layer of paint, old loose paint coatings have been and should be removed.

Exterior Decorative Elements

Cornice: Sample #s 39 and 40 were taken from two spots on the west elevation cornice; face, and underside soffit respectively. In addition to location the earliest color is different as are the number of layers. Close examination of historic photographs indicate that at one time the cornice face exhibited missing pieces as did the window entablatures (discussed below). Damage was also seen to the over-window panels.

Entablature: Sample #s 37 and 38 were taken from the entablature. Whites and light grays seem to be the dominant color scheme for the entablature, the cornice, and the panel above the three windows.

Over-Window Panels: Sample #s 33 through 36 are reflective of the slight differences in the number of layers, likely due to repair campaigns. The presence of the salmon color is important; it is inconsistent for the panels but overall it is a consistent fourth layer of the exterior. The light blue gray first layer of the four layers of Sample 35 is likely to be representative of one early paint scheme, but not the earliest. The total of just four layers, instead of the six layers of the building walls, plus the absence of the green and rust red of the walls, indicates a major repair campaign of the west elevation took place after the period of rust red color. Early photographs do not indicate that the west elevation color values differ from the other elevations in the photographs.

Windows and Door

The windows of the building have been replaced at least twice in the twentieth century (sample #s11-14). The single layer supports the historic research. The door #3 also has just a single layer (sample #23).

Interior Walls

After the paint sampling program had been completed in the field and the laboratory, historic research indicated that a major repair campaign had included the renewal of all interior surfaces. Our field research had indicated that the entire roof of the main building had been replaced by concrete (perhaps circa 1938) so ceiling sampling was not undertaken. The supplementary sampling program focused on the interior as can be deduced from the break in the numbering. Interior samples are #s 24-32 and #s 41-50. What is evident: the interior has been painted many times, many colors have been used, some colors show up in different layers, and the number of layers range from one to eight. No distinctive patterns were discernible nor was there any apparent consistency across all rooms. At best one can say that creamy yellow and greens were favored.



Figure A1-3: Architectural Conservator John Feinberg taking paint samples from an over-window panel of the west elevation.

Paint Analysis Summary

Site

NOTE: The term fence hereinafter refers to the site boundary enclosure comprising the retaining wall's plinth, piers, and balustrade.

Location	Sample ID #	1st Layer	2nd Layer	3rd Layer	Total # of Layers
Fence: Top Rail	1	White	White	—	2
Fence: Baluster	2	White	White	—	2
Fence: Bottom Rail	3	White	White	—	2
Fence: Column Cap*	4	Deep Rust Red (10R3/8)	Green (10Y7/2)	Salmon (7.5YR8/6)	6
Fence: Column Bead	5	White	White	—	2
Fence: Column shaft	6	Deep Rust Red (10R3/8)	Green (10Y7/2)	Salmon (7.5YR8/6)	6
Fence: Column Base	7	Deep Rust Red (10R3/8)	Green (10Y7/2)	Salmon (7.5YR8/6)	6

*Good sample, typical

Exterior Walls

Location	Sample ID #	1st Layer	2nd Layer	3rd Layer	Total # of Layers
Porch: Exterior Wall, NW Corner	8	Yellow (2.5Y8/4)	White	—	2
Porch: Exterior Wall, Band	9	Traces of Yellow (2.5Y8/4)	White	—	2
Porch: Exterior Wall, North Wall	10	Deep Rust Red (10R3/8)	Green (10Y7/2)	Salmon (7.5YR8/6)	6
Window at Breakfast Nook—Shutter Vane	11	Dark Brown (10YR2/2)	—	—	1
Window at Breakfast Nook—Frame/ Sash	12	Black	—	—	1

Window at Porch Interior—Vane	13	Black	—	—	1
Window at Porch Interior— Frame/ Sash	14	Black	—	—	1
North Elevation Exterior Wall East of Door 6 (see Key Map)	15	Green (10Y7/2)	Deep Rust Red (10R3/8)	Salmon (7.5YR8/6)	6
North Elevation Exterior Wall East of Window 6 (see Key Map)	16	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
North Elevation Exterior Wall East of Window 7 (see Key Map)	17	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
North Elevation Exterior Wall East of Window 8 (see Key Map)	18	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
North Elevation Wall North of Window 14 (see Key Map)	19	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
Elevation Exterior Wall West of Door 7 (see Key Map)	20	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
Elevation Exterior Wall SW of Door 3 (see Key Map)	21	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6
Elevation Exterior Wall NE of Door 3	22	Green (10Y7/2)	Deep Rust Red (10R3/8)	Green (10Y7/2)	6

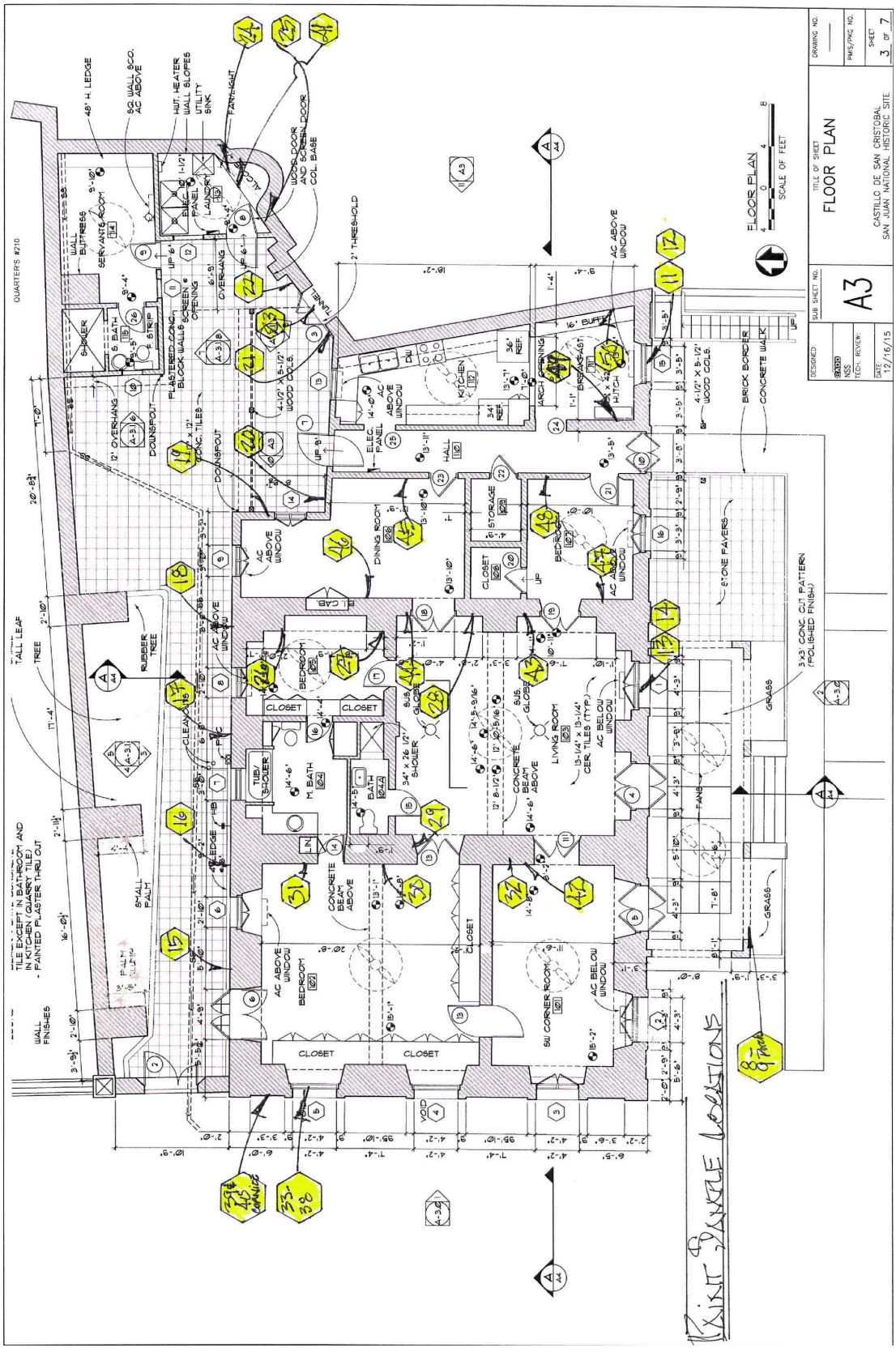
Door 3 (see Key Map)	23	Black	—	—	1
Exterior panel above window of Room 102 (see Key Map)	33	White	Light blue gray (5PB7/1)	White	7
Exterior panel above window of Room 102, background, right side raised element (see Key Map)	34	White	White	White	3
Exterior panel above window of Room 102, background, center ornament (see Key Map)	35	Light blue gray (5PB7/1)	Salmon (7.5YR8/6)	Gray (5PB8/1)	4
Exterior panel above window of Room 102, background, (see Key Map)	36	Possibly specks of Salmon (7.5YR8/6)	White	White	3+
Exterior panel above window of Room 102, entablature (see Key Map and drawing)	37	Gray tint white	White	White	3+
Exterior panel above window of Room 102, entablature	38	White	Gray tint white	White	3+
Cornice	39	Gray (5Y7/1)	White	White	3
Cornice at “soffit” (see drawing on sheet)	40	Near white	Near white	Near white	5

Interior Walls

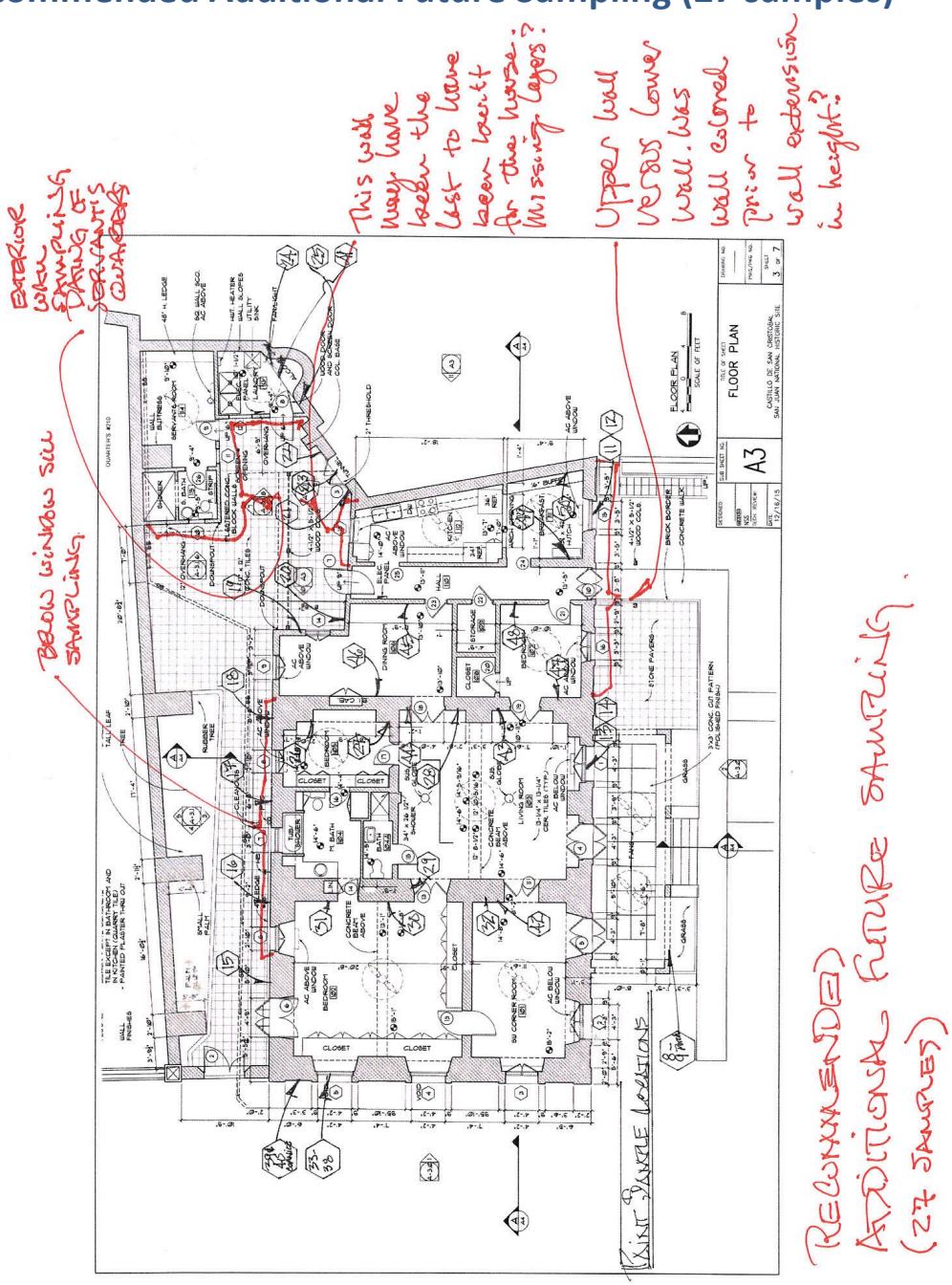
Location	Sample ID #	1st Layer	2nd Layer	3rd Layer	Total # of Layers
"Hearth" NE (see Key Map)	24	Traces of Yellow (2.5Y8.5/3)	Light gray green (5GY9/1)	White	3
"Hearth" SE (see Key Map)	25	Light gray green	Yellow (2.5Y8.5/3)	Green (10Y7/2)	5
Room 103 (see Key Map)	26	Yellow (2.5Y8.5/3)	Green (10Y7/2)	White	4
Room 105 (see Key Map)	27	Touch of Yellow (2.5Y8.5/3)	Green (10Y7/2)	Gray Green (2.5Y8/2)	6
Room 103 (see Key Map)	28	White	A bit of creamy white	White	3
Doorway between Rooms 102 and 103 (see Key Map)	29	Aqua green (7.5GY7/2)	Light Butterscotch (7.5YR8/4)	Creamy White	4
Room 102 (see Key Map)	30	Green (5G7/2)	Putty (2.5Y8/2)	White	5
Room 102 (see Key Map)	31	Creamy white	White	—	2
Room 101 (see Key Map)	32	Red (10R3/4)	Green (5G7/2)	Red (10R3/4)	8
Wall below hearth in laundry room	41	Salmon (7.5YR8/6)	Gray (10Y8/1)	Gray white	6
East wall of Room 102 (see Key Map)	42	Cream (10YR7/1.5)	White	White	3
East wall of Room 103 (see Key Map)	43	Creamy yellow (10YR9/3)	Green (10GY6/2)	White	6
East wall of Room 103 (see Key Map)	44	Creamy yellow (10YR9/3)	Green (10GY6/2)	Brown (7.5YR7/2)	5
East wall of Room 106 (see Key Map)	45	Creamy yellow (10YR9/3)	Green (10GY6/2)	Blue green (10GY6/2)	5+
West wall of Room 106 (see Key Map)	46	Creamy yellow (10YR9/3)	White	White	5

West wall of Room 107 (see Key Map)	47	Creamy yellow (10YR9/3)	White	White	3
East wall of Room 107 (see Key Map)	48	Brown coat of plaster	Creamy yellow (10YR9/3)	—	1
West wall of Room 111 (see Key Map)	49	Creamy yellow (10YR9/3)	Green (10GY6/2)	Brown (7.5YR7/2)	7
East wall of Room 111 (see Key Map)	50	Green (10GY6/2)	Brown (7.5YR7/2)	White	6

Key Map


FLOOR PLAN
SCALE OF FEET
TITLE OF SHEET
FLOOR PLAN
CASTILLO DE SAN CRISTOBAL
SAN JUAN NATIONAL HISTORIC SITE
SUB SHEET NO.
A3
DESIGNED:
NSS
TECH. REVIEW:
DATE: 12/16/15
DRAWING NO.
PMIS/PKG NO.
SHEET 3 OF 7
QUARTER'S #210
TALL LEAF TREE
RUBBER TREE
SMALL PALM
WALL FINISHES
TILE EXCEPT IN BATHROOM AND IN KITCHEN (QUARRY TILE)
- PAINTED PLASTER THRU OUT
48" H. LEDGE
SQ. WALL SCO. AC ABOVE
HWT. HEATER
WALL SLOPES
UTILITY SINK
FAN/LIGHT
WOOD DOOR AND SCREEN DOOR
COL. BASE
2" THRESHOLD
SERVANTS ROOM
WALL BUTTRESS
SHOWER
S. BATH
F. STRIP
PLASTERED CONC. BLOCK WALLS
SCREEN OPENING
OVERHANG
12" OVERHANG
DOWNSPOUT
CONC. TILES
4-1/2" X 5-1/2" WOOD COLS.
ELEC. PANEL
AC ABOVE WINDOW
KITCHEN
HALL
ARCH OPENING
BREAKFAST
HUTCH
16" BUFFET
BRICK BORDER
CONCRETE WALK
STONE PAVERS
DINING ROOM
STORAGE
CLOSET
BEDROOM
BI. CAB.
M. BATH
BATH
TUB/SHOWER
SUS. GLOBE
34" x 26 1/2" SHOWER
CONCRETE BEAM ABOVE
LIVING ROOM
13-1/4" x 13-1/4" CER. TILES (TYP.)
AC BELOW WINDOW
FANS
GRASS
3'x3' CONC. CUT PATTERN (POLISHED FINISH)
SW CORNER ROOM
VOID
CLEANOUTS
Print Sample Locations

Recommended Additional Future Sampling (27 samples)



Appendix 1-1: Individual Paint Sample Sheets

PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 1	**Location of sample:** Fence, Top Rail
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 2	**Location of sample:** Fence: Baluster
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 3	**Location of sample:** Fence: Bottom rail
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 4	**Location of sample:** Fence: Column cap Good Sample TYPICAL
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	Gray		
	White Top Coat		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 5	**Location of sample:** Fence: Column bead
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 6	**Location of sample:** Fence: Column "shaft" *
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	Gray		
	White Top Coat		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 7	**Location of sample:** Fence: Column base *
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	Gray		
	White Top Coat		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 8	**Location of sample:** Porch: exterior wall, NW corner
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Yellow	2.5Y8/4	
	white		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 9	**Location of sample:** Porch: exterior wall, Band
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Traces of Yellow	2.5Y8/4	
		White	

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 10	**Location of sample:** Porch: exterior wall, north wall
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	Gray		
	White Top Coat		

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 11	**Location of sample:** Window at breakfast nook: shutter vane
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: wood**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Dark Brown	10YR2/2	

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 12	**Location of sample:** Window at breakfast nook: frame/sash
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Black		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 13	**Location of sample:** Window at porch interior: vane
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: wood**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Black		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 14	**Location of sample:** Window at porch interior: frame/sash
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: wood**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Black		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 15	**Location of sample:** North elevation exterior wall east of door 6 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Green	10Y7/2	
	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	White Top Coat		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 16	**Location of sample:** North elevation exterior wall east of window 6 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Green	10Y7/2	
	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	White Top Coat		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 17	**Location of sample:** North elevation exterior wall east of window 7 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Green	10Y7/2	Partial layer
	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	White Top Coat		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 18	**Location of sample:** North elevation exterior wall east of window 8 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Green	10Y7/2	Partial layer
	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	White Top Coat		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 19	**Location of sample:** Elevation exterior wall north of window 14 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Green	10Y7/2	Partial layer
	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	White Top Coat		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 20	**Location of sample:** Elevation exterior wall west of door 7 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Green	10Y7/2	Partial layer
	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	White Top Coat		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 21	**Location of sample:** Elevation exterior wall SW of door 3 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Green	10Y7/2	Partial layer
	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	White Top Coat		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 22	**Location of sample:** Elevation exterior wall NE of door 3 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Green	10Y7/2	
	Deep Rust Red	10R3/8	
	Green	10Y7/2	
	Salmon	7.5YR8/6	
	Gray Green	10Y6/2	
	White Top Coat		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 23	**Location of sample:** Door 3 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: Wood**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Black		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 24	**Location of sample:** "Hearth" NE (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Traces of a yellow		
	Light gray green	5GY9/1	
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 25	**Location of sample:** "Hearth" SE (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Light gray green		
	Yellow		
	Green	10Y7/2	
	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 26	**Location of sample:** Room 105 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Yellow	2.5Y8.5/3	
	Green		
	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 27	**Location of sample:** Room 105 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Touch of yellow		
	Green		
	Gray green	2.5Y8/2	
	White		
	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 28	**Location of sample:** Room 103 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	White		
	A bit of creamy white		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 29	**Location of sample:** Between rooms 102 & 103 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data: Difficult, somewhat spotty layer for layer 2 from bottom and looks different in areas	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Aqua green	7.5GY7/2	
	Light butterscotch	7.5YR8/4	
	Creamy white		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 30	**Location of sample:** Room 102 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data: Sample may be incomplete, traces of early layers only	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Green	5G7/2	
	Putty	2.5Y8/2	
	White		
	Creamy white		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 31	**Location of sample:** Room 102 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data: In sample, layer exposed	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Creamy white		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 32	**Location of sample:** Room 101 (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Red	10R3/4	
	Green	5G7/2	
	Red	10R3/4	
	Putty	7.5YR7/2	
	Green	5G7/2	
	Cream	7.5YR7/2	
	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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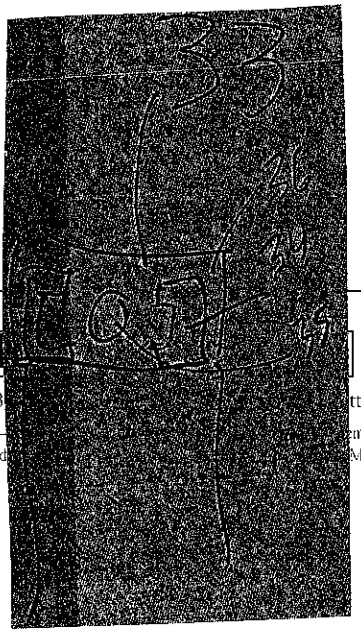
PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 33	**Location of sample:** Ext. panel above window of Room 102, background (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	White		
	Light blue gray	5PB7/1	
	White		
	Light blue gray	5PB7/1	
	Salmon	7.5YR8/6	
	Gray	5PB8/1	
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**



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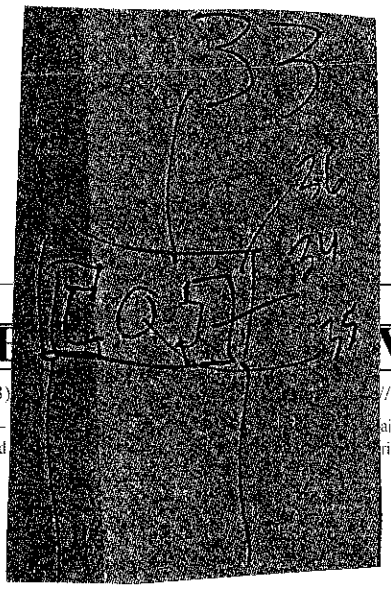
PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 34	**Location of sample:** Ext. panel above window of Room 102, background, right side raised element (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	White		
	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**



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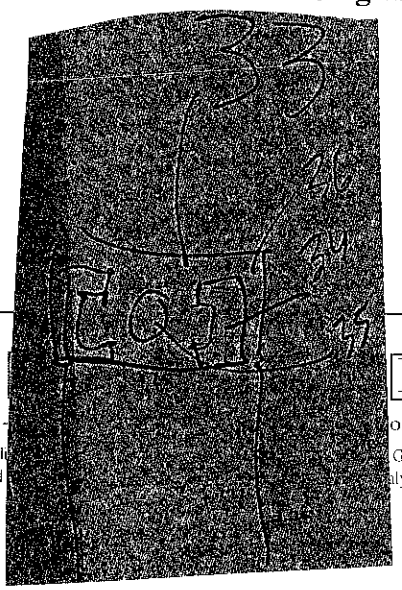
PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 35	**Location of sample:** Ext. panel above window of Room 102, background, center ornament (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Light blue gray	5PB7/1	
	Salmon	7.5YR8/6	
	Gray	5PB8/1	
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**



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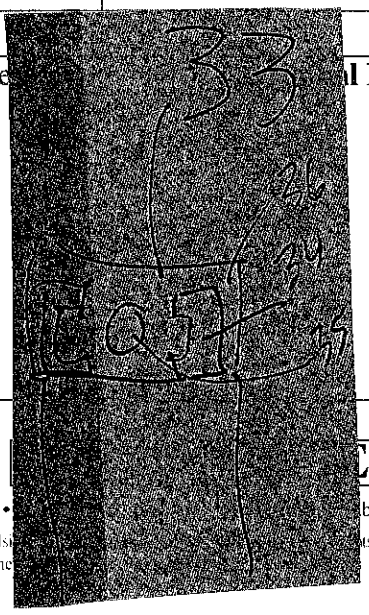
lysis

PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 36	**Location of sample:** Ext. panel above window of Room 102, background (see key map)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Possibly specks of Salmon residuals	7.5YR8/6	
	Multiple layers of white		

Further Observations, Documentation or Sketche[redacted]l Paint Layer



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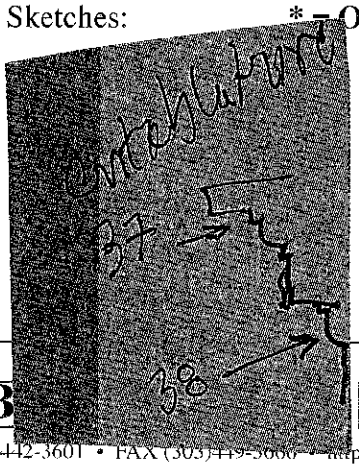
PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 37	**Location of sample:** Ext. panel above window of Room 102, entablature (see key map and drawing)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Gray tint white		
	Multiple layers of white		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**



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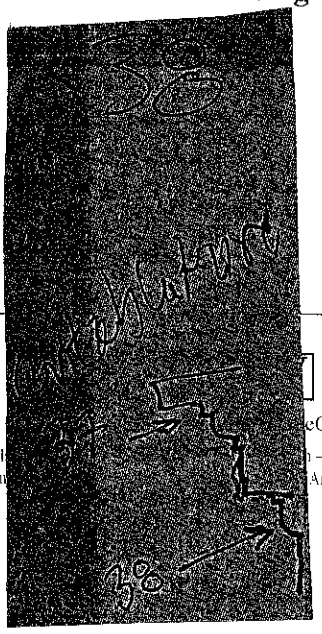
PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 38	**Location of sample:** Ext. panel above window of Room 102, entablature (see key map and drawing)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	White		
	Gray tint white		
	Multiple layers of white		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**



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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 39	**Location of sample:** Cornice at west elevation
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate: stucco**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Gray	5Y7/1	
	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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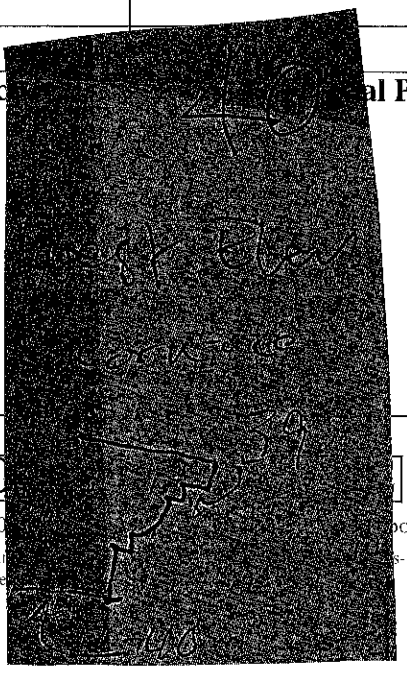
Paint Analysis

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 40	**Location of sample:** Cornice at "soffit" (see drawing on envelope)
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Near white		
	Near white		
	Near white		
	White		
	Gray white		

Further Observations, Documentation or Sketc[illegible] **al Paint Layer**



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manship – Landscape Architecture – Municipal and Local Gove[illegible]

PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 41	**Location of sample:** Wall below hearth in laundry room
Date Taken: Sept. 11, 2015	
By: JDF	
Date Examined: Oct. 29-30, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Salmon	7.5YR8/6	
	Gray	10Y8/1	
	Gray white		
	Gray white		
	Gray white		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 42	**Location of sample:** East wall of room 101
Date Taken: November 17, 2015	
By: RW	
Date Examined: Dec. 4-9, 2015	**Substrate: no plaster!**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Cream	10YR8/1.5	
	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 43	**Location of sample:** East wall of Room 103
Date Taken: November 17, 2015	
By: RW	
Date Examined: Dec. 4-9, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Creamy yellow	10YR9/3	
	Green	10GY6/2	
	White		
	Cream		
	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 44	**Location of sample:** East wall of room 103
Date Taken: November 17, 2015	
By: RW	
Date Examined: Dec. 4-9, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Creamy yellow	10YR9/3	
	Green	10GY6/2	
	Brown	7.5YR7/2	
	White		
	Multiple whites		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 45	**Location of sample:** East wall of room 106
Date Taken: November 17, 2015	
By: RW	
Date Examined: Dec. 4-9, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Creamy yellow	10YR9/3	
	Gray green*	10GY6/2	
	Blue green*	10GY6/2	
	Brown	7.5YR7/2	Very thin
	Multiple layers of white		
*Two layers in some places, each of two colors. One layer of 10GY6/2 is dominant			

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 46	**Location of sample:** West wall of room 106
Date Taken: November 17, 2015	
By: RW	
Date Examined: Dec. 4-9, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Creamy yellow	10YR9/3	
	White		
	White		
	Brown	7.5YR7/2	
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 47	**Location of sample:** West wall of room 107
Date Taken: November 17, 2015	
By: RW	
Date Examined: Dec. 4-9, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Creamy yellow	10YR9/3	
	White		
	White		
Suspect incomplete sample, no plaster			

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 48	**Location of sample:** East wall of Room 107
Date Taken: November 17, 2015	
By: RW	
Date Examined: Dec. 4-9, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Brown coat of plaster		
	Creamy yellow	10YR9/3	

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 49	**Location of sample:** West wall of Room 111
Date Taken: November 17, 2015	
By: RW	
Date Examined: Dec. 4-9, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Creamy yellow	10YR9/3	
	Green	10GY6/2	
	Brown	7.5YR7/2	
	White		
	Light brown	10YR8/1	
	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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PAINT ANALYSIS

Identification: TCI	
Project: HSR for Building 211	
Location: Castillo de San Cristobal, San Juan, PR **Structure:** Quarter Num. 211	
Sample #: 50	**Location of sample:** East wall of Room 111
Date Taken: November 17, 2015	
By: RW	
Date Examined: Dec. 4-9, 2015	**Substrate:**
By: JDF	**Top Color:**
Data:	

Approx Historic Date	Layer Description (color, varnish, dirt, etc.)	Munsell #	Characteristics
*	Green	10GY6/2	
	Brown	7.5YR7/2	Traces of a coral intermixed but top surface appears brown
	White		
	Light gray brown	10YR8/1	
	White		
	White		

Further Observations, Documentation or Sketches: *** = Original Paint Layer**

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Appendix 2—Mortar and Parge Coat Analysis

LABORATORY TESTING

Mortar and Parge Coat Analysis

A total of four samples were removed for laboratory testing. Samples were removed by NPS staff (Figure A2-1) from the exterior of the north wall of Quarter No. 211 and the south elevation of the retaining wall north of the building. Mortar sample removal locations are shown in Figure A2-2; the exterior parge coat sample was removed at the same location as Mortar Sample 2.

Characteristic mortar properties were identified through a series of chemical tests. The objectives of the mortar tests were to identify mortar typology as related to original mortar constituents and their proportions, binder/aggregate ratio, color, and aggregate gradation.



Figure A2-1: Mortar removal involved scoring exterior parge coat using an angle grinder and chipping with hand tools to expose masonry.

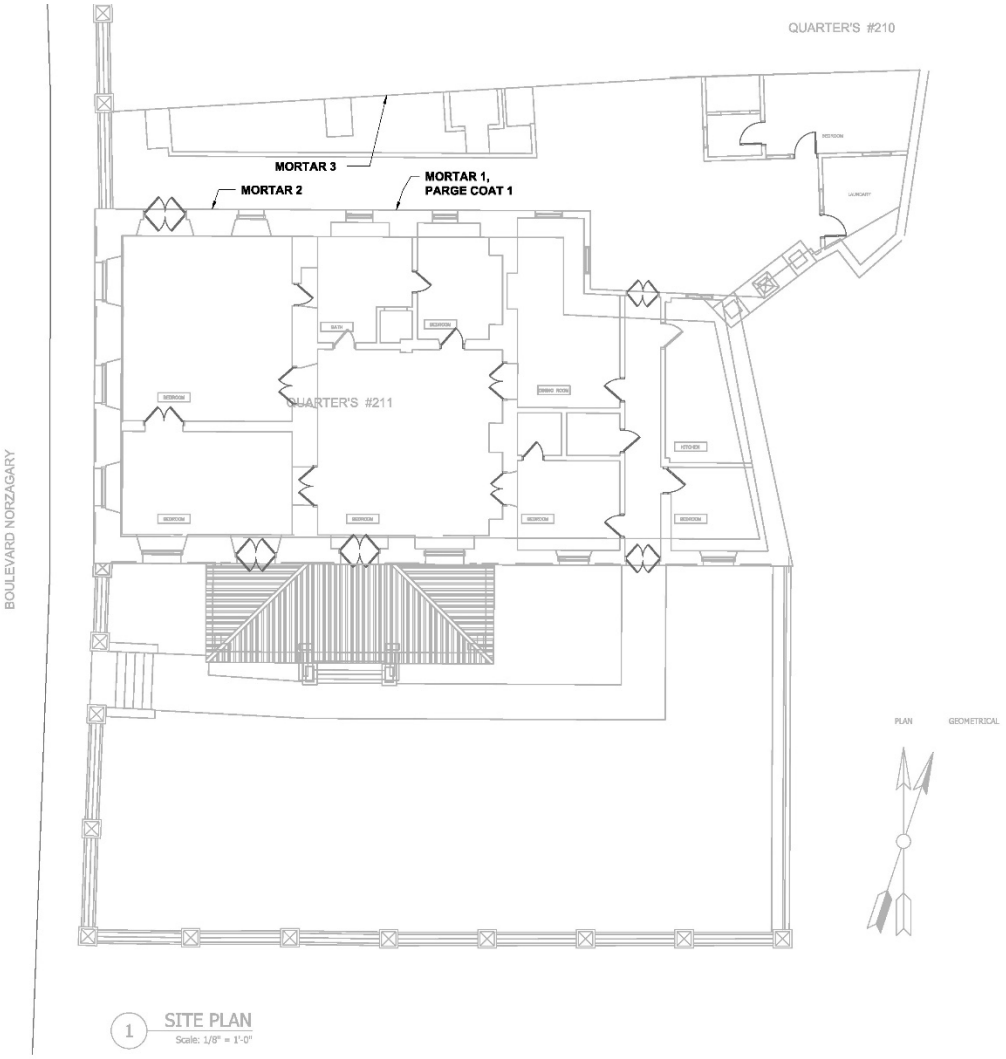

Figure A2-2: Mortar sample locations.

Analysis Techniques

Chemical mortar examination followed the method described by Middendorf, et al.[1] The method is based on the use of acid digestion and chemical analysis to identify soluble silica resulting from Portland cement hydration. Aggregate sieve analysis was conducted in accordance with the requirements of ASTM C136, *Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates*, following acid digestion of the binder. Mortar color was analyzed using the Pantone digital color analysis system.

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[1]Middendorf, et al. *Chemical Characterization of Historic Mortars*. State-of-the-Art Report of RILEM Technical Committee 167-COM: Characterization of Old Mortars with Respect to their Repair. RILEM Publications SARL, 2004.

Sample Identification

Three mortar samples and one parge coat sample were removed from Quarter No. 211 walls for testing. Samples are identified in Table A2-1. See also Figure A2-2 for mortar sample locations.

Mortar Color Analysis

Image color analysis was conducted outdoors under direct natural sunlight using the "My Pantone" color analysis application. Image analysis extracts five dominant image colors in order of the proportion of each color in the sample. Multiple analyses were conducted on each mortar sample to represent the range of colors present. Color analysis results are shown in figures A2-3 through A2-10.

Table A2-1: Mortar and Parge coat: Sample Identification and Location

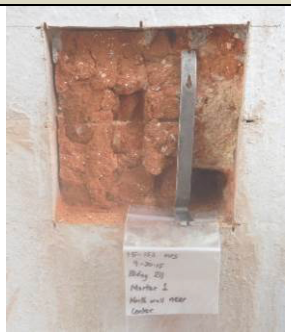
Sample ID	Location, condition	Photograph
Mortar 1	Exterior north wall, 4th pier from west end, approx. 4'-6" above grade. Slightly friable and soft, with frequent white lime inclusions measuring 0.02 to 0.04 inch. Color is tan/brown.	
Mortar 2	Exterior north wall, 2nd pier from west end, approx. 4'-6" above grade. Very friable, very soft, with few visible lime inclusions. Color is tan/brown.	
Mortar 3	Exterior, south side of north retaining wall, east of middle buttress approx. 3'-0" above grade. Friable, with occasional small lime inclusions. Fibrous plant matter included (from roots growing in wall). Color is brown.	
Parge coat 1	Same location as sample Mortar 2. Very hard, gray, with considerable entrapped air component. Thickness varies from 0.5 to 0.65 inch.	 



Figure A2-3: Sample Mortar 1. Scale at right is 10^{ths} of an inch.

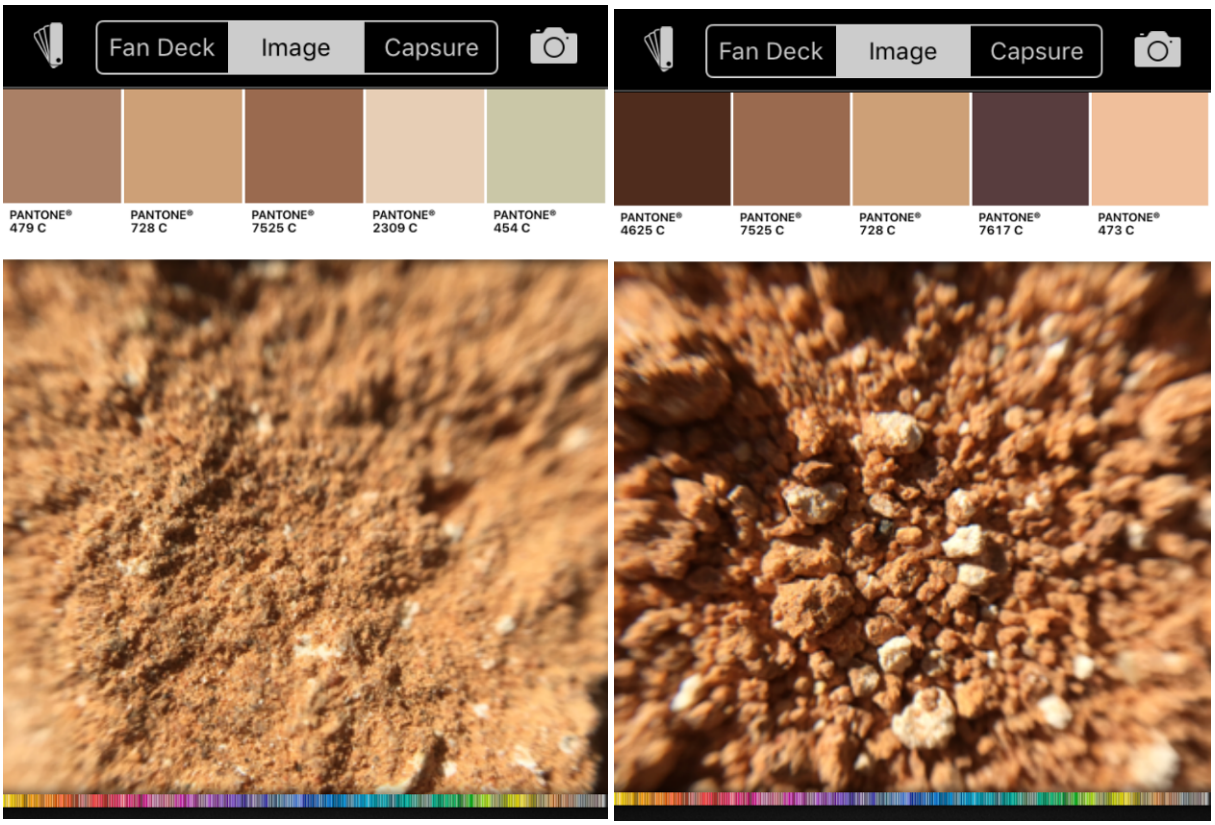


Figure A2-4: Color analysis results, Mortar 1. Dominant colors are shown in order at the top of each image; the most prevalent color is shown at the left of each row.

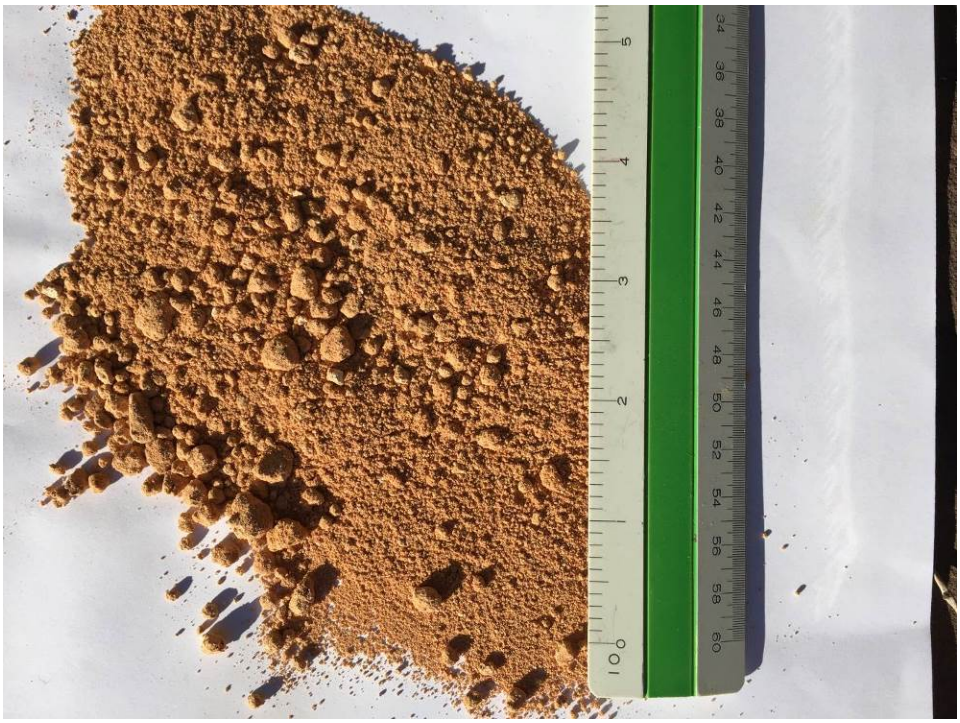


Figure A2-5: Sample Mortar 2. Scale at right is 10^{ths} of an inch.

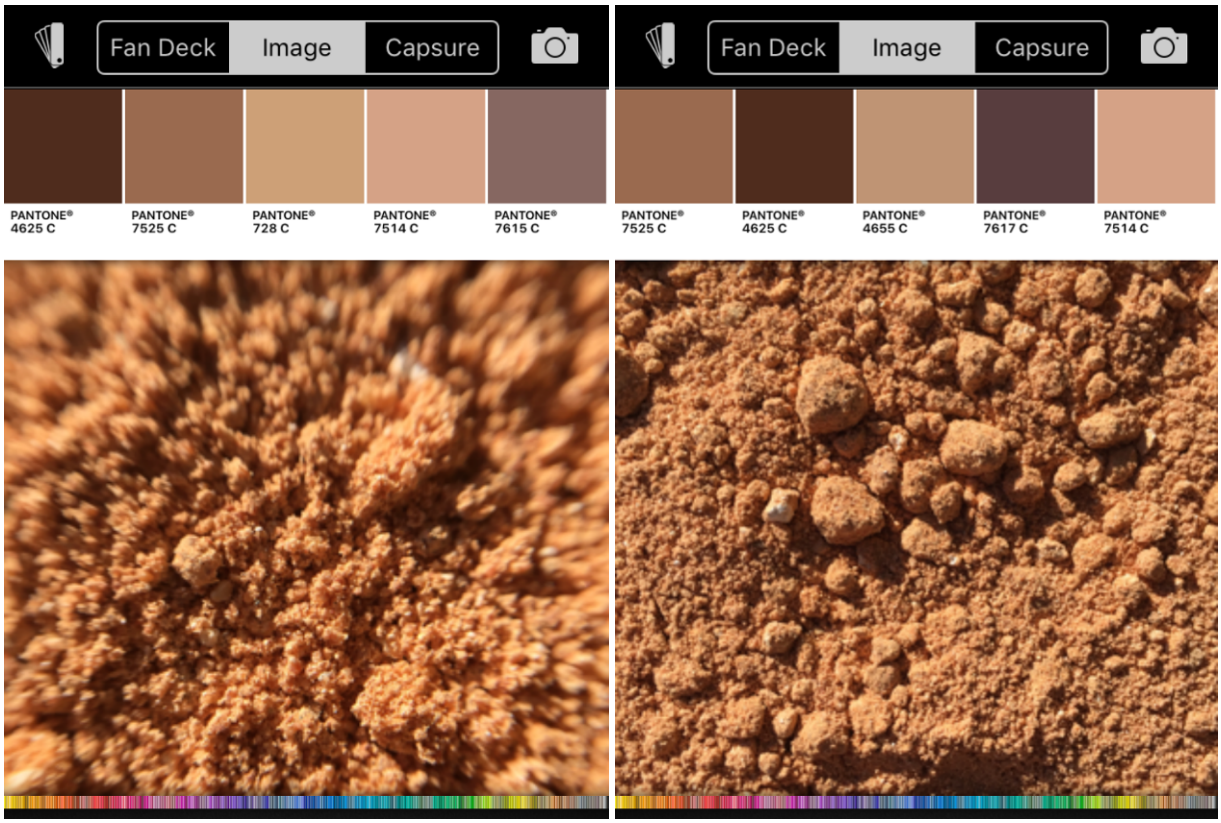


Figure A2-6: Color analysis results, Mortar 2. Dominant colors are shown in order at the top of each image; the most prevalent color is shown at the left of each row.

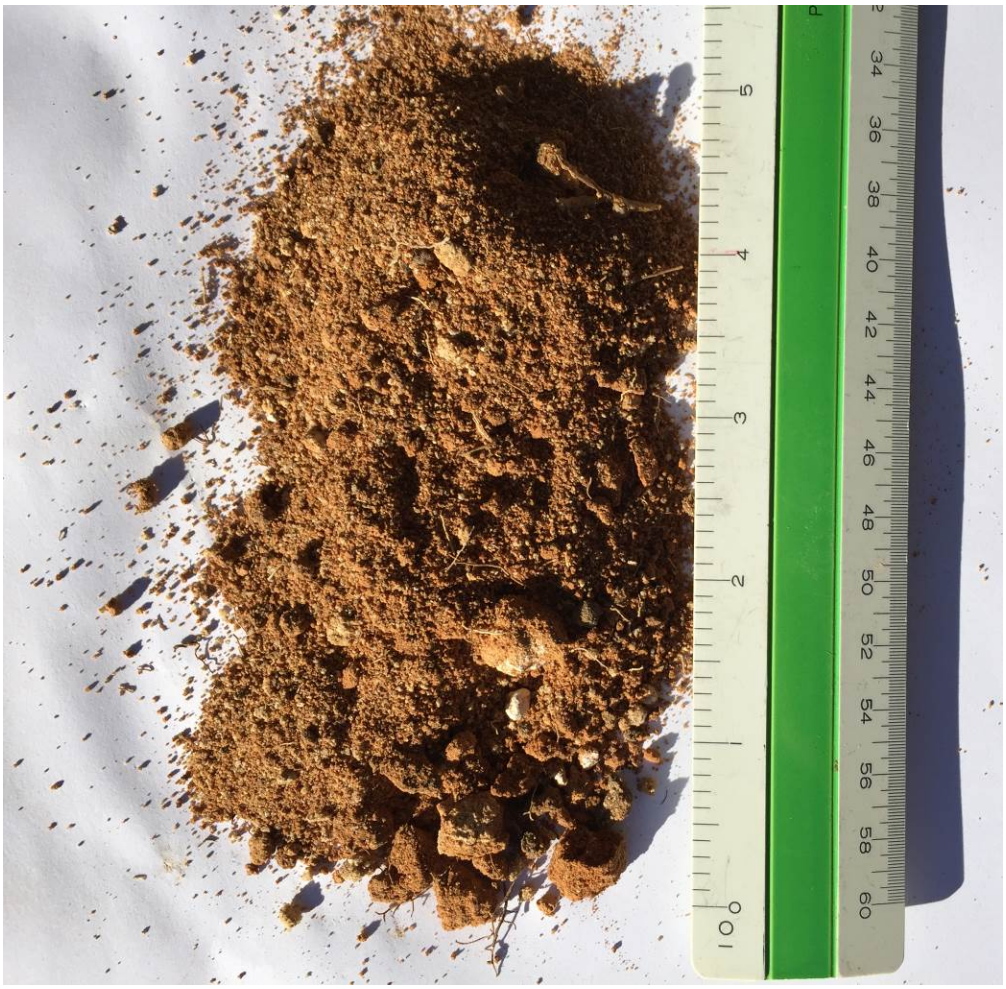


Figure A2-7: Sample Mortar 3. Scale at right is 10^{ths} of an inch.

