CALIFORNIA DEPARTMENT OF STATE HOSPITALS

REPORT ON THE SEISMIC SAFETY OF THE STATE HOSPITALS

SUPPLEMENTAL REPORT TO THE LEGISLATURE

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DIRECTOR
Pam Ahlin

Pursuant to the Fiscal Year 2015-16 Budget, the Department of State Hospitals submits this Supplemental Report to the Legislature on the Seismic Safety of the State Hospitals. This report was developed with input by the Department of General Services, the Office of Statewide Health Planning and Development, Fong and Chan Architects, Thornton Tomasetti, and Seismic Safety Commission staff.

Department of State Hospitals

Supplemental Report to the Legislature - Seismic Safety

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Department of State Hospitals

Supplemental Report to the Legislature - Seismic Safety

EXECUTIVE SUMMARY

The Fiscal Year (FY) 2015-16 Budget requires the Department of State Hospitals (DSH) to submit a Supplemental Report to the Legislature (SRL) regarding known information about the level of seismic safety of state hospital buildings and structures, the need for further assessments, and a plan for addressing deficiencies in seismic safety.

This report was prepared in consultation with the Department of General Services (DGS), the Office of Statewide Health Planning and Development (OSHPD), Seismic Safety Commission (SSC) staff, Fong and Chan Architects, and Thornton Tomasetti, an engineering firm. DGS, OSHPD and SSC provided methodology recommendations whereas Fong and Chan as well as Thornton Tomasetti provided technical assistance including the preliminary evaluations of hospital campuses.

The DSH manages the nation's largest inpatient forensic mental health hospital system. In FY 2014-15, the DSH served almost 13,000 patients and on average the inpatient census was approximately 6,700 in a 24-hours-a-day, seven-days-a-week hospital system and 600 outpatient census in its conditional release program. The DSH oversees five state hospitals and three psychiatric programs located in state prisons, employing approximately 12,334 staff.

The DSH's five state hospitals are Atascadero, Coalinga, Metropolitan – Los Angeles, Napa and Patton. The three psychiatric programs are operated through an interagency agreement with the California Department of Corrections and Rehabilitation (CDCR), treating inmates at prisons in Vacaville, Salinas Valley and Stockton.

Fully assessing the DSH's buildings and structures for seismic safety is complex and costly. The state hospitals include approximately 474 buildings, which amass over 6.5 million sq. ft. of space, operating on over 2,600 acres. For example, each hospital includes buildings which either house patients or in which patient care is provided as well as structures such as hospital police officer stations, firehouses, kitchens, chapels, trade shops, warehouses and administrative buildings.

The DSH is not subject to the 1973 Alfred E. Alquist Hospital Seismic Safety Act, the premier statute guiding seismic safety for acute care hospitals, and therefore not required to remove, replace, or retrofit its buildings due to seismic concerns by a specified date. However, the Seismic Performance Categories (SPC) classification system that the OSHPD developed as a result of the Act, is helpful in identifying state hospital buildings that are in danger of poor performance in the event of an earthquake, and the use of those methodologies has revealed significant risk to state hospital buildings. It should be noted that while DSH is not subject to the Alquist Act, new state hospital construction is built in accordance with current building codes that typically meet seismic safety levels intended by the Act.

The methodology employed in conducting a preliminary assessment of the state hospitals' seismic safety included reviewing existing DSH and DGS records; consulting with the DGS, OSHPD and SSC staff regarding how to quickly and cost effectively assess the general state of the hospital campuses; and consulting with Fong and Chan, and Thornton Tomasetti to evaluate the DSH buildings. Challenges encountered included inadequate records of the DGS assessments performed on the hospital campuses and inconsistent definitions of buildings across the hospitals.

In sum, the state hospitals and its associated buildings are unique in design, location, age and construction materials; were not built to serve its current population of primarily forensic patients; and are located in high seismicity areas, built on Class D soil types, and proximal to large faults.

Notably, the state hospitals are at significant risk in the event of an earthquake, albeit not simultaneously. In fact, other than DSH-Coalinga, which was built in 2005, the other state hospitals consist of buildings that:

- Have reached or surpassed their original intended lifespan.
- Are made of materials that have historically performed poorly in earthquakes.
- Have older and vulnerable non-structural infrastructure such as water and gas lines.
- Have buildings that contain asbestos and lead paint which pose significant health risks to patients and staff.
- Are 85 percent SPC 1 rated which are considered a threat to life safety.

As such, the DSH recommends the following to mitigate and prioritize seismic safety of its hospitals:

- Develop a more robust building categorization scheme.
- Establish a uniform inventory system and update DSH inventory records at each of the state hospitals.
- Use the data from this report to prioritize buildings for seismic evaluation.
- Seek additional funds to assess the prioritized buildings for seismic safety.
- Initiate capital outlay retrofits and/or construction as needed to address seismic deficiencies.

THE DEPARTMENT OF STATE HOSPITALS OVERVIEW

The Department of State Hospitals

The DSH manages the nation's largest inpatient forensic mental health hospital system. Its mission is to provide evaluation and treatment in a safe and responsible manner, seeking innovation and excellence in state hospital operations, across a continuum of care and settings. The DSH is responsible for the daily care and provision of mental health treatment of its patients. In FY 2014-15, the DSH served almost 13,000 patients and on average the inpatient census was approximately 6,700 in a 24-hours-a-day, seven-days-a-week hospital system and approximately 600 outpatient census in its conditional release program. The DSH oversees five state hospitals and three psychiatric programs located in state prisons. Additionally, the DSH provides services in jail-based competency treatment programs and conditional release programs throughout the 58 counties. It employs approximately 12,334 staff.

The DSH's five state hospitals are Atascadero, Coalinga, Metropolitan – Los Angeles, Napa and Patton. The three psychiatric programs are operated through an interagency agreement with the California Department of Corrections and Rehabilitation (CDCR), treating inmates at prisons in Vacaville, Salinas Valley and Stockton.

The five state hospitals are all licensed acute psychiatric hospitals defined as a health facility that provides 24-hour inpatient care for persons with mental health disorders, including the following basic services: medical, nursing, rehabilitative, pharmacy, and dietary services. The California Department of Public Health (CDPH) is the California state agency responsible for determining a hospital is in compliance with applicable state licensing requirements.

With the exception of DSH-Coalinga, all other state hospitals, with the exception of a few buildings, were built prior to 1960. While the Department of State Hospitals was established in 2012, formerly the Department of Mental Health, the oldest existing State Hospital – DSH – Napa – was established in 1875.

Table 1 lists the state hospitals that are the subject of this report. While the DSH also administers psychiatric programs located in state prisons, this report is specific to the five state hospitals.

Table 1 – General Statistics on the State Hospitals

Hospital	Opened	Sq Ft*	Acres*	Bldgs*	County
DSH-Atascadero	1954	885,715	448	70	San Luis Obispo
DSH-Coalinga	2005	1,684,308	304	52	Fresno
DSH-Metropolitan	1916	1,219,476	162	108	Los Angeles
DSH-Napa	1875	1,529,502	1,500	169	Napa
DSH-Patton	1893	1,237,766	243	75	San Bernardino

* = approximate

Department of State Hospitals

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State Hospital Relevant Facts

The following information is relevant to consider in documenting and analyzing the seismic safety of the state hospitals.

- Apart from DSH-Coalinga, all of the state hospitals were largely constructed prior to 1960, though each campus has a number of buildings that were constructed or otherwise renovated in subsequent years.

- Each state hospital currently serves an overwhelmingly forensic population; however, the original use of four of the hospitals was for the mental health treatment of civilly committed populations. In fact, apart from DSH-Coalinga, no state hospital was designed to serve its current population. Additionally, the state hospitals' design does not reflect modern treatment principles in critical areas, specifically, the use of dorms rather than individual patient rooms.

- Each state hospital is unique in its design, location, and age: no two state hospitals are identical. The state hospitals are comprised of buildings that were made of various different construction materials, built over various decades, and in distinct locations.

- DSH-Patton is currently overbedded in an effort to help address the department's waitlist of pending patient placements. This overbedding means that the hospital has no swing space (i.e., capacity to move patients to alternate, unused space if an earthquake damages a building enough to require evacuation).

METHODOLOGY FOR ASSESSING THE STATE HOSPITALS

Assessment Methodology

The methodology employed in conducting a preliminary assessment of the state hospitals' seismic safety included reviewing existing DSH and DGS records regarding the DSH buildings; consulting with the DGS, OSHPD and SSC staff regarding how best to quickly and effectively assess the general state of the hospital campuses; and consulting with Fong and Chan, and Thornton Tomasetti to evaluate the DSH buildings.

OSHPD is the regulatory entity responsible for enforcing building standards for health facilities construction including hospital buildings in general acute care hospitals, acute psychiatric hospitals and skilled nursing facilities. The SSC is charged with investigating earthquakes, researching earthquake-related issues and reports, and recommending to the Governor and Legislature policies and programs needed to reduce earthquake risk. The DSA provides design and construction oversight for K–12 schools, community colleges, Essential Services Buildings, and various other state-owned and leased facilities. The Division also develops accessibility, structural safety, and historical building codes and standards utilized in various public and private buildings throughout the State of California.

The DGS, DSA, OSHPD, and SCC staff, advised the DSH that it would be possible to preliminarily evaluate the seismic safety of the buildings on each campus by utilizing both the DGS Assembly Bill (AB) 300 and OSHPD Seismic Performance Category (SPC) classification systems.[1] Both systems were recommended to be employed because while the SPC system was designed for hospital facilities, it was not intended to be used for all buildings on a hospital's campus.[2] Accordingly, the AB 300 system was deemed necessary to provide holistic data for each campus.[3]

Thorton Tomasetti, in conjunction with Fong and Chan, was contracted to do the initial site work needed to conduct this classification effort such as:

- Each building on each campus was identified by a unique building number, consistent with the numbering scheme in use at the hospital. Building information, including square footage and primary building usage, were collected from DSH records.

- Limited site visits to each of the campuses were conducted for the purpose of visually assessing the condition of buildings and confirmation of overall building geometry and construction type, insofar as was possible without extensive site work. Some potential building deficiencies that were visually discernible during the site visit were noted for use in future analysis, although the firm was not tasked with performing a complete evaluation of building deficiencies.

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[1] Explanations of these systems in detail are provided later in this report.

[2] However, because there was no reasonable method to review the nonstructural performance of each individual building, DSH was not able to utilize the NPC system for its buildings. Accordingly, the non-structural performance of systems within DSH buildings were not evaluated for this report.

[3] To address building inventory and categorization issues, DSH applied both systems to every building, and is providing the results in terms of square footage, rather than numbers of buildings.

- A review of available, original construction documents was performed where necessary to determine the building construction type and foundation type.

- A review of proximity to faults, recent earthquake history, and an analysis of soil types were also conducted for each campus.

- Buildings were assigned both a DGS AB 300 category as well as an OSHPD SPC classification.[4]

The results provide a general impression of the level of seismic risk associated with the state hospital buildings in the absence of detailed engineering evaluations. By using these two methodologies, as well as studying earthquake history, soil types, etc., the DSH was able to quickly and cost-effectively classify the state hospital campuses to provide preliminary data on the seismic safety of its sites.[5]

Challenges in Evaluating the State Hospitals
Because the DSH is lacking in reliable historical data related to the seismic assessments and retrofits conducted in prior years, a preliminary assessment of the five campuses was conducted. Due to limitations of time and resources, conducting a meaningful evaluation of the seismic safety of the state hospitals is hindered by:

- **Inconsistent Inventory Practices:** while each campus has a numbering/naming system for its buildings, these systems vary by hospitals. For example, at DSH-Napa, one "building" may actually consist of several seismically separate structures that are functionally one contiguous building. At DSH-Coalinga, however, there are several "buildings" designated by the use of particular areas within a single seismically connected structure. This makes it particularly difficult to effectively and consistently describe the seismic safety of the campuses using building names or numbers rather than square footage.

- **Unclear Categorization Scheme for Buildings:** seismic standards as well as structural best practices for buildings on DSH campuses differ with usage. For example, a 10,000 sq. ft. structure could be used to house a) patients, b) the hospital's police force, or c) sensitive information technology (IT) and telecommunication equipment vital to the functioning of the facility. Each of these potential usages comes with a host of specific requirements or best practices. As such, the DSH's current building classification scheme does not adequately and quickly identify the code requirements for each building. A more robust classification system needs to be developed as part of further assessing the state hospitals.

[4] For those buildings that would fall into either SPC 1 or SPC 2, because it was not feasible to identify which specific category applied to each building and at the recommendation of SSC staff, any such buildings were classified as SPC 1 in accordance with the California Administrative Code, section 2.0.1.2.3.

[5] Additionally, as a result of this effort, seismically relevant campus maps have been developed for the department and are included in the Appendix to this report.

BACKGROUND ON SEISMIC ASSESSMENTS

History on Relevant Seismic Safety Standards

The majority of California's seismic laws were historically focused on public school construction. In fact, much of the initial basis for seismic design standards for buildings originated from public school construction. Those standards and methods have merit in the evaluation of the state hospitals.

The 1933 Long Beach earthquake (estimated 6.2 magnitude) caused seismic safety in California[6] to be revisited, leading to the passage of the first of several significant seismic legislative initiatives, the Field Act (1933).[7] The Field Act mandated earthquake resistant construction of schools. The Riley Act, also passed in 1933, required all new construction be regulated by the review of construction plans, inspections during construction, and the issuance of building permits prior to allowing occupancy of new buildings.

Several significant school-related legislative initiatives followed, including the Garrison Act (1939) and the Greene Act (1967), and building codes were amended to include seismic construction standards, though earthquakes would periodically occur that tested those standards and instigated revisions.[8] This became a common pattern, with building codes gradually increasing earthquake safety requirements and even banning certain types of construction outright.

Perhaps the next most historically significant earthquake in California's history was the 1971 "Sylmar" earthquake that struck the San Fernando Valley area. The earthquake caused extensive damage to numerous buildings that were designed in accordance with the Uniform Building Code (UBC) of the day, demonstrating the inadequacy of some of the UBC's seismic provisions.

The Sylmar earthquake brought hospital construction as a focus of seismic safety as it severely affected four major hospital campuses, including collapsing two hospital buildings and killing 47 people. Subsequently, the California State Legislature passed the Alfred E. Alquist Hospital Seismic Safety Act in 1973.

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[6] Other significant earthquakes had occurred prior to this, including the 1906 earthquake in Santa Clara County that collapsed the multistoried, unreinforced masonry building at Agnews State Hospital killing over 100 patients.

[7] Much of this background section has been taken from other published reports on the same subject. In particular, "Seismic Safety in California Hospitals: Assessing an Attempt to Accelerate the Replacement or Seismic Retrofit of Older Hospital Facilities", which can be found at https://mceer.buffalo.edu/pdf/report/05-0006.pdf. Other sources can be found at: http://www.seismic.ca.gov/pub/HospSeismicSfty.pdf, http://www.nps.gov/tps/how-to-preserve/briefs/41-seismic-retrofit.htm, and http://www.oshpd.ca.gov/fdd/seismic_compliance/SB1953/SeismicReport.pdf.

[8] For a concise listing of California earthquakes, please see http://www.oshpd.ca.gov/fdd/seismic_compliance/SB1953/SeismicReport.pdf.

In 1986, the Legislature enacted Senate Bill (SB) 547, which required local governments in highly seismic regions to begin identifying hazardous unreinforced masonry buildings.[9] It also required local building officials to establish loss-reduction programs for such buildings under their jurisdiction by January 1, 1990. After the 1989 Loma Prieta earthquake, which saw significant damage to unreinforced buildings, numerous cities enacted ordinances requiring mitigation of these hazards.

In 1994, in the wake of the Northridge earthquake, the Alquist Act was amended by SB 1953, requiring OSHPD to develop standards of earthquake performance categories for general acute care hospitals. The measure also made OSHPD responsible for reviewing and approving structural and non-structural seismic evaluations, compliance schedules, and construction documents developed by owners, including field review of work performed. The bill set a deadline of January 1, 2008, by which time general acute care hospital buildings determined to pose a risk to life safety be removed from acute care use. The 2008 deadline for certain classes of buildings has been extended multiple times to 2013, then to 2015, and again to 2020.

The DSH is exempt from the retrofit requirements of the Alquist Act. Health and Safety Code section 130005 (k) states that a “hospital building” must be “licensed pursuant to subdivision (a) of Section 1250.” Health and Safety Code section 1250 (a) refers to the licensing of “General Acute Care Hospitals,” whereas the state hospitals are licensed as acute psychiatric hospitals. However, new construction of state hospital buildings are generally required to be built in accordance to the standards found in Title 24 of the California Code of Regulations, known as the “California Building Code” or CBC.

[9] “In buildings that have not been seismically upgraded, **particularly unreinforced masonry buildings**, parapets, chimneys, and gable ends may dislodge and fall to the ground during a moderate to severe earthquake. Walls, floors, roofs, skylights, porches, and stairs which rely on tied connections may simply fail. Interior structural supports may partially or totally collapse. Upper stories may collapse onto under-reinforced lower floors with large perimeter openings or atriums.” (Emphasis Added) Taken from: http://www.nps.gov/tps/how-to-preserve/briefs/41-seismic-retrofit.htm

CLASSIFICATION SYSTEMS/METHODOLOGIES FOR EXISTING BUILDINGS

Relevant Classification Systems

There are several classification systems that have been previously used by State agencies for assessing buildings to determine their level of seismic risk and prioritize retrofit needs. The two most relevant to the State Hospitals, and the two used for the purposes of this report, are:

- OSHPD's SPC and NPC Rating System, and
- DGS' AB 300 Rating System

OSHPD's SPC and NPC Rating System

OSHPD's building rating system for general acute care hospitals was established as a result of SB 1953, an amendment to the Alquist Act. Its intent is to ensure hospital buildings remain operational after an earthquake. OSHPD developed a twofold rating system for hospital buildings with all buildings classified on a five-point scale.

SPC ratings relate to the building structure itself and are roughly divided into two categories depending on the building date of construction. The following table provides additional clarification on OSHPD's SPC ratings.

Table 2 – SPC Building Categories[10]

Rating	Description and Deadline
SPC 1	Buildings posing significant risk of collapse and danger to the public. Buildings with a Probability of Collapse greater than 1.20% are placed in this category. These buildings must be brought up to the SPC 2 level by January 1, 2008 or removed from acute care service. Buildings with an approved extension are permitted to provide acute care service only up to the length of extension granted. The maximum extension that may be granted is January 1, 2020, beyond which the building can no longer provide general acute care services.
SPC 2	Buildings in compliance with the pre-1973 California Building Standards Code or other applicable standards, but not in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act. These buildings do not significantly jeopardize life, but may not be repairable or functional following strong ground motion. These buildings must be brought into compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, its regulations or its retrofit provisions by January 1, 2030 or removed from acute care service.

[10] Taken from: http://www.oshpd.ca.gov/fdd/seismic_compliance/SB1953/SeisPerfRatings-v3-2.html

Rating	Description and Deadline
SPC 3	Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, utilizing steel moment-resisting frames in regions of high seismicity and constructed under a permit issued prior to October 25, 1994. These buildings may experience structural damage which does not significantly jeopardize life, but may not be repairable or functional following strong ground motion. Buildings in this category will have been constructed or reconstructed under a building permit obtained through OSHPD. These buildings may be used to January 1, 2030 and beyond.
SPC 4	Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, but may experience structural damage which may inhibit ability to provide services to the public following strong ground motion. Buildings in this category will have been constructed or reconstructed under a building permit obtained through OSHPD. These buildings may be used to January 1, 2030 and beyond.
SPC 5	Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act and reasonably capable of providing services to the public following strong ground motion. Buildings in this category will have been constructed or reconstructed under a building permit obtained through OSHPD. These buildings may be used without restriction to January 1, 2030 and beyond.

SPC 1 and SPC 2 buildings are required to be taken out of acute care service, replaced, or retrofitted, whereas SPC 3, SPC 4, and SPC 5 buildings are allowed to stay in service indefinitely.

Buildings with deficiencies posing a threat to life safety are categorized as SPC 1. Originally, SPC 1 buildings were required to be removed from acute care service, retrofitted, or replaced by 2008, although there have been several extensions granted that extend the deadline to 2020, whereas SPC 2 buildings may remain in service until 2030. To determine if a pre-1973 building falls into SPC 1 or SPC 2, an evaluation similar to an American Society of Civil Engineers (ASCE) 41-13 Tier 1 deficiency-based checklist evaluation (a federal evaluation process) is performed.[11]

Although it is possible to upgrade a pre-1973 building to remain in service past 2030, the bar is high. Pre-1973 structures need to be upgraded to meet the Immediate Occupancy performance objective, which refers to a building being able to be in operation after an earthquake event and without loss of life. In addition, significant amounts of materials testing and construction quality verification for the existing conditions must be performed.

[11] In the initial mandated reporting of SPC ratings required by SB 1953, a large number of existing hospitals were categorized as SPC 1. However, the large costs that would be incurred to replace those facilities within an approximately ten year period before the 2008 deadline appeared economically infeasible within the constraints of the healthcare business model. In response, OSHPD implemented an additional mechanism by which a building with deficiencies could be categorized as SPC 2 and remain in service until 2030. A risk-based analysis procedure using the HAZUS-AEBM method could be used to analyze individual buildings based on their basic building construction type, age of construction, height, site seismicity, and a list of specific deficiencies. Structures with a specific probability of collapse were upgraded to SPC 2. In this manner, OSHPD was better able to refine the seismic retrofit priorities to focus on the facilities and particular buildings that were most at risk.

On the other hand, Nonstructural Performance Category (NPC) ratings address the extent to which non-structural elements, such as ceilings, equipment, architectural elements, and utility distribution systems, are laterally anchored or braced.

Buildings that do not have adequate anchoring or bracing for select systems, namely communication systems, emergency power supply, bulk medical gas systems, fire alarm systems, and emergency lighting equipment and signs in the means of egress are rated NPC 1.

Since these systems supply utilities throughout the campus, all these systems in all buildings on the campus need to be adequately braced to achieve NPC 2 status for the hospital.

To achieve NPC 3 status, the hospital must first achieve NPC 2 status, and the essential operational areas of the building, including in critical care areas, clinical laboratory service spaces, pharmaceutical service spaces, radiological service spaces, and central and sterile supply areas, must have adequate non-structural bracing.

Buildings with all non-structural components adequately braced are rated as NPC 4.

Finally, an NPC 5 rating indicates NPC 4 bracing plus a 72-hour water supply and liquid sewage storage capacity as well as radiological service and on onsite fuel supply for 72 hours of acute care operation.

DGS's AB 300 Rating System

As mentioned previously, public school construction has been a historical focus of seismic safety. In 1999, AB 300 required the DGS to conduct an inventory of public Kindergarten-12 school buildings that did not meet the minimum requirements of the 1976 UBC.[12] The DGS, through the Division of the State Architect (DSA), developed a seismic-safety inventory methodology to evaluate the buildings in a meaningful way without conducting costly field investigations. The screening process adopted by DSA eliminated all but approximately 16,000 school building construction projects, which were then further evaluated using a construction document review process to identify the lateral-force-resisting systems of these buildings.

