

# **EXECUTIVE SUMMARY**

## **INTRODUCTION**

The Kodiak Launch Complex (KLC) is a proposed commercial space rocket launch facility to be located on Kodiak Island, Alaska. The purpose of this environmental assessment is to examine the potential for environmental impacts resulting from proposed KLC construction and operation. The proposed KLC would support commercial rocket launches to place small satellites into orbit.

Alaska Aerospace Development Corporation (AADC), established by the Alaska State Legislature as a public corporation located for administrative purposes within the Alaska Department of Commerce and Economic Development, would be responsible for construction and operation of the proposed KLC. The Secretary of Transportation has been authorized by the Commercial Space Launch Act to oversee and coordinate U.S. commercial launch activities. The Secretary is implementing this authority through the Federal Aviation Administration's Office of the Associate Administrator for Commercial Space Transportation (OCST); the proposed KLC would be licensed through this office. This environmental assessment will provide input to the OCST's determination regarding issuance of the KLC license.

## **PURPOSE AND NEED**

The proposed action would provide a commercial alternative to launching small satellites from Federal installations. OCST promotes commercial space transportation activities and encourages the establishment of commercial launch sites and complementary facilities as an important element of the space transportation system in order to complement U.S. Government sites and assist the United States' competitive position internationally (49 USC § 70101). The provision of launch services by the private sector is consistent with the national security and foreign policy interest of the United States. A commercial space launch vehicle facility represents an important national security asset. The proposed KLC would provide infrastructure for placing telecommunications, remote sensing, military, scientific, and research payloads in polar low-earth orbit.

In accordance with implementing regulations issued under authority of the Commercial Space Launch Act, AADC will apply to OCST for a commercial space launch site operator license. This document covers construction and operation of the proposed facilities. Launch-related issues would be addressed on a launch-specific basis, as launches are proposed.

## **DESCRIPTION OF PROPOSED ACTION**

This environmental assessment will inform OCST prior to OCST's determination regarding issuance of a license to operate the proposed KLC launch site. The complex would be located on state-owned land at the eastern side of Kodiak Island, 20 miles south-southeast of Kodiak, Alaska (Figure S-1). The proposed 3,100-acre site is on a peninsula that is commonly referred to as Narrow Cape. Current site uses include grazing, a 190-meter (625-foot) high navigational aid tower and support buildings, and recreation (hunting, birdwatching, fishing, fossil collecting, whale-watching). Principal proposed KLC facilities would include a Launch Control and Management Center, a Payload Processing Facility, and a launch area (Figure S-2). AADC customers would use proposed KLC facilities to place small payloads (up to 5,000 pounds) into orbit using expendable solid-fuel launch vehicles. In the first year of operation, AADC would conduct 1 launch using a team of approximately 100 professionals onsite for up to 6 weeks before the launch. Over the next 22 years, AADC would phase up to a maximum of 9 launches per year with staffing reduced (through operations experience) to teams of approximately 40 professionals onsite for up to 4 weeks before each launch.

## **CONSIDERATION OF ALTERNATIVES**

AADC conducted a statewide survey to identify candidate locations, preliminary screening of 27 locations, detailed literature review and limited fieldwork for four locations, and detailed fieldwork for three locations, resulting in recommendation of the proposed location for KLC. Screening criteria were (1) availability of suitable property; (2) availability of support services nearby; (3) availability of year-round logistical support; (4) availability of food and lodging; (5) availability of safe launch zones; (6) relative environmental concerns; and (7) weather concerns. Figure S-3 identifies the location of sites evaluated.

## **SUMMARY OF ENVIRONMENTAL IMPACTS**

### **Air Resources**

Impacts to air quality from construction and operation activities of the proposed KLC are expected to be localized and short term. Land clearing and the temporary operation of a cement batch plant would increase ambient concentrations of particulates; however, anticipated concentrations would be lower than both state and Federal air quality standards. Operational emissions from the use of diesel generators would be temporary and are not expected to be appreciable off site. Ambient air quality impacts due to particulate emissions from expendable launch vehicles have been estimated to be less than the 24-hour