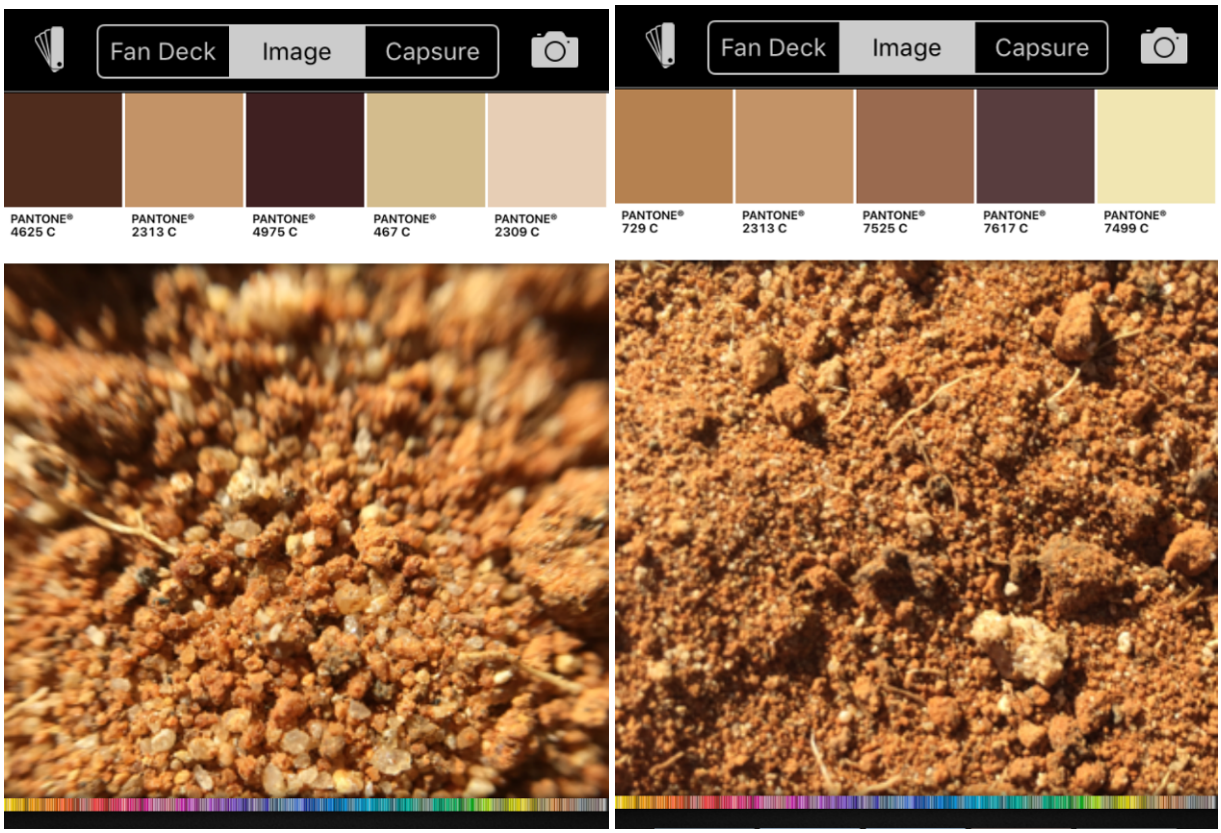


Figure A2-8: Color analysis results, Mortar 3. Dominant colors are shown in order at the top of each image; the most prevalent color is shown at the left of each row.



Figure A2-9: Sample Parge coat 1. Scale is 10^{ths} of an inch.

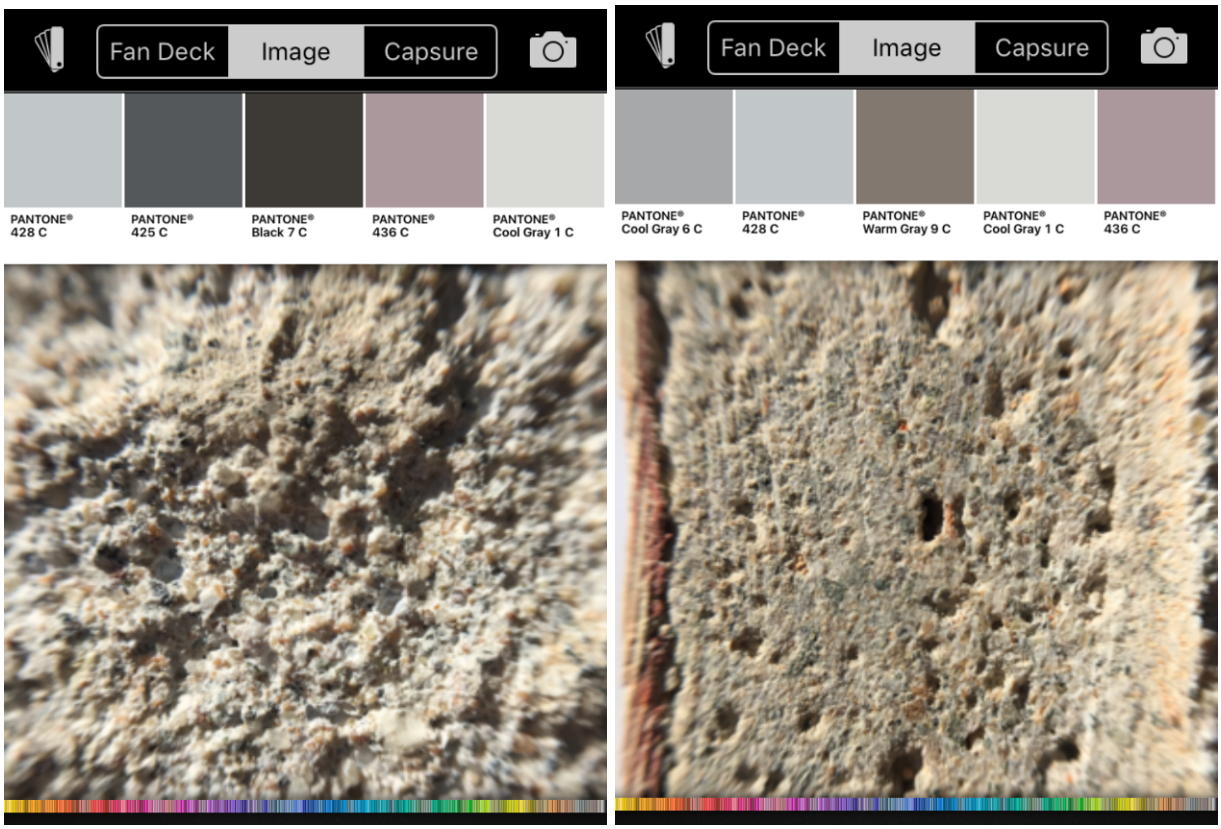


Figure A2-10: Color analysis results, Parge coat 1. Dominant colors are shown in order at the top of each image; the most prevalent color is shown at the left of each row. Left image: exposed parge coat surface; right image: cross-section.

Aggregate Sieve Analysis

Mortar and parge coat samples were digested with acid and remaining aggregate was analyzed to determine sand gradation. The aggregate gradation curves, plotted in Figure A2-11, shows that all three mortar sands are much finer than permitted by ASTM C144, *Standard Specification for Aggregate for Masonry Mortars*. Sand used in Mortar 2 and Mortar 3 are essentially identical, and sand used for Mortar 1 is slightly coarser. Parge coat sand is similar to a fine mason's sand and is somewhat coarser than mortar sands. Aggregate distribution and aggregate colors are also shown in Figure A2-12.

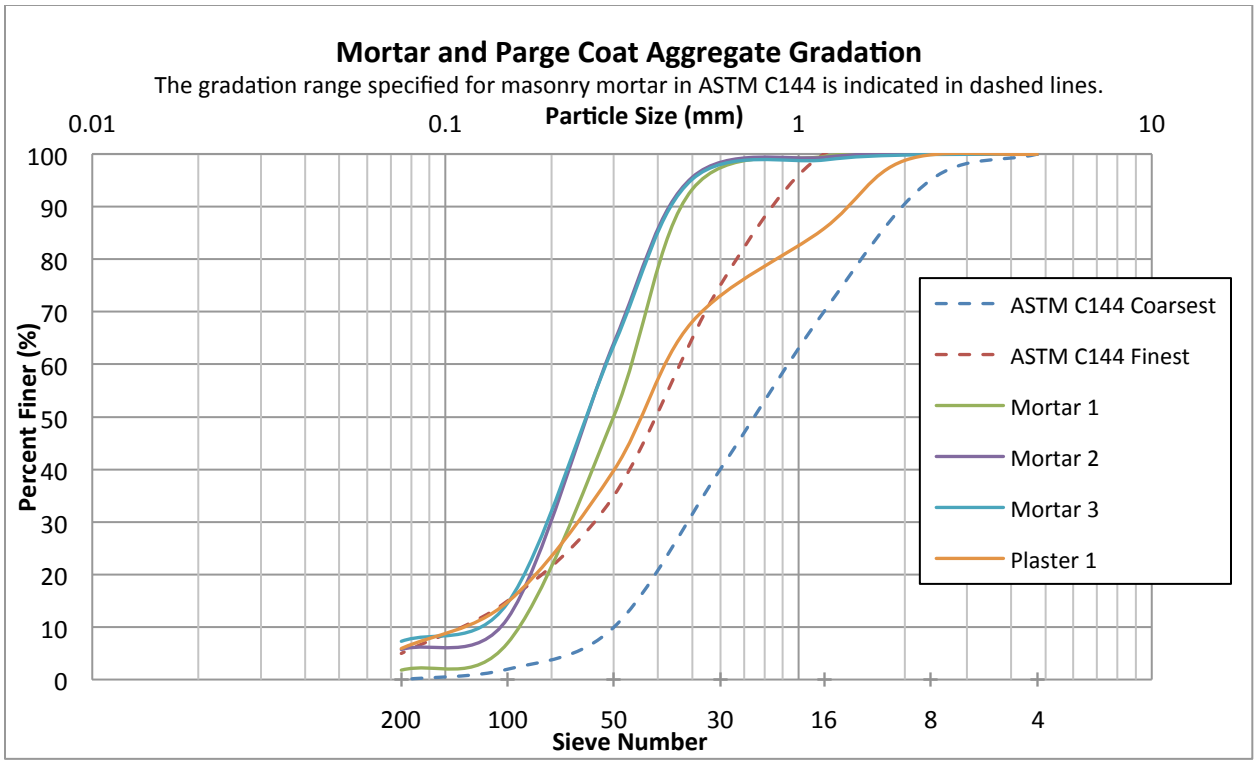


Figure A2-11: Aggregate distribution by sieve size. Samples Mortar2 and Mortar 3 are nearly identical and occupy the same curve on the chart.



Sieve Size:	8	16	30	50	100	200	Pan

Figure A2-12. Aggregate distribution and color for mortar and parge coat samples.

Binder Content and Proportions

Mortar and parge coat samples were evaluated using simple acid digestion to determine typical binder to aggregate ratios and a more sophisticated chemical analysis to identify hydraulic components. The results of acid digestion of the mortar samples are shown in Table A2-2. All samples exhibit a binder/aggregate ratio that would be considered under-sanded in comparison with typical modern mortar standards. That is, the mortars and parge coat all have a high binder content in comparison with the sand content.

Chemical analysis results are summarized in Table A2-3. The three mortar samples are sand-lime formulation; the parge coat sample has a considerable cement component.

Table A2-2: Results of acid digestion of mortar samples

Sample ID	Mass before acid digestion (g)	Mass after acid digestion (g)	Binder mass (g)	Aggregate mass (g)	Binder volume (cm3)	Aggregate volume (cm3)	Total volume (cm3)	Binder (%)	Aggregate (%)
Mortar 1	34.71	25.47	9.24	25.47	14.42	19.88	34.30	42	58
Mortar 2	50.41	29.87	20.54	29.87	32.06	23.31	55.37	58	42
Mortar 3	51.11	47.07	4.04	47.07	6.31	36.73	43.04	15	85
Parge coat 1	40.54	26.16	14.38	26.16	22.44	20.41	42.86	52	48

Table A2-3: Results of chemical mortar analysis.

Sample ID	Sample Mass (g)	Aggregate Mass (g)	Soluble Silica (g)	Volumetric Ratio		
				Portland Cement	Lime	Aggregate
Mortar 1	10.00	5.92	0.04	0.0	1.0	0.8
Mortar 2	10.00	5.71	0.04	0.0	1.0	0.7
Mortar 3	10.00	5.93	0.06	0.0	1.2	1.0
Parge coat 1	10.00	3.00	0.94	1.0	1.3	0.8

Mortar and Parge coat Analysis: Discussion

Upon removal from the walls, mortar samples appeared to have different texture and friability. Analysis shows that all three mortar samples have similar aggregate gradation and proportions and it is possible that different exposure conditions and related deterioration have resulted in hardness variations.

Mortar samples 2 and 3 used essentially identical sand gradations. Sand in Mortar sample 1 is slightly more coarse. It is possible that masonry at locations where samples 2 and 3 were removed were constructed at the same time, or that repairs were carried out at both areas in a single campaign. Mortar at sample area 1 used a sand that is statistically similar but slightly more coarse. All three mortar samples have nearly identical ratios of lime to sand.

Exterior parge coat appears to be a modern cement-based material, using modern sand, with a very high binder to aggregate ratio equal to 1 part binder to 0.35 parts sand aggregate. Typical cementitious parge coats have cement to aggregate ratios varying from approximately 1:1 to 1:3.

The very high binder content of the tested parge coat mortar suggests that aggregate has a significant acid-soluble fraction, likely having a base of either limestone or coral stone. Parge coats often consist of cement and aggregate with no lime component and the lime detected in the mix may actually be acid-soluble aggregate, in which case the parge coat consists of 1 part cement to 2.1 parts sand aggregate. Future material analysis could use petrographic methods to determine aggregate mineralogy and determine binder to aggregate ratio using microscopic rather than chemical analysis.

Appendix 3— Investigative Testing

INVESTIGATIVE TESTING—INTRODUCTION

Amongst the available investigative techniques to achieve project objectives, the following were selected with the objectives anticipated to be met by the investigative technique.

1. Surface Penetrating Radar (SPR), to determine as-built conditions, interior voids, near surface delamination, embedded metals (pipes, roof drains, conduit), concrete reinforcement, concrete section thickness, and wall typologies.
2. Pachometer Scanning, locations of embedded metals, particularly the concrete reinforcement and its patterns.
3. Infrared Thermography, to define areas of delamination of wall coating systems, subsurface anomalies, general conditions, and moisture.
4. Sounding, to assist in locating near surface delamination of wall coating systems.
5. Videoscope Evaluation, confirmation of subsurface conditions and conditions of reinforcement in the concrete, as accessible.
6. Laboratory Testing of Mortar and Parge Coat, characteristics of the samples and matching of typologies for dating assistance.
7. Paint Sample Analysis, to determine the number of layers and color matching to the international system of color notation, Munsell, thereby determining original colors and relative ages of surfaces or elements sampled, as possible.

Surface Penetrating Radar Scanning

Surface Penetrating Radar (SPR) is a nondestructive method typically used to determine subsurface conditions of building elements, locate structural reinforcing bars, locate regions of deterioration or distress, and evaluate internal moisture content. On this project, SPR was instrumental in providing information to better understand construction typology and variations in construction, as related to variations in materials being used, wall geometry, and workmanship. SPR and other techniques described in this report were used to map concealed subsurface conditions at interior and exterior building walls, site walls, retaining walls, floors, and ceilings. Limited validation of radar results were carried out on site, following the desire to avoid destructive probes for viewing internal conditions. SPR scanning at concrete elements provided clear results, but for masonry there remains some uncertainty regarding internal conditions. Better confidence could be obtained with localized evaluation of internal conditions. For example, a small-diameter borescope inserted into holes drilled into mortar joints could be used to check for rubble fill identified with SPR scans.

SPR techniques use reflections of microwave energy to identify internal anomalies. A GSSI SIR-3000 radar unit was used with a 1500 MHZ antenna mounted in a wheeled trolley for scanning building walls, retaining walls, floors, roofs, and fence walls. The method provided information on the interior makeup of scanned sections, including:

- as-built conditions,
- detecting voids or rubble fill at the interior of walls,
- locating near-surface damage such as delaminating parge coat
- locating embedded pipes, conduit, and roof drains,
- determining thickness of concrete sections, and

- locating reinforcement in concrete sections.

Results of SPR scans provided critical information for understanding construction typologies to identify similarities (and differences) in construction at different areas of the building, augmenting and validating findings of historical research.

The radar system was calibrated at known-depth elements based on strong reflections from the back side of concrete construction at the south elevation covered entry porch. A total of 155 radar scans were recorded on site for post-processing in the office. Representative SPR results are provided in Figure A3-1 through Figure A3-15. The visual tabulation of results is provided on the building elevations are also included in this appendix.

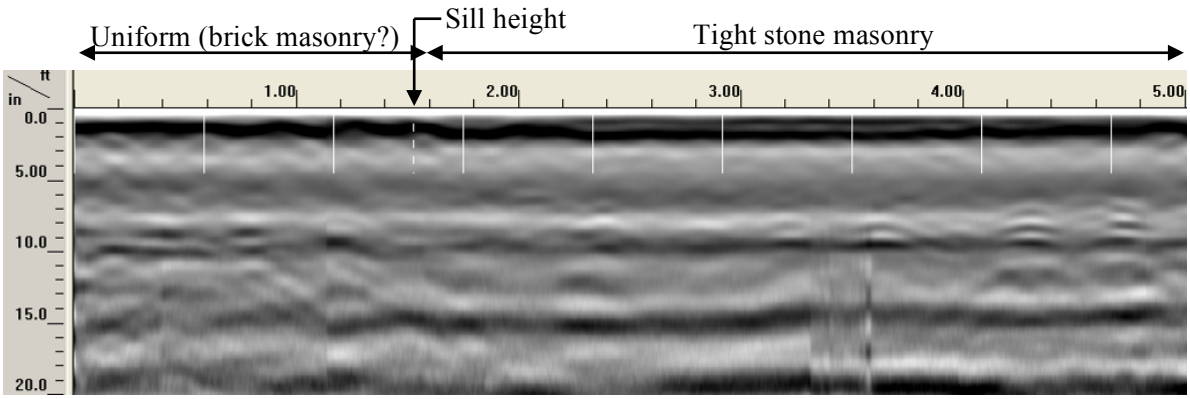


Figure A3-1. Scan No. 0126, vertical, north wall of dining room from exterior. Brick was detected up to the window sill, with tight masonry above. Bottom of wall is at left.

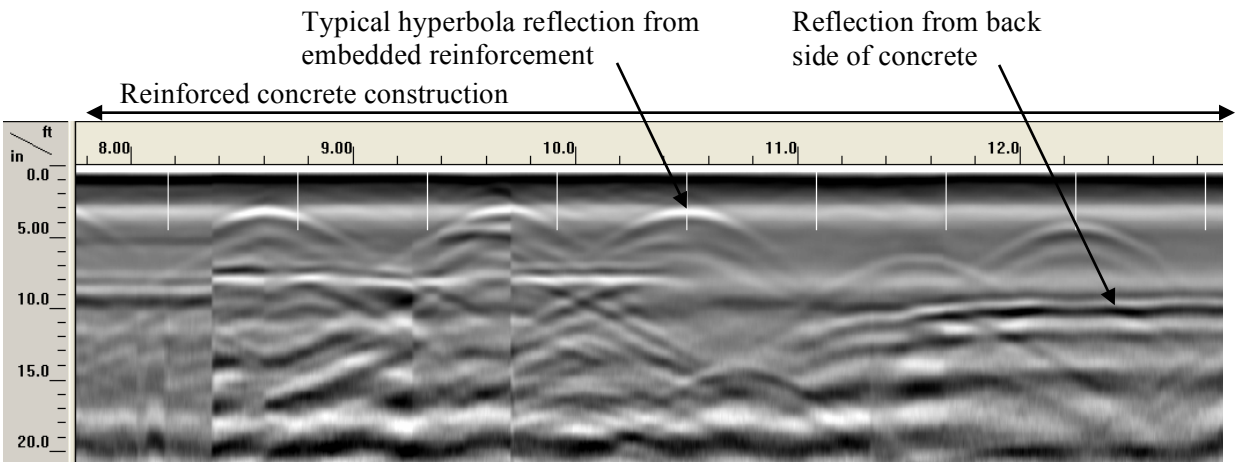


Figure A3-2. Continuation of scan 0126, vertical. Scan shows reinforced concrete construction above the window head. The back side of the masonry wall is not captured by this scan.

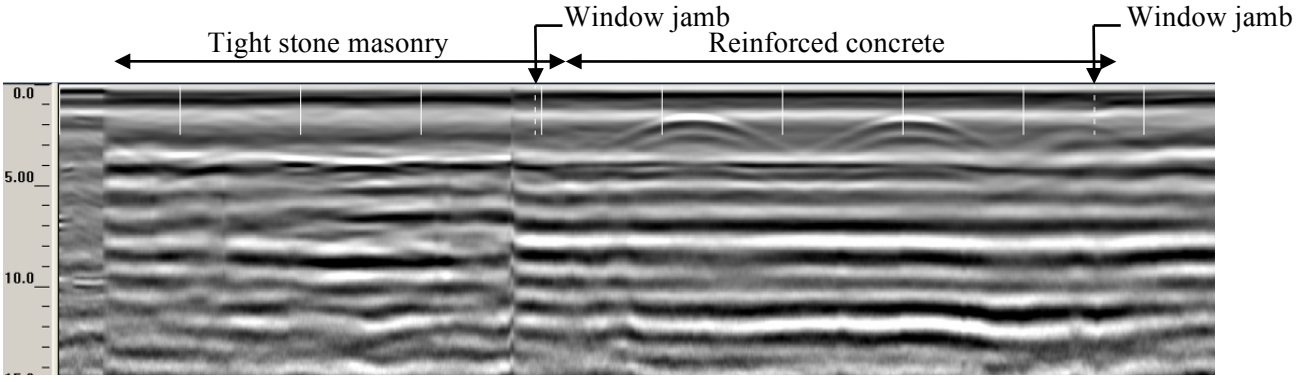


Figure A3-3. Radar scan 0122 at north wall below the window sill, horizontal, beginning at the northeast corner of the dining room and continuing west. Uniform stone construction is shown, infilled with reinforced concrete below the dining room window.

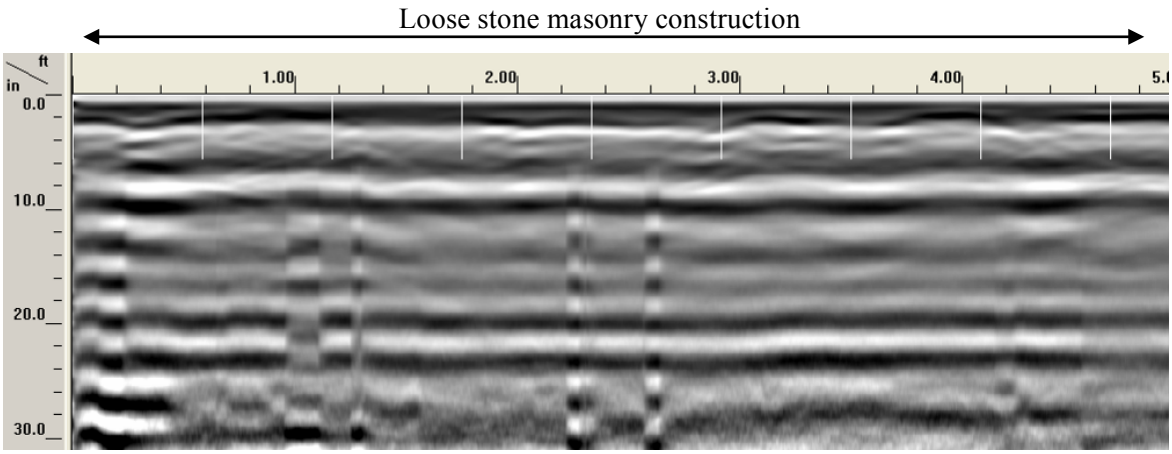


Figure A3-4. Scan 0146, horizontal at 4 feet above grade, recorded at the north retaining wall near the west end. Scan shows "loose" stone masonry construction with many internal discontinuities.

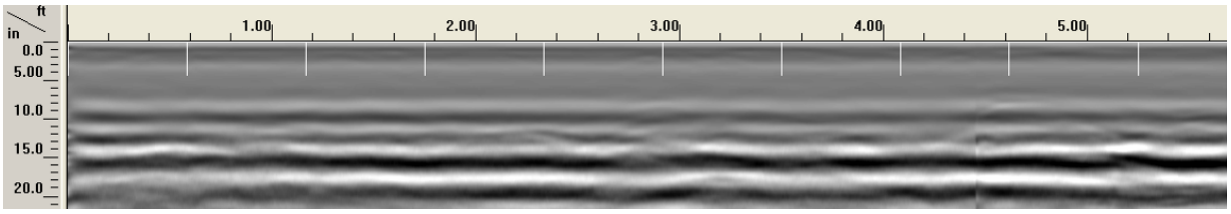


Figure A3-5. Radar Scan 053, horizontal at 4 feet above the floor, wall between breakfast room and hall at south end of hall. The radar scan represents very uniform unreinforced masonry construction.,

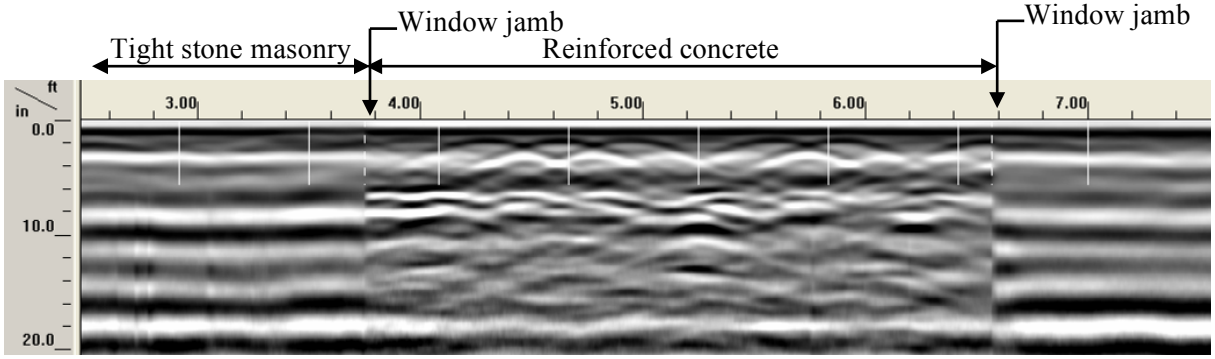


Figure A3-6. Scan 0116, horizontal below window sills, west elevation from exterior. Reinforced concrete was found beneath the window sill, with tight stone masonry at either side of the window.

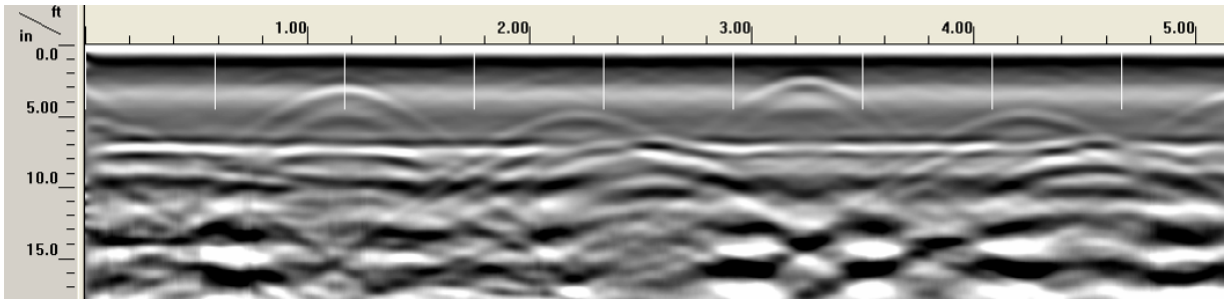


Figure A3-7. Scan 097, horizontal, recorded at 4 feet above the floor at the south wall of the servant's room. Construction appears to be reinforced masonry construction (possibly hollow clay tile) or concrete with localized surface parge coat delamination.

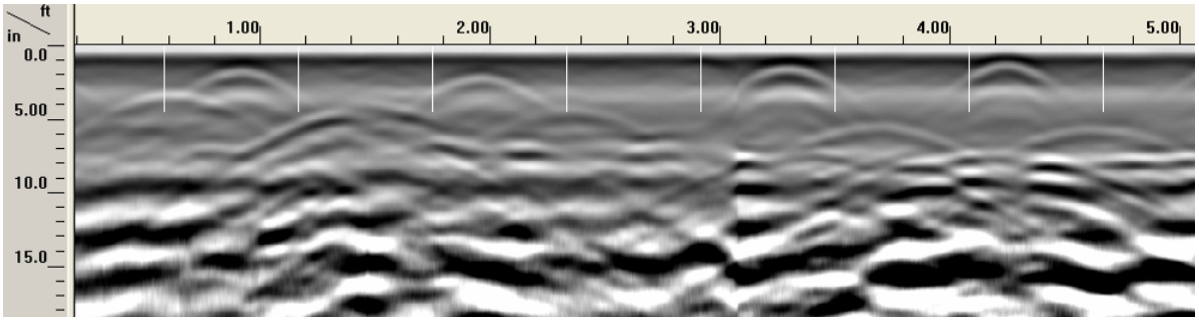


Figure A3-8. Scan 0103, horizontal, recorded at 4 feet above the exterior pavement at the west wall of the servant's room. This appears to be reinforced masonry construction, possibly hollow clay tile.

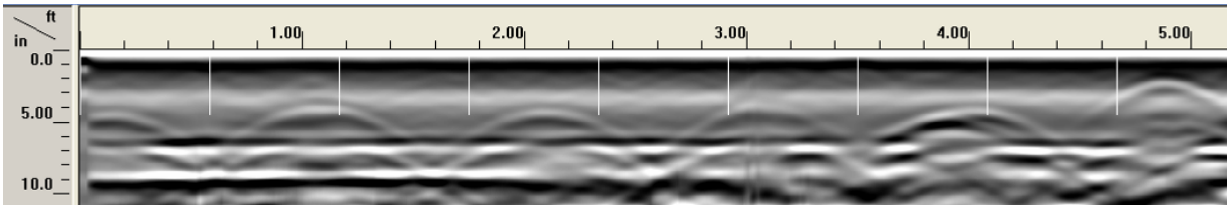


Figure A3-9. Scan 098, horizontal 40 inches above the exterior pavement at the west wall of the laundry. Reinforced construction.

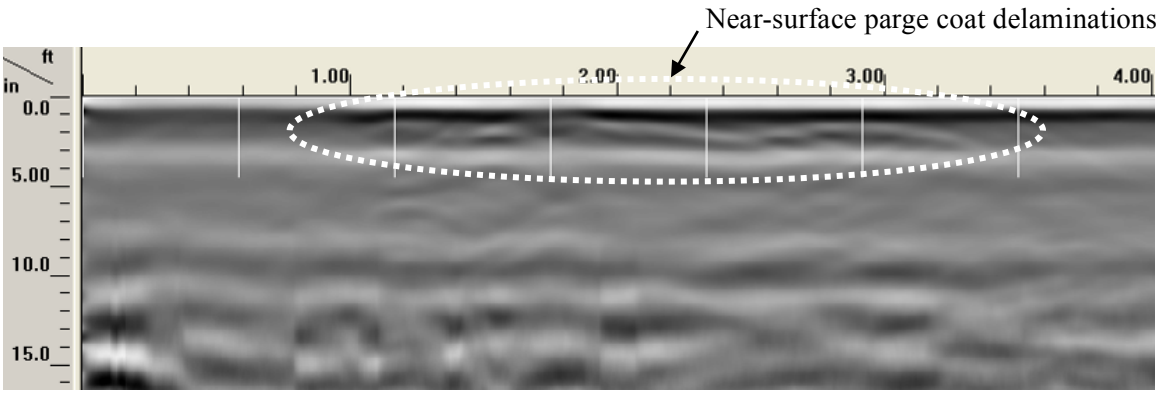


Figure A3-10. Scan 066, horizontal scan at the east wall on the interior of the laundry room. Parge coat delaminations were discovered, measuring 0.3 to 1.0 inch thick.

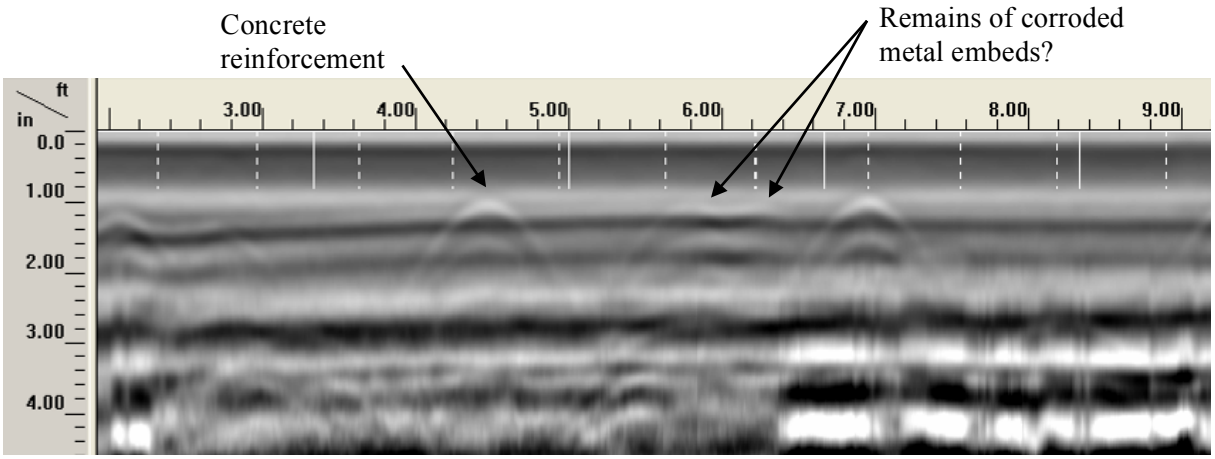


Figure A3-11. Radar scan 027, horizontal, recorded beneath balusters at the west fence wall, to the south of the entry gate. Vertical reinforcement is clear; also seen are slight reflections that may indicate locations of previous metal fence embedments. These embed spacing appears to be approximately 5 inches.

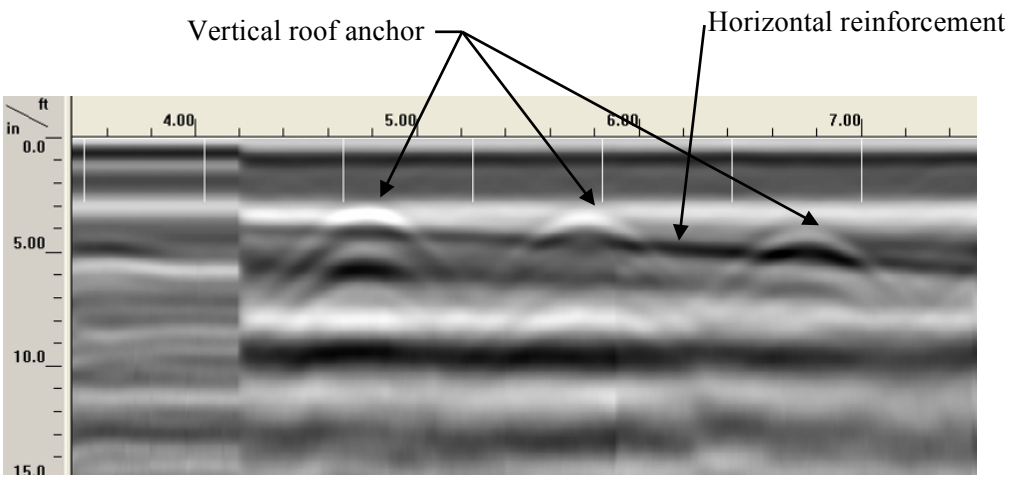


Figure A3-12. Scan 036, horizontal at the north wall of living room near ceiling. A series of metal roof anchors were observed.

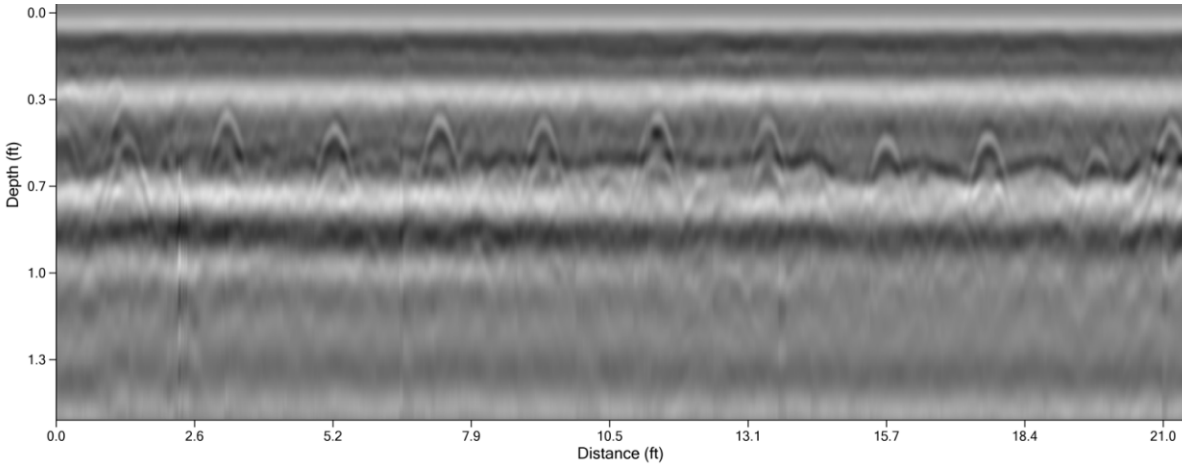


Figure A3-13. Scan 014, recorded from south to north at the living room floor slab. Many typical reflections observed at embedded reinforcement. Reinforcement spacing = 16 to 20 inches on center, at a depth of 4 ¾ to 6 inches. Slab thickness 6 ½ to 6 ¾ inch.

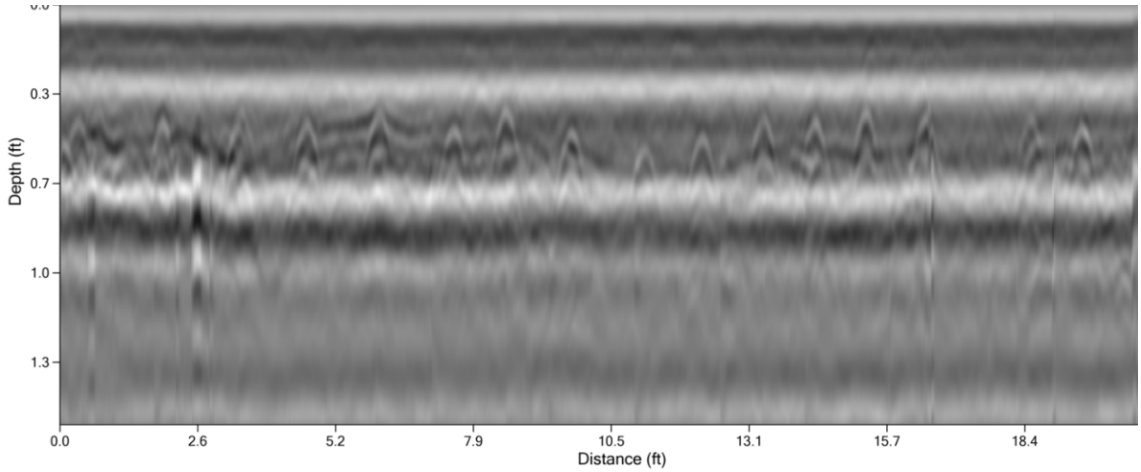


Figure A3-14. Scan 015, recorded from west to east at the living room floor slab. Reinforcement spacing = 24 inches on center, at a depth of 4 ¾ to 7 ½ inches. Slab thickness is variable from 5 ¼ to 7 ¼ inch.

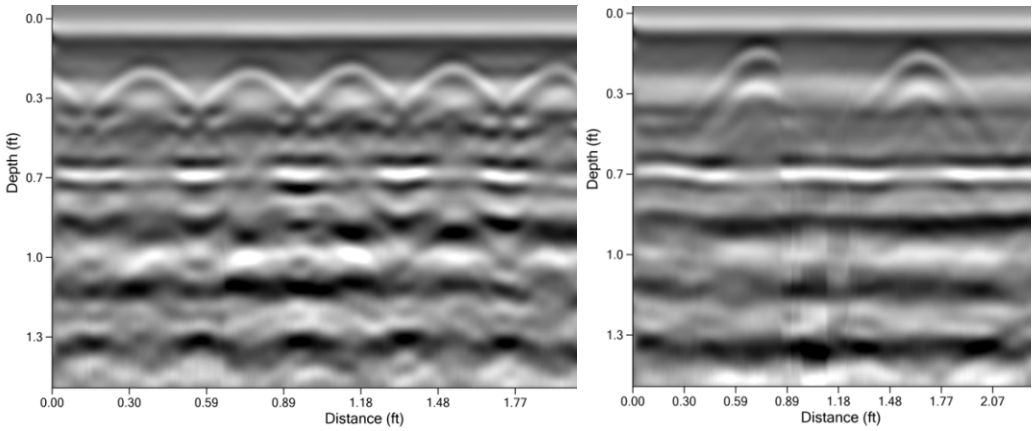


Figure A3-15. Scans 031 (left) and 032 (right), recorded at the family room ceiling. Reinforcement oriented north-south is at a spacing of 6 ½ to 7 inches; reinforcement spanning east-west is spaced at 12 inches. Roof slab thickness = 7 inches.

Characteristics of reinforced concrete sections are provided in Figures A3-16 through A3-19.

Figure A3-16. Reinforced Concrete Floor Slab Characteristics, Based on SPR Analysis.

Location	Reinforcement				Slab Thickness (inch)	Notes
	East-West		North-South			
	Spacing (inch)	Cover (inch)	Spacing (inch)	Cover (inch)		
Front entry porch	18	2.25-2.75	18	3.25-3.5	4.75-6.25	Typology 1
Master bedroom	21-26	4.75-6.25	21	6.25	5.5-7	Typology 2
Living room, dining room	24	4.75-7.5	16-20	4.75-6	5.25-7.5	Typology 2
Kitchen	22	3.5-4.75	22	4.25	5.25-6.75	Typology 3
Breakfast room (at southeast)	17.5-24.75	3.5-4	18-19.25	3.75	5.25-6.5	Typology 4
Servant's room	23	7-8.25	18	6.5-7.25	8.4-10	Typology 5 Top slab of 5 ¼" over bottom slab of 4 ¾"?

Figure A3-17. Reinforced Concrete Roof Slab Characteristics, Based on SPR Analysis.

Location	Reinforcement				Slab Thickness (inch)	Notes
	East-West		North-South			
	Spacing (inch)	Cover (inch)	Spacing (inch)	Cover (inch)		
Front entry porch	12	2.75	7	2.25	5	Typology A
Master bedroom	12-13	2.25	4-4.5	2	5	Typology B With 2 ¾" topping slab?
Living room	12	2.75	7	2.25	7	Typology A
SW corner room	6.5-7	2.5	12	2	7	Typology C
Hall near kitchen	6.5-8	1.75-2.75 (2 layers)	7.5	2.5	6.75	Typology D Strong reflections @ 9, 15" also
Breakfast room (at southeast)	6.75-8.75	2.25-3.75 (2 layers)	9.5	2.6	5	Typology E Strong reflection @ 9.6" also
Servant's room	7-11.4	2.125	8-10	2, 7.75-8 (2 layers)	10	Typology F

Figure A3-18. Reinforced Concrete Beam Characteristics, Based on SPR Analysis.

Location	Dimensions		Horiz. Reinf.	Shear Stirrups	Roof Slab
	Ht. (in.)	Width (in.)			
Living room beam	19	12 1/4	2 layers, @ 2" and 6" from bottom. 3 bars across bottom parallel to the beam span	@12" nominal spacing, varies from 10" to 13"	8 ¼" thick; may be 5" with topping slab
Master bedroom beam	19	12 1/8	2 layers, @ 2 ½" and 4 ½" from bottom. 3 bars across bottom parallel to the beam span	@ 5" nominal spacing to 43" from supports, 8.5" spacing beyond. 1 ½" side cover	7.8" thick, appears to be 5" slab with topping

Figure A3-19. Reinforced Concrete Characteristics at Entry Porch Structure, Based on SPR Analysis.

Member	Geometry	Reinforcement		Notes
Column at porch entry	8 5/8 in. x 18 ¾ in.	Vertical reinf.: 3 ½" cover, bars at each corner	Column ties @ 10 to 11 in., 2 ¾" cover	Vert. reinf. possibly #6 bars
Exterior wall at south, above arches	8 ¼" thick wall (incl. surface parge coat)	Vertical: @ 12" spacing, 2 ¼" cover	Horizontal: @ 8" spacing, 1 7/8" cover	Approx. #4 bars

Significant SPR observations include the following; see Appendix 3-1 for elevation drawings annotated with SPR observations.

1. Exterior walls of Quarter No. 211 are of highly variable construction with different concrete and masonry materials throughout. Reinforced concrete was used at localized regions.

2. Exterior wall construction appears different below approximately the sill height at the north and west elevations, and portions of the south elevation.

3. At one time, north and west elevation windows likely extended down below existing sills to the first floor line. Areas beneath current windows are infilled with reinforced concrete or different forms of masonry construction.

4. Concrete roof slabs appear to be anchored into masonry walls using steel bars approximately 12 inches on center and extending 12 inches down into walls.

5. The upper portion of the north dining room wall is reinforced concrete; the lower portion is masonry construction.

6. Occasional areas of brick infill exist throughout. These areas are localized, measuring less than 4 square feet each.

7. Walls of the Servant's Suite are of more recent reinforced masonry (or irregular reinforced concrete) construction.

8. Floors are reinforced concrete slabs on grade throughout. Floor slabs throughout the main building appear to be of similar construction, with slight variations in slab thickness. Reinforcement and thickness of floor slabs in the kitchen and breakfast room vary somewhat from conditions at other parts of the building and it is possible that these floor slabs were constructed at a different time. The floor slab in the Servant's Suite is significantly different from other slabs on site, indicating a different construction era.

9. Significant variations exist in roof slab reinforcement and thickness. Some of these variations are likely for structural reasons. Roof slabs throughout the main house have a single layer of reinforcement each direction. The use of two layers of concrete reinforcement at the hall near the kitchen and at the breakfast room suggest that these roofs represent a different design approach and a more modern construction era. Construction of the roof slab at the Servant's Room is significantly different from that of other roofs on site and also suggests it dates to a more modern construction era.

Pachometer Scanning

An eddy-current pachometer was used to calibrate and supplement SPR scanning. The pachometer detects embedded metals, and, at locations where SPR scans provided reinforcement depth, the pachometer was used to estimate reinforcement diameter. The pachometer was used mainly at structural columns at the south entry porch and at structural beams in the living room and master bedroom. Results of pachometer scanning are combined with SPR results in the above SPR discussion section.

