Seward Highway to Glenn Highway Connection

Draft Environmental Impact Statement

Draft (as of July 2011)

Alaska Department of Transportation and Public Facilities
P.O. Box 196900
Anchorage, AK 99519-6900

Federal Project No: NH-000S(588)
AKSAS Project No. 58544

Seward Highway to Glenn Highway
MULTIMODAL SOLUTIONS
moving people and goods

July 2011

Executive Summary

1.1 Study Intent
- 1.1.1 What is this project?
- 1.1.2 Where did this project come from?
- 1.1.2.1 What studies preceded this project?
- 1.1.3 Who is leading this project?
- 1.1.4 What is this EIS document for?
- 1.1.5 What stage are we at in the process?
- 1.1.6 What happens now? What happens next?

1.2 Study Area
- 1.2.1 Where is it?
- 1.2.2 What is it?

1.3 Contents
- 1.3.1 How should I use this document?
- 1.3.2 What is covered in this document?

Master List of Acronyms and Abbreviations

	A Legacy for Users
AAC	Alaska Administrative Code
AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AC	Advisory Circular
AC&W	Aircraft Control & Warning
ACMA	Alaska Coastal Management Act
ACMP	Alaska Coastal Management Program
ACS	American Community Survey
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AEA	Alaska Energy Authority
AEIC	Alaska Earthquake Information Center
AFD	Anchorage Fire Department
AHA	Alaska Housing Authority
AHRS	Alaska Heritage Resources Survey
AMATS	Anchorage Metropolitan Area Transportation Solutions
AMP	Airport Master Plan
ANHC	Anchorage Neighborhood Health Center
APD	Anchorage Police Department
APDES	Alaska Pollution Discharge Elimination System
APE	Area(s) of Potential Effect
APP	Anchorage Pedestrian Plan
ARC	Alaska Road Commission
ARC	Airport Reference Code
ARRC	Alaska Railroad Corporation
AS	Alaska Statute
ASD	Anchorage School District
ASHA	Alaska State Housing Authority
AST	Above-ground Storage Tank
AWMP	Anchorage Wetlands Management Plan
BG	block group
BGS	below ground surface
BLM	U.S. Bureau of Land Management
BMP	best management practice
BP	before present
BRL	Building Restriction Line
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
BTU	British Thermal Unit
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CBC	Christmas Bird Count
CBD	Central Business District
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act

CFR	Code of Federal Regulation
CGP	Construction General Permit
CH_4	methane
CIA	Community Impact Assessment
CINA	Cook Inlet Native Association
CIRI	Cook Inlet Region, Inc.
CO	carbon monoxide
CO_2	carbon dioxide
CRC	Cultural Resource Consultants, LLC
CSP	Community Services Patrol
CU	Community Use
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibel
DCOM	Department of Ocean and Coastal Management
DEC	Department of Environmental Conservation
DEIS	draft environmental impact statement
DEW	Distance Early Warning
DHHS	U. S. Department of Health and Human Services
DHSS	Alaska Department of Health and Social Services
DNR	Department of Natural Resources
DOE	Determination of Eligibility
DOT&PF	Alaska Department of Transportation and Public Facilities
DRO	Diesel Range Organics
EAFB	Elmendorf Air Force Base
EAST	*East Anchorage Study of Transportation*
EFH	Essential Fish Habitat
EIS	environmental impact statement
EJ	environmental justice
ELL	English Language Learners
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESA	Environmental Site Assessment
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FEIS	final environmental impact statement
FEMA	Federal Emergency Management Agency
FHA	Federal Housing Administration
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FTA	Federal Transit Administration
GHG	greenhouse gases
GIS	geographic information system
GPD	gallons per day
GPM	gallons per minute
GPS	global positioning system
GRO	Gasoline Range Organics
H2H	Seward Highway to Glenn Highway Connection or Highway-to-Highway project
HAND	Municipality of Anchorage Housing and Neighborhood Development Commission

HOV	high-occupancy vehicle
HUD	Housing and Urban Development
IHS	Interstate Highway System
ISA	Initial Site Assessment
JBER	Joint Base Elmendorf-Richardson
KOP	key observation viewpoint
kV	kilovolt
LEP	limited English proficiency
L_{eq}	equivalent sound level
$L_{eq(h)}$	hourly equivalent sound level
LOS	level of service
LRTP	*Anchorage Bowl 2025 Long Range Transportation Plan with 2027 Revisions*
LUST	Leaking Underground Storage Tank
LWCF	Land and Water Conservation Fund
$\mu g/m^3$	micrograms per cubic meter
MAG	Mitigation Advisory Group
MBTA	Migratory Bird Treaty Act
MFL	Merrill Field Landfill
ML&P	Anchorage Municipal Light & Power
MOA CMP	Anchorage Coastal Management Plan
MOA	Municipality of Anchorage
MPO	Metropolitan Planning Organization
MS4	municipal separate storm sewer
MSAT	Mobile Source Air Toxic
MSB	Matanuska-Susitna Borough
N_2O	nitrous oxide
NAACP	National Association for the Advancement of Colored People
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NATA	National Air Toxics Assessment
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGO	non-government organization
NHPA	National Historic Preservation Act
NHS	National Highway System
NHTSA	National Highway Traffic Safety Administration
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_X	nitric oxide and nitrogen dioxide
NPDES	National Pollution Discharge Elimination System
NR	Natural Resource
NRHP	National Register of Historic Places
NSB	North Slope Borough
NTU	nephelometric turbidity units
NU	Neighborhood Use
NWI	National Wetlands Inventory
O_3	ozone
OHA	Office of History and Archaeology
ONRW	outstanding national resource waters
P&N	Purpose and Need

Pb	lead
PCBs	Polychlorinated Biphenyls
PCE	Primary constituent element
PCE	Tetrachloroethene
PM	particulate matter
ppm	parts per million
PSA	public service announcement
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation Recovery Act
ROD	Record of Decision
ROFA	Runway Object-Free Area
ROW	Right of Way
RPZ	Runway Protection Zone
RRO	Residual Range Organics
RSA	Runway Safety Area
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act:
SE	socioeconomic
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide
SSC	Species of Special Concern
SU	Special Use
TC	Trails and Connections
TCE	Trichloroethene
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
TNM	Federal Highway Administration Traffic Noise Model® (Version 2.5)
UAA	University of Alaska Anchorage
UAF	University of Alaska Fairbanks
U-Med	University-Medical District
Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
USACE	U.S. Army Corps of Engineers
USARAK	U.S. Army Alaska
USC	United States Code
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
V/C	volume to capacity
VMT	vehicle miles traveled
VOC	volatile organic compound
WACS	White Alice Communication Systems

Chapter 1: Purpose and Need

Table of Contents

1.1 INTRODUCTION 1
1.2 BACKGROUND 1
1.3 HISTORICAL OVERVIEW AND ANCHORAGE PLANNING 4
1.3.1 Historical Overview 4
1.3.2 Anchorage Planning 7
1.4 BACKGROUND DATA 9
1.5 REGIONAL POPULATION TRENDS 9
1.6 MAJOR DESTINATIONS 10
1.7 TRAVEL PATTERNS 11
1.8 MODES OF TRAVEL 11
1.8.1 Single-Occupant Vehicles 11
1.8.2 Freight Trucks 11
1.8.3 Carpools 11
1.8.4 Vanpools 12
1.8.5 Buses 12
1.8.6 Walking Trips 12
1.8.7 Bicycling Trips 13
1.9 PURPOSE OF AND NEED FOR ACTION 14
1.9.1 Purpose 14
1.9.2 Transportation Needs 14
Need 1: Congestion 14
Need 2: Travel Efficiency 19
Need 3: Neighborhood Connectivity 20
Need 4. Improve Safety 22
Need 5. Improve Modal Interrelationships 25
1.10 PROJECT OBJECTIVES 27
1.10.1 Need 1. Reduce Congestion 27
1.10.2 Need 2. Improve Travel Efficiency 28
1.10.3 Need 3. Improve Neighborhood Connections 28
1.10.4 Need 4. Improve Safety 28
1.10.5 Need 5. Improve Modal Interrelationships 28
1.11 BIBLIOGRAPHY 29

DRAFT

List of Tables

Table 1-1. Population Growth 10
Table 1-2. Comparison of Level of Service at Major Intersections on the Existing Arterial Connection during A.M. and P.M. Peak Hours in 2010 and 2035 15
Table 1-3. Pedestrian and Bicycle Crashes (1998–2002) 24

List of Figures

Figure 1-1. Regional Map 2
Figure 1-2. Project Area 3
Figure 1-3. H2H Project Planning History 6
Figure 1-4. Relationship of Transportation Planning Efforts and Decision Making 8
Figure 1-5. Bus Ridership 12
Figure 1-6. Existing Trails 13
Figure 1-7. Level of Service Categories for Road Segments 15
Figure 1-8. Intersection and Segment Level of Service (2010) 17
Figure 1-9. Predicted Intersection and Segment Level of Service in 2035 under the No Action Alternative 18
Figure 1-10. Neighborhood Connectivity 21
Figure 1-11. Vehicle and Pedestrian Accident Data 23
Figure 1-12. Gambell Street and 15th Avenue 24
Figure 1-13. Transit Network Impeded by Congestion 26

DRAFT

1.1 INTRODUCTION

The Seward Highway to Glenn Highway Connection project is being undertaken by the Alaska Department of Transportation and Public Facilities (DOT&PF) (Joint Lead Agency), Federal Highway Administration (FHWA) (Federal Lead Agency), and the Federal Transit Administration (FTA) (Joint Federal Lead Agency) in cooperation with the Municipality of Anchorage (MOA) (Cooperating Agency) and the U.S. Army Corps of Engineers (USACE) (Cooperating Agency). These agencies propose to improve mobility and access for people and goods that use the arterial connection between the Seward and Glenn highways in Anchorage, Alaska. As the proposed action, historically referred to as the Highway-to-Highway or H2H project, would use federal transportation funds it is a federal action. To comply with the National Environmental Policy Act (NEPA), an environmental impact statement (EIS) is being prepared. For this EIS, the proposed construction year evaluated is 2015, and the project design year is 2035.

Project Team Mission Statement: The team will approach the project development process as a collaborative effort involving residents, businesses, and agencies in a meaningful dialog. We will develop context sensitive design and mitigation approaches to avoid and minimize community and natural resource impacts and balance community values. The team will develop a project that best meets the purpose and needs for the improvement, preserves or enhances community values, and supports the vision for the H2H project expressed in the AMATS Long Range Transportation Plan while evaluating a broad range of alternatives.

Pursuant to the Council on Environmental Quality Regulations, 40CFR§1502.13 and FHWA's Technical Advisory T6640.8A, the Purpose and Need Statement identifies and describes the proposed action and the transportation problems or other needs that the agencies intend to address with the project. It also forms the basis for determining the range of alternatives considered in the EIS, including the No Action Alternative. The purpose and need for this project was developed based on previous planning studies; travel demand modeling; and public, agency, and tribal input.

1.2 BACKGROUND

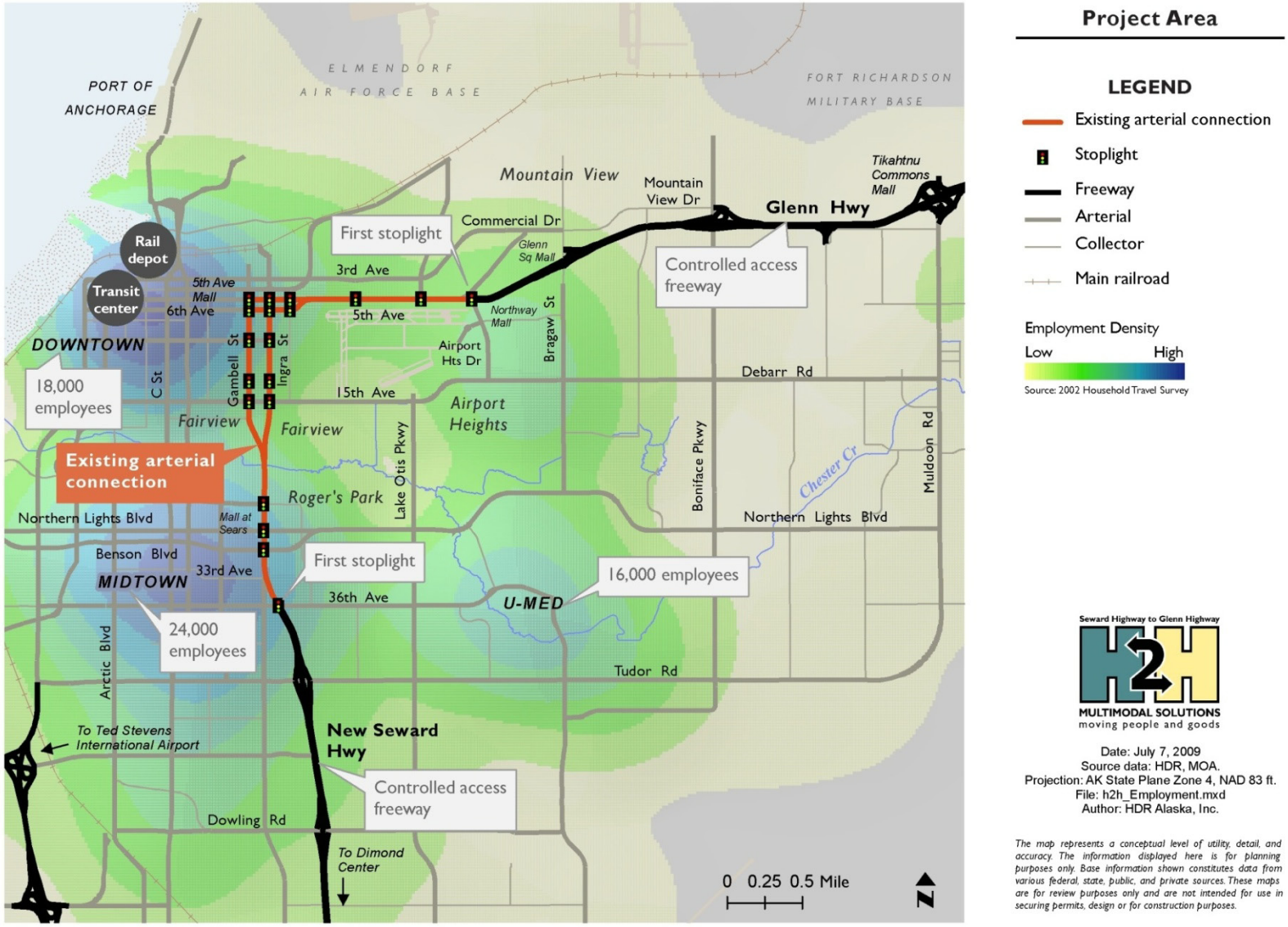
The Seward and Glenn highways are divided, controlled-access freeways[1] that approach the Downtown and Midtown areas of Anchorage. The freeways transition into urban arterial streets with intersecting roads, stop lights, and commercial and residential access. See Figure 1-1 and Figure 1-2.

The Seward and Glenn highways connect major local destinations within Anchorage and other regional destinations in Alaska and the lower 48 states via Canada. As Alaska's largest city, Anchorage is a major center for industry and commerce in the state. According to Anchorage's Metropolitan Planning Organization (MPO), the Anchorage Metropolitan Area Transportation Solutions (AMATS), the Seward and Glenn highways are the only road links that connect the Anchorage metropolitan area to the remainder of Alaska. Anchorage "relies heavily on transportation infrastructure and services for mobility, economic activity, and connectivity to deliver goods and services" (AMATS 2007a).

[1] A controlled-access freeway is a divided highway designed for the unimpeded flow of large traffic volumes. Access to a freeway is rigorously controlled, and intersection grade separations are required (http://www.fhwa.dot.gov/planning/glossary/glossary_listing.cfm).

Figure 1-1. Regional Map

Figure 1-2. Project Area



The Glenn and Seward Highways, including the existing arterial connection[2], are part of the National Highway System (NHS)[3] and designated as Interstate Highway System (IHS)[4] routes. The NHS and IHS are federal designations for highways that serve a region's major destinations, such as population centers, ports, airports, public transportation facilities, and military installations (FHWA 2008). The IHS is a network of highways and is a subset of the NHS. Nationwide, the IHS is typically built to the highest functional classification: controlled-access freeway. In Figure 1-2, the heavy black line depicts the access-controlled freeway portions of the Glenn and Seward highways. The orange line depicts the existing arterial connection.

Seward Highway in Anchorage, facing south, early 1960s.

Source: Anchorage Museum Archives

In Anchorage, the Seward and Glenn highways, including the existing arterial connection, serve NHS and IHS functions. They provide access to major destinations such as population centers to the north (Wasilla, Palmer, Eagle River, and Chugiak) and south (Indian, Bird, and Girdwood) (see Figure 1-1); employment centers in Downtown, Midtown, and the University-Medical District (U-Med); transportation hubs such as the Port of Anchorage, the rail depot, the Downtown Transit Center, and the Ted Stevens Anchorage International Airport; and military installations at Elmendorf Air Force Base and Fort Richardson Military Base (see Figure 1-2).

1.3 HISTORICAL OVERVIEW AND ANCHORAGE PLANNING

1.3.1 Historical Overview

The Seward Highway and Glenn Highway were constructed during the 1940s and terminated at the edges of developed Anchorage (approximately 15th Avenue to the south and Bragaw Street to the east). By the late 1960s, Anchorage's population had grown by expanding to the east and to the south, as had the population of the Matanuska-Susitna Valley communities to the north. These increases in local and regional population caused increased traffic on roads and highways in Anchorage that accessed major employment, commercial, and industrial centers. In response to the increasing travel demand, and in order to improve travel efficiency to developing residential and industrial areas southward, the Seward Highway was upgraded to a four-lane freeway with frontage roads (AMATS 1976). Similarly, the Glenn Highway was upgraded to a six-lane freeway to accommodate growth to the north and the east. The existing arterial connection was not upgraded to a freeway but remained as arterial streets.

As a result of the continued population growth and urban development patterns, congestion on the existing arterial connection continued to increase. To address the problem, the existing arterial streets were widened, and one-way couplets were built to handle the traffic (Gambell-Ingra couplet and 5th–6th

[2] This project defines the "existing arterial connection" as the New Seward Highway from 36th Avenue north to Fifth Avenue (including Ingra and Gambell streets) and the Glenn Highway from Airport Heights Drive west to Gambell Street (including the East Fifth Avenue and the Fifth–Sixth Avenue couplet).

[3] **National Highway System (NHS).** The National Highway System shall: "(A) serve major population centers, international border crossings, ports, airports, public transportation facilities, and other intermodal transportation facilities and other major travel destinations; (B) meet national defense requirements; and (C) serve interstate and interregional travel." (23 USC 103[b])

[4] **Interstate Highway System (IHS).** The Dwight D. Eisenhower National System of Interstate and Defense Highways "shall be located so as–(i) to connect by routes, as direct as practicable, the principal metropolitan areas, cities, and border points with routes of continental importance in Canada and Mexico." (23 USC 103[c])

Interstate highways are a subset of the broader National Highway System. Both are part of the Federal-Aid Highway Program that provides substantial funding to state transportation agencies. (23 USC 103[b])

avenue couplet) shortly after the 1964 earthquake. Despite wider arterial streets and one-way couplets, population growth has caused traffic to continue to increase on the existing arterial connection, thus resulting in congestion. Over the past 40 years, locally adopted transportation plans and studies continued to identify the need to improve the existing arterial connection and recommended strategies to do so; however, public concern about the proposed freeway concept prevented the plans from becoming projects.

Most recently, the congestion problems on the existing arterial connection were studied in detail in the AMATS *Anchorage Bowl 2025 Long-Range Transportation Plan, with 2027 Revisions* (LRTP). The development of the LRTP included extensive public involvement and study of existing transportation problems, planned development patterns, and transportation needs in the Anchorage Bowl. The LRTP proposed and adopted a freeway-class project to address the congestion on the existing arterial connection. The LRTP states:

> *Seward Highway is the dominant north-south traffic corridor in the Anchorage Bowl.*[5] *North of 36th Avenue, the highway transitions into an arterial street, eventually evolving into the Gambell-Ingra- streets arterial couplet. Very heavy traffic volume at 36th Avenue overwhelms the arterial portion of the Seward Highway and the Ingra-Gambell streets couplet farther north. A virtual traffic blockage occurs in an "L-shaped" area from the Glenn Highway at Airport Heights to Ingra-Gambell Street and then down the couplet and Seward Highway to 36th Avenue. Congestion brings north-south traffic to a standstill and creates a barricade for east-west traffic. Drivers move to alternative routes to avoid getting caught in the gridlock. (AMATS 2007a, 68)*

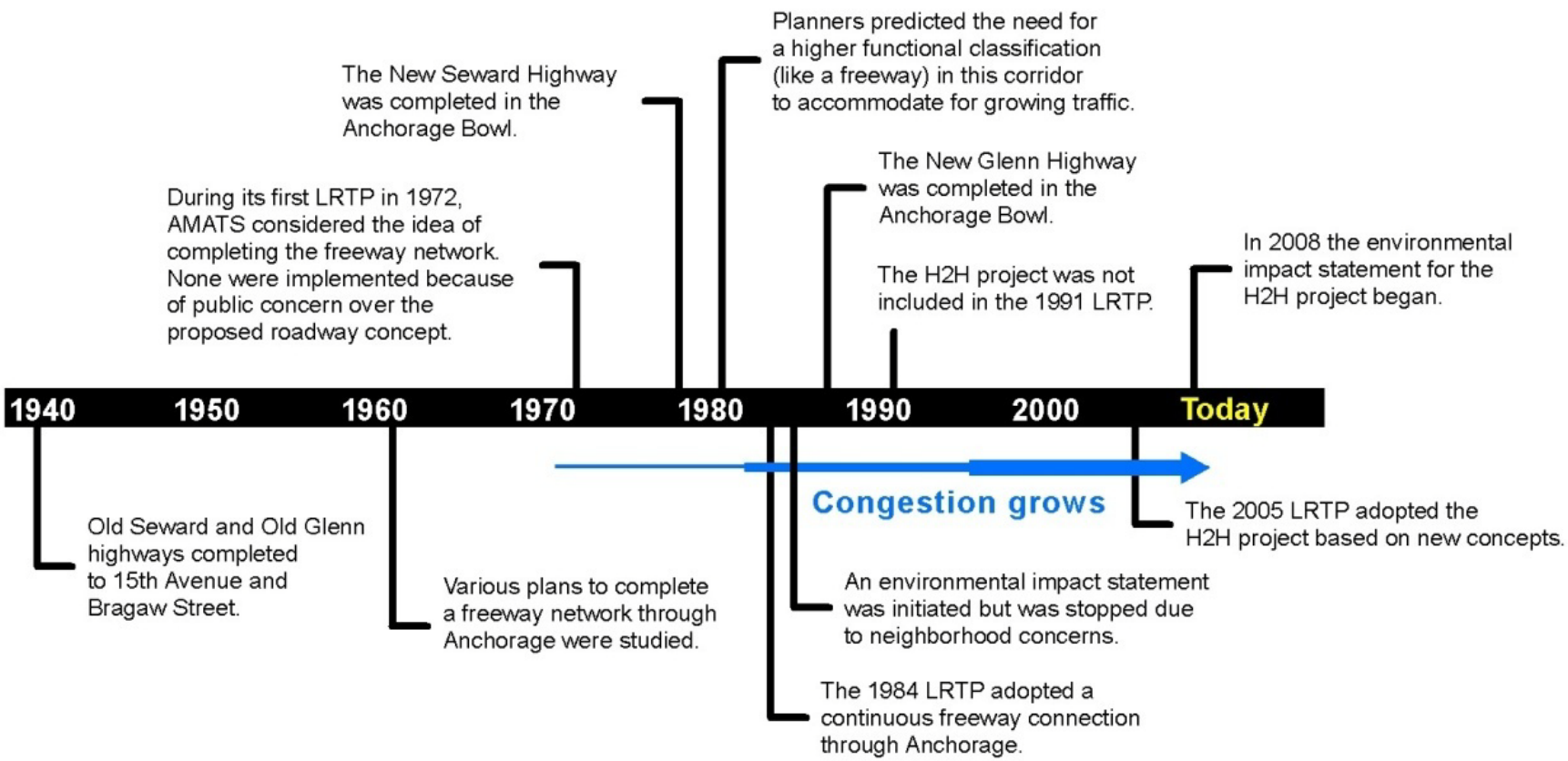
The LRTP was adopted by the policy committee of the AMATS in 2005 and again with revisions in 2007. Figure 1-3 illustrates the planning history for the H2H project.

The 2008 Alaska Statewide Long-Range Transportation Policy Plan also recognizes the H2H project as a top priority to address high demand for additional capacity on urban highways in Alaska (page 20). H2H is recognized as a critical piece of NHS that needs to be modernized to current standards to address safety and connectivity. The plan notes that improvement of this and other urban highways will "result in reduced delay, fewer crashes, and less air pollution from idling vehicles" (page 20).

DRAFT

[5] The Anchorage Bowl occupies about 112 square miles and is bounded by Chugach State Park, Knik and Turnagain Arms, Elmendorf Air Force Base (Elmendorf), and Fort Richardson Military Base (Fort Richardson).

Figure 1-3. H2H Project Planning History

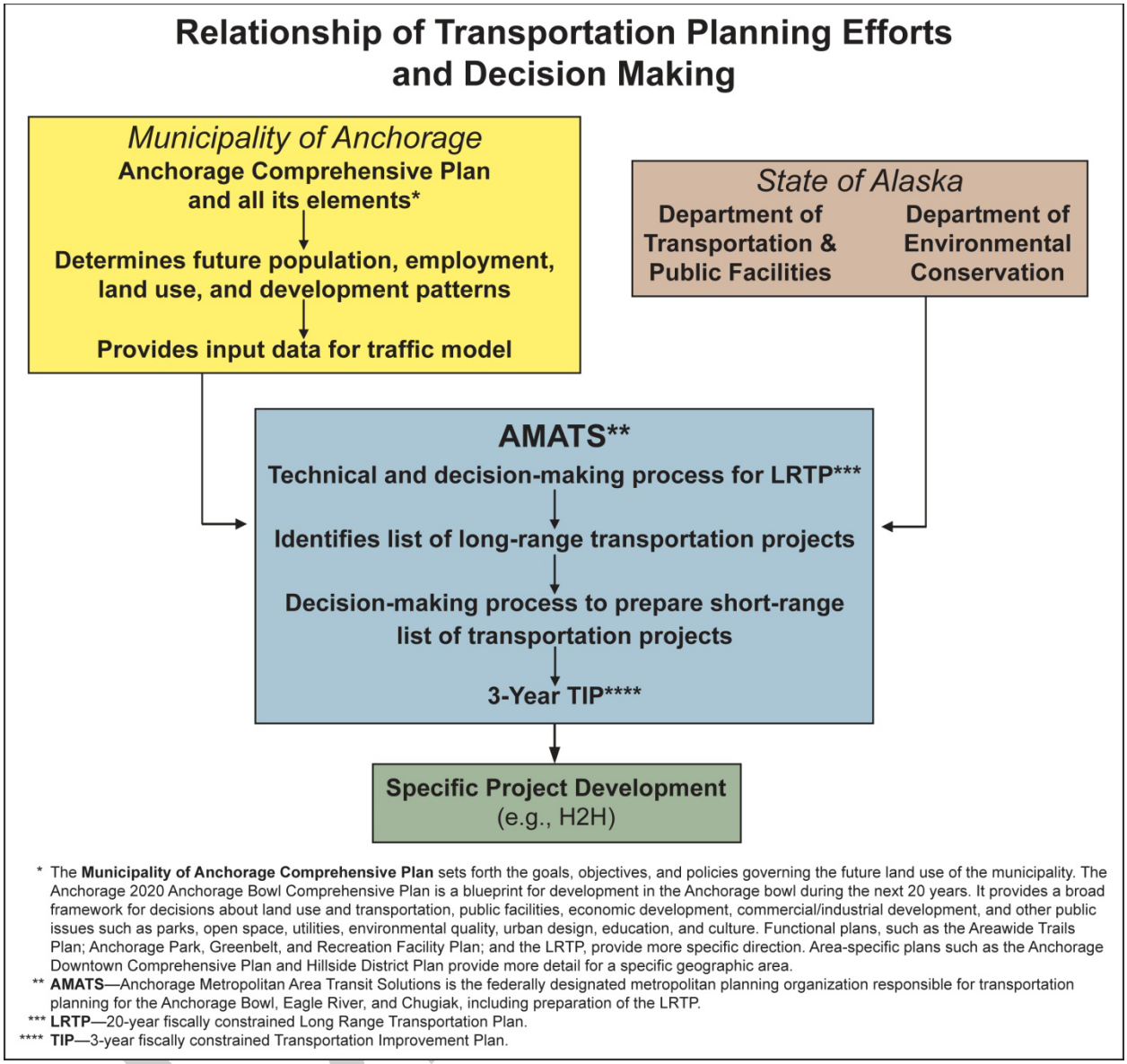


1.3.2 Anchorage Planning

Anchorage 2020: Anchorage Bowl Comprehensive Plan (Anchorage 2020) is a "blueprint to guide development in the Anchorage Bowl" and "provides a framework for decisions about land use and transportation" (page 3). The land use policy context is established through goals and policies in Anchorage 2020. Anchorage 2020 (page 48) identifies that "the safe, efficient movement of people and goods throughout town is vital to the quality of life and the local economy." The plan recognizes that improvements may be made to selected roadways based on additional studies like those done in the LRTP. The comprehensive plan is general in nature and is refined through functional plans like the LRTP. The 2007 LRTP (pages 114–117) provides more specific definition of the H2H concept. Through its adoption by the AMATS policy committee, of which the DOT&PF has voting membership, the LRTP also established a joint Municipal-State vision for the H2H project (see Figure 1-4).

DRAFT

Figure 1-4. Relationship of Transportation Planning Efforts and Decision Making



The project has now moved into project development under NEPA. The Purpose and Need Statement represents the goals of the lead and cooperating agencies in implementing the project.

LRTP Vision. The LRTP envisions the H2H project as reducing congestion with a high-capacity highway designed to serve trips to major destinations within the MOA, while reducing traffic on neighborhood streets. According to the plan, the H2H project would have depressed sections of highway through residential areas covered with features such as landscaping, parks, or other community enhancements. It would also reconnect key neighborhood streets over the depressed highway, and improve neighborhood connectivity with trails and sidewalks. The LRTP (page 115) also notes that *Anchorage 2020* land use policies for eastern Downtown and western Fairview are intended to allow for development of critical housing units needed near Downtown. The LRTP indicates that the H2H project should complement *Anchorage 2020* policies for infill and redevelopment in this urban area through careful design consideration. The plan hopes that the project could in turn spur economic development in

eastern Downtown and western Fairview. In response to these vision goals, the LRTP identified a solution for the corridor in close coordination with the public that resulted in the following objectives:

- The project design should enhance east-west neighborhood street connectivity.
- The project should provide decking over the facility for open spaces that create a neighborhood focus and integrate with abutting neighborhoods.
- The project would allow Gambell and Ingra Streets to be two-sided, north-south streets.
- The project would be designed to provide space for high-density residential and limited mixed-use development.

The current effort represents a continuation of the project development process by transitioning from regional transportation planning to the development of a specific project. This will require verifying the transportation problems identified previously in much greater detail and developing a comprehensive set of project needs and a responsive range of solutions. This more detailed process will benefit from the use of a similar comprehensive and meaningful consultation with the public and stakeholders and may yield build alternatives that vary from the LRTP concept in location, facility type, and related offsetting mitigation. The intent is to develop an improvement that balances positive and negative effects while striving for consistency with the goals of Anchorage 2020 and other applicable local, state and federal guidance.

1.4 BACKGROUND DATA

The places where the population lives and works and the locations of major destinations, both for individual and commercial needs, play an important role in determining travel demand. Travel patterns and behavior are the basis for estimating the demand for travel, which in turn helps to provide information on what kinds of transportation improvements would meet existing and future transportation needs. This section provides background data on population, major trip generators, and travel patterns in Anchorage as well as the outlying communities to the north such as Chugiak, Eagle River, Wasilla, and Palmer within the Matanuska-Susitna Borough (MSB). Finally, this section looks at the modes of travel that are available to access the major trip generators.

1.5 REGIONAL POPULATION TRENDS

Population growth is one of the most important factors in determining future travel demand. Large increases in population over an extended period can cause substantial increases in travel demand, which results in congestion on roads if capacity does not keep up with demand. For the existing arterial connection, the important growth areas include Anchorage, the MSB, and the Chugiak–Eagle River area. As shown in Table 1-1, those areas are expected to experience rapid population growth. The greatest growth percentage is expected in the MSB at 92 percent, followed by Chugiak–Eagle River at 87 percent (between 2002 and 2025). As discussed below, workers from these communities commute on the Glenn Highway through the existing arterial connection to access employment centers in Anchorage. As the population grows, it is expected that traffic to Downtown Anchorage and Midtown would increase. The expected growth in the Anchorage Bowl would also increase traffic on the Seward Highway. Growth south of the Anchorage Bowl in Girdwood was also reviewed, but there is not a population forecast for many of the small communities in this area. Available data shows that in 2005 Girdwood had a population of 2,130, and it is expected that the population will be 4,090 in 2024.

DRAFT

Table 1-1. Population Growth

Area	2002	2025 Forecast	Numeric Change	2002–2025 Growth (%)
Anchorage Bowl	237,160	302,330	65,170	28
Chugiak–Eagle River	31,540	58,870	27,330	87
MSB	65,800	126,600	60,800	92
Total	334,500	487,800	153,300	46

Source: AMATS 2007a

1.6 MAJOR DESTINATIONS

Major destinations in Anchorage include employment centers; military bases; intermodal port, rail, transit, and airport facilities; and shopping and retail centers. Travel destinations are dispersed in Anchorage, but these major activity centers attract large numbers of trips. The NHS, including the Seward and Glenn highways and the existing arterial connection, is the key connection for people and goods to travel to these major destinations.

Major Non-military Employment Centers: The *MOA 2020 Comprehensive Plan*, the blueprint for land use and development in the Anchorage Bowl, identifies three major employment centers: Downtown, Midtown, and the U-Med District (MOA Planning 2001). These three centers are currently the largest employment centers in Anchorage. In the most recently published documents, Midtown was the largest employment center with an estimated 24,350 employees (MOA Planning 2009); Downtown had 18,300 employees (MOA Planning 2007); and the U-Med District had 16,000 employees (DOT&PF 2009).

Military Bases: As an IHS route, the existing arterial connection is part of the Strategic Highway Network, which is part of the NHS. The Strategic Highway Network is important to the United States' strategic defense and provides access, continuity, and emergency capabilities for defense purposes (FHWA 2008). The Seward and Glenn highways and the existing arterial connection provide access and mobility for both Elmendorf Air Force Base and Fort Richardson Army Base.

These military bases are important employment centers and are key contributors to the economy. The military (primarily Air Force and Army) is the largest employer in the Anchorage area (Alaska Department of Labor and Workforce Development 2006). A significant number of military personnel live off base and commute to the military bases for work. In 2005, there were 6,703 active-duty military on Elmendorf Air Force Base with 56 percent living off base and 4,066 active-duty military on Fort Richardson with 23 percent living off base (Alaska Department of Labor and Workforce Development 2006). Civilian employees who live in and around Anchorage also work on base. Combined, these two military installations had a civilian employment of 2,600 employees (Alaska Department of Labor and Workforce Development 2006).

Intermodal Port, Rail, Transit, and Airport Facilities: Goods transported to and from the Port of Anchorage and Ted Stevens Anchorage International Airport are trucked to and from local distribution centers, warehouse stores, and outside of Anchorage to both the north and south using the existing arterial connection and the Seward and Glenn highways. The Alaska Railroad Corporation's (ARRC) downtown rail depot and People Mover's Downtown Transit Center are also accessed using the existing arterial connection (see Figure 1-2).

Shopping and Retail Centers: Shopping and retail centers are key destinations for shoppers and freight haulers. Anchorage's largest shopping areas are accessed from the Seward and Glenn highways and the existing arterial connection. These shopping areas include the Dimond Center (south Anchorage), the Mall at Sears (Midtown), the Fifth Avenue Mall (Downtown), the Northway Mall (east Anchorage), and two new malls in east Anchorage: the Glenn Square Mall and the Tikahtnu Commons Mall (see Figure 1-2).

DRAFT

1.7 TRAVEL PATTERNS

Only a small percentage of travelers (less than 10%) drive all the way through the study area on the Seward and Glenn Highways. Most of the trips using the existing arterial connection are headed to major destinations within the study area. The primary destinations during the peak commuting periods from both the north and the south are the Downtown, Midtown, and U-Med employment centers and the local military installations. Many people who access the major destinations in Anchorage commute from Eagle River, Chugiak, and the MSB. About 85 percent of all workers who live in Chugiak and Eagle River and 29 percent of all workers who live in MSB commute to the Anchorage Bowl with the Glenn Highway providing primary access (U.S. Census Bureau 2006). Of those, nearly 43 percent of Chugiak–Eagle River commuters and 45 percent of MSB commuters work in Downtown and Midtown. For the Seward Highway, about 44 percent of the traffic is headed to the Downtown, Midtown, the U-Med District, and South Anchorage areas. Another 12 percent is headed to the Ship Creek–Elmendorf Air Force Base area (DOT&PF 2009a). Because the above-listed employment centers are close to the existing arterial connection, many of these commuters use the existing arterial connection for travel.

1.8 MODES OF TRAVEL

The Seward and Glenn highways and the existing arterial connection provide access to major destinations by supporting mobility for single-occupant vehicles and multiple modes of travel including freight trucks, carpools, vanpools, buses, walking, and bicycling.

1.8.1 Single-Occupant Vehicles

The LRTP states that 90 percent of the trips in Anchorage are made in personal vehicles, either as drivers or passengers (AMATS 2007a). According to the 2007 *Status of the System* and the U.S. Census, 68 percent of the trips made to work were made by people driving alone, and another 12 percent carpooled. Data from the DOT&PF *Central Region Annual Traffic Volume Report 2005-2007* (DOT&PF 2008a) show that 91 percent of the vehicles on Glenn Highway and 93 percent on the Seward Highway are noncommercial vehicles—motorcycles, passenger cars, pickup trucks, and vans. The LRTP indicates that a shift in mode share to transit and high occupant vehicles and away from single occupant vehicles would occur on the Glenn Highway. The plan establishes a target of five to seven percent of that corridor's peak-period commuters shifting to a new high-performance express commuter bus service.

1.8.2 Freight Trucks

Truck traffic on the existing arterial connection is primarily traveling to and from the Port of Anchorage, ARRC's rail depot, and the Ted Stevens Anchorage International Airport. Trucks deliver nearly all goods headed for Anchorage destinations. Trucks also move a substantial share of statewide freight to and from the Port of Anchorage and Ted Stevens Anchorage International Airport. In 2006, daily truck volumes exceeded 3,500 vehicles on the Glenn Highway and exceeded 2,200 vehicles on the Seward Highway. This is about 8.3 percent of all vehicle traffic on the Glenn Highway at Airport Heights Drive and 4.3 percent of the traffic on the Seward Highway at 76th Avenue (calculated by HDR based on 2006 data provided by the DOT&PF Highway Data Office). The *MOA Freight Mobility Study* identifies improving the connection between the Seward and Glenn highways as one of the long-term priorities for enhancing freight mobility (MOA Traffic 2001).

1.8.3 Carpools

The MOA Public Transportation Department supports carpools through the Share-A-Ride program, which has been in place since 1976. About 12 percent of commuters carpool to work within the MOA (U.S. Census Bureau 2006). Based on data from People Mover's Share-A-Ride program, in 2008 there were 187 active carpools carrying 365 people total with approximately two people to a car. In 2008, about 66 percent of the Share-A-Ride carpools originated in the Anchorage Bowl, 17 percent in Chugiak–Eagle River, 15 percent in the Mat-Su Valley, and 2 percent in Girdwood (MOA Public Transportation 2008b).

DRAFT

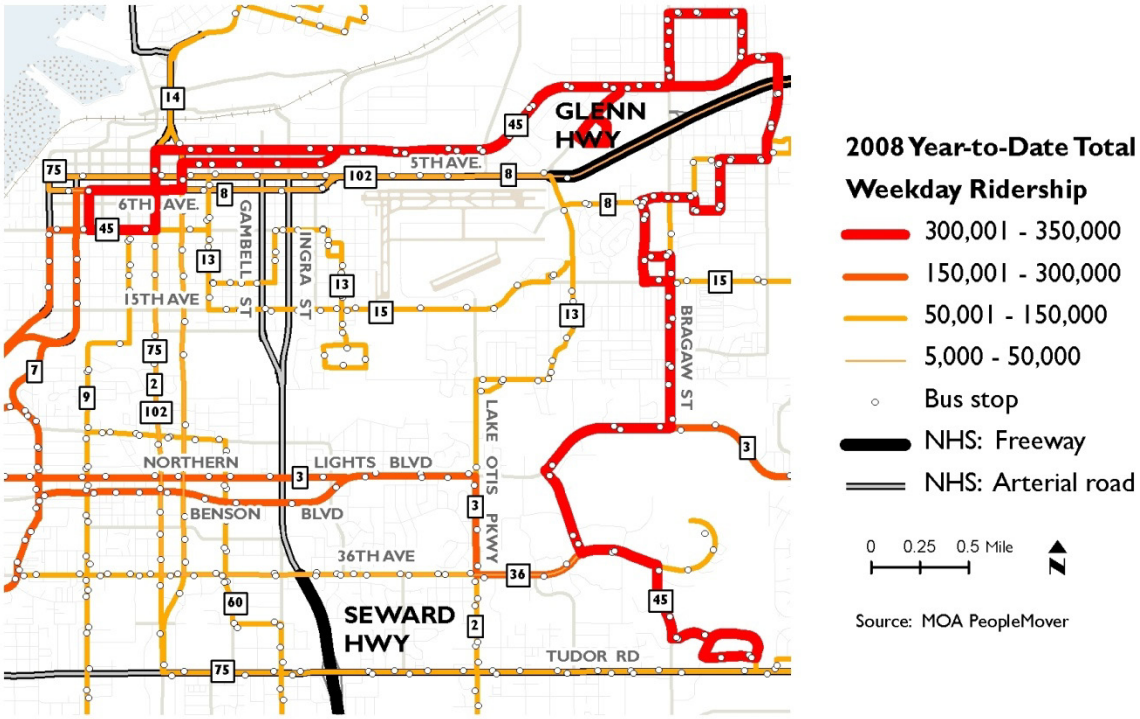
1.8.4 Vanpools

In 2008, the MOA Share-A-Ride vanpool program coordinated fifty-two 13-passenger vans, which served the Anchorage Bowl, the Mat-Su Valley, and Girdwood. Of these fifty-two vanpools, forty-nine originated in the Mat-Su Borough. The most frequent vanpool destinations were employment centers in Anchorage such as military bases, Midtown, Downtown, and East Anchorage (White 2008). The LRTP states that forming vanpools is a particularly effective strategy to address the Glenn Highway traffic demand and relieve congestion.

1.8.5 Buses

The MOA's Public Transportation Department provides public bus transportation through People Mover. People Mover buses travel more than two million miles a year with 16 routes serving the greater Anchorage and Chugiak–Eagle River area (see Figure 1-5 for bus ridership in the project area). According to *People Mover Blueprint: A Plan to Restructure the Anchorage Transit System*, the busiest route is Route 45, which serves the east side of Anchorage to the Downtown area. This route serves up to 20 percent of all transit riders (MOA Public Transportation 2002). Route 45 parallels the Glenn Highway via Mountain View Drive to Commercial Drive to Third Avenue and the Downtown Transit Center. There are no bus routes on Ingra and Gambell streets. Routes 13 and 15 run parallel to Gambell Street on local streets in Fairview, and these routes cross Ingra and Gambell streets. Routes 77, 78, and 102 use the Glenn Highway to provide service between Eagle River and Anchorage. Routes 3, 13, 15, and 36 cross the existing arterial connection on the Seward Highway.

Figure 1-5. Bus Ridership



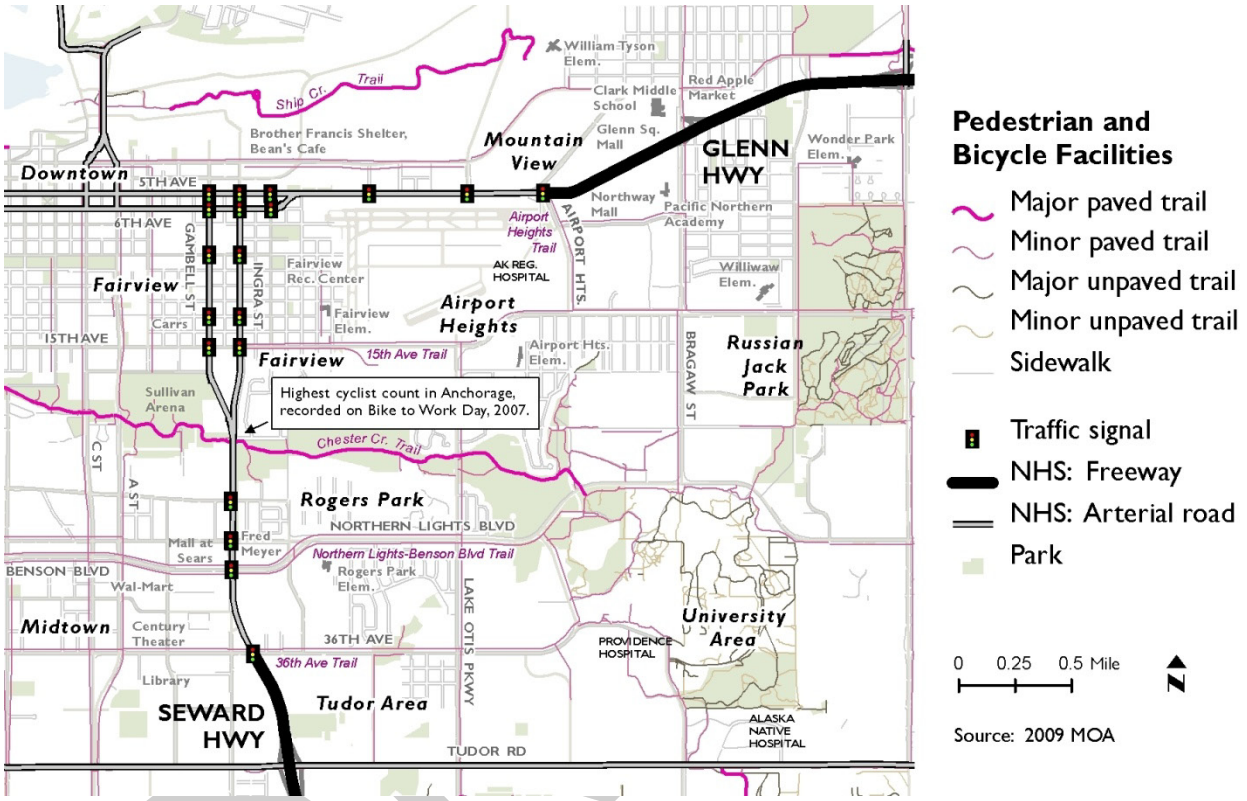
1.8.6 Walking Trips

According to the 2000 U.S. Census, the existing arterial connection bisects areas of high pedestrian use relative to the rest of the Anchorage Bowl. The *Anchorage Pedestrian Plan* identified Downtown, Midtown, Fairview, Roger's Park, and Airport Heights as having the highest percentage of walking trips in the Anchorage Bowl (MOA Traffic 2007a) (see Figure 1-2).

1.8.7 Bicycling Trips

A number of trails are adjacent to or intersect the existing arterial connection including the Chester Creek Trail, the Northern Lights–Benson Boulevard Trail, the 36th Avenue trail, the 15th Avenue Trail, and the Airport Heights Trail (see Figure 1-6). On Bike to Work Day in 2007, the highest cyclist count in Anchorage (238) was recorded on Chester Creek Trail at the Seward Highway. Chester Creek Trail crosses under the existing arterial connection (AMATS 2007b).

Figure 1-6. Existing Trails



1.9 PURPOSE OF AND NEED FOR ACTION

1.9.1 Purpose

The purpose of the Highway-to-Highway project is to reduce congestion by improving mobility[6] and access[7] for people and goods traveling to and from Anchorage's major urban activity centers (see Figure 1-2, Project Area) using the Seward and Glenn highways. These improvements are necessary for reducing congestion and improving travel efficiency, creating better neighborhood connections, reducing crashes, and enhancing modal interrelationships.

1.9.2 Transportation Needs

Need 1: Congestion

Heavy and increasing traffic during peak commuting hours causes unacceptable congestion and delay on the existing arterial connection and on alternate routes.

This section summarizes the current and future congestion under the No Action Alternative on the existing arterial connection. Congestion levels are evaluated using a measure called level of service (LOS).[8] Level of service is a method of describing the congestion level of an intersection, street, or freeway. When the capacity of a road is exceeded, the result is congestion and a poor level of service.

Level of service is represented by a letter "grade" ranging from LOS A for excellent conditions (free-flowing traffic) to LOS F for failure conditions (extremely congested, stop-and-go traffic). LOS B through LOS E describe progressively worse traffic conditions (see Figure 1-7). Typically, in urban areas (including Anchorage), LOS E and F and lower are considered unacceptable congestion levels. AMATS has adopted LOS D and above as acceptable congestion levels.

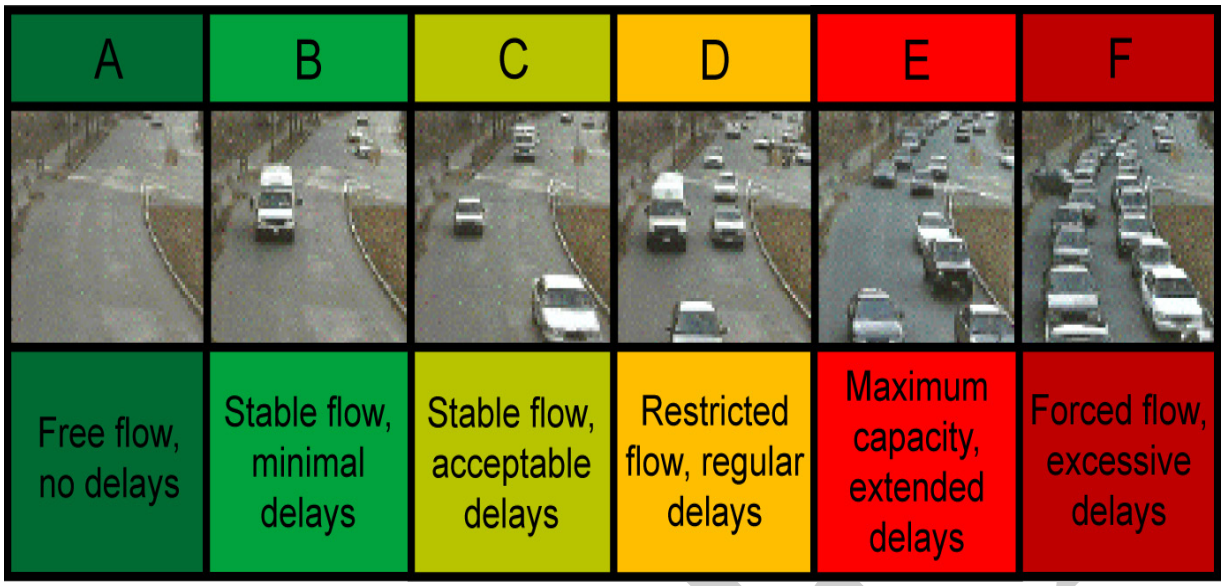
DRAFT

[6] The term *mobility* is defined by FHWA as "the ability to move or be moved from place to place" (www.fhwa.dot.gov/planning/glossary). This "ability to move or be moved" is not mode-dependent but applies to vehicles, transit, pedestrians, and bicyclists. According to FHWA, mobility can be measured in terms of "travel times, level of traffic congestion, or duration of congestion—all of which focus on how long it takes to get from place to place" (www.fhwa.dot.gov/environment/cmaqpgs/amaq/03cmaq1.htm).

[7] The term *access* is a feature of roads that serve the start and end of a trip, where access to adjacent property is the primary function. For a discussion of the dual roles of mobility and access played by the highway network, see www.fhwa.dot.gov/planning/fcsec2_1.htm.

[8] The *level of service* reflects how well the traffic demand is accommodated by the available roadway capacity and the relative ease of traffic flow on a scale of A to F, with free flow being rated LOS A and congested conditions rated as LOS F. AMATS has adopted LOS D or above as its goal. LOS E and LOS F are considered unacceptable.

Figure 1-7. Level of Service Categories for Road Segments



For intersections, congestion is measured by the amount of delay at an intersection. Delays equal to or less than 55 seconds (average per vehicle) represent LOS A through D; delays greater than 55 seconds represent LOS E or F. Congestion translates into increased travel times and fuel consumption. As these factors increase, workers' productivity declines, and costs associated with labor and fuel increase.

Current and Future Intersection Level of Service (LOS)

The existing arterial connection is congested during the peak morning and peak evening hours. In 2010 two major signalized intersections on the existing arterial connection performed at an unacceptable level of service in the A.M. and P.M. peak hours (see Table 1-2). By 2035, the intersection level of service will continue to decline with 10 signalized intersections performing at unacceptable level of service in the A.M. and P.M. peak hours. Figure 1-8 shows the level of service at intersections on the existing arterial connection in the A.M. and P.M. peak hours for 2010 and Figure 1-9 for 2035.

Table 1-2. Comparison of Level of Service at Major Intersections on the Existing Arterial Connection during A.M. and P.M. Peak Hours in 2010 and 2035

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	2010	2035	2010	2035
Seward Highway and 36th Avenue	🟡	🔴	🟡	🔴
Seward Highway and Benson Boulevard	🟢	🔴	🔴	🔴
Seward Highway and Northern Lights Boulevard	🟢	🔴	🟡	🔴
Gambell Street and Sixth Avenue	🟢	🟢	🟢	🔴
Ingra Street and Sixth Avenue	🟢	🟢	🟢	🔴
Gambell Street and Fifth Avenue	🟢	🟢	🟢	🔴
Ingra Street and Fifth Avenue	🟢	🔴	🟢	🔴

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	2010	2035	2010	2035
Fifth Avenue and Concrete Street	🟢	🟢	🟢	🔴
Fifth Avenue and Reeve Boulevard	🔴	🔴	🔴	🔴
Glenn Highway and Airport Heights Road	🔴	🔴	🟡	🔴

KEY:

🟢 **= LOS C or better**

🟡 **= LOS D**

🔴 **= LOS E or worse**

Sources: H2H Traffic Model

DRAFT

Figure 1-8. Intersection and Segment Level of Service (2010)

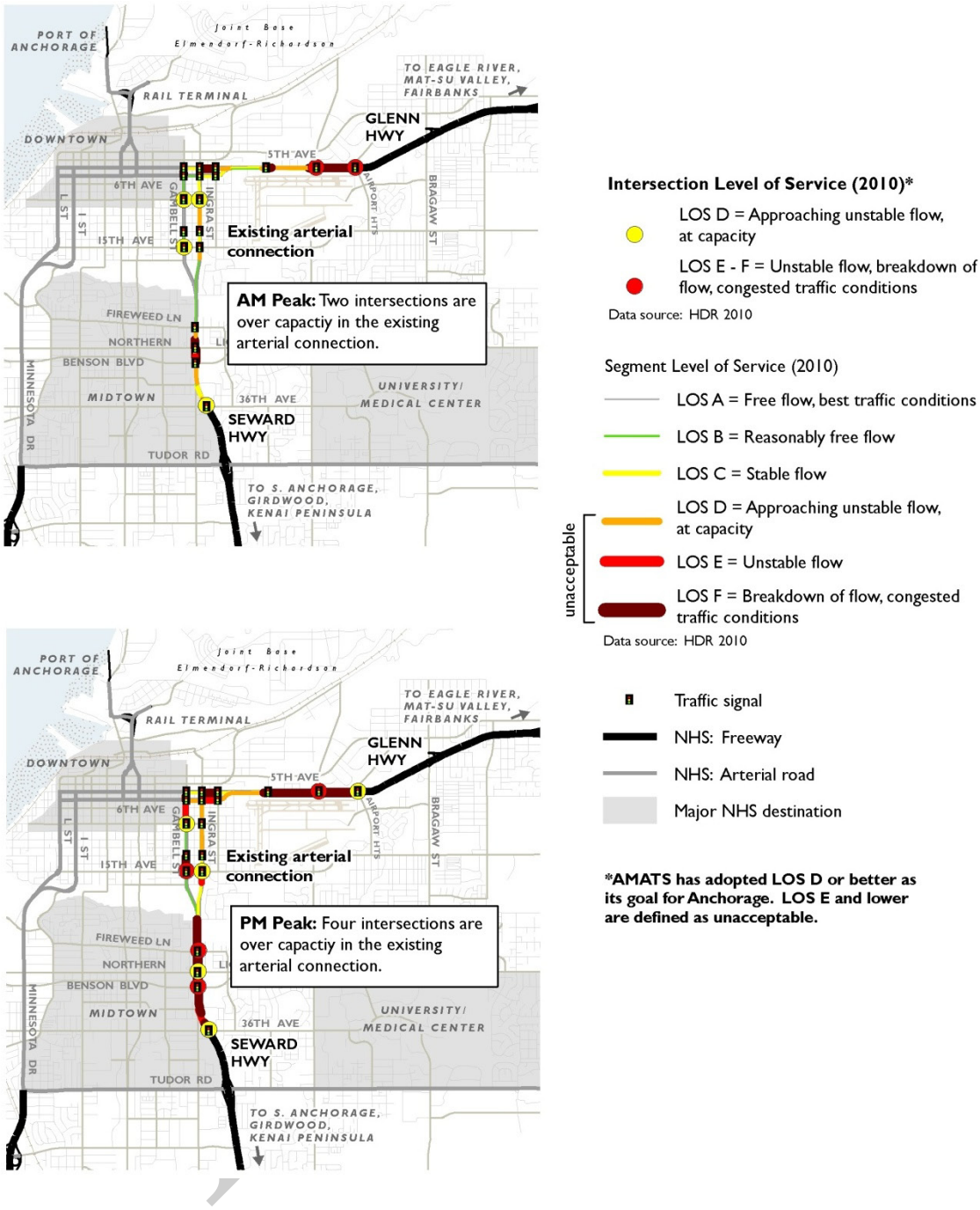
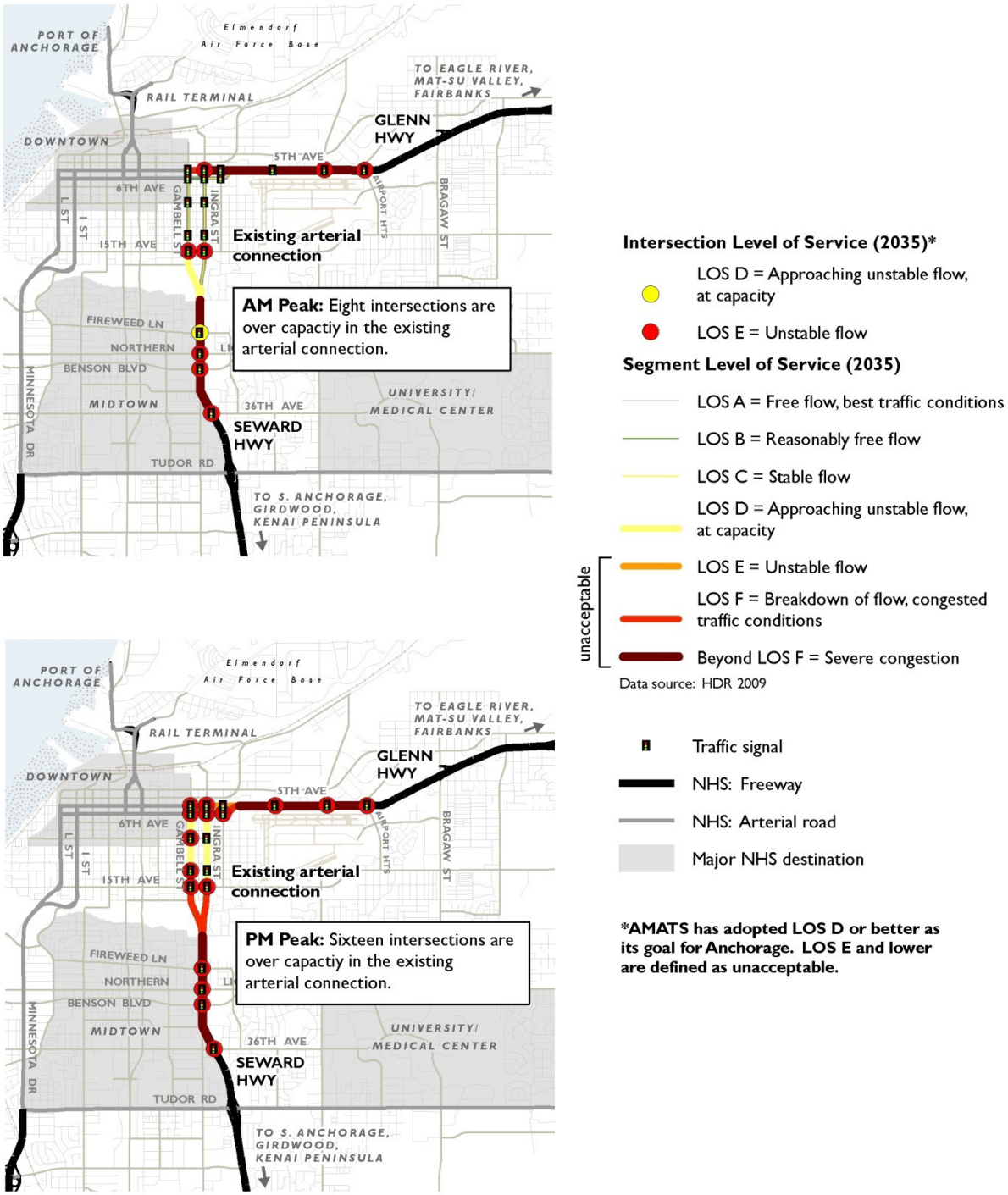


Figure 1-9. Predicted Intersection and Segment Level of Service in 2035 under the No Action Alternative



Current and Future Roadway Segment Level of Service (LOS)

In addition to the intersections, segments of the existing arterial connection currently operate at an unacceptable level of service in both A.M. and P.M. peak periods. As shown on Figure 1-8, in 2010 during the A.M. peak period, the segment of 5th Avenue from Airport Heights Drive to Reeve Boulevard

and the segment from Karluk Street to Ingra Street operated at LOS F or lower. In 2010 during the P.M. peak period, the segment from 36th Avenue to 20th Avenue operated at LOS F and the segment of 6th Avenue (changing to 5th Avenue) from Concrete Street to Airport Heights Drive operated at LOS F or lower.

In the future, under the No Action Alternative, traffic congestion will increase, and the level of service on the existing arterial connection will continue to decrease as a result of the increase in traffic volume. The AMATS travel demand model predicts that traffic on the Glenn Highway east of Airport Heights will increase from the current volume of 50,000 vehicles per day to 85,000 vehicles per day by 2027. On the Seward Highway south of 36th Avenue, traffic is predicted to increase from the current volume of 54,000 vehicles per day to 75,000 vehicles per day. By 2035, at these rates of growth, traffic on the Glenn Highway will exceed 105,000 vehicles per day and traffic on the Seward Highway traffic will exceed 85,000 vehicles per day. As shown on Figure 1-9, as the traffic volumes increase, the level of service continues to decrease. In 2035 in the A.M. peak, the segment from 36th Avenue to East 20th Avenue and the segment of 5th Avenue from Airport Heights Drive to Ingra Street are predicted to operate at LOS F or lower. In 2035 in the P.M. peak, the segment from 36th Avenue to 15th Avenue and the segment of 5th Avenue from Airport Heights Drive to Medfra Street are predicted to operate at LOS F or lower.

Congestion-Related Traffic Diversion and Travel Speed

One of the results of the current and future unacceptable level of service at the intersections and segments of the existing arterial connection is congestion on other roads in the area. Instead of traffic using the existing arterial connection as it transitions from the freeway at each end, the heavy congestion at the signalized intersections causes traffic to back up and drivers to divert to other routes to reach their destinations. This diversion to other routes contributes to the overloading of many of the other arterial streets between the highways. This includes roads such as Lake Otis Parkway, Bragaw Street, Northern Lights Boulevard, 36th Avenue, Debarr Road/15th Avenue, Airport Heights, and 3rd Avenue/Commercial Drive/Mountain View Drive (see Figure 1-2). In turn, as these arterial streets become congested, travelers try to find alternate routes on local neighborhood streets to avoid the congestion, which increases the safety risk for local residential traffic. The congestion also results in slower travel speeds. For example, speeds on the existing arterial connection between Northern Lights Boulevard and 36th Avenue are estimated to be 32 mph slower than the posted speed of 45 mph during the A.M. and P.M. peak periods.

Need 2: Travel Efficiency

The Seward and Glenn highways are controlled-access freeways that transition into urban arterial streets. The stop-and-go conditions on the arterial streets (conditions that are caused by multiple traffic signals and driveways) decrease travel efficiency to user destinations. Increasing traffic is anticipated to make travel efficiency worse.

Road Classification, Travel Delay, and Cost

For the purpose of this project, travel efficiency is defined as "the ability to accomplish a trip with a minimum expenditure of time and effort."The Seward and Glenn highways are functionally classified by DOT&PF as "urban principal arterials"[9] that were built as controlled-access freeways and that provide a

[9] **Urban Principal Arterial.** According to FHWA, the urban principal arterial system "should serve the major centers of activity of a metropolitan area, the highest traffic volume corridors, and the longest trip desires; and should carry a high proportion of the total urban area travel on minimum mileage. The system should be integrated, both internally and between major rural connections. The principal arterial system should carry the major portion of trips entering and leaving the urban area, as well as the majority of through movements desiring to bypass the central city. In addition, significant intra-area travel, such as between central business districts and outlying residential areas; between major inner city communities, or between major suburban centers should be served by this system. Frequently the principal arterial system will carry important intra-urban as well as intercity bus routes. Finally, this system in small urban and urbanized areas should provide continuity for all rural arterials which

high level of mobility coming into Anchorage. Once in Anchorage, these highways transition abruptly into arterial streets (with no access control). In addition to providing access to major destinations, the existing arterial connection also provides direct access to local businesses and homes. These arterial segments are characterized by intersecting streets and driveways, lower speed limits, and frequent stoplights.

The abrupt change in functional classification from high-speed, controlled-access highways to the existing arterial connection adversely affects the continuity and efficiency of the NHS. This change in classification occurs a number of miles from the major destinations. Because the existing arterial connection has conflicting functions (local access and mobility), it is not efficient under current or projected traffic volumes for either function (see Figure 1-8 and Figure 1-9).

Traffic flows close to the posted speeds (55–65 mph) on the freeway segments of the Seward and Glenn highways, but the stop-and-go conditions and lower travel speeds on the existing arterial connection decrease travel efficiency. In 2007, DOT&PF examined the delay in its major corridors and estimated the value of lost time to the traveling public using a value of $15 per hour. The study found that the existing arterial connection has the highest cost to the traveling public of all roads in Alaska. DOT&PF estimated that the cost of delay to the traveling public was $45 million annually—$18 million more per year than the next-highest corridor (Tudor Road–Muldoon Road) (DOT&PF 2007a). The LRTP states that an important need for the H2H project is to reduce the "time spent in traffic." The plan says this would benefit "a wide range of users from commuters, to freight haulers, to emergency response personnel" (AMATS 2007a, 115). In particular, the plan states that improving freight mobility by decreasing congestion and decreasing travel time would reduce the cost of doing business in the region (AMATS 2007a, 115).

Need 3: Neighborhood Connectivity

The wide streets and heavy traffic volumes of the existing arterial connection make travel across and along this road difficult for bicycle, pedestrian, and vehicle users and adversely affect adjacent neighborhoods. Increasing traffic is anticipated to make neighborhood connections and adverse impacts worse.

Street widths on the existing arterial connection range from about 45 feet (Gambell Street and 15th Avenue crosswalk) to about 120 feet (Seward Highway and Northern Lights Boulevard crosswalk). These wide streets and associated heavy traffic volumes (53,000 vehicles per day on the Seward Highway in Midtown and on the Gambell-Ingra couplet) make local travel across and along the existing arterial connection difficult for bicyclists, pedestrians, and vehicles and adversely affect adjacent neighborhoods, including Mountain View, Fairview, Downtown, Midtown, and Rogers Park. At several locations, the existing arterial connection separates local commercial, educational, and recreational destinations from residential areas. The LRTP (page 115) indicates that a potential benefit of the H2H project is that traffic is no longer the major feature and concern of neighborhoods and communities and that traffic on local streets and in neighborhoods is reduced.

