



NASA Informal Technical Meetings SSFL Group 2 Investigation Report





Agenda

- Introduction
 - Objectives
 - RFI Sites Overview
- RFI Report Summaries
- Wrap-up



Introduction

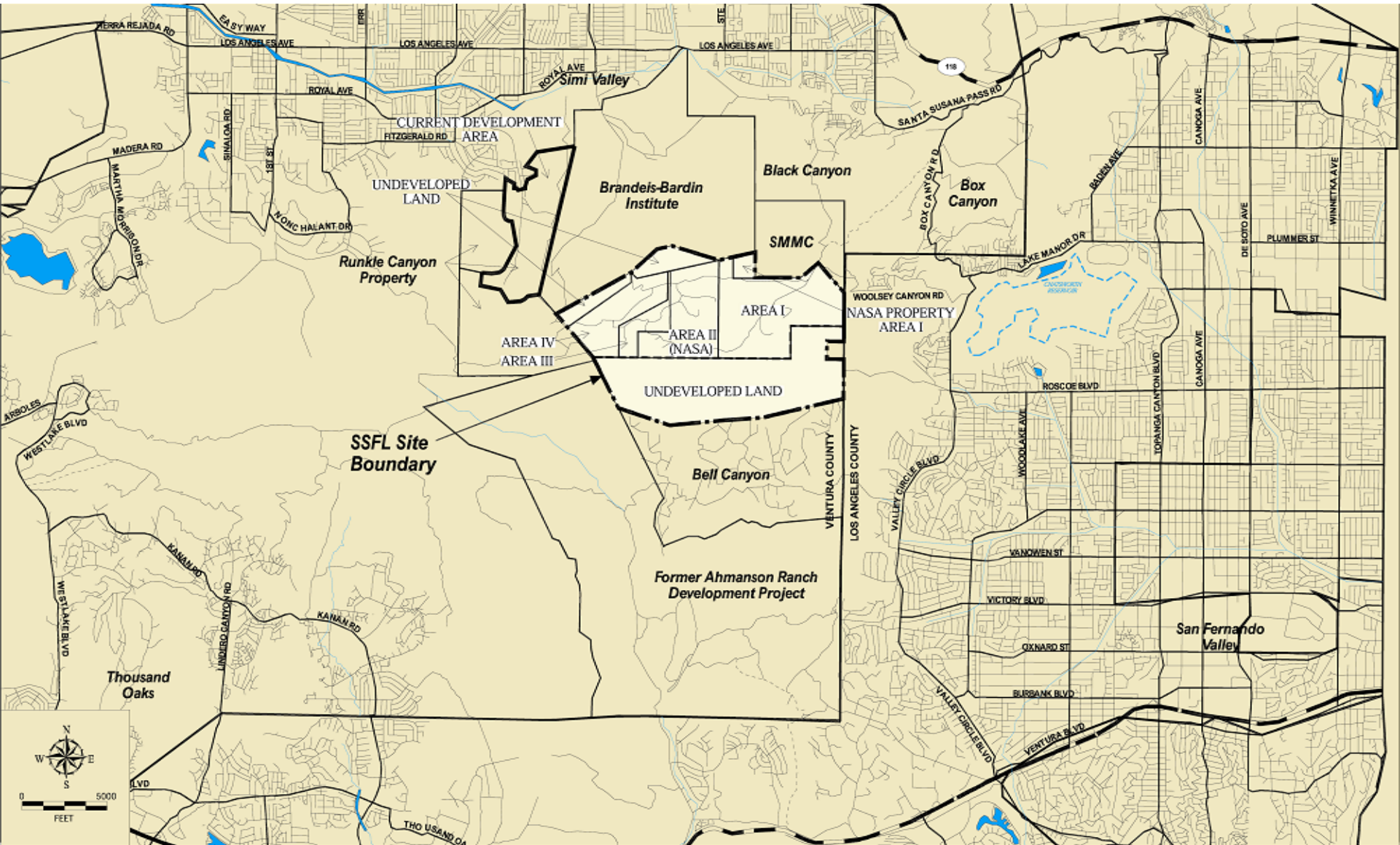


Objectives

- To communicate the results of the field investigations and recommendations being submitted to DTSC in the Group 2 RCRA Facility Investigations (RFI) Report
- To provide opportunity for Community to give early feedback directly to NASA (formal comments go directly to DTSC)
- To help facilitate the public review process of the Group 2 RFI Report