Infrared Thermography

Infrared thermography techniques measure heat emitted from surfaces to identify general condition, moisture, and subsurface anomalies. In this case thermograms were captured during a cooling cycle from 8 to 9 PM as exterior walls lost heat to the cooler night air. Transmission and emission of heat energy is affected by moisture content, internal voids, variations in materials or construction quality, and near-surface delaminations and spalls. A total of 105 thermograms were recorded for analysis and interpretation.

Typical infrared images are provided in Figure A3-20 through Figure A3-25. Elevation drawings annotated with results of infrared scanning are provided in Appendix 3-2. Conditions observed with infrared thermography at Quarter No. 211 include the following.

- Pipes embedded in walls
- Pipes embedded in paving (seen in infrared image, not included in elevation drawing annotations)
- Spalled concrete
- Delaminated parge coat
- Damp zones
- Variations in wall construction

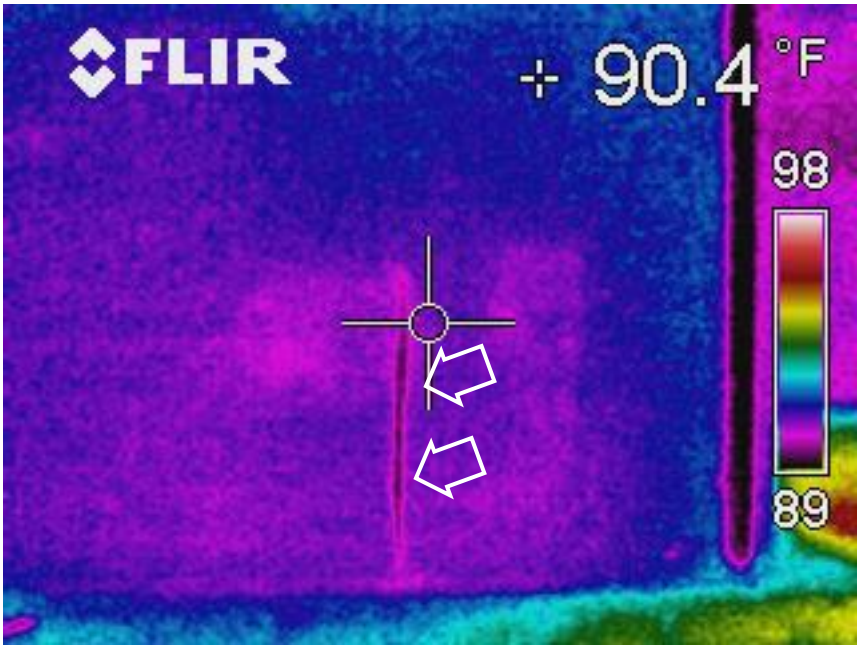


Figure A3-20. Lower temperature pipe in wall, west elevation servant's quarter, below window.

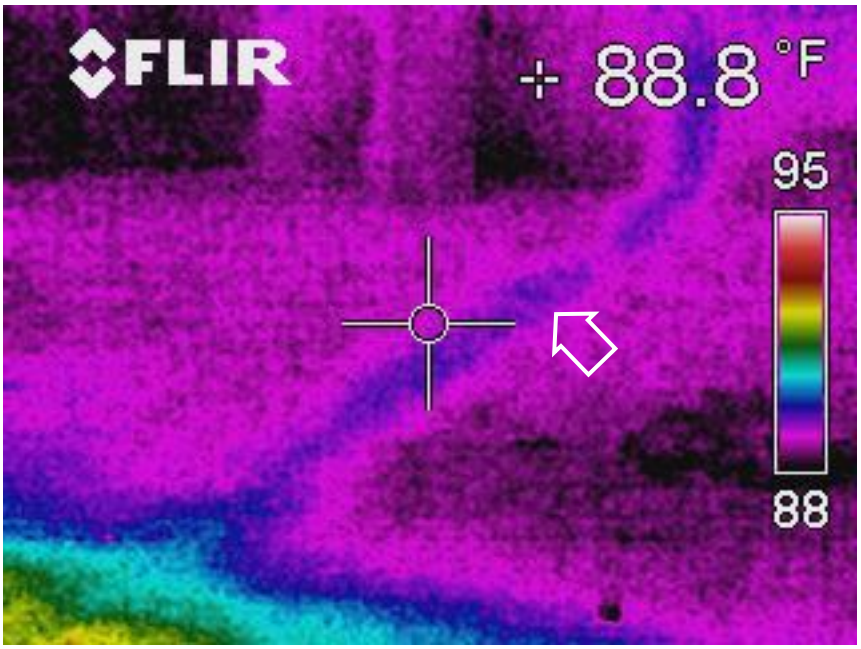


Figure A3-21 Lower temperature pipe, embedded in north kitchen wall and travelling under paving to the servant's room.

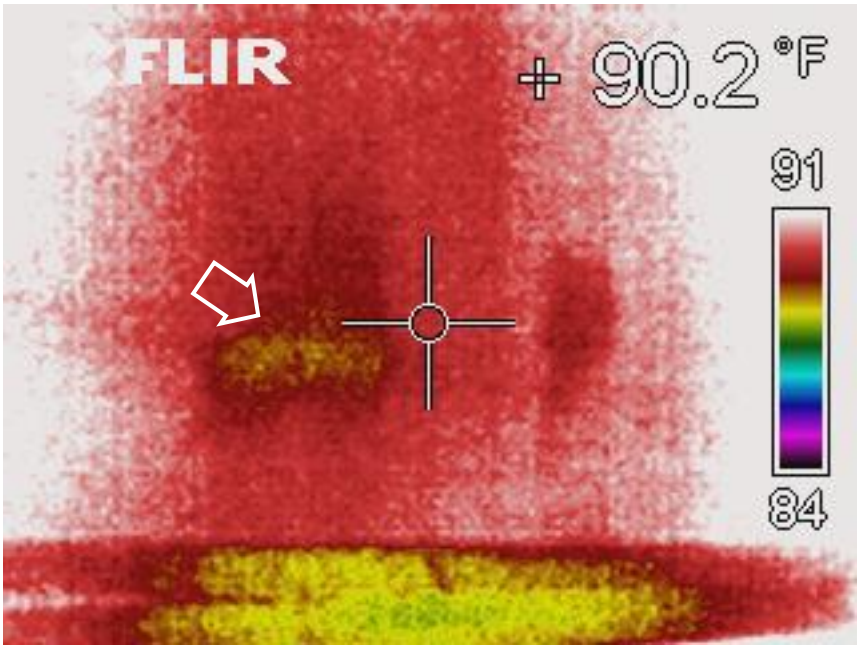


Figure A3-22. Disturbed masonry zone at embedded drain pipe, east end of north retaining wall.

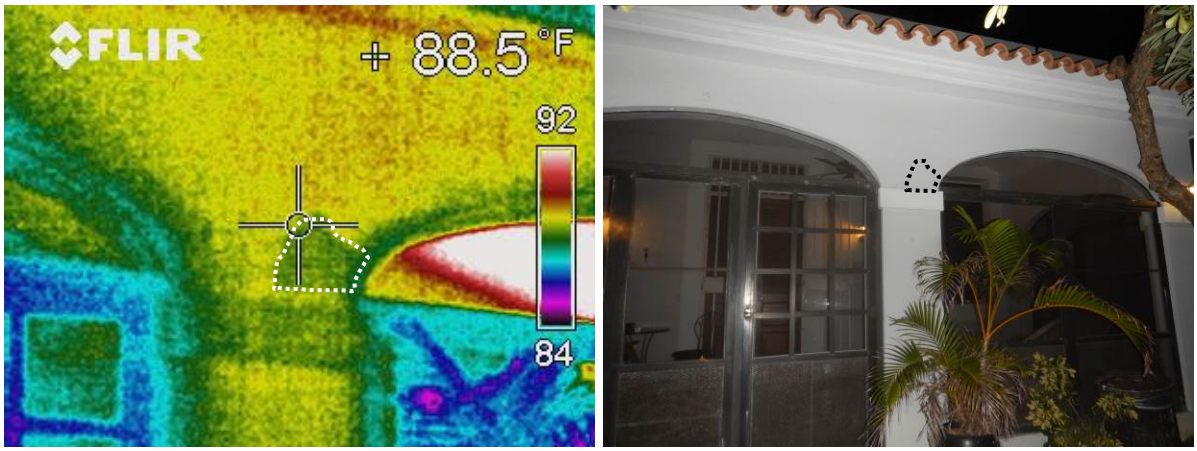


Figure A3-23. Spalled concrete, porch support column, outlined with dashed line.

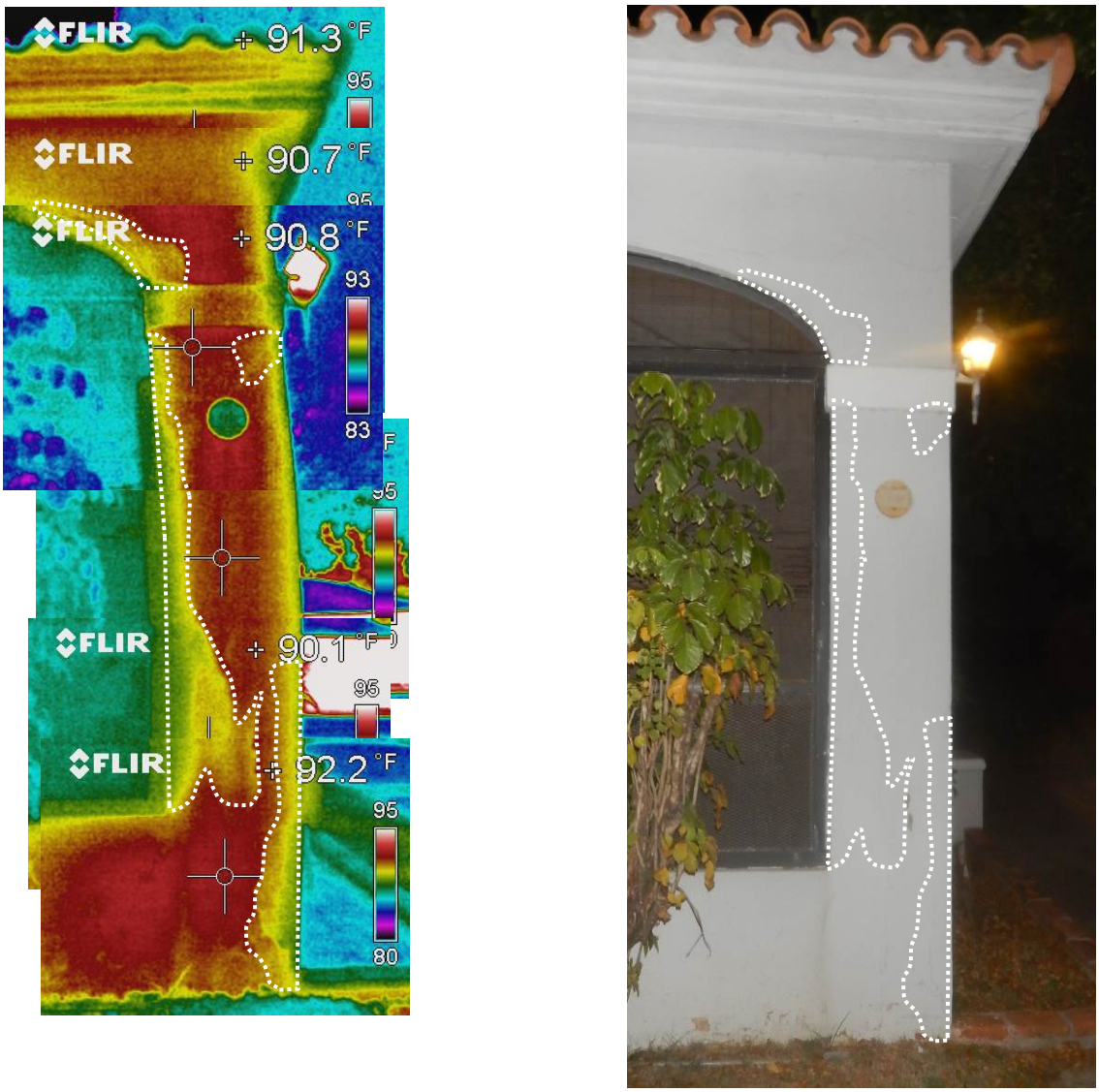


Figure A3-24. West elevation concrete column at entry porch. Left: composite infrared thermogram; right: photograph. Concrete spall areas outlined in each image.

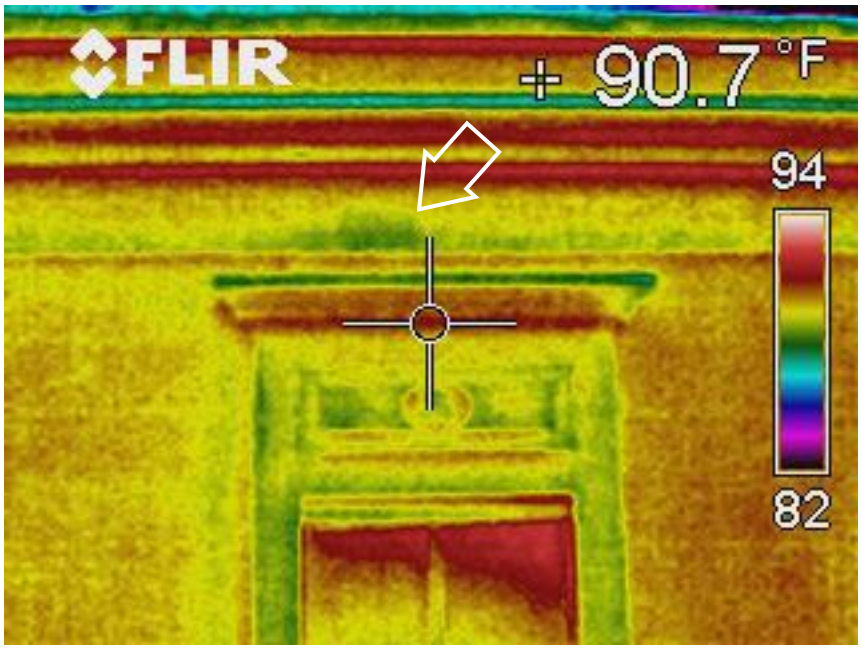


Figure A3-25. Thermogram taken at west elevation, central window. Slight color variations above the window head under the cornice indicate moisture or localized parge coat delamination, indicated by the arrow.

Sounding

A special sounding hammer was used to locate parge coat delaminations. The nature of near-surface solidity is reflected by sound variations when the hammer is struck against the wall surface. Delaminated areas "sound" hollow, giving off a higher frequency resonance, whereas solidly attached parge coat gives off a dull thud when struck. Sounding in progress is shown in Figure A3-26.

The majority of parge coat sounded on site appeared to be firmly attached to the masonry or concrete substrate. Parge coat delaminations were localized in nature, typically showing as delaminated zones of 10 square feet or less. Locations with prevalent delamination include parge coat surfaces at the exterior of the north retaining wall, and the west and south interior laundry walls. Sounding confirmed radar scanning findings at these two locations.



Figure A3-26. Sounding to locate near-surface parge coat delaminations at north courtyard retaining wall.

Videoscope Evaluation

A videoscope was used to observe reinforcement condition at entry porch columns. The ¼-inch diameter videoscope head was inserted into a crack that had opened at a concrete spall (Figure A3-27). Five images were recorded. Videoscope observations showed vertical reinforcement to be approximately sized as No. 3 (3/8-inch diameter), with severe active corrosion. Corrosion had resulted in near total section loss at one location.



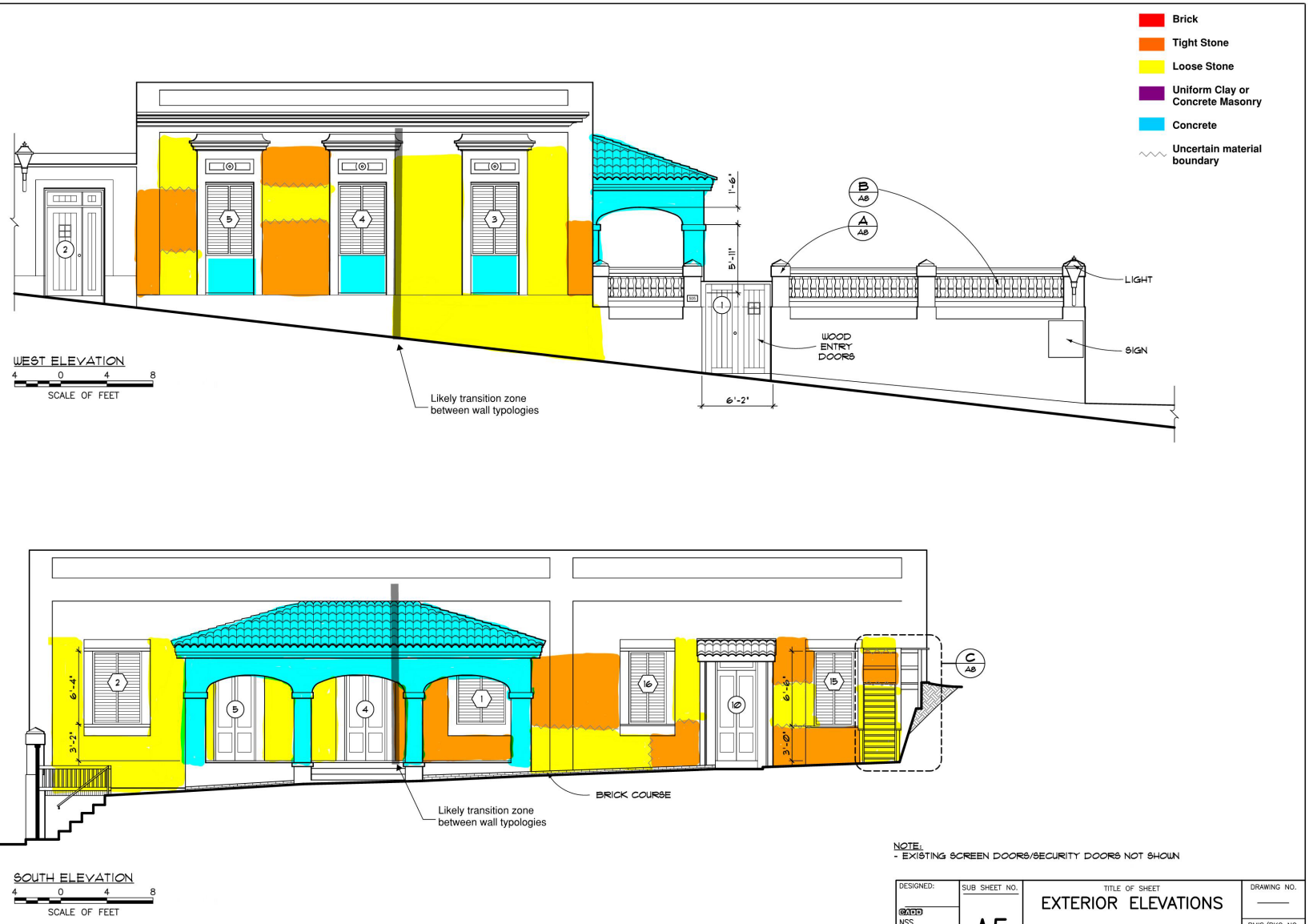
Figure A3-27. Column at the northwest corner of the entry porch where videoscope observations were conducted.



Figure A3-28. Videoscope images of embedded column reinforcement. Reinforcement was sized to be No. 3 bars with near total section loss due to corrosion. Flaking corrosion debris is evident in videoscope images.

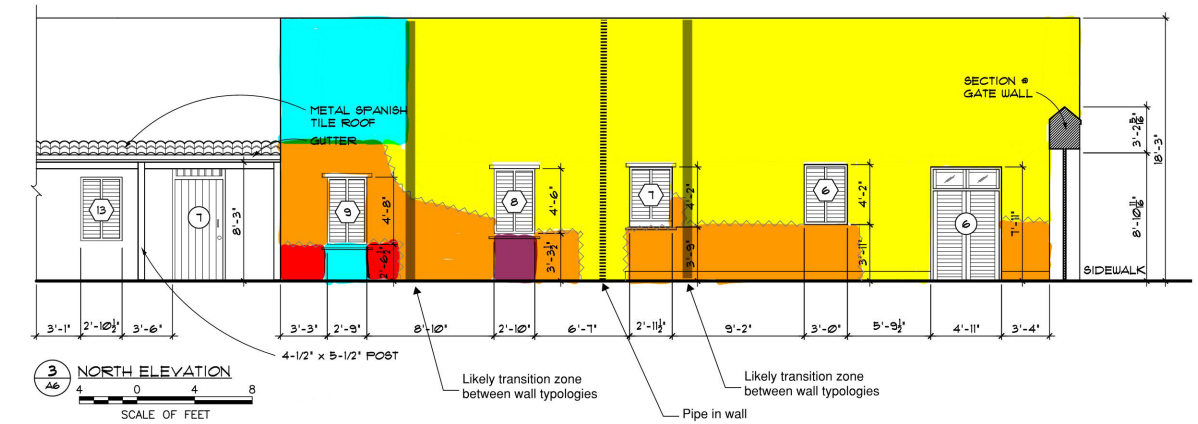
APPENDIX 3-1

ELEVATION DRAWINGS ANNOTATED WITH SURFACE PENETRATING RADAR OBSERVATIONS



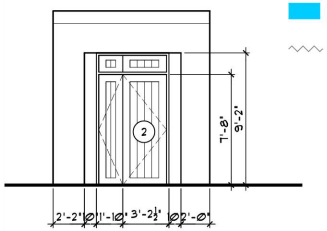
NOTE:
- EXISTING SCREEN DOORS/SECURITY DOORS NOT SHOWN

DESIGNED: NSS TECH. REVIEW: DATE: 2/17/16	SUB SHEET NO. A5	TITLE OF SHEET EXTERIOR ELEVATIONS QUARTER #211 CASTILLO DE SAN CRISTOBAL SAN JUAN NATIONAL HISTORIC SITE	DRAWING NO. PMIS/PKG NO. 114073 SHEET 5 OF 8



3 A6 NORTH ELEVATION

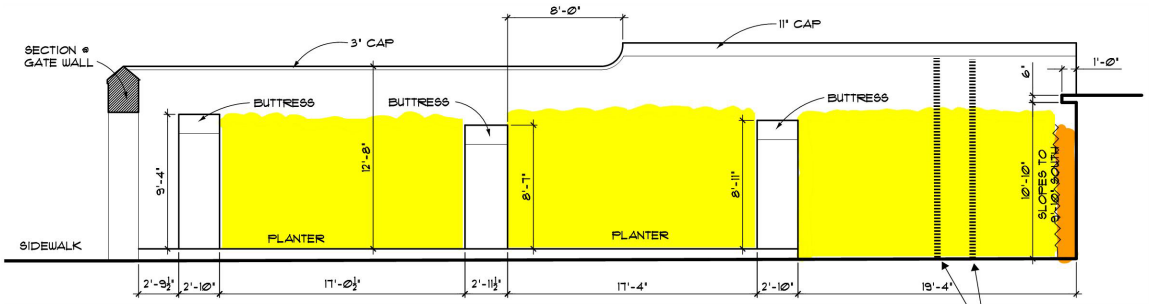
4 0 4 8 SCALE OF FEET



4 A6 NORTH COURTYARD, WEST GATE ELEVATION

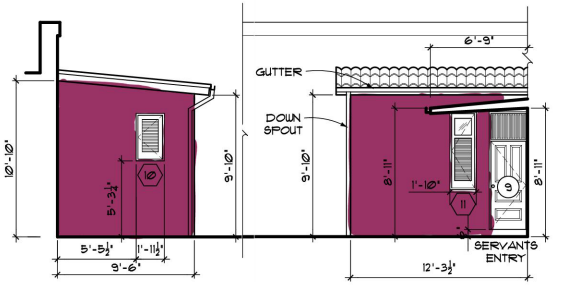
4 0 4 8 SCALE OF FEET

- Brick
- Tight Stone
- Loose Stone
- Uniform Clay or Concrete Masonry
- Concrete
- Uncertain material boundary



5 A6 NORTH COURTYARD, NORTH WALL ELEVATION

4 0 4 8 SCALE OF FEET

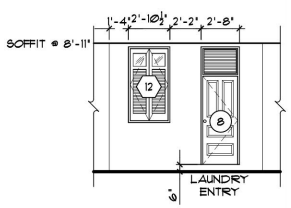


6 A6 SERVANT'S WEST ELEVATION

4 0 4 8 SCALE OF FEET

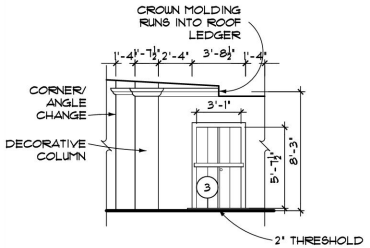
7 A6 SERVANT'S SOUTH ELEVATION

4 0 4 8 SCALE OF FEET



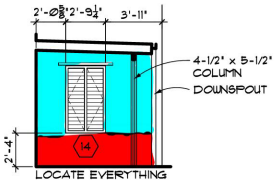
8 A6 SERVANT'S WEST ELEVATION

4 0 4 8 SCALE OF FEET



9 A6 TUNNEL ENTRY

4 0 4 8 SCALE OF FEET



10 A6 EAST ELEVATION @ ROOM 106

4 0 4 8 SCALE OF FEET

NORTH COURTYARD ELEVATIONS

4 0 4 8 SCALE OF FEET

NOTE:
- EXISTING SCREEN DOORS/SECURITY DOORS NOT SHOWN

DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
DRAWN: NSS	A6	EXTERIOR ELEVATIONS	
TECH. REVIEW:		QUARTER #211	PMIS/PKG NO. 114073
DATE: 2/17/16		CASTILLO DE SAN CRISTOBAL SAN JUAN NATIONAL HISTORIC SITE	SHEET 6 OF 8

APPENDIX 3-2

ELEVATION DRAWINGS ANNOTATED WITH INFRARED THERMOGRAPHY OBSERVATIONS

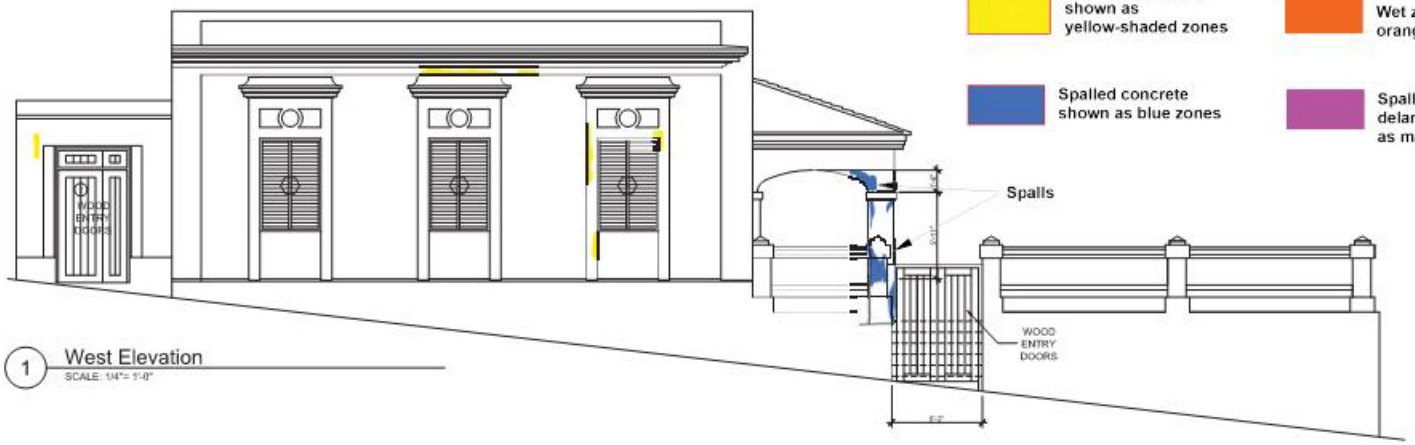
Infrared Thermography Observations

Material variations shown as yellow-shaded zones

Wet zones shown as orange

Spalled concrete shown as blue zones

Spall or plaster delamination shown as magenta zones



1 West Elevation
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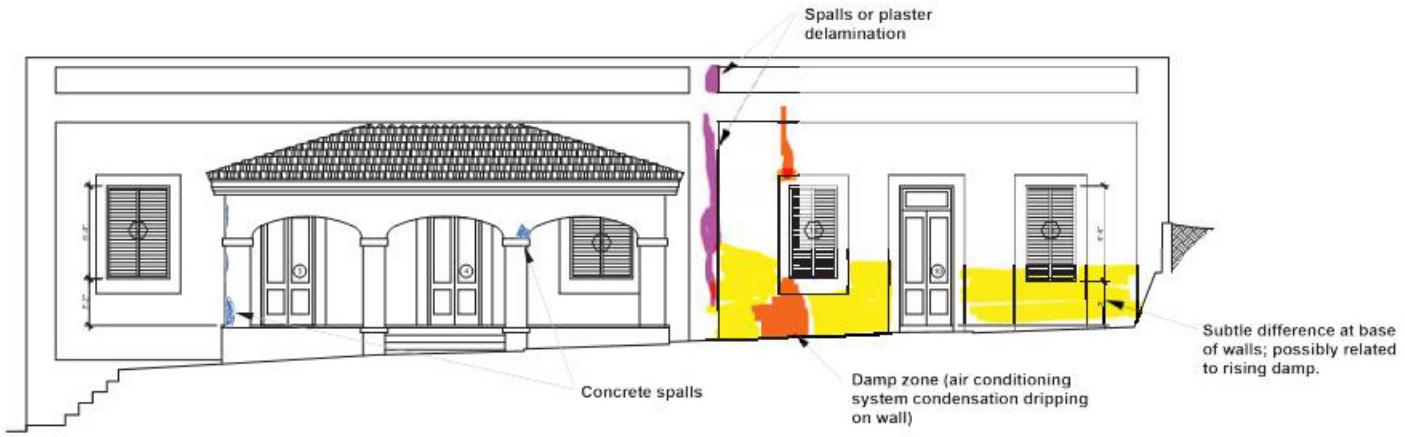
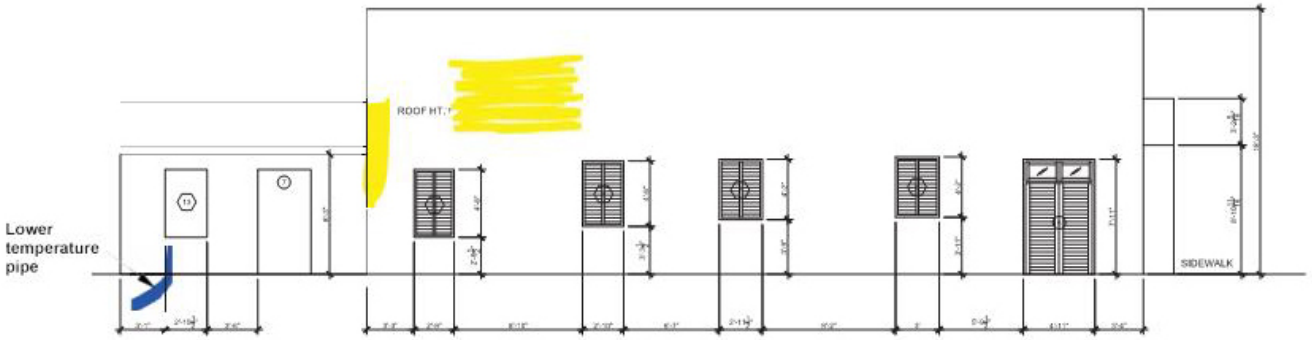


2 South Elevation
SCALE: 1/4"= 1'-0"

EXISTING CONDITIONS	DATE: 11.3.2015	EXT. ELEVATIONS
	DRAWN BY: NSS	QUARTER NO. #211 CASTILLO DE SAN CRISTOBAL SAN JUAN, PUERTO RICO
	CHECKED: ---	SHEET: A 3.0

Infrared Thermography Observations



3 North Elevation
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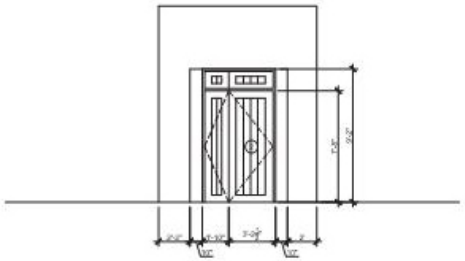

4 North Courtyard, West Gate Elevation
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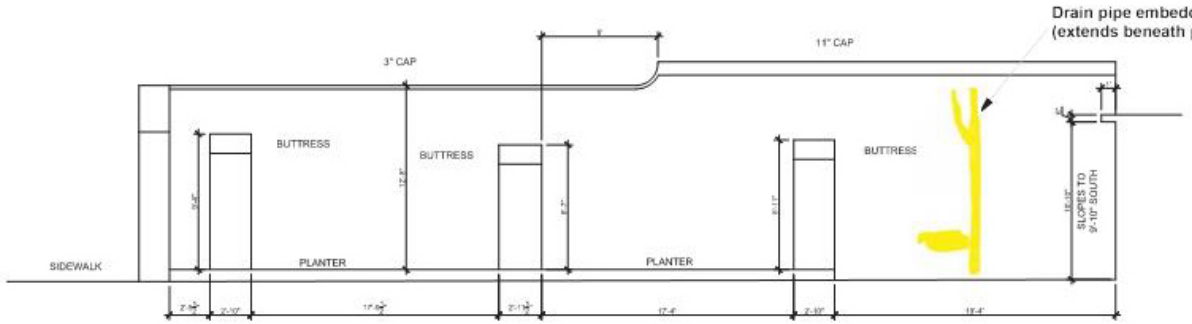
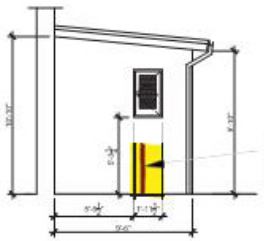
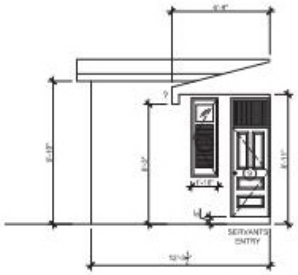


5 North Courtyard, North Wall Elevation
SCALE: 1/4"= 1'-0"

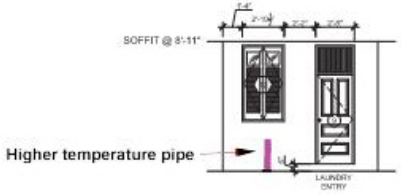
Material variations shown as yellow-shaded zones



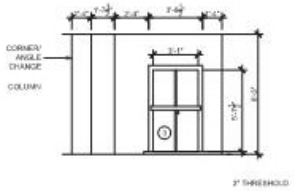
6 Servants West Elevation
SCALE: 1/4"= 1'-0"



7 Servants South Elevation
SCALE: 1/4"= 1'-0"



8 Laundry West Elevation
SCALE: 1/4"= 1'-0"



9 Tunnel Wall Elevation
SCALE: 1/4"= 1'-0"



10 East Elevation
SCALE: 1/4"= 1'-0"

EXISTING CONDITIONS

DATE	11.3.2015
DRAWN BY	NSS
CHECKED	---

EXT. ELEVATIONS

QUARTER NO. #211
CASTILLO DE SAN CRISTOBAL
SAN JUAN, PUERTO RICO

SHEET
A
3.1

Appendix 4—Structural Considerations

STRUCTURAL CONSIDERATIONS

General Structural Configuration

The walls are predominately unreinforced mass masonry walls, interspersed with sections of reinforced concrete. The roofs are reinforced concrete throughout, the exception being a small roof area at the north courtyard, which is constructed of light wood framing and a partial roof covering the southeast entry. Metal anchors connecting reinforced concrete roofs to walls were detected at all locations scanned. Roof anchors penetrate 12 inches below ceiling height at regular intervals.

Wind/Hurricane Loads

A full structural analysis of the lateral wind force resisting system was not conducted, but the overall structural system is inherently resistant to high winds. Significant retrofit efforts are likely not required to address wind loads. However, light framing at the courtyard roof should be analyzed for adequacy to resist hurricane-level wind forces. Minor anchoring or other retrofit is likely at this roof system, installed with the recommended repairs and partial reconstruction.

Seismic

The building is located in an area of high seismic activity and a structural analysis should be conducted to determine the need for retrofit. Structural systems were evaluated using Tier 1 checklist of ASCE 41-13, *Seismic Evaluation and Rehabilitation of Existing Buildings*. Special consideration of the historic significance of this structure is required during evaluation and analysis to ensure any retrofit measures are minimized and any work meets preservation objectives. It does not appear that past earthquakes inflicted significant damage to the building. Exterior walls show minor cracking near some building corners that could be the result of either seismic activity or thermal movement.

Overall, the massive masonry walls and heavy roof slabs would result in large lateral loads during seismic excitation. Further, concrete walls and roofs are lightly reinforced and appear to have been designed only for gravity loads. Both of these characteristics suggests poor seismic performance. However, the structural system does have some components that enhance resistance to seismic activity:

- Masonry walls are very thick, with a low slenderness ratio, measured as the height divided by the wall thickness.
- Main lateral load-resisting walls are braced by frequent cross walls.
- The concrete roof slab appears to frame into and was built integral with exterior masonry walls. Concrete roof slab reinforcement provides a type of ring beam or bond beam at the roof diaphragm level and acts to enhance wall continuity around the building.
- The concrete roof slab is well anchored into masonry walls throughout.

A series of measurements were taken at roof parapets to quantify height, thickness, and slenderness (expressed as the height-to-thickness ratio). The parapets do not appear to be reinforced, and ASCE 41-13, Seismic Evaluation and Retrofit of Existing Buildings, requires analysis and potential retrofit for unreinforced masonry parapets with a height-to-thickness ratio of greater than 1.5, and reinforced concrete parapets with a height-to-thickness ratio greater than 3.0. Site measurements of parapet geometry are provided in Figure A4-1. According to ASCE 41 parapet height is measured to the point of connection, which in this case is where roof slab reinforcement is doweled into wall. Hence all site measurements of parapet height are equal to the parapet projection above the roof plus 8 inches.

Unreinforced masonry parapets and concrete parapets all exceed ASCE 41 slenderness limits. All parapets require seismic evaluation and potential retrofit. Retrofit may be simple braces visible only from above, or internal reinforcement.

The west elevation cornice also requires seismic evaluation and retrofit. Retrofit is likely, to prevent the cornice from detaching during a seismic event. A series of internal anchors would be appropriate for anchoring cornices; anchors would be designed to give strength and ductility in a seismic event and to support the weight of cornices should tension cracks develop in the masonry.

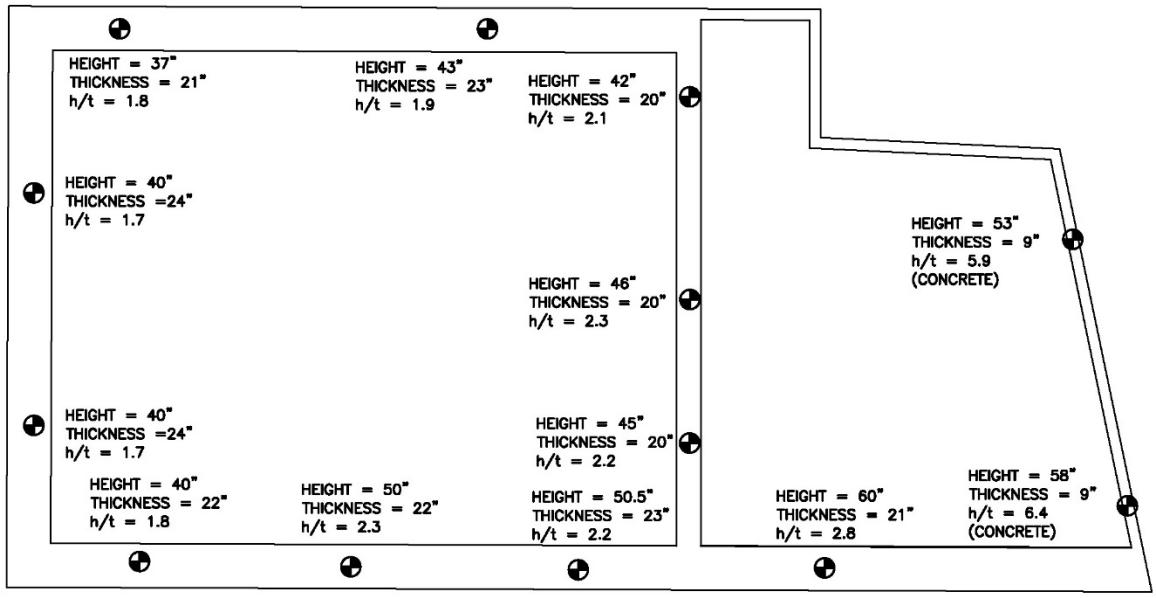


Figure A4-1. Roof parapet height and thickness measurements.

Retaining Wall Displacement

Laser Plumb Survey

A laser plumb was used to quantify lateral wall displacement along three vertical lines and one horizontal line at the north retaining wall (see Figure A4-2 for locations). Results of the laser plumb survey are included in Figure A4-3 and Figure A4-4.

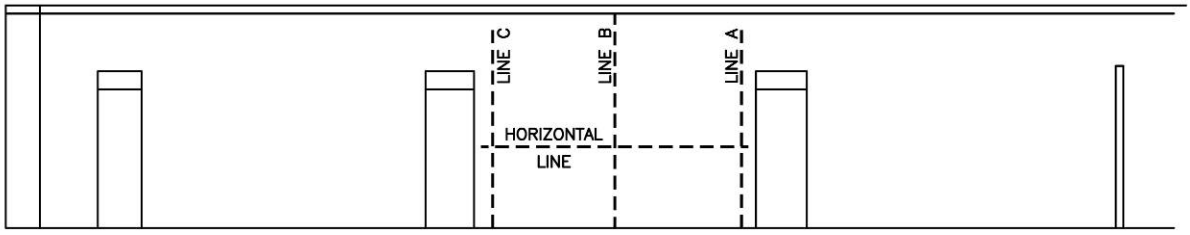


Figure A4-2. Locations of laser plumb measurements at the north retaining wall.

At Line A, the wall is essentially plumb up to the top of the buttress; above that point the wall displaces sharply to nearly 2 inches outward. Displacements along Lines B and C are dominated by horizontal flexure of the wall panel between buttresses, with a maximum displacement of 0.75 and 1.5 inches above mid-height, returning to negative 1 and 0 inches at the top of the wall. Vertical profiles reflect cracking and confirm outward bulging of the wall.

Horizontal displacement shows classic flexure curvature between buttresses, with a maximum displacement of nearly 3 inches midway between buttresses.

Laser Plumb Survey - Discussion

Significant lateral movement was recorded at the north retaining wall. Displacements appear related to vertical and horizontal flexure action rather than rigid-body rotation of the wall. Movement is most likely caused by overloading as a result of soil loads and surcharge loads from Quarter No. 210, located directly to the north of Quarter No. 211. The south wall of Quarter No. 210 is built into the top of the retaining wall, partially compromising wall thickness. Retaining wall movement may be exacerbated by vegetation growth within the wall, in close proximity to the wall at its base, and on the grounds of Quarter No. 210. Movement may also have been caused by past seismic events. Structural analysis is required to determine adequacy and the need for any retrofit or strengthening.

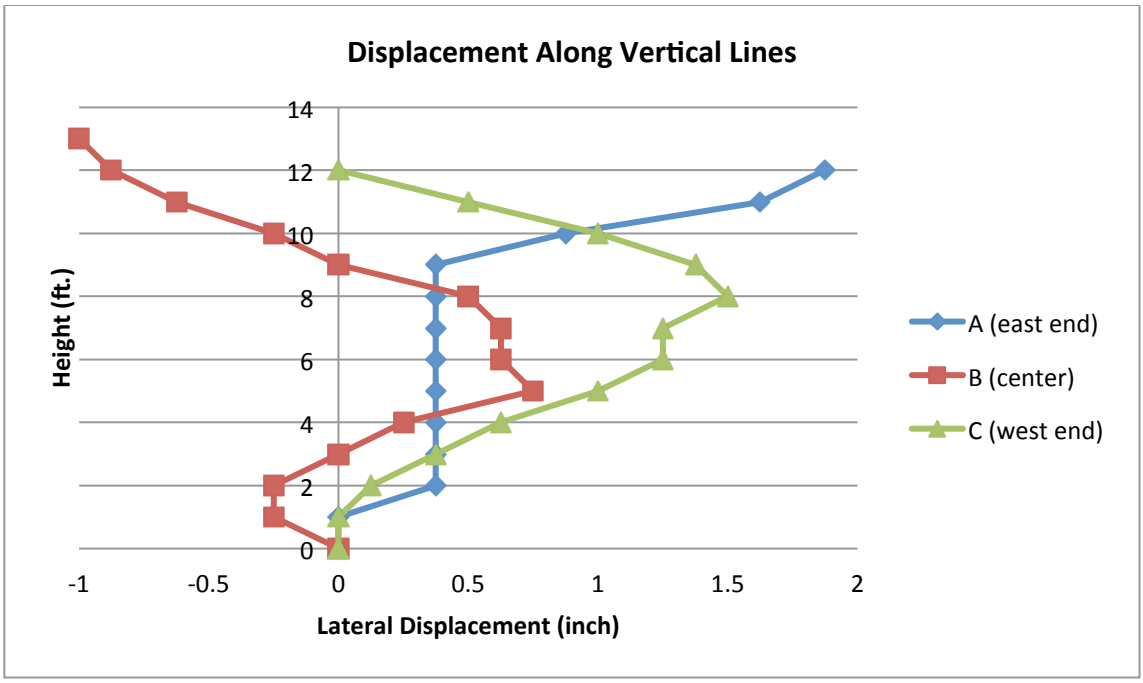


Figure A4-3. Horizontal displacement measured at the east end, center, and west end of the center panel at the north retaining wall along vertical lines A, B, and C shown in Figure A4-2. Positive measured displacement represents movement outward. Measured movement is representative of flexural displacement due to soil loads exceeding the wall's lateral capacity. The wall leans back inward (towards the retained soil) at the top of the wall at Lines B and C. Displacements measured along Line A suggest progressive movement of the wall away from retained soil.

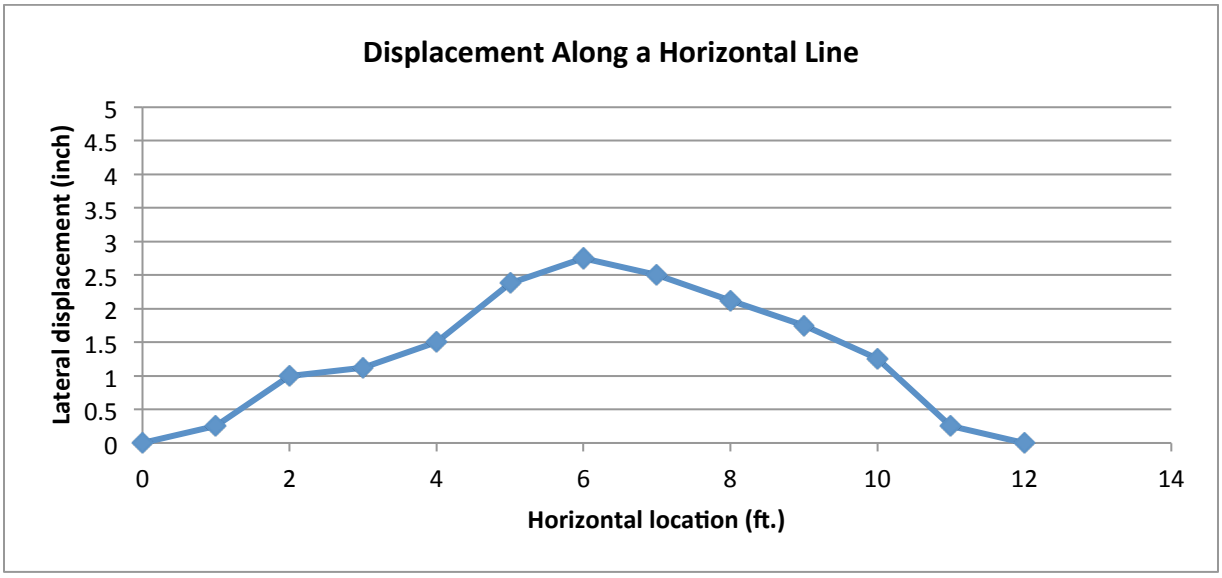


Figure A4-4**.** Horizontal displacement measured at the north retaining wall, center panel, at an elevation of 4'-11" above grade, along the horizontal line indicated in Figure A4-2. Outward movement is represented as positive displacement. Deflections represent flexural displacement of the wall between buttresses as a result of soil loads exceeding the wall's lateral capacity. A maximum displacement of nearly 3 inches was measured at midspan between buttresses.