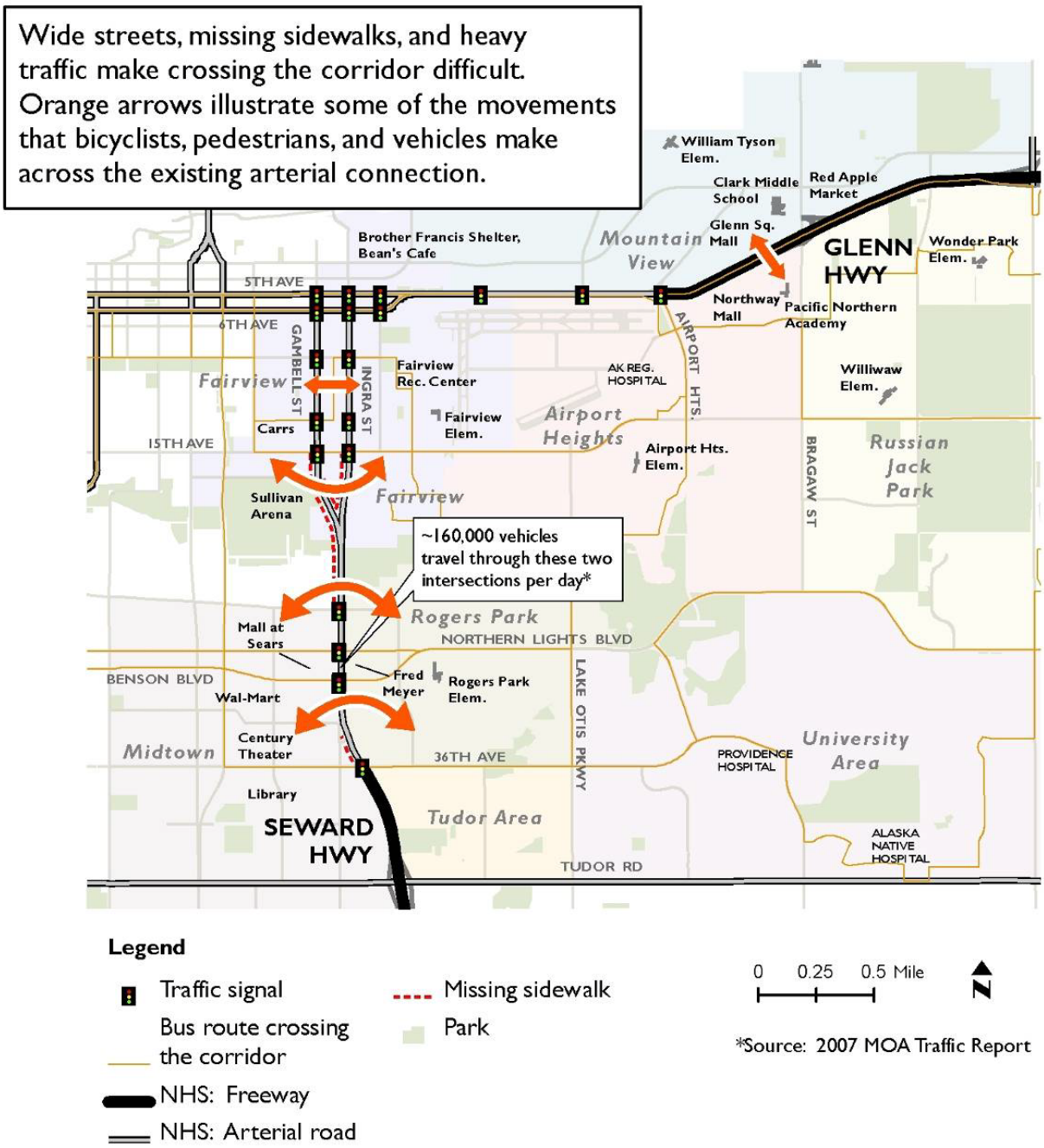
Several of the adjacent neighborhoods rely heavily on walking and transit modes of transportation. According to the 2000 U.S. Census, the number of vehicles per household in the Anchorage Bowl is lowest in the Fairview, Mountain View, and Downtown areas, with less than one vehicle per household. These factors also correlate to a greater reliance on walking and transit for transportation than in other areas of Anchorage.

---

intercept the urban boundary" (FHWA 1989). According to FHWA, because of the nature of travel served by the principal arterial system, almost all fully and partially controlled access facilities will be part of this functional system. However, this system is not restricted to controlled-access routes. In order to preserve the identification of controlled-access facilities, the principal arterial system is stratified as follows: (1) Interstate, (2) other freeways and expressways, and (3) other principal arterials (with no control of access). (www.fhwa.dot.gov/planning/fsec2_1.htm)

Figure 1-10 illustrates some of the movements that bicyclists, pedestrians, and vehicles need to make to cross the existing arterial connection. In one case, the Fairview neighborhood (community council boundary) is bisected by the existing arterial connection, which separates one side of an established residential area and neighborhood commercial center from the other side of the residential area. This has had adverse effects on the community character, both existing and planned land-use patterns, and local travel.

Figure 1-10. Neighborhood Connectivity



The combination of heavy traffic, wide streets, and reliance on walking near the existing arterial connection has created unsafe conditions for pedestrians and contributes to high numbers of vehicle-pedestrian crashes. For more information, see Need 4, below. If the existing arterial connection is not improved, increasing traffic volumes and poor pedestrian street design will continue to affect neighborhoods and safe access to nearby shopping, educational, and recreation facilities. The LRTP (page 115) indicates that a potential benefit of the H2H project is that the safety and ease of crossing the corridor (for cars and pedestrians) could be substantially enhanced.

Need 4. Improve Safety

Locations along the existing arterial connection, and on alternate travel routes that receive overflow traffic due to congestion on the existing arterial connection, have high numbers of crashes that result in property damage, fatalities, and severe injuries. Increasing traffic is anticipated to make safety conditions worse. The corridor presents major concerns for pedestrian safety.

Vehicle Safety

Nearly every major intersection on the existing arterial connection is consistently within the MOA's top 50 intersections for the highest number of crashes per year. DOT&PF crash and volume data place the existing arterial connection as the worst bottleneck in the state and raise substantial safety concerns. According to the report:

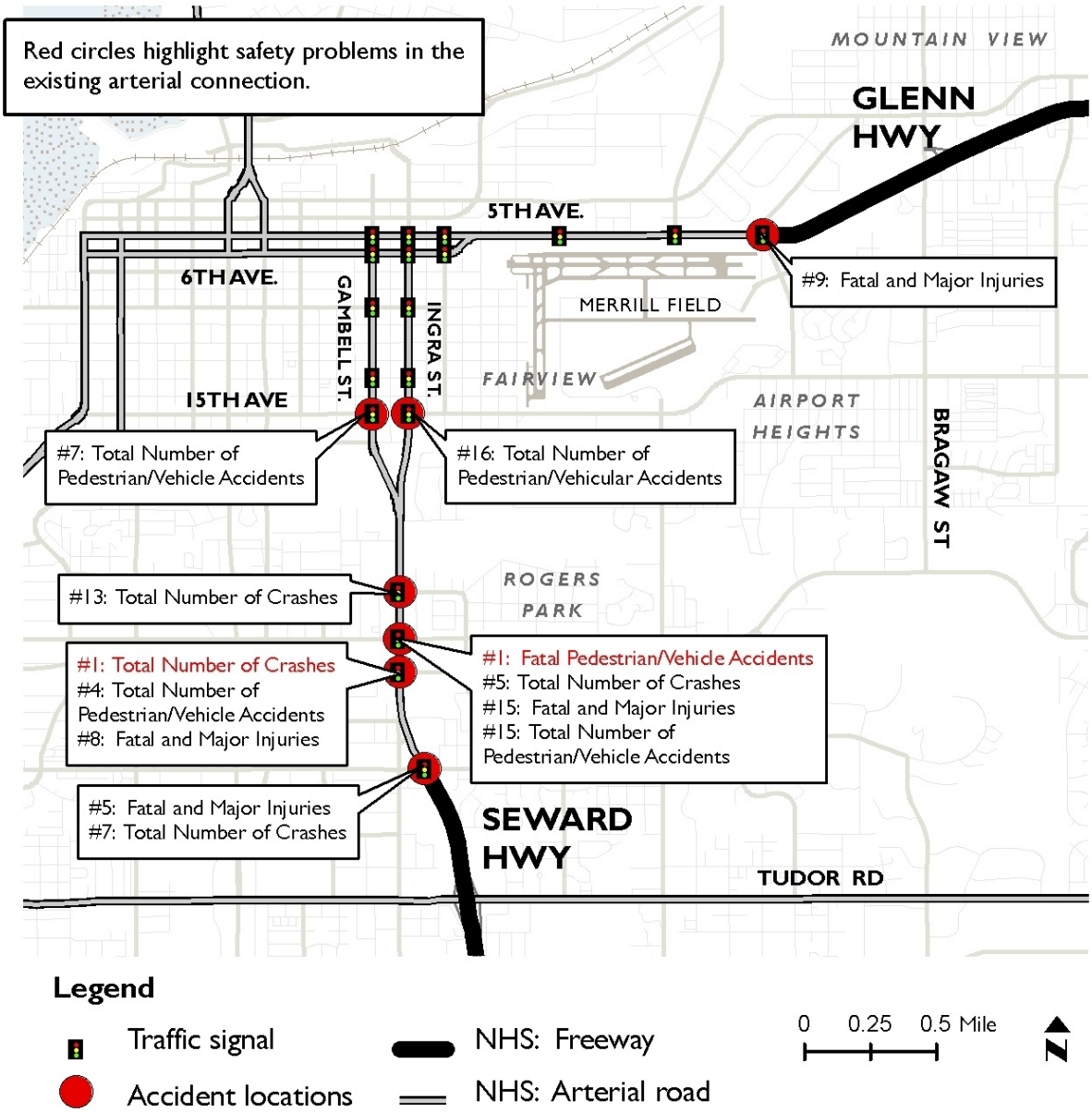
- Five percent of the crashes in the entire state happen on the existing arterial connection —750 crashes per year (or more than two crashes every day on average).
- Signals along the existing arterial connection and adjacent "bypass" arterials show the highest number and rates of major injuries and fatalities at signals in Anchorage. (DOT&PF 2007a).

In 2008, DOT&PF summarized crash data for 2002 to 2006. The intersection of Seward Highway with Benson Boulevard was ranked either first or second every year over that five-year period (DOT&PF 2008c). In terms of crashes with major injuries and fatalities over that period, the intersection of 36th Avenue with the Seward Highway ranked fifth, the intersection of Benson Boulevard with the Seward Highway ranked eighth, the intersection of Airport Heights Drive with the Glenn Highway ranked ninth, and the intersection of Northern Lights Boulevard with the Seward Highway ranked 15th (See Figure 1-11). Based on MOA crash rate data for 2006, seven intersections along the existing arterial connection were on the top 50 list. The intersection of Ingra Street with 9th Avenue ranked the highest (15th) on the existing arterial connection (See Figure 1-11).

In addition to total number of crashes, DOT&PF also ranked intersections by crash rate (crashes per million vehicles) and by fatal and major-injury crashes. Of the top 20 vehicle crash locations in Anchorage between 2002 and 2006, the intersections that ranked first, fifth, seventh, and 13th were all located on the existing arterial connection. Of the fatal and major crashes in Anchorage, the intersections that ranked fifth, eight, ninth, and 15th were located on the existing arterial connection.

DRAFT

Figure 1-11. Vehicle and Pedestrian Accident Data



DOT&PF ranks the "Top 20 Intersections in Anchorage 2002-2006" by total number of crashes, accident rate, and by fatal and major injury crashes. The MOA 2007 Pedestrian Plan ranks the top 20 intersections in Anchorage with the highest total number of accidents over a 15-year period.

Pedestrian and Bicycle Safety

According to DOT&PF, from 1998 to 2002, four of the top five roads with the highest rates of pedestrian and bicycle crashes per mile were segments of the existing arterial connection: 5th Avenue, 6th Avenue, Gambell Street, and Ingra Street (see Table 1-3) (DOT&PF 2005). Over the same period, the intersection of Northern Lights Boulevard with Seward Highway had the fifth-highest number of pedestrian-bicycle crashes in the city (see Table 1-3) (DOT&PF 2005). See Figure 1-11 for the location of the roads in Table 1-3.

Statistics identify pedestrian safety concerns on the existing arterial connection (see Table 1-3). Sidewalks are missing along segments of Ingra and Gambell streets and along a number of cross streets (for example, 33rd Avenue, East 8th Avenue, and Juneau Street). Where there are sidewalks, they often have little to no separation from traffic and are often obstructed with utility poles and other street hardware that reduces the area for safe, efficient pedestrian and bicycle travel (see Figure 1-12).

Figure 1-12. Gambell Street and 15th Avenue

Obstructions such as fire hydrants and utility boxes do not provide adequate space for pedestrians and bicycle users.

Table 1-3. Pedestrian and Bicycle Crashes (1998 – 2002)

Rank Based on Crash Rate	Total Pedestrian-Bicycle Crashes with Vehicles	Rate (crashes/mile)	Road Name
1st	25	22.9	6th Avenue
3rd	18	17.8	Gambell Street
4th	17	15.5	Ingra Street
5th	33	14.8	5th Avenue

Source: DOT&PF 2005

According to the 2007 MOA *Traffic Report*, one fatal vehicle-pedestrian crash occurred on the existing arterial connection at 6th Avenue and Ingra Street, and about 18 bicycle-pedestrian collisions were reported on the existing arterial connection during the reported year (MOA Traffic 2007b). High numbers of crashes indicate safety hazards for pedestrians and bicyclists who cross the existing arterial connection at the intersections of Benson Boulevard and Northern Lights boulevards with the Seward Highway, along Gambell and Ingra streets from 15th Avenue to 5th Avenue, and along 5th Avenue.

Pedestrian crash data presented in the MOA 2007 *Pedestrian Plan* ranked four of the intersections on the existing arterial connection in the top 20 of Anchorage intersections with the highest total number of pedestrian-bicycle crashes over a 15-year period: Seward Highway/Benson Boulevard (#4), Gambell/15th Avenue (#7), Seward Highway/Northern Lights Boulevard (#15), and Ingra Street/15th Avenue (#16). Overwhelmingly, the driver was found to be at fault for the crash. The Seward Highway/Northern Lights Boulevard intersection ranked #15 for the total number of pedestrian crashes, but it had the most fatalities (two) of all the intersections.

DRAFT

Need 5. Improve Modal Interrelationships

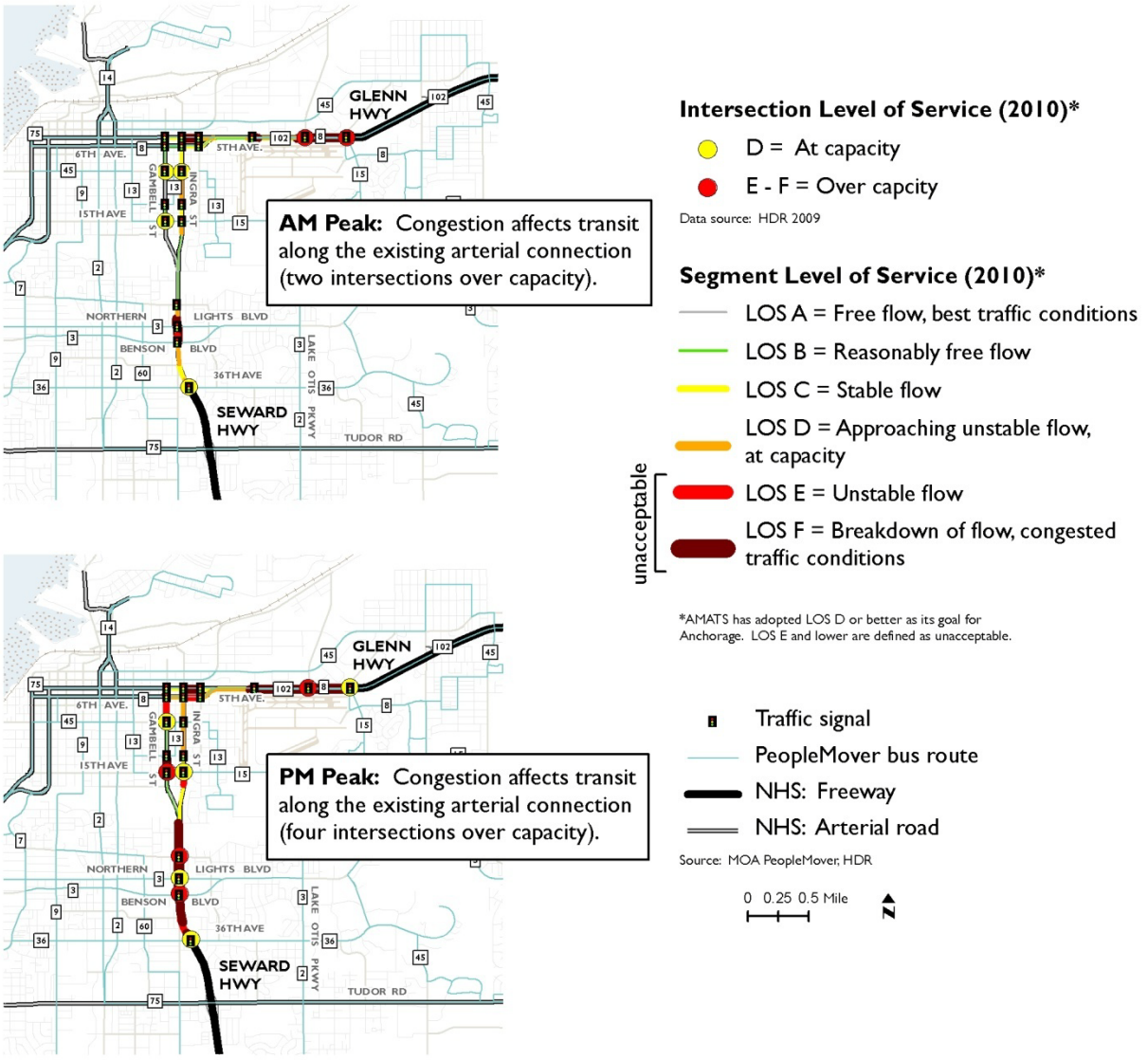
Public transportation service through the Glenn Highway corridor is impeded by traffic congestion and transfers to local bus routes are not easily scheduled. As demand for transit services continues to increase, transportation planning on both the Seward and Glenn highway corridors should develop alternatives to coordinate land use with transportation and increase non-motorized modal travel while moving people more efficiently throughout the region. Freight mobility to the port, rail yard, and airport are impeded by traffic congestion and inefficiency in the arterial connection.

The MOA provides public transportation through People Mover. People Mover includes bus transit, AnchorRIDES (a para-transit service), and Share-A-Ride (a vanpool service). People Mover currently has 55 buses operating on 16 routes and 52 vans serving Anchorage, the MSB, and Girdwood.

Public transportation service on the Glenn Highway is impeded by congestion and is inadequately linked to local bus routes. The stop-and-go conditions on the existing arterial connection create delay and inefficient travel for existing and planned express commuter transit services on the Seward and Glenn highways and make it difficult to schedule connecting service with local buses. Longer travel times also discourage transit ridership. The LRTP recognizes the importance of improving travel time for transit in serving longer commute trips that are typical on the existing arterial connection. Figure 1-13 shows People Mover bus routes relative to the congested intersections on the existing arterial connection.

DRAFT

Figure 1-13. Transit Network Impeded by Congestion



Several of the routes (Routes 3, 8, 15, 36, and 102) must cross the existing arterial connection at heavily congested intersections, including one intersection that is over capacity during the A.M. peak period and five intersections that are over capacity during the P.M. peak period. Route 102, which provides commuter service from Eagle River on the Glenn Highway, must traverse the length of the over-capacity 5th Avenue. These conditions contribute to making bus trips more than twice as long as those for the same automobile trip and discourage transit ridership (AMATS 2007b).

Congestion also hampers consistent arrival times at transit stops and makes scheduling transfers difficult. In fact, as congestion has increased, People Mover has had to add time to its schedule on the existing arterial connection. For example, according to the *2000 People Mover Ride Guide*, in 2000, Route 102 between Downtown and the transit center in Eagle River on the Glenn Highway was scheduled to take 30

minutes during the P.M. peak period. Currently, according to the *2008 People Mover Ride Guide*, Route 102 is scheduled to take 37 minutes.

Traffic congestion along 5th Avenue will be exacerbated as demand increases, which will further delay Route 102. Moreover, the expanded service that People Mover has planned for Eagle River, Birchwood, and Peters Creek into Downtown will be delayed due to the increasing traffic and congestion along 5th Avenue as described in Section 1.9.2.

According to People Mover's weekday ridership counts in 2006, the busiest route in Anchorage was Route 45, which serves east Anchorage, Mountain View, and the U-Med District with service into Downtown along Third Avenue. This route served 20 percent of all transit riders on People Mover's system in 2006.

The AMATS LRTP traffic model predicts that the high-occupancy vehicle (HOV) lane planned from Eagle River to Boniface Parkway will be essential to meet the travel demand. The demand in 2027 is anticipated to approach the capacity of an eight-lane freeway, and the planned express buses, vanpools, and carpools operating on the planned HOV lane are what will keep the freeway operating at an acceptable level (LOS D). As traffic continues to increase between now and 2035, transit and HOV lanes will become more important to reduce congestion. The LRTP indicates that the H2H project could improve transit through shortened travel times, made possible by new opportunities to implement high-speed express bus, HOV lanes, or both and advocates reducing reliance on single-occupant trips.

Truck freight movement is an important component of intermodal travel on the Seward and Glenn Highways and efficient freight movement is an important function intended for the National Highway/Interstate Highway System. The Seward and Glenn Highways also function (in combination with other NHS links) to connect outlying areas and many parts of Anchorage with Ted Stevens International Airport for passenger and freight trips. Congestion and travel inefficiency (described in needs 1 and 2) on the existing arterial connection impedes truck freight mobility to important freight shipment origins and destinations like the Ship Creek industrial area, the Alaska Railroad's Anchorage yard, the Port of Anchorage, and Anchorage International Airport. The efficient connectivity for freight movement to these key destinations, hampered by the arterial connection needs to be improved.

Anchorage 2020 recognizes importance of freight mobility. The plan (page 48) calls for freight movement to be facilitated throughout the community, but especially among the port, international airport, railroad, and industrial reserves. According to the LRTP (page 115), the H2H project would help remedy problems with freight mobility by decreasing congestion and improving travel times, which would subsequently reduce the cost of doing business in and around the region. Moreover, according to the LRTP, freight haulers would be able to move between the Port of Anchorage and distribution centers without traveling on surface streets through Downtown and Midtown neighborhoods.

1.10 PROJECT OBJECTIVES

The following project objectives were developed based on the purpose and needs identified in Section 1.9.

1.10.1 Need 1. Reduce Congestion

- Reduce unacceptable, peak-hour congestion on the arterial road segments of the Seward and Glenn highways
- Reduce spillover, cut-through traffic on adversely affected adjacent parallel arterials
- Reduce demand on alternate routes for traffic that is more appropriately served by the National Highway System

DRAFT

1.10.2 Need 2. Improve Travel Efficiency

- Improve travel time to user destinations, including major employment centers in Downtown, Midtown, and University-Medical District
- Improve travel time for traffic heading north or south through Anchorage
- Safely and efficiently accommodate mobility for longer trips and accessibility to adjacent land parcels and local streets

1.10.3 Need 3. Improve Neighborhood Connections

- Make it easier to cross the existing arterial segments of the corridor
- Improve local circulation for motorized and non-motorized travel along and across the corridor
- Reduce adverse effects to neighborhoods caused by traffic conditions and facilitate safe and convenient local travel in the neighborhoods

1.10.4 Need 4. Improve Safety

- Reduce crash rates in the corridor and on alternate routes for vehicles, pedestrians, and bicyclists
- Improve bicycle and pedestrian safety (i.e. between and across the Seward and Glenn highways)

1.10.5 Need 5. Improve Modal Interrelationships

- Improve travel time for transit services using and crossing the corridor
- Build improvements that facilitate the transfer of passengers from commuter transit services to local transit services
- Improve travel time for freight (truck) trips serving major intermodal port, rail, and airport facilities.
- Provide convenient and efficient linkages among public transportation, pedestrian and bicycle facilities, and roadways
- Reduce single occupant vehicle (SOV) usage in the design year as compared to the No Action Alternative.

DRAFT

1.11 BIBLIOGRAPHY

[AMATS] Anchorage Metropolitan Area Transportation Solutions. 1976. *Long Range Element: AMATS Transportation Plan.*

———. 2003. *Status of the System.*

———. 2007a. *Anchorage Bowl 2025 Long Range Transportation Plan, With 2027 Revisions*. Published online at www.muni.org/iceimages/transplan/2025%20LRTP%20with%202027%20.pdf.

———. 2007b. *Status of the System.*

Alaska Department of Labor and Workforce Development. 2006. *Alaska Economic Trends*. June.

[DOT&PF] Alaska Department of Transportation and Public Facilities. 2000. Glenn Highway: *Gambell Street to McCarrey Street Reconstruction, Project Background and History*. Prepared by HDR Alaska, Inc. January.

———. 2005. *Pedestrian and Bicycle Collisions with Motor Vehicles in Anchorage: 1998–2002.* November.

———. 2007a. *Central Region, State of Alaska, DOT&PF: Top 10 Congestion Bottlenecks.* January 26.

———. 2008a. *Central Region Annual Traffic Volume Report 2005-2007* March.

———. 2008b. *Let's Get Moving 2030: Alaska Statewide Long-Range Transportation Policy Plan.*

———. 2008c. *Top 20 Intersections in Anchorage 2002–2006 Map.* September 12.

_____. 2009. Northern Access to U-Med District Reconnaissance Study Public Scoping Materials May 19, 2009. Published at www.hkminc.com///%20%20%20MEETING%20PPT.pdf.

———. 2009a. *Seward to Glen Highway Connection, Origin-Destination Analysis Technical Memorandum, July*.

[FHWA] Federal Highway Administration. 2008. *The National Highway System.* Published online at www.fhwa.dot.gov/planning/nhs/. Accessed November 24, 2008.

[MOA] Municipality of Anchorage. 2001. *Anchorage 2020 Anchorage Bowl Comprehensive Plan.* Planning Department. Published online at home.muni.org/iceimages/Planning/_.pdf.

———. 2002. *People Mover Blueprint: A Plan to Restructure the Anchorage Transit System*. Public Transportation Department. March. Published online at www.muni.org//.cfm.

———. 2003. *U-Med/Universities and Medical District Framework Master Plan.* Prepared by ZGF Architects, Inc. With DOWL Engineers, Kittelson & Associates, Rick Williams Consulting for MOA Planning Department.

———. 2007. *Anchorage Downtown Comprehensive Plan*.

———. 2009. *Draft Midtown District Plan.* Prepared by HDR Alaska, Inc. for MOA Planning Department.

———. 2008b. People Mover Share-A-Ride Data. Submitted to HDR October 2008.

DRAFT

[MOA] Municipality of Anchorage. Traffic Department. 2001. *Freight Mobility Study*.

———. 2007a. *Anchorage Pedestrian Plan (Public Review Draft)*. March.

———. 2007b. *Municipality of Anchorage 2007 Traffic Report*. Published online at www.muni.org/// %20SECTION%20V.pdf.

U.S. Census Bureau. 2006. Travel to Work for those 16 years and Older, Municipality of Anchorage. 2006 American Community Survey.

White, Rindi. 2008. "Fewer cars commuting to Anchorage." *Anchorage Daily News*, November 11, 2008.

DRAFT

Chapter 2: Alternatives Development Process

Table of Contents

2.1 OVERVIEW OF THE ALTERNATIVES DEVELOPMENT AND SCREENING PROCESS 1
2.2 PUBLIC AND AGENCY INPUT 3
2.2.1 Travel Demand Modeling 4
2.3 ALTERNATIVES DEVELOPMENT PROCESS 4
2.3.1 Develop the Purpose and Need (Task 1) 4
2.3.2 Development of Screening Criteria (Task 2) 5
2.3.3 Transportation Modes, Strategies, and Corridors (Task 3) 5
Preliminary Corridors and Alternatives 6
Transportation Modes and Strategies 7
2.3.4 Range of Preliminary Alternatives (Task 4) 8
2.4 ALTERNATIVE SCREENING PROCESS 10
2.4.1 Apply the Screening Criteria (Task 5) 10
2.5 NO ACTION ALTERNATIVE 14
2.6 NO ACTION ROADWAY 14
2.7 NO ACTION BUS TRANSIT 14
2.8 NO ACTION PEDESTRIAN AND BIKE FACILITIES 16
2.9 NO ACTION TRAVEL DEMAND/TRANSPORTATION SYSTEMS MANAGEMENT 17
2.10 REASONABLE ALTERNATIVES 18
2.10.1 Reasonable Alternatives Carried Forward for Detailed Study in the EIS (Task 6) 18
Gambell-Ingra Alternative 19
Pedestrian Connections 21
With Transit or With Enhanced Transit 21
Orca Alternative 22
Pedestrian Connections 23
Transit 23
15th Avenue Alternative 23
Pedestrian Connections 24
Transit 24
2.11 CONSTRUCTION OF ALTERNATIVES 24
2.11.1 Gambell-Ingra Alternative 24
Phase I: 36th Avenue Overpass (Tudor Road to 33rd Avenue) 24
Phase II: Seward Highway Mainline Extension (33rd Avenue to Chester Creek) 24
Phase III: Glenn Highway Mainline Extension (3rd Avenue to Bragaw Street) 24
Phase IV: Seward Highway Mainline Extension (Chester Creek to 5th Avenue) 25
Phase V: Seward Highway-Glenn Highway Completion (4th Avenue to 9th Avenue) 25
2.11.2 Orca Alternative 25
Phase I: 36th Avenue Overpass (Tudor Road to 33rd Avenue) 25
Phase II: Seward Highway Mainline Extension (33rd Avenue to Chester Creek) 25
Phase III: Seward Highway Mainline Extension (Fireweed to 5th Avenue) 25
Phase IV: Glenn Highway Mainline Extension (5th Avenue to Bragaw Street) 25
2.11.3 15th Avenue Alternative 25
Phase I: 36th Avenue Overpass (Tudor Road to 33rd Avenue) 25
Phase II: Seward Highway Mainline Extension (33rd Avenue to Chester Creek) 25
Phase III: Seward Highway Mainline Extension (Fireweed to 5th Avenue) 26
2.12 BIBLIOGRAPHY 27

DRAFT

List of Tables

Table 2-1. Screening Criteria 5
Table 2-2. Screening Results 10

List of Figures

Figure 2-1. Alternatives Development and Screening Process 2
Figure 2-2. Public Involvement Summary of Activities to Date 3
Figure 2-3. Summary of Previously Studied Alternatives and Corridors 6
Figure 2-4. Preliminary Corridors and Alternatives Suggested During Scoping 7

DRAFT

2.1 OVERVIEW OF THE ALTERNATIVES DEVELOPMENT AND SCREENING PROCESS

The alternatives development and screening process identifies and screens a full range of alternatives to determine a list of reasonable alternatives for evaluation in the Draft EIS. The full range of alternatives comes from a variety of sources, including previously studied alternatives and those transportation modes, strategies, and corridors identified during the National Environmental Policy Act (NEPA) scoping process.

The Council on Environmental Quality (CEQ) refers to the alternatives analysis process as the "heart of the EIS," and requires agencies to:

> *Rigorously explore and objectively evaluate all reasonable alternatives and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated (40 CFR 1502.14a).*

In addition, the project alternatives considered reasonable under NEPA include those alternatives "that are practical or feasible from a technical and economic standpoint and using common sense."[1]

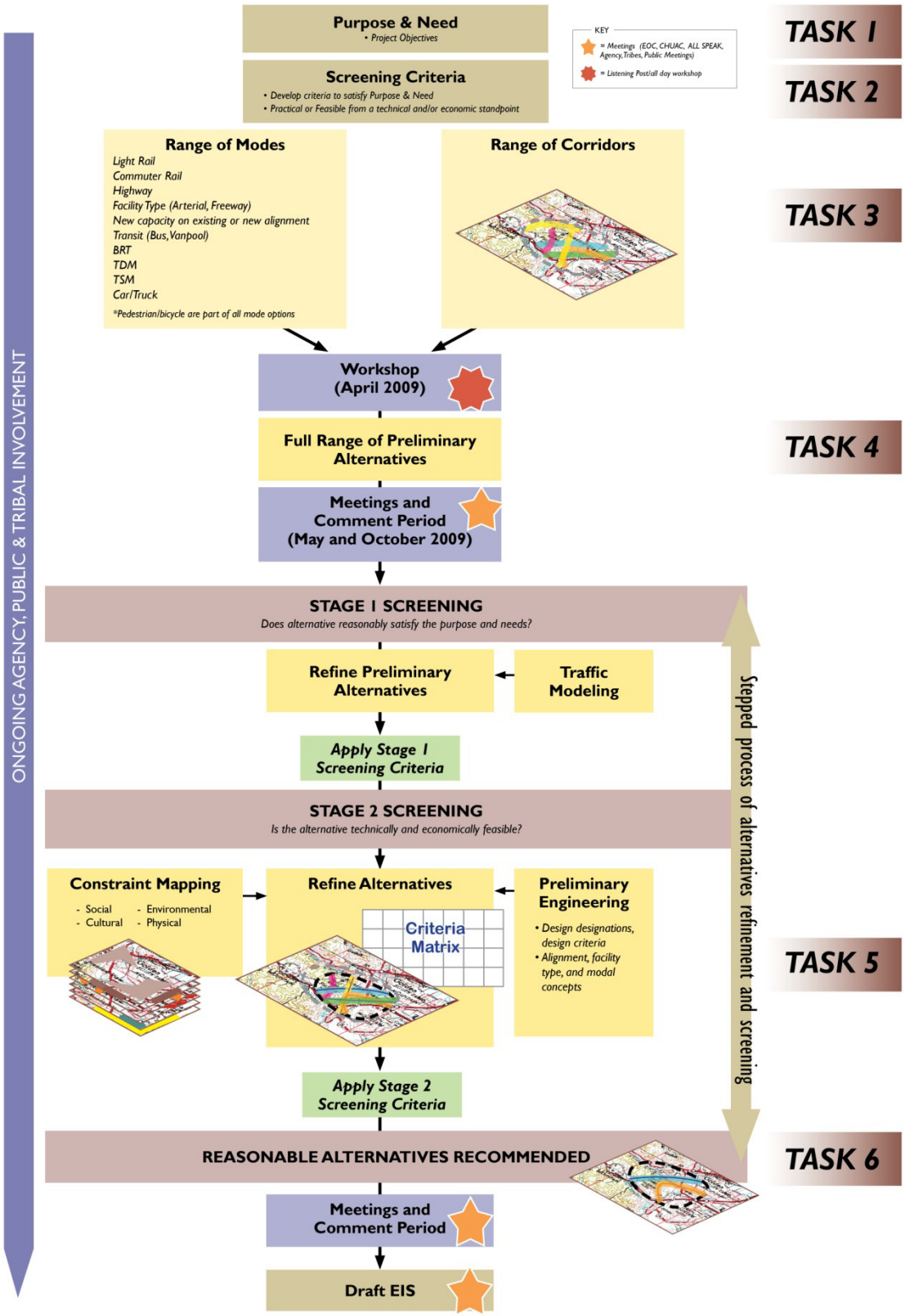
For the Seward Highway to Glenn Highway Connection (H2H) alternatives development process, transportation modes, strategies, and corridors were identified. These modes, strategies, and corridors were further refined to develop a full range of preliminary alternatives. Evaluations using specific measures (screening criteria) were conducted to help determine if the alternatives were consistent with the project's purpose and need. In addition, alternatives were screened against environmental factors, consistency with locally adopted plans, technical, and economic considerations. Implementation of the screening criteria and an extensive agency, public, and Tribal review process were used to determine reasonable alternatives.

The H2H alternatives development and screening process consisted of the tasks displayed in Figure 2-1.

DRAFT

[1] Council on Environmental Quality: 40 Most Asked Questions Concerning CEQ's NEPA Regulations; 46 Red. Reg. 18026, as amended, 51 Fed. Reg. 15618.

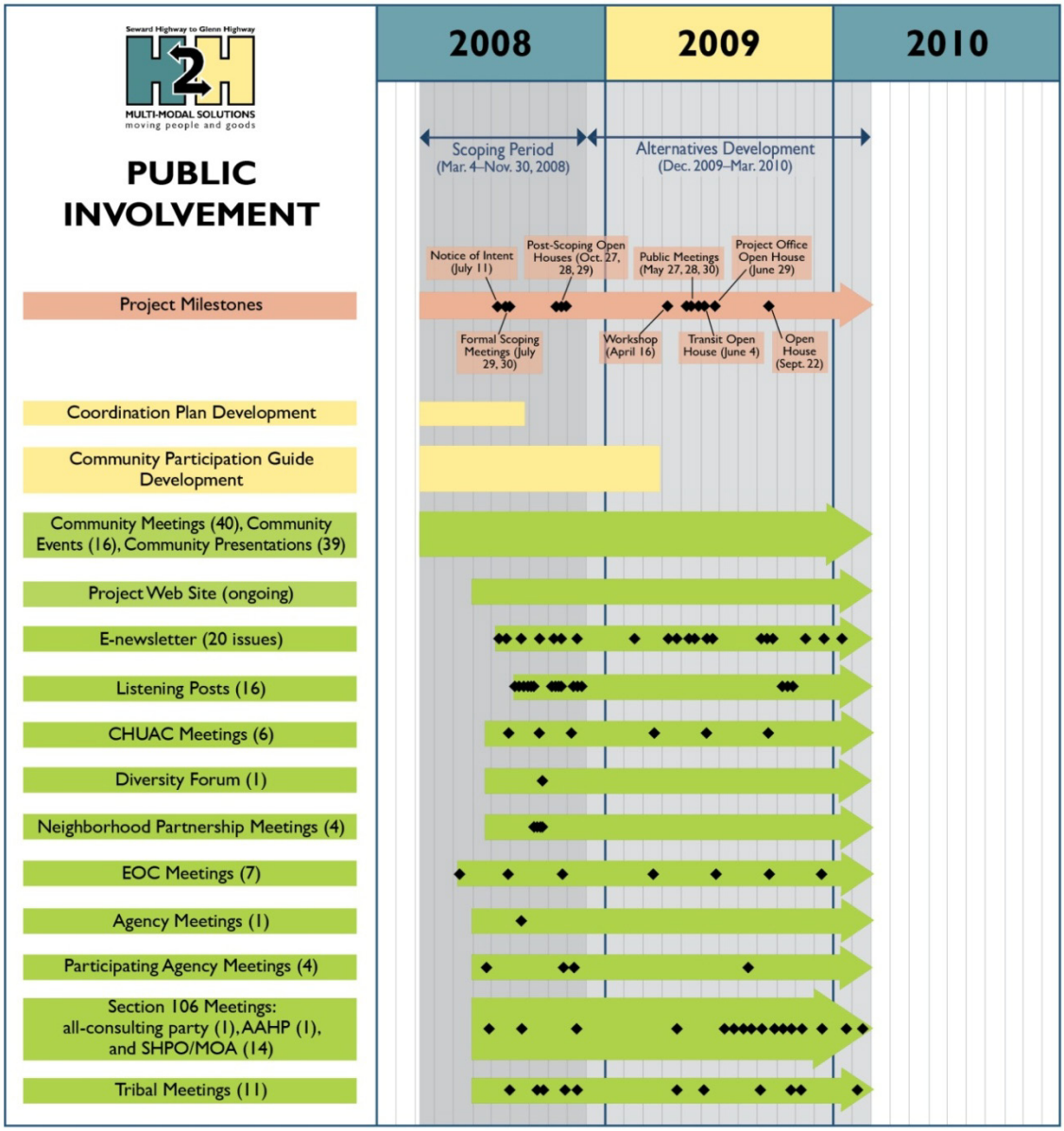
Figure 2-1. Alternatives Development and Screening Process



2.2 PUBLIC AND AGENCY INPUT

An extensive outreach program was initiated as part of the EIS process. During project scoping there was a wide variety of public, agency, and Tribal outreach opportunities, as shown in Figure 2-2. Public and agency input played an important role in the development of the purpose and need and identification of the transportation modes, strategies, corridors, and alternatives for the H2H project. During the scoping period, more than 1,200 comments were received from more than 400 individual commenters; many of the comments were related to alternatives. The project received more than 5,000 comments from more than 1,000 commenters during the alternatives development phase of the study. Public involvement that occurred during these phases of the study is documented in the *Scoping Summary Report* and the *Reasonable Alternatives Technical Memorandum* (DOT& PF 2010) **(Appendix ??).**

Figure 2-2. Public Involvement Summary of Activities to Date



2.2.1 Travel Demand Modeling

The travel model adopted by the Anchorage Metropolitan Area Transportation Solutions (AMATS) was used to forecast future traffic volumes for the alternatives screening process. The AMATS Travel Model (including the base roadway and transit networks) was adopted as part of the *2025 Long-Range Transportation Plan with 2027 Revisions* (LRTP) (AMATS 2007).

The AMATS 2027 travel model was coded to equitably assess the various alternatives being considered. Access connections to major arterials and other facilities were kept as similar as possible between the corridor scenarios; as necessary, corridor scenarios have frontage roads where access to local roads were expected to be required. The construction year for the H2H project is projected to be 2015, and the project design year is 20 years beyond this date (2035). The alternatives screening analysis used the approved and calibrated AMATS Travel Model with the traffic volume results grown to the projected traffic volumes in 2035 using a linear growth rate of 1.5 percent per year, which is commensurate with population growth trends in Anchorage.

The AMATS 2035 travel model is being updated, and a sensitivity analysis will be performed to ensure that the results of the initial screening are still appropriate given updated population and employment projections.

2.3 ALTERNATIVES DEVELOPMENT PROCESS

2.3.1 Develop the Purpose and Need (Task 1)

The Purpose and Need Statement serves as the basis for identifying the reasonable alternatives. To be carried forward for detailed study in the Draft EIS, an alternative must satisfy the purpose and need of the project (and be practical or feasible to construct from a technical and economic standpoint). Chapter 1 provides a detailed description of the development of the purpose and needs for this study. In the *Reasonable Alternatives Technical Memorandum* (DOT& PF 2010*)* (**Appendix ??**), an illustration is provided on how screening criteria correspond to the defined purpose and needs.

DRAFT

2.3.2 Development of Screening Criteria (Task 2)

The screening criteria provide critical information about how well an alternative satisfies the project's purpose and needs and whether it is technically, environmentally and economically feasible. The criteria are used to generate measures to systematically and objectively identify reasonable alternatives and screen out unreasonable alternatives.

The H2H screening process consisted of two stages with two steps each. The Stage 1 criteria focused on satisfying the purpose and need; the Stage 2 criteria focused on technical, environmental, and economic considerations. A general summary of the screening criteria is provided in Table 2.1. Detailed information regarding the criteria is provided in the *Draft Reasonable Alternatives Technical Memorandum* (DOT& PF 2010) (**Appendix ??**).

Table 2.1. Screening Criteria

STAGE 1		STAGE 2	
Step 1	**Step 2**	**Step 1**	**Step 2**
• Need 1. Reduce Congestion • Need 2. Improve Travel Efficiency	• Need 3. Improve Neighborhood Connection • Need 4. Improve Safety • Need 5. Improve Multimodal Connections • Environmental Factors • Consistency with Anchorage Comprehensive Plan Elements	• Technical and Environmental Consideration • Impact to the Natural, Physical, Biological or Human Environment	• Economic Considerations
Focus: Full range of alternatives developed with enough detail to allow traffic modeling to be completed. Used AMATS traffic modeling[2] measures and cursory environmental review to screen alternatives.	**Focus:** Determined a typical section and corridor width for the screened alternatives. Used AMATS traffic modeling measures, residential data, road connection data, safety statistics, environmental factors, and local planning documents to screen alternatives.	**Focus:** Conceptual engineering developed for the screened alternatives. Used technical and environmental factors to screen alternatives.	**Focus:** Conceptual engineering for screened alternatives was further refined to minimize right-of-way and environmental impacts, and to reduce cost. Used cost comparison to determine if the alternative was considered reasonable.

2.3.3 Transportation Modes, Strategies, and Corridors (Task 3)

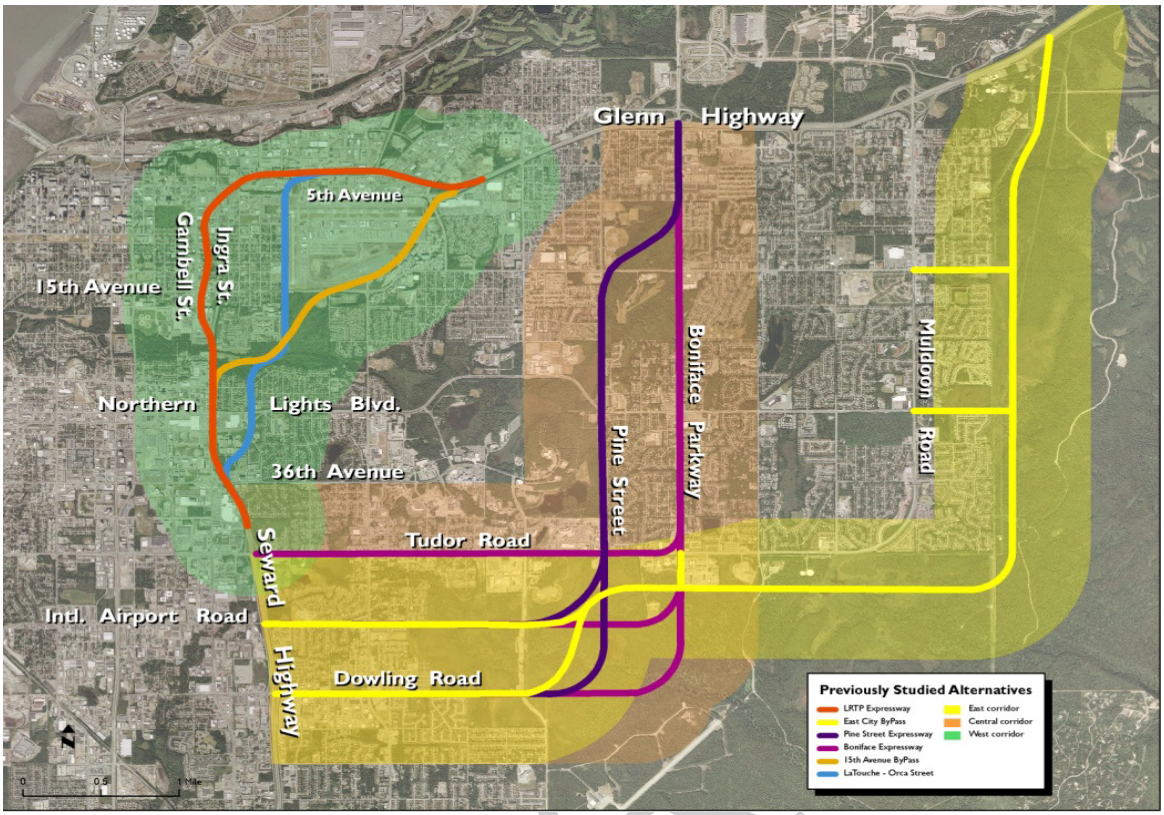
The processes and resources used to identify transportation modes, strategies, and corridors for development of alternatives for the H2H project included reviewing past transportation studies and recommendations; alternatives listed in the *Notice of Intent* (NOI); transportation modes, strategies, and corridors identified through the scoping process; and public, agency, and Tribal input. During the scoping and alternatives development meetings, discussions occurred suggesting that the alternatives would be created by pairing corridors with a combination of modes and strategies.

Over the past 45 years, planning studies were conducted citing the need for improvements between the Seward and Glenn highways. The alternative alignments identified from these documents was compiled into Figure 2-3 and shared with the public during scoping.

2 The alternatives screening analysis utilized the approved and calibrated AMATS Travel Model. Please review the Reasonable Alternatives Technical Memorandum for additional detail regarding the modeling effort.

DRAFT

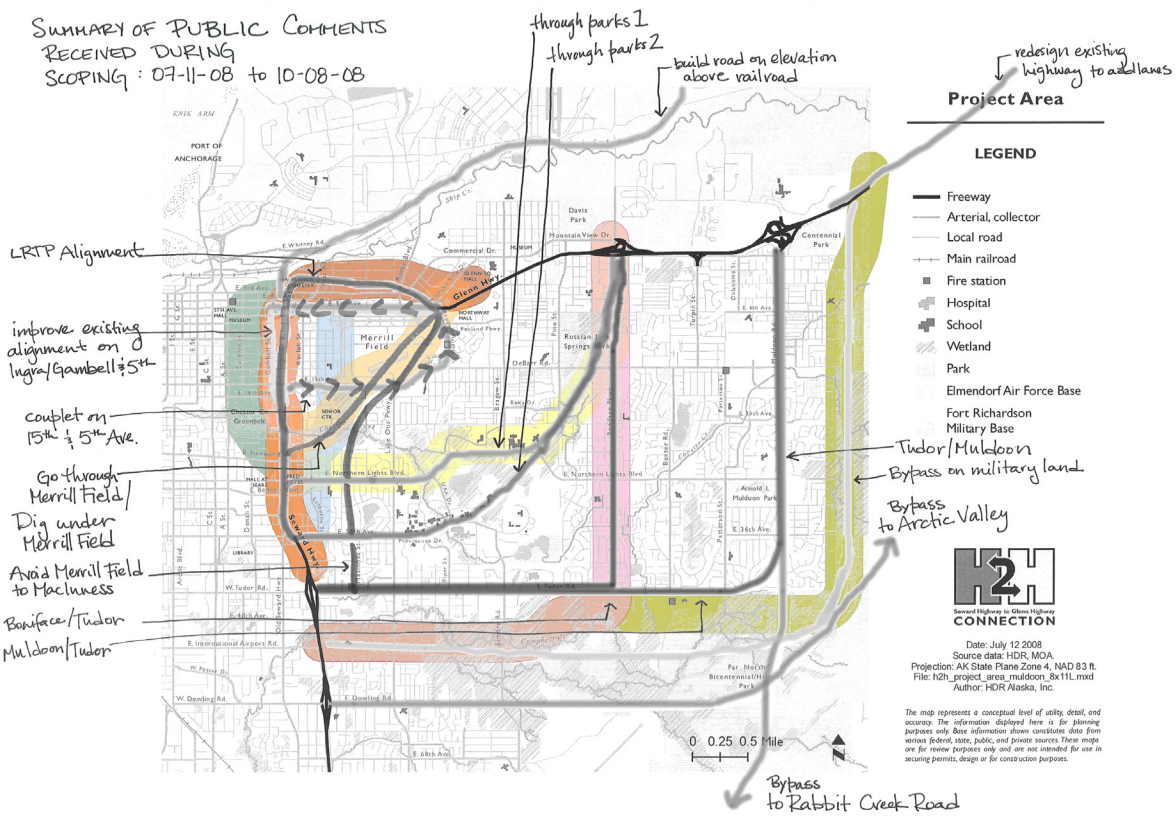
Figure 2-3. Summary of Previously Studied Alternatives and Corridors



Preliminary Corridors and Alternatives

During scoping, residents, agencies, and Tribes were asked to suggest possible alignments that might satisfy the purpose and needs. The results are shown in Figure 2-4. Color-coded preliminary corridors on Figure 2-4 show how suggestions from the public were captured in the preliminary corridor selection process. Each color-coded corridor is 1,800 feet wide. Detailed corridor descriptions and information regarding other preliminary alternatives are provided in the *Reasonable Alternatives Technical Memorandum* (DOT& PF 2010) (**Appendix ??**).

Figure 2-4. Preliminary Corridors and Alternatives Suggested During Scoping



Transportation Modes and Strategies

The project team used input from the public and agencies to develop the "Transportation Modes and Strategies" for consideration in the H2H project. The spectrum of modes and strategies ranged from improving the efficiency of the existing system to implementing new capacity improvements in the study area. Detailed information regarding modes and strategies are provided in the *Reasonable Alternatives Technical Memorandum* (DOT& PF 2010) (**Appendix ??**).

Comments received during the scoping period led the project team to explore more than just a "highway connection." People asked that a mix of transportation options be considered that would work together to meet the identified transportation needs. The purpose and need were broadened to explicitly include multiple modes of travel.

The modal options comprised those listed below. Note that pedestrian and bicycle considerations are included in all modal options.

- **Roadway**

  Arterial – Arterial streets are roadways that provide adjacent access and traverse across town to connect employment and commercial activity centers and major residential areas. They provide both mobility and access.

  Expressway – Expressways are capable of handling higher traffic volumes and generally have limited access instead of fully controlled access. They allow medium to high speeds. Expressways can be divided or undivided. An expressway's function is primarily mobility.

Freeway – Freeways are high speed roadways capable of handling large volumes of traffic. The main function of a freeway is to provide the most mobility and least access to carry through-traffic longer distances. Freeways are often divided, multi-lane facilities.

High-Occupancy Vehicle (HOV) Lane – An HOV lane, sometimes called a carpool lane, is a special lane reserved for the use of carpools, vanpools, and buses carrying more than one occupant.

- **Transit**

  Bus Rapid Transit (BRT) – BRT is a flexible form of rapid bus transit that combines stations, vehicles, services, and Intelligent Transportation System (ITS) elements into an integrated system. BRT can travel mixed with traffic on streets and highways but typically has its own right-of-way to improve travel time for transit riders.

  Commuter Rail Transit (CRT) – CRT provides suburb-to-central-city or suburb-suburb service. The fixed route service is typically set up to serve community needs of workers with a concentration of service during peak rush hours with reduced service at other times. CRT operates on heavy rail tracks, the same train tracks used by long-distance passenger service or freight trains like the Alaska Railroad.

  Express Bus – Express Bus service uses the existing transit bus fleet, but has fewer stops than regular transit service so it delivers passengers to their destination faster. This service often provides limited or nonstop service from park-and-ride facilities or transit stations to major employment centers, central business districts, or commercial areas.

  Light Rail Transit (LRT) – According to the Transportation Research Board, LRT is " a metropolitan rail system characterized by its ability to operate single cars or short trains along exclusive rights-of-way at ground level, on aerial structures, in subways, or occasionally in streets, and to board and discharge passengers at track or car-floor level." LRT is designed for moderate or short-distance fixed route trips in urban areas. It does not operate on heavy rail tracks.

  Personal Rapid Transit (PRT) –PRT is a type of public transportation whereby automated vehicles (small pod cars with three or four seats) run on a network of specially built guideways. PRT systems do not stop at every station but make an automated, computer-controlled, nonstop journey to the user's destination.

- **Land Use and Transit –** This strategy changes the distribution of new population and employment growth coupled with supporting modifications to the transit system to maximize transit use, increase pedestrian and bike trips, and reduce automobile use in an attempt to eliminate the need for a major capital highway project.

- **Transportation System Management (TSM)** – TSM is series of strategies (e.g., timing traffic signals, closing side streets, etc.) to make the existing transportation system more efficient without investing in major capital improvements.

- **Travel Demand Management (TDM)** – TDM is a series of strategies designed to reduce automobile travel demand (often focused on peak periods) through various means, such as increasing transit use, promoting alternative work hours, and telecommuting.

2.3.4 Range of Preliminary Alternatives (Task 4)

The project team developed a full range of preliminary alternatives based on scoping comments provided by the public, agencies, and Tribes; previous studies; and analysis developed for the Anchorage's Long

DRAFT

Range Transportation Plan, in response to the problems identified in the Purpose and Need Statement. The full range of preliminary alternatives includes the following:

- No Action Alternative: The No Action Alternative is the base condition on which all alternatives are built. All H2H alternatives assume that all roadway projects, transit improvements, and TDM/TSM strategies identified in the No Action Alternative will be built.
- Stand-Alone TDM/TSM Alternative
- Stand-Alone Transit Alternatives
  - Stand-Alone Commuter Rail Alternative
  - Stand-Alone Light Rail Transit (LRT) Alternative
  - Stand-Alone Bus Rapid Transit (BRT) Alternative
- Multimodal Corridor Alternatives: Each multimodal alternative includes roadway improvements to the connection between the Seward and Glenn highways. New controlled access highway alignments would have depressed sections through developed residential areas with major arterial streets connected by interchanges; local streets necessary for neighborhood connections would be grade-separated.
  - Multimodal Corridor Alternatives with and without Enhanced Transit: Controlled-access highway, with eight (8) general purpose lanes.
    - Cordova
    - Gambell-Ingra
    - Orca
    - 15th Avenue
    - Northern Lights
    - Boniface
    - East City
- Multimodal Roadway Expansion Alternatives
  - Seward-Glenn Arterial Expansion: two (2) additional arterial lanes on the existing highway connection with and without enhanced transit.
  - Multiple Arterial Expansion Alternative: two (2) additional arterial lanes on a number of arterial roads between the Seward and Glenn Highways with and without enhanced transit.
- Land Use and Transit Alternative
  - Concepts A, B, C, and D

Please see the *Reasonable Alternatives Technical Memorandum* (DOT& PF 2010) provided in **Appendix ??** for more detailed information regarding the alternatives.

DRAFT

2.4 ALTERNATIVE SCREENING PROCESS

2.4.1 Apply the Screening Criteria (Task 5)

The screening process and criteria discussed previously were used to screen the full range of alternatives. Stage 1 screening evaluated the alternatives on how well they satisfy the purpose and needs of the H2H project. The alternatives that satisfy the Stage 1 criteria were refined to provide more specific details and then were evaluated against the Stage 2 (technical, environmental, and cost) screening criteria. Comments provided by members of the public, Tribes, and local, state, and federal agencies during the scoping and the alternatives development processes were considered during the screening process. Please see the *Draft Reasonable Alternatives Technical Memorandum* (DOT& PF 2010) (**Appendix ??**) for detailed information regarding the screening results (see Table 2.1).

Table 2.1. Screening Results

Alternative	Stage/Step Eliminated				Reason for Retention/Elimination
	Stage 1		Stage 2		
	Step 1	Step 2	Step 1	Step 2	
No Action	Automatically carried forward for NEPA comparison.				**Carried forward.** • Does not meet purpose and need but provides basis for comparison with other alternatives.
Stand-Alone TDM/TSM	√				**Eliminated at Stage 1, Step 1.** • Qualitative assessment revealed that there would not be a level of trip reductions to relieve congestion or improve travel efficiency. • Therefore, does not satisfy Needs 1 and 2.
Stand-Alone Transit					
Commuter Rail	√				**Eliminated at Stage 1, Step 1.** • Existing arterial connection would still be congested. • Failing traffic conditions are not sufficiently relieved on parallel adjacent streets. • Would not substantially reduce travel time on the existing corridors. • Therefore, does not satisfy Needs 1 and 2.
Light Rail Transit (LRT)	√				**Eliminated at Stage 1, Step 1.** • Existing arterial connection would still be congested. • Failing traffic conditions are not sufficiently relieved on parallel adjacent streets. • Would not substantially reduce travel time on the existing corridors. • Therefore, does not satisfy Needs 1 and 2.

DRAFT

Alternative	Stage/Step Eliminated				Reason for Retention/Elimination
	Stage 1		Stage 2		
	Step 1	Step 2	Step 1	Step 2	
Bus Rapid Transit (BRT)	√				**Eliminated at Stage 1, Step 1.** • Existing arterial connection would still be congested. • Failing traffic conditions would not be sufficiently relieved on parallel adjacent streets. • Would not substantially reduce travel time on the existing corridors. • Therefore, does not satisfy Needs 1 and 2.
Multimodal Corridor With and Without Enhanced Transit (Controlled-Access Highway, (8) General Purpose Lanes)					
Cordova		√			**Eliminated at Stage 1, Step 2.** • High number of residential relocations (1,700). • Substantial length through residential area (6.12 miles). • High residential street impacts with a large number of impacts to "Safe Routes to Schools" (77). • Therefore, does not satisfy Need 3. • High number of residential relocation in low-income and minority areas (approx. 550). • Impact to parklands (23 acres). • Business relocations (50). • Municipal Planning Department stated that alternatives are not consistent with adopted plans and have unacceptable impacts to parks.
Gambell-Ingra					**Carried forward.** • Satisfies the purpose and needs. • Technically feasible and is believed to be possible to permit. • Practical and financially feasible.
Orca					**Carried forward.** • Satisfies the purpose and needs. • Technically feasible and is believed to be possible to permit. • Practical and financially feasible.
15th Avenue					**Carried forward.** • Satisfies the purpose and needs. • Technically feasible and is believed to be possible to permit. • Practical and financially feasible.

DRAFT

Alternative	Stage/Step Eliminated				Reason for Retention/Elimination
	Stage 1		Stage 2		
	Step 1	Step 2	Step 1	Step 2	
Northern Lights		√			**Eliminated at Stage 1, Step 2.** • Residential relocations (approx. 700). • Number of road connections impacts in residential area (44). • Number of residential relocations constitutes a large percentage of the Downtown Community Council (37%). • Therefore, does not satisfy Need 3. • High number of residential relocation in low-income and minority areas (approx. 500). • Impact to historic properties (18). • Municipal Planning Department stated that alternatives are not consistent with adopted plans.
Boniface	√				**Eliminated at Stage 1, Step 1.** • Existing arterial connection would still be congested. • Failing traffic conditions would not be sufficiently relieved on parallel adjacent streets. • Would not substantially reduce travel time on the existing corridors. • Therefore, does not satisfy Needs 1 and 2. • Second-greatest impacts to wetlands (86 acres). • Second-greatest impacts to parks (71 acres).
East City	√				**Eliminated at Stage 1, Step 1.** • Existing arterial connection would still be congested. • Failing traffic conditions would not be sufficiently relieved on parallel adjacent streets. • Would not substantially reduce travel time on the existing corridors. • Therefore, does not satisfy Needs 1 and 2. • Greatest impacts to wetlands (199 acres). • Greatest impacts to parks (170 acres).
Multimodal Roadway Expansion With and Without Enhanced Transit					

DRAFT

Alternative	Stage/Step Eliminated				Reason for Retention/Elimination
	Stage 1		Stage 2		
	Step 1	Step 2	Step 1	Step 2	
Seward –Glenn Arterial Expansion	√				**Eliminated at Stage 1, Step 1.** • Existing arterial connection would still be congested. • Failing traffic conditions would not be sufficiently relieved on parallel adjacent streets. • Would not substantially reduce travel time on the existing corridors. • Therefore, does not satisfy Needs 1 and 2.
Multiple Arterial Expansion	√				**Eliminated at Stage 1, Step 1.** • Existing arterial connection would still be congested. • Failing traffic conditions would not be sufficiently relieved on parallel adjacent streets. • Would not substantially reduce travel time on the existing corridors. • Therefore, does not satisfy Needs 1 and 2.
Land Use and Transit Alternatives					
Concepts A, B, C, and D	√				**Eliminated at Stage 1, Step 1.** • Existing arterial connection would still be congested. • Failing traffic conditions would not be sufficiently relieved on parallel adjacent streets. • Would not substantially reduce travel time on the existing corridors. • Therefore, does not satisfy Needs 1 and 2.

DRAFT

2.5 NO ACTION ALTERNATIVE

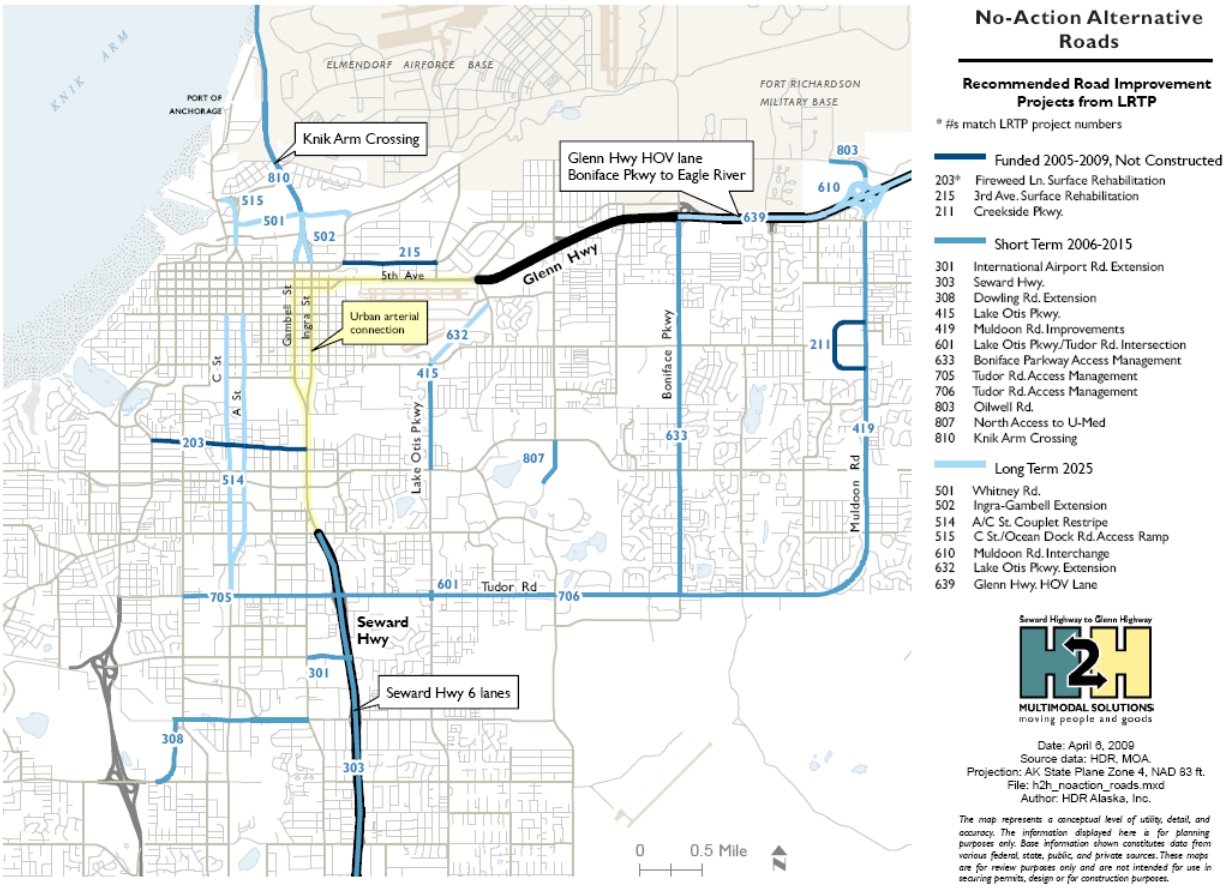
The No Action Alternative, or base case, includes all improvements from the *Anchorage Bowl 2025 Long Range Transportation Plan with the 2027 Revisions* (2007 LRTP), *Congestion Management Program Report* (AMATS1994), and other local planning documents, except the H2H project. The No Action Alternative assumes that those other projects and improvements would be completed and operating within the Anchorage transportation system, as stated in the 2007 LRTP, prior to the design year for this project (2035), whether or not any build alternative is implemented for this project.

2.6 NO ACTION ROADWAY

Planned roadway improvement projects in the project area are depicted in Figure 2-1. Projects with the greatest traffic influence on the H2H project include:

- LRTP Project #303. The Seward Highway between O'Malley and 36th Avenue would be widened to six lanes.
- LRTP Project #639. The Glenn Highway would have one high-occupancy vehicle (HOV) lane in each direction constructed from Boniface Parkway to Artillery Road in Eagle River.
- LRTP Project #810. The Knik Arm Crossing would connect Anchorage with Point MacKenzie.

Figure 2-1. No Action Alternative Roadway Improvements



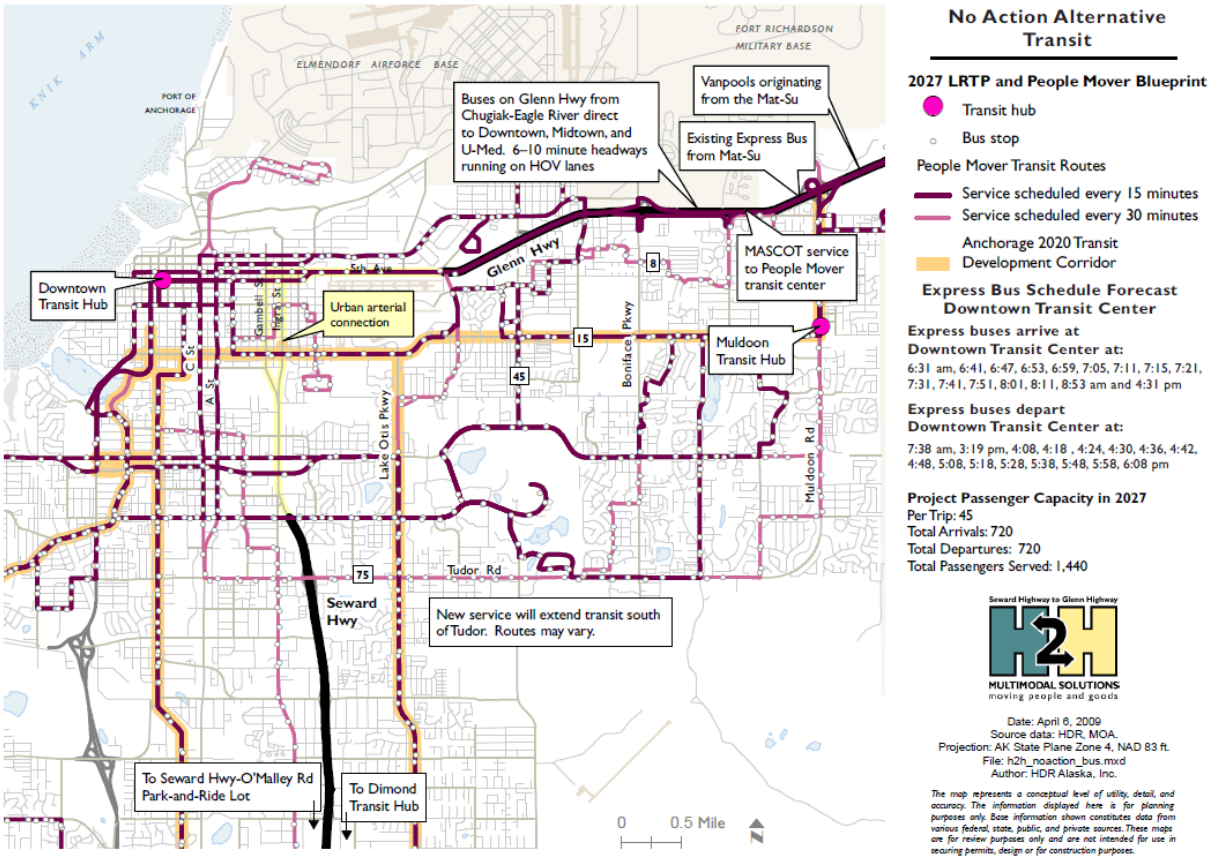
2.7 NO ACTION BUS TRANSIT

Under the No Action Alternative, the Anchorage Public Transportation Department would continue to provide:

- People Mover Bus Transit
- AnchorRIDE paratransit
- Vanpool service
- Free online carpool matching service
- Planned public transportation improvements (refer to Appendix B) are also assumed to occur.
- Matanuska-Susitna Community Transit (MASCOT), the transit service in the Matanuska-Susitna Borough (MSB) would continue to provide service between Wasilla and Palmer to and from Anchorage.
- Route 102 would operate weekday peak period commuter service between Chugiak Eagle River and Anchorage. According to the LRTP, the headways on route 102 buses are planned to be increased to operate every six to ten minutes, running on HOV lanes (Project Number 639). The LRTP indicates the route would pick up passengers at the North and South Birchwood park and ride Lots, stop at the Eagle River Transit Center, and a newly constructed park and ride lot in the vicinity of Artillery Road/Glenn Highway. Under the No Action Alternative, these buses would run on the existing arterial streets after leaving the controlled access segment of the Glenn Highway (at Airport Heights Drive).
- **30-minute Headways on all Weekday Routes Until 6:00 p.m.** All weekday routes in People Mover's system are planned to have bus service every half hour from the start of the day (generally 6:30 a.m.) until 6:00 p.m. This includes increases in midday service to the Eagle River area. Routes identified for 30-minute headways are the 1, 2, 8, 13, 14, 36, 60, 75, 76, and 78. This service would be operated with People Mover's existing fleet.
- **15-Minute Peak Service.** Select routes (the 3, 7, 9, 15, 36, and 45 which are specifically identified in either the *Anchorage 2020 Comprehensive Plan*, or the *2027 LRTP*) would receive improvements to service during the peak periods.

