

**NASA SSFL EIS for Proposed
Demolition and Environmental
Cleanup Activities:
Summary of Alternatives Eliminated
from Further Consideration**

Prepared for
National Aeronautics and Space Administration

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Acronyms and Abbreviations

AOC	Administrative Order on Consent for Remedial Action
dBa	decibel (A-weighted)
DEIS	<i>Draft Environmental Impact Statement for Proposed Demolition and Environmental Cleanup Activities at Santa Susana Field Laboratory, Ventura County, California</i>
ft	feet
GHG	greenhouse gas
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
ROI	region of influence
SSFL	Santa Susana Field Laboratory
yd ³	cubic yards

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SECTION 1

Introduction

This report summarizes the alternatives eliminated from further consideration in the *Draft Environmental Impact Statement for Proposed Demolition and Environmental Cleanup Activities at Santa Susana Field Laboratory, Ventura County, California* (NASA, 2013) (referred to as the “DEIS”). This report is divided into three sections. The first section is the introduction and lists the 11 resource areas that were evaluated, the Proposed Action (DEIS Section 2.2), and the alternatives eliminated from further evaluation. Section 2 provides a summary of the impacts by resource area. The third section provides an overall comparison of the impacts by alternative and includes the impacts for the proposed action described in the DEIS.

1.1 Resource Area Evaluation

The National Aeronautics and Space Administration (NASA) evaluated 11 resource areas in the DEIS. The evaluation for each resource area included its affected environment (DEIS Section 3), which focuses on those resources and conditions potentially subject to impacts from the Proposed Action (DEIS Section 2.2) or other alternative actions considered (Section 1.2 of this report) for the assigned region of influence. The evaluation also considered the environmental consequences or potential impacts (DEIS Section 4) to the resource areas as a result of implementing the Proposed Action or alternatives. This analysis identifies likely short- and long-term impacts, as well as direct, and indirect impacts on the environment. The Proposed Action and the alternatives eliminated from further evaluation could cause direct impacts as a result of the proposed demolition and environmental cleanup activities. The resource areas evaluated and corresponding sections for the affected environment descriptions and potential impact evaluations in the DEIS is provided in Table 1.1-1.

TABLE 1.1-1

Resource Areas Evaluated and Corresponding Sections in the DEIS

NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation

Resource Area	DEIS Affected Environment	DEIS Environmental Consequences
Site Infrastructure and Utilities	Section 3.2	Section 4.10
Cultural Resources	Section 3.3	Section 4.3
Biological Resources	Section 3.4	Section 4.4
Air Quality and Greenhouse Gas Emissions	Section 3.5	Section 4.7
Water Resources	Section 3.6	Section 4.6
Soils, Landslide Potential, Topography, and Paleontological Resources	Section 3.7	Section 4.2
Hazardous and Nonhazardous Materials and Waste	Section 3.8	Section 4.12
Health and Safety	Section 3.9	Section 4.9
Traffic and Transportation	Section 3.10	Section 4.5
Noise	Section 3.11	Section 4.11
Environmental Justice	Section 3.12	Section 4.8

1.2 Proposed Action and Description of Alternatives

In addition to the Proposed Action described in Section 2.2 of the DEIS, NASA evaluated alternatives other than the background cleanup goals stipulated in the Administrative Order on Consent for Remedial Action (AOC) (State of California DTSC Docket No. HAS-CO_10/11-038, 2010). Alternatives evaluated consider the implementation of the soil and groundwater remediation technologies previously discussed to achieve various risk-based cleanup levels, specifically Suburban Residential, Commercial/Industrial, and Recreational risk-based cleanup levels.

In general, risk-based protocols are designated for each of these cleanup levels to help NASA and other decision makers assess the possible ways in which people and animals (receptors) could be exposed to soil and groundwater contaminants. A receptor must have the potential for exposure to the contaminated soil for a risk to be present. After the potential for exposure to receptors has been confirmed, the extent of exposure can be evaluated using different criteria, including the duration of exposure, the type of contamination to which a sensitive receptor would be exposed, the frequency of exposure, and the relative toxicity of the contaminant. In other words, based on the number of days a person is on Santa Susana Field Laboratory (SSFL), the areas he/she might access, and the conditions of the site, a risk-based protocol is established that designates what cleanup level is necessary to keep that person healthy and safe.

1.2.1 Description of Proposed Action—Demolition, Soil Cleanup to Background Levels, and Groundwater Cleanup

The Proposed Action evaluated in the DEIS is to demolish existing structures and to remediate soil and groundwater contamination on the NASA-administered property of SSFL. DEIS Sections 2.2.1 through 2.2.3 describe the specific project components of these activities. The areas proposed for soil remediation are shown in Figure 1.2-1.

1.2.2 Description of Alternative 1—Demolition, Soil Cleanup to Suburban Residential Cleanup Goals, and Groundwater Cleanup

This alternative would entail the cleanup of soil and groundwater to meet Suburban Residential soil cleanup goals and Suburban Residential drinking water standards. Figure 1.2-2 shows the general footprints of the soil that would require remediation under Alternative 1. The depth of soil that would require cleanup varies on a site-by-site basis; generally, it is less than 5 feet (ft), but can reach 20 ft in limited areas. The exposure scenario for Suburban Residential cleanup assumes that both adults and children would be exposed to soil and groundwater at a home. The exposure duration is assumed to be 24 hours per day, 350 days per year, for a total of 30 years.

The media to which the residents would be exposed include surface soil (0 to 2 ft) and subsurface soil to a depth of 10 ft (assuming that the home has a basement). The exposure route for soil would include accidental ingestion, inhalation of soil particles, and dermal contact. It is assumed that the residents would be exposed to vapors in the soil gas from the subsurface soil via a process known as vapor intrusion.

For the groundwater exposure scenario, the primary expected exposure routes include ingestion when residents drink the water (an estimated 2 liters per day), inhalation of vapors emanating from the water, and absorption via dermal contact through washing.

1.2.2.1 Demolition

Proposed demolition activities under Alternative 1 would be the same as those described for the Proposed Action in DEIS Section 2.2.1.

1.2.2.2 Soil and Groundwater Cleanup

The same soil and groundwater remedial technologies described under the Proposed Action in DEIS Sections 2.2.2 and 2.2.3 are considered under this alternative. In addition, the soil and groundwater remedial technologies that were considered for this alternative but were not considered for the Proposed Action are described in DEIS

Section 2.4.2. As shown in Figure 1.2-2, the footprint of areas requiring remedial action for Alternative 1 is smaller than the footprint for the Proposed Action (Figure 1.2-1). Technologies that might prove ineffective in meeting the background cleanup goals on schedule under the Proposed Action might be effective in meeting the risk-based goals under Alternative 1.

Soil remedial technologies such as excavation and ex situ treatments would include excavation to bedrock in some areas because the top of bedrock is shallow. Bedrock would not be removed. Rock outcrops would be retained, as possible. The approximate volume of soil that would require excavation under these scenarios to meet the Alternative 1 cleanup goals is estimated to be approximately 182,000 yd³. Confirmatory sampling would verify that the necessary contaminated soils had been removed to meet the cleanup goals. After excavation was complete, no other monitoring would be required.

1.2.3 Description of Alternative 2—Demolition, Soil Cleanup to Commercial/Industrial Cleanup Goals, and Groundwater Cleanup

This alternative would evaluate the cleanup of soil (vapor intrusion pathway only) to meet the Commercial/Industrial soil cleanup goals and groundwater cleanup. Figure 1.2-3 shows the general footprints of the soil that would require remediation under Alternative 2. The depth of soil that would require cleanup varies on a site-by-site basis; generally it is less than 5 ft, but can reach 20 ft in limited areas.

The exposure scenario for Commercial/Industrial soil cleanup assumes that adults would be exposed to soil and vapors while at work. The exposure duration is assumed to be 8 to 10 hours per day, 250 days per year, for a total of 25 years. The media to which the residents would be exposed include surface soil (0 to 2 ft) and subsurface soil to a depth of 10 ft. The exposure route for soil would include accidental ingestion, inhalation of soil particles, and dermal contact.

The evaluation uses the assumption that the workers would be exposed to vapors in the soil gas from the subsurface soil and groundwater via the vapor intrusion pathway.

1.2.3.1 Demolition

Proposed demolition activities under Alternative 2 would be the same as those described for the Proposed Action in DEIS Section 2.2.1.

1.2.3.2 Soil and Groundwater Cleanup

The same soil and groundwater remedial technologies described under the Proposed Action are considered under Alternative 2. In addition, the soil and groundwater remedial technologies that were considered for this alternative but were not considered for the Proposed Action are described in DEIS Section 2.4.2. As shown in Figure 1.2-3, the footprint of areas requiring remedial action for Alternative 2 is smaller than the footprints for the Proposed Action (Figure 1.2-1) or Alternative 1 (Figure 1.2-2). Technologies that might prove ineffective in meeting the cleanup goals under the Proposed Action or Alternative 1 might be effective in achieving the Alternative 2 cleanup goals.

