- **NASA COMMUNITY INFORMATIONAL UPDATE ON THE**
- **ENVIRONMENTAL IMPACT STATEMENT**
- **SANTA SUSANA FIELD LAB (SSFL)**
- 6:00 Doors Open; Sign-in and Review Displays/handouts; Talk with NASA experts
- 6:45 Welcome, Introductions (Fellows)
- Facilitator (Santos)
- Amy Keith – General EIS process; next steps; timeline
- Allen Elliott – How Impacts are Assessed
- Jason Glasgow – Potential Remediation Technologies
- 7:45 Facilitated Questions and Answers on presentations and Review Displays
- 8:30 Meeting ends

Welcome to the NASA Information Meeting

Santa Susana Field Laboratory

National Environmental Policy Act

Environmental Impact Statement

Amy Keith, NASA EIS Project Manager

EIS Process

NASA Proposes Cleanup and Demolition

→

Notice of Intent (NOI)

Published July 6

Describe Action

Describe Scoping

Introduce Contacts

→

Scoping

Participate with other agencies and the public

Official Comment Period –Sept. 17

→

Environmental Analysis

Biological Survey

Archeological Survey

Wetlands Delineation

Air, Transportation, Other Studies

↓

Prepare Draft EIS

→

Review Draft EIS

Notice of Availability (NOA)

Comment Period

Public Meeting

→

Prepare Final EIS

→

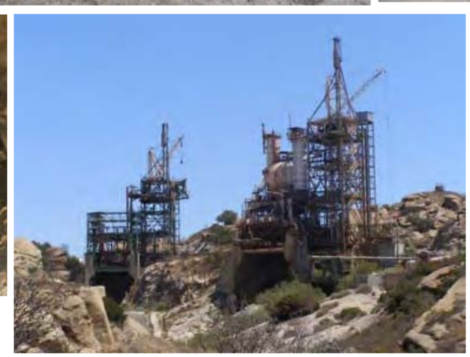
Record of Decision (ROD)

National Aeronautics and Space Administration

NASA’s Environmental Impact Statement (EIS) Process







Basic Elements Within an EIS

Proposed Action

Environmental Resources

Evaluate potential **Impacts**

Basic Elements Within an EIS

Proposed Action

Environmental Resources

Evaluate potential **Impacts**

Proposed Action and Alternatives

- Proposed Action– Demolition, Soil Cleanup to Background Levels, Groundwater Cleanup
- Alternative 1−Demolition, Soil Cleanup to Suburban Residential Cleanup Goals, Groundwater Cleanup
- Alternative 2−Demolition, Soil Cleanup to Commercial/Industrial Cleanup Goals, Groundwater Cleanup
- Alternative 3−Demolition, Soil Cleanup to Recreational Cleanup Goals, Groundwater Cleanup
- No Action Alternative

Technical Approaches Being Considered

Soil Cleanup

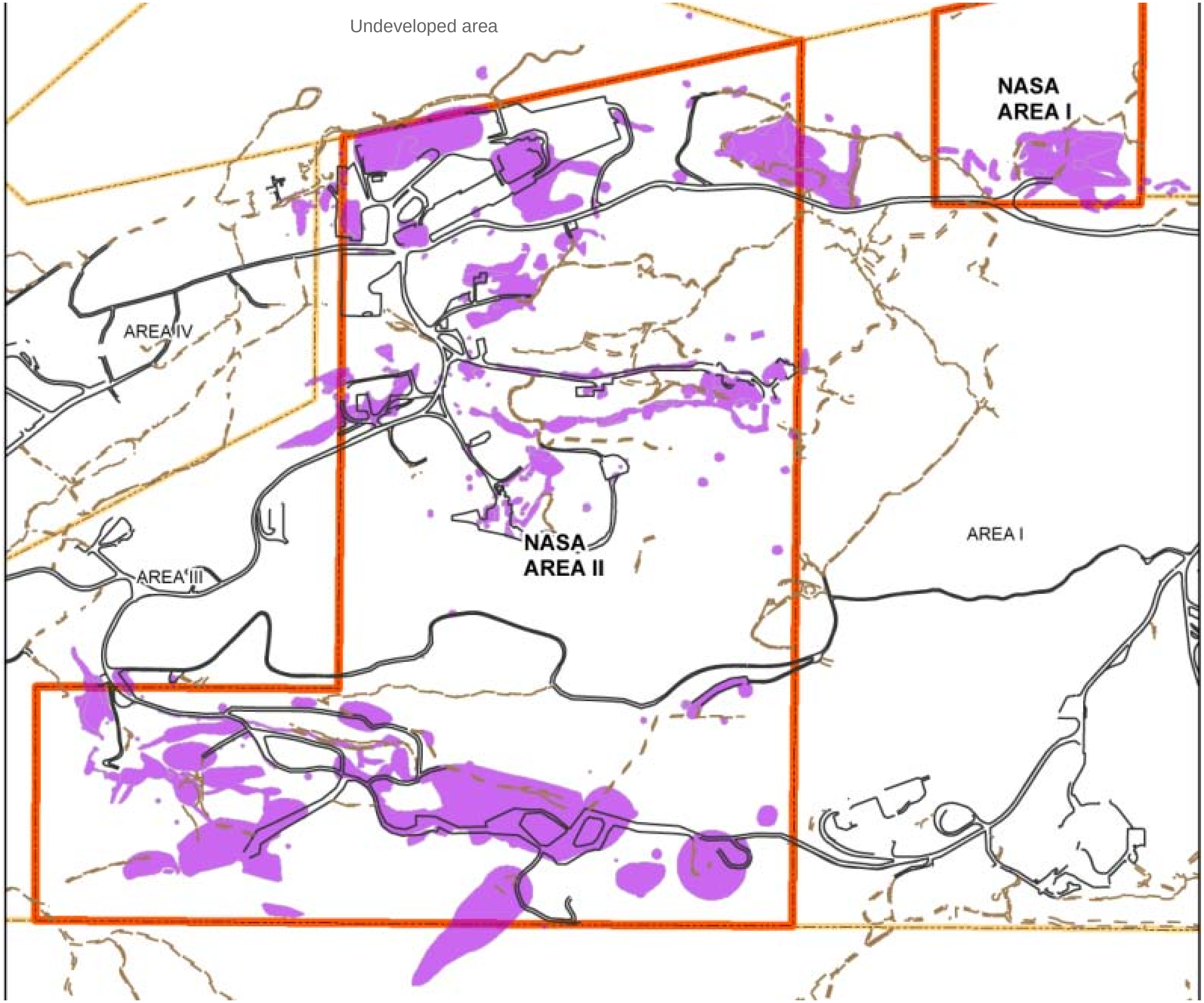
1. Excavation and offsite disposal
2. Excavation, onsite landfilling, and encapsulation
3. Soil vapor extraction
4. Ex situ treatment using land farming
5. Ex situ treatment using thermal desorption
6. In situ physical treatment using soil mixing
7. In situ chemical oxidation or reduction
8. In situ anaerobic or aerobic biological treatment
9. Phytoremediation
10. Monitored natural attenuation

Groundwater Cleanup

1. Pump and treat
2. Vacuum extraction
3. Iron particle injection
4. Heat-driven extraction
5. In situ chemical oxidation
6. In situ enhanced bioremediation
7. Monitored natural attenuation