DRAFT

Figure 2-2. No Action Alternative Transit



2.8 NO ACTION PEDESTRIAN AND BIKE FACILITIES

Under the No Action Alternative, it is anticipated that the improvements identified in the *Anchorage Pedestrian Plan* and *Anchorage Bicycle Plan* would be implemented and the other existing conditions would remain the same as they are today.

Planned improvements under the 2007 *Anchorage Pedestrian Plan* include:

- Project No. 89, separated pedestrian crossing, Seward Highway at 36th Avenue
- Project No. 166, pedestrian crossing improvements, Seward Highway at Benson and Northern Lights boulevards
- Project No. 90, midblock separated crossing between Benson and Northern Lights boulevards
- Project Nos. 75, 138, 114, & 21, area sidewalk improvements
- Project Nos. 42 & 43, pedestrian crossings at 15th Avenue
- Project Nos. 79 & 125, crossing improvements between Fireweed Lane and 5th Avenue
- Project No. 127, pedestrian crossing improvements, 5th Avenue between LaTouche and Gambell streets
- Project No. 87, pedestrian crossing improvements, Glenn Highway at Airport Heights Drive

Planned improvements under the 1997 *Anchorage Areawide Trails Plan* include:

- Paved multi-use trails on the Gambell-Ingra couplet
- Bike route on the 5th-6th avenue couplet

(Refer to Appendix B for more complete descriptions.)

2.9 NO ACTION TRAVEL DEMAND/TRANSPORTATION SYSTEMS MANAGEMENT

AMATS includes both travel demand management (TDM) and transportation system management (TSM) strategies in the *Anchorage 2025 Long Range Transportation Plan with 2027 Revisions* (2007) that would continue to be implemented in the No Action Alternative. TDM strategies encourage behavior changes when it comes to travel modes, alternative work times, and improved transit to enhance ridership. TSM strategies work to reduce congestion through improved traffic signal timing, adding turning lanes, spot geometric changes, or lengthening turn lanes, all of which help move traffic.

TDM strategies change traveler behavior. These TDM strategies are proposed to be implemented under the No Action Alternative. These strategies were identified in the Congestion Management Program (MOA 1994) and the Anchorage Bowl 2025 Long-Range Transportation Plan with 2027Revisions. (AMATS 2007). Some strategies have already been used; others strategies are planned for future use. Appendix A identifies the status of each strategy. The assumption is that the MOA/AMATS will implement the planned measures within the planning time horizon of the LRTP (2027) and that they would therefore be in place and functioning by the design year of the H2H project (2035). TDM strategies fall into the following categories (Table 2.2):

Table 2.2. Existing Planned TDM Strategies*

Policy and Management ▪ Access Management ▪ Trip Reduction Ordinance (Voluntary) ▪ Land use policies to reduce SOV ▪ Site design criteria to increase transit usage ▪ Parking requirements in zoning codes ▪ Ordinance to require provisions of bicycle facilities ▪ Education programs ▪ Implement value pricing ▪ Enforcement ▪ Turn Prohibitions **Employer-Based Trip Management Programs** ▪ Ride sharing programs ▪ Priority parking for carpools and vanpools ▪ Employer-subsidized transit use ▪ Telecommuting/other work schedule options ▪ On-site employer transportation coordinator ▪ Marketing (rideshare/transit/bicycle) ▪ Guaranteed Ride Home Program ▪ Employee transportation allowance ▪ Eliminate existing employee parking subsidies ▪ Showers/lockers for bicyclists/pedestrians **School Transportation** ▪ School access and safety program ▪ Walking school bus program **Parking Management** ▪ Public sector parking pricing ▪ On-street parking ▪ Preferential parking for HOV vehicle	**Improve Transit** ▪ Improvements to bus routes and schedules (including schedules and improved transfers) ▪ More frequent service (lower headways) ▪ Transit operation monitoring ▪ Bus maintenance improvements ▪ Transit passenger amenities ▪ Transit marketing and informational programs ▪ Monthly transit passes ▪ Improved feeder bus service ▪ Improve express bus service ▪ Park and Ride facilities ▪ Road operational changes ▪ Para-transit services ▪ Bus traffic signal preemption ▪ Joint development activities **Areawide SOV Reduction Incentives** ▪ Areawide Commute Management Organization ▪ Park and Ride Lots **Bicycle and Pedestrian Programs** ▪ Bicycle plans and maps ▪ Bicycle lockers, racks, and other storage facilities ▪ Bicycle routes, lanes, and paths ▪ Sidewalk and walkway facilities ▪ Pedestrian connections with transit ▪ Safety consideration for sidewalks and walkways ▪ Integration of facilities for bicyclists with transit ▪ Bicycle media and promotion campaign ▪ Trails coordinator or coordinator program ▪ Education programs for bicyclists and potential cyclists

DRAFT

▪ Parking supply controls ▪ Employer tax benefits	

** Individual strategies under these categories and their definitions are included in Appendix A.*

TSM strategies focus on reducing congestion through signal timing or spot improvements to the road network. These strategies would continue to be implemented under the No Action Alternative. Some strategies have already been implemented; others strategies are planned to be implemented. Appendix A identifies the status of each strategy. TSM strategies fall into the following categories (Table 2.3):

Table 2.3. Existing Planned TSM Strategies*

Traffic Signal Optimization	**Roadway Improvements**
▪ Periodic review and optimization of signals ▪ Intersection signal timing to reduce delay and coordinate timing plans for sub-areas or along corridors ▪ Time-of-day optimization, including vehicle-actuated signals ▪ Automated and real-time data collection ▪ Operation of a traffic management center to facilitate monitoring and rapid response ▪ Emergency vehicle signal preemption ▪ Transit signal preemption ▪ Intersection geometry changes to eliminate split-phase signal operation (by installing dedicated left-turn lanes) ▪ Field observation and maintenance **Spot Geometric Improvements** ▪ Focus on geometric improvements at intersections and freeways ▪ Add auxiliary lane between ramps on freeway ▪ Install dedicated turn lanes or lengthen turn lanes ▪ Study key congestion areas to reveal cost-efficient strategies	▪ Concurrent-Flow ▪ Reversible Lane Systems ▪ Super arterials ▪ High Occupancy Vehicle lanes (HOV) ▪ Arterials with limited access ▪ Highway/Railroad crossing improvements **Traffic Calming** ▪ Use tools provided in the Traffic Calming Protocol Manual (MOA Traffic Department 2002) ▪ Prime locations—neighborhoods experiencing cut through traffic

** Individual strategies under these categories and their definitions are included in Appendix A. These TSM strategies are identified in the Congestion Management Program (MOA 1994) and the Anchorage Bowl 2025 Long-Range Transportation Plan with 2027Revisions (AMATS 2007).*

The next sections describe the action alternatives. It should be noted that the Alaska Department of Transportation & Public Facilities (DOT&PF) would be responsible for highway capacity improvements. Other agencies would be responsible for implementation of other transportation measures and modes. Other than commuter rail, it is assumed that the Municipality of Anchorage (MOA) would be responsible for the implementation of transit improvements. The Alaska Railroad would be responsible for the implementation of commuter rail. Depending on the program or strategy DOT&PF and the MOA could be responsible for TDM/TSM implementation.

2.10 REASONABLE ALTERNATIVES

2.10.1 Reasonable Alternatives Carried Forward for Detailed Study in the EIS (Task 6)

ADD INTRODUCTION

Gambell-Ingra Alternative

The Gambell-Ingra Alternative would be a controlled-access freeway[3] that starts at the Tudor Road interchange on the existing New Seward Highway. The alignment traverses north, then east to intersect with the existing Glenn Highway west of the Bragaw Street interchange. The length of the alternative would be approximately 4.22 miles and is depicted in plan view on Figure ??. Bus transit improvements and trail connections are part of the alternative. The number of lanes on the highway would vary along the alignment between 6 and 8 lanes depending on traffic demand and operational requirements. The south end of the alternative would match up to the planned 6 lanes on the Seward Highway and at the north end it would match up to the planned 8 lanes on the Glenn Highway. To minimize and avoid impacts, the highway is proposed with the minimum footprint allowed by DOT&PF design standards. The minimum footprint includes a jersey barrier median (rather than a grass swale median), and clear zones on the sides of the roads have been minimized. A typical cross-section drawing of what the highway segments could look like is shown in Figure ??.

Picture or simulation of a jersey barrier.

Caption: A concrete jersey barrier median would protect traffic from crossing into oncoming traffic and minimizes space requirements.

DRAFT

[3] Controlled Access Freeway: A controlled-access freeway is a divided highway designed for the unimpeded flow of large traffic volumes. Access to a freeway is rigorously controlled, and intersection grade separations are required (http://www.fhwa.dot.gov/planning/glossary/glossary_listing.cfm).

INSERT 11X17 FOLDOUT PLAN VIEW DRAWING LIKE THE ONE MATT HAS DONE.

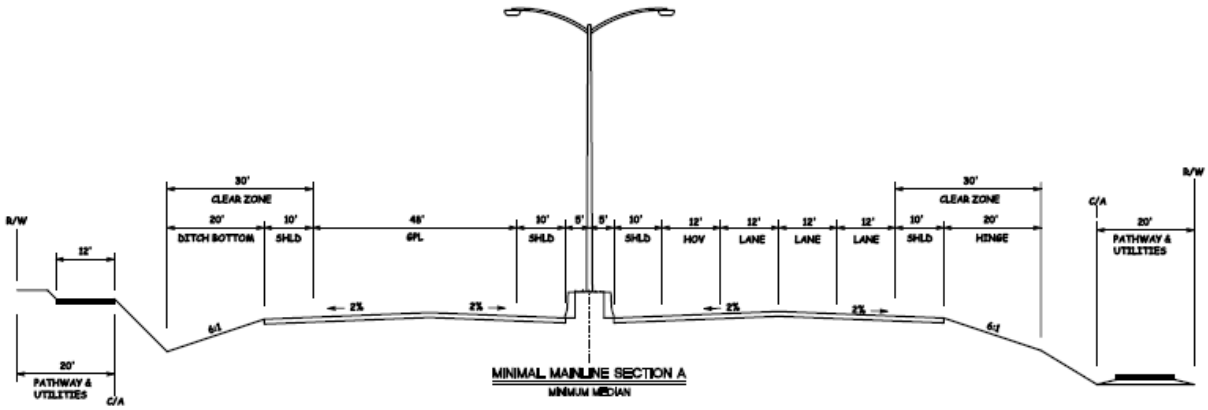


Figure 3 The mainline freeway connection would vary between 6 and 8 lanes depending on the traffic demand and operational needs. Space will be retained to provide room for utilities, pathways, and identified transit improvements.

Through Midtown, the new highway is proposed to largely follow the current Seward Highway alignment, but would be depressed (excavated below ground with retaining walls on the sides), under Benson Boulevard, Northern Lights Boulevard, and Fireweed Lane. A typical cross-section drawing of what the depressed segments could look like is shown in Figure ??. Within the depressed segments, the highway would have retaining walls and an underground drainage system. North of Fireweed Lane, the highway would daylight out of the hillside on the south side of Chester Creek. At Chester Creek, the highway would go over the creek and the existing culverts for Chester Creek and the greenbelt trail would be replaced with a new bridge.

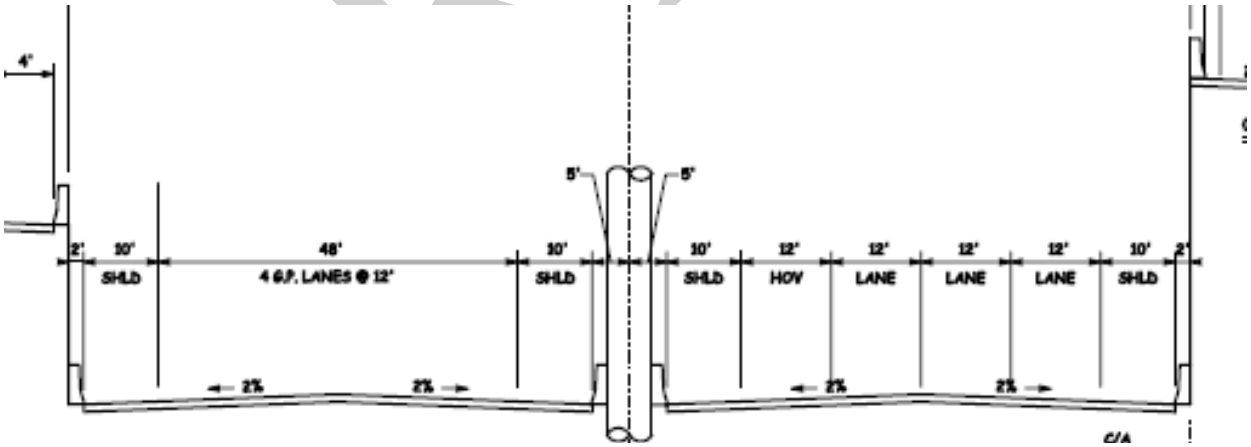


Figure 4 The depressed sections would be excavated below ground with retaining walls on the sides. Jersey barriers in the middle and vertical sidewalls minimize impacts. Select local cross-streets would cross over depressed segments.

South Midtown access on and off the highway at the Tudor Road interchange would remain largely as it is currently. North Midtown access would be provided at on-off ramps at Benson Boulevard (southward) and Fireweed Lane (northward). There would be an underpass at 36th Avenue, but no direct access on and

off the highway. Overpass bridges would be located at Northern Lights Boulevard, Benson Boulevard, and Fireweed Lane.

One-way frontage roads would be located along the east and west sides of the highway in the segment through Midtown starting at Tudor Road. The purpose of the frontage roads would be to provide access to adjacent properties and to major cross-streets at Benson and Northern Lights Boulevards, Fireweed Lane, and 20th Avenue. At 20th Avenue, the northbound frontage roads would cross under the highway mainline and the frontage road would be extended north as a two-way street to connect to Gambell Street. The two-way frontage road between 20th Avenue and 15th Avenue would provide access to the Sullivan Arena and local businesses.

The Seward Highway mainline would continue north of 20th Avenue roughly along Ingra Street and largely within the DOT&PF right-of-way. Just south of 15th Avenue it would curve slightly to the west until about 13th Avenue to align with Hyder Street. The mainline highway will remain low, depressed through Fairview, in an alignment generally along Hyder Street until it reaches 5th Avenue, where it starts a curve to the east, day-lighting out of the bluff above Ship Creek.

Downtown access would be provided at on-off ramps at 6th (southward) and 3rd Avenue (northward). There would be overpasses at 15th Avenue, 13th Avenue, 11th Avenue, 10th Avenue (pedestrian/bicycle bridge), 9th Avenue, 6th Avenue, and 5th Avenue, but only on and off ramps at 6th Avenue and 3rd Avenue.

The existing Gambell and Ingra streets would remain as arterial streets but would be reconstructed and converted to two-way streets between 15th Avenue and 9th Avenue. Improvements include a reduction in one lane each direction with wider sidewalks and/or separated pathways, new bike lanes, and/or potentially some on-street parking. North of 9th Avenue, Gambell and Ingra Streets would remain as they are today (one way streets with 4 lanes each way).

INSERT FIGURE OF GAMBELL-INGRA CROSS SECTION DRAWING FROM MATT.

As the new highway curves to the east, it would follow an alignment below the Ship Creek bluff north of 3rd Avenue. Near Reeve Boulevard it curves back into an alignment with the Glenn Highway west of Bragaw Street.

Overpasses would be provided at Reeve Boulevard, Commercial Drive, and Mountain View Drive with the mainline highway going underneath. Access on and off the highway is proposed at an interchange at Mountain View Drive/5th Avenue. There are several design variations that could be used for this interchange, including different configurations of a diamond interchange or a single point urban interchange. Local surface streets would be realigned to maintain connections. See Figures ?? - ??.

Pedestrian Connections

Anticipated improvements for bikes and pedestrians are depicted on Figure ??. A continuous sidewalk/trail network is proposed for the length of the facility. Sidewalks on local streets crossing the highway will be reconstructed as part of the project. Reconstruction of Gambell and Ingra Streets between 15th and 9th could include wider sidewalks, bike trails, and/or separated trails. In accord with the CITE PLANNED IMPROVEMENTS THAT WE WILL BE COMPLETING IN A BULLET LIST.

With Transit or With Enhanced Transit

FILL IN/UPDATE AFTER FTA ALTERNATIVES ANALYSIS COMPLETE.

Each reasonable alternative "with transit" includes everything that is in Anchorage's adopted plans, as described in the No Action Alternative (e.g. an HOV lane from Peter's Creek to Boniface Parkway on the Glenn Highway and increased headways on the current express bus route 102). The express buses would travel into Anchorage on planned HOV lanes coming in on the Glenn Highway from Peter's Creek to Boniface Parkway. From there the express buses would run in general-purpose traffic lanes to

DRAFT

Downtown, Midtown, and U-Med (Alaska Native Medical Center) on A and C streets, 5th and 6th avenues, and 36th Avenue. A summary of the alternatives Without Enhanced Transit includes the following features:

- Existing style bus vehicles.
- HOV lanes on Glenn Highway between Peters Creek and Boniface Parkway.
- Park and Ride Lots at North Birchwood, South Birchwood, Eagle River, and Artillery Road.
- Glenn Highway Express Bus would operate every 6 minutes in peak period and 30 minutes off peak.
- No Express Bus on Seward Highway.
- The existing Route #60 bus is assumed to continue to provide service to the Huffman Town Center and a planned park and ride lot at O'Malley/Glenn Highway.

For the Enhanced Transit system, the HOV lane on the Glenn Highway would be continued in from Boniface Parkway on the proposed multimodal corridors. In addition, a BRT route would be added on the Seward Highway (which is not in adopted plans) starting at the Huffman Town Center, stopping at a park and ride lot at O'Malley Road and the Seward Highway, and then continuing north on the Seward Highway. The transit system would operate as a full BRT system, with special branding, low entry vehicles, more substantial stations, and increased headways all day long. For both the Glenn and Seward routes the BRT lines leave the multimodal corridors and function as an employment circulator, linking the Downtown, Midtown, and U-Med employment centers on A and C streets, 5th and 6th avenues, and 36th Avenue. On this circulator route, these streets would have either an HOV (diamond lane) or bus signal priority at the intersections, giving the enhanced transit system a travel time advantage compared to the alternatives Without Enhanced Transit (even off of the multimodal corridor). A summary of the Enhanced Transit alternatives includes the following features:

- The BRT would operate on HOV freeway lanes from outlying areas that tie-into the new multimodal corridor alternatives.
- The system would operate as an employment circulator with HOV lanes and/or signal priority for buses at intersections on its arterial loop route.
- The BRT system would have special branding, low-entry vehicles, and more substantial stations.
- The Glenn Highway BRT would originate at the North Birchwood Park and Ride Lot, with stops at South Birchwood Park and Ride Lot, Eagle River Transit Center, Artillery Road Park and Ride Lot, Downtown Transit Center, Midtown Transit Center, U-Med District, and Alaska Native Hospital on the southbound run, with the same stops in reverse on the northbound run.
- The Glenn Highway BRT would operate on 6-minute headways during peak periods and 20-minute headways during off peak periods – 14 hours per day.
- Seward Highway BRT—Originates at Huffman Town Center with stops at O'Malley Park and Ride, Midtown Transit Center, and Downtown Transit Center on the northbound run, with same stops in reverse for the southbound run.
- The Seward Highway BRT would operate on 10-minute headways during peak periods and 30-minute headways in off peak periods for 14 hours per day.
- The existing Route #60 bus is assumed to continue to be needed to be operated to provide for local service on its existing route.

Orca Alternative

Similar to the Gambell-Ingra Alternative, the Orca Alternative would be a controlled access freeway that starts at the Tudor Road interchange on the existing New Seward Highway. The alignment would traverse generally to the northeast to intersect with the existing Glenn Highway west of the Bragaw Street

DRAFT

interchange. The length of the alternative would be approximately 3.89 miles and is depicted in plan view on Figure ??.

The Orca Alternative through Midtown is the same as the Gambell-Ingra Alternative. South of Fireweed Boulevard the Orca Alternative starts to curve to the right on new alignment. Ramps would be provided to connect to the Gambell-Ingra one-way couplet and to service local businesses and residences located in Fairview and Downtown Anchorage. Gambell and Ingra streets would continue to function as an arterial couplet. Depending on the traffic volumes remaining on the couplet, improvements may include a reduction in lanes, wider sidewalks, new bike lanes or a pathway, and/or potentially some on-street parking.

North of Fireweed Lane the highway would daylight out of the hillside on the south side of Chester Creek and transition from a depressed section (Figure X) to a rural embankment section (Figure X). At Chester Creek the highway would travel over the creek, and a new culvert and bridge for Chester Creek and the greenbelt trail would be constructed. The new alignment would continue west around the southeastern corner of the Anchorage Senior Center and intersect with an interchange at 15th Avenue. North of 15th Avenue the alignment would travel along Orca Street and the western edge of Merrill Field, between Fairview Elementary School and Runway 16-34, and intersect with a 5th Avenue interchange. Within this section, the roadway would change to a depressed section and the conceptual design would take into consideration the closeness of the private property to the west and the runway safety zone on the east.

As the new highway curves to the east, it would follow the same alignment as the Gambell-Ingra Alternative, following the Ship Creek bluff north of 3rd Avenue, with access provided through an interchange at Mountain View Drive/5th Avenue. There are several design variations that could be used for this interchange, including different configurations of a diamond interchange or a single point urban interchange. Finally, the new highway would proceed northeast to transition into alignment with the existing Glenn Highway.

Pedestrian Connections

The bicycle and pedestrian improvement for the Orca Alternative are the same as those described for the Gambell-Ingra Alternative.

Transit

FILL IN AFTER FTA ALTERNATIVES ANALYSIS COMPLETE.

15th Avenue Alternative

Similar to the Gambell-Ingra Alternative, the 15th Avenue Alternative would be a controlled access freeway that starts at the Tudor Road interchange on the existing New Seward Highway. The alignment would traverse northeast to intersect with the existing Glenn Highway west of the Bragaw Street interchange. The length of the alternative would be approximately 3.54 miles and is depicted in plan view on Figure ??.

The 15th Avenue Alternative through Midtown is the same as the Gambell-Ingra Alternative and the Orca Alternative. Similar to the Orca Alternative, ramps would provide access to and from the Gambell-Ingra one-way couplet to service local businesses and residences in Fairview and Downtown Anchorage.

South of Fireweed Lane, the 15th Avenue alternative would turn east and then continue northeast following a similar alignment as the Orca Alternative. The new highway would continue along a new alignment northeast across the Chester Creek Greenbelt and Sitka Street Park. Access would be provided with a split interchange at 15th Avenue that connects to Merrill Field Drive (from the south) and to Lake Otis Parkway (from the north).

DRAFT

The new highway would then travel north of 15th Avenue along the southeastern edge of Merrill Field General Aviation Airport, between gravel strip 4/22 and the Alaska Regional Hospital. The alignment continues as a rural embankment section. Access would be provided with an interchange at Mountain View Drive and 5th Avenue. There are several design variations that could be used for this interchange, including different configurations of a diamond interchange or a single point urban interchange. Local surface streets would be realigned to maintain connections. See Figures ?? - ??. Finally, the new highway would proceed northeast to transition into alignment with the existing Glenn Highway.

Pedestrian Connections

The bicycle and pedestrian improvement for the Orca Alternative are the same as those described for the 15th Avenue Alternative.

Transit

FILL IN AFTER FTA ALTERNATIVES ANALYSIS COMPLETE.

2.11 CONSTRUCTION OF ALTERNATIVES

Funding is not yet in place for the H2H project. If the entire project were to be funded, any of the alternatives could be constructed in XX years; however, a phased construction approach has been developed should funding become available in smaller amounts over an extended timeframe. If a phased approach is taken, the entire project may not be completed until early 2030.

The following sections describe in general terms how construction could be phased over time for each reasonable alternative. A preliminary phasing plan was developed to construct phases first that have independent utility, or will be useful on their own prior to completion of the other phases. The final phasing plan will depend upon funding and final design. For more details on construction methods and on construction impacts, see Chapter 25.

2.11.1 Gambell-Ingra Alternative

Phase I: 36th Avenue Overpass (Tudor Road to 33rd Avenue)

This phase would begin with the bridge of the Seward Highway over 36th Avenue (Tudor Road to 33rd Avenue). The phase would include new frontage roads between Tudor Road and Benson Boulevard. The 36th Avenue overpass is proposed as the first phase because of the severity of the congestion at this intersection. This project would provide a useable highway segment alleviating congestion by removing one traffic signal from the Seward Highway.

Phase II: Seward Highway Mainline Extension (33rd Avenue to Chester Creek)

The second phase would extend the frontage roads north from Benson Boulevard, and construct the mainline Seward Highway trench between Benson Boulevard and Fireweed Lane. Ramps on and off the highway would be constructed at Benson Boulevard (southward) and at Fireweed Lane (northward). Material from the Midtown trenching would be placed north of 3rd Avenue along to prepare that segment for construction in Phase III. Excess or unusable material would be disposed of. This segment is proposed as the second phase of construction because of the severity of congestion. This phase would provide a useable highway segment extending the controlled access northward, removing traffic signals from the mainline highway at Benson and Northern Lights boulevards and Fireweed Lane, and alleviating congestion in Midtown. If constructed together, Phase I and II would provide the ability to better balance excess excavation material with fill needs at 36th Avenue, thereby reducing costs.

Phase III: Glenn Highway Mainline Extension (3rd Avenue to Bragaw Street)

The third phase would extend the mainline Glenn Highway from 3rd Avenue to Bragaw Street with on and off ramps connecting to the highway (to the north) at 3rd and 5th avenues. The interchange at Airport

DRAFT

Heights Drive would also be constructed. This would provide a useable highway segment, alleviating congestion along Merrill Field and extending the controlled access on the Glenn Highway to Downtown. Phase III or Phase IV could be constructed in either order.

Phase IV: Seward Highway Mainline Extension (Chester Creek to 5th Avenue)

This phase would extend the controlled access on the Seward Highway from Chester Creek to Downtown with on and off ramps connecting to 6th and 5th avenues. The trench along Hyder Street, local cross street bridges, and a bridge over Chester Creek would all be constructed in this phase. Reconstruction of Ingra and Gambell streets and their connection to the frontage roads in Midtown would occur as part of this phase after the mainline highway is extended. Phase III or Phase IV could be constructed in either order.

Phase V: Seward Highway-Glenn Highway Completion (4th Avenue to 9th Avenue)

The last phase would be the final mainline connection of the Seward and Glenn highways between about 9th Avenue and 4th Avenue. Phase V could be constructed in conjunction with either Phase III or Phase IV (whichever is constructed last) pending available funding.

2.11.2 Orca Alternative

Phase I: 36th Avenue Overpass (Tudor Road to 33rd Avenue)

The first phase would be the same as for the Gambell-Ingra Alternative.

Phase II: Seward Highway Mainline Extension (33rd Avenue to Chester Creek)

The second phase of this alternative would be the same as for the Gambell-Ingra Alternative. Material from the Midtown trenching would be placed north of 3rd Avenue to prepare that segment for construction in Phase IV. Excess or unusable material would be disposed of.

Phase III: Seward Highway Mainline Extension (Fireweed to 5th Avenue)

The third phase would turn the Seward Highway mainline to the east and extend it from Fireweed Lane, across Chester Creek, and north along Orca Street to on and off ramps at 5th Avenue. Material from the Orca Street trenching would be used to raise the grade across the Chester Creek valley or placed north of 3rd Avenue to prepare that segment for construction in Phase IV. Excess or unusable material would be disposed of. This phase would construct a functional extension of the highway providing access to and from downtown from the south. Reconstruction of Ingra and Gambell Streets would occur as part of this phase after the mainline highway is extended.

Phase IV: Glenn Highway Mainline Extension (5th Avenue to Bragaw Street)

This phase would extend the mainline Glenn Highway from 5th Avenue to Bragaw Street with on and off ramps connecting to the highway (to the north) at 5th Avenue. The interchange at Airport Heights Drive would also be constructed. This would alleviate congestion along Merrill Field and complete the controlled access freeway connection between the Seward and Glenn highways.

2.11.3 15th Avenue Alternative

Phase I: 36th Avenue Overpass (Tudor Road to 33rd Avenue)

The first phase would be the same as for the Gambell-Ingra Alternative.

Phase II: Seward Highway Mainline Extension (33rd Avenue to Chester Creek)

The second phase of this alternative would be the same as for the Gambell-Ingra Alternative. Material from the Midtown Trenching would be placed through the Merrill Field segment of Phase III to prepare that segment for construction. Excess or unusable material would be disposed of.

DRAFT

Phase III: Seward Highway Mainline Extension (Fireweed to 5th Avenue)

The third phase would turn the Seward Highway mainline to the east and extend it from Fireweed Lane, across Chester Creek, and north through Merrill Field to an interchange at Airport Heights Drive. This phase would complete the highway connection. Reconstruction of Ingra and Gambell Streets would occur as part of this phase after the mainline highway is completed.

DRAFT

2.12 BIBLIOGRAPHY

[DOT&PF] Alaska Department of Transportation and Public Facilities. March 2010. *Draft Reasonable Alternatives Technical Memorandum.*

———. August 2009. *Scoping Summary Report*

DRAFT

Chapter 3: Traffic and Transportation Affected Environment

Table of Contents

3.1 INTRODUCTION 1
3.2 AFFECTED ENVIRONMENT 1
3.2.1 Roadway System 1
Travel Patterns 3
Congestion 4
Travel Times and Travel Speeds 7
Safety 8
Planned Improvements 11
3.2.2 Transit System 13
Planned Improvements 16
3.2.3 Freight System 16
Ted Stevens Anchorage International Airport (TSAIA) 17
Planned TSAIA Improvements 17
Port of Anchorage 18
Planned Improvements 18
Alaska Railroad 19
Planned Improvements 20
Motor Freight 20
Planned Improvements 21
3.3 BIBLIOGRAPHY 23

List of Tables

Table 3.1. East-West and North-South Arterial Roads within the Study Area 3
Table 3.2. Level of Service (LOS) at Major Intersections within the Study Area 6
Table 3.3. Planned Roadway Projects 12
Table 3.4. Existing Transit Service and Planned Improvements 15
Table 3.5 Cargo and Freight at TSAIA 17
Table 3.6. Traffic Counts at Ocean Dock Road Port of Anchorage 18
Table 3.7. Alaska Railroad Tonnage 19

List of Figures

Figure 3-1. Existing Roadway Network 2
Figure 3-2. Level of Service on Roadways Intersections (2010) in Study Area 5
Figure 3-3. Travel Speeds 8
Figure 3-4. Vehicle Crashes and Crash Rates, 2002-2006 9
Figure 3-5. Fatal/Major Injuries, 2002–2006 10
Figure 3-6. Pedestrian and Bicycle Crashes, 2002–2006 11
Figure 3-7. Planned Roadways 13
Figure 3-8. Existing and Planned Transit System 14
Figure 3-9. Freight System 21

3.1 INTRODUCTION

This chapter summarizes the regulatory setting, affected environment, and environmental consequences of traffic and the transportation systems. Transportation systems include roadways, public transportation, and freight movement by boat, rail, and roadway within the H2H study area (Figure 3-1). Airports are addressed in Chapter 4, and pedestrian and bicycle facilities are addressed in Chapter 12. Chapter 1, Purpose and Need provides information on the H2H project background, historical planning, regional population trends, major destinations, travel patterns, and modes of travel. It is recommended that prior to reading Chapter 3, the reader review Chapter 1, as it contains a substantive summary of traffic and transportation problems the project intends to address. This chapter focuses more broadly on the existing and planned traffic and transportation facilities within the study area and anticipated impacts to those facilities.

Regulatory Setting. This section was prepared in accordance with Federal Highway Administration's (FHWA) Technical Advisory T6640.8A, *Guidance on Preparing and Processing Environmental and Section 4(f) Documents,* which requires an analysis of travel patterns and accessibility in an Environmental Impact Statement (EIS), and with Alaska Department of Transportation and Public Facilities's (DOT&PF) *Alaska Environmental Procedures Manual*.

Study Area. The study area for traffic and transportation is shown in Figure 3-1. The study area includes intersections on key parallel arterial streets.

Methodology. For this analysis, existing documents, including transportation plans, engineering studies, and operations data were gathered. A complete list of resources can be found in the Bibliography. The data needed to understand traffic patterns come from the Anchorage Travel Model and subsequent traffic analysis completed with a computer program called VISSIM. VISSIM uses the traffic data from the Anchorage Travel Model and simulates traffic flows, and roadway and intersection performance at a more refined scale. The Anchorage Travel Model contains information about existing land use, population and employment, along with assumptions about future land use, population, and employment. The model uses this information, along with a street network, to forecast current and design year (2035) traffic conditions. For more information on the Anchorage Travel Model update and the forecast completed for the H2H project, refer to the Traffic Forecasting Methodology Paper and Travel Model Documentation Report.

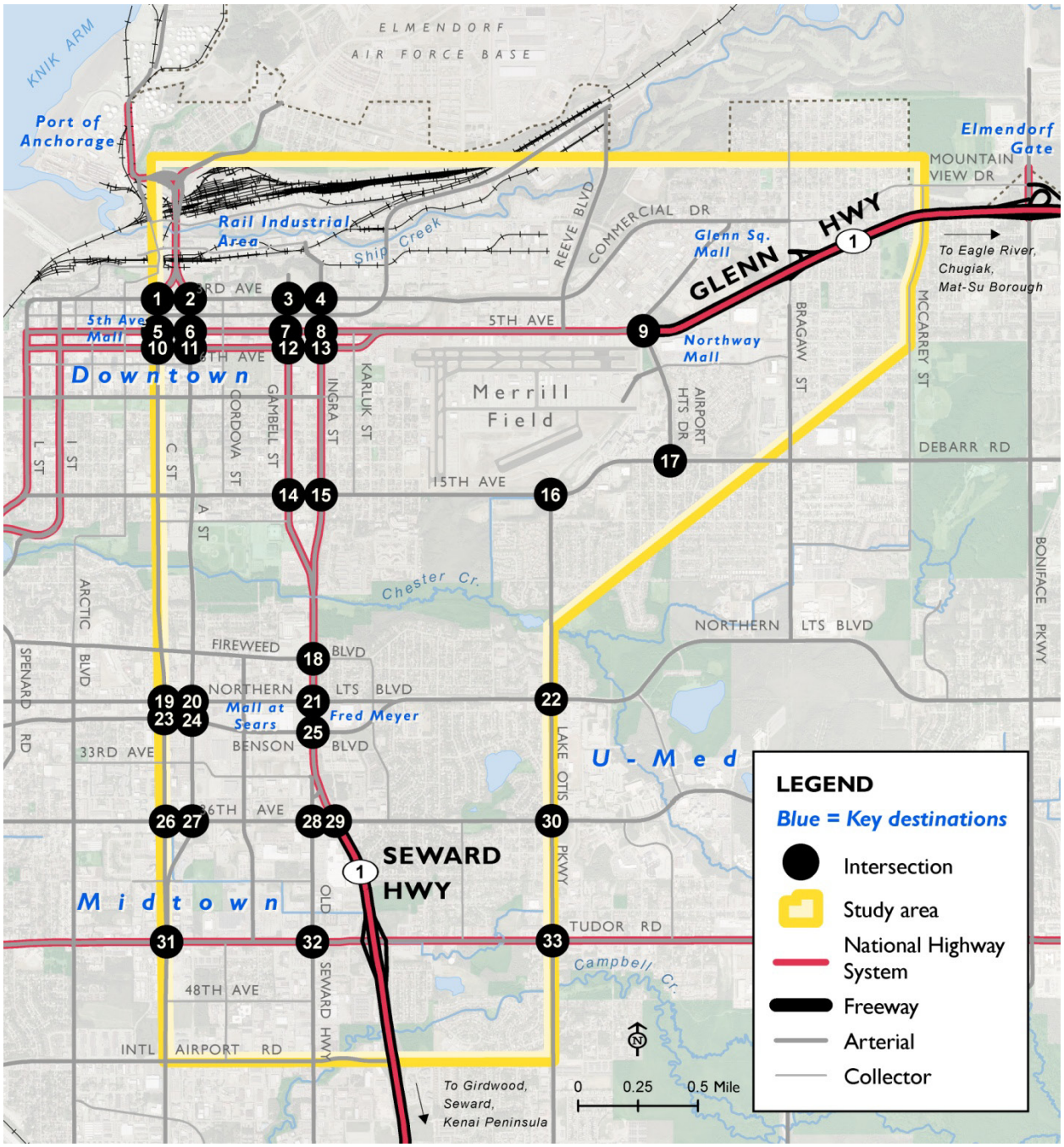
3.2 AFFECTED ENVIRONMENT

3.2.1 Roadway System

The existing roadway system is a network of freeways and arterial, collector, and local streets. A portion of the network has been identified as part of the National Highway System[1] (see Figure 3-1). On the outer limits of the study area, the Seward and Glenn highways are classified as freeways. These freeways are fully access-controlled, divided highways at the southern edge of Midtown and the northeast edge of Downtown. The freeways end at 36th Avenue on the south end and at Airport Heights Drive on the north end of the study area.

[1] **National Highway System (NHS).** The National Highway System shall: "(A) serve major population centers, international border crossings, ports, airports, public transportation facilities, and other intermodal transportation facilities and other major travel destinations; (B) meet national defense requirements; and (C) serve interstate and interregional travel." (23 USC 103[b])

Figure 3-1. Existing Roadway Network



Within the study area, the Seward Highway (at 36th Avenue) and the Glenn Highway (at Airport Heights Drive) transition from freeways to six-lane urban arterial streets, with intersecting streets controlled by traffic signals or stop signs, pedestrian crosswalks, and frequent commercial and residential driveway access.

These urban arterial segments of the National Highway System are characterized by high-travel demand, congestion, and safety issues caused by traffic levels that exceed the capacity of the existing arterial network, particularly during peak periods. Segments of the existing arterial connection currently operate at an unacceptable level of service (LOS) in both A.M. and P.M. peak periods. Refer to Chapter 1, Purpose and Need for more detail on the existing arterial connection.

The east-west and north-south roads within the study area (see Table 3-1) are illustrated in Figure 3-1. Heavy congestion at the signalized intersections along the existing arterial connection causes traffic to back up and drivers to divert to other routes to reach their destinations. This diversion to other routes contributes to the overloading of many of the other arterial streets in the study area. This includes roads such as the A-C couplet, Lake Otis Parkway, Bragaw Street, Northern Lights Boulevard, 36th Avenue, Debarr Road/15th Avenue, Airport Heights, and 3rd Avenue/Commercial Drive/Mountain View Drive. In turn, as these arterial streets become congested, travelers try to find alternate routes on local neighborhood streets to avoid the congestion, which increases the safety risk for local residential traffic.

Classifying Roads

Functional classification of roads depends on how the road actually functions: does the road provide access to property or does the road provide more mobility?

Freeways provide the highest level of mobility and most efficient travel with controlled access for ingress and egress by way of ramps, and greater speed for the longest uninterrupted distance.

Arterials also provide mobility, a higher level efficiency with access minimized to serve as high volume traffic corridors for through trips, and to major attractors.

Collectors provide both mobility and access, with a less travel efficiency, using lower speeds for shorter distances, connecting local street traffic to arterial streets and access to adjacent property.

Local streets provide access to property, usually residential or local commercial areas, with little through traffic at low speeds.

Source: AASHTO. 2004. A Policy on Geometric Design of Highways and Streets (the AASHTO Green Book)

Table 3.1. East-West and North-South Arterial Roads within the Study Area

East-West Roads	North-South Roads
Tudor Road	A-C streets
36th Avenue Benson-Northern Lights boulevard	New Seward Highway and Gambell-Ingra streets
Fireweed Lane (between Spenard Rd and Seward Hwy)	Lake Otis Parkway (ends at 15th Ave)
15th Avenue-DeBarr Road	Airport Heights Drive (between DeBarr Road and the Glenn Highway)
5th-6th avenues and the Glenn Highway	Bragaw Street (Northern Lights Boulevard to the Glenn Highway)
3rd Avenue-Commercial Drive	

Travel Patterns

The primary destinations during the peak commuting periods from both the north and the south are the Downtown, Midtown, and U-Med employment centers and the local military installation (see Figure 3-1). Travel patterns in the study area are dominated by traffic coming from or going to the Seward and Glenn highways. Data indicate that most traffic using the Seward and Glenn corridors for trips has either a start

or end point within the H2H study area (DOT&PF 2009). Most of the trips (90%) using the existing arterial connection between the two highways are travelling to and from major destinations within the study area. Only a small percentage of travelers (less than 10%) use the Seward and Glenn Highways to bypass the study area.

Many people who access the major destinations in Anchorage commute from Eagle River, Chugiak, and the MSB. About 85 percent of all workers who live in Chugiak and Eagle River and 29 percent of all workers who live in MSB commute to the Anchorage Bowl with the Glenn Highway providing primary access (U.S. Census Bureau 2006). Of those, nearly 43 percent of Chugiak–Eagle River commuters and 45 percent of MSB commuters work in Downtown and Midtown. For the Seward Highway, about 44 percent of the traffic is headed to and from Downtown, Midtown, the U-Med District, and South Anchorage areas. Another 12 percent is headed to the Ship Creek–Joint Base Elmendorf-Richardson area (DOT&PF 2009). Because the above-listed employment centers are close to the existing arterial connection, many of these commuters use the existing arterial connection for travel.

Traffic analysis shows that traffic on the Seward and Glenn highways coming into the study area have a substantial directionality, which means that during rush hour, there is not an equal amount of traffic going in both directions (DOT&PF 2009). On the Glenn Highway in the morning, more traffic goes west (toward Downtown and Midtown) than east. In the afternoon, this pattern is reversed, with more traffic heading east (toward Eagle River). On the Seward Highway in the morning, more traffic goes north (toward Downtown and Midtown) than south; however, the directionality is not as exaggerated as that on the Glenn Highway.

Congestion

High travel demand and insufficient capacity lead to congested conditions on the existing arterial and throughout the study area. The existing arterial connection between the Seward and Glenn highways has a capacity of approximately 34,500 trips per day, but serves traffic volumes of more than 50,000 to 60,000 trips per day through Midtown.

In addition to this connection-specific problem, congestion extends throughout the study area. According to the Municipality of Anchorage's *2008 Annual Traffic Report*'s 2008 Top 50 AADT Locations, 18 streets within the study area are over capacity today. Level of service (LOS) measures congestion at intersections and on roadways and is used to measure traffic delay. Figure 3-2 identifies LOS for major intersections and roadways in the study area. The Municipality of Anchorage considers LOS D and above acceptable. As shown on the figure, many intersections and streets are currently over capacity, and many more are approaching capacity.

Figure 3-2. Level of Service on Roadways Intersections (2010) in Study Area

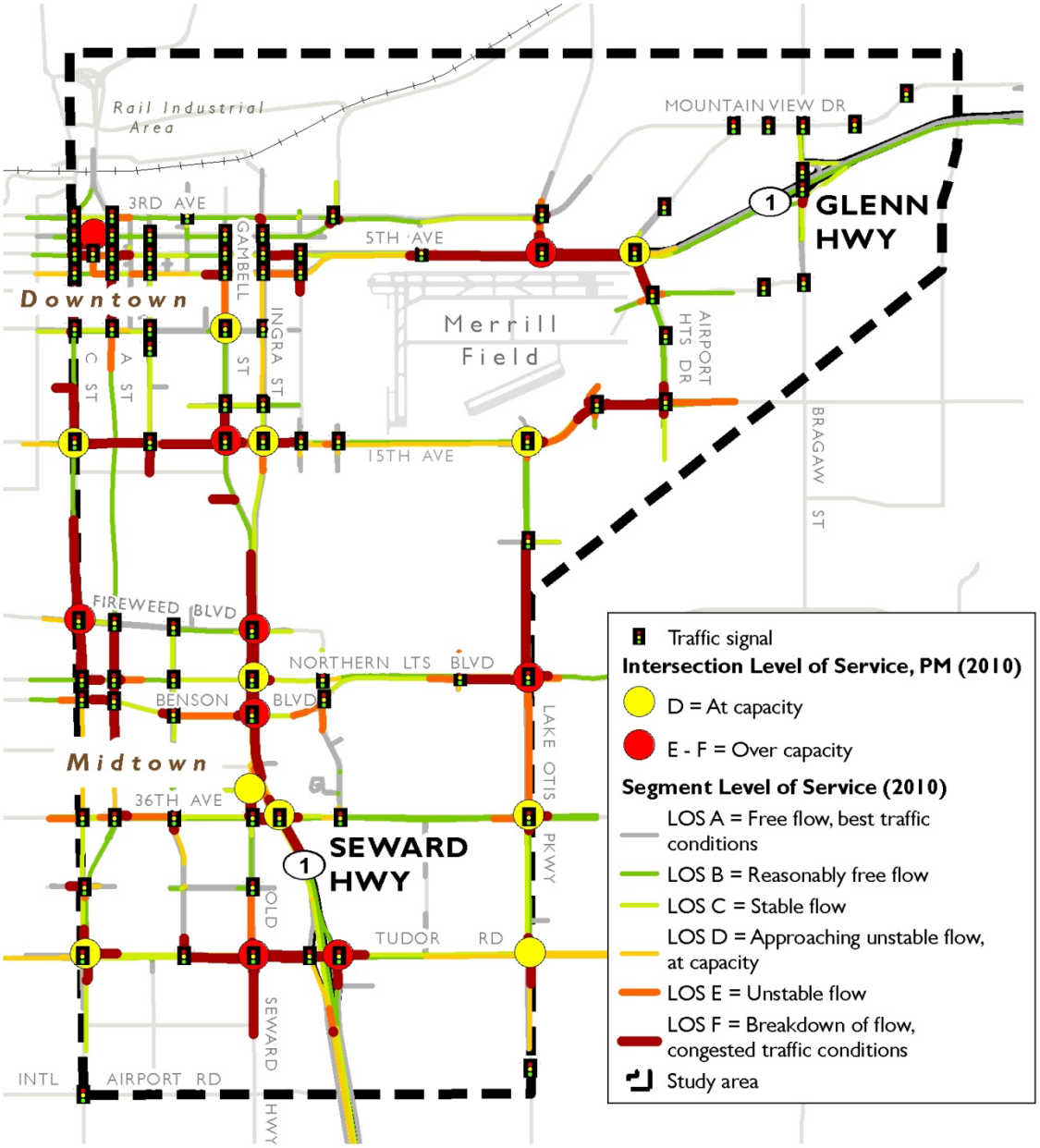


Table 3-2 provides LOS measurements at morning and evening peak periods for key intersections in the study area (the location of numbered intersections can be found on Figure 3-1). As Table 3-2 shows, during the morning peak period there is one intersection that is failing, with LOS E or worse. During the 2010 evening peak period, five intersections are failing, with LOS E or worse. Table 3-2 also shows the seconds of delay that result at each intersection due to congestion.

Table 3.2. Level of Service (LOS) at Major Intersections within the Study Area

#	Intersection	Congestion	
		2010 Morning Peak LOS (Seconds of Delay)	2010 Evening Peak LOS (Seconds of Delay)
1	3rd Avenue and C Street	🟢 (29)	🟢 (28)
2	3rd Avenue and A Street	🟢 (15)	🟢 (18)
3	3rd Avenue and Gambell Street	🟢 (0)	🟢 (1)
4	3rd Avenue and Ingra Street	🟢 (25)	🟢 (13)
5	5th Avenue and C Street	🟢 (15)	🟢 (18)
6	5th Avenue and A Street	🟢 (22)	🟢 (21)
7	5th Avenue and Gambell Street	🟢 (6)	🟢 (16)
8	5th Avenue and Ingra Street	🟢 (26)	🟢 (22)
9	Glenn Highway and Airport Heights Drive	🔴 (137)	🟡 (35)
10	6th Avenue and C Street	🟢 (9)	🟢 (15)
11	6th Avenue and A Street	🟢 (14)	🟢 (20)
12	6th Avenue and Gambell Street	🟢 (15)	🟢 (16)
13	6th Avenue and Ingra Street	🟢 (12)	🟢 (14)
14	15th Avenue and Gambell Street	🟡 (36)	🔴 (88)
15	15th Avenue and Ingra Street	🟢 (31)	🟡 (45)
16	15th Avenue and Lake Otis Parkway	🟢 (16)	🟡 (44)
17	Debarr Road and Airport Heights Drive	🟢 (15)	🟢 (34)
18	Fireweed Boulevard and Seward Highway	🟢 (5)	🔴 (95)
19	Northern Lights Boulevard and C Street	🟢 (32)	🟢 (34)
20	Northern Lights Boulevard and A Street	🟢 (28)	🟢 (19)
21	Northern Lights Boulevard and Seward Highway	🟢 (28)	🟡 (52)

KEY:

🟢 **LOS C or better**
🟡 **LOS D**
🔴 **LOS E or worse**

#	Intersection	Congestion	
		2010 Morning Peak LOS (Seconds of Delay)	2010 Evening Peak LOS (Seconds of Delay)
22	Northern Lights Boulevard and Lake Otis Parkway	🟢 (32)	🔴 (109)
23	Benson Boulevard and C Street	🟢 (11)	🟢 (16)
24	Benson Boulevard and A Street	🟢 (30)	🟢 (26)
25	Benson Boulevard and Seward Highway	🟢 (26)	🔴 (63)
26	36th Avenue and C Street	🟢 (26)	🟢 (25)
27	36th Avenue and A Street	🟢 (14)	🟢 (19)
28	36th Avenue and Old Seward Highway	🟢 (29)	🟢 (34)
29	36th Avenue and Seward Highway	🟡 (35)	🟡 (47)
30	36th Avenue and Lake Otis Parkway	🟡 (35)	🟡 (46)
31	Tudor Road and C Street	🟡 (51)	🟡 (50)
32	Tudor Road and Old Seward Highway	🟢 (29)	🔴 (103)
33	Tudor Road and Lake Otis Parkway	🟢 (31)	🟡 (39)

KEY:

🟢 **LOS C or better**
🟡 **LOS D**
🔴 **LOS E or worse**

Source: H2H VISSIM Model 2010

Note: The location of numbered intersections can be found on Figure 3-1

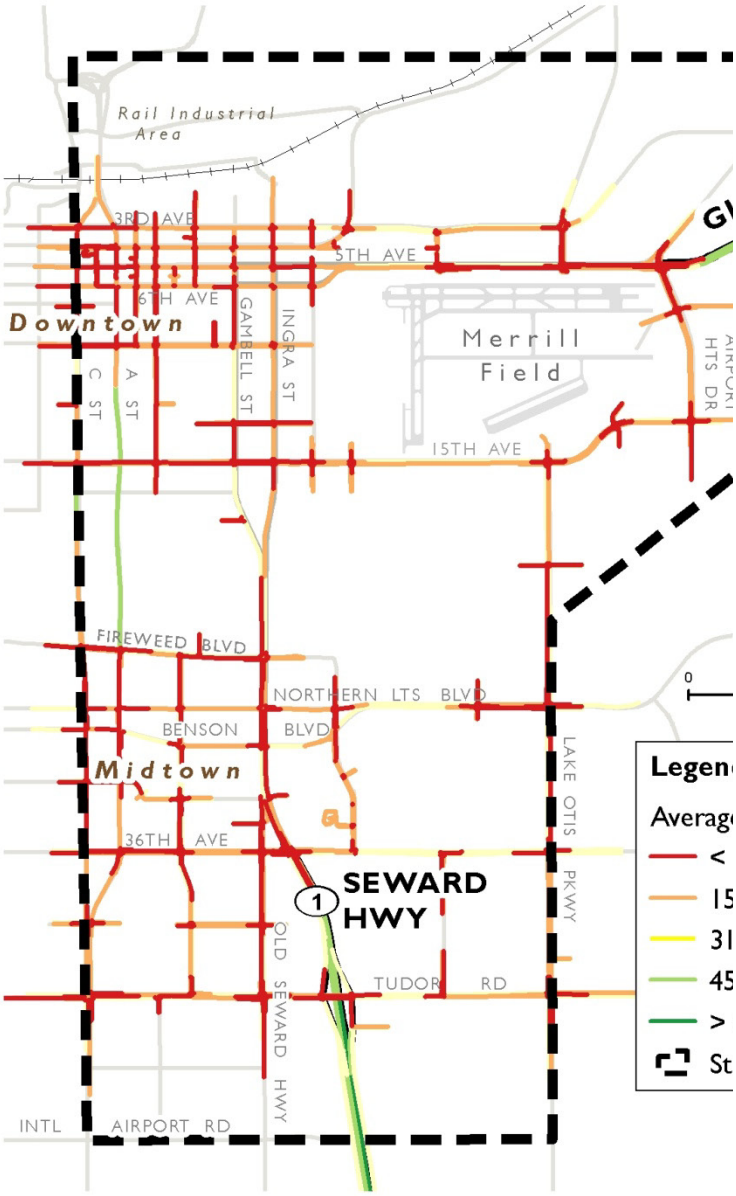
Travel Times and Travel Speeds

Travel speeds within the study area are higher on the Seward and Glenn highways and slow considerably once traffic leaves the highways and enters arterial and local streets, particularly along the existing arterial connection (5th/6th avenues and Gambell/Ingra streets). This is due in part to stop and go conditions created by multiple traffic signals and driveways, which decrease travel efficiency. Figure 3-3 shows the travel speeds within the study area. While traffic flows near posted speeds (55 to 65 mph) on the freeway segments of the Seward and Glenn highways, traffic flows more slowly on all the local streets in between the highways. In 2035, the average travel time[2] between the Seward Highway/Tudor Road interchange

[2] The average travel time was calculated for the PM peak hour. Since travel volumes are worse during the afternoon than during other times of the day, it was determined that, if the travel time was acceptable, it would be acceptable in the other periods as well.

and the Glenn Highway/Bragaw Street interchange using the existing arterial connection is projected to be 36.6 minutes (DOT&PF 2010b).

Figure 3-3. Travel Speeds



Safety

Heavy traffic and congestion decreases the time and space that drivers normally have to respond to traffic signals, lane changes and increased weaving traffic. The sudden slow-down of traffic and turning movements at major cross streets set the stage for vehicle crashes. DOT&PF crash and volume data place the existing arterial connection as the worst bottleneck in the state leading to high numbers of crashes. According to the report:

What is the **crash rate?**

The crash rate of an intersection is calculated by taking the number of vehicle crashes and dividing it by the total number of vehicles that pass through the intersection.

Crash rate = $\frac{\text{\# crashes}}{\text{\# total vehicles}}$

- Five percent of the crashes in the entire state happen on the existing arterial connection —750 crashes per year (or more than two crashes every day on average).
- Signals along the existing arterial connection and adjacent "bypass" arterials show the highest number and rates of major injuries and fatalities at signals in Anchorage. (DOT&PF 2007).

Within the study area, nine intersections are listed in DOT&PF's top 20 intersections for fatal and major-injury crashes (2008c); ten intersections are listed on DOT&PF's top 20 intersections based on crash rates (2008c). Figure 3-4 shows the total vehicle crashes and crash rates for key intersections within the study area (the location of numbered intersections can be found on Figure 3-1).

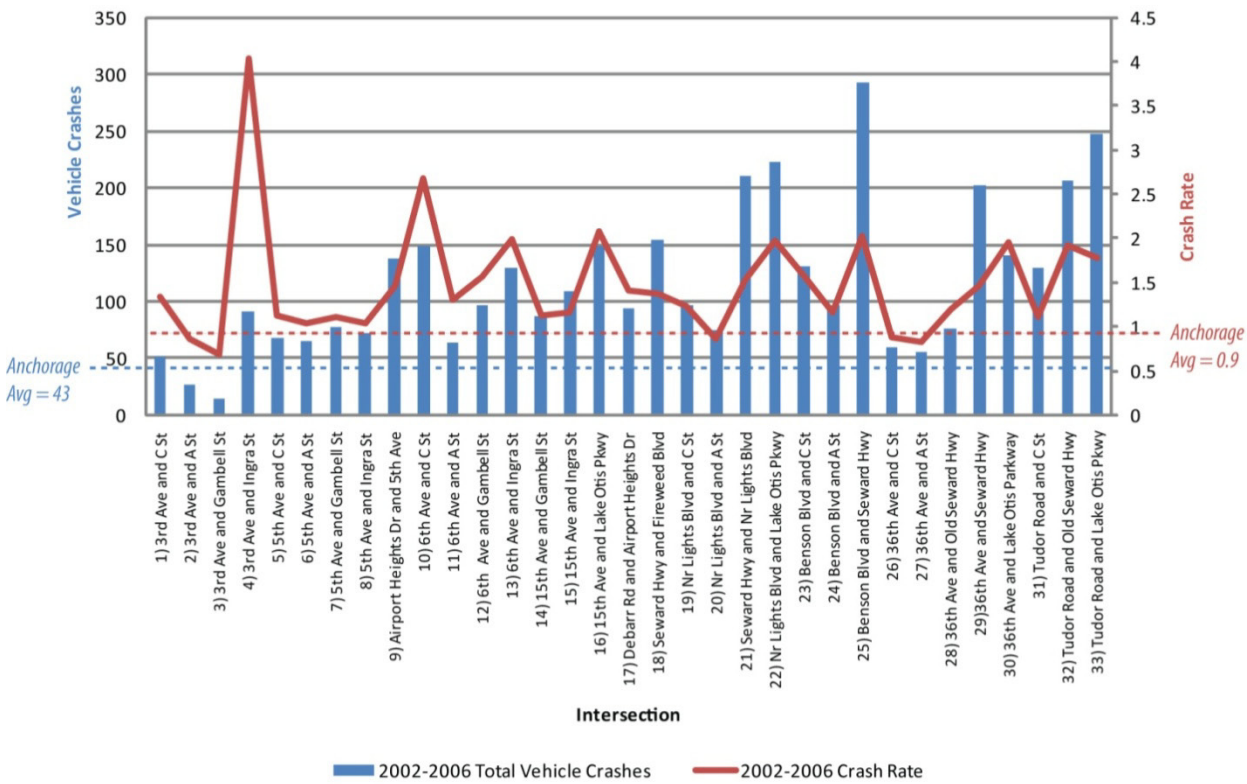
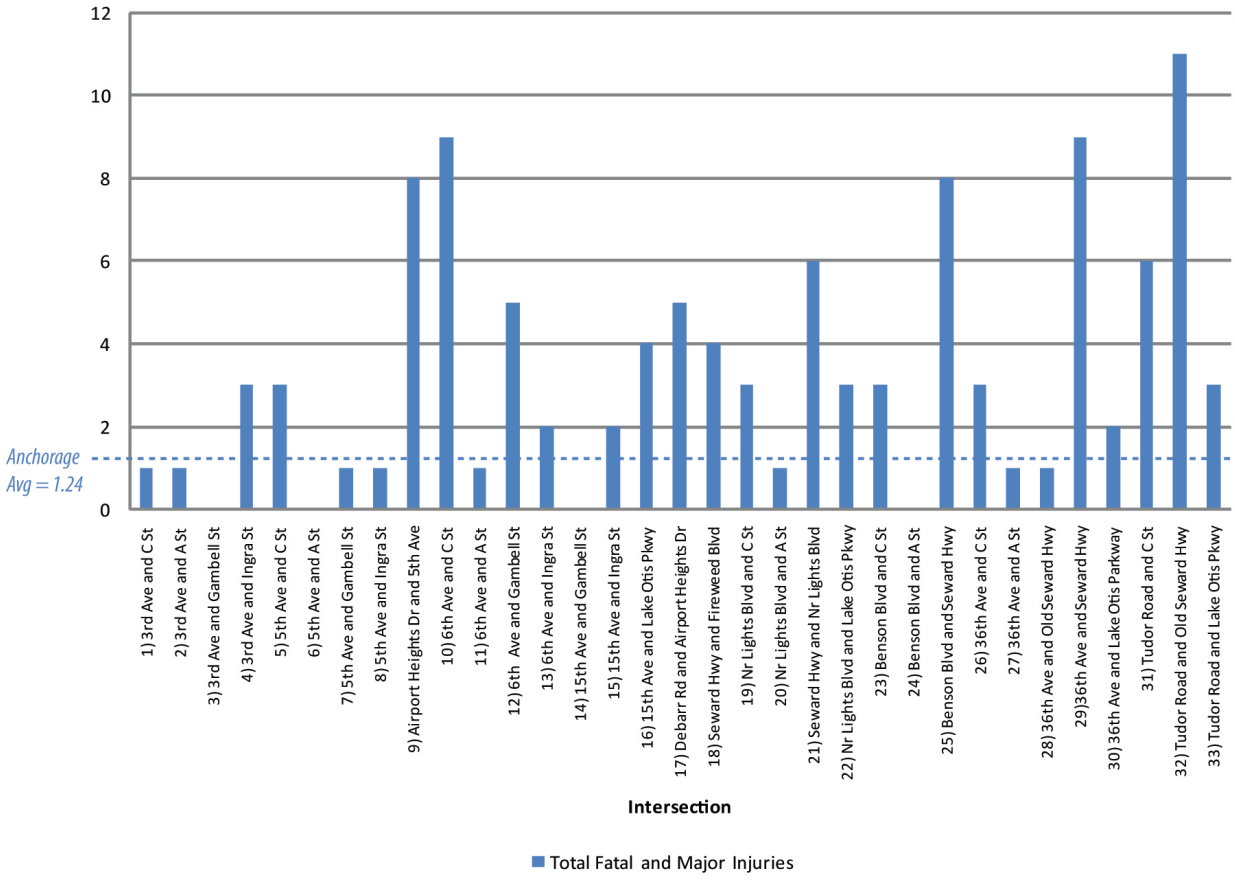


Figure 3-4. Vehicle Crashes and Crash Rates, 2002-2006

Source: DOT&PF 2008c.Within Anchorage, the average number of vehicle crashes per intersection from 2002 to 2006 was 43 (calculated from DOT&PF data, 2008c). As shown on Figure 3-5, the majority of the intersections in the study area had total numbers of vehicle crashes higher than that average. In Anchorage, the average crash rate from 2002 to 2006 was 0.95 (calculated from DOT&PF data, 2008c). Again, many of the intersections in the study area had crash rates that exceeded the average. Overall this data indicates that the study area as a whole experiences higher vehicle crash volumes and rates, indicating a safety issue.

A look at fatal and major injury statistics during the same time period reveals a similar indication of transportation safety in the study area. Figure 3-5 shows the fatal and major injuries recorded during the 2002 to 2006 time period (the location of numbered intersections can be found on Figure 3-1). The average within Anchorage for fatal and major injuries per intersection is 1.24 (calculated from DOT&PF data, 2008c). Many of the intersections in the study area exceeded that average.

Figure 3-5. Fatal/Major Injuries, 2002–2006

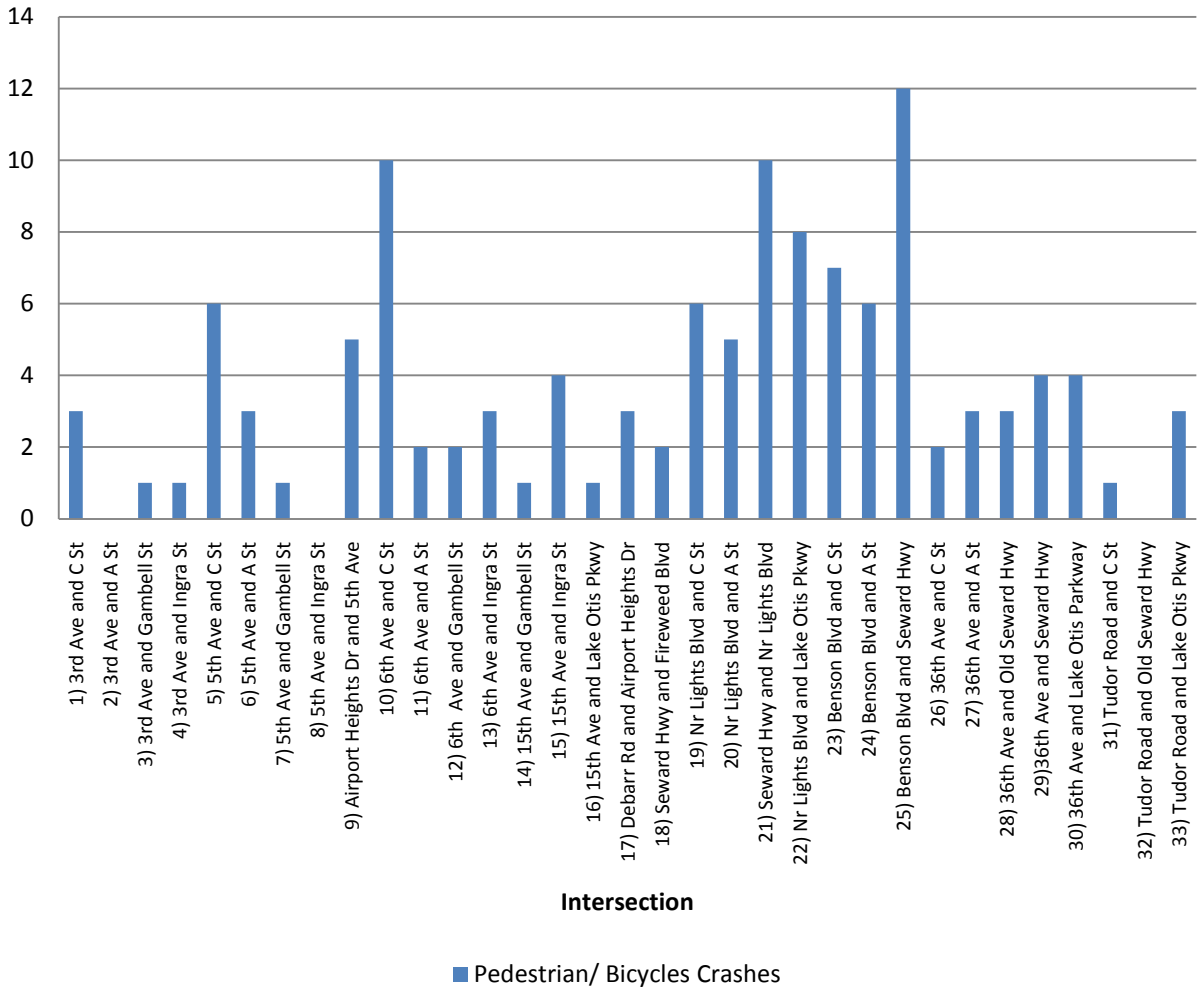


Source: DOT&PF 2008c.

Examining pedestrian and bicycle crash rates in the study area reveals safety concerns for these users in the study area.

Figure 3-6 shows the total numbers of pedestrian and bicycle crashes recorded at the same set of intersections within the study area (the location of numbered intersections can be found on Figure 3-1). Data was not available to determine average pedestrian and bicycle crash rates; however, the data shows that five intersections within the study area recorded more than six pedestrian and bicycle crashes during the time period of 2002 to 2006.

Figure 3-6. Pedestrian and Bicycle Crashes, 2002–2006



Source: DOT&PF 2010b.

Planned Improvements

It is assumed that the planned projects included in the Anchorage *Bowl 2025 Long Range Transportation Plan with 2027 Revisions* will be completed by 2027 as called for in the plan. Planned roadway projects that may affect the study area are listed Table 3-3 and depicted in Figure 3-7. More detail on planned improvements can be found in Appendix X *No Action Alternative*. The H2H project is also a planned project adopted in the LRTP, but the final location is to be determined through this EIS process.

Table 3.3. Planned Roadway Projects

LRTP Project	Location	Work Involved	Purpose
203	Fireweed Lane Surface Rehabilitation (from Spenard Road to Seward Highway)	Reconstruct roadway to improve surface and safety for automobiles and non-motorized users	Maintenance and safety
215	Third Avenue Surface Rehabilitation (from Post Road to Reeve Boulevard)	Restripe from 4 lane to 3 lane, including sidewalk addition/ improvements	Capacity and freight
303	Seward Highway (from O'Malley Road to Tudor Road)	Reconstruct and widen from 4 to 6 lane freeway; construct pathway; frontage road improvements; landscaping; potential noise walls	Capacity and freight
415	Lake Otis Parkway (from Northern Lights Boulevard to DeBarr Road)	Reconstruct and increase capacity, bridge over Chester Creek, Lake Otis/Northern Lights Blvd. intersection and pedestrian/landscape facilities	Capacity
501	Whitney Road (from North C Street to Post Road)	Upgrade to urban industrial standards; may include relocation of Whitney Road	Maintenance, safety, and freight
502	Ingra-Gambell Extension (from Third Avenue to Whitney Road)	Construct new facility	Circulation, access, and freight
514	A/C St. Couplet Restripe (from Tudor Road to Ninth Avenue)	Restripe to include 4 lanes in each direction	Capacity and freight
515	C St./Ocean Dock Rd. Access Ramp (from C Street Viaduct to Ocean Dock Road)	Reconstruct the ramp at Ship Creek	Maintenance, safety, and freight
632	Lake Otis Pkwy extension (from Debarr Road to Airport Heights Drive Interchange at Glenn Highway)	Construct new minor arterial and construct new sidewalk	Increase circulation
639	Glenn Highway HOV lanes (from Boniface Pkwy Interchange to Eagle River Artillery Rd Interchange)	Widen with lanes to the inside (one lane each direction designated HOV); Ship Creek Bridge improvement	Capacity and freight
705	Tudor Rd. Access Management (from Seward Highway to Arctic Boulevard)	Add access management and turn restrictions; modify local connections to make adjacent property access to other roads; east-west or north-south in lieu of direct access from Tudor Rd. wherever practical	Circulation, access, and freight
810	Knik Arm Bridge	Construct new bridge facility across Knik Arm; construct associated road connections to Anchorage and Mat-Su roadway networks	Access, circulation, and freight

Source: AMATS 2007.

The *Anchorage Downtown Comprehensive Plan* (MOA 2007) included several additional recommendations regarding transportation and circulation assuming the H2H project is completed:

- Convert 3rd Avenue to a one-way westbound traffic route to make a couplet with the existing 6th Avenue one-way eastbound traffic route.
- Convert 5th Avenue to two-way traffic.

These changes are not currently incorporated into the LRTP, but may be included in future LRTP updates.