Soil remedial technologies including excavation and ex situ treatments would involve excavation to bedrock in some areas because the top of bedrock is shallow. Bedrock would not be removed. Rock outcrops would be retained, as possible. The approximate volume of soil that would require excavation under these scenarios meet the Alternative 2 cleanup goals is estimated to be approximately 92,000 yd³. Confirmatory sampling would verify that the necessary contaminated soils were removed to meet the cleanup goals. After excavation was complete, no other monitoring would be required.

1.2.4 Description of Alternative 3—Demolition, Soil Cleanup to Recreational Cleanup Goals, and Groundwater Cleanup

This alternative would evaluate the cleanup of soil to meet Recreational risk-based criteria and groundwater cleanup. Figure 1.2-4 shows the footprints of the soil that would require remediation under Alternative 3. The depth of soil that would require cleanup varies on a site-by site-basis; generally it is less than 5 ft, but can reach 20 ft in limited areas.

The exposure scenario for Recreational cleanup assumes that both adults and children are exposed to soil and groundwater while performing recreational activities. The exposure duration is assumed to be several hours per day, 50 days per year, for a total of 30 years. The media to which the recreationists would be exposed include surface soil (0 to 2 ft) and subsurface soil to a depth of 10 ft. The exposure routes for soil would include accidental ingestion, inhalation of soil particles, and dermal contact.

The analysis assumes that recreationists would be exposed to vapors in the soil gas from the subsurface soil and groundwater via vapor intrusion.

1.2.4.1 Demolition

Proposed demolition activities under Alternative 3 would be the same as those described for the Proposed Action in DEIS Section 2.2.1.

1.2.4.2 Soil and Groundwater Cleanup

The same soil and groundwater remedial technologies described under the Proposed Action are considered under Alternative 3. In addition, the soil and groundwater remedial technologies that were considered for this alternative but were not considered for the Proposed Action are described in DEIS Section 2.4.2. As shown in Figure 1.2-4, the footprint of areas requiring remedial action for Alternative 3 would be smaller than the footprints for the Proposed Action (Figure 1.2-1), Alternative 1 (Figure 1.2-2), or Alternative 2 (Figure 1.2-3). Technologies that might prove ineffective in meeting the cleanup goals under the Proposed Action or Alternatives 1 or 2 might be effective in achieving the Alternative 3 cleanup goals.

Soil remedial technologies that include excavation and ex situ treatments would include excavation to bedrock in some areas because the top of bedrock is shallow. Bedrock would not be removed. Rock outcrops would be retained, as possible. The approximate volume of soil that would require excavation under these scenarios to meet the Alternative 3 cleanup goals is estimated to be approximately 58,000 yd³. Confirmatory sampling would verify that the necessary contaminated soils were removed to meet the cleanup goals. After excavation was complete, no other monitoring would be required.

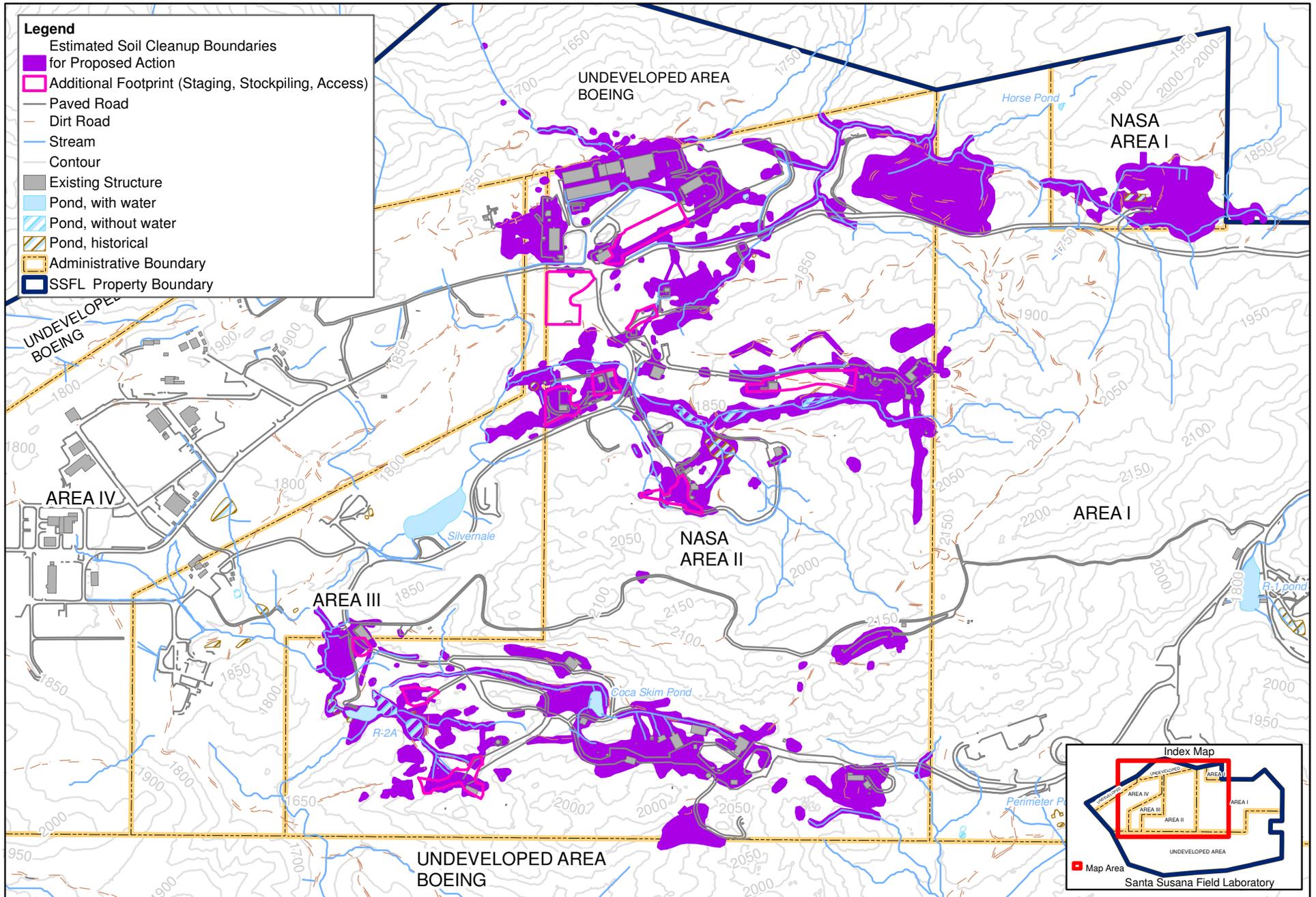
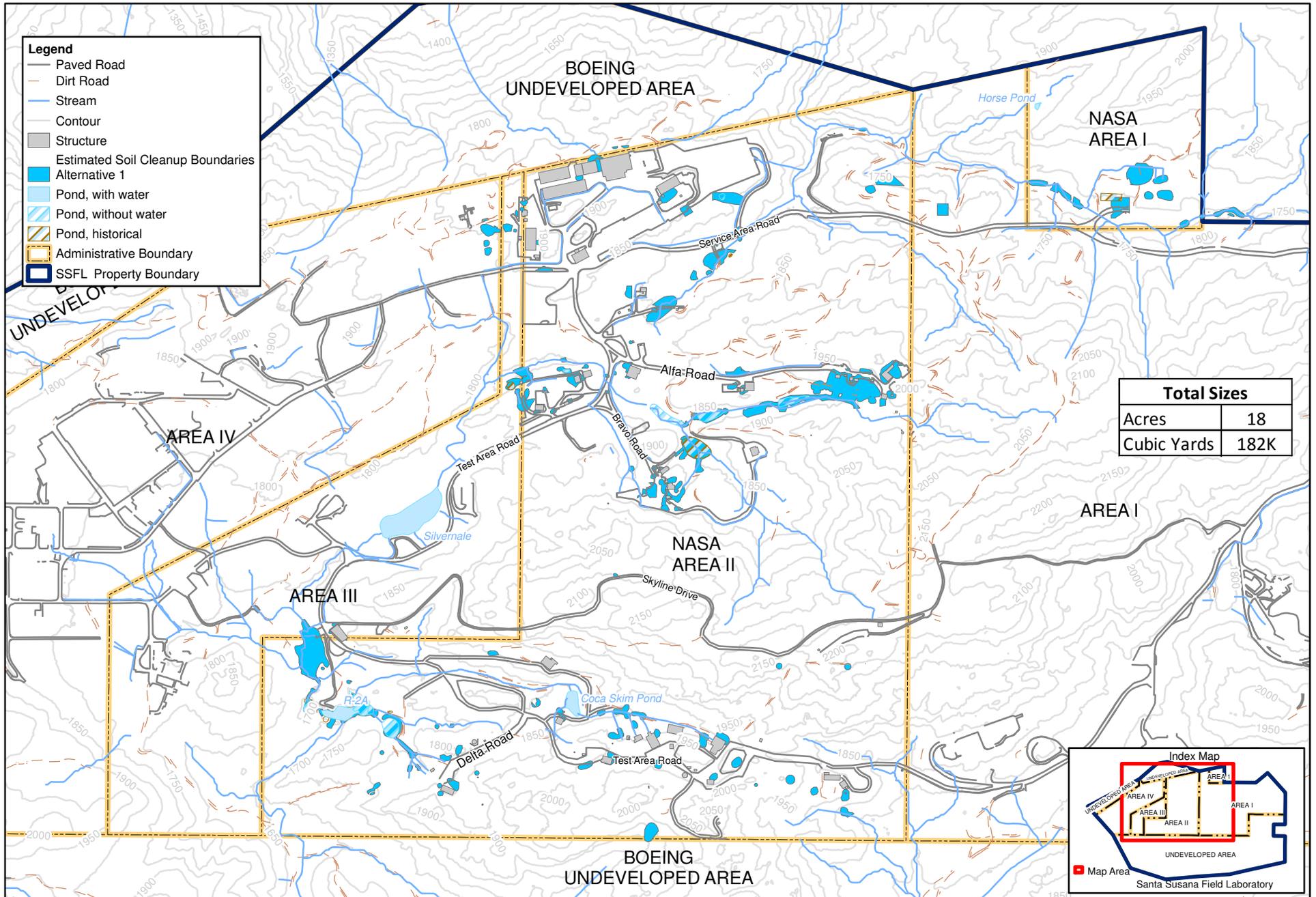