National Aeronautics and Space Administration

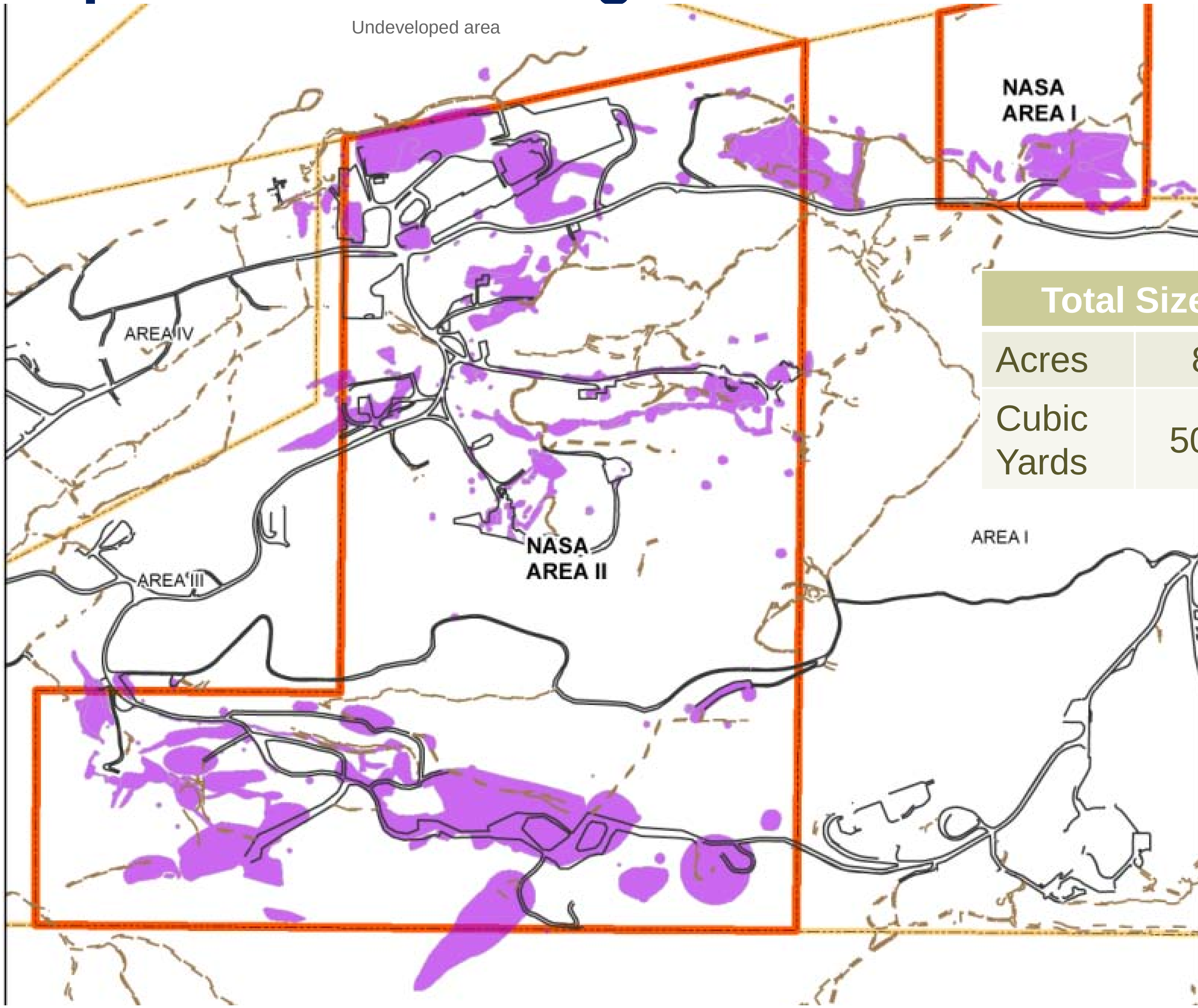
Cleanup Areas for Background



What is the basis for the cleanup areas ?

- Same as Preliminary Remediation Areas (PRAs) from the Field Sampling Plans
  - Analytical Data – Contaminant concentration levels from field sampling
  - Comparison values – Latest laboratory reporting limits (RLs) or 2005 background data for proposed alternative; respective risk calculations from the Draft Remedial Investigation (RI) Reports for Alternatives 1, 2, and 3
- Compare Analytical Data to Comparison Values
- Produce a Map Showing Areas