Figure A4-5**.** Vegetation growth at Quarter No. 210, north of the Quarter No. 211 retaining wall (the upper portion of which is seen painted yellow at right in this image).



Figure A4-6**.** Horizontal and diagonal cracks at the center retaining wall panel.

Summary and Recommendations

- Masonry construction: appears to be a mix of large and small stone units interspersed with occasional pockets of brick or regular small stone construction mixed. Construction characteristics detected with radar appear to be representative of typical masonry construction in the local area as shown in Figure A4-6 and Figure A4-7. Some radar scans showed a distinct change in construction at some areas (see radar and notes on building elevations). These changes are subtle but indicate either a different construction crew or a different era. Sometimes the size of the masonry unit changes but more typically it is a change in wall solidity, from very solid (complete mortar fill behind stones) to some gaps and voids in mortar fill.

- Floors are reinforced concrete slabs on grade throughout. Slabs throughout the house are of similar thickness (ranging from 4 ¾ to 7.5 inch thick) and with similar reinforcement layout. There is a change in slab construction at servant's suite, where the slab is much thicker (up to 10 inches thick) and reinforcement placed much deeper in the slab than throughout the rest of the home. These differences indicate the floor slab at the servant's room is of a different era than slabs throughout the rest of the home.

- Concrete roof slabs at the porch and throughout much of the home have similar construction characteristics, with roof slab thickness in the range of 5 to 7 inches and reinforcement spacing varying from 4 to 7 inches in the main span direction, to 12 to 13 inch spacing for transverse reinforcement. Roof slabs at the kitchen hall and breakfast room have different characteristics, most notably having 2 layers of reinforcement in the main span direction. This reinforcement layout could be interpreted as a more modern design, or a design originating from a different engineering office, and suggests these roof slabs were constructed in a different era than roofs throughout the rest of the home. The roof at the servant's room also has 2 reinforcement layers, and the slab here is 10 inches thick. Both of these construction characteristics point to a possible third construction era at the servant's room roof.

- As discussed previously, the building requires engineering analysis to evaluate adequacy for resistance to high winds and seismic loads. Retrofit for wind resistance will likely be limited to the light roof framing at the courtyard roof. Seismic retrofit will likely involve, at the least, parapet bracing and cornice anchors.

- Reinforcement corrosion at portions of the concrete construction at the front porch is locally severe, resulting in concrete spalls and loss of reinforcement capacity. Repairs are required to address reinforcement corrosion and associated concrete damage.

- The north courtyard retaining wall has significant cracking and displacement, and retrofit is likely required. The wall could be strengthened by construction of an

additional buttress, installation of internal reinforcement, or use of wall anchors connected to deadmen or spades in the soil mass to the north.



Figure A4-6. Exposed masonry at the fortress, showing highly variable mixed-mode masonry construction. Construction includes coursed stone masonry and rubble masonry interspersed with brick leveling courses.



Figure A4-7. Exposed masonry construction at a local home near Quarters No. 211, showing highly variable masonry wall construction with large dressed stones, small rubble stone, and occasional brick infill.

Recommended Treatments (Structural)

Masonry Building Walls

Exterior masonry walls are in good to excellent condition with only minor visually evident distress. Walls appear to be generally plumb and true with no significant deflection. Some cracks occur at the upper parts of the southeast and northwest corners. Treatment is recommended to maintain structural continuity and mitigate potential moisture infiltration.

1. Requirement for Treatment and Use
   Cracks at the southeast and northwest corners require treatment to maintain structural continuity for resisting loads imposed by future seismic events.

2. Alternative for Treatment and Use
   a. No treatment. Potential for additional crack growth and loss of structural capacity in a future seismic event.
   b. Architectural treatment. Routing to widen crack, repointing, and re-application of parge coat at exterior to restore architectural appearance and prevent moisture infiltration.
   c. Structural and architectural treatment. Combined with the architectural treatment above, this option includes installation of stitching to carry structural loads across cracks. Stitching involves placement of stainless steel reinforcement spanning across cracks at a regular spacing. Reinforcement may be small-diameter wires, bars, or threaded rods, embedded within the masonry wall.

3. Recommendations
   Recommend structural and architectural treatment as described above. This intervention is prioritized as a long-term repair and should be implemented in the next 1 to 3 years.

Reinforced Concrete Elements

The reinforced concrete structure supporting the front patio roof has localized areas of moderate to severe corrosion, cracked concrete, and spalled concrete. A full structural analysis was not conducted, but in its current condition, the concrete and reinforcement deterioration does not appear to significantly affect the structure's capability to carry roof loads. Repairs are needed to mitigate future corrosion effects, to arrest ongoing deterioration, and to restore the concrete's capacity to resist lateral wind and seismic loads. These repairs are categorized as having a long-term priority, and should be carried out within the next 2 years.

Other reinforced concrete elements on site including building walls and site walls do not display significant distress and no treatments are recommended.

1. Requirement for Treatment and Use
   Distress and damage at concrete pillars and supporting arches diminishes structural capacity. Action is necessary to restore the structure's ability to resist lateral wind and seismic loads.

2. Alternative for Treatment and Use
   a. No treatment. Damage in the form of reinforcement corrosion, concrete cracking, and concrete loss will continue. There is a high potential for moderate damage and partial loss of lateral structural capacity in a future seismic event.
   b. Architectural treatment. Patching and painting only.
   c. Structural treatment. Will include localized concrete removal to expose corroding reinforcement, treatment of remaining reinforcement, stitching in new reinforcement where section loss exceeds structural parameters, coating of exposed existing and new reinforcement to minimize future corrosion potential, patching concrete, and painting.

3. Recommendations
   Recommend structural and architectural treatment as described above. This intervention is prioritized as a long-term repair and should be implemented in the next 1 to 3 years.

Parapets and Cornice

Parapet dimensions (measured as height-to-thickness ratio) exceed requirements for unreinforced masonry construction in seismic zones and pose a falling hazard during future seismic events.

The west elevation cornice is identified as another potentially vulnerable element that could detach and fall in a seismic event. Such action represents a life safety hazard to pedestrians on the public sidewalk at the west elevation directly below the cornice.

1. Requirement for Treatment and Use
   Treatment required to address potential life safety hazard. Treatments may follow recommendations of ASCE 41-13 (as described previously in this Report) and can be conducted in a sensitive manner to fulfill historic preservation objectives.

2. Alternative for Treatment and Use
   a. No treatment. Considering the building's performance in many prior seismic events, the cornice and parapets pose only a minor threat of future collapse.
   b. External bracing. Installation of bracing extending from near the tops of parapets back to the roof diaphragm. This alternative requires careful attention to roofing penetrations to maintain waterproofing and roof function. Parapet braces would be visible from above when viewed from adjacent buildings and nearby fortress walls. Method is easily reversible and common. Not recommended for cornice treatment due to visibility.
   c. Internal strengthening. Installation of vertical reinforcement at parapets to increase lateral capacity and installation of horizontal reinforcement at cornices to augment structural connection. Stainless steel reinforcement would be installed in cores removed from masonry and grouted in place using materials compatible with historic construction. Structural strengthening will not penetrate roofing membrane and is not visible, maintaining current appearance.

3. Recommendations
   Performance in past seismic events appears to be satisfactory with no visibly evident distress. Recommendation is for no treatment at this time, although consideration should be given to strengthening west elevation parapets and cornices that pose a falling hazard to persons on the public sidewalk directly adjacent to the building's west elevation.

Retaining Wall

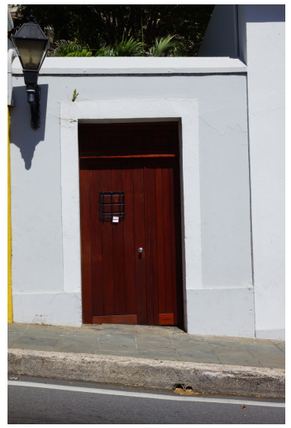
The retaining wall to the north of Quarters No. 211 protects Quarters No. 211 and also provides support to the grounds and building at Quarters No. 210. Observed distress indicates wall sections between buttresses are unable to resist applied soil loads. It is clear that the retaining wall's capacity has been exceeded. Crack patterns and measured deflections are indicators of moderate to severe structural distress and some treatment is recommended. Repairs are required to maintain structural capacity and protect against future loss and/or collapse.

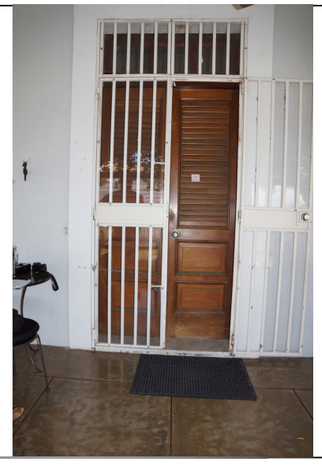
1. Requirement for Treatment and Use
   Strengthening is recommended to stabilize the wall and ensure ongoing structural viability as both a retaining wall and structural support to Quarters No. 210 directly to the north. Failure would result in loss of historic fabric and represents a life safety hazard to persons on the grounds or in the buildings at Quarters No. 211 and Quarters No. 210.

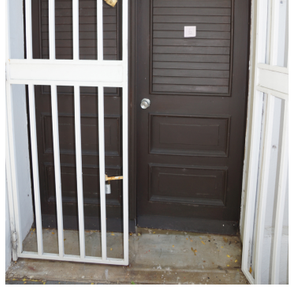
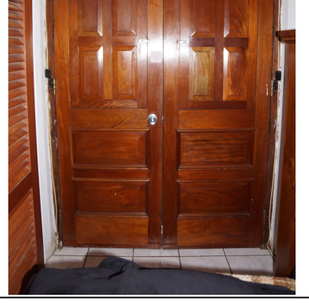
2. Alternative for Treatment and Use
    a. No treatment. In its current condition, the wall has some reserve capacity.
    b. Monitoring. Implement long-term crack and tilt monitoring system with alarms to determine if movement is ongoing or if conditions are static. Monitoring should be done for one year or longer.
    c. Vegetation removal. Trees and shrubs exist at near the wall at the grounds of Quarters No. 210 and Quarters No. 211. Root growth is likely infiltrating the masonry wall, reducing long-term viability.
    d. Install water drainage system. Soil loads increase with saturation, and improving drainage may be sufficient for stabilization. The drainage system would include installation of filter fabric at the back (soil) side of the wall and weeps through the wall at its toe. Considerable excavation required to expose the wall's back surface throughout its height.
    e. Crack repair. Rout to expand crack, repoint with mortar, and restore parge coat at face of wall including painting to match existing.
    f. Install additional buttresses mid-span between existing buttresses. Construction would reflect style and tradition expressed at this and other retaining walls throughout the area and could be carried out in a manner sympathetic to existing appearance. Buttresses would be visible.
    g. Install steel tiebacks to concrete deadmen, embedded in soil at the back side of the wall. This option requires some excavation on the grounds of Quarters No. 210 at a distance from the wall approximately equal to the wall height. Tiebacks would augment the wall's ability to resist soil loads.
    h. Install steel tiebacks to duck-bill anchors. No excavation required; anchors would be installed through the front face. There would be some loss of historic fabric at coreholes and anchor plates at the wall face, and patching would have to be done in a manner sympathetic to existing historic materials.
    i. Internal reinforcement. Stainless steel reinforcement would be installed in holes cored within the wall mass. This option would have a minimal effect on the wall's appearance while maintaining ongoing functionality. Vertical reinforcement is required; it is unclear if horizontal reinforcement is also necessary.

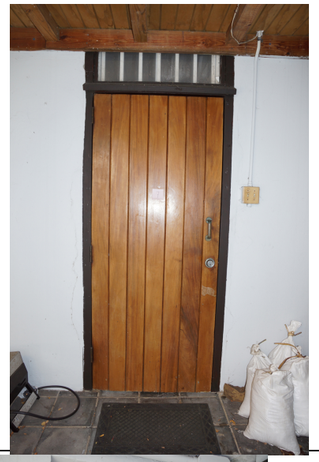
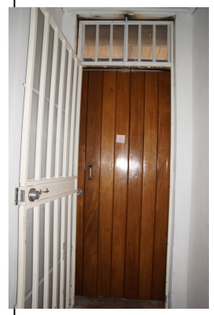
3. Recommendations
   Remove vegetation with root growth into the wall, repair cracks, and install tiebacks with duckbill anchors to restore structural capacity.

Appendix 5—Door Schedule

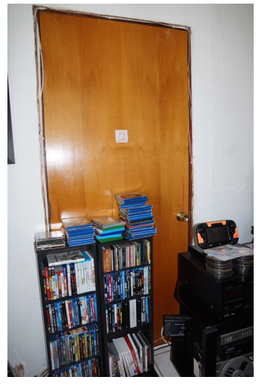
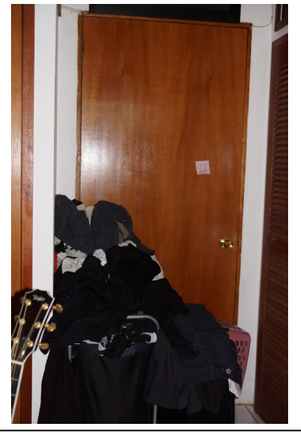
Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
1	Street side 965, interior 966	Site, SW corner	93	33 & 34	Two leaves with small window in western one, each leave has four wide verical boards	Modern deadbolt; window hinge and clasp, and hinges	no			Good
2	Street side 967; interior 968	Site, Northwest corner	Overall height is 113 in, 92 in of which is the height of the door. There are wood blocks at the top that are 12 in x 12 in.	overall width of 56 in.	Two leaves, one narrow (20 in), other wider (36 in). The narrow one has two vertical boards and the wider one has four vertical panels with a two-panel wide window in upper half	Modern deadbolt; window hinge and clasp, and hinges	no			Good

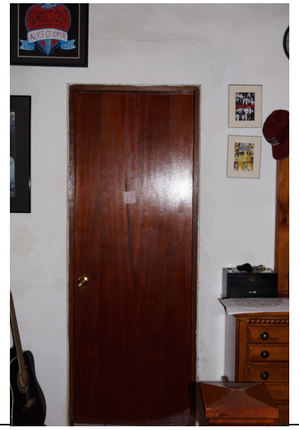
Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
3	Exterior: 969; interior 1022	Site, Tunnel access	67.5 in	15.5 each leaf, total of 37 in.	Two leaves, each with two wide vertical boards over two wide vertical boards, painted dark brown.	Modern deadbolt; window hinge and clasp, and hinges	no			Good; Slight split in left (NE) leaf's one board.
4	Ext: 970, Int: 971	Exterior, south elevation		51 in	two leaves, transom, and gate lined with plexi. The exterior side of the door has louvers in upper part of both leaves over two horizontal panels. The interior of each upper leaf has a two-vertical-panel door covering the opening of the louvers over two horiztonal panels.	Modern entry set, center key thumb latch to secure upper two panels ventilation sub-door.				Fair, refinish both sides

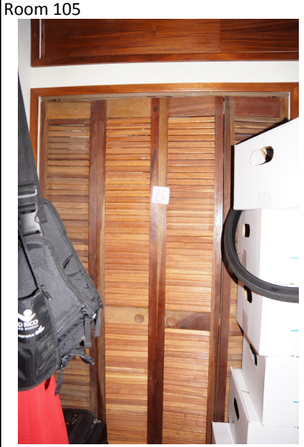
Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
5	Ext: 972, Int: 973	Exterior, south elevation		51 in	two leaves, transom, and metal gate lined with plexi on exterior. Interior has three glass parts to transom, each leaf has two vertical panels--one over the other-- over two horizontal panels.	Modern entry set, center key slide bolt to secure upper two panels ventilation sub-door. No apparent exterior locking system for steel security door.				Fair, cracked and discolored varnish, refinish both sides
6	Ext: 974, Hardware: 975, Int: 976	Exterior, north elevation, west end		57 in	two leaves, glass transom, and gate lined with plexi, each leaf has four vertical panels over two horizontal panels	Modern entry set, center key, east leaf floor slide bolt, slide bolt to secure upper 4 panels ventilation sub-door, modern deadbolt for security door west leaf. 				Fair, cracked and discolored varnish, refinish both sides

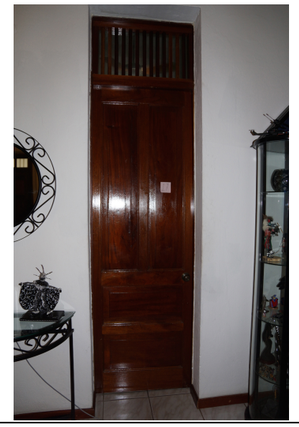
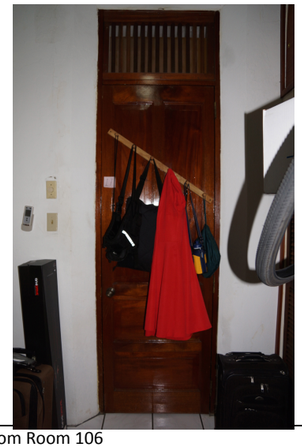
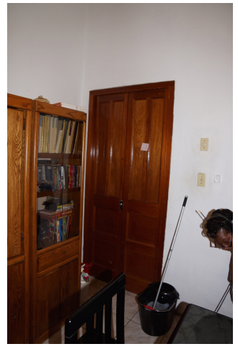
Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
7	Ext: 977, Int: 978/979	Exterior, north elevation, east end: entry to hall	84.5	35 in	Transom has metal bars and glass panel; wood drip edge below, and door itself has seven vertical boards, T&G, bronze pull and deadbolt.	Modern deadbolt and bronze handles (interior and exterior), interior steel security door with modern deadbolt.			 	Good; Transom glass is broken.
8	Ext: 980/981 Int: 982	Exterior, west elevation of servant's building; laundry entry.	75 in	30.5 in	Open transom with wood insect screen above wood door with two vertical panels over two horizontal panels	Screen door: secured by steel hook and screw eye latch, interior modern closer, and with bronze handles. Entry door: modern lock set with center key.	yes	 		Fair; Screen door has loss of coating [revarnish]; door has varnished wood that is cracked (UV and age) and scraped.

Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
9	Ext: 983/984; Int: 985	Exterior, south elevation of servant's building; bedroom entry	75 in	30.5 in	Open transom with wood insect screen above wood door with two vertical panels over two horizontal panels	Screen door: secured by steel hook and screw eye latch, interior modern closer, and with bronze handles. Entry door: modern lock set with center key.	yes 			Fair; Screen door has loss of coating [revarnish]; door has varnished wood that is cracked (UV and age) and scraped.
10	Ext: 986, Int: 987	Exterior, south elevation, east end	108 in	44 in	Double door, each has one vertical over two horiztonal panels, three glass panels @ transom, comtemporary orb	Entry door has modern entry set, steel security door (single leaf) has modern deadbolt, in east leaf an interior slide bolt to secure upper two panels ventilation sub-door.	metal gate on exterior of transom and doors			Wood and varnish, good, scratched, misaligned

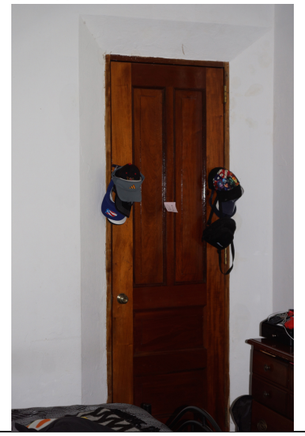
Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
11	From Room 103: 989, From Room 101: 990, Hardware Detail: 991--corroded chrome contemporary; 3 hinges 	Interior, betweeen Rooms 101 and 103	83.25 in + 2.5 HE + 13 in transom	21 in x 2	Double door, each with two side-by-side vertical panels over two stacked horizontal panels. Transom has wood bars.	North leaf has passage set with lever on east face, knob on west face, rectangular back plates in bright silver colored finish (chrome over brass?). Thumb turn privacy lock on west face below knob.		From room 103 	From Room 101 	Wood and varnish, good, scratches
12	From Room 101: 992, From Room 102: 993	Interior, between Rooms 101 and 102	84 in	35.5 in	Single door, flush hollow core wood, 1-in wood jamb	Modern passage set, brass plated with a privacy lock thumb turn on north face in center of handle.	no	From Room 101 	From Room 102 	Good

Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
13	From Room 102, 994; from Room 103, 995	Interior, between room 102 and 103	91.5 in	22.25 in x 2	Double door, similar to Door 11 but without transom	North leaf has passage set with lever on east face, knob on west face, rectangular back plates in bright silver colored finish (chrome over brass?). Thumb turn privacy lock on west face below knob.	no	From Room 102 	From Room 103 	Good
14	From Room 104=996; missing view of door from Room 102	Interior, between Rooms 102 and 104	84 in	30 in	Single door, 2 vertical panels over two horizontal panels	Modern passage set, privacy lock thumb turn, activation on east face in center of knob. Bright brass finish.		From Room 104 		Good

Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
15	From Room 103 = 997; Photo 998 Room 104 to the right, Room 103 to the left	Interior, between Rooms 104 and 103	91 in	30 in	Transom above (18 in) door, which has two vertical panels over three horizontal panels	Modern passage set, privacy lock thumb turn, activation on north face in center of knob. Well worn, Schlage identification on latch plate.	no			Good
16	From Room 105 = blocked off by new built-in closet (photo 1000); from Room 103, Photo 1001	Interior, between Rooms 104 and 105	85.5 in	32 in	single door	Modern passage set with push button activated privacy lock, west face.	no	Room 105 		Good

Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
17	From Room 103 = 1001; From Room 105 = 1002	Interior, between Rooms 105 and 103	89.5 in	29.5 in	Similar to Door 15 but recessed in opening by 6.5 in	Modern passage set with center of knob push button activated lock on north face. Antique brass finish.	no	Room 103 	Room 105 	Good
18	1004 Closeup of hardware 	Interior, between Rooms 103 and 106			Double, in 14.5 in straight recess, two vertical panels over two horizontal panels, similar to door 19	Possibly same lockset as for doors 11 and 13: rectangular back plates, finish is worn, identified as "Perko" on face of knob. Lever is on east face. North leaf is active.	no	From Room 103 	From Room 106 	Good

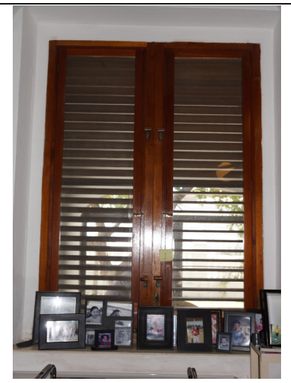
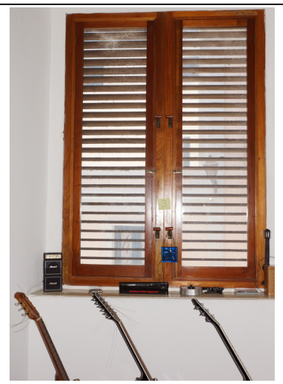
Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
19	From Room 103 = 1010; From Room 107 = 1011	Interior, between Rooms 103 and 107	88.5 in	38 in	double, in 6.5 in beveled recessed	Same as Door 18 except Perko is not embossed on face of knob. Typical passive leaf has top and bottom brass slide bolts.	no	From Room 103 	From Room 107 	Good
20	From Room 107=1012	Interior, between Rooms 107 and 108	84 in	29.5 in	single door with vent, has 9 in step up to sill	Modern passage set in brass (obscured).	no	From Room 107 		Unknown due to being obscured.

Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
21	From Room 107=1013; From room 110 = upper part 1014, lower part 1015	Interior, between Rooms 107 and 110	96 in	29.5 in	single door, two vertical panels over two horizontal panels	Modern passage set in brass, keyed center of knob lock.	no	From Room 107 	from Room 110 upper at left, lower at right  	Good; scratched
22	From Room 110 (Hall) = 1016; From Room 109 = 1017	Interior, between Rooms 109 and 110	87 in	21.5 in	Single, step up 6 inches to sill. Glass opening at top, below are two vertical panels over two horizontal panels	Modern passage set in brass, keyed center of knob lock.	Vent screen in top panel	From Room 110 	From Room 109 (Room 109 is to the left; Hall --Room 110-- is to the right) 	Good

Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
23	1018= upper portion from Room 110 (hall); 1019 = lower portion from Room 110 (hall).	Interior, between Room 106 and 110	94 in	29.5 in	Single, two vertical panels above two horizontal panels	Modern passage set with privacy lock activated by center push button. West door face has brass slide bolt.	no	From Room 110 upper portion 	From Room 110 lower portion (but it looks like it could be from room 106…) 	Good
24	NO DOOR	Interior, between Room 110 and 111				n/a				n/a

Door No.	Photo nos.	Location	H	W	Configuration	Hardware	Screen or Bars	Photo	Photo	Condition
25	No DOOR	Interior, between Rooms 110 and 112				n/a				n/a
26	892 from Room 114; 899 from Room 115. Need Better Photos	Interior, between Rooms 114 and 115	73 in	24.25 in	Single with 19.5 in high transom	Modern passage locksest in brushed chrome finish, privacy function activated on west face.		From Room 114 	From Room 115 	Good; Painted white, brushed chrome

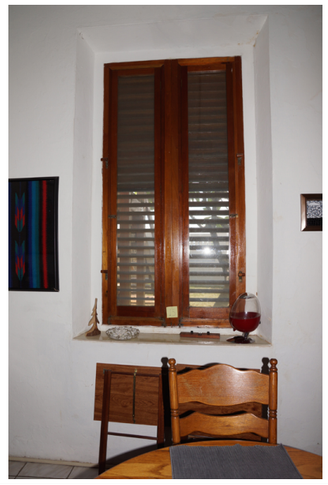
Appendix 6: Window Schedule

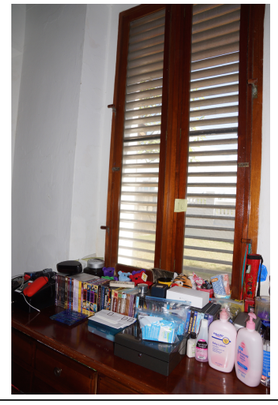
Window No.	Photo nos.	Elevation	H	W	Configuration	Hardware	Screen	Plexiglass	Louvers	Exterior Photo	Interior Photo	Condition Photo and Description if applicable
1	ext: 927; int: 953	S	70 +/- in	51 in	Double casement window, swings inward	A	no	yes	yes, controls are on interior at center of both windows and typically are stuck.			Poor; Damaged interior lower 13 inches. See photo 1025. 
2	ext: 928; int: 954	South, west end	70 +/- in	51 in	Double casement window, swings inward A. Wood frame and plexiglass; B. Wood louvers; C. Plexi; D. Wood casements on the interior	A	no	yes	yes, controls are on interior at center of both windows and typically are stuck.	 	 	Fair; Frame's lower left corner has a loose joint. Wood has deterioration. See photo 1028.  
3	ext: 929; int: 955	West, south end	70 in	50 in	Double casement window, swings inward A. Wood frame and plexiglass; B. Wood louvers; C. Plexi; D. Wood casements on the interior	A	no	yes	yes, controls are on interior at center of both windows and typically are stuck.			Fair; Broken upper corner of interior plexi; plexi weathered, crazing TYPICAL. Missing slide bolt north window.  

Window No.	Photo nos.	Elevation	H	W	Configuration	Hardware	Screen	Plexiglass	Louvers	Exterior Photo	Interior Photo	Condition Photo and Description if applicable
4	Ext: 930 Int: 956	West, center	70-71 in	50 in	Double casement window; interior is covered over by new built-in closet.	obscured	no	yes	yes			Obsured; n/a
5	Ext: 931 Int: 956	West, north end	70-71 in	50 in	Double casement window; interior is covered over by new built-in closet.	Obscured	no	yes	yes			Obsured; n/a
6	ext: 932 Int: 963	North, west end	50 in	34 in	Double casement window	B	no	yes	yes, controls are behind the photos on the window sill.			Fair; wood deterioration at bottom third suspected, exterior louver is stuck closed, thus obscured surfaces; similar windows this elevation typically have deterioration at the bottom third, sash, and frame.

Window No.	Photo nos.	Elevation	H	W	Configuration	Hardware	Screen	Plexiglass	Louvers	Exterior Photo	Interior Photo	Condition Photo and Description if applicable
7	ext: 933 int: 957	North, west center	50 in	36 in	Double casement window	B	no	yes	yes, controls are on interior sides of both windows and typically are stuck.			Fair; Lower right shutter frame has minor deterioration (which T doesn't see in the zoomed in photo) and the wood of the interior has some deterioraton… do you need pix since it's visible in the interior photo if zoomed in.)
8	Ext: 934 Int: 958	North, east center	54 in	34 in	Double casement window	B	no	no	yes, controls are on interior sides of both windows and typically are stuck.			Poor; Shutter and sash have maximum deterioration and need to be replaced.
9	Ext: 935, Int: 960	North, west end	56 in	36 in	Double casement window	B	no	no	yes, controls are on interior sides of both windows and typically are stuck.			Poor; Shutter and sash have maximum deterioration and need to be replaced 

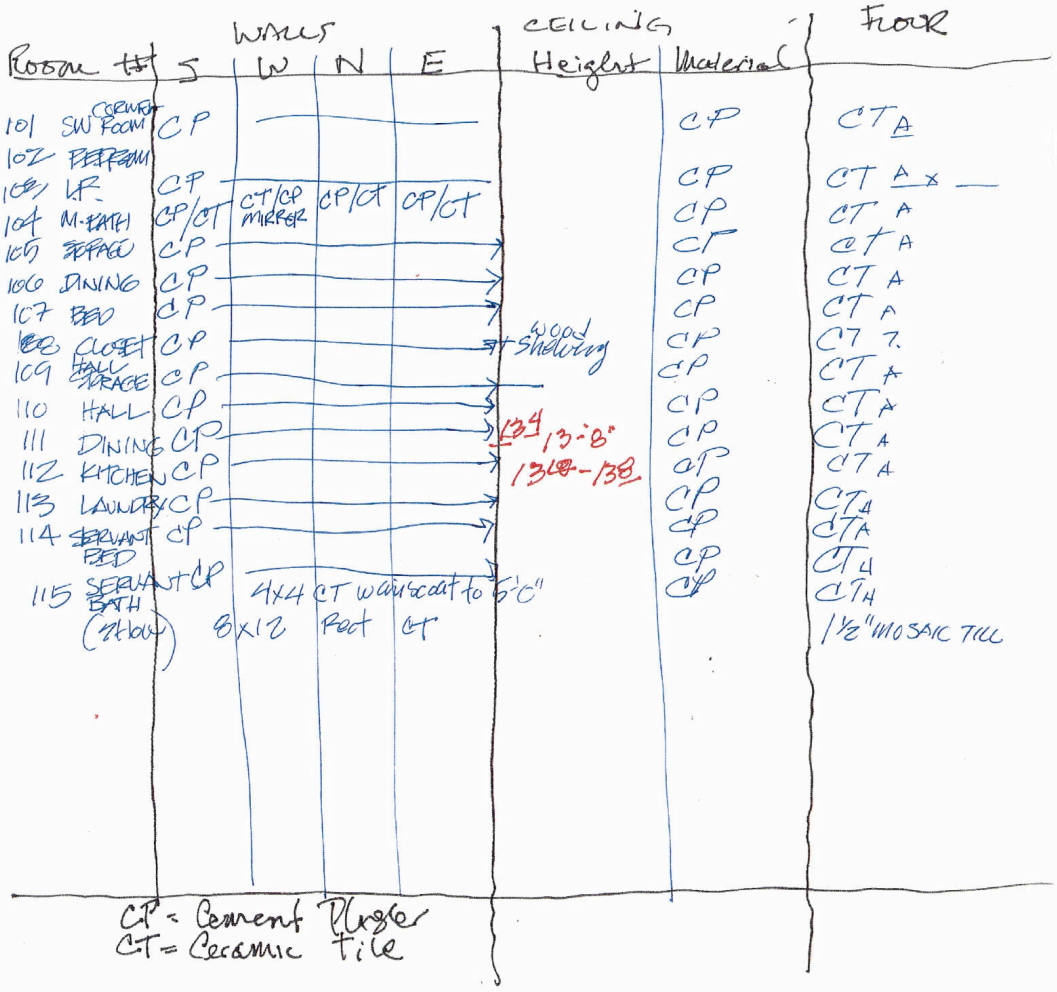
Window No.	Photo nos.	Elevation	H	W	Configuration	Hardware	Screen	Plexiglass	Louvers	Exterior Photo	Interior Photo	Condition Photo and Description if applicable
10	Ext: 937, Int: 939	Servant's Qtrs, west elevation, north end	39.5 in	23.5 in	Single casement window 63.25 inches above grade	From outside, single shutter hinged on the left, plexiglass, screen (both with metal frames), and lower hopper.	yes	yes	yes, but inoperable			Good
11	Ext: 938 Int: 940/941	Servant's Qtrs, south elevation	83.5 in	22 in	Single casement	From outside, single shutter hinged on the left, plexiglass, screen (both with metal frames), and lower hopper.	yes	yes	yes, but inoprable			Good
12	Ext: 942/943 Int: 944	Servant's Qtrs, west elevation, south end	63 in	34 in	Single casement	From outside, double shutter hinged on outside each 15 in wide x 58.75 in high, screen (both with metal frames), and lower hopper.	yes	no	yes, but inoperable 			Good; Bubbling paint on shutters (need to strip and repaint)

Window No.	Photo nos.	Elevation	H	W	Configuration	Hardware	Screen	Plexiglass	Louvers	Exterior Photo	Interior Photo	Condition Photo and Description if applicable
13	Ext: 945 Int: 947	North elevation, east end	34.5 in	53 in	Double casement	B	no	no	yes, controls are on interior sides of both windows and typically are stuck.			Good
14	Ext: 946 Int: 948	East elevation	56 in	33.25 in	Double casement	B	no	no	yes, controls are on interior sides of both windows and typically are stuck.			Good
15	Ext: 950/951 Int: 949	South elevation, east end	75.25 in	39.5	Double casement	B	no	no	yes, controls are on interior sides of both windows and typically are stuck.			Poor; Rotted lower frame, inside and out

Window No.	Photo nos.	Elevation	H	W	Configuration	Hardware	Screen	Plexiglass	Louvers	Exterior Photo	Interior Photo	Condition Photo and Description if applicable
16	Ext: 952 Int: 980	South elevation	75.5 in	38 in	Double casement	B	no	no	yes, controls are on interior sides of both windows and typically are stuck.			Poor; Some older rot on the outside
Type A is a varnished double casement window with three side hinges and 1 slide bolt per window, swinging open inward.												
Type B is a varnished double casement window with 2 center hinges and 1 slide bolt per window, swinging open inward.												

Appendix 7—Finish Schedule

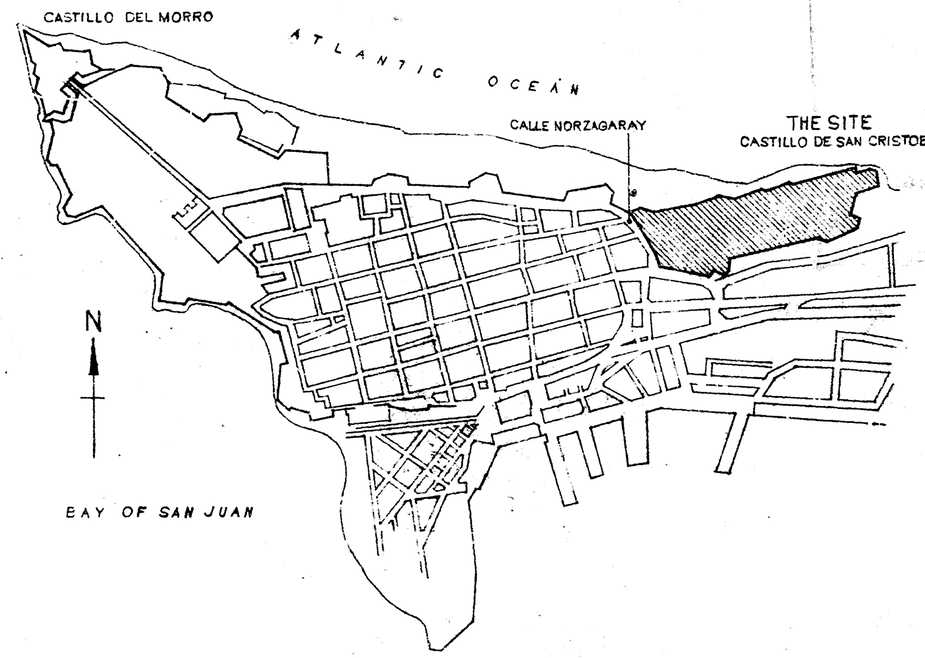
FINISH SCHEDULE



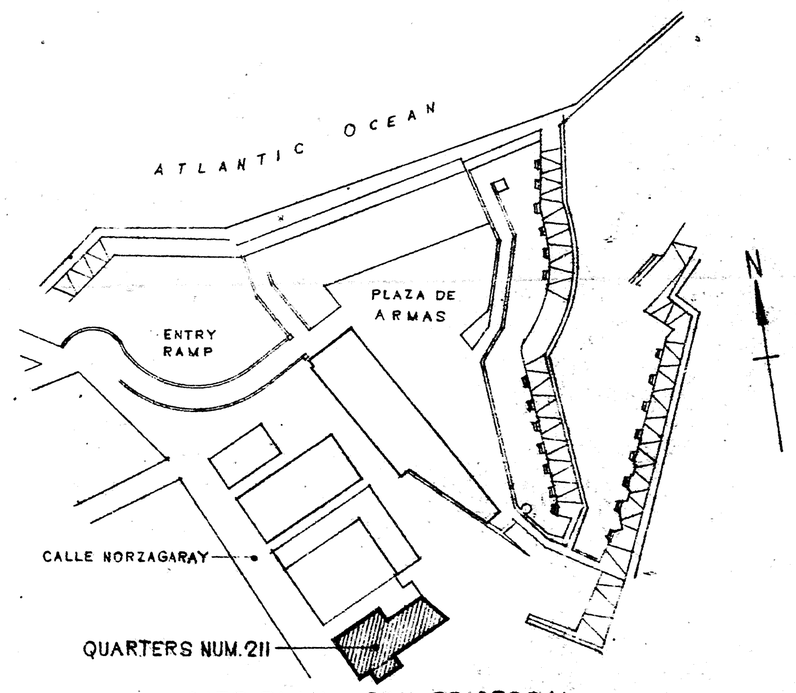
Appendix 8—HABS Drawings

TRIM LINE

QUARTERS NUM. 211
CASTILLO DE SAN CRISTOBAL
SAN JUAN, PUERTO RICO



MAP OF OLD SAN JUAN



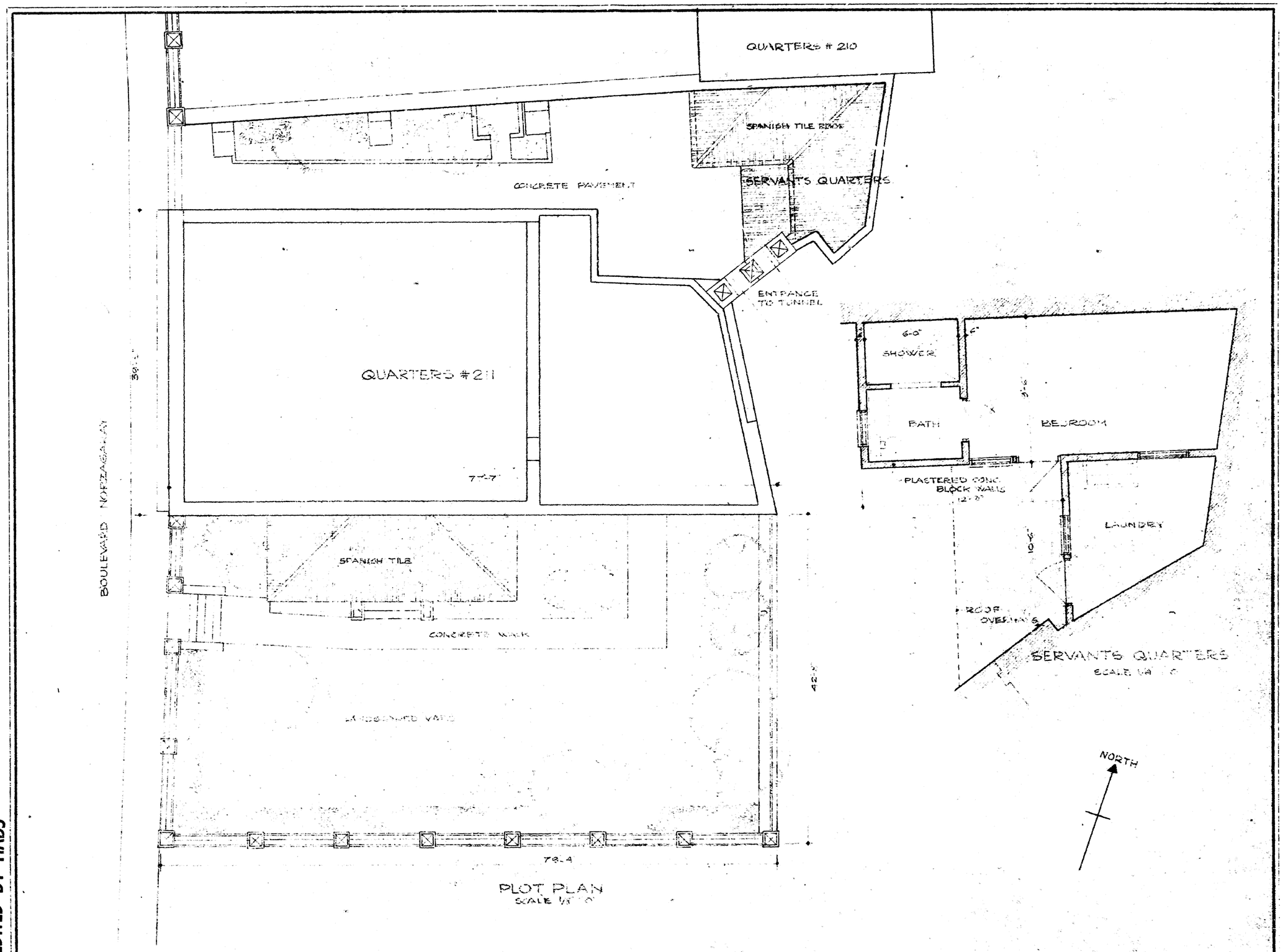
SITE PLAN - SAN CRISTOBAL

QUARTERS NUM. 211, BUILT IN THE EARLY 19TH CENTURY AS A BLACK SMITH SHOP FOR THE SPANISH CORPS OF ARTILLERY. REMODELED IN THE 1880 AS OFFICERS QUARTERS IT CONTINUED TO SERVE AS SUCH UNTIL 1964.

UNEDITED BY HABS

UNDER DIRECTION OF UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE, BRANCH OF PLANS AND DESIGN	NAME OF STRUCTURE: QUARTERS #211 FORMERLY A BLACK SMITH SHOP FOR THE CORPS OF ARTILLERY. BOULEVARD NORZAGARAY SAN JUAN, PUERTO RICO	SURVEY NO.	HISTORIC AMERICAN BUILDINGS SURVEY SHEET 1 OF 5 SHEETS	LIBRARY OF CONGRESS PRINTS AND PHOTOGRAPHS DIVISION

393 / 80031



F.C.GUESSING DEL. 1964

FIELD OFFICE, VIRGIN ISLANDS NATIONAL PARK UNDER DIRECTION OF UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE, BRANCH OF PLANS AND DESIGN	NAME OF STRUCTURE QUARTERS # 211, FORMERLY BLACK SMITHY OF SAN CRISTOBAL BOULEVARD, NORZAGARAY SAN JUAN, PUERTO RICO	SURVEY NO.	HISTORIC AMERICAN BUILDINGS SURVEY SHEET 2 OF 5 SHEETS

393/80031

UNEDITED BY HABS

TRIM LINE

NOTE: ALL WALLS RUBBLE MASONRY
ROOF REINFORCED CONCRETE SLAB
FLOORS BLACK & WHITE CONCRETE TILE EXCEPT IN BATHROOM AND IN KITCHEN (QUARRY TILE)
WALL FINISHES PAINTED PLASTER THRU OUT

CONCRETE BEAM ABOVE

BATH

BEDROOM

DINING ROOM

KITCHEN

BEDROOM

CONCRETE BEAM ABOVE

BEDROOM

LIVING ROOM

BEDROOM

BEDROOM

PORCH

BOULEVARD NORZAGARAY

FLOOR PLAN SCALE 1/4"=1'-0"

NORTH

A

B

B

A

UNEDITED BY HABS

F.C. GIESSING, DEL. 1964

FIELD OFFICE, VIRGIN ISLANDS NATIONAL PARK
UNDER DIRECTION OF UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE, BRANCH OF PLANS AND DESIGN

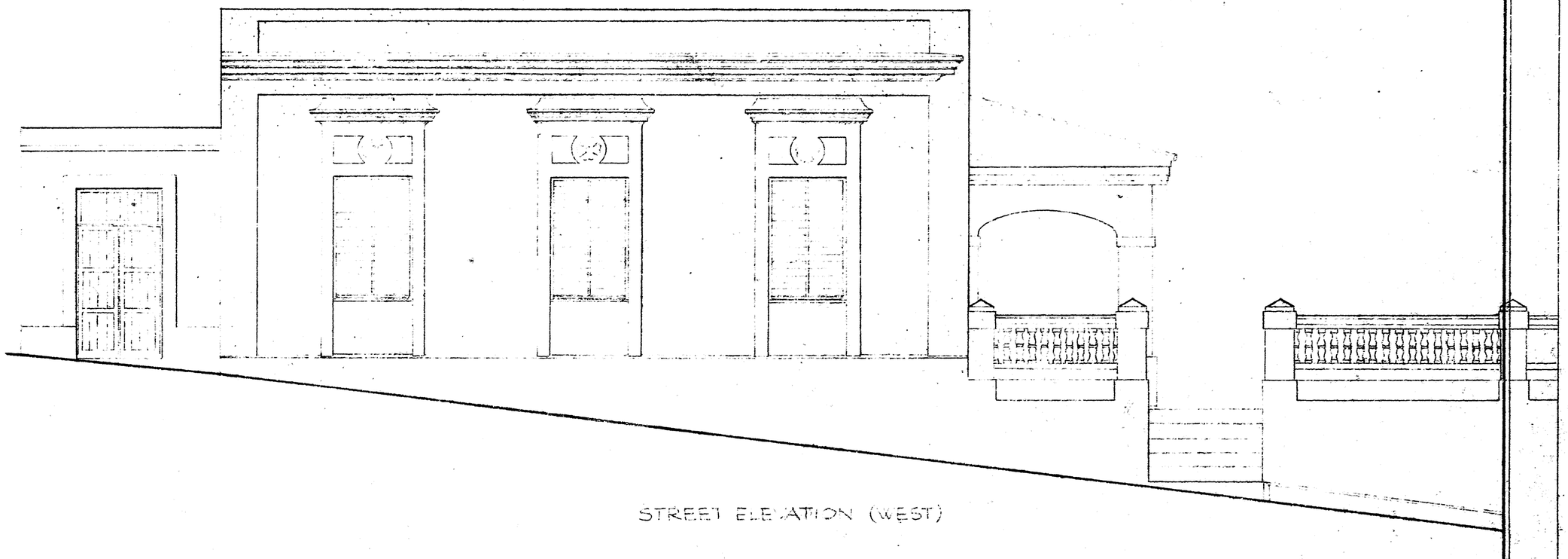
NAME OF STRUCTURE
QUARTERS # 211, FORMERLY BLACK SMITHY OF SAN CRISTOBAL
BOULEVARD NORZAGARAY
SAN JUAN, PUERTO RICO

SURVEY NO.