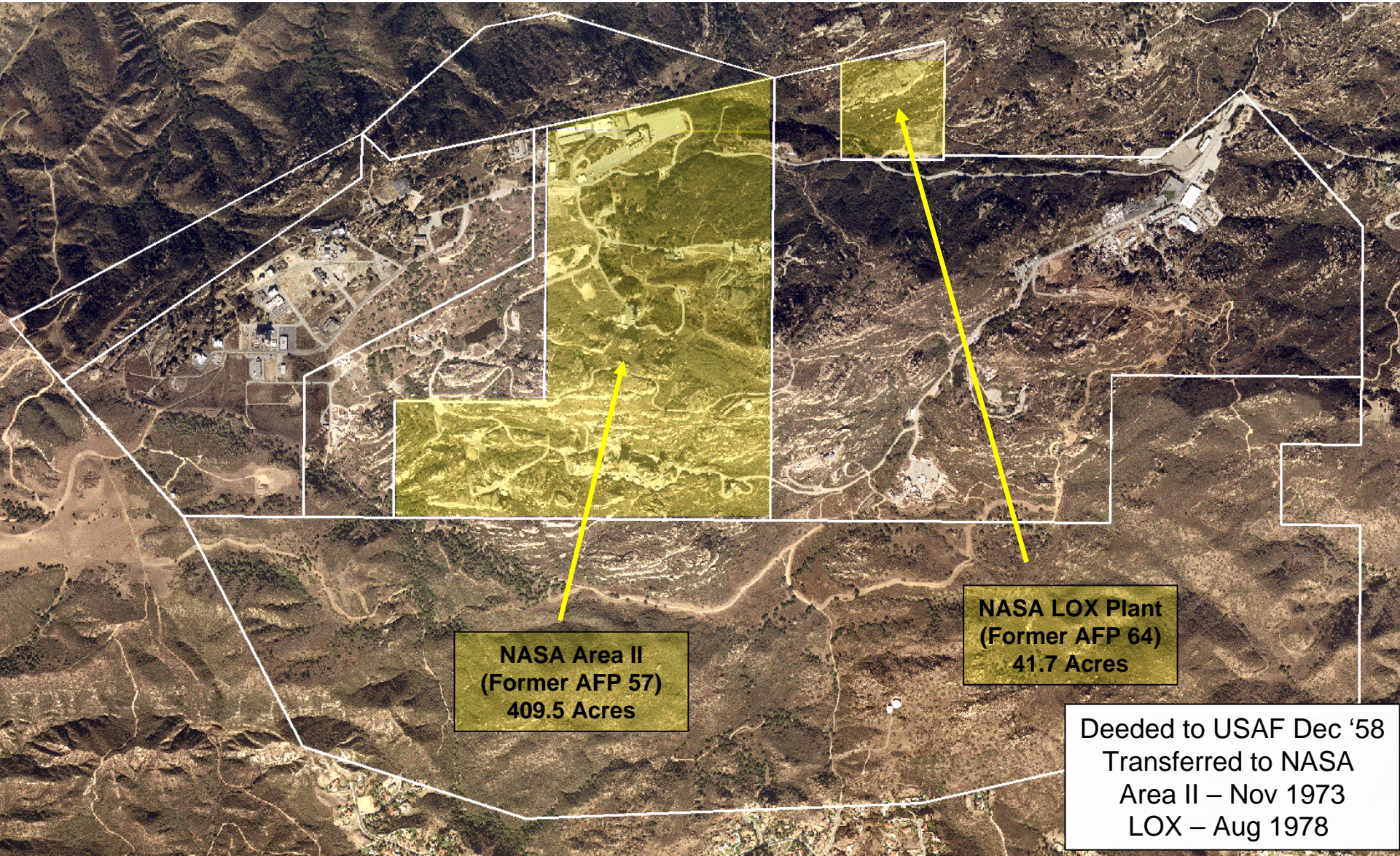


SSFL Regional Map





SSFL Site Map



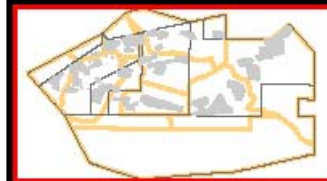
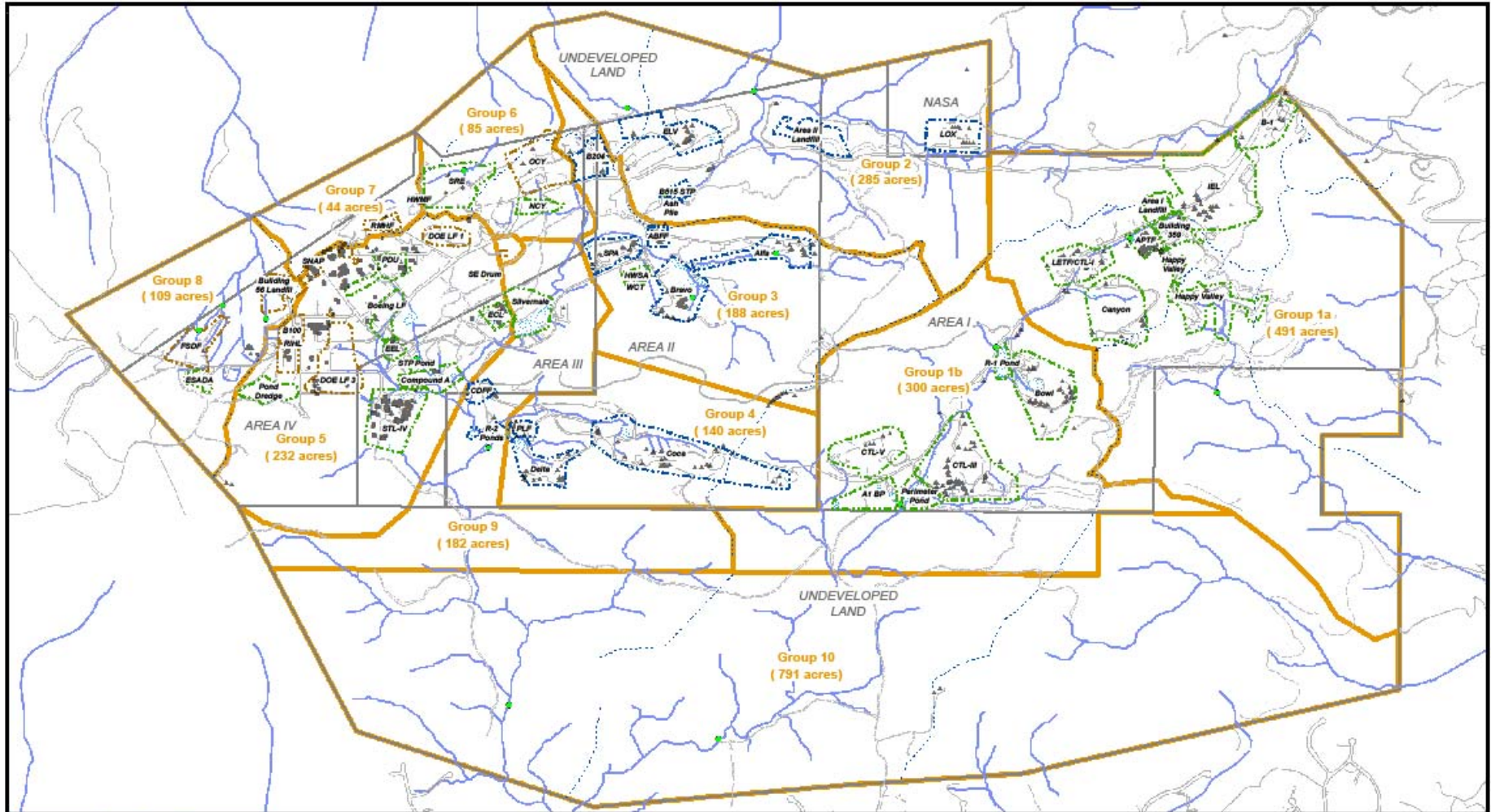
**NASA Area II
(Former AFP 57)
409.5 Acres**