The AB 300 system utilized a "Life Safety Performance" threshold for seismic safety.[13] This meant that buildings were segregated between those that were at low risk for life-threatening injury or entrapment (though the building may be severely damaged or even unusable after an earthquake) from those that were not. The building types in Category 2 can be generalized as concrete or masonry structures that have brittle behavior or that have weak connections between parts (e.g. roof to wall connection) that could result in a heightened risk of full or partial collapse.

[12] Substantial improvements in the seismic design of buildings were incorporated into the 1976 UBC.

[13] Life safety performance is defined as: "building performance that includes significant damage to both structural and nonstructural components during a design earthquake, though at least some margin against either partial or total structural collapse remains. Injuries may occur, but the level of risk for life-threatening injury and entrapment is low."

However, there are certain types of common deficiencies in older wood-framed buildings that were accounted for and precluded in the building code for schools, but not in the building code for other types of structures. Because of this, wood-framed buildings on non-school campuses may have been built with deficiencies that would cause the building to be designated as Category 2. Wood-framed buildings and buildings designed after mid-1978 were exempted from the AB 300 program because they typically perform well in earthquakes.

Table 3 – AB 300 Building Categories

Category	Definition
1	Buildings deemed likely to meet life safety standards
2	Buildings flagged for further detailed investigation based on being of construction types that perform poorly in earthquakes.[14]
Exempt	Wood-framed buildings and buildings designed after mid-1978 exempted from AB 300 because they typically perform well in earthquakes, included in Category 1 as a subset.

Comparison of the OSHPD SPC/NPC and DGS AB 300 Systems
Both rating systems are relevant for consideration based on the type of DSH building. However, there are marked differences between the OSHPD SPC/NPC and AB 300 systems, including:

- The SPC/NPC system is considerably more conservative as an evaluation tool than the AB 300 system. The SPC/NPC system has more comprehensive performance expectations and correspondingly lower tolerance for risk.

- The SPC/NPC system addresses non-structural elements whereas the AB 300 does not.

- The SPC/NPC system was specifically developed for hospital facilities whereas the AB 300 system was developed for public schools. Schools typically are simpler building systems, with fewer aspects that could be adversely affected by an earthquake, and serve populations that are more ambulatory than hospital populations.

Of the two classification systems, the SPC/NPC system is most useful for acute care and essential services space, whereas the AB 300 methodology is adequate for non-acute care space and non-essential services buildings. However, the AB 300 system can be overlaid with the SPC/NPC system to further identify buildings within certain SPC categories to provide a more accurate level of performance in the event of an earthquake.

[14] Category 2 buildings include the following construction types: concrete moment frames, concrete or masonry shear walls with flexible floor or roof diaphragms, steel cantilever column structures with wood-framed roofs, light-framed steel buildings with metal siding or rod bracing, precast tilt-up concrete walls or frames, and unreinforced masonry walls.

THE FIVE STATE HOSPITALS – CONSTRUCTION HISTORY AND MATERIALS

DSH-Atascadero

Hospital Location
DSH-Atascadero is located in San Luis Obispo County at the southern end of the City of Atascadero. The site is bordered by a regional park to the west, and farm and unused land in the remaining perimeter. The facility has approximately 70 structures, including patient treatment units, recreation rooms, chapel, employee dormitories, administration services, medical services, plant operations, kitchen, warehouses, and other supporting facilities.

Construction History and Materials
The hospital was constructed in 1954, including Wards 1-15, 20-24 and 27-28, the Main and East-West Corridors, and the main adjoining buildings including the Fire House and the Steam Plant.

These buildings were all constructed of reinforced concrete walls and floors on shallow spread footings. Concrete moment frames provide the structure for the long span ceilings over the large Auditorium and Gym rooms. Many of the buildings have an irregular shape, with re-entrant corners. One architecturally unique structure that exists on the campus is the Visitors building. This structure has reinforced concrete ‘mushroom’ shaped columns that spread out at the top to form the roof. The maintenance and warehouses built to the west of the main building are a mixture of steel braced and moment framed buildings.

In 1963, Wards 16-19, 25, and 26 were added using the same construction type of reinforced concrete walls and floors. In 1993, several buildings were remodeled. The renovations were architectural and no seismic upgrades were made. In 2001, the main corridor was extended at the north end to provide for three new buildings consisting of Wards 29-34. The lateral system building type for these wards is a mixture of reinforced concrete and Concrete Masonry Unit (CMU) shear walls. One building (rehabilitation therapy) was observed to be constructed of precast concrete. Additionally, the campus also includes a number of steel shelters, modular buildings and light steel framed sheds.

DSH-Coalinga

Hospital Location
DSH-Coalinga is located seven miles east of the City of Coalinga and about 200 miles south of Sacramento. The site is bordered by Pleasant State Valley Hospital on the west and farmland around the remainder of the site. The facility has approximately 52 structures, including patient treatment units, recreation rooms, chapel, employee dormitories, administration services, medical services, plant operations, kitchen, warehouses, and other supporting facilities.

Construction History and Materials
The hospital was constructed as a singular project in 2005. The facility consists of patient treatment units, dining hall, medical services, kitchen, recreational and educational center in a secured fenced area. Outside the secured fenced area, the facility has administration services, police services, guard towers, kitchen, plant operations, and warehouses buildings.

The facility is built with two types of construction for the building lateral systems – steel braced frames and CMU walls. Outside the secured fence area, the majority of the buildings are one story CMU load-bearing and shear walls with metal deck over steel framed roof. The Administration building, outside the secured fenced area, is a two-story steel braced frame building. The floor framing consists of steel beams and lightweight concrete fill over metal deck.

In the secured fenced area, the patient treatment unit wings are two-story buildings constructed of CMU load-bearing and shear walls. The central portion of the treatment units, which is seismically separate from the wings, is constructed using steel braced frames. The treatment units' floors and roofs are framed with steel beams and lightweight concrete fill over metal deck. All the supporting facilities inside the secured fenced area are one story steel braced frame buildings with CMU wall cladding system at the perimeter. The guard towers are made of tall concrete tilt-up panels.

DSH-Metropolitan

Hospital Location

DSH-Metropolitan is located in the City of Norwalk about 15 miles Southeast of Downtown Los Angeles. The site is between Norwalk Boulevard and Bloomfield Avenue, bordered by commercial/industrial land to the north and east, with low-rise residential housing to the south and west. The facility has approximately 108 structures, including patient treatment units, recreation rooms, chapel, employee dormitories, administration services, medical services, plant operations, kitchen, warehouses, and other supporting facilities. The hospital has both secure (fenced) and non-secure areas.

Construction History and Materials

The first phase of hospital construction was 1914 with gradual development of the northern end of the campus through 1930. These buildings' conditions range from plaster and rust stains to structural deficiencies from termite damage, rotting and roof damage. Some buildings are unoccupied and slated for demolition while some have been retrofitted and in good usable condition.

The next major phase of construction started after World War Two in 1947 and continued until the late 1950s. This second phase of buildings shows less deterioration than the first, however there are still signs of rotting, termite damage and general environmental wearing with a number having been renovated in the late 1990s and early 2000s. There have been sporadic bursts of construction from 1970 until the present day.

A number of building construction types and lateral systems occur at the facility. The patient treatment buildings consist of two types of construction: two-story with concrete shear walls and single story with reinforced masonry bearing walls with wood or metal deck diaphragms.

The majority of the rest of the buildings are single or two story structures with lateral force-resisting systems consisting of reinforced masonry bearing walls with wood or metal deck diaphragms; steel braced frames; steel light framed construction; light steel framed modular construction; steel moment frames; or wood frame construction. The clinical administration building is four stories with concrete moment frame construction and the laundry building is single story with precast concrete tilt-up walls. The hospital police kiosks are light framed wood construction. There are a number of specialty structures such as the water towers and Co-Generational Plant building that have unique bracing.

DSH-Napa

Hospital Location

DSH-Napa is located on California State Highway 221, three miles south of downtown Napa and 60 miles southwest of Sacramento. The site is bordered by Napa Valley College to the west, suburbs to the north, and a quarry and materials processing site to the east and south.

Construction History and Materials

The hospital was originally constructed in 1875 and has since expanded to the present date. The facility has approximately 169 structures, which include buildings with over 100,000 sq. ft. to structures that cover less than 100 sq. ft.

The facility has patient treatment units, recreation rooms, chapel, and other supporting facilities in a secured fenced area. Employee dormitories, administration services, medical services, plant operations, kitchen, and warehouses are outside the fenced area. The majority of the facility has one-story structures and a few two or three-story buildings. Damage from the August 2014 South Napa Earthquake is still evident.

Table 4 – Development of DSH-Napa

Era	Construction Type and Size	Usage
1875 to 1900	Unreinforced masonry walls with wood framed floors Wood shear walls/framing - small buildings	Mechanical equipment Residential
1900 to 1939	Wood shear walls/framing - small buildings Wood shear walls/framing - large buildings Concrete shear walls with mix of wood and concrete floors and no seismic separations	Sheds and garages Wards and employee housing Patient treatment units and employee housing
1940 to 1950	Concrete shear walls with concrete floors and seismic separations Wood shear walls/framing - small buildings	Patient treatment units Residential
1950 to 1975	Reinforced masonry walls with light framed roof Concrete shear walls with a mix of wood and concrete floors Steel light framed	Mechanical equipment and Chapel Patient treatment units and kitchen Shed and storage
1975 to 2015	Steel light framed Modular units Reinforced masonry walls with light framed roof	Storage and kiosks Police office Security and visitor center

Concrete, light framed steel, and wood were used for construction from the early 1900s to the present. Reinforced masonry buildings with light framed roof were constructed from the 1950s to 2000, and the unreinforced masonry buildings were constructed in the 1875 until the early 1900s. The modular units were assembled on the site around the 1980s. The largest expansion took place in the 1940s, focused primarily on patient treatment units and residential housing.

DSH-Patton

Hospital Location

DSH-Patton is located northeast of San Bernardino, approximately 70 miles east of Downtown Los Angeles. The facility occupies a rectangular area of approximately 243 acres and is bordered by Highland Avenue to the south, Victoria Avenue to the west, and North Orange Avenue to the east. A school and low-rise residential housing are located on the north side of the facility. The facility has approximately 75 structures, including patient treatment units, recreation rooms, chapel, employee dormitories, administration services, medical services, plant operations, kitchen, warehouses, and other supporting facilities. The hospital has both secure (fenced) and non-secure areas.

Construction History and Materials

The first construction phase of the hospital began in the year 1893 with a single building that is now abandoned due to seismic issues, termite damage and utility damage. From 1912 through 1939 there was continuous construction of various structures that today show evidence of structural deficiencies, termite damage, asbestos, lead paint and other general deterioration of the building facilities. Several of these buildings are condemned or uninhabitable, though some have been retrofitted and remain in good working condition.

After World War Two, there was continuous development through 1960 that consisted of employee housing and patient treatment centers. These structures are mostly all habitable, with some signs of deterioration such as termite damage and utility dysfunctionality. There is one notable condemned building from this phase that has been slated for demolition due to rotting. The final phase of construction started in 1980 and consisted of sporadic development until 2009.

DSH-Patton contains three separate secure fenced areas inside the greater campus area. The structures within the secured areas consist of the patient treatment units, staff offices, medical services, day treatment facilities and sports facilities, etc. The rest of the facility outside the secure fenced areas consists of the staff offices, auditorium, kitchen, laundry building, plant operations workshops/warehouses, hospital police department, staff accommodation, administration building, and a significant solar panel array.

A number of building construction types and lateral systems occur at the facility. Within the secure fenced area the types of construction and lateral systems for single and two story structures are reinforced masonry bearing walls with wood or metal deck diaphragms; concrete frame with unreinforced masonry infill walls; concrete moment frame; precast concrete tilt-up walls; commercial and industrial wood frame; or light frame steel modular units. One of the patient treatment buildings is four stories with a concrete moment frame.

Outside the secure fenced area, the majority of building construction types are single or two-story structures with lateral force-resisting systems consisting of reinforced masonry bearing walls with wood or metal deck diaphragms; precast concrete tilt-up walls; commercial and industrial wood frame; light wood frame; braced steel frame; or light frame steel modular units. The Annex administration building is three stories with a concrete moment frame. The auditorium is three stories and a structural system of reinforced masonry bearing walls with wood or metal deck diaphragms.

HISTORICAL DATA ON THE SEISMIC SAFETY OF THE STATE HOSPITALS

History of State Hospital Seismic Assessments and Retrofits

There is no record of a comprehensive seismic safety assessment conducted of the state hospitals in the department's history.

In the 1980s and 1990s there was a state effort, conducted by the DGS, to evaluate state buildings for structural deficiencies.[15] However, approximately only 75 structures were assessed during this timeframe. Unfortunately, while the DSH has periodically assessed buildings for seismic safety as needed for specific capital outlay planning purposes, a comprehensive assessment of the state hospitals remains outstanding.

The Division of the State Architect's (DSA) Risk Level Tool

When DGS conducted assessments, both those in the 1980s and 1990s and those requested by the DSH later for capital outlay purposes, the assessment method used was the Division of the State Architect's (DSA) Risk Level Tool.

This tool assigns a numerical score, ranging from I through VII, to each assessed building to denote their seismic risk. Structures are assessed based upon four categories or aspects ("Building," "Risk to Life," "Systems," and "Occupancy"), and then assigned a predictive result to each category by level. For example, the "Risk to Life" of a Level I structure is characterized as "Negligible," whereas it is characterized as "Moderate" in a Level IV structure. To date, all available assessment data on DSH buildings is tied to this scale.

In 2015, the SSC and OSHPD made DSH aware that they recommended moving away from the DSA Risk Level Tool as it was not an adequate assessment tool for seismic safety.[16] The DSH organized a meeting on September 4, 2015 with OSHPD, SSC staff, and DSA to discuss the scale and its potential use for the purposes of this report. All parties agreed that since the standard for structural evaluations moved away from the type of risk assessment inherent in the DSA Risk Level Tool, it should not be used for the DSH's evaluations prospectively.

Review of DGS Seismic Analysis Work

For the past few years, the DSH worked with the DGS to obtain all of the assessment records for DSH facilities.

Unfortunately, in reviewing the data, some of the assessment information appears to be irreconcilable to the DSH's building inventories. The data provided by the DGS includes a significant number of buildings that do not appear on the current state inventory list for the department. DSH has made repeated attempts to reconcile the DGS data to inventories, including tasking the assignment to facilities staff that had been working at their location for over 25 years. To date, the data remain irreconcilable.

[15] Some of the assessments occurred later as well.

[16] The criticisms included the fact that the designations of each level (i.e., "moderate risk to life") were unclear and seemed to overlap with other levels.

Additionally, assessments seem to have been done on portions of buildings rather than entire structures. From a structural standpoint, it may be appropriate as some DSH buildings have been expanded over time and a single building may be comprised of several seismically separate structures. Unfortunately, this further adds to the difficulty of concisely addressing the number of assessed buildings.

These challenges notwithstanding, Tables 5 and 6 illustrate the assessment data provided by the DGS to date on the number of assessments and retrofits done for each state hospital.

Table 5 – Number of Buildings Assessed by Risk Levels

Level	Atascadero	Coalinga[17]	Metropolitan	Napa	Patton
I	0	0	0	0	0
II	3	0	0	0	0
III	12	0	2	1	0
IV	4	0	3	21	1
V	2	0	15	4	3
VI	0	0	3	1	0
VII	0	0	0	0	0

Table 6 – Number of Buildings Retrofitted

Atascadero	Coalinga	Metropolitan	Napa	Patton
1	0	10	3	0

Analysis of Existing Assessment and Retrofit Data
In analyzing the assessment and retrofit data, no clear patterns emerge. However, the DSH has made the following observations about the data:

- Most of the assessments and retrofits appear to have been completed in the 1990s or early 2000s.

- There is no pattern in terms of the types of buildings evaluated. For example, at DSH-Metropolitan, the two main patient housing units, Continuing Treatment East and Continuing Treatment West were both assessed. However, the Skilled Nursing Facility, another major patient housing building, does not appear to have been assessed, while other general purpose buildings (libraries, laundry, etc.) were.

- When conducting retrofits of assessed buildings, it appears that patient housing was emphasized. However, it does not appear that there is any particular pattern as to why other buildings were selected for retrofit, though factors such as project cost or impact to hospital operations were likely considered. For example, at DSH-Atascadero, the kitchen was retrofitted, but the East-West Corridor, which is a major thoroughfare for the hospital, was not.

[17] DSH-Coalinga was neither assessed nor needed retrofits due to being constructed in 2005.

ASSESSMENT DATA ON THE SESIMIC SAFETY OF THE STATE HOSPITALS

Classification of Buildings (OSHPD SPC Ratings and DGS AB 300 Categories)

Table 7 details a summary of DSH buildings by square footage as classified under the OSHPD SPC system as well as the DGS AB 300 system.

With the exception of DSH-Coalinga, the vast majority of DSH space is considered SPC 1. SPC 1 represents potential for seismic deficiencies and the need for further assessments and retrofits (or replacement). Buildings constructed prior to 1973 with any deficiencies that cannot be justified as acceptable by calculation are deemed to be a threat to life safety and categorized as SPC 1. Under the Alquist Act, SPC 1 buildings were required to be removed from acute care service by 2008, although there have been extensions granted that in some cases extend the deadline to 2020.

Table 7 – Summary of Building Ratings by Campus (Building Square Footage)[18]

		OSHPD SPC			AB 300	
Facility	**Total Square Footage**	**SPC 1**	**SPC 3**	**SPC 4 and SPC 5**	**Category 1 or Exempt[19]**	**Category 2**
ASH	885,715	591,534 (67%)	81,674 (9%)	208,507 (24%)	845,343 (95%)	40,281 (5%)
CSH	1,684,308	0 (0%	0 (0%)	1,684,308 (100%)	1,684,308 (100%)	0 (0%)
MSH	1,219,476	1,078,674 (88%)	0 (0%)	140,002 (11%)	597,376 (49%)	616,500 (51%)
NSH	1,529,502	1,453,077 (95%)	0 (0%)	74,208 (5%)	1,410,869 (92%)	113,349 (7%)
PSH	1,237,766	1,158,978 (94%)	0 (0%)	78,788 (6%)	373,922 (30%)	863,844 (70%)

Note: the SPC classification system should be considered primary over the AB 300 system since it was intended for general acute care hospital buildings.

[18] Data is presented in terms of the building square footage, not in terms of the number of buildings, because of the large variation in building sizes and inconsistencies between campuses in building identification numbering systems.

[19] Wood-framed buildings and buildings designed after mid-1978 were exempted from the AB 300 program because they typically perform well in earthquakes, so those have been included as Category 1. However, the applicability of this exemption for wood-framed buildings in the AB 300 study to an evaluation of the State Hospital campuses requires confirmation. Further investigation is required to determine if these types of deficiencies are present on the State Hospitals campuses.

Seismicity of the State Hospitals

The five State Hospitals, and the approximately 6.5 million sq. ft. of buildings on those campuses, are located in areas of "High Seismicity."[20] Typically, seismic risk is highly dependent on at least three factors: proximity to an earthquake faults, the earthquake's magnitude, and local soil conditions as softer soils tend to amplify ground motions.

Table 8 – Seismic Values

Hospital	S_{ds} Value	S_{d1} Values	Classification
DSH-Atascadero	0.82 g	0.474 g	High Seismicity
DSH-Coalinga	1.27 g	0.65 g	High Seismicity
DSH-Metropolitan	1.33 g	0.71 g	High Seismicity
DSH-Napa	1.27 g	0.69 g	High Seismicity
DSH-Patton	1.33 g	0.71 g	High Seismicity

The table reflects the S_{ds} and S_{d1} values of each of the state hospitals

The ASCE 7-10 Standard, which is an integral part of many building codes in the United States, provides calculations that can be performed to determine a relative degree of seismicity of an area based upon these and other factors.

Areas of "High Seismicity" are typically defined having S_{ds} values over 0.50g or S_{d1} values over 0.20g, where S_{ds} and S_{d1} are seismic parameters used for determining the level of seismic forces in buildings. These are expressed in terms of "g" (normal gravity), and larger values indicate higher seismic forces.

Soil Types

Ground shaking is a primary cause of earthquake damage to man-made structures. A large contributor to the level of shaking that occurs in an earthquake is the soil composition, as soft soils tends to amplify ground shaking. If an earthquake is strong enough and close enough to cause damage, the damage will usually be more severe on soft soils.

The National Earthquake Hazards Reduction Program (NEHRP) has defined five soil types based on their shear-wave velocity.

Soil types are classified by letter (A, B, C, D, or E), with amplification of ground shaking higher in the later types. Type A soil, for example, does not contribute greatly to shaking amplification, whereas Type D is likely to significantly amplify shaking.

Table 9 - Soil Class

Hospital	Soil Class
ASH	D
CSH	D
MSH	D
NSH	D
PSH	D

[20] Information on seismicity is based on U.S. Geological Survey (USGS) seismic hazard data, as well as a review of geo-hazard reports previously commissioned for each of the five campuses.

Recent Major Nearby Earthquakes

The following table represents the most recent, significant earthquakes near the five state hospitals.

Table 10 – Most Recent Major Earthquakes

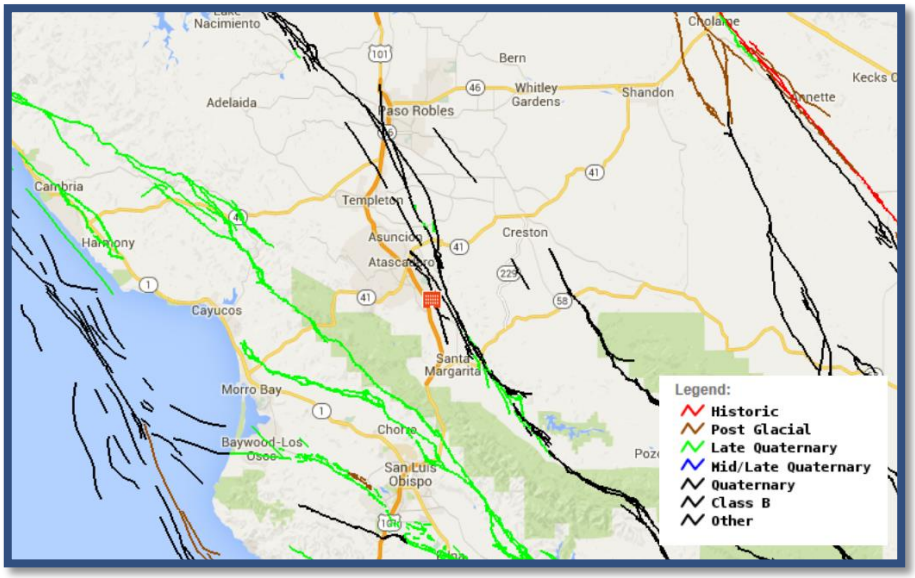
Hospital	Earthquake	Year	Magnitude
DSH-Atascadero	San Simeon	2003	6.6
DSH-Coalinga	Coalinga	1983	6.0
DSH-Metropolitan	Northridge	1994	6.7
DSH-Napa	South Napa[21]	2014	6.0
DSH-Patton	Northridge	1994	6.7

Proximity to Faults

The following tables show the faults nearest each state hospital.