Figure 1.2-1
Proposed Soil Remediation Area Under the Proposed Action
NASA - Santa Susana Field Laboratory
EIS Summary of Alternatives Eliminated From Further Evaluation



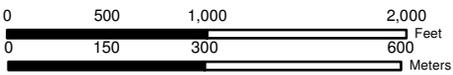
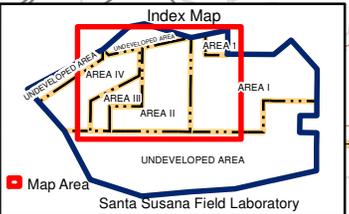
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- Legend**
- Paved Road
 - - - Dirt Road
 - Stream
 - Contour
 - ▭ Structure
 - ▭ Estimated Soil Cleanup Boundaries
 - ▭ Alternative 1
 - ▭ Pond, with water
 - ▭ Pond, without water
 - ▭ Pond, historical
 - - - Administrative Boundary
 - ▭ SSFL Property Boundary

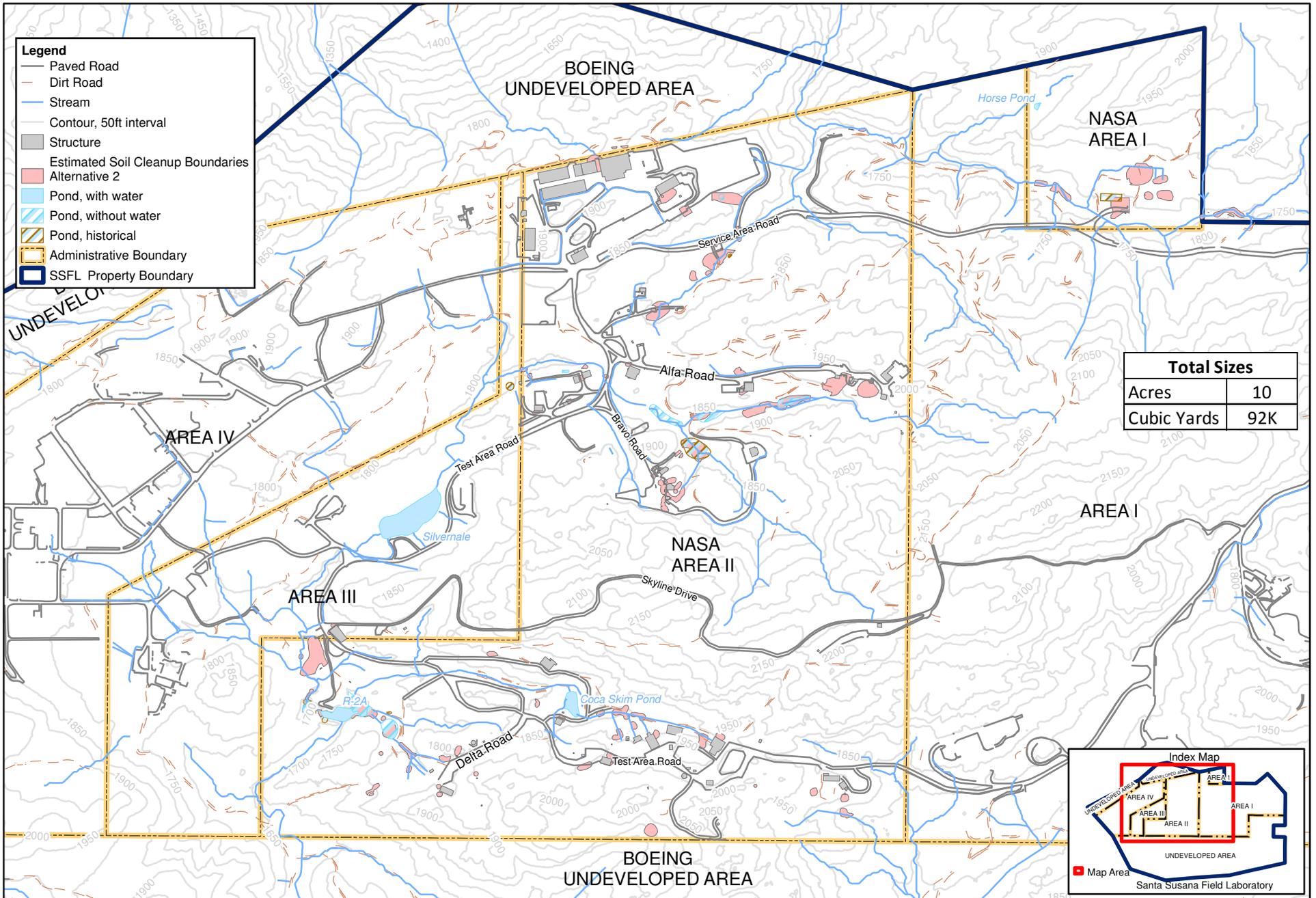
Total Sizes	
Acres	18
Cubic Yards	182K



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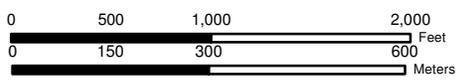
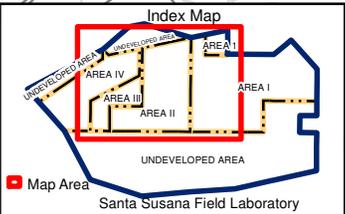
Figure 1.2-2
Proposed Soil Remediation Area Under Alternative 1
NASA - Santa Susana Field Laboratory
EIS Summary of Alternatives Eliminated From Further Evaluation

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- Legend**
- Paved Road
 - - - Dirt Road
 - Stream
 - Contour, 50ft interval
 - ▭ Structure
 - ▭ Estimated Soil Cleanup Boundaries Alternative 2
 - ▭ Pond, with water
 - ▭ Pond, without water
 - ▭ Pond, historical
 - ▭ Administrative Boundary
 - ▭ SSFL Property Boundary