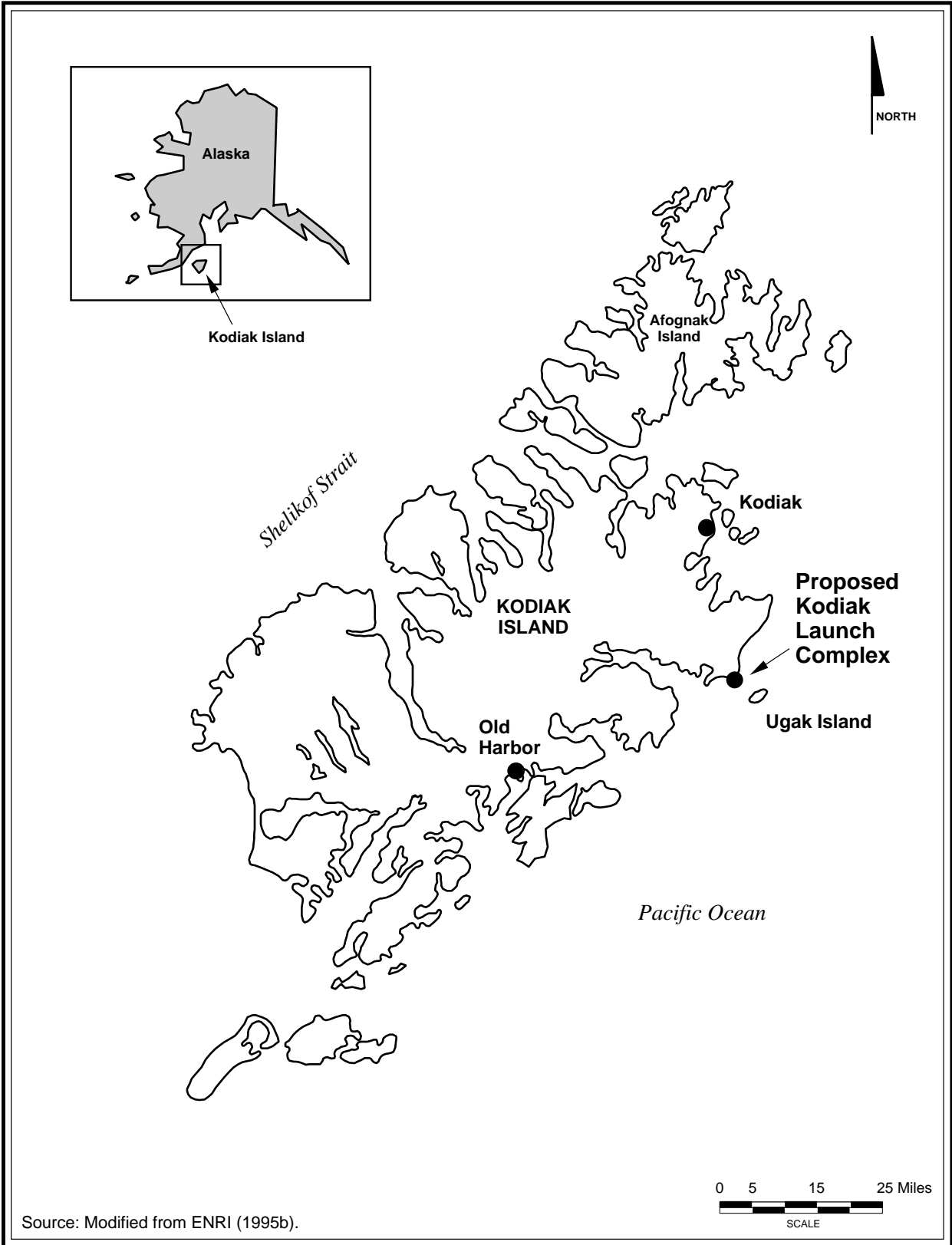


Figure S-1. Proposed Kodiak Launch Complex site location.