Table 11 – Atascadero State Hospital: Distance for Fault Sources

Fault Source	Distance to Site	Maximum Magnitude
Rinconada	1.7 miles	7.5
Los Osos	13.5 miles	7.0
San Luis Range	20.8 miles	7.2
Hosgri	20.8 miles	7.3
San Juan	22.7 miles	7.1
South San Andreas	27.2 miles	7.6



[21] The South Napa earthquake did extensive damage to Napa State Hospital

Table 12 – Coalinga State Hospital: Distance for Fault Sources

Fault Source	Fault Source	Fault Source
Great Valley	5.7 miles	7.2
S. San Andreas	19.5 miles	7.0

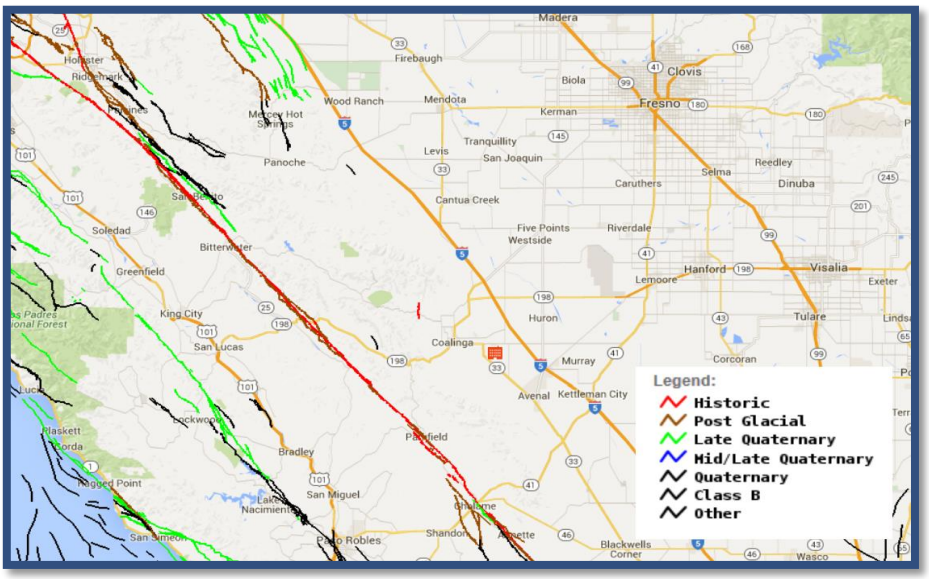


Table 13 – Metropolitan State Hospital: Distance for Fault Sources

Fault Source	Fault Source	Fault Source
Puente Hills	0.6 miles	7.1
Elsinore	4.6 miles	7.8
Elysian Park	9.9 miles	6.7
Newport Inglewood	10.1 miles	7.5

Table 14 – Napa State Hospital: Distance for Fault Sources

Fault Source	Fault Source	Fault Source
West Napa	1.9 miles	6.7
Green Valley	6.5 miles	6.8
Hunting Creek-Berryessa	12.7 miles	7.1
Hayward-Rodgers Creek	14.2 miles	7.3

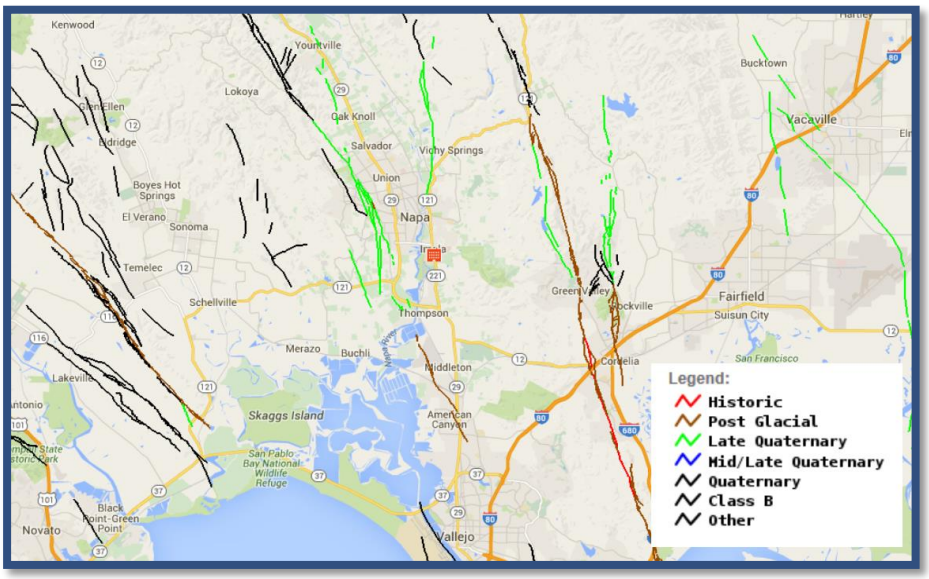
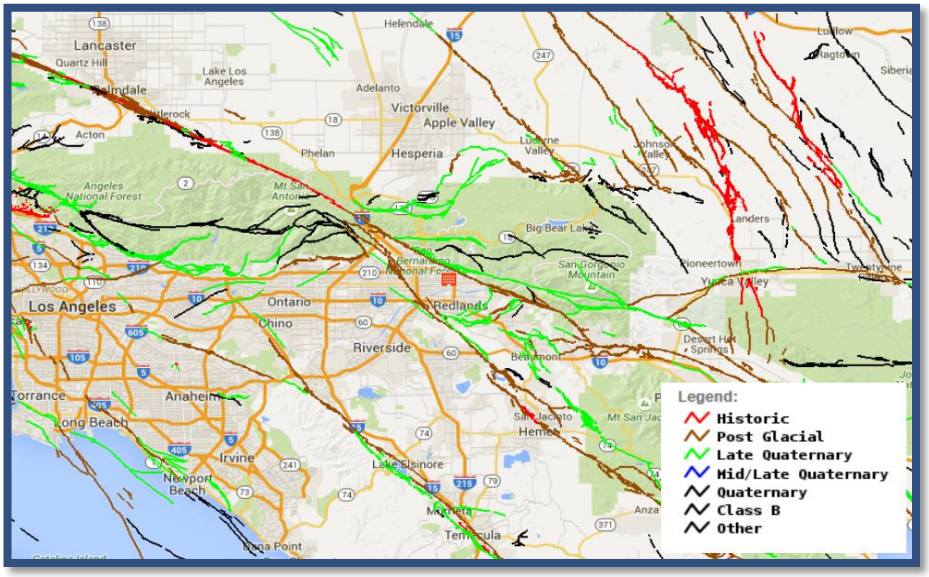


Table 15 – Patton State Hospital: Distance for Fault Sources

Fault Source	Fault Source	Fault Source
South San Andreas	0.6 miles	8.2
San Jacinto	6.4 miles	7.8
Cleghorn	9.7 miles	6.8
North Frontal	12.7 miles	7.2



ANALYSIS OF THE SEISMIC SAFETY OF THE STATE HOSPITALS

Assessment of Overall Risk

As aforementioned, the DSH is not subject to the 1973 Alfred E. Alquist Hospital Seismic Safety Act, the premier statute guiding acute care hospitals, and therefore not required to remove, replace, or retrofit its buildings due to seismic concerns by a specified date. While DSH is not subject to the Alquist Act's retrofit requirements, new construction are built in accordance with current building codes that meet the intent of the Act. However, the SPC classification system is applicable in identifying buildings that are in danger of poor performance in the event of an earthquake, and the use of those methodologies has revealed significant risk to state hospital buildings. In sum, the state hospitals are at significant risk in the event of an earthquake, albeit not simultaneously.[22]

Seismic Status of Patient Housing

As shown in the Appendix maps for each hospital, and as indicated in Table 7, the vast majority of the patient housing buildings on each campus are substantially SPC 1 and may pose a significant threat to life in the event of an earthquake. This is because the majority of state hospital patient housing was built prior to 1973.

Seismic Status of Other Critical Space

In addition to patient housing, there are other structures critical to the ongoing operations of that hospital. For example, main kitchens (where all campus food is prepared), medical treatment areas, as well as police and fire stations must be able to withstand an earthquake if a hospital is to continue providing services and housing patients. Unfortunately, these other critical buildings are also substantially classified as SPC 1.

Age of State Hospital Buildings

Though each campus has a number of buildings constructed or otherwise renovated in subsequent years, the vast majority of DSH buildings were constructed prior to 1960. Using the typical building lifespan factor of 50 years, the state hospital campuses consist of buildings that have reached or surpassed their original intended lifespan and should be reviewed for the need for retrofit or replacement.

Seismicity of Location

All state hospitals are located in areas of high seismicity. This increased possibility of an earthquake as well as the likelihood of shaking damage exacerbates the concerns noted above.

Presence of Hazardous Materials

For buildings constructed prior to 1960, there is a higher likelihood those structures will contain hazardous materials such as lead paint or asbestos, both of which would prove to be significant health hazards if patients, staff or the public were exposed in the event of an earthquake. Since a building would not need to collapse for hazardous materials to be exposed to the environment, this makes any earthquake that a state hospital experiences a potential health hazard.

[22] DSH-Coalinga is excluded given its recent construction and likelihood of seismic stability.

State Hospital (Non-Structural) Infrastructure

Structural evaluations of the individual buildings on a campus does not reflect the entirety of the seismic risk to life safety or to the functionality of a facility after an earthquake. Non-structural infrastructure (i.e., water and gas lines), pivotal to the operations of the campus, can be damaged and result in a loss of function for certain buildings or entire areas of a campus, even if the individual buildings are not significantly damaged.[23]

In institutions like the state hospitals, which house patients 24 hours per day, seven days per week, damage to the main potable water lines, gas lines, or a security system like the new Personally Duress Alarm System (PDAS) can be just as significant a concern as a brick-and-mortar building suffering damage in an earthquake. In older facilities, these non-structural infrastructure elements tend to be similarly aged, and therefore particularly vulnerable.[24]

Outdated Design and Lack of Space

Each state hospital currently serves an overwhelmingly forensic population, despite having been built for civil commitments. Because of this, and because of their age, the state hospitals' building design does not reflect modern treatment principles in critical areas, particularly the number of patients bedded per room. This leads to additional safety concerns, such as an increased likelihood that multiple patients are affected in the event of an earthquake.

Additionally, DSH-Patton is currently overbedded in an effort to help address the department's waitlist of pending patient placements. This overbedding means that the hospital has no capacity to move patients to alternate, unused space if an earthquake damages a building enough to require evacuation. The overbedding also increases the chances of injury or loss of life in the event of an earthquake. Because other state hospitals are all experiencing capacity limitations, lack of space is itself a significant concern.

Lack of Designed Essential Services Buildings

The 2013 California Administrative Code[25] defines an Essential Services Building as "any building, or any building of which a portion is used or designed to be used as a fire station, police station, emergency operations center, California Highway Patrol office, sheriff's office or emergency communication dispatch center." Any of the aforementioned operations in a building make that building an Essential Services Building. The Code states (Article 1, Section 4-201) that such buildings must be "capable of providing essential services to the public after a disaster" and "be designed and constructed to minimize fire hazards and to resist, insofar as practical, the forces generated by earthquakes, gravity, and winds."

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[23] This includes serving as potential fire or other health hazards. Additionally, after being subjected to severe shaking, certain equipment may be damaged and become non-functional. Equipment with complex electronics are particularly susceptible to damage of this type. The current CBC requires Special Seismic Certification for certain types of critical equipment to help ensure operability after an earthquake.

[24] Water, sewer, gas, etc. tends to be installed contemporaneous with building construction periods since they are inherently tied together.

[25] See also: Health and Safety Code section 16001.

Each state hospital has its own police and fire operations housed in fire stations, police stations, and operating emergency and dispatch operations centers. However, the state hospitals were not designed with buildings qualifying as Essential Services structures, so police and fire personnel in these facilities are in non-compliant buildings.[26] This may make the DSH's emergency responders ability to take immediate action in the event of an earthquake far less certain, as the DSH first responders themselves may be affected by the event.

[26] With the possible exception of DSH-Coalinga

PROPOSED NEXT STEPS AND RECOMMENDATIONS

Aside from DSH-Coalinga, the remaining four state hospital campuses have a sizable number of buildings that pose a risk to life safety, as well as the continued operation of the facilities, after an earthquake. It is recommended that a careful analysis of those buildings with seismic concerns, as well as critical non-structural infrastructure, be conducted to ensure the DSH patients and staff are safe in the event of an earthquake.

The following represents the DSH's planned next steps in continuing to identify and address the seismic safety concerns of its campuses.

Develop Comprehensive Building Categorization

Because the usage of the buildings on the state hospital campuses determines the seismic standards applicable for that structure, the initial step in addressing the seismic safety concerns at the state hospitals is to develop a more comprehensive building categorization scheme.

Currently, the department uses a basic categorization scheme to classify its buildings. Unfortunately, this scheme does not account for the various regulatory building requirements applicable to certain DSH buildings. For example: "Essential Services" buildings are lumped in with office space in the "Administration" category. The scheme also completely ignores the existence of its non-structural infrastructure, such as water and gas systems.

Additionally, each campus catalogs their buildings differently from the other campuses, and there is no single method used to classify "buildings" that are comprised of several structures, built at different times, with differing usages.

Accordingly, DSH will develop and adopt a new scheme that will more easily associate the specific regulatory building requirements as determined by that building's usage to each structure. Buildings with multiple usages within one structure will be associated with the usage that has the more stringent regulatory requirements. The new scheme will also establish a hierarchy of usage, based upon the importance of each usage category to the ongoing function of the hospital.[27]

As part of this reclassification effort, the DSH will also re-examine its site plans and inventories. DSH will establish a uniform method for identifying what constitutes a "building," which will be based upon a combination of seismic/structural separation, construction intent (such as whether a space was built with deliberate separation from a CBC standpoint), and the primary goal of the building (shared building systems within the structure).

By updating its inventories and site plans, and by implementing the new classification system, the DSH will have a consistent inventory scheme across all of the State Hospitals; more easily identify which regulatory requirements apply to each structure for future projects; and help prioritize, based upon the importance of a building's function to the hospital operation, which buildings to seismically assess and retrofit.

[27] Consideration will need to be made for interrelations between buildings and for the fact that DSH has forensic patient housing. For example, buildings that are part of the egress path for an essential services building need to be considered essential, as should areas that utilities pass through to service Essential Services buildings. Additionally, since patients in lock-down areas cannot evacuate themselves from a building, these areas should be flagged and evaluated for better performance.

Prioritize Buildings and Systems for Evaluation
Given the large number of state hospital buildings needing further evaluation, the DSH would then utilize a tiered approach to prioritize the need for seismic evaluations.[28]

DSH would first eliminate those buildings that are known to be seismically safe from needing further assessment. These may include DSH-Coalinga, buildings that have already undergone retrofits, acute-care occupancies with SPC ratings of 3-5, and non-acute care occupancies that are designated Category 1 or Exempt.

For the remaining buildings, DSH would use a combination of the SPC and AB 300 ratings, the usage of the buildings, and factors such as age and presence of hazardous materials to establish a hierarchy of buildings to further assess.

Seeking Necessary Funding and Conduct Assessments
As seismic assessments are costly, the DSH may need to seek funding via a Capital Outlay Budget Change Proposal (COBCP) or other means to pursue resources to fund the assessments of the prioritized buildings.

After obtaining the necessary resources, the DSH would conduct studies to assess its campuses in accordance with its prioritization scheme. The studies would determine critical building deficiencies, and provide conceptual retrofit schemes in sufficient detail to allow cost estimation. The studies would also entail a life-cycle analysis as to whether a retrofit or new construction may be the most cost effective option given maintenance needs, age of the building, viability of its design for clinical usage, historical mitigation issues, and the costs to retrofit or replace.

Align with the DSH Infrastructure Master Plan
In the latter part of Fiscal Year 2014-15, DSH contracted with Fong and Chan to develop an Infrastructure Master Plan for each of the state hospitals. Fong and Chan will conduct holistic evaluations of the state hospitals, factoring in the current state and life-cycle costs of each building, expected future needs for patient capacity, safety needs, and clinical best practices, and create a comprehensive facilities plan to ensure each hospital campus is able to meet the needs of the patients it serves. The results of the aforementioned seismic studies will be incorporated into this plan, which will lay out the retrofit, demolition, and new construction proposals necessary to address seismic deficiencies.

[28] The specific approach is detailed in Appendix A.

CONCLUSION

The seismic safety of the State Hospitals is critical to the long term health and wellbeing of the almost 13,000 patients treated annually and the department's 12,000 staff. While all five state hospitals are located in areas of high seismicity and built upon shaking amplifying soils, four of the five state hospitals are at particular risk. In addition to building damage, the hospitals are vulnerable to damage to its non-structural infrastructure, and at risk of exposing staff, patients, and neighboring communities to hazardous materials such as asbestos in the event of an earthquake.

The preliminary data provided in this report has identified a need for more focused assessments for many DSH buildings. While the DSH will narrow the scope of these assessments and prioritize buildings of seismic concern, conducting more focused reviews of the DSH buildings is necessary. Without these assessments and the undertaking of appropriate retrofits or new construction projects, vulnerable Californians served and employed by the DSH will continue to be at risk.

APPENDIX A – PRIORITIZATION SCHEME FOR FURTHER SEISMIC ASSESSMENTS

Given the large number of State Hospital buildings needing further evaluation, the DSH would then use the following, tiered approach to prioritize the need for seismic evaluations:

- Eliminate from consideration Coalinga State Hospital.
- Eliminate from consideration all buildings having already undergone seismic retrofits.
- Eliminate from consideration those buildings that are slated to be (or currently are) removed from service for reasons other than seismic safety. In particular, this would include all buildings proposed for demolition.
- Using the revised categorization scheme, segregate those buildings based upon whether they are defined in Title 24 as acute-care occupancies.
- Apply the preliminary SPC designations to acute-care occupancies.
- Eliminate from consideration those buildings that fall into SPC 3, SPC 4, or SPC 5.
- For those buildings designated as SPC 1, overlay the preliminary AB 300 designations to segregate buildings into two tiers to prioritize assessments.

Table 16 – Tier Definitions

Tier	Definition
1	SPC 1 buildings that are also Category 2
2	SPC 1 buildings that are also Category 1 or Exempt[29]

- For the buildings that are not acute-care occupancies, apply the preliminary AB 300 designations.[30]
- Eliminate from consideration those buildings that fall into Category 1 or are Exempt.[31]
- For buildings that fall into the Exempt category, conduct the additional site work needed to validate that those buildings meet the exempt requirements. [32]
- Eliminate those buildings which are truly exempt from consideration. Buildings which are not truly exempt would be considered Category 2 for the purposes of evaluation.

[29] Exemptions would need to be confirmed, and if inapplicable, then the building would become Tier 1.

[30] Some building types, such as older unreinforced masonry structures have a very high baseline risk level, without considering building deficiencies, making further evaluation unnecessary.

[31] For those buildings used in an Essential Services capacity, additional analysis would be needed.

[32] Example: survey the pre-1973 wood-framed buildings to verify that they are bolted to their foundations and that the cripple walls are sheathed.

- Of the remaining buildings (SPC 1 buildings of both Tiers, as well as Category 2 buildings), establish prioritization scores for all buildings/systems based upon *usage*, *type/age*, and *hazard* as described below in Table 17:

Table 17 – Highest Priority Buildings (Seismic Evaluations)[33]

#	Action
1	Patient housing would be given highest priority for evaluations. SPC 1 buildings that are Tier 1 would be prioritized first, unless operational reasons (example: number of patients or if the patients are particularly non-ambulatory) dictate otherwise.
2	Critical non-structural infrastructure (those systems that a campus cannot function without, would prevent admissions, or would otherwise pose a grave risk to patients or staff) would be given second highest priority for evaluations. These systems would likely include electric power (including back-up systems such as cogeneration plants and areas housing mobile generators), gas and water systems, and critical IT/Telecom systems.[34]
3	The remaining SPC 1 buildings that are Tier 1 would be given third highest priority.

- Prioritize the rest of the buildings on DSH campuses using a threefold system. Each building would be assigned points based upon its **usage**, its **type/age**, and its degree of **hazard**. Table 18 below reflects the categories for this point system:

Table 18 – Prioritization of Remaining Buildings

Category	Criteria
Usage	Using the hierarchy of building categories described above, each building will be assigned points based upon its usage.
Type/Age	Buildings will be assigned points based on basic building characteristics such as its age, building type, number of stories, known security risks, pending deferred maintenance, regulatory compliance, and original design criteria.
Hazard	Buildings will be assigned points based upon the likelihood of containing asbestos or other hazardous materials.

- Tally the total points for each building and propose assessments with those buildings with the highest number of points prioritized over those with less.

- Seek feedback from DGS, OSHPD, and the SSC on the identified assessment priorities via an independent review, and make adjustments as necessary.

[33] Mitigating factors, such as the overbedding at PSH, will also factor into developing a list of priorities.

[34] This would potentially include the vulnerability of the systems themselves in an earthquake, as well as the viability of appropriate back-up systems.