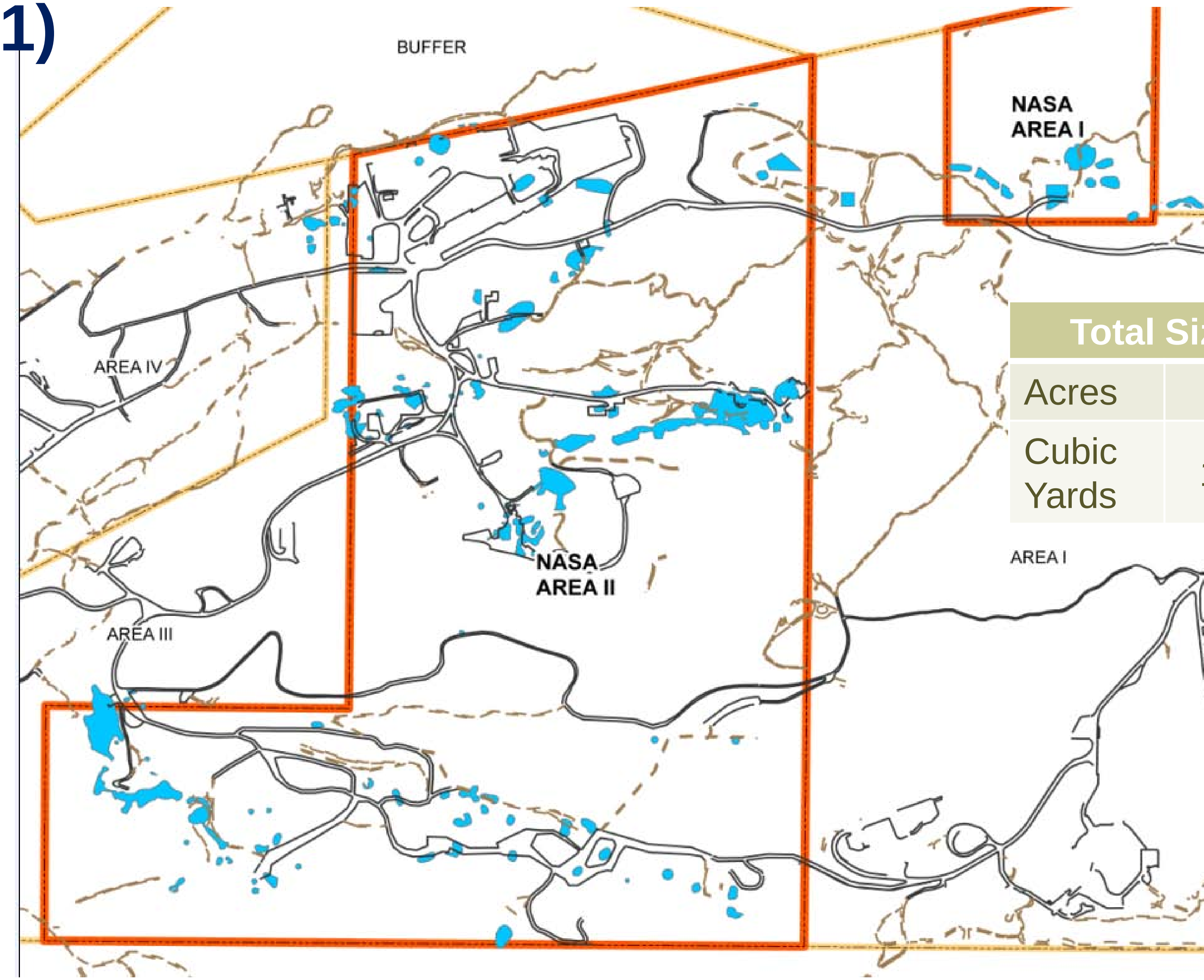
Cleanup Areas for Background



Total Sizes	
Acres	85
Cubic Yards	502K

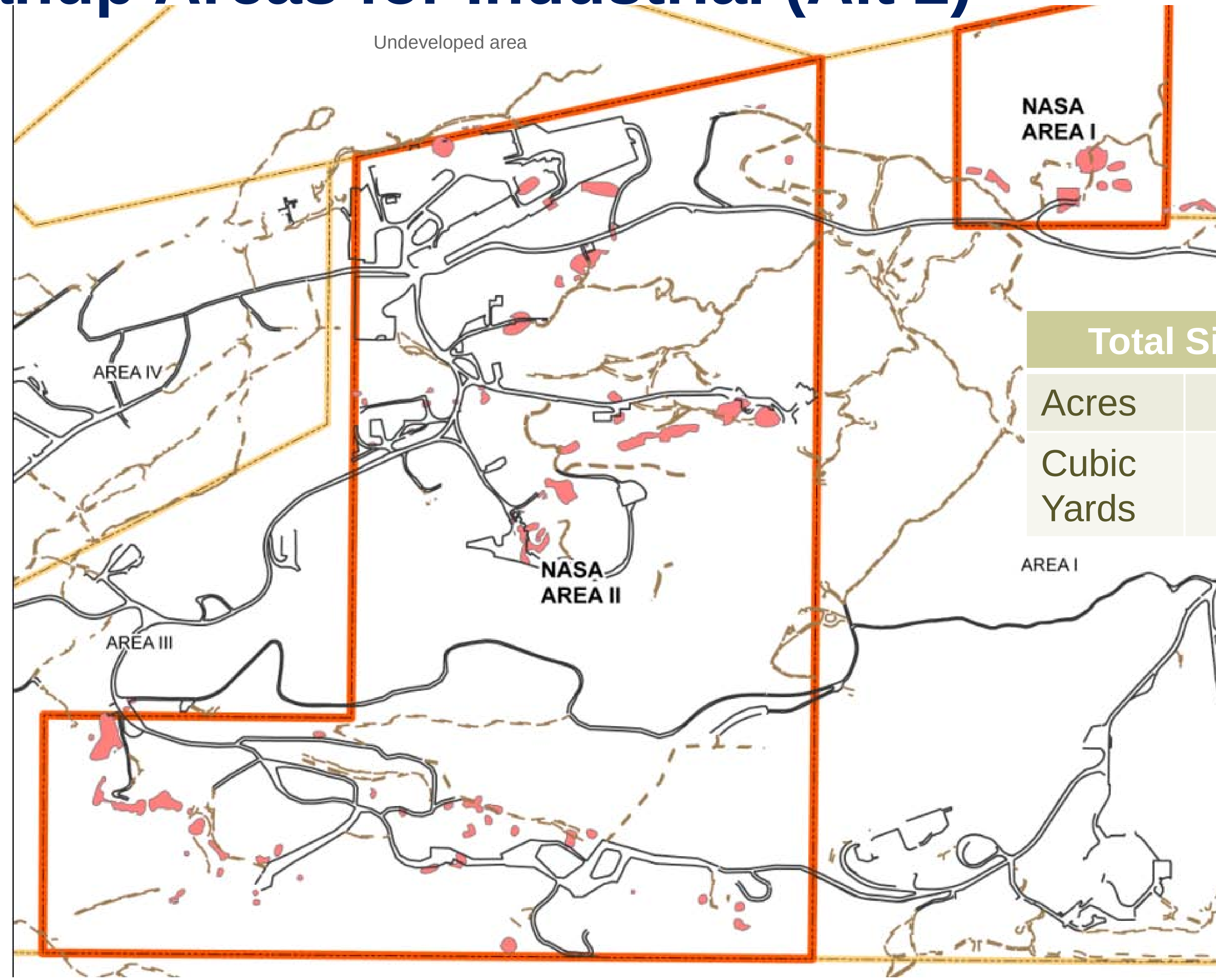
National Aeronautics and Space Administration

Cleanup Areas for Suburban Residential (Alt 1)



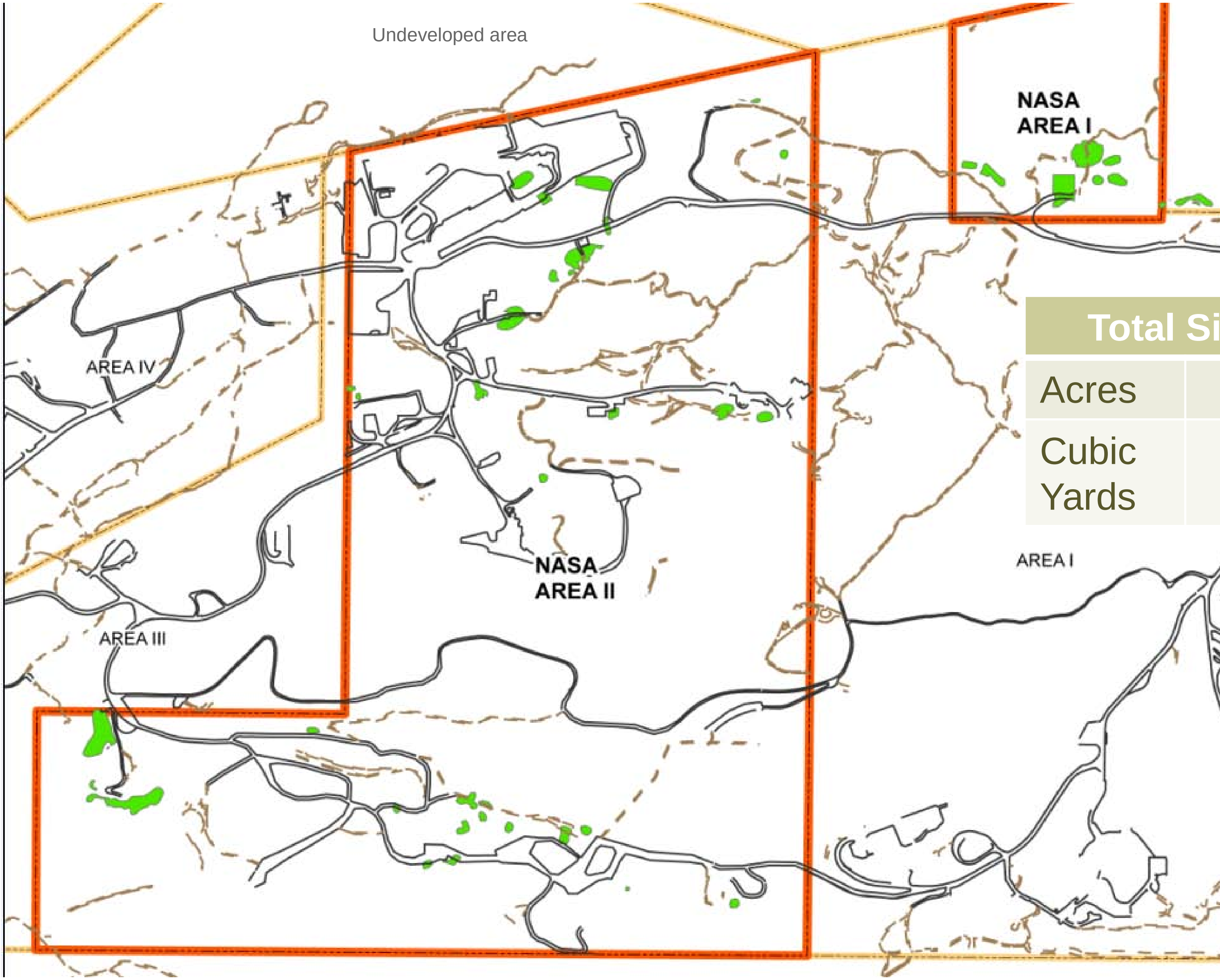
Total Sizes	
Acres	18
Cubic Yards	182K

Cleanup Areas for Industrial (Alt 2)



Total Sizes	
Acres	10
Cubic Yards	92K

Cleanup Area for Recreational (Alt 3)



