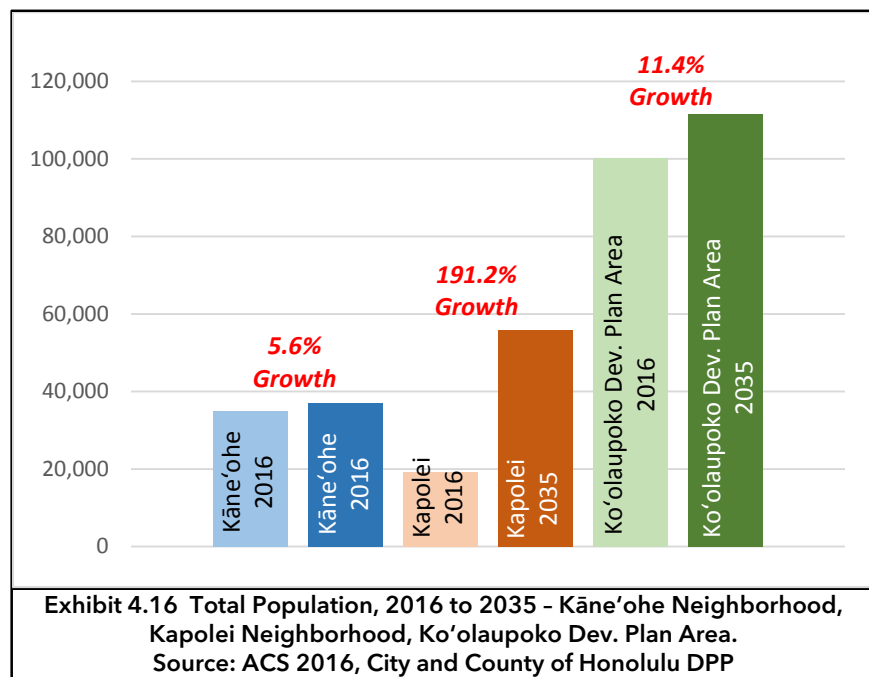


4.3.1.2 Future Changes to Kāneʻohe’s Demographic Profile

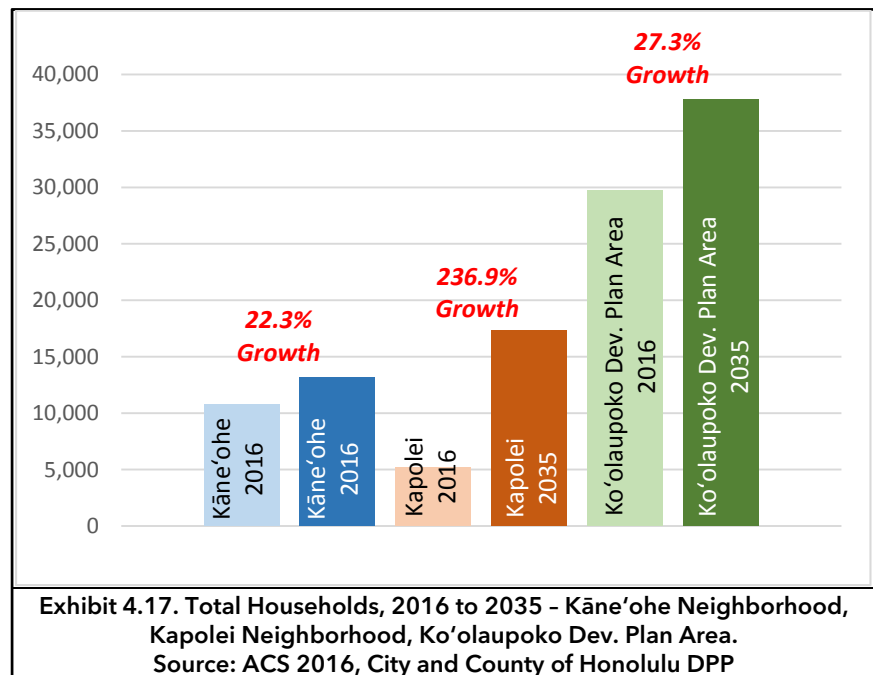
Future changes to Kāneʻohe demographics would generally reflect projected changes to community resident population and housing characteristics. The City DPP develops socio-economic projections for City development plan areas based upon the State Department of Business, Economic Development and Tourism’s (DBEDT) long-range socio-economic projections. DPP currently projects socio-economic conditions to the year 2035 and further develops projections for subareas of each development plan area. The Koʻolaupoko development plan area has five subareas: 1) Kahaluʻu; 2) Kāneʻohe; 3) Kailua; 4) Waimanalo; and 5) Mōkapu (Kāneʻohe Marine Corps Hawaiʻi).

Based upon DPP’s projections, Kāneʻohe’s resident population is projected to only increase moderately by about 5.6% from 2016 to 2035 (19 year period). As indicated in Exhibit 4.16, this projected growth rate is comparatively lower than population growth anticipated for the Koolaupoko Development Plan area as a whole and significantly lower than projections for high growth areas like Kapolei. Kaneʻohe’s comparatively



low rate of population growth reflects a community that is anticipated to be relatively stable, aligning with patterns observed in demographic data.

Exhibit 4.17 compares changes in the total number of households from 2016 to 2035 for Kāneʻohe and the areas previously analyzed. In Kāneʻohe the total number of households would increase in tandem with the neighborhood's population by 22.3%, a growth rate slightly lower than growth seen for the Koʻolaupoko area as a whole. The growth in the number of households is comparably lower than the projected increase in households for Kapolei.



Similar growth patterns are observed for the projected increase in the number of housing units in these areas. The number of housing units in Kāneʻohe is projected to increase by 22.1% which is four percentage points lower than the anticipated growth rate for Koʻolaupoko as a whole. Similar to previous patterns observed, the growth rate in housing units for Kāneʻohe is significantly smaller than the 260.9% growth rate anticipated for Kapolei.

Projected growth in Kāneʻohe's population, housing units, and households are relatively lower than projections observed for high growth communities like Kapolei. Growth patterns for Kāneʻohe neighborhood characteristics are slightly lower to those of the larger Koʻolaupoko area. Existing census data for Kāneʻohe suggests neighborhood growth is currently stable. Demographic projections suggests Kāneʻohe will continue to grow at a stable rate that is comparably lower than the growth of the surrounding community and Oʻahu's high growth neighborhoods.

4.3.1.3 Heritage Sensitivity Concerns

As discussed previously, over 41,000 individuals are presently interred at HMP. Less than 6% of HMP's burial plots remain unsold and could be exhausted in about 5 years. Anticipated near-term depletion of available burial plots at HMP pose significant concerns in how HMP and cemeteries statewide would accommodate future demand for burial space. In particular, near-term depletion of HMP burial space constrains the capacity of families that own and/or are interred at HMP to plan for the interment of relatives in the same location as other deceased family members.

While other cemeteries exist on O‘ahu, the interment of deceased family members across multiple cemeteries presents heritage sensitivity issues related to visitation and remembrance activities. While cremation has become the dominant method of post-death care for Hawai‘i residents, provision of interment space is needed to accommodate the variety of disposition preferences held by O‘ahu residents.

4.3.1.4 Business and Economic Conditions in Kāne‘ohe

Military Uses

The U.S. military has been an important part of Kāne‘ohe’s regional economy throughout the post-WWII period. Marine Corps Base Hawaii (MCBH) Kāne‘ohe Bay occupies 2,951 acres on O‘ahu’s Mōkapu Peninsula in the Kāne‘ohe region. MCBH Kāne‘ohe Bay is the largest of seven installations which comprise Marine Corps Base Hawaii; the other major installation on O‘ahu being Camp H.M. Smith in Hālawā.

The base is a major employer and economic contributor to windward O‘ahu, primarily the Kāne‘ohe and Kailua communities. It is the largest civilian employer in windward O‘ahu, and military personnel provide substantial support for local business. A 2012 study of the economic impact of MCBH Kāne‘ohe Bay done for the U.S. Army Corps of Engineers estimated that 93 percent of MCBH Kāne‘ohe Bay’s total employment impact on O‘ahu (17,243 jobs), and 86 percent of its total economic impact (\$1.26 billion) occurred in its neighboring communities, the main beneficiary being windward O‘ahu (Marstel-Day, LLC, 2014).

Industrial Uses

The only notable industrial use in the vicinity of the Petition Area is the HC&D, LLC’s Kapa‘a Quarry operations. This quarry operation occurs on the eastern half of the Oneawa hillside, and its operations cover approximately 416 acres. HC&D’s quarry provides aggregates for subbase preparation, ready-mix concrete, and asphaltic concrete mix for industrial and construction activities islandwide.

Other industrial uses in the larger region include the Kapa‘a Light Industrial Park and the City’s Kapa‘a Transfer Station located along Kapa‘a Quarry Road in Kailua. The privately-owned Kapa‘a Light Industrial Park contains a number of industrial warehouse spaces across a 22.3 acre area that has a variety of tenants. The Kapa‘a Transfer Station is a refuse transfer facility managed by the City Department of Environmental Services (DES), and is located at the base of the closed Kapa‘a Sanitary Landfill (R.W. Beck, 2008). The transfer station site is shared by an automotive and equipment services yard and a refuse yard, both under City jurisdiction.

Commercial Uses

The only major commercial uses in the vicinity of the Petition Area are located along Kāneʻohe Bay Drive about one mile away to the north. The Windward City Shopping Center encompasses about 15 acres of land at the corner of Kāneʻohe Bay Drive and Kamehameha Highway. This shopping center has many tenants consisting of restaurants, retail shops, home services, and health and beauty shops. Across this shopping center is a car dealership and service center. The Bay View Golf Park consisting of a golf course and other amusement park activities is located along Kāneʻohe Bay Drive across from Castle High School.

Along the mauka side of Kamehameha Highway from its intersection with Kāneʻohe Bay Drive for approximately 0.35 miles are several commercial uses. These uses include a range of retail and commercial businesses, gas stations, restaurants, business offices, fast food eateries, another car dealership and service center, and home improvement stores.

Visitor Activities in Kāneʻohe

Kāneʻohe is not a popular visitor destination as compared to other areas of the island, such as the North Shore, Kualoa Ranch, or Kailua. Kāneʻohe Bay and Coconut Island provide scenic ocean recreational activities, but ocean access within Kāneʻohe is limited, therefore, tours operate out of Heʻeia State Park. There are no significant white sand beaches in Kāneʻohe other than those at MCBH Kāneʻohe Bay. Other scenic parks or activities include the City's Hoʻomaluhia Botanical Garden and the Valley of the Temples situated north of Kāneʻohe. Commercial activities in Kāneʻohe provide some interest for visitors, primarily at Windward Mall. Otherwise, existing commercial activities are more oriented toward serving residences.

4.3.1.5 Potential Project Impact and Mitigation on Social Factors

No Action Alternative

The No Action Alternative would involve a continuation of ongoing cemetery operations within only the existing HMP site. The Petition Area would continue to maintain its undeveloped character and would remain overgrown with vegetation. No existing or future housing and visitor units would be affected under this alternative. Therefore, no significant changes to Kāneʻohe's resident population, housing conditions, business or regional economic conditions, or demographic character are anticipated.

Although changes to population, housing, and demographic characteristics are not anticipated, social issues related to the near-term depletion of burial space would occur. Families with burial space at HMP wanting to inter relatives close to deceased family members at the cemetery would be forced to plan for interment in other locations. Interment across multiple cemeteries would make it considerably difficult for families to engage in visitation and remembrance activities. As a result, effects on family heritage sensitivity issues would result under the No Action Alternative.

Proposed Action

The project does not propose new residences or visitor units, therefore, improvements should have negligible, if any, effect on Kāneʻohe’s existing or future projected demographic characteristics. The project would not change the City’s long-term demographic projections for the Kāneʻohe community and the larger Windward district. Project improvements would have negligible, if any, effect on the low rate of anticipated growth for this community. Resident population and housing units would therefore follow current projected trends occurring under the No Action Alternative. Similarly, the future demographic composition and characteristics (e.g. ethnicity, age) of residents would continue and not be affected by the project.

Cemetery expansion or the Cultural Preserve would not significantly change nor adversely impact the character of this project area and larger Kāneʻohe community. The visual characteristic of the Petition Area would change from an undeveloped and overgrown forested area into a graded landscaped area for cemetery visitation. However, the expanded passive cemetery land use is the same and complementary to activities already occurring at HMP and the Hawaiʻi State Veterans Cemetery. This change is more compatible with the area, as compared to a new industrial or commercial development occurring instead.

Cemetery expansion would provide a significant community benefit by supporting and providing opportunities for continued heritage considerations at HMP as well as the veteran’s cemetery for families. The project would increase burial space capacity providing increased opportunities for family members to plan for the future or accommodate current interment needs by allowing families to be buried within the same cemetery or nearby (e.g. Family buried at Hawaiʻi State Veterans Cemetery). This is especially important for visitation and remembrance activities.

Localized Effects on Kāneʻohe Businesses

The project would have no effect on military activities and related jobs because improvements are not located within MCBH Kaneohe Bay or military-related, and would not affect business operations occurring within the base. The project would also have no effect on the visitor industry and businesses in Kāneʻohe associated with those activities. HMP is not a visitor attraction as compared to the National Memorial Cemetery of the Pacific (Punchbowl), which is a site with national interest. Visitors to HMP would mainly consist of residents visiting gravesites of family members and relatives.

Project improvements would have minimal effect on industrial uses or activities associated with those businesses. The project does not involve new industrial land uses or businesses that would compete with existing industrial businesses in Kāneʻohe. The cemetery’s expansion is located on the northern side of the Oneawa hillside, opposite of HC&D, LLC’s Kapa’a Quarry operations. As a result, short-term construction activities for the cemetery’s expansion are not expected to negatively impact quarry operations. Construction of the cemetery expansion may require

materials that are manufactured at this quarry, which would have a small but beneficial effect on HC&D, LLC's Kapa'a Quarry business.

The project does not include any new commercial uses such as retail stores, restaurants, coffee shops, etc. Therefore, cemetery operations would not negatively impact or compete with commercial uses in the vicinity and larger Kāne'ohe community. The cemetery expansion site is located a considerable distance away from existing retail and commercial businesses operating along Kamehameha Highway and Kāne'ohe Bay Drive. Therefore, short-term construction activities are not expected to negatively impact those businesses or their operations (e.g. disrupt vehicle access or parking).

The additional burial plots created by the project would generate slightly more daily visits by family members on a typical weekday, and increased visits on weekends. This would indirectly have a small but beneficial effect for businesses in the area that support cemetery related activities, such as flower shops or restaurants and other eateries (e.g. fast food businesses). Visitors to the expanded cemetery could purchase flowers from nearby retail stores, or visit restaurants, coffee shops, etc. after funeral services or gravesite visitations.

The Cultural Preserve managed by the Ko'olaupoko Hawaiian Civic Club would not be open to the general public because the site would be intended for restoration and maintenance of historic sites, cultural practices, and educational programs. Persons participating in these activities could visit restaurants and other retail establishments in Kāne'ohe. The majority of persons participating in these cultural activities are expected to be members of the Civic Club or residents of the Windward district. Thus, commercial businesses could experience a small, but positive, benefit from participants visiting their establishments, particularly restaurants, coffee shops, fast food establishments, etc.

4.3.2 Economic and Fiscal Effects from Project

An economic impact analysis and public fiscal assessment was conducted by CBRE and forecasts the economic and fiscal impacts on O'ahu and across the state from the implementation of the project (CBRE, 2018). The analysis evaluated: 1) the general and specific effects to the local economy resulting from cemetery expansion improvements, which include capital investment, construction and maintenance employment, worker wages, and other regional monetary and employment effects; and 2) the impact to the "public purse" from the project from new tax/fee revenue received relative to any additional costs that would be assumed by the State and City due to project implementation. Additional information on analysis methodology as well as tables highlighting data, analysis, and modeling results are included in the study's report in Appendix B.

Summary of Economic and Fiscal Effects

Under the No Action Alternative, there would be no expenditure of construction funds, and no new employment of maintenance personnel. Operations would continue as present, and no changes to the economic or fiscal condition of the State, jobs, and wages would occur.

The cemetery expansion of HMP would result in significant expenditures that would favorably impact O‘ahu’s economy on both a direct and indirect basis. The project would increase the level of capital investment and capital flow in the region, which would in turn contribute to and extend employment opportunities and the tax base. A summary of the effects is provided below.