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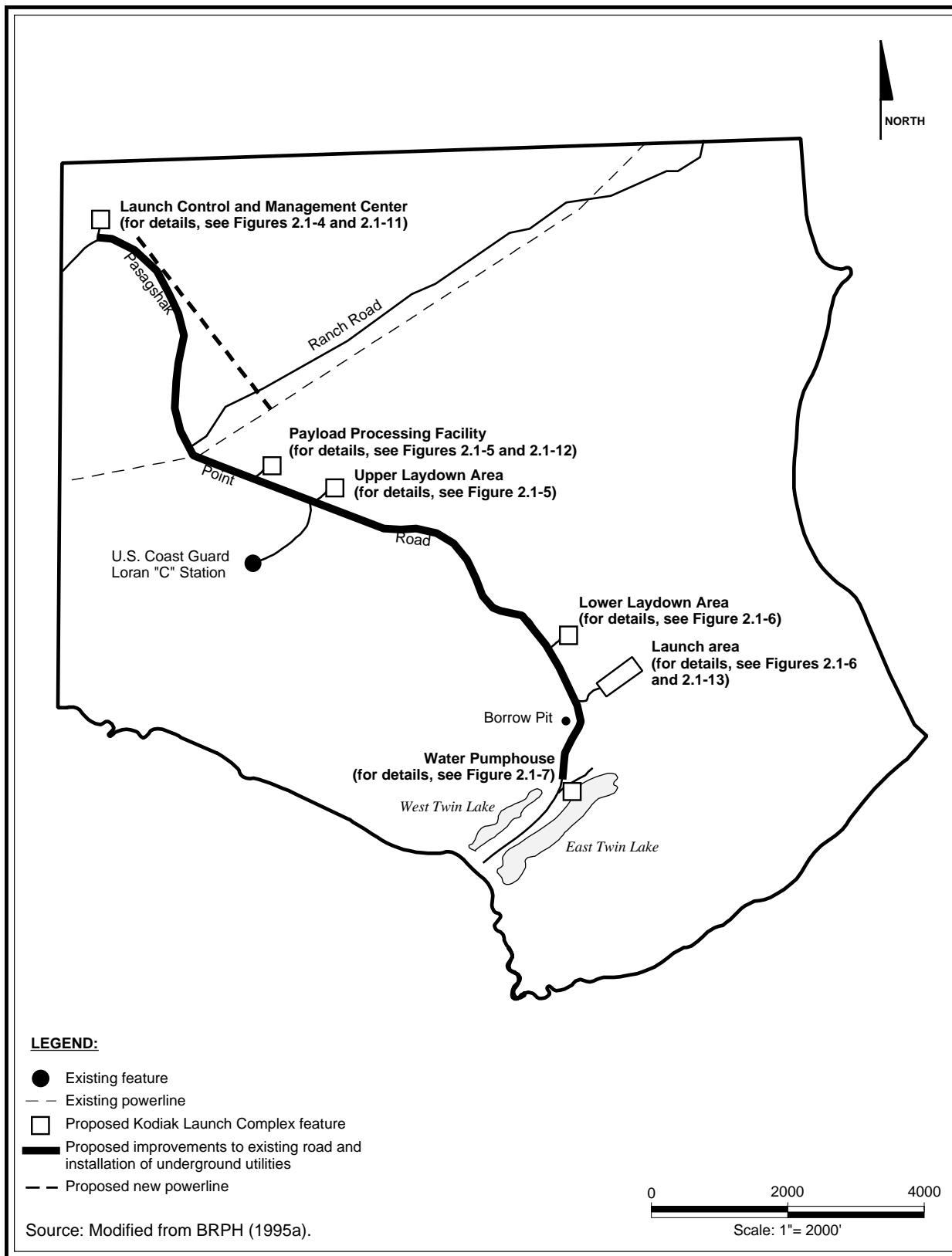


Figure S-2. Proposed KLC site layout.