**NASA LOX Plant
(Former AFP 64)
41.7 Acres**

**Deeded to USAF Dec '58
Transferred to NASA
Area II – Nov 1973
LOX – Aug 1978**



Surficial Media RFI Groups



Basemap Legend

● Tank - UST	■ RFI Group Boundary	— Roads
■ Tank - AST	■ Administrative Area	— Streams
▲ Tank - Not Yet Determined	■ Property Boundary	■ Pond
■ RFI Site - Boeing	— Drainage	
■ RFI Site - DOE	— Road - Asphalt	
■ RFI Site - NASA	— Roads - Dirt	

RFI Group Boundaries

SANTA SUSANA FIELD LABORATORY

January 31, 2008

1 inch equals 1,200 feet

0 1,200 2,400 Feet

CH2MHILL

FIGURE XX



Key Milestones (DRAFT)

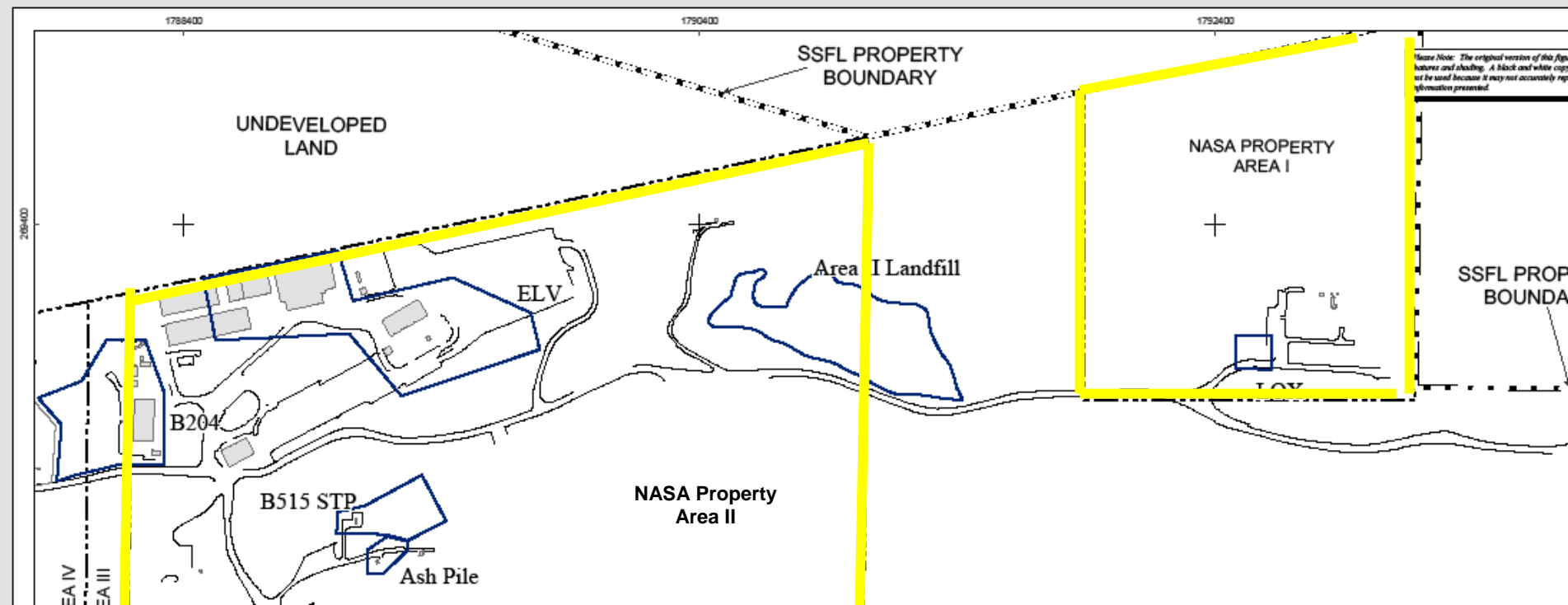
Task	Draft to DTSC	Final Approval
Group 2 RFI	Dec 2008	Jan 2011
Group 3 RFI	May 2009	Apr 2011
Group 4 RFI	Submitted	Apr 2010
Group 9 RFI	Sep 2009	Sep 2011
Eco RFI	Sep 2010	Oct 2011
Surficial CMS	Dec 2011	Jul 2012
Surficial Cleanup Workplan	Jan 2015	Jun 2015
GW RFI	Sep 2009	Feb 2011
GW CMS	May 2012	Feb 2013
GW Cleanup Workplan	Feb 2015	Oct 2015
Cleanup Actions	2017	