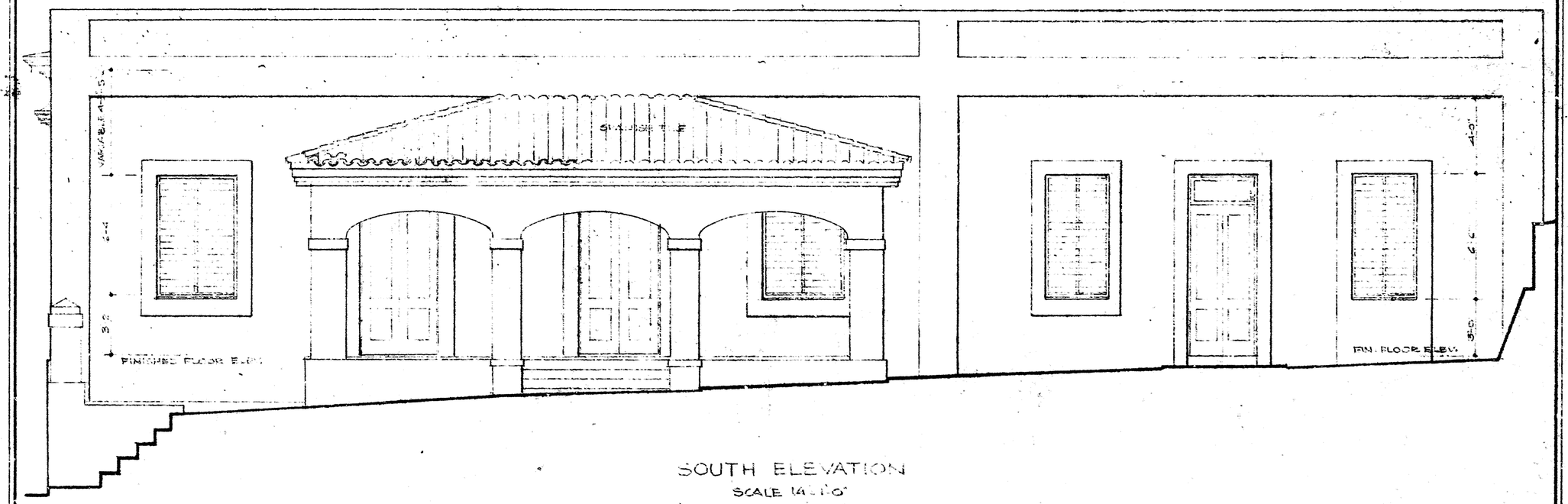
HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 3 OF 5 SHEETS

393/80031

TRIM LINE



STREET ELEVATION (WEST)



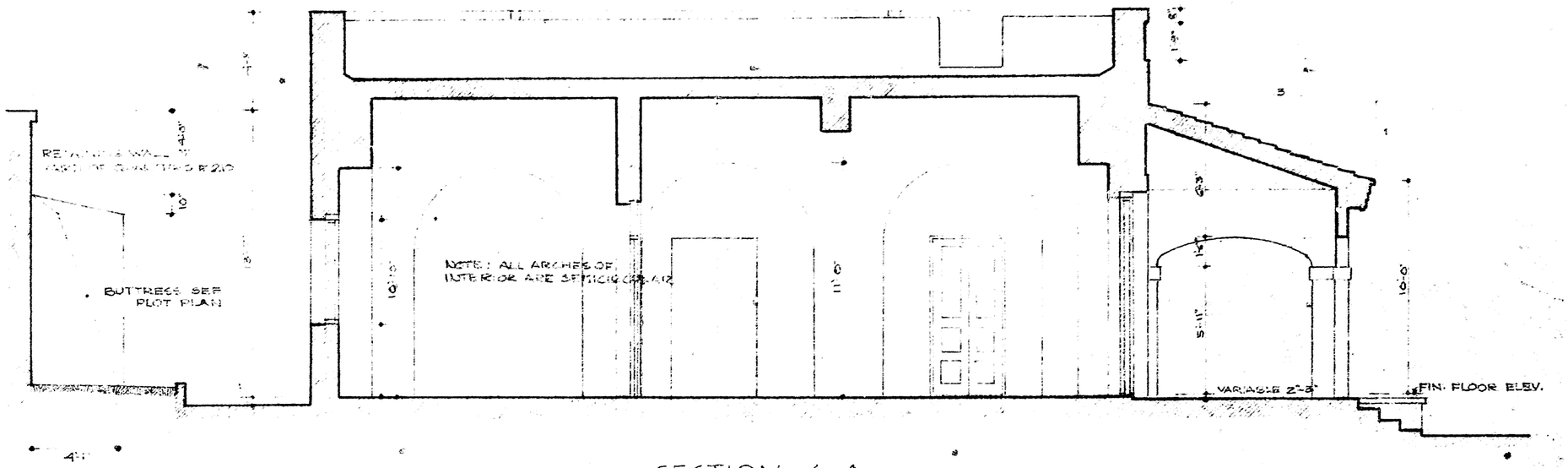
SOUTH ELEVATION
SCALE 1/4"=1'-0"

F.C.G. ESSING DEC. 1964

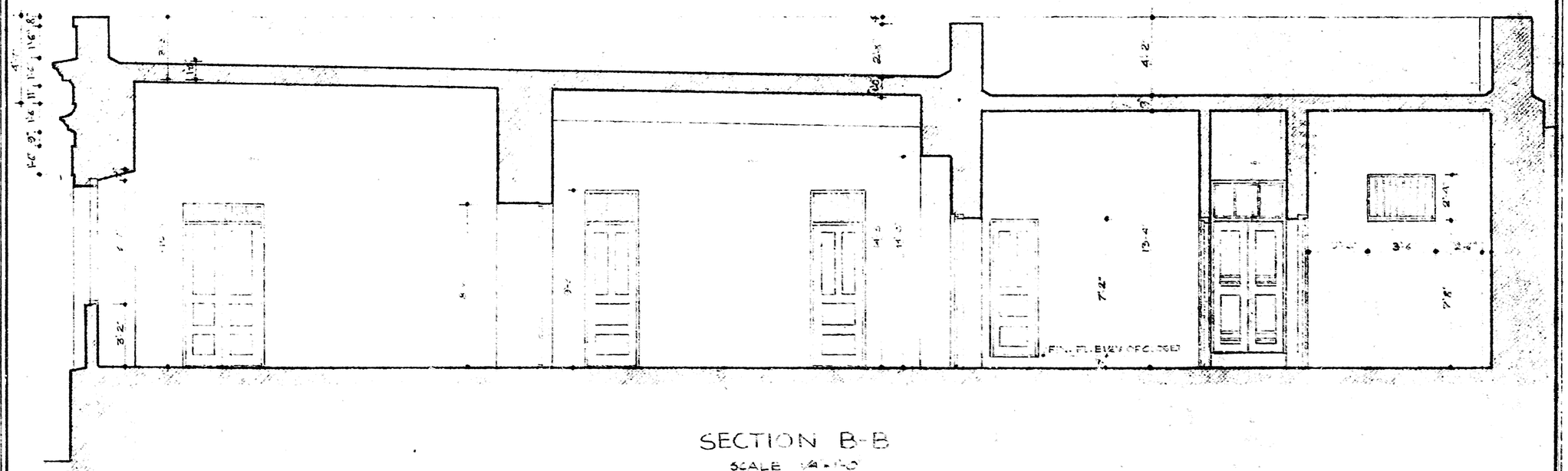
FIELD OFFICE, VIRGIN ISLANDS NATIONAL PARK UNDER DIRECTION OF UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE, BRANCH OF PLANS AND DESIGN	NAME OF STRUCTURE QUARTERS # 211, FORMERLY BLACK SMITHY OF SAN CRISTOBAL BOULEVARD NORZAGARAY SAN JUAN, PUERTO RICO	SURVEY NO. PR-71	HISTORIC AMERICAN BUILDINGS SURVEY SHEET 4 OF 5 SHEETS	LIBRARY OF CONGRESS INDEX NUMBER

UNEDITED BY HABS

393/80031



SECTION A-A



SECTION B-B

SCALE 1/4" = 1'-0"

PROCESSING DELISH

FIELD OFFICE, VIRGIN ISLANDS NATIONAL PARK

UNDER DIRECTION OF UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE, BRANCH OF PLANS AND DESIGN

NAME OF STRUCTURE

QUARTERS # 211, FORMERLY BLACK SMITHY OF SAN CRISTOBAL

BOULEVARD NORZAGARAY — SAN JUAN, PUERTO RICO

SURVEY NO.

HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 5 OF 5 SHEETS

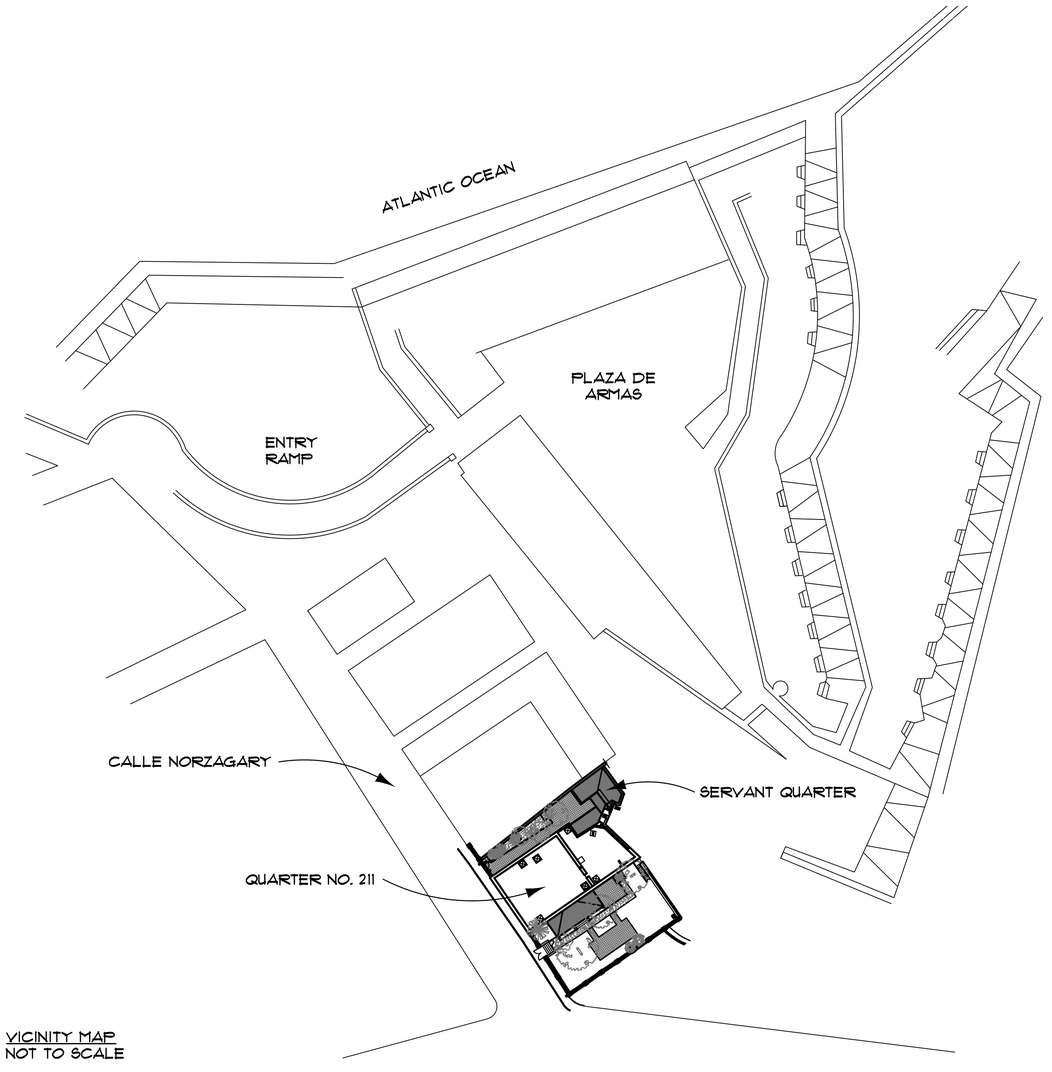
393/80031

UNEDITED BY HABS

TRIM LINE

Appendix 9—Documentation Drawings As-Built as of October 2015, Drawn by the Collaborative inc.

QUARTER NO. 211
CASTILLO DE SAN CRISTOBAL
SAN JUAN, PUERTO RICO



VICINITY MAP
NOT TO SCALE



NOT TO SCALE

SAN JUAN NATIONAL HISTORIC SITE

PROJECT INDEX	
SHEET NO.	DESCRIPTION
A1	COVER SHEET
A2	SITE PLAN
A3	FLOOR PLAN
A4	ROOF PLAN
A5	EXTERIOR ELEVATIONS
A6	EXTERIOR ELEVATIONS
A7	EXTERIOR ELEVATIONS. & SECTION CUTS
A8	SITE DETAILS

BASIC DATA: BASED UPON FIELD CONDITIONS AND DIMENSIONING TAKEN IN SEPTEMBER 2016 BY THE COLLABORATIVE INC., BOULDER, COLORADO

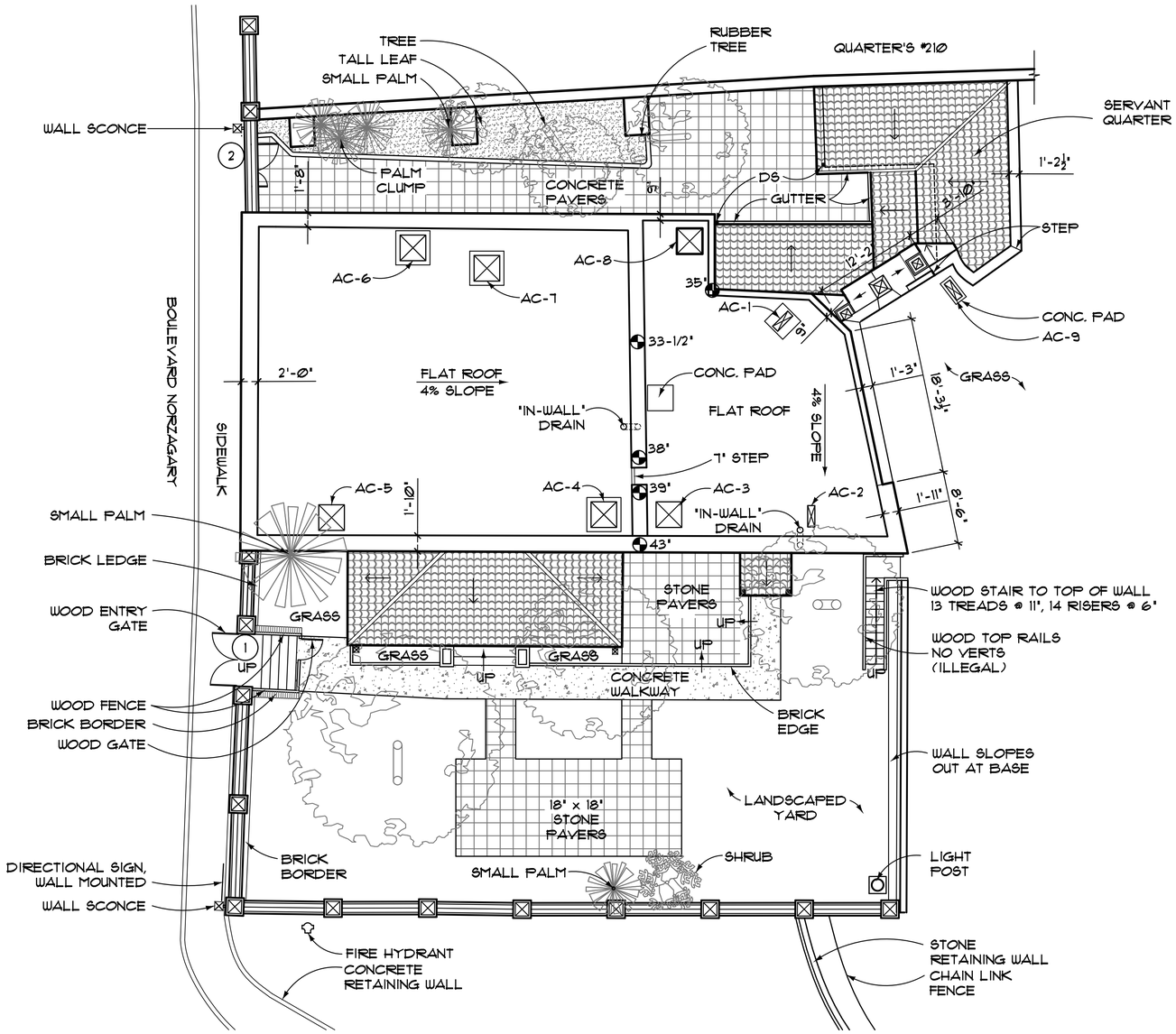
EXISTING CONDITIONS

UNITED STATES
DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE
DENVER SERVICE CENTER

TITLE OF PROJECT
QUARTER NO. 211
LOCATION WITHIN PARK
CASTILLO DE SAN CRISTOBAL
NAME OF PARK
SAN JUAN NATIONAL HISTORIC SITE
REGION: SOUTHEAST | COUNTY | STATE

DRAWING NO. A1
PMIS/PKG NO. 114073
SHEET 1 OF 8



SITE PLAN

8 0 8 16

SCALE OF FEET

DESIGNED: NSS TECH. REVIEW: DATE: 2/17/16	SUB SHEET NO. A2	TITLE OF SHEET SITE PLAN QUARTER NO. 211 CASTILLO DE SAN CRISTOBAL SAN JUAN NATIONAL HISTORIC SITE	DRAWING NO. —— PMIS/PKG NO. 114073 SHEET 2 OF 8

SMALL TALL LEAF TREE
SMALL PALM
PALM CLUMP
RUBBER TREE
QUARTER'S #210
SHOWER
WALL BUTTRESS
SERVANTS ROOM 114
S. BATH 115
F. STRIP
48" H. LEDGE
SQ. WALL SCO. AC ABOVE
ON-DEMAND HW HEATER
WALL SLOPES
UTILITY SINK
FAN/LIGHT
ELEC. 10' 1-1/2" PANEL
LAUNDRY 113
ALCOVE
WOOD DOOR AND SCREEN DOOR
COL. BASE
2" THRESHOLD
TUNNEL
12' OVERHANG
DOWNSPOUT
PLASTERED CONC. BLOCK WALLS
SCREEN @ OPENING
12" x 12" CONC. TILES
6'-9" OVERHANG
4-1/2" X 5-1/2" WOOD COLS.
CLEANOUTS
4" LEDGE @ 8'
HB
PVC
AC ABOVE WINDOW
TUB/ SHOWER
M. BATH 104
BEDROOM 102
BEDROOM 105
CLOSET
LIN.
BI. CAB.
CONCRETE BEAM ABOVE
BATH 104A
34" x 26 1/2" SHOWER
SUS. GLOBE
DINING ROOM 106
ELEC. PANEL
AC ABOVE WINDOW
HALL 110
KITCHEN 112
34" REF.
36" REF.
DW
SW CORNER ROOM 101
LIVING ROOM 103
13-1/4" x 13-1/4" CER. TILES (TYP.)
CLOSET 108
STORAGE 109
BEDROOM 107
ARCH OPENING 6'-7"
BREAKFAST 111
16" BUFFET
13" x 42" HUTCH
4-1/2" X 5-1/2" WOOD COLS.
FANS
GRASS
STONE PAVERS
BRICK BORDER
CONCRETE WALK
CONC. WALK
3'x3' CONC. CUT PATTERN (POLISHED FINISH)
VOID
UP
DN

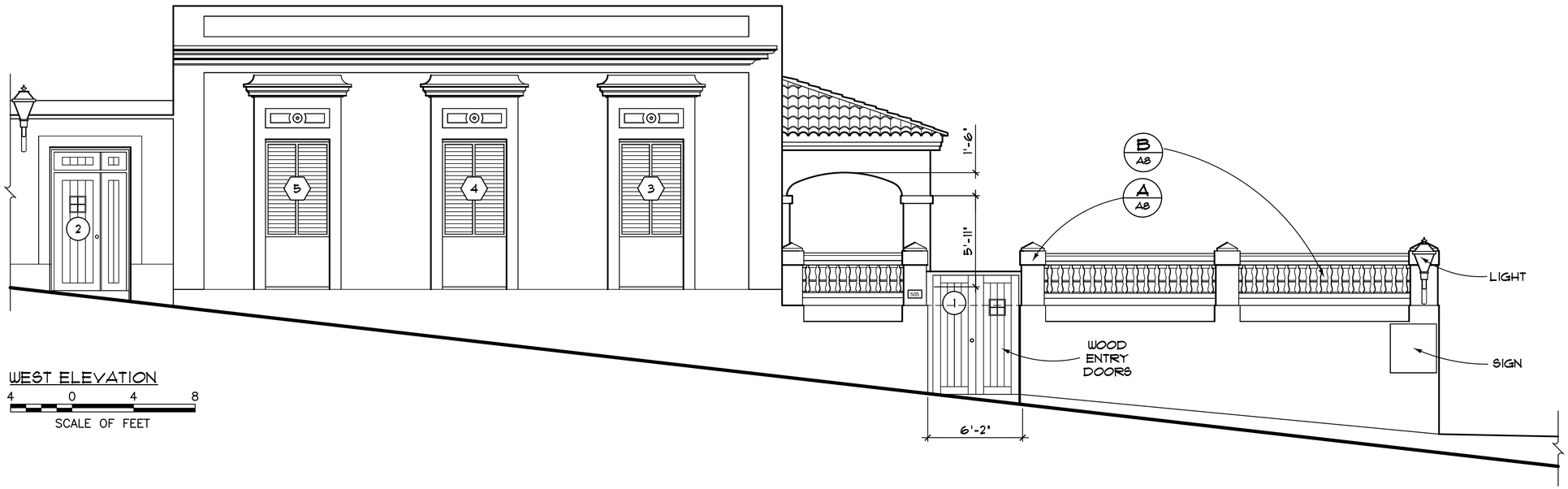
NOTE: ALL WALLS RUBBLE MASONRY
ROOF - REINFORCED CONCRETE SLAB
FLOORS - BLACK & WHITE CONCRETE TILE EXCEPT IN BATHROOM AND IN KITCHEN (QUARRY TILE)
WALL FINISHES - PAINTED PLASTER THRU OUT

FLOOR PLAN
4 0 4 8
SCALE OF FEET

DESIGNED: DADD NSS TECH. REVIEW: DATE: 2/17/16	SUB SHEET NO. A3	TITLE OF SHEET FLOOR PLAN QUARTER NO. 211 CASTILLO DE SAN CRISTOBAL SAN JUAN NATIONAL HISTORIC SITE	DRAWING NO. PMIS/PKG NO. 114073 SHEET 3 OF 8

TREE
TALL LEAF
SMALL PALM
RUBBER TREE
QUARTERS #210
WALL SCONCE
PALM CLUMP
CONCRETE PAVERS
CONCRETE PAVERS
1.25/12 SLOPE
SPANISH TILE
SERVANT QUARTERS
DS
GUTTER
1'-2½"
1'-9"
6"
DS
GUTTER
1.25/12 SLOPE
1.25/12 SLOPE
3'-10"
STEP
AC-6
AC-7
AC-8
1.15/12 SLOPE
12'-2"
35"
STEP
AC-1
9"
CONC. PAD
AC-9
33-1/2" ABOVE ROOF
2'-0"
FLAT ROOF
4% SLOPE
CONC. PAD
GRASS
1'-3"
18'-3½"
FLAT ROOF
IN-WALL DRAIN
38" ABOVE ROOF
4% SLOPE
7" STEP
39" ABOVE ROOF
AC-4
AC-3
AC-2
1'-11"
8'-6"
IN-WALL DRAIN
AC-5
1'-10"
43" ABOVE ROOF
BOULEVARD NORZAGARY
SIDEWALK
SMALL PALM
BRICK LEDGE
4.5/12 SLOPE
4.5/12 SLOPE
4.5/12 SLOPE
3/12 SLOPE
WOOD ENTRY GATE
GRASS
SPANISH TILE
STONE PAVERS
UP
WOOD STAIR TO TOP OF WALL
13 TREADS @ 11", 14 RISERS @ 6"
HANDRAIL
UP
GRASS
GRASS
UP
UP
WOOD TOP RAILS
NO VERTS
(ILLEGAL)
WOOD GATE
UP
CONGRETE WALKWAY
B A8
A A8
30" H. WOOD FENCE
BRICK LEDGE
1 A8
BRICK EDGE
C A8
ROOF PLAN
4 0 4 8
SCALE OF FEET

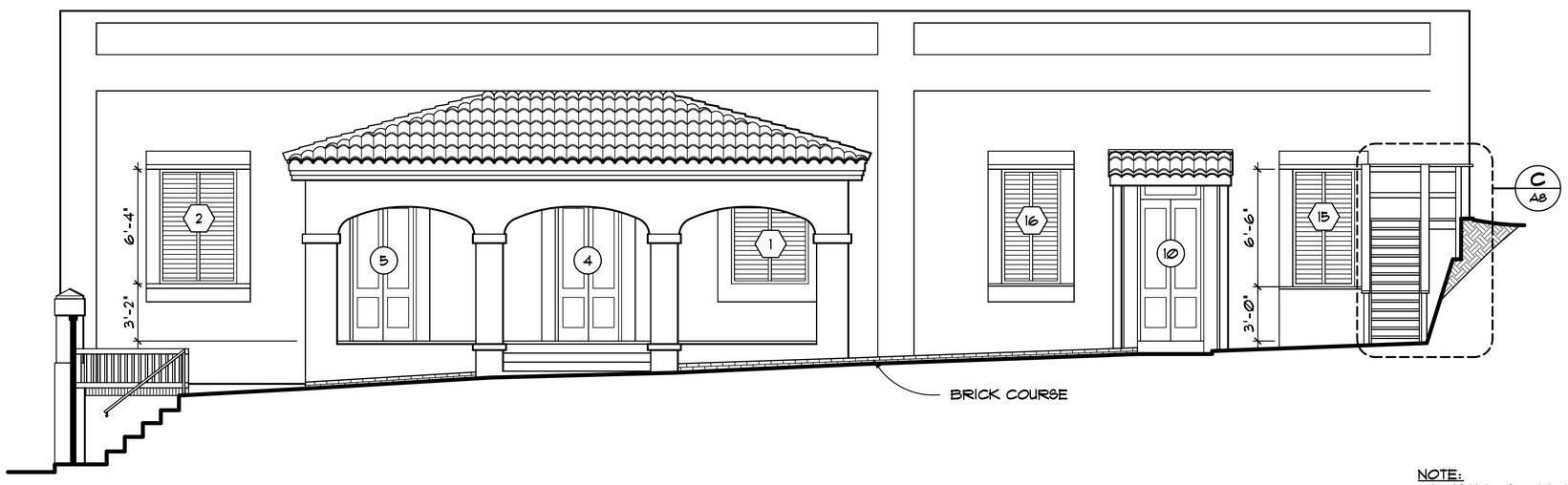
DESIGNED: DAED NSS TECH. REVIEW: DATE: 2/17/16	SUB SHEET NO. A4	TITLE OF SHEET ROOF PLAN QUARTER NO. 211 CASTILLO DE SAN CRISTOBAL SAN JUAN NATIONAL HISTORIC SITE	DRAWING NO. —— PMIS/PKG NO. 114073 SHEET 4 OF 8



WEST ELEVATION

4 0 4 8

SCALE OF FEET



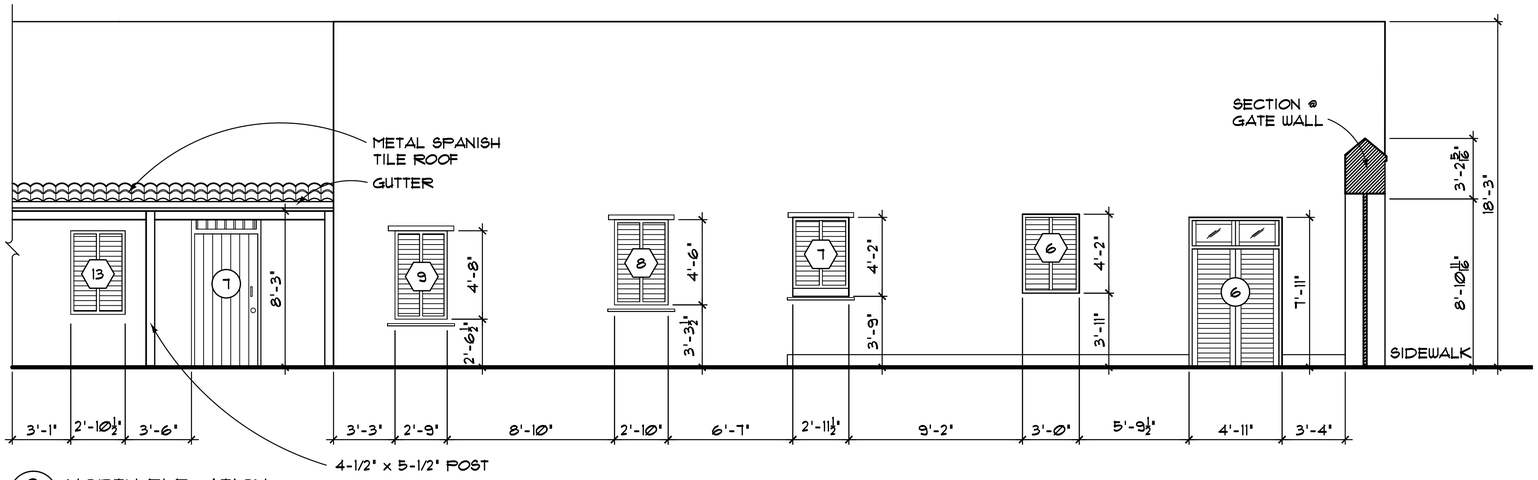
SOUTH ELEVATION

4 0 4 8

SCALE OF FEET

NOTE:
- EXISTING SCREEN DOORS/SECURITY DOORS NOT SHOWN

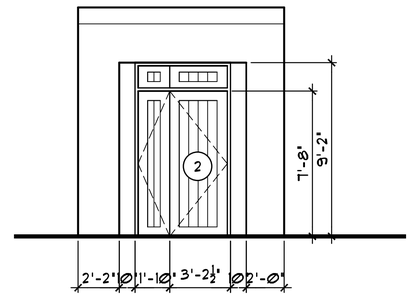
DESIGNED: CADD NSS TECH. REVIEW: DATE: 2/17/16	SUB SHEET NO. A5	TITLE OF SHEET EXTERIOR ELEVATIONS QUARTER NO. 211 CASTILLO DE SAN CRISTOBAL SAN JUAN NATIONAL HISTORIC SITE	DRAWING NO. —— PMIS/PKG NO. 114073 SHEET 5 OF 8



3 A6 NORTH ELEVATION

4 0 4 8

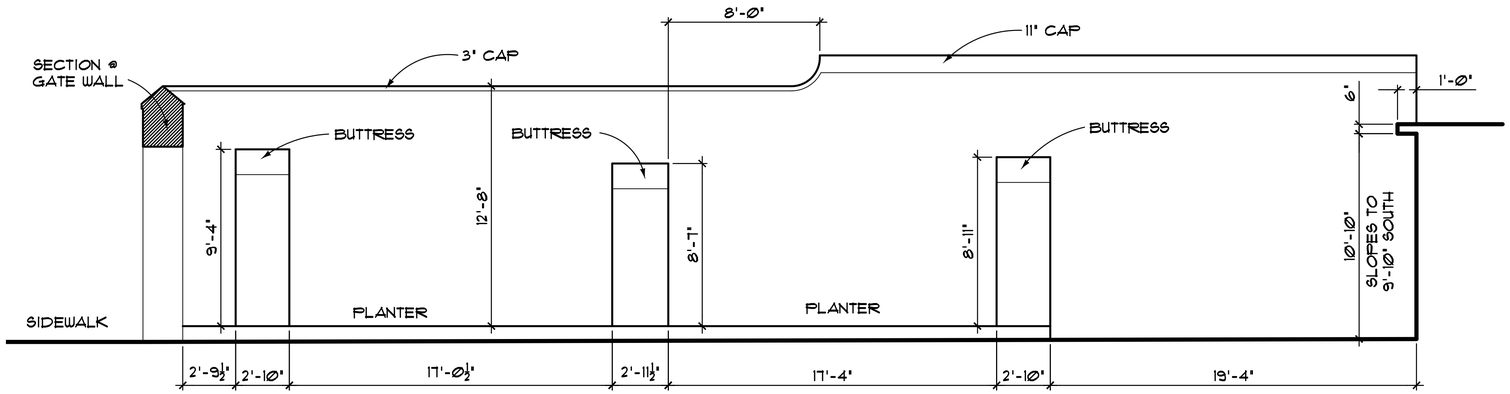
SCALE OF FEET



4 A6 NORTH COURTYARD, WEST GATE ELEVATION

4 0 4 8

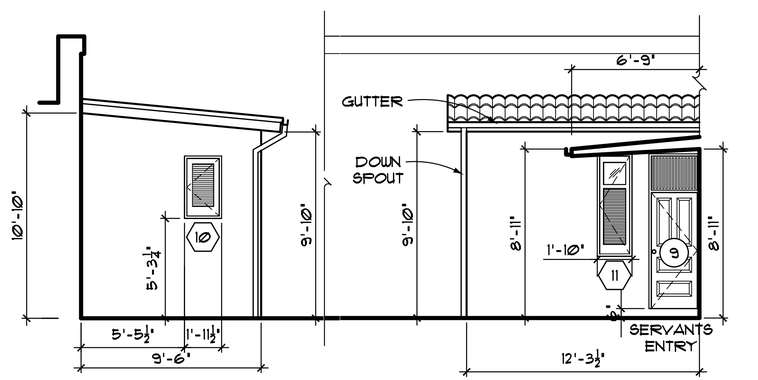
SCALE OF FEET



5 A6 NORTH COURTYARD, NORTH WALL ELEVATION

4 0 4 8

SCALE OF FEET



6 A6 SERVANT'S WEST ELEVATION

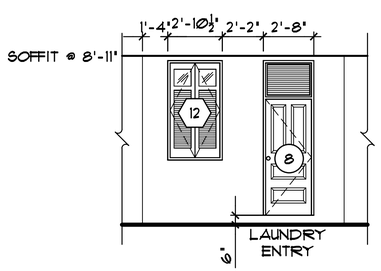
4 0 4 8

SCALE OF FEET

7 A6 SERVANT'S SOUTH ELEVATION

4 0 4 8

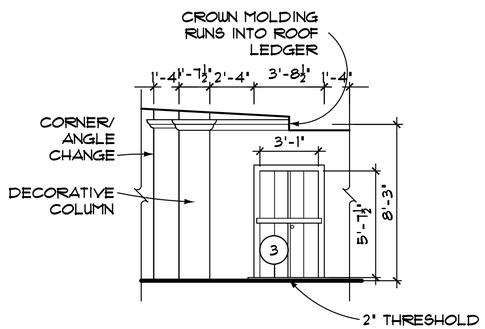
SCALE OF FEET



8 A6 SERVANT'S WEST ELEVATION

4 0 4 8

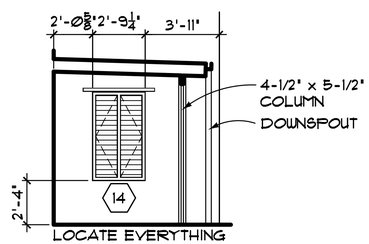
SCALE OF FEET



9 A6 TUNNEL ENTRY

4 0 4 8

SCALE OF FEET



10 A6 EAST ELEVATION @ ROOM 106

4 0 4 8

SCALE OF FEET

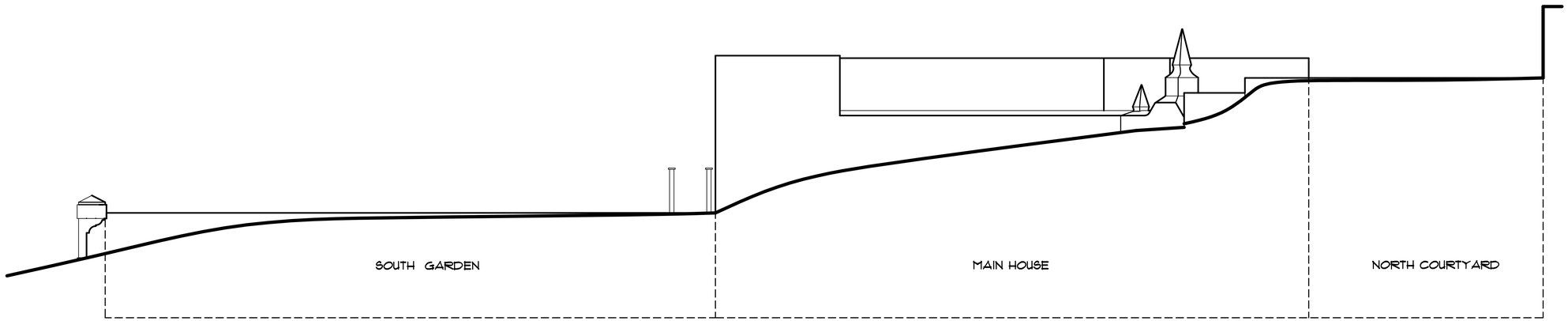
NORTH COURTYARD ELEVATIONS

4 0 4 8

SCALE OF FEET

NOTE:
- EXISTING SCREEN DOORS/SECURITY DOORS NOT SHOWN

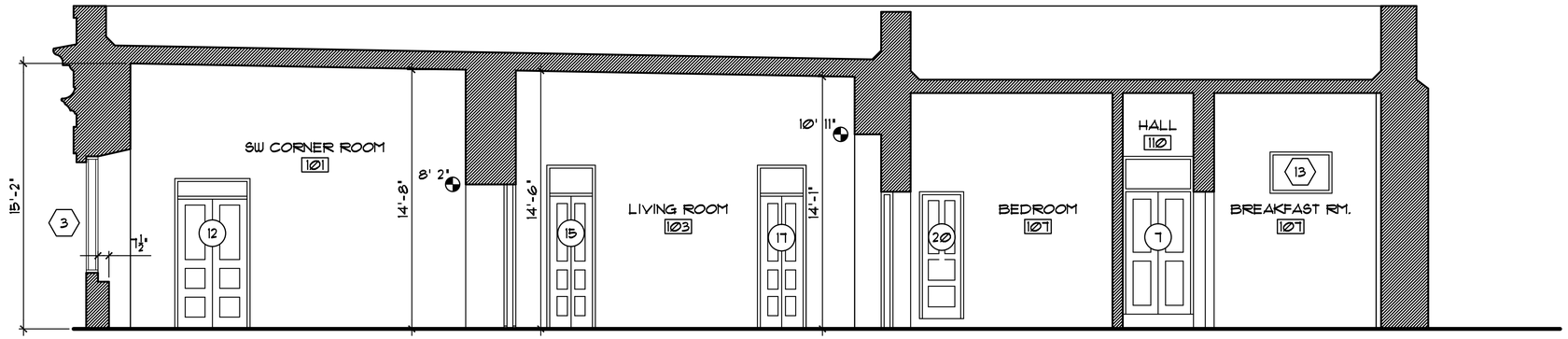
DESIGNED: DMDD NSS TECH. REVIEW: DATE: 2/17/16	SUB SHEET NO. A6	TITLE OF SHEET EXTERIOR ELEVATIONS QUARTER NO. 211 CASTILLO DE SAN CRISTOBAL SAN JUAN NATIONAL HISTORIC SITE	DRAWING NO. —— PMIS/PKG NO. 114073 SHEET 6 OF 8



11/A7 UPPER EAST ELEVATION

4 0 4 8

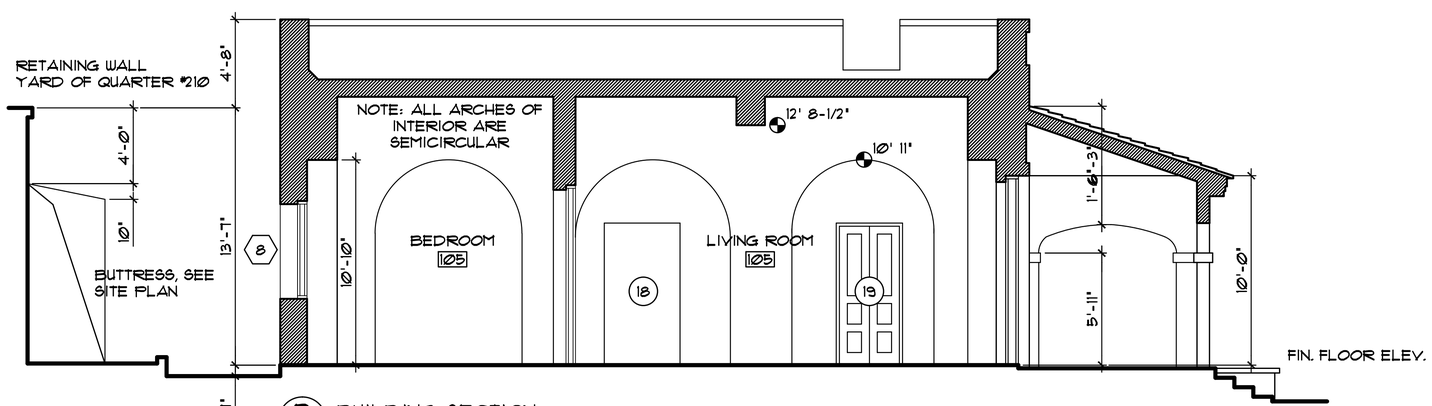
SCALE OF FEET



A/A7 BUILDING SECTION

4 0 4 8

SCALE OF FEET



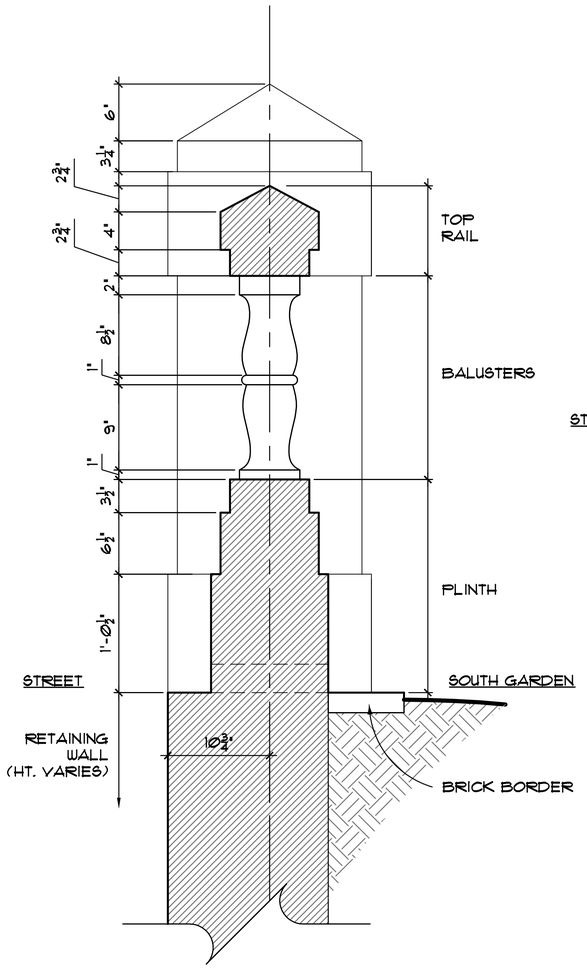
B/A7 BUILDING SECTION

4 0 4 8

SCALE OF FEET

NOTE:
- EXISTING SCREEN DOORS/SECURITY DOORS NOT SHOWN

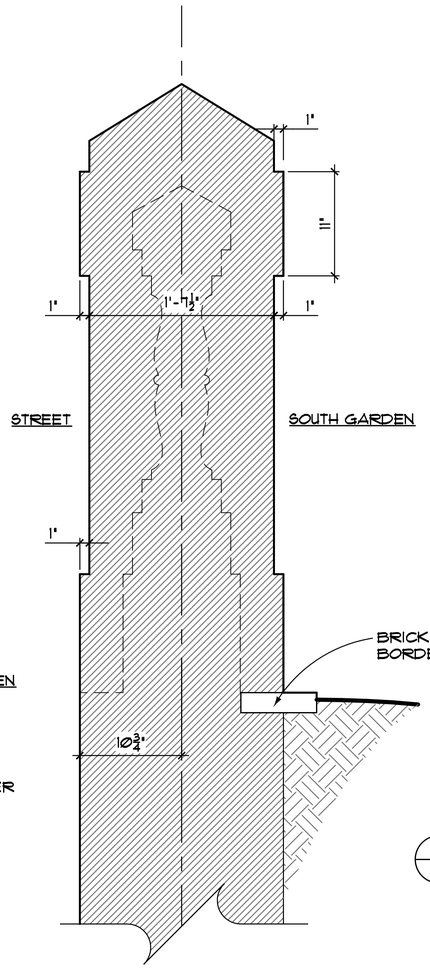
DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
DRAWN: NSS	A7	EXTERIOR ELEVATIONS & SECTION CUTS QUARTER NO. 211	
TECH. REVIEW:		CASTILLO DE SAN CRISTOBAL	PMIS/PKG NO. 114073
DATE: 2/17/16		SAN JUAN NATIONAL HISTORIC SITE	SHEET 7 OF 8



A / A8 EXTERIOR FENCE RETAINING WALL BALUSTER SECTION, TYPICAL

12 6 0 12

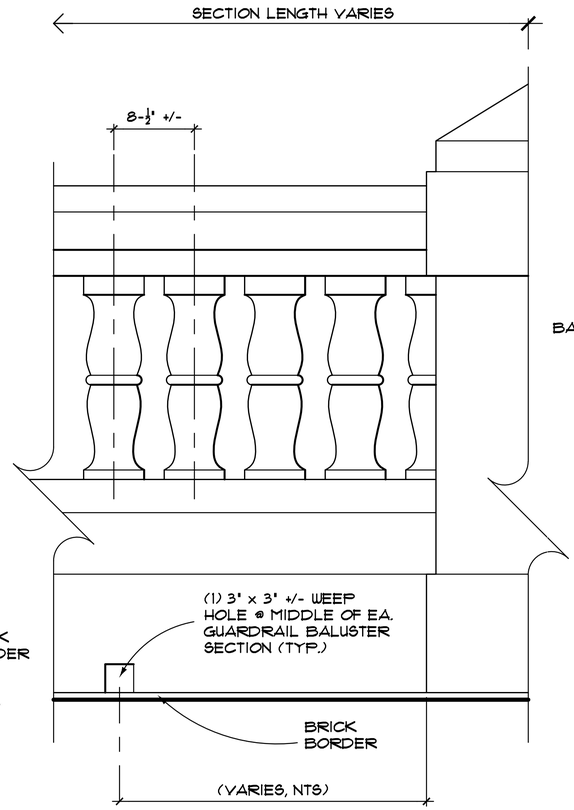
SCALE OF INCHES



B / A8 EXTERIOR FENCE COLUMN SECTION, TYPICAL

12 6 0 12

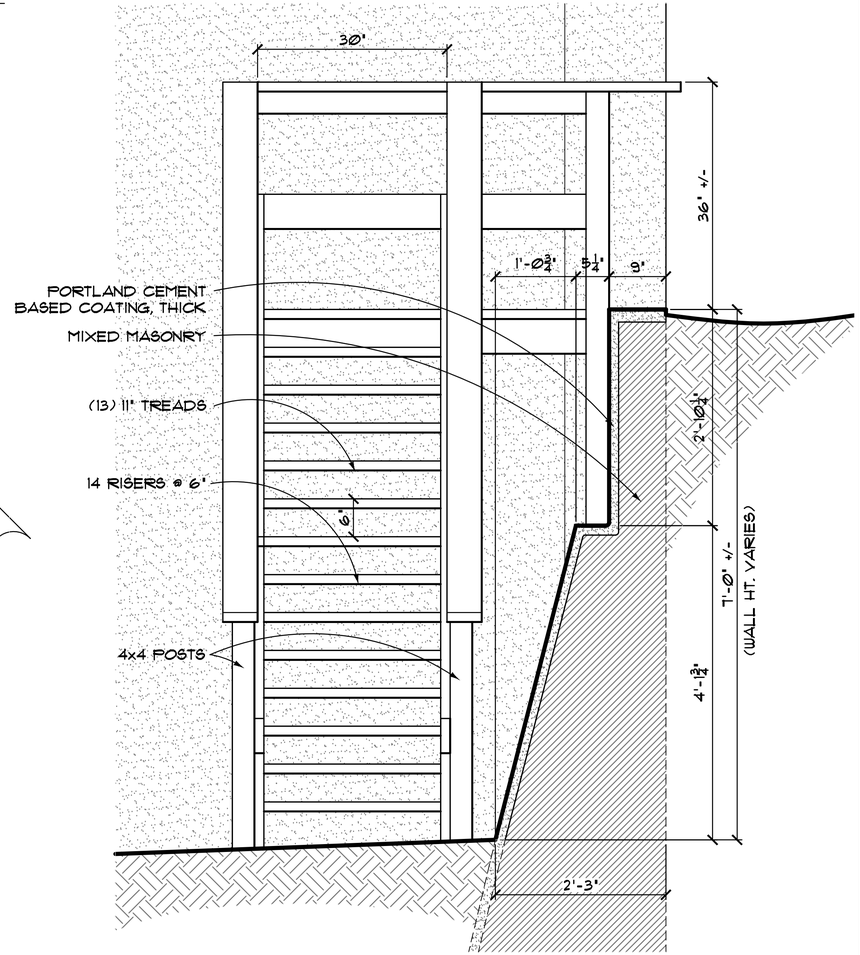
SCALE OF INCHES



1 / A8 FENCE ELEVATION TYPICAL GARDEN SIDE

12 6 0 12

SCALE OF INCHES



C / A8 EAST RETAINING WALL SECTION AT SOUTH GARDEN, TYPICAL

1 0 1 2

SCALE OF FEET

NOTE:
- VERTICAL DIMENSIONS WERE OBTAINED FROM FIELD MEASUREMENTS, HORIZ. DIMENSIONS. DETAIL WAS COMPLETED FROM PHOTOGRAPHS/INTERPOLATION OF KNOWN DIMENSIONS FOR TYPICAL SECTION

DESIGNED: CADD NSS TECH. REVIEW: DATE: 2/17/16	SUB SHEET NO. A8	TITLE OF SHEET SITE DETAILS QUARTER NO. 211 CASTILLO DE SAN CRISTOBAL SAN JUAN NATIONAL HISTORIC SITE	DRAWING NO. — PMIS/PKG NO. 114073 SHEET 8 OF 8

Appendix 10:
Digital Photodocumentation

NOTE:
There can be situations for which additional information from photographs may prove helpful in providing different views of a particular area or condition. To facilitate access to the photographic documentation, the captions for the figures include a reference to sources such as JDF 767. This notation references digital photographs taken by John D Feinberg as provided in their entirety in the Appendix Ten: Digital Photodocumentation. This notation references digital photographs taken by John D Feinberg (JDF) and the number of the photograph. Similarly there are photographs taken by Michael Schuller (MPS), Rodd Wheaton (RW), and Dean Brookie (DB). The primary documentation is provided by the John Feinberg series of photographs. The further information need should be first approached by examining the photographs taken just before and just after the photograph selected and referenced in the caption. Secondarily, additional supplementary views of the desired area or situation will potentially be available in the photographic files of the other three photographers. For select photographs another view may be referenced for viewer consideration.