APPENDIX MAPS

APPENDIX B – ATASCADERO

B.1 Campus Maps
- B.1.1 DSH Category
- B.1.2 Building Construction Type
- B.1.3 Building Vintage
- B.1.4 AB 300 Category
- B.1.5 OSHPD SPC Rating

APPENDIX C – COALINGA

C.1 Campus Maps
- C.1.1 DSH Category
- C.1.2 Building Construction Type
- C.1.3 Building Vintage
- C.1.4 AB 300 Category
- C.1.5 OSHPD SPC Rating

APPENDIX D – METROPOLITAN

D.1 Campus Maps
- D.1.1 DSH Category
- D.1.2 Building Construction Type
- D.1.3 Building Vintage
- D.1.4 AB 300 Category
- D.1.5 OSHPD SPC Rating

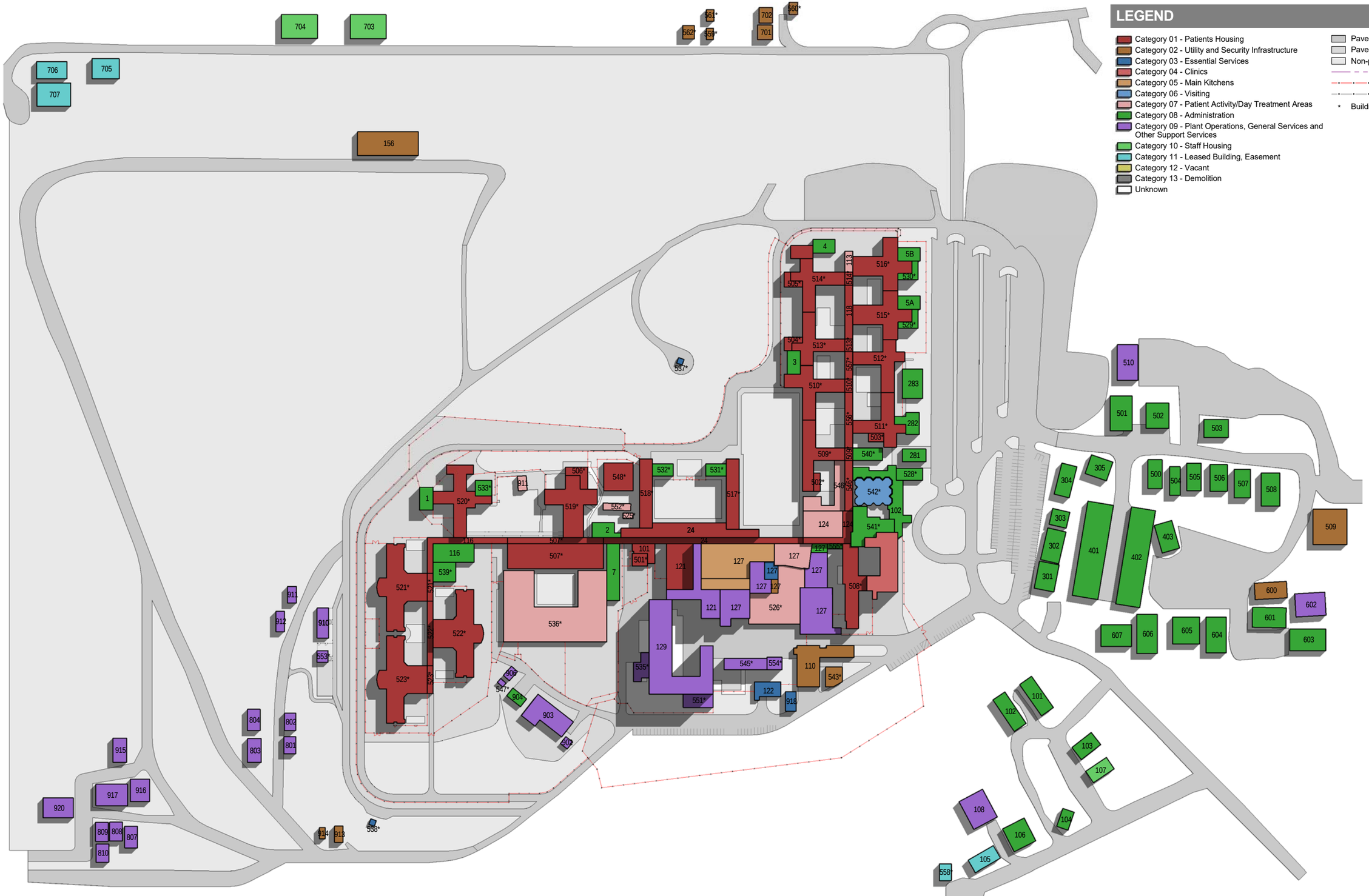
APPENDIX E – NAPA

E.1 Campus Maps
- E.1.1 DSH Category
- E.1.2 Building Construction Type
- E.1.3 Building Vintage
- E.1.4 AB 300 Category
- E.1.5 OSHPD SPC Rating

APPENDIX F – PATTON

F.1 Campus Maps
- F.1.1 DSH Category
- F.1.2 Building Construction Type
- F.1.3 Building Vintage
- F.1.4 AB 300 Category
- F.1.5 OSHPD SPC Rating

DEPARTMENT OF STATE HOSPITALS
1600 9TH STREET, SUITE 150
SACRAMENTO, CA, 95814



LEGEND

- Category 01 - Patients Housing
- Category 02 - Utility and Security Infrastructure
- Category 03 - Essential Services
- Category 04 - Clinics
- Category 05 - Main Kitchens
- Category 06 - Visiting
- Category 07 - Patient Activity/Day Treatment Areas
- Category 08 - Administration
- Category 09 - Plant Operations, General Services and Other Support Services
- Category 10 - Staff Housing
- Category 11 - Leased Building, Easement
- Category 12 - Vacant
- Category 13 - Demolition
- Unknown
- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence
- * Building Number Assigned by Architect

62.5FT

62.5FT

Appendix B1.1
DSH Category

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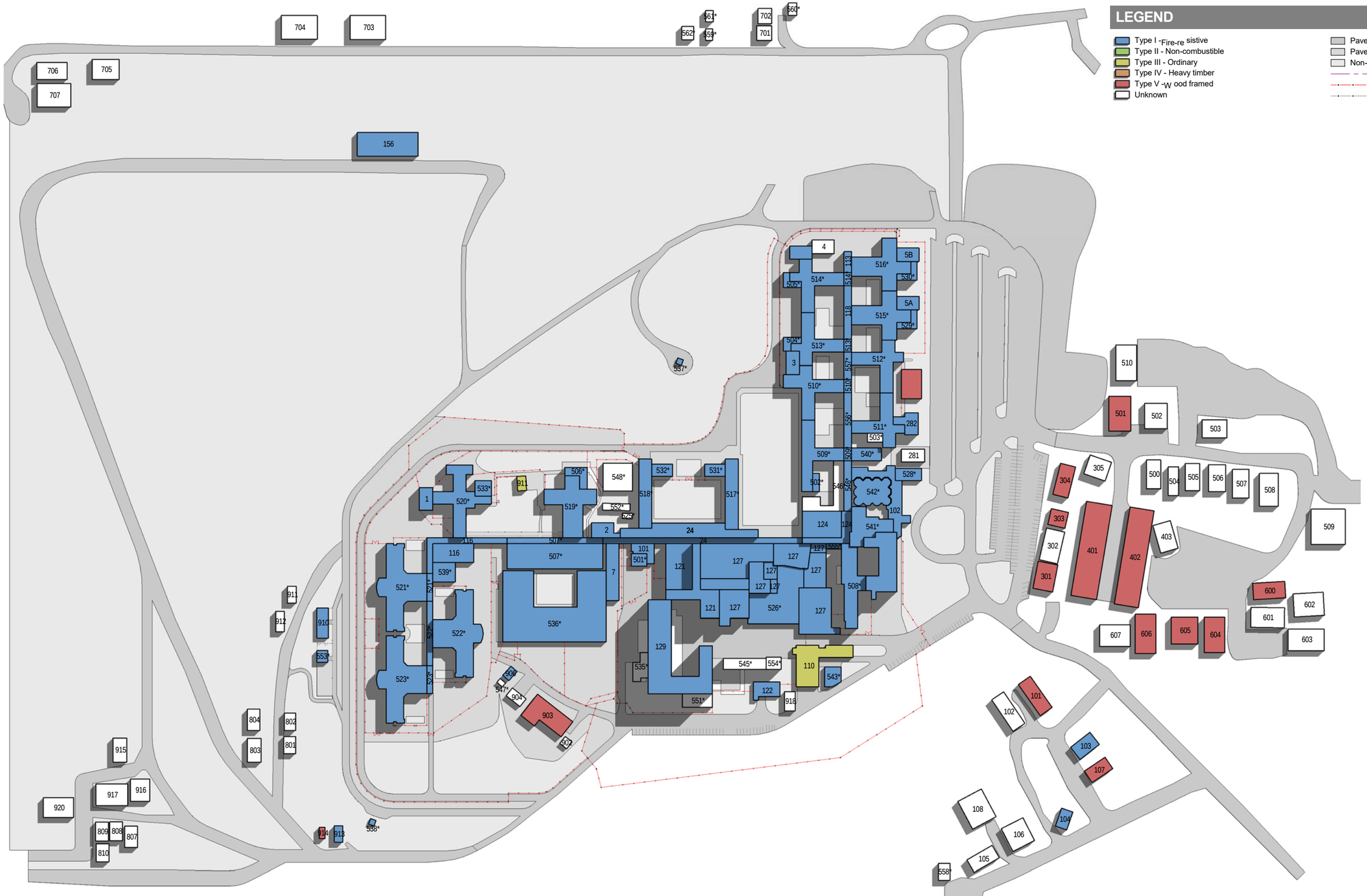
INFRASTRUCTURE MASTER PLAN

ATASCADERO STATE HOSPITAL



LEGEND

- Type I - Fire-resistive
- Type II - Non-combustible
- Type III - Ordinary
- Type IV - Heavy timber
- Type V - Wood framed
- Unknown
- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

62.5FT

62.5FT

Appendix B1.2
Building Construction Type

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INFRASTRUCTURE MASTER PLAN

ATASCADERO STATE HOSPITAL

LEGEND

- Building was built prior to 1900
- Building was built between 1900 and 1920
- Building was built between 1920 and 1940
- Building was built between 1940 and 1960
- Building was built between 1960 and 1973*
- Building was built between 1973 and 2000*
- Building was built after 2000
- Building vintage is unknown

* Enactment of the Alfred E. Alquist Hospital Seismic Safety Act in 1973.

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

62.5FT

Appendix B1.3
Building Vintage

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INFRASTRUCTURE MASTER PLAN

ATASCADERO STATE HOSPITAL

LEGEND

Per Seismic Safety Inventory of California Public Schools, Department of General Services, dated November 15, 2002.

- AB 300 - Category 1
  Those building types that are likely to perform well, and are expected (but not guaranteed) to achieve life-safety performance in futures earthquakes.
- AB 300 - Category 2
  Those building types that are not expected to perform as well in future earthquakes. Require detailed seismic evaluation to determine if they can be expected to achieve life-safety performance.
- AB 300 - Exempt
  Buildings built after 1979 due to substantial improvements incorporated into 1976 UBC adopted for design and construction of public schools on July 1, 1979. Wood framed buildings, these are known to perform well in earthquakes.
- Not Applicable

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

62.5FT

Appendix B1.4
AB 300 Category

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INFRASTRUCTURE MASTER PLAN

ATASCADERO STATE HOSPITAL

LEGEND

Per 2013 California Administrative Code, Chapter 6, Table 2.5.3.

- SPC 1/2
  Buildings pos ing significant risk of collapse and danger to the public Buildings with Probability of Collapse greater than 1.20% and/or buildings in compliance with the pre-1973 California Building Standards Code or other applicable standards, but not in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act.
- SPC 3
  Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, utilizing steel moment-resisting frames in regions of high seismicity as defined in Section 4.2.10 and constructed under a permit issued prior to October 25, 1994.
- SPC 4/5
  Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, but may experience structural damage which may inhibit ability to provide services to the public following strong ground motion. As well as buildings that are reasonably capable of providing services to the public following strong ground motion.
- Unknown

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

62.5FT

62.5FT

Appendix B1.5
OSHPD SPC Rating

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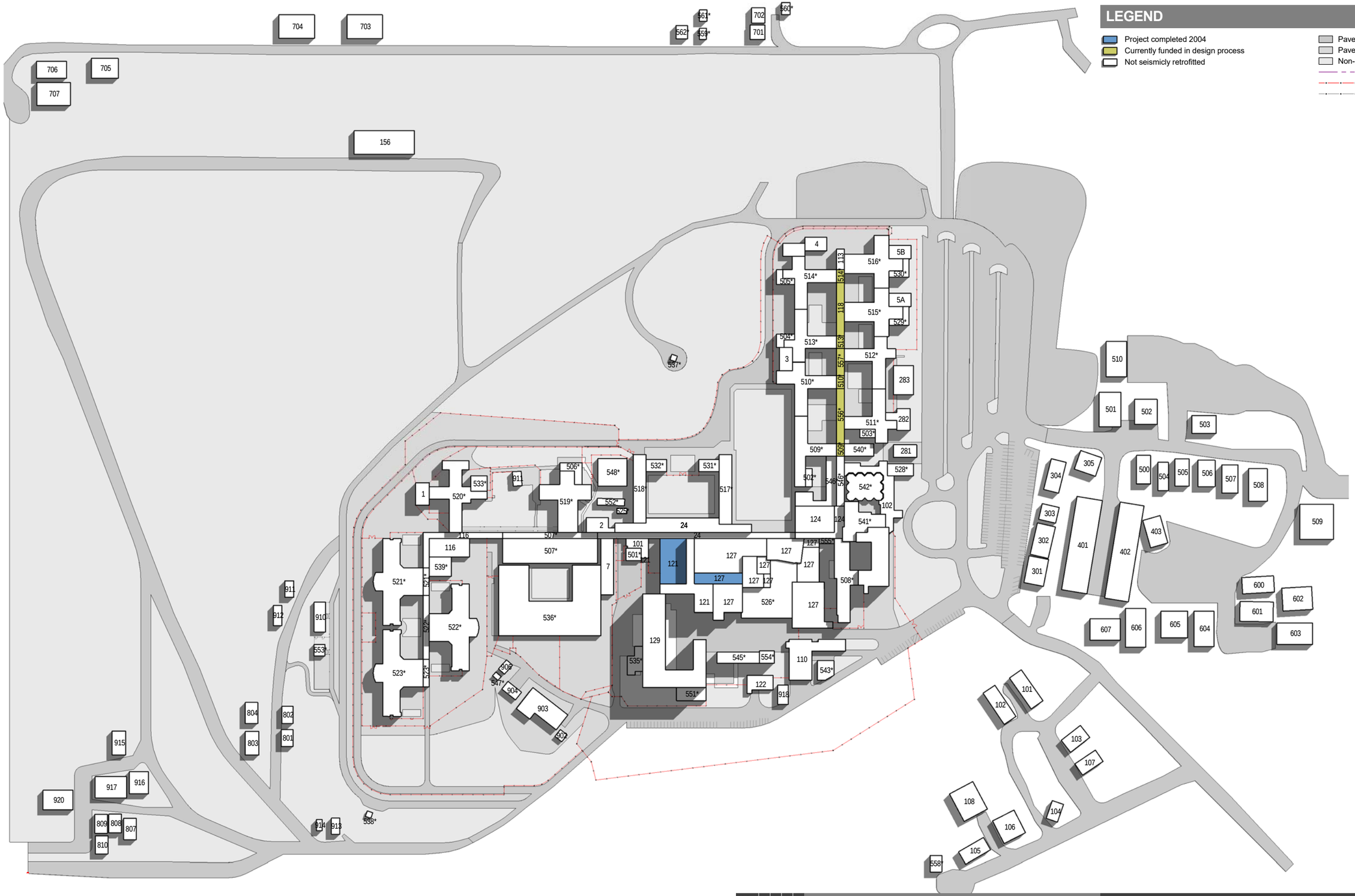
INFRASTRUCTURE MASTER PLAN

ATASCADERO STATE HOSPITAL



62.5FT

29.5FT

Appendix B1.6
Building Seismic Retrofit

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INFRASTRUCTURE MASTER PLAN

ATASCADERO STATE HOSPITAL

80FT

60FT

Appendix C1.1
DSH Category

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INFRASTRUCTURE MASTER PLAN

COALINGA STATE HOSPITAL

80FT

60FT

Appendix C1.1
DSH Category

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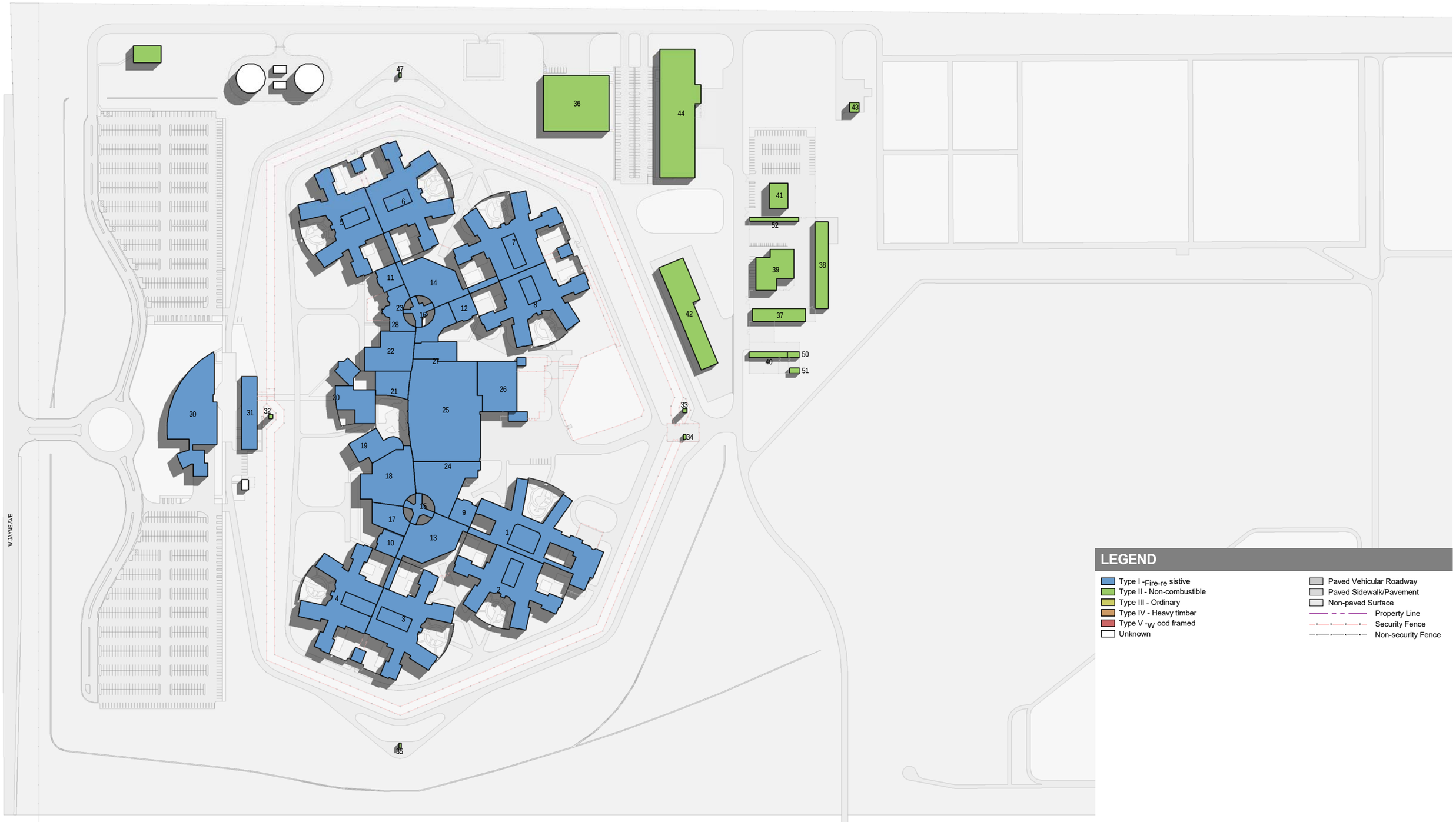
INFRASTRUCTURE MASTER PLAN

COALINGA STATE HOSPITAL



80FT

80FT

Appendix C1.2
Building Construction Type

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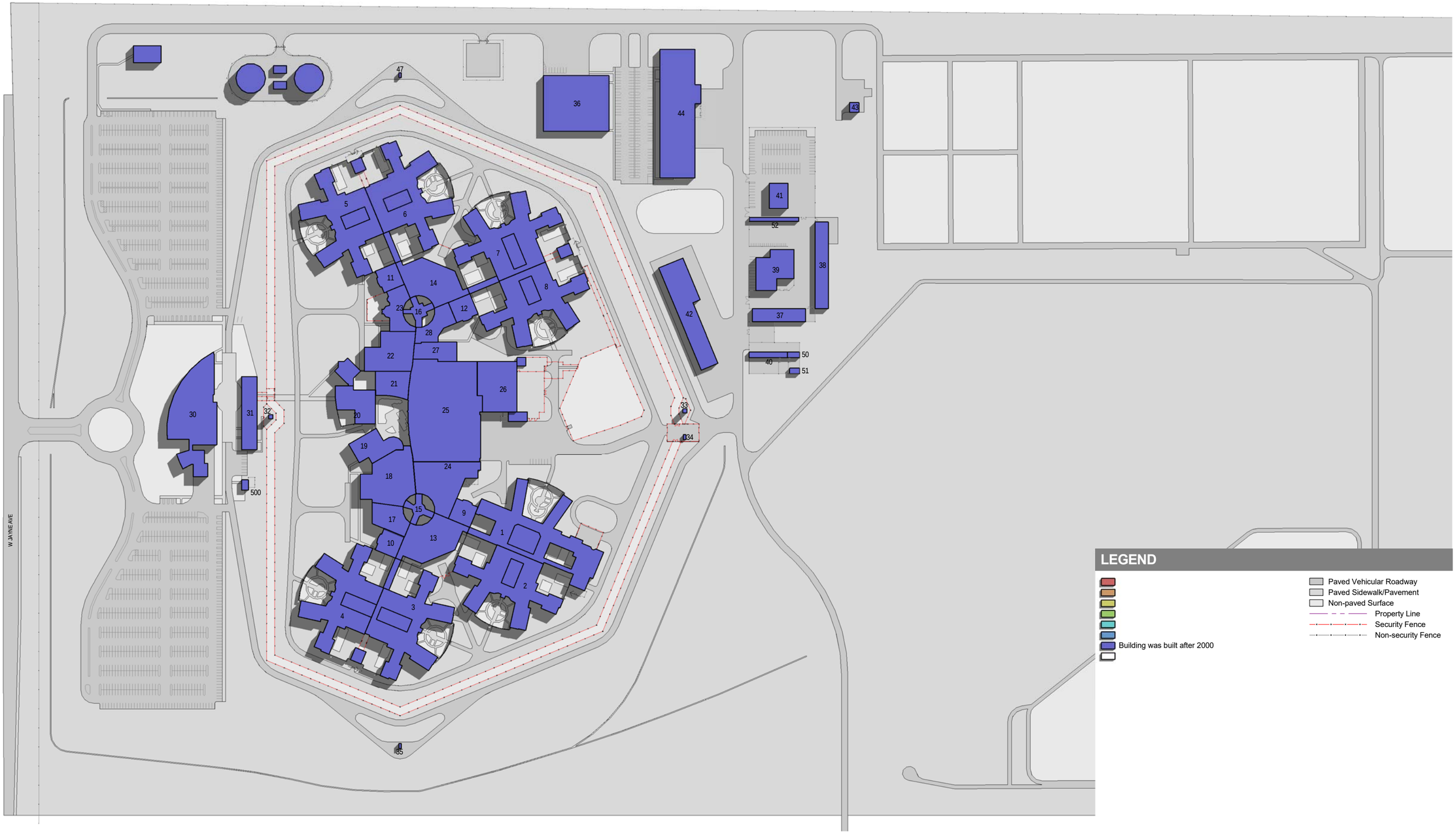
INFRASTRUCTURE MASTER PLAN

COALINGA STATE HOSPITAL



60FT 60FT

Appendix C1.3
Building Vintage

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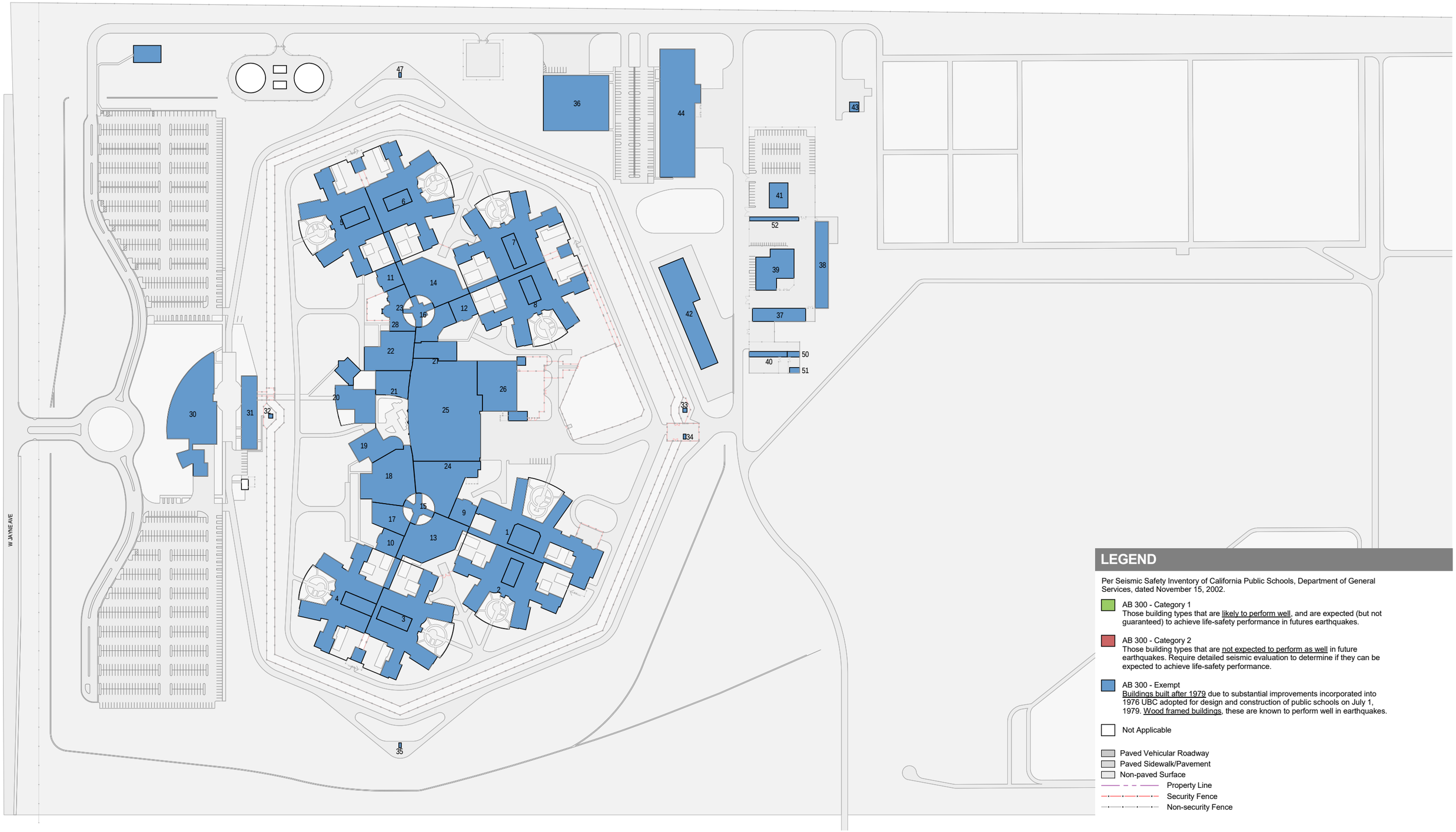
INFRASTRUCTURE MASTER PLAN

COALINGA STATE HOSPITAL



LEGEND

Per Seismic Safety Inventory of California Public Schools, Department of General Services, dated November 15, 2002.