Total Sizes	
Acres	6
Cubic Yards	58K

Basic Elements Within an EIS

Proposed Action

Environmental Resources

Evaluate potential **Impacts**

List of Resources to Evaluate

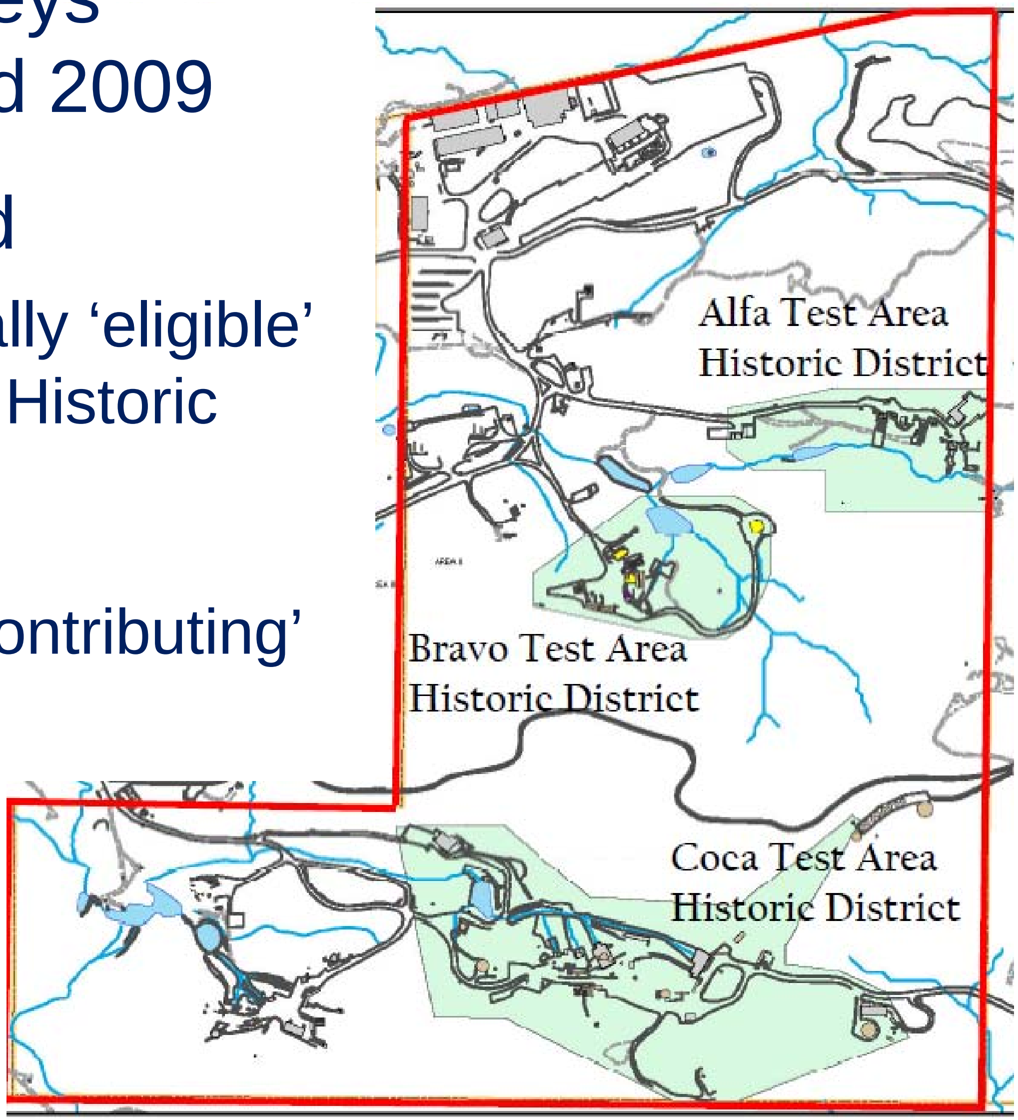
NEPA requires federal agencies to consider environmental effects that include, among others, impacts on social, cultural, and economic resources, as well as natural resources.

- Air Quality
- Biological Resources
- Cultural, Historic, and Archaeological
- Environmental Justice
- Geological Resources
- Greenhouse Gas
- Hazardous Materials / Hazardous Waste
- Health and Safety
- Infrastructure and Utilities
- Land Use
- Noise
- Paleontology
- Socioeconomics
- Transportation
- Water Resources