Figure 3-7. Planned Roadways

**Note: Project number 603 is number for the the H2H project in the LRTPt. The blue lines depict the conceptual location of the H2H project reasonable alternatives; the final location and configuration of this project will be determined through this EIS.*

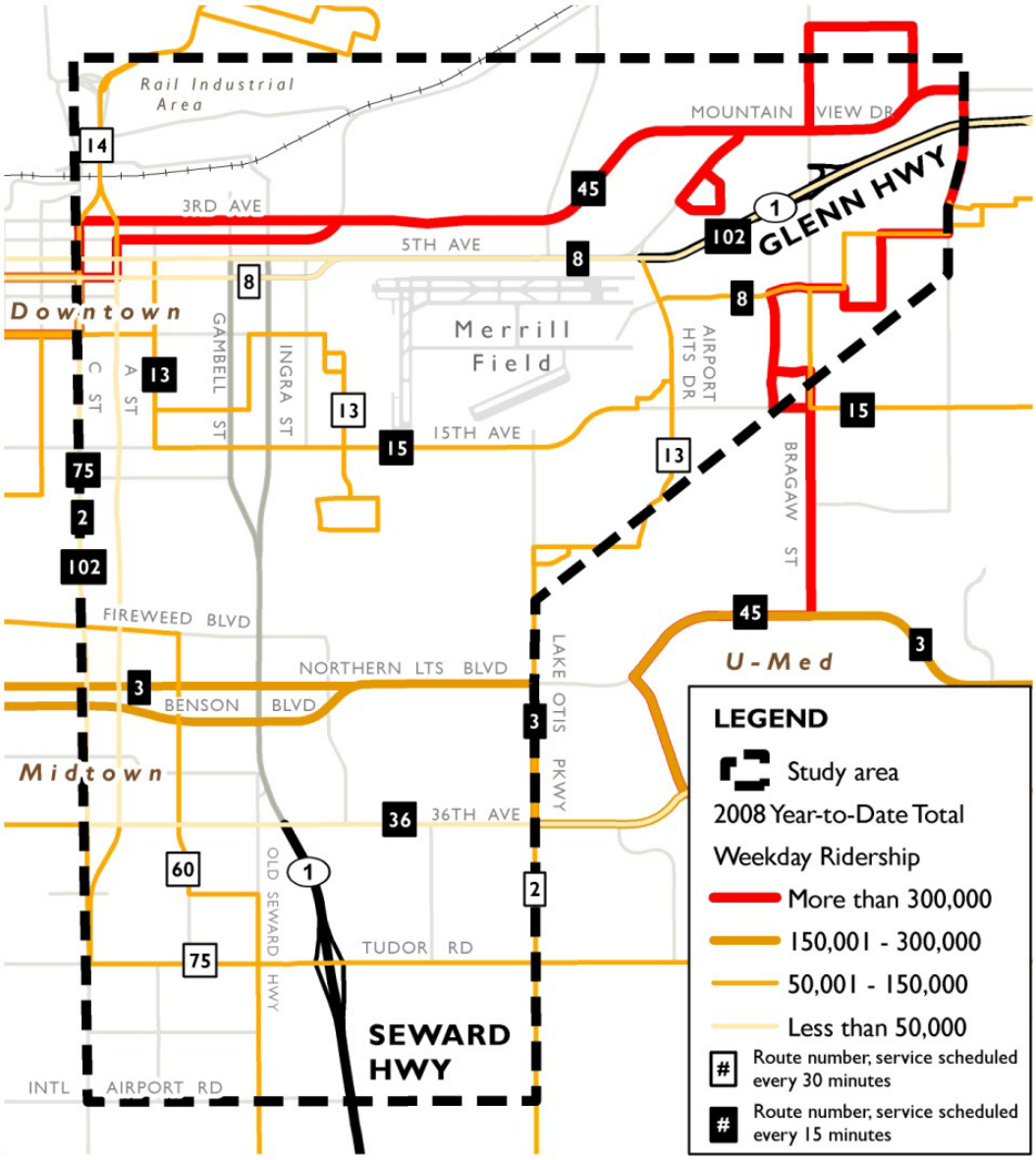
3.2.2 Transit System

The Municipality of Anchorage provides public transportation through its Public Transport Department with People Mover bus service and Share-a-Ride vanpool and carpool. There are 14 bus routes operating in the Anchorage Bowl and Chugiak-Eagle River area, with more than 2 million miles traveled annually.

The 2008 estimated annual People Mover ridership was nearly 4.2 million (MOA 2008b). The existing transit system and planned transit system improvements are depicted on Figure 3-8.

According to *People Mover Blueprint: A Plan to Restructure the Anchorage Transit System*, the busiest route is Route 45, which serves the east side of Anchorage to the Downtown area. This route serves up to 20 percent of all transit riders (MOA 2002). Route 45 parallels the Glenn Highway via Mountain View Drive to Commercial Drive to 3rd Avenue and the Downtown Transit Center. There are no bus routes on Ingra and Gambell streets; however, there are several routes that operate within the study area (see Figure 3-8 and Table 3-4).

Figure 3-8. Existing and Planned Transit System



Note: Numbers shown are bus route numbers.

Table 3.4. Existing Transit Service and Planned Improvements

Route Number	Start Point	End Point	Key Destinations	Average Daily Ridership	Planned Improvements
Existing Routes					
2	Downtown Transit Center	Dimond Center	Lake Otis, Frontier Bldg., Lake Otis, Independence Park, Dimond Center	1,123	30 minute headways*
3	Downtown Transit Center	Muldoon Transfer Center or Centennial Village Housing	Northern Lights, Charter College, UAA, Providence Hospital, Chester Valley, Nunaka Valley, Muldoon Transfer Center, Centennial, Village Housing	1,536	15 minute headways
8	Downtown Transit Center	Northway Mall	Northway Mall, Muldoon Transfer Center, Merrill Field	705	30 minute headways*
13	Downtown Transit Center	Muldoon Transfer Center	University Hospitals, Senior Center, UAA, Charter College, Providence Hospital, Tudor Centre, Alaska Native Medical Center, Muldoon Transfer Center	984	30 minute headways*
14	Downtown Transit Center	Downtown Transit Center	Government Hill, AT&T Alascom, Joint Base Elmendorf-Richardson	228	30 minute headways*
15	Downtown Transit Center	Muldoon Transfer Center	DeBarr, Alaska Regional Hospital, Northway Mall, Muldoon Transfer Center	799	15 minute headways
36	Downtown Transit Center	Providence Hospital	West Anchorage, Turnagain, Northwood, 36th Avenue, Frontier Bldg., UAA, Providence Hospital, APU	620	15 minute headways
45	Downtown Transit Center	Alaska Native Medical Center	Mountain View, Northway Mall, UAA, Providence Hospital, Alaska Native Medical Center. (45G serves downtown and North Mt. View/Glenn Square Shopping Center)	2,670	15 minute headways
60	Downtown Transit Center	Huffman Business Park	Old Seward, University Center, Old Seward, Dimond Center, Oceanview, Huffman Business Park	841	30 minute headways*
75	Downtown Transit Center	Tikahtnu Commons	Tudor, Alaska Native Medical Center, Frontier Building, Muldoon, Target at Tikahtnu Commons	1,029	30 minute headways*
102	Alaska Native Medical Center	Birchwood Park & Ride	Eagle River, Chugiak, Alaska Native Medical Center, Providence Hospital, Downtown Transit Center, Eagle River Transit Center, North Birchwood Park & Ride, & Peters Creek Trading Post	311	6-10 minute headways

**On weekdays from approximately 6:30 am to 6:00 pm.*
Sources: AMATS 2007; MOA 2008a; MOA 2009b.

In addition to bus service, transit services in the study area include vanpools and carpools. In 2010, the MOA Share-A-Ride vanpool program coordinated 55 thirteen-passenger vans, which served the Anchorage Bowl, the Mat-Su Valley, and Girdwood. Of these 55 vanpools, 52 originated in the Mat-Su Borough. The most frequent vanpool destinations were employment centers in Anchorage such as the military base, Midtown, Downtown, and East Anchorage (White 2008). In fall of 2010 the Share-A-Ride vanpool received 19 new vehicles, three for replacement and 16 vehicles for expansion of the program. The new Emergency Ride Home program provides vanpool participants a ride home during the workday in case of personal illness, immediate family illness or death of a family member. Another program "Try a Ride" provides potential riders with a free ride to see if vanpooling would fit their commuting needs.The MOA Public Transportation Department supports carpools through the Share-A-Ride program, which has been in place since 1976. About 12 percent of commuters carpool to work within the MOA (U.S. Census Bureau 2006). Based on data from People Mover's Share-A-Ride program, in 2008 there were 187 active carpools carrying 365 people total with approximately two people per car. In 2008, about 66 percent of the Share-A-Ride carpools originated in the Anchorage Bowl, 17 percent in Chugiak–Eagle River, 15 percent in the Mat-Su Valley, and 2 percent in Girdwood (MOA Public Transportation 2008b).

Planned Improvements

In addition to the inventory of improvements recommended in the *People Mover Route Restructure Plan Update,* there are projects or improvements to transit on record in the *Anchorage Bowl 2025Long Range Transportation Plan with 2027 Revisions*, and in a People Mover presentation given to the Anchorage Assembly work session on August 8, 2008. These recommendations included increased headways on all routes within the study area. See Table 3-4 for details.

Other plans are in progress following the LRTP that suggest further transit improvements. The *Anchorage Downtown Comprehensive Plan* (MOA 2007) recommended transit improvements for the Downtown area. These included creating a Downtown Circulator route throughout the core area with 5-minute headways, and expanding or relocating the existing Transit Center located on 6th Avenue. The *Draft Midtown District Plan* (MOA 2009a) recommends creating a mixed-use transit hub and transfer station between A and C streets and Northern Lights and Benson Boulevards in the long term. Other transit recommendations include improved bus stops along a circulator route connected to Downtown on the A/C corridor.

The Alaska Railroad Corporation (ARRC) also has plans to improve transit in Anchorage. . The ARRC studied commuter rail between Anchorage and the Mat-Su Core Area (Wasilla and Palmer area) for a number of years. The roughly 1-hour commuter rail trip between the Mat-Su Borough and Anchorage is described with five stations and five stops: Wasilla, near the Glenn-Parks Highway interchange, Eagle River, Joint Base Elmendorf-Richardson, and Anchorage (the planned Ship Creek Intermodal Center). The ARRC has undertaken several projects in support of commuter rail service, primarily funded through FTA money.Within the Anchorage Bowl, upgrades are underway on the Ship Creek Intermodal Transportation Center project. Previous phases of work added and straightened track. The current work involves restoration of the Historic Depot, and future work involves constructing a new departure lounge and a pedestrian skybridge to Downtown. The intent of these improvements is to improve multimodal connectivity and support potential future commuter rail.

3.2.3 Freight System

Since very few goods are produced in Alaska, most goods need to be imported. The freight system in Anchorage includes the Ted Stevens Anchorage International Airport (TSAIA), Port of Anchorage, Alaska Railroad (ARRC) facilities, and the road network (Glenn and Seward highways). TSAIA is not physically located within the study area; however freight that lands at the airport often travels through the

study area to reach its final destination. The Port of Anchorage is located in the Ship Creek area, northwest of the project area. The Alaska Railroad rail yards are located in the northwest corner of the study area. The airport, port, and railroad handle freight that passes through the project study area. The Glenn and Seward highways are the only vehicular routes in and out of Anchorage for truck freight distribution to communities on the road system. For example, truck freight haulers going from the Port of Anchorage to Prudhoe Bay on the North Slope use the Glenn Highway, and truck freight haulers going to the Kenai Peninsula use the Seward Highway.

According to the AMATS 2001 Freight Mobility Study, the common operational element to all these freight entry points is the truck (AMATS 2001). A strong road system that supports efficient truck movement in turn supports a healthy economy. The study indicates that "much of the retail freight entering Anchorage is time sensitive. The 'just in time' freight distribution system relies upon the ability of freight movers to transport the various commodities to market in a prescribed time. Delays caused by weather, traffic congestion and other constraints affect the efficiency of the system."

Ted Stevens Anchorage International Airport (TSAIA)

TSAIA is an international airport that serves local, state, national and international passengers and cargo. The airport is a major economic driver in the local community and the state, providing local jobs and linking Alaska to the rest of the world (ISER 2007). Because of its strategic location between Asia, Europe, and North America, air freight cargo is a large part of the airport's activity. Based on total cargo, Anchorage is the third busiest cargo airport in the world, behind only Memphis and Hong Kong (ISER 2007).

Table 3.5 Cargo and Freight at TSAIA

Type of Cargo	Tons of Freight
Intra-Alaska	117,654
Non-Alaska Domestic	21,092
International	4,997,409
Total	5,136,154

Of the intra-Alaska cargo, about 25,000 tons is deplaned and not transited to another plane, meaning it is loaded off airplanes and enters the road system through Anchorage; about 91,000 tons is enplaned, meaning it is loaded onto airplanes (TSAIA 2009). About 187 tons of intra-Alaska cargo is "in transit," which means the majority of the intra-Alaska cargo either enters or leaves the airport via the road system (TSAIA 2009). However, the 2001 AMATS *Freight Mobility Study* states that the airport has "the least direct effect on truck freight transport within the city" because the majority of the freight never leaves the airport perimeter.

Planned TSAIA Improvements

In 2006, TSAIA began a master plan update and updated projections for future operations, passengers, and cargo. As of 2008, the master plan was not completed, and an alternative for future improvements had not been selected; however, cargo tonnage is anticipated to increase 6.1 percent. Planned improvements covered in the 2002 Master Plan Update include:

- Add a second north-south air carrier runway when justified by operational demands
- Provide additional terminal capacity between the North and South Terminals (complete)
- Continue to develop the North, South, East, and West Airparks to address cargo and general aviation needs

Port of Anchorage

The Port of Anchorage serves 90 percent of Alaska's population and the major military installation via road, rail, and air cargo connections (POA 2009). About 80 percent of Alaska's maritime trade and 90 percent of its consumer imports arrive through the port. The port includes a 129-acre industrial park, of which 63 percent is leased by port users. Four to five vessels arrive weekly from two major carriers, Horizon Lines, Inc. and Totem Ocean Trailer Express. The port is designated by the Department of Defense as one of 19 National Strategic Ports and has supported military deployments to the Middle East. More than 90 percent of port's freight is redistributed by truck over the road system (Alaska Trucking Association 2010). According to the Port of Anchorage, tonnage through the Port was 3,798,272 tons in 2009, of which 45 percent was comprised of vans, flats, and containers (POA 2009). In 2009, 217,221 containers were handled by the Port (Leon 2010).

Trucks enter and exit the port via Ocean Dock Road. On Ocean Dock Road at the Port of Anchorage Weigh-in-Motion system, monthly traffic counts are taken for both cars and commercial trucks. This information is presented in DOT&PF's Annual Traffic Reports and identifies month, number of days counts took place, direction of travel, total traffic count and percent by vehicle type. In 2008, the most recent traffic report, some of the lowest traffic volumes yielded the highest percent of commercial trucks, as shown in Table 3-5. In months with the highest traffic volumes, the percent of truck traffic was lower than in those months with low traffic volumes. Traffic modeling completed for the project estimates that that approximately 76 percent of the trips going to or from the Port remain in the Anchorage bowl; about 5 percent are destined for Birchwood, Chugiak, and Eagle River; 18 percent travel out of Anchorage to the north and 1 percent head out of Anchorage to the south.

Table 3.6. Traffic Counts at Ocean Dock Road Port of Anchorage

Month	Number of Days	Direction of Travel	Total Traffic	Percent Commercial Trucks
April	24	NB	23,600	48.96%
April	24	SB	24,360	48.58%
December	28	NB	23,576	42.52%
December	28	SB	24,854	42.58%
August	29	NB	33,273	45.99%
August	29	SB	35,030	45.90%

Source: DOT&PF 2008b.

Planned Improvements

The Port of Anchorage is working on a multi-year expansion considered a U.S. D.O.T. Project of National Significance. All environmental permits are in place for this project and compliance measures underway. These improvements provide:

- New energy efficient electrified cargo container cranes in 2010;
- Increased terminal capacity; improving ship berthing activities;
- Additional acreage for cargo storage, queuing, and goods transfer;
- Deeper berths allowing access of vessels currently serving Alaska;
- Direct road and rail access to shipping line making handling of goods more efficient;
- Infrastructure for barge service; and
- Demolition of old structures.

All in all, the Port of Anchorage is growing from 86 acres to 221 acres to improve cargo facilities and passenger ship access. More information on project development can be found in the Port of Anchorage Master Plan (MOA 1999).

Alaska Railroad

The Alaska Railroad Corporation (ARRC) offers a multitude of freight transport to its domestic and foreign customers, rail to marine service, rail to barge, and rail to truck service. ARRC handles four main types of freight—bulk petroleum, gravel, coal, and other .Rail freight volumes were relatively steady between 2000 and 2009. In 2009, ARRC carried 6.16 million tons of freight. The ARRC Rail Depot, Rail Yard, Headquarters Building and some track are located within the northern portion of the study area in Anchorage.

Anchorage is the final destination of all bulk petroleum, all gravel, and 70 percent of other freight handled by ARRC (see Table 3-6). In 2009, freight destined for Anchorage accounted for approximately 72 percent of all freight handled by ARRC. Bulk petroleum is shipped from Flint Hills refinery at North Pole by tanker car. Once the tank cars arrive in Anchorage they are unloaded into the Ship Creek tank farm. Bulk petroleum is then transported by pipeline to Joint Base Elmendorf-Richardson or TSAIA. Gravel is hauled to Anchorage by gravel cars and is delivered directly to two locations in south Anchorage. Anchorage is the final destination of 70 percent of total "other freight" handled by ARRC which either comes through the Port of Whittier or the Port of Seward. Seward receives freight from over seas, including Japan and Korea. The freight from Seward and Whittier travels by rail car to Anchorage, where it may be transported locally or regionally by truck.

The remaining 30 percent of "other freight" passes through Anchorage to Fairbanks. Export coal also passes through Anchorage by rail on its way to Seward. In 2009, freight that passed through Anchorage accounted for approximately 16 percent of all freight handled by ARRC.

The only freight handled by ARRC that does not pass through Anchorage is "local coal" which is shipped from Healy to Fairbanks and accounted for approximately 12 percent of total freight handled by ARRC in 2009.

Table 3.7. Alaska Railroad Tonnage

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
GRAND TOTAL	6,260	7,790	7,557	7,975	7,567	8,226	7,662	6,457	6,599	6,163
Final Destination Anchorage										
Bulk Petroleum	2,254	2,372	2,339	2,722	2,653	2,555	2,068	2,230	1,910	1,657
Gravel	2,178	3,543	3,659	3,769	3,139	4,024	3,900	2,377	2,776	2,306
Other (70% of total)	336	400	421	402	379	406	425	519	477	446
Total	*4,768*	*6,315*	*6,419*	*6,893*	*6,171*	*6,985*	*6,393*	*5,126*	*5,163*	*4,409*
Pass-through Anchorage										
Coal (export)	734	699	311	224	500	384	374	342	471	801
Other (30% of total)	144	171	180	172	162	174	182	223	204	191
Total	*878*	*870*	*491*	*396*	*662*	*558*	*556*	*565*	*675*	*992*
Not through Anchorage										

Coal (local [Healy to Fairbanks)	614	605	647	686	734	683	713	766	761	762

Source: Alaska Railroad Corporation, Markets, Sales, Services, Anchorage, Alaska, personal communications, 2010.

Planned Improvements

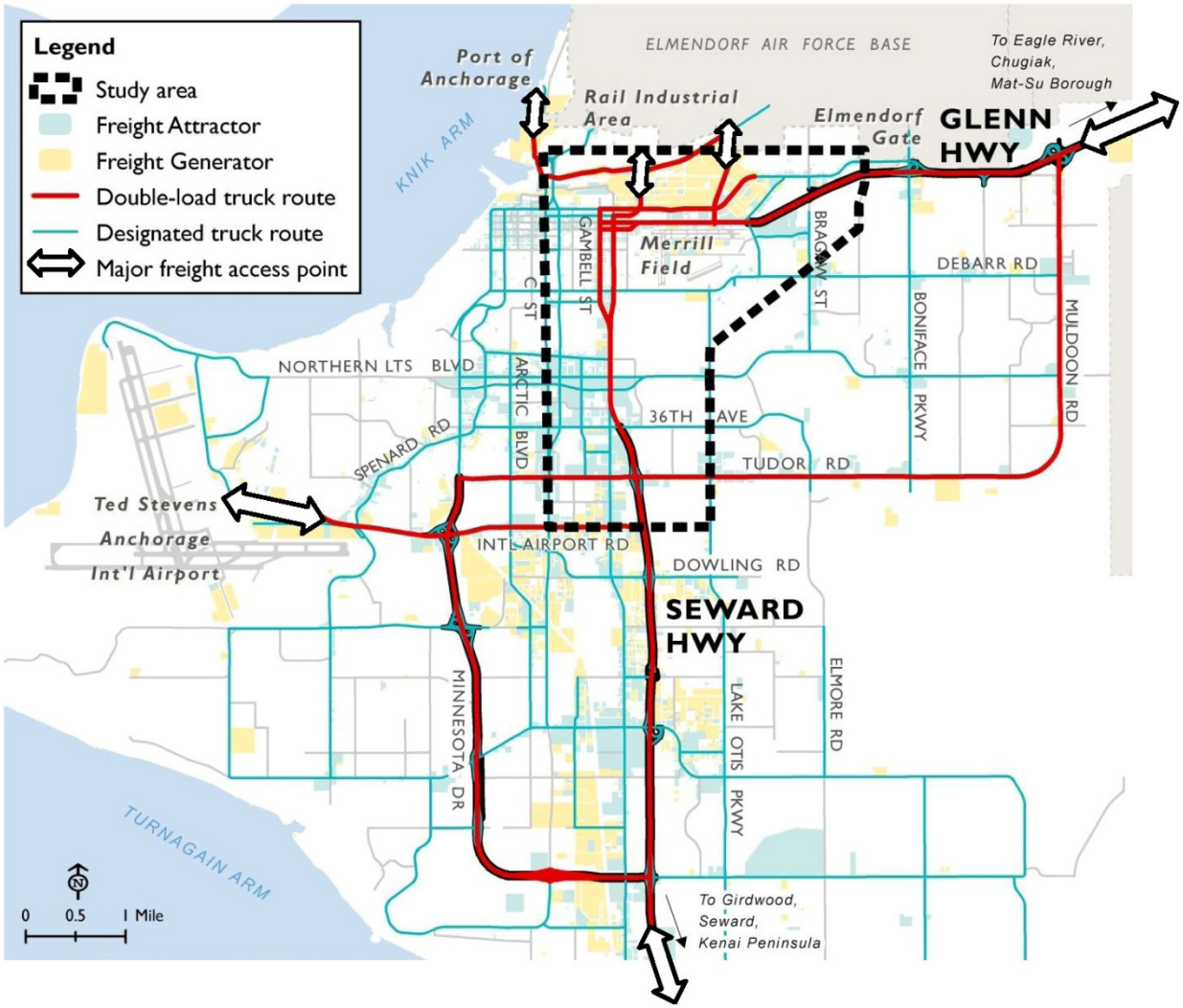
The Environmental Assessment for a project to extend double tracks between the Anchorage rail yard at MP 114 and the Airport Spur at MP 110 is expected to go to the Federal Transit Authority (FTA) in 2010. More information on Alaska Railroad projects may be found on the ARRC Web site (ARRC 2010).

Motor Freight

The Port of Anchorage and TSAIA import the majority of freight. The main way that freight is distributed from these importers is via freight trucks, which travel in and through the Anchorage metropolitan area (AMATS 2007). Daily deliveries on local roads to commercial business and shopping areas are usually done by single-unit trucks or box vans. These make up the majority of total truck volume within the Anchorage Bowl (AMATS 2001). Double loads (i.e., tandem trucks with a tractor and two trailers following behind) are limited to Ocean Dock Road, Whitney Road, Post Road, Reeve Boulevard, 3rd, 4th, 5th and 6th avenues, the Glenn Highway east of Gambell Street, and south on Gambell Street to the Seward Highway (Figure 3-9). A much larger share of tractor-trailer combination vehicles operates on Ocean Dock Road to and from Ship Creek and onto the Glenn Highway from Reeve Boulevard than on other routes.

The daily truck volume on the Glenn Highway northbound at the permanent traffic counter at Eklutna exceeds 3,500 vehicles; and on the Seward Highway, truck volume near 76th Avenue is about 2,200 daily (DOT&PF 2009). Whether freight trucks are bound for the Seward or the Glenn highways, they pass through the study area. Figure 3-9 shows the freight system including freight generators and attractors, and major access points.

Figure 3-9. Freight System



Source: MOA 2005.

Freight arrives at the port or airport and is trucked to an industrial area on C Street (between Dimond Road and International Airport Road) for warehousing and local distribution. From the industrial area, goods travel on the Seward and Glenn highways through the project study area. Anchorage's *Official Streets and Highways Plan* was updated with the LRTP and shows official truck routes for the municipality (MOA 2005). Figure 3-9 also shows designated truck routes and double load truck routes.

Planned Improvements

Planned improvements to the arterial and highway road system in Anchorage will directly improve freight Table 3-3 lists roadway projects and notes which are particularly intended to improve freight circulation. In addition, overall reduction in congestion aids freight movement. The LRTP calls out several projects that will improve freight distribution including connection of the Glenn and Seward highways; the Knik Arm Crossing; C Street viaduct improvements; and new port access from the Glenn Highway through extension of Ingra-Gambell streets couplet (AMATS 2007).

The Knik Arm Crossing is a notable planned improvement that would improve freight connectivity in the area (KABATA 2007). The proposed crossing would provide a shorter, efficient connection to the road

network for freight leaving the Port of Anchorage and traveling north on the NHS. Container loads destined for the Mat-Su and Interior Alaska could travel the Knik Arm Crossing route north rather than traverse the existing route through Downtown Anchorage and the Glenn Highway. The Knik Arm Crossing also includes a phased connection to the H2H project as traffic demand merits which, when built, would provide an equally strong link to the Glenn Highway for goods traveling north to Eagle River and to the Seward Highway for goods traveling south to the Kenai Peninsula.

3.3 BIBLIOGRAPHY

Alaska Trucking Association. 2010. *Facts about Trucking in Alaska.* Available online at http://www.aktrucks.org/servlet/content/facts_about_trucking_in_alaska.html (accessed August 17, 2010).

[ARRC] Alaska Railroad Corporation. 2008. *Alaska Railroad Corporation 2008 Annual Report*. Published on-line at http://www.akrr.com/pdf/PR_2335%202008%20Annual%20Report%20narrative%20final.pdf Accessed April 13, 2010.

———. 2010. *Alaska Railroad Corporation Anchorage Projects*. Published on-line at http://www.alaskarailroad.com/corporate/CapitalProjects/AnchorageProjects/tabid/483/Default.aspx.

[AMATS] Anchorage Metropolitan Area Transportation Solutions. June 2001. *Freight Mobility Study*. Published on-line at http://www.muni.org/Departments/traffic/AMATS/Documents/freightmobilitystudy.pdf Accessed April 13, 2010.

———. 2007. *Anchorage Bowl 2025 Long-Range Transportation Plan with 2027 Revisions.* Published on-line at http://www.muni.org/Departments/traffic/AMATS/Pages/LRTP.aspx Accessed February 15, 2010.

[DOT&PF] Alaska Department of Transportation and Public Facilities. 2007. *Central Region, State of Alaska, DOT&PF: Top 10 Congestion Bottlenecks.* January 26.

———. 2008a. *Let's Get Moving 2030 Alaska Statewide Long-Range Transportation Policy Plan*. Published on-line at http://www.dot.state.ak.us/stwdplng/areaplans/lrtpp/SWLRTPHome.shtml Accessed February 15, 2010.

———. 2008b. *Central Region Annual Traffic Volume Report 2005-2007* March.

———. 2008c. *2002-2006 Intersection Crashes.*

———. 2009. *Seward to Glen Highway Connection, Origin-Destination Analysis Technical Memorandum, July*.

———. 2010a. *2002-2008 MOA Pedestrian Crashes and 2002-2008 MOA Bicycle Crashes.*

———. 2010b. *Seward to Glen Highway Connection, Stage 1 Step 1 Screening Memo, Month.*

HDR Alaska, Inc. May 2001. *East Anchorage Study of Transportation Final Study Report*. Prepared for Alaska Department of Transportation & Public Facilities. Anchorage.

[ISER] Institute for Social and Economic Research, University of Alaska Anchorage. 2007. *Ted Stevens Anchorage International Airport: Economic Significance.* Prepared for Ted Stevens Anchorage International Airport.

[KABATA] Knik Arm Bridge and Toll Authority. 2007. *Knik Arm Crossing Final EIS and Section 4(f) Evaluation.*

Leon, Edward. 2010. Correspondence between Edward Leon (Port of Anchorage) and Sandra Cook (HDR Alaska, Inc.). Record on file with HDR.

[MOA] Municipality of Anchorage. 1999. *Port of Anchorage Master Plan*. Published on-line at http://www.muni.org/Departments/port/pages/MasterPlan.aspx. Accessed April 15, 2010.

———. 2004. *Port of Anchorage Intermodal Expansion Project*. Published on-line at http://www.portofanchorage.org/ Accessed April 15, 2010.

———. 2005. *Official Streets and Highways Plan*. Prepared by the Traffic Department, Division of Transportation Planning. Published on-line at http://www.muni.org/Departments/traffic/AMATS/Documents/2005OSHP.pdf Accessed April 13, 2010.

———. December 2007. *Destination Downtown: Anchorage Downtown Comprehensive Plan.* Prepared by the Planning Department. Published on-line at http://www.muni.org/Departments/Planning/Publications/Pages/CBD_CompPlan_Final07.aspx Accessed April 14, 2010.

———. 2008a. *People Mover Ride Guide.*

———. 2008b. People Mover PowerPoint Presentation to AMATS, September 1, 2008. Record on file with HDR Alaska.

———. 2009a. *Draft Midtown District Plan.*

———. 2009b. *Public Transportation Department Ridership Report: 2008 Year to Date.*

_____. 2010. *November Newsletter to Vanpoolers.*

Port of Anchorage. 2009. Mission, Vision and History. Published on-line at http://www.muni.org/port/history.cfm. Accessed February 19, 2009.

RLS & Associates. May 2009. *People Mover Route Restructure Plan* Update. Prepared for Municipality of Anchorage. Dayton, OH.

[TSAIA] Ted Stevens Anchorage International Airport. 2009. *Ted Stevens Anchorage International Airport: 2008 Master Plan Study Report Draft.* Prepared by WH Pacific, HNTB Corporation and DOWL Engineers. Published online at http://www.dot.state.ak.us/anc/business/planning/ANCmaster08.pdf Accessed August 31, 2010.

Chapter 4: Airports
Affected Environment
Table of Contents

4.1 INTRODUCTION 1
4.1.1 Regulatory Setting 2
4.2 AFFECTED ENVIRONMENT 2
4.2.1 Merrill Field (Context) 2
Airport Description 2
Airport Operations 5
Airspace 5
Airport Planning and Capital Program 6
4.3 BIBLIOGRAPHY 7

List of Tables

Table 4-1. Merrill Field Airport 2008 Operating Revenue* 4

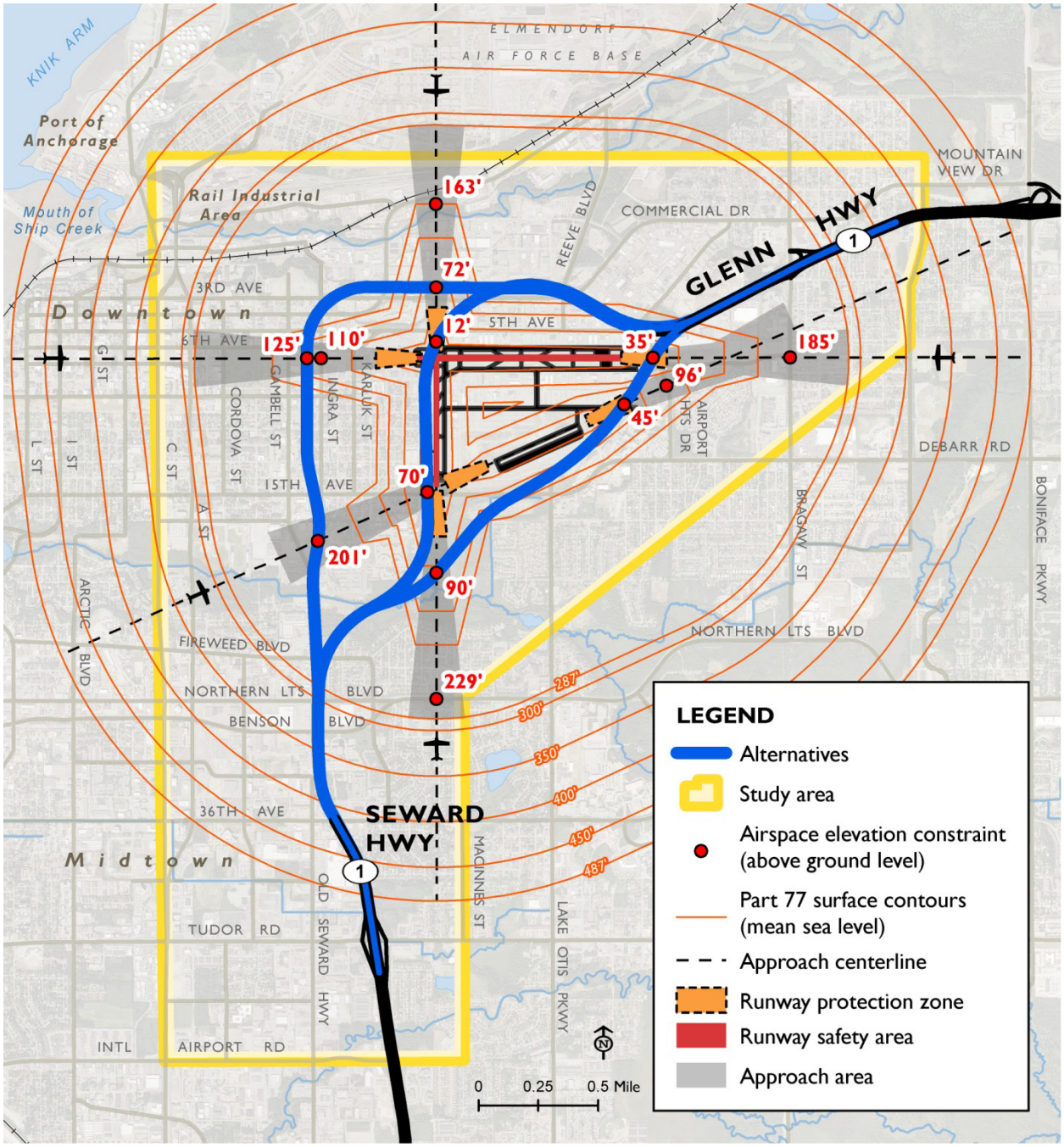
List of Figures

Figure 4-1. Merrill Field Study Area 1
Figure 4-2. Merrill Field Land Use and Safety Areas 3

4.1 INTRODUCTION

There is one airport located within the H2H project area, Merrill Field. Merrill Field is owned by the Municipality of Anchorage (MOA) and is operated under the provisions of Title 11, Chapter 11.60 of the Anchorage Municipal Code. An Airport Manager oversees the airport and the Municipal Airports Aviation Advisory Commission serves as an advisory board to the MOA for airport and aviation-related issues. Figure 4-1 depicts the airport boundary and airspace.

Figure 4-1. Merrill Field Study Area



4.1.1 Regulatory Setting

The Federal Aviation Administration (FAA) has primary authority over airspace and ensuring a safe operating environment at public use airports. As a participating agency, the FAA will review the effects of the project against published FAA advisory circulars and regulations that govern airspace and ensure a safe operating environment on the airfield. When an airport accepts federal grant funds for airport purposes, they agree to preserve and operate their facilities in a safe and efficient manner and comply with certain conditions and assurances. Merrill Field has received federal funding for airport improvement and construction projects and is therefore obligated to comply with applicable federal laws and FAA regulations and grant assurances (14 CFR 151 and 152). Acquisition of airport property is subject to the requirements of FAA grant assurances if that property was purchased with FAA money. See Chapter 7, Acquisitions and Relocations, for more information regarding property acquisition.

Rules prescribed by the FAA governing all aviation activities in the United States are contained in the Federal Aviation Regulations (FAR), which are part of Title 14 of the Code of Federal Regulations (CFR). The following FAA regulations and guidance are relevant to the H2H project:

14 CFR

- Part 77 – Objects Affecting Navigable Airspace
- Part 150 – Airport Noise Compatibility Planning
- Part 155 – Release of Airport Property from Surplus Property Disposal Restrictions

The FAA also publishes Advisory Circulars (AC) that provide guidance and information related to aviation activities. The following airport design ACs are relevant to the H2H project.

Advisory Circulars (AC)

- AC 150/5300-13, Airport Design
- AC 150/5325-4B, Runway Length Requirements for Airport Design
- AC 150/5370-2E, Operational Safety on Airports During Construction
- AC 150/5390, Heliport Design

4.2 AFFECTED ENVIRONMENT

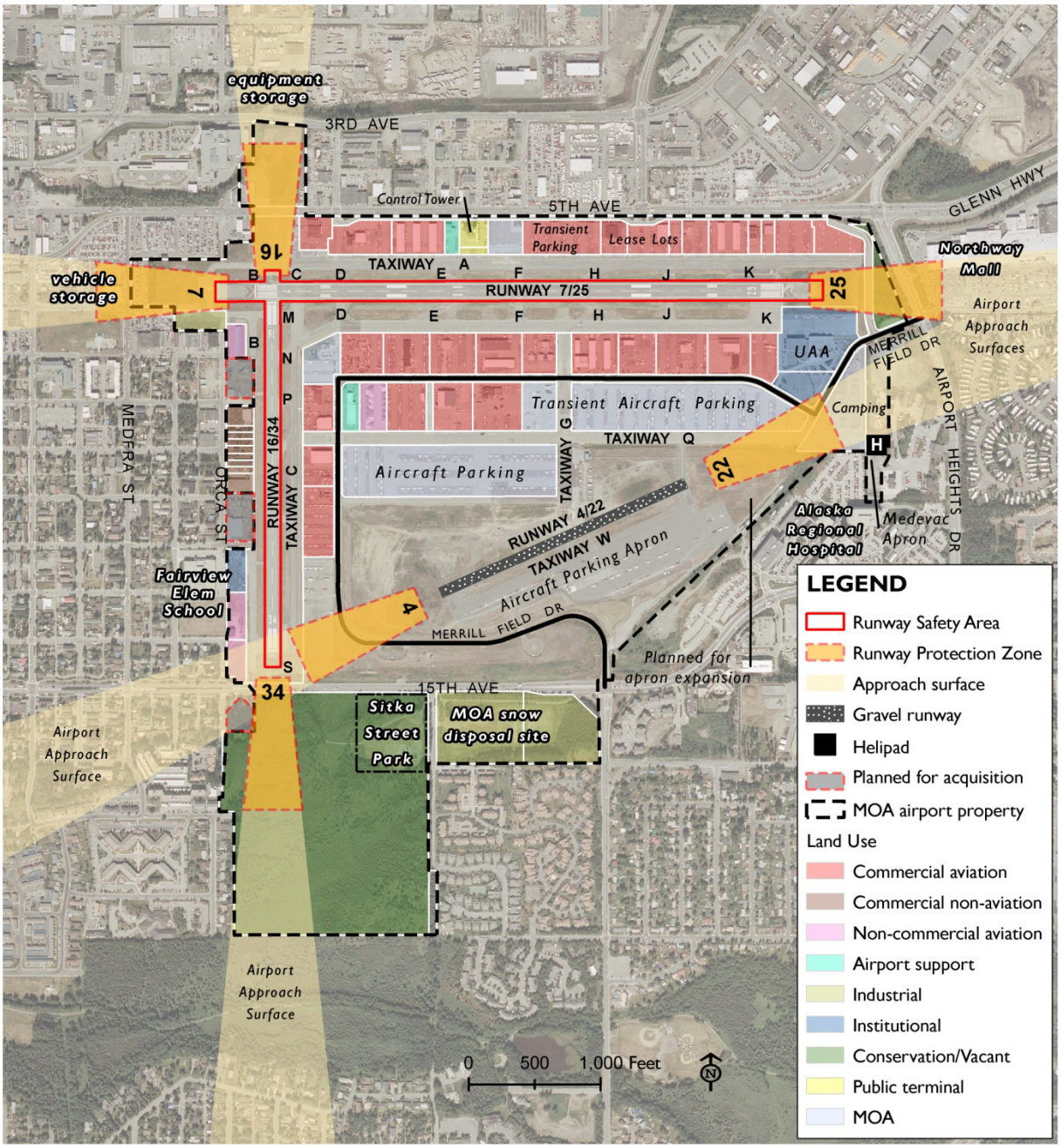
4.2.1 Merrill Field (Context)

Airport Description

Merrill Field Airport is located on approximately 438 acres within the boundaries of the MOA and is in the Highway to Highway study area (Figure 4-1). The airport, Anchorage's first, was established in 1930 and was the location of the Territory of Alaska's first aviation beacon, which was dedicated in September 1932. Merrill Field was the only airport serving Anchorage until 1951, when an airfield with longer and heavier runways was needed to accommodate larger and faster commercial aircraft. Merrill Field had been ranked as one of the busiest general aviation airports in the nation, with activity peaking in 1984. On its Web site, the MOA states that in 2007, Merrill Field was the 86th busiest airport in the nation with 174,848 flight operations. See Chapter 19, Historic, Archaeological, and Paleontological Resources, for more information related to the airport's history and potential historic resource values.

Merrill Field is classified as a Primary Commercial Service Airport (10,000 enplanements) and restricts aircraft using the airport to 12,500 pounds or less. The airfield consists of two asphalt paved runways: Runway 7-25, with parallel taxiways on the north and south sides, and Runway 16-34, with one parallel taxiway on the east side and a partial parallel taxiway on the west side. There is also one gravel/ski runway, Runway 4/22 (Figure 4-2).

Figure 4-2. Merrill Field Land Use and Safety Areas



Additional taxiways provide access to the runways from aircraft parking areas and provide links between the parallel taxiways and their respective runways. Taxiway Q provides direct access to the Alaska Regional Hospital Emergency Room, enabling medevac flights to taxi to the hospital door. There is a heliport located near Alaska Regional Hospital (Figure 4-2) and other helicopter parking areas throughout the airport.

In 2007, there were 2,870,762 square feet of airport property under lease. There are 25 commercial leaseholds, some of which are subleased, and approximately 46 aviation-related businesses operating from Merrill Field. Aviation services at Merrill Field include fuel sales, maintenance, repair parts and

supplies, avionics, aircraft sales, hanger and tiedown rental, aircraft leasing, aircraft rental, aircraft charter, flight instruction, propeller repair, aircraft upholstery, and aerial photography. Airport operating revenue for 2008 is summarized in Table 4-1.

Table 4-1. Merrill Field Airport 2008 Operating Revenue*

Type of Revenue	Amount
Airport Lease Fees	$523,671
Airport Property Rental	$403,183
Other Revenue (Rental charges/Administrative Grant Reimbursements)	$419,816
Permanent Parking Fees	$285,334
Vehicle Parking	$13,984
MOA Aviation Fuel Fees	$38,861
State of Alaska Aviation Fuel Fees	$15,475
Medivac Taxiway Fees	$47,520

**Source: Merrill Field Airport 2010 Statement of Revenue and Expenses*

Note: The source year is 2010 but the data is for 2008. 2009 and 2010 data was not final at the time of this writing.

According to the Airport Manager, the MOA received tax revenue from leased parcels at Merrill Field in the amount of $295,006 in 2008 and $335,466 in 2009 and is predicted to receive $354,573 in 2010 (Lundeby 2010).

Merrill Field has more than 1,200 tiedown spaces, of which the MOA manages 530, leaseholders manage 641, and 51 are reserved for transient aircraft parking. In 2007, 633 transient aircraft stayed a total of 2,607 days. The average stay was 9.38 days (MOA N.D.). In 2010, permanent parking rates for airplanes and vehicles range from $40 to $80 per month (MOA N.D.). The transient parking rate in 2010 for airplanes and vehicles is $5 per day. There are also four MOA helicopter parking positions available (Aires 2000).

The airport can be accessed from 15th Avenue and Airport Heights Drive. Merrill Field Drive is the main access on the airport and connects from Airport Heights Drive to 15th Avenue. There is also limited access from Orca Street to several airport facilities west of Runway 16/34 (Figure 4-2). Facilities on the north side of Runway 7/25 can be accessed from 5th Avenue. Limited short-term vehicular parking is available adjacent to the various commercial aviation/fixed-base operator businesses and facilities on the airport for customers and employees. There are also approximately 100 spaces available in the center area of the airport. Aircraft owners typically park on the tiedown spaces or in the T-hangers vacated by their aircraft when they fly.

Other airport-related land uses occurring on airport property include the University of Alaska Anchorage (UAA) Aviation Technology Center at the east end of the airport (which includes a hangar and flight school) and a campground and picnic area at the east end of Taxiway Q (used by transient pilots). Non-aviation uses include a park at 15th Avenue and Sitka Street (for more discussion on Sitka Street Park, see the Draft Section 4(f) Evaluation in Chapter 22), a snow disposal site used by the MOA (also at 15th

Avenue and Sitka Street), equipment storage for the Municipal Light and Power Company on East 3rd Avenue, vehicle storage for Alaska Sales and Service along Medfra Street, and MOA warehouse/office space (901, 917, and 1015 Orca Street) (Figure 4-2).

Airport Operations

Merrill Field serves local and itinerant general aviation, air taxis, and military aircraft. Aircraft using Merrill Field primarily consist of small planes less than 12,500 pounds and include such models as the Cessna 208 Caravan, the Cessna Skyhawk 172, the Piper-18 Super Cub, and the Piper-31 Navajo.

General aviation is defined as all civil aviation not classified as air carrier, commuter/air taxi, or military. It includes uses such as flying for enjoyment, transportation of personnel or cargo by business firms and individuals in privately owned aircraft, pipeline patrol, aerial advertising, business/corporate aviation, and flight training. Total aircraft based at Merrill Field has fluctuated from a low of 746 in 1980 (the first year included in the historical data) to a peak of 1,079 in 1986 (Aires 2000). In 2007, 892 aircraft were based at Merrill Field (MOA N.D.). General aviation operations peaked at 372,299 in 1984, the peak year for total aircraft operations at the airport. In 1997 there were 176,820 general aviation operations (Aires 2000). General aviation operations have accounted for an average of 96 percent of total operations at the airport since 1980.

Air taxi operations include the unscheduled operation of "for hire" air taxis. In 1997, there were 10,370 aircraft operations in the air taxi category (Aires 2000). The air taxi category includes aircraft operated by leaseholders and tenants at the airport and air taxis from other airports. There are currently eight air taxis listed on the MOA Web site for Merrill Field. Recorded air taxi operations are believed to account for only 70 percent of the actual air taxi operations, due to the fact that air taxis do not provide the FAA Air Traffic Control Tower with an air taxi identifier.

Military operations at Merrill Field account for a very small portion of the total operations. In 1997 there were only 23 military operations counted, and these were primarily U.S. Air Force rescue helicopters coming to Alaska Regional Hospital (Aires 2000).

Approximately 20-25 fixed-wing medevacs and a limited number of civil helicopter medevacs land at Merrill Field each month.

Airspace

FAA design criteria for airports require certain safety areas be established for each runway. These safety areas include the runway safety area (RSA), runway object-free area (ROFA), runway protection zone (RPZ), building restriction line (BRL), and Part 77 surfaces. The dimensions of the various safety areas are based on the Airport Reference Code (ARC), which is based on the aircraft approach speed and wingspan. The runway safety areas at Merrill Field are important to the H2H project because they could affect the height and location of project components.

The RSA is a rectangular area centered on the runway centerline of specified width and length along and beyond the ends of the runway. The RSA is intended to provide a measure of safety in the event of an aircraft's excursion from the runway by significantly reducing the extent of personal injury and aircraft damage during overruns, undershoots, and veer-offs. The RSA for Runway 7/25 is 150 feet wide and extends 300 feet beyond both ends of the runway. For Runway 16/34, the RSA is 120 feet wide and extends 240 feet beyond the north end of the runway and 120 feet beyond the south end of the runway (Figure 4-2).

The ROFA is also a rectangular area centered on the runway centerline. The ROFA is provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the ROFA for air navigation or aircraft ground-maneuvering purposes. The ROFA for

Runway 7/25 is 500 feet wide and extends 300 feet beyond both ends of the runway. The ROFA for Runway 16/34 is 250 feet wide and extends 240 feet beyond both ends of the runway.

The RPZ is an area off the runway end to enhance the protection of people and property on the ground. It is desirable that RPZs be cleared of aboveground objects; if this is not possible, then they should be clear of facilities that lead to an assembly of people. The RPZ for both runways is 1,000 feet long, with an inner width of 250 feet and an outer width of 450 feet (Figure 4-2). Portions of all four RPZs extend outside the airport property line. A building is within the RPZ for Runway 7 and a portion of the Northway Mall is within the RPZ for Runway 25 (Figure 4-2). A car dealership used to be in the RPZ for Runway 16 on the north side of 5th Avenue, but the FAA required the airport to acquire the property and remove the building to keep the RPZ in compliance with FAA regulations.

The BRL is a line that identifies suitable building area locations at the airport. The BRL for the runways varies from 200 feet to 365 feet. There are several buildings that penetrate the BRL, including the UAA Aviation Technology Center and several buildings along Orca Street (Aires 2000).

FAR Part 77 establishes imaginary surfaces, related to airports and their runways, which are used to identify obstructions (Figure 4-1). Obstructions include any construction or alteration of structures more than 200 feet in height above ground level or at a height that penetrates defined imaginary surfaces located in the vicinity of a public-use airport.

Airport Planning and Capital Program

Development at Merrill Field is guided by an Airport Master Plan (AMP) completed in 2000 and funded by the FAA, the State of Alaska, and the MOA. The AMP is scheduled to be updated in the next few years (approximately 2011-2014). The AMP provides a long-range (20-year) plan to guide development of the airport and includes recommendations regarding additional airport property, airfield improvements, avigation improvements, projects related to general aviation and air taxis, airport access and parking, airport support projects, and land use on airport property.

There are a number of elements in the plan that are in the H2H study area. The plan calls for purchasing property along the west side of the airport along Orca Street for use as hangars and completing the current partial parallel Taxiway B along the front of these lease lots so that it becomes a full parallel taxiway. The acquisition plan also includes a parcel south of 15th Avenue at the northwest corner of the airport conservation area. Between the gravel runway (4/22) and Alaska Regional Hospital, the plan calls for expansion of aircraft parking and snow storage areas.

A capital improvement program for implementing the plan exists for Merrill Field and includes projects through 2017. Improvements include runway and taxiway rehabilitation, access road rehabilitation, purchasing of snow removal equipment, apron improvements, construction of Taxiway B, and security upgrades.

Identified improvements within the H2H project study area include:

- Improvements to the Medevac Apron due to differential settlement of the pavement surface (Figure 4-2). Currently scheduled for 2013.
- Apron improvements along the east boundary of the airport to include new aircraft parking aprons and commercial lease space. Currently scheduled for 2014.
- Construction of a full-length parallel taxiway on the west side of Runway 16/34. This project includes property acquisition and building demolition and is scheduled over several years (2015-2017).

4.3 BIBLIOGRAPHY

[Aires] Aires Consultants LTD. 2000. *Final Report, Merrill Field Airport Master Plan*. Prepared for the Municipality of Anchorage.

[DOT&PF] Alaska Department of Transportation and Public Facilities. 1996. *Alaska Aviation System Plan and Update*.

———. 2004. *Anchorage Area General Aviation System Plan*. Prepared by Aries Consultants Ltd. June.

[FAA] Federal Aviation Administration. No date. *National Plan of Integrated Airport Systems (NPIAS) (2009-2013)*. Report of the Secretary of Transportation to the United States Congress Pursuant to Section 47103 of Title 49, United States Code.

Lundeby, Dave. August 26, 2010. Email message from Lundeby (Municipality of Anchorage) to John Tolley (Municipality of Anchorage). Record on file with HDR.

[MOA] Municipality of Anchorage. No date. *Merrill Field General Information*. Available online at http://www.muni.org/Departments/merrill_field/Pages/GeneralInformation.aspx (accessed March 2, 2010).

Chapter 5: Land Use
Affected Environment

Table of Contents

5.1 INTRODUCTION 1
5.2 REGULATORY SETTING 2
5.3 AFFECTED ENVIRONMENT 2
5.3.1 Resource Identification Methods 2
5.3.2 Existing Land Use 2
Planned Development 5
5.3.3 Local Land Use Plans 5
Anchorage 2020 5
Merrill Field AMP 7
Long Range Transportation Plan 8
Bike Plan 8
Pedestrian Plan 8
Anchorage Downtown Comprehensive Plan 8
Anchorage Coastal Management Plan 8
Anchorage Bowl Park, Natural Resource, and Recreation Facility Plan 9
Midtown District Plan - DRAFT 9
Mountain View Neighborhood Plan – In Progress 9
Fairview Community Plan – In Progress 9
5.3.4 Existing Zoning 9
Commercial Zones 12
Industrial Zones 13
Residential Zones 13
Other Zones in Study Area 14
Zones Not in Study Area 14
Title 21 Rewrite 14
5.4 BIBLIOGRAPHY 15

List of Tables

Table 5-1. Land Use 3
Table 5-2. Major Policy Areas 7
Table 5-3. Study Area Zoning Designations 9

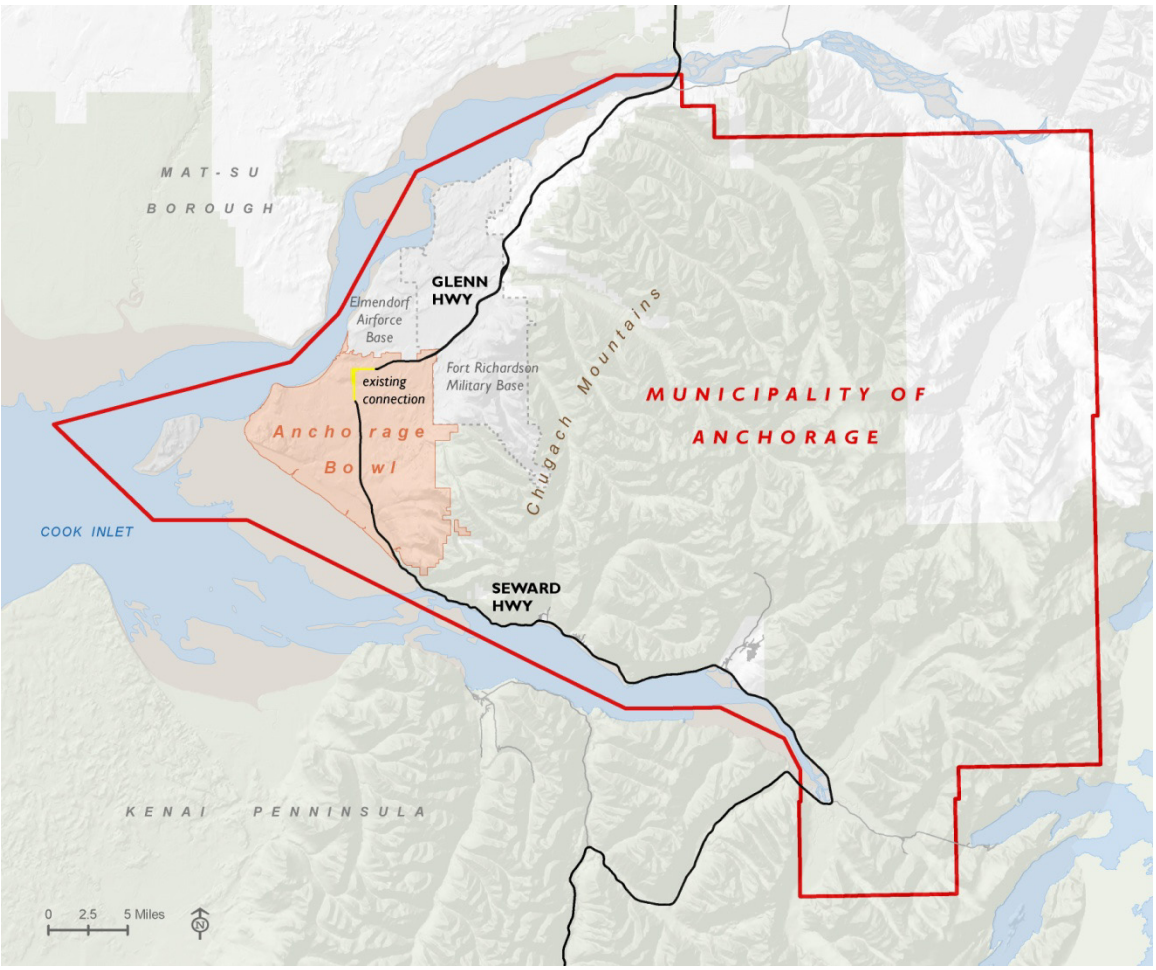
List of Figures

Figure 5-1. Map of the Anchorage Bowl and Municipal Boundary 1
Figure 5-2. Map of Land Use Study Area 4
Figure 5-3. Anchorage 2020 Land Use Policy Map 6
Figure 5-4. Study Area Zoning Designations 12

5.1 INTRODUCTION

This chapter describes the existing land use in the study area as well as applicable plans and policies. It also analyzes the expected impacts of the proposed alternatives on land use patterns in this area. The Municipality of Anchorage (MOA) is approximately 1,251,200 acres with the Anchorage Bowl being the most urbanized portion of the MOA (see Figure 5-1). The MOA is approximately 64,000 acres and is bounded by Chugach State Park, Turnagain and Knik Arms of Cook Inlet, and the Joint Base Elmendorf-Richardson. The land use study area is approximately 4,885 acres or about 7.6 percent of the Anchorage Bowl (see Figure 5-2). It encompasses areas where land use patterns could be affected by one or more of the build alternatives. Land use in the study area is a mix of residential, commercial, industrial, institutional, parks and open space, transportation, right of way, vacant and other uses. Generally, there is a greater percentage of commercial, industrial, and right of way uses in the study area than in the Municipality overall. Residential, parks and open space, and vacant land uses are a smaller percentage of the Municipality average for these uses. Except for a major greenbelt and open space area that bisects it, the study area is highly developed.

Figure 5-1. Map of the Anchorage Bowl and Municipal Boundary



5.2 REGULATORY SETTING

This section discusses the applicable federal, state, and local laws and regulations that govern land use. Technical Advisory T6640.8A, *Guidance on Preparing and Processing Environmental and Section 4(f) Documents,* from the Federal Highway Administration (FHWA), requires an analysis of current development trends and state and/or local government plans and policies on land use and growth in the area impacted by a proposed project.

Alaska state law requires unified home rule municipalities such as the Municipality of Anchorage (MOA) to provide planning, platting, and land use regulation. A "unified home rule municipality is a borough in which all cities within its boundaries have been dissolved and which has adopted a home rule charter under a special procedure in [Alaska Statutes:] Title 29" (DCED 2003).

The MOA is responsible for developing general or comprehensive plans for land development within its jurisdiction. These plans provide the framework for future land use. The public has the opportunity to participate in the land use planning process by reviewing and commenting on draft plans before they are adopted by the Anchorage Assembly. All plans discussed in this section have been developed in accordance with this general approach and therefore represent the type of future land use desired by the MOA.

5.3 AFFECTED ENVIRONMENT

5.3.1 Resource Identification Methods

The project team researched existing documents, including adopted and draft plans and MOA GIS information. The project team also consulted with the MOA Planning Department. A complete list of documents researched and local officials consulted can be found in the Bibliography.

5.3.2 Existing Land Use

In Anchorage, land use is classified according to the activities that take place on a parcel of land, and one parcel can have multiple land uses. In these cases, the MOA identifies a primary land use and considers the other land uses secondary. The following analysis considers a parcel's primary land use as defined by the MOA.

The MOA categorizes land into different uses, including residential, commercial, industrial, institutional, parks and open space, transportation, right of way, vacant, and other. Land use in the study area is summarized in Table 5-1 and Figure 5-2. Table 5-1 also compares the acreage of each land use in the study area to that in the Anchorage Bowl.

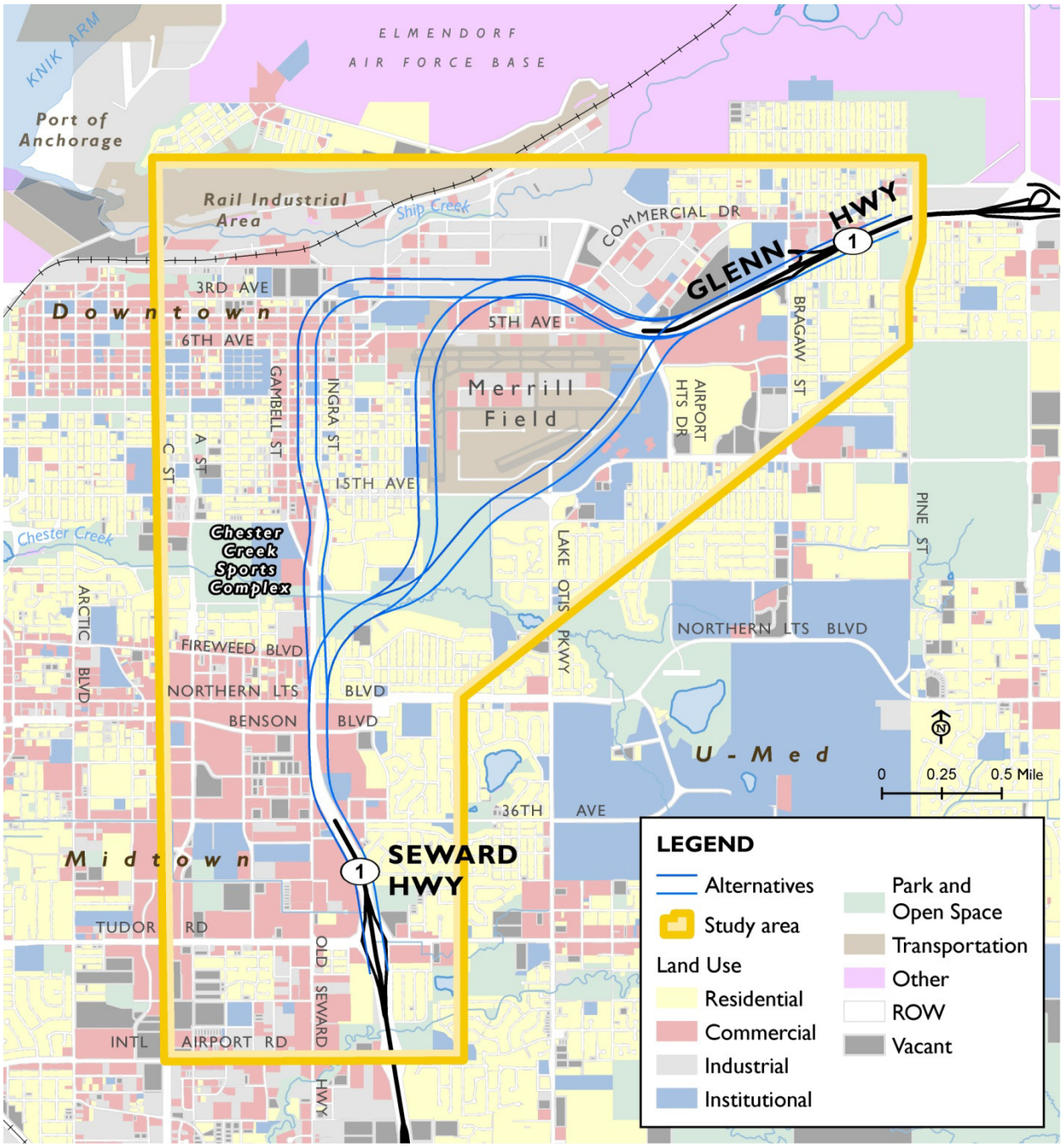
Table 5-1. Land Use

	Study Area		Anchorage Bowl	
Land Use	**Acres**	**%**	**Acres**	**%**
Residential	1,004.5	20.6%	19,545.5	29.2%
Commercial	874.2	17.9%	3,079.8	4.6%
Industrial	522.0	10.7%	2,628.2	3.9%
Institutional	376.6	7.7%	3,981.5	5.9%
Parks and Open Space	360.5	7.4%	11,229.9	16.8%
Transportation	408.8	8.4%	3,993.2	6.0%
Right of Way	1,050.7	21.5%	9,246.6	13.8%
Vacant	275.6	5.6%	11,161.4	16.7%
Other	8.2	0.2%	2,071.0	3.1%
Total	4,881.1	100.0%	66,936.9[1]	100.0%

Source: MOA GIS, computed by HDR.

[1] This total is less than other reported totals for the Anchorage Bowl because the land use dataset excludes the mudflats.

Figure 5-2. Map of Land Use Study Area



Approximately 21.6 percent (1,050.7 acres) of the study area is right of way (ROW), making it the dominant land use. The study area's second-largest land use is residential, at 20.6 percent (1,004.5 acres). While the dominant land use of the Anchorage Bowl is residential, at 29.9 percent, only about 16.6 percent of the Anchorage Bowl is right of way.

Unique or special land uses in the study area include:

Merrill Field – Merrill Field is a transportation use and is one of the busiest general aviation airports in the United States. Merrill Field offers a mix of commercial aviation activities; there are approximately 46 aviation-related businesses operating on Merrill Field including flightseeing companies, air taxi companies, flight schools, and maintenance companies (MOA 2010). For more information about Merrill Field, please see Chapter 4, Airports.

Rail Industrial Area – Located near the mouth of and along Ship Creek. There is an existing Alaska Railroad Corporation (ARRC) rail yard that includes a track system, repair buildings, a fueling area, a steaming rack, warehouses, and offices. Activities at the rail yard have included fueling, painting, steam cleaning, freight loading, and maintenance work on locomotives and rail cars. Properties outside the rail yard, leased to tenants, have been used for many different types of activities, several of which include power plants, trucking and transit operations, fuel storage, and auto salvage. For more information on the ARRC rail facilities see Chapter 3, Traffic and Transportation.

Chester Creek Sports Complex – This complex is classified as a park and open space use and is one of the largest recreation sites in Anchorage. It includes the Sullivan Arena, Ben Boeke Ice Arenas, Mulcahy Stadium, Anchorage Football Stadium, Kosinski Fields, outdoor hockey rinks, a skateboard park (proposed), and portions of the Chester Creek Greenbelt and Charles Smith Memorial Park. For more information, please see Chapter 22, Section 4(f) and 6(f) Evaluation, and Chapter 6, Social Environment.

Planned Development

Currently, there are no known major developments that are pursuing a rezoning or are under construction that would result in a change of land use in the study area (Davis 2010).

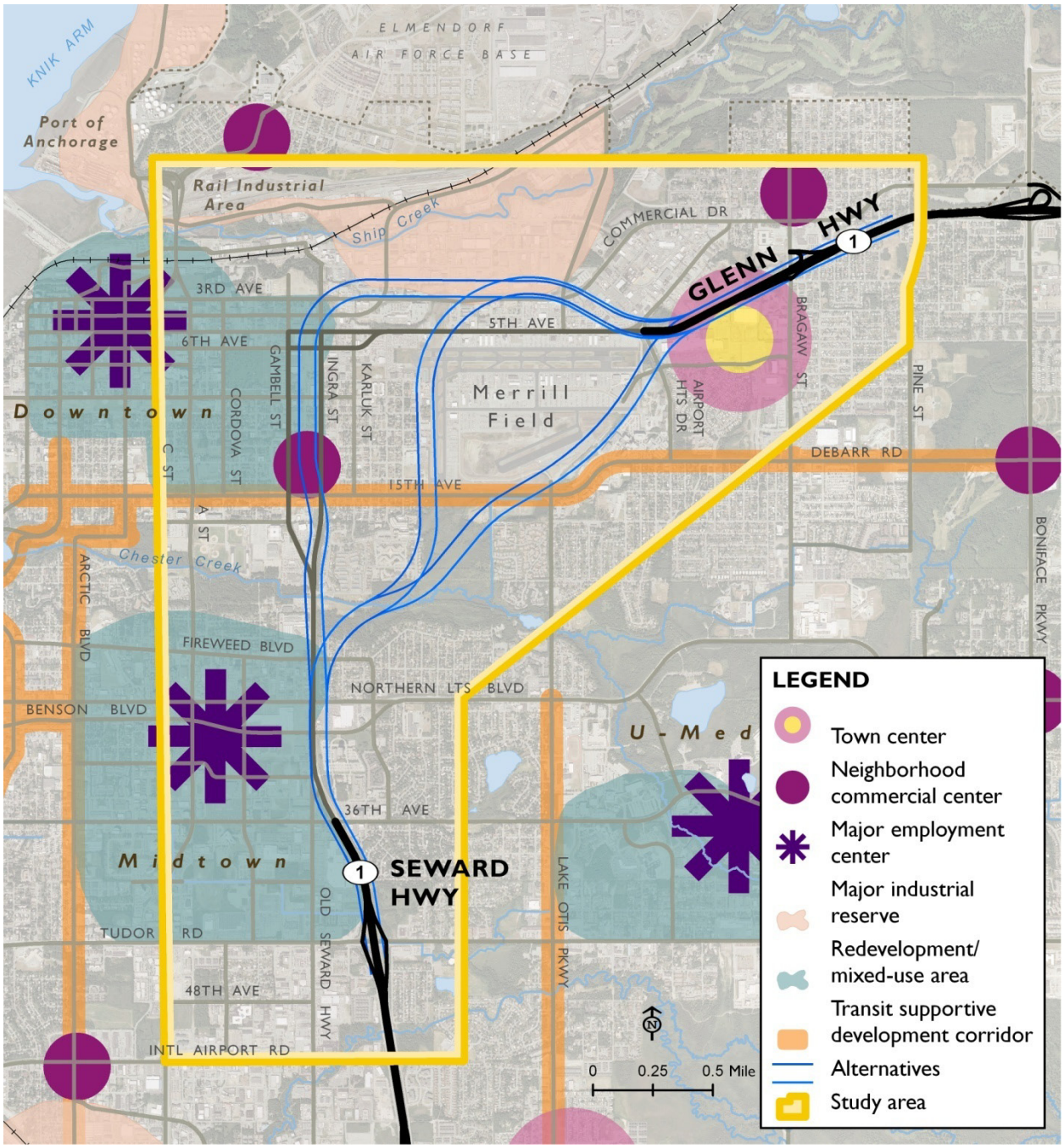
5.3.3 Local Land Use Plans

This section identifies and summarizes the adopted land use plans that provide development guidance over the land uses in the study area. In addition, there are several plans (including the Midtown District Plan, the Mountain View Neighborhood Plan, and the Fairview Neighborhood Plan) that are in various stages of development but have not been approved by the Anchorage Assembly. Because the recommendations and policies in the draft plans could change prior to adoption, they are included for informational purposes but will not be used as part of the consistency evaluation.

Anchorage 2020

"Anchorage 2020" is the Anchorage Bowl Comprehensive Plan, adopted by the Anchorage Assembly in February 2001 and amended in September 2002 to serve as a guideline for future development in the Anchorage Bowl. The Land Use Policy Map (Figure 5-3) summarizes the major land use policies identified in Anchorage 2020.