1. The project would create numerous construction, equipment operator and specialty trade jobs, directly and indirectly, during the planning and construction phase.
2. Existing employment (administrative and service positions) at the HMP would be extended and marginally enhanced for several additional decades, including positions that could otherwise gradually fade away as available plots are sold and utilized.
3. Cemetery expansion would proportionately increase the need for maintenance workers over time from currently 20 up to 27 positions.
4. Short-term construction jobs, wages, and benefits would be generated for both on-site construction workers along with off-site worker servicing the construction effort.
5. Numerous local businesses would see significant profit opportunities arising for contracting companies involved in the project’s construction, and for local businesses that would supply a substantial portion of the materials needed in the effort.
6. The general island economy would benefit from the project, as HMP’s employees would spend their discretionary income in shops, restaurants, and service establishments throughout the island, and in purchasing goods and services.
7. Indirectly, these wages, profits, and expenditures from the project moving through the regional economy would have a multiplier effect increasing the amount of capital flowing to the entire community.
8. Much of the direct and indirect spending would be re-directed to other island industries, and would in turn be put back through the region’s economic and tax structure.

4.3.2.1 Economic Effects with Project

Direct Business Profits from Construction

CBRE’s economic analysis was based on a 16-year build-out and sell-out/absorption modeling period (2020 through 2035). The full absorption and construction of the project could possibly take a shorter or longer period. However, whether full sales of burial plots take 16 or 20 years, the economic impact during the construction period and stabilized “operation” of the cemetery would be the same following construction completion.

Implementation of cemetery expansion improvements would contribute an estimated \$29.3 million in direct development capital to O‘ahu’s economy during the project’s approximately 1.5 year construction period. Table 4.8 shows this expenditure during the study period. Although a significant proportion of materials required to construct the cemetery expansion may need to be imported to O‘ahu, a portion of construction costs spent during development would flow to local businesses as contractor and supplier profits.

Table 4.8 Proposed Project Schedule and Estimated Construction Costs <i>All Amounts Expressed in Constant 2018 Dollars</i>				
Item	Development and Sales Period			Totals During Build-Out
	2020 to 2025	2026 to 2030	2031 to 2035	
Infrastructure Construction	\$29,304,000	\$0	\$0	\$29,304,000
Total Periodic Construction Costs	\$29,304,000	\$0	\$0	\$29,304,000
Contractor Profits	\$2,930,400	\$0	\$0	\$2,930,400
Supplier Profits	\$1,172,160	\$0	\$0	\$1,172,160
Source: CBRE 2018				

Net contractor profit margins are typically assumed to be 8% to 20% of total construction costs. Analysis for this project utilizes a more conservative 10% profit factor. Supplier profits were extrapolated at 4% of total construction costs. Estimated contractor profits to local building companies from implementation of cemetery expansion improvements totals an estimated \$2.9 million across the project construction period. Aggregate supplier profits are estimated at \$1.1 million.

Employment Opportunities Created

Demand for full-time equivalent (FTE) employment positions (on- and off-site, direct and indirect) during construction, operation, and maintenance of the expanded cemetery area was estimated using indicators obtained from the construction of comparable projects and Hawai‘i industry averages. These jobs are expected to be opportunities for existing resident construction workers and local supply businesses, and to maintain HMP’s existing operational jobs that could potentially decrease as existing burial plot inventory diminishes.

Table 4.9 highlights worker-year, FTE employment created or sustained by the project during construction, sell-out absorption, and a stabilized on-going annual basis thereafter. A total of 73 worker years (equivalent to 52 work weeks at 40 hours per week) of employment in the construction trades is projected to be needed for cemetery expansion related site work and infrastructure emplacement.

Table 4.9 Estimated Yearly Full-Time Equivalent Employment Jobs Created by Proposed Project				
	Development and Sales Period			Totals During Build-Out
	2020 to 2025	2026 to 2030	2031 to 2035	
Construction Employment ¹	73	0	0	73
Total Periodic Construction Jobs	73	0	0	73
On-Going Employment				
Maintenance, Administrative and Services	190	210	225	625
Total FTE Jobs in Place, End of Period	38 ²	42	45	45
Off-Site Employment ³	88	70	75	233
Total FTE Jobs in Place, End of Period	37	14	15	15
Total Periodic Worker Years	351	280	300	931
Total End of Period Permanent Job Count	51	56	60	60
¹ Infrastructure construction employment estimated at 1 worker-year for every \$400,000 in costs. Includes all direct employment associated with construction, on and off-site. ² Current staff of 38 employees, including 20 maintenance, 10 administrative, 5 funeral services and 3 community services. Expansion of existing park from 80 acres to 108 acres will create an additional 7 maintenance positions. ³ Estimated at one cumulative off-site employment position for every three on site positions. Source: CBRE 2018				

HMP's existing 38 operating personnel would continue to be employed with an additional seven maintenance personnel added over time to maintain the expanded cemetery area. The resulting total of 45 personnel employed is expected to remain constant after 2035, although there may be some slippage in administrative, sales, and servicing departments. Indirect/off-site employment positions created by the project would service the construction effort and HMP employees and their operations. Employment positions created are estimated at one-third the on-site/direct job count. This totals 233 worker years from 2020 to 2035 and 15 FTE jobs per year during the project stabilization period.

Wage Income Generated

Data from the State Department of Labor and Industry Relations and the current HMP operating payroll were evaluated to estimate personal income (wages) that would flow to O'ahu workers from the project. As indicated in Table 4.10, total construction wages paid during construction is expected to be about \$5.9 million. Current payroll for HMP's 38-member staff is approximately \$2.7 million annually, and is expected to continue on a going-forward basis and apart from additional wages paid to increased maintenance staff for the expanded cemetery. Total HMP employee wages during the modeling period would be \$43.8 million and is expected to stabilize

to \$3.2 million annually thereafter. Anticipated indirect/off-site employee wages would total \$13.1 million during build-out, and are expected to stabilize to \$842,400 annually.

The general island economy is expected to benefit as individuals employed as a result of the project are expected to spend their discretionary income at O‘ahu shops, restaurants, and service establishments. Much of this spending would be re-directed by those businesses to other island industries with a significant portion of these secondary profits put back through the region’s economic and tax structure. In this manner, wages, profits, and expenditures resulting from project implementation increase the amount of capital flowing to the entire community.

Table 4.10 Estimated Yearly Employee Wages Created by Proposed Project					
<i>All Amounts Expressed in Constant 2018 Dollars</i>					
	Development and Sales Period			Totals During Build-Out	
	2020 to 2025	2026 to 2030	2031 to 2035		
Construction Wages ¹					
Infrastructure Emplacement	\$5,942,851	\$0	\$0	\$5,942,851	
Total Periodic Construction Wages	\$5,942,851	\$0	\$0	\$5,942,851	
					Stabilized Annually
<i>Maintenance, Administrative and Services ²</i>					
Annual Wages	\$2,665,485	\$2,946,062	\$3,156,495	\$8,768,043	\$3,156,495
Total Periodic Wages	\$13,327,425	\$14,730,312	\$15,782,477	\$43,840,214	
<i>Off-Site Employment Wages ³</i>					
Annual Average Wages	\$821,371	\$786,240	\$842,400	\$2,178,571	
Total Periodic Wages	\$4,928,227	\$3,931,200	\$4,212,000	\$13,071,427	\$842,400
PERIODIC WAGES (TOTAL)	\$24,198,503	\$18,661,512	\$19,994,477	\$62,854,492	\$3,998,895
¹ Average annual wage for full-time-equivalent construction worker (equipment operators and other infrastructure-related trades) at \$81,120 (\$39/hour X 2,080 hours). ² Based on current payroll of HMP. Added workers due to expansion assumed to be at average proportional wage. ³ Average annual wage for full-time-equivalent general worker at \$56,160 (\$27/hour), the average wage for all "All Occupations" in the state. Source: CBRE 2018					

Summary of Direct, Local Economic Impacts

As indicated in Table 4.11, the total base economic impact during the construction and sale/absorption period of burial plots is estimated at about \$141 million. After build-out, the annual stabilized total base economic impact is expected to be \$5.9 million annually.

Some \$7 million in annual revenue, and \$115.9 million during the 16-year modeling period, in HMP operations would occur. This wouldn’t be “new” economic activity, but sustenance of current operations. These gross revenues are partially attributable to sales of new burial plots that would otherwise be diminished with the existing HMP becoming fully absorbed and used. HMP revenues and operating budget was then adjusted (decreased) to \$5 million annually projected on

a stabilized basis (with revenues continuing to flow in from the maintenance trust fund, funeral services and plot resales) to account for burial plots being sold-out post-2035.

Table 4.11 Summary of Economic Impacts Associated with Proposed Project					
<i>All Amounts Expressed in Constant 2018 Dollars</i>					
	Development and Sales Period			Totals During Build-Out	Stabilized Annually
	2020 to 2025	2026 to 2030	2031 to 2035		
<u>Construction Activity</u>					
Construction Wages	\$5,942,851	\$0	\$0	\$5,942,851	
Contractor Profits	\$2,930,400	\$0	\$0	\$2,930,400	
Supplier Profits	\$1,172,160	\$0	\$0	\$1,172,160	
Other Construction Costs	\$19,258,589	\$0	\$0	\$19,258,589	
Total Construction Impact	\$29,304,000	\$0	\$0	\$29,304,000	
<u>Memorial Park Revenue</u>					
Annually	\$7,000,000	\$7,700,000	\$8,470,000		\$5,000,000
Total During Entire Period	\$35,000,000	\$38,500,000	\$42,350,000	\$115,850,000	
<u>Off-Site Wages³</u>					
Annually	\$821,371	\$786,240	\$842,400		
Total During Entire Period	\$4,928,227	\$3,931,200	\$4,212,000	\$13,071,427	\$842,400
TOTAL BASE ECONOMIC IMPACT	\$34,232,227	\$50,917,440	\$55,874,400	\$141,024,067	\$5,842,400
¹ Estimated at \$1,000 per home per month.					
Source: CBRE 2018					

Comparison with State Input/Output Model

CBRE also analyzed the impacts of the project for O‘ahu and Statewide using the State of Hawai‘i, Department of Business and Economic Development and Tourism (DBEDT) Inter-County Input-Output Economic Model, Type II multipliers (2012 analysis approved in August 2016). These factors quantify the total Direct, Indirect and Induced “effects” of various forms of business and spending activity as it flows through the economy of the islands. In every instance, application of the macro Input-Output multipliers resulted in higher dollar, employment, and tax revenue indicators than in CBRE’s subject-focused micro-model, which was designed to reflect Direct and upper-level Indirect impacts only.

A summary of the results from using the State’s multipliers among the construction-based outputs is provided, and tables calculating these results are in CBRE’s report in Appendix B.

1. The \$19.3 million in “other construction costs” remaining from the total construction budget would generate a total State Economic Output of \$57.4 million during build-out.
2. Direct construction wage earnings of \$5.9 million would yield \$10.3 million in statewide wage earnings.

3. Indirect and induced State taxes would total \$3.6 million during construction.
4. Direct effect jobs created by construction employment would be 2.25 times the number of projected jobs, or a total of 164.8 worker years of employment.
5. Direct effect jobs created by operating employment would be 1.58 times the number of on-site workers, or a total of 263.1 worker years of employment from 2020 through 2035, and 94.8 annually thereafter.

Ancillary Economic Effects

Project implementation and operation would have negligible to minor impacts to the socio-economic characteristics of the surrounding community related to real estate issues. Cemetery expansion is not expected to significantly impact property values or real estate taxes of homes located down slope and adjacent to the Petition Area. Property values throughout Windward O‘ahu are largely driven by external, cyclical economic factors in an existing (and expanding) cumulative mass, and would not be driven by the expansion of a cemetery that has existed for decades.

4.3.2.2 Fiscal Effects with Project

Public fiscal impacts are typically estimated on a per-capita basis given the conservative assumption that each new person added to O‘ahu’s community is responsible for a similar tax obligation as other island residents. New per-capita costs would not occur from this project because there no new (migrant) residents would result from the cemetery expansion project. Analysis focused on additional fiscal impacts (i.e. incoming tax dollars and outgoing government expenditures) to the City and State arising from the construction of cemetery expansion rather than monies and costs already existing from the existing cemetery and associated operations.

Total New/Sustained Public Gross Revenue

Table 4.12 summarizes new and sustained gross public revenue that would flow to the City and State from the cemetery expansion project. Real Property Tax (RPT) is expected to generate about 50% of total City General Fund revenue in the 2018 fiscal-year budget with secondary taxes and fees comprising the remainder. The City currently receives some \$530 per year in RPT from HMP’s 164-acre property that includes the Petition Area. RPT revenue is not expected to change significantly as a result of HMP expansion. The City is expected to receive \$500,000 in one-time fee, permit, and license revenue at project commencement. Otherwise, there would be no enhanced benefits from the project. Other than the minimal RPT revenue that would be obtained, the \$500,000 in fees is the only public revenue expected from the project.

Table 4.12 Total New/Sustained Public Gross Revenue & Public Fiscal Costs and Benefits from the Proposed Project <i>All Amounts Expressed in Constant 2018 Dollars</i>					
	Development and Sales Period			Totals During Build-Out	Stabilized Annually
	2020 to 2025	2026 to 2030	2031 to 2035		
Total Gross Public Revenues					
City and County of Honolulu Public Revenues					
Real Property Taxes to City & County of Honolulu ¹	\$0	\$0	\$0	\$0	\$0
Adjustment for Other Proportional Taxes	1.99	1.99	1.99	1.99	1.99
Adjusted City & County Revenues	\$0	\$0	\$0	\$0	\$0
Plus Impact Fees	\$500,000	\$0	\$0	\$500,000	\$0
Total City & County Receipts	\$500,000	\$0	\$0	\$500,000	\$0
State of Hawai'i Public Revenues					
To State (Income Taxes)	\$1,867,724	\$1,532,537	\$1,653,318	\$5,053,579	\$266,581
To State (GET)	\$1,725,149	\$388,785	\$416,555	\$2,530,489	\$83,311
To State (Income Taxes & GET)	\$3,592,873	\$1,921,322	\$2,069,873	\$7,584,068	\$349,892
Adjustment for Other Proportional Taxes	1.15	1.15	1.15	1.15	1.15
Adjusted State Revenues	\$4,131,804	\$2,209,520	\$2,380,354	\$8,721,678	\$402,376
Plus Impact Fees	\$0	\$0	\$0	\$0	
Total State of Hawaii Receipts	\$4,131,804	\$2,209,520	\$2,380,354	\$8,721,678	\$402,376
AGGREGATE SALES REVENUE	\$4,131,804	\$2,209,520	\$2,380,354	\$8,721,678	\$402,376
¹ City receives annual RPT of \$530 on 164-acre site Petition Area located in. RPT revenue indicated as \$0 in table because revenue is comparably smaller than other City and State revenues. Source: CBRE 2018					

In recent fiscal years, income tax and General Excise Tax (GET) has generated about 87% of State general fund revenues (excluding carry-over funds), with secondary taxes and fees contributing the remainder. The State is expected to receive \$5.0 million in primary income tax receipts from on and off-site construction worker wages, wages of HMP operations personnel, as well as profits from local businesses benefitting from the project during the 16-year modeling period.

Estimated income tax revenue is based on average statewide corporate and personal payment rates of 4.4% and 5.1%, respectively, applied against economic model forecasts. The State is expected to generate annual income tax revenue of \$266,581 after project stabilization in 2035. The State is expected to collect GET revenues totaling \$2.5 million with a stabilized amount of \$83,311 annually thereafter during the 16-year modeling period. Estimated GET revenues were calculated as 4.712 percent of the gross amount of building contracts, construction supplies, work, and resident spending, and from ongoing HMP business activity sustained by the cemetery expansion. State Income Tax and GET revenues collectively total \$7.5 million for the construction, and \$349,892 in total revenue stabilized annually after build out. Public fiscal analysis anticipates HMP

economic activity expressed in primary tax sources would result in secondary tax revenue equivalent to statewide averages. Estimated secondary State receipts were calculated as 1.15 times Income Tax and GET totals. Application of this ratio results in a cumulative total estimated tax collection of \$8.7 million during the initial forecasting period through 2035, and \$402,376 annually on a stabilized basis thereafter.

Net Public Costs and Benefits

As indicated in Table 4.13, the project is not expected to generate new per capita or actual costs beyond nominal amounts already incurred by the State or City. The cemetery expansion area is expected to merely sustain existing operational parameters. Expansion of public services, infrastructure, and facilities would not be needed. This results in all added public revenue generated by the project being “marginal profits”.

Table 4.13 New/Added Public Costs - Public Fiscal Costs and Benefits from the Proposed Project					
<i>All Amounts Expressed in Constant 2018 Dollars</i>					
	Development and Sales Period			Totals During Build-Out	Stabilized Annually
	2020 to 2025	2026 to 2030	2031 to 2035		
INCLUDES “NEW” COUNTY AND STATE TAXES AND COSTS ONLY					
Added Public Costs (Expenses)					
By City & County of Honolulu	\$0	\$0	\$0	\$0	\$0
By State of Hawaii	\$0	\$0	\$0	\$0	\$0
Total Public Costs	\$0	\$0	\$0	\$0	\$0
Source: CBRE 2018					

Table 4.14 indicates that net public benefits (revenues less costs) flowing to the City from the proposed project total an estimated \$500,000 in upfront licensing, permitting, and other fees. No other benefits or costs to the City during the modeling period or on a standardized basis thereafter are expected. The State will receive net benefits (“profits”) of \$8.7 million from 2020 through 2035 and an annual benefit of \$402,376 on a standardized basis thereafter.