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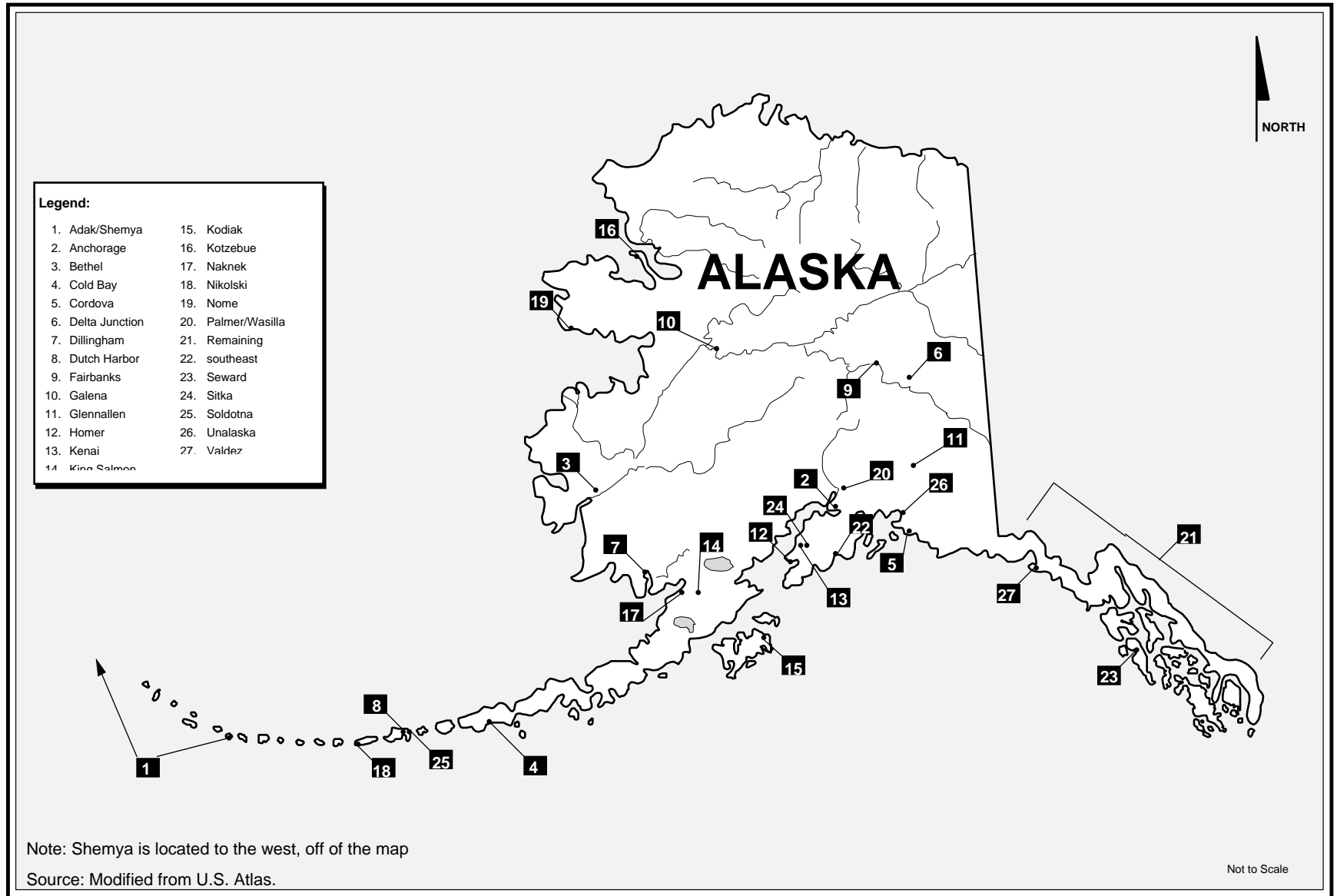


Figure S-3. Alternative launch site locations.

average National Ambient Air Quality Standard. Emissions of hydrogen chloride (which converts to hydrochloric acid in the atmosphere) and aluminum oxide from launches would slightly degrade local air quality, but impacts would be temporary and are not expected to be substantial. Emissions of toxic air pollutants from liquid fuels are expected to be minimal due to the enclosed nature of storage and the small quantities (maximum 100 gallons) involved. Potential contributions to the upper atmosphere include emissions from ground-level operations as well as exhaust emissions from launch vehicles. Emissions from the proposed nine yearly KLC rocket launches would have a small impact on the levels of ozone found in the stratosphere; however, the release of chlorine and aluminum into the stratosphere would make a minimal contribution to the overall impact of ozone depletion. A Clean Air Act conformity analysis is not required because the air quality control region is in attainment.

### **Water Resources**

Water quality in the area would be protected during construction by erosion and sediment controls established under a Stormwater Pollution Prevention Plan and permitted under the National Pollutant Discharge Elimination System. Potable water would be transported to the site during the construction period; therefore, water resources in the area would not be used for this purpose. Use of portable toilets during this period would also protect the water quality of the area. Some water from East Twin Lake and or groundwater would be used for the temporary cement batch plant during construction, for potable water during operations, and (if necessary) fire protection and personnel deluge during operation. Atmospheric deposition of hydrochloric acid from solid rocket motor exhaust would occur in nearby surface waters. However, pH changes would be mitigated since local streams and lakes have a high capacity for buffering acid inputs as a result of ions (calcium and magnesium) that have been carried into the atmosphere with sea spray and ultimately returned in rainfall. This occurrence, combined with periodic flushing as a result of steep gradients, small catchment basins, and heavy precipitation, would result in small, transitory pH changes.