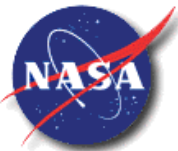


Group 2 RFI

- Former LOX Plant
- Area 2 Landfill
- Expendable Launch Vehicle (ELV)
- Former Incinerator and Ash Pile
- Sewage Treatment Plant

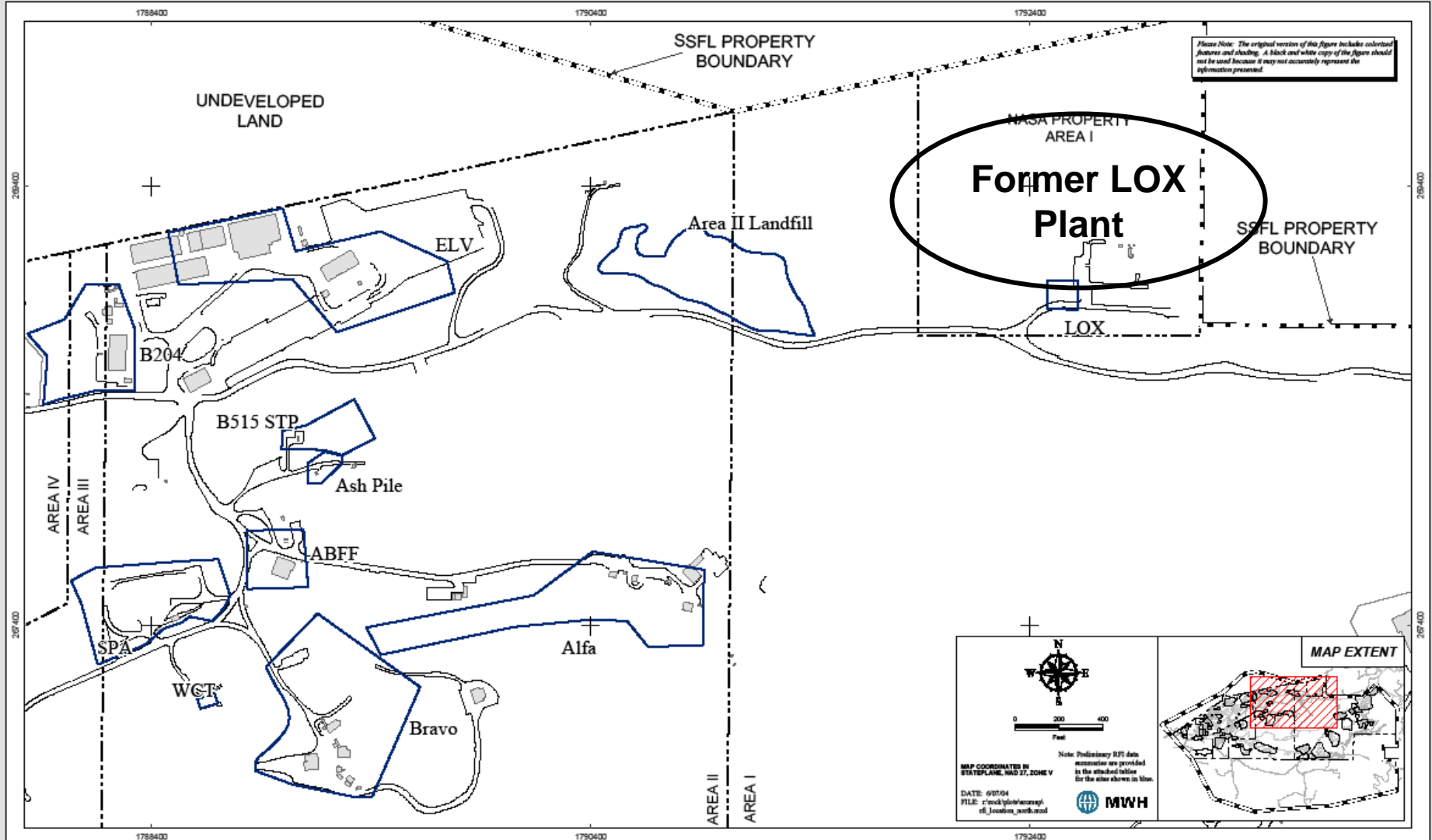
Northern RFI Sites Santa Susana Field Laboratory