Table 4.14 Net Public Benefits (Profits) - Public Fiscal Costs and Benefits from the Proposed Project <i>All Amounts Expressed in Constant 2018 Dollars</i>					
	Development and Sales Period			Totals During Build-Out	Stabilized Annually
	2020 to 2025	2026 to 2030	2031 to 2035		
INCLUDES "NEW" COUNTY AND STATE TAXES AND COSTS ONLY					
Total Net Public Benefits					
By City & County of Honolulu	\$500,000	\$0	\$0	\$500,000	\$0
By State of Hawaii	\$4,131,804	\$2,209,520	\$2,380,354	\$8,721,678	\$402,376
Aggregate Net Benefits	\$4,631,804	\$2,209,520	\$2,380,354	\$9,221,678	\$402,376
Source: CBRE 2018					

4.4 AGRICULTURE

4.4.1 Existing Conditions

4.4.1.1 Historic Agriculture Use

As discussed in Section 4.1, the Kāneʻohe ahupuaʻa was a pre-contact population center with inland agricultural fields fed by streams that flowed downslope from the Koʻolau Range. Sweet potato, pandanus, wauke, bananas, and taro were grown in pre-contact Kāneʻohe. Coastal areas of the ahupuaʻa also contained multiple fishponds (Honua 2018). By the mid-19th century, Land Commission Award records indicate that lands claimed in Kāneʻohe were occupied by taro fields, fishponds, and dryland for crops.

Agricultural production would continue to dominate land use within Kāneʻohe through the mid-20th century. Sugarcane, rice, pineapple, cattle, and sheep were cultivated in the Kāneʻohe region during this period. Pineapple and cattle were previously cultivated on Petition Area lands. Kāneʻohe became an important area for dairy production on Oʻahu by the mid-20th century. The Souza Brothers Dairy was located near the Petition Area with area lands said to have been grazed by cattle owned by this operation. Presently, no commercial agriculture activity occurs within the Petition Area.

4.4.1.2 Agriculture Land Use Classifications

Soils of the Kāneʻohe and Alaeloa soil series underlie the Petition Area. The USDA NRCS characterizes general uses of these soils, which include agriculture (SCS 1972). Soils in the Alaeloa series were recorded as being used for pineapple cultivation, pasturage, wildlife habitat, homesites, and water supply functions. Kāneʻohe series soils were recorded as being used for pasturage, homesites, and urban development. Although agricultural use has been documented for these soils, the Hawaiʻi Soil Atlas classifies these soil series as “naturally infertile” (College of Tropical Agriculture and Human Resources). This classification is granted to soils with low

nutrient holding capacity that are often deficient in calcium, magnesium, and potassium. However, naturally infertile soils can become productive if amended with the proper nutrients.

Land Study Bureau Classification

The University of Hawai‘i Land Study Bureau’s (LSB) Detailed Land Classification-Island of Oahu, classifies soil by land type in which classifications are provided for an overall crop productivity rating, with and without irrigation. Overall LSB ratings range from A to E, with A representing the class of highest productivity and E the lowest.

Figure 4.5 graphically shows the LSB ratings established for the Petition Area. As shown on the figure, Petition Area lands are rated “D” and “E” indicating area lands are poorly suited for agricultural use.

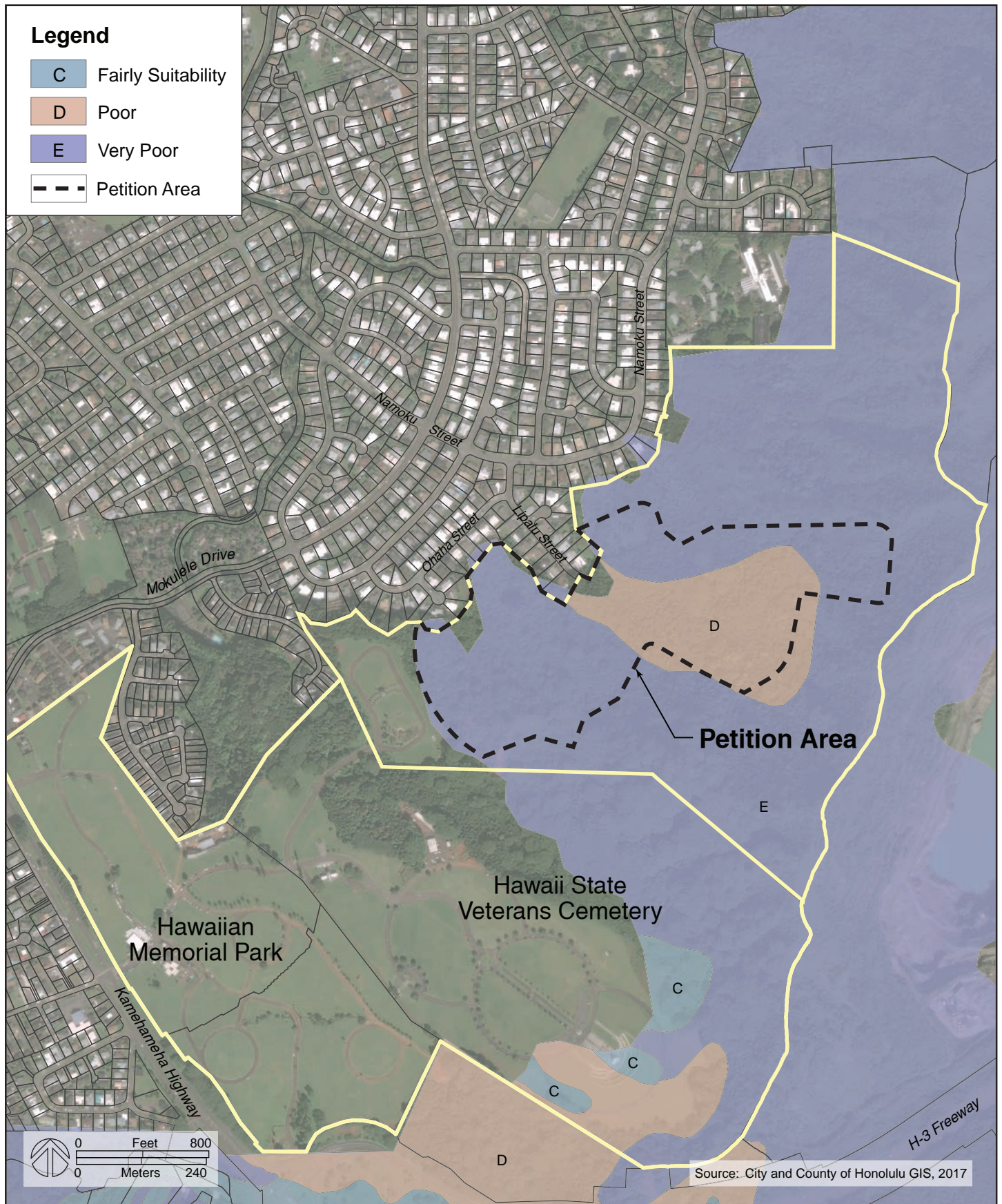
Agricultural Lands of Importance to the State of Hawai‘i.

The State Department of Agriculture’s Agricultural Lands of Importance to the State of Hawai‘i (ALISH), established a classification system for identification of agriculturally important lands to the State of Hawai‘i. Three classes of lands are established which are: 1) Prime, 2) Unique, and 3) Other. Lands not included under this system are “unclassified.” Figure 4.6 graphically shows the ALISH ratings established for the Petition Area.

As shown on the figure, a small corner of the northwest corner of the Petition Area is classified as “Prime Land.” This area bordering existing residences is associated with the small basin where a well and seep are located. However, no improvements are planned for this corner site. These lands are best suited for production of a variety of crops.

A section of the northeast portion of the Petition Area is classified as “Other Lands.” This area includes the eastern end of the cemetery’s expansion, and a large portion of the Cultural Preserve. Areas classified as Other Lands are important to Hawai‘i agriculture, but exhibit properties such as seasonal wetness or a limited rooting zone that render the Prime and Unique designation inapplicable. These lands can be farmed satisfactorily through proper management such as application of fertilizer inputs and soil amendments.

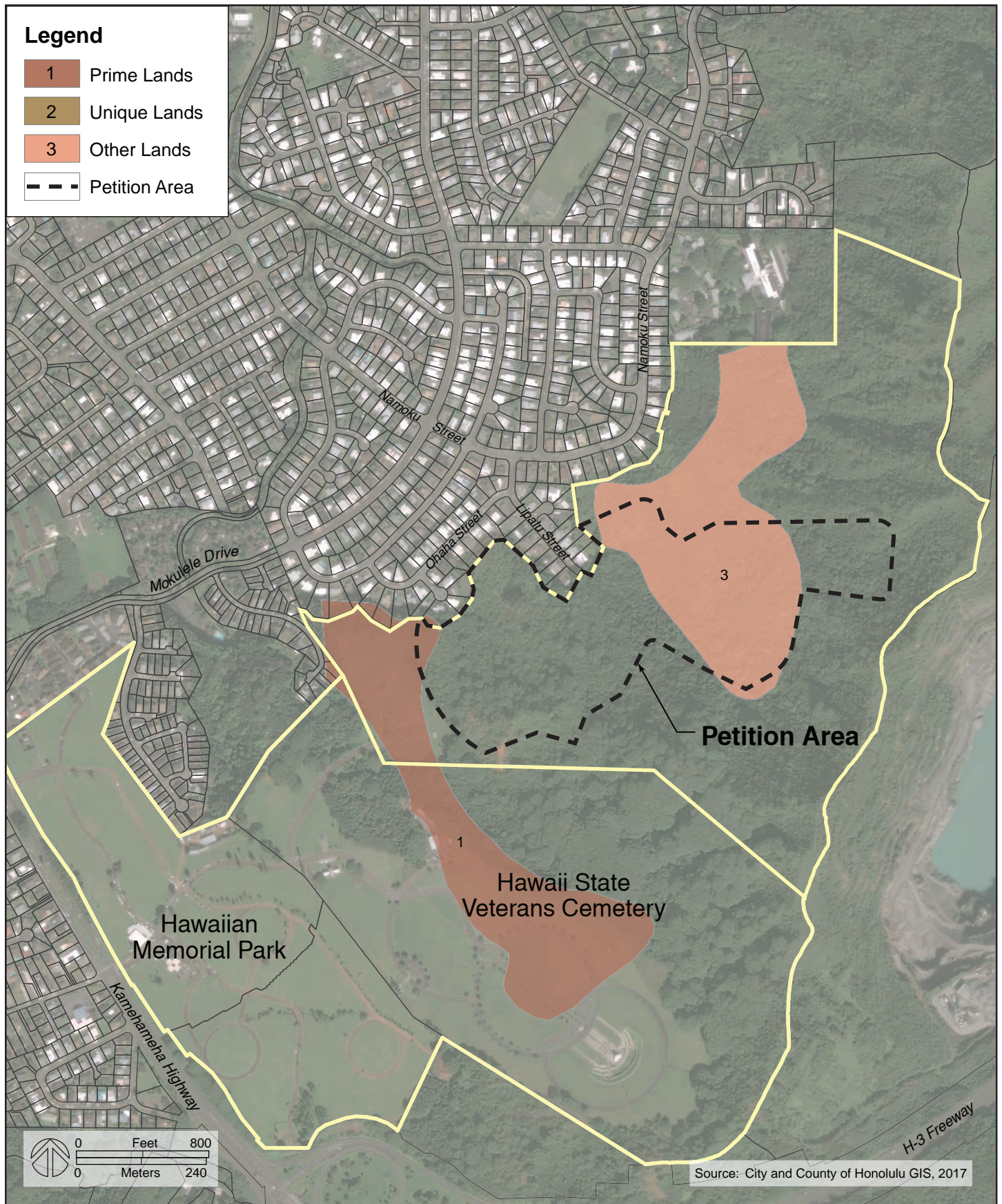
The majority of the Petition Area was excluded from the ALISH classification process. These lands include the western and central portions of the Petition Area, and sections of the northern portion at low and high elevations, and the higher elevation lands of the Cultural Preserve. Lands were excluded from the ALISH classification process based on specific criteria for exclusion that were established. For example, lands with slopes in excess of 35% were not considered for classification.



Land Study Bureau Soil Classification

Figure 4.5

Hawaiian Memorial Park Cemetery Expansion Project Final Environmental Impact Statement
Kāneʻohe, Oʻahu, Hawaiʻi



ALISH Classification Map

Figure 4.6

Hawaiian Memorial Park Cemetery Expansion Project Final Environmental Impact Statement
Kāne'ohe, O'ahu, Hawai'i

Important Agricultural Lands

An outcome of Hawai‘i’s post-statehood shift from a plantation-based economy to one driven by tourism and Federal spending prompted concerns about how to best protect the state’s agricultural lands and promote the viability of agriculture. These concerns led to the proposal and subsequent amendment of the Hawai‘i State Constitution in 1978 to identify and designate Important Agricultural Lands (IAL). As a result, the State has the legal responsibility to promote agriculture and the conservation of Hawai‘i’s productive agricultural lands.

The IAL designation is intended to identify a select class of farm land that would be used for long-term active agricultural production. This designation is a supplemental state land use classification for a sub-set of high-quality farm land within the State Agricultural District. The IAL designation seeks to promote the economic viability of farming, and to make it possible for landowners to keep agricultural lands active by granting landowners access to incentives and supportive measures that reduce the cost of farming. This ultimately leads to the long-term preservation and protection of productive agricultural lands.

In 2005 and 2008, the State Legislature passed two bills that among other things, provided the framework for counties to identify IAL by establishing eight criteria to be used when reviewing land for IAL consideration and outlined the process used to evaluate agricultural land. The City DPP has identified land on O‘ahu where the IAL designation is recommended. The Honolulu City Council is in the process of reviewing the DPP’s recommendations, but has not adopted these recommendations by resolution. Once adopted, recommendations will be submitted to the State LUC for final approval and adoption. The Petition Area is not located in the State Agricultural District and is located within the State Conservation District. Therefore, the Petition Area is ineligible for consideration as IAL.

4.4.2 Potential Project Impact and Mitigation

Food security issues and the desire for food self-sufficiency in Hawai‘i has been discussed at many levels. In 2012, the State Office of Planning, Department of Business, Economic Development and Tourism (DBEDT) prepared a strategic/functional plan addressing this topic (Office of Planning, 2012). The three strategic objectives of the “Increased Food Security and Food Self-Sufficiency Strategy” are:

1. Increase demand for and access to locally grown foods.
2. Increase production of locally grown foods.
3. Provide policy and organizational support to meet food self-sufficiency needs.

Commercial agriculture and aquaculture production are allowable uses within the Petition Area's Conservation District designation, subject to a permit. The Petition Area is specifically located within the Conservation District's General and Limited Subzones. Agricultural uses are permitted within both subzones. Aquaculture related uses are permitted within the Limited Subzone, which encompasses higher elevation sections in the northern portion of the Petition Area.

No Action Alternative

Agricultural ~~activities~~ activity ~~for~~ would not occur within the Petition Area under this alternative. ~~Uses supporting agricultural activities are not proposed in the project.~~ The area would remain undeveloped and heavily vegetated with varying topographic conditions. The majority of Petition Area soils would continue to have low potential for agricultural production without proper amendments.

Proposed Action

Uses supporting agricultural activities are not proposed as part of this project. Cemetery expansion improvements including grading of the Petition Area and related site improvements would allow expansion of HMP operations. Although portions of the Petition Area were previously used for pineapple cultivation and dairy production, contemporary soil data indicates the majority of area soils have low utility for agricultural production. As a result, project implementation would not result in adverse impacts to agricultural resources.