### **Geology And Soil Resources**

Construction activities for the proposed facilities at KLC would result in the disturbance of approximately 174,000 square meters (43 acres) of topsoil. Although topsoil removal would not impact underlying bedrock, some amount of the area's geologic material could be used for road and foundation work. Adverse impacts to the remaining geologic and soil resources would not be expected. Some erosion would be expected at slopes of 7 percent and greater; however, soil erosion control practices, implemented through the Stormwater Pollution Prevention Plan, would keep erosion damage to a

minimum. Changes in soil pH due to acid deposition from launch combustion products would not be expected; KLC soils have a high cation exchange capacity.

## **Noise**

Minor impacts from noise would occur during construction of the proposed KLC, during pre-launch operations, and during launches. Adverse impacts to the occupational health of construction personnel are not expected because workers near activities producing unsafe noise levels would be required to wear hearing protection and worker exposure times would be limited according to standards set by the Occupational Safety and Health Administration. Launch noise would be audible on Kodiak Island for a distance of approximately 19 kilometers (12 miles) for approximately 1 minute. Sonic booms would be heard only on the open ocean. Given the infrequency and short duration of launches, adverse impact to the public is expected to be minimal. Noise levels outside of the Launch Control and Management Center, in which site personnel would be located during a launch, would be within OSHA standards.

## **Ecological Resources**

Construction of the proposed KLC would require clearing, grading, or disturbance of approximately 174,000 square meters (43 acres) of native vegetation. The removal of vegetation would create a reduction in available habitat for birds and mammals. The vegetation types that would be disturbed are abundant on the proposed KLC site and are not considered high-quality wildlife habitat; therefore, impacts to bird and mammal populations would be small.

The noise and activity of construction would cause some disruption to wildlife, causing departure from the immediate area of construction. Construction activity would take place more than 910 meters (3,000 feet) away from a presumed eagle nest site on Narrow Cape and would not be visible from the nest. At this distance, construction noise would be less than 70 dBA and would not be expected to disturb nesting eagles. AADC will advise its construction workers to remain alert to the presence of any eagle nest and will advise the U.S. Fish and Wildlife Service if a nest is found on the construction site.

Launch-related noise could impact terrestrial mammals in the form of species-specific startle responses and possible temporary hearing impairment, but these impacts are expected to be minor, short-term, and localized. Noise impacts to land birds at the proposed KLC would be minimal since startle disturbances are anticipated only during launches, causing birds within an approximate 8- to 10-kilometer (5- to 6-mile) radius of the proposed KLC to fly away from nesting sites, then return within several minutes. Launch-related noise would temporarily disrupt normal activities (resting, feeding, grooming) of

pinnipeds and sea otters, but long-term changes in behavior patterns are not expected. Two Federally-listed endangered whale species migrate through the area in spring and fall but would not be measurably affected by infrequent launches from the proposed KLC. The Steller sea lion, a Federally-listed threatened species, and the Steller's eider, a Federally-proposed threatened species, could be disturbed by launch noise; however, disturbances would be brief and noise levels expected from launches would not be anticipated to have a lasting impact.

Substantial impacts to vegetation from the deposition of launch combustion products, primarily hydrogen chloride and aluminum oxide, are not expected. For birds that would receive direct exposure to launch emissions, some harmful effects would be expected; however, few birds would be exposed to the plume since the launch activity is expected to frighten most birds away from the immediate area. Predicted ground-level concentrations of emission products (hydrochloric acid and aluminum oxide) are relatively low; therefore, impacts from toxicity to terrestrial mammals would not be expected. Since these compounds would be dispersed over a large area and immediately diluted and/or neutralized by receiving waters, direct (i.e., acute or chronic health effects) or indirect (i.e., damage to prey species) impacts to marine mammals would not be expected from these chemical releases.

Land-clearing during construction would be carefully planned and temporary; therefore, impacts to down-gradient streams are not likely, and impacts to the freshwater fisheries resources of Narrow Cape are not expected. Measurable impacts to stocked trout, native game fish, and non-game fish are not expected from atmospheric releases of hydrogen chloride and attendant pH changes. Anadromous and marine fisheries would not be affected by construction or operation of the proposed KLC.