- AB 300 - Category 1
  Those building types that are likely to perform well, and are expected (but not guaranteed) to achieve life-safety performance in futures earthquakes.
- AB 300 - Category 2
  Those building types that are not expected to perform as well in future earthquakes. Require detailed seismic evaluation to determine if they can be expected to achieve life-safety performance.
- AB 300 - Exempt
  Buildings built after 1979 due to substantial improvements incorporated into 1976 UBC adopted for design and construction of public schools on July 1, 1979. Wood framed buildings, these are known to perform well in earthquakes.
- Not Applicable

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

80FT 80FT

Appendix C1.4
AB 300 Category

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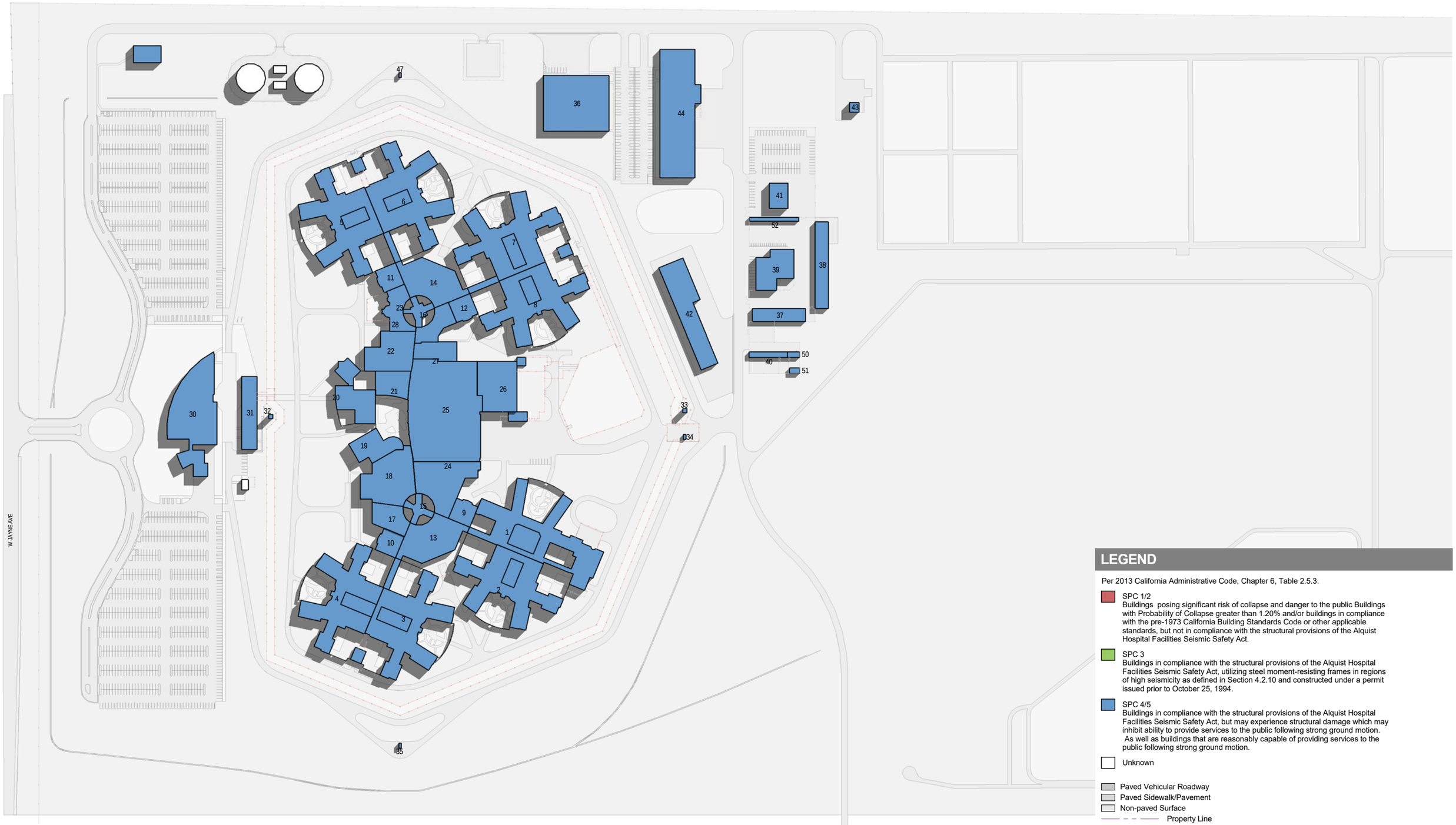
INFRASTRUCTURE MASTER PLAN

COALINGA STATE HOSPITAL



LEGEND

Per 2013 California Administrative Code, Chapter 6, Table 2.5.3.

SPC 1/2
Buildings posing significant risk of collapse and danger to the public Buildings with Probability of Collapse greater than 1.20% and/or buildings in compliance with the pre-1973 California Building Standards Code or other applicable standards, but not in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act.

SPC 3
Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, utilizing steel moment-resisting frames in regions of high seismicity as defined in Section 4.2.10 and constructed under a permit issued prior to October 25, 1994.

SPC 4/5
Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, but may experience structural damage which may inhibit ability to provide services to the public following strong ground motion. As well as buildings that are reasonably capable of providing services to the public following strong ground motion.

Unknown

Paved Vehicular Roadway
Paved Sidewalk/Pavement
Non-paved Surface
Property Line
Security Fence
Non-security Fence

80FT 80FT

Appendix C1.5
OSHPD SPC Rating

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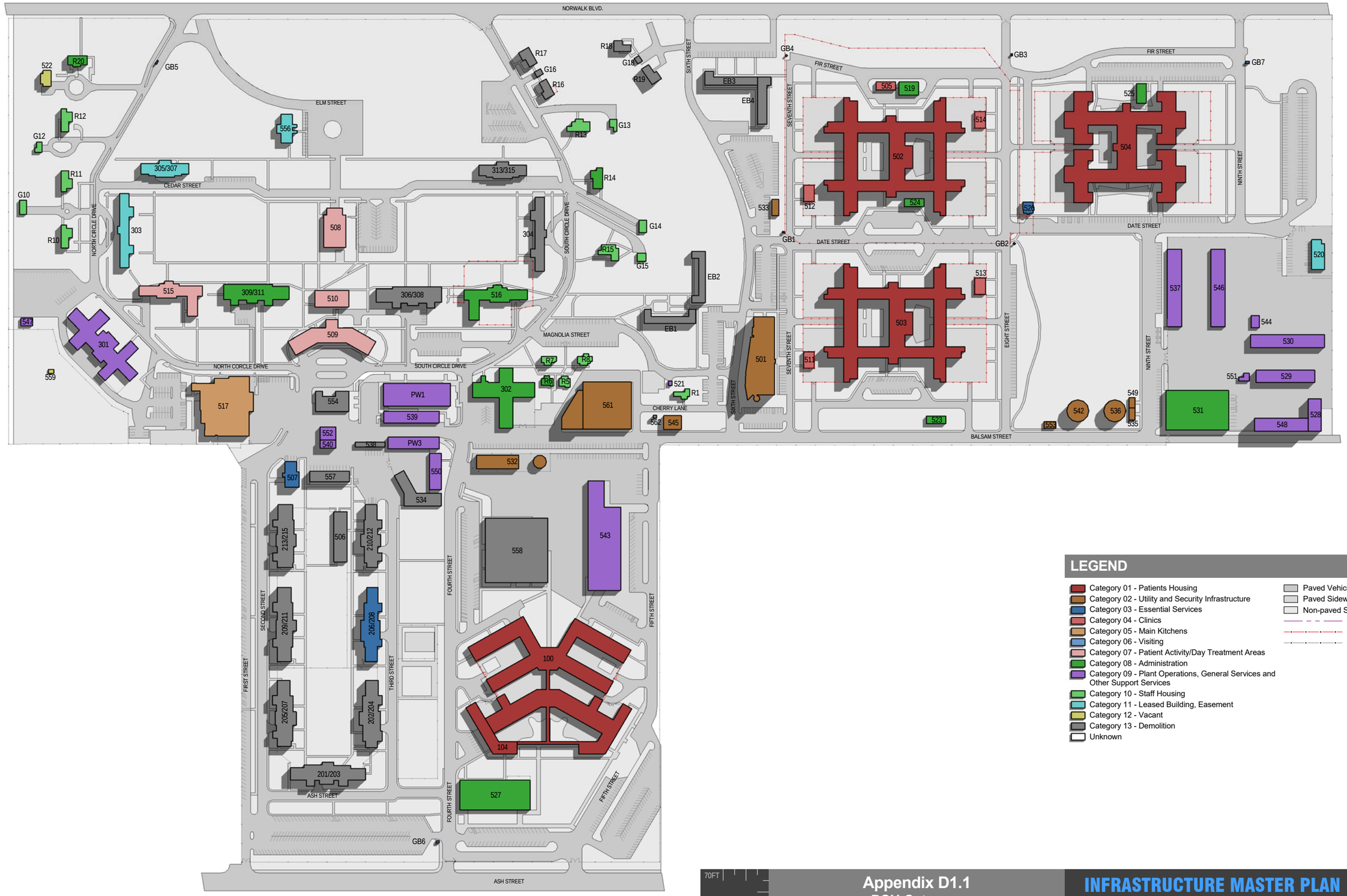
INFRASTRUCTURE MASTER PLAN

COALINGA STATE HOSPITAL



LEGEND

- Category 01 - Patients Housing
- Category 02 - Utility and Security Infrastructure
- Category 03 - Essential Services
- Category 04 - Clinics
- Category 05 - Main Kitchens
- Category 06 - Visiting
- Category 07 - Patient Activity/Day Treatment Areas
- Category 08 - Administration
- Category 09 - Plant Operations, General Services and Other Support Services
- Category 10 - Staff Housing
- Category 11 - Leased Building, Easement
- Category 12 - Vacant
- Category 13 - Demolition
- Unknown

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

70FT

Appendix D1.1
DSH Category

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INFRASTRUCTURE MASTER PLAN

METROPOLITAN STATE HOSPITAL

LEGEND

- Type I - Fire-resistive
- Type II - Non-combustible
- Type III - Ordinary
- Type IV - Heavy timber
- Type V - Wood framed
- Unknown
- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

70FT 70FT

Appendix D1.2
Building Construction Type

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INFRASTRUCTURE MASTER PLAN

METROPOLITAN STATE HOSPITAL

LEGEND

- Building was built between 1900 and 1920
- Building was built between 1920 and 1940
- Building was built between 1940 and 1960
- Building was built between 1960 and 1973*
- Building was built between 1973 and 2000*
- Building was built after 2000
- Building vintage is unknown

* Enactment of the Alfred E. Alquist Hospital Seismic Safety Act in 1973.

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

Appendix D1.3
Building Vintage

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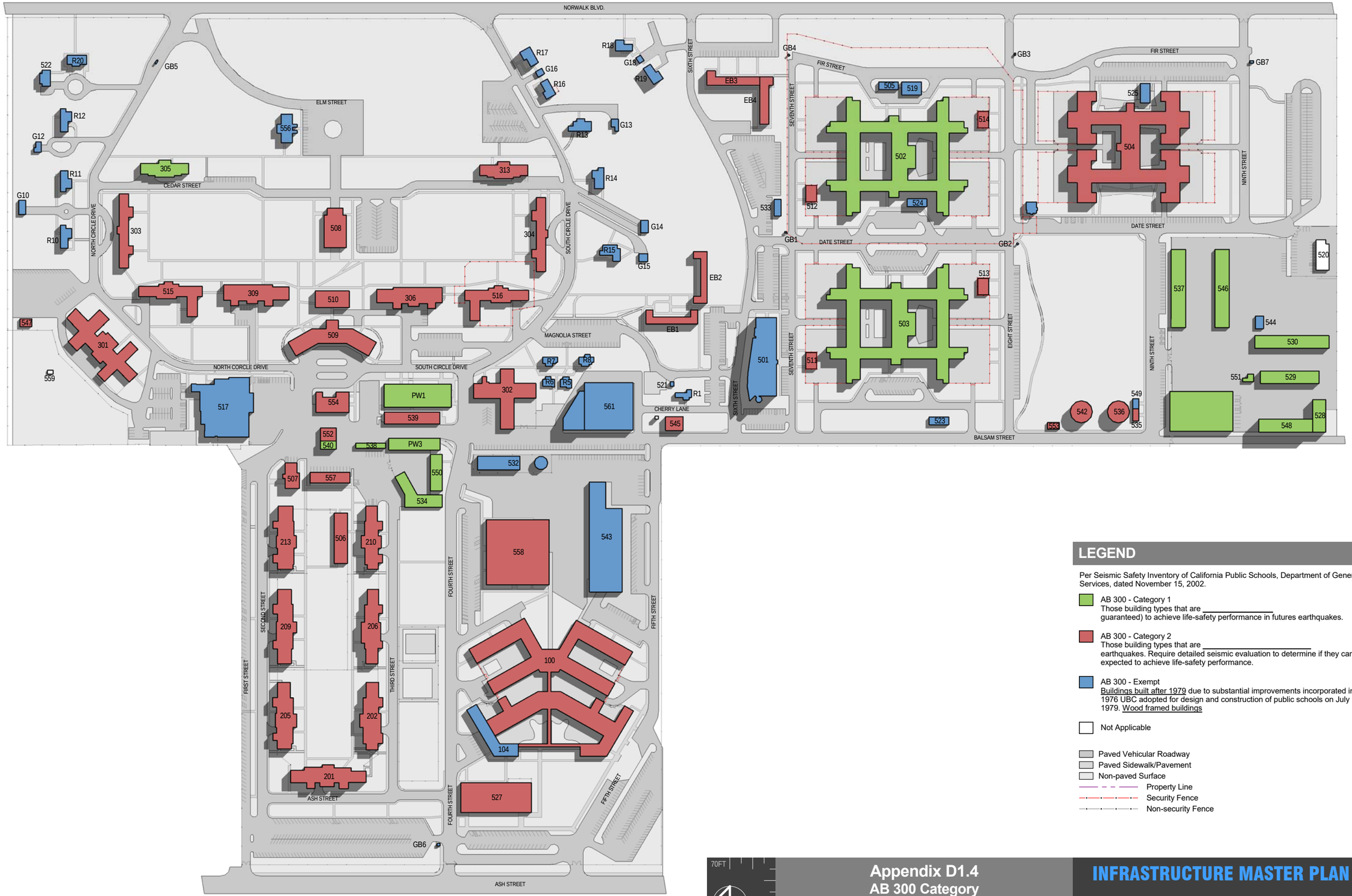
INFRASTRUCTURE MASTER PLAN

METROPOLITAN STATE HOSPITAL



LEGEND

Per Seismic Safety Inventory of California Public Schools, Department of General Services, dated November 15, 2002.

AB 300 - Category 1
Those building types that are _____ guaranteed) to achieve life-safety performance in futures earthquakes.

AB 300 - Category 2
Those building types that are _____ earthquakes. Require detailed seismic evaluation to determine if they can be expected to achieve life-safety performance.

AB 300 - Exempt
Buildings built after 1979 due to substantial improvements incorporated into 1976 UBC adopted for design and construction of public schools on July 1, 1979. Wood framed buildings

Not Applicable

Paved Vehicular Roadway
Paved Sidewalk/Pavement
Non-paved Surface
Property Line
Security Fence
Non-security Fence

70FT 70FT

Appendix D1.4
AB 300 Category

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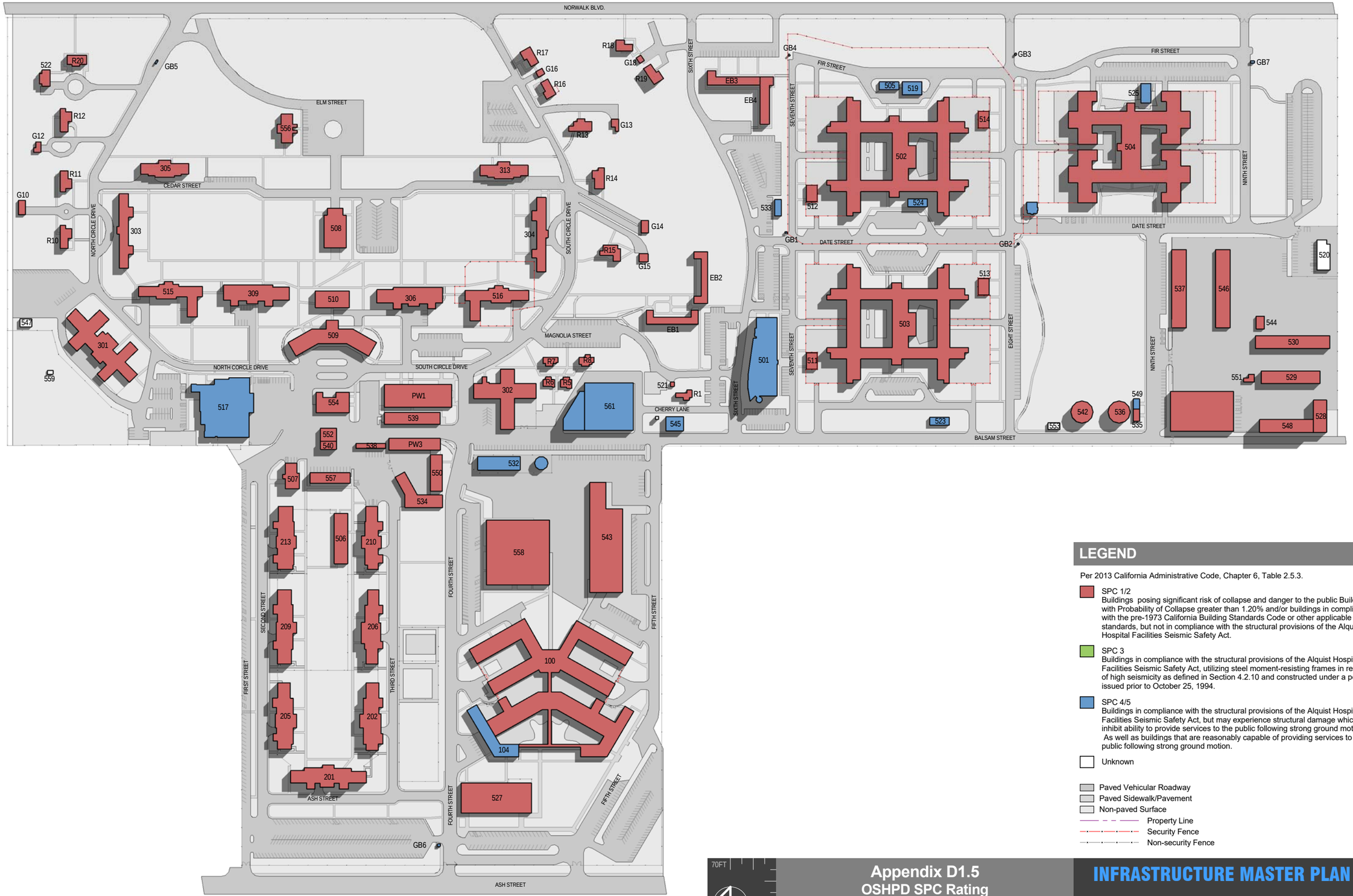
INFRASTRUCTURE MASTER PLAN

METROPOLITAN STATE HOSPITAL



LEGEND

Per 2013 California Administrative Code, Chapter 6, Table 2.5.3.