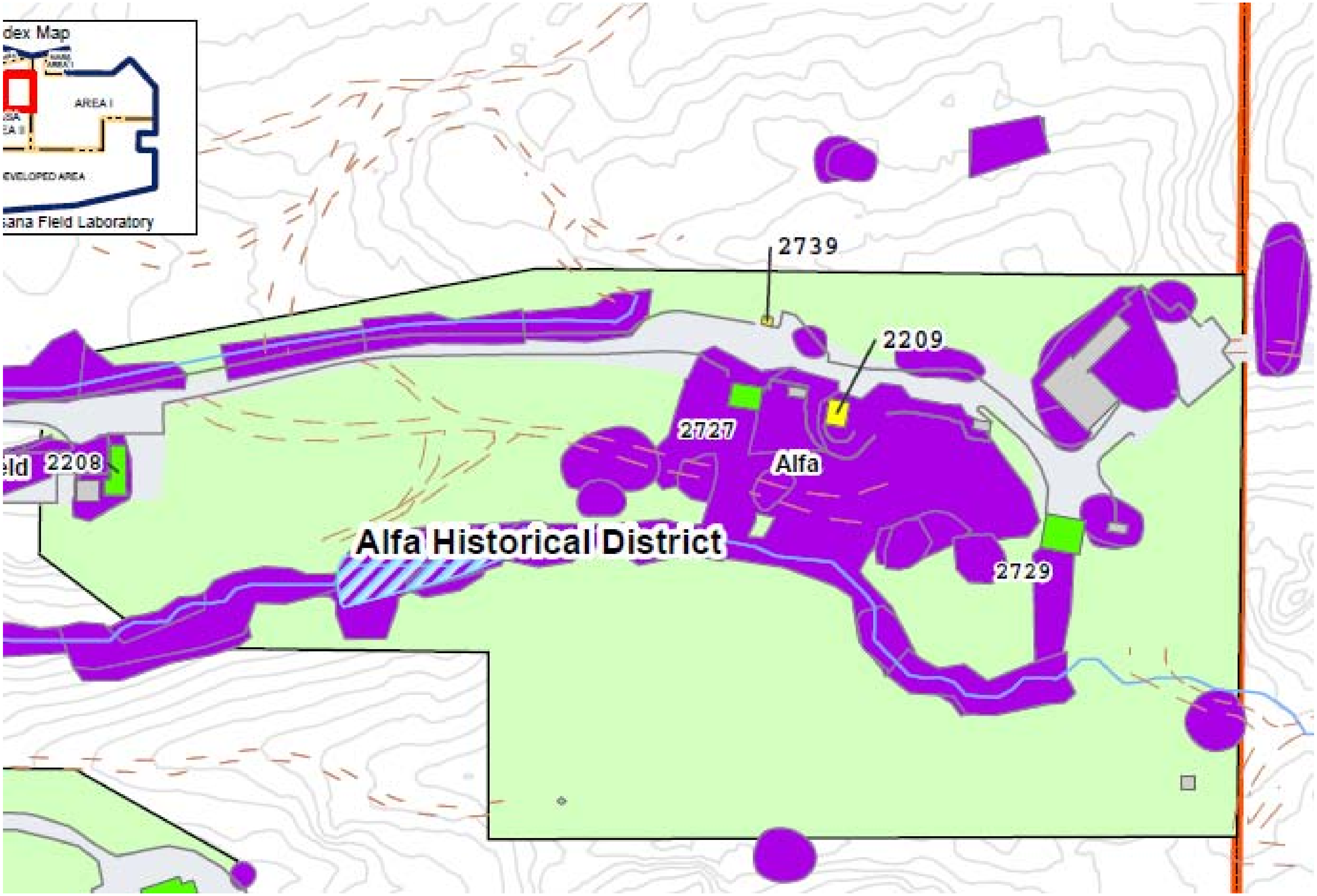
Historic Properties on Area II

Two Historic/Structural surveys were performed in 2007 and 2009

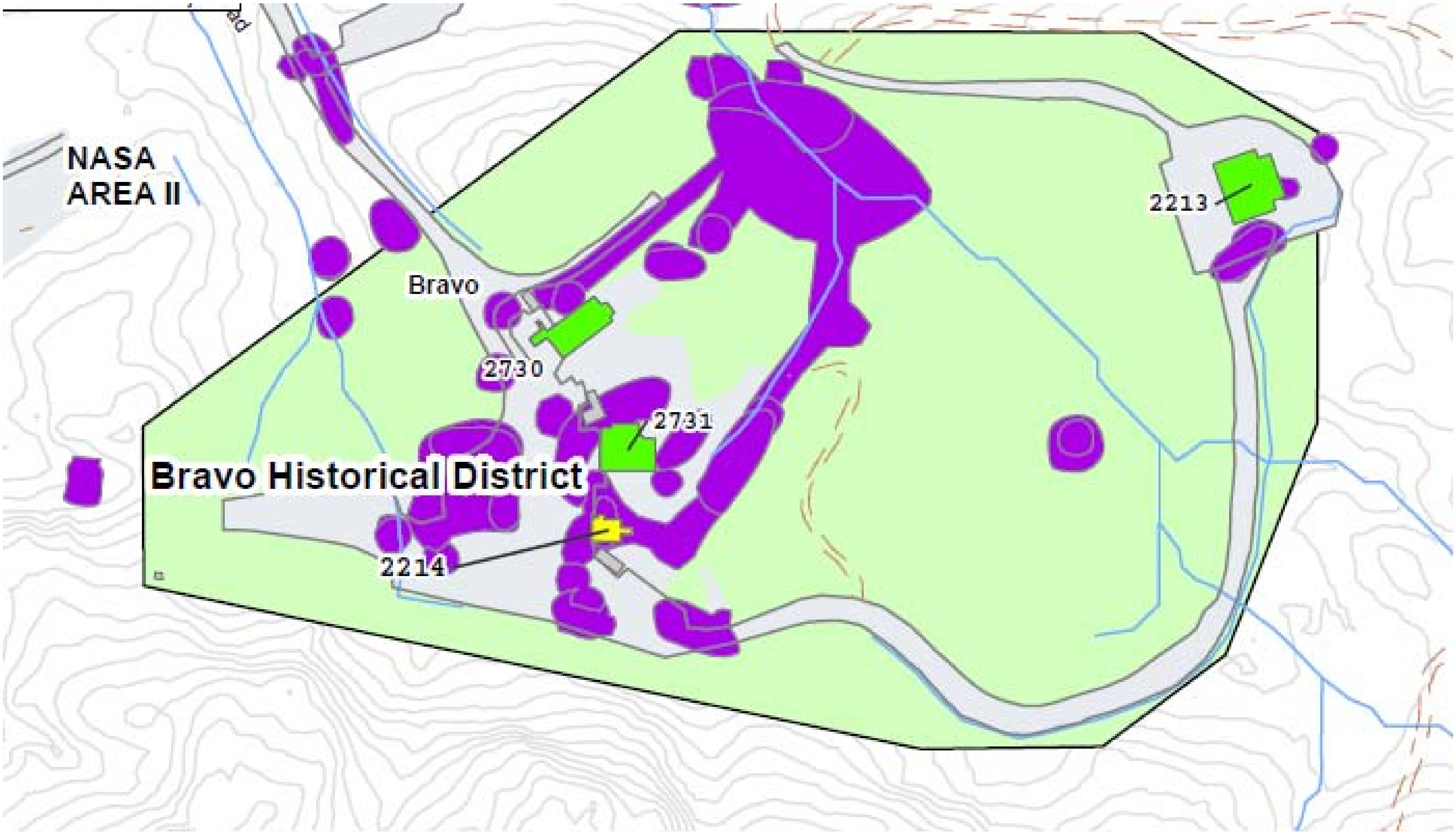
- 3 historic districts identified
  - 9 structures found individually 'eligible' for the National Register of Historic Places (NRHP)
  - 27 structures considered 'contributing' to the historic districts