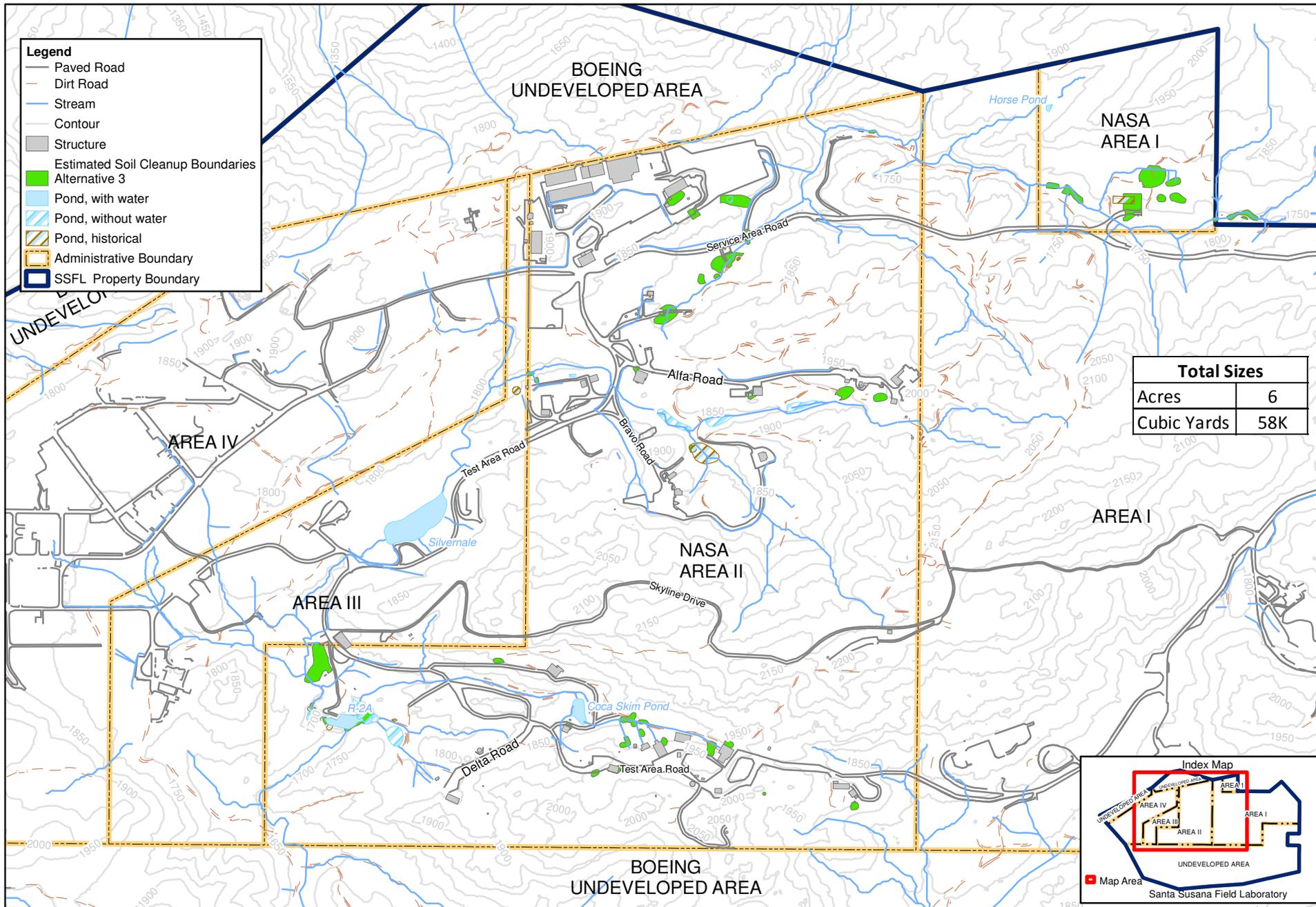
Total Sizes	
Acres	10
Cubic Yards	92K



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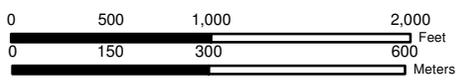
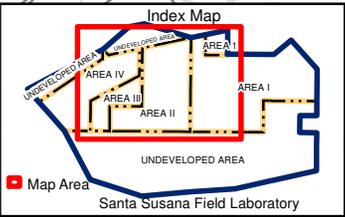
Figure 1.2-3
Proposed Soil Remediation Area Under Alternative 2
NASA - Santa Susana Field Laboratory
EIS Summary of Alternatives Eliminated From Further Evaluation

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- Legend**
- Paved Road
 - - - Dirt Road
 - Stream
 - Contour
 - ▭ Structure
 - ▭ Estimated Soil Cleanup Boundaries Alternative 3
 - ▭ Pond, with water
 - ▭ Pond, without water
 - ▭ Pond, historical
 - - - Administrative Boundary
 - ▭ SSFL Property Boundary

Total Sizes	
Acres	6
Cubic Yards	58K



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Figure 1.2-4
Proposed Soil Remediation Area Under Alternative 3
NASA - Santa Susana Field Laboratory
EIS Summary of Alternatives Eliminated From Further Evaluation

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SECTION 2

Environmental Consequences

This section describes the potential environmental consequences or impacts to the resource areas as a result of implementing the Proposed Action or alternatives eliminated from further evaluation. This analysis identifies likely short- and long-term impacts, as well as direct, and indirect impacts on the environment. The Proposed Action and the alternatives eliminated from further evaluation could cause direct impacts as a result of the proposed demolition and environmental cleanup activities.

The evaluation involved examining the types and intensities of the potential impacts. It considered, for example, whether impacts would be local to the SSFL site or have wider, more regional impacts. It looked at whether impacts would be short term, occurring only during site work, or long term, lasting after the work was complete. Table 2.0-1 lists the evaluation criteria for analyzing potential impacts and an impact’s level of significance. However, resource area-specific impacts were develop and are located in DEIS Section 4 by resource area, as listed in Table 1.1-1.

TABLE 2.0-1
Evaluation Criteria for Analyzing Environmental Impacts
NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation

Intensity of Impact	
No Impact	No impacts would be expected
Negligible	Impacts would not be expected to be measurable, or would be measurable but too small to cause any change in the environment
Minor	Impacts would be measurable but within the capacity of the affected system to absorb the change
Moderate	Impacts would be measurable but within the capacity of the affected system to absorb the change and the impacts could be compensated for with mitigation and resources so the impact would not be substantial
Significant	Impacts would be measurable but not within the capacity of the affected system to absorb the change, and without major mitigation, could be severe and long lasting
Type of Impact	
Beneficial	Would result in some level of environmental improvement
Negative	Would have an adverse effect on the natural or human environmental to include, physical, social, or cultural environment
Context of Impact	
Local	Would occur within the NASA-administered property at SSFL
Regional	Would occur outside the NASA-administered property at SSFL
Duration of Impact (How Long)	
Short Term	Would occur only during the proposed demolition and immediate remediation period
Long Term	Would continue beyond the proposed demolition and immediate remediation period

Table 2.0-2 provides a summary of the estimated soil volumes, hauling requirements, and backfill estimates for each of the alternatives discussed in this section under the excavation and offsite disposal approach described in DEIS Section 2.2.2.

TABLE 2.0-2

Estimated Soil Volume and Truck Requirements under the Proposed Action and Alternatives 1, 2, and 3 for the Excavation and Offsite Disposal Cleanup Technology

NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation

Removal Parameters	Proposed Action	Alternative 1 (Residential)	Alternative 2 (Industrial)	Alternative 3 (Recreational)
Removal Volume	500,000 yd ³	182,000 yd ³	92,000 yd ³	58,000 yd ³
Trucks Required for Soil Removal	26,441	9,568	4,860	3,031
Truck Frequency for Soil Removal Hauling ^a	53 trucks per day	19 trucks per day	10 trucks per day	6 trucks per day
Backfill Volume— 1/3 of total volume	167,000 yd ³	61,000 yd ³	31,000 yd ³	19,000 yd ³
Trucks Required for Backfill Hauling	8,814	3,189	1,620	1,010
Truck Frequency for Backfill Hauling ^a	18 trucks per day	6 trucks per day	3 trucks per day	2 trucks per day
Hauling Duration	23 months	23 months	23 months	23 months
Daily Material Handled ^a	1,698 tons per day	614 tons per day	312 tons per day	195 tons per day
Note: ^a Assumes completion of cleanup and soil hauling by the end of 2017. yd ³ = cubic yards				

2.1 Potential Impacts of the Proposed Action—Demolition, Soil Cleanup to Background Levels, and Groundwater Cleanup

The section describes the potential impacts to the resource area posed by the Proposed Action. Table 2.1-1 lists the impacts by resource area and provides a description of the impact. A more detailed description of the impacts can be found in DEIS Section 4.