- SPC 1/2
  Buildings posing significant risk of collapse and danger to the public Buildings with Probability of Collapse greater than 1.20% and/or buildings in compliance with the pre-1973 California Building Standards Code or other applicable standards, but not in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act.
- SPC 3
  Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, utilizing steel moment-resisting frames in regions of high seismicity as defined in Section 4.2.10 and constructed under a permit issued prior to October 25, 1994.
- SPC 4/5
  Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, but may experience structural damage which may inhibit ability to provide services to the public following strong ground motion. As well as buildings that are reasonably capable of providing services to the public following strong ground motion.
- Unknown

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

70FT 70FT

Appendix D1.5
OSHPD SPC Rating

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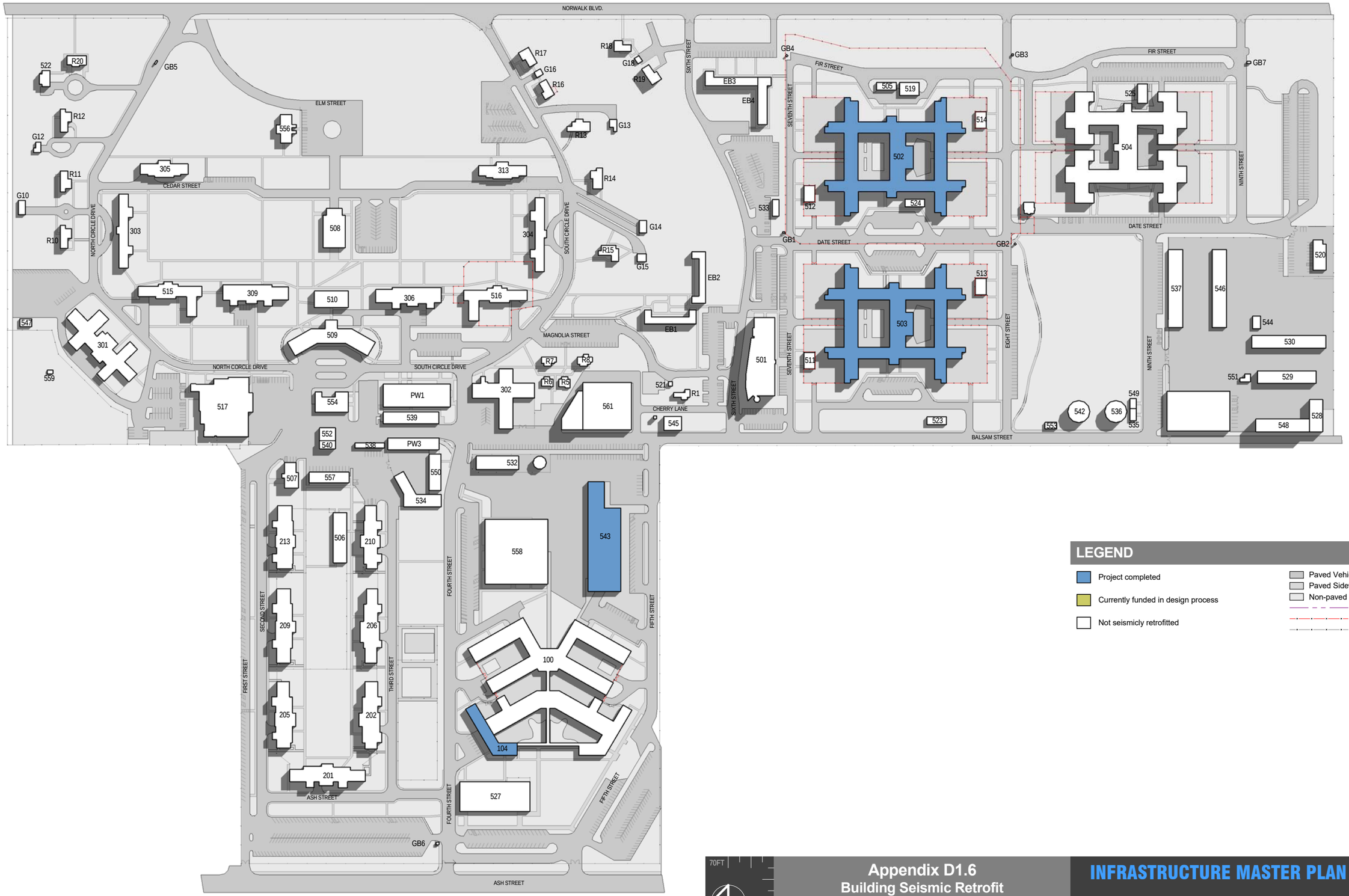
INFRASTRUCTURE MASTER PLAN

METROPOLITAN STATE HOSPITAL



LEGEND

- Project completed
- Currently funded in design process
- Not seismicly retrofitted
- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

70FT

Appendix D1.6
Building Seismic Retrofit

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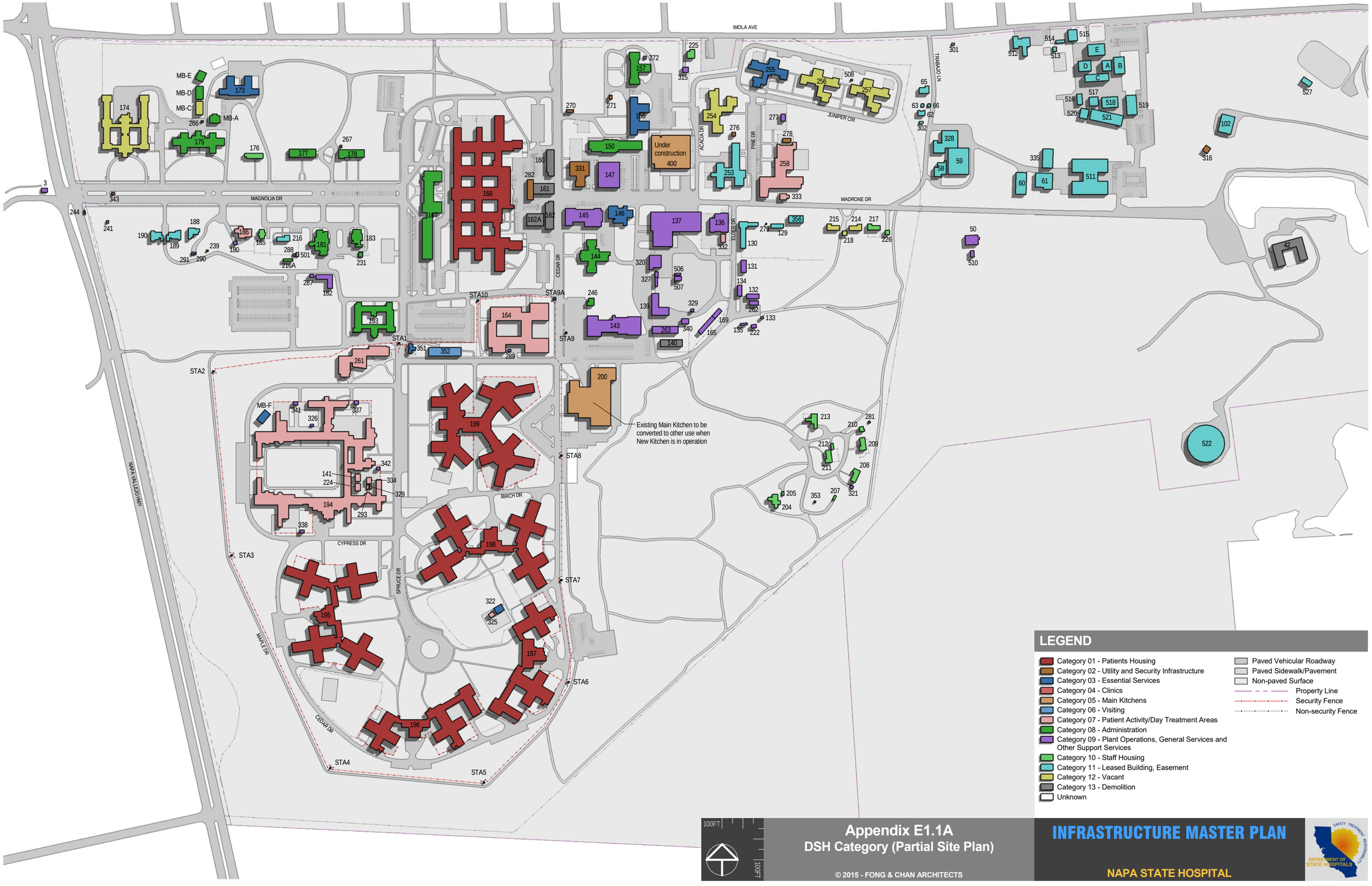
INFRASTRUCTURE MASTER PLAN

METROPOLITAN STATE HOSPITAL



Appendix E1.1A
DSH Category (Partial Site Plan)

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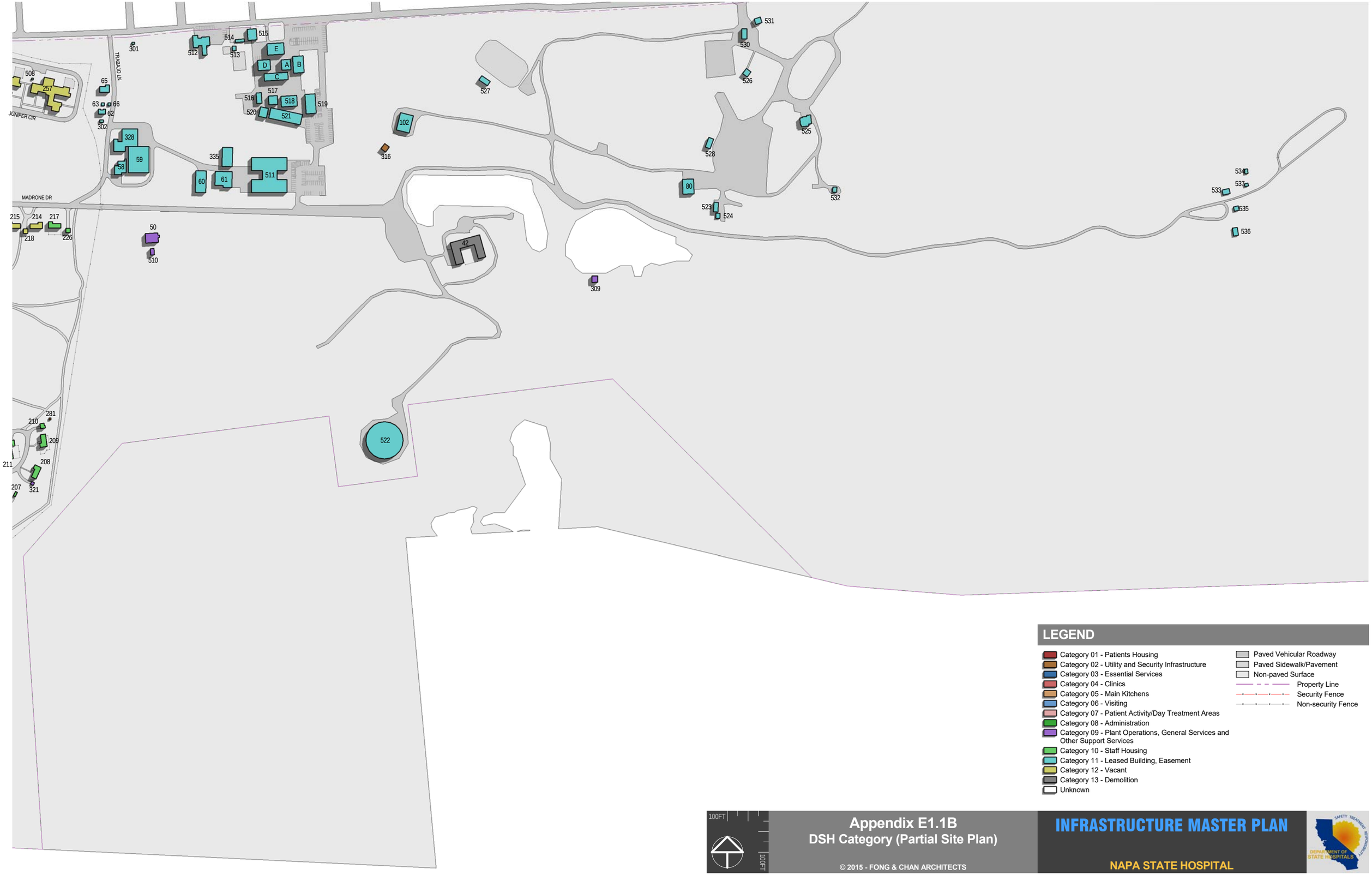
INFRASTRUCTURE MASTER PLAN

NAPA STATE HOSPITAL



LEGEND

- Category 01 - Patients Housing
- Category 02 - Utility and Security Infrastructure
- Category 03 - Essential Services
- Category 04 - Clinics
- Category 05 - Main Kitchens
- Category 06 - Visiting
- Category 07 - Patient Activity/Day Treatment Areas
- Category 08 - Administration
- Category 09 - Plant Operations, General Services and Other Support Services
- Category 10 - Staff Housing
- Category 11 - Leased Building, Easement
- Category 12 - Vacant
- Category 13 - Demolition
- Unknown
- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

100FT

100FT

Appendix E1.1B
DSH Category (Partial Site Plan)

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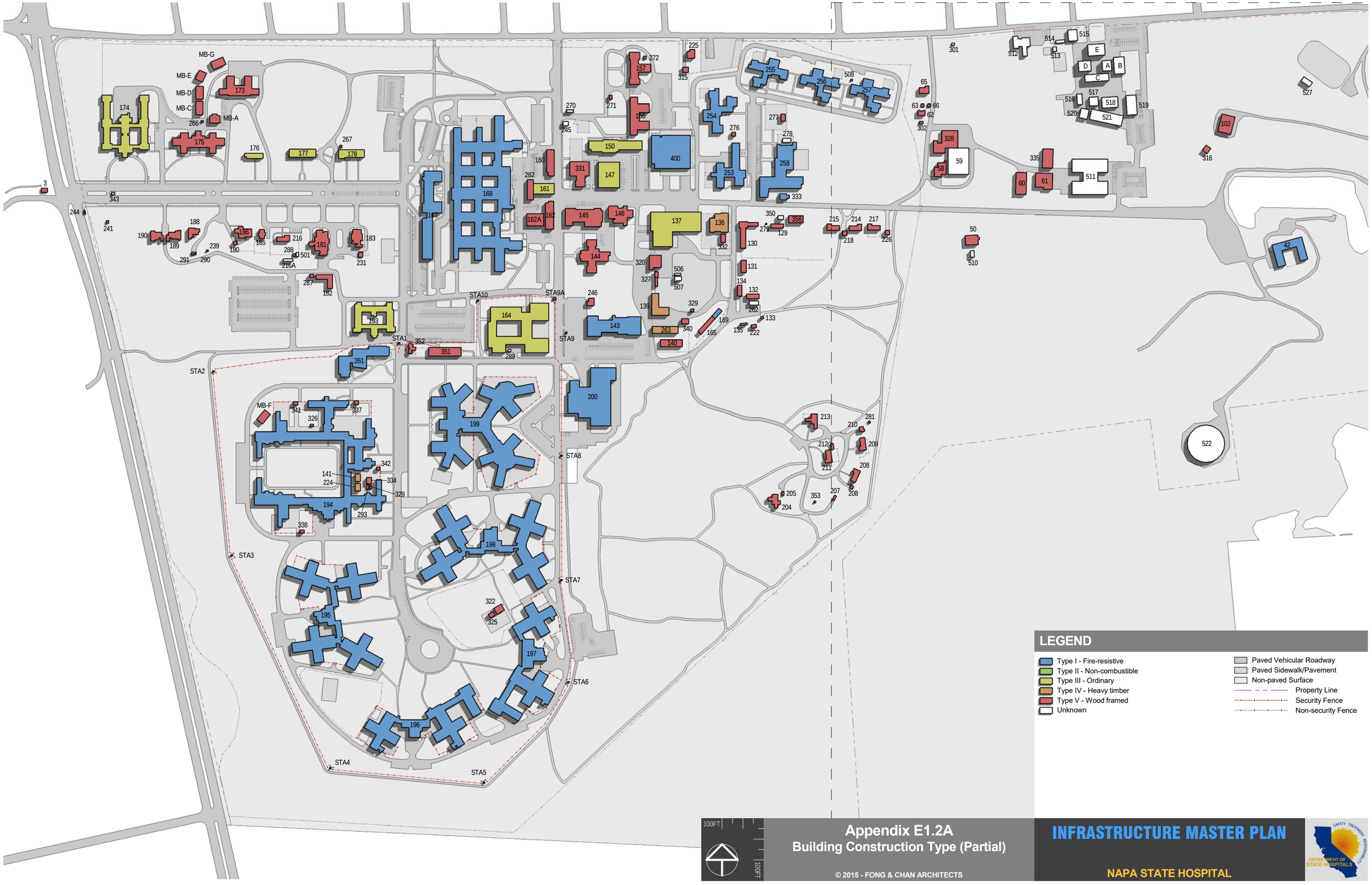
INFRASTRUCTURE MASTER PLAN

NAPA STATE HOSPITAL



Appendix E1.2A
Building Construction Type (Partial)

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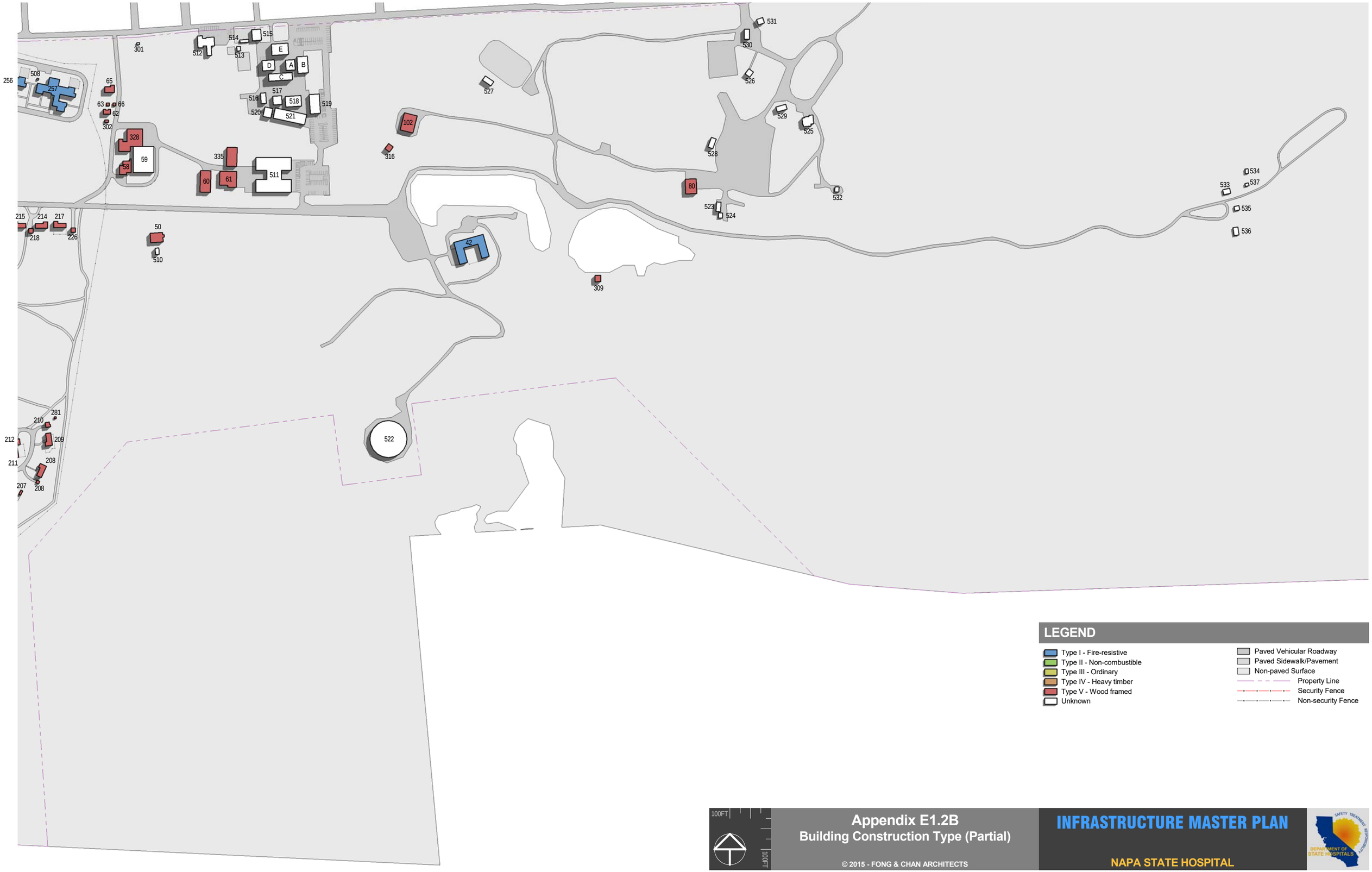
INFRASTRUCTURE MASTER PLAN

NAPA STATE HOSPITAL



LEGEND

- Type I - Fire-resistive
- Type II - Non-combustible
- Type III - Ordinary
- Type IV - Heavy timber
- Type V - Wood framed
- Unknown
- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

100FT

Appendix E1.2B
Building Construction Type (Partial)

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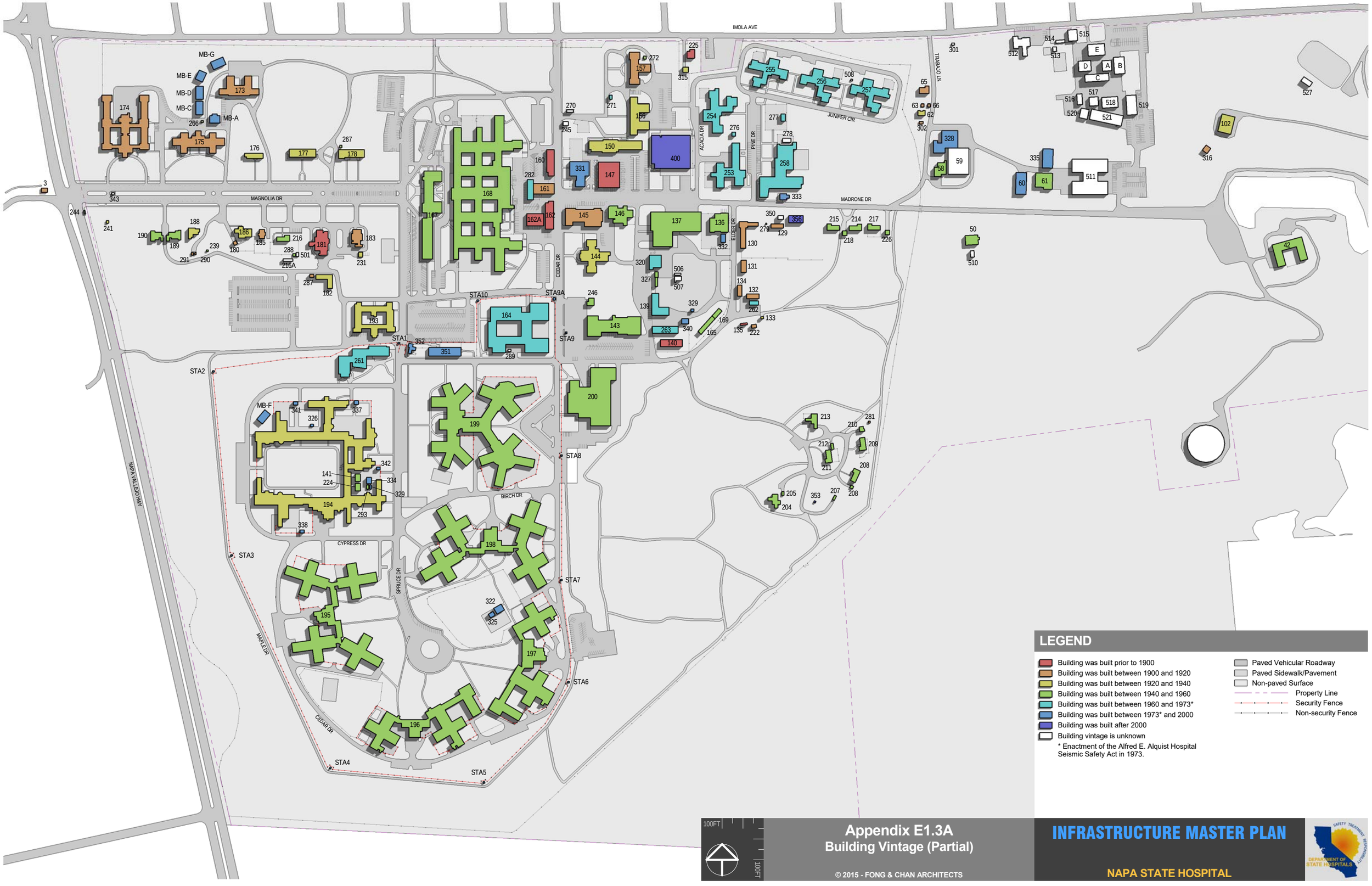
INFRASTRUCTURE MASTER PLAN