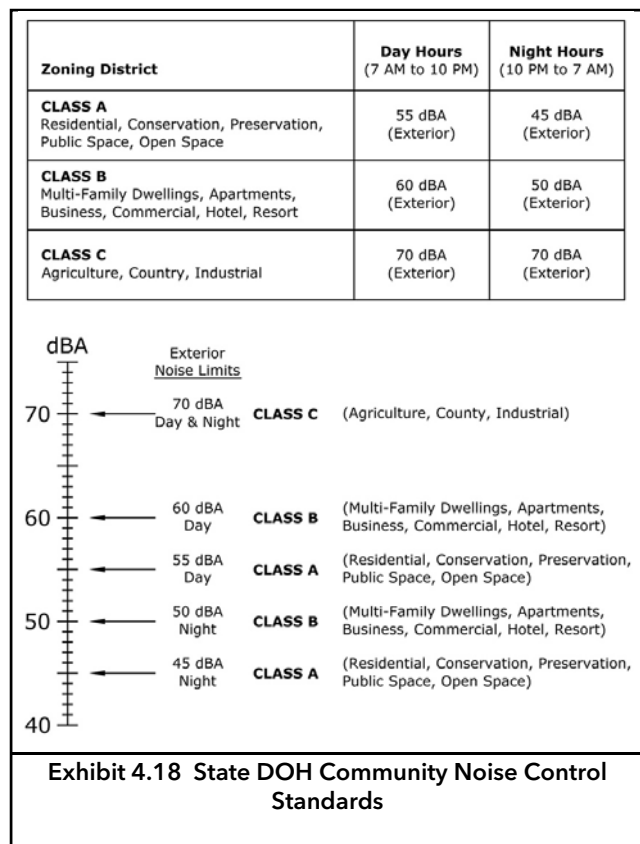
4.5 NOISE

Censeo AV+Acoustics (Censeo) conducted an environmental noise assessment (Censeo, 2018) of the Petition Area. This study is included in Appendix L. The purpose of this noise assessment is to identify potential noise impacts to the surrounding area resulting from the construction and operation of the expanded cemetery area.

Noise Standards

Various state and federal agencies have established guidelines and standards for assessing environmental noise impacts and setting noise limits as a function of land use. A brief description of common acoustic terminology used in these guidelines and standards is presented.

1. Environmental Noise. Title 11, Chapter 46 (Community Noise Control), HAR, regulates environmental noise limits within the State. These rules define three classes of zoning districts and specifies corresponding maximum permissible sound levels due to stationary noise sources such as air-conditioning units, exhaust systems, generators, compressors, pumps, etc. Maximum permissible sound levels applicable to these zoning classes are shown in Exhibit 4.18. The regulation also applies to noise related to agricultural, construction, and industrial activities, which may not be stationary. The maximum permissible noise levels are enforced by the State DOH for any location at or beyond the property line and shall not be exceeded for more than 10 percent of the time during any 20-minute period.



HMP is open during daylight hours, and all memorial services and grounds maintenance occur during daytime hours. The most prevalent noise sources during normal operations, such as lawn mowers, are mobile and are not regulated by the DOH criteria. However, the day/night noise limits for Class A land uses can be used as

guidelines for general ambient noise and evaluating environmental noise impacts (Censeo, 2018).

2. **Traffic Noise.** The project is expected to result in some additional vehicular traffic into and out of the HMP property. To address traffic noise effects, the State's noise ordinance is not applicable to traffic noise sources. However, the Federal Transit Administration (FTA) presents allowable traffic noise exposure increases based on existing exposure levels. Based on measured sound levels, an increase of 1 decibel (dB) due to project traffic noise is considered acceptable for highway noise. The ambient noise level further within the HMP cemetery and expansion area closer to residential areas is lower, so a total noise increase of 5 dB is considered acceptable (Censeo, 2018).
3. **Construction Noise.** The State DOH allows construction activities to occur with the appropriate community noise permits during specific hours, as shown below. Any excessive noise outside of these hours requires an approved Community Noise Variance from the State DOH.

Equipment Used	Allowed Hours of Operation
Pile Drivers, Jackhammers, Impact Hammers, Demolition Equipment, etc.	9:00 a.m. - 5:30 p.m. Monday - Friday
Normal Construction Equipment	7:00 a.m. - 6:00 p.m. Monday - Friday 9:00 a.m. - 6:00 p.m. Saturday

The State DOH does not quantify allowable construction sound levels. Therefore, the FTA noise limits proposed as "reasonable criteria for assessment" was utilized. Though these construction noise limits are defined at the property line, they can also be applied to the construction area boundary for analyzing impacts from construction noise. The Construction Noise Limit guidelines are summarized below.

Federal Transit Administration General Assessment Construction Noise Limits		
Land Use	1-Hour L_{eq} (dBA)	
	Day (7:00 a.m. - 10:00 p.m.)	Night (10:00 p.m. - 7:00 a.m.)
Residential	90	80
Commercial	100	100
Industrial	100	100

For this project, a 1-hour L_{eq} level of 90 A-weighted decibels (dBA) was used as the maximum daytime construction noise level at the construction area boundary due to the adjacent residential land uses.

4.5.1 Existing Conditions

Ambient noise level measurements were taken by CENSEO in November 2017 to assess the existing acoustic environment near the Petition Area. A total of one long-term noise measurement location and four short-term noise measurement locations were selected. These noise measurement locations are shown in Exhibit 4.19, and a summary of locations is provided in Table 4.15.

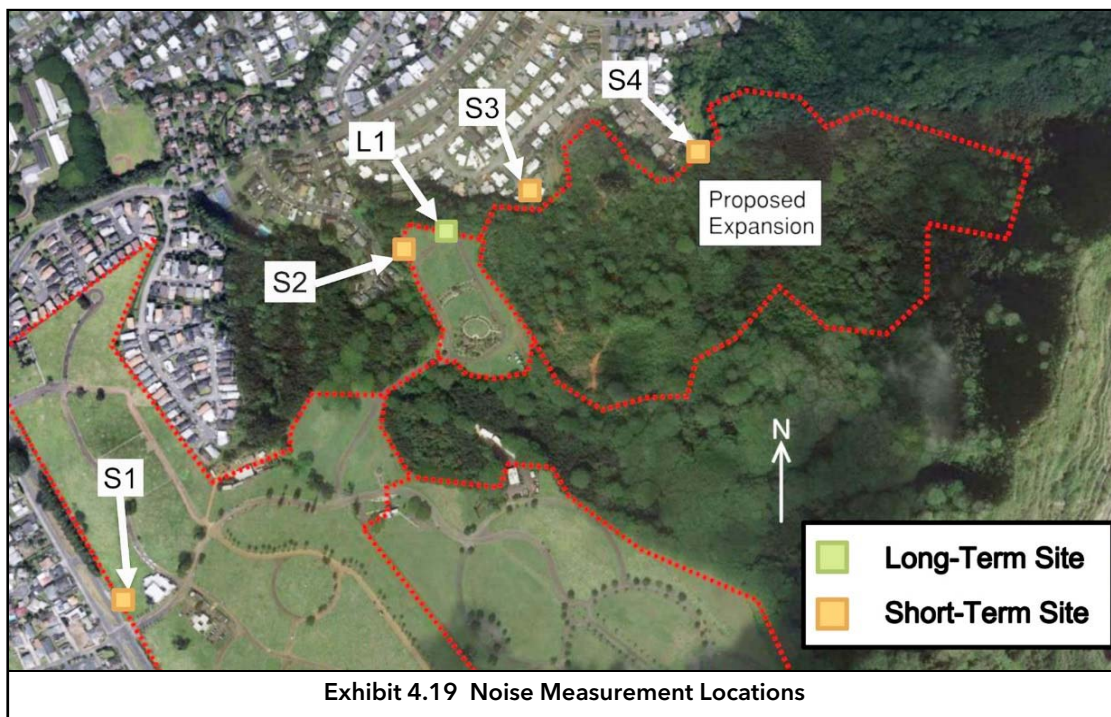


Table 4.15 Summary of Noise Measurement Locations				
Site Name	Location	Sound Sources	Duration	Start Time
L1	Hawaiian Memorial Park: Ocean View Garden North	Dominant: Park maintenance/vehicles	6 days	12:00 am 11/3/17
S1	Kamehameha Highway Main Entrance	Dominant: Traffic	20 minutes	3:31 pm 11/2/17
S2	Hawaiian Memorial Park: Ocean View Garden NW	Dominant: Park maintenance/vehicles	20 minutes	3:06 pm 11/2/17
S3	Ohaha Place	Dominant: Dogs, roosters Secondary: Air/regular traffic	20 minutes	2:13 pm 11/2/17
S4	Lipalu Place	Dominant: Dogs Secondary: Air/regular traffic	20 minutes	2:16 pm 11/2/17
Source: Censeo, 2018				

Long-Term Measurement Results

One long-term measurement was performed on the northern boundary of the Ocean View Garden section of HMP. The measurement was continuous from November 2, 2017 through November 9, 2017. The measured 1-hour equivalent sound level (L_{eq}) and the 90% exceedance level (L_{90}) were determined. The L_{90} noise level is widely accepted as the standard for determining the background noise level. Dominant sound sources documented included park maintenance activities and vehicles.

The range of background noise levels was consistent across the measurement period. The highest measured sound levels during the week were due to trucks or construction vehicles on the cemetery grounds. Dogs, roosters, air traffic (MCBH Kāneʻohe Bay), and traffic from Kamehameha Highway also contributed to ambient noise levels. Overall daily average sound levels were calculated using long-term measurement data obtained and are shown in Table 4.16.

Table 4.16 Overall Daily Average Sound Levels		
Average (Day) Sound Level - L_{eq} (day) ¹	Average (Night) Sound Level - L_{eq} (night) ²	Average Day/Night Level - L_{dn} ³
54 dBA	47 dBA	55 dBA
Notes: 1. L_{eq} (day) is an average of the equivalent sound levels during the daytime hours only (between 7 a.m. and 10 p.m.) within a 24-hour measurement period. 2. L_{eq} (night) is an average of the equivalent sound levels during the nighttime hours only (between 10 p.m. and 7 a.m.) within a 24-hour measurement period. 3. The L_{dn} is the 24-hour L_{eq} obtained after addition of 10 dBA to the sound levels from 10 p.m. to 7 a.m. Source: Censeo, 2018		

Short-Term Measurements

Four short-term measurements were performed in the area surrounding HMP and the Petition Area. The data obtained was averaged over the duration of the measurement period to determine the approximate ambient noise level for each measurement location.

Traffic noise was the dominant noise source at S1. Noise from maintenance vehicles, although intermittent, resulted in the highest sound levels at S2. Ambient noises inside the cemetery typically originated from traffic on Kamehameha Highway or from roosters. Animals in the surrounding neighborhood were the main noise source measured at locations S3 and S4. Therefore, ambient noise levels in the neighborhood are determined primarily by the presence of dogs or roosters in the surrounding area. Proximity to nearby roads and associated vehicular traffic had less of an influence on sound levels because neighborhood vehicular traffic is minimal. Results from short-term measurements are shown in Table 4.17.

Table 4.17 Measurement Results Summary		
Location ID	Location Description	L _{eq} ¹
S1	Kamehameha Highway	70 dBA
S2	Ocean View Garden	48 dBA
S3	Ohaha Place	45 dBA
S4	Lipalu Street	57 dBA
Notes: 1. Average sound level Source: Censeo, 2018		

4.5.2 Potential Project Impact and Mitigation

No Action Alternative

Under the No Action Alternative, existing noise-generating activities from maintenance activities, visitations, etc. occurring within the HMP cemetery should continue, and noise levels should continue at low noise levels, at about 55 dBA L_{dn}. Traffic noise along Kamehameha Highway would be the primary noise generator that is particularly louder closer to the highway. In the future, there would be more vehicles travelling along this highway that would generate increased traffic noise along the HMP's property. However, the overall typical noise level projected 50 feet within the cemetery would be 58 dBA and is not significantly greater than current levels.

Noise levels within the Petition Area should remain at low levels, between 45 to 57 dBA L_{eq} based upon the measurements taken. Animals in the surrounding neighborhood along with occasional air traffic would continue being the main noise sources.

Proposed Action

With the project, the main noise effects would be from short-term construction activities as compared to the long-term operation of the cemetery expansion. The primary long-term noise sources during normal daytime operations would be from maintenance vehicles and equipment (e.g., lawn mowers and grass trimmers) operating within the expanded cemetery. Noise from funeral services would have minimal impact because such services would continue to be held at existing facilities near the HMP entrance, and the number of services scheduled on a typical day would continue to occur at the present levels. The only change would be smaller private services held at a burial plot by the family occurring within the expanded cemetery.

Visitation of burial plots by families or friends within the expanded cemetery would occur in addition to vehicles traveling along extended internal HMP roadways to reach these areas. Currently, noise levels from these visitation activities within HMP is relatively low based upon measurements taken, and similar levels would likely occur within the expanded cemetery (e.g. 48 dBA at Ocean View Garden). Cemeteries tend to not be significant noise generating activities.

Maintenance equipment, though likely audible at nearby residences if occurring nearby, are mobile and temporary noise sources, and are not regulated for noise at the federal, state or local levels. Maintenance equipment would only be used during daytime hours, which is consistent with current cemetery operations. Maintenance equipment and vehicles would not be operated continuously over long periods or allowed to idle for extended periods of time that further reduce potential maintenance equipment noise impacts.

Backhoes are used during normal operations to create burial spaces. These activities occur sparingly and only during daytime hours. Typical backhoe operations at 25 feet or further from the property line are expected to be less than the 90 dBA construction noise limit identified under FTA's criteria for residential land use areas. As previously discussed, the State DOH does not quantify allowable construction noise levels.

Cultural practices and restoration activities occurring within the Cultural Preserve are not expected to generate significant noise, and noises generated would likely not occur on a daily basis.

The project would generate a minor increase in vehicular traffic typically as part of visitations due to additional burial plots within the expanded cemetery. A Traffic Impact Analysis Report (Appendix [N-9](#)) projected a 2% increase in traffic volumes along Kamehameha Highway due to the project by the year 2040. Traffic noise occurring about 50 feet within HMP from the highway was projected using these traffic volumes. This analysis projects an increase in traffic noise levels of less than one decibel increasing from 58 dBA to 59 dBA, and is considered negligible. Traffic noise within the cemetery as a whole is expected to increase by only one decibel due to the expansion project by 2040. Though noise from cemetery internal traffic may be audible at nearby homes, noise events should be intermittent during commuter peak hours. HMP closes its gates to traffic at night, so nighttime traffic noise from within the cemetery would not occur.

Short-Term Construction Noise Effects

Short-term construction activities would generate noise volumes that would be audible at nearby residences. The actual sound levels that would be experienced in the vicinity will vary greatly during construction activities, and are a function of the distance from the noise source, sound attenuation (topography, vegetation structures) between the noise source and the noise receptor, the duration of the construction activities, and the number of pieces of equipment used. Exhibit 4.20 shows noise levels for various pieces of construction equipment from 50 feet away from FTA's *Transit Noise and Vibration Impact Assessment* (FTA, 2006).

The noise levels represent the maximum A-weighted sound pressure levels (L_{max}) measured at a distance of 50 feet from the construction equipment. The actual noise levels produced during construction activities would be a function of the methods employed during each stage of the process by the contractor. Although the specific equipment and quantity used would be determined by the contractor, the equipment identified represents a reasonable approximation of what would be used.

Construction noise levels at the property line are expected to be below the FTA's noise impact threshold of 80 dBA for residential land uses.

Exhibit 4.20 Construction Equipment Noise Levels	
Equipment	Typical Noise Level 50 Feet from Source
Backhoe	80 dBA
Dozer	85 dBA
Generator	81 dBA
Grader	85 dBA
Jack Hammer	88 dBA
Loader	85 dBA
Paver	89 dBA
Pile-driver (Impact)	101 dBA
Rock Drill	98 dBA
Scraper	89 dBA
Truck	88 dBA
Source: Censeo, 2018	

Typical noise levels decrease 6 dBA when doubling the distance away. Given the 150-foot buffer area from residents, construction noise levels for equipment shown at the property line would decrease about 10 dBA. Being within a home structure would further shield and reduce construction noise levels. In addition, the majority of grading activities would occur further mauka and consequently well away from adjacent residents further minimizing noise disturbances. In comparison, average noise from a washing machine is about 70 dBA and gas-powered lawnmowers or leaf blowers are about 90 dBA. Nevertheless, it is anticipated that construction noise levels will exceed the existing ambient noise levels at the Petition Area boundary. Intermittent construction noises would likely be clearly audible during site excavation and grading activities.

None of the intruding noise would be high enough to cause hearing loss for nearby residents. The Federal Occupational Safety and Health Administration and many state standards set the Permissible Exposure Limit at 90 dBA of noise exposure over an 8-hour time period, while 85 dBA is commonly used as a guide for other industrial safety practices. Hearing risk exposure of 85 dBA for eight hours per day, followed by 10 hours of recovery time results in negligible risk to hearing. Louder noise from construction equipment used during the day would not occur continuously at nearby residences at such levels over an eight hour period.

However, people may need to raise their voice or reduce the talker-to-listener distance in order to communicate effectively. The severity of the speech interference will depend on how close the residents are to the site as well as the location of the construction activities occurring. Although this noise disruption would likely occur over the duration of construction activities, the impact of these disruptions are minor and of a short-term duration.

Therefore, construction activities would inevitably result in short-term, but minor to moderate noise impacts. The extent of these impacts would vary depending on the stage of construction, wind direction, specific equipment being used, distance to the receptor, and the duration of each

activity. Therefore, the ability to control construction noise levels relates primarily to the duration and time of construction activity in any one day.