A summary of the four photographer files and attributes are as follows:
JDF, camera assigned numbers 767-1110, 343 photographs, with captions, contracted documentation.
DB, camera assigned numbers 842-924, 930, and 8501-8503, 91 photographs, uncaptioned
JDF, camera assigned numbers 605-617, 13 photographs, uncaptioned
MPS, camera assigned numbers 9852-9980 and 9835, 129 photographs, uncaptioned
RW, camera assigned numbers 4536-4833, 297 photographs, uncaptioned

The Word documents provided as a part of the final submittal is searchable for key words in the captions.

Captioned Digital Photodocumentation

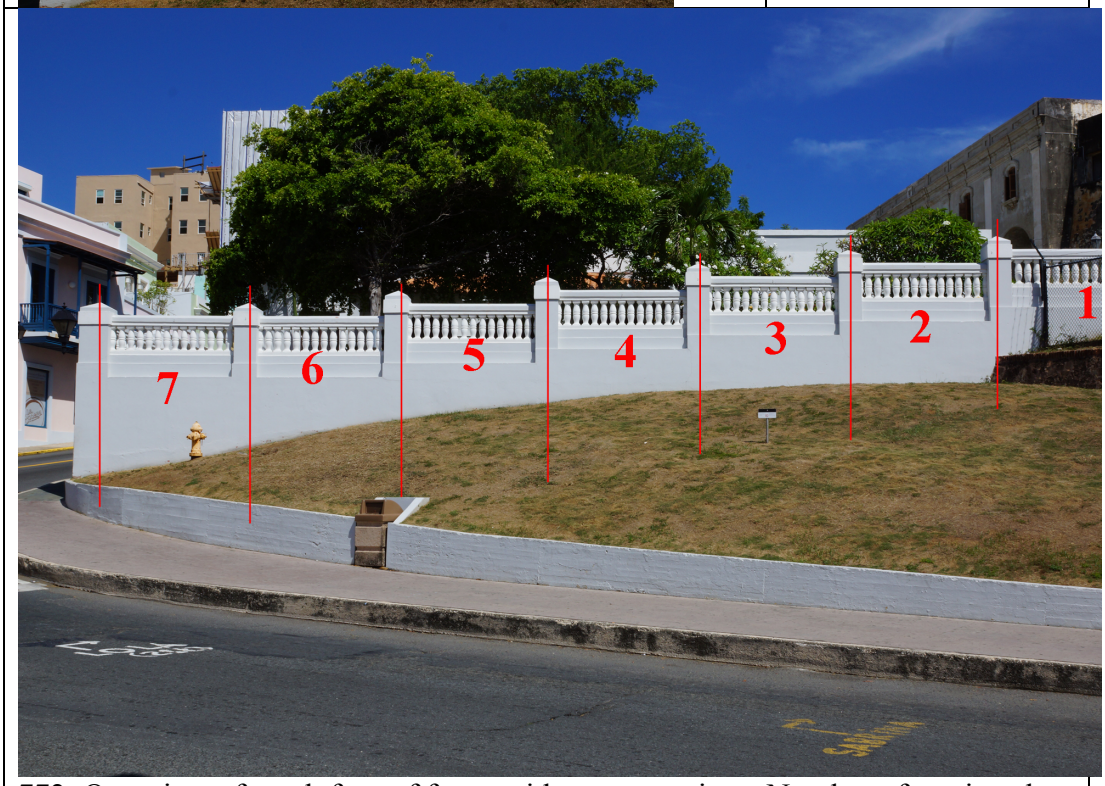
		767: South face of fence: Section 1 to the right and Section 2 to the left.
		768: South face of fence: Section 2 to the right and Section 3 to the left.
		769: South face of fence: Section 4 to the right and Section 5 to the left.



770: South face of fence: Section 5 to the right and Section 6 to the left.

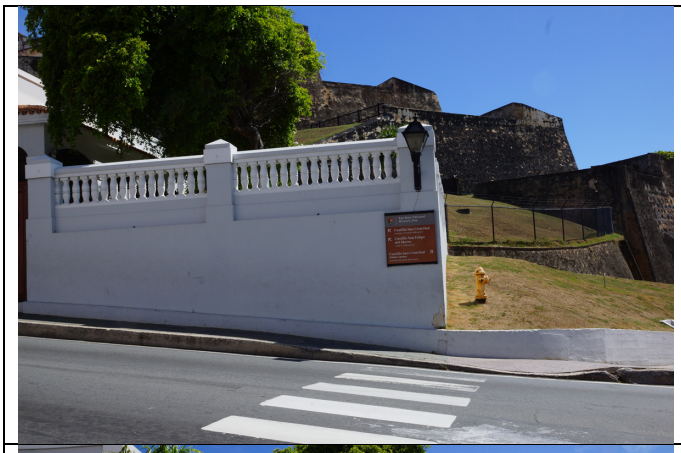


771: South face of fence: Section 6 to the right and Section 7 to the left.



772: Overview of south face of fence with seven sections. Number of sections has #1 at photo right.

		773: Site context to the south door at sidewalk edge is from tunnel of the back of the north courtyard.
		774: Glacis and retaining wall adjacent to the south face of the fence.
		775: Southwest corner of fence.

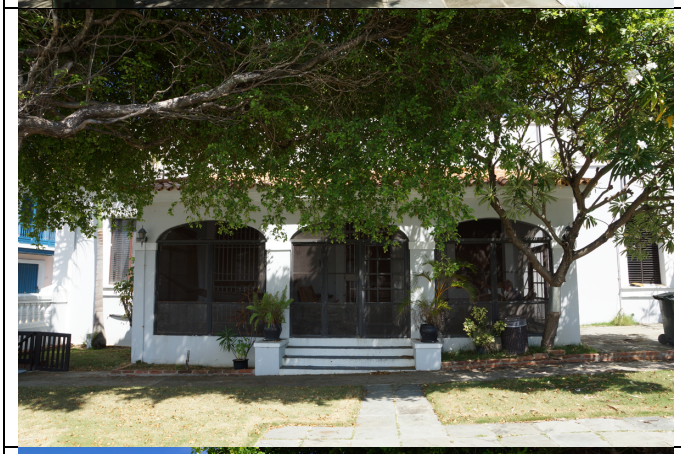
		776: Fence along west boundary: Section 8 to photo right and Section 9 to photo left.
		777: Fence along west boundary: Gate and Section 10, and overview.
		778: Fence along west boundary: west elevation, south third

		779: Fence along west boundary: west elevation, middle third
		780: Fence along west boundary: north elevation, north third. North courtyard west wall and gate.
		781: Context wall of #210.

		782: South lawn, east half including the retaining wall and wood staircase in the corner.
		783: Fence, north face, Sections 1 through 4 (left to right).
		784: Fence, north face, Sections 4 through 7 (left to right).

		785: Fence, east face of west portion, Sections 8, 9, and 10.
		786: Close up of Sections 9 and 10.
		787: Staircase, looking north.

		788: Joint of two walls with light standard, southeast interior corner; note retaining wall multiple faces and batter.
		789: South elevation of Building 211, east portion: east end of south lawn.

		790: East elevation of enclosed porch.
		791: South elevation of enclosed porch and Building 211. (Wall above porch roof is blocked from view by tree.)
		792: South elevation of Building 211, west portion between enclosed porch and street.

		793: South elevation looking from southwest corner west along upper section of wall otherwise obscured by trees.
		794: Limited view of upper south wall.
		795: Exterior corner of join between south fence and retaining wall.

		796: Top of “concrete” retaining wall at east end of south lawn.
		797: East elevation of Building 211.

	798: Parapet of tunnel entry, spired parapet, southeast face.
	799: To the right of previous photo, parapet is squared up.
	800: To the further right or north/northeast.

		801: View of northwest corners of building, roofs over laundry and courtyard bedroom in the foreground.
		802: Partial elevations: north elevation to photo left, east elevation at photo center.
		803: Roofs and parapets of structures on east end of north courtyard, looking southeast from Building 210.

		804: Roofs at west end of north courtyard looking southeast. Spired parapet is at tunnel entry.
		805: North elevation, partial, east end, from Building 210 looking south.
		806: North elevation, partial, center east, from Building 210 looking south.

		807: North elevation, partial, center east oblique, from Building 210 looking south.
		808: North elevation, partial, center east, from Building 210 looking south.
		809: North elevation, partial, west end of north wall of Building 211, from Building 210 looking south.

		810: North elevation, partial, middle of north wall of Building 211, from Building 210 looking south.
		811: North elevation, partial, middle west of north wall of Building 211, from Building 210 looking south.
		812: North elevation, partial, middle west oblique of north wall of Building 211, from Building 210 looking south.

	813: View from north looking south along west elevation parapet.
	814: View from north looking south along west elevation parapet.
	815: South elevation of north courtyard bedroom and bath.

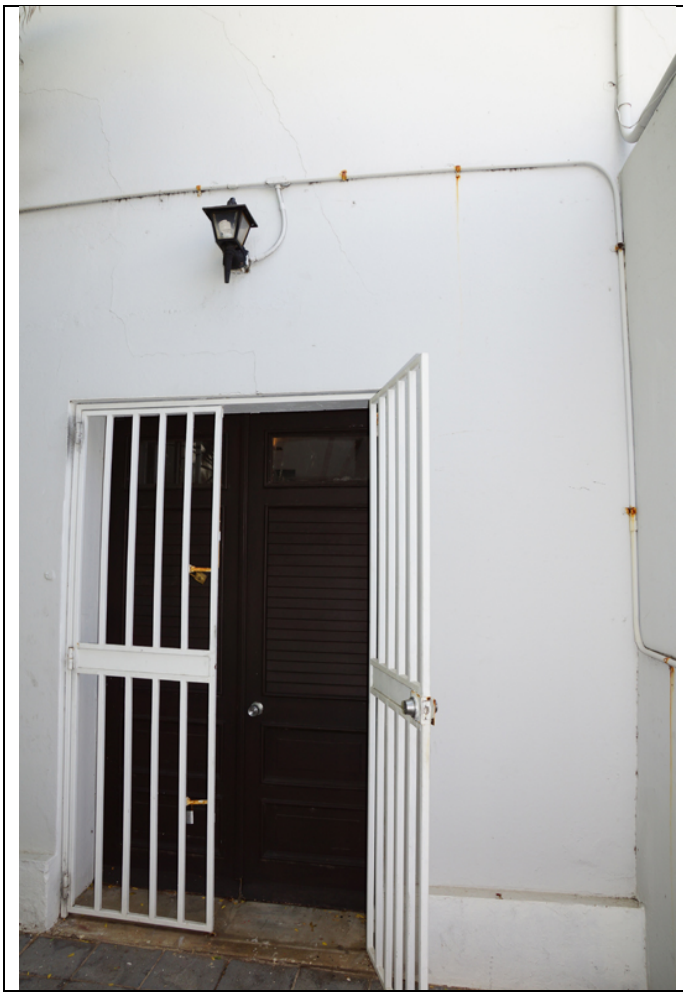
	816: West elevation of laundry room in north courtyard.
	817: Entry door to tunnel from north courtyard.
	818: North elevation of Building 211, “East Wing.” door at center is to hallway serving kitchen and breakfast room.

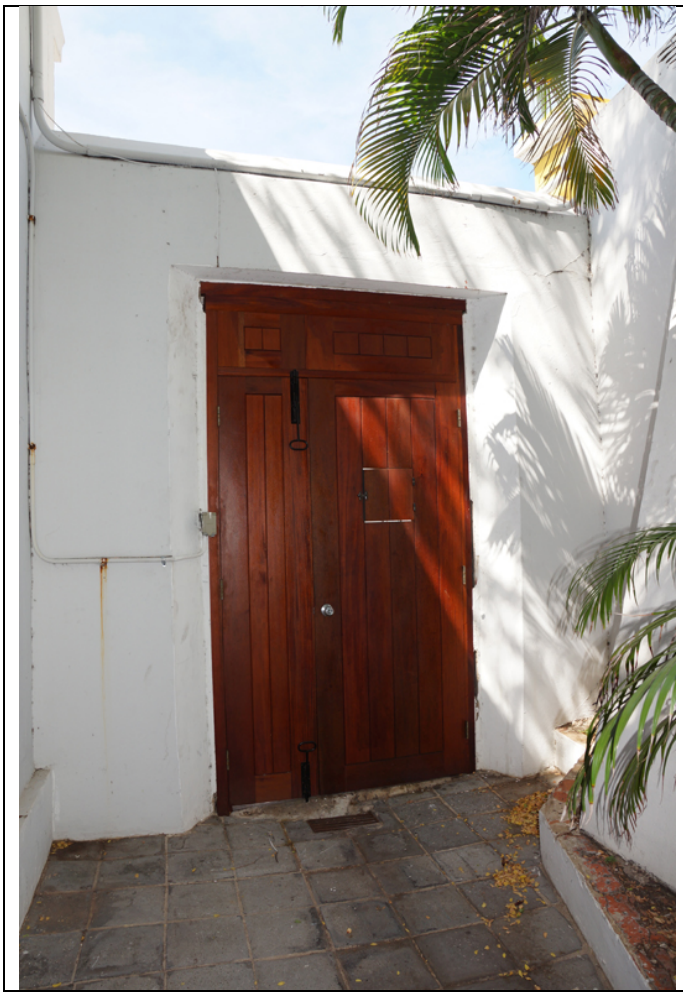
	819: East elevation, window is to dining room.
	820: Lower section of north elevation starting at east: dining room (first in sequence).

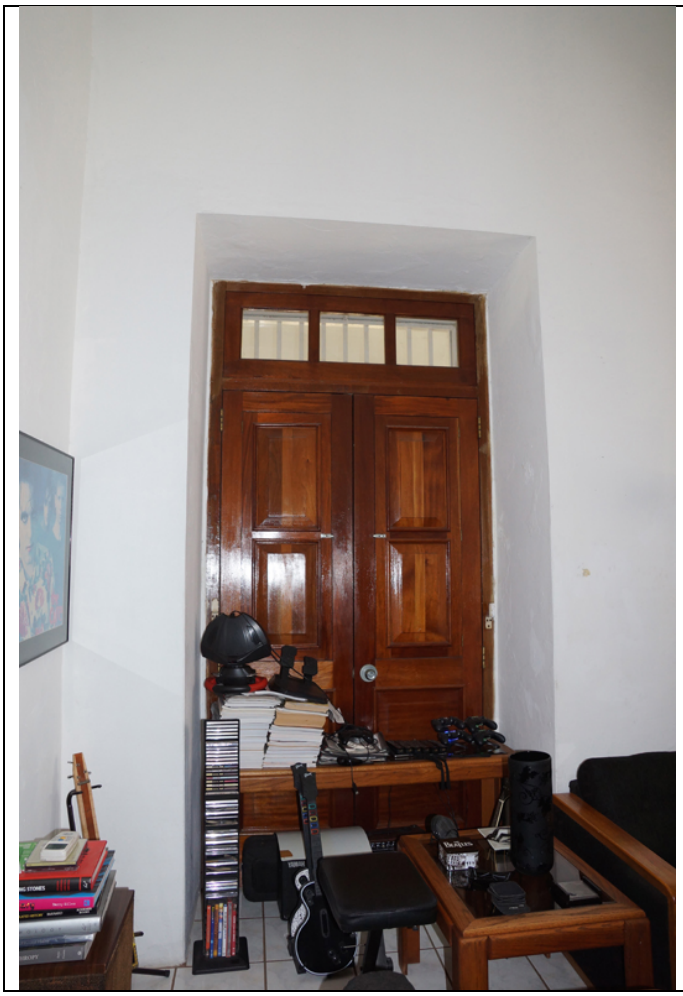
	821: Lower section of north elevation starting at east: dining room (next in sequence).

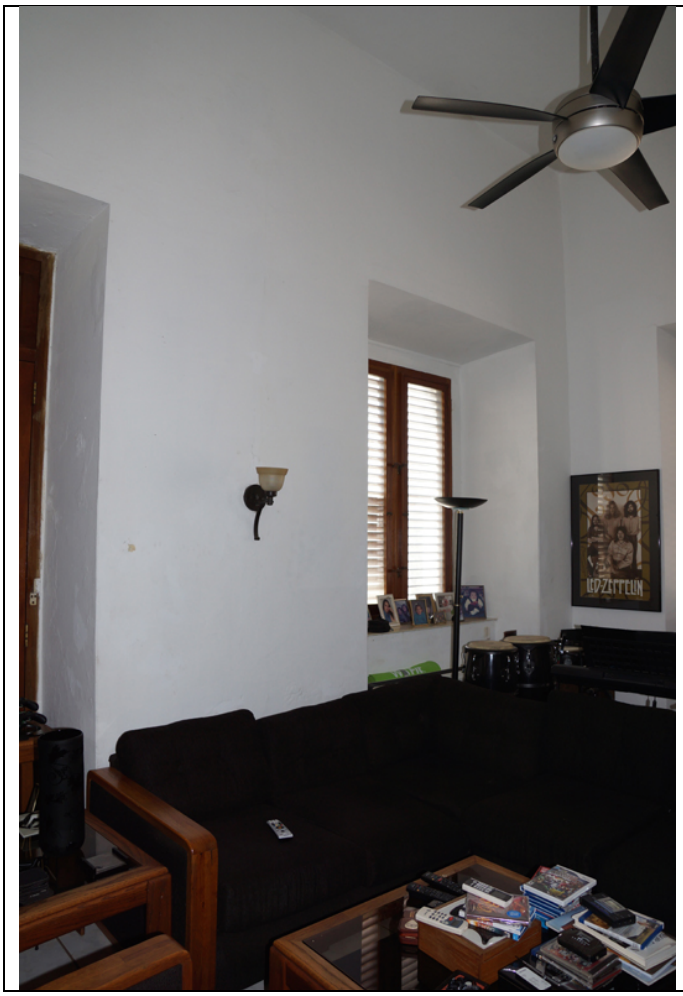
	822: Lower section of north elevation starting at east: dining room (next in sequence).

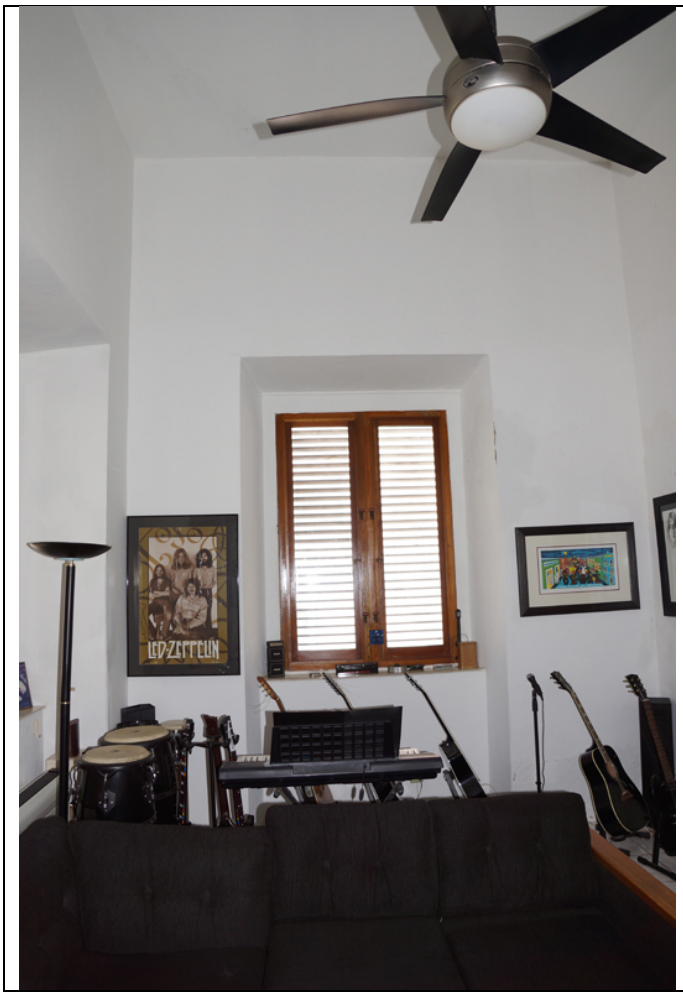
	823: Lower section of north elevation starting at east: dining room (next in sequence).

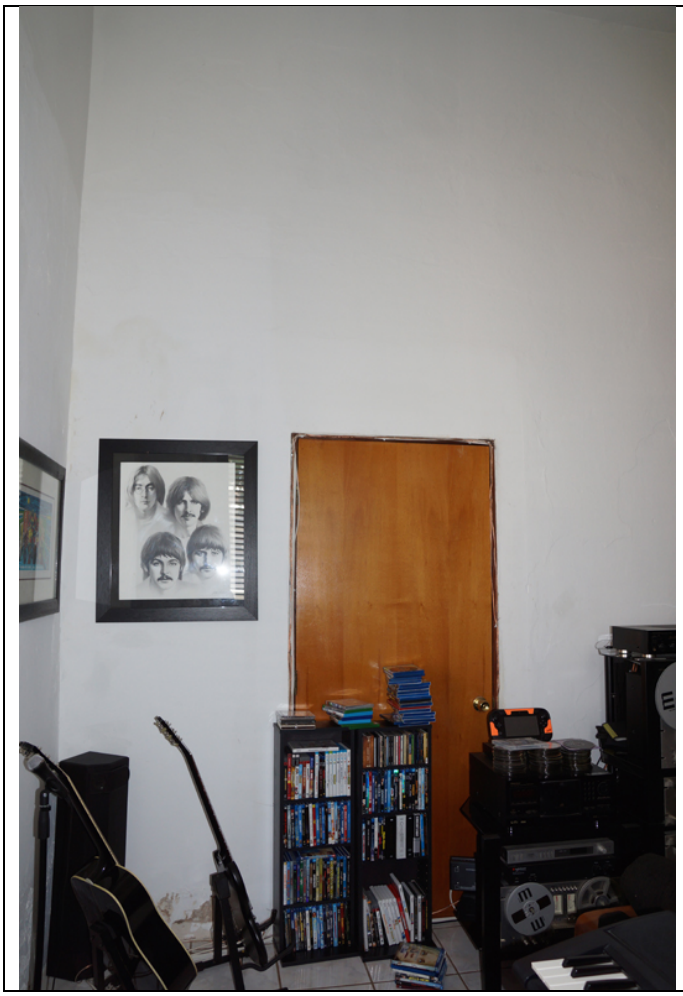
	824: Lower section of north elevation starting at east: dining room (next in sequence and end of north elevation).

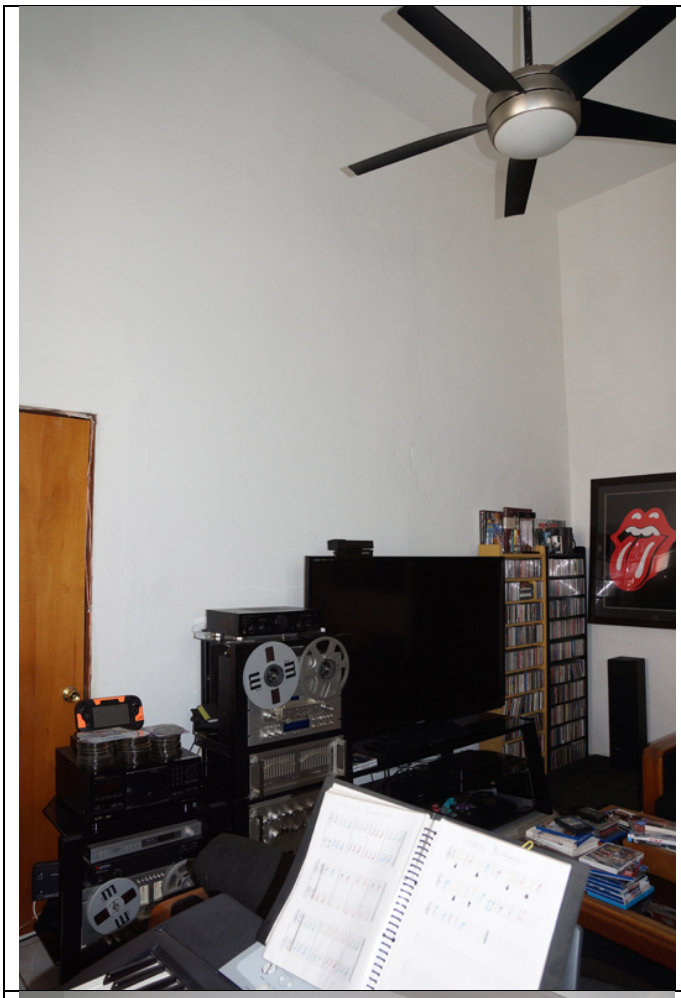
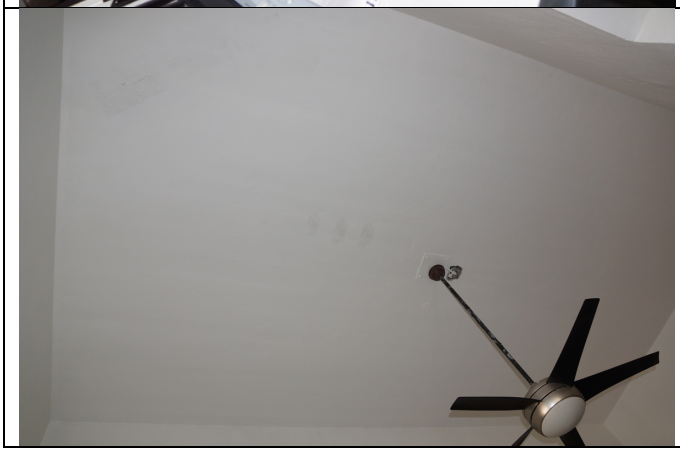
	825: New door at west end of north courtyard.

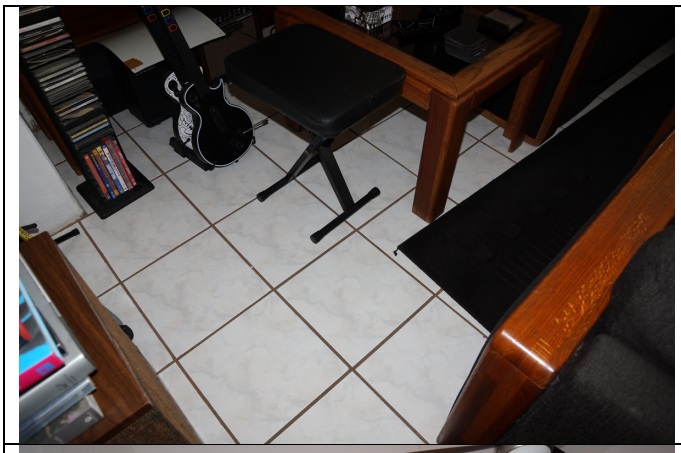
	826: Room 101: South wall east portion, door to enclosed porch.

	827: Room 101, south wall, west portion.

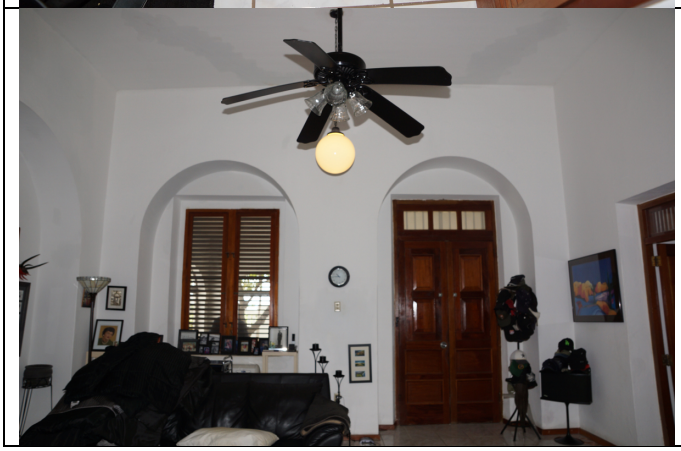
	828: Room 101, west wall.

	829: Room 101: north wall, west portion

	830: Room 101: north wall, east portion
	831: Room 101, ceiling.

	832: Room 101, floor.
	833: Room 102, south wall.
	834: Room 102, west wall.

	835: Room 102, north wall.
	836: Room 102, east wall.
	837: Room 102, ceiling.

	838: Room 102, ceiling.
	839: Room 102, floor.
	840: Room 103, south wall.

	841: Room 103, west wall.
	842: Room 103, north wall.
	843: Room 103, east wa;;

	844: Room 103, ceiling, south half
	845: Room 103, ceiling, north half.
	846: Room 104S (subdivided from 104), floor.

	847: Room 104S (subdivided from 104), south wall.

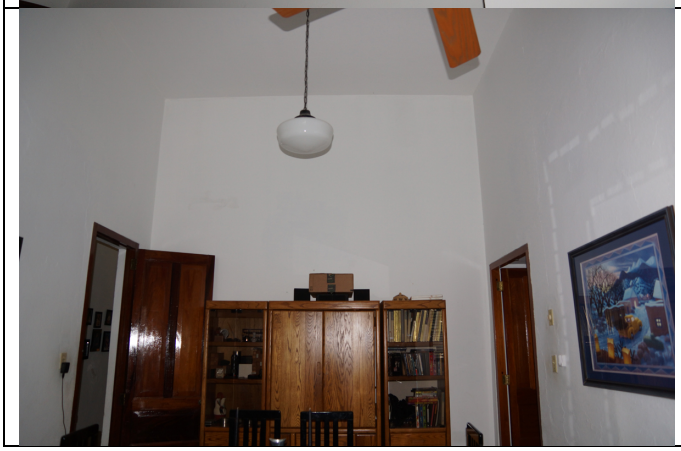
	848: Room 104S (subdivided from 104), west wall.

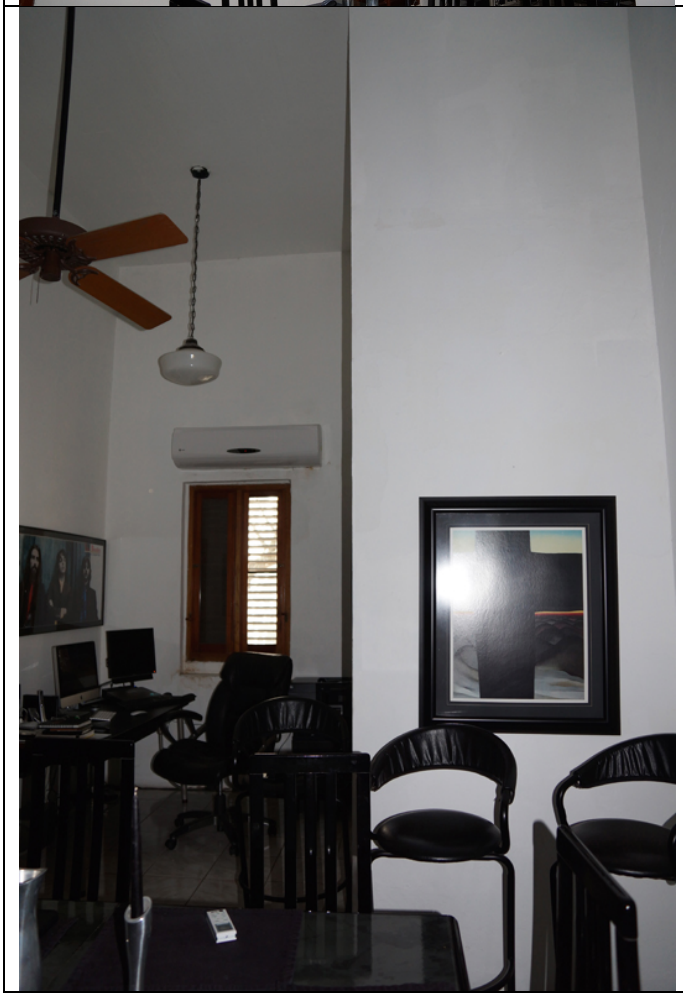
	849: Room 104S (subdivided from 104), north wall.

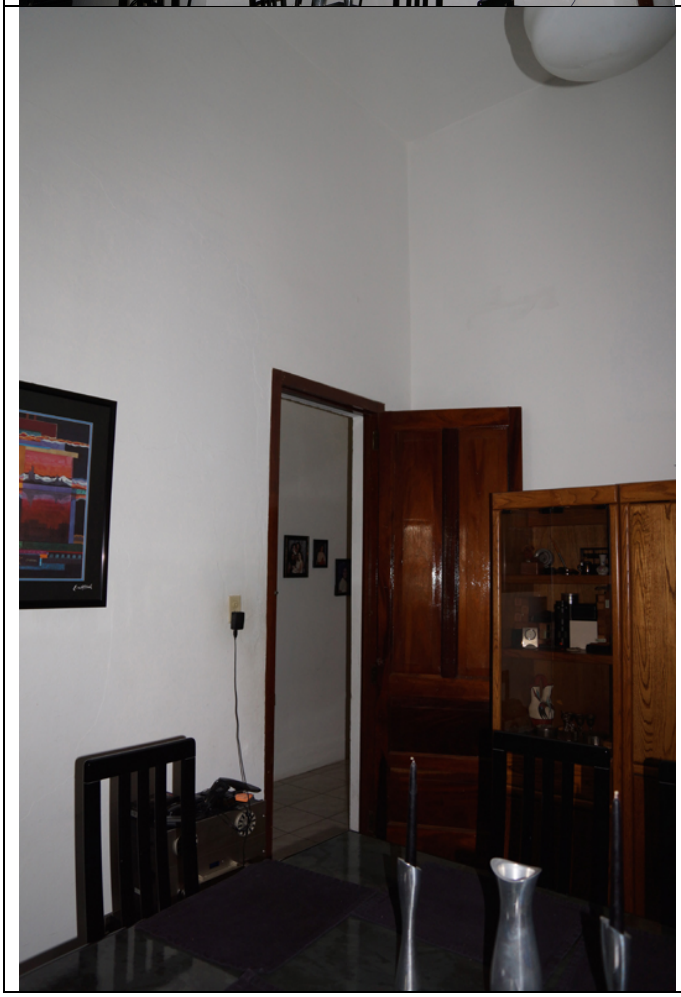
	850: Room 104S (subdivided from 104), east wall.
	851: Room 104S (subdivided from 104), ceiling.

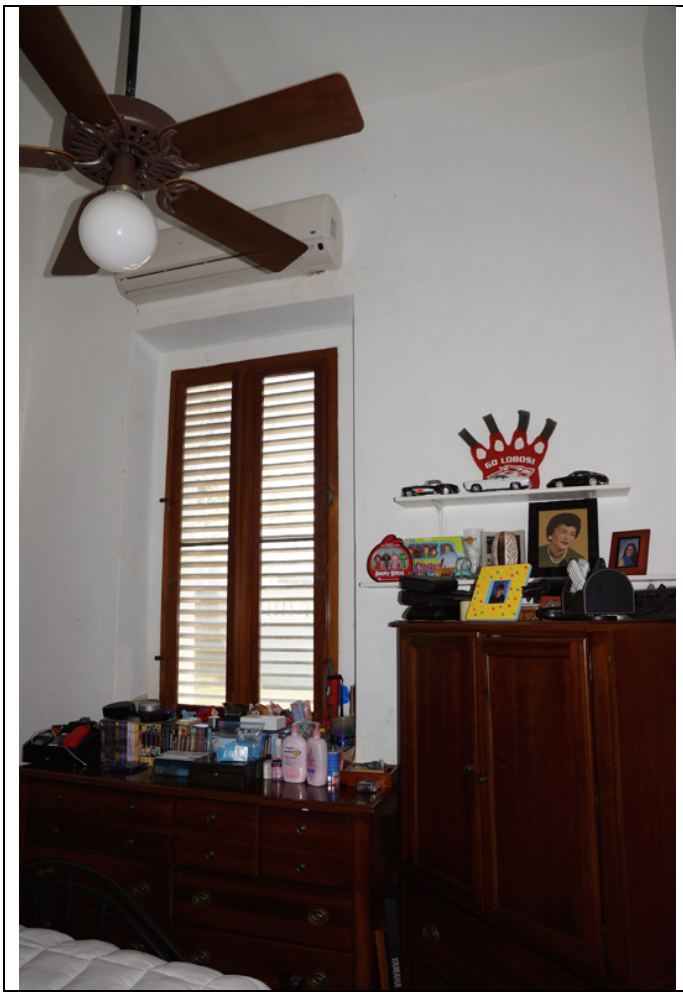
	852: Room 104S (subdivided from 104), floor.
	853: Room 105, south wall.

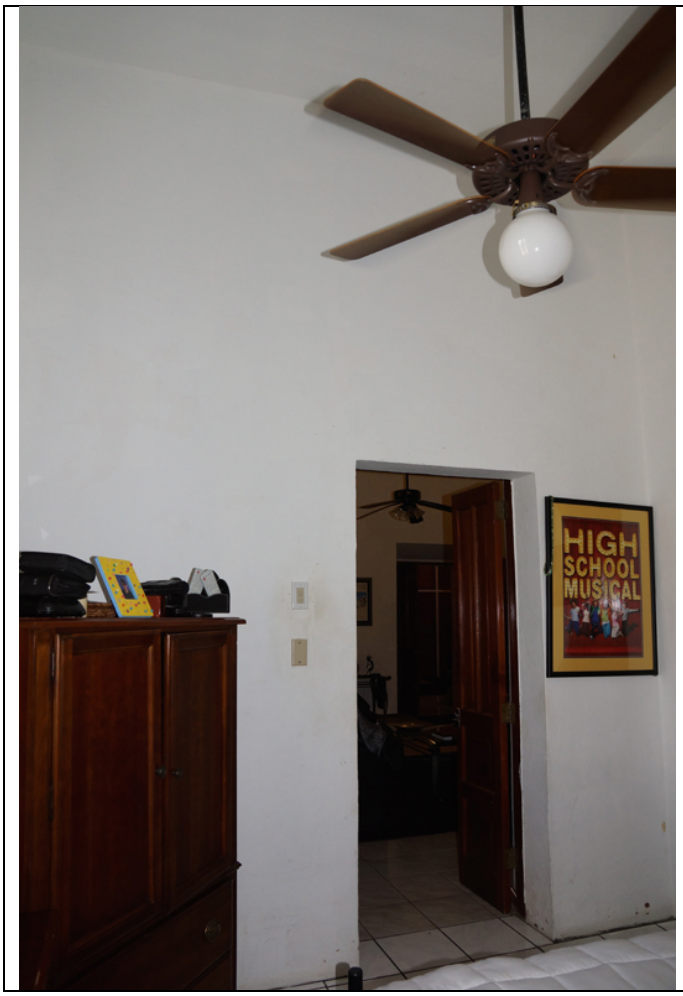
	854: Room 105, west wall.
	855: Room 105, north wall.

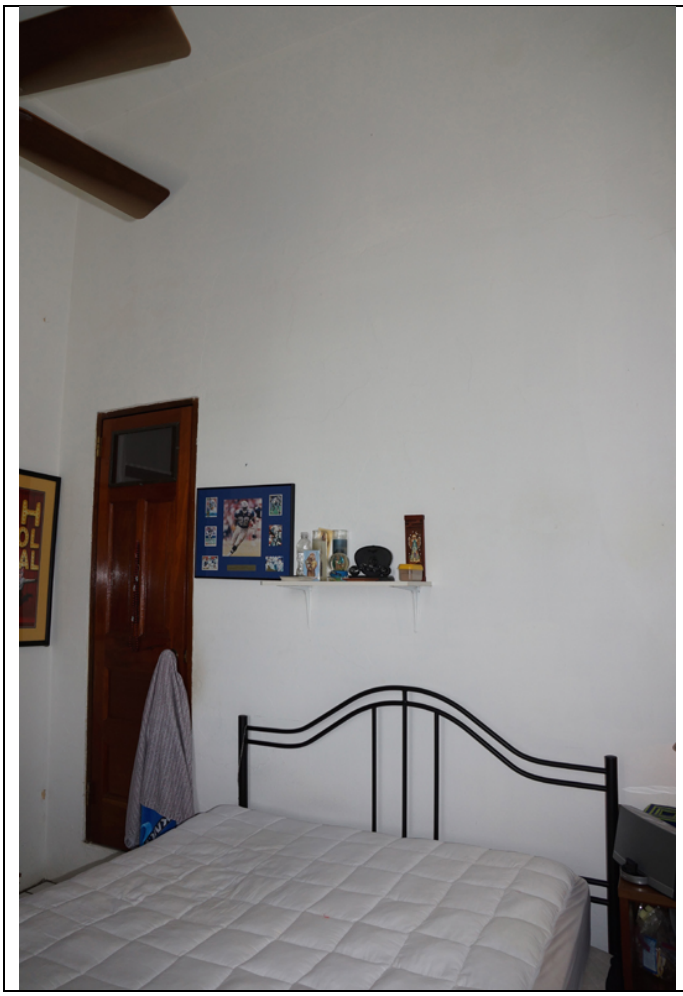
	856: Room 105, east wall, lower portion.
	857: Room 105, east wall, higher portion and ceiling.
	858: Room 106, south wall.

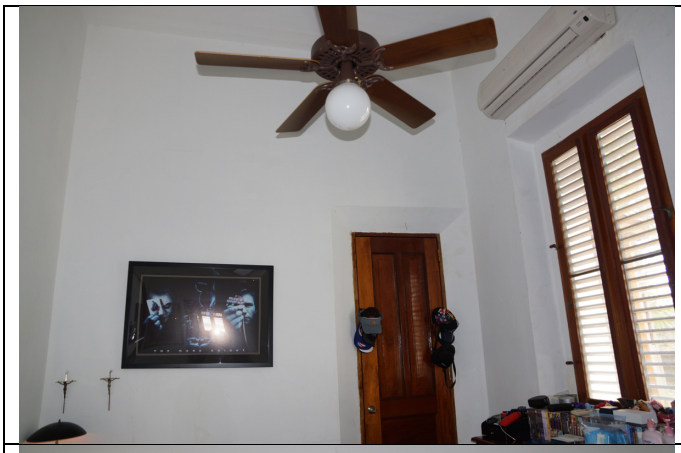
	859: Room 106, west wall.
	860: Room 106, north wall.

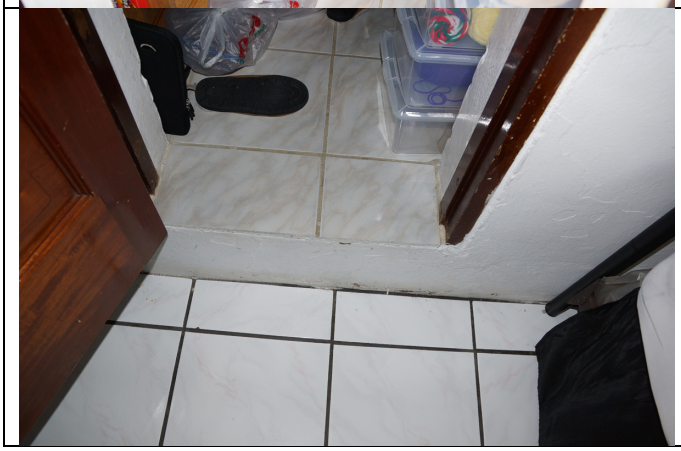
	861: Room 106, east wall.
	862: Room 106, southeast corner.

	863: Room 107, south wall.

	864: Room 107, west wall.

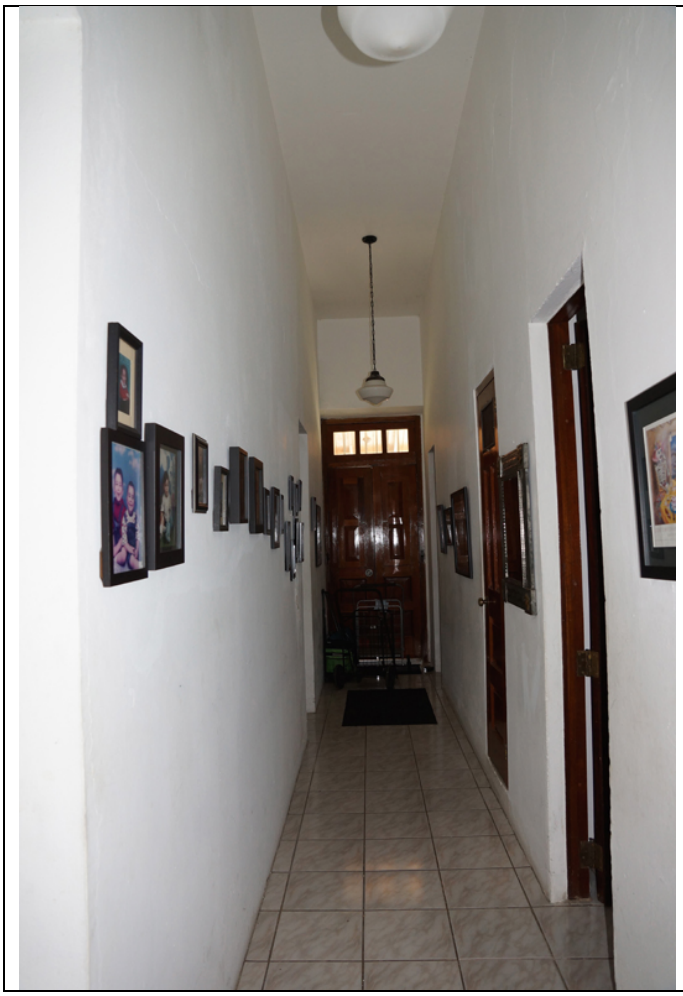
	865: Room 107, north wall.