Group 2 – Former LOX Plant

Northern RFI Sites Santa Susana Field Laboratory





Group 2 – Former LOX Plant





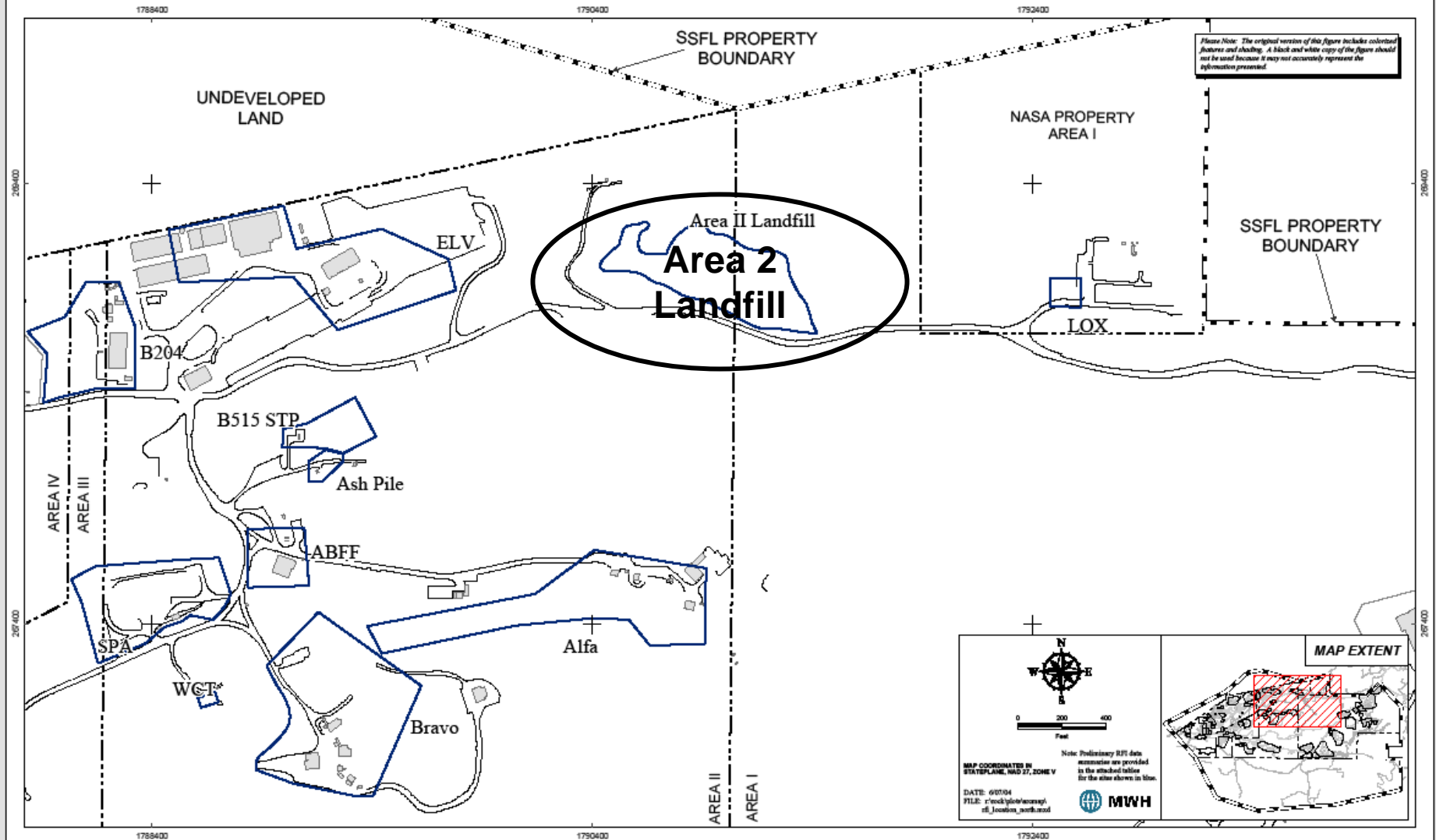
Group 2 – Former LOX Plant