Figure 5-3. Anchorage 2020 Land Use Policy Map



The major policy areas that are found in the study area are described in Table 5-2.

Table 5-2. Major Policy Areas

Major Policy Area	Description
Midtown and Downtown Major Employment Centers	A major employment center is the most intensely developed portion of the Anchorage Bowl and serves as a focal point for the highest densities of office employment (more than 50 employees per acre), with supporting retail and commercial uses.
Midtown and Downtown Redevelopment/Mixed-Use Areas	A redevelopment/mixed-use area is an area to be developed at medium and high densities to allow people to live closer to work. Redevelopment/mixed-use areas are to be located near major employment centers. District plans that refine Anchorage 2020's vision for these areas have been developed. The Anchorage Downtown Comprehensive Plan was adopted in 2007 and is in the process of being implemented, and a public review draft of the Midtown District Plan has also been developed. Both plans are discussed later in this chapter.
Ship Creek Industrial Reserve	An industrial reserve, as described in the comprehensive plan, contains large vacant areas zoned for industrial use and is strategically located near important transportation facilities such as the Ted Stevens Anchorage International Airport, the Port of Anchorage, the railroad yard, and the highway system. Access to an efficient transportation network is important for the movement of goods around the city and state. The Alaska Railroad Corporation has a master plan for this area and is currently pursuing an intermodal transportation center and associated improvements (pedestrian amenities, transit infrastructure, etc).
Northway Mall Town Center	Town centers are to be the focal points for sub-areas within the Anchorage Bowl. Town centers should have a mix of retail shopping and services, public facilities, and medium- to high-density residential areas. The only town center in the study area is the Northway Mall. Recent nearby retail developments (including Glenn Square Mall and Tikahtnu Commons), however, were not anticipated when this plan was developed; consequently, this area may develop differently than planned.
Mountain View and Fairview Neighborhood Commercial Centers	A neighborhood commercial center is similar to a town center but on a smaller scale. The vision for such a center in Mountain View is refined in the Mountain View Neighborhood Plan, which is discussed later in this chapter. A plan for Fairview is currently being developed and is also discussed later in this chapter.
15th Avenue/DeBarr Road Transit-Supportive Development Corridor	A transit-supportive development corridor represents "optimal locations for more intensive commercial and residential land use patterns that will support and encourage higher levels of transit service." The MOA is currently developing a land use plan map that supports this type of development along the corridor, which is expected to be adopted by the end of 2010.

Source: Anchorage 2020.

Merrill Field AMP

The Merrill Field Airport Master Plan (AMP), adopted by the MOA in 2000, guides future development at Merrill Field to ensure the airport remains a viable air transportation facility. The objective of the AMP is to provide a long-range perspective to guide development at the airport. The AMP also places priority on supplying aviation services to the surrounding area since it is considered a convenient general aviation facility. The plan identifies the need to acquire property to accommodate training facilities and airport expansion; it also examines needs to improve the airfield, air traffic control facilities, general aviation facilities, and air taxi facilities. Proposed in the plan is a new public terminal and improvements to airport access and parking (MOA 2000). For more information on Merrill Field, please see Chapter 4, Airports.

Long Range Transportation Plan

The Anchorage Metropolitan Area Transportation Solutions (AMATS) Long Range Transportation Plan (LRTP) identifies transportation projects that are needed in the Anchorage Bowl by the year 2027. To learn more about planned transportation improvements in the study area, please see Chapter 3, Traffic and Transportation. The LRTP is scheduled to be updated in 2011.

Bike Plan

The MOA Bike Plan's purpose is to identify needed bicycle infrastructure and provide a plan for increasing the use of bicycles for transportation. Additional components of the overall plan include programs to promote enforcement, safety, education, and bicycle support facilities, such as bicycle parking and signage. To learn more about planned bicycle improvements in the study area, please see Chapter 12, Considerations Relating to Pedestrians and Bicyclists.

Pedestrian Plan

The MOA Pedestrian Plan focuses on pedestrian facilities adjacent to streets and roadways and on walkways that connect adjacent subdivisions and schools. Improvements considered in the plan emphasize making facilities easier and safer to walk (AMATS 2007). To learn more about planned pedestrian improvements in the study area, please see Chapter 12.

Anchorage Downtown Comprehensive Plan

The Anchorage Downtown Comprehensive Plan (Downtown Plan) is a subarea plan that builds on Anchorage 2020 and refines the vision for Downtown Anchorage.

The portion of the Downtown Plan within the study area identifies four policy areas (MOA 2007a):

Ship Creek – The plan indicates that this area should have medium-density residential development combined with commercial and railroad-related uses (MOA 2007a, 51).

Downtown Mixed-Use Residential: Pioneer Slope – This area should have a diverse mix of low- and medium-density uses, including open space, commercial, residential, and industrial uses (page 50).

Downtown Mixed-Use: East Avenues – This area should have commercial and mixed-used development, and should "cater to populations interested in a live/work environment (page 48)."

Downtown Mixed-Use Residential: Barrow Street – This area should be primarily medium-density residential with some small home office and corner retail development (page 50).

The Downtown Plan also includes recommended changes to the transportation network, including converting 5th Avenue to two-way traffic, converting 3rd Avenue to one-way traffic (westbound), etc. For more information on proposed transportation improvements, please see Chapter 3, Traffic and Transportation.

Anchorage Coastal Management Plan

The Anchorage Coastal Management Plan defines issues of local concern and guides development within the Anchorage Coastal Zone Boundary (MOA 2007b). The Ship Creek, Chester Creek, and Campbell Creek drainage areas are subject to the MOA coastal management plan. To learn more about Anchorage's coastal management plan and its policies relative to the H2H study area, please see Chapter 23, Coastal Zone.

Anchorage Bowl Park, Natural Resource, and Recreation Facility Plan

The Anchorage Bowl Park, Natural Resource, and Recreation Facility Plan provides guidelines on determining basic needs for parks, leisure activities, trails, and natural use areas for the Anchorage Bowl (MOA 2006). These guidelines also ensure a balance of such facilities provided to neighborhoods in the Anchorage Bowl. To learn more about the existing conditions, potential impacts, and mitigation measures for parks and recreation facilities, please see Chapter 6, Social Environment or Chapter 22, Section 4(f) and 6(f) Evaluation.

Midtown District Plan - DRAFT

Once adopted, the Midtown District Plan will supplement Anchorage 2020 in the area bounded by Tudor Road, Seward Highway, Chester Creek, and Spenard Road. The Midtown District Plan identifies the area's core as focusing on A/C streets from 40th Avenue to Fireweed Lane. A substantial amount of Midtown's future office development is expected to be concentrated in this area. Other policy areas in the study area include a Midtown mixed-used area and the Denali District. A public review draft of the plan has been developed but has not been adopted by the Anchorage Assembly.

Mountain View Neighborhood Plan – In Progress

The purpose of the Mountain View Neighborhood Plan is to define clear priorities and actions for future revitalization. Goals and strategies are developed in the plan with the intent to spur neighborhood revitalization and economic development. These goals and strategies are being reviewed by the neighborhood and business focus groups to ensure that community issues are appropriately addressed in the plan. This plan is still under development and has not been adopted by the Anchorage Assembly.

Fairview Community Plan – In Progress

The purpose of the Fairview Community Plan is to provide a vision to guide private and public investment. Through the evaluation of history and identification of demographic, economic, and land use characteristics, common values are recognized for the community. These values are translated into goals, objectives, and strategies critical to the implementation of the vision for the community of Fairview. The plan indicates that if the Glenn and New Seward highways contribute to Fairview's revitalization, the H2H project could be acceptable to the community. This plan is still under development and has not been adopted by the Anchorage Assembly.

5.3.4 Existing Zoning

Zoning is a type of land use regulation that divides a community into districts and imposes development requirements within each area (zone). Zoning typically regulates allowable land uses, building and site requirements, and the allowable density of each use. The zoning designation indicates how the MOA intends for the land to be used; it does not necessarily reflect how it is currently being used.

Zoning in Anchorage is established in Title 21[2] of the Anchorage Municipal Code. Table 5-3 and Figure 5-4 summarize zoning designations for the study area and the Anchorage Bowl.

Table 5-3. Study Area Zoning Designations

Title 21 Zoning Designation	Zoning Description	Study Area		Anchorage Bowl	
		Acres	%	Acres	%

[2] As of March 2010, Title 21 is being rewritten and has not been fully adopted by the Anchorage Assembly. Results discussed in this section reflect the existing zoning requirements.

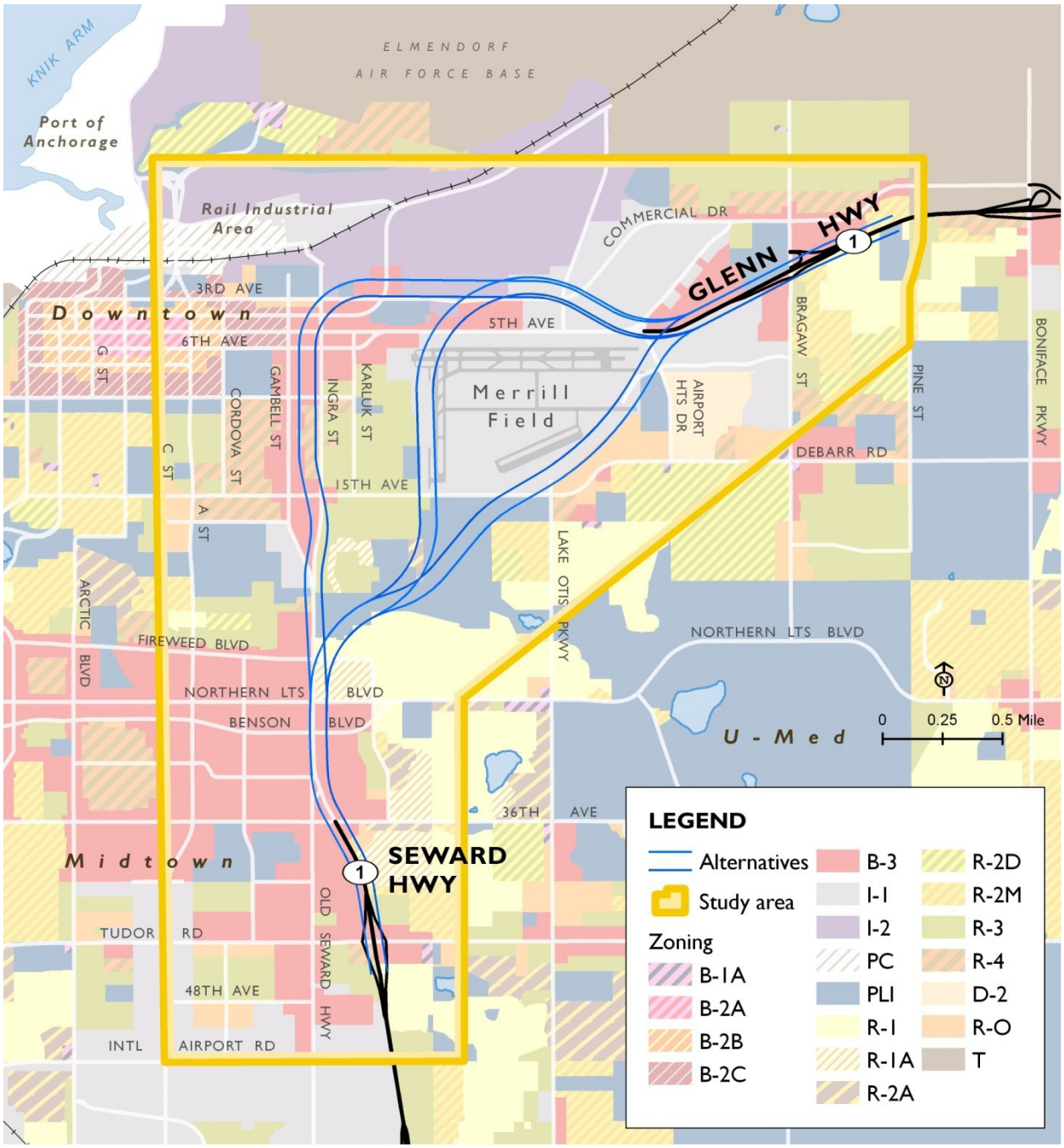
Title 21 Zoning Designation	Zoning Description	Study Area		Anchorage Bowl	
		Acres	%	Acres	%
B-1A	Local and Neighborhood Business	5.3	0.1%	113.2	0.2%
B-2A	Central Business Core	13.1	0.3%	41.7	0.1%
B-2B	Central Business Intermediate	36.3	0.7%	98.5	0.1%
B-2C	Central Business Periphery	64.7	1.3%	146.7	0.2%
B-3	General Business	988.0	20.2%	2,817.2	3.9%
D-2	Residential Development	67.2	1.4%	67.2	0.1%
I-1	Light Industrial	879.7	18.0%	3,324.7	4.6%
I-2	Heavy Industrial	474.8	9.7%	1,479.3	2.1%
R-1	Single Family Residential	417.9	8.6%	6,248.1	8.7%
R-1A	Single Family Residential	105.3	2.2%	4,174.8	5.8%
R-2A	Two Family Residential	30.0	0.6%	2,127.2	3.0%
R-2D	Two Family Residential	121.5	2.5%	562.5	0.8%
R-2M	Multiple Family Residential	153.3	3.1%	3,710.0	5.2%
R-3	Multiple Family Residential	530.1	10.9%	3,084.6	4.3%
R-4	Multiple Family Residential	187.7	3.8%	577.9	0.8%
R-O	Residential Office	144.5	3.0%	419.6	0.6%
PC	Planned Community	63.3	1.3%	529.1	0.7%
PLI	Public Lands and Institutions	591.2	12.1%	17,582.7	24.5%

Title 21 Zoning Designation	Zoning Description	Study Area		Anchorage Bowl	
		Acres	%	Acres	%
T	Transition	11.4	0.2%	7,909.5	11.0%
Other*		0.0	0.0%	16,718.6	23.3%
Total		4,885.3	100%	71,733.1	100%

**Other includes, AF, B-1B. B-4, MC, MI, R-10, R-5, R-6, R-7. R-8, R-9, and W.*

Source: MOA GIS, computed by HDR.

Figure 5-4. Study Area Zoning Designations



Commercial Zones

The B-1A district is intended for local and neighborhood businesses that serve the daily needs of nearby neighborhoods. In the study area, approximately 0.1 percent (5.3 acres) is zoned B-1A compared to 0.2 percent (113.2 acres) of the Anchorage Bowl.

The B-2A, B-2B, and B-2C zoning districts apply to central business districts. B-2A is for the core employment areas to create a concentration of facilities and for the development of ground-level

pedestrian-oriented uses. B-2B is intended to create financial uses, offices, and hotels in the area immediately surrounding the central business district (CBD) core. B-2C is similar to B-2B, except it is to create these areas at the periphery of the CBD. The B-2A, B-2B, and B-2C districts are approximately 0.3 percent (13.1 acres), 0.7 percent (36.3 acres), and 1.3 percent (64.7 acres) of the study area, respectively. In the Anchorage Bowl, these zoning districts comprise 0.1 percent (41.7 acres), 0.1 percent (98.5 acres), and 0.2 percent (146.7 acres), respectively.

The B-3 district is for general commercial uses in areas exposed to high traffic volumes. Approximately 20.2 percent (988.0 acres) of the study area is zoned B-3, compared to only 3.9 percent (2,817.2 acres) of the Anchorage Bowl. Most of the commercial property in the Anchorage Bowl is zoned B-3, but it should be noted that residential development is also allowed in a B-3 district.

Industrial Zones

Approximately 18 percent (879.7 acres) of the study area is zoned I-1, which is for urban and suburban light manufacturing, processing, storage, wholesaling, and distribution operations. A limited amount of commercial use is allowed in an I-1 district. Residential uses are not permitted except as an accessory use in the same building as the principal use. Approximately 4.6 percent (3,324.7 acres) of the Anchorage Bowl is zoned I-1.

The I-2 zoning district is the heavy industrial district for heavy manufacturing, storage, major shipping terminals, and similar uses. Approximately 9.7 percent (474.8 acres) of the study area is zoned I-2 compared to 2.1 percent (1,479.3 acres) of the Anchorage Bowl.

Residential Zones

R-1 and R-1A are both single-family residential districts. They have the same use restrictions, but the R-1A district has a higher lot width and area requirement. Approximately 8.6 percent (417.9 acres) of the study area is zoned R-1, while 2.2 percent (105.3 acres) of the study area is R-1A. In the Anchorage Bowl, approximately 8.7 percent (6,248.1 acres) is R-1 and 5.8 percent (4,174.8 acres) is R-1A.

The R-2A and R-2D districts are for low-density urban and suburban two-family residential areas. The use restrictions for these districts are the same but the required lot width and area is greater in the R-2A district. Approximately 0.6 percent (30.0 acres) of the study area is zoned R-2A, compared to 3.0 percent (2,127.2 acres) of the Anchorage Bowl. Approximately 2.5 percent (121.5 acres) of the study area is zoned R-2D, compared to 0.8 percent (562.5 acres) of the Anchorage Bowl. The R-2M district is for medium-density urban and suburban multiple-family areas. The allowable density varies depending on the minimum lot size. Approximately 3.1 percent (153.3 acres) of the study area is zoned R-2M compared to 5.2 percent (3,710.0 acres) of the Anchorage Bowl.

The R-3 zoning district is for urban and suburban single-family, two-family, and multi-family residential uses with medium population densities. Approximately 10.9 percent (530.1 acres) of the study area is zoned R-3, compared to approximately 4.3 percent (3,084.6 acres) of the Anchorage Bowl.

Approximately 3.8 percent (187.7 acres) of the study area is zoned R-4, which is for multi-family residential. The number of dwelling units is dependant of the lot area and width. Approximately 0.8 percent (577.9 acres) of the Anchorage Bowl is zoned R-4.The R-O district is the Residential-Office district, which includes “urban and suburban residential and professional office uses in an area undergoing a transition or in areas where commercial uses might be damaging to established residential neighborhoods. The R-O district also provides a mix of low- to medium-density residential uses with certain specified business, personal, and professional services that can function efficiently without generating large volumes of traffic.” Approximately 3.0 percent (144.5 acres) of the study area is zoned R-O, compared to 0.6 percent (419.6 acres) of the Anchorage Bowl.

Other Zones in Study Area

Approximately 1.3 percent (63.3 acres) of the study area is zoned PC (Planned Community), which is for planned communities such as the Ship Creek Planned Community area. Each PC district is governed by the ordinance that creates it. Districts may be residential or industrial in nature. Approximately 0.7 percent (529.1 acres) of the Anchorage Bowl is zoned PC.

The PLI district is for public lands and institutions. Approximately 12.1 percent (591.2 acres) of the study is zoned PLI, compared to 24.5 percent (17,582.7 acres) of the Anchorage Bowl.

Approximately 0.2 percent (11.4 acres) of the study area is zoned T (Transition District). The T designation is for areas that are not developing and are not expected to develop in the near future with any specific land-use types. Approximately 11.0 percent (7,909.5 acres) of the Anchorage Bowl is zoned T.

Zones Not in Study Area

Approximately 23.3 percent (16,718.6 acres) of the Anchorage Bowl has a zoning designation that does not occur within the study area. For that reason, these zoning designations will not be discussed. These zones are Antenna Farm (AF), Community Business (B-1B), Rural Business District (B-4), Marine Commercial (MC), Marine Industrial (MI), Rural Residential (R-5), Suburban Residential (R-6), Intermediate Rural Residential (R-7), Rural Residential (Large Lot) (R-8), Rural Residential (R-9), Residential Alpine/Slope (R-10), and Watershed (W).

Title 21 Rewrite

Title 21 of the Anchorage Municipal Code governs land use and development. The regulations address zoning, subdivision requirements, and development standards. Title 21 is being rewritten to modernize the code, to make it more useable and easier to understand, and to implement recently adopted plans and policies. Title 21 consists of 14 chapters, 2 of which (Chapters 21.09 Girdwood and 21.11 Signs) are currently in effect. Some of the remaining chapters have been adopted by the Anchorage Assembly but will not take effect until all chapters have been adopted due to their interrelated nature. Currently, the goal of the MOA Planning Department is to complete the rewrite process by the end of 2010. No area-wide rezones are expected as part of the Title 21 rewrite process.

5.4 BIBLIOGRAPHY

[AMATS] Anchorage Metropolitan Area Transportation Solutions. 2007. *Anchorage Pedestrian Plan.* Published online at: http://www.muni.org/Departments/traffic/AMATS/Documents/PedestrianPlan_Web.pdf.

Davis, Tom. 2010. Email message from Tom Davis (Municipality of Anchorage) to Laurie Cummings (HDR Alaska, Inc.). April 23, 2010. Record on file with HDR Alaska, Inc.

[DCED] Alaska Department of Community and Economic Development. 2003. *Alaska Planning Commission Handbook* . Published online at: http://www.alaskaplanning.org/documents/Planning_Whole_Book.pdf).

[MOA] Municipality of Anchorage. 2000. *MRI Master Plan*. Published online at: http://www.muni.org/Departments/merrill_field/Pages/MasterPlan.aspx.

———. 2006. *Anchorage Bowl Park, Natural Resource and Recreation Facility Plan.* Published online at: http://www.muni.org/Departments/Planning/Publications/ParkPlan_2006/Parks_MP_2006.pdf.

———. 2007a. *Anchorage Downtown Comprehensive Plan.* Published online at: http://www.muni.org/Departments/Planning/Publications/Pages/CBD_CompPlan_Final07.aspx.

———. 2007b. *Anchorage Coastal Management Plan.* Published online at: http://www.muni.org/Departments/Planning/Publications/Pages/ACMP.aspx.

———. 2010. *Merrill Field General Information*. Published online at: http://www.muni.org/Departments/merrill_field/Pages/GeneralInformation.aspx.

Chapter 6: Social Environment
Affected Environment

Table of Contents

6.1 INTRODUCTION 1
- 6.1.1 Regulatory Setting 1
- 6.1.2 Study Area 1
- 6.1.3 Methodology 3

6.2 AFFECTED ENVIRONMENT 3
- 6.2.1 Existing Demographics 3
  - Population 3
  - Age Characteristics 4
  - Gender Characteristics 5
  - Race/Ethnicity Characteristics 5
  - Education Characteristics 7
  - Household Characteristics 7
  - Income and Employment Characteristics 8
- 6.2.2 Existing Housing 9
  - General Characteristics 9
  - Group Quarters 10
- 6.2.3 Community Cohesion 11
- 6.2.4 Travel Patterns and Accessibility 11
  - Mode of Transportation to Work 11
  - Vehicle Availability 11
  - Public Transit 12
  - Mobility Disabled 12
- 6.2.5 Community Facilities and Public Services 13
  - Educational Facilities 14
  - Child Care Facilities 15
  - Religious Facilities/Places of Worship 16
  - Other Community Facilities 16
  - Public Safety 17
  - Health Care Services 17
- 6.2.6 Recreational Resources 18
- 6.2.7 Public Health 18

6.3 BIBLIOGRAPHY 20

List of Tables

Table 6-1. Population 4
Table 6-2. Age Characteristics 4
Table 6-3. Race/Ethnicity Characteristics 6
Table 6-4. Household Characteristics, 2009 8
Table 6-5. Income and Employment Characteristics 9
Table 6-6. Housing Characteristics 9
Table 6-7. Vehicle Availability, 2000 12
Table 6-8. Mobility Disabled, 2000 13
Table 6-9. School Summary 15

List of Figures

Figure 6-1. Social Environment and Community Impact Assessment Study Areas.....2
Figure 6-2. Age Characteristics by Block Group.....5
Figure 6-3. Minority Population by Block Group.....5
Figure 6-4. Group Quarters by Block Group.....10
Figure 6-5. Percent of Households without Cars by Block Group.....12
Figure 6-6. Percent of Population Age 16 or Older with a Mobility Disability by Block Group.....12
Figure 6-7. Community Facilities and Public Services.....14

6.1 INTRODUCTION

The term "social environment" describes a range of issues that affect communities and the people living within them. This chapter provides background information and impact analysis for a variety of topics including population, housing, community facilities, public safety, and recreational resources. This chapter will also identify the project's potential benefits to the social environment.

Early in the project it was determined that due to the urbanized nature of the project area, there was a likelihood of affecting existing communities. Because of concerns regarding impacts to these communities, a Community Impact Assessment (CIA) technical report, which provides more refined analysis and additional detail, was prepared. For more information, please see *Socio-Economics Methodology*, the *Community Impact Assessment* report, the *Social and Economic Affected Environment Data Summary*, and Chapter 9, Environmental Justice.

6.1.1 Regulatory Setting

This section discusses the applicable federal, state, and local laws and regulations that govern the social environment. FHWA Technical Advisory T 6640.8A, "Guidance for Preparing and Processing Environmental and Section 4(f) Documents," dated October 24, 1987, along with FHWA's *Community Impact Assessment: A Quick Reference for Transportation*, were used to guide the analysis in this chapter. According to FHWA, an analysis of the social environment needs to discuss:

- changes in the neighborhoods or community cohesion for various social groups as a result of the proposed action;
- changes in travel patterns and accessibility (e.g., vehicular, commuter, bicycle, or pedestrian);
- impacts on school districts, recreation areas, churches, businesses, and police and fire protection services (including both direct impacts to these entities and indirect impacts of displacing households and businesses);
- impacts of alternatives on highway and traffic safety[1] and on overall public safety; and
- social groups especially benefited or harmed by the proposed project, particularly disproportionate impacts to elderly, handicapped, transit-dependent, and minority and ethnic groups[2].

6.1.2 Study Area

Social data and analysis in this chapter are presented at a number of different geographic levels, from the most refined (closest to the proposed alternatives), to broader levels useful for indirect and cumulative affects and for comparison and context.

The social environment study area is defined as all census block groups within 0.5 miles of either side of the project alternatives (see Figure 6-1). A block group is the smallest geographic unit for which data were available. The study area encompasses the residents, buildings, and communities that are potentially directly impacted by the proposed project.

This study area is a refinement of the CIA study area (see Figure 6-1). The CIA study area includes all 12 community councils[3] within 0.5 miles of a project alternative. This broader study area is useful in providing context for the neighborhoods affected. Data are also presented for the Anchorage Bowl, the

[1] In this EIS, highway and traffic safety is addressed in Chapter 3, Traffic and Transportation.

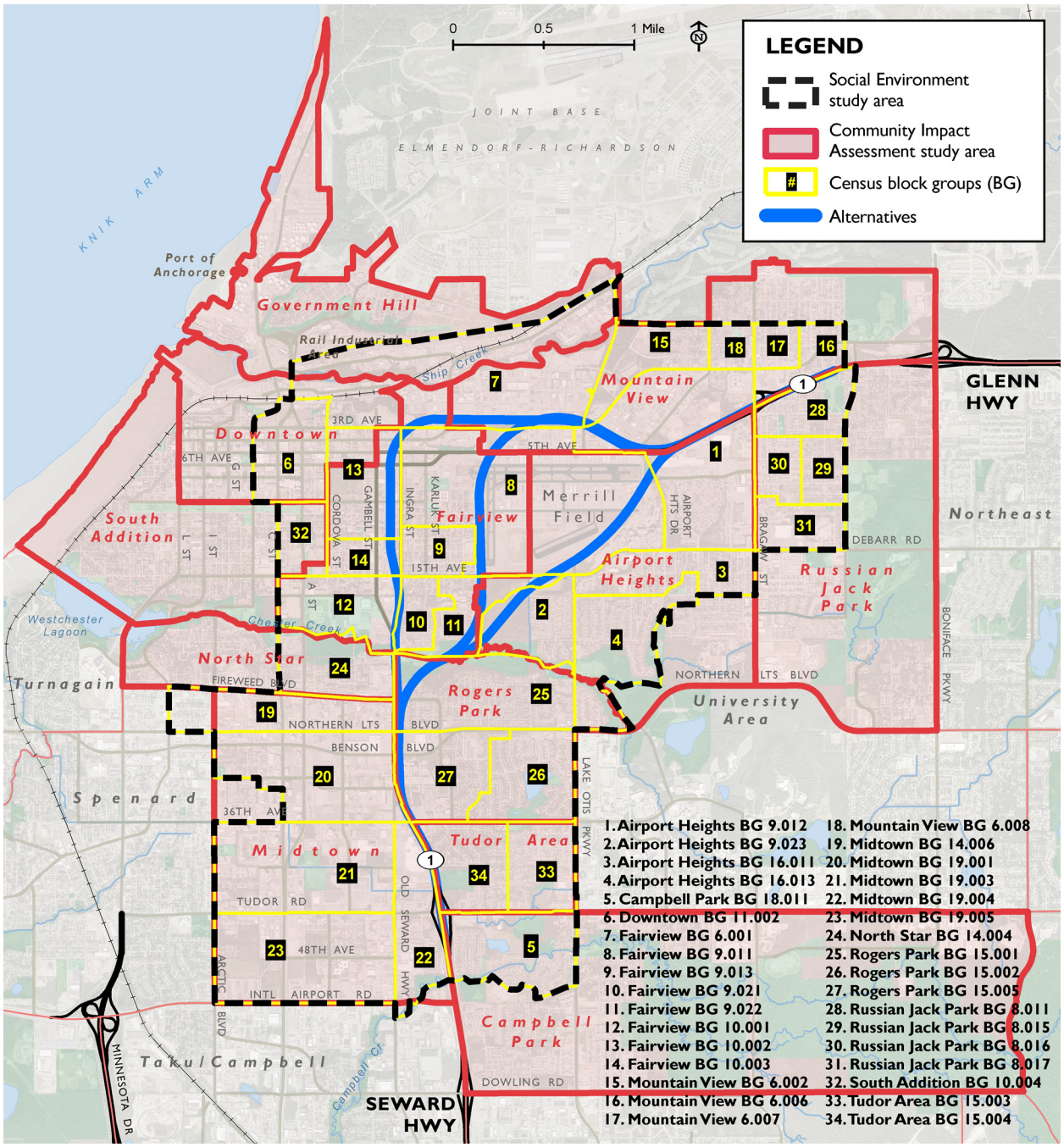
[2] Additional information about impacts to minority groups is provided in Chapter 9, Environmental Justice.

[3] Anchorage Municipal Code 2.40.030 defines community councils as "nonprofit, voluntary, self-governing associations composed of residents, property owners, business owners, and representatives from nonprofit associations and other entities located within geographical areas designated as districts by the Assembly" (MOA 2005).

Municipality of Anchorage (MOA)[4], and the Matanuska-Susitna Borough (MSB) to provide context and comparison of the impacts and to identify indirect impacts.

For more information on the study area and additional details on the social environment, please see the *Community Impact Assessment* report and the *Community Council Assessments* (CIA Appendices A-L).

Figure 6-1. Social Environment and Community Impact Assessment Study Areas



[4] Anchorage Bowl refers to the portion of the Municipality that is bounded by Joint Base Elmendorf-Richardson, Chugach State Park, and Cook Inlet.

6.1.3 Methodology

Data were collected from a wide array of primary and secondary data sources, including:

- U.S. Census Bureau
- Research and Analysis Section of the Alaska Department of Labor and Workforce Development
- Community- and borough-level data from the Community Database of the Alaska Department of Commerce, Community and Economic Development
- ESRI (a geographic information systems [GIS] firm that provides demographics data)
- Property Appraisal Division of the MOA
- Interviews, GIS data, and numerous planning documents prepared by or for the MOA

Much of the data analysis in the chapter, particularly the population and demographic information, is based on ESRI's *Demographic Update* data (ESRI 2009). Data were collected for each census block and presented within the social environment study area. Demographic information was also collected for the CIA study area, Anchorage Bowl, MOA, and MSB. These characteristics were used to evaluate how the characteristics of the study area are similar to or different from those of the larger community. For the purposes of this analysis, specific block groups (BG) are identified by a shorthand label that includes the community council and census tract in which the block group occurs. For example, block group 7 in census tract 6, which is located in the area of the Mountain View Community Council, is referred to as Mountain View BG 6.007. More information about the resource identification methods can be found in the *Social and Economic Affected Environment Data Summary*.

6.2 AFFECTED ENVIRONMENT

6.2.1 Existing Demographics

The term "demographics" refers to the social characteristics of a human population. This section describes geographic and, in some cases, tabular trends of selected demographic variables in the affected area. The characteristics described include population size, age, gender, race/ethnicity, education level, household composition, and income and employment status. More information about the existing demographics of the study area can be found in the *Social and Economic Affected Environment Data Summary*.

Population

The MOA and MSB were the fastest-growing regions in Alaska from 2000 to 2009, with the MOA growing by more than 10 percent, and the MSB growing by more than 42 percent (Mercer and Williams 2010). The population of the study area[5], however, has grown at a slower rate (5.1 percent). Within the MOA, most people (82 percent) live in the Anchorage Bowl. The study area contains about 15 percent of the Anchorage Bowl's population of 237,916 (Table 6-1).

[5] The term "study area" refers to the Social Environment study area unless otherwise noted.

Table 6-1. Population

Area	2000 Population	2009 Population	Change (%)
SE Study Area	33,359	35,152	5.1%
CIA Study Area	59,032	62,985	6.7%
Anchorage Bowl	216,111	237,916	10.1%
MOA	260,283	287,460	10.4%
MSB	59,322	87,583	47.6%

Source: ESRI (2009); U.S. Census 2000

Age Characteristics

The age characteristics in the study area are similar to those of the Anchorage Bowl and the MOA. As shown in Table 6-2, approximately one-quarter of the population of each area is comprised of people under the age of 18, approximately two-thirds are between the ages and 18 and 64, and the remaining population is 65 and over. The median age in the SE and CIA study areas is similar to that in the Anchorage Bowl and the MOA.

Table 6-2. Age Characteristics

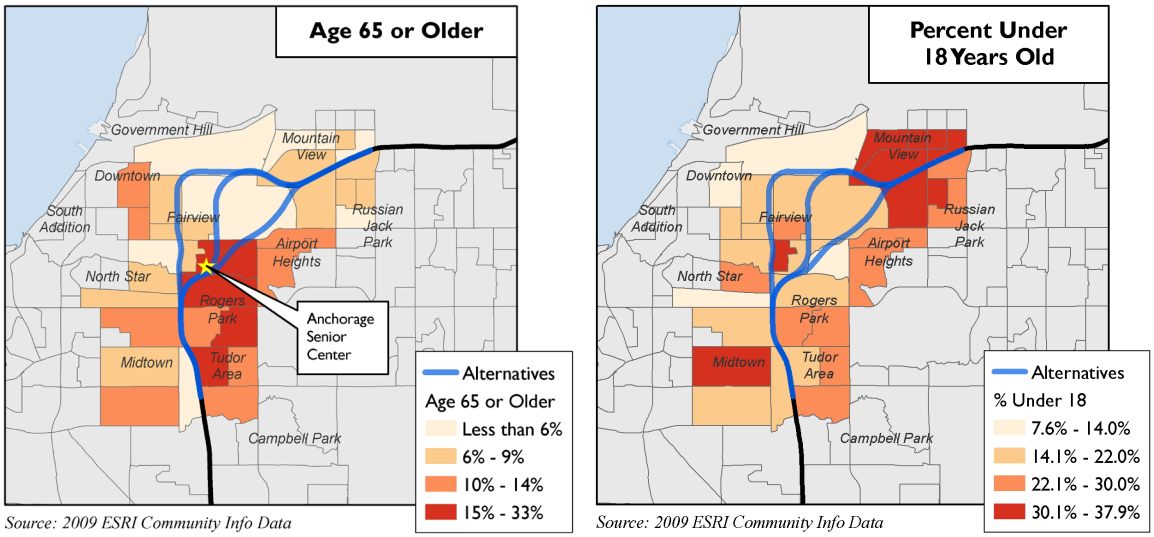
Area	Under 18 Years	18-64 Years	65 Years and Over	Median Age
SE Study Area	24%	66%	10%	34
CIA Study Area	24%	66%	10%	33
Anchorage Bowl	25%	66%	9%	34
MOA	26%	67%	8%	34
MSB	28%	65%	7%	35

Source: ESRI (2009); U.S. Census Bureau, 2008 American Community Survey

Within the study area, there is considerable age diversity (Figure 6-2). In Fairview, in the area roughly bounded by Chester Creek, Karluk Street, 15th Avenue, and Orca Place near the Anchorage Senior Center (Fairview BG 9.022), more than a quarter of the population is 65 and over. It is likely that some residents choose to live near the Anchorage Senior Activities Center, a non-profit facility that provides a gathering place for more than 2,000 members 55 years old and over, with opportunities for recreation, education, and socializing. In Rogers Park between Northern Lights Boulevard, Seward Highway, Chester Creek, and Lake Otis Parkway (Rogers Park BG 15.001), there is another large population of seniors. This area exhibits a high percentage of long-time residents and low transiency. Some neighborhoods near the project alternatives have a comparatively high number of young people. For example, more than a third of the population in Mountain View is less than 18 years old. This is likely due to the relatively high concentration of minority populations[6] in those areas, which according to Census statistics tend to have larger families with more children—bringing the average age down.

[6] Minority population is defined as the sum total of the following populations: Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, Two or More Races, White Hispanic, and Other Hispanic.

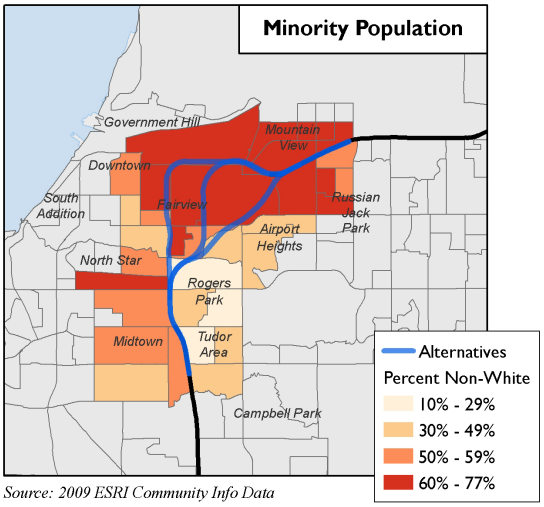
Figure 6-2. Age Characteristics by Block Group



Gender Characteristics

The gender characteristics of the study area population are similar to those of the Anchorage Bowl. There are, however, a number of block groups in the study area with a higher proportion of males compared to other block groups in the area. The higher proportion of males (73 percent) in the Ship Creek Valley area near the Brother Francis Shelter (Fairview BG 6.001, which is roughly bounded by Reeve Boulevard, 3rd Avenue, and A Street, to just north of the Alaska Railroad Corporation [ARRC] tracks) (Figure 6-3), is likely because most clients in need of social services and temporary, emergency housing tend to be male, according to the Census. In 2008, 80 percent of the shelter's clients were male (MOA 2009a). The presence of the Anchorage Correctional Complex is likely the reason why Fairview east of Ingra Street (Fairview BG 9.011) has a higher percentage (68 percent) of males. The majority of offenders at the Anchorage Correctional Complex are also male (ADOC 2009). Downtown between 9th Avenue, F Street, the ARRC tracks, and Cordova Street (Downtown BG 11.002) (63 percent) is the location of a number of community residential centers ("halfway houses") for offenders on furlough and misdemeanants completing relatively short sentences; typically, based on offender statistics, these facilities house a high percentage of males (UAA 2009).

Figure 6-3. Minority Population by Block Group



Race/Ethnicity Characteristics

The study area has a much higher percentage of minority residents (52 percent) than the Anchorage Bowl as a whole (38 percent; see Table 6-3). The study area accounts for 15 percent of the total Anchorage Bowl population, but about 20 percent of its minority population, with particularly large concentrations in Mountain View (72 percent) and Fairview (63 percent). Other community councils in the study area also have concentrations of minority residents in certain block groups, such as Airport Heights between the Glenn Highway and Debarr Road (Airport Heights BG 9.012), the

southwest corner of Rogers Park (BG 15.005), and South Addition between 9th and 15th avenues (South Addition BG 10.004).

For most racial/ethnic groups, the study area has a composition similar to that of the Anchorage Bowl, but a noticeably higher percentage of Alaska Natives. Alaska Natives are the largest minority group in the study area and the Anchorage Bowl, and their numbers are growing. While only about 8 percent of Anchorage's population is Alaska Native (Williams 2010), about 23 percent of the state's 122,000 Alaska Natives live in the MOA. Many of the Alaska Natives who moved to the MOA are young adults who left home to pursue a job or post-secondary training (Williams 2010).

Table 6-3. Race/Ethnicity Characteristics

Area	White	Black or African American	American Indian or Alaska Native	Asian	Native Hawaiian or Pacific Islander	Other Race	Two or More Races	Hispanic	Total Minority[7]
SE Study Area	51%	8%	15%	8%	2%	5%	11%	11%	52%
CIA Study Area	54%	7%	13%	8%	2%	5%	10	11%	50%
Anchorage Bowl	65%	5%	9%	7%	1%	3%	9%	8%	38%
MOA	68%	5%	8%	6%	<1%	3%	8%	8%	35%
MSB	84%	<1%	6%	<1%	<1%	1%	7%	4%	17%

Source: ESRI (2009).

Anchorage is becoming more racially/ethnically diverse, with fast growth among minorities and slower growth in the White population (ISER 2006). Over the past two decades a growing number of immigrants have been attracted to Anchorage by job opportunities and low taxes (Goldsmith et al. 2005). An additional draw could be that the state makes annual Permanent Fund dividend payments to qualified residents, regardless of whether they are citizens (Goldsmith et al. 2005). The most common birthplaces of recent immigrants are Samoa and other Pacific Islands, the Philippines, and Mexico (ISER 2006). According to the 2000 Census, the highest percentages of foreign-born residents are from the Philippines (14.6 percent), Korea (11.4 percent), Mexico (9.3 percent), Laos (9.1 percent), and the Dominican Republic (7.8 percent). This ethnic diversity is concentrated among younger residents (Goldsmith 2006). The ethnicity of students enrolled in the Anchorage School District (ASD) supports this trend. Minorities make up about 27 percent of Anchorage's population, but minority children are now the majority in ASD schools, growing from 20 percent in 1980, 26 percent in 1990, 44 percent in 2004, and 51 percent in 2009 (Goldsmith et al. 2005; ASD 2010). For more information on minority and low-income populations, please see Chapter 9, Environmental Justice. (Note: The Environmental Justice chapter presents data only on minority and low-income populations from the MOA and the Environmental Justice study area.)

Another measure of ethnic diversity is the primary language spoken at home. The Census reports four general language categories: English, Spanish, Asian and Pacific Islander, and Other. In the study area, there is a slightly lower percentage of households (78.3 percent) that speak English as their primary language when compared to the Anchorage Bowl (81.9 percent). Based on the 2009 ASD's English Language Learners elementary school enrollment information, non-English speaking households in the

[7] Total minority is the sum total of the following populations: Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, Two or More Races, White Hispanic, and Other Hispanic.

study area are likely to be Hmong, Hispanic, Samoan, Filipino, Sudanese, and Alaska Native (ASD 2010d).

The Census also documents if a household is linguistically isolated from the community because there are no people over the age of 14 in that household who have a good command of the English language. In the study area, a higher percentage of households (5.3 percent) are linguistically isolated compared to the Anchorage Bowl (3.1 percent).

Education Characteristics

Education level is one indicator of the human resources available in a community and the level of labor force preparation. In general, income increases with advancing educational attainment. The study area has a higher percentage of residents (15 percent) who did not complete high school than the Anchorage Bowl (9 percent). Mountain View and Fairview residents, in particular, have less formal education than Anchorage Bowl residents overall. A fifth or more of residents 25 years and older in these neighborhoods did not complete high school, compared to 9 percent in the Anchorage Bowl. South Addition and Rogers Park residents have an especially high level of education compared to the Anchorage Bowl as a whole.

Household Characteristics

The U.S. Census Bureau defines a family household as a householder and one or more people living in the same household who are related to the householder by birth, marriage, or adoption. The study area has a lower percentage (52 percent) of family households than the Anchorage Bowl (66 percent), but a similar average family size. The percentage of family households was lowest in Downtown between 9th Avenue, F Street, the ARRC tracks, and Cordova Street (Downtown BG 11.002) (16.9 percent) and highest (80.9 percent) in Rogers Park in the area roughly bounded by 36th Avenue, Wentworth Street, Northern Lights Boulevard, and Lake Otis Parkway (Rogers Park BG 15.002). The average number of persons per household in the study area is approximately 2.4, compared to 2.6 in the Anchorage Bowl. This is expected given the lower percentage of family households in the study area. According to the 2000 Census, the study area has a higher percentage (26.0 percent) of single-parent households than the Anchorage Bowl (18.1 percent).

Table 6-4. Household Characteristics, 2009

Area	Total Households	Average Household Size	Family Households	Average Family Household Size
SE Study Area	13,375	2.4	7,228 (52%)	3.19
CIA Study Area	25,376	2.3	13,103 (51%)	3.14
Anchorage Bowl	88,998	2.6	56, 497 (63%)	3.18
MOA	104,446	2.6	68,983 (66%)	3.21
MSB	30,734	2.82	22,078 (71.8%)	3.28

Source: ESRI (2009); U.S. Census Bureau, 2008 American Community Survey

Income and Employment Characteristics

Median household income in the Anchorage Bowl is high in comparison to many other U.S. cities; in 2008, the median household income was $73,632 (Table 6-5). Household income remains comparatively high because average wages are higher; non-wage income is growing, and the share of working adults—especially women—is larger than it is nationwide (Goldsmith et al. 2005). In the study area, residents appear to be less well off; the median household income is more than $20,000 less per household. However, within the study area, there is a wide range of median household incomes by census block groups, from $22,563 in Fairview in the area surrounding the Anchorage Senior Center (Fairview BG 9.022) to $131,399 in the Rogers Park area roughly bounded by 36th Avenue, Wentworth Street, Northern Lights Boulevard, and Lake Otis Parkway (Rogers Park BG 15.002).

Because the study area has a wide range of median household incomes, it is not surprising that the unemployment rate also has a wide range (from 3.1 percent in Russian Jack Park near the Glenn Highway (Russian Jack BG 8.015) to 42.1 percent in Downtown between 9th Avenue, F Street, the ARRC tracks, and Cordova Street (Downtown BG 11.002).

In general, the Fairview and Mountain View community councils have some of the lowest median household incomes and highest unemployment rates in the Anchorage Bowl. Both neighborhoods are attractive to lower income households, especially new immigrants, first-time homeowners, special needs individuals, and tenants seeking low-cost rentals (Bell 1999; czb 2004; Fairview Community Council 2009).

Table 6-5. Income and Employment Characteristics

Area	Unemployment Rate	Median Household Income
SE Study Area	12%	$50,199
CIA Study Area	11%	$51,815
Anchorage Bowl	8%	$73,632
MOA	7%	$75,637
MSB	9%	$72,966

Source: ESRI (2009); U.S. Census Bureau, 2008 American Community Survey; Alaska Department of Labor and Workforce Development (2010b). Median household income figures are weighted averages.

For more information on low-income populations, please see Chapter 9, Environmental Justice.

6.2.2 Existing Housing

This section describes housing characteristics in the study area, including housing availability and affordability, housing tenure, and value of housing units. In addition, institutional and noninstitutional group housing in the study area are discussed.

General Characteristics

The MOA is Alaska's largest population center and housing market. In 2008, the Anchorage Bowl had a total of 94,402 housing units (Table 6-6), which the U.S. Census Bureau defines as a house, apartment, mobile home or trailer, or a group of rooms or single room occupied as a separate living quarters. Approximately 15.7 percent of the housing units in the Anchorage Bowl are in the study area. Approximately 10 percent of the housing units in the study area are vacant compared to only 6 percent of units in the Anchorage Bowl. Vacant units are typically for sale or rent, indicating that there is a slightly lower demand for housing in the study area.

Table 6-6. Housing Characteristics

Area	Total Housing Units	Owner Occupied Housing Units	Renter Occupied Housing Units	Vacant Housing Units	Average Assessed Value of Housing Unit
SE Study Area	14,790	36%	54%	10%	$142,420
CIA Study Area	27,702	35%	56%	8%	$147,154
Anchorage Bowl	94,402	55%	39%	6%	$211,638
MOA	111,136	56%	38%	6%	$217,209
MSB	39,751	60%	17%	23%	N/A

Source: ESRI (2009); U.S. Census Bureau, 2008 American Community Survey; Municipality of Anchorage (2010)

Note: Percentages may not equal 100% due to rounding.

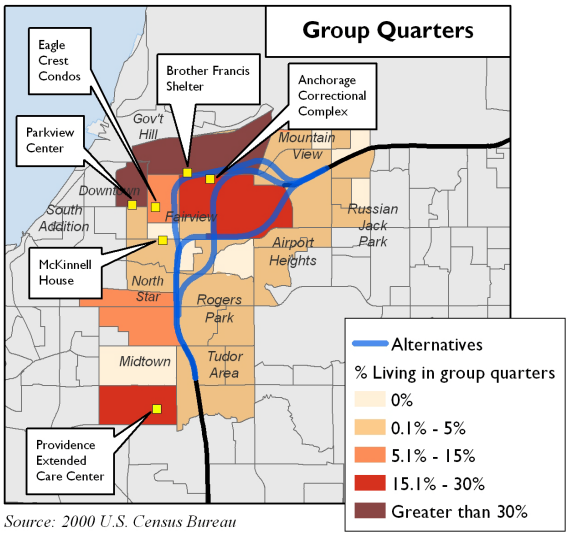
Housing in the study area is a mix of different types, including single-family detached homes, zero lot lines, townhomes, condominiums, apartments, and mobile homes. Fairview, Mountain View, and

Midtown have the highest numbers of apartment units, representing more than 70 percent of the housing stock in these community councils (MOA 2009b).

Alaska has high housing costs for both rental and owner-occupied housing, and Anchorage is no exception (Schultz 2009). The average sales price of residential properties in the MOA in 2009 was 72 percent higher than it was in 2000 (Alaska Multiple Listing Service 2010). Home prices are expected to rise by an average of 3.8 percent a year over the next 10 years (Mullins 2009). In the study area, the lowest-cost areas for housing units are Mountain View, Midtown, and Fairview. In these community councils, the average assessed value per residential unit is less than $100,000. The Mountain View housing market, in particular, is currently geared toward low to moderate income residents. Housing units in sections of Midtown and Airport Heights also have a comparatively low average value, which is likely due to the presence of a relatively large number of mobile homes. Recently, many mobile homes in Midtown have been replaced with new manufactured or modular cottages or with condominiums to increase the potential for individual lot or unit ownership (HDR 2007). The highest-cost neighborhoods (the average assessed value per residential unit is more than $240,000) in the study area include Rogers Park, South Addition, and Tudor Area, with the highest values found in Rogers Park (Rogers Park BG 15.002 and BG 15.001) and in the Tudor Area west of MacInnes Street (Tudor Area BG 15.004).

In the study area, more than half the housing units are renter-occupied, compared to only 39 percent in the Anchorage Bowl. Some neighborhoods near the project corridor, including Mountain View, Downtown, Fairview, and Midtown, have the densest concentrations of rental units in the MOA. Because the majority of available units are rentals, neighborhoods with the highest percentage of rental housing also have more vacancies. Pockets of rental housing also occur in neighborhoods that otherwise have relatively high levels of owner-occupied housing. For example, South Addition between 9th and 15th avenues (South Addition BG 10.004) includes a large number of multi-family units. Rogers Park, one of the oldest and most established neighborhoods in the MOA, has a high concentration of owner-occupied housing. Rents within the study area can also vary greatly. In the 2000 Census, the median contract rent varied from $398 per month in Fairview near the Anchorage Senior Center (Fairview BG 9.022) to $1,258 in Rogers Park between Northern Lights Boulevard and Chester Creek (Rogers Park BG 15.001). For more information on housing, please see Chapter 7, Acquisitions and Relocations.

Figure 6-4. Group Quarters by Block Group



Source: 2000 U.S. Census Bureau

Group Quarters

The definition of "group quarters" for the U.S. Census Bureau's 2008 American Community Survey is a place where people live or stay, in a group living arrangement that is owned or managed by an entity or organization providing housing and/or services for the residents. These services may include custodial or medical care as well as other types of assistance, and residency is commonly restricted to those receiving these services.

A larger percentage (8.8 percent) of study area residents live in group quarters compared to the Anchorage Bowl (2.6 percent), particularly in the Downtown area, probably because of the presence of a number of boarding houses and halfway houses in the neighborhood (Figure 6-4). Other group housing facilities in the study area include Anchorage Correctional Complex, Parkview Center, Brother Francis Shelter, Eagle Crest Condos, McKinnell House, and Providence Extended Care Center, the largest long-term care facility in Alaska.

6.2.3 Community Cohesion

The term "community cohesion" refers to the degree to which residents have a sense of belonging to their community. What makes a community cohesive can vary, but some indicators include length of residence, percentage of owner-occupied housing, percentage of single-family detached housing, percentage of family households, interaction among neighbors, racial homogeneity, participation in local organizations and community activities, and elderly populations. Some community councils, such as Rogers Park, Tudor, and South Addition, tend to have values above the Anchorage Bowl average for these indicators and appear to have higher levels of community cohesion. Other community councils, such as Midtown and North Star, have values below the Anchorage Bowl average and potentially have low levels of community cohesion. More information about community cohesion can be found in the *Community Impact Assessment*.

6.2.4 Travel Patterns and Accessibility

Social impact analysis guidance from FHWA requires an examination of changes in travel patterns and accessibility (e.g., vehicular, commuter, bicycle, or pedestrian). This section describes the affected environment related to travel patterns and accessibility. More information on the transportation problems to be solved by the project can be found in Chapter 2, Purpose and Need. Additional information on transportation environment and impacts can be found in Chapter 3, Traffic and Transportation, and information on bikes and pedestrians can be found in Chapter 12, Considerations Relating to Pedestrians and Bicyclists. Although those chapters have considerable background information on affected environment and changes to the transportation system, this chapter discusses the social effects of travel patterns and accessibility, particularly the effects on social groups that might be especially benefited or harmed by the proposed project, such as elderly, handicapped, transit-dependent, and minority and ethnic groups. According to the 1990 National Personal Transportation Survey, the average person will walk about 1,500 feet to a transit stop. All residential areas in the study area based on GIS analysis are within 1,500 feet of a transit stop.

Mode of Transportation to Work

According to the 2000 Census, study area residents are slightly more likely to use public transportation (4.4 percent) or walk (5.5 percent) as their mode of transportation to work than are residents of the Anchorage Bowl. Only 2.2 percent of Anchorage Bowl residents use public transportation, and 2.5 percent walk. A similar percentage of residents choose to bicycle (1.0 percent in the study area compared to 0.6 percent in the Anchorage Bowl). Study area residents also tend to have shorter commutes, with 46.9 percent of workers in the study area having a commute of less than 15 minutes, and 41.0 percent having a commute between 15 and 29 minutes. In the Anchorage Bowl, 37.4 percent of workers have a commute of less than 15 minutes and 50.3 percent have a commute between 15 and 29 minutes.

Vehicle Availability

The mode of transportation used by area residents is influenced by availability. Without a vehicle available, residents must rely on alternate modes such as public transit, taxis, walking, or bicycling for their transportation needs. As shown in Table 6-7, according to the 2000 U.S. Census, approximately 7.1 percent of occupied housing units in the Anchorage Bowl do not have a vehicle. Within the SE study area, approximately 15.0 percent of occupied housing units do not have a vehicle. Concentrations (more than 30 percent) of housing units without a vehicle occur in Downtown between 9th Avenue, F Street, the ARRC tracks, and Cordova Street (Downtown BG 11.002); in Fairview near the Anchorage Senior Center (Fairview BG 9.022); and in Midtown between Northern Lights Boulevard, Arctic Boulevard, Fireweed Lane, and the Seward Highway (Midtown BG14.006) (Figure 6-5).

Table 6-7. Vehicle Availability, 2000

Sub-Area	Total Occupied Housing Units	Owner-Occupied Housing Units with No Vehicles	Rental Housing Units with No Vehicles	Total Housing Units with No Vehicles	Percent of Housing Units with No Vehicles
SE Study Area	13,007	259	1,686	1,945	15.0
CIA Study Area	24,081	477	2,854	3,331	13.8
Anchorage Bowl	81,088	1,168	4,605	5,773	7.1
MOA	94,822	1,278	4,799	6,077	6.4
MSB	27,329	378	376	754	2.8

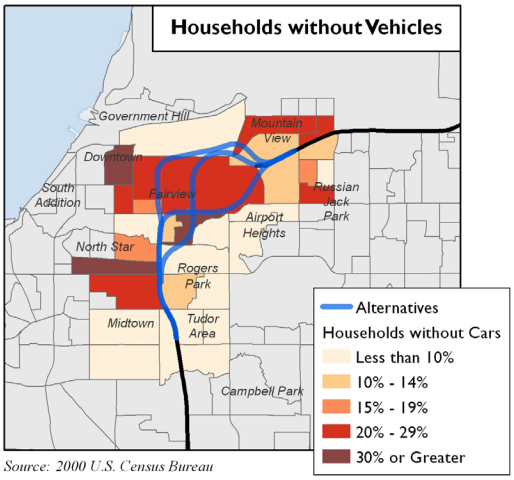
Source: U.S. Census Bureau, 2000 Census

Public Transit

People Mover, the public transit system, operates 13 bus routes and approximately 256 stops within the SE study area. Of these, four routes use or cross the existing corridor. In 2009, the Downtown Transit Center had an average of 2,898 riders per weekday. Within the SE study area, the 3 stops with the highest averages are (1) C Street and 7th Avenue, west side of the street (382 riders); (2) 6th Avenue and C Street, south side of the street (193 riders); and (3) A Street and 31st Avenue, east side of the street (159 riders). Most residents are within 1,500 feet of a transit stop.

In addition, Anchor Rides, a public transportation service for people unable to use People Mover, also operates within the study area. For more information about public transit, please see Chapter 3, Traffic and Transportation.

Figure 6-5. Percent of Households without Cars by Block Group

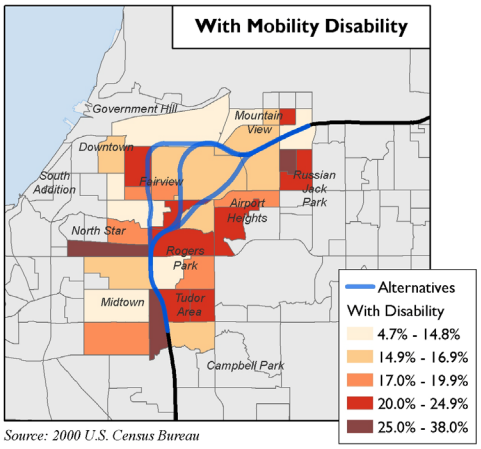


Source: 2000 U.S. Census Bureau

Mobility Disabled

This section presents information on statistics from the 2000 U.S. Census for people with disabilities residing in the study area (Figure 6-6). People could have more than one type of disability and the disabilities could limit a person's activities. Not all limitations affect a person's mobility. In addition, disabled children under 15 typically have a family member, guardian, or other adult to assist them when they travel. As a result, not all people listed in the Census as having one or more disabilities would have difficulty traveling. For the purposes of this analysis, people who are considered mobility disabled are those who have difficulties going outside the home alone and are 16 years of age or older. Table 6-8 shows the number of mobility-disabled individuals in the study areas, the Anchorage Bowl, the MOA, and the MSB. In 2000,

Figure 6-6. Percent of Population Age 16 or Older with a Mobility Disability by Block Group



Source: 2000 U.S. Census Bureau

approximately 6.7 percent of the SE study area and 6.4 percent of the CIA study area had mobility disabilities. This is higher than the percentage in the Anchorage Bowl (approximately 4.7 percent) or the MOA (approximately 3.8 percent).

Table 6-8. Mobility Disabled, 2000

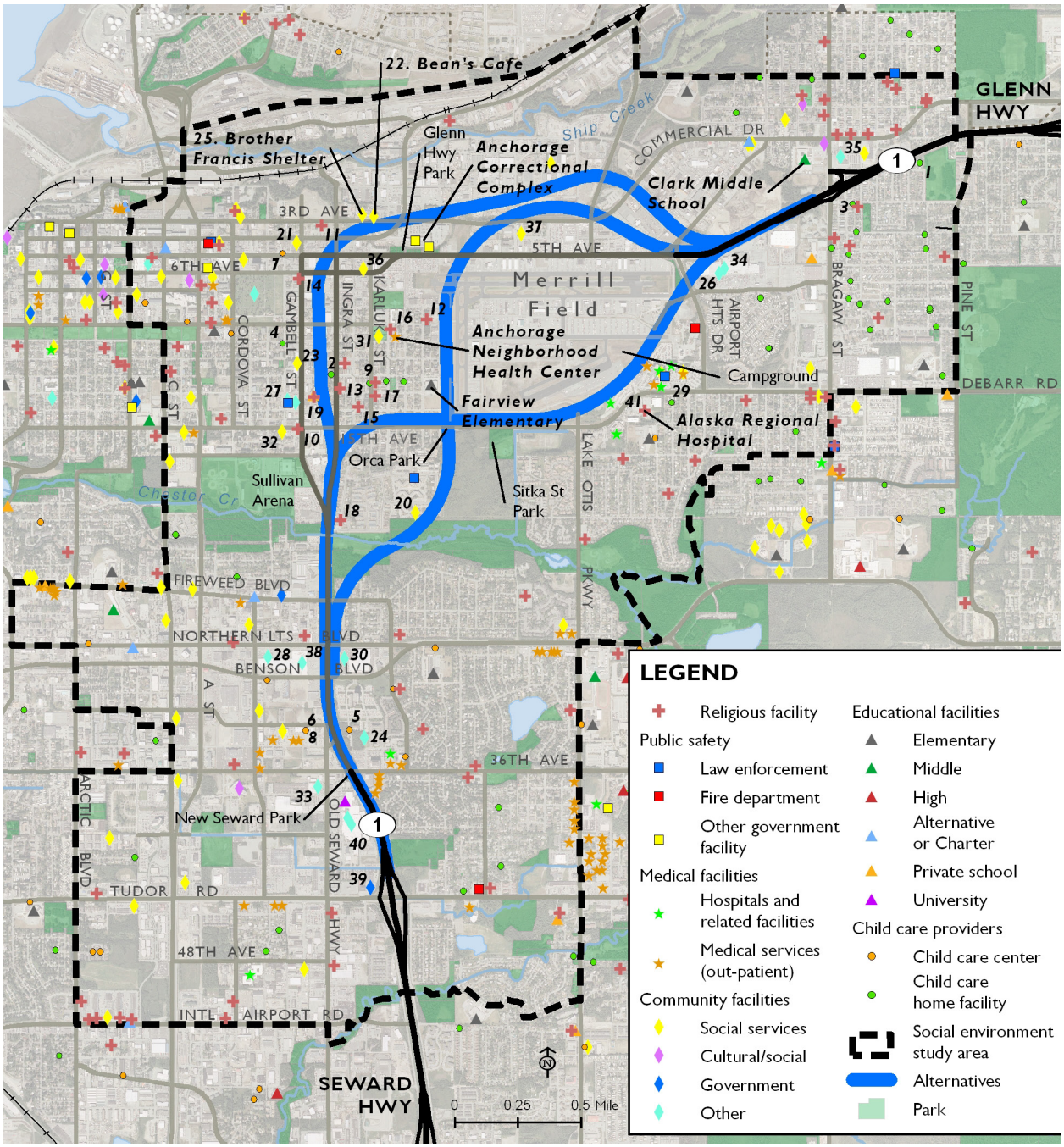
Area	Total Population (in 2000)	Population Age 16 years or Older with a Mobility Disability	Percent of Total Population with a Mobility Disability
SE Study Area	33,438	2,248	6.7
CIA Study Area	59,032	3,793	6.4
Anchorage Bowl	213,111	9,913	4.7
MOA	260,283	9,975	3.8
MSB	59,322	2,259	3.8

Source: U.S. Census Bureau, 2000 Census

6.2.5 Community Facilities and Public Services

Social impact analysis guidance from FHWA recommends describing impacts on important community facilities and services such as schools, recreation areas, churches, and police and fire protection services. Community facilities discussed in this section include educational, child care, religious institutions, and other community facilities (social services, cultural and social, governmental, and other types). Public services include public safety, health care, and recreation. Community facilities and public services may be publically operated or operated by for-profit or non-profit organizations. Figure 6-7 shows the community facilities in the study area. Numbered sites relate to potentially affected facilities identified in the sections below.

Figure 6-7. Community Facilities and Public Services



Source: HDR Alaska

Note: numbered sites relate to potentially affected facilities identified in the sections below.

Educational Facilities

Educational facilities are those that provide pre-school, primary, secondary, and post-secondary education to study area residents; they include elementary schools, middle schools, high schools, alternative or charter schools, private schools, and universities. These facilities are represented by triangles (▲) on Figure 6-7. The ASD provides public education for grades kindergarten through 12. Currently, ASD

enrollment is approximately 50,000 students, and it operates 101 schools (61 elementary schools, 10 middle schools, 9 high schools, 12 alternative schools, and 8 charter schools). There are 13 ASD schools in the study area. Only two of these schools (Fairview Elementary and Clark Middle) are potentially impacted by a project alternative. These schools are summarized in Table 6-9. More information about these schools can be found in the Fairview Community Council Assessment and the Mountain View Community Council Assessment (CIA Appendices D and G), respectively.

Table 6-9. School Summary

	Fairview Elementary	ASD 2008-2009	Clark Middle School	ASD 2006-2007
Grades	K-6	N/A	6-8	N/A
Students	417	48,837	803	49,230
Capacity	92.66%	N/A	136%	N/A
Attendance Rate	90.68%	92.76%	89.1%	92.5%
Retention Rate	0.23%	0.37%	6.5%	1.0
Transiency Rate	40.75%	26.05%	34.2%	26.8%
Economically Disadvantaged	100%	35.58%	100%	37.22%
Disabled	39	N/A	138	N/A
Limited English Proficiency	110	N/A	323	N/A
Ethnically Diverse*	89%	52%	87%	52%

**Ethnically Diverse from ASD 2009 and has different source year.*

.Source: Fairview - 2008-2009 Profile of Performance, Clark – 2006-2007 School Report Card

Note: Clark Middle School was closed for renovations for the 2007-2008 and 2008-2009 school years. As a result, the 2006-2007 data are the most recent.

There are four private schools within study area. Only one (True Vine Christian School in Fairview) is potentially impacted by a project alternative. True Vine Christian School is associated with True Vine Baptist Church; it provides educational services for grades K–12.

Child Care Facilities

There are 51 childcare facilities within the SE study area, represented by dots (●) on Figure 6-7. Of these, there are 8 child care providers (4 home day care facilities and 4 day care centers) that are closest to the project alternatives and could be affected.

Home Day Care Facilities

1. Baby Steps Family Child Care
2. Estrellas Magicas
3. Lil Debbie Day Care
4. Pammy's Play Place

Day Care Centers

5. BP Early Learning Center
6. Gan Yeladim Early Learning Center
7. Little Steps Preschool
8. RurAL CAP Child Development Center

More information about these facilities can be found in the respective community council assessments.

Religious Facilities/Places of Worship

There are 69 religious facilities in the study area, represented by plus signs (✚) on Figure 6-7). The following are those nearest to the proposed alternatives and could be affected:

9. New Antioch Church of God in Christ
10. Iglesia Cristiana Eben-Ezer Church of God
11. First Native Baptist Church
12. First Spanish Assemblies of God
13. Greater Friendship Baptist Church
14. Revival Assembly of God
15. Iglesia de Dios Bet-el (Bethel Hispanic Church of God)
16. Most Worshipful Prince Hall Grand Lodge of Alaska
17. Northern Lights Baptist Church
18. Shiloh Missionary Baptist Church
19. True Vine Ministries

More information about these facilities can be found in the respective community council assessments.

Other Community Facilities

In addition to the community facilities listed above, there are other facilities and places of interest important to study area residents. These facilities are represented by diamonds (◆) on Figure 6-7. The following are descriptions of other facility types considered:

- **Social services:** facilities that provide meals, food bank, counseling, employment, or other social services for low-income and homeless persons who live in the study area.
- **Cultural and social:** facilities that attract residents from the entire MOA as well as visitors, tourists, and others. Malls are included because they provide a social gathering point and are used for community events such as bib pick-up for local running events, immunization clinics, etc.
- **Government:** properties that are owned and controlled by local, state, and federal government entities.
- **Other:** facilities and places of interest that have been identified as important to the community but do not fall into one of the above categories.

Several other community facilities (22) are potentially affected by a project alternative:

20. Anchorage Senior Center
21. Anchorage Job Center, Downtown
22. Bean's Café
23. Bishop's Attic
24. BP Energy Center
25. Brother Francis Shelter
26. Carrs Grocery Store – Airport Heights
27. Carrs Grocery Store – Fairview
28. Carrs Grocery Store – Sears Mall
29. Cradle Club (inside Alaska Regional Hospital)
30. Fred Meyer
31. Kid's Kitchen (inside Fairview Recreation Center)
32. McKinnell House
33. New Sagaya Midtown Market
34. Northway Mall
35. Red Apple Market
36. Salvation Army Clitheroe Center
37. Safe Harbor Inn
38. The Mall at Sears
39. U.S. Fish and Wildlife Service
40. University Center Mall
41. Women, Infants & Children (WIC) Nutrition Program (inside Alaska Regional Hospital)

Two of the facilities listed above, Bean's Café and Brother Francis Shelter, provide critical services to the low-income and homeless populations of Anchorage. Bean's Cafe provides meals, daytime shelter, and information and referral assistance to health and human service programs. Brother Francis Shelter provides temporary, emergency shelter for men and women. The shelter also provides evening meals, showers, laundry facilities, and information and referral assistance for social services programs. In fiscal year 2009, Brother Francis Shelter provided 68,343 nights of stay with an average of 202 people per night. In addition, they provided more than 55,000 meals to more than 3,100 homeless individuals (Catholic Social Services 2009).

More information about these facilities can be found in the respective community council assessments.

Public Safety

This section describes organizations that provide emergency and health care services in the study area. A central 911 dispatch system serves the entire MOA and coordinates police, fire, and emergency medical response within the study area.

Anchorage Fire Department. Fire coverage in the study area is provided by the Anchorage Fire Department (AFD), which has three fire stations (Stations 1, 3, and 4) located in the study area for fire and medical emergencies. These facilities are represented by squares (■) on Figure 6-7. The AFD has a target response time of four minutes for having a fire truck arrive at a structure fire or having a basic life support unit arrive at a code red medical emergency (AFD 2009).

The study area is within the coverage area of the Community Services Patrol (CSP). CSP staff takes people who are incapacitated by alcohol in public places into protective custody and transports them to the Sleep-Off Center located in the Anchorage Correctional Complex.