TABLE 2.1-1
Summary of Impacts for the Proposed Action
NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation

Resource Area	Potential Impacts	Impact Descriptions
Soils, Landslide Potential, Topography, and Paleontological Resources	Significant, negative, regional, long term ●	Impacts from soil cleanup to this resource area would result primarily from ground disturbance as a result of 500,000 yd ³ of contaminated soil or more being excavated. Because of the use of this invasive remediation, erosion effects would be significant.
Cultural Resources	Significant, negative, regional, long term <i>Adverse effect under National Historic Preservation Act (NHPA) Section 106</i> ●	The Proposed Action calls for the demolition of historic structures on NASA-administered land at SSFL. Demolition would have a significant impact to all of the historic architectural resources. Historic architectural resources are the Alfa, Bravo, and Coca Test Area Historic Districts. These comprise 45 structures in total, of which 9 are individually eligible for listing in the National Register of Historic Places (NRHP) and 36 are eligible as contributing resources to historic districts. The historic structures would be gone from the site. Disturbance of the site during cleanup would have a significant impact on archeological resources at SSFL. Ground disturbance activities also would have adverse effects under Section 106 of the NHPA on these resources. Based on research and archeological surveys of the entire NASA-administered land at SSFL, the Proposed Action would adversely and significantly impact approximately 0.65 acre of the Burro Flats Painted Cave archeological site. Listed in the NRHP and the California Register of Historic Resources in May 1976, the site consists of pictographs (rock art paintings), petroglyphs (rock art that has been scored or incised into the rock surface), mortars, tooling, and habitat. The cave's period of significance is believed to be 1000 to 1499 A.D. The Proposed Action also could impact a second potentially NRHP-eligible archeological site in the northern portion of the project area. SSFL has been formally identified by the Santa Ynez Band of Chumash Indians as an Indian Sacred Site under Executive Order 13007. The Proposed Action would have a significant impact on the Sacred Site.
Biological Resources	Significant, negative, regional, long term ●	The Proposed Action would result in a significant, negative, regional, and long-term impact because of the amount of ground disturbance that would occur. Additionally, changes to soil profiles (the micro and macro fauna of the soil ecosystems) are expected to be significant. The extensive level of excavation necessary to meet the 2010 AOC would lead to soil instability, decreased vegetative biodiversity, and increased spread of invasive weeds.
	Minor, beneficial, regional, long term ■	Over time, the demolition would increase the amount of undeveloped, vegetated area and would have a minor, beneficial impact on surrounding native vegetation through increased habitat availability, rainfall infiltration, and slow stormwater runoff.
Traffic and Transportation	Significant, negative, regional, long term ●	The primary impacts on this resource area would result from truck traffic along the routes accessing SSFL and from onsite demolition, construction, and environmental cleanup activity. The DEIS evaluated demolition of up to 100 percent of existing structures, and excavation of the top 2 ft of soil for offsite disposal. These actions would generate the largest volume of offsite traffic and, therefore, provide the most conservative analysis. Demolition would generate approximately 94,536 tons of debris (test stands and other structures) and excavation would generate approximately 500,000 yd ³ of soil. The high volume of heavy vehicle trips needed to haul this waste material offsite would result in a significant, negative, regional, and long-term impact to local pavement conditions on some roadways leading to SSFL (Roscoe, Valley Circle, and Woolsey Canyon).

TABLE 2.1-1

Summary of Impacts for the Proposed Action*NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation*

Resource Area	Potential Impacts	Impact Descriptions
Water Resources	Moderate, negative, local, long term ●	Demolition would remove impervious surfaces and disturb soil, thus increasing the potential for erosion. Demolition also would increase the potential for accidental releases of hazardous materials from construction equipment (fuel and lubricants) and from the demolished structures (lead-based paint and asbestos). Soil and groundwater cleanup technologies would result in increased erosion potential from excavation of up to 500,000 yd ³ of soil, changes in hydrology (both surface water and groundwater), impairment of Section 303(d)-listed water bodies, and impacts to the quality of surface water and groundwater.
	Moderate, beneficial, regional, long term ■	Demolition would include the removal of structures up to 5 ft below grade; this removal would reduce the amount of impervious surface throughout the NASA-administered property at SSFL, resulting in a site that would be more similar to natural topographic and hydrologic conditions. Specifically, demolishing structures would allow for increased infiltration to groundwater, with a corresponding reduction in surface runoff. As a result, the impact on hydrology and drainage that could result from implementation of the proposed demolition activities would be minor and beneficial. In the long term, groundwater and soil cleanup to background levels, regardless of the remediation approach, likely would reduce groundwater contaminant concentrations because lower soil concentrations would be susceptible to leaching. Contaminant flux from the plume could decrease gradually through the action of natural processes (adsorption, geochemical degradation, and dispersion) to background concentrations, as fresh groundwater was introduced to the plume area from recharge areas and as the contaminant mass in the groundwater was depleted resulting in a moderate, beneficial impact.
Air Quality and Greenhouse Gas Emissions	Moderate, negative, regional, short term ●	Moderate impacts on air quality and climate change could result from operating equipment, vehicles, and power sources, and from dust generation due to demolition and excavation of up to 500,000 yd ³ of soil. National Ambient Air Quality Standards (NAAQS) criteria pollutants (a set of air pollutants that cause smog, acid rain, and other health hazards) were estimated. Additionally, Council on Environmental Quality (CEQ) thresholds for greenhouse gas (GHG) emissions were estimated.

TABLE 2.1-1
Summary of Impacts for the Proposed Action
NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation

Resource Area	Potential Impacts	Impact Descriptions
Environmental Justice	Moderate, negative, local, short term 	<p>The DEIS assessed potential impacts on minority and low-income populations within the region of influence (ROI), based on 49 census block groups that are either adjacent to the SSFL property and potentially could be affected by remedial activities; or adjacent to or near (within approximately 1 mile of) the local roadway network used by trucks accessing SSFL during implementation of the Proposed Action. The impacts for the proposed action would be moderate.</p> <p>Of the 49 block groups evaluated, 18 Los Angeles County block groups have at least 50 percent minority populations, and 9 of those block groups have a minority population that is meaningfully greater than the population of the ROI. Six block groups were identified as low-income populations.</p> <p>There are five block groups in Ventura County that are adjacent to SSFL. The Summit and Mountain View mobile home communities along Woolsey Canyon Road were specifically analyzed, as requested by local community members. This block group is 17 percent minority, which is below the average for the ROI and the county, and has a 0 percent poverty rate. None of the Ventura County block groups meets the criteria for minority or low-income populations and, as such, there is little or no potential for disproportionate impacts to minority and low-income populations living in proximity to SSFL.</p> <p>A further analysis was conducted on minority and low-income populations lying along the local roadway network used by trucks accessing SSFL. Overall, 33 block groups in the region of influence are adjacent to the truck routes and 13 block groups are near (not adjacent to but within 1 mile of) the truck routes. In assessing these, the block groups were assigned a potential environmental justice impact score based on their proximity to truck routes, percent minority population, percent poverty rate, etc. This assessment indicated that none of these block groups meets the criteria for minority or low-income populations and, as such, there is little potential for disproportionately high or adverse environmental justice effects related to increased truck traffic.</p>
Health and Safety	Moderate, negative, local, short term 	Moderate impacts to health and safety of onsite work crews would be expected from demolition and environmental cleanup activities. The potential for injury or exposure is broad and includes exposure to hazardous materials, safety hazards to utilities (gas and electric), physical hazards such as slips and falls or being struck by heavy equipment or debris, and natural hazards such as poison oak, stinging insects, and rattlesnakes. Additional health and safety factors might include dust generated from demolition activities, which potentially could expose workers to contaminated soil.
	Minor, beneficial, local, long term 	Removal of contaminated soil and improvement to groundwater from the Proposed Action would result in minor, beneficial impacts to future users of the site.
Site Infrastructure and Utilities	Minor, negative, local, short term 	The Proposed Action would result in a potential for impacts to potable water supply; systems that provide natural gas, sewer, and electrical service; and the communications system. Minor impacts are associated with the removal of natural gas and electrical infrastructure because of the inherent safety concerns with explosion, electrocution, and fire.

TABLE 2.1-1

Summary of Impacts for the Proposed Action*NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation*

Resource Area	Potential Impacts	Impact Descriptions
Noise	Minor, negative, local, short term 	The DEIS compared existing noise levels on NASA-administered property to estimated future noise levels associated with proposed demolition and environmental cleanup activities. Minor noise impacts would result from increased traffic volumes. Existing noise levels range from 52- to 61-decibel (A-weighted) (dBA) community noise equivalent level at a distance of 100 ft. An estimated 3,476 truck trips from demolition and between 16,800 and 26,000 additional trucks for excavation and disposal would result in an increase of 3-dBA change in noise levels along the designated truck routes at a distance of 100 ft. Under the Proposed Action, the frequency and duration of truck traffic would be measurably and noticeably higher than the existing conditions; as such, the overall increase in noise would be perceptible.
Hazardous and Nonhazardous Materials and Waste	Minor, negative, regional, long term 	Demolishing test stands, buildings, and ancillary structures on the NASA-administered property at SSFL would result in a minor impact by generating waste materials including hazardous wastes, nonhazardous wastes, mixed wastes, and/or other classifications with specific management or disposal requirements. NASA would characterize materials as hazardous or nonhazardous after demolition and before materials were loaded onto trucks or trailers for transport to an offsite approved waste facility. Among the soil cleanup technologies, excavation with offsite disposal is the only activity that would result in minor impacts for hazardous waste disposal facilities. The potential for the release of contamination during environmental cleanup activities would result in a minor impact.
<p>Notes:</p> <ul style="list-style-type: none"> ● or ■ = Significant ◐ or ◑ = Moderate ◒ or ◓ = Minor ○ or □ = Negligible ▽ = No impact <p>Circular symbols represent negative impacts while square symbols represent beneficial impacts, and the degree to which the symbol is filled represents the severity of the impact.</p>		

2.2 Potential Impacts of Alternative 1–Demolition, Soil Cleanup to Suburban Residential Cleanup Goals, and Groundwater Cleanup

The section describes the potential impacts to the resource area posed by Alternative 1. Table 2.2-1 lists the impacts by resource area and provides a description of the impact.