Group 2 – Area 2 Landfill

Northern RFI Sites Santa Susana Field Laboratory





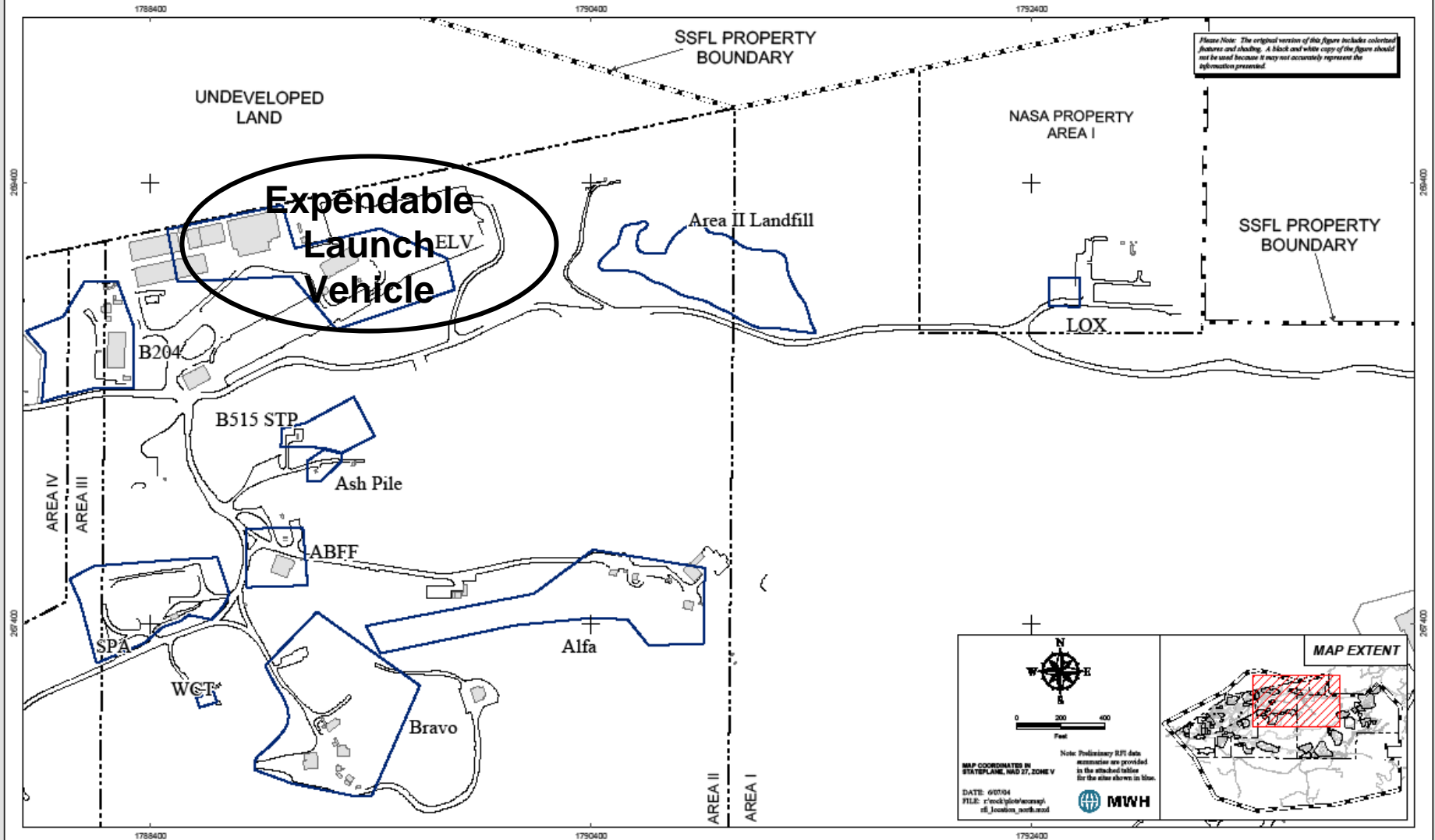
Group 2 – Area 2 Landfill





Group 2 – Expendable Launch Vehicle (ELV)