Anchorage Police Department. Law enforcement in the study area is provided by the Anchorage Police Department (APD). Officers are based out of the headquarters building on Elmore Road but have access to substations located throughout the MOA, including four in the study area. These facilities are represented by squares (■) on Figure 6-7. The Anchorage Correctional Complex, which has a current capacity of 396 prisoners with an expansion potential for an additional 192, operates as a booking center and pre-trial facility and is located in the study area.

The calls for service tracked by the APD highlight the level of incidents within community councils. Within the study area, the greatest number of calls occurs in the Downtown, Fairview, Midtown, and Mountain View community councils.

Health Care Services

Study area residents have access to a wide range of health care services, some of which are located within the SE study area. These facilities are represented by stars (★) on Figure 6-7. Alaska Regional Hospital is a 250-bed facility offering a broad spectrum of medical services as well as numerous outreach services. It is the only non-military hospital in Alaska with a landing strip allowing the air ambulance (LifeFlight) service to transfer patients directly from the plane to the emergency room.

There are numerous medical clinics, doctors' offices, and related services located within the study area, including the Anchorage Neighborhood Health Center (ANHC) in Fairview (which is planning to relocate to a new building that is being built at C Street and International Airport Road). The ANHC is the largest community health center in Alaska, serving more than 12,000 patients each year through a wide range of medical and dental services. The North Star Behavioral Health System, which provides in-patient behavioral health services for children between ages 4 and 17, operates three locations within the study area.

6.2.6 Recreational Resources

Within the study area, there are 49 established parks, totaling approximately 1,880 acres of municipal parkland (Figure 6-7). Other recreational resources in the study area include park shelters, playgrounds, soccer fields, tennis courts, hockey rinks, and trails. Many of these resources are considered Section 4(f) resources and are discussed in Chapter 22, Section 4(f) and 6(f) Evaluation. Non Section 4(f) recreational resources that may be affected are described below. For a complete list of recreational facilities in the study area, please see the *Social and Economic Affected Environment Data Summary*.

Opened in 1983, the George M. Sullivan Arena is a multi-use facility that hosts sporting events, trade shows, concerts, and other special events. It has a capacity between 6,500 and 9,000, depending on the event. The Sullivan Arena includes an international-specification ice rink and is home to the Alaska Aces and UAA Seawolves hockey teams. It is also home to the UAA basketball team and the annual Great Alaska Shootout basketball tournament. More than 500,000 people attend events here annually. Previous studies have indicated that there are access issues and that events can cause traffic problems on adjacent roads. There is also inadequate parking to comply with MOA parking standards.

Merrill Field owns a 62-acre parcel south of 15th Avenue that is part of the runway protection zone for the airport's north-south runway. The MOA Parks and Recreation Department has a Special Land Use Permit from the airport for an 8-acre section of this parcel known as Sitka Street Park, which is discussed in Chapter 22, Section 4(f) and 6(f) Evaluation. The remaining 54 acres are largely undeveloped but receive some recreational use as informal foot trails and ski trails.

Merrill Field Campground is owned by the MOA and managed by Merrill Field. It provides airplane tie-downs and 13 grass tent camping sites for transient pilots and their guests.

Orca Park is approximately 0.35 acres and is classified as a Natural Resource Park. It is largely undeveloped except for a paved trail that traverses the park.

New Seward Park is approximately 0.11 acres and located southwest of the Seward Highway/36th Avenue intersection. It is classified in the park plan as a Natural Resource park and is not developed except for some landscaping.

The Glenn Highway Buffer Park provides a visual natural buffer and open space along the north side of 5th Avenue. Other than a sidewalk/paved trail along the southern edge and a "Welcome to Anchorage" sign, the park is undeveloped.

The Seward Highway Buffer Park provides open space and serves as a buffer between the Seward Highway and adjacent residential property.

Clark Middle School has recreational facilities that include a soccer field, track, tennis courts, auditorium, etc., which are available for public use during non-school times.

6.2.7 Public Health

According to FHWA, examining the degree to which a proposed action affects public health is a key consideration of the National Environmental Policy Act process (FHWA 1992). The CEQ (CFR 1508.8) defines effects to include "ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or **health**, whether direct, indirect, or cumulative" (CEQ 1978) [emphasis added]. As such, effects on health are examined throughout the EIS. This section provides a summary of affected environment topics most directly related to public health from a social perspective. Where more detailed affected environment information is available, the reader is referred to those locations.

Many of the impact discussions in Section 6.3 of this chapter also have more information in other locations, and citations are provided. The impact analysis in this chapter provides a summary of the public

health related impacts from the other chapters and focuses on how those changes will affect the social groups identified in this chapter, with particular emphasis on disproportionate impacts to elderly, handicapped, and transit-dependent populations described above. Disproportionate effects on minority and low-income groups are discussed in Chapter 9, Environmental Justice.

Public health topics discussed below include safety, air quality, water quality, noise, and physical activity. For more information on these topics, please see the *Social and Economic Affected Environment Data Summary* or the appropriate EIS chapter.

There are two components of safety: transportation-related safety and crime/overall violence. Transportation-related safety generally refers to vehicle-to-vehicle interactions and vehicle-to-pedestrian/cyclist interactions. Many intersections in the study area have crash rates that exceed the MOA average. Several intersections have also experienced multiple pedestrian/bicycle crashes. For more information on transportation-related safety, please see Chapter 3, Traffic and Transportation.

Crime/overall violence is discussed in Section 6.2.5 of this chapter, under subsection "Public Safety."

Clean air is vital to human health; poor air quality can negatively affect people, plants, animals, and manmade structures. The major airborne pollutants of interest for transportation projects are CO, PM_{10}, $PM_{2.5}$, ozone, and ozone precursors (volatile organic compounds and NO_X). Anchorage currently meets national standards for these substances. For more information, see Chapter 13, Air Quality.

Water quality is important for people's health and the health of the surrounding natural environment. The greatest public health concerns are drinking water and water people encounter through recreational or personal activities such as fishing, boating, or swimming. All four watersheds in the study area (Ship Creek, Chester Creek, Fish Creek, and Campbell Creek) are considered impaired by fecal coliform. In addition, Ship Creek is considered impaired for petroleum products from the Glenn Highway to the mouth. These are not sources of drinking water in Anchorage. For more information on water quality, see Chapter 15, Water Quality.

Health impacts related to noise include annoyance (which can negatively impact a person's quality of life), hearing loss or degradation, communication interference, sleep disturbance, and reduced ability to perform complicated tasks (FHWA N.d.). Data show that existing peak-hour noise levels in the vicinity of the reasonable alternatives range from the mid-50s dBA to the mid-70s dBA. The data also show that, generally speaking, the highest measured noise levels occurred in Midtown. The residential areas to the east of Midtown typically exhibit lower levels. In some cases, existing measured noise levels are in excess of the applicable noise abatement criteria at both residential and commercial properties in the study area. For more information, see Chapter 14, Noise.

The built environment can have an impact on health by providing opportunity for physical activity. However, high traffic volumes and the lack of sidewalks and trails may cause people to view walking or bicycling as unsafe (CDC N.d.). Older areas such as Fairview and Mountain View have relatively complete sidewalk networks, while other communities may have sidewalks only on selected roads. There are a small number of on-street bicycle facilities. The Chester Creek multi-use trail is also heavily used by pedestrians and bicyclists. For more information, please see Chapter 12, Considerations Relating to Pedestrians and Bicyclists.

6.3 BIBLIOGRAPHY

[ADOC] Alaska Department of Corrections. 2009. Division of Administrative Services. *2009 Offender Profile.* Available online at http://www.correct.state.ak.us/corrections/admin/docs/profile_2009_final.pdf.

[AFD] Anchorage Fire Department. 2009. *Strategic Plan 2009-2015*.

Alaska Department of Education and Early Development. 2010. *Statistics and Reports: District Enrollment Totals by Ethnicity for All Alaskan Public Schools*. Available online at http://www.eed.state.ak.us/stats/ (accessed April 29, 2010).

Alaska Department of Labor and Workforce Development, Research and Analysis Section. 2010a. *Population Estimates.* Available online at http://almis.labor.state.ak.us/?PAGEID=67&SUBID=171 (accessed June 1, 2010).

———. 2010b. *Unemployment Rate.* Available online at http://almis.labor.state.ak.us/?PAGEID=67&SUBID=188 (accessed April 28, 2010).

———. 2010c. *Housing Costs: Average Purchase Price.* Available online at http://laborstats.alaska.gov/?PAGEID=67&SUBID=199 (accessed June 28, 2010).

Alaska Multiple Listing Service, Inc. 2010. *Anchorage Market Statistics: Residential Sale Prices.* Available online at http://www.reals8.com/statistics.htm (accessed May 10, 2010).

Anonymous. 2009. "Anchorage real estate market." *Mortgage and Real Estate News*. April 28, 2010. Available online at http://news.nationalrelocation.com/anchorage-real-estate-market/.

[ASD] Anchorage School District. No date. *No Child Left Behind: Frequently Asked Questions.* Available online at http://www.asdk12.org/nclb/everyone/faq.asp (accessed June 14, 2010).

———. 2009. *ASD Memorandum #120 (2009-2010)*. Available online at http://www.asdk12.org/depts/demographics/ethnicity/Ethnicity09_10.pdf (accessed June 25, 2010).

———. 2010a. *Free Summer Meals for Children*. Available online at http://www.asdk12.org/PR/DistrictNews/article.asp?storyID=1579 (accessed June 29, 2010).

———. 2010b. *Free and Reduced-Price Meal Plans*. Available online at http://www.asdk12.org/menus/frp.asp (accessed June 14, 2010).

———. 2010c. *Demographics*. Available online at http://www.asdk12.org/depts/expect_the_best/demographics.asp (accessed April 24, 2010).

———. 2010d. English Language Learners Program. Available online at http://www.asdk12.org/depts/ell/.

Bell, T. 1999. "Fairview comes 'alive' - Residents lead transformation." *Anchorage Daily News*. June 20: Anchorage, AK.

Boehlke, D. 2005. *Fairview: A Dynamic Neighborhood in a Changing City*.

Catholic Social Services. 2009. *Brother Francis Shelter.* Available online at http://www.cssalaska.org/html/programs/brother-francis.php (accessed June 30, 2010).

[CDC] Centers for Disease Control and Prevention. No date. *CDC Recommendations for Improving Health Through Transportation Policy.* Available online at http://www.cdc.gov/transportation/docs/FINAL%20CDC%20Transportation%20Recommendations-4-28-2010.pdf.

[CEQ] Council on Environmental Quality. 1978. *Regulations for Implementing NEPA.* Available online at http://ceq.hss.doe.gov/nepa/regs/ceq/toc_ceq.htm.

czb, LLC. 2004. *Revitalizing Mountain View into a Community of Choice.*

ESRI. 2009. *Demographic Update: 2009/2014*.

Fairview Community Council. 2009. *A Plan for Fairview's Neighborhoods.* Revised Final Draft.

[FHWA] Federal Highway Administration. No date. *Noise Effects, Standards, Measures, and Predictors.* Available online at http://www.fhwa.dot.gov/environment/audible/al7.htm.

———. 1992. *NEPA and Transportation Decisionmaking.* Available online at http://environment.fhwa.dot.gov/projdev/tdmpdo.asp.

Fried, N. 2003. "The Matanuska-Susitna Borough." *Alaska Economic Trends* 23 (1): 3-14.

———. 2007. "The Matanuska-Susitna Borough." *Alaska Economic Trends* 27 (6): 4-15.

———. 2010. "Employment Scene." *Alaska Economic Trends* 30 (2): 16-18.

Goldsmith, S. 2006. *Anchorage in the 21st Century, 3rd Anchorage School District Conference on Personalizing Education*. April 21-22, 2006. Anchorage, AK.

Goldsmith, S., L. Howe, and L. Leask. 2005. *Anchorage At 90: Changing Fast, With More to Come.* Institute of Social and Economic Research, University of Alaska Anchorage. Anchorage, AK,

[HDR] HDR Alaska, Inc. 2007. *Anchorage Midtown Charrette Draft District Plan.* Prepared for the Municipality of Anchorage.

[ISER] Institute of Social and Economic Research. 2006. *Understanding Alaska: People, Economy, and Resources.* University of Alaska Anchorage. Anchorage, AK,

Lowe, M., P. DeRoche, S. Sharp, and M. Wilson. 2009. *New Students in Anchorage School District: Where Are They From?* Institute of Social and Economic Research, University of Alaska Anchorage. Anchorage, AK.,

Mercer, E., and G. Williams. 2010. "Alaska's 2009 Population." *Alaska Economic Trends* 30 (4): 4-10.

[MOA] Municipality of Anchorage. 2001. Planning Department. *Anchorage 2020: Anchorage Bowl Comprehensive Plan.* Anchorage, AK.

———. 2005. *Definition and recognition of community councils.* Anchorage Municipal Code 2.40.030.

———. 2009a. Department of Health and Human Services. *Overview of Homelessness in Anchorage, Alaska.* Available online at http://www.muni.org/Departments/health/Documents/Overview%20of%20Homelessness%20in%20Anchorage.pdf.

———. 2009b. Department of Neighborhoods. *Draft Anchorage Housing Fact Book.*

———. 2010. Property Appraisal Division. Personal communication with HDR Alaska, Inc. and Northern Economics, Inc., June 1.

Mullins, L. 2009. "The Top 10 Housing Markets for the Next 10 Years." *U.S.News & World Report*.

Robinson, D., N. Fried, A. Shanks, and J. Wilkinson. 2010. "Employment Forecast for 2010." *Alaska Economic Trends* 30 (1): 4-20.

Schultz, C. 2009. "The Anchorage Rental Market." *Alaska Economic Trends* 29 (9): 11-16.

[UAA] University of Alaska Anchorage. 2009. Alaska Justice Forum. *Alaska Offender Profile 2009.* Available online at http://justice.uaa.alaska.edu/forum/26/4winter2010/b_akdoc.html.

U.S. Census Bureau. No date. *2008 American Community Survey 1-Year Estimates.* Available online at http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=&_lang=en&_ts= (accessed April 28, 2010).

———. 2000. *U.S. Census*.

Williams, G. 2005. "Population Projections." *Alaska Economic Trends* 25 (2): 4-16.

Williams, J. G. 2010. "Anchorage Migration." *Alaska Economic Trends* 30 (2): 4-12.

Chapter 7: Acquisitions and Relocations
Affected Environment

Table of Contents

7.1 INTRODUCTION 1
7.2 REGULATORY SETTING 1
7.3 AFFECTED ENVIRONMENT 1
7.3.1 Methodology 1
7.3.2 Residential 2
7.3.3 Business 7
7.4 BIBLIOGRAPHY 9

List of Tables

Table 7-1. Comparison of Acres of Types of Residential Units 2
Table 7-2. Percentage of Renters who Pay More than 30% of Income on Rent 6
Table 7-3. Apartment Quality in Study Area 7

List of Figures

Figure 7-1. Public and Private Land Ownership 3
Figure 7-2. Residential Units Density 4
Figure 7-3. Average Value of Housing Units, 2009 5
Figure 7-4. Housing Occupancy and Vacancy Rates, 2009 6
Figure 7-5. Business Square Footage 8

7.1 INTRODUCTION

This chapter summarizes existing land ownership, values, and vacancy rates, and DOT&PF-owned right-of-way. It provides details on anticipated acquisitions of property and relocations that would result from the reasonable alternatives in the H2H study area (See Figure 7-1). For more detail on land use trends, see Chapter 5, Land Use. For more detail on public facilities and the social effects, see Chapter 6, Social Environment. For information on business impacts see Chapter 10, Economic. For more detail on relocations, refer to the *Conceptual Stage Relocation Report*, Appendix X.

7.2 REGULATORY SETTING

Government agencies sometimes need to acquire private property for public programs or projects. However, agencies cannot abuse this policy. The Fifth Amendment of the U.S. Constitution states that private property shall not "be taken for public use, without just compensation." In addition, Congress enacted the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the Uniform Act) to provide for fair and equitable treatment of persons whose property will be acquired or who will be displaced because of programs or projects financed with federal funds. The rules implementing this law assure property owners that their interests will be protected, and that they will be treated fairly and equitably (DOT&PF 2005).

All federal and state agencies must comply with the policies and provisions set forth in the Uniform Act and its amendments. The acquisition and relocation program associated with the H2H project will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and relocation resources will be available to all residential and business relocates without discrimination. The DOT&PF's *Alaska Right-of-Way Manual* (2006) provides additional guidance on policies and procedures relating to right-of-way acquisition, appraisal, relocation, and property management.

The acquisition and relocation analysis has been conducted according to the Federal Highway Administration's (FHWA) guidance on Relocation Impacts under Technical Advisory T6640.8a, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents.* The guidance requires that the analysis address:

- the number and characteristics of households to be displaced
- available comparable housing
- any special considerations (e.g., ethnic, minority, elderly, handicapped or other)
- measures to be taken if replacement housing is not available and a commitment to last resort housing
- the number and characteristics of business and farms to be displaced
- available comparable sites, likelihood of relocation, and potential impacts to businesses or farms caused by relocation
- discussion of outreach regarding relocation impacts.

The following chapter has been prepared to show existing conditions data that will support analysis of impacts to meet the requirements of the guidance.

7.3 AFFECTED ENVIRONMENT

7.3.1 Methodology

Information on land ownership, right-of-way, and properties was obtained by reviewing community plans, maps, and tax assessor data. Once alternatives were developed and refined, the right-of-way anticipated to be needed to construct and operate the alternatives was overlaid on maps of property parcels to identify which parcels would be impacted.

Ownership patterns in the study area help to characterize the potential impacts for relocation to similar sites and the relative magnitude of potential relocations. Overall, the study area exhibits land ownership trends that are similar to those within the greater Anchorage Bowl. Within the study area, about 48 percent of the land is privately owned and 52 percent of the land is publicly owned (MOA 2008b). Within the Anchorage Bowl, the percentages are similar, with 47 percent private ownership and 53 percent public ownership. Figure 7-1 shows public (peach) and private (light yellow) ownership distribution within the study area and shows the existing DOT&PF and MOA owned right-of-way (grey). Along highway sections, existing right-of-way typically ranges from 150 to 300 feet wide. Along arterial streets, existing right-of-way typically ranges from 60 to 70 feet wide.

7.3.2 Residential

Looking more closely at the types of residential occupancy reveals that the study area has higher percentages of duplex and multi-family development and lower percentages of single-family homes than the average percentages within the Anchorage Bowl. In fact, within the study area, multi-family housing accounts for more than 34 percent of the residential land use. Compared to the Anchorage Bowl percentage of 12 percent, the study area shows nearly three times the average percentage of multi-family housing than in the Bowl overall. Table 7-1 shows the comparison of residential land use percentages between the study area and the Anchorage Bowl, and Figure 7-2 shows the distribution of the different types of residential occupancy within the study area.

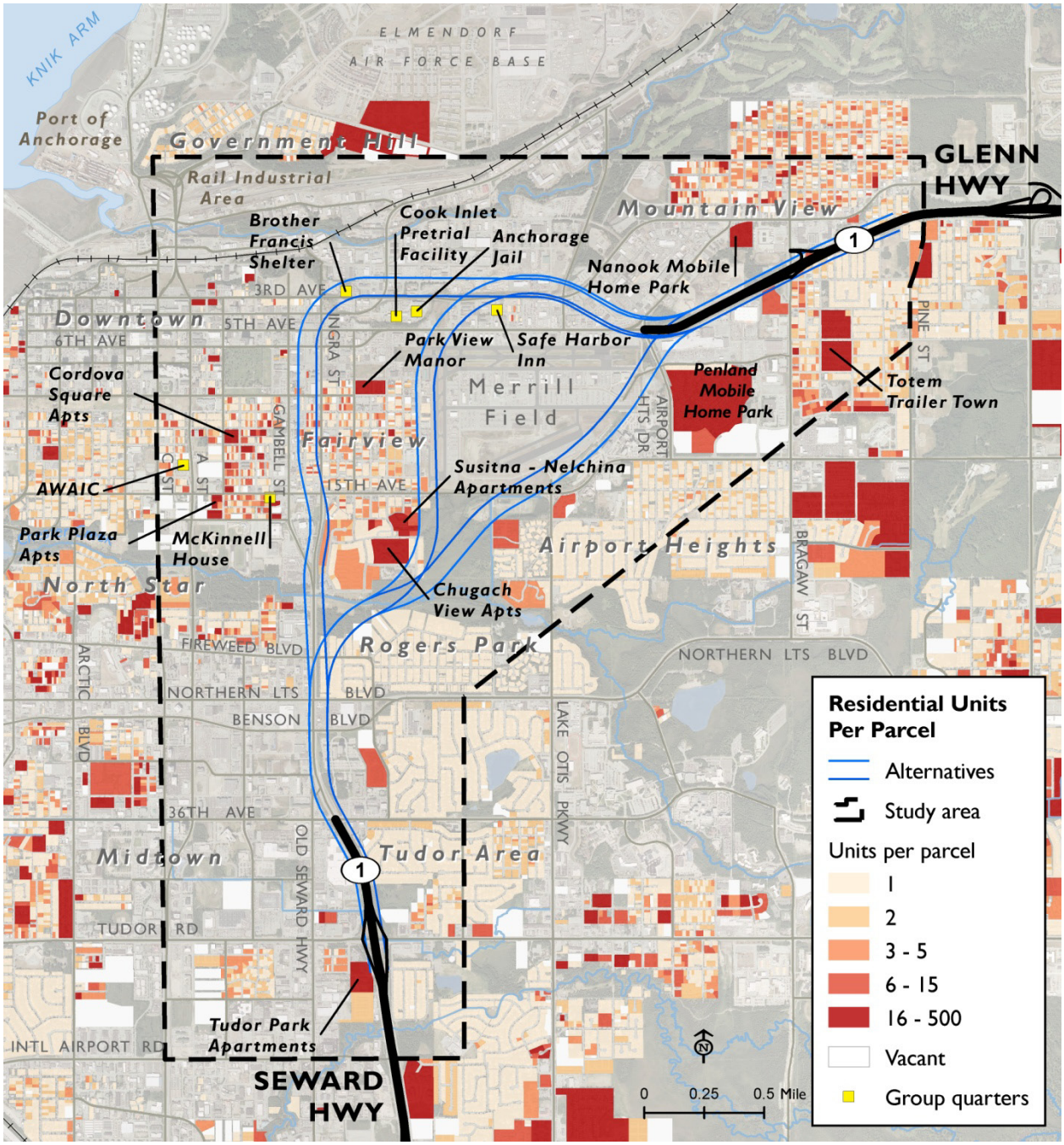
Table 7-1. Comparison of Acres of Types of Residential Units

Type	Study Area		Anchorage Bowl	
	Acres	% of Residential Land Use	Acres	% of Residential Land Use
Single-Family	561	56%	15,751	81%
Duplex	107	11%	1,541	8%
Multi-Family	337	34%	2,253	12%
Total	1005	100%	19,545	100%

Source: MOA 2008c.

Figure 7-1. Public and Private Land Ownership

Figure 7-2. Residential Units Density

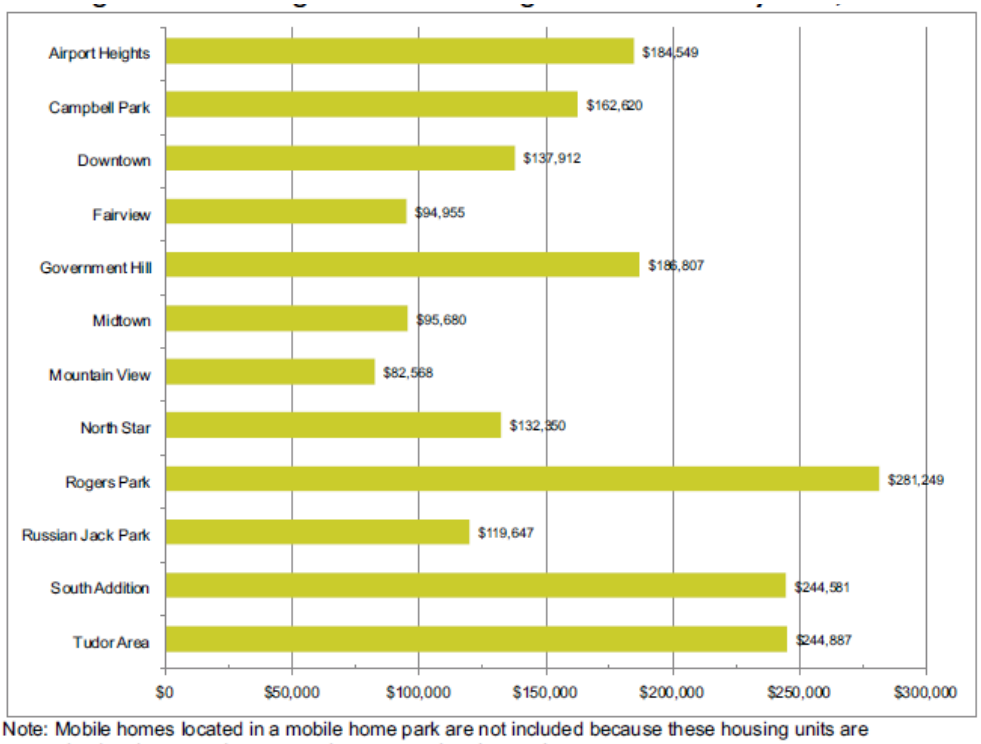


Within the study area, areas of higher residential units per parcel occur most frequently in Fairview, the northeast portions of Airport Heights, and in Mountain View. In Tudor Area, Rogers Park, and the majority of Airport Heights, most residential parcels contain one unit. There are several group quarters in the study area that also provide housing. These are noted on Figure 7-2. Vacant residentially zoned land is depicted in white on Figure 7-2 and is sparsely scattered throughout the study area.

Housing values are a factor to consider in characterizing households and to determine if comparable housing may be available in the event of relocation. Housing values in the study area vary. The lowest-

cost housing is located in Mountain View and Fairview. Highest cost housing is located in Rogers Park, South Addition, and Tudor Area. Figure 7-3 shows average housing values by Community Council boundary.

Figure 7-3. Average Value of Housing Units, 2009

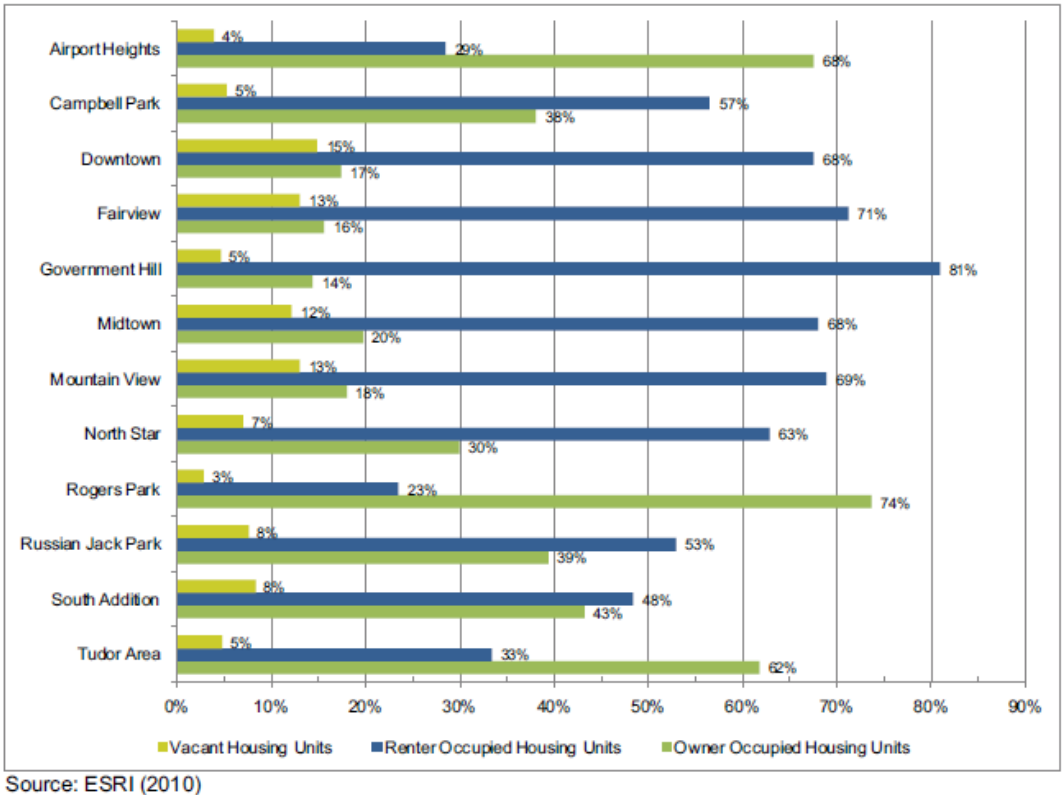


Note: Mobile homes located in a mobile home park are not included because these housing units are categorized and assessed as personal property rather than real property.
Source: Municipality of Anchorage (2010)

Housing occupancy (owner-occupied or renter-occupied) is an important characteristic in determining the kinds of households that may need to be relocated. See Figure 7-4 for housing occupancy and vacancy rates by community council. In 2009, within the study area, Rogers Park, Airport Heights, and Tudor Area had the highest concentrations of owner-occupied units and lowest concentrations of renter-occupied units, suggesting these neighborhoods are primarily owner-occupied. Other neighborhoods are predominantly renter-occupied: Downtown, Fairview, Midtown, Mountain View, Campbell Park, Government Hill, Russian Jack Park, and North Star had higher percentages of renter-occupied units.

Vacancy rates provide information to determine how available replacement housing may be in the event of relocation. In general, lower vacancy rates suggest a high demand for units, and higher vacancy rates suggest an adequate supply of housing (MOA 2008a). Downtown, Fairview, Midtown, and Mountain View had higher vacancy rates. While Campbell Park, Government Hill, Russian Jack Park, and North Star showed higher percentages of rental housing, these neighborhoods had relatively low vacancy rates.

Figure 7-4. Housing Occupancy and Vacancy Rates, 2009



Source: ESRI (2010)

Examining rental affordability and quality of units provides background information to help determine if replacement units will be available in the study area. Affordability of rent is defined as a household that can rent a property for 30 percent or less than their total income (MOA 2009). Table 7-2 compares the percentages of renters who must expend more than 30 percent of their income on rent in Anchorage with Boise and Seattle. Comparing Anchorage to these other cities reveals that Anchorage renters do spend more of their income on rent than renters elsewhere, indicating that rent is less affordable.

Table 7-2. Percentage of Renters who Pay More than 30% of Income on Rent

Income Range	Anchorage	Boise	Seattle
$20,000 to $34,999	71.5%	54.1%	69.5%
$35,000 to $49,999	33.6%	18.7%	29.4%
$50,000 to $74,999	17.7%	2.8%	14.5%

Source: MOA 2009 from American Community Survey 2007.

Within the study area, quality of apartment units varies. Table 7-3 shows percentages of apartment units that were rated below C grade within the study area. According to the 2009 MOA Property Appraisal, an average of 12.4 percent of all apartment units were below C grade. Most of the community councils within the study area had a lower percentage of apartments worse than grade C condition than Anchorage as a whole. This could indicate that in these areas, the quality of rental units is better than average. In Campbell Park, Government Hill, Russian Jack, and South Addition percentages of rental units rated below grade C were more than double the Anchorage average.

Table 7-3. Apartment Quality in Study Area

Area	Renter-Occupied Housing Units*	Percentage of Apartment Units Below C Grade**	Approximate Number of Apartment Units Below C Grade***
Airport Heights	743	0%	0
Campbell Park	1,928	32.4%	625
Downtown	340	4.8%	16
Fairview	2,698	6.2%	167
Government Hill	890	100%	890
Midtown	1,783	5.6%	100
Mountain View	1,767	4.2%	74
North Star	1,200	5.7%	68
Rogers Park	317	0%	0
Russian Jack	2,418	37.8%	914
South Addition	1,208	27.4%	331
Tudor Area	267	0%	0

**Source: DOT&PF 2010 (H2H Socio-Economic Technical Report)*

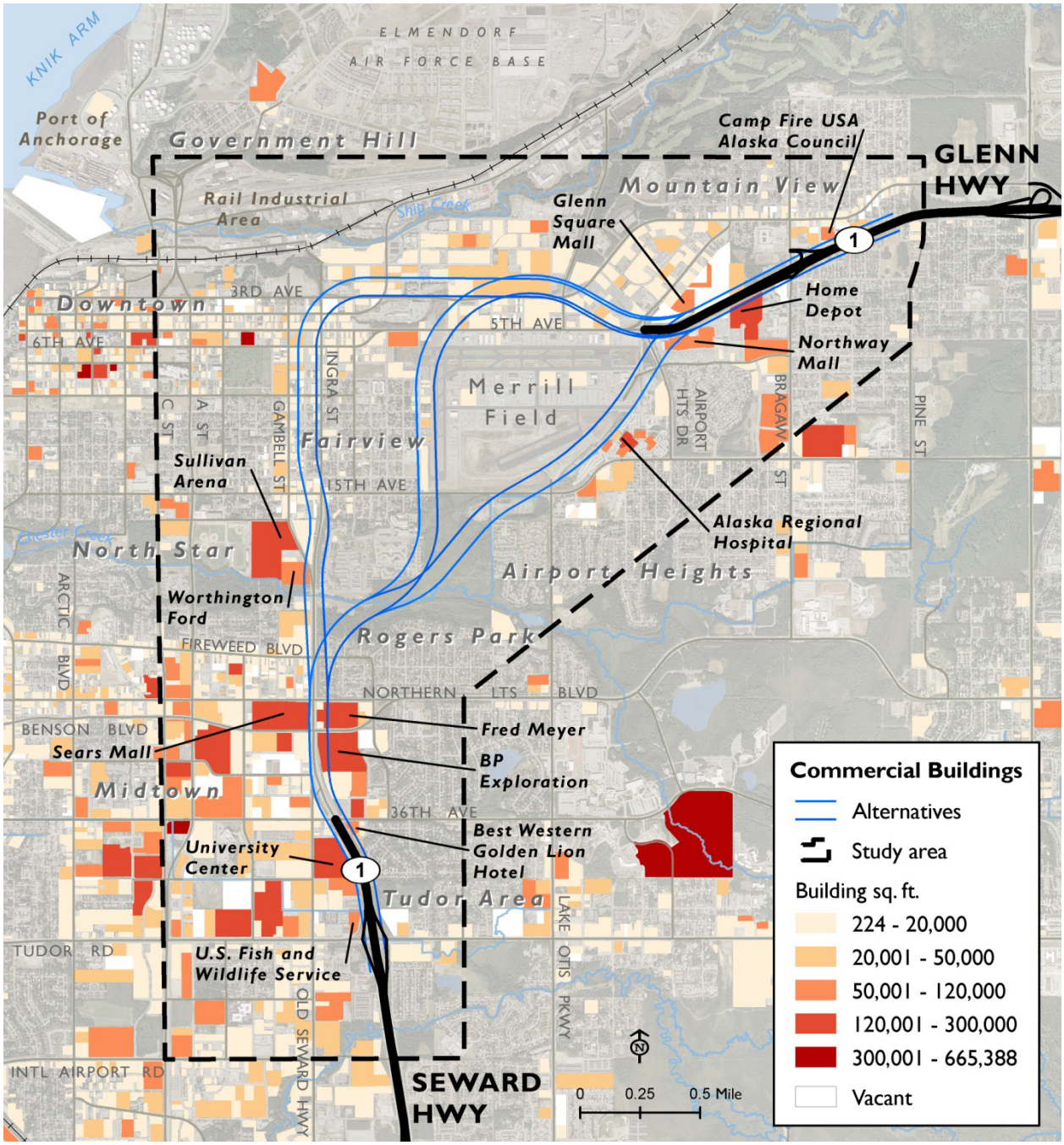
***Source: MOA 2009 from MOA Property Appraisal, 2009.*

****Calculated based on sources listed above.*

7.3.3 Business

In addition to housing, business and farm relocations must be identified and characterized. There are commercial and industrial businesses within the study area, primarily in Midtown; along 5th and 6th avenues and Gambell and Ingra streets; Downtown; and north of 5th Avenue and along Commercial Drive. To help quantify business size, data was not available on employees per business; however, data was available on square footage of the commercial and industrial buildings associated with each parcel. Figure 7-5 shows the square footage of the commercial and industrial buildings associated each parcel and identifies larger businesses in close proximity to the reasonable alternatives. The southern portion of the study area in Midtown west of the Seward Highway has the greatest number of higher square footage businesses. There are no farms within the study area and therefore no farm relocations or impacts.

Figure 7-5. Business Square Footage



7.4 BIBLIOGRAPHY

DOT&PF. 2005. *Acquiring Real Property for Federal and Federal-Aid Programs and Projects.* Federal Highway Administration.

———. 2006. *Alaska Right-of-Way Manual.*

———. 2010. *H2H Social Economic Technical Report.* Prepared by Northern Economics, Inc.

MOA. 2008a. *Five Year Housing and Community Development Consolidated Plan: 2008-2012.* Department of Neighborhoods and Office of Economic Development.

———. 2008b. *Land Use Data.* GIS and Mapping Services. Available online at http://www.muni.org/departments/it/gis2/pages/default.aspx

———. 2008c. *CAMA Parcel Database.* Property Appraisal Division.

———. 2009. *Draft Anchorage Housing Fact Book.* Department of Neighborhoods.

Chapter 8: Utilities
Affected Environment

Table of Contents

8.1 INTRODUCTION AND REGULATORY SETTING 1
8.2 AFFECTED ENVIRONMENT 1
8.2.1 Water 1
8.2.2 Wastewater 3
8.2.3 Telecommunications 5
8.2.4 Electrical 7
8.2.5 Natural Gas 8
8.3 BIBLIOGRAPHY 10

List of Figures

Figure 8-1. Water Utilities 2
Figure 8-2. Wastewater Utilities 4
Figure 8-3. Telecommunications Utilities 6
Figure 8-4. Electrical Utilities 8
Figure 8-5. Gas Utilities 9

8.1 INTRODUCTION AND REGULATORY SETTING

This section describes utilities in the study area and related impacts. Data were collected through a review of published sources and as-built drawings and meetings with local utility companies. For more detail, refer to the *Utilities Reconnaissance Study* (2008), *Utility Research Memorandum* (2009), and *Utility Research Memorandum* (2010) in Appendix X. Construction can cause costs and impacts when utilities need to be relocated to accommodate a transportation project.

> The effects to utilities that will result from construction will be temporary. With proper design and coordination, disruptions to customers will be minimal. Affected utilities will be relocated during construction in cooperation with utility providers.

While no federal or NEPA regulations specifically call out utilities, they are important public facilities that can be costly to relocate. Also, disruptions in service during construction may occur, thereby affecting the social environment.

The utility study area includes water, wastewater, telecommunications, electrical, and natural gas infrastructure within a buffer that is approximately one-half mile from the project alternatives. It is the same as the general study area. The utility study area was selected because it includes the area where likely utility infrastructure could be affected by project alternatives.

8.2 AFFECTED ENVIRONMENT

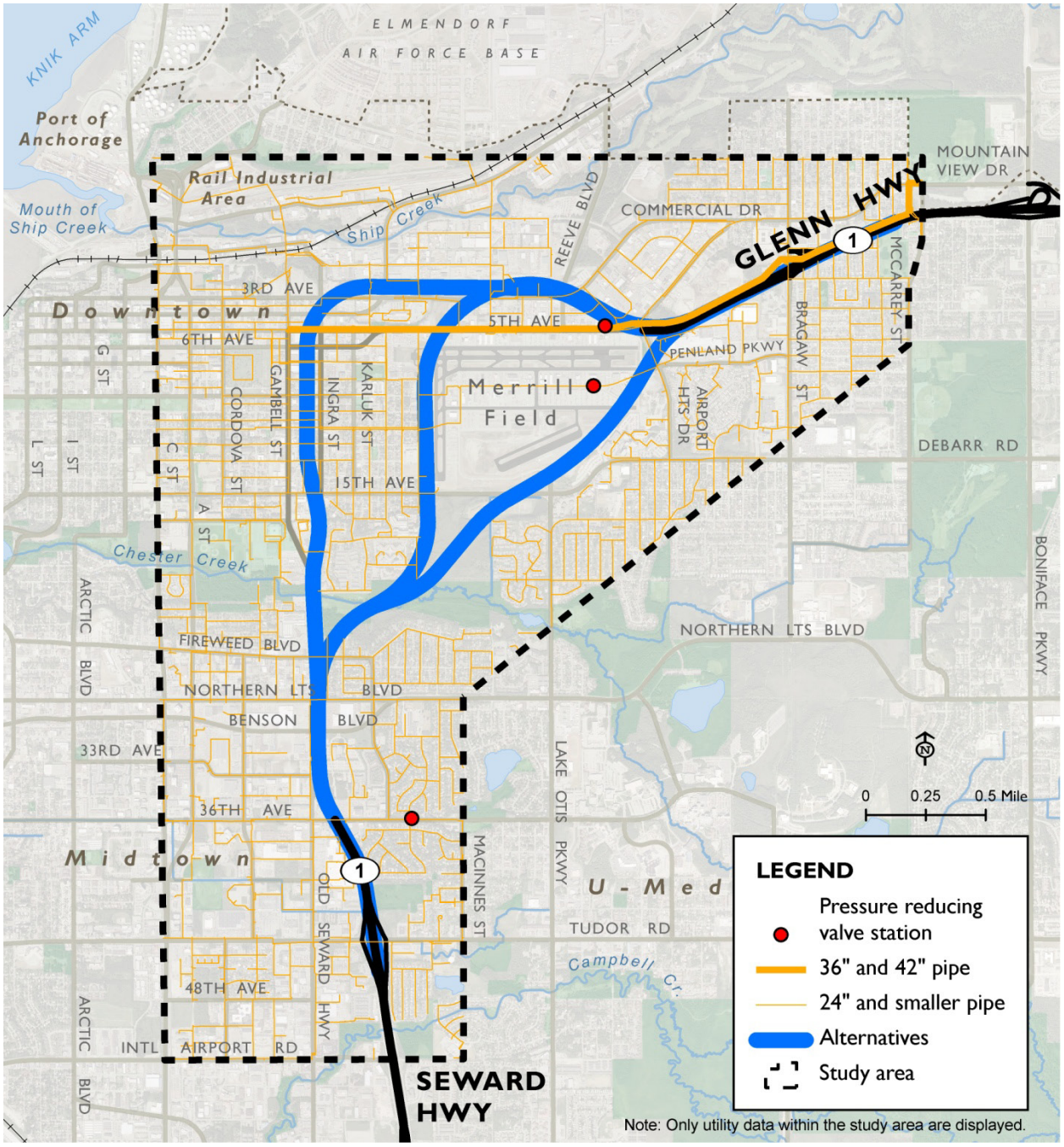
Many utilities are located within the utility study area including water, wastewater, telecommunications, electrical, and natural gas. The former Anchorage municipal landfill is located underneath portions of Merrill Field, but that topic is discussed in Chapter 20, Contaminated Sites. Water and wastewater facilities are owned by the Municipality of Anchorage. Telecommunications, electrical, and natural gas facilities are privately owned by regulated utility companies.

8.2.1 Water

Figure 8-1 depicts the water utilities within the study area. As can be seen on the map, water utilities of 24″ and smaller are located throughout the study area. Notably, a large-diameter pipe (36″/42″), which functions as a transmission main, runs from Gambell Street west along 5th Avenue and the Glenn Highway. Pressure-reducing valve stations are located in the study area near 5th Avenue, west of Airport Heights Drive; near Merrill Field Drive; and along 36th Avenue/Providence Drive. It is estimated to cost upward of $1 million to relocate each pressure-reducing valve station. Transmission mains would be the most important and most expensive to relocate since so many parts of the system are fed by transmission mains.

> **Pressure-reducing valve station:** A valve that is installed on water pipes to modulate pressures in a water system. Water typically enters at high pressure and exits at a pressure that is suitable for delivery to a home/neighborhood, typically installed above ground in a building or below ground in a buried vault.
>
> **Transmission main:** Transmission mains typically carry large volumes of water (often at high pressure), and supply water to the rest of the system.

Figure 8-1. Water Utilities

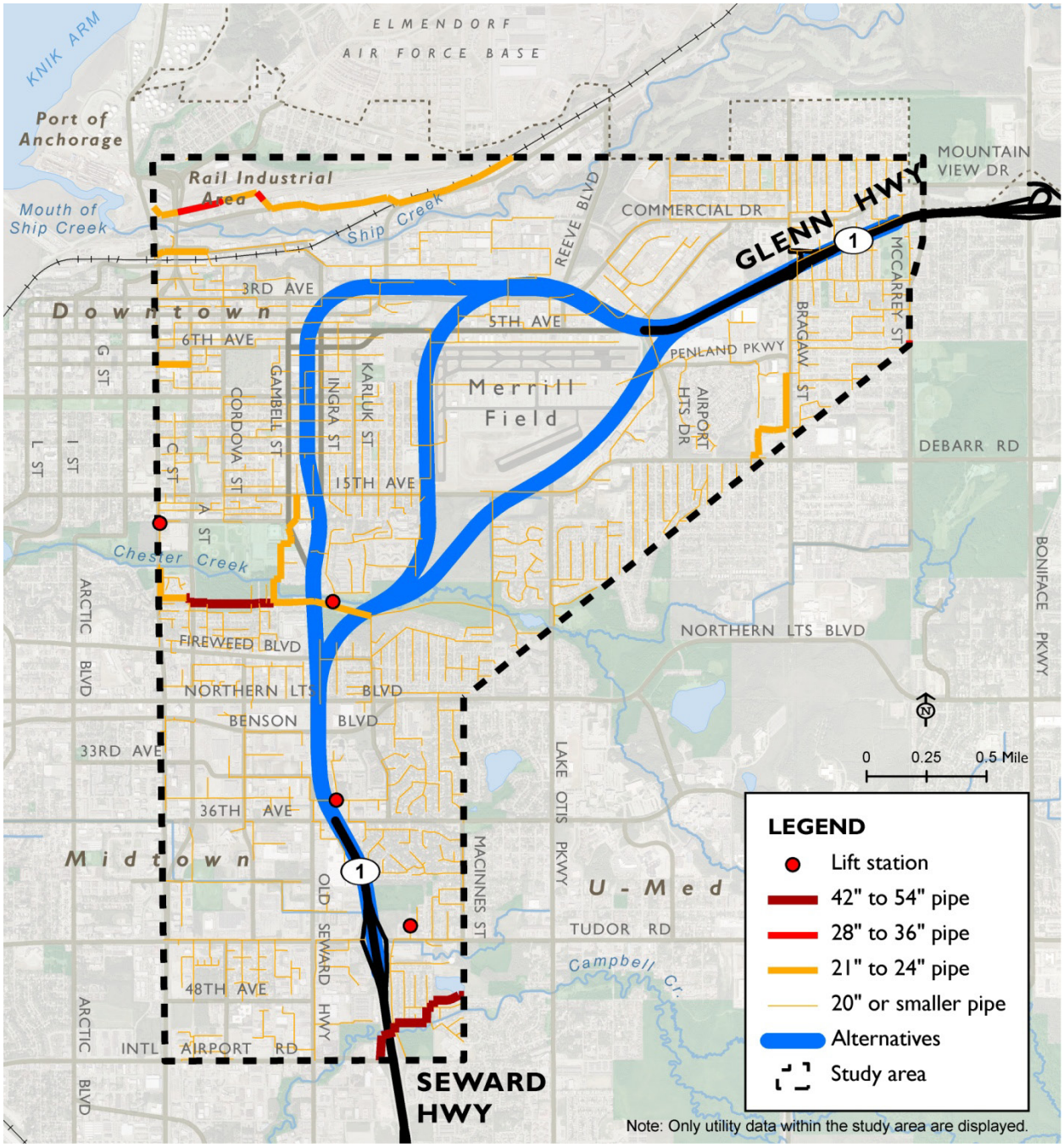


8.2.2 Wastewater

Lift station: An underground structure where wastewater flows are collected and "lifted" to a point of higher elevation, typically installed at a low point in a sewer collection system. The station contains one or multiple pumps that pump the wastewater to a higher elevation.

Figure 8-2 depicts the wastewater utilities within the study area. Wastewater lines of 20″ or smaller are located throughout the study area. Larger wastewater lines (21″ and higher) feed the smaller lines. One wastewater line of 21″/24″ is located just south of Chester Creek from Latouche Street westward through the study area to C Street and beyond. In one part of this segment, the diameter of the line increases to 42″/54″. Another wastewater line of 21″/24″ extends from the Chester Creek line north to 15th Avenue west of Gambell Street. A wastewater line of 42″/54″ crosses the Seward Highway south of Tudor Road. Lift stations are located (1) along Chester Creek just east of the Seward Highway, (2) at 35th Avenue just east of the Seward Highway, and (3) near the intersection of the Seward Highway and Tudor Road. Lift stations can be expensive and disruptive to move. It is estimated to cost upward of $1 million to relocate each lift station; relocating individual segments of pipe, depending on length, material, and diameter of pipe, may also equate to a large cost (*Utility Research Memorandum* 2009). The figure below highlights the larger diameter pipes (21″ and higher), which could affect greater population if service were to be disrupted.

Figure 8-2. Wastewater Utilities



8.2.3 Telecommunications

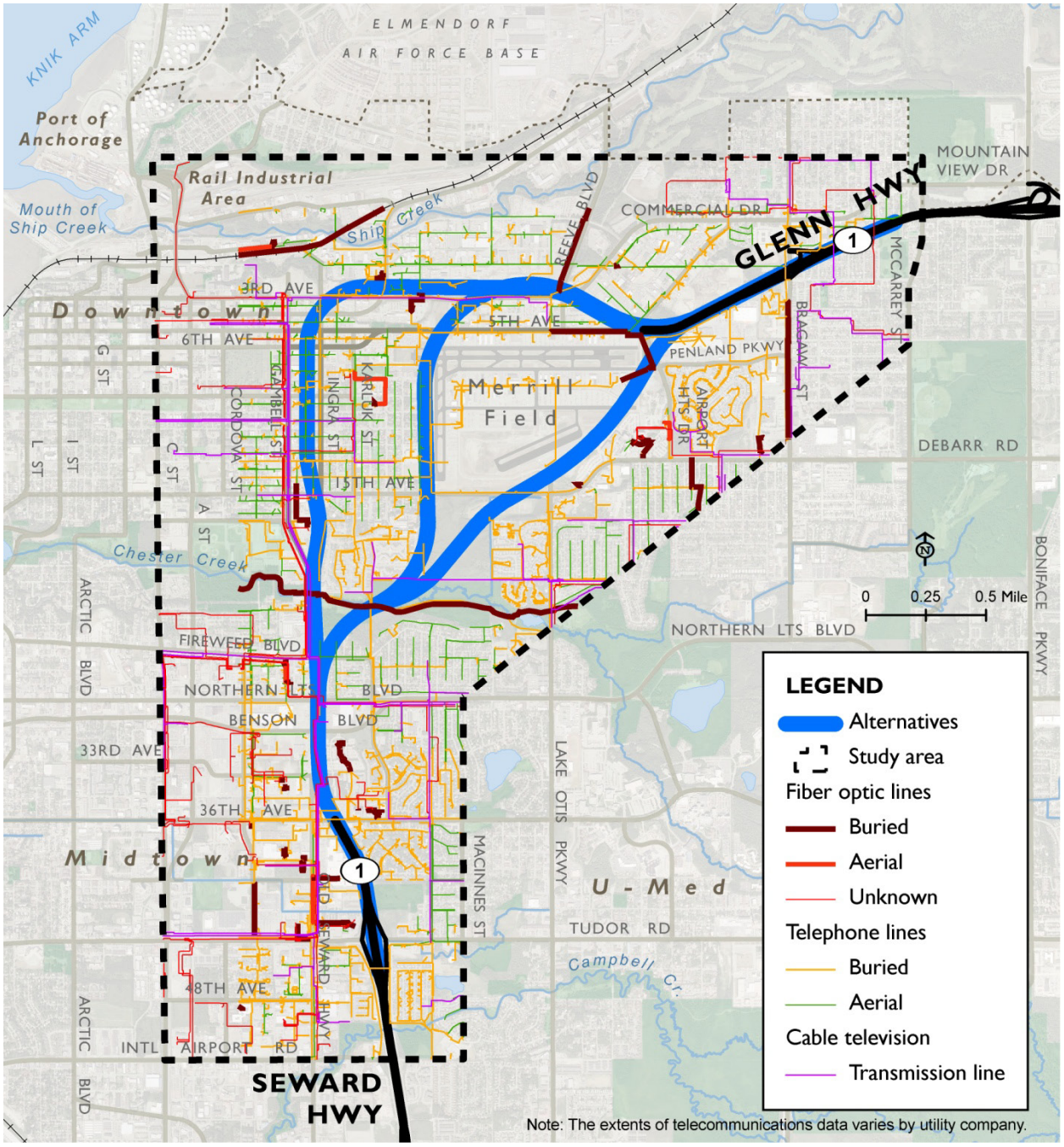
Fiber optics: A technology that uses glass (or plastic) threads (fibers) to transmit data. A fiber optic cable consists of a bundle of glass threads, each of which is capable of transmitting messages modulated onto light waves. Fiber optic lines are expensive to install. In addition, they are more fragile than wire and are difficult to splice.

Telecommunication lines (fiber optic lines, transmission lines, and telephone lines, both buried and aerial) are located throughout the study area. These facilities are owned by two private companies: ACS and GCI. Figure 8-3 depicts the telecommunications utilities within the study area. Generally speaking, buried lines are more expensive to relocate than aerial lines.

Major GCI-owned fiber optics within the study area supply service to areas such as Joint Base Elmendorf-Richardson and the Matanuska Susitna Valley (*Utility Research Memorandum* 2009). GCI-owned fiber optic lines begin near the intersection of the Seward Highway and 36th Avenue, and extend northward along the highway and Gambell Street. East/west fiber optic lines branch off the mainline. A GCI-owned cable TV transmission line follows 5th Avenue from Gambell Street to Reeve Boulevard.

ACS-owned fiber optic aerial lines and telephone lines (both buried and aerial) are located throughout the study area. ACS-owned telephone and fiber optics serve many businesses and facilities, including the Anchorage Jail, Alaska Regional Hospital, and Anchorage Municipal Light and Power (ML&P). ACS-owned buried fiber optic lines are located throughout the study area, notably along Chester Creek, Reeve Boulevard, and 5th Avenue, Airport Heights Drive, and Penland Parkway.

Figure 8-3. Telecommunications Utilities



8.2.4 Electrical

Electrical utilities are located throughout the study area. Major transmission lines are located along Northern Lights Boulevard, west of Karluk Street and north of 15th Avenue, and north of 3rd Avenue. Electrical utilities in the study area are owned by ML&P. Figure 8-4 depicts the major electrical utilities (power plants, substations, and transmission lines) within the study area. Two power plants are located within the study area: one north of East Whitney Road and east of A Street, and a second north of Karluk Street and 3rd Avenue. Substations are located in the study area near the intersection of the Seward Highway and 36th Avenue, along Northern Lights Boulevard, near the intersection of Gambell Street and 9th Avenue, near the intersection of Cordova Street and 3rd Avenue, and north of the Glenn Highway and east of Mountain View Drive. There are 115kV[1] and 35kV transmission lines in the study area, mainly along Northern Lights Boulevard, Gambell Street, west of Karluk Street, along 3rd Avenue, along 1st Avenue, and along Bragaw Street. A free-standing "moment tower" is located near the intersection of Seward Highway and Northern Lights Boulevard. The tower allows the transmission line to make a 90-degree turn at this location. A standard utility pole would have required guy wires that would have encroached on the roadway.

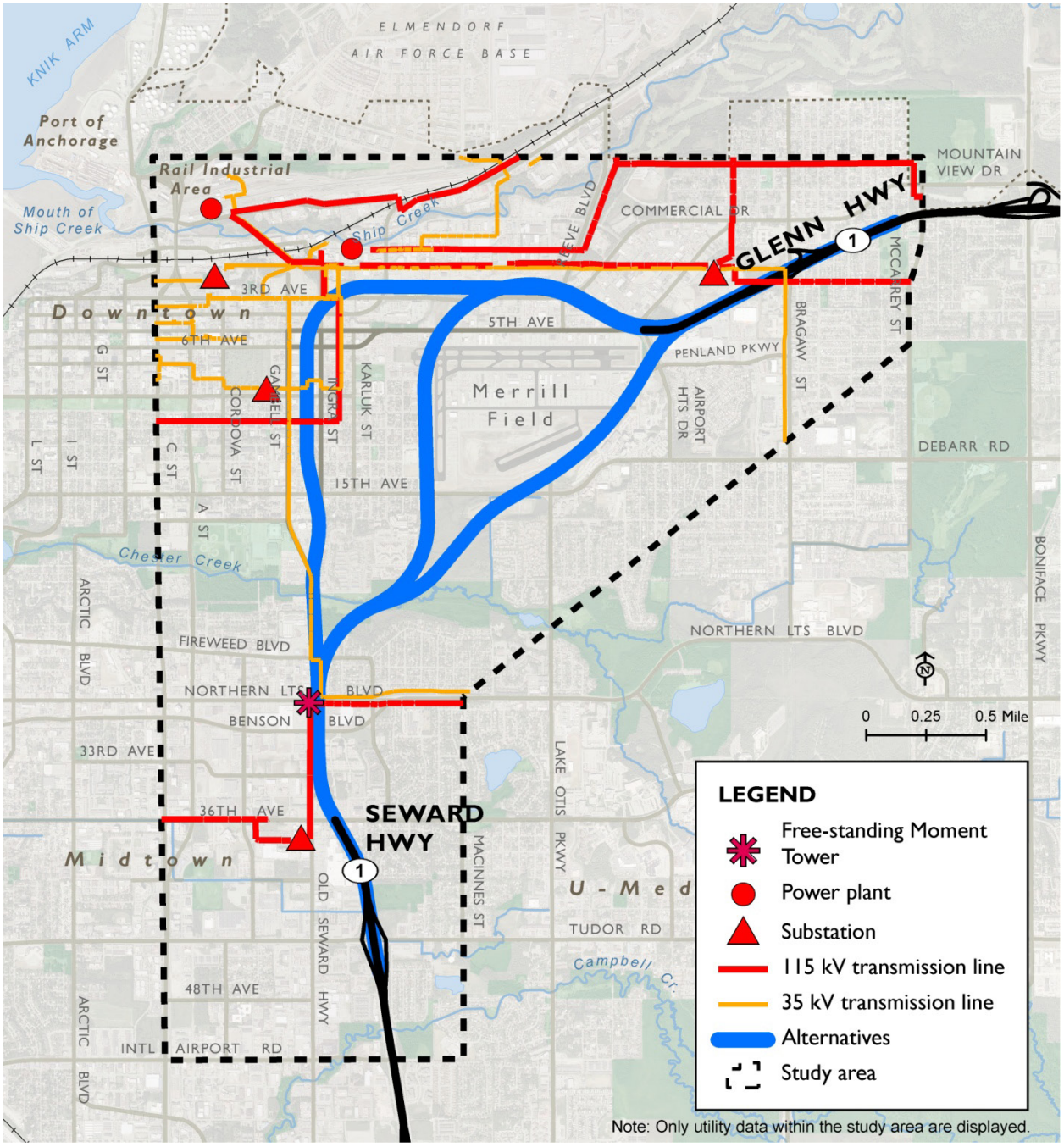
Free-standing moment tower: A large-diameter electrical utility pole that supports transmission lines. The pole has no lateral support features such as tie downs or guy wires and is laterally supported by moment forces designed into the foundation of the pole.

Substation: A station with transformers that changes the voltage of power lines from low to high or high to low. Electric power may flow through several substations between the generating power plant and the consumer.

During the 2008–2013 timeframe, ML&P plans to upgrade the existing 35kV-to-115kV line along the Seward Highway and Gambell Street between Northern Lights Boulevard and 1st Avenue, and Northern Lights Boulevard from the Seward Highway to Bragaw Street. ML&P also plans to construct a substation in the Midtown area, although the location is not yet determined.

[1] kV: kilovolt

Figure 8-4. Electrical Utilities

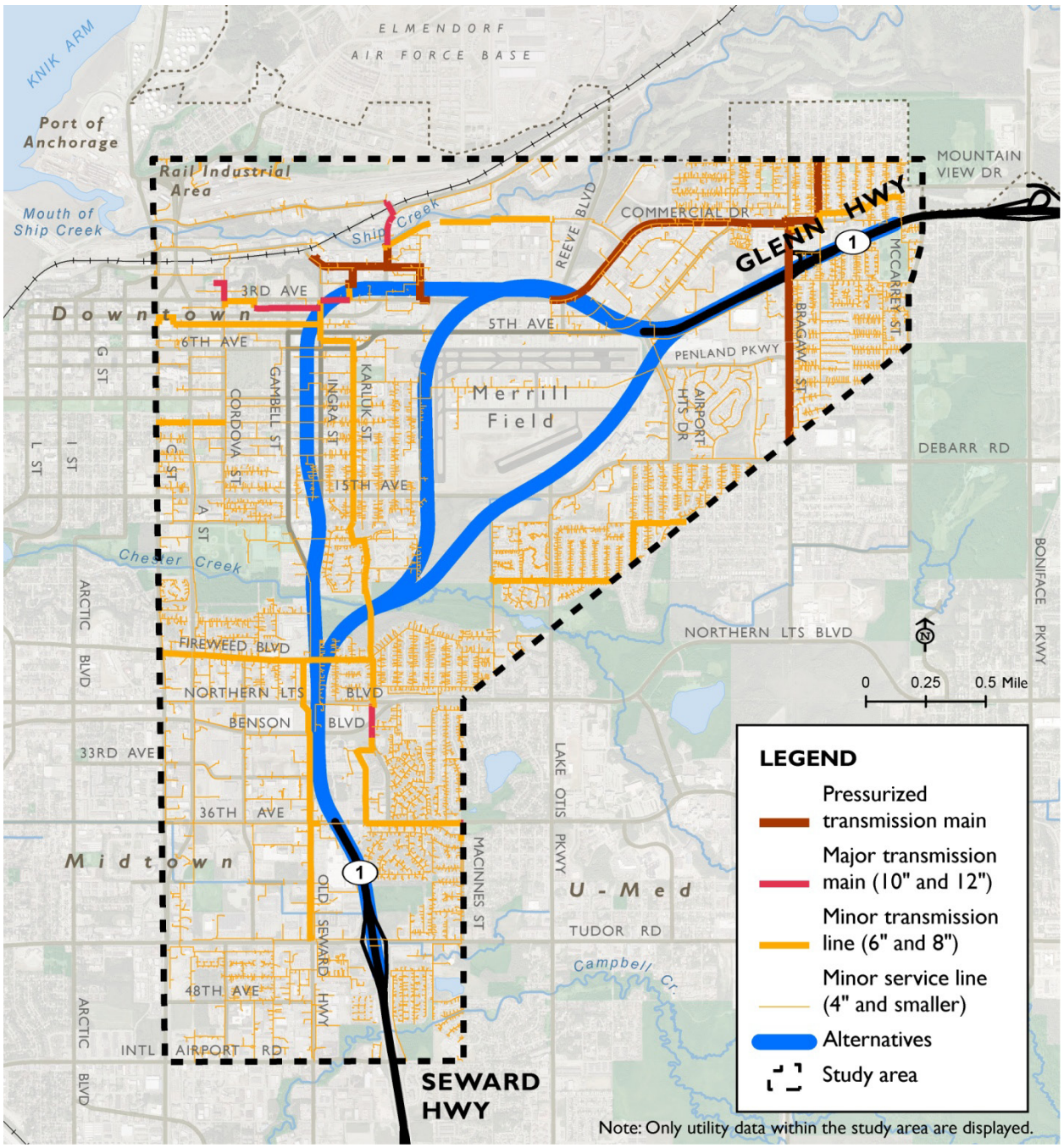


8.2.5 Natural Gas

Natural gas utilities are located throughout the study area. Natural gas utilities are owned by Enstar. Figure 8-5 depicts the natural gas utilities within the study area. Minor transmission lines (6 ″/8″) and minor service lines (2″/4″) are located throughout the study area. Notably, pressurized transmission mains are located along Ship Creek Avenue, extending from Ingra Street to east of Post Road, and along 3rd Avenue/Commercial Drive, turning south on Bragaw Street, extending to Debarr Road. There are

segments of major transmission main (10″/12″) along Latouche Street between Benson and Northern Lights boulevards, along 3rd Avenue from Ingra Street to Karluk Street, and along Post Road north of 1st Avenue. Pressurized transmission mains and major transmission mains are more costly on a linear foot basis to relocate and typically impact more uses than distribution system relocation (*Utility Research Memorandum* 2009).

Figure 8-5. Gas Utilities



8.3 BIBLIOGRAPHY

[DOT&PF] Alaska Department of Transportation and Public Facilities. 2008. *Utilities Reconnaissance Study*.

———. 2009. *Utility Research Memorandum*.

———. 2010. *Utility Research Memorandum*.

Chapter 9: Environmental Justice
Affected Environment

Table of Contents

9.1 INTRODUCTION 1
- 9.1.1 Regulatory Setting 1
- 9.1.2 Methodology 2

9.2 AFFECTED ENVIRONMENT 3
- 9.2.1 Minority Populations 3
- 9.2.2 Low-Income Populations 7
- 9.2.3 Demographic Characteristics 10
  - Age 12
  - Disabled Persons 12
  - Auto Ownership 12
  - Income 12
  - Ethnicity 12
  - Language Characteristics 13
- 9.2.4 Minority or Low-Income Community Facilities 14

9.3 BIBLIOGRAPHY 23

List of Tables

Table 9-1. 2000 and 2009 Minority Populations 3
Table 9-2. 2000 and 2009 Study Area Income Characteristics 7
Table 9-3. Characteristics of Minority and Low-Income Populations 10
Table 9-4. LEP Population 14
Table 9-5. Low-Income or Minority Community Facilities 15

List of Figures

Figure 9-1. Percent Non-White Population, U.S. Census 2000 5
Figure 9-2. Percent Non-White Population, ESRI 2009 5
Figure 9-3. Minority Residential Areas, H2H Study Area (2000 and 2009) 6
Figure 9-4. Percent Poverty, U.S. Census 2000 8
Figure 9-5. Percent Below DHHS Poverty Level, ESRI 2009 8
Figure 9-6. Low-Income Residential Areas, H2H Study Area (2000 and 2009) 9
Figure 9-7. Race/Ethnicity of Minority Identified by Elementary School District, H2H Study Area 13
Figure 9-8. Low-Income and Minority Community Facilities 22

9.1 INTRODUCTION

This chapter describes low-income and minority populations in the H2H socioeconomic study area and identifies the project-related impacts on these populations. The basis for this analysis is Federal Highway Administration (FHWA) Order 6640.23, which establishes the policies and procedures for complying with Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. EO 12898 directs Federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of Federal projects on the health and environmental of minority and low-income populations to the greatest extent practicable and permitted by law. Minority and low-income populations exist within the H2H study area. Section 9.2 identifies the affected environment and Section 9.3, Environmental Consequences, evaluates the potential for the alternatives to result in disproportionately high and adverse effects to the identified populations. More information can be found in Chapter 6, Social Environment, or in the *H2H Community Impact Assessment Technical Report* (DOT&PF 2010).

Environmental Justice: Defined by the U.S. Environmental Protection Agency's Office of Environmental Justice as "The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the executing of federal, state, local, and tribal programs and policies."

Minority: FHWA Order 6640.23 defines a minority as "…a person who is Black, Hispanic, Asian American, American Indian, or Alaska Native." The White House Office of Management and Budget amended this definition in its Bulletin No. 00-02 (March 9, 2000) to include Native Hawaiian and Other Pacific Islanders as minorities.

Low Income: FHWA Order 6640.23 defines a low-income household as one that has "…a household income at or below the Department of Health and Human Services (HHS) poverty guidelines."

9.1.1 Regulatory Setting

Key compliance issues relate to ensuring an inclusive and meaningful participation process for potentially affected minority populations and low-income populations. The study of impacts to environmental justice populations from a transportation project is legally mandated and supported by federal regulations, statutes, policies, technical advisories, and Executive Orders, including:

- FHWA Order 6640.23
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- Title VI of the Civil Rights Act of 1964
- Environmental Protection Agency (EPA) Guidance for Consideration of Environmental Justice in Clean Air Act Section 309 Reviews
- U.S. Department of Transportation Order on Environmental Justice (5680-1), 1997
- National Environmental Policy Act (NEPA)
- Clean Air Act (CAA) of 1990, Section 309
- Guidelines published by the Council on Environmental Quality (CEQ) (40 CFR 1500)
- FHWA Technical Advisory 6640.8A (1987), Guidance for Preparing and Processing Environmental and Section 4(f) Documents
- Department of Transportation Order 5610.2
- FHWA Interim Guidance, Addressing Environmental Justice in Environmental Assessments/Environmental Impact Statements (July 2010)

9.1.2 Methodology

Demographic analysis was conducted to help identify if low-income or minority populations exist within the H2H study area and, if so, where those populations are located. While FHWA does not establish thresholds to define low income and minority populations, demographic and statistical analysis and guidance from CEQ and EPA was used to characterize populations in the study area. The demographic analysis was based on income and race information from the most recent U.S. Census (2000), 2009 data from a demographics database firm (ESRI 2009), information from the Anchorage School District (ASD 2009), and through public involvement and community outreach. Geographic information systems (GIS) software was used to identify minority and low-income populations at the census block group level[1] within the Municipality of Anchorage and the H2H study area. The location where these populations live within the study area was refined using residential land use information (MOA 2008). These data sources were combined to provide a composite mapping of likely minority and low-income population areas.

To supplement the demographic analysis, a comprehensive public outreach effort was also undertaken to help identify low-income and minority populations and to understand how the proposed alternatives could affect those populations. H2H public involvement methods included conducting one-on-one interviews, attending cultural and faith-based group meetings, holding listening posts, and participating in community events. The project team also partnered with a number of cultural, civic, and faith-based organizations to engage environmental justice (EJ) communities in the project, and formed and met with committees (Neighborhood Partnerships and the Diversity Forum) established to engage non-traditional stakeholders. Public meetings were advertised utilizing translated flyers distributed by canvassing neighborhoods and targeted email lists. Phone lines and key project documents were made available in Hmong, Spanish, Tagalog, Samoan, and Nuer. Meeting advertisements were made available on the project Web site, e-newsletter, and partner e-mail lists that included the Anchorage School District, Municipality of Anchorage, and several cultural organizations. In addition, meetings were announced using local print, television, and radio advertisements; Public Service Announcements, and display ads on People Mover buses.