NAPA STATE HOSPITAL


IMOLA AVE
MAGNOLIA DR
MADRONE DR
JUNIPER CIR
TRABAJO LN
ACACIA DR
PINE DR
ELDER DR
CEDAR DR
BIRCH DR
CYPRESS DR
SPRUCE DR
MAPLE DR
NAPA VALLEJO HWY
MB-G
MB-E
MB-D
MB-C
MB-A
MB-F
STA1
STA2
STA3
STA4
STA5
STA6
STA7
STA8
STA9
STA9A
STA10
LEGEND
Building was built prior to 1900
Building was built between 1900 and 1920
Building was built between 1920 and 1940
Building was built between 1940 and 1960
Building was built between 1960 and 1973*
Building was built between 1973* and 2000
Building was built after 2000
Building vintage is unknown
* Enactment of the Alfred E. Alquist Hospital Seismic Safety Act in 1973.
Paved Vehicular Roadway
Paved Sidewalk/Pavement
Non-paved Surface
Property Line
Security Fence
Non-security Fence
100FT
100FT
Appendix E1.3A
Building Vintage (Partial)
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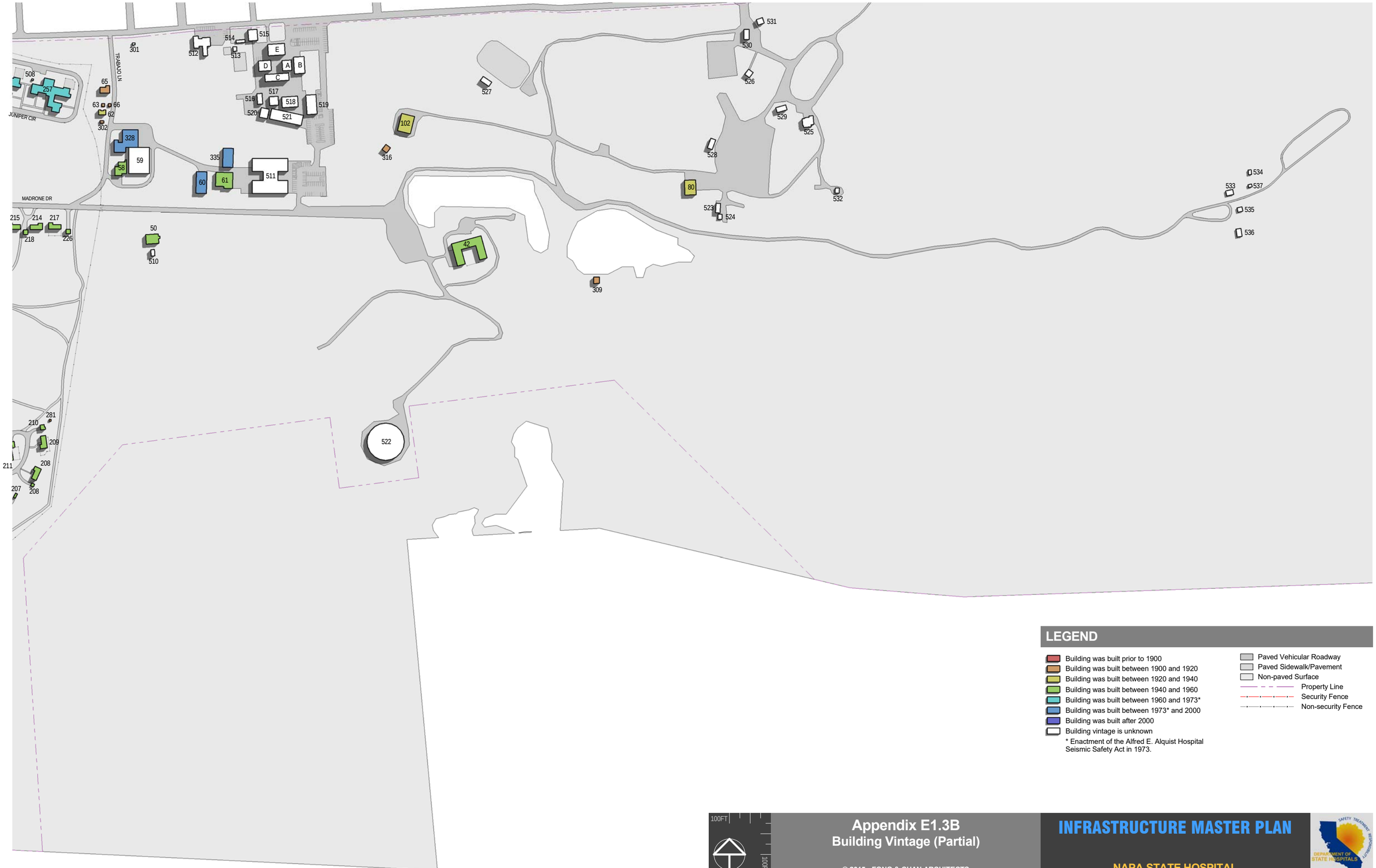
INFRASTRUCTURE MASTER PLAN
NAPA STATE HOSPITAL
SAFETY TREATMENT RESPONSIBILITY
DEPARTMENT OF STATE HOSPITALS



LEGEND

- Building was built prior to 1900
- Building was built between 1900 and 1920
- Building was built between 1920 and 1940
- Building was built between 1940 and 1960
- Building was built between 1960 and 1973*
- Building was built between 1973* and 2000
- Building was built after 2000
- Building vintage is unknown

* Enactment of the Alfred E. Alquist Hospital Seismic Safety Act in 1973.

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

100FT

Appendix E1.3B
Building Vintage (Partial)

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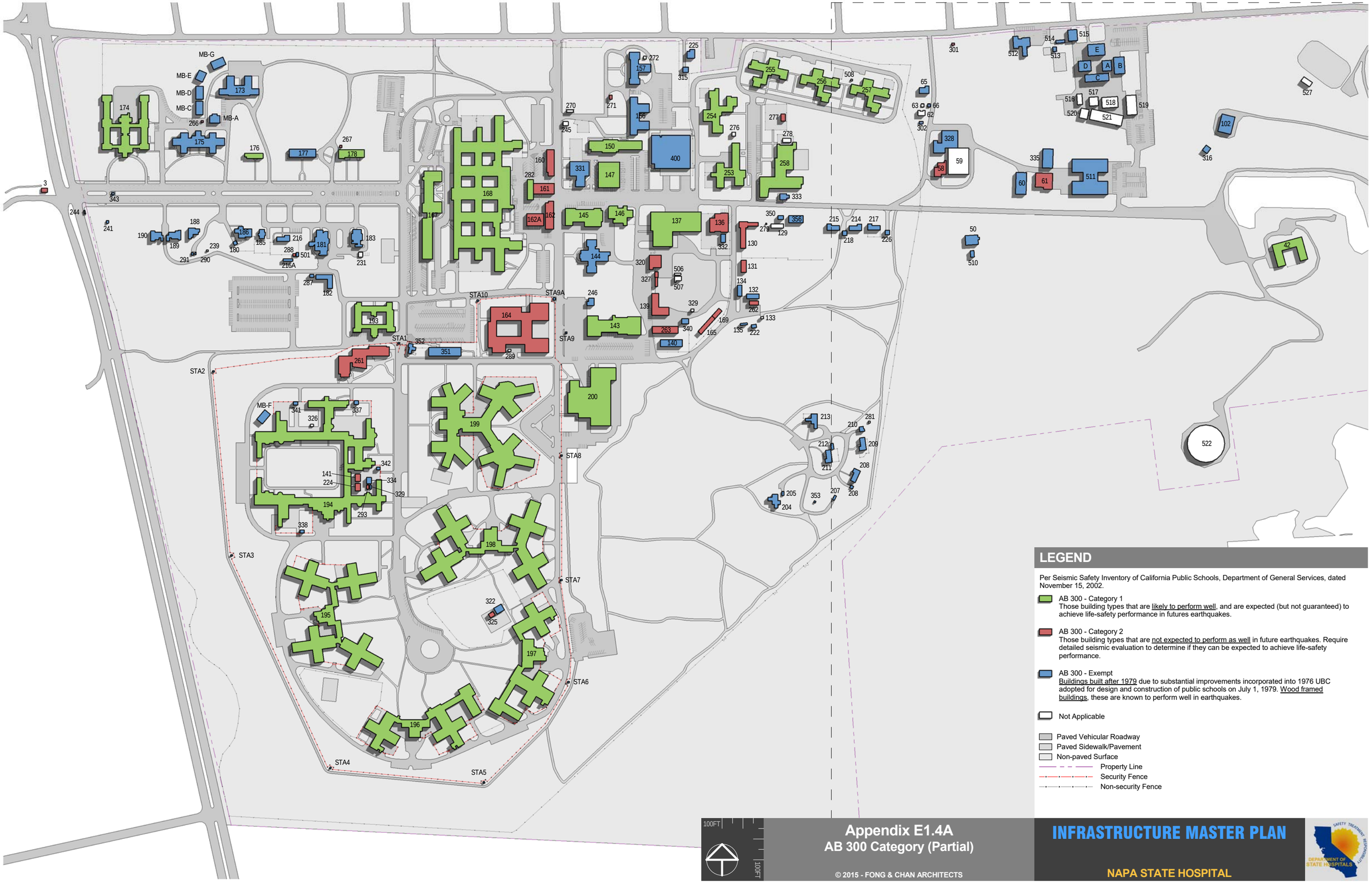
INFRASTRUCTURE MASTER PLAN

NAPA STATE HOSPITAL



LEGEND

Per Seismic Safety Inventory of California Public Schools, Department of General Services, dated November 15, 2002.

- AB 300 - Category 1
  Those building types that are likely to perform well, and are expected (but not guaranteed) to achieve life-safety performance in futures earthquakes.
- AB 300 - Category 2
  Those building types that are not expected to perform as well in future earthquakes. Require detailed seismic evaluation to determine if they can be expected to achieve life-safety performance.
- AB 300 - Exempt
  Buildings built after 1979 due to substantial improvements incorporated into 1976 UBC adopted for design and construction of public schools on July 1, 1979. Wood framed buildings, these are known to perform well in earthquakes.
- Not Applicable
- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

Appendix E1.4A
AB 300 Category (Partial)

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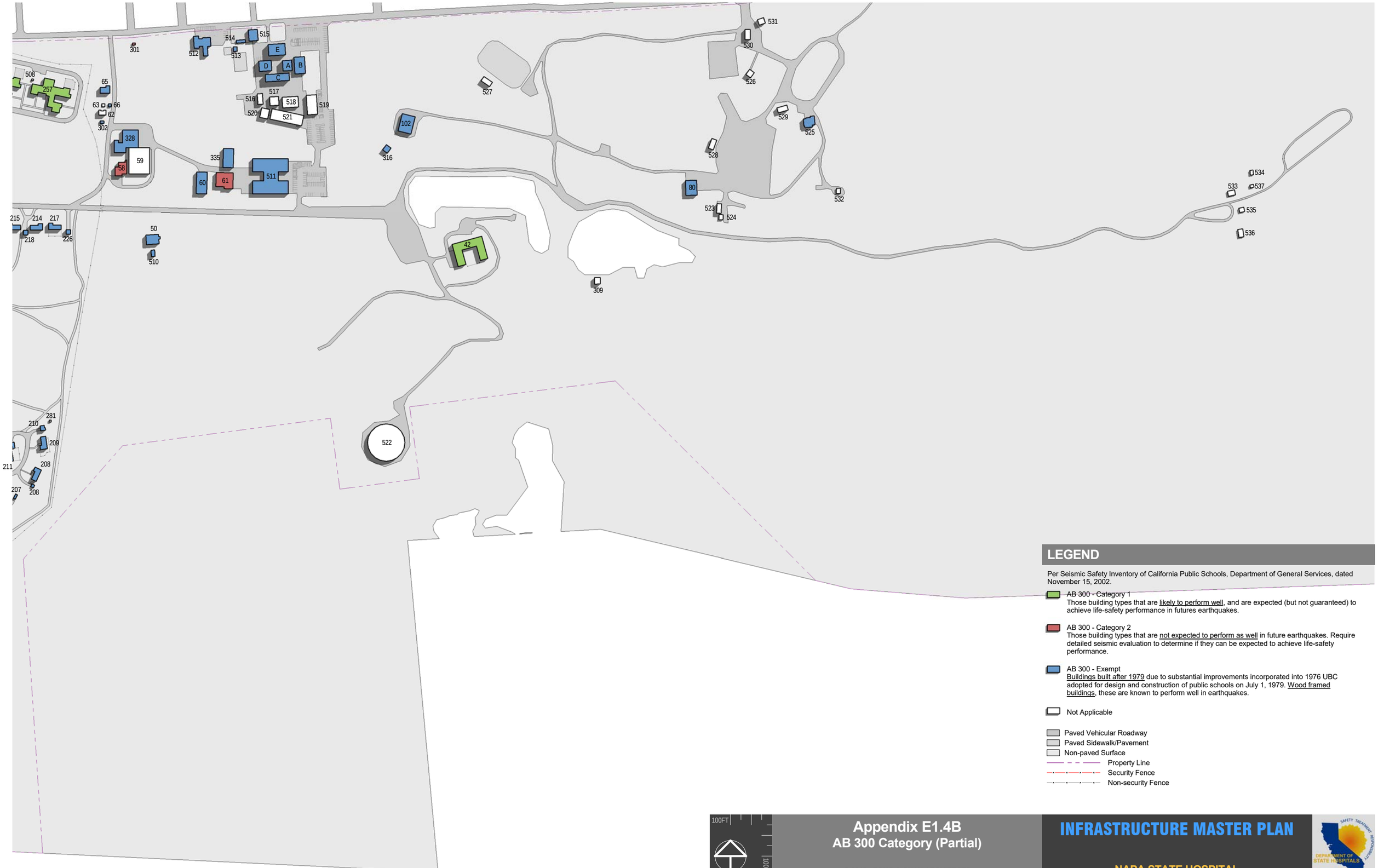
INFRASTRUCTURE MASTER PLAN

NAPA STATE HOSPITAL



LEGEND

Per Seismic Safety Inventory of California Public Schools, Department of General Services, dated November 15, 2002.

AB 300 - Category 1
Those building types that are likely to perform well, and are expected (but not guaranteed) to achieve life-safety performance in futures earthquakes.

AB 300 - Category 2
Those building types that are not expected to perform as well in future earthquakes. Require detailed seismic evaluation to determine if they can be expected to achieve life-safety performance.

AB 300 - Exempt
Buildings built after 1979 due to substantial improvements incorporated into 1976 UBC adopted for design and construction of public schools on July 1, 1979. Wood framed buildings, these are known to perform well in earthquakes.

Not Applicable

Paved Vehicular Roadway
Paved Sidewalk/Pavement
Non-paved Surface
Property Line
Security Fence
Non-security Fence

100FT

Appendix E1.4B
AB 300 Category (Partial)

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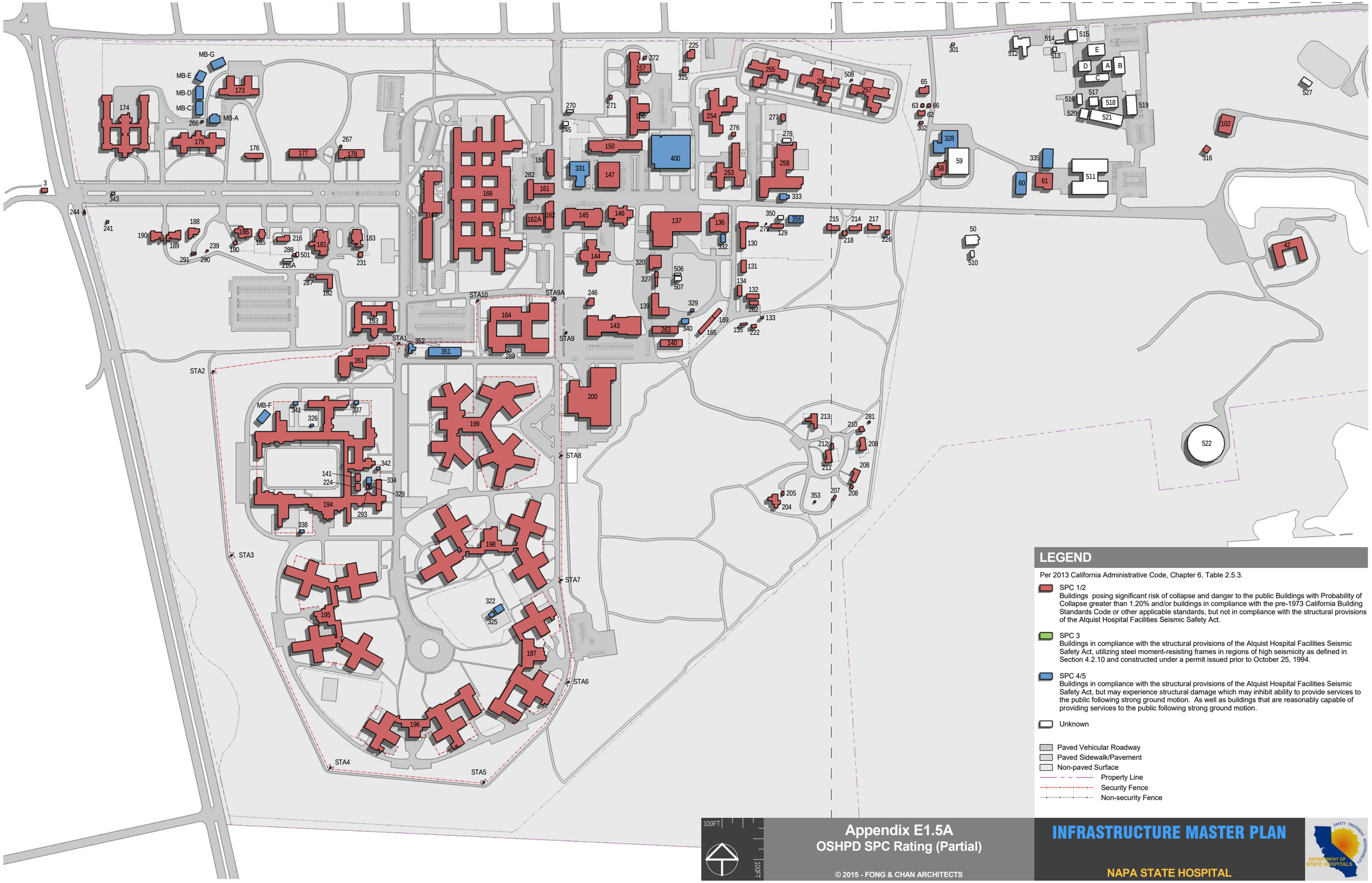
INFRASTRUCTURE MASTER PLAN

NAPA STATE HOSPITAL



Appendix E1.5A
OSHPD SPC Rating (Partial)

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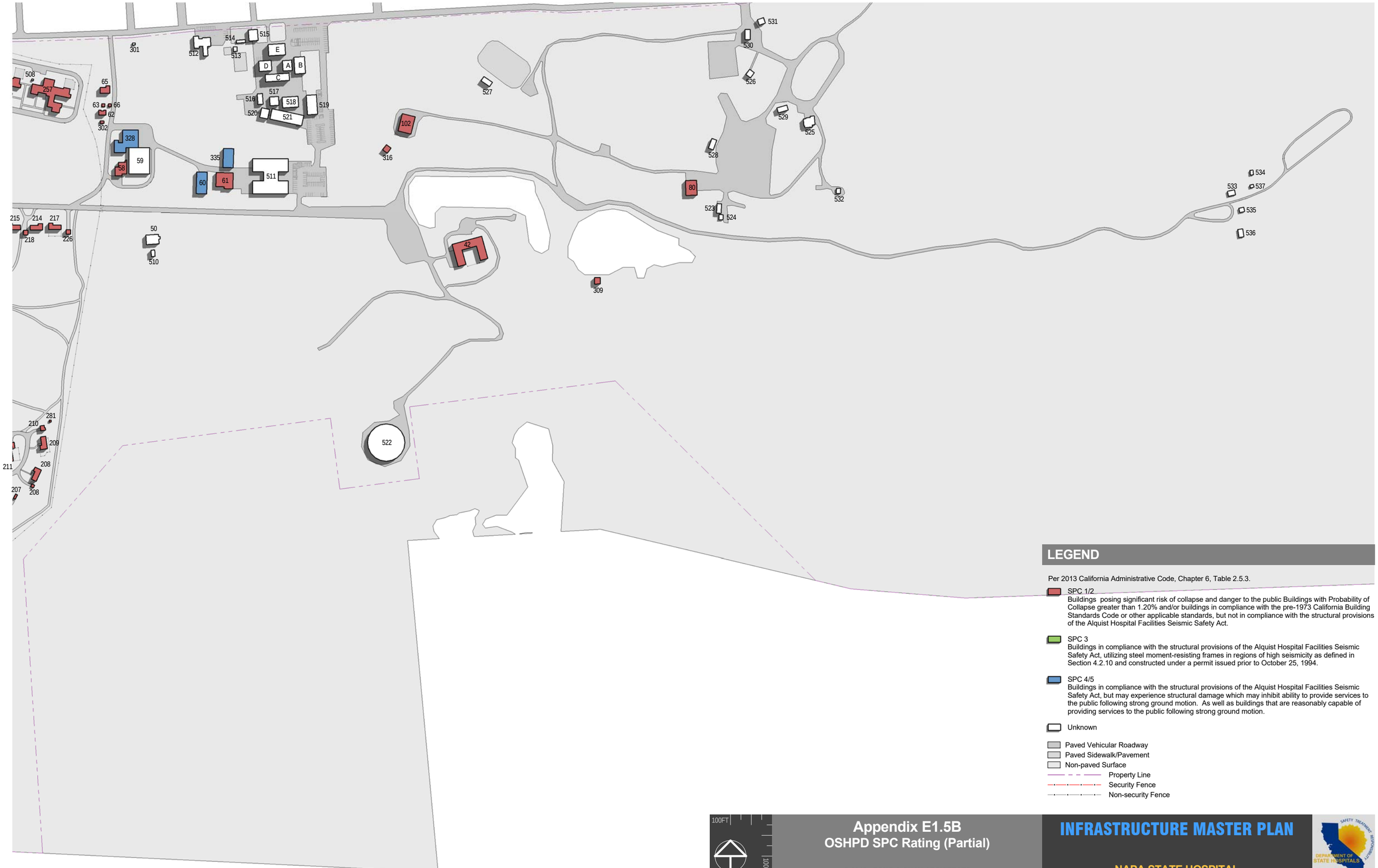
INFRASTRUCTURE MASTER PLAN

NAPA STATE HOSPITAL



LEGEND

Per 2013 California Administrative Code, Chapter 6, Table 2.5.3.