In cases where construction noise exceeds, or is expected to exceed the State's "maximum permissible" property line noise levels, a permit must be obtained from the State DOH to allow the operation of vehicles, construction equipment, power tools, etc., which emit such noise levels. This ministerial permit is typical for construction activities. Prior to issuing the noise permit, DOH may require the contractor to incorporate noise mitigation into the construction plan, or require the contractor to conduct noise monitoring or community meetings to discuss construction noise.

The DOH noise permit does not limit the noise level generated at the construction site, but rather the times at which noisy construction can take place. Specific permit restrictions for construction activities are:

1. No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels ... before 7:00 AM and after 6:00 PM of the same day, Monday through Friday.
2. No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels... before 9:00 AM and after 6:00 PM on Saturday.
3. No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels on Sundays and on holidays.

Construction activities generate not only audible airborne sounds, but can also result in varying degrees of ground vibration depending on the equipment and methods employed. Vibration induced by the specific construction equipment utilized would not usually result in adverse effects on people or structures. Jack hammering is the greatest source of vibration; however, these impact activities would be located a significant distance away from adjacent residences. During site activities, noise from the earth-moving construction equipment would likely be more noticeable than any perceived vibration. Furthermore, ground vibration from construction activities would be temporary, and thus not have a significant impact.

Mitigative Measures for Construction Noise

To mitigate short-term construction noise effects, the following mitigative measures are proposed.

1. A construction noise permit would be obtained from the State DOH for operation of construction equipment.
2. A majority of the construction noise mitigation is in the form of scheduling to limit the construction hours to the timeframe specified by the State DOH.
3. The contractor would use reasonable and standard practices to mitigate noise, such as using mufflers on diesel and gasoline engines, and using properly tuned and balanced machines. Construction crews should refrain from using loud equipment within 50 feet of a residence, if possible. If unavoidable, noise impacts may be reduced by utilizing equipment intermittently or by blocking the line-of-sight from noise sources to noise-sensitive receivers with barriers or other designed noise mitigation measures.

4. Possible source control methods listed in Table 4.18 below would be considered during the design phase as part of contractor requirements, and such methods can be applied to most construction equipment.

Table 4.18 Noise Control Methods	
Scheduling	Limit activities that generate the most noise to less sensitive time periods (e.g. daytime hours).
Substitution	Use quieter methods/equipment when possible (e.g. low noise generators, smaller excavators, etc.).
Exhaust Mufflers	Install quality mufflers on equipment.
Reduced Power Options	Use smallest size and/or lowest power as required.
Quieter Backup Alarms	Install manual adjustable or ambient sensitive alarms. Do not use backup alarms during night work.
Motors	Insulate or enclose motors
Equipment Selection	Electric equipment is quieter than pneumatic equipment
Equipment Retrofit	Rubber chucks in jackhammers
Equipment Maintenance	Sharpen and balance tools, repair silencing equipment, replace worn parts and open airways
Staging Area	Maximize the distance between the construction staging areas and nearby receptors to the greatest extent possible

4.6 AIR QUALITY

4.6.1 Existing Conditions

Ambient concentrations of air pollution are regulated by both National and State ambient air quality standards (AAQS). National AAQS are specified in Section 40, Part 50 of the Code of Federal Regulations (CFR), while State of Hawai'i AAQS are defined in Chapter 11-59, HAR. National and State AAQS have been established for six criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), lead (Pb), ozone (O₃), and concentrations of particulate matter (less than 10 microns (PM₁₀) and less than 2.5 microns (PM_{2.5})). The State has also set a standard for hydrogen sulfide (H₂S).

National primary standards are designed to protect the public health with an "adequate margin of safety." National secondary standards, on the other hand, define levels of air quality necessary to protect the public welfare from "any known or anticipated adverse effects of a pollutant." Table 4.19 summarizes both the National and the State AAQS.

Secondary public welfare impacts may include such effects as decreased visibility, diminished comfort levels, or other potential injury to the natural or man-made environment. State AAQS are designed "to protect public health and welfare and to prevent the significant deterioration of air quality." Each of the regulated air pollutants has the potential to create or exacerbate some form of adverse health effect or to produce environmental degradation when present in sufficiently high concentration for prolonged periods of time. The AAQS specify a maximum allowable

concentration for a given air pollutant for one or more averaging times to prevent harmful effects. Averaging times vary from one hour to one year depending on the pollutant and type of exposure necessary to cause adverse effects. In the case of the short-term (i.e., 1- to 24-hour) AAQS, both National and State standards allow a specified number of exceedances each year.

Table 4.19				
State and Federal Ambient Air Quality Standards				
Air Pollutant	Averaging Time	Hawai'i AAQS	Federal (NAAQS)	
			Primary	Secondary
Carbon Monoxide (CO)	8-hour	4.4 ppm	9 ppm	--
	1-hour	9 ppm	35 ppm	--
Lead (Pb)	Quarter	1.5 µg/m ³	1.5 µg/m ³	1.5 µg/m ³
	3-months	--	0.15 µg/m ³	0.15 µg/m ³
Nitrogen Dioxide (NO ₂)	Annual	0.04 ppm	0.053 ppm	0.053 ppm
	1-hour	--	0.100 ppm	--
Ozone (O ₃)	8-hour	0.08 ppm	0.075 ppm	0.075 ppm
Particulate Matter <10 microns in diameter (PM ₁₀)	Annual	50 µg/m ³	--	--
	24-hour	150 µg/m ³	150 µg/m ³	150 µg/m ³
Particulate Matter <2.5 micrometers in diameter (PM _{2.5})	Annual	--	15 µg/m ³	15 µg/m ³
	24-hour	--	35 µg/m ³	35 µg/m ³
Hydrogen Sulfide (H ₂ S)	1-hour	0.035 ppm	--	--
Sulfur Dioxide (SO ₂)	Annual	0.03 ppm	--	--
	24-hour	0.14 ppm	--	--
	3-hour	0.50 ppm	--	0.50 ppm
	1-hour	--	0.075 ppm	--
Source: State Department of Health, 2008				

Present Air Quality in Area

Much of manmade particulate emissions originate from area sources, such as the mineral products of industrial and agricultural activities. Manmade sulfur oxides are emitted almost exclusively by point sources, such as power plants and other fuel-burning industries that are not present in the Kāneʻohe region. Nitrogen oxides emissions emanate predominantly from area sources (mostly motor vehicle traffic), although industrial point sources contribute a significant share. The majority of carbon monoxide emissions occur from area sources (motor vehicle traffic), while hydrocarbons are emitted mainly from point sources.

Air quality in the State can generally be characterized as relatively clean and low in pollution. However, communities near the State's active volcanos record higher levels of SO₂ and PM_{2.5} with regular exceedances of National AAQS for SO₂ and occasional exceedances of National AAQS for PM_{2.5}. The Environmental Protection Agency (EPA) considers volcanism as natural, uncontrollable events with the State of Hawai'i requesting exclusion of volcanism related National AAQS exceedances from attainment and nonattainment determinations. Excluding exceedances due to volcanic emissions, the Island of O'ahu was in attainment of all National and State AAQS in 2015 (DOH, 2015). Tradewinds are predominant throughout the year, typically carrying emissions and other air pollutants from inland areas toward the ocean.

Air quality in the region surrounding the Petition Area is primarily affected by vehicular carbon monoxide (CO) emissions. Air quality is affected to a lesser extent by commercial and industrial uses, such as the quarry on the other side of Oneawa hillside. Residential uses also surround HMP and the Petition Area and are not significant sources of airborne pollutant regulated under National and State AAQS.

CO emissions in the vicinity of the Petition Area are generated primarily by vehicles traveling on major roadways or highways that include Kamehameha Highway, Kāneʻohe Bay Drive, Mokulele Drive, and the H-3 Freeway. Traffic traveling north and south along the portion of Kamehameha Highway adjacent to HMP is fairly heavy during weekday commuter peak periods, but generally flows well. Traffic activity on Mokulele Drive traveling east and west is also heavy during peak commuter periods but flows fairly well.

The H-3 Freeway is routed south of the Petition Area with heavy vehicular traffic characteristic of major highways. However, the Oneawa hillside separates and shields the H-3 Freeway from the Petition Area, which minimizes the impact of vehicular CO emissions associated with the H-3. Additionally, dominant northeasterly trade winds likely push vehicular emissions from this roadway away from the Petition Area. Vehicular traffic using HMP's internal roads is minimal and would not have a significant contribution to CO emissions. Traffic patterns on minor streets in the HMP vicinity are also low and would contribute minimally to CO emissions. Therefore, vehicular related CO emissions in the Petition Area are not expected to exceed the State's one hour AAQS for CO (9 ppm), and should be well within the National AAQS. Therefore, present CO emissions from vehicular traffic do not impact air quality within the Petition Area.

The most proximate commercial use to the Petition Area is the Windward City Shopping Center which is northwest and a considerable distance from the Petition Area. Industrial uses in the Kaneʻohe region are located within the Kāneʻohe town center which is also located far from the Petition Area. Dominant easterly tradewinds push emissions generated by these uses away from the Petition Area.

4.6.2 Potential Project Impact and Mitigation

No Action Alternative

The Petition Area will remain densely vegetated and undeveloped under the No Action Alternative. Therefore, continuing undeveloped conditions within the Petition Area and continued HMP operations would have no effect on air quality in the area. Air quality would continue to be affected to a lesser extent by industrial operations at the quarry situated on the other side of Oneawa hillside. Localized vehicular related CO emissions would continue to have the greatest impact to air quality in the area.

Traffic growth along Kamehameha Highway and its anticipated traffic impact at intersections used by vehicles to access HMP was forecasted in the project's traffic study (ATA 2017). Study intersections include Kamehameha Highway and Halekou Road as well as Kamehameha Highway and Mahinui Road. Based on this analysis, intersections are anticipated to operate at a level of service similar to existing conditions with excessive congestion not expected. Without excessive congestion, CO emissions occurring at HMP driveway intersections should not be significant nor exceed the State and Federal AAQS. As a result, adverse air quality impacts related to CO emissions are not anticipated.

Proposed Action

With the project, the main effects on air quality would be from short-term construction activities as compared to the long-term activities occurring within the cemetery expansion. The only source of potential long-term effects on regional air quality would be CO from localized traffic congestion at the HMP driveway intersections. Activities at burial sites within the expanded cemetery would not generate long-term impacts potentially affecting air quality.

Short-Term Effects on Air Quality

Short-term impacts on air quality could occur due to construction of cemetery expansion improvements. There are two types of air pollution that could result in short-term air quality impacts: 1) fugitive dust emission from project construction activities and vehicle movement; and 2) exhaust emission from on-site construction equipment. There may also be short-term impacts from vehicular CO emissions related to travel of construction equipment to and from the Petition Area, the temporary increase in local traffic caused by commuting construction workers, and the disruption of normal traffic flow caused by roadway lane closures, if required.

Fugitive dust emissions could result from earth moving activities associated with cemetery expansion improvements. Earth moving activities include grading and grubbing of the Petition Area, construction of related retaining walls, and development of site improvements such as roadways and drains. Site grading and infrastructure improvements would likely occur in phases of 5-acre increments and should be completed within a year. The geotechnical analysis notes existing soils would be moist to wet given the high rainfall environment surrounding the area (Geolabs, Inc., 2018). Therefore, these soils should result in less potential for airborne transmission of dust compared to drier soils.

Construction activities would comply with State's air pollution controls prescribed under State DOH's rules (Chapter 11-59, HAR "Ambient Air Quality Standards" and Chapter 11-60.1, HAR "Air Pollution Control"). These rules prohibit visible emission of fugitive dust from construction activities at the property line. A dust control plan would be prepared if adverse air quality impacts are anticipated for implementation by the contractor. Dust control measures may involve implementation of a watering program or use of windscreens. Other measures include BMPs at

the job site (i.e. tire washing programs), and use of temporary rock pavers for heavily traveled areas with exposed soils.

On-site mobile and stationary construction equipment would also emit air pollutants from engine exhaust. Large construction equipment typically used for earthmoving activities is generally diesel-powered. NO₂ emissions from diesel engines can be comparatively higher than gasoline powered equipment. However, annual AAQS for NO₂ should not be exceeded from short-term construction equipment operation. The short-term (1-hour) standard for NO₂ is derived from a three-year average for this air pollutant. Therefore, it is unlikely that relatively short-term construction emissions would exceed the 1-hour standard. CO emissions from diesel engines are generally low and should be comparatively lower than vehicular related CO emissions on nearby roadways. Exhaust emissions from construction vehicles can be further minimized through the proper operation and maintenance of all equipment.

Movement of heavy construction equipment and worker vehicles traveling to and from the Petition Area could have temporary short-term effects increasing congestion. Activities could obstruct the normal flow of traffic for short periods, resulting in increases to overall vehicular emissions in the general region. However, traffic in Kāneʻohe generally operates at acceptable levels, and movement of heavy equipment should not result in excessive traffic congestion.

Mitigative Measures for Short-Term Effects

To mitigate short-term construction effects on air quality within the Petition Area from emissions of fugitive dust, the following mitigative measures are proposed.

1. A dust control plan would be prepared during the project's design phase for implementation by the contractor in compliance with State regulations. Dust control measures may involve implementation of BMPs potentially consisting of a watering program, use of windcreens, and use of temporary rock pavers for heavily traveled areas with exposed soils.
2. Construction vehicles would be properly operated and all equipment properly maintained to minimize exhaust emissions.
3. The movement of heavy construction equipment and workers would occur outside peak traffic periods. Design plans would be coordinated with the project contractor to ensure movement of equipment and workers does not occur during commuter peak traffic hours.

Long-Term Effects on Air Quality

Long-term impacts to air quality would be related to CO emissions from vehicles traveling to the expanded cemetery. The traffic study anticipates that expanded cemetery operations would generate a small increase in vehicular traffic (ATA 2017). Study intersections would continue to operate at a level of service similar to the No Action Alternative. As a result, long-term cemetery operations at the Petition Area are not expected to result in excessive congestion that would lead

to vehicular CO emissions exceeding State one hour AAQS (9 ppm). CO emissions should be well within the National AAQS (35 ppm). Vehicular traffic on HMP internal roadways would increase slightly, but should continue to provide an insubstantial contribution to CO emissions.

Federal air pollution control regulations also require new motor vehicles to be equipped with emission control devices that reduce emissions significantly. Amendments to the Clean Air Act require further emission reductions that have been phased in since 1994. The added restrictions on emissions from new motor vehicles would lower average emissions each year as a greater number of older vehicles leave the state's roadways. This would further reduce the potential for incidences of CO concentrations exceeding state standards.

4.7 VISUAL RESOURCES

Methodology

The project's impact on the visual character of the landscape surrounding the Petition Area was assessed by first identifying prominent views oriented toward the Petition Area from public vantage points where the Petition Area may be visible. Two City planning documents, the *Coastal View Study* (Chu and Jones, 1987) and *Ko'olau Poko Sustainable Communities Plan* (DPP, 2017) were referenced to identify relevant established views and visual resources that should be evaluated in this analysis.

Visual resources discussed in these documents include prominent views and landforms. Prominent views where the Petition Area may be visible were also identified from vantage points in public areas surrounding the Petition Area. These views were selected from a variety of distances and orientations surrounding the Petition Area to assess the project's visual impact from multiple vantage points. Together, the prominent views identified result in a visual analysis that provides a thorough understanding of the visual impact that would result from project implementation. The following discussion details the prominent views included from the documents referenced, identifies prominent views that comprise this study, and describes the visual character of the landscape seen from these views.

4.7.1 Existing Conditions

The visual character of the Kāne'ōhe ahupua'a is defined by the region's natural features and land uses. These natural features include the Ko'olau mountain range, vegetated inland hills, and Kāne'ōhe Bay. Residential land uses dominate the area immediately north of the Petition Area. This area is generally comprised of single and two-story single-family homes. The area generally south and east of the Petition Area is natural in character due to the presence of the Oneawa hillside, which is undeveloped and densely vegetated. The area generally west of the Petition Area is largely open space in character due to the presence of landscaped areas of HMP and the nearby Pali Golf Course. The Petition Area encompasses a portion of Oneawa Hills. These areas include the hillside

slopes and parts of the summit ridgeline. These areas are undeveloped and natural in character given the presence of a mature Schefflera/Java Plum non-native forest on the hillside slopes and basins.

Coastal View Study

The *Coastal View Study* was developed for the City's Department of Land Utilization (now known as the Department of Planning and Permitting). The study inventoried significant coastal views, coastal land forms, and important open spaces that comprise O'ahu's scenic shoreline resources. The study identifies views from public viewing points and coastal roadways within the City's Special Management Area (SMA).

The study subdivides the island into viewsheds, which are entire surface areas visible to an observer from a viewing point. The viewshed applicable to the Petition Area is the Ko'olaupoko district's Kāne'ohe Bay Viewshed. The Kāne'ohe Bay Viewshed is further divided into two sections which are Kahalu'u and He'eia. The He'eia section is pertinent to the project area, and visual resources associated with this section were reviewed. However, no coastal views, scenic lookouts, or resources pertinent to the project area were identified.