Because minority populations and low-income populations exist within the study area, the EIS considers the potential for the alternatives to result in disproportionately high and adverse effects to the identified populations. The impact analysis used the community impact assessment as the basis for determining adverse effects on the environment and community resources. If a resource category was found to have negligible, minimal, low, or moderate impacts, then no further EJ evaluation was performed for that resource. If a resource category identified a high and adverse impact, then qualitative and quantitative analyses were used to determine if that impact is considered disproportionate with respect to minority populations and low-income populations. The resources identified that could be affected such that a community might experience adverse impacts include community cohesion (the extent that a community feels connected), quality of life, community services and community gathering centers, economics, relocations, transportation (such as access), land use, Section 4(f) and 6(f) lands, air quality, noise, water quality, cultural resources, hazardous materials, and visual resources.

[1] The 2000 U.S. Census block groups in the MOA were established by the project team as the smallest geographic unit for which data were available (due to privacy protection in the original datasets). The 2008 and 2009 U.S. Census American Community Survey also published demographic statistics for the MOA. This information, more current than the 2000 Census but not available at the block group level of detail, was used to validate analysis results obtained from the 2009 ESRI data. Therefore, the MOA boundary was chosen for statistical comparison purposes in this chapter.

9.2 AFFECTED ENVIRONMENT

9.2.1 Minority Populations[2]

Table 9-1 shows the race/ethnicity breakdown of the population within the H2H socioeconomic study area as compared to the total MOA population in 2000 and 2009. There are slight differences between 2000 Census and 2009 ESRI demographics, but in general the distribution of minority populations is similar and suggests a growth trend over that time period.

Table 9-1. 2000 and 2009 Minority Populations

Race/Ethnicity	H2H Study Area		Municipality of Anchorage	
	2000 # (% of Total)	2009 # (% of Total)	2000 # (% of Total)	2009 # (% of Total)
White	17,938 (54%)	17,983 (49%)	181,982 (70%)	195,014 (66%)
Black or African American	2,802 (8%)	2,730 (7%)	14,667 (6%)	15,119 (5%)
American Indian or Alaska Native	4,307 (13%)	5,149 (14%)	18,326 (7%)	23,132 (8%)
Asian	2,473 (7%)	2,910 (8%)	14,208 (5%)	18,569 (6%)
Native Hawaiian or Pacific Islander	711 (2%)	755 (2%)	2,335 (1%)	2,707 (<1%)
Other	57 (<1%)	1,851 (5%)	583 (<1%)	8,618 (3%)
Two or more races	2,225 (7%)	3,774 (10%)	13,383 (5%)	24,301 (8%)
Hispanic (all races)	2,846 (9%)	4,039 (11%)	14,799 (6%)	19,668 (6%)
Minority Total	15,421 (46%)	18,395 (51%)	78,301 (30%)	101,612 (34%)
Total Population	33,359 (100%)	36,378 (100%)	260,283 (100%)	296,626 (100%)

Source: U.S. Census Bureau, 2000 and ESRI Community Info Data, 2009

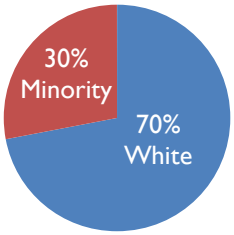
[2] *Minority population is defined as the sum total of the following populations: Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, two or more races, White Hispanic, and Other Hispanic.

Figures 9-1 and 9-2 illustrate the distribution of minority residents in Anchorage by block group in 2000 and 2009, respectively. The mapping shows the general concentration of minorities in the H2H study area, with the darkest shading indicating where those concentrations are "meaningfully greater[3]" than the MOA average.

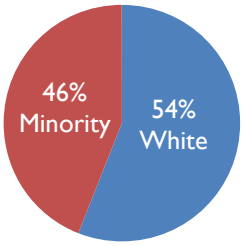
[3] EPA guidance advises to define minority populations by a "meaningful greater percentage" in the study area as compared to the reference unit population (EPA 1998). CEQ guidance recommends identifying areas exceeding 50 percent minority (CEQ 1997). The "meaningfully greater" classification in Figures 9-1 and 9-2 exceeds one standard deviation (16 percent), and also corresponds exactly with the threshold recommended in CEQ guidance (an area exceeding 50 percent minority population).

Figure 9-1. Percent Non-White[4] Population, U.S. Census 2000

Municipality of Anchorage



H2H Study Area



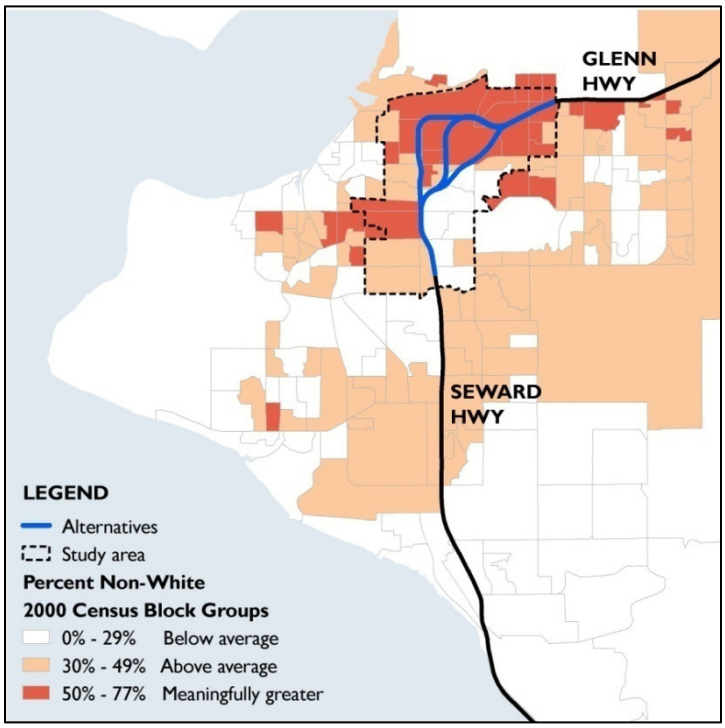
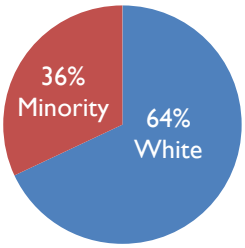
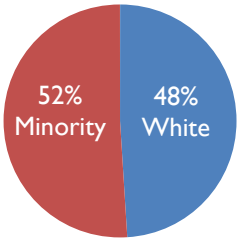


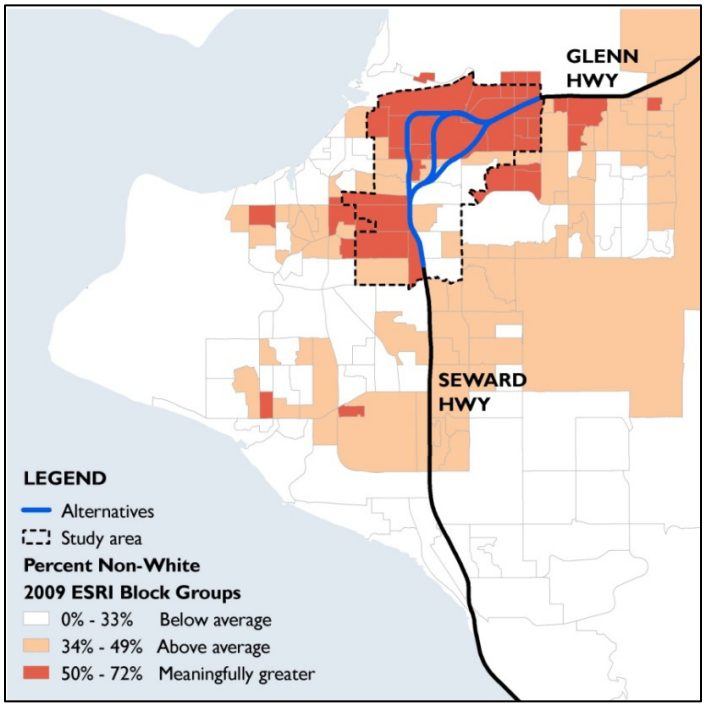
Figure 9-2. Percent Non-White Population, ESRI 2009

Muncipality of Anchorage



H2H Study Area

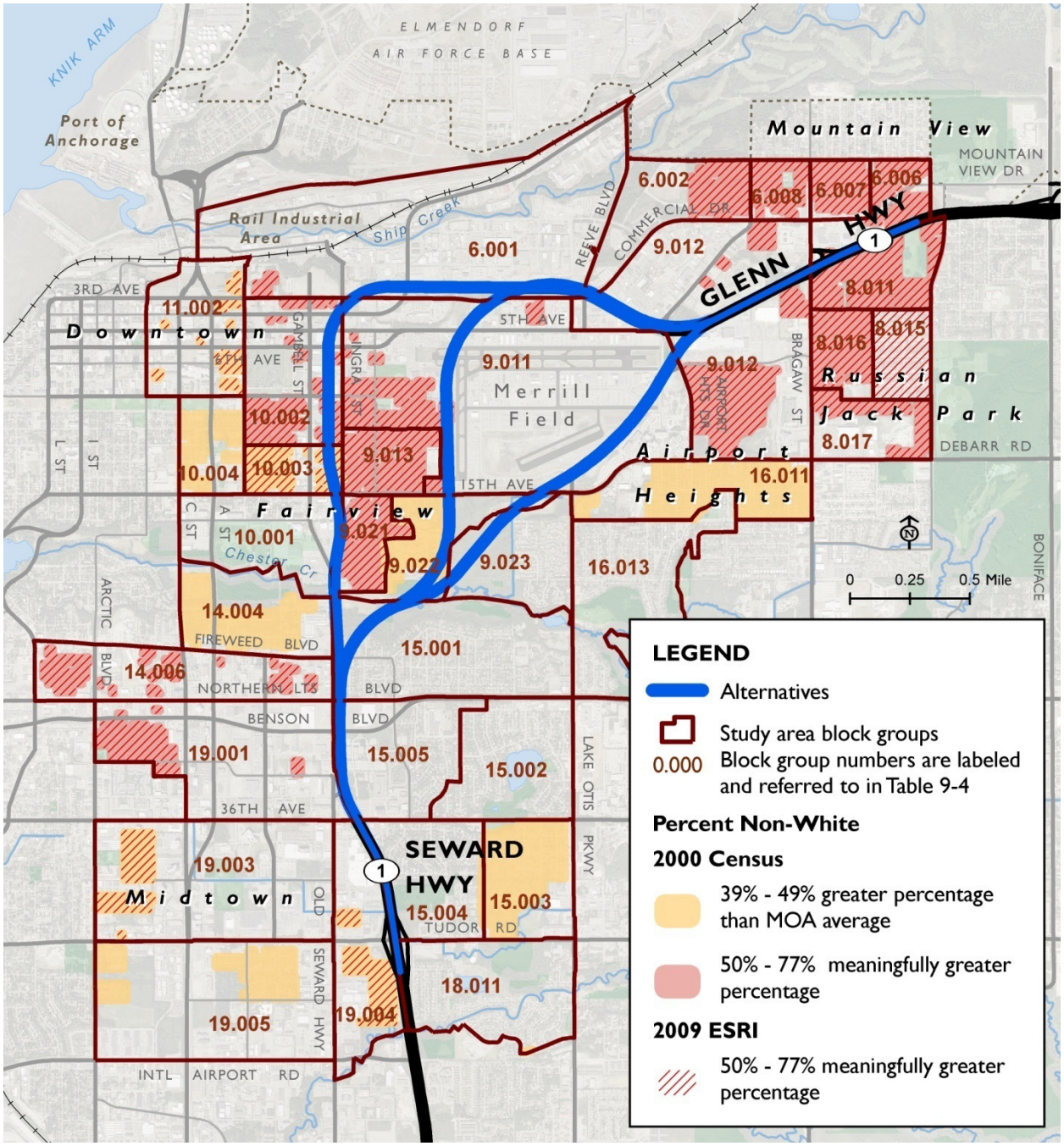




[4] Percent Non-White = (Total Population – Total White, Non-Hispanic Persons) / Total Population.

Figure 9-3 shows the H2H study area in greater detail. This map combines 2000 and 2009 block group data with residential land use information to show locations where minority populations are likely to reside. Areas of greater concentration are identified in Midtown, Fairview, Downtown, Mountain View, Airport Heights, and Russian Jack Park.

Figure 9-3. Minority Residential Areas, H2H Study Area (2000 and 2009)



Sources: 2009 ESRI Community Info, 2000 U.S. Census, 2008 MOA land use

9.2.2 Low-Income Populations

Table 9-2 outlines income characteristics and compares the H2H study area to the MOA as a whole. Based on these statistics, it is evident that the study area had a considerably higher percentage of low-income residents in 2000 than the MOA (17% compared to 7%) and in 2009 had a higher percentage of block groups below U.S. Department of Health and Human Services (DHHS) poverty levels (38% compared to 20%). Similarly, the median income in the study area was considerably lower in both 2000 and 2009 as compared to the MOA as a whole (29% less in 2000 and 31% less in 2009).

Table 9-2. 2000 and 2009 Study Area Income Characteristics

Characteristic	H2H Study Area		Municipality of Anchorage	
	Number	Percentage of Total	Number of persons	Percentage of Total
2000 Persons Below Poverty Level	5,533	17%[5]	19,319	7%[6]
2009 Number of Block Groups Below DHHS Poverty Level	13	38%	43	20%
2000 Median Household Income	$39,286[7]		$55,546	
2009 Median Household Income	$50,199[8]		$75,637[9]	

Source: U.S. Census Bureau 2000 and ESRI Community Info Data 2009

Note: The number of persons below the poverty level was not available with the ESRI data.

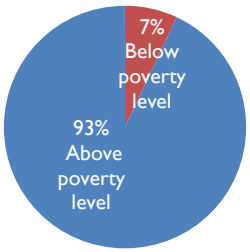
Across Anchorage, an average of 7 percent of the population was considered to be in poverty during the 2004 Census[4].

Figure 9-4 shows the distribution of this population by block group and outlines the H2H study area for reference. Darker shades on the map depict higher percentages of the population considered to be in poverty.[10] Concentrations of poverty are identified in the H2H study area, specifically in the south Midtown, Fairview, and Mountain View areas.

Block groups with median income levels below the 2009 DHHS poverty guidelines for Alaska are shaded on the map in Figure 9-5.[11] Darker shades depict block groups below poverty guidelines with high population density. The Fairview, Mountain View, and Russian Jack Park areas are highlighted.

[5] This figure represents the average percent poverty calculated using block groups in the H2H study area.
[6] As an additional reference, the 2008 American Community survey reports 7.2 percent poverty for the MOA.
[7] This figure represents the average median 2000 household income calculated using block groups in the H2H study area.
[8] This figure represents the average median 2009 household income calculated using block groups in the H2H study area.
[9] As an additional reference, the 2008 American Community survey reports a median household income of $74,396 for the MOA. The 2009 ESRI figure is an average of median household income block groups in the MOA.
[10] Block groups that are "above the Anchorage average" are within one standard deviation greater than the mean, and those "meaningfully greater" than the overall Anchorage average are greater than one standard deviation above the mean.
[11] Percent poverty figures are not available from the 2009 ESRI data for direct comparison. But, the percentage of low-income residents by block group was calculable using demographic data provided by ESRI and based on DHHS poverty guidelines. Population density was also included on the map to account for census block groups that encompass very large areas (such as Joint Base Elmendorf-Richardson and Bicentennial Park).

Municipality of Anchorage



H2H Study Area

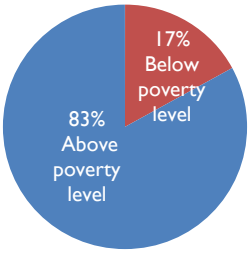
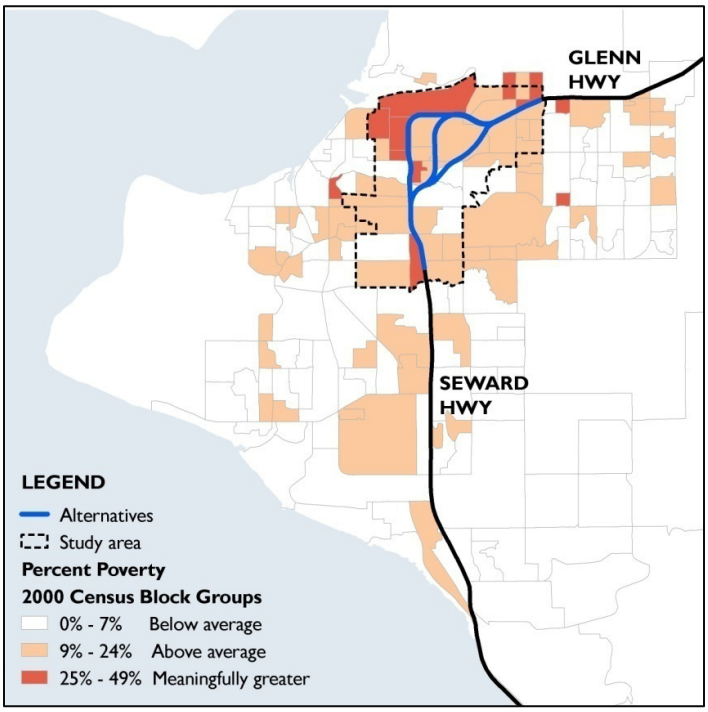
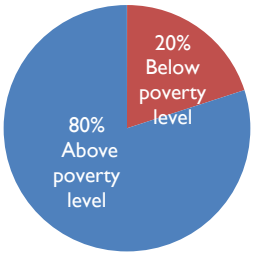


Figure 9-4. Percent Poverty, U.S. Census 2000



Note: Population was normalized by area to account for large census block groups.

Municipality of Anchorage



H2H Study Area

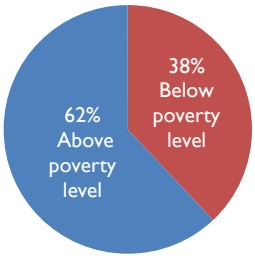


Figure 9-5. Percent Below DHHS Poverty Level, ESRI 2009

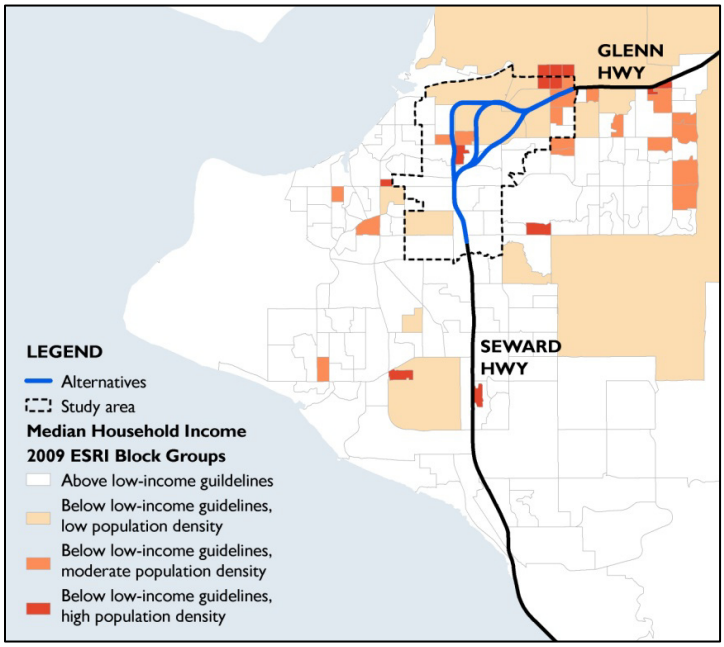
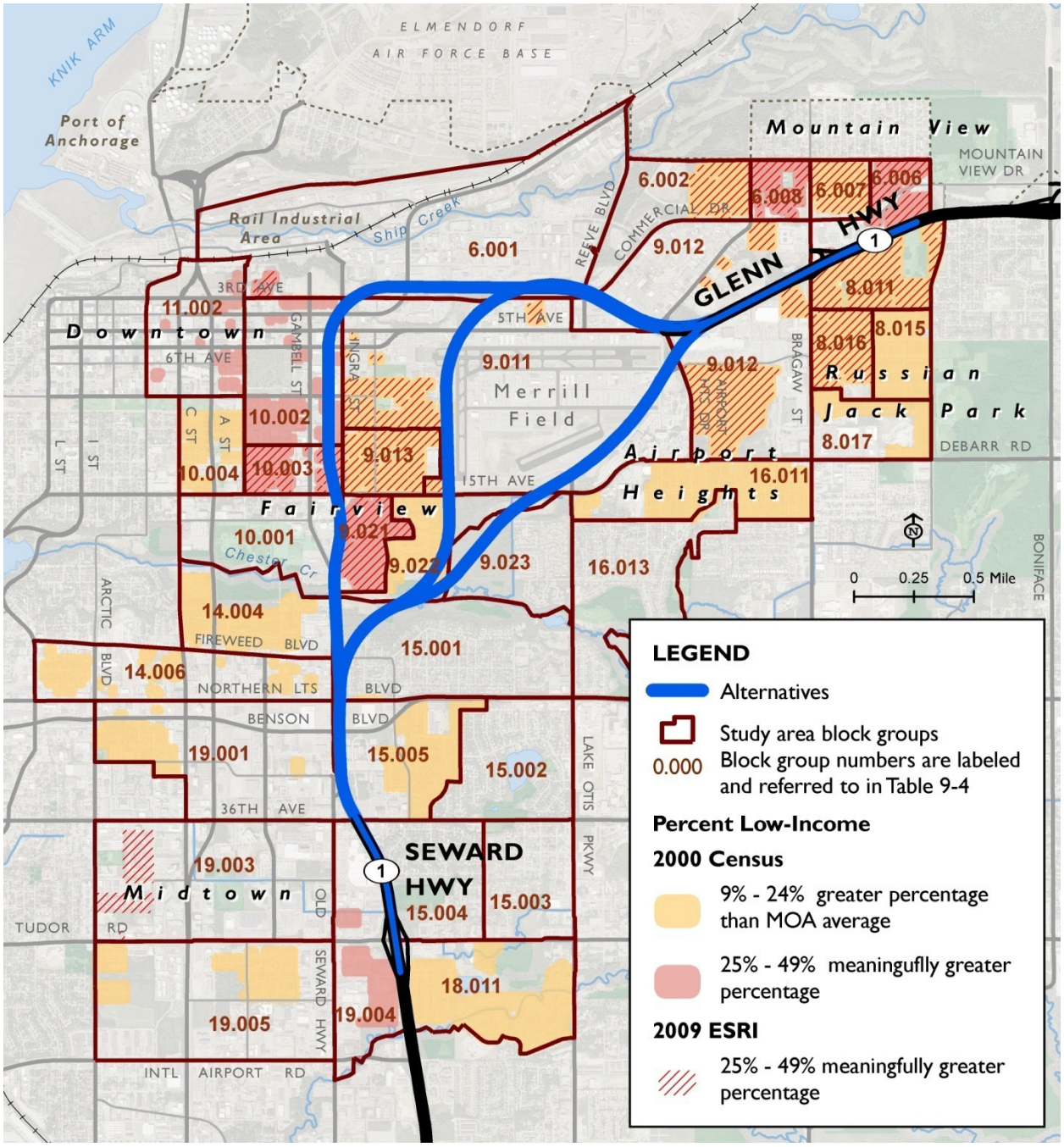


Figure 9-6. Low-Income Residential Areas, H2H Study Area (2000 and 2009)



Sources: 2009 ESRI Community Info, 2000 U.S. Census, 2008 MOA land use

9.2.3 Demographic Characteristics

This section describes the demographic characteristics of minority and low-income populations identified in the study area (Figures 9-3 and 9-6, respectively). Table 9-3 outlines age, disability, auto ownership, income, ethnicity, and English language ability by block group in detail.

Table 9-3. Characteristics of Minority and Low-Income Populations

Block Group	Age 65 Years and Older		Mobility Disabled	Auto Ownership	Median Income		Percent Non-White		Non-English Speaking
	2000 # (%)	2009 # (%)	2000 # (%)	2000 Cars/HH	2000 $	2009 $	2000 %	2009 %	2000 # (%)
Fairview									
6.001	12 (4%)	16 (4%)	26 (10%)	1.53	38,167	40,707	55%	70%	6 (2%)
9.011	64 (4%)	77 (5%)	73 (16%)	1.13	26,538	34,802	64%	70%	60 (5%)
9.013	77 (8%)	86 (9%)	79 (17%)	1.04	29,038	37,207	64%	67%	106 (11%)
9.021	93 (7%)	116 (9%)	46 (12%)	1.22	31,250	38,855	70%	75%	224 (19%)
9.022	251 (26%)	242 (26%)	146 (22%)	0.82	18,396	22,563	44%	54%	154 (17%)
10.001	21 (3%)	28 (4%)	13 (7%)	1.23	28,839	35,594	35%	45%	11 (2%)
10.002	102 (8%)	119 (9%)	109 (21%)	1.07	25,909	33,664	56%	61%	50 (4%)
10.003	63 (8%)	70 (9%)	83 (17%)	1.26	27,019	33,951	43%	55%	31 (4%)
Mountain View									
6.002	40 (4%)	46 (5%)	29 (14%)	1.08	29,500	39,503	65%	72%	107 (12%)
6.006	33 (5%)	38 (5%)	47 (14%)	1.27	31,094	38,643	56%	64%	20 (3%)
6.007	52 (6%)	63(7%)	46 (24%)	0.92	31,444	38,560	77%	75%	71 (8%)
6.008	32 (4%)	40 (5%)	53 (17%)	0.89	22,788	29,484	72%	77%	54 (8%)
Russian Jack Park									
8.011	72 (6%)	85 (7%)	64 (11%)	1.42	38,145	46,880	53%	57%	28 (3%)
8.015	60 (7%)	82 (9%)	87 (20%)	1.88	55,795	67,230	30%	55%	13 (1%)
8.016	63 (6%)	72 (7%)	130 (26%)	1.44	27,409	32,622	59%	65%	57 (6%)
8.017	35 (4%)	45 (5%)	103 (24%)	1.15	40,431	50,943	68%	64%	35 (5%)
Airport Heights									
9.012	97 (6%)	122 (6%)	109 (17%)	1.41	38,684	45,907	64%	70%	81 (5%)
9.023	99 (13%)	159 (21%)	23 (17%)	1.53	55,208	70,083	27%	31%	34 (5%)
16.011	92 (9%)	151 (12%)	53 (18%)	1.87	47,417	59,794	41%	41%	7 (1%)
16.013	148 (10%)	176 (11%)	88 (24%)	1.86	48,333	60,244	22%	31%	13 (1%)
South Addition									
10.004	33 (5%)	68(11%)	10 (5%)	1.02	30,673	39,094	50%	44%	12 (2%)

Block Group	Age 65 Years and Older		Mobility Disabled	Auto Ownership	Median Income		Percent Non-White		Non-English Speaking
	2000 # (%)	2009 # (%)	2000 # (%)	2000 Cars/HH	2000 $	2009 $	2000 %	2009 %	2000 # (%)
Downtown									
11.002	81 (7%)	169 (10%)	107 (16%)	0.81	25,577	34,460	49%	54%	30 (3%)
Spenard									
14.004	74 (7%)	86 (8%)	195 (18%)	1.42	37,031	48,118	48%	55%	118 (11%)
Midtown									
14.006	58 (6%)	63 (7%)	166 (27%)	0.93	31,324	39,651	56%	60%	188 (22%)
19.001	54 (7%)	85 (10%)	51 (16%)	1.12	29,167	35,717	52%	57%	55 (8%)
19.003	61 (9%)	41 (7%)	32 (14%)	1.50	37,065	48,478	39%	55%	0 (0%)
19.004	16 (4%)	28 (5%)	27 (38%)	1.22	24,583	31,155	44%	56%	12 (3%)
19.005	160 (13%)	178 (12%)	49 (18%)	1.50	46,513	58,153	41%	46%	43 (4%)
Rogers Park									
15.001	248 (18%)	320 (23%)	64 (23%)	1.80	66,016	85,233	13%	18%	15 (1%)
15.002	170 (15%)	190 (17%)	40 (19%)	1.94	98,491	131,399	14%	17%	48 (5%)
15.005	96 (11%)	104 (12%)	28 (12%)	1.59	43,750	57,340	25%	38%	11 (1%)
Tudor Area									
15.003	64 (7%)	120 (12%)	86 (24%)	1.84	55,500	69,697	40%	39%	18 (2%)
15.004	88 (10%)	150 (16%)	58 (22%)	1.83	65,074	77,502	20%	29%	0 (0%)
Campbell Park									
18.011	101 (9%)	123 (11%)	28 (16%)	1.73	53,571	67,509	23%	31%	62 (6%)
18.013	61 (9%)	60 (3%)	53 (17%)	1.50	37,065	48,478	39%	38%	0 (0%)
H2H Study Area	2,810 (8%)	3,557 (6%)	2,248 (18%)	1.36	39,286	49,434	44%	52%	1,774 (6%)
MOA	7,974 (3%)	23,291 (8%)	9,975 (4%)	1.71	55,546	71,986	28%	35%	5,266 (2%)

Key: Less than MOA average; Greater than MOA average (but less than study area average); Greater than MOA average and study area average

Source: U.S. Census Bureau, 2000 and ESRI Community Info Data, 2009

Age

Table 9-3 displays the number of residents age 65 and older and their percentage of population by block group. According to 2009 data, 8 percent of Anchorage is 65 years or older. Both 2000 and 2009 data sources indicate that over-65 populations are highest in block groups within the Fairview, Airport Heights, and Rogers Park areas. The block group with the highest percentage of seniors in 2009 occurs in Fairview (block group 9.022) at 26 percent; block group 15.001, located in Rogers Park, has the highest raw number of residents age 65 or older (320).

Disabled Persons

The 2000 Census data indicate that approximately 9,975 persons over the age of 16 living within the MOA identified themselves as having a mobility disability (4 percent of the total population). In the H2H study area, this figure is 2,248 persons, or 18 percent of the total study area population. According to the data in Table 9-3, persons with mobility disabilities are distributed throughout the study area, with the highest percentage located in Midtown (block group 19.004) at 38 percent; the block group with the highest raw number of disabled individuals is located in Spenard (block group 14.004) with 195 people.

Auto Ownership

The 2000 Census reports an average of 1.71 cars per household in the MOA, while the average number of cars per household in the H2H study area is lower, at 1.36. According to Table 9-3, areas with less than 1.00 car per household include Fairview, Mountain View, Downtown, and Midtown. Households without cars are dependent on transit, bicycle, and pedestrian modes of transportation.

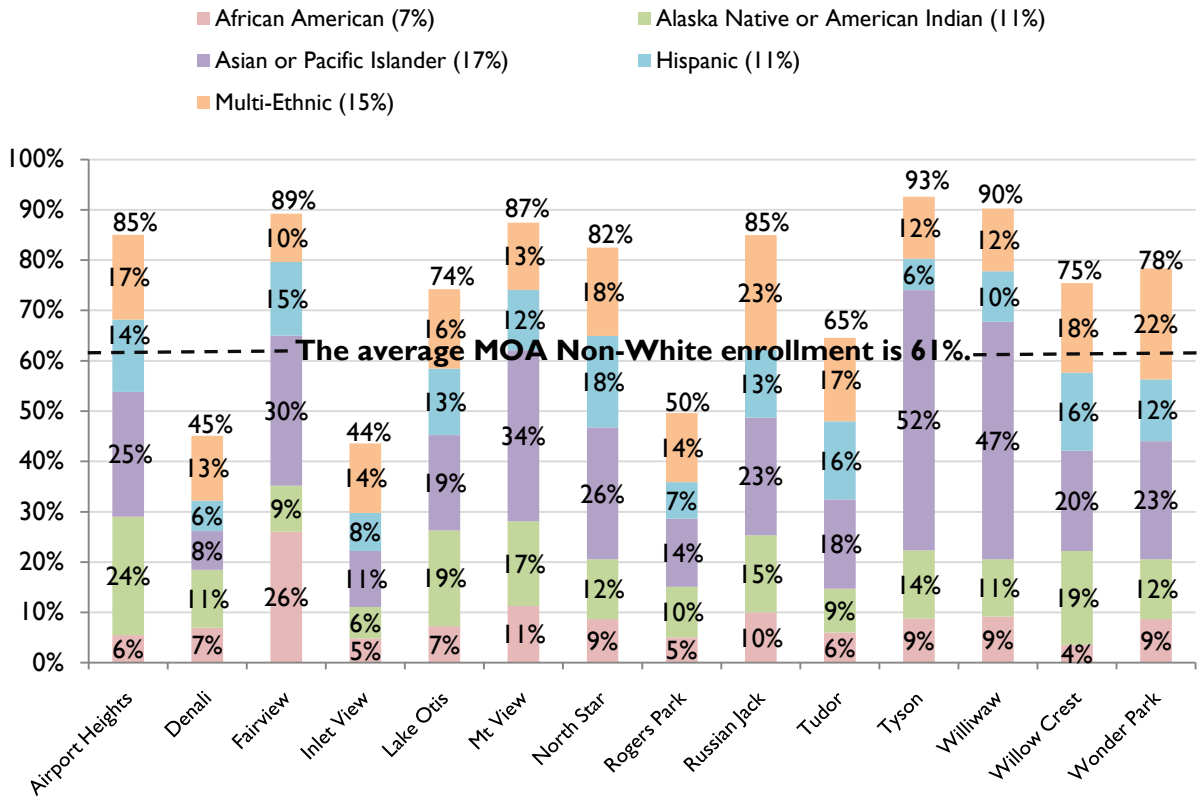
Income

Lower than average median household incomes are found throughout the H2H study area. Average or above-average incomes are found in Rogers Park and the Tudor Area. Notably, the lowest incomes in all of Anchorage are found in Fairview and Mountain View, by as much as 68 percent lower than the average MOA median household income.

Ethnicity

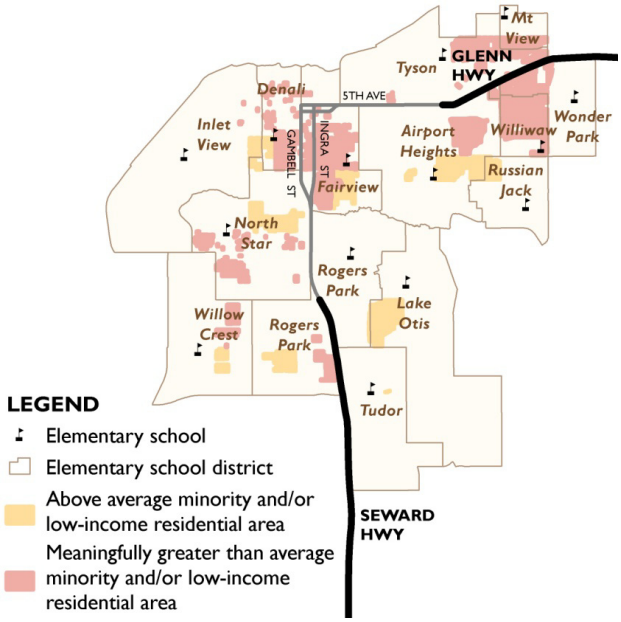
Both 2000 and 2009 datasets show concentrations of minority populations in the Fairview, Mountain View, Russian Jack Park, Airport Heights, Downtown, and Midtown areas (see Table 9-3 and Figure 9-3). The Anchorage School District is an additional data source that provides more detailed information about the various ethnicities found within study area block groups. Figure 9-7 shows the ethnicity of student enrollment in the 2009-2010 school year. The average non-white enrollment in Anchorage is 61 percent. Out of 14 public elementary school districts in the H2H study area, 11 have non-white enrollment percentages above the average 61 percent, with the highest in Tyson Elementary (Mountain View area) at 93 percent. The data show the highest minority concentrations to be in the Fairview, Tyson, Mountain View, and Williwaw elementary school districts. The highest African American population is found in Fairview; the highest Alaska Native enrollment numbers are found in Airport Heights; the highest Asian or Pacific Islander populations are found in Tyson, Williwaw, and Mountain View; the largest concentration of Hispanic students is found in the North Star, Tudor, Willow Crest, and Fairview areas; and finally, the greatest number of multi-ethnic students is located in Russian Jack.

Figure 9-7. Race/Ethnicity of Minority Identified by Elementary School District, H2H Study Area



Percentages in the legend represent average MOA enrollment figures.

Source: Anchorage School District 2009-2010



The map at right shows where minority and/or low-income populations live within the public elementary school districts of the H2H study area. The ethnic diversity of these residential areas is shown in the above graph.

Language Characteristics

Table 9-3 shows that Fairview, Spenard, and Midtown have greater than average numbers of non-English speakers (as high as 22 percent in Midtown). To identify and further characterize households in which English is not the primary language, the project team used data from the

English Language Learners (ELL) program in nearby elementary schools.[12] Within these schools, the ASD reported that Spanish, Samoan, and Hmong are spoken by 5 percent or more of the student population (see Table 9-4). The project team has provided interpretation and translation of vital documents in the above languages, in addition to documents published in English.

Table 9-4. LEP Population

Elem. School Name	Enrolled Students	Spanish		Hmong		Samoan	
	# pers.	# pers.	% of Total	# pers.	% of Total	# pers.	% of Total
Tyson William	501	15	3.0%	79	15.8%	32	6.4%
Denali Montessori	401	9	2.2%	3	0.7%	1	0.2%
Rogers Park	496	11	2.2%	2	0.4%	6	1.2%
Fairview	446	23	5.2%	10	2.2%	50	11.2%
Williwaw	368	13	3.5%	70	19.0%	17	4.6%
Airport Heights	327	17	5.2%	22	6.7%	18	5.5%
North Star	428	17	4.0%	0	0.0%	16	3.7%
Mountain View	398	14	3.5%	54	13.6%	8	2.0%
Wonder Park	277	9	3.2%	9	3.2%	14	5.1%
Willow Crest	387	25	6.5%	6	1.6%	18	4.7%
Inlet View	225	6	2.7%	0	0.0%	1	0.4%
Total	4254	159	3.7%	255	6.0%	181	4.3%

Source: 2009-2010 ASD English Language Learners Program Data; ASD 2009-2010 Ethnicity Report

Note: Red highlighted text indicates schools with greater than 5% of the school population speaking that particular language.

9.2.4 Minority or Low-Income Community Facilities

This section describes minority or low-income community facilities located in the project area. There are more than 150 total community facilities within the study area, including businesses and educational, childcare, healthcare, housing, and religious institutions (see Chapter 6, Social Environment, for more details). Many of these facilities serve low-income and minority

[12] The U.S. Census reports only levels of English proficiency and not primary languages spoken. The FHWA report *How to Engage Low-Literacy and Limited-English Proficiency Populations* states, "[i]nformation collected at the elementary-school level gives a more focused picture of the population within a smaller area because these schools have a smaller attendance boundary than middle and high schools." The DOT&PF used the U.S. Department of Justice Safe Harbor guidelines for Limited English Proficiency to determine LEP populations. The Safe Harbor Guidelines recommend "written translation of vital documents for each eligible LEP language group that constitutes 5% or 1,000 people, whichever is less of the population of persons eligible to be served or likely to be affected or encountered."

populations. Within the Fairview and Mountain View neighborhoods, there is a concentration of low-income and minority community facilities. In the Russian Jack neighborhood, there is a concentration of in-home child care providers that serve families receiving child care assistance. Table 9-5 lists all the known community facilities that serve low-income and minority populations and could be affected by the reasonable alternatives. Figure 9-8 shows where these facilities are located in relationship to the reasonable alternatives.

Table 9-5. Low-Income or Minority Community Facilities

Map #	Name	Low-Income	Minority	Description
Schools				
1	Anchorage Vocational Academic Institute of Learning (AVAIL)	X	X	Public, grade 9-12 school. An alternative high school program devoted to students who have dropped out of traditional schools. 98% economically disadvantaged, 50% ethnically diverse, fewer than 40% LEP
2	Fairview Elementary School	X	X	Public, grade K-16 school, located in the Fairview neighborhood. 100% economically disadvantaged, 89% ethnically diverse.
3	Eagle Crest Academy		X	Private, grade 7-12 school with focus on dyslexic students. 20 students, 25% ethnically diverse.
4	Airport Heights Elementary School	X	X	Public, grade K-6 school. 71% economically disadvantaged, 86% ethnically diverse, 36% LEP.
5	Crossroads	X		Grade 7-12 school for pregnant & parenting teens. 12 students. 60% economically disadvantaged, more than 60% ethnically diverse, fewer than 40% LEP.
6	Clark Middle School	X	X	Grade 6-8 school located in the Mountain View neighborhood. 100% economically disadvantaged, 87% ethnically diverse.
Child Care Provider (home)				
1	Alaska Children's Daycare Services	X		Registered (voluntary) in Thread Alaska Database as serving families that receive child care assistance. No data available on minority status.
2	Tonya's Berry Patch	X		See above.
3	Gomez Day Care	X		See above.
4	Pammy's Play Place	X		See above.
5	Estrellas Magicas	X		See above.
6	New Antioch Angels Daycare	X		See above.
7	Dee's Child Care Services	X		See above.

Map #	Name	Low-Income	Minority	Description
8	Learning Early Day Care	X		See above.
9	Crystal-Care Daycare	X		See above.
10	Three Times The Charm Childcare	X		See above.
11	Chong S Barnett	X		See above.
12	Chong S Barnett	X		See above.
13	Ruby's Child Care	X		See above.
14	Santa Day Care	X		See above.
15	Mercedes Childcare	X		See above.
16	Home Sweet Home	X		See above.
17	Maribel Daycare	X		See above.
18	Ivory Tower Day Care	X		See above.
19	Maria Contreras	X		See above.
20	A Child's World	X		See above.
21	Divino Nino	X		See above.
22	Casa Cuna	X		See above.
23	Sweet Home	X		See above.
24	Peek A Boo Daycare	X		See above.
Child Care Provider (center)				
1	Northern Lights Preschool & Kindergarten	X		Registered (voluntary) in Thread Alaska Database as serving families that receive child care assistance. No data available on minority status.
2	Klever Kids	X		Registered (voluntary) in Thread Alaska Database as serving families that receive child care assistance. No data available on minority status.
3	RurAL CAP Child Development Center	X		Provides care for children between the ages of 19 months to five years, and has a sliding tuition scale to benefit low-income families. Recipient of Head Start grant.
4	Camp Fire - Rogers Park	X		Provides safe, free, and nurturing after-school alternatives to youth in low-income neighborhoods.

Map #	Name	Low-Income	Minority	Description
5	Easter Seals/Tundra Tykes	X		Provides child care services at costs that are affordable to families in need.
6	Camp Fire - Denali	X		Provides safe, free, and nurturing after-school alternatives to youth in low-income neighborhoods.
7	Little Steps Day School	X		Registered (voluntary) in Thread Alaska Database as serving families that receive child care assistance. No data available on minority status.
8	Camp Fire - Airport Heights	X		Provides safe, free, and nurturing after-school alternatives to youth in low-income neighborhoods.
9	Kids' Corps - Mountain View	X		Provides child-care services for low-income families. Recipient of Head Start grant.
Library				
1	Z.J. Loussac Public Library	X	X	Public library.
2	Mountain View Library	X	X	Public library.
Religious Facilities/Places of Worship				
1	Alaska Korean CRC		X	Korean church.
2	New Season Christian Center		X	Black church.
3	Islamic Community Center of Anchorage		X	Ethnically diverse church.
4	Church Of Jesus Christ Of Latter Day Saints		X	Offers services in Spanish and Samoan.
5	Anchor Park United Methodist Church		X	Offers services in Tongan.
6	Shiloh Missionary		X	Black church.
7	Iglesia Christiana Eben-Ezer Church of God		X	Hispanic church.
8	Central Lutheran Church and Anchorage Native Lutheran Church		X	Ethnically diverse church. Building is shared by two congregations.
9	Iglesia de Dios Bet-al (Bethel Hispanic Church of God)		X	Hispanic church that holds worship services primarily in Spanish.
10	Greater Friendship Baptist Church		X	Black church.

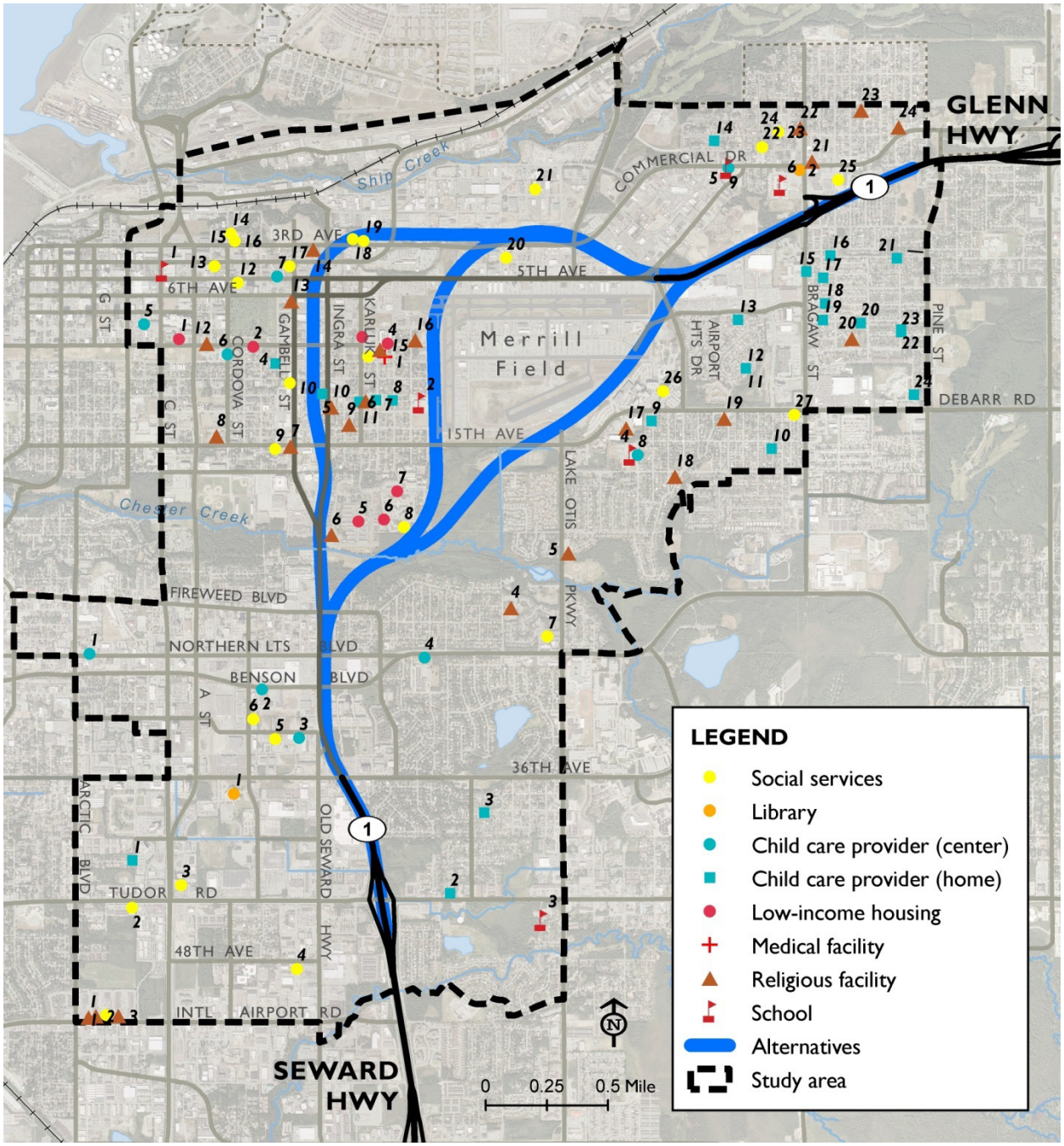
Map #	Name	Low-Income	Minority	Description
11	New Antioch Church of God in Christ		X	Black church.
12	Salvation Army, Korean Corps Community Center	X	X	Religious institution.
13	Revival Assembly of God		X	Samoan/Pacific Islander/Polynesian church.
14	First Native Baptist Church		X	Alaska Native church.
15	Most Worshipful Prince Hall Free & Accepted Masons		X	Black Mason hall.
16	First Spanish Assemblies of God		X	Hispanic church.
17	Anchorage Church Of Christ		X	Offers Samoan service.
18	Trinity Christian Reformed		X	Ethnically diverse church.
19	Grandview Baptist Church		X	Provides ESL program to improve language skills for citizenship test.
20	St Anthony's Parish Of The Archdiocese		X	Offers services in Filipino and Samoan.
21	Congregational Christian Church Of American Samoa In Ak		X	Samoan church.
22	Mountain View Baptist Church	X	X	Has offered ESL programs in the past; planning to open a food pantry.
23	Leake Temple A. M. E. Zion Church		X	Black church.
24	First Samoan United Methodist		X	Samoan church.
Medical Facility				
1	Anchorage Neighborhood Health Center in Fairview	X		Community health center that provides sliding scale and uncompensated care for uninsured and low-income patients.
Low-Income Housing				
1	Parkview Center	X		Minimum security, temporary transitional housing, owned by Anchorage Correctional Center.
2	Eagle Crest Condos	X		Transitional Housing Program that provides low-cost lodging. Owned by Salvation Army.

Map #	Name	Low-Income	Minority	Description
3	Park View Manor/Gateway Learning Center	X		Low-income housing, including job skills education center. Owned by Alaska Housing Finance Corporation.
4	Merrill Crossing Housing	X		Low/moderate-income housing. Owned by Anchorage NeighborWorks.
5	Chester Park Estates	X		Family low-income housing apartment subsidized by HUD.
6	Ptarmigan Park Apartments	X		Family low income housing apartment subsidized by HUD.
7	Chugach View	X		Elderly low-income housing apartment subsidized by HUD.
Social Services Facilities				
1	Alaska Health Fair, Inc.	X		Nonprofit organization that works with communities, schools, senior centers, and businesses to provide comprehensive, low-cost health fairs, including health screening services.
2	Anchorage Neighborhood Housing	X		Provides affordable housing services. Member of NeighborWorks America.
3	Job Corps	X		Job Corps is a no-cost education and career technical training program administered by the U.S. Department of Labor that helps young men and women ages 16 through 24 improve the quality of their lives through career technical and academic training.
4	Salvation Army Adult Rehabilitation Program	X	X	Provides housing, counseling, life skills education, spiritual development, and work therapy for men who are struggling to overcome challenges and difficult circumstances resulting from the effects of substance abuse. This residential program is supported solely from the sales at local Salvation Army Thrift stores.
5	Anchorage Job Center, Midtown	X		Provides job location services.
6	March of Dimes, Alaska Chapter		X	Health advocacy organization for mothers and babies. Provides grants to other nonprofits and prenatal education in English and Spanish.
7	Expanded Food & Nutrition Education Program (EFNEP)	X		Provides nutritional programs for limited resource audiences, run by UAF Cooperative Extension Service.
8	Anchorage Senior Center	X	X	Non-residential senior activity center with 2,800 members. Provides rental space for community organizations, including minority groups.

Map #	Name	Low-Income	Minority	Description
9	McKinnell House / Emergency center	X		Shelter for homeless two-parent families or single-parent fathers. Case management services helps adults to obtain employment and move back into independent housing. Services include food pantry and financial assistance for medical prescriptions and clothing. Owned by Salvation Army.
10	Bishop's Attic	X		Nonprofit thrift store provides clothing and furniture for those in need through vouchers, owned by Catholic Social Services.
11	Kid's Kitchen (at Fairview Community Center)	X	X	Kid's Kitchen provides free nutritious meals every weekday to 75 kids. Activity center provides rental space for community organizations, including minority groups.
12	YWCA		X	Nonprofit organization with mission of eliminating racism and empowering women. Provides local programs in health, finance, youth development, social justice, leadership, and empowerment.
13	Consumer Credit Counseling	X		Nonprofit HUD-approved counseling agency. provides guidance on debt management, housing, loans, etc.
14	Catholic Social Services	X	X	Social service agency. Services include emergency shelters, teen homes, food pantry, supportive housing, adoption and pregnancy support, disability services, and refugee and immigrant resettlement program.
15	Mabel T Caverly Senior Center	X	X	Senior Center that provides social, recreational and/or emotional support to elderly, frail, low-income and minority individuals. Programs include small grants for those who do not have insurance coverage.
16	Intervention Help Line	X		Addiction/recovery support services for low to no cost.
17	Anchorage Job Center, Downtown	X		Provides job location services.
18	Brother Francis Shelter	X		Temporary, emergency shelter for men and women provides an evening meal, showers, laundry facilities, and information and referral assistance for social services programs.
19	Bean's Café	X		Provides meals, daytime shelter, information and referral assistance to health and human service programs.
20	Safe Harbor Inn	X		Transitional housing for very low-income (as defined by HUD) homeless families and people with disabilities who are clients of local social service agencies, health care organizations, and job training and employment organizations.
21	Food Bank of Alaska	X		Obtains and provides food to partner agencies feeding hungry people.

Map #	Name	Low-Income	Minority	Description
22	Mother Lawrence	X	X	Family-run neighborhood food pantry, food and clothing distribution.
23	Mountain View Community Center	X	X	Activity center provides rental space and kids' programs. Operated by the Boys and Girls Club of Alaska.
24	Kid's Kitchen (at Mountain View Community Center)	X	X	Activity center provides rental space for community organizations, including minority groups. Kid's Kitchen provides free nutritious meals every weekday to 75 kids.
25	Camp Fire USA, Alaska Council	X	X	Alaska head office for Camp Fire USA. Non-profit organization provides affordable before- and after-school programs, community centers, summer camps, and rural Alaska program to ethnically diverse population of youth.
26	Women Infants & Children (WIC) Nutrition Program (Alaska Regional Hospital)	X		One of several Anchorage WIC offices, provides supplemental food and nutrition program for pregnant and breastfeeding women and their children from birth to age five who meet eligibility guidelines.
27	Out North Contemporary Art House		X	Provides a forum for underrepresented artists, especially artists with disabilities, artists of color, LGBTQ artists, and artists whose work pushes traditional boundaries of aesthetics and content.

Figure 9-8. Low-Income and Minority Community Facilities



9.3 BIBLIOGRAPHY

[ASD] Anchorage School District. 2009. *2009-2010 Ethnicity Report.* ASD Memorandum #120 (2009-2010). Office of the Superintendent.

——. 2010. *Anchorage School District Ten-Year Capital Improvement Plan: Analysis and Recommendations.* 2009-2010 Anchorage School Board.

[CEQ] Council on Environmental Quality. 1997. *Environmental Justice: Guidance Under the National Environmental Policy Act.* Washington, DC: Executive Office of the President.

DeNavas-Walt, Carmen, Bernadette D. Proctor, and Jessica C. Smith. 2009. *Income, Poverty, and Health Insurance Coverage in the United States: 2008.* Current Population Reports, P60-236. U.S. Census Bureau. Washington, DC: U.S. Government Printing Office.

[DOT&PF] Alaska Department of Transportation and Public Facilities. 2009. *Seward Highway to Glenn Highway Connection: Environmental Justice Methodology.* Prepared by HDR Alaska, Inc.

[EPA] U.S. Environmental Protection Agency. 1998. *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses.* Prepared in partial fulfillment of EPA Contract 68-WE-0026, Work Assignment 72-IV.

[ESRI] Environmental Systems Research Institute. 2009. *Community Info Demographic GIS Data 2009/2014.*

[FHWA] Federal Highway Administration. 1998. *FHWA Actions to Address Environmental Justice in Minority Populations and Low income Populations.* U.S. Department of Transportation Order 6640.23. Available online at http://www.fhwa.dot.gov/legsregs/directives/orders/6640_23.htm.

——. 2002. "EJ Statistical Applications Questions." *Re: NEPA.* Available online at http://nepa.fhwa.dot.gov/ReNEPA/ReNepa.nsf/discussionDisplay?Open&id=11BF58C8C02294B285256C56007C5C9E&Group=Community - Social Issues - Environmental Justice&tab=DISCUSSION#11BF58C8C02294B285256C56007C5C9E.

——. July 2010. *FHWA Interim Guidance, Addressing Environmental Justice in Environmental Assessments/Environmental Impact Statements*.

Hartell, Ann. 2007. "Methodological Challenges of Environmental Justice Assessments for Transportation Projects." *Transportation Research Record: Journal of Transportation Research Board.* Washington, DC: Transportation Research Board.

[IRP] Institute for Research on Poverty. 2009. *What are poverty thresholds and poverty guidelines?* University of Wisconsin-Madison. Available online at http://www.irp.wisc.edu/faqs/faq1.htm.

U.S. Census Bureau. 2000a. "Age by Types of Disability for the Civilian Noninstitutionalized Population 5 Years and Over with Disabilities, Anchorage Municipality and (H2H Project Area) Block Groups." *American FactFinder*. Available online at http://factfinder.census.gov/home/saff/main.html?_lang=en.

——. 2000b. "Anchorage Borough QuickFacts." *U.S. Census 2000*. Available online at http://quickfacts.census.gov/qfd/states/02/02020.html.

——. 2000c. "Hispanic or Latino by Race, Anchorage Municipality, Alaska." *American FactFinder*. Available online at http://factfinder.census.gov/home/saff/main.html?_lang=en.

——. 2000d. "Sex by Age, Anchorage Municipality, Alaska." *American FactFinder*. Available online at http://factfinder.census.gov/home/saff/main.html?_lang=en.

——. 2000e. "Sex by Age, Anchorage Municipality, Alaska (H2H Project Area Block Groups)." *American FactFinder*. Available online at http://factfinder.census.gov/home/saff/main.html?_lang=en.

——. 2000f. "Median Household Income in 1999 (Dollars), Anchorage Municipality, Alaska." *American FactFinder*. Available online at http://factfinder.census.gov/home/saff/main.html?_lang=en.

——. 2000g. "Median Household Income in 1999 (Dollars), Anchorage Municipality (H2H Project Area) Block Groups." *American FactFinder*. Available online at http://factfinder.census.gov/home/saff/main.html?_lang=en.

——. 2000h. "Poverty Status," Anchorage Municipality, Alaska." *American FactFinder*. Available online at http://factfinder.census.gov/home/saff/main.html?_lang=en.

——. 2000i. "Race, Anchorage Municipality, Alaska." *American FactFinder*. Available online at http://factfinder.census.gov/home/saff/main.html?_lang=en.

U.S. Department of Health and Human Services. 2009. *The 2009 HHS Poverty Guidelines.* Available online at http://aspe.hhs.gov/poverty/09poverty.shtml.

Chapter 10: Economic Conditions
Affected Environment

Table of Contents

10.1 INTRODUCTION 1
10.1.1 Regulatory Setting 1
10.1.2 Study Area 1
10.1.3 Methodology 2
10.2 AFFECTED ENVIRONMENT 3
10.2.1 Overview of Local and Regional Economy 3
10.2.2 Employment 4
10.2.3 Unemployment 4
10.2.4 Established Business Districts 5
10.2.5 Freight Transportation in the MOA 6
10.2.6 Property Taxes in the MOA 7
10.3 BIBLIOGRAPHY 8

List of Figures

Figure 10-1. Economic Study Area 2

10.1 INTRODUCTION

This chapter describes the existing economic conditions and the foreseeable economic impacts that could occur with each of the H2H project alternatives. The affected environment (Section 10.2) describes current economic conditions that could be affected by the project. Included in the affected environment section is a discussion of the regional and local economy, including information on employment, an identification and description of existing businesses and business districts (including information on highway-related businesses such as gas stations and motels), a discussion of the economics associated with freight distribution that could be affected by the project, and a review of the local taxes.

10.1.1 Regulatory Setting

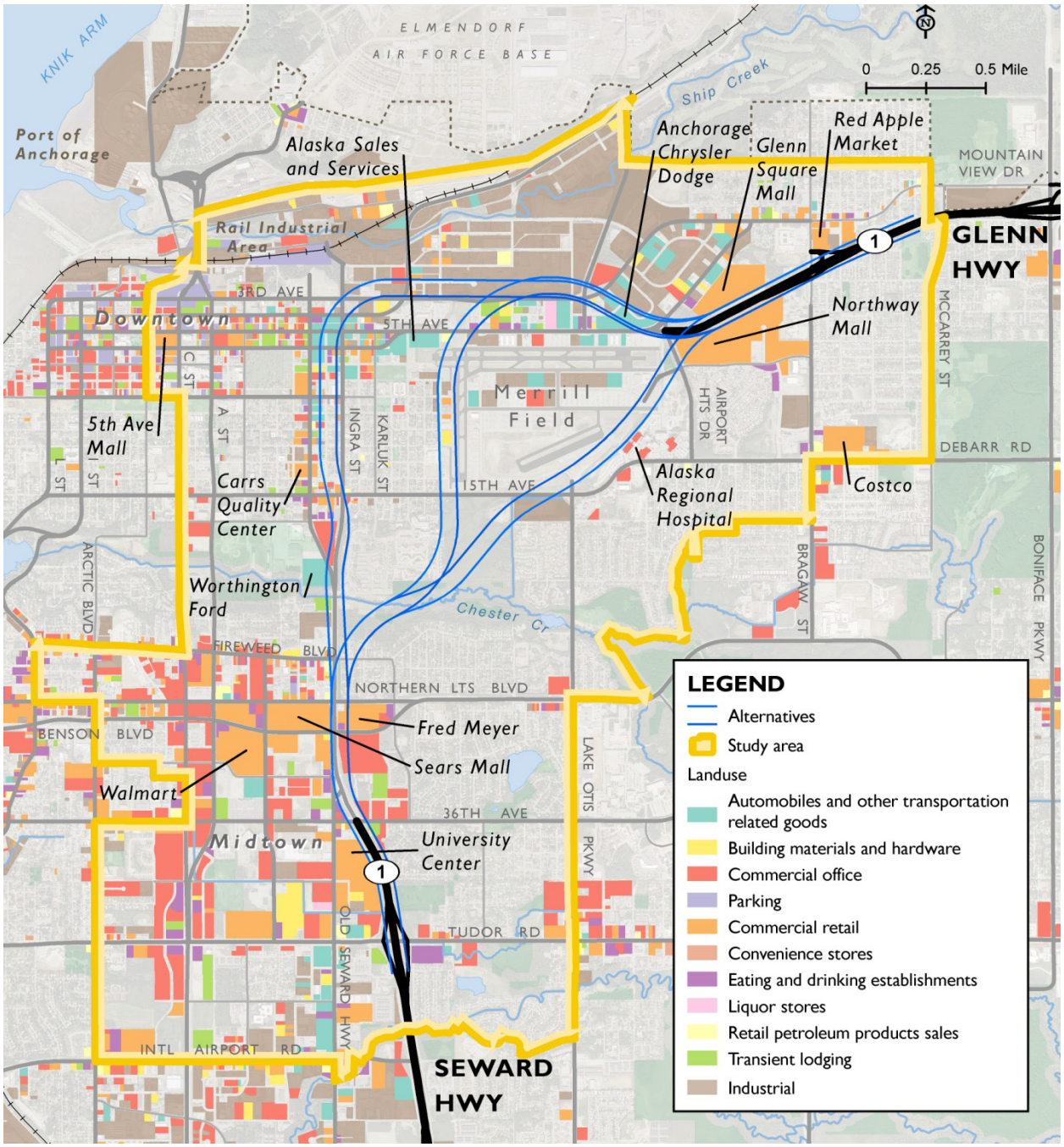
Federal environmental policy, as embodied in the National Environmental Policy Act (NEPA), requires the assessment and disclosure of foreseeable effects of transportation projects as part of the environmental impact assessment process, including economic effects caused by the project alternatives. Federal Highway Administration (FHWA) Technical Advisory T 6640.8A, "Guidance for Preparing and Processing Environmental and Section 4(f) Documents," dated October 24, 1987, was used to guide the economic analysis in this chapter. According to FHWA, the economic analysis should discuss the following for each alternative commensurate with the level of impacts:

- The economic impacts on the regional and/or local economy such as development, taxes and public expenditures, employment opportunities, accessibility, and retail sales;
- Impacts on the economic vitality of existing highway-related businesses (e.g., gasoline stations and motels) and the overall local economy;
- Impacts of the proposed action on established business districts, and any opportunities to minimize or reduce such impacts by the public and/or private sectors.

10.1.2 Study Area

The economics study area was delineated to include all the census block groups that are within an area one-half mile to either side of the centerline of the project alternatives (see Figure 10-1). This study area was identified as the area most likely to experience direct impacts from the construction and operation of the project alternatives. Indirect impacts are described for a broader area including the Municipality of Anchorage (MOA) and the Matanuska-Susitna Borough (MSB). Figure 10-1 depicts the alternatives relative to the economic study area.

Figure 10-1. Economic Study Area



10.1.3 Methodology

Data were collected from a wide array of primary and secondary data sources, including, but not limited to, the U.S. Census Bureau; Research and Analysis Section of the Alaska Department of Labor and Workforce Development; community- and borough-level data from the Community Database of the Alaska Department of Commerce, Community and Economic Development; ESRI; Property Appraisal Division of the Municipality of Anchorage; and numerous planning documents prepared by or for the MOA. These data sources were used to describe the current conditions in the study area. More

information about the methods used as part of the analysis can be found in the H2H *Socio-Economics Methodology* technical report.

10.2 AFFECTED ENVIRONMENT

This chapter describes the economic conditions anticipated to be affected by the proposed project.

10.2.1 Overview of Local and Regional Economy

The following paragraphs describe the key economic drivers in the local and regional economy.

Federal Spending. Federal spending has been a major economic driver in Alaska for many years. Federal dollars have funded a variety of projects in the MOA, including major infrastructure. By creating jobs and income, these projects help drive the local economy. The federal presence is not as strong in the MSB as it is in the MOA, but a substantial number of MSB residents work for the federal government in the MOA in both military and civilian agencies.

Military. Joint Base Elmendorf-Richardson has played pivotal roles in the MOA economy for many years (Fried and Windisch-Cole 2006). These two military installations together represent the single largest economic engine in the MOA in terms of employment and income.

Oil and Gas. The MOA serves as an administrative center for Alaska's petroleum industry, with many of the North Slope workers living in the city and commuting to the oilfields for two- or three-week rotations. This sector also supports a large number of oilfield and drilling support firms based in Anchorage, thereby increasing the overall economic importance of the sector. There are only a handful of oil industry jobs in the MSB; however, four percent of the borough's labor force commutes to the North Slope to work at oil-related jobs (Fried 2007).

Visitor Industry. One of the major drivers of the MOA and MSB economies is the visitor industry. Travelers journeying to Alaska often use Anchorage as a gateway to the state. The MOA provides the infrastructure necessary to support the tourism industry statewide in terms of hotels and restaurants. The convention industry is also an important driver in the local economy, bringing visitors to the MOA during the shoulder seasons (spring and fall), thereby extending the tourist season from the peak summer months.

Retail. In response to the growing population, the MOA and, increasingly, the MSB are home to a wide variety of major retailers, from upscale department stores to large discount firms, which both provide employment and lower the cost of living for local residents. The healthcare industry has developed to support most of the healthcare needs of the population. The expansion of retail and service firms in the MSB means that borough residents are spending more of their income locally and less in the MOA (Fried 2003; Robinson et al. 2010). However, the MOA continues to be the largest retail and wholesale trade center in Alaska.

Recent Economic Trends. The MOA's 20 years of uninterrupted employment growth ended in 2009 (Robinson et al. 2010) and the MOA joined the national recession, recording its first year-to-year job losses. Losses showed up in industries tied to tourism, air cargo, and construction. Job losses in the MOA, however, were not as severe as those in the rest of the country due to a large and thriving oil industry and an especially heavy dependence on federal government spending. The MSB continued to register healthy job growth through the first three quarters of 2009 (Fried 2010b). Unlike other areas of the state, wage and salary job growth in the MSB has come more from population growth than vice versa (Fried 2007). MSB commuters who earn their wages in the MOA return home to spend them on housing and consumer goods and services, which spurs additional economic activity in the borough. As a result of the rapidly expanding MSB retail market, more borough residents are spending their retail dollars closer to home (Robinson et al. 2010).

10.2.2 Employment

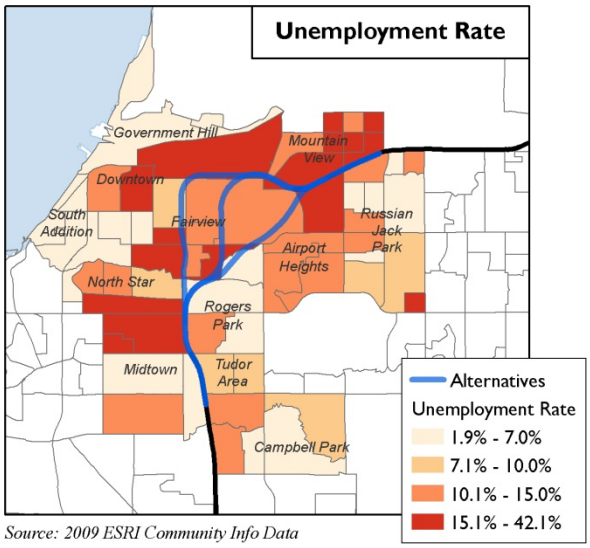
Anchorage 2020, the comprehensive plan for the Anchorage Bowl, designates three areas as employment centers: Downtown, Midtown, and the University-Medical (U-Med) District (MOA 2001a). These centers have the highest concentration of office employment in the MOA. Midtown is Anchorage's largest employment area (24,350 employees; MOA 2009a), followed by Downtown (18,300 employees; MOA 2009a) and the U-Med District (16,000 employees; DOT&PF 2009). Other main employment destinations include the joint military base (12,769 military and civilian employees; Alaska Department of Labor and Workforce Development 2006) and Ted Stevens Anchorage International Airport (10,222 full-time employees; ISER 2007). In 2008, only about 3 percent of the MOA's workers were employed outside the MOA, but 36 percent of the MSB's workers were employed outside the borough (U.S. Census Bureau N.d.). The majority of the MSB's workers employed outside the borough commute daily to jobs in the MOA. Of the approximately 9,000 people who commute into the MOA from the MSB, about 45 percent work in Downtown and Midtown (HDR 2009).

The top employers in the MOA are government entities (military, federal government, school district, and state government). Providence Alaska Medical Center, the largest private-sector employer in the MOA, has experienced employment gains from steady growth at its Anchorage hospital campus and satellite facilities. Moreover, health care's labor-intensive nature and the fact that many health care employers are providing services around the clock explain the large number of jobs they provide (Fried 2009). The Providence Alaska Medical Center, together with the Alaska Regional Hospital, Alaska Native Medical Center, and a constellation of other medical-related facilities and offices, is located in the U-Med District of east Anchorage. Also located in the U-Med District is the University of Alaska Anchorage (UAA), the seventh largest employer in the MOA. The Matanuska-Susitna Borough School District is the single largest employer in the MSB (there are no large military posts or bases in the borough). The third largest employer and the largest private sector employer in the MSB is the Mat-Su Regional Medical Center, located between Palmer and Wasilla.