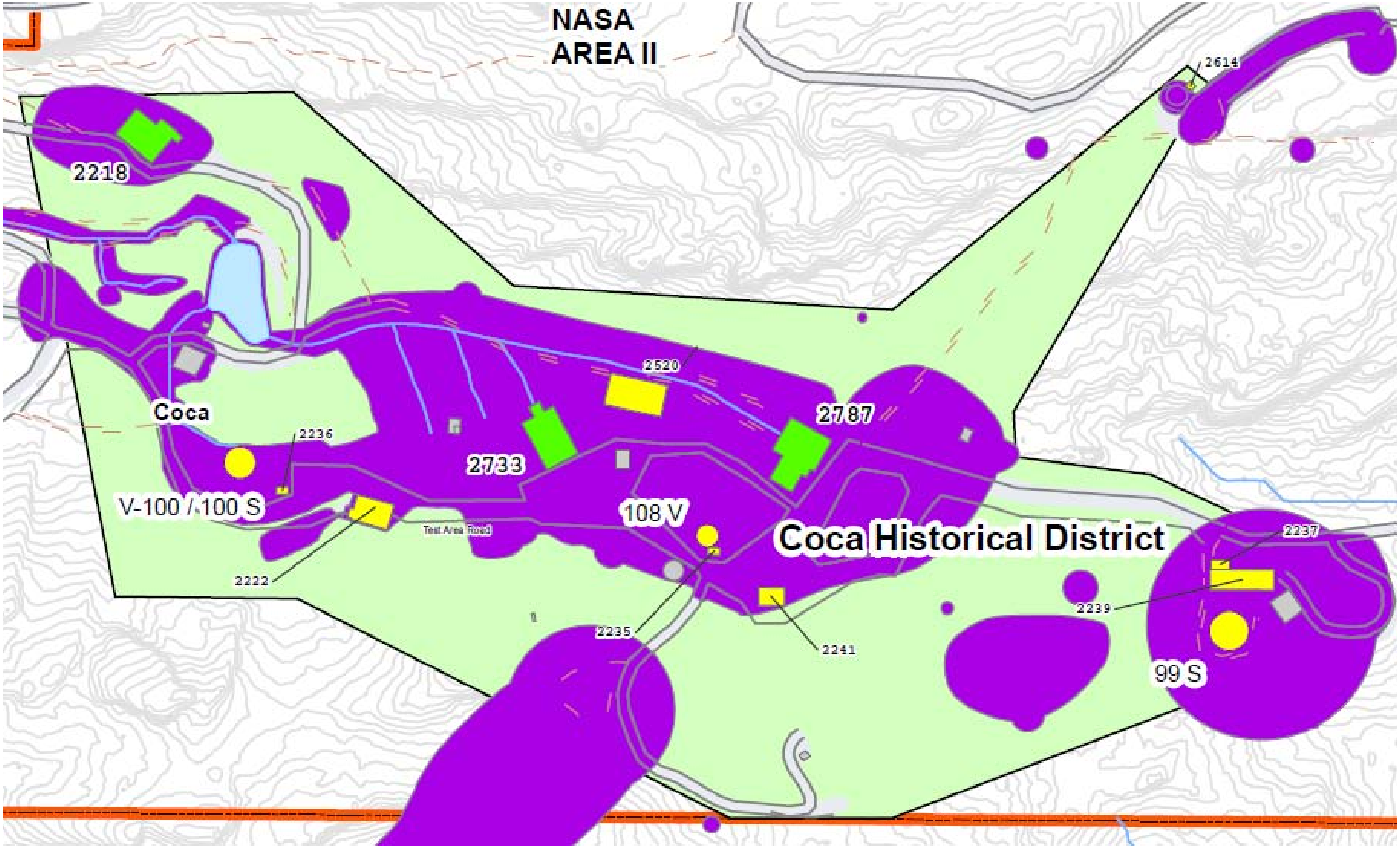
Alfa District



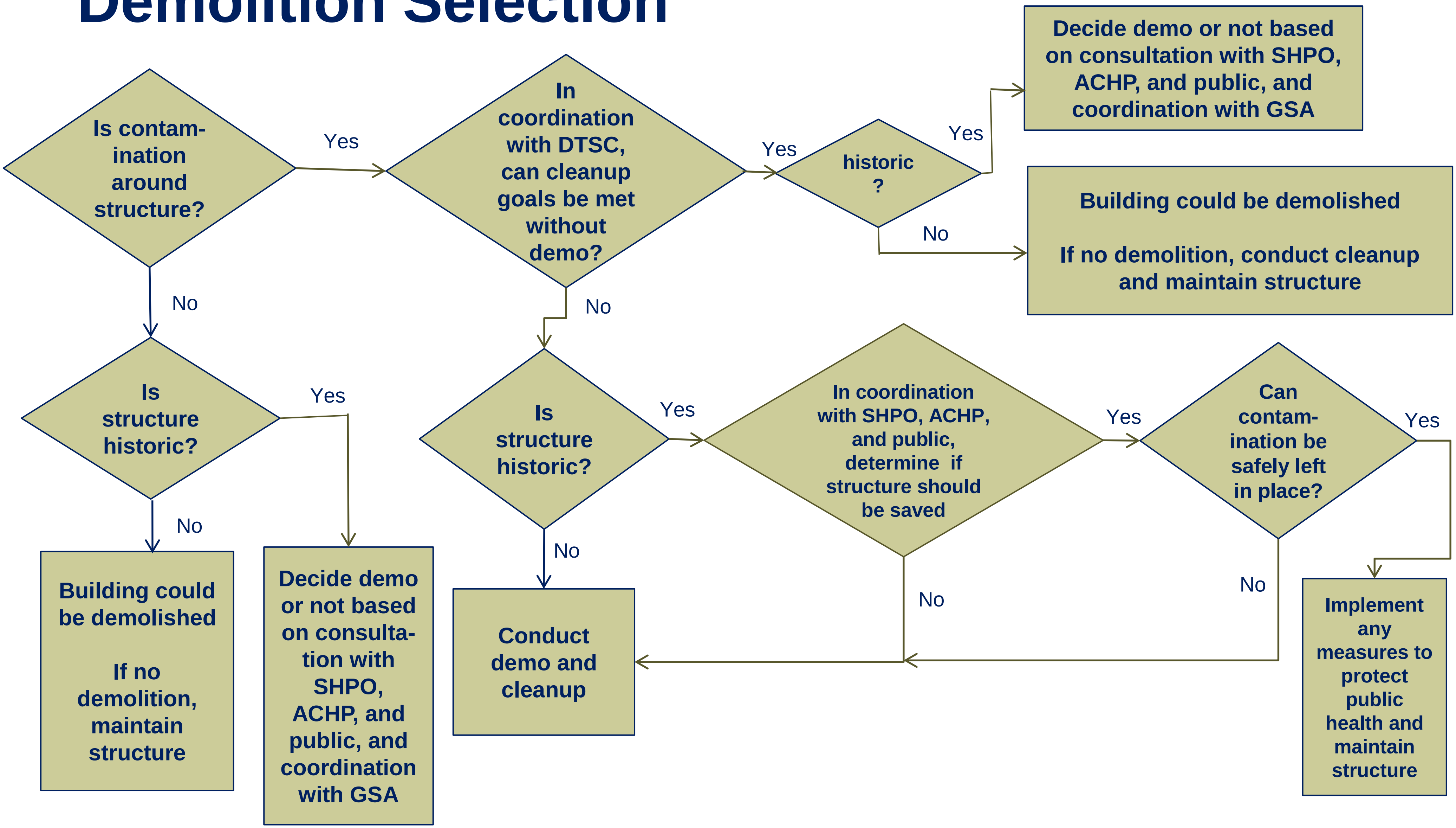
Bravo District



Coca District



Conceptual Thinking on Building Demolition Selection



Basic Elements Within an EIS

Proposed Action

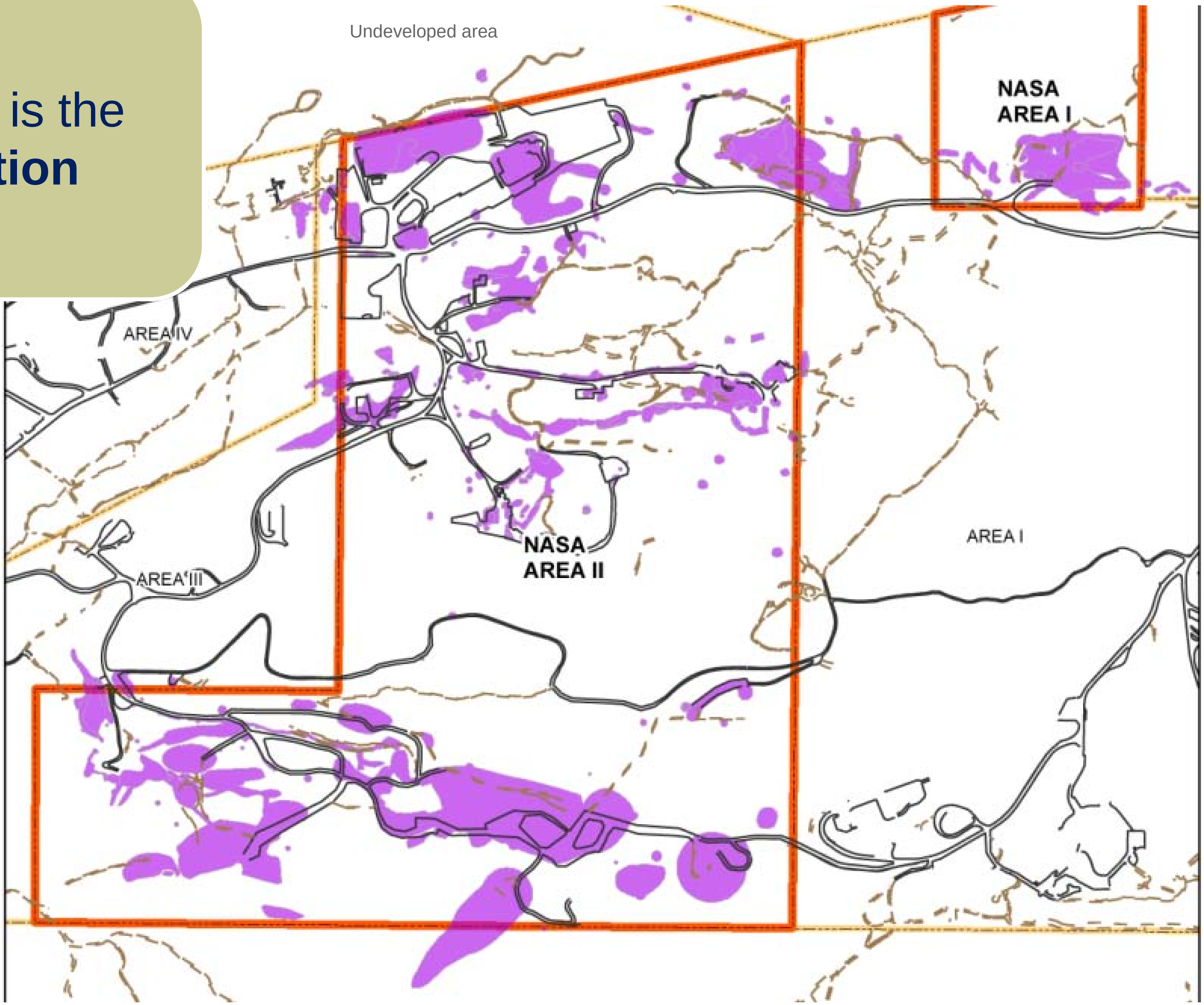
Environmental Resources

Evaluate potential **Impacts**

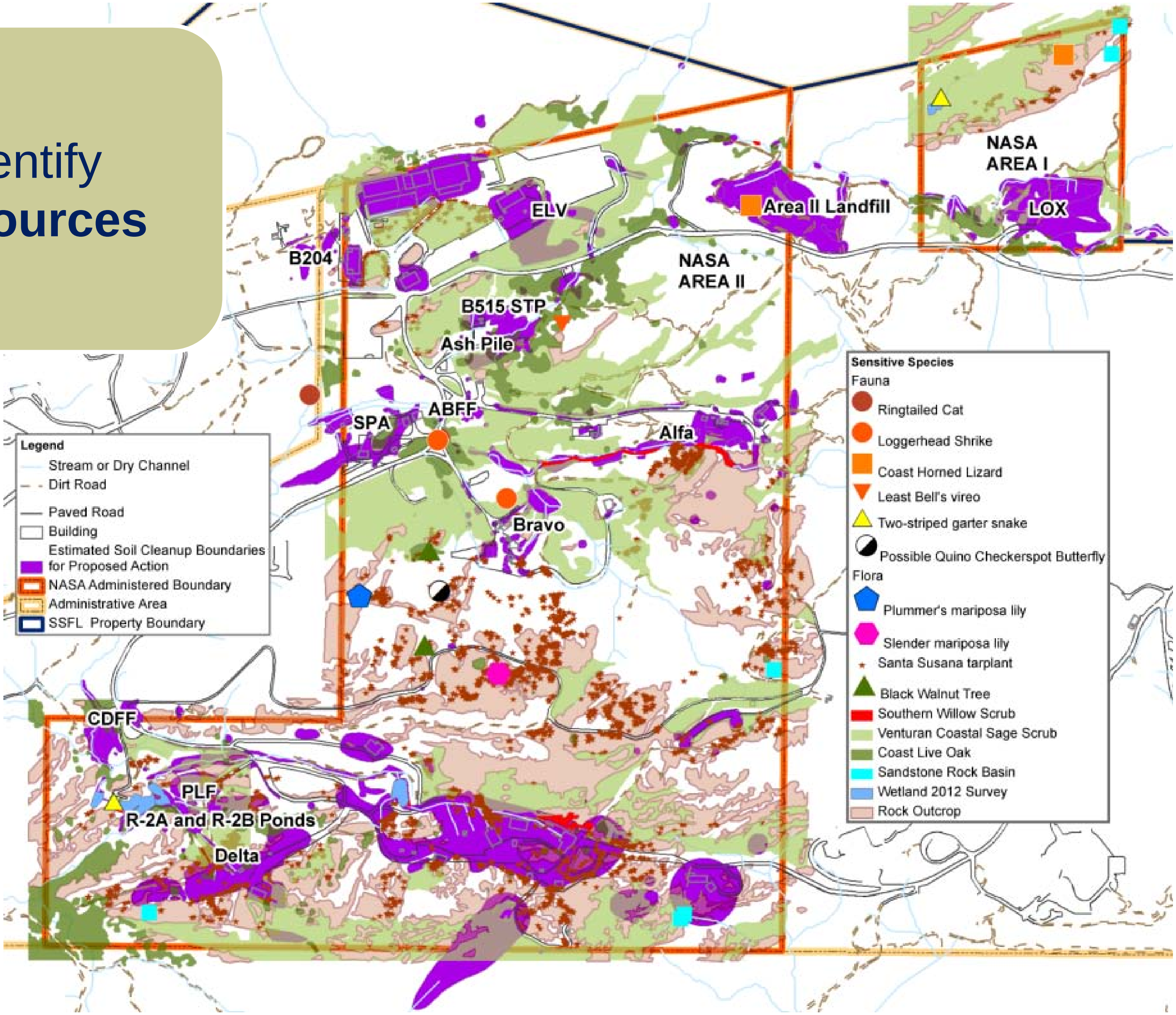
How impacts will be evaluated in the EIS

→ Example soil excavation

What is the **Action**



Identify **Resources**



Biological Resource Facts

Resource	Total Approx. Acres	Acres Impacted			
		Proposed Action (Background)	Alternative 1 (Residential)	Alternative 2 (Industrial)	Alternative 3 (Recreational)
Wetlands [a]	3.2 ac	2.4 ac **(78%)**	1.0 ac **(32%)**	0.8 ac **(25%)**	0.7 ac **(22%)**
Venturan Coastal Sage Scrub [b]	95.4 ac	12.8 ac **(13%)**	1.7 ac **(2%)**	0.9 ac **(1%)**	0.5 ac **(1%)**
Southern Willow Scrub [b]	1.0 ac	0.8 ac **(78%)**	0.4 ac **(35%)**	0.2 ac **(19%)**	0.01 ac **(1%)**

a - Federal

b - State designated high-priority conservation natural habitats

Evaluate potential **Impacts**

	Activities Assessed
Air Quality	• Increase in criteria pollutant emissions from both onsite and offsite activities including excavation or other ground disturbing activities, demolition, erosion, equipment exhaust, exhaust from crew commutes, and exhaust from heavy trucks used to haul materials and soils to the appropriate licensed waste disposal facilities.
Water Resources	• Effects on surface water and groundwater quality, hydrology, and infiltration from the various cleanup approaches, changes in surficial flow patterns as a result of broad excavation or removal of structures or paved surfaces.
Traffic	• Effects on roadway operations, road conditions, parking, and emergency access from heavy truck use within and accessing SSFL.

Soil Hauling Estimates
Assuming Excavation and Offsite Disposal

	Proposed Action (Background)	Alternative 1 (Residential)	Alternative 2 (Industrial)	Alternative 3 (Recreational)
Removal Volume (cy)	502,000	182,000	92,000	58,000