TABLE 2.2-1

Summary of Impacts for Alternative 1

NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation

Resource Area	Potential Impacts	Impact Descriptions
Soils, Landslide Potential, Topography, and Paleontological Resources	Significant, negative, regional, long term 	The impacts from installation and operation of remedial technologies associated with Alternative 1 on soils, landslide potential, topography, and paleontological resources would be the same as those listed for the Proposed Action. However, the total volume of soil to be removed is lower in this alternative than in the Proposed Action (an estimated 182,000 yd ³ under Alternative 1 compared to 500,000 yd ³ under the Proposed Action), but the potential for erosion effects remain significant.
Cultural Resources	Significant, negative, regional, long term <i>Adverse effect under Section 106</i> 	Alternative 1 calls for the demolition of historic structures on NASA-administered land at SSFL. Demolition would have a significant impact to all of the historic architectural resources. Historic architectural resources are the Alfa, Bravo, and Coca Test Area Historic Districts. These comprise 45 structures in total, of which 9 are individually eligible for listing in the NRHP and 36 are eligible as contributing resources to historic districts. The historic structures would be gone from the site. The analyses of soil and groundwater remediation technologies under the Proposed Action would be the same under Alternative 1. However, the proposed environmental cleanup activities potentially could be limited to avoid known archaeological areas; in addition, a small portion of the Alternative 1 remediation footprint overlaps with an area where known archaeological resources occur.
Biological Resources	Moderate, negative, regional, long term 	Direct impacts to biological resources would be proportional to the level of soil disturbance. Because the remediation footprint for Alternative 1 is approximately 18 acres as compared to the estimated 105-acre remediation footprint under the Proposed Action, the potential impacts to biological resources associated with Alternative 1 would be notably less than those under the Proposed Action, as follows: <ul style="list-style-type: none"> • Eight acres of Alternative 1 in natural habitat. The remaining 9 acres of disturbance (55 percent) would occur in non-natural habitat. • Most impacts on wildlife would result from loss of habitat or the use of large equipment and loud noises close to natural communities. Potential impacts to wildlife species would be similar to those of the Proposed Action, but the impacts would be less because of the reduced extent of activity. • Alternative 1 could affect up to 1 acre (total) of wetlands. However, mortality or any disturbance to a federally listed threatened or endangered species (Braunton's milkvetch, Least Bell's Vireo, California red-legged frog, Quino checkerspot butterfly, and fairy shrimp) identified near the ROI resulting from cleanup activities would result in a moderate impact under Alternative 1.
	Minor, beneficial, regional, long term 	Over time, the demolition would increase the amount of undeveloped, vegetated area and would have a moderate, beneficial impact on surrounding native vegetation through increased habitat availability, rainfall infiltration, and slow stormwater runoff.

TABLE 2.2-1

Summary of Impacts for Alternative 1*NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation*

Resource Area	Potential Impacts	Impact Descriptions
Traffic and Transportation	Moderate, negative, regional, long term 	The impacts from Alternative 1 would be similar to those discussed under the Proposed Action, with one distinction. Compared to the Proposed Action, the number of heavy vehicle trips required to haul soils offsite if all soils were to be removed by the end of 2017 under the excavation and offsite disposal approach would be approximately one third as many under Alternative 1 due to the decreased amount of excavation material. Some degradation of non-truck route roadways leading to the project site would still be expected. In some locations, this traffic might result in deteriorated pavement, which could affect comfort and pavement life, although the level of deterioration would be less than under the Proposed Action due to the decrease in excavated soils requiring offsite disposal. This alternative would result in a moderate impact.
Water Resources	Minor, negative, local, long term 	The types of impacts to surface water runoff and groundwater infiltration, groundwater quality, and surface water quality would be the same as under the Proposed Action, but the extent of the impacts would be less because excavation and/or treatment impacts would be less.
	Minor, beneficial, regional, long term 	Demolition would include the removal of structures up to 5 ft below grade; this removal would reduce the amount of impervious surface throughout the NASA-administered property at SSFL, resulting in a site that would be more similar to natural topographic and hydrologic conditions. Specifically, demolishing structures would allow for increased infiltration to groundwater, with a corresponding reduction in surface runoff. As a result, the impact on hydrology and drainage that could result from implementation of the proposed demolition activities would be minor and beneficial.
Air Quality and Greenhouse Gas Emissions	Minor, negative, regional, and short-term 	Criteria pollutant and GHG emissions from excavation and offsite disposal would not exceed the General Conformity <i>de minimis</i> threshold values and CEQ threshold, respectively. Because the Alternative 1 criteria pollutant emissions are, in some cases, close to the General Conformity <i>de minimis</i> threshold values and because GHG emissions are of the same order of magnitude as the CEQ threshold, the emissions resulting from excavation and offsite disposal would have a minor impact on air quality and climate change. The climate is not expected to be changed by Alternative 1 activities.
Environmental Justice	Minor, negative, local, and short term 	Proposed environmental cleanup activities would not be expected to cause disproportionate impacts to minority or low-income populations. The same potential impacts to the safety and health of children described under the Proposed Action would be anticipated for Alternative 1. Because Alternative 1 would require fewer trucks to remove excavated soils than would be required by the Proposed Action, the effects under Alternative 1 would be minor.
Health and Safety	Moderate, negative, local, short term 	Because the potential health and safety risks are common to each alternative, the potential moderate health and safety impacts that could result from the implementation and operation of remedial technologies under Alternative 1 would be the same as those described under the Proposed Action.
	Minor, beneficial, local, long term 	Removal of contaminated soil and improvement to groundwater from the Alternative 1 would result in minor, beneficial impacts to future users of the site.
Site Infrastructure and Utilities	Negligible, negative, local, short term 	Alternative 1 would result in a potential for impacts to potable water supply; systems that provide natural gas, sewer, and electrical service; and the communications system. Negligible impacts are associated with the removal of natural gas and electrical infrastructure under Alternative 1 because of the inherent safety concerns with explosion, electrocution, and fire and the smaller soil removal volumes as compared to the Proposed Action.

TABLE 2.2-1

Summary of Impacts for Alternative 1*NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation*

Resource Area	Potential Impacts	Impact Descriptions
Noise	Negligible, negative, local, short term 	The impacts under Alternative 1 would be similar to those discussed under the Proposed Action, with one distinction. Under Alternative 1, if all soils were removed by the excavation and offsite disposal approach, soil remediation activities would result in approximately one third of the offsite truck traffic analyzed under the Proposed Action. As a result, increases in traffic noise levels to above existing levels would be less than under the Proposed Action. The duration of activity could be reduced; however, it might still extend through the end of 2017 with a reduced truck frequency.
Hazardous and Nonhazardous Materials and Waste	Minor, negative, regional, long term 	The implementation and operation of the remediation technologies under Alternative 1 would have the same types of impacts as those identified for the Proposed Action due to the impact being minor. However, there would be a reduction in the following areas: <ul style="list-style-type: none"> • The volumes of waste materials and contaminated soils generated would be less than those generated under the Proposed Action. • Proportionally fewer trips would be required to transport waste materials, thus reducing the risk of potential releases due to human error. • The use of fuel, oils, and other lubricants onsite would be reduced. • The duration of remediation activities would be shorter, thus reducing the risk of potential releases of chemicals and exposure to fugitive dust.
<p>Notes:</p> <p>● or ■ = Significant</p> <p>◐ or ◑ = Moderate</p> <p>○ or ◒ = Minor</p> <p>○ or ◓ = Negligible</p> <p>▽ = No impact</p> <p>Circular symbols represent negative impacts while square symbols represent beneficial impacts, and the degree to which the symbol is filled represents the severity of the impact.</p>		

2.3 Potential Impacts of Alternative 2—Demolition, Soil Cleanup to Commercial/Industrial Cleanup Goals, and Groundwater Cleanup

The section describes the potential impacts to the resource area posed by Alternative 2. Table 2.3-1 lists the impacts by resource area and provides a description of the impact.