SPC 1/2
Buildings posing significant risk of collapse and danger to the public Buildings with Probability of Collapse greater than 1.20% and/or buildings in compliance with the pre-1973 California Building Standards Code or other applicable standards, but not in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act.

SPC 3
Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, utilizing steel moment-resisting frames in regions of high seismicity as defined in Section 4.2.10 and constructed under a permit issued prior to October 25, 1994.

SPC 4/5
Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, but may experience structural damage which may inhibit ability to provide services to the public following strong ground motion. As well as buildings that are reasonably capable of providing services to the public following strong ground motion.

Unknown

Paved Vehicular Roadway
Paved Sidewalk/Pavement
Non-paved Surface
Property Line
Security Fence
Non-security Fence

100FT

Appendix E1.5B
OSHPD SPC Rating (Partial)

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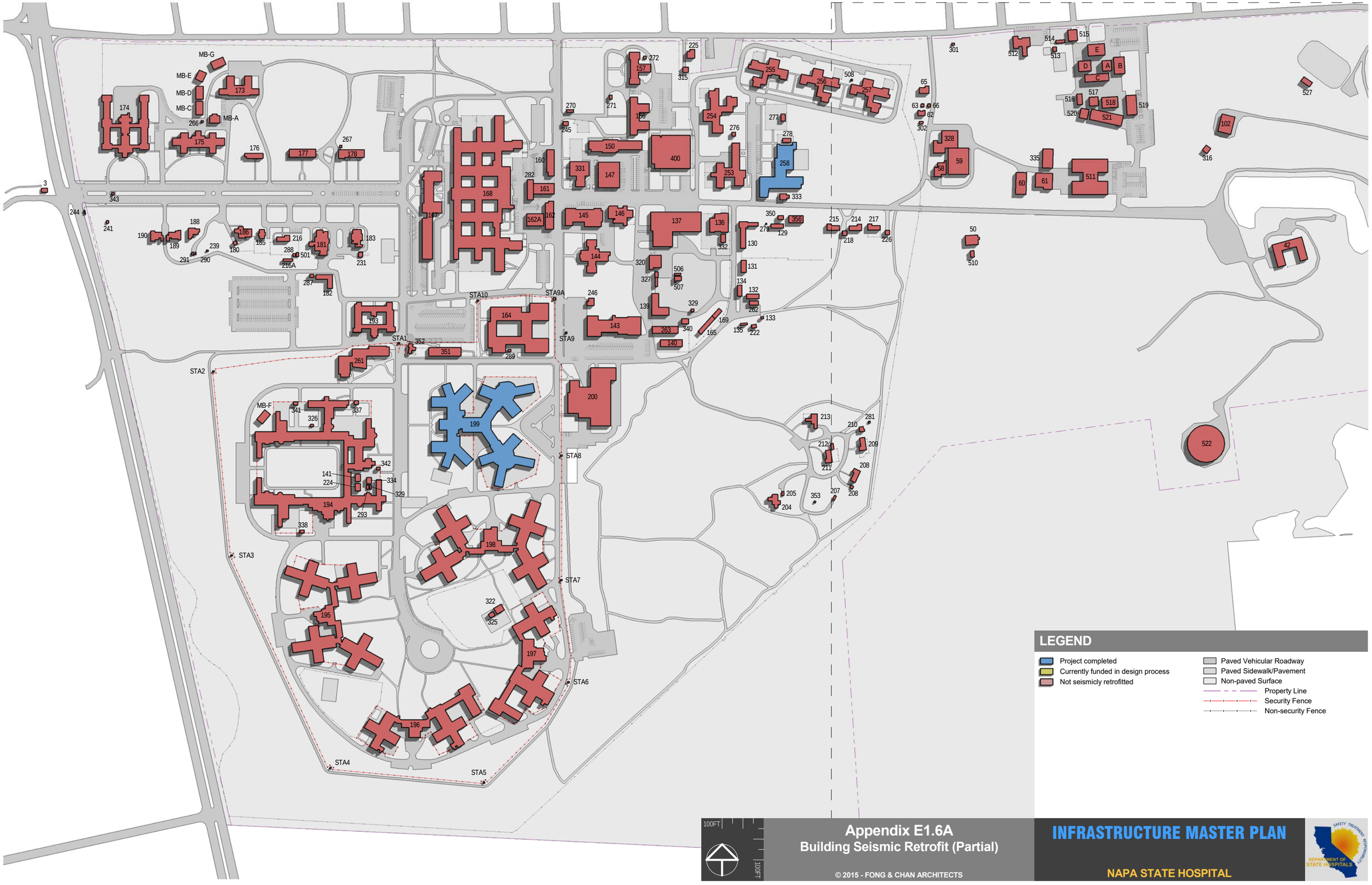
INFRASTRUCTURE MASTER PLAN

NAPA STATE HOSPITAL



Appendix E1.6A
Building Seismic Retrofit (Partial)

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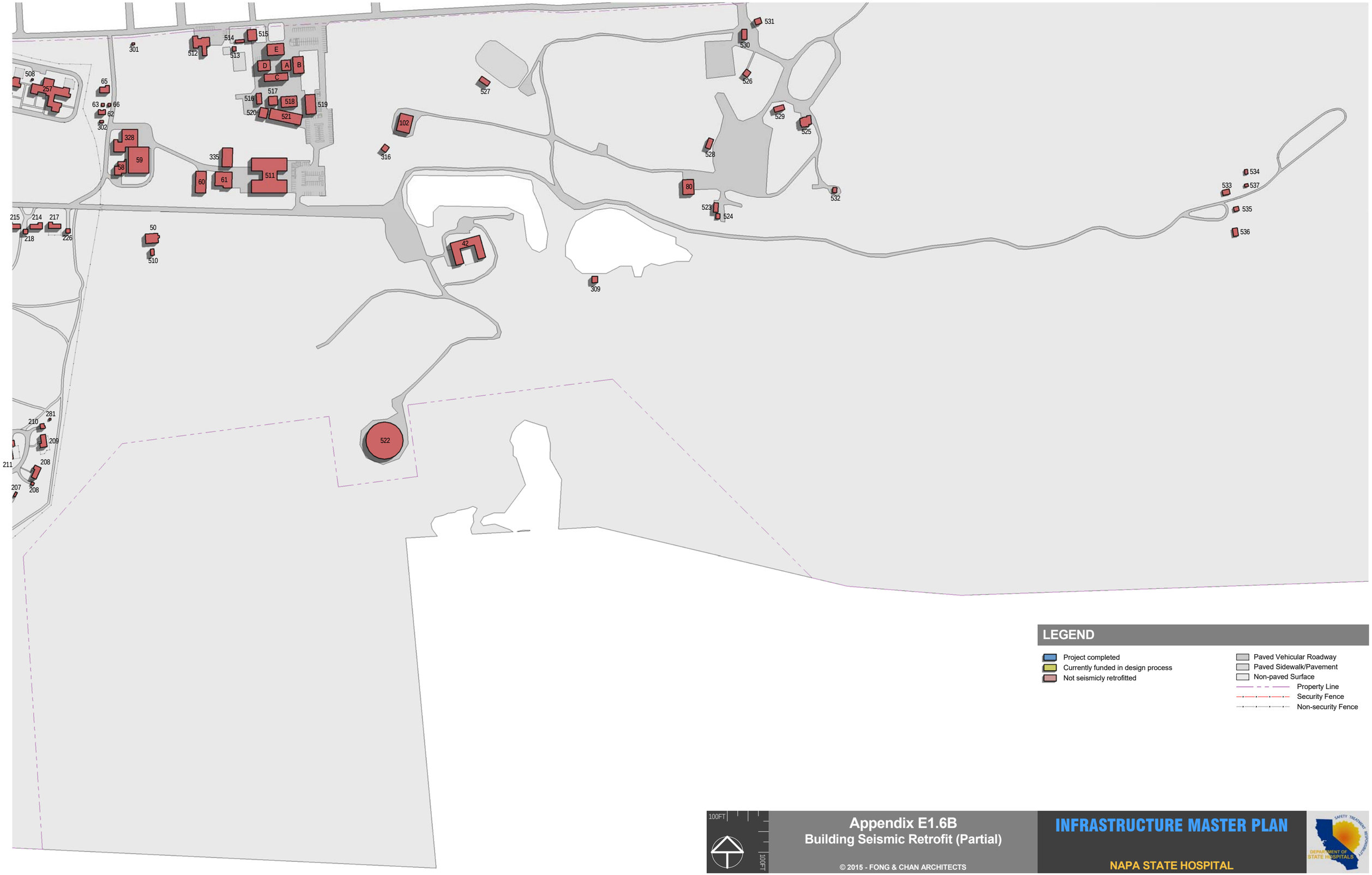
INFRASTRUCTURE MASTER PLAN

NAPA STATE HOSPITAL



Appendix E1.6B
Building Seismic Retrofit (Partial)

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INFRASTRUCTURE MASTER PLAN

NAPA STATE HOSPITAL

LEGEND

- Category 01 - Patients Housing
- Category 02 - Utility and Security Infrastructure
- Category 03 - Essential Services
- Category 04 - Clinics
- Category 05 - Main Kitchens
- Category 06 - Visiting
- Category 07 - Patient Activity/Day Treatment Areas
- Category 08 - Administration
- Category 09 - Plant Operations, General Services and Other Support Services
- Category 10 - Staff Housing
- Category 11 - Leased Building, Easement
- Category 12 - Vacant
- Category 13 - Demolition
- Unknown

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

75FT 75FT

Appendix F1.1
DSH Category

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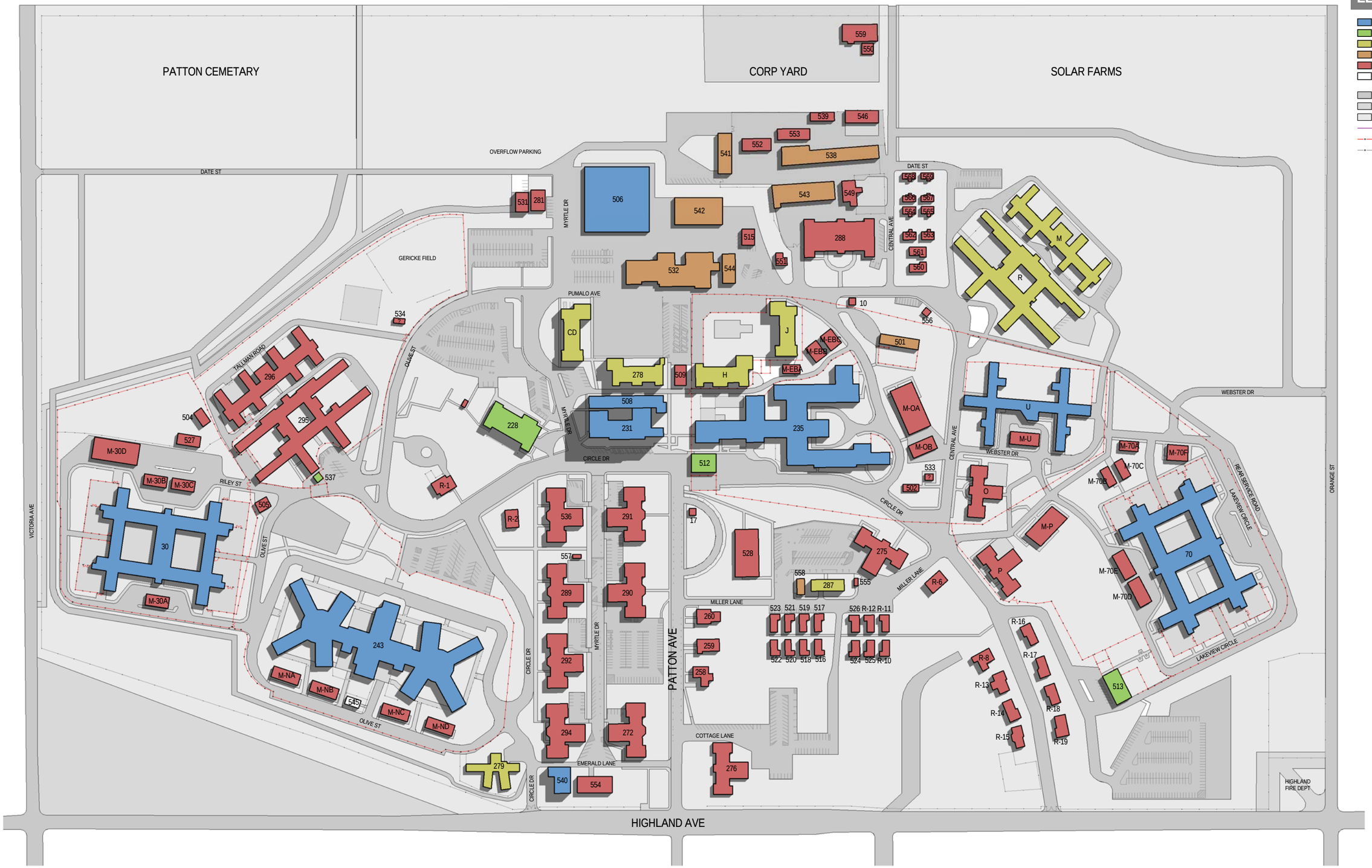
INFRASTRUCTURE MASTER PLAN

PATTON STATE HOSPITAL



LEGEND

- Type I - Fire-resistive
- Type II - Non-combustible
- Type III - Ordinary
- Type IV - Heavy timber
- Type V -ᴡ ood framed
- Unknown

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

75FT 75FT

Appendix F1.2
Building Construction Type

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INFRASTRUCTURE MASTER PLAN

PATTON STATE HOSPITAL

LEGEND

- Building was built between 1900 and 1920
- Building was built between 1920 and 1940
- Building was built between 1940 and 1960
- Building was built between 1960 and 1973*
- Building was built between 1973 and 2000*
- Building was built after 2000
- Building vintage is unknown

* Enactment of the Alfred E. Alquist Hospital Seismic Safety Act in 1973.

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

75FT 75FT

Appendix F1.3
Building Vintage

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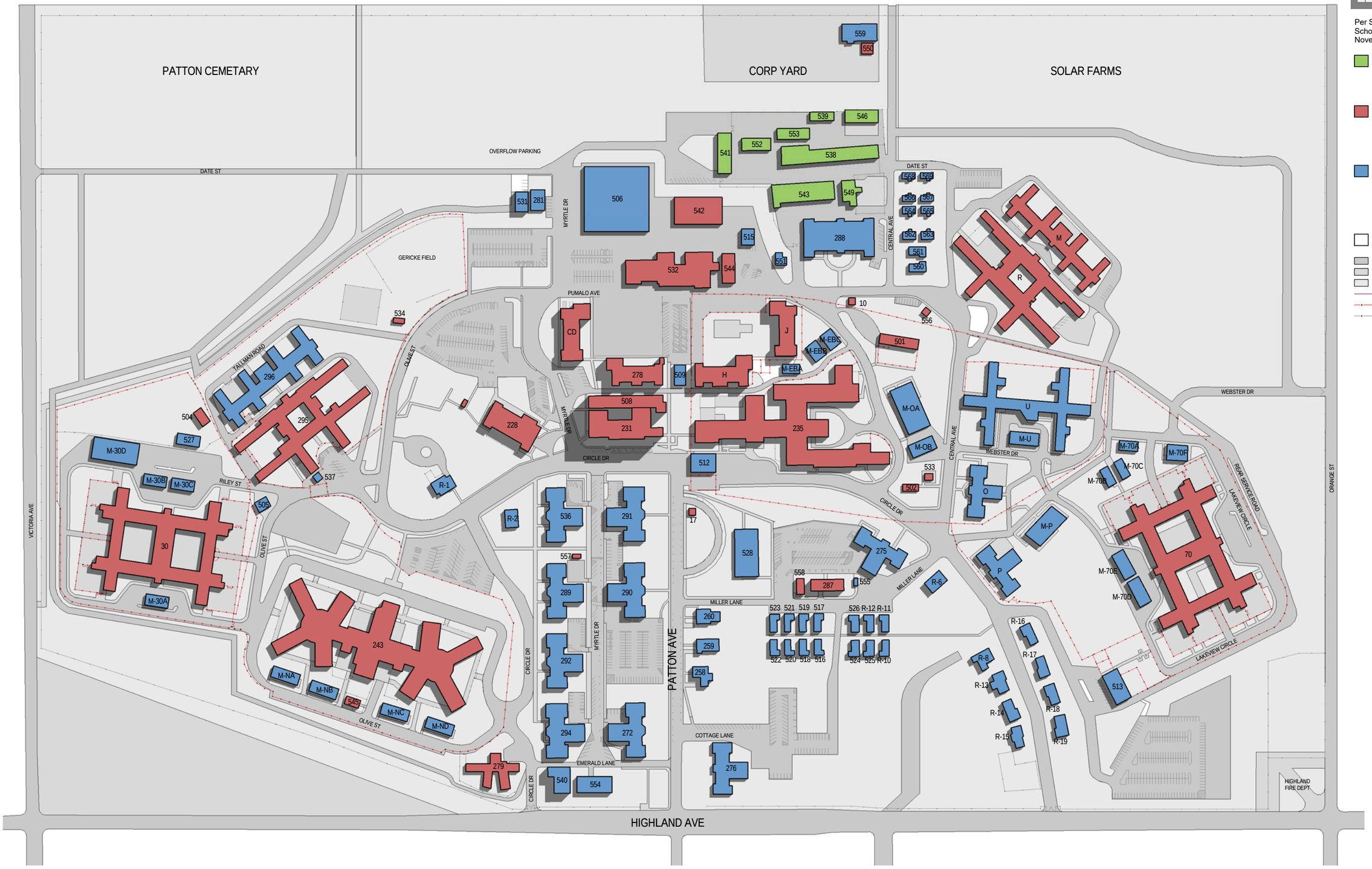
INFRASTRUCTURE MASTER PLAN

PATTON STATE HOSPITAL



LEGEND

Per Seismic Safety Inventory of California Public Schools, Department of General Services, dated November 15, 2002.

- AB 300 - Category 1
  Those building types that are _____ well to achieve life-safety performance in futures earthquakes.
- AB 300 - Category 2
  Those building types that are _____ perform as well detailed seismic evaluation to determine if they can be expected to achieve life-safety performance.
- AB 300 - Exempt
  Buildings built after 1979 improvements incorporated into 1976 UBC adopted for design and construction of public schools on July 1, 1979. _____ buildings earthquakes.
- Not Applicable

- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

75FT 75FT

Appendix F1.4
AB 300 Category

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INFRASTRUCTURE MASTER PLAN

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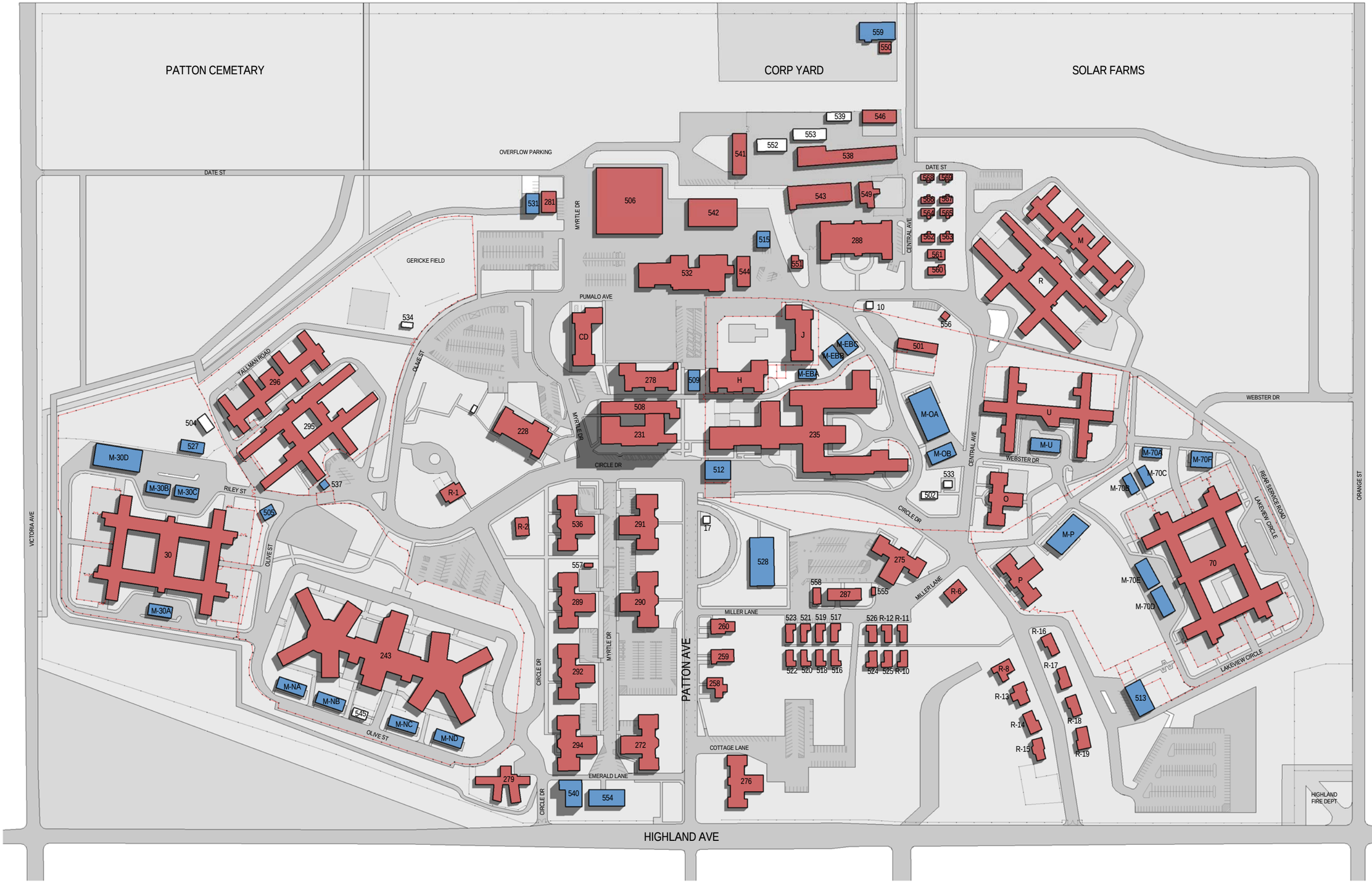

LEGEND

Per 2013 California Administrative Code, Chapter 6, Table 2.5.3.

- SPC 1/2
  Buildings posing significant risk of collapse and danger to the public Buildings with Probability of Collapse greater than 1.20% and/or buildings in compliance with the pre-1973 California Building Standards Code or other applicable standards, but not in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act.
- SPC 3
  Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, utilizing steel moment-resisting frames in regions of high seismicity as defined in Section 4.2.10 and constructed under a permit issued prior to October 25, 1994.
- SPC 4/5
  Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, but may experience structural damage which may inhibit ability to provide services to the public following strong ground motion. As well as buildings that are reasonably capable of providing services to the public following strong ground motion.
- Unknown
- Paved Vehicular Roadway
- Paved Sidewalk/Pavement
- Non-paved Surface
- Property Line
- Security Fence
- Non-security Fence

75FT

Appendix F1.5
OSHPD SPC Rating

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INFRASTRUCTURE MASTER PLAN

PATTON STATE HOSPITAL