### **Launch Safety**

AADC would initiate a flight safety program to protect the public, range participants, and property from the risk created by conducting launch operations, based on the safety regulations in force at U.S. government launch facilities. Proposed KLC facilities would be located so that launch vehicles would fly primarily over open water, minimizing the risk to the public should flight termination be necessary. The flight safety program would result in a total public casualty risk, for all mission activities, that would be less than 1 in 1,000,000.

### **Land Use**

Approximately 174,000 square meters (43 acres) of land would be converted to commercial use from its current use for grazing; land use for the rest of the 13-square kilometer (3,100-acre) site would remain



unchanged. The proposed KLC site is state-owned land and represents less than one-tenth of 1 percent of the state-owned land area in the Kodiak Island Borough. The proposed action underwent a review for consistency with standards established under the Alaska Coastal Management Program (Alaska Administrative Code, Title Six, Chapter 80) and was issued a final consistency determination. These standards require that there be balanced utilization and protection of coastal lands and waters, and that there is a higher priority for uses that are economically or physically dependent on a coastal location when compared to uses that do not require a coastal location.

### **Socioeconomics**

Construction of the proposed KLC would result in expenditures of approximately \$18 to \$24 million on goods and services, which would support the construction industry as well as have an indirect positive effect on the local economy. Adverse impacts on community resources and infrastructure are not expected because the population increase due to construction of the facility would be small (an estimated 45 employees) and temporary (18 month construction schedule). Permanent employment opportunities associated with operation of the facility would be limited because each launch customer is expected to bring its own professional staff for temporary assignments; it is estimated that each launch could require as many as 20 local workers.

### **Recreation**

Impacts to recreational resources would be small. The site would be closed immediately before and during launch activities but would remain open for recreational activities at all other times. It is expected that launches would present additional recreational opportunities because AADC would work with local government and community groups to arrange for viewing sites and bus transportation for interested residents to view launches.

### **Visual Resources**

The construction and operation of the proposed KLC would affect the visual resources of Narrow Cape by placing five new man-made structures into the area. Due to the flat terrain of the Narrow Cape site, the Launch Service Structure, which would be 52 meters (170 feet) in height, would be visible over most of the cape and from offshore. Care during and after construction to return areas adjacent to the structures and site access roads to their pre-construction condition would mitigate visual impacts. The visual impact of the structures themselves would be minimized by painting them a color (steel blue or gray) that would

blend into the background of the most common viewing angles. The isolation of the site and limited number of viewers further diminish visual impacts.

### **Cultural Resources**

Cultural resources would not be directly impacted because none have been noted in the area to be developed. Based upon consultation with the State Historic Preservation Officer (SHPO), there are no properties in, or eligible for inclusion in, the National Register of Historic Places within the project's area of potential effect. However, two archaeological sites and a complex of World War II era facilities in the vicinity of proposed construction could experience indirect impacts due to the increase of human activity associated with construction and operation of the proposed KLC. As recommended by the SHPO, these two sites will be taken into account in future overall facility planning.

### **Hazardous Materials And Waste Management**

Construction of the facilities at the proposed KLC would use small quantities of hazardous material that would result in the generation of some hazardous and non-hazardous wastes. The use, management, and disposal of the materials would be handled so that impacts to the environment would be small.

### **Public Involvement**

AADC has obtained public input on its proposed operation of a launch site through legislative approval in open session, open Board meetings, public presentations, meetings, hearings, media coverage, and a citizens advisory committee. From December 1993 through March 1996, AADC has sponsored or participated in 35 events in Kodiak and Chiniak presenting and discussing facts related to the siting, construction, and operation of the proposed KLC. Total attendance by the public has exceeded 600 individuals. In addition, AADC officials have participated in two separate radio call-in shows and responded to 16 callers. Finally, OCST will afford the public the opportunity to review a proposed Finding of No Significant Impact for 30 days because the proposed action, licensing a commercial space launch site, is one without precedent.

### **SUMMARY**

Overall, the construction and operation of the proposed KLC would produce little or no adverse impact to the quality of air, water, or soil in the area. Disturbance of vegetation during construction would result in short-term, localized impacts to birds and mammals. Launch noise is expected to temporarily disturb

seabirds and mammals resting and feeding in a 13-kilometer (8-mile) radius of the proposed KLC, but long-term impacts are not expected. Risks to the public would be small and limited to those experienced at existing national launch complexes. Small impacts to recreational and visual resources would be expected. Socioeconomic impacts to Kodiak Island and the state would be beneficial.