10.2.3 Unemployment

As in other areas of Alaska, there is large seasonal variation in the unemployment rate in the MOA and MSB because of the seasonal nature of many economic activities, particularly commercial fishing, mining, and tourism. The unemployment rate is typically highest in February and lowest in August (Alaska Department of Labor and Workforce Development 2010).

In 2009, the MOA recorded an unemployment rate of about 6.4 percent for the year. The highest 2009 rate of unemployment in the economic study area was found in the Downtown area, which had 36.7 percent unemployment; contributing to this high rate are the numerous transitional housing units located there (ESRI 2009). Fairview and Mountain View also had unemployment rates more than double that of the MOA. All three areas have high minority populations and lower education levels, which are characteristic of groups with lower employment rates. High unemployment rates are also found in pockets of Airport Heights and Rogers Park, both of which have higher minority populations than their community council averages.



Source: 2009 ESRI Community Info Data

10.2.4 Established Business Districts

Beginning in the late 1960s, many of the retail businesses in the MOA clustered in the eastern and southern portions of the city as neighborhoods spread beyond the historic Downtown core. During the past decade, however, the population has rapidly increased in the northern suburb of Eagle River-Chugiak and in the MSB towns of Houston, Wasilla, and Palmer. As a result of this population shift, the newest major retail development in the MOA has focused on the Glenn Highway going north (Bergsman 2007). Some recent large-scale business development projects in the MOA have met with only limited success. For example, the Glenn Square Shopping Mall, constructed in Mountain View in 2007, was expected to be the dominant retail shopping center in the northeast Anchorage trade area (P. O'B Montgomery & Company 2010). Currently, however, much of the retail and office space in the 200,000-square-foot development stands vacant (O'Malley 2009; Kim 2010). The most recent mall along the Glenn Highway (Tikahtnu commons), located just outside the study area at Muldoon Road and the Glenn Highway, however, appears to be thriving. It has a large multiplex cinema, Target, Lowe's, and several other shops.

Figure 10-1 shows the locations of commercial and industrial businesses and business districts within the study area. Among those neighborhoods in proximity to the project corridor, Midtown, Fairview, and Downtown had the largest number of businesses in 2009. Midtown has taken on an increasingly important economic role in the MOA because of its superior road network leading to all parts of the region and its adjacency to the Ted Stevens Anchorage International Airport (Development Strategies 2007). Currently, Midtown is the major commercial retail center for the MOA (MOA 2001b). In addition, Midtown is the MOA's largest employment area (24,000 employees) due to its concentration of high-rise office towers that contain multiple businesses MOA 2001a; 2009a).

Still considered the central business district of Anchorage, Downtown is the second largest employment center in the MOA (18,000 employees) (MOA 2001a). While Downtown no longer plays a role as a regional shopping center, it is an important regional commercial destination with major department stores, specialty shops, restaurants, and hotels (HDR 1996). Resident-oriented commerce has largely given way to visitor-oriented shops and tourist services as the ground-level commerce. In addition, some office-based functions—most notably government and legal services—remain anchored to Downtown near state and federal courthouses (HDR 1996).

In the study area, Fairview has a high concentration of businesses because the neighborhood includes a large amount of commercially zoned land and high-volume transportation corridors. The transformation into a strip commercial corridor was strengthened when the one-way couplet of Gambell and Ingra streets was implemented. The corridor contains a mix of commercial and residential buildings, together with a few institutional buildings, such as churches and a police substation. Businesses in the corridor are strongly defined by the high volume of local and through traffic (Boehlke 2005). The dominating commercial land use is auto dealerships and services (Fairview Community Council 2009).

Some neighborhoods in the study area that are otherwise largely residential have pockets of commercial activity. For example, Airport Heights has a high number of retail businesses and food and drinking establishments, due mainly to the intense commercial activity along the heavily trafficked 5th Avenue, 6th Avenue, and Glenn Highway. Businesses along this corridor line both sides of the roads, attracting customers from the heavy volume of passing traffic.

Highway-related businesses tend to be more dependent on drive-by traffic for their success. Businesses such as gas stations, hotels and motels, and shopping centers tend to locate on high-volume roadways, with good access and visibility. Figure 10-1 classifies the commercial and industrial land uses relative to the proposed alternatives. As can be seen in the figure, highway-related businesses such as major malls (University Center, Mall at Sears, Northway Mall, and Glenn Square Mall) have been developed along the existing Seward and Glenn highways. Other major malls outside the study area, like Tikahtnu Commons and the Dimond Center are also located along the Seward-Glenn highway corridor. Businesses

such as petroleum sales (gas stations), automobiles and other transportation-related goods (car dealerships, recreational vehicles sales, etc.), eating and drinking establishments (especially fast food restaurants), and hotels and motels have located along the existing arterial connection along 5th and 6th avenues and through Midtown along the Seward Highway.

10.2.5 Freight Transportation in the MOA

The movement of freight plays an important role in the local, regional, and statewide economy. A transportation project that increases capacity and/or speed can lower costs and improve service in freight movement, which, in turn, can have a positive effect on firms engaged in the production, distribution, trade and/or retail sale of physical goods (ICF Consulting and HLB Decision-Economics 2002). This section provides a snapshot of the current movement of freight into, out of, and around the MOA, focusing on those economic characteristics of the MOA that contribute to the city's unique patterns of freight traffic. Additional information about MOA traffic volumes and patterns is provided in Chapter 3, Traffic and Transportation.

While the movement of freight within the MOA is much the same as that in other urban areas across the United States, a number of distinguishing features of Alaska and the Southcentral region set the MOA apart. First, because Alaska has a very small manufacturing sector, virtually all producer and consumer goods must be imported from outside the state (Goldsmith and Schwoerer 2009).

Second, the MOA is the major year-round marine, rail, and air hub serving Alaska along the Railbelt (MOA 2001b). The Port of Anchorage, located at the head of Cook Inlet directly north of Downtown, is primarily a receiving port. Inbound cargo spans the full range of goods, materials, and equipment needed by consumers and businesses in the MOA and most of the rest of Alaska. Most freight is brought to the port via container ship. Ships are off-loaded, and the containers may be hauled by truck tractor to either the destination of consumption, or to a warehouse facility off port premises where they are off-loaded and redistributed in smaller trucks or consolidated for tractor transport (MOA 2001b). A substantial number of trucking, transfer, and consolidating firms are located in the Ship Creek industrial area north of Downtown. In addition, the Alaska Railroad Corporation operates a trailer-on-flat-car facility at its main yard in the Ship Creek basin, which is used to load and unload container vans arriving from the port. The freight is then moved by rail to points north, predominantly Fairbanks and nearby military bases (MOA 2001b).

The Ship Creek area remains one of the MOA's major warehousing and transportation-related industrial areas and continues to play a critical role in the shipment and distribution of goods to the MOA and the rest of the state. However, the bulk of outdoor storage facilities and warehousing, as well as manufacturing/processing plants and construction yards, has gravitated from the Downtown-Ship Creek basin area to the rail/highway industrial corridor between the Old Seward Highway and Arctic Boulevard and to the King Street industrial area (HDR 1996). In summary, major MOA freight generators and consumers form a "T"-shaped corridor starting in the north with the Port and Ship Creek area warehouse district, through the Downtown central business district, and continuing southward adjoining the New and Old Seward highways to Midtown and areas of south Anchorage, where major retail commercial and light industrial nodes are located (MOA 2001b). This configuration places most truck traffic to or from the Port onto the New Seward Highway, Gambell-Ingra streets, and C Street. Some truck traffic also uses the L Street-Minnesota Avenue connection to the King Street industrial area.

The third unique aspect of freight movement in the MOA is that much of the retail freight entering the municipality is time sensitive (MOA 2001b). The distance from manufacturing and agricultural centers to the MOA is great. Moreover, because of factors such as land costs, retail outlets in the MOA have limited warehousing capability, which means supplies of food, fuel, and other essential goods must arrive on a continuous basis. For that reason, goods must be shipped for "just in time" delivery to Anchorage outlets. The freight distribution system relies on the ability of freight movers to transport the various commodities

to market in a prescribed time. Delays caused by weather, traffic congestion, and other constraints affect the efficiency of the system and the cost of delivery.

According to a study by UAA (n.d.), about 80 percent of Alaska's maritime trade (and 90 percent of all its consumer imports) arrive through the Port of Anchorage. More than 90 percent of that freight is redistributed by truck over the road system (Alaska Trucking Association 2010). Using 2002 data, the UAA study estimated that the Port of Anchorage had a total economic impact of $663 million and that freight activity at the Port contributed to $137 million in household earnings and 4,142 jobs. According to the Port of Anchorage (MOA 2009b), tonnage through the Port was 3,798,272 tons in 2009, of which 45 percent was comprised of vans, flats, and containers.

10.2.6 Property Taxes in the MOA

In 2009, property taxes were the largest single source of revenue in the MOA (44%). Other sources in 2009 include, charges for services (28%), capital grants (12%), operating grants (6%), investment earnings (4%), other taxes (4%), and other miscellaneous (2%) (MOA 2009c). A transportation project can result in decreases or increases in residential, commercial, and industrial real estate values and property taxes through changes in accessibility, safety, traffic noise, visual quality, community cohesion, or business productivity. The final section of the economic affected environment examines property taxes in the MOA. Changes in real property (i.e., land and the buildings affixed to the land) resulting from the acquisition of right-of-way or induced economic growth can change property tax revenues, which, in turn, can affect a community's fiscal strength and the provision of municipal services (Forkenbrock and Weisbrod 2001).

Real property, which includes land and any improvements to the land, such as buildings, is subject to property tax. Property taxes are the largest single source of government revenue for the MOA, accounting for about 46 percent of the city's roughly $906 million in revenues in 2008. In 2008, the total taxable value of property in the community councils in the study area was about $7.4 billion. The community councils with the largest taxable values are Downtown and Midtown, both of which contain large office buildings. Together, these two community councils accounted for about 40 percent of the total taxable value of real property in the economic study area, though they only account for 14 percent of the total parcels and 12 percent of the total residential units. Fairview and Russian Jack Park account for nearly one-third of the residential units in the economic study area.

In the economic study area, the large taxable value of property in Downtown and Midtown reflects the concentrated commercial development in those areas. Property in certain residential areas, such as Rogers Park, a relatively affluent neighborhood in the study area, also has a relatively high taxable value. Sections of the study area with lower taxable values are concentrated in Mountain View, which has a large number of relatively low-value housing units.

10.3 BIBLIOGRAPHY

Alaska Department of Labor and Workforce Development. 2006. Alaska Economic Trends. June.

———. 2010. Unemployment Rate. Research and Analysis Section. Available online at http://almis.labor.state.ak.us/?PAGEID=67&SUBID=188 (accessed April 28, 2010).

Alaska Trucking Association. 2010. Facts about Trucking in Alaska. Available online at http://www.aktrucks.org/servlet/content/facts_about_trucking_in_alaska.html (accessed August 17, 2010).

[ARRC] Alaska Railroad Corporation. 2009. LEED Renovation of Historic Freight Shed. Project Facts. Available online at http://www.alaskarailroad.com/Portals/6/pdf/projects/2010%20Historic%20Freight%20Shed.pdf (accessed June 1, 2010).

Bergsman, S. 2007. "New projects are planned in retail-starved Alaska." Shopping Centers Today. Available online at http://www.icsc.org/srch/sct/sct1007/alaska.php (accessed May 25, 2010).

Boehlke, D. 2005. Fairview: A Dynamic Neighborhood in a Changing City.

[CIRI] Cook Inlet Region, Inc. 2008. Tikahtnu Commons. Available online at http://www.ciri.com/content/company/TikahtnuCommons.aspx (accessed June 1, 2010).

Development Strategies, Inc. 2007. Economic Outlook and Land Demand Projections: Midtown Anchorage, Anchorage, Alaska. Prepared for HDR Alaska, Inc.

[DOT&PF] Alaska Department of Transportation and Public Facilities. 2009. Northern Access to U-Med District Reconnaissance Study Public Scoping Materials May 19, 2009. Available online at www.hkminc.com///%20%20%20MEETING%20PPT.pdf.

[ESRI] Environmental Systems Research Institute. 2009. Community Info Demographic GIS Data 2009/2014.

Fairview Community Council. 2009. A Plan for Fairview's Neighborhoods. Revised Final Draft.

Forkenbrock, D., and G. Weisbrod. 2001. Guidebook for Assessing the Social and Economic Effects of Transportation Projects. Transportation Research Board and National Research Council. Washington, DC.

Fried, N. 2003. "The Matanuska-Susitna Borough." Alaska Economic Trends, 23 (1): 3-14.

———. 2007. "The Matanuska-Susitna Borough." Alaska Economic Trends, 27 (6): 4-15.

———. 2009. "The Trends 100." Alaska Economic Trends, 29 (7): 4-11.

———. 2010. "Employment Scene." Alaska Economic Trends, 30 (2): 16-18.

Fried, N., and B. Windisch-Cole. 2006. "The Military is Big Business in Anchorage." Alaska Economic Trends, 26 (6): 4-14.

Goldsmith, S., and T. Schwoerer. 2009. Anchorage Port Intermodal Expansion Program (PIEP). Benefit Cost Analysis of Proposed TIGER Discretionary Grant Funds. Prepared for the Port of Anchorage.

[HDR] HDR Alaska, Inc. 1996. Anchorage Bowl Commercial and Industrial Land Use Study. Prepared for the Department of Community Planning and Development, Municipality of Anchorage. Anchorage, AK.

———. 2009. Seward Highway to Glenn Highway Connection: Origin-Destination Analysis Technical Memorandum. Prepared for the Alaska Department of Transportation and Public Facilities.

ICF Consulting and HLB Decision-Economics. 2002. Economic Effects of Transportation: The Freight Story.

[ISER] Institute of Social and Economic Research. 2007. Ted Stevens Anchorage International Airport: Economic Significance 2007. Available online at http://www.iser.uaa.alaska.edu/Publications/Airport2007_final.pdf.

Kim, Christine. 2010. "Mountain View shopping center largely vacant." KTUU.com. Available online at http://www.ktuu.com/Global/story.asp?S=12186576 (accessed May 20, 2010).

[MOA] Municipality of Anchorage. 2001a. Anchorage 2020: Anchorage Bowl Comprehensive Plan. Planning Department. Anchorage, AK.

———. 2001b. Freight Mobility Study for the Anchorage Metropolitan Area. Traffic Department. Anchorage, AK.

———. 2009a. Anchorage Midtown District Plan: Public Review Draft. Anchorage, AK.

———. 2009b. 2009 Port of Anchorage Annual Tonnage Report. Port of Anchorage. Available online at http://www.muni.org/departments/port/pages/default.aspx (accessed August 17, 2010).

———. 2009c. 2009 Comprehensive Annual Financial Report For the Fiscal Year Ended December 31, 2009. Available online at http://www.muni.org/Departments/finance/controller/CAFR/2009%20CAFR%20Introductory%20Section.pdf (accessed September 16, 2010).

O'Malley, J. 2009. "Mountain View's heart is a Red Apple." Anchorage Daily News. June 30: Anchorage, AK.

P. O'B Montgomery & Company. 2010. Glenn Square. Available online at http://www.pobmontgomery.com/images/GlennSq.pdf (accessed May 25, 2010).

Robinson, D., N. Fried, A. Shanks, and J. Wilkinson. 2010. "Employment Forecast for 2010." Alaska Economic Trends, 30 (1): 4-20.

[UAA] University of Alaska Anchorage. No date. The Economic Impact and Logistics of the Port of Anchorage. Prepared by Dr. Darren Prokop. Department of Logistics College of Business & Public Policy. Available online at http://www.muni.org/Departments/port/Documents/EconImpact.pdf (accessed August 17, 2010).

U.S. Census Bureau. No date. 2008 American Community Survey 1-Year Estimates. Available online at http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuID=&_lang=en&_ts= (accessed April 28, 2010).

Chapter 11: Joint Development
Affected Environment

Table of Contents

11.1 INTRODUCTION 1
11.2 REGULATORY SETTING 1
11.3 AFFECTED ENVIRONMENT 1
11.3.1 Roadways 1
11.3.2 Transit 2
11.3.3 Pedestrian and Bicycle Network 2
11.3.4 Utilities 2
11.3.5 Chester Creek Fish and Wildlife Habitat 2
11.3.6 Municipal Community Planning 3
11.3.7 USDOT/HUD/EPA Interagency Partnership for Sustainable Communities 3
11.4 BIBLIOGRAPHY 4

11.1 INTRODUCTION

The Joint Development chapter discusses joint development measures that will preserve or enhance the social, economic, environmental, and visual values related to the H2H affected environment. The Federal Highway Administration's (FHWA) objective in evaluating joint development opportunities is "to achieve better compatibility between the highway and its environment" (2009). In general, joint development opportunities are current and planned projects that are within the right-of-way of the reasonable alternatives or immediately adjacent to the reasonable alternatives. These projects could potentially be jointly developed along with the H2H project. This chapter provides a consolidated summary of all the joint development opportunities in the Environmental Impact Statement (EIS). The following joint development opportunities are considered in this chapter:

- Roadways
- Transit
- Pedestrian and Bicycle Network
- Utilities
- Chester Creek Fish and Wildlife Habitat
- Municipal Community Planning

> It is FHWA's intent that "the designs for highway and the non-highway elements should be developed in close coordination and with a view toward achieving aesthetic harmony, safety, economy, and compatibility with the adjoining neighborhood. […] Joint development applies not only to cooperative planning by highway and non-highway agencies, but also involves concern for land use beyond the highway right-of-way. The intent is to encourage coordinated planning within a broad highway corridor to identify opportunities which would benefit the adjoining communities while achieving transportation objectives and overall cost effectiveness" (FHWA 2009).

Section 11.3 Affected Environment identifies joint development opportunities, and Section 11.4 Consequences identifies what benefits may be derived from joint development, who will benefit, and the entities responsible to maintain the joint development. Joint development opportunities and impacts are also addressed elsewhere in this EIS (for example, pedestrian and bike planned projects and impacts are discussed in Chapter 12).

11.2 REGULATORY SETTING

Joint development opportunities have been identified according to the Federal Highway Administration's (FHWA) guidance under Technical Advisory T6640.8a, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents.* The guidance requires that the analysis address any joint development measures that will enhance an affected community's social, economic, environmental, and visual values, identify the benefits to be derived, those who will benefit, and the entities responsible for maintain the identified measures.

11.3 AFFECTED ENVIRONMENT

11.3.1 Roadways

There are roadway improvement projects within the study area that are planned for development by the Municipality of Anchorage (MOA) and Alaska Department of Transportation and Public Facilities (DOT&PF) through the Anchorage Metropolitan Area Transportation Solutions (AMATS) *Anchorage Bowl 2025 Long-Range Transportation Plan, with 2027 Revisions* (LRTP) (see Chapter 3, Traffic and Transportation). The LRTP provides an opportunity for the H2H project to be coordinated with the projects described in the plan. The most relevant opportunities for joint development include surface rehabilitation along 3rd avenue, and construction of a new extension of Gambell and Ingra streets from 3rd Avenue to Whitney Road. Of note, this planned viaduct extension of Gambell and Ingra Streets is part of the planned Knik Arm Crossing project which includes an extension from the Knik Arm Bridge to the

H2H project, envisioned to connect to Gambell and Ingra streets at 3rd Avenue (KABATA 2007). Both the Knik Arm Crossing and the H2H Project are planned as part the National Highway System (NHS). Connecting the Knik Arm Crossing to H2H would complete the NHS in north Anchorage. The *Knik Arm Crossing Final EIS* identifies that the connecting road from the bridge and the viaduct to 3rd Avenue would be operated and maintained by DOT&PF.

11.3.2 Transit

Transit alternatives were jointly developed and evaluated by the MOA, DOT&PF, Federal Transit Administration (FTA), and FHWA through the H2H EIS process, resulting in an enhanced BRT alternative (see Ch. 2, Alternatives). The MOA is the agency with jurisdiction over transit in Anchorage, and FTA is the federal agency with jurisdiction over transit. Should an enhanced BRT be selected as part of the preferred alternative, the new system could be jointly developed by DOT&PF, FHWA, MOA, and FTA with DOT&PF and FHWA funding roadway elements and the MOA and FTA funding buses, stations, and other transit-specific elements. The BRT system would be owned and operated by the MOA. Infrastructure improvements that support BRT operations are described in the H2H Chapter Alternatives.

11.3.3 Pedestrian and Bicycle Network

There are a number of pedestrian and bicycle facilities within the study area that are planned for development by the MOA and DOT&PF through AMATS (see Chapter 12, Considerations Relating to Pedestrians and Bicycles). Of note, the *Anchorage Bicycle Plan* (AMATS 2010) identifies a "conceptual Highway to Highway corridor," a proposed separated multi-use pathway that would connect the Chester Creek Trail with the Glenn Highway trail at Boniface. A proposed separated multi-use pathway along 3rd Avenue would connect the Ship Creek trail with other pathways at Reeve Boulevard. Sidewalk improvements are planned along the existing Seward Highway alignment from 36th Avenue north, continuing along Gambell and Ingra streets. These pathway and sidewalk improvements present joint development opportunities with the MOA as part of the H2H project. The majority of other planned pedestrian and bicycle improvements intersect the H2H alternatives perpendicularly at crossing sites, and development of the crossings could be done jointly with the MOA. The H2H roadway alternatives have been designed to accommodate the planned pedestrian and bicycle improvements.

11.3.4 Utilities

Utilities within the study area include water, wastewater, telecommunications, electrical and natural gas (see Ch. 8, Utilities). Construction efforts for H2H would be coordinated with plans of the utility providers. Of these utilities, there are known plans to upgrade some electrical utilities during the 2008-2013 timeframe: e.g. ML&P plans to upgrade the existing 35kV-to-115kV line along the Seward Highway and Gambell Street between Northern Lights Boulevard and 1st Avenue, and Northern Lights Boulevard from the Seward Highway to Bragaw Street; and ML&P also plans to construct a substation in the Midtown area, although the location is not yet determined. These projects provide joint development opportunities with the H2H project.

11.3.5 Chester Creek Fish and Wildlife Habitat

Within the study area, Chester Creek is an urban watershed that provides fish and wildlife habitat, but has been negatively influenced by development (see Ch. 16, Ecosystem). Chester Creek is essential habitat for anadromous fish populations, including pink salmon, coho salmon and Dolly Varden char; however, urban development has altered the creek, which has resulted in a decline of these species in the creek. Structures (dams, culverts, bridges) built in the creek have been identified as an important reason for the decline. Previous projects at Westchester Lagoon have removed barriers further downstream in Chester Creek to improve fish passage. Several additional projects have been identified as high priority to improve fish passage upstream in a 2000 study done by USACE. These include replacement of the existing culvert at Seward Highway and Chester Creek (3rd highest priority); relocation of the North Fork into its original channel (4th highest priority) (USACE 2000); cable relocation and bank restoration at

Karluk Street pedestrian bridge (10th highest priority); and bank stabilization and relocation of storm drain outfall at Seward Highway downstream (11th highest priority). The USACE and MOA are both cooperating agencies on the H2H EIS. Depending on the alternative selected, these projects present joint development opportunities with the MOA, ADF&G, and/or the USACE.

11.3.6 Municipal Community Planning

Land use planning done by the MOA indicates several land plans within the H2H study area (see Ch. 5, Land Use). These include plans for a neighborhood commercial center in Fairview, a town center at Northway Mall, a transit supportive development corridor along 15th Avenue, and redevelopment/mixed-use areas in Downtown and Midtown. The *Draft Midtown District Plan* identifies a potential future transit station and transit corridors. The *Draft Fairview Community Plan* envisions that the H2H project would be acceptable to the community if the project contributes to Fairview's revitalization. The *Draft Mountain View Neighborhood Plan* also identifies revitalization as a goal. In addition to these plans, Merrill Field Airport and Chester Creek Sports Complex are unique land uses in the study area that have their own planning documents. Coordinating H2H improvements with these planning efforts to help implement planning in place is a joint development opportunity with the MOA and the community.

11.3.7 USDOT/HUD/EPA Interagency Partnership for Sustainable Communities

On June 16, 2009, EPA joined with the U.S. Department of Housing and Urban Development (HUD) and the U. S. Department of Transportation (DOT) to help improve access to affordable housing, provide more transportation options, and lower transportation costs while protecting the environment in communities nationwide. Through a set of guiding livability principles and an agreement that will guide the agencies' efforts, this partnership will coordinate federal housing, transportation, and other infrastructure investments to protect the environment, promote equitable development, and help to address the challenges of climate change. This partnership could foster joint development in the communities affected by the proposed H2H project alternatives through several different avenues.

HUD is launching a Sustainable Communities Regional Planning Grant program, designed to create stronger, more sustainable communities by connecting housing to jobs, fostering local innovation and building a clean energy economy. The Regional Planning Grants will be awarded competitively to multi-jurisdictional and multi-sector partnerships as well as regional consortia consisting of state and local governments, metropolitan planning organizations, educational institutions, non-profit organizations and philanthropic organizations. Grant applications will be reviewed not only by HUD but also by the DOT and the EPA.

DO**T and HUD, for the first time ever, will join forces to award** TIGER (Transportation Investment Generating Economic Recovery) II Planning Grants and Sustainable Community Challenge Grants for localized planning activities that ultimately lead to projects that integrate transportation, housing and economic development. Many projects may include components that fall under both the TIGER II Planning Grants and the Sustainable Community Challenge Grants.

11.4 BIBLIOGRAPHY

FHWA 2009. Office of Real Estate Services Project Development Guide. Available online at http://www.fhwa.dot.gov/realestate/pdg.htm

KABATA 2007. *Knik Arm Crossing: Final Environmental Impact Statement and Final Section 4(f) Evaluation*.

USACE 2000. *Chester Creek 206 Study: Aquatic Habitat Restoration Project.* Prepared by HDR Alaska, Inc.

Chapter 12: Considerations Relating to Pedestrians and Bicycles Affected Environment

Table of Contents

12.1 INTRODUCTION AND PLANNING ENVIRONMENT 1
12.2 AFFECTED ENVIRONMENT 2
12.2.1 Pedestrian and Bike Use Patterns 2
12.2.2 Existing and Proposed Facilities 5
12.3 BIBLIOGRAPHY 8

List of Tables

Table 12-1. Key Study Area Pedestrian and Bicycle Facilities 6

List of Figures

Figure 12-1. H2H Project Area 3
Figure 12-2. Gambell Street and 15th Avenue 4
Figure 12-3. Seward Highway and 36th Avenue 4
Figure 12-4. Pedestrians in Winter Conditions 5
Figure 12-5. Bicyclist in Winter Conditions, Seward Highway and 36th Avenue 5

12.1 INTRODUCTION AND PLANNING ENVIRONMENT

This section describes pedestrian and bike use patterns; existing and planned pedestrian and bicycle facilities; and anticipated impacts to these users and facilities in the H2H study area. Analysis has been conducted according to the Federal Highway Administration's (FHWA) guidance on Considerations Relating to Pedestrians and Bicycles under Technical Advisory T6640.8a, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents.* Under 23 USC 109(m) *Protection of Nonmotorized Transportation Traffic*, if a proposed project would sever an existing major route or have a significant adverse impact on nonmotorized traffic, the project must provide a reasonable alternate route, or must show that such a route exists.

The study area for pedestrians and bikes is the same as the general H2H study area. Data were collected from a review of local plans that address bike and pedestrian facilities and use. See the Bibliography for a comprehensive list of sources.

The *Anchorage 2020: Anchorage Bowl Comprehensive Plan* and the *Anchorage Bowl 2025 Long Range Transportation Plan, With 2027 Revisions* (*2027 LRTP)* provide guidance for planning, land use, and transportation for Anchorage's future. *Anchorage 2020* calls for "an efficient transportation system that offers affordable, viable choices among various modes of travel that serve all parts of the community" (AMATS 2007a, 38); the *2027 LRTP*'s sixth goal calls for a transportation system that provides accessible, attractive, and competitive transportation options for walkers, bikers, and transit riders. The H2H project envisioned in the LRTP facilitates regional trail connections from Chester Creek Trail north to Ship Creek Trail, and from Ship Creek Trail east to Glenn Highway Trail and Russian Jack Park (AMATS 2007a, 132).

The Municipality of Anchorage's (MOA) *Non-Motorized Transportation Plan* was developed to provide more planning detail on pedestrians, bicycles, and trails. It is broken into three separate plans that address those three topics respectively.

Pedestrian – The word encompasses the primary users of pedestrian facilities, including those who travel by wheelchair and those who walk.

Sidewalk – A paved surface that is within a vehicular right of way, aligned with a road, and constructed either adjacent to the curb or separated from the curb for use by pedestrians.

Compared to a separated pathway, a sidewalk is typically narrower (standard width of 5 feet) and is intended primarily for walking.

Separated Pathway – A shared-use pathway located along a roadway and separated from traffic; also referred to as a "multi-use pathway." This type of facility is 8 to 10 feet wide to allow bicycles, pedestrians, and other nonmotorized users to pass. The recommended separation from the roadway is 7 feet (a minimum of 5 feet).

Bicycle Lane – A one-way, on-street facility that carries bicycle traffic in the same direction as adjacent motor vehicle traffic. A bicycle lane is typically 5 feet wide and is marked and signed for bicycle traffic.

Greenbelt Multi-Use Trail – A paved trail (8 to 10 feet wide) that is typically separated from the road system, through parks and designated greenbelts and that uses tunnels and overpasses at street crossings to avoid traffic conflicts.

Trail – An access route for nonmotorized travel typically located in a greenbelt and consisting of a stable surface, either pavement or compacted granular fill. A trail is usually *not* aligned with a road.

Source: Anchorage Bicycle Plan, 2010

The *Anchorage Pedestrian Plan* (AMATS 2007b) establishes a 20-year plan to improve the pedestrian environment and increase walking as a mode of transportation. It sets priorities to double the number of pedestrian trips while reducing the number of injuries due to pedestrian-vehicle crashes.

The *Anchorage Bicycle Plan* (AMATS 2010) aims to increase bicycle facilities and the use of bicycles for transportation. The plan envisions a safe, connected network of bicycle facilities that provides access to jobs, schools, and services while reducing the number of bicycle crashes. Additional on-street bicycle facilities on arterial and major collector streets and improved enforcement are the primary strategies the plan offers to achieve these goals. The plan identifies a separated pathway in association with the H2H project and depicts a corridor for this project based on the alignment shown in the LRTP. It also

recommends special studies to further develop bicycle infrastructure along the Gambell-Ingra couplet and in Midtown, which suggests that planned bicycle infrastructure could be affected by H2H alternatives.

The *Areawide Trails Plan* (MOA 1997) concentrates on trails used for recreation and transportation. Trail users in the study area are primarily pedestrians, bicyclists, interpretive users, runners/joggers, cross-country skiers, and skijorers. The trail system in Anchorage also serves snowmobilers, equestrians, dog mushers, and water trail users, but trails in the study area are not conducive to these uses. The plan encourages sharing trail uses, identifies improvements, and provides management guidance.

Section 4(f) analysis of publicly-owned recreational trails is covered in Chapter 22, Section 4(f) Evaluation. Trails and recreational amenities also are addressed in Chapter 6, Social Environment, in the subsection entitled Recreation.

12.2 AFFECTED ENVIRONMENT

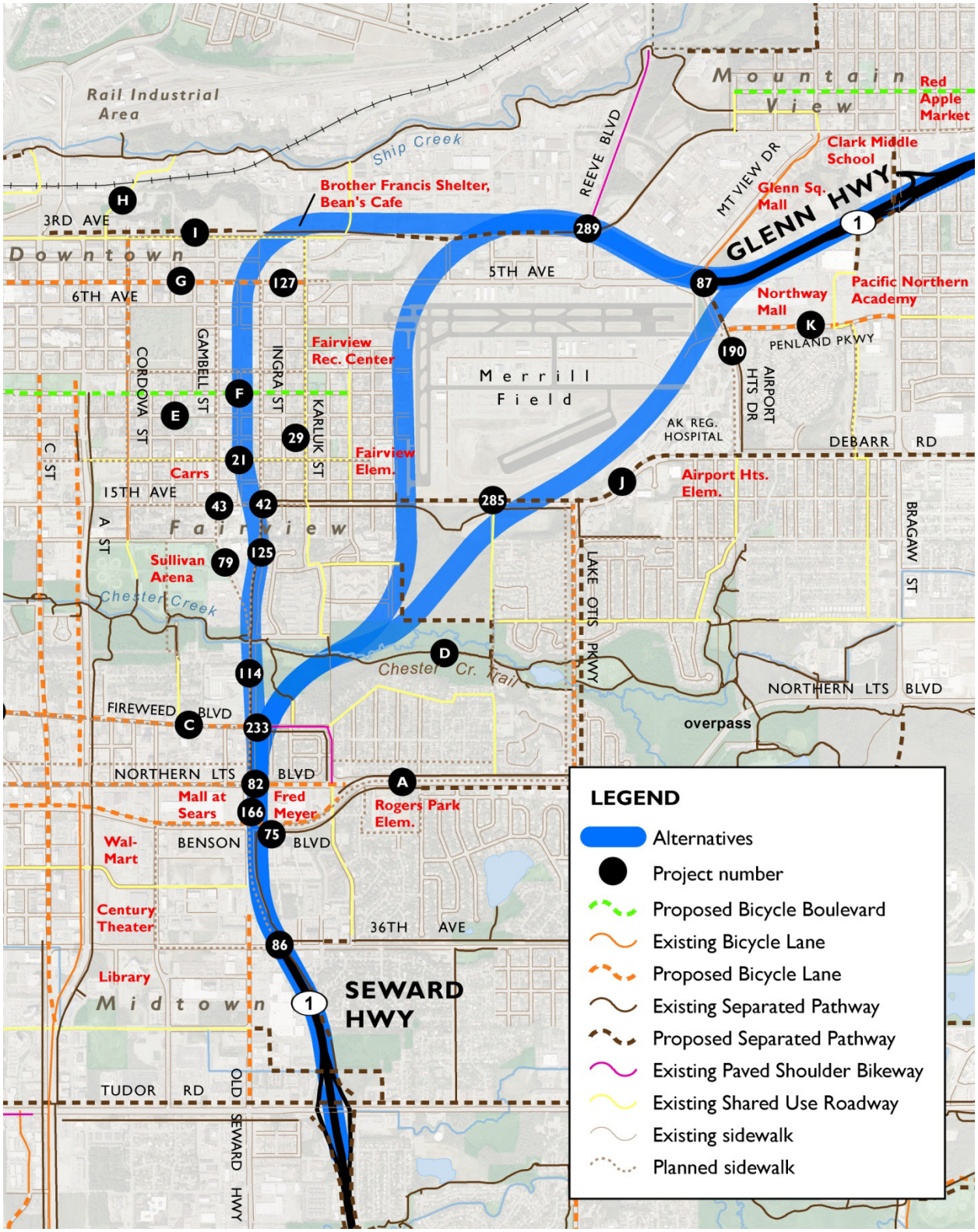
12.2.1 Pedestrian and Bike Use Patterns

Figure 12-1 portrays the existing and planned pedestrian and bicycle network. The purpose and need chapter identifies improving safety for bicycles and pedestrians as one of the main reasons improvements are proposed. Within the study area, many of the major intersections along the existing arterial connection report the highest rates of pedestrian and bicycle crashes per mile in Anchorage (see Purpose and Need, Chapter 2, for exact locations and rates). Where sidewalks exist, they often have little to no separation from traffic and are obstructed with utility poles and other street hardware that reduces the area for safe, efficient pedestrian and bicycle travel (see Figures 12-2 and 12-3). Figure 3-4, Neighborhood Connectivity, and Section 3.2.3, describe the challenges that the current highway causes bicyclists and pedestrians. These challenges were expressed repeatedly by the public, local government, and social service agencies during the scoping process. A more walkable and bike-friendly community is desired by many residents from the neighborhoods within the study area.

In Anchorage on a weekday, about 5.7 percent of trips taken are walking trips (AMATS 2002). Most walking trips occur in the central part of the city (Downtown, Fairview, Mountain View, North Midtown). Residents in parts of the study area make the highest percentage of nonmotorized trips city-wide: Downtown[1] (20.5%), Mountain View (17.2%), and North Midtown (13.5%) (AMATS 2002). These neighborhoods have relatively dense neighborhood development with a mix of land uses and fairly complete sidewalks on most streets. These areas also show the lowest ownership of cars per household, according to the U.S. Census 2000. In Midtown, University-Medical District (U-Med), and Fairview, vehicle ownership is predominantly 1.5 or fewer vehicles per household; in the core Downtown area, vehicle ownership is 0.8 to 0.9 vehicles per household. Other areas of town, do not have comparable pedestrian facilities, and also have higher rates of vehicles per household, generally 1.6 to 2.6. In the past, development standards allowed new road construction or development without sidewalks, or with sidewalks on only one side of street.

[1] The Downtown Area includes the Fairview community.

Figure 12-1. H2H Project Area



Note: planned trail includes planned separated pathways and bicycle lanes. For a list of current facilities and proposed projects, see Table 12-2.

Figure 12-2. Gambell Street and 15th Avenue

Obstructions such as fire hydrants and utility boxes do not provide adequate space for pedestrians and bicycle users.

Figure 12-3. Seward Highway and 36th Avenue

Street crossings have heavy congestion that pedestrians and bicycle users must traverse.

About 1 percent of trips taken in Anchorage on weekdays are bicycle trips (AMATS 2002). The bicycle network in Anchorage is made up mainly of roadside trails, greenbelt multi-use trails, and a small number of on-street bicycle lanes and signed bikeways (AMATS 2010, 11). On Bike-to-Work Day in 2007 and 2008, the highest bicycle use in the city was recorded at Seward Highway and Chester Creek Trail. The next two highest locations were at A Street/Chester Creek Trail and Chester Creek Trail/Northern Lights Boulevard overpass at Goose Lake (AMATS 2010, 17). The three most common bicycle destinations are Downtown, Midtown, and the U-Med (AMATS 2010, 18). Also, the U-Med area is the home of Alaska Pacific University and the University of Alaska Anchorage, which includes relatively high numbers of bicycle commuters. The use patterns and employment/education centers all are accessible off the Chester Creek Trail. This indicates that the Chester Creek Trail, running east-west through the study area, is a prime trail for commuter bicycle use.

The Chester Creek Trail is separated from the road system by grade-separated crossings at all streets. The trail is heavily used by bicyclists, pedestrians, in-line skaters, and joggers. In the winter, the trail also is used by cross-country skiers, winter-equipped bicycles, and skijorers. Chester Creek Trail is lighted from the Northern Lights overpass to Westchester Lagoon, and is groomed for cross-country skiing. See Chapter 22, Section 4(f) Evaluation, for more details on Chester Creek Trail as a recreational facility.

Anchorage experiences six months of winter cold, snow, and ice. Because of this, winter maintenance of sidewalks and trails has a large impact on nonmotorized transportation in Anchorage, both decreasing use and changing uses. Many trails are used for cross-country skiing and skijoring. With larger snow tires, bicyclists use the trails in winter as well. Lighting of pedestrian and bicycle facilities is also important in the winter when daylight decreases.

Figure 12-4. Pedestrians in Winter Conditions

Source: Anchorage Pedestrian Plan

Figure 12-5. Bicyclist in Winter Conditions, Seward Highway and 36th Avenue

Source: Anchorage Bicycle Plan

12.2.2 Existing and Proposed Facilities

Due to changing development standards over time in Anchorage, the sidewalk network is largely incomplete (AMATS 2007b, 7). Older Anchorage neighborhoods including Fairview, Downtown, and Mountain View, have more complete sidewalk networks, although they can be disjointed. In other portions of the study area such as Midtown and U-Med, sidewalks occur only along major arterial and collector streets. Several pedestrian projects are planned along the existing arterial connection to provide for grade-separated pedestrian crossings and replace missing sidewalks. Pedestrian projects are planned to provide access along the Seward Highway and intersections with major arterials (36th Avenue, Benson Boulevard, Northern Lights Boulevard, and Fireweed Boulevard); improve the Downtown/Fairview pedestrian grid; and improve pedestrian routes along major arterials in Airport Heights (e.g., Lake Otis Parkway and Airport Heights Drive).

Primary north-south routes for the proposed bicycle network within the study area are separated pathways along Seward Highway frontage roads and A/C streets (AMATS 2010, 46). Primary east-west routes within the study area are Benson Boulevard, Chester Creek Trail, and Debarr Road/15th Avenue (AMATS 2010, 53). Additionally, the Ingra/Gambell couplet and Midtown (between Northern Lights and Benson Boulevard, and north to Fireweed) are identified in the Bicycle Plan as special study areas that require further analysis. The Ingra/Gambell couplet is targeted for a reconnaissance study to improve bicycle safety, and Midtown is targeted for study to determine how to improve east-west bicycle connectivity and plan additional bicycle facilities. The need for special studies suggests that planned bicycle infrastructure is neither well-defined nor optimized in these areas. There are no bicycle lanes planned directly on the Seward Highway, Gambell and Ingra streets, or the Glenn Highway. Planned bike lanes cross the Seward Highway at Benson Boulevard, Northern Lights Boulevard, and 15thAvenue. Planned bike lanes also cross Gambell and Ingra streets at 13th Avenue and 9th Avenue. A “conceptual Highway to Highway corridor” project, to include a separated multi-use pathway, is highlighted on the Bike Plan’s Proposed Bicycle Network map.

Table 12-1 lists key pedestrian and bicycle facilities and associated planned projects in the study area by alternative corridors (see Figure 12-1 for approximate locations).

Table 12-1. Key Study Area Pedestrian and Bicycle Facilities

Pedestrian/Bicycle Facility and Associated Planned Upgrades (project numbers/map letters) ***See Figure 12-1 for approximate locations***	**Alternative**		
	Gambell-Ingra	**Orca**	**15th Avenue**
Seward Highway from 36th Ave to Chester Creek	X	X	X
• 36th Ave at Seward Highway, Planned Crossing (86)	X	X	X
• Northern Lights & Seward Highway, Planned Crossing (82)	X	X	X
• Northern Lights Blvd. – Seward Highway to Lake Otis Pkwy, Planned Separated Multi-use Pathway (A)	X	X	X
• Seward Highway at Northern Lights and Benson Boulevards, Planned Crossing (166)	X	X	X
• Benson Boulevard & Seward Highway, Planned Sidewalk Upgrade (75)	X	X	X
• Benson Boulevard – Arlington Dr. to LaTouche St., Planned Bicycle Lane (B)	X	X	X
• Fireweed Lane at Seward Highway, Planned Special Crossing (233)	X	X	X
• Fireweed Lane to Chester Creek, Planned Sidewalk Improvement (114)	X	X	X
• Fireweed Lane—Spenard Road to Seward Highway, Planned Bicycle lane (C)	X	X	X
Chester Creek Greenbelt Multi-Use Trail (D)	X	X	X
Downtown/Fairview Pedestrian Grid	X	X	
• Existing sidewalk network (E)	X	X	
• Fairview pedestrian/bike grid – 3rd, 9th, 13th, 15th Aves and Cordova, Karluk streets; Planned Sidewalks (currently missing) & Improvements (29)	X	X	
• 5th Ave – LaTouche St. to Gambell St., Planned Crossing (127)	X	X	
• 13th Ave – C St to Fairview Elementary School, Planned Sidewalk Upgrade (21)	X	X	
• 15th Ave & Ingra St., Planned Crossing (42)	X	X	
• 15th Ave & Ingra St., Planned Crossing (43)	X	X	
• Gambell St – 5th Ave to Fireweed Lane, Planned Crossing (79)	X	X	
• Ingra St. – 5th Ave to Chester Creek, Planned Crossing (125)	X	X	
• 10th Ave – P St. to Medfra St., Planned Bicycle Boulevard (F)	X	X	
5th Avenue to Glenn Highway	X	X	X
• Airport Heights Dr & Glenn Highway, Planned Crossing (87)	X	X	X
• 5th Avenue, Coastal Trail to Karluk Street, Planned Bicycle Lane	X	X	X

Pedestrian/Bicycle Facility and Associated Planned Upgrades (project numbers/map letters) ***See Figure 12-1 for approximate locations***	**Alternative**		
	Gambell-Ingra	**Orca**	**15th Avenue**
(G)			
3rd Avenue	X		
• 3rd Ave & Reeve Blvd, Planned Crossing (289)	X		
• Planned Trail connections to Ship Creek Trail (H)	X		
• 3rd Ave—A St to Hyder St, Planned Separated Multi-use Pathway (I)	X		
Airport Heights Drive			X
• Airport Heights Dr – Penland Pkwy to Debarr Rd – west side; missing sidewalk, Planned Upgrade (190)			X
• 15th Ave & Sitka St, Planned Crossing (285)			X
• Debarr Rd/15th Ave – Orca St. to Turpin St., Planned Separated Multi-use Pathway (J)			X
• Penland Parkway—Airport Heights Dr. to Bragaw St., Planned Bicycle Lane (K)			X

12.3 BIBLIOGRAPHY

[AMATS] Anchorage Metropolitan Area Transportation Solutions. 2002. *Municipality of Anchorage Household Travel Survey, Final Report*. Prepared by NuStats for AMATS.

———. 2007a. *Anchorage Bowl 2025 Long Range Transportation Plan, With 2027 Revisions*. Published online at www.muni.org/iceimages/transplan/2025%20LRTP%20with%202027%20.pdf.

———. 2007b. *Anchorage Pedestrian Plan.*

———. 2010. *Anchorage Bicycle Plan.*

[MOA] Municipality of Anchorage. 1997. *Areawide Trails Plan.*

———. 2001. Planning Department. *Anchorage 2020 Anchorage Bowl Comprehensive Plan.* Published online at home.muni.org/iceimages/Planning/_.pdf.

Chapter 13: Air Quality
Affected Environment
Table of Contents

13.1 INTRODUCTION 1
13.1.1 Regulatory Setting 1
Air Quality Standards 1
State and Federal Transportation Conformity Rule 3
Mobile Source Air Toxics (MSATs) 3
Greenhouse Gases 3
13.1.2 Methodology 4
13.2 AFFECTED ENVIRONMENT 5
13.2.1 Carbon Monoxide 7
13.2.2 Particulate Matter 9
13.2.3 MSAT 10
13.2.4 Ozone 10
13.2.5 Greenhouse Gases 10
13.3 BIBLIOGRAPHY 12

List of Tables

Table 13-1. National Ambient Air Quality Standards 2
Table 13-2. Criteria Pollutant Sources and Health Effects 6
Table 13-3. Second Highest 8-Hour Average CO Concentration Data From Anchorage Monitoring Stations 9
Table 13-4. Second Highest 24-Hour Average PM_{10} Concentration Data from Anchorage Monitoring Stations 10

List of Figures

Figure 13-1. Trend in Second Maximum H-Hour CO Concentration at Anchorage CO Monitoring Stations: 1980–2008 7
Figure 13-2. Anchorage CO Maintenance Area Boundary and Air Quality Monitoring Stations 8

13.1 INTRODUCTION

Air quality refers to the cleanliness of the atmosphere. Clean air is vital to human health and is a resource protected by federal, state, and local regulations. Pollutants in the air not only can negatively affect humans but can also affect plants, animals, and manmade structures. Ambient (outdoor) air quality is affected by climate, topography, meteorological conditions, and airborne pollutants produced by natural or manmade sources. NEPA regulations require that the effects of a proposed project on air quality are evaluated in an EIS.

13.1.1 Regulatory Setting

The study of air quality impacts from a transportation project is legally mandated and supported by federal and state regulations, statutes, policies, and technical advisories designed to protect both public health and the natural environment, including:

- Clean Air Act
- National Ambient Air Quality Standards
- Control of Hazardous Air Pollutants from Mobile Sources (40 CFR Parts 59, 80, 85, and 86)
- Federal Transit Laws (Title 23 USC)
- Transportation Conformity Rule (40 CFR 93)
- Alaska Administrative Code 18 AAC 50.700

Air Quality Standards

The EPA is responsible for the establishment of National Ambient Air Quality Standards (NAAQS), national policies, and guidelines for the uniform and scientifically reliable study of air pollutants. The NAAQS include primary national standards to protect public health and secondary standards to protect public welfare. Anchorage is subject to air quality regulations issued by EPA. EPA's NAAQS set limits on concentration levels of criteria pollutants. Concentration levels of the criteria pollutants must not exceed the NAAQS over specified time periods. DEC monitors air quality throughout the state to compare the levels of criteria pollutants found in the atmosphere with the NAAQS. Table 13-1 summarizes the ambient air quality standards applicable for criteria pollutants in the study area.

Table 13-1. National Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Violation Determination	Primary Standards	Secondary Standards
Carbon Monoxide	8-hour	Not to be exceeded more than once per year	9 ppm	9 ppm
	1-hour	Not to be exceeded more than once per year	35 ppm	35 ppm
Lead	Rolling 3-month Average	Not to be exceeded	0.15 μg/m³	0.15 μg/m³
	Quarterly	Not to be exceeded	1.5	1.5
Ozone	8-hour	3-year average of the annual 4th highest daily maximum 8-hour average concentration	0.075 ppm	0.075 ppm
Nitrogen Dioxide	Annual Arithmetic Mean	Annual arithmetic mean	0.053 ppm	0.053 ppm
	1-hour	3-year average of the 98th percentile of the daily maximum 1-hour average	0.100 ppm	--
Sulfur Dioxide	3-hour	Not to be exceeded more than once per year	--	0.50 ppm
	1-hour	3-year average of the 99th percentile of the daily maximum 1-hour average	0.075 ppm	--
PM_{10}	24-hour	The expected number of days per calendar year with a 24-hour average concentration above 150 μg/m³ is equal to or less than 1 over a 3-year period	150 μg/m³	150 μg/m³
$PM_{2.5}$	Annual Average	3-year average of the annual arithmetic mean	15 μg/m³	15 μg/m³
	24-hour	3-year average of the 98th percentile of 24-hour concentrations	35 μg/m³	35 μg/m³

ppm = parts per million
μg/m³ = micrograms per cubic meter
-- = no standard has been established
Source: EPA 2010 (40 CFR 50)

One of the following three EPA designations indicates compliance status with respect to the NAAQS for specific areas and specific pollutants:

- Attainment areas are those with measured concentrations that are below the standards.
- Nonattainment areas are those designated as not meeting the standards. These areas must take actions within a specific timeframe to reduce emissions and attain the NAAQS.
- Maintenance areas are those that were previously designated nonattainment for a specific pollutant, but have consistently shown improvement with several years of concentrations below the standards. However, these areas are subject to maintenance plans for ensuring that measures are in place for continued compliance.

Specific areas can be designated as attainment for one pollutant and nonattainment or maintenance for another pollutant.

State and Federal Transportation Conformity Rule

Transportation conformity is an analytical process required for all federally funded transportation projects located in nonattainment or maintenance areas. Under the 1990 Clean Air Act (CAA) Amendments, the U.S. Department of Transportation cannot fund, authorize, or approve federal actions to support programs or projects that do not conform to the State Implementation Plan—the state's plan for meeting and maintaining compliance with the NAAQS—for achieving the goals of the CAA. Conformity with the CAA takes place on two levels: first at the regional level and second at the project level; the proposed project must conform at both levels to be approved.

Alaska Administrative Code 18 AAC 50.700, "Conformity," and the federal Transportation Conformity Rule, 40 CFR 93, establish criteria and procedures for determining conformity with State Implementation Plans (SIPs) of transportation plans, programs, and projects in Alaska that are developed, funded, or approved by the U.S. Department of Transportation and by metropolitan planning organizations (MPOs) or other recipients of funds under Title 23 U.S.C. or the Federal Transit Laws. The conformity regulations are applicable to projects within nonattainment or maintenance areas.

The requirements to demonstrate conformity for a project are twofold. Regional conformity is demonstrated by confirming that a project is included in a conforming Transportation Improvement Program (TIP) and Long Range Transportation Plan (LRTP). Project level conformity must be established for projects located in a CO, PM_{10}, or $PM_{2.5}$ nonattainment or maintenance area. To meet project level conformity, a local hot spot analysis or qualitative assessment is required to evaluate potential air pollutant concentrations to demonstrate that the project would not cause or contribute to a violation of the NAAQS.

Mobile Source Air Toxics (MSATs)

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. (EPA 2004).

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). The EPA has identified seven compounds with substantial contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. FHWA considers these the priority mobile source air toxics. To date, there are no NAAQS for MSATs, and there are no established criteria for determining when MSAT emissions should be considered a significant issue.

Greenhouse Gases

Vehicles also emit greenhouse gases (GHGs) into the atmosphere. The GHGs associated with transportation are water vapor, carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Any process that burns fossil fuel releases CO_2 into the air. CO_2 makes up the bulk of the emissions from transportation. Alaska is unique among U.S. states in that emissions from aircraft account for the majority of transportation GHG emissions. Nationwide, on-road vehicles account for around 85% of transportation GHG emissions. Because Alaska is heavily dependent on air travel, aviation emissions dominate (MAG 2009)

The Alaska Climate Change Sub-Cabinet was formed in 2007. The Sub-Cabinet is charged with preparing and implementing an Alaska Climate Change Strategy. This document will address state policies for anticipated climate change. The Mitigation Advisory Group (MAG) was tasked by the Alaska Climate Change Sub-Cabinet with preparing recommendations on measures that might be included in a strategy to mitigate (i.e. reduce) greenhouse gas emissions in Alaska.

On May 13, 2010, EPA issued a final rule that addresses GHG emissions from stationary sources under the CAA permitting programs. This final rule sets thresholds for GHG emissions that define when permits under the New Source Review Prevention of Significant Deterioration (PSD) and title V Operating Permit programs are required for new and existing industrial facilities.

On April 1, 2010, EPA and the National Highway Traffic Safety Administration (NHTSA) announced a joint final rule on Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy standards (40 CFR parts 85, 86, and 600; 49 CFR Parts 531, 533, 536, et al.). These standards apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. EPA and NHTSA are working on two new joint rulemakings, one to develop the first-ever fuel efficiency and GHG emissions standards for commercial trucks, and another to adopt the second-phase of GHG and fuel economy standards for light-duty vehicles.

To date there are no established criteria for determining when motor vehicle GHG emissions from a proposed project should be considered a significant issue under NEPA.

13.1.2 Methodology

Air quality effects were analyzed to ensure the project will not cause or contribute to air quality falling below established standards on a regional and local level. Local operational effects were evaluated based on tailpipe exhaust in the vicinity of intersections affected by the project. Regional operational effects were considered by comparing project emissions between the different build alternatives and the No Action Alternative. Criteria pollutants, MSATs, greenhouse gases, and construction effects were addressed. For more information on the air quality analysis methodology see the Air Quality Technical Report.

Emissions were quantified for local and project area impacts using the MOBILE6.2 model (EPA 2004) and AKMOBILE6 (a complementary program that works in conjunction with MOBILE6.2 to account for wintertime practices unique to Alaska). AKMOBILE6 input files that included specific parameters appropriate for Anchorage were obtained from the MOA and travel data from the traffic model forecast of the project were used in the following analyses.

- Because the project is located in a CO maintenance area dispersion modeling (hotspot analysis) was performed for intersections in the study area using EPA's CAL3QHC model. CO model analyses were performed for three worst case intersections per build alternative, based on level of service (LOS) and vehicle volumes.
- A MSAT analysis of air toxic emission trends was completed for selected road segments and combined for a total emissions value for each alternative, including the No Action Alternative. Emission estimates were compared between existing conditions and design year conditions, as well as between alternatives in the design year. A discussion of information that is incomplete or unavailable for a project specific assessment of MSAT impacts is included.
- Greenhouse gas emissions from project operations were calculated for each alternative, including the No Action Alternative. Emission estimates were compared between existing conditions and design year conditions, as well as between alternatives in the design year.

Particulate emissions of PM_{10} and $PM_{2.5}$ were addressed qualitatively. In addition to the regional emission estimates, a discussion of road dust fallout was included based on current literature.

Emissions from construction impacts were addressed qualitatively through a discussion of typical sources of construction emissions and a summary of reasonable precautions that will be taken to avoid dust emissions.

13.2 AFFECTED ENVIRONMENT

Protected by the Chugach Mountains and the Alaska Range, and warmed by Pacific Ocean currents, Anchorage has a temperate maritime climate. Temperatures range from an average minimum monthly temperature of 8°F in January to an average maximum monthly temperature of 65°F in July. The average annual snowfall is 71 inches, with average annual rainfall of 16 inches (WRCC 2010). The prevailing wind direction is from the south, following the valley terrain. The area experiences winter inversion conditions that can lead to higher concentrations of CO and PM as emissions accumulate from vehicles (WRCC 2010).

Table 13-2 is a summary of criteria pollutant sources and health effects.

Table 13-2. Criteria Pollutant Sources and Health Effects

Criteria Pollutant	Pollutant Sources and Health Effects
Carbon Monoxide	**Source** – Burning of natural gas, coal, oil, etc.
	Health Effects - Reduces ability of blood to bring oxygen to body cells and tissues; cells and tissues need oxygen to work. CO may be particularly hazardous to people who have heart or circulatory (blood vessel) problems and people who have damaged lungs or breathing passages.
Lead	**Source** – Lead gasoline additives, non-ferrous smelters, paint, lead solder, and battery plants.
	Health Effects - Seizures, high blood pressure, mental retardation, central nervous system failures, and behavioral disorders; children and infants especially susceptible to low doses.
Ozone	**Source** – Chemical reaction of pollutants, volatile organic compounds (VOCs)[a] and NO_X.
	Health Effects - Breathing problems, reduced lung function, asthma, irritates eyes, stuffy nose, reduced resistance to colds and other infections, may speed up aging of lung tissue.
	Environmental Effects – O_3 can damage plants and trees; smog can cause reduced ambient visibility.
	Property Damage – Damages rubber, fabrics, etc.
Nitrogen Dioxide	**Source** – Burning of gasoline, natural gas, coal, oil, etc.
	Health Effects – Lung damage, illnesses of breathing passages and lungs (respiratory system).
	Environmental Effects – NO_2 is an ingredient of acid rain (acid aerosols), which can damage trees and lakes. Acid aerosols can reduce ambient visibility.
	Property Damage – Acid aerosols can eat away stone used on buildings, statues, monuments, etc.
Sulfur Dioxide	**Source** – Burning of coal and oil, especially high-sulfur coal from the Eastern United States; industrial processes (paper, metals), diesel fuel.
	Health Effects – Breathing problems; may cause permanent damage to lungs.
	Environmental Effects – SO_2 is an ingredient in acid rain (acid aerosols), which can damage trees and lakes. Acid aerosols can also reduce ambient visibility.
	Property Damage – Acid aerosols can eat away stone used in buildings, statues, monuments, etc.
PM_{10} and $PM_{2.5}$	**Source** – Burning of wood, diesel, and other fuels; industrial plants; agriculture (plowing, burning off fields); unpaved roads, sand/salt from winter maintenance operations.
	Health Effects – Nose and throat irritation, lung damage, bronchitis.
	Environmental Effects – Particulates are the main source of haze that reduces ambient visibility.
	Property Damage – Ashes, soot, smokes, and dusts can dirty and discolor structures and other property, including clothes and furniture

Source: CDOT 2008

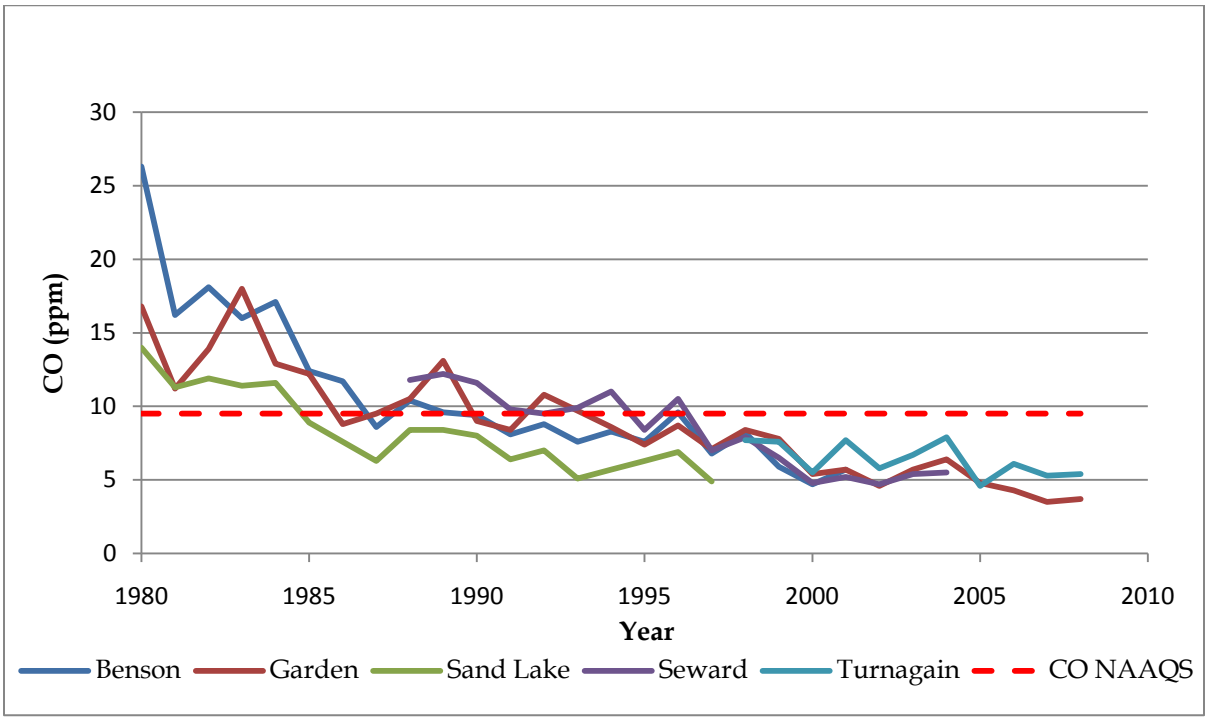
[a] VOCs (volatile organic compounds) are released from burning fuel (gasoline, oil, wood coal, natural gas, etc.), solvents, paint, glues, and other products used at work or home. Cars are a main source of VOCs. VOCs include chemicals such as benzene, toluene, methyl chloride, and methyl chloroform.

The major airborne pollutants of interest for transportation projects are CO, PM_{10}, $PM_{2.5}$, ozone, and ozone precursors (volatile organic compounds and NO_X). Since the transition to unleaded gasoline (1996) and ultra low sulfur diesel (2007), lead and SO_2 are not pollutants of concern for transportation projects, and they were not addressed in this analysis.

13.2.1 Carbon Monoxide

Anchorage was first designated as experiencing high levels of ambient CO concentrations in the early 1970s, when monitoring programs demonstrated elevated levels of CO throughout the community. Anchorage violated the CO NAAQS every year from 1972 through 1994 and again in 1996 and was designated a nonattainment area. As a result, a number of efforts were made to bring Anchorage into compliance (including such initiatives as vehicle inspections, fuel additives, and vehicle plug-in programs). In 1998, Anchorage began a continuous series of years in compliance with the NAAQS. In February 2004, EPA approved a request and maintenance plan to redesignate Anchorage from a nonattainment area to a maintenance area. Figure 13-1 demonstrates the monitor data trends for CO from 1980 to 2008.

Figure 13-1. Trend in Second Maximum H-Hour CO Concentration at Anchorage CO Monitoring Stations: 1980–2008



Source: MOA 2009

Figure 13-2 depicts the Anchorage CO maintenance area boundary in relation to the project area.

Figure 13-2. Anchorage CO Maintenance Area Boundary and Air Quality Monitoring Stations

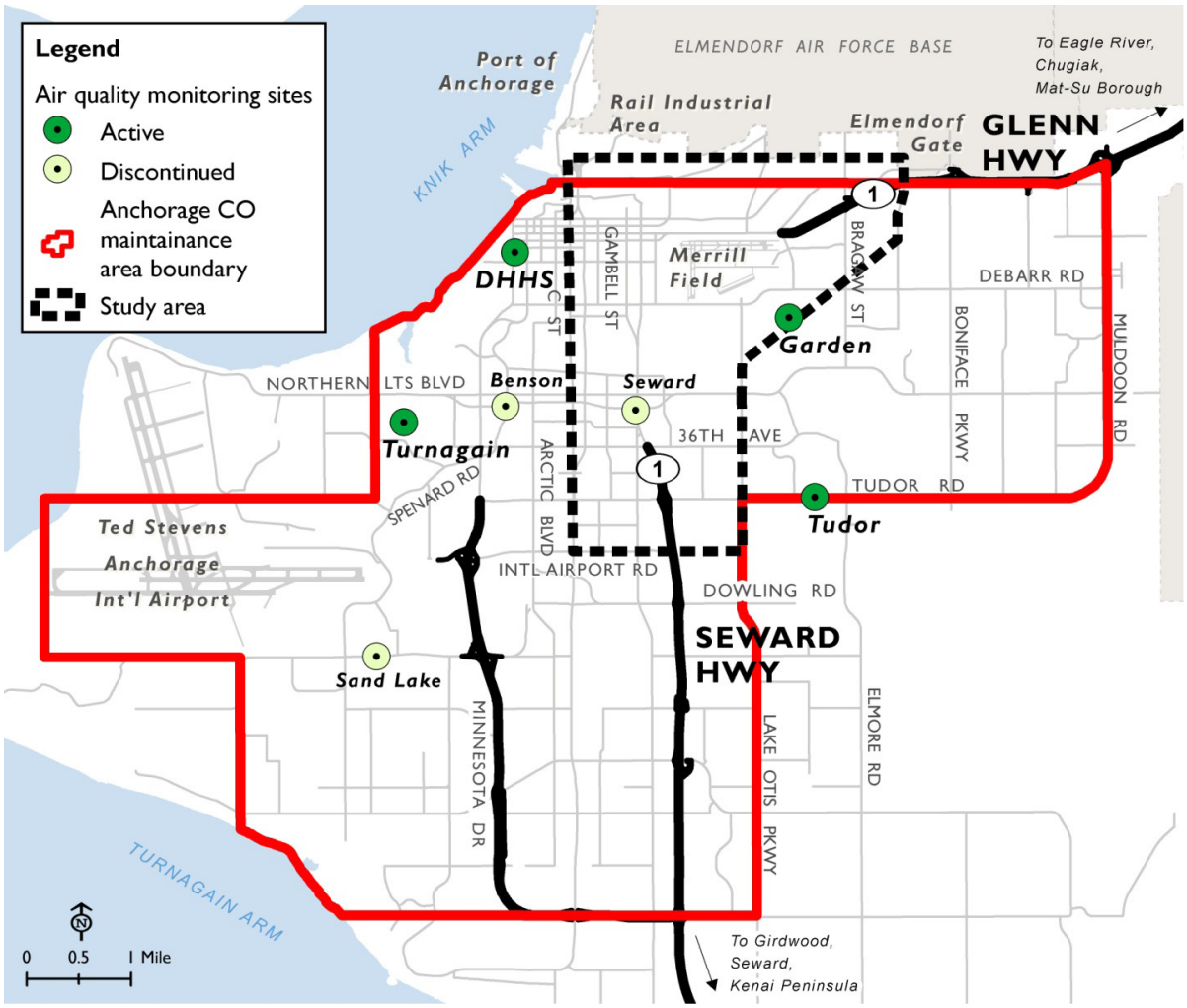


Table 13-3 summarizes the most recent CO monitoring values at the Turnagain and Garden stations from 2005 to 2008. These are the last two CO monitoring stations operating in the Anchorage Bowl. Over the past 30 years, several monitoring stations have been discontinued because they have been found redundant while others have been added to meet new monitoring objectives (MOA 2009).

Table 13-3. Second Highest 8-Hour Average CO Concentration Data From Anchorage Monitoring Stations

Year	Garden station (ppm)	Turnagain station (ppm)	DHHS station (ppm)
2005	4.8	4.6	NA
2006	4.3	6.1	NA
2007	3.5	5.3	3.1
2008	3.7	5.4	3.1

NAAQS for CO indicate the standard is "not to be exceeded more than once per year." The second highest monitor value is shown, demonstrating compliance with the NAAQS.
ppm = parts per million
NA = monitor data not available. DHHS station began collecting data in October 2007
Note:CO is not monitored at the Tudor monitoring station.
NAAQS standard for 8-hour CO is 9 ppm.
Source: MOA 2009

Under the existing, approved CO maintenance plan for Anchorage, the Municipality of Anchorage (MOA) must follow plan requirements to ensure that the area does not revert to nonattainment for CO. A maintenance area is subject to the same project-level air quality analysis that is required for a nonattainment area. The proposed H2H project would be within the currently designated maintenance area for CO.

13.2.2 Particulate Matter

The project is located in an area designated as attainment for all other criteria pollutants. The Eagle River community, located approximately 10 miles north of Anchorage and outside the project area, is currently considered nonattainment for particulate matter (PM_{10}). The Anchorage Bowl has exceeded the NAAQS for PM_{10} during windstorms and after ash fall from volcanic eruptions. However, these exceedances are considered "natural events" and Anchorage remains classified as an attainment area (MOA 2009). PM_{10} concentrations do not show a clear trend because of variability due to natural events such as wind storms and volcanic eruptions. Changes in road sanding and clean-up methods were made beginning in 1996 to address roadway PM_{10} emissions. These efforts have contributed to a decreasing trend in PM_{10} concentrations from roadway sources (MOA 2009).

Table 13-4 summarizes recent PM_{10} monitor data in Anchorage and shows concentrations below the NAAQS.

Table 13-4. Second Highest 24-Hour Average PM_{10} Concentration Data from Anchorage Monitoring Stations

Year	Garden station (µg/m³)	Tudor station (µg/m³)
2005	52	145
2006	48	105
2007	56	98
2008	49	109

NAAQS for PM_{10} indicate the standard is "not to be exceeded more than once per year." The second highest monitor value is shown, demonstrating compliance with the NAAQS.
µg/m³ = micrograms per cubic meter
NAAQS standard for 24-hour PM_{10} is 150 µg/m³.
Source: MOA 2009

13.2.3 MSAT

Over the past 20 years, the AAQP has conducted a number of air toxics monitoring studies. Although these studies have been short-term, they suggest that outdoor and indoor benzene concentrations in Anchorage are among the highest in the U.S. Two notable studies are summarized below. The studies analyzed VOCs including benzene, which is a priority MSAT.

The 1993–94 Ambient Volatile Organic Compound Monitoring Study addressed concerns about VOC exposures among residents of a neighborhood adjacent to a large petroleum storage facility. Sample results indicated higher benzene concentrations near roadway intersections than near the tank farm, suggesting that motor vehicle exhaust emissions were the primary source of benzene and other VOCs in most of Anchorage (Taylor 1994). The benzene concentrations from this study were two to three times higher than other major cities included in a 1990 EPA study (EPA 1990).

The 2002 Ted Stevens Anchorage International Airport Air Toxics Monitoring Study was performed