Truck Capacity (cy/truck)	19 (~24 tons)	19 (~24 tons)	19 (~24 tons)	19 (~24 tons)
Truckloads Required	26,421	9,579	4,842	3,052
Frequency (trucks/day) [a]	(52) [12] {27}	(19) [12] {27}	(10) [12] {27}	(6) [12] {27}
Hauling Duration (months) [a]	(23) [100] {44}	(23) [36] {16}	(23) [18] {8}	(23) [12] {5}

a - ( ) denotes frequency needed to meet 2017 deadline
[ ] denotes limits based on operational controls
{ } is based on the working air conformity limits. Final calculations will be provided in the Draft EIS.

NASA Impact Definitions

Impact	Description
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; or 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.

Quality: Beneficial- would have a positive effect on the physical, social, or cultural environment.
Negative-would have an adverse effect on the physical, social, or cultural environment

Duration: 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.

Proximity: Local–would occur within the NASA-administered property at SSFL.
Regional–would occur outside the NASA-administered property at SSFL.

Cumulative Impacts?

Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes the actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Section 1508.7).

- Actions of a similar character, which could affect the same environmental resources as NASA proposed action such as Boeing and DOE cleanups and demolition

Mitigations

Mitigation includes:

(a) Avoiding the impact altogether by not taking a certain action or parts of an action.

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

National Aeronautics and Space Administration

NASA’s Environmental Impact Statement (EIS) – Remedial Technologies





Remedial Technology Selection and Evaluation Phases

- Phase 1 – Remedial technology feasibility screening evaluation used to select the technologies

- Phase 2 – National Environmental Policy Act (NEPA) evaluation of remedial technologies and their potential environmental impacts

What is the process for selecting remedial technologies to evaluate in the EIS?