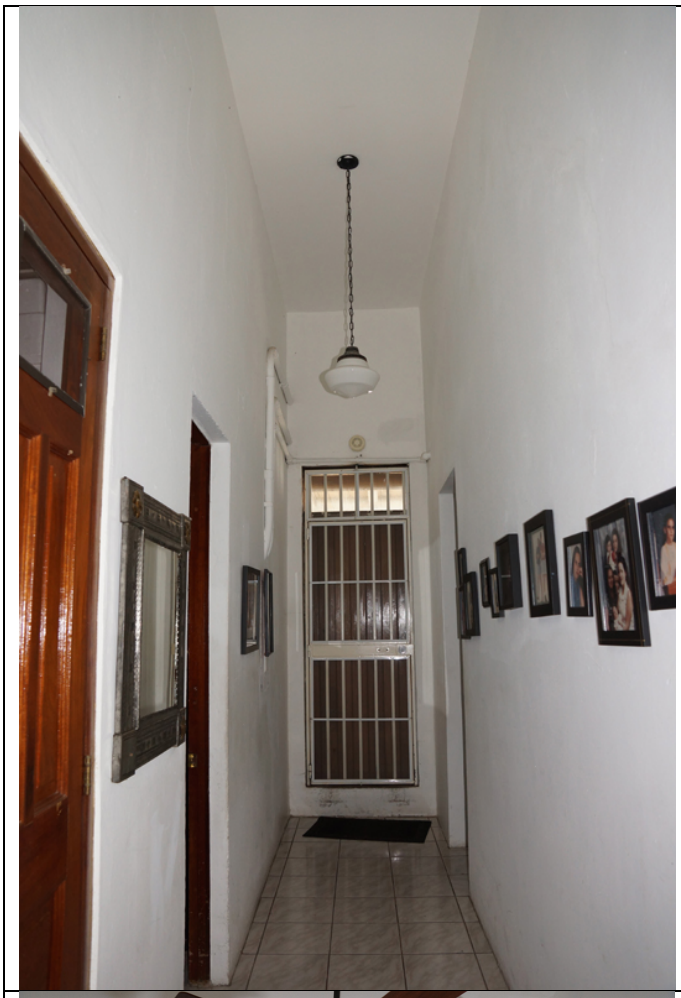
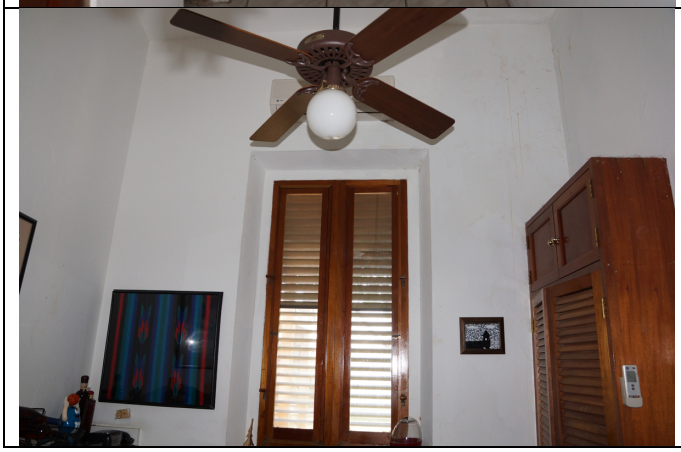
	866: Room 107, east wall.
	867: Room 107, ceiling.
	868: Room 107, floor by closet.

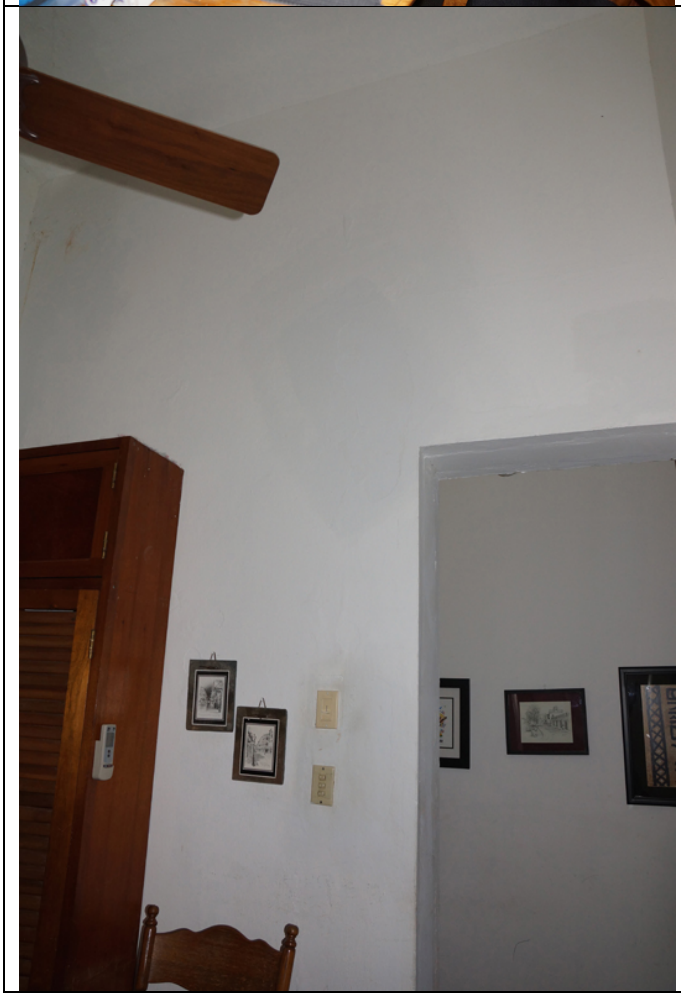
	869: Room 108, inside of closet off Room 107.
	870: Room 108
	871: Room 108, floor.

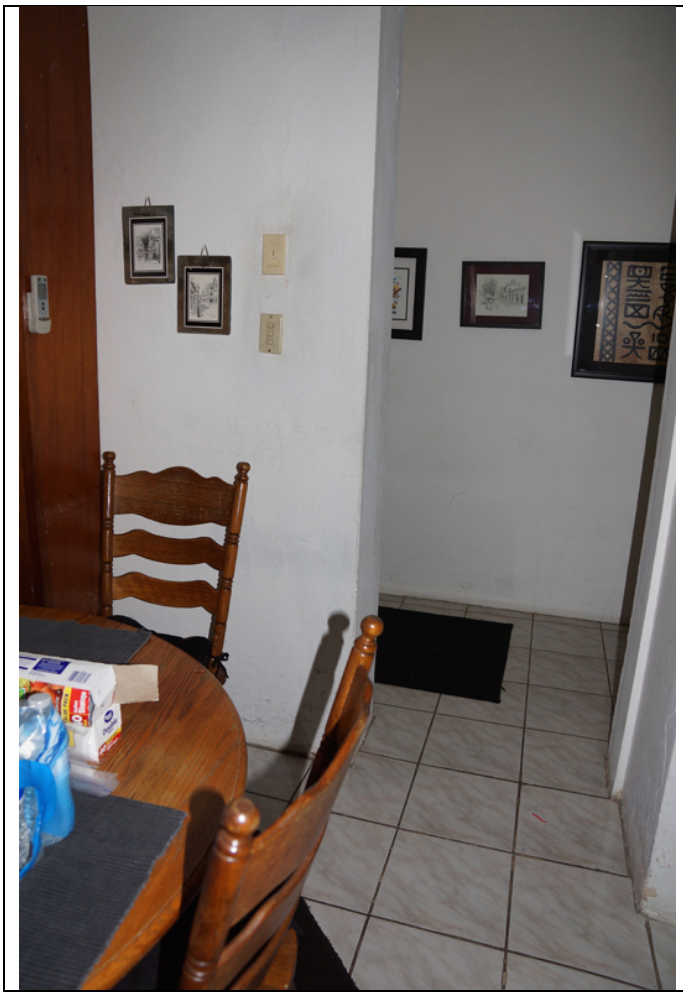
	872: Room 109, looking west, upper portion.

	873: Room 109, looking west, lower portion.

	874: Room 110, south wall

	875: Room 110, north wall
	876: Room 111, south wall, upper portion.

	877: Room 111, south wall, lower portion.
	878: Room 111, west wall, upper portion

	879: Room 111, west wall, lower portion.

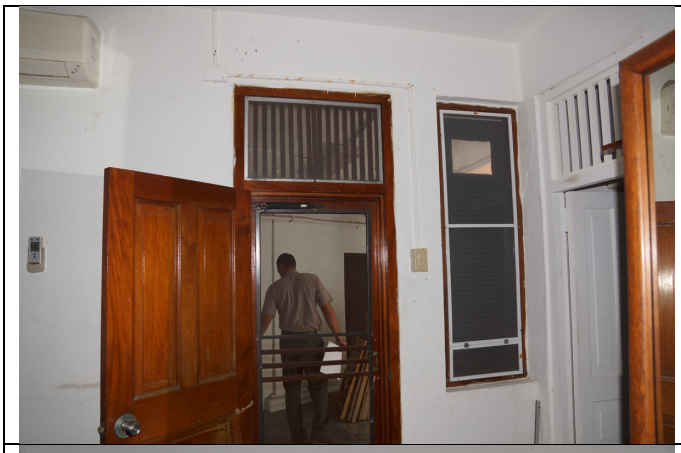
	880: Room 112, south wall.

	881: Room 112, north wall.
	882: Room 113, south wall, lower portion.

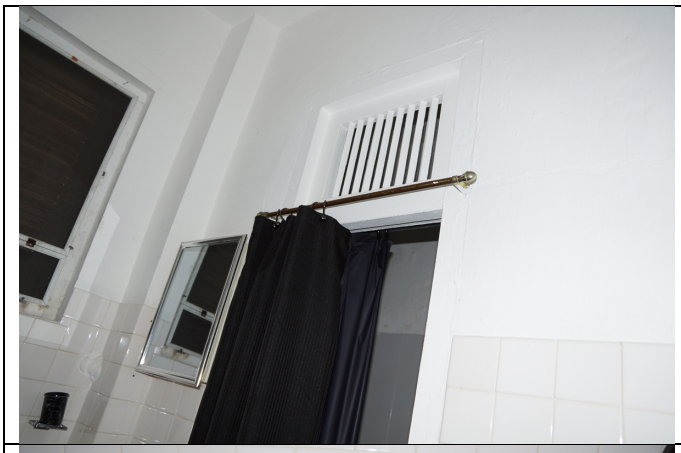
	883: Room 113, south wall, upper portion.
	884: Room 113, west wall, upper portion.
	885: Room 113, west wall, lower portion.

	886: Room 113, north wall, upper portion.
	887: Room 113, north wall, lower portion.
	888: Room 113, southeast wall behind shelf unit.

	889: Room 113, southeast wall behind shelf unit.
	890: Room 114, southeast portion.

	891: Room 114, southwest portion.
	892: Room 114, west wall.
	893: Room 114, north wall.

	894: Room 114, north wall.
	895: Room 115, west wall.
	896: Room 115, north wall.

	897: Room 115, northwest wall, upper portion.
	898: Room 115, south wall.

	899: Room 115, east wall.
	900: Roof, looking from east to west.

	901: Roof, looking from west to east. For similar view, see # 906.
	902: West roof, looking south.
	903: West roof, looking west.

	904: West portion of roof, looking north.
	905: East portion of roof, looking north.
	906: Roof, looking from west to east.

	907: East roof, looking south.
	908: East roof, looking west.
	909: East roof, looking north.

	910: East roof, looking northeast.
	911: North courtyard.
	912: North courtyard.

	913: North courtyard.
	914: North courtyard.
	915: North courtyard.

	916: North courtyard
	917: North courtyard
	918: HVAC, north

	919: HVAC, north
	920: HVAC
	921: HVAC

	922: HVAC
	923: HVAC
	924: HVAC

	925: HVAC
	926: HVAC

	927: Window 1, exterior

	928: Window 2, exterior

	929: Window 3, exterior

	930: Window 4, exterior

	931: Window 5, exterior

	932: Window 6, exterior

	933: Window 7, exterior

	934: Window 8, exterior

	935: Window 9, exterior
	936: Window 9, condition

	937: Window 10, exterior

	938: Window 11, exterior

	939: Window 10, interior

	940: Window 11, interior

	941: Window 11, interior

	942: Window 12, exterior with shutters closed

	943: Window 12, exterior with shutters open

	944: Window 12, interior

	945: Window 13, exterior

	946: Window 14, exterior

	947: Window 13, interior

	948: Window 14, interior



949: Window 15, interior

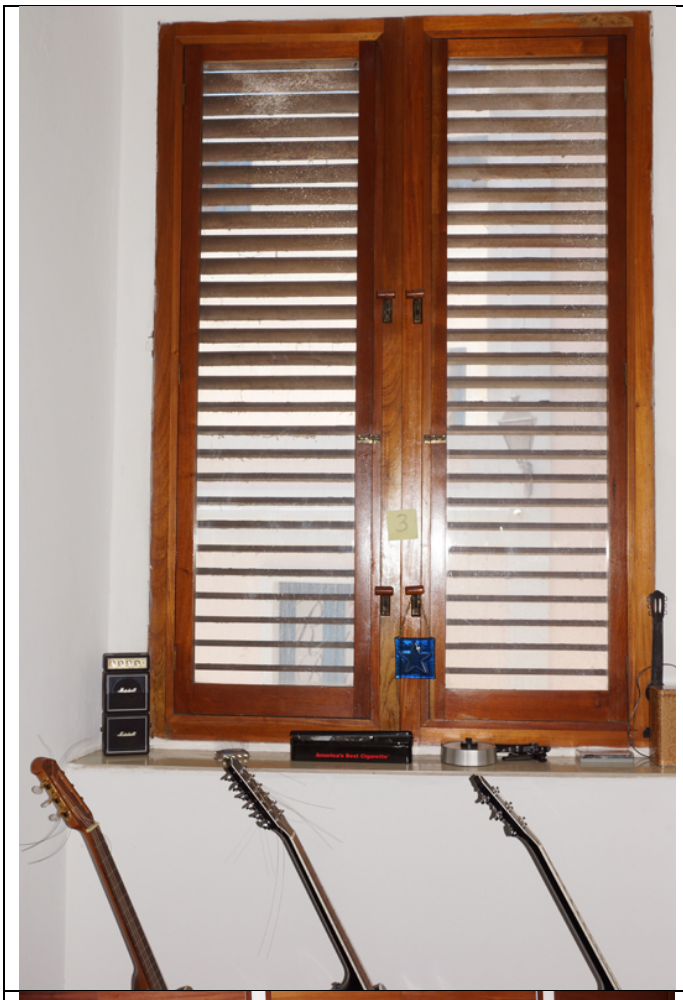
	950: Window 15, exterior

	951: Window 15, exterior

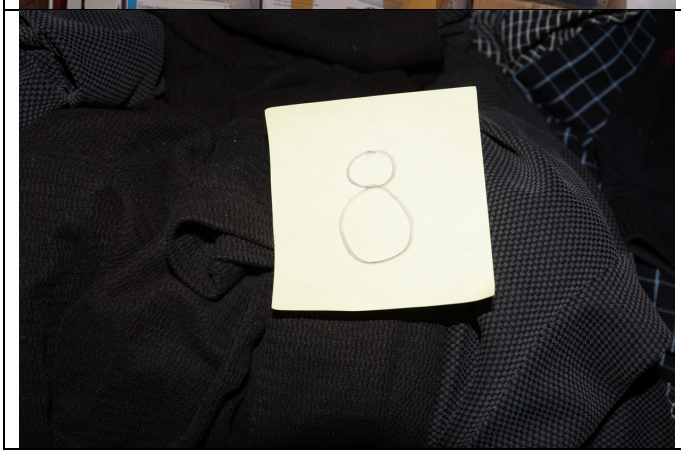
	952: Window 16, exterior

	953: Window 1, interior

	954: Window 2, interior

	955: Window 3, interior
	956: Window 4 and Window 5 interiors, covered over by newer built-in closet

	957: Window 7, interior

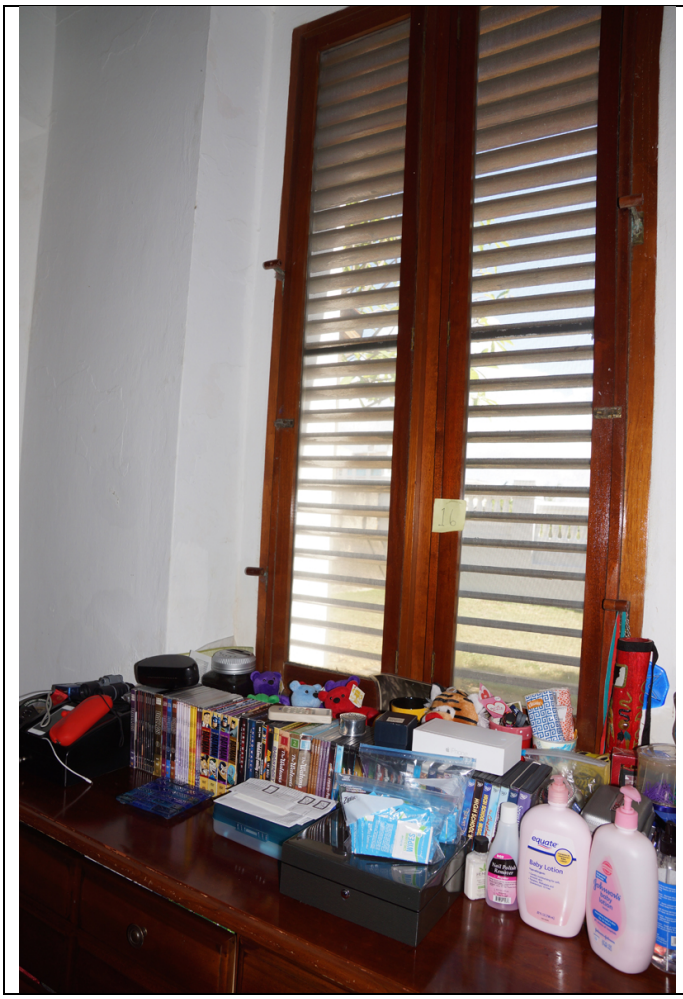
	958: Window 8, interior
	959:

	960: Window 9, interior

	961: Window 10, interior

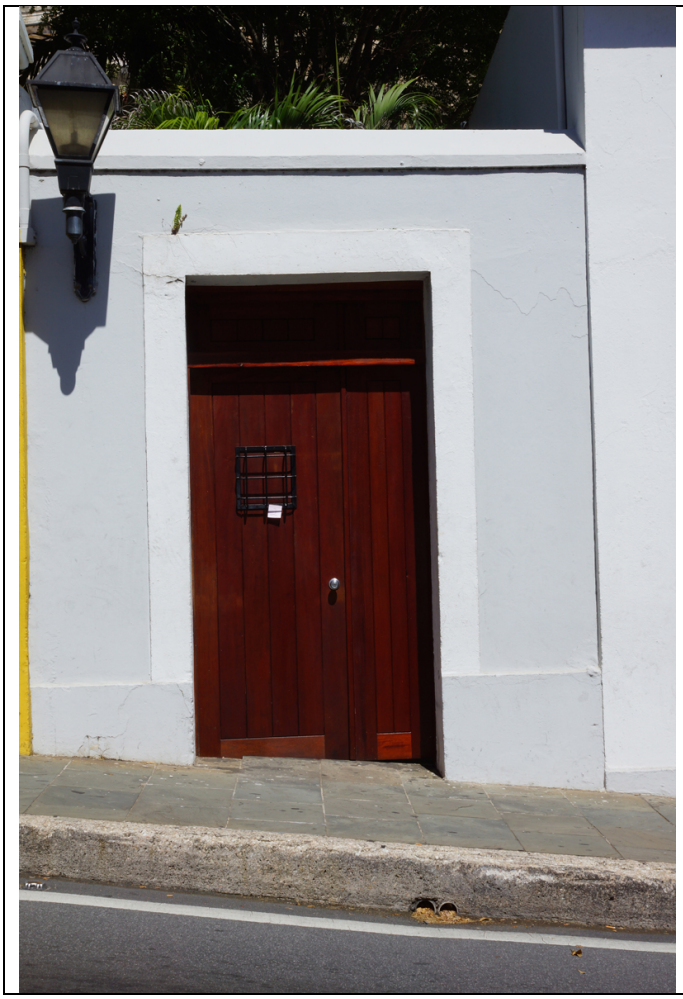
	962: Window 14, interior

	963: Window 6, interior

	988: Window 16, interior

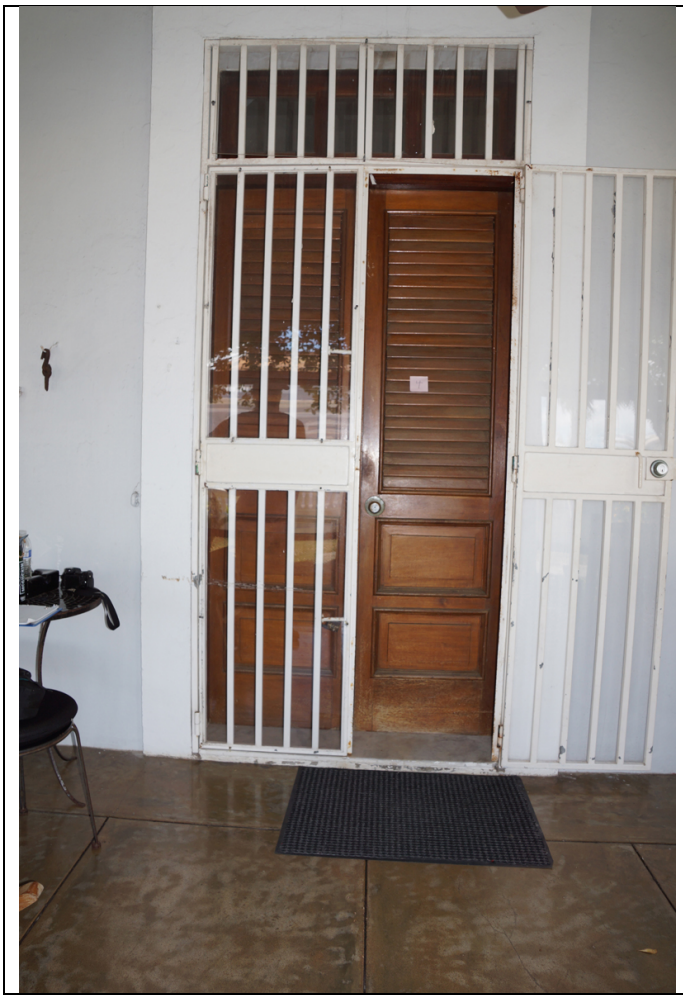
	964: not in focus; delete
	965: Site Door 1, exterior (street side)

	966: Site Door 1, interior

	967: Site Door 2, exterior

	968: Site Door 2, interior

	969: Site Door 3, Exterior (photo of interior is image no. 1022)

	970: Door 4, exterior

	971: Door 4, interior

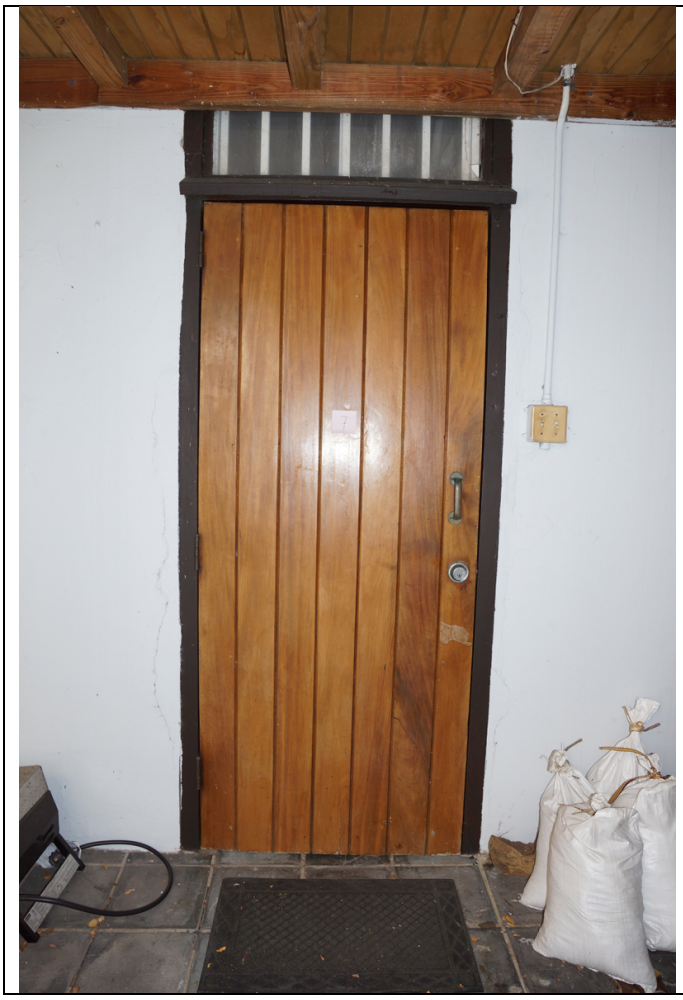
	972: Door 5, exterior

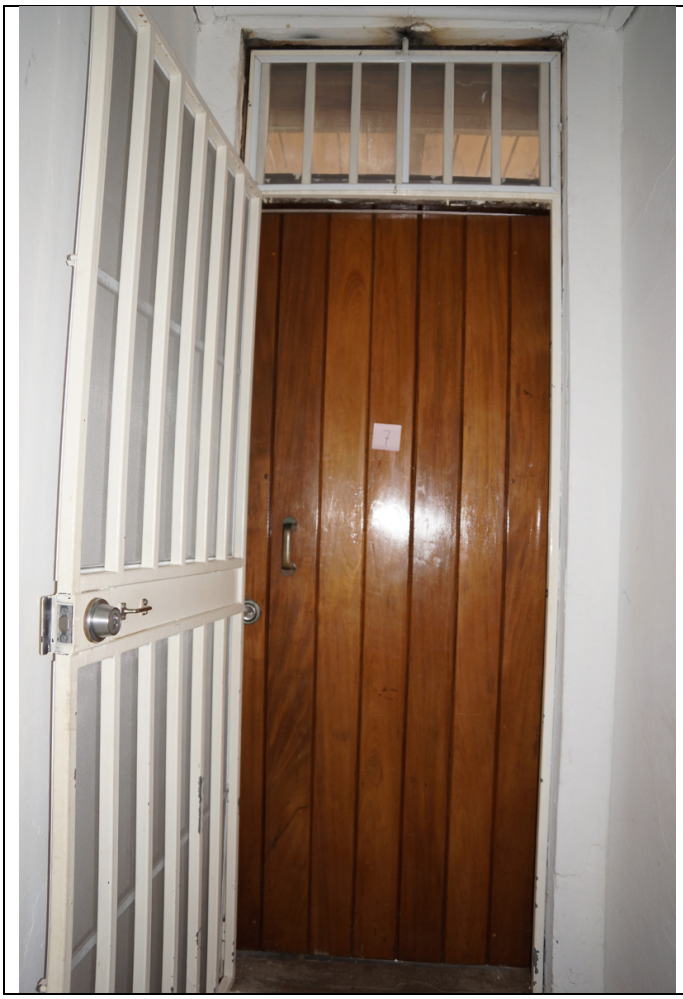
	973: Door 5, interior

	974: Door 6, exterior

	975: Door 6, hardware detail (flush bolt)

	976: Door 6, interior

	977: Door 7, exterior

	978: Door 7, interior, with gate open

	979: Door 7, interior, with gate closed

	980: Door 8, exterior screen

	981: Door 8, exterior, with screen open

	982: Door 8, interior

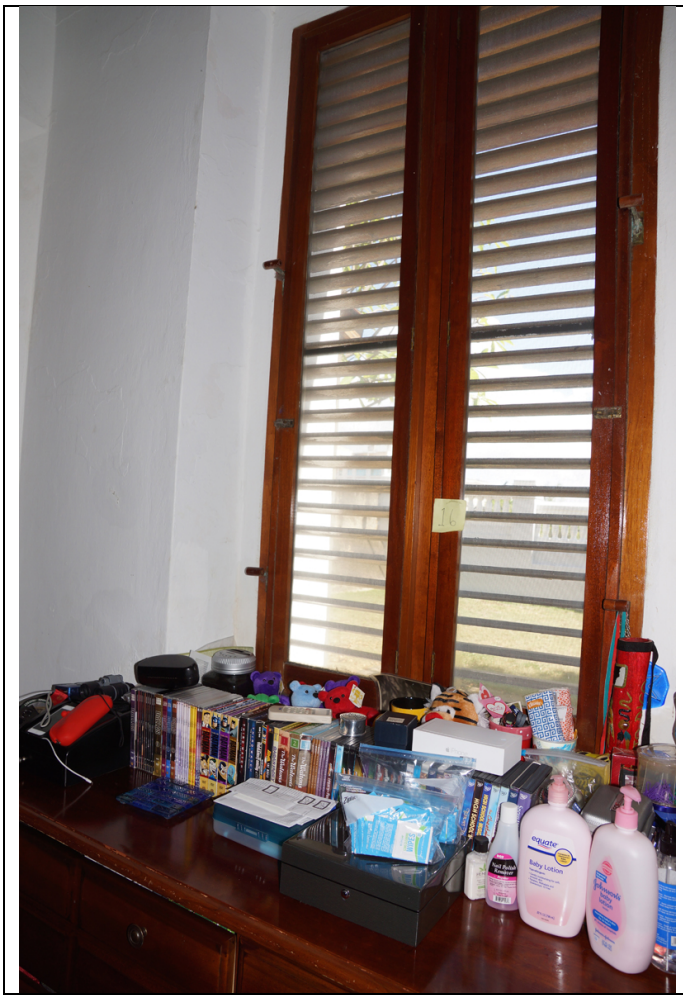
	983: Door 9, exterior screen

	984: Door 9, exterior with screen open

	985: Door 9, interior

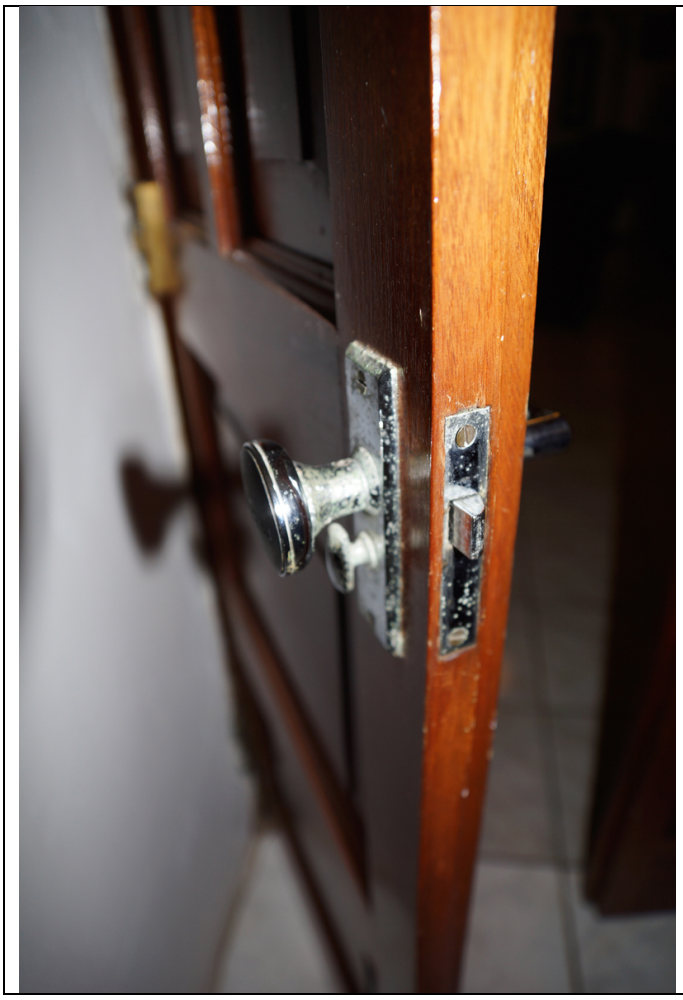
	986: Door 10, exterior with gate open

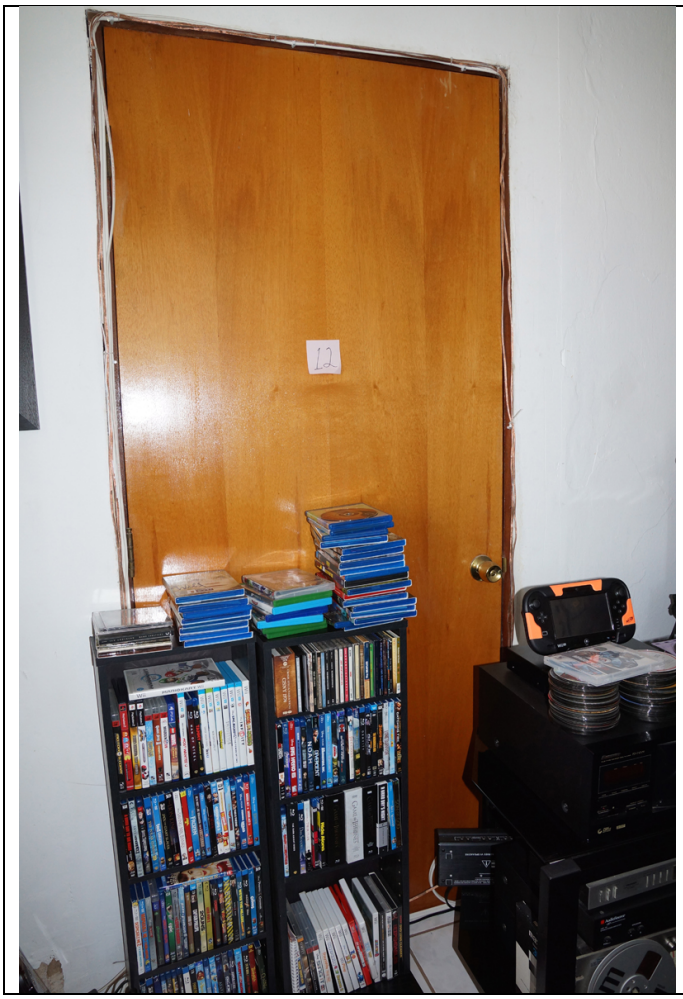
	987: Door 10, interior

	988: Window 16, interior

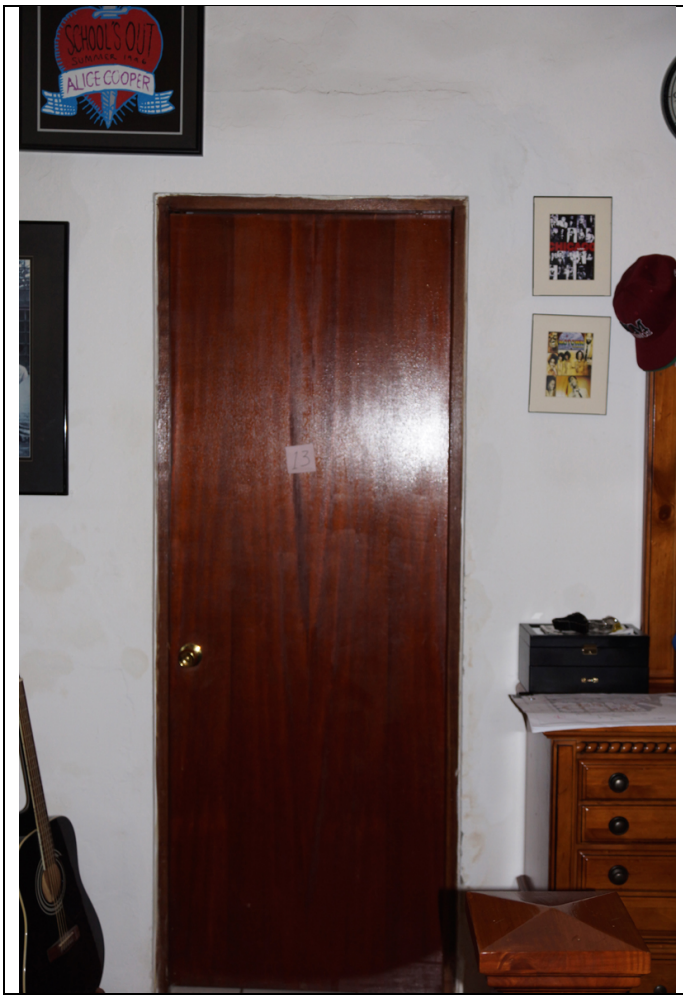
	989: Door 11, from Room 103

	990: Door 11, from Room 101

	991: Detail of hardware of Door 11

	992: Door 12, from Room 101

	993: Door 12, open from Room 102

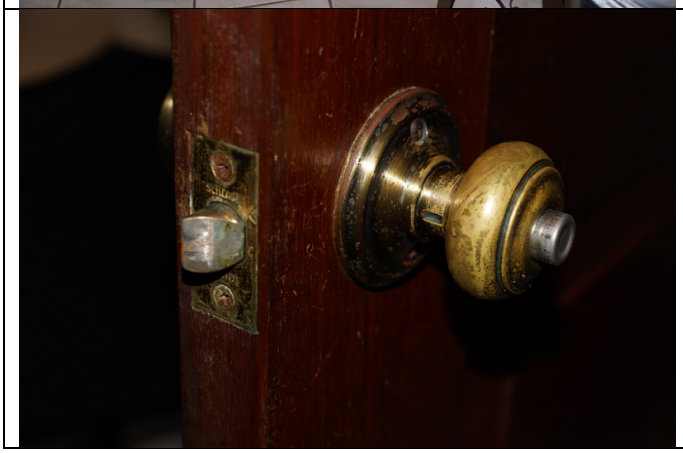


994: Door 13, from Room 102

	995: Door 13, from Room 103

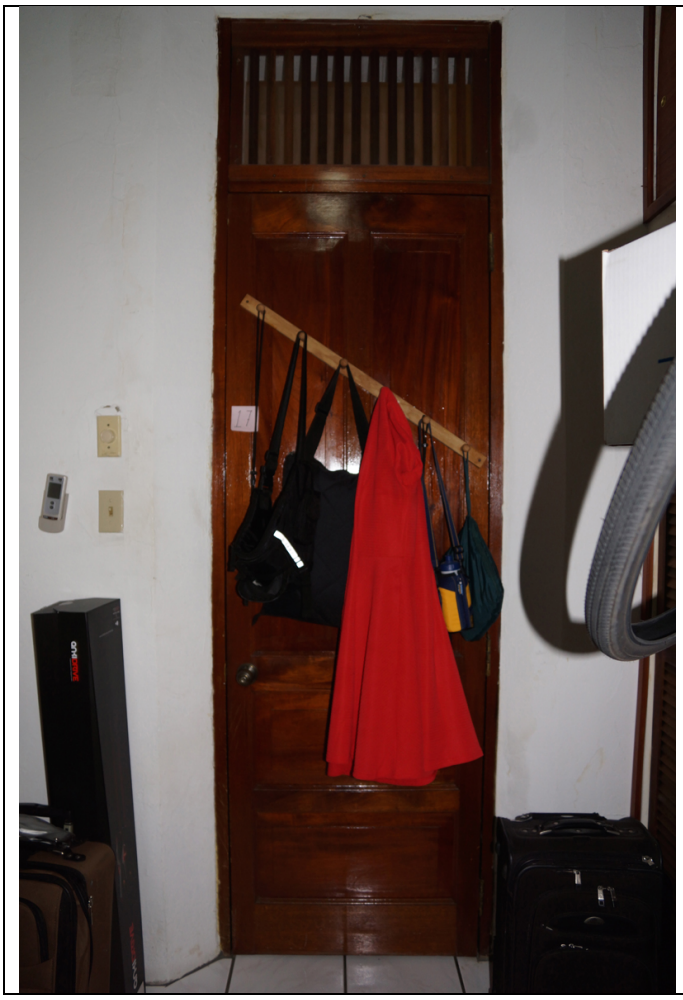
	996: Door 14, from Room 104

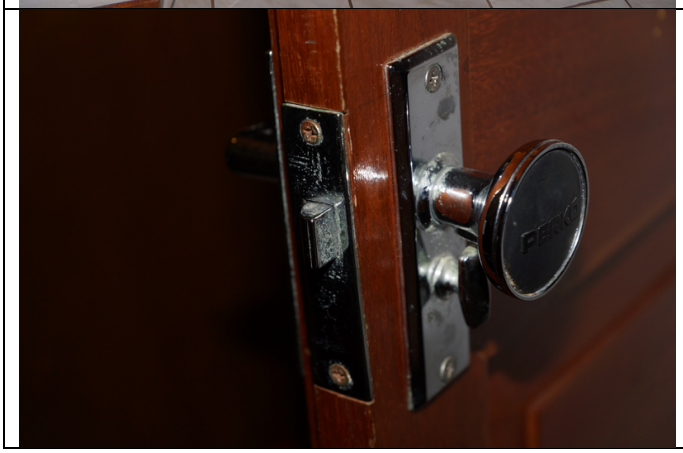
	997: Door 15, from Room 103

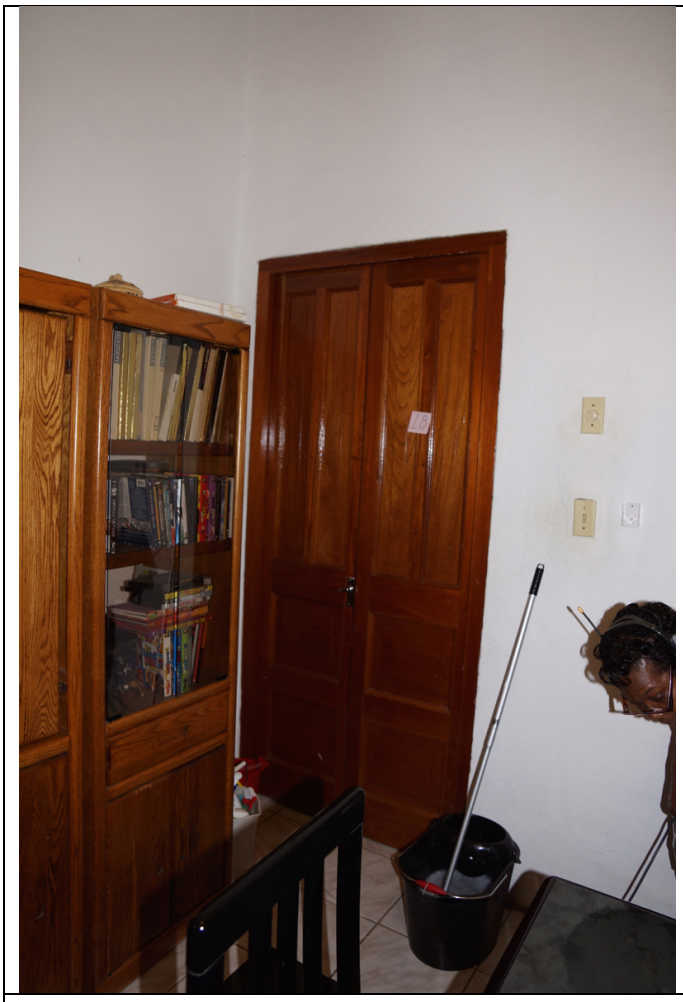
	998: Door 15, Room 104 to the right, Room 103 to the left.
	999: Detail of hardware of Door 15

	1000: Door 16, from Room 105

	1001: Door 17, from Room 103

	1002: Door 17, from Room 105

	1003: Door 18, from Room 103
	1004: Close up of hardware for Door 18



1005: Door 18 from Room 106

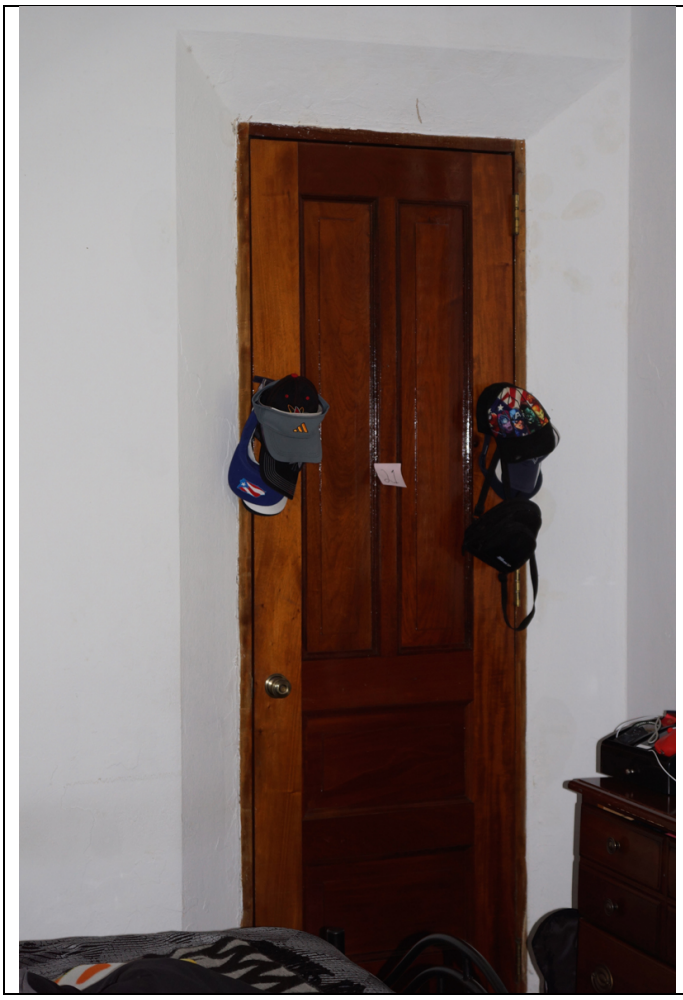
Images 1006-1009 were deleted on site and were reshot because the tags identifying door numbers had been on the incorrect doors and thus were out of sequence. The following images are the next in sequence.

	1010: Door 19 from Room 103

	1011: Door 19 from Room 107



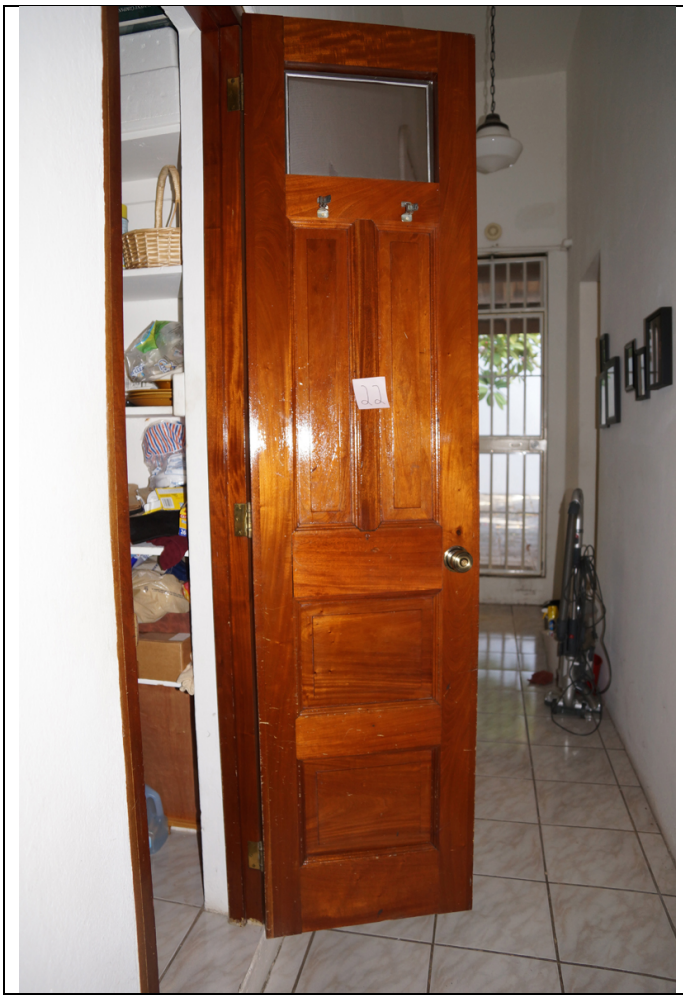
1012: Door 20, from Room 107

	1013: Door 21, from Room 107

	1014: Door 21, upper part, from Room 110

	1015: lower part, from Room 110

	1016: Door 22, from Room 110

	1017: Door 22, opening into Room 110; Room 109 is to the left.

	1018: Door 23, upper portion, from Room 110

	1019: Door 23, lower portion, from Room 110

	1020: Door 23, from Room 106

	1021: Door 26, from Room 114

	1022: Interior of Site Door 3, typical leaf
	1023: Site Door 3, both leaves open, tunnel beyond.