TABLE 2.3-1

Summary of Impacts for Alternative 2

NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation

Resource Area	Potential Impacts	Impact Descriptions
Soils, Landslide Potential, Topography, and Paleontological Resources	Significant, negative, regional, long term ●	The nature of the impacts associated with the installation and operation of remedial technologies associated with Alternative 2 on soils, landslide potential, topography, and paleontological resources would generally be the same as those listed for the Proposed Action and Alternative 1. However, the total volume of soil to be removed is lower in this alternative than in the Proposed Action or in Alternative 1 (an estimated 92,000 yd ³ under Alternative 2 compared to 500,000 yd ³ under the Proposed Action and 182,000 yd ³ under Alternative 1), but the potential for erosion effects remain significant.
Cultural Resources	Significant, negative, regional, long term <i>Adverse effect under Section 106</i> ●	Alternative 2 calls for the demolition of historic structures on NASA-administered land at SSFL. Demolition would have a significant impact to all of the historic architectural resources. Historic architectural resources are the Alfa, Bravo, and Coca Test Area Historic Districts. These comprise 45 structures in total, of which 9 are individually eligible for listing in the NRHP and 36 are eligible as contributing resources to historic districts. The historic structures would be gone from the site. Proposed environmental cleanup activities potentially could avoid known archaeological areas; however, a small portion of the Alternative 2 remediation footprint overlaps with an area where known archaeological resources occur.
Biological Resources	Minor, negative, regional, long term ○	The footprint for Alternative 2 is approximately 10 acres as compared to the 105-acre remediation footprint under the Proposed Action. Because the level of cleanup activities would be less under Alternative 2, the potential direct impacts to biological resources would be less than those under the Proposed Action and Alternative 1, as follows: <ul style="list-style-type: none"> • Five acres of the Alternative 2 area are located within natural habitat, with the remaining 5 acres in non-natural habitat. • The direct impacts would be similar to those discussed under Alternative 1; however, the impacts would be less because of the reduced extent of activity. • Alternative 2 could affect up to 0.81 acre (total) of wetlands. However, mortality or any disturbance to a federally listed threatened or endangered species (Braunton's milkvetch, Least Bell's Vireo, California red-legged frog, Quino checkerspot butterfly, and fairy shrimp) identified near the ROI resulting from cleanup activities would result in a minor impact under Alternative 2.
	Minor, beneficial, regional, long term ◻	Over time, the demolition would increase the amount of undeveloped, vegetated area and would have a moderate, beneficial impact on surrounding native vegetation through increased habitat availability, rainfall infiltration, and slow stormwater runoff.

TABLE 2.3-1
Summary of Impacts for Alternative 2
NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation

Resource Area	Potential Impacts	Impact Descriptions
Traffic and Transportation	Moderate, negative, regional, long term ●	The impacts from Alternative 2 would be similar to those discussed under the Proposed Action and Alternative 1; however, the number of heavy vehicles trips required to haul soils offsite under Alternative 2, if all soils were to be removed by the end of 2017 under the excavation and offsite disposal approach, would be approximately one half as many as under Alternative 1 and one-sixth of those under the Proposed Action, due to the decreased amount of excavation material. Some degradation of non-truck route roadways leading to the project site still would be expected; however, it would be measurably less than that under the Proposed Action or Alternative 1.
Water Resources	Minor, negative, local, long term ○	The types of impacts to surface water runoff and groundwater infiltration, groundwater quality, and surface water quality would be the same as under the Proposed Action, but the extent of the impacts would be less because excavation and/or treatment impacts would be less.
	Minor, beneficial, regional, long term ■	Demolition would include the removal of structures up to 5 ft below grade; this removal would reduce the amount of impervious surface throughout the NASA-administered property at SSFL, resulting in a site that would be more similar to natural topographic and hydrologic conditions. Specifically, demolishing structures would allow for increased infiltration to groundwater, with a corresponding reduction in surface runoff. As a result, the impact on hydrology and drainage that could result from implementation of the proposed demolition activities would be minor and beneficial.
Air Quality and Greenhouse Gas Emissions	Minor, negative, regional, and short-term ○	Criteria pollutant and GHG emissions from excavation and offsite disposal would not exceed the General Conformity <i>de minimis</i> threshold values and CEQ threshold, respectively. Because the Alternative 2 criteria pollutant emissions are, in some cases, close to the General Conformity <i>de minimis</i> threshold values and because GHG emissions are of the same order of magnitude as the CEQ threshold, the emissions resulting from excavation and offsite disposal would have a minor impact on air quality and climate change. The climate is not expected to be changed by Alternative 2 activities.
Environmental Justice	Minor, negative, local, and short term ○	Proposed environmental cleanup activities would not be expected to result in disproportionate impacts to minority or low-income populations. The same potential impacts to the safety and health of children described under the Proposed Action would be anticipated for Alternative 2; however, the effect would be less, because Alternative 2 would require fewer trucks to remove excavated soils and provide backfill than would the Proposed Action.
Health and Safety	Moderate, negative, local, short term ●	Because the potential health and safety risks are common to each alternative, the potential moderate health and safety impacts that could result from the implementation and operation of remedial technologies under Alternative 2 would be the same as those described under the Proposed Action.
	Minor, beneficial, local, long term ■	Removal of contaminated soil and improvement to groundwater from the Proposed Action would result in minor, beneficial impacts to future users of the site.
Site Infrastructure and Utilities	Negligible, negative, local, short term ○	Alternative 2 would result in a potential for impacts to potable water supply; systems that provide natural gas, sewer, and electrical service; and the communications system. Negligible impacts are associated with the removal of natural gas and electrical infrastructure under Alternative 2 because of the inherent safety concerns with explosion, electrocution, and fire and the smaller soil removal volumes as compared to the Proposed Action.

TABLE 2.3-1

Summary of Impacts for Alternative 2*NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation*

Resource Area	Potential Impacts	Impact Descriptions
Noise	Negligible, negative, local, short term 	The impacts under Alternative 2 would be similar to those discussed under the Proposed Action and Alternative 1. However, under Alternative 2 if all soils were removed by the excavation and offsite disposal approach, soil remediation activities would result in approximately half of the offsite truck traffic required under Alternative 1. As a result, increases in traffic noise levels to above existing levels would be less than those discussed under the Proposed Action and Alternative 1.
Hazardous and Nonhazardous Materials and Waste	Minor, negative, regional, long term 	The implementation and operation of the remediation technologies under Alternative 2 would have the same types of impacts as those identified for the Proposed Action due to the impact being minor. However, there would be a reduction in the following areas as compared to the Proposed Action or Alternative 1: <ul style="list-style-type: none"> • The volumes of waste materials and contaminated soils generated would be less than those generated under the Proposed Action. • Proportionally fewer trips would be required to transport waste materials, thus reducing the risk of potential releases due to human error. • The use of fuel, oils, and other lubricants onsite would be reduced. • The duration of remediation activities would be shorter, thus reducing the risk of potential releases of chemicals and exposure to fugitive dust.
<p>Notes:</p> <p>● or ■ = Significant</p> <p>◐ or ◑ = Moderate</p> <p>○ or ◒ = Minor</p> <p>○ or ◓ = Negligible</p> <p>▽ = No impact</p> <p>Circular symbols represent negative impacts while square symbols represent beneficial impacts, and the degree to which the symbol is filled represents the severity of the impact.</p>		

2.4 Potential Impacts of Alternative 3—Demolition, Soil Cleanup to Recreational Cleanup Goals, and Groundwater Cleanup

The section describes the potential impacts to the resource area posed by Alternative 3. Table 2.4-1 lists the impacts by resource area and provides a description of the impact.

TABLE 2.4-1

Summary of Impacts for Alternative 3

NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation

Resource Area	Potential Impacts	Impact Descriptions
Soils, Landslide Potential, Topography, and Paleontological Resources	Significant, negative, regional, long term ●	The nature of the impacts associated with the installation and operation of remedial technologies associated with Alternative 3 on soils, landslide potential, topography, and paleontological resources would generally be the same as those listed for the Proposed Action, Alternative 1, and Alternative 2. However, the total volume of soil to be removed is lower in this alternative than in the Proposed Action and in Alternatives 1 and 2 (an estimated 58,000 yd ³ under Alternative 3 compared to 500,000 yd ³ under the Proposed Action, 182,000 yd ³ under Alternative 1, and 92,000 yd ³ under Alternative 2), but the potential for erosion effects remain significant.
Cultural Resources	Significant, negative, regional, long term <i>Adverse effect under Section 106</i> ●	Alternative 3 calls for the demolition of historic structures on NASA-administered land at SSFL. Demolition would have a significant impact to all of the historic architectural resources. Historic architectural resources are the Alfa, Bravo, and Coca Test Area Historic Districts. These comprise 45 structures in total, of which 9 are individually eligible for listing in the NRHP and 36 are eligible as contributing resources to historic districts. The historic structures would be gone from the site. Proposed environmental cleanup activities would avoid known archaeological areas; there would be no impact on archaeological resources under NEPA and no significant archaeological properties would be affected under Section 106.
Biological Resources	Minor, negative, regional, long term ○	The footprint for Alternative 3 is approximately 6 acres as compared to the 105-acre remediation footprint under the Proposed Action. Because the level of cleanup activities would be less under Alternative 3, the potential direct impacts to biological resources would be less than those under the Proposed Action and Alternatives 1 and 2, as follows: <ul style="list-style-type: none"> • The Alternative 3 area contains 3 acres located within natural habitats and 3 acres where disturbance would occur in non-natural habitats. • The direct impacts would be similar but less than those discussed under the other alternatives. • Alternative 3 could affect up to 0.79 acre (total) of wetlands. However, mortality or any disturbance to a federally listed threatened or endangered species (Braunton's milkvetch, Least Bell's Vireo, California red-legged frog, Quino checkerspot butterfly, and fairy shrimp) identified near the ROI resulting from cleanup activities would result in a minor impact for Alternative 3.
	Minor, beneficial, regional, long term ◻	Over time, the demolition would increase the amount of undeveloped, vegetated area and would have a moderate, beneficial impact on surrounding native vegetation through increased habitat availability, rainfall infiltration, and slow stormwater runoff.