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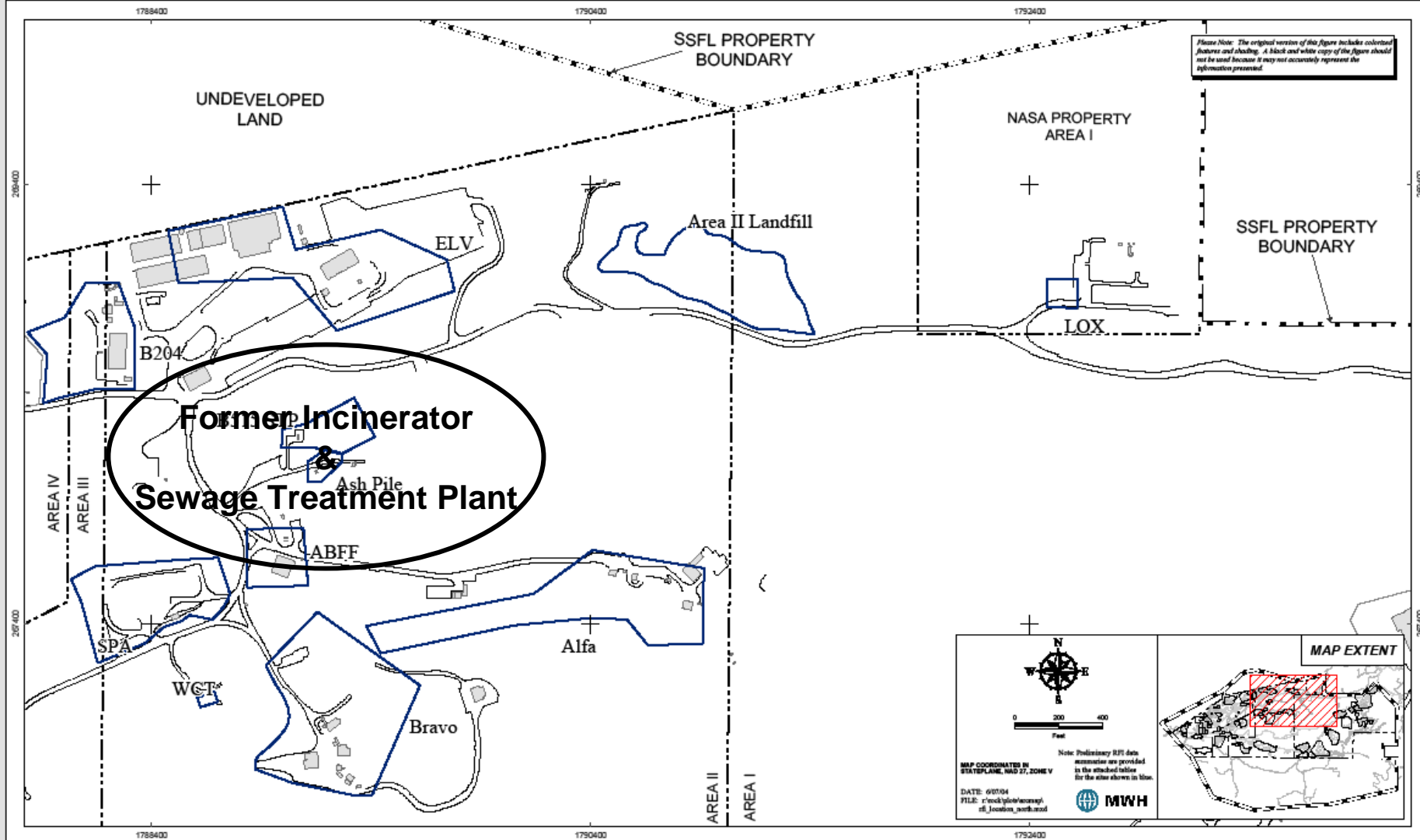
Group 2 – Expendable Launch Vehicle (ELV)





Group 2 – Former Incinerator & Sewage Treatment Plant

Northern RFI Sites Santa Susana Field Laboratory





Group 2 – Former Incinerator & Sewage Treatment Plant





Group 2 – Former Incinerator & Sewage Treatment Plant





How was this RCRA Facility Investigation Performed?

- **Historical Review** – Determines what we are looking for during the investigation
- **Data Collection & Evaluation**
 - **Nature and Extent** – What chemicals have been released and where are they
 - **Transport and Fate** – How do contaminants move through the environment and where are they likely to end up
 - **Risk Evaluation** – Potential human health and ecological
- **Recommendations** – Do we need additional information in order to decide where (and how much) cleanup actions are needed



Data Collection and Evaluation

- Nature and extent
 - Potential areas of concern chosen (historical review, potential release areas, etc.)
 - Data compared to published risk-based concentrations (ecological and human health [PRGs]) and SSFL background
 - “Step-out” extent sampling
 - Extent completed when we answer: What is it? How much is there? and What is the boundary?



Data Collection and Evaluation (cont.)

- Human health risk
 - Methods in SRAM followed
 - Receptors – resident (with garden), worker, recreational
 - Exposures to COCs
 - Direct: soil & groundwater ingestion, dermal contact with soil & groundwater
 - Indirect: inhalation of particulates, VOCs (soil and groundwater; indoor and outdoor air)
 - Media
 - Surface soil (0-2 ft bgs), subsurface soil (0-10 ft bgs), near surface groundwater, soil vapor



Data Collection and Evaluation (cont.)

- Ecological risk
 - Methods based primarily on SRAM; DTSC and EPA guidance
 - Terrestrial and aquatic habitats evaluated including wetlands



RFI Report Summaries



Group 2 – Former LOX Plant



Former LOX Plant - History

- Owned by the U.S. Air Force and operated by Air Products, Inc. until the late 1960s
- Liquid oxygen (LOX) was produced at the site from liquefied air using a cryogenic process
- Buildings and LOX tanks were removed in the early 1970s, and the concrete foundations (of tanks) were removed in 1996
- Sump and clarifier were excavated and removed as part of the accelerated cleanup program in 1993
- Asbestos and Drum Disposal Area was removed in early 1990s
- Additional debris containing asbestos was removed from drainage ditch in 2007 (Sage Ranch area)





Former LOX Plant – Nature & Extent

- Samples collected between 1993 and 2008
 - Soil matrix: 251 samples
 - Soil vapor: 262 samples
 - Groundwater: 1 sample
- Sampling shows presence of metals, PAHs, TPH, and VOC soil gas
- Data gaps: Ag, BbF, IP, TRPH (vertical), TCE (soil vapor, vertical)



Former LOX Plant – Risk Evaluation

- The primary COCs for the LOX Plant are benzidine, arsenic, and BaP in soil and multiple chlorinated VOCs in soil vapor.
- The primary exposure scenarios were the residential and industrial worker exposure scenarios for soil exposure; plant consumption for the residential scenario; all 3 scenarios for soil vapor.
- The total cancer risk for the COCs exceeds the upper end of the regulatory risk range (1×10^{-4}).