The H-3 Freeway leading into the MCBH Kaneohe was identified as a roadway providing lateral views across the bay and encompassing the entire viewshed. However, this section of the freeway is makai (northeast) of HMP and the Petition Area. No significant roadway views from H-3 within the viewshed area occur within the vicinity of the Petition Area or existing HMP site. Coastal views identified occur along sections of Kāne'ohe Bay Drive and Kamehameha Highway located north and away from the project area (past Castle High School). Significant stationary views identified within the Kāne'ohe Bay Viewshed were at the He'eia State Park and the H-3 scenic lookout. These stationary view locations are not near the Petition Area, nor would views from these sites be affected by the project. The H-3 scenic lookout is located closer to the entrance to the MCBH Kāne'ohe, and is of scenic coastline views of Kāne'ohe Bay.

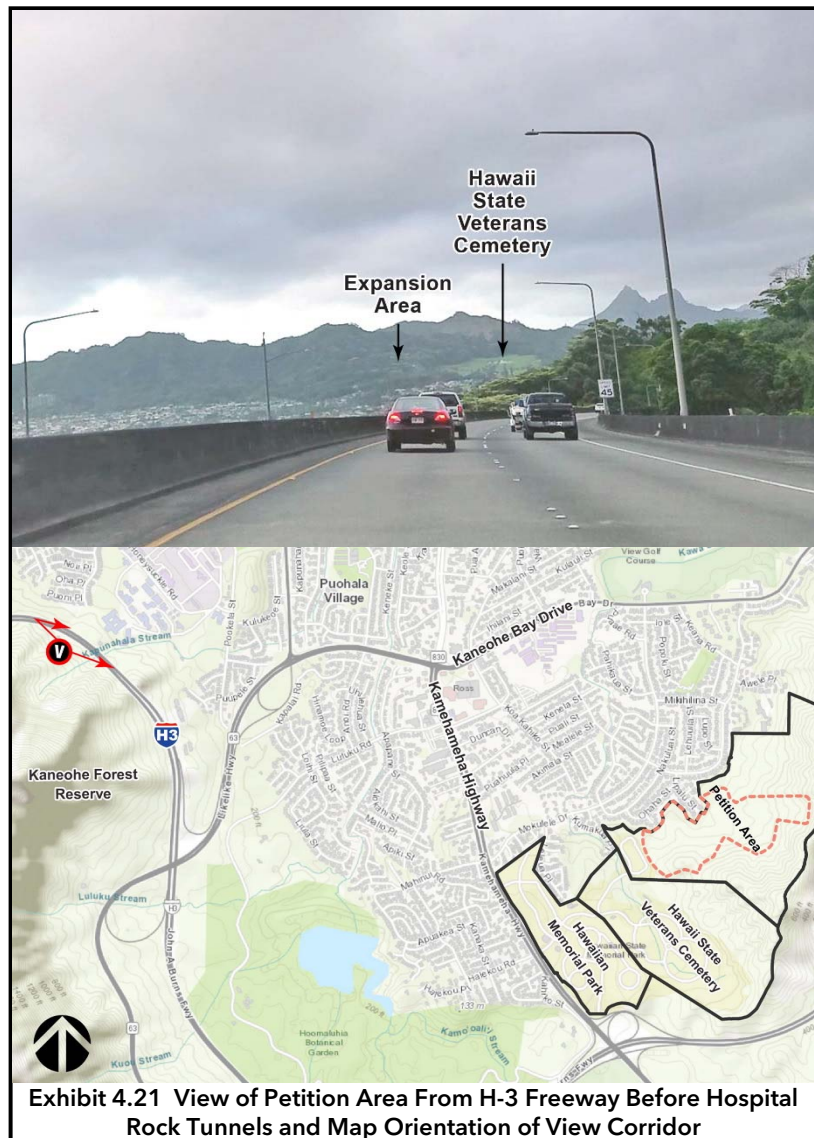
Ko'olau Poko Sustainable Communities Plan

The *Ko'olau Poko Sustainable Communities Plan*, adopted in August 2017, provides general policy guidance for land use actions by the City. This plan identifies the general orientation and vantage points of prominent views within the Ko'olaupoko district. Based upon review of the sustainable communities plan's Open Space Map, two views were identified that would be applicable to the Petition Area. Both views are from upland locations of the broader Kāne'ohe community and Kāne'ohe Bay viewshed.

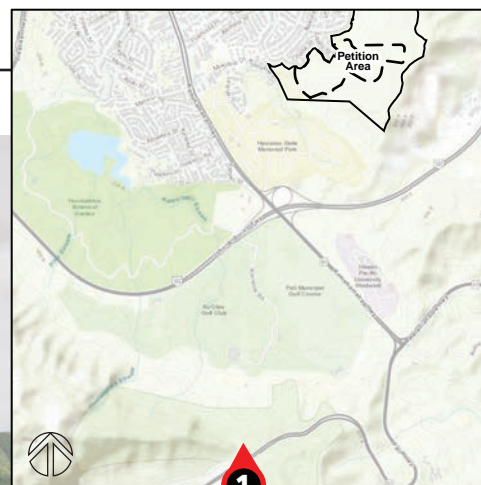
The first viewing point emanates from the Pali Lookout, and consists of a panoramic makai-oriented view of the broad Kāneʻohe community. Individuals looking makai from the Pali Lookout are provided with an expansive view of concentrated urbanized areas combined with large open space areas of the Koʻolau Golf Club, City’s Pali Golf Course, Oneawa Hill, other undeveloped areas, and Kāneʻohe Bay in the background. This view is shown in Figure 4.7. HMP’s existing landscaped cemetery lawns are visible as well as a small portion of the Hawaiʻi Veterans Cemetery. Existing portions of the Petition Area including the heavily vegetated western lower flank slopes of Oneawa Hills are not prominent, but are visible from this view.

The second view identified from the community plan consists of continuous makai views from the H-3 Freeway of the broader Kāneʻohe community while traveling in a vehicle. Makai of the Tetsuo Harano Tunnels, views of the Kāneʻohe viewshed are similar to that from the Pali Lookout, particularly for drivers heading towards Kāneʻohe. Expansive views are mainly of Kāneʻohe Bay due to the highway’s concrete guardrails blocking portions of the view from a vehicle. Oneawa Hill and the ridgeline extending toward the MCBH Kaneohe are also landforms prominent in the view.

The Petition Area is visible for a very short period (about 10 seconds) for Kāneʻohe bound vehicles right before entering the Hospital Rock Tunnels. Exhibit 4.21 shows a view captured from a vehicle of the Petition Area and Hawaiʻi State Veterans Cemetery before reaching Hospital Rock Tunnels. This exhibit also shows the short section of the H-3 Freeway where views of the Petition Area is available. Views of the Petition Area then disappear for motorists once the tunnels are reached and beyond that because of the highway’s lower elevation approaching the Kāneʻohe exit ramp and the presence of dense vegetation and tall trees along the highway obscuring views.

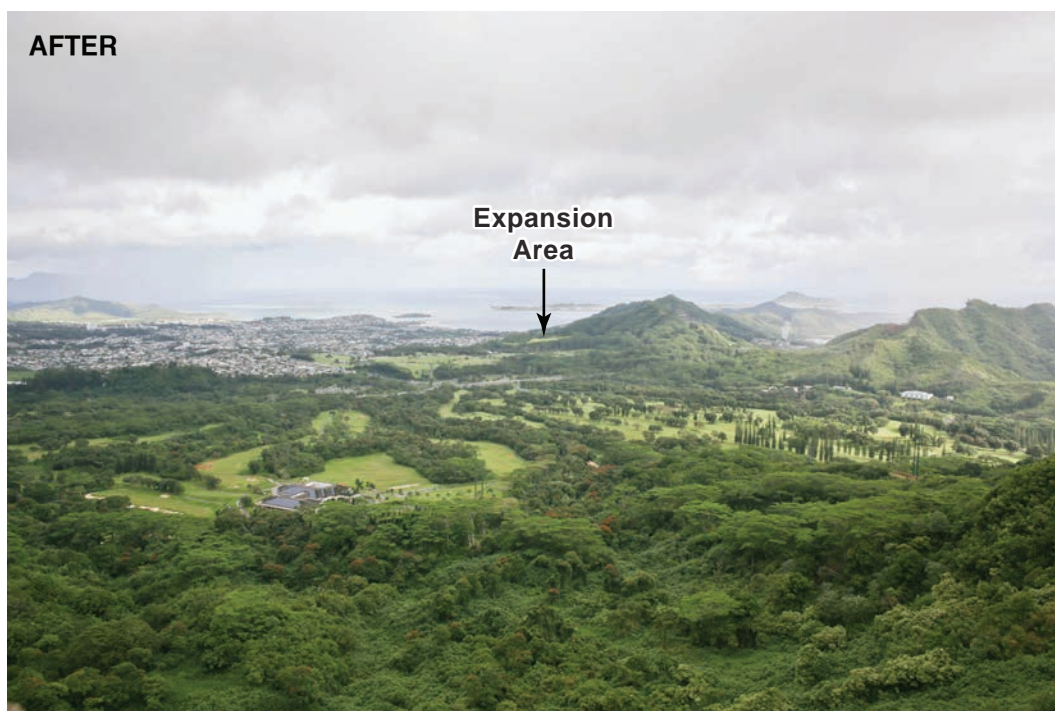


BEFORE



1 View from Pali Lookout facing east (before project).

AFTER



1 View from Pali Lookout facing east (after project).

Comparative View of Petition Area: Pali Lookout

Figure 4.7

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Additional Public Views

Other prominent public views of the Petition Area were identified from surrounding public vantage points. These views of the Petition Area were selected to allow for a more thorough assessment of the project's impact on the visual character of the surrounding landscape. The following discussion identifies these views and describes the visual character of the surrounding landscape.

Public Views Along Kamehameha Highway

Kamehameha Highway near HMP provides existing views of the Oneawa hillside and the Petition area. Motorists traveling northbound on Kamehameha Highway (Kāneʻohe bound) toward HMP can see existing portions of HMP as they pass beneath the overpass of the H-3 Interchange. However, as vehicles approach HMP, a high, vegetated berm on the makai side of the highway is present that obscures views of HMP and the Petition Area until one nears the cemetery's main entrance (Exhibit 4.22). Vehicles travelling in the southbound direction would similarly have views of HMP and the Petition Area blocked.



**Exhibit 4.22 View of Vegetated Berm Along Kamehameha Highway
Obscuring Views of HMP**

The first public view along Kamehameha Highway identified is oriented makai toward the Petition Area at HMP's main entrance across of Halekou Road. A photo of this view is shown in Figure 4.8. Existing HMP facilities and landscaped areas are visible from this view. Portions of the Petition Area closest to Kamehameha Highway, including the flanks of Oneawa Hills are visible. However, the dense vegetation and tall trees associated with the undeveloped portions of the Hawai'i State Veterans Cemetery property block most views of the Petition Area.

Traveling further north from this main entrance, tall trees and vegetation present along the highway obscure all views of HMP and the Petition Area until vehicles reach the second HMP entrance across of Mahinui Road. The second view identified from Kamehameha Highway is also oriented makai toward HMP's from their northernmost entrance, and a photo of this view is shown in Figure 4.8. Similar to the view from HMP's main entrance, landscaped areas of HMP are visible along with the heavily vegetated flanks of Oneawa Hills within the Petition Area.



2A View toward Petition Area from main entrance of HMP (before project).



2A View toward Petition Area from main entrance of HMP (after project).



2B View toward Petition Area from HMP's second driveway across Mahinui Road (before project)



2B View toward Petition Area from HMP's second driveway across Mahinui Road (after project).



Comparative Views of Petition Area: HMP Entrances

Figure 4.8

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Dense vegetation and tall trees associated with the undeveloped portions of the Hawai'i State Veterans Cemetery similarly property block most views, and some roofs of existing residences are visible.

Views from Pikoiloa Subdivision

Four views of the Petition Area from vantage points located within the Pikoiloa Subdivision were identified. The first three views are located immediately north of the Petition Area. Views are at the intersection of Ohaha Place and Ohaha Street, a stationary spot further east on Ohaha Street, and a stationary spot on Lupo Street. The fourth vantage point is located further north from these views at the intersection of Namoku Street and Mokulele Drive.

As a whole, the densely vegetated hillside with tall trees currently separating nearby residences from the Petition Area are prominent features within these views. Mature trees populating Oneawa Hills are also visible and are the only aspects of the Petition Area visible. The landscapes visible from these views are shown in Figure 4.9.

The fourth view located further north from the Petition Area at the intersection of Namoku Street and Mokulele Drive provides views of the vegetated hillside comprising the eastern portion of the Petition Area. Surrounding residential uses are also visible from this vantage point. A photograph of this view is included in Figure 4.10.

Views from Kāneʻohe Bay Drive

Three views oriented toward the Petition Area were identified along Kāneʻohe Bay Drive. This roadway is located about one and a half miles north of the Petition Area. These prominent views are shown in Figure 4.11. Looking toward the Petition Area from the eastbound lane of this roadway, existing commercial buildings associated with the Windward City Shopping Center block views.

The first potential available view along Kāneʻohe Bay Drive was identified further east by Castle High School (7A on Figure 4.11). However, facilities associated with the high school, including the school's classroom buildings, street fencing, and tennis courts are the dominant features of this view. Only a small portion of the Petition Area's upper elevations that consists of heavily vegetated portions of Oneawa hillside are visible from this view.

As one travels further east along Kāneʻohe Bay Drive, Castle High School facilities remain as the only features visible obscuring views toward the Petition Area. These educational facilities dominate views along this roadway, which is apparent in the second photo of this view (7B) in Figure 4.11 from the intersection of Kāneʻohe Bay Drive with Pūʻōhala Street. Only a small portion of the upper reaches of Oneawa hillside outside of the Petition Area can be seen. Residential homes and existing trees dominate and block views of the Petition Area approaching south along this roadway.



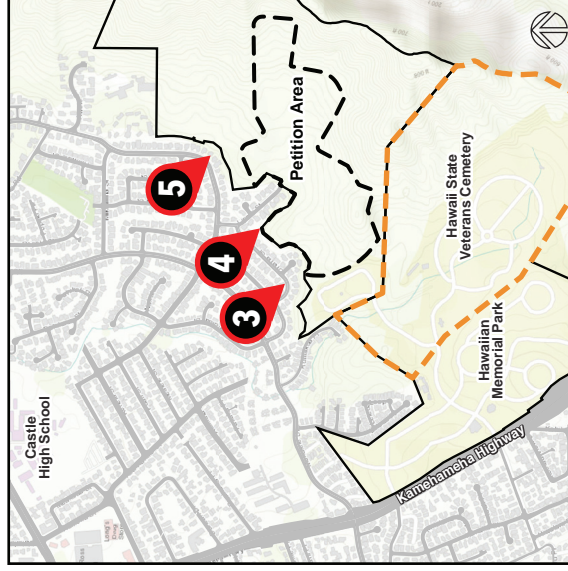
3 View looking from Ohaha Place and Ohaha Street intersection facing south toward Petition Area (before and after project).