TABLE 2.4-1
Summary of Impacts for Alternative 3
NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation

Resource Area	Potential Impacts	Impact Descriptions
Traffic and Transportation	Moderate, negative, regional, long term 	The impacts from Alternative 3 would be similar to those discussed under the Proposed Action and Alternatives 1 and 2; however, the number of heavy vehicle trips required to haul soils offsite under Alternative 3, if all soils were to be removed by the end of 2017 under the excavation and offsite disposal approach, would be approximately 60 percent of that under Alternative 2 and 9 percent of that under the Proposed Action due to the decreased amount of excavation material. Some degradation of non-truck route roadways leading to the project site still would be expected; however, it would be measurably less than that under the previous alternatives.
Water Resources	Minor, negative, local, long term 	The types of impacts to surface water runoff and groundwater infiltration, groundwater quality, and surface water quality would be the same as under the Proposed Action, but the extent of the impacts would be less because excavation and/or treatment impacts would be less.
	Minor, beneficial, regional, long term 	Demolition would include the removal of structures up to 5 ft below grade; this removal would reduce the amount of impervious surface throughout the NASA-administered property at SSFL, resulting in a site that would be more similar to natural topographic and hydrologic conditions. Specifically, demolishing structures would allow for increased infiltration to groundwater, with a corresponding reduction in surface runoff. As a result, the impact on hydrology and drainage that could result from implementation of the proposed demolition activities would be minor and beneficial.
Air Quality and Greenhouse Gas Emissions	Minor, negative, regional, and short-term 	Criteria pollutant and GHG emissions from excavation and offsite disposal would not exceed the General Conformity <i>de minimis</i> threshold values and CEQ threshold, respectively. Because the Alternative 3 criteria pollutant emissions are, in some cases, close to the General Conformity <i>de minimis</i> threshold values and because GHG emissions are of the same order of magnitude as the CEQ threshold, the emissions resulting from excavation and offsite disposal would have a minor impact on air quality and climate change. The climate is not expected to be changed by Alternative 3 activities.
Environmental Justice	Minor, negative, local, and short term 	Proposed environmental cleanup activities would not be expected to result in disproportionate impacts to minority or low-income populations. The same potential impacts to the safety and health of children described under the Proposed Action would be anticipated for Alternative 3; however, the effect would be less, because Alternative 3 would require fewer trucks to remove excavated soils and provide backfill than would the Proposed Action.
Health and Safety	Moderate, negative, local, short term 	Because the potential health and safety risks are common to each alternative, the potential moderate health and safety impacts that could result from the implementation and operation of remedial technologies under Alternative 3 would be the same as those described under the Proposed Action.
	Minor, beneficial, local, long term 	Removal of contaminated soil and improvement to groundwater from the Proposed Action would result in minor, beneficial impacts to future users of the site.
Site Infrastructure and Utilities	Negligible, negative, local, short term 	Alternative 3 would result in a potential for impacts to potable water supply; systems that provide natural gas, sewer, and electrical service; and the communications system. Negligible impacts are associated with the removal of natural gas and electrical infrastructure under Alternative 3 because of the inherent safety concerns with explosion, electrocution, and fire and the smaller soil removal volumes as compared to the Proposed Action.

TABLE 2.4-1

Summary of Impacts for Alternative 3*NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation*

Resource Area	Potential Impacts	Impact Descriptions
Noise	Negligible, negative, local, short term ○	The impacts under Alternative 3 would be similar to those discussed under the Proposed Action and Alternatives 1 and 2. However, under Alternative 3 if all soils were removed by the excavation and offsite disposal approach, soil remediation activities would result in the least amount of offsite truck traffic among the alternatives. As a result, increases in traffic noise levels above existing levels would be less under the Proposed Action and Alternatives 1 and 2.
Hazardous and Nonhazardous Materials and Waste	Minor, negative, regional, long term ○	The implementation and operation of the remediation technologies under Alternative 3 would have the same types of impacts as those identified for the Proposed Action due to the impact being minor. However, there would be a reduction in the following areas as compared to the Proposed Action or Alternatives 1 or 2: <ul style="list-style-type: none"> • The volumes of waste materials and contaminated soils generated would be less than those generated under the Proposed Action. • Proportionally fewer trips would be required to transport waste materials, thus reducing the risk of potential releases due to human error. • The use of fuel, oils, and other lubricants onsite would be reduced. • The duration of remediation activities would be shorter, thus reducing the risk of potential releases of chemicals and exposure to fugitive dust.
<p>Notes:</p> <p>● or ■ = Significant</p> <p>◐ or ◑ = Moderate</p> <p>○ or ◒ = Minor</p> <p>○ or ◓ = Negligible</p> <p>▽ = No impact</p> <p>Circular symbols represent negative impacts while square symbols represent beneficial impacts, and the degree to which the symbol is filled represents the severity of the impact.</p>		

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SECTION 3

Proposed Action and Alternatives Environmental Consequence Comparisons

Table 3.1-1 provides a comparison of the impacts of the Proposed Action the three alternatives.

TABLE 3.1-1

Summary of Impacts for the Proposed Action and Alternatives Eliminated from Further Evaluation

NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation

Resource Area	Proposed Action and Alternatives Eliminated from Further Evaluation			
	Proposed Action	Alternative 1	Alternative 2	Alternative 3
Soils, Landslide Potential, Topography, and Paleontological Resources	Significant, negative, regional, long term ●			
Cultural Resources	Significant, negative, regional, long term <i>Adverse effect under Section 106</i> ●	Significant, negative, regional, long term <i>Adverse effect under Section 106</i> ●	Significant, negative, regional, long term <i>Adverse effect under Section 106</i> ●	Significant, negative, regional, long term <i>Adverse effect under Section 106</i> ●
Biological Resources	Significant, negative, regional, long term ●	Moderate, negative, regional, long term ○	Minor, negative, regional, long term ○	Minor, negative, regional, long term ○
	Minor, beneficial, regional, long term □			
Traffic and Transportation	Significant, negative, regional, long term ●	Moderate, negative, regional, long term ○	Moderate, negative, regional, long term ○	Moderate, negative, regional, long term ○
Water Resources	Moderate, negative, local, long term ○	Minor, negative, local, long term ○	Minor, negative, local, long term ○	Minor, negative, local, long term ○
	Moderate, beneficial, regional, long term □			
Air Quality and Greenhouse Gas Emissions	Moderate, negative, regional, short term ○	Minor, negative, regional, and short-term ○	Minor, negative, regional, and short-term ○	Minor, negative, regional, and short-term ○
Environmental Justice	Moderate, negative, local, short term ○	Minor, negative, local, and short term ○	Minor, negative, local, and short term ○	Minor, negative, local, and short term ○

TABLE 3.1-1

Summary of Impacts for the Proposed Action and Alternatives Eliminated from Further Evaluation*NASA SSFL EIS Summary of Alternatives Eliminated from Further Evaluation*

Resource Area	Proposed Action and Alternatives Eliminated from Further Evaluation			
	Proposed Action	Alternative 1	Alternative 2	Alternative 3
Health and Safety	Moderate, negative, local, short term ●	Moderate, negative, local, short term ●	Moderate, negative, local, short term ●	Moderate, negative, local, short term ●
	Minor, beneficial, local, long term ■	Minor, beneficial, local, long term ■	Minor, beneficial, local, long term ■	Minor, beneficial, local, long term ■
Site Infrastructure and Utilities	Minor, negative, local, short term ○	Negligible, negative, local, short term ○	Negligible, negative, local, short term ○	Negligible, negative, local, short term ○
Noise	Minor, negative, local, short term ○	Negligible, negative, local, short term ○	Negligible, negative, local, short term ○	Negligible, negative, local, short term ○
Hazardous and Nonhazardous Materials and Waste	Minor, negative, regional, long term ○	Minor, negative, regional, long term ○	Minor, negative, regional, long term ○	Minor, negative, regional, long term ○
<p>Notes:</p> <p>● or ■ = Significant</p> <p>● or ■ = Moderate</p> <p>○ or □ = Minor</p> <p>○ or □ = Negligible</p> <p>▽ = No impact</p> <p>Circular symbols represent negative impacts while square symbols represent beneficial impacts, and the degree to which the symbol is filled represents the severity of the impact.</p>				