Area II Landfill



Area 2 Landfill – History

- Unlined landfill operated 1955 – 1980
- Unused fill material and construction debris (asphalt, concrete, drums, scrap metal, timber, vegetation) were disposed of in the upper flat portion and the steep north-facing slope.
- Near total re-vegetation of the disturbed areas was observed in the 1988 and 1995 aerial photographs.





Area II Landfill – Nature & Extent

- Samples collected between 1993 and 2008
 - Soil Matrix: 145 samples
 - Soil Vapor: 83 samples
 - Groundwater: 1 sample

Sampling shows presence of metals, PAHs, dioxins, and PCBs.

- Data gaps: PCB-congeners (horizontal), Cu (vertical)



Area II Landfill – Risk Evaluation

- The primary COCs are BaP, PCBs, and dioxins/furans in soil and benzene in soil vapor.
- Primary exposure scenarios were residential, industrial worker, and recreational for soil; plant consumption for the residential scenario; residential and industrial worker for soil vapor.
- The total cancer risk for the COCs exceeds the lower end of the regulatory risk range (1×10^{-6}).



Expendable Launch Vehicle (ELV) Area



ELV - History

- Bldg. 202 was Laser and Electro-Optical System (LEOS) storage, a cafeteria, photo lab, and for manufacturing of harnesses for space shuttles.
- Bldg. 203 involved the use of a Lead Tinning Machine, Vapor Degreaser, Aqueous Cleaner, Sand Blaster, and machine tools.
- Bldg 206 was originally tested rocket engine components using LOX and petroleum-based fuels (RP-1 and JP-4), chemical storage, engine assembly and check, paint booth operations, machine shop, welding shop, steam cleaning operations, equipment storage, hazardous materials storage, and office space. Wastes were burned off in pond.





ELV – Nature & Extent

- Samples collected between 1993 and 2008
 - Soil Matrix: 353 samples
 - Soil Vapor: 41 samples
 - Groundwater: 5 samples
- Sampling shows presence of metals, PAHs, dioxins, TPH, and three VOCs.
- Data gaps: Dioxins, DRO (horizontal), SVOCs, TPHs, VOCs (vertical), TCE, PCE, cis-1,2-DCE (soil vapor)



ELV – Risk Evaluation

- The primary COCs are dioxins/furans in soil and TCE in soil vapor.
- The primary exposure scenarios were the plant consumption pathway for the residential scenario; all 3 scenarios for soil vapor.
- The total cancer risk for the COCs exceeds the lower end of the regulatory risk range (1×10^{-6}) for soil; exceeds upper end of risk range for soil vapor (1×10^{-4}).



Former Incinerator & Ashpile and Sewage Treatment Plant



Former Incinerator & Ashpile - History

- The Incinerator was a brick structure approximately 10 feet by 8 feet with a 30-foot-high metal smokestack, surrounded by a 4-foot concrete apron.
- Operational from the mid-1950s through the 1970s. Waste from the Incinerator was deposited in an ash pile located in an unpaved area to the south of the Incinerator.
- Paper, photographs, and trash were burned at Building 2758.
- Soil investigation identified lead and silver exceeded the threshold limit concentration.
- Ash pile was removed and excavated in 1993.



Former Ash Pile



Sewage Treatment Plant - History

- Below grade, concrete-lined plant
- Operated from 1961 – 1987
- Received cooling tower water, possibly containing trace solvents / fuels, and sanitary sewage
- An inactive leach field lies to the east of the STP, and received waste from the ELV buildings (B211/202/203/206).
- The plant used a comminutor, source aeration unit, and clarifier where clarified effluent was removed from the top after solids settled to the bottom.
- Settled sludge was removed for disposal and treated water was pumped out and ultimately arrived in the Silvernale Reservoir.





Incinerator /STP – Nature & Extent

- Samples collected between 1993 and 2008
 - Soil Matrix: 222 samples
 - Soil Vapor: 61 samples
 - Groundwater: 73 samples
- Sampling shows presence of metals, PCBs, PAHs, and dioxins in soil and TCE is soil gas.
- Data gaps: PCB-126, BaP (horizontal), dioxins, metals (vertical-1 local, surrounded), TCE, PCE, cis-1,2-DCE (soil vapor)



Incinerator /STP – Risk Evaluation

- The primary COCs are dioxins/furans, PAHs, PCBs, and barium in soil; PCE and cis-1,2-DCE in soil vapor; and arsenic and TCE in groundwater.
- Primary exposure scenarios are plant consumption pathway for the residential scenario; residential scenario for soil and groundwater; residential and industrial worker for soil vapor.
- The total cancer risk for the COCs exceeds the lower end of the regulatory risk range (1×10^{-6}) for soil and soil vapor; exceeds upper end of risk range for groundwater (1×10^{-4}).



Group 2

Overall Ecological Risk

Evaluation

- Potential COCs are barium, mercury, dioxin/furan and PCB congeners, and phthalates in soil, and 10 VOCs in soil gas.
- No unacceptable risks were identified for any receptors at the STP site.
- The remaining four Group 2 RFI sites had unacceptable risks identified for at least one receptor from at least one COC. Primary receptors were deer mice, hermit thrush, and plants.



Any Questions??