4 View from Ohaha Street facing southwest toward Petition Area (before and after project).



5 View from Lupo Street and Namoku Street facing southwest toward Petition Area (before and after project).

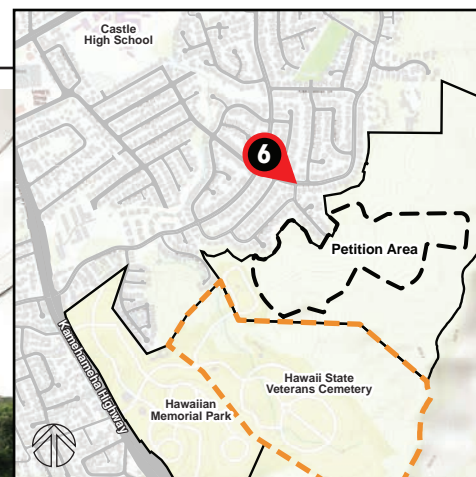


Views from Residential Area Immediately Downslope of Petition Area

Figure 4.9

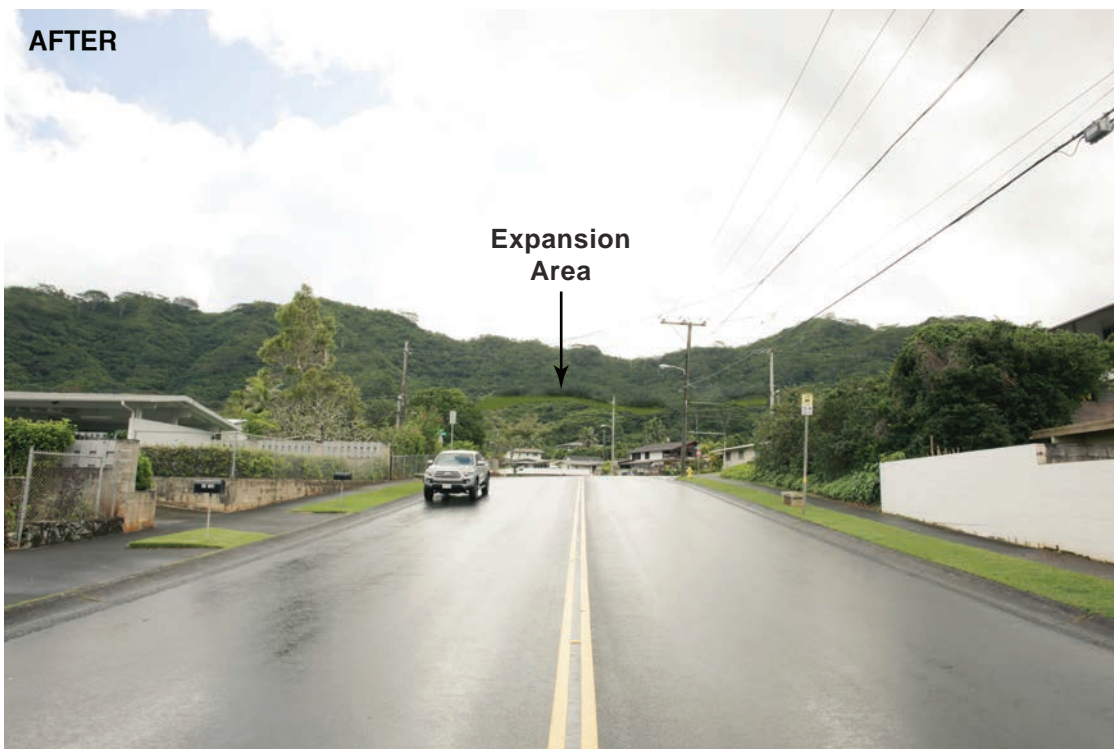
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BEFORE



6 View from Namoku Street and Mokulele Drive intersection facing south toward Petition Area (before project).

AFTER



6 View from Namoku Street and Mokulele Drive intersection facing south toward Petition Area (after project).

Comparative Views of Petition Area: Namoku St. and Mokulele Dr. Intersection

Figure 4.10

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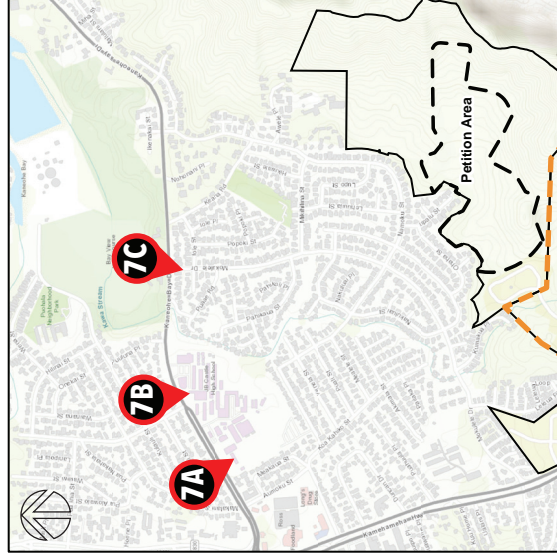
7A View facing south toward the Petition Area from the east bound lane of Kāne'ōhe Bay Drive. Expansion area not visible.



7B View facing south toward the Petition Area from the intersection of Puohala Street and Kāne'ōhe Bay Drive. Expansion area not visible.



7C View facing south toward Petition Area from intersection of Bay View Drive Golf Course entrance and Kāne'ōhe Bay Drive. Expansion area not visible.



Views from Kāne'ōhe Bay Drive

Figure 4.11

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The third view is from Kāneʻohe Bay Drive's intersection with the Bay View Golf Course entrance. Residential homes and trees continue to dominate this view block views of the Petition Area and Oneawa hillside.

4.7.2 Potential Project Impact and Mitigation

The concepts established in characterizing visual quality from the *Coastal View Study* (Chu and Jones, 1987) were used to assess the visual impacts resulting from this project. Visual qualities associated with scenic resources were evaluated using three factors that were: 1) visual vividness, 2) unity, and 3) intactness. These criteria are briefly described below:

1. Visual Vividness. The memorability of a landscape is derived from contrasting landscape components as they combine to create striking and distinctive visual patterns, taking into account form, line, texture and color.
2. Visual Unity. The degree to which the visual resources of a landscape scene join together to form a coherent, harmonious and visual pattern; a balanced composition between manmade and natural elements.
3. Visual Intactness. The extent to which the landscape is free from visually encroaching features.

Using these criteria, the visual impact of the project was evaluated based upon the degree of change to an existing view or alteration of a scenic resource.

No Action Alternative

Adverse impacts to the visual quality of prominent views identified are not anticipated under the No Action Alternative. The Petition Area would remain undeveloped and highly vegetated under this alternative. As a result, the visual vividness, unity, and intactness of prominent views oriented toward the Petition Area would remain similar to existing conditions under this alternative and would not be impacted

Proposed Action

As a whole, the Proposed Action would result in grading activities for cemetery expansion that substantially alter existing landforms and vegetation within the Petition Area. The Cultural Preserve would have minor landscaping improvements that should not significantly alter current conditions or views of this densely vegetated area. Grading would result in extensive cut and fill activities for the cemetery expansion to achieve a more balanced topography having slopes no greater than 20% to allow for pedestrian access among gravesites.

In order to achieve desired finished grades, the lower flank slopes of the Oneawa Hills on the western end of the site would need to be cut. The majority of this western hillside would be excavated reducing it up to 40 feet in height; however, the areas near the top of the hillside would

reduce it up to 100 feet in height. This western section is where the most significant changes to existing topographic conditions would occur. Areas graded would be landscaped with turf grass, altering the view of the existing canopy forest character within the Petition Area.

Although the project would alter the Petition Area's present visual appearance and forest character, this change would not have an adverse effect on existing views and viewing locations identified. The landscaped and open space character of the expanded cemetery would complement the existing HMP and Hawai'i State Veterans Cemetery already present within the backdrop of the larger Oneawa hillside. The alteration of the Petition Area's view is one of many elements comprising the visual quality of the visible landscape. In comparison, other potential urban developments, such as residences or commercial uses, would create a greater visual change and contrast in character.

Within the larger viewshed, the landscaped open space view and character of the expanded cemetery is similar to several other existing surrounding uses such as the Pali Golf Course, Ko'olau Golf Club, HMP, and State veteran cemetery. The Petition Area would not be visible at several public viewing sites along roadways as already discussed. Existing dense vegetation and tall trees, particularly within the State's veteran cemetery's property along the hillside, would screen views of the expanded cemetery particularly from upland areas looking toward Kāne'ohe Bay.

More importantly, elevations within the cemetery expansion would generally be lower or the same elevation as existing surrounding uses making its view difficult to see from many areas and along roadways. The grading plan for the cemetery expansion would predominantly result in elevations ranging from about 230 to 350 feet AMSL. Only a very small area of the cemetery expansion near the Cultural Preserve would have grading improvements extending up to the 400-foot elevation. In comparison, the Hawai'i State Veteran Cemetery ranges in elevation from 280 to 370 feet AMSL. HMP's existing cemetery ranges in elevation from 270 to 340 feet AMSL.

Visual simulations were created for several views to assist in the evaluation and assessment of visual impact resulting from the Proposed Action. Utilizing the preliminary grading plan developed, a 3D topographic model was created that was then edited to create the proposed roads and layout of the design. After accurately representing the proposed plan in a 3D model, desired views were rendered to photo manipulate them with images taken. Resulting visual simulations were previously included with figures comparing before and after photos.

Pali Lookout View Effects

The visual impact of the project on the expansive view of the Kāne'ohe region viewshed from the Pali Lookout can be seen in Figure 4.7. As indicated in this figure, only a portion of the 28.2 acre cemetery expansion area would be visible because most of the area would be blocked by existing dense vegetation and trees associated with the State cemetery. The 14.5 acre Cultural Preserve area would predominantly remain vegetated by the existing forest, remaining visually similar to existing conditions, and would not be visible from the lookout.

Although the Petition Area would change visually, the overall character of the larger Kāneʻohe region viewshed from this vantage point would not be significantly impacted. The distance of the Petition Area from this lookout view diminishes its effect as compared to the Koʻolau Golf Club and Pali Golf Course in the immediate distance. The landscaped turf of the cemetery expansion would also be generally compatible with views of the existing landscaped open space character of HMP, veteran cemetery, and golf courses.

The visual vividness of the landscape remains largely unchanged as the undeveloped character of Oneawa hillside is still apparent. Although a small portion of Oneawa hillside is altered, the distinct visual character established by surrounding undeveloped and urbanized areas of Kāneʻohe establishing the vividness of this view is maintained. The backdrop of Kāneʻohe Bay is an important component contributing to the viewshed's visual vividness, and the project would not disrupt this view. The visual unity of this view would not be impacted significantly. Although the Petition Area has changed visually, turf grass and native plant landscaping utilized aligns with the overall vegetated character of the surrounding area. Therefore, the unity of natural and urban elements comprising the visual landscape is predominantly maintained. The visual intactness of this view would also be maintained. Although the appearance of the Petition Area has changed, grading and landscaping improvements do not result in development that encroaches upon important features of the visible landscape.

H-3 Freeway View Effects

The project would not significantly impact the visual qualities of the landscape and overall Kāneʻohe region viewshed seen from the short section of the H-3 Freeway. The Petition Area is only visible momentarily as motorists travel toward Kāneʻohe on the freeway as previously discussed. The Petition Area is one of many features comprising the expansive landscape seen from this vantage point, and the change would not be significant and similar to changes from the Pali Lookout view.

The visual vividness of this view would not be significantly impacted as landscaped portions of the Petition Area align with the natural character of Oneawa hillside and do not detract from the visual character of the surrounding region. Therefore, the distinctive visual pattern of urban development and vegetated areas that characterize the visible landscape would not be significantly altered. The visual unity of this view would not be significantly impacted. Although the cemetery expansion area would be graded and landscaped, the landscaped area visible would not conflict with the vegetated character of the surrounding area. In contrast, residential or commercial developments that are larger in scale would have a disruptive effect on the visual unity of the surrounding area. These developments are not proposed in this project. Therefore, project implementation would not significantly impact the visual intactness of this view relative to developments that would visually encroach upon the existing landscape.

Kamehameha Highway View Effects

The project's impact on the view from Kamehameha Highway at the main HMP entrance would not be significant and can be seen in Figure 4.8. A small portion of this graded and landscaped area of the expanded cemetery would be visible, resulting in a slight and relatively minor change to the character of this view. Existing dense vegetation and tall trees from the State's veteran cemetery's property screens views of the expanded cemetery. In addition, the lower elevation of the cemetery expansion relative to the existing HMP cemetery is evident in further blocking views.

Although this view would change slightly, landscaped areas visible align with the vegetated character of the surrounding area. Vegetated areas of Oneawa hillside would continue to be visually dominant. Therefore, the distinct visual pattern established by HMP's existing facilities and landscaped and naturally vegetated areas would be maintained, preserving the visual vividness of the landscape. The visual unity of the landscape would not be impacted as grading and landscaping improvements would not significantly alter the naturally vegetated character of Oneawa hillside that dominates the landscape surrounding the Petition Area. Therefore, the visual unity of manmade and natural features in the landscape would not be significantly altered. Project hillside grading improvements would not result in development that would encroach upon the natural and manmade features seen. While the nearest visible hillside would be graded and landscaped, this action would not encroach upon surrounding features, such as Oneawa hillside, that establish the visual quality of the landscape.

The project's visual impact on the view at HMP's second driveway entrance across of Mahinui Road can also be seen in Figure 4.8. Project improvements that grade and landscape the westernmost hillside in the Petition Area would result in a minor change to the landscape seen from this view, which is similar to the change at the main entrance. Although the project would result in a slight change to the visible landscape, the impact of the project would not be significant.

The visual vividness of this view would be maintained as the visual pattern of landscaped and developed areas of HMP in the foreground, residences in the middle ground, and naturally vegetated areas of Oneawa hillside in the background remain prominent components of the view. The project does not disrupt the visual unity of the view. Although a landscaped portion of the Petition Area is visible, this portion is small relative to surrounding natural, landscaped, and developed components of this view. These components continue to dominate the view and the visual unity of these components would be maintained. The visual intactness of this view would not be impacted. The portion of the Petition Area that would be visible is comparatively smaller than other natural and developed components of this view and does not encroach upon these components of the visible landscape.

Pikoiloa Subdivision View Effects

The project would not significantly impact views of the landscape seen from vantage points directly downslope of the Petition Area in the Pikoiloa subdivision shown on Figure 4.9. Existing views from these locations would essentially be unchanged. The Petition Area would continue to be obscured by mature trees on the vegetated hillside separating nearby residences from the Petition Area. Although a small number of mature trees seen in the background of the view would be removed through cemetery expansion improvements, the majority of trees visible are located on the nearby hillside that would remain. Therefore, the landscape visible from these views would remain largely unchanged after project implementation, preserving the existing vividness, unity, and intactness of the landscape.

A visual simulation was created for the fourth view from this subdivision located at the intersection of Namoku Street and Mokulele Drive. As shown in Figure 4.10, the highly vegetated hillside upslope of residences along Mokulele Drive greatly obscures most of the current views of the Petition Area that would be altered by grading and landscaping improvements. Only a small graded and landscaped portion of the Petition Area can be seen in views from this vantage point.

Although the landscape seen from this view would change slightly, the overall visual impact would not be significant. Landscaped portions of the Petition Area visible are visually compatible with the naturally vegetated areas surrounding the Petition Area. The visual vividness of the landscape would be maintained as the visual pattern of residences and Namoku Street in the foreground and vegetated areas in the background would not change substantially. The visual unity of this view would not be disrupted as the coherence between manmade developments in the foreground and open space landscaped elements in the background would predominantly be maintained. Although vegetation in the improved portion of the Petition Area visibly differs from surrounding naturally vegetated areas, it does not differ so drastically that it significantly impacts the distinctive visual pattern of the landscape. The visual intactness of the landscape would be maintained. While a landscaped area of the Petition Area would be visible, this area comprises only a small portion of the surrounding landscape and would not encroach upon the natural character of the surrounding area.

Kāneʻohe Bay Drive View Effects

Prominent views identified along Kāneʻohe Bay Drive would not be significantly impacted by the Proposed Action. These prominent views are oriented south toward the Petition Area and located near Castle High School; the intersection of Kāneʻohe Bay Drive and Pūʻōhala Street; and the intersection of the Bay View Golf Course and Kāneʻohe Bay Drive. As previously discussed, the Petition Area is predominantly not visible from this road due to existing residences, vegetation, Castle High School, and commercial uses obscuring views.

The visual character of the visible landscape is largely dominated by educational facilities and private residences. Upper elevations of Oneawa hillside and the Ko‘olau mountains are visible in the backdrop of these views. The Petition Area is not visible and obscured by residences and educational facilities seen in the foreground (Figure 4.11). The landscape visible from these views would remain unchanged after project implementation because the Petition Area is not visible. The visual vividness, unity, and intactness of the landscape seen from these views would be preserved. Therefore, the project would not significantly impact views of the landscape seen from these prominent views.

4.8 HAZARDOUS MATERIALS

In April 2018, Environmental Data Resources Inc. (EDR) conducted a survey of environmental and historical records pertaining to the Petition Area and vicinity within a quarter, half, and one mile radius (referred to as the “study area”). The survey was conducted to assess environmental risk associated with the Petition Area (EDR, 2018). Records surveyed included standard Federal and State governmental databases of known or potential sources of hazardous materials or waste. The Petition Area was not listed in any of the records surveyed by EDR. A full discussion of survey results is provided in the survey report included in Appendix M.

4.8.1 Existing Conditions

4.8.1.1 Background/Historical Context

Historic land use of the Petition Area can provide insight on the likelihood that hazardous materials are present at the surface and subsurface levels. The AIS (Appendix J) indicates that lands within the Kāne‘ohe region were used for commercial agriculture, ranching, and dairy activities since the mid-19th century (Honua 2018). The Petition Area itself was previously used for pineapple cultivation along with ranching and dairy operations.

Cattle were introduced to the Petition Area through ranching and dairy operations. Cattle related operations resulted in the degradation of Kawa‘ewa‘e Heiau due to its use as a cattle pen. The site was also said to have been used as grazing land for cattle of the Souza Brother’s Dairy.

The majority of archaeological sites documented in the Petition Area were associated with traditional native Hawaiian pre-contact and early post-contact eras. A smaller number of historic sites (older than 50 years) were documented and include dirt roadways, an ‘auwai system, water retention terraces, and earthen pits identified as charcoal kilns. Surface level features associated with land uses that may introduce hazardous materials into the environment, such as above ground storage tanks, were not identified.