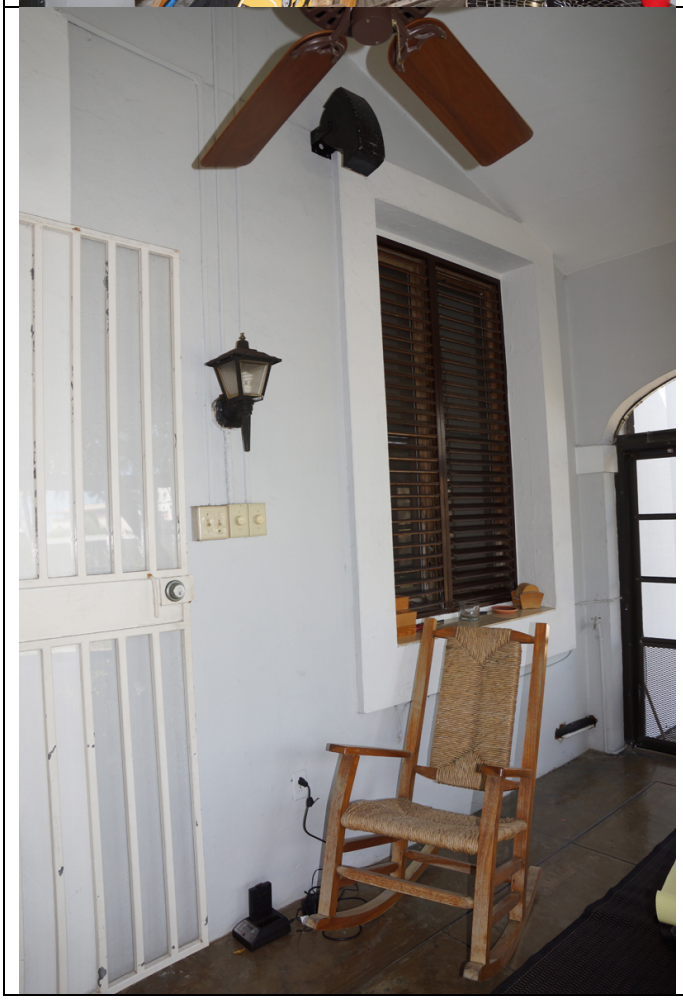
	1024: Built-in cabinet in west wall of Room 106, dining room
	1025: Window 1, interior

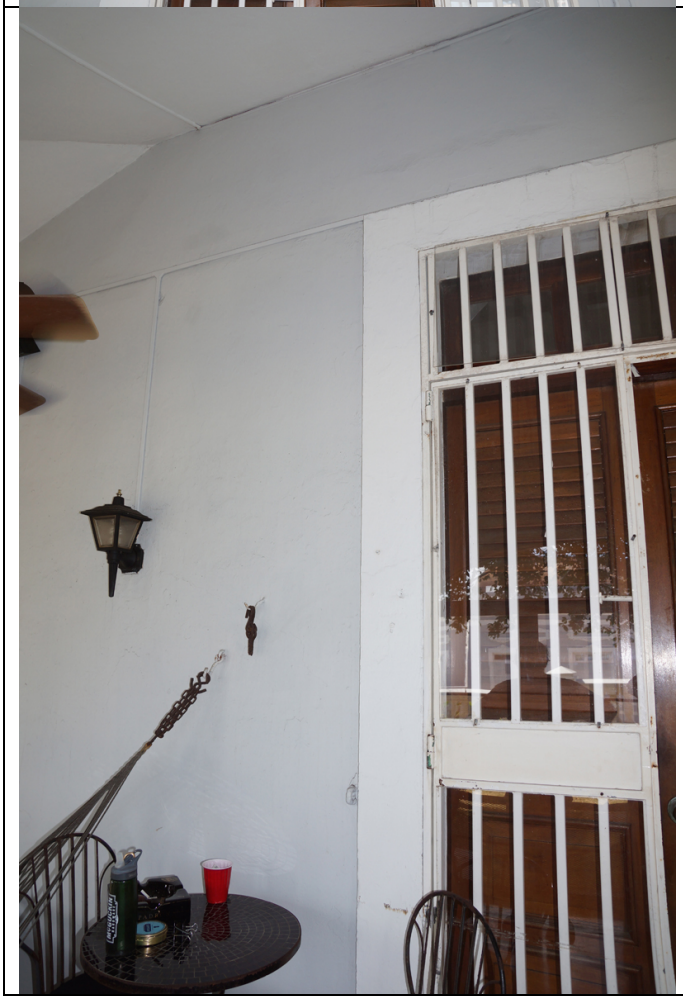
	1026: Window 1, exterior
	1027: Window 1, exterior detail
	1028: Window 2 exterior; note full penetration of awl at center.
	1029: Window 8, interior

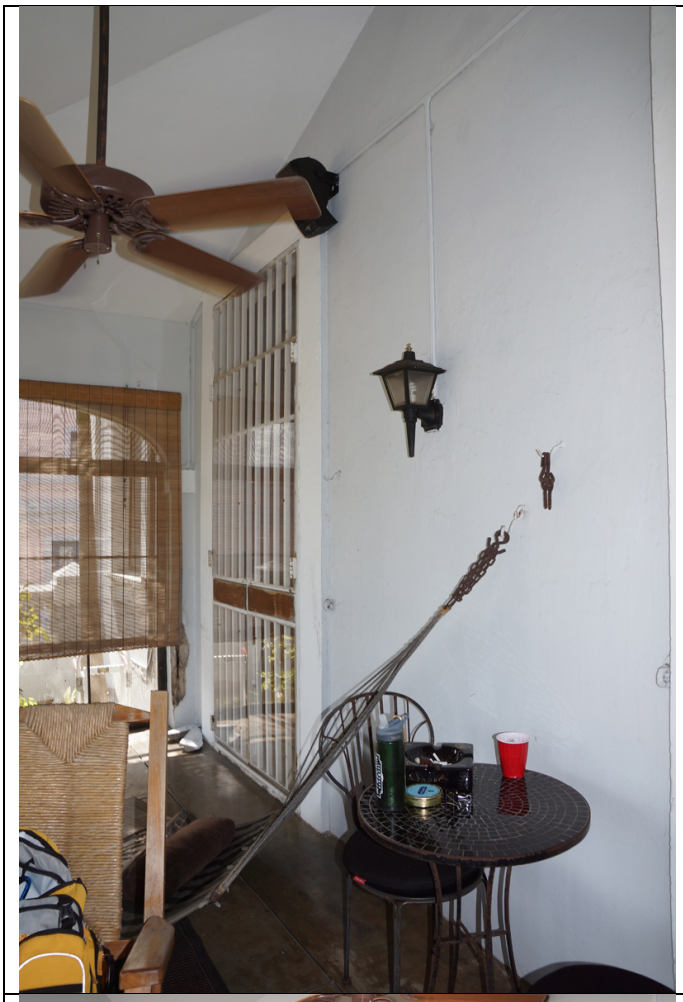
	1030: Window 8, detail
	1031: Window 9
	1032: Window 9

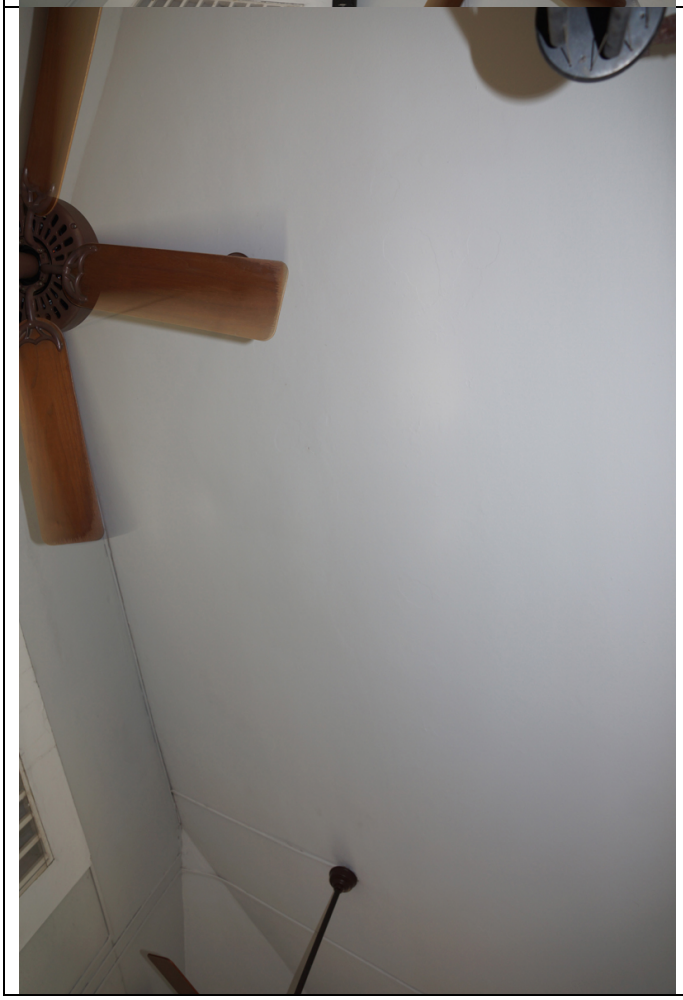
	1033: Window 15, interior (Room 111)
	1034: Window 15
	1035: Enclosed Porch, interior, east wall

	1036: Enclosed Porch, interior, southeast corner
	1037: Enclosed Porch, interior, south wall
	1038: Enclosed Porch, interior, southwest corner

	1039: Enclosed Porch, interior, west wall
	1040: Enclosed Porch, interior, northeast corner

	1041: Enclosed Porch, interior, north wall, center portion, and ceiling
	1042: Enclosed Porch, interior, north wall, west center portion

	1043: Enclosed Porch, interior, north wall, west portion
	1044: Enclosed Porch, interior, west wall

	1045: Enclosed Porch, interior, ceiling
	1046: Enclosed Porch, interior, ceiling

	1047: Enclosed Porch, interior, ceiling
	1048: Enclosed Porch, interior, floor
Door Width: 4 feet, 2 inches Door Height: 8 feet, 3 +/- inches Transom Height: 1 foot, 7.5 inches	1049-1053 Door 4 dimensions

	1054: Condition Issues: Porch—spalling concrete due to rust jacking, northwest corner of interior
	1055: Condition Issues: Southwest corner of exterior

	1056: Condition Issues: AC line penetration; note vegetative growth of fern
	1057: Condition Issues: Base of south lawn's cast retaining wall. Note longitudinal crack.
	1058: Roof No. 1

	1059: Roof No. 1

	1060: Roof Nos. 1, 2, 2A, and 3

	1061: Roof No. 3, metal roof tile sheets
	1062: Roofs: Clogged valleys

	1063: Roofs: Cracks and chips (coatings?)
	1064: Roofs: Chips and cracks
	1065: Roofs: Metal roof of pressed tile design. Rust perforations abound. Slope of roof is too little for material; needs to be a minimum of 1-1/2:12.

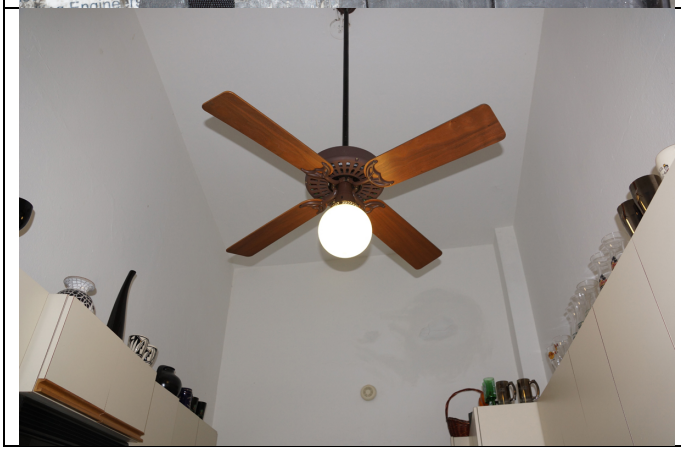
	1066: Roofs: Inside (northwest face) of parapet above tunnel entry. Spired design.
	1067: Roofs: Inside of retaining wall parapet, south.
	1068: Roofs: Inside of retaining wall parapet, middle, east face

	1069: Roofs: Inside of retaining wall parapet, north terminus with Building 210.
	1070: Roofs: Inside of return by section of parapet above tunnel entry
	1071 Roofs: Top of tunnel entry parapet, at crown, has a crack and is debonded.

	1072: Condition: Loss of render, detail
	1073: Condition: Loss of render, detail
	1074: Condition: Details of cap on parapet. Note small cracks.

	1075: Condition: Detail of small spire
	1076: Condition: Detail of large central spire
	1077: Exposure window #2 Similar view in # 1078

	1078: Exposure window # 2 & Mortar Sample #2
	1079: Taking mortar samples
	1080: Mortar Sample #1

	1081: Mortar Sample #3, from common wall with Building 210 site, e.g., north wall of north courtyard.
	1082: Mortar samples, locations noted.
	1083: Fans and Light Fixtures: Kitchen (Room 112). Four paddle, brown, globe light

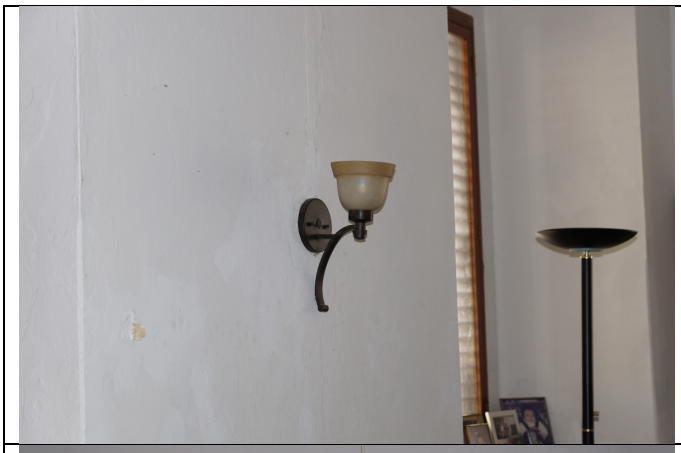
	1084: Fans and Light Fixtures: Breakfast nook (Room 111). Four paddle, brown, globe light.
	1085: Fans and Light Fixture: Hallway (Room 110). Pendant, acorn shaped globe in translucent white, chain hung.
	1086: Fans and Light Fixture: Hallway (Room 110). Pendant, acorn shaped globe in translucent white, chain hung.

	1087: Fans and Light Fixture: (Room 106). Pendant, acorn shaped globe in translucent white, chain hung.
	1088: Fans and Light Fixtures: (Room 106). Four blade, brown, no light
	1089: Fans and Light Fixtures: (Room 106). As the four blade fan has no light, the pendant fixture provided the light source.

	1090: Fans and Light Fixtures: Typical white pendant, globe, chain hung
	1091: Fans and Light Fixtures: (Room 103). Five paddle, black, four lights
	1092: Fans and Light Fixtures: (Room 103). Pendant

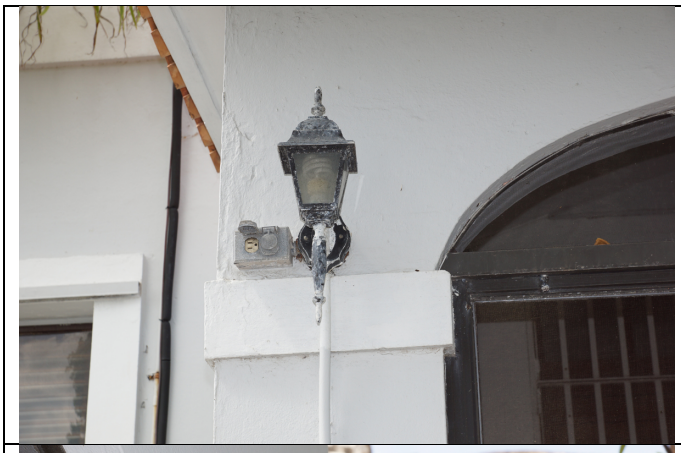
	1093: Fans and Light Fixtures: (Room 103). Sconce—wall sconce, uplight, iridescent glass
	1094: Fans and Light Fixtures: (Room 105).
	1095: Fans and Light Fixtures: Room 103, east wall. Sconce—wall sconce, uplight, iridescent glass

	1096: Fans and Light Fixtures: Room 103, north wall. Sconce—wall sconce, uplight, iridescent glass
	1097: Fans and Light Fixtures: Room # 107.
	1098: Fans and Light Fixtures: (Room 101). Fan: five blade, grey metal finish, built-in light, manufacturer “Hampton Bay”

	1099: Fans and Light Fixtures: Room 101, south wall. Sconce—wall sconce, uplight, iridescent glass
	1100: Fans and Light Fixtures: (Room 102). Pendant
	1101: Fans and Light Fixtures: (Room 102). Fan: five blade, grey metal finish, built-in light, manufacturer “Hampton Bay”

	1102: Fans and Light Fixtures: (Room 102). Pendant
	1103: Fans and Light Fixtures: (Room 107). Fan: five blade,
	1104: Fans and Light Fixtures: (Room 104). Above mirror

	1105: Fans and Light Fixtures: Porch West of two porch fans
	1106: Fans and Light Fixtures: Enclosed porch interior West wall sconce
	1107: Fans and Light Fixtures: Enclosed porch interior East wall sconce

	1108: Fans and Light Fixtures: Exterior of enclosed porch, south elevation, west end Wall sconce
	1109: Fans and Light Fixtures: Exterior of enclosed porch, south elevation, east end Wall sconce
	1110: Fans and Light Fixtures: Exterior of enclosed porch, south elevation, west end Ceiling mounted sconce

Uncaptioned Digital Photodocumentation

Uncaptioned Digital Photodocumentation



DB-842



DB-882



DB-843



DB-883



DB-844



DB-884



DB-845



DB-885



DB-846



DB-886



DB-847



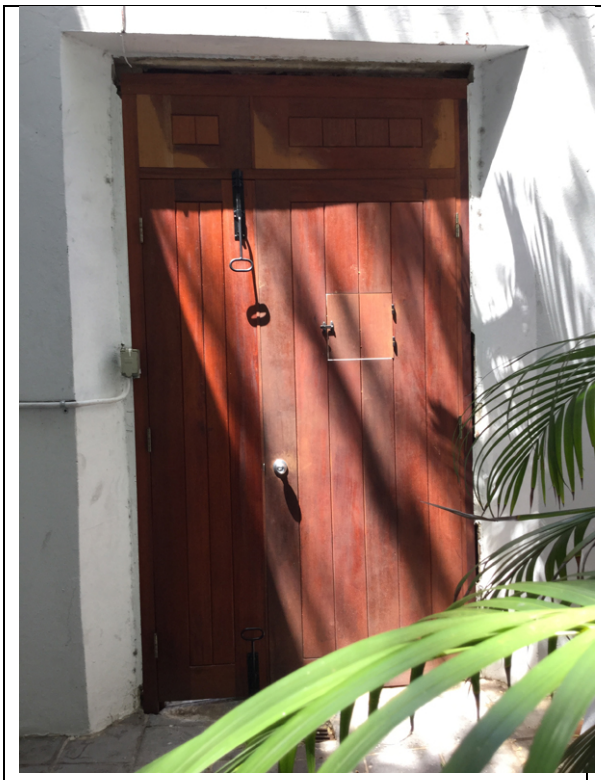
DB-887



DB-848



DB-888



DB-849



DB-889



DB-850



DB-890



DB-851



DB-891



DB-852



DB-892



DB-853



DB-893



DB-854



DB-894



DB-855



DB-895



DB-856



DB-896



DB-857



DB-897



DB-858



DB-898



DB-859



DB-899



DB-860



DB-900



DB-861



DB-901



DB-862



DB-902



DB-863



DB-903



DB-864



DB-904



DB-865



DB-905



DB-866



DB-906



DB-867



DB-907



DB-868



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DB-911



DB-872



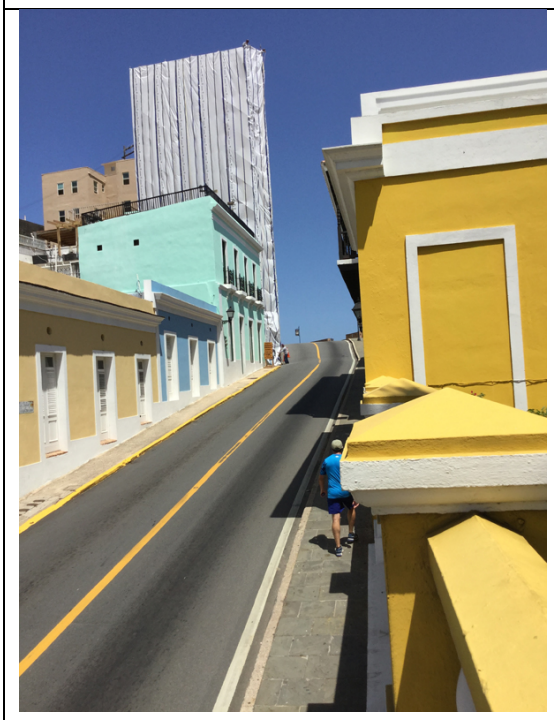
DB-912



DB-873



DB-913



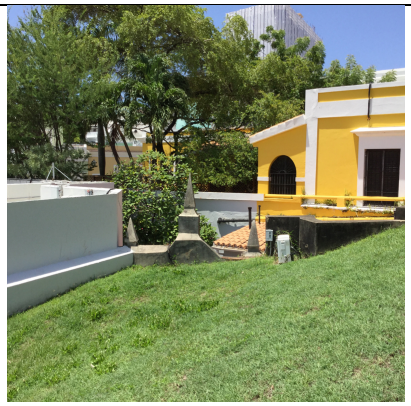
DB-874



DB-914



DB-875



DB-915



DB-876



DB-916



DB-877



DB-917



DB-878



DB-918



DB-879



DB-919



DB-880



DB-920



DB-881



DB-921



DB-882



DB-922



DB-923



DB-924



DB-930



DB-8501



DB-8502



DB-8503



JDF-605



JDF-606



JDF-607



JDF-608



JDF-609



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JDF-614



JDF-615



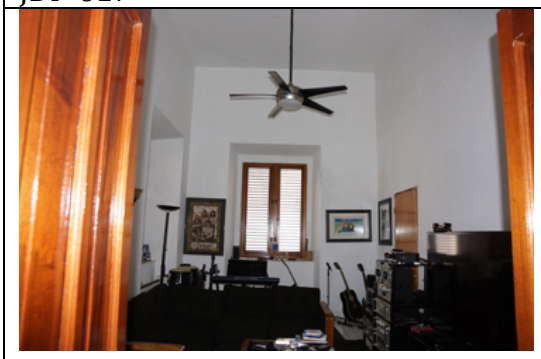
JDF-616



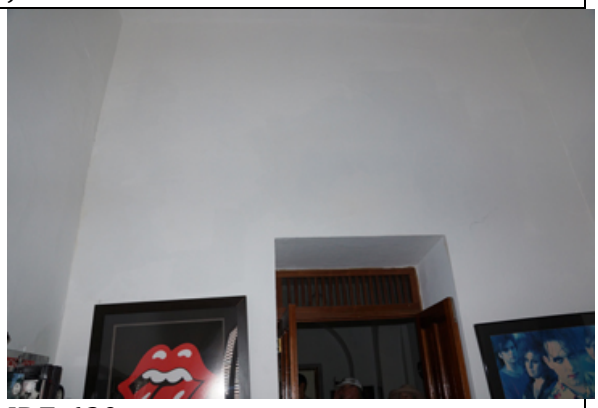
JDF-617



JDF-618



JDF-619



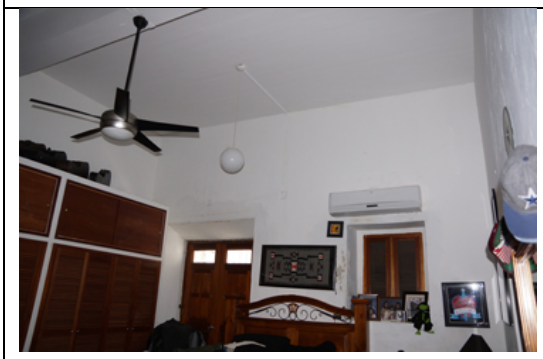
JDF-620



JDF-621



JDF-622



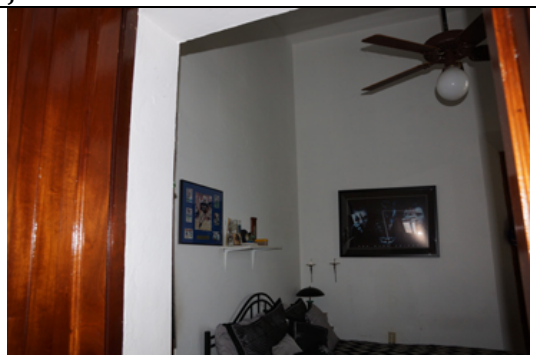
JDF-623



JDF-624



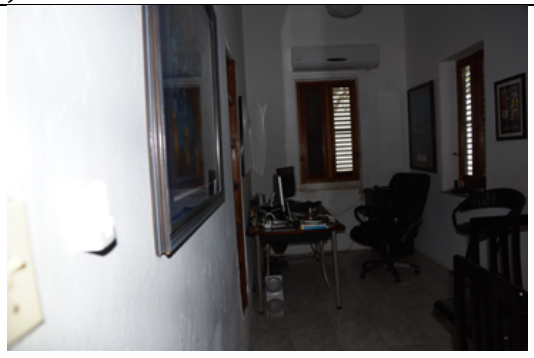
JDF-625



JDF-626



JDF-627



JDF-628



JDF-629



JDF-630



JDF-631



JDF-632



JDF-633



JDF-634



JDF-635



JDF-636



JDF-637



JDF-638



JDF-639



JDF-640

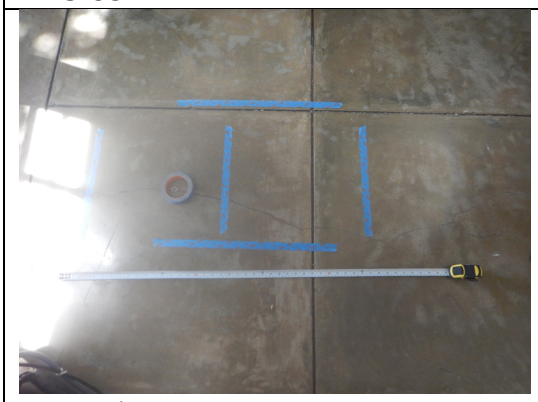
 JDF-641	



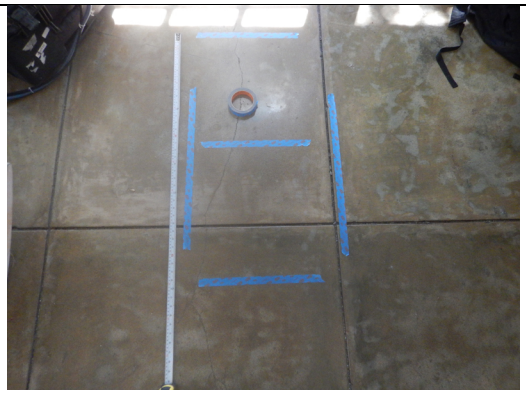
MPS-852



MPS-853



MPS-854



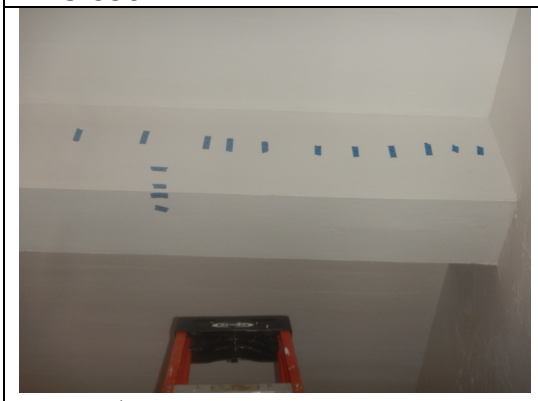
MPS-855



MPS-856



MPS-857



MPS-858



MPS-866



MPS-867



MPS-868



MPS-869



MPS-870



MPS-871



MPS-872



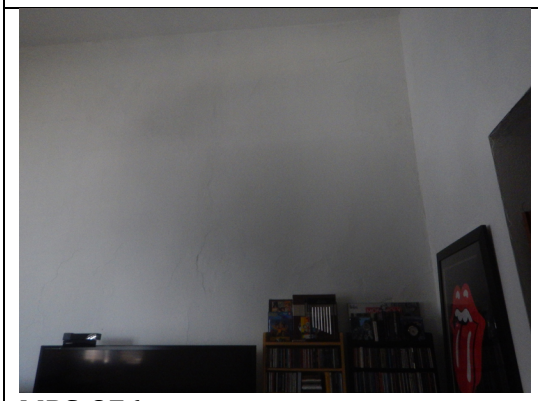
MPS-873



MPS-874



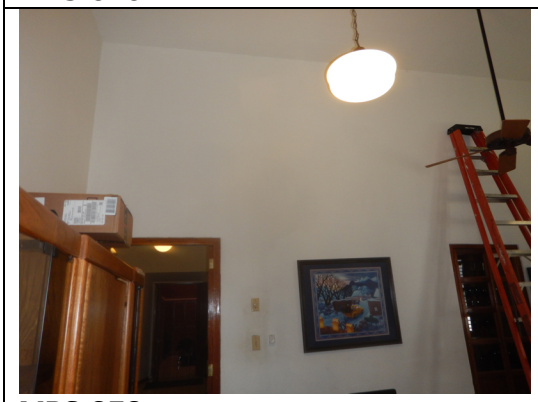
MPS-875



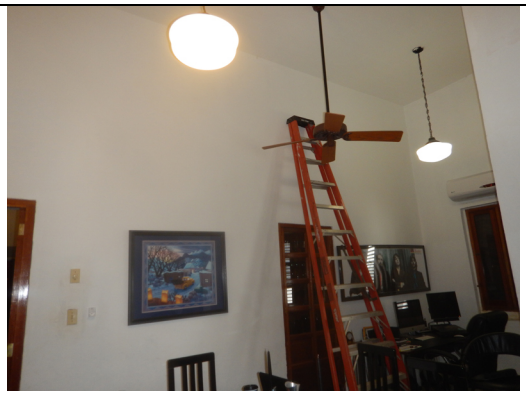
MPS-876



MPS-877



MPS-878



MPS-879



MPS-880



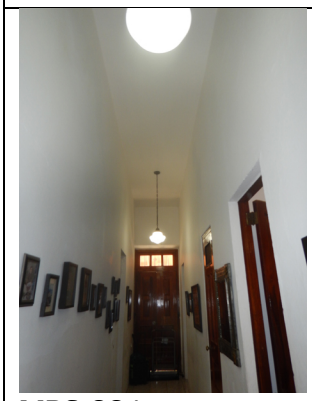
MPS-881



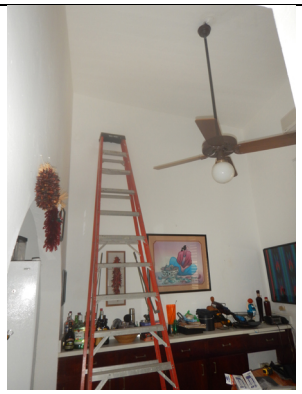
MPS-882



MPS-883



MPS-884



MPS-885



MPS-886



MPS-887



MPS-888



MPS-889



MPS-890



MPS-891



MPS-892



MPS-893



MPS-894



MPS-895



MPS-896



MPS-897



MPS-898



MPS-899



MPS-900



MPS-901



MPS-902



MPS-903



MPS-904



MPS-905



MPS-906



MPS-907



MPS-908



MPS-909



MPS-910



MPS-911



MPS-912



MPS-913



MPS-915



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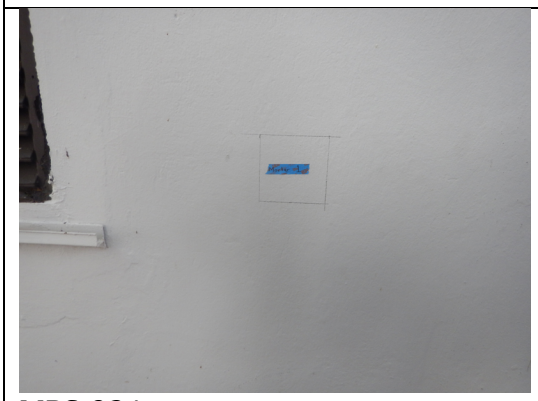
MPS-922



MPS-923



MPS-924



MPS-925



MPS-926



MPS-927



MPS-928



MPS-929



MPS-930



MPS-931



MPS-932



MPS-933



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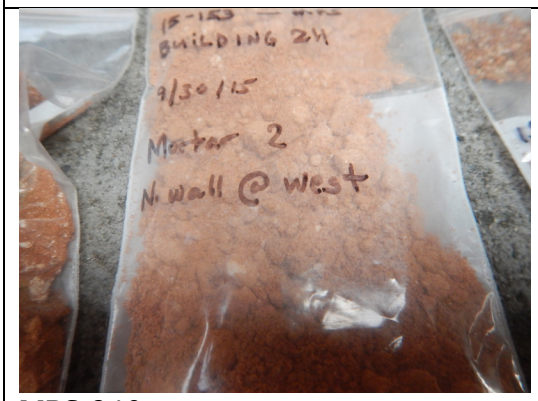
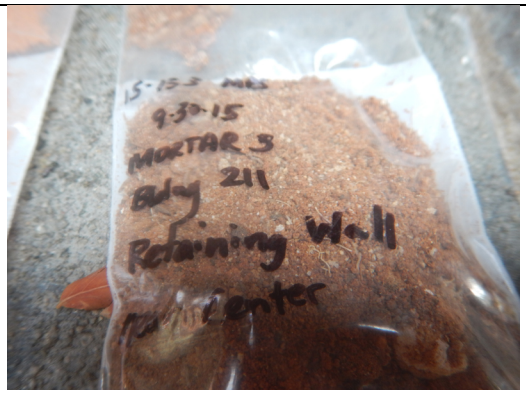
MPS-938



MPS-939



MPS-940



MPS-941



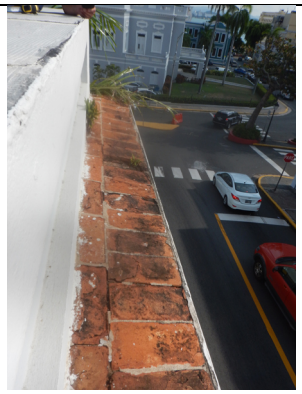
MPS-942



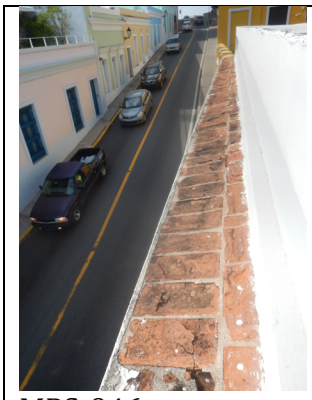
MPS-943



MPS-944



MPS-945



MPS-946



MPS-947



MPS-948



MPS-953



MPS-954



MPS-964



MPS-965



MPS-966



MPS-967



MPS-968



MPS-969



MPS-970



MPS-971



MPS-972



MPS-973



MPS-974



MPS-975



MPS-976



MPS-977



MPS-978



MPS-979



MPS-980



MPS-9835



RW-536



RW-537



RW-538



RW-539



RW-540



RW-541



RW-542



RW-543



RW-544



RW-545



RW-546



RW-547



RW-548



RW-549



RW-550



RW-551



RW-552



RW-553



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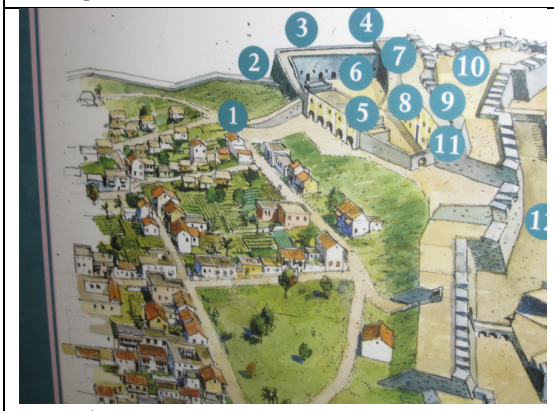
RW-573



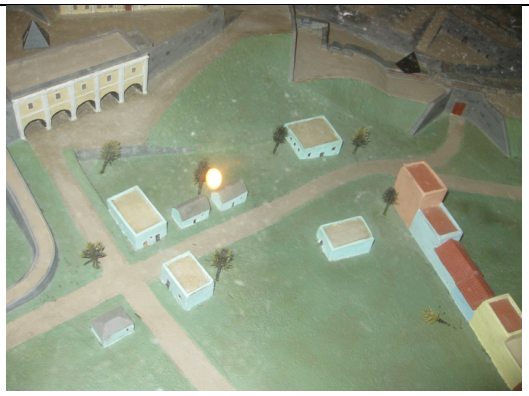
RW-574



RW-575



RW-576



RW-577



RW-578



RW-579



RW-582



RW-583



RW-584



RW-585



RW-586



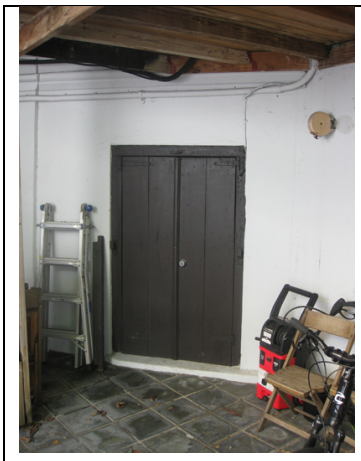
RW-587



RW-618



RW-619



RW-620



RW-621



RW-622



RW-623



RW-624



RW-625



RW-626



RW-627



RW-628



RW-629



RW-630



RW-631



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RW-633



RW-634



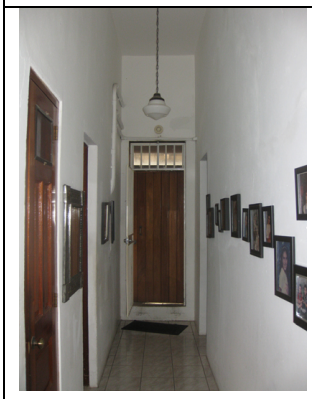
RW-635



RW-636



RW-637



RW-638



RW-639



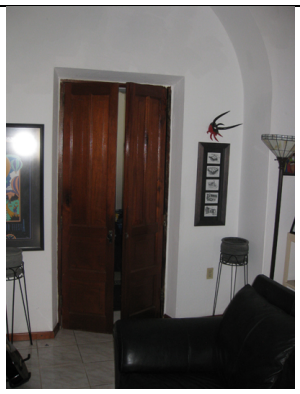
RW-640



RW-641



RW-642



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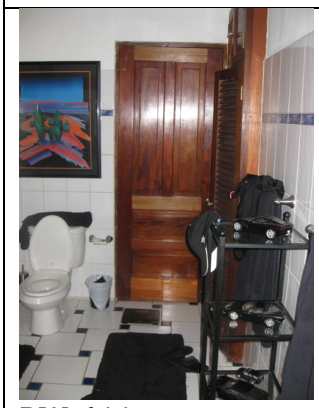


RW-644



RW-645



RW-646



RW-647



RW-648



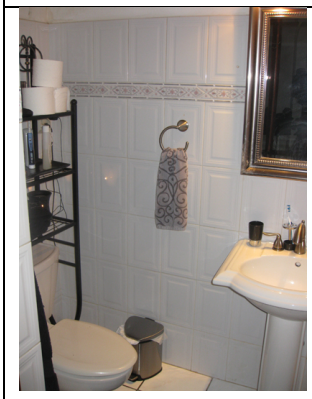
RW-649



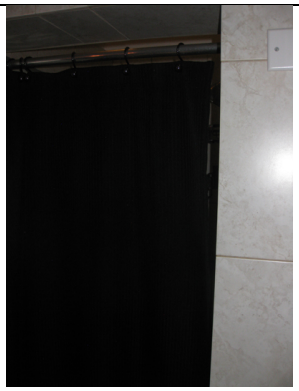
RW-650



RW-651



RW-652



RW-653



RW-654



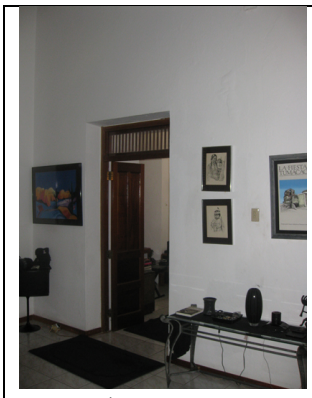
RW-655



RW-656



RW-657



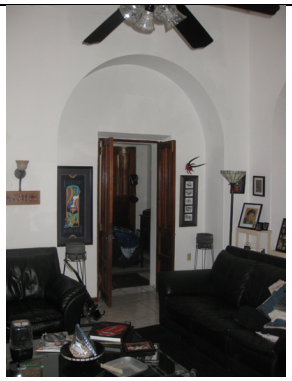
RW-658



RW-659



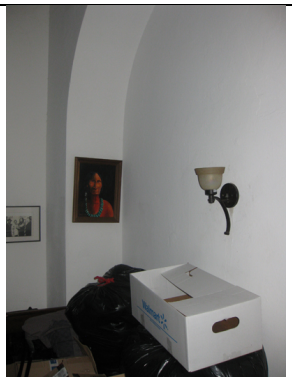
RW-660



RW-661



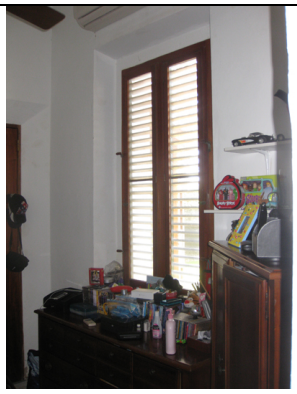
RW-662



RW-663



RW-664



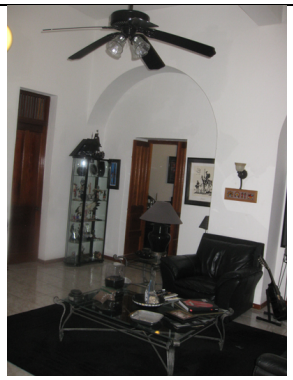
RW-665



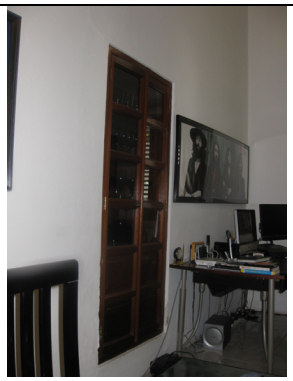
RW-666


RW-667


RW-668

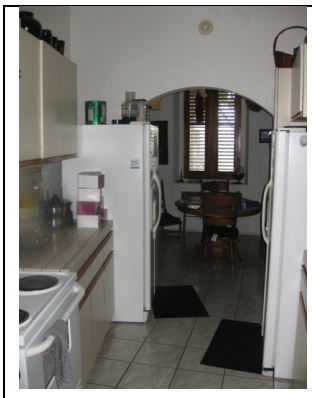

RW-669

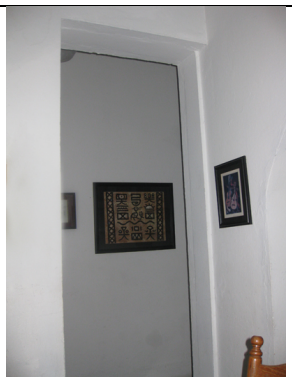

RW-670


RW-671

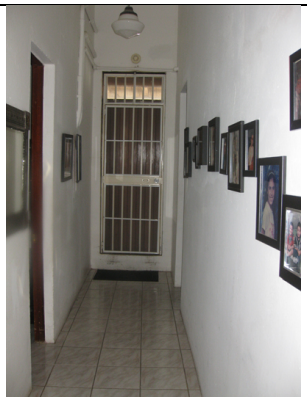

RW-672


RW-673


RW-674


RW-675


RW-676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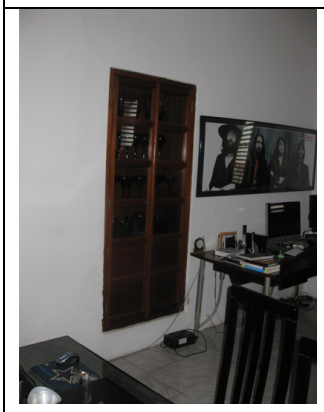
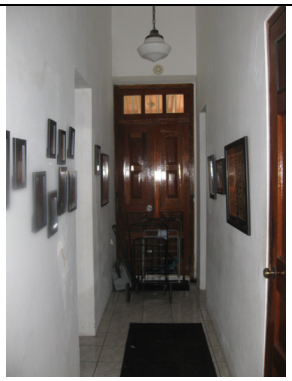

RW-678


RW-679


RW-680


RW-681



RW-682



RW-683



RW-684



RW-685



RW-686



RW-687



RW-688



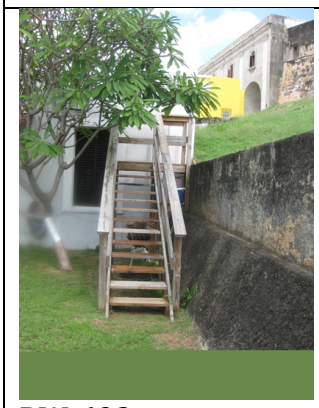
RW-689



RW-690



RW-691



RW-692



RW-693



RW-694



RW-695



RW-696



RW-697



RW-698



RW-699



RW-700



RW-701



RW-702



RW-703



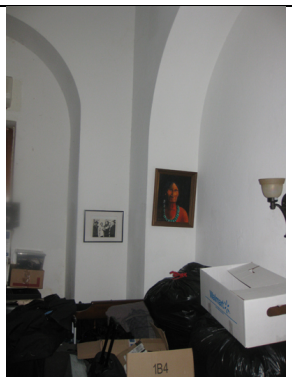
RW-704



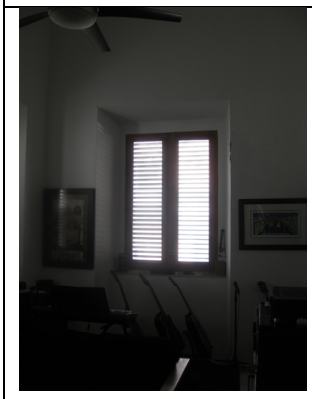
RW-705



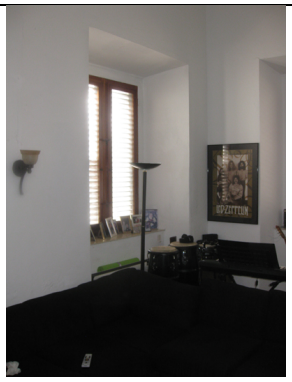
RW-706



RW-707



RW-708



RW-709



RW-710



RW-711



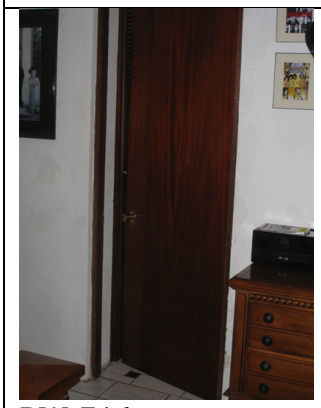
RW-712



RW-713



RW-714



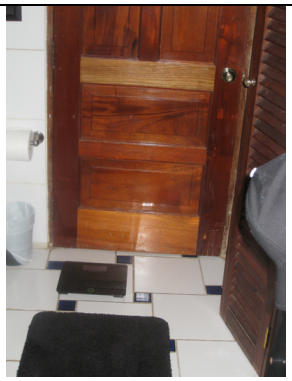
RW-716



RW-717



RW-718



RW-719



RW-720



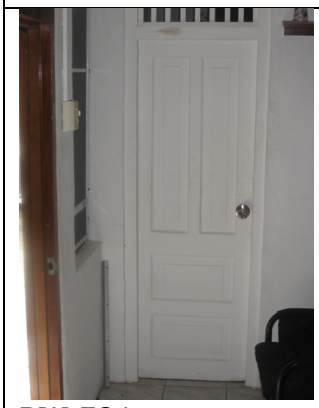
RW-721



RW-722



RW-723



RW-724



RW-725



RW-726



RW-727



RW-826



RW-827



RW-828



RW-829



RW-830



RW-831



RW-832



RW-833