- Step 1 – Develop a "universe" of technologies that can be used for site remediation
- Step 2 – Evaluate the contaminants requiring remediation and select applicable technologies from the "universe" list
- Step 3 – Evaluate the following for each technology selected in Step 2
  - Effectiveness
  - Implementability
  - Cost-effectiveness

Step 1 – Technology Universe Sources

- Engineering judgment and past experience at other facilities including NASA sites
- Public input during scoping
- Literature Search
  - Clu-in Website and Webinars
  - Federal Roundtable
  - Academia
- Boeing Site-specific Experience/Evaluations
- Ongoing Department of Energy Treatability Study Evaluations

Step 2 – Soil Technology Screen

Primary Contaminants

- Organics
  - VOCs (TCE)
  - SVOCs (including PAHs)
  - TPH
  - PCBs
  - Dioxins
  - Energetics
- Inorganic
  - Metals

Technologies Considered

- Organic / Inorganic Contaminants
  - Excavation & Disposal
  - Excavation, Onsite Landfilling, and Encapsulation
  - Phytoremediation
  - Monitored Natural Attenuation (MNA)
  - Institutional Controls
- Organic Contaminants
  - Soil Vapor Extraction (VOCs)
  - Ex-situ Treatment
    - Landfarming
    - Thermal Desorption
  - In-situ Treatment
    - Soil Mixing
    - Oxidation / Reduction
    - Biological Treatment

Step 2 – Groundwater Technology Screen

Primary Contaminants

- Organics
  - VOCs
- Inorganic
  - Metals

Technologies Considered

- Organic / Inorganic Contaminants
  - Pump & Treat
  - Iron Particle Injection (primarily TCE)
  - MNA
  - Institutional Controls
- Organics Contaminants
  - Vacuum Extraction (VOCs)
  - In-situ Treatment
    - Heat Driven Extraction
    - Oxidation / Reduction
    - Biological Treatment

Step 3 – Effectiveness Technology Screen

- Ability to destroy contamination?
- Ability to reduce contamination to a non-toxic byproduct?
- Ability to reduce mobility of contamination?
- How long will the technology have to be implemented?
- Bedrock Constraints
  - Ability to reach contamination?
  - Bedrock fracture network?
  - Ability to deliver remedial technology to low permeability rock matrix?

Step 3 – Implementability Technology Screen

- Utilities / infrastructure available to support technology?
- Site-specific physical restrictions present (slopes / shallow bedrock / bedrock outcrops / depth to groundwater)?
- Most technology applications are implementable for soil or shallow groundwater; however, bedrock remediation technologies that are implementable are limited due to complex fault and fracture networks.
- Site-specific regulatory requirement considerations?
  - Air permitting
  - Water discharge permitting
  - Waste disposal
  - Other permits or notification

Step 3 – Cost-effectiveness Technology Screen

- Example Cost-effective Technologies
  - Enhanced bioremediation
  - In-situ chemical reduction
  - Phytoremediation
  - Landfarming
  - Monitored Natural Attenuation

- Example Costly Technologies
  - Excavation and Disposal
  - Thermal Technologies
  - Pump and Treat (GETS)

Soil Clean Up Technologies Selected for Evaluation

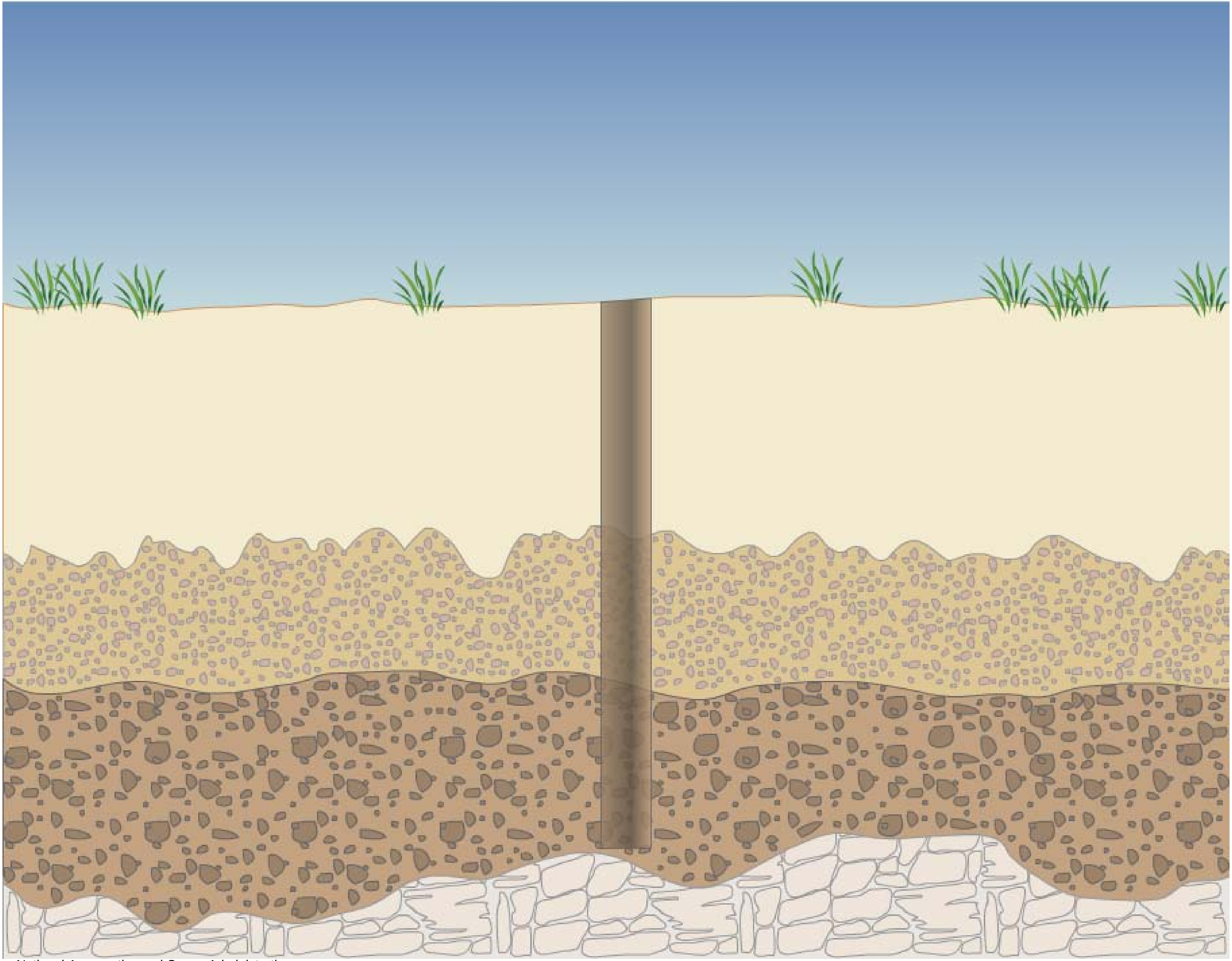
- Excavation and Offsite Disposal
- Excavation, Onsite Landfilling, and Encapsulation
- Soil Vapor Extraction
- Exsitu Treatment
  - Landfarming
  - Thermal Desorption (Rotary Dryer or similar technology)

Soil Clean Up Technologies Selected for Evaluation (continued)

- Insitu Treatment
  - Soil mixing (heat, ZVI, or oxidant)
  - Chemical Oxidation or Reduction (ZVI, H_2O_2, $KMnO_4$)
  - Biological Treatment (Anaerobic or Aerobic)
- Phytoremediation
- Monitored Natural Attenuation
- Institutional Controls

Excavation and Disposal

In-situ Treatment - Reduction



National Aeronautics and Space Administration

In-situ Treatment - Oxidation

In-situ Treatment - Soil Mixing

Groundwater Clean Up Technologies Selected for Evaluation

- Pump and Treat
- Vacuum Extraction
- Insitu Treatment
  - Iron Particle Injection
  - Chemical Oxidation (H_2O_2, $KMnO_4$)
  - Enhanced Bioremediation (Anaerobic or Aerobic)
- Heat Driven Extraction
- Monitored Natural Attenuation
- Institutional Controls

Heat Driven Extraction with Vacuum Extraction

Pump and Treat Groundwater

Remedial Technology Selection

- Multiple technologies may be implemented at same location (treatment train) on the basis of:
  - Contaminant mix present in soil or groundwater
  - Contaminant variation with depth (fate and transport of contaminants vary in subsurface)
  - VOCs migrating upward from groundwater into soil
  - Contaminant concentrations

NEPA Evaluation of Remedial Technologies

- NEPA evaluation of remedial technologies will include remedial technology environmental impact analysis for each resource area:
  - Land Use
  - Site Infrastructure
  - Cultural Resources
  - Biological Resources
  - Air Quality and Greenhouse Gas Emissions
  - Water Resources
  - Geologic and Paleontologic Resources
  - Hazardous Materials and Hazardous Waste
  - Health and Safety
  - Traffic and Transportation
  - Noise
  - Socioeconomics
  - Environmental Justice

NASA