4.8.1.2 Survey of Environmental and Historical Records

Figure 4.12 shows the locations of sites identified in EDR's search and review of environmental and historical records. Overall, a total of seven sites were identified from the research. No sites were identified within a quarter mile radius around the Petition Area, two sites were identified within the half mile radius, and five sites were identified within the one mile radius.

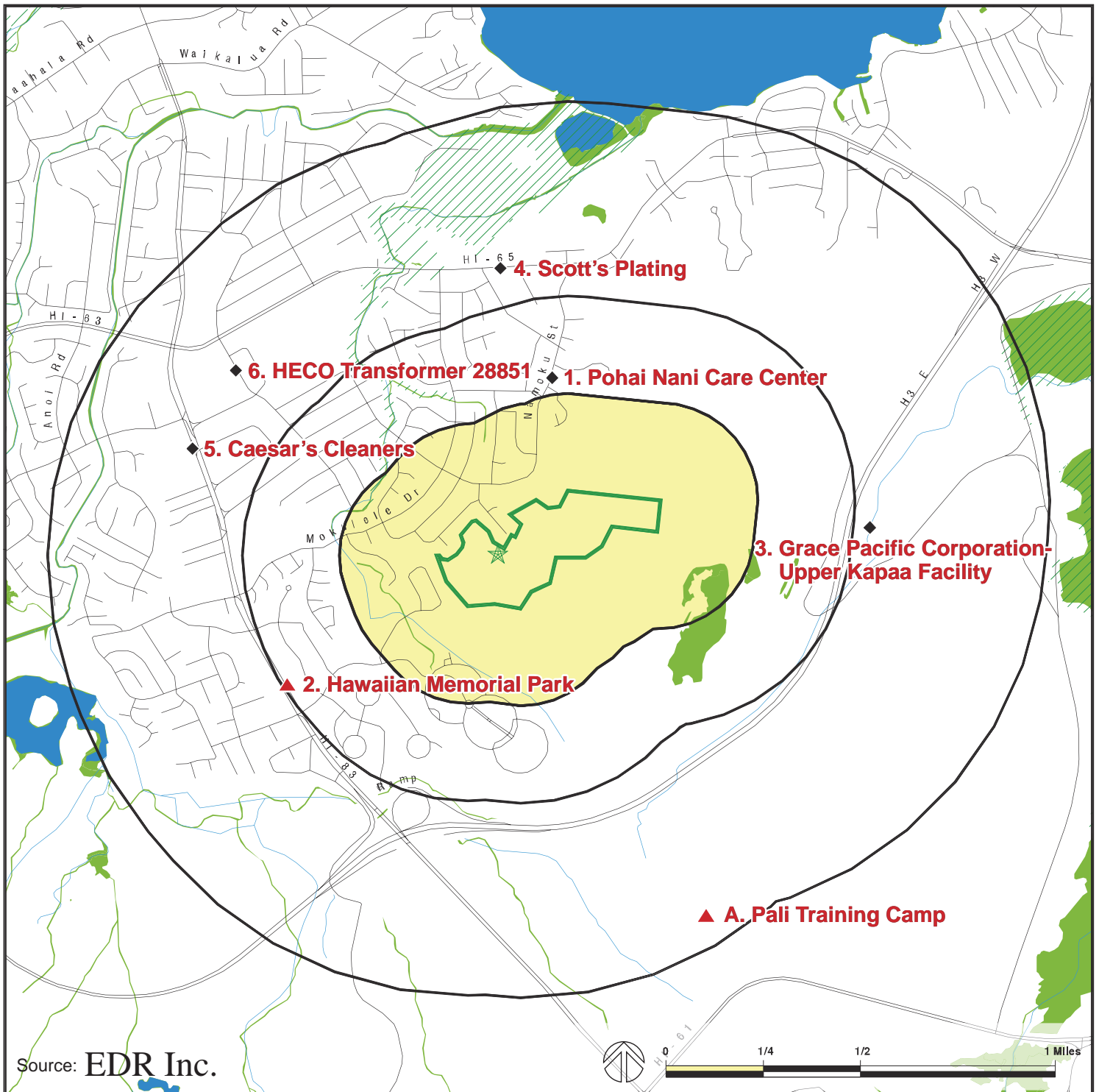
None of the identified sites poses a hazardous material threat to HMP or the Petition Area. One of the sites consists of HMP's existing crematory that is permitted for such operations. Four of the sites within the half- to one-mile distance are located at lower elevations from the Petition Area, and thus any potential spills occurring would flow further downhill and away from the Petition Area.

1. EPA National Priorities List (NPL). The NPL report is the U.S. Environmental Protection Agency (USEPA) registry of the nation's worst uncontrolled or abandoned hazardous waste sites, also known as "Superfund" sites. No NPL or proposed NPL sites were found within the study area.
2. Comprehensive Environmental Response, Compensation & Liability Information System (CERCLIS). Federal Facility and Superfund Enterprise Management System (SEMS) databases were reviewed. These databases lists known or suspected uncontrolled or abandoned hazardous waste sites related to the Superfund Program. No CERCLIS sites were found within the study area.
3. SEMS ARCHIVE. This database tracks sites that have no further interest under the Federal Superfund Program based on available information. Archived status indicates that, to the best of the EPA's knowledge, site assessment has been completed and no further steps will be taken to list the site on the NPL.

One SEMS ARCHIVE site, identified as Scott's Plating, is located over a half a mile north along Kāne'ōhe Bay Drive, and at a lower elevation from the Petition Area. This site now consists of the health care home service provider Hale Ku'ike Bay Side. The site has no potential hazards or controls, no further action is required for it, it can be used for unrestricted residential use, and its case was completed in 2013.

4. Resource Conservation and Recovery Act (RCRA) Corrective Actions Facilities (CORRACTS). This database contains information concerning RCRA facilities that have conducted, or are conducting a corrective action in response to a release of hazardous waste or constituents. No RCRA CORRACTS sites were found within the study area.
5. RCRA-Treatment, Storage, & Disposal (TSD) Facilities. The USEPA's RCRA program identifies and tracks hazardous waste from point of generation to disposal. This database is a compilation of facilities reporting generation, storage, treatment or disposal of hazardous waste. No TSD facilities were found within the study area.

OVERVIEW MAP - 5257155.2S



LEGEND

- | | | |
|---|------------------------------|----------------------------|
| Target Property | National Priority List Sites | National Wetland Inventory |
| Sites at elevations higher than or equal to the target property | Dept. Defense Sites | State Wetlands |
| Sites at elevations lower than the target property | Indian Reservations BIA | Upgradient Area |
| Manufactured Gas Plants | 100-year flood zone | |
| | 500-year flood zone | |

EDR Sites

Hawaiian Memorial Park Cemetery Expansion Project Final Environmental Impact Statement
Kāneʻohe, Oʻahu, Hawaiʻi

Figure 4.12

6. RCRA-Large and Small Quantity Generators. This USEPA database identifies facilities reporting generation, storage, transportation, treatment or disposal of hazardous waste. No RCRA-Large and Small Quantity Generators were identified within the study area.
7. Federal Emergency Response Notification System (ERNS). This database compiles information on the sudden and/or accidental release of hazardous substances, including petroleum, into the environment. The Petition Area is not a listed ERNS site.
8. State Hazardous Waste Sites (SHWS). SHWS records are the State's equivalent to CERCLIS. Review of SHWS records indicate five SHWS sites are located within one half to one mile of the Petition Area. One of the sites is Scott's Plating that was previously discussed under SEMS ARCHIVE. A summary of the remaining four sites is provided.
 - a. The nearest site to the Petition Area is HMP's crematory operation operating out of their existing facility near the main cemetery entrance. The site has no hazard potential, no further action is required, it can be used for unrestricted residential use, and operates under a permit for a diesel underground storage tank for the crematorium.
 - b. The Grace Pacific Corporation's upper Kapa'a facility was identified, and is located along Kapa'a Quarry Road over 0.5 miles away and at a lower elevation than the Petition Area. Hazardous material were found from soil samples collected, but none were above State Environmental Action Levels (EAL) and did not pose a threat to human health or the environment. The site has no hazard potential, and no further action is required.
 - c. Ceasar's Cleaners was identified as a site that is located about 0.75 miles away, situated along Kamehameha Highway generally across of Windward City Shopping Center, and at a lower elevation than the Petition Area. Perchloroethylene (PCE) was found in soil under their warehouse in 2007, and the site does have a medium hazard potential that is being managed with controls.
 - d. Hawaiian Electric Company, Inc. (HECO) has a transformer site identified that is located about 0.75 miles away, situated along Aumoku Street in the residential area across of Windward City Shopping Center, and at a lower elevation than the Petition Area. In 2003, hazardous material spilled at a level below the State's EAL. Clean-up was taken and no further action is required.
9. State and Tribal Landfill / Solid Waste Disposal Sites List. These records inventory solid waste disposal facilities and landfills in a particular State. Depending on the state, records may inventory active or inactive facilities or open dumps failing to meet RCRA criteria for solid waste landfills or disposal sites. No State and Tribal Landfill / Solid Waste Disposal Sites were identified within the study area.

10. Leaking Underground Storage Tank (LUST). This State DOH database identified one LUST site, Pohai Nani Care Center, just over a quarter mile away and at a lower elevation than the Petition Area. Diesel and gasoline storage tanks identified are reported to be permanently out of use, and no further action is required
11. Underground Storage Tank (UST). Pohai Nani Care Center is the only facility with registered USTs identified in the study area. This facility also appear on the LUST database and was previously addressed. Three underground storage tanks at Pohai Nani are listed in the UST database and have the status of “Permanently out of Use”.
12. State and Tribal Institutional Control / Engineering Control Registries. This State DOH database identifies sites with engineering controls in place. One site, Caesar’s Cleaners, is located over half a mile west and generally at a lower elevation than the Petition Area. Potential hazards at this site are managed through engineering controls as previously discussed.
13. State and Tribal Voluntary Cleanup Sites. No sites identified in databases documenting state and tribal voluntary cleanup sites were found within the study area. The EPA’s Indian Voluntary Cleanup Priority (VCP) Region 1 and 7 databases were reviewed. These databases document voluntary cleanup priority sites located in these EPA regions. The State’s Voluntary Response Program (VRP) was also examined.
14. SPILLS database. This database documents hazardous substance release incidents reported to the State DOH, Office of Hazard Evaluation and Emergency Response (HEER). Two SPILLS sites, Grace Pacific Corporation and Caesars’ Cleaners, were identified. These sites were previously discussed under SHWS records.
15. Financial Assurance Information. Owners and operators of hazardous waste facilities must provide proof of possessing sufficient funds for cleanup, closure, and post-closure of their facilities. These entities are documented on the Financial Assurance Information list. One listed site was the Pohai Nani Care Care Center, and their facility’s underground storage tanks were described under the LUST.
16. Drinking Water Wells. The State Commission on Water Resources Management (CWRM) Well Index Database tracks information related to the construction and installation of production wells in the state. The database identified 13 wells within a one mile radius of the Petition Area. No wells were located within the Petition Area. The majority of identified wells are listed as “Unused” or “Abandoned”. Two wells located over a half mile south of the Petition Area and generally at a lower elevation are used for non-domestic, non-agriculture related irrigation. One well, also located over a half mile south and at a lower elevation relative to the Petition Area is used for golf course related irrigation.
17. Formerly Used Defense Sites. This registry identifies Formerly Used Defense Sites where the US Army Corps of Engineers is actively or plans to take necessary cleanup actions. The Pali Training Camp is listed in this registry. This 4,400 acre site is located just under one mile south from the Petition Area, and is near the Hawai‘i Pacific University Hawai‘i Loa campus, and is generally at a higher elevation. The site was

- previously used for military training and is known or suspected to contain military munitions and unexploded ordnances. Portions of site have been developed with residential, recreational, and educational uses associated with the university's campus.
18. Unexploded Ordnance Sites. This listing is maintained by the Department of Defense and documents the location of unexploded ordnance sites. Five unexploded ordinance sites are documented at the Pali Training Camp site.
 19. AIRS. This State DOH listing documents permitted facilities. One AIRS facility is for HMP's crematorium as previously discussed under SHWS.

4.8.1.3 Cemetery Related Hazardous Substances

The impact of interred human remains on groundwater resources has been raised as a potential impact associated with cemetery operations and was evaluated for the EIS. Adverse impacts may occur from the seepage of decay products from the purification of an interred corpse into surrounding groundwater resources. Corpse seepage contains decay products such as bacteria, viruses, along with organic and inorganic chemical products (Ucisik and Rushbrook, 1998). Migration of corpse seepage into nearby groundwater resources can be rapid if soil surrounding an interred corpse is porous. Seepage migration could result in local waterborne disease epidemics in areas where groundwater is used as a water source.

The capacity for corpse seepage to contaminate groundwater resources is influenced by a variety of factors including cemetery geologic characteristics as well as cemetery layout and management. The presence of decay products associated with corpse seepage was assessed in the soil and groundwater near nine Australian cemeteries (Dent and Knight 1998). Initial assessment results discussed in the study reflect considerable variation in the concentration of the substances measured and overall low values. However, the study's initial results indicate decay products are measureable and could impact the environment.

In contrast to more sensitive groundwater resources, the HMP site and Petition Area sit above the Kailua Caldera that are part of the Kailua Member of the Ko'olau volcanics. These basalt flows are dense, massive, and relatively impermeable due to almost complete filling of interstices with secondary minerals resulting from hydrothermal alteration. Clinker beds have been cemented into hard and essentially impermeable breccia. The deep weathering of the Kailua volcanics across this regions has also resulted in stiff silt and clay residual soils underlain by saprolite. The Petition Area is situated below the UIC line and is part of exempted aquifers that do not serve as a source of drinking water, and will not serve as a source of drinking water in the future. The Petition Area is also situated outside the City's No Pass Zone. This zone demarcates areas on O'ahu where the installation of waste disposal facilities, which may contaminate groundwater resources used or expected to be used for domestic water supplies are prohibited.

Specific concerns have also been raised about the potential for groundwater contamination related to formaldehyde, a hazardous substance regulated by the EPA. Although concerns have been raised, little research exists on the relationship between groundwater contamination by formaldehyde and the burial of embalmed corpses. Existing research concludes formaldehyde poses minimal environmental concerns should seepage containing formaldehyde migrate into nearby groundwater, provided chemical concentrations are not significant (Hanna and Moyce 2008).

Embalmed bodies, including those interred at HMP, are often encased within a concrete burial ~~container vault~~. This ~~container vault~~ limits the passage of seepage and associated decay products into the surrounding environment. Formaldehyde released through decomposition of an embalmed corpse would eventually degrade into methane under anaerobic conditions found within a burial ~~container vault~~. Any formaldehyde that escapes the burial ~~container vault~~ would degrade comparatively faster in aerobic conditions of the sub-terrestrial environment.

As discussed in Section 3.6.3, formaldehyde was not detected in four groundwater samples taken at sites downslope of the Petition Area and HMP. Formaldehyde was not detected in samples at an analytical detection limit of 5 parts per billion. Based upon these water quality tests, formaldehyde is not an environmental issue associated with cemetery activities of HMP and the Hawai'i State Veterans Cemetery.

4.8.2 Potential Project Impact and Mitigation

No Action Alternative

Risk of adverse environmental impact from known or potential hazardous material sources would not increase under the No Action Alternative. Sites identified in environmental and historical records related to hazardous materials would continue to be located away from and not affect the Petition Area. Therefore, exposure risk to hazardous materials for HMP visitors and staff would remain nonexistent under this alternative.

Corpses buried at HMP would continue to be interred in concrete burial ~~containers vaults~~. Usage of these vaults limits the seepage of decay products including pathogens and formaldehyde produced into the surrounding environment. In particular, formaldehyde would continue to not be present in groundwater downslope from HMP and the Petition Area.

Proposed Action

The Proposed Action would not result in elevated risk of adverse impact from known or potential hazardous material sources within the Petition Area or in the surrounding area. Sites identified in hazardous waste related environmental and historical records would continue to be located over a quarter mile away and would continue to not pose an existing hazardous risk. Risk of exposure to

these hazardous material sites for visitors and staff at HMP would remain nonexistent under the Proposed Action. The Cultural Preserve would contribute minimal additional hazardous material issues to this area.

Concrete burial ~~containers~~^{vaults} would continue to be used under the Proposed Action. Although the number of burials would increase with the cemetery expansion, interment within burial ~~containers~~^{vaults} would mitigate risk of corpse seepage containing pathogens or formaldehyde into nearby environmental resources.

The AIS did not identify surface level features within the Petition Area that may potentially introduce hazardous materials into the environment, such as remnant fuel tanks from prior agricultural and ranching activities. The majority of surface level archaeological features identified were associated with traditional native Hawaiian pre-contact and early post-contact eras. Any activities associated with these features would have been related to traditional native Hawaiian activities and are unlikely to have introduced hazardous materials or substances into the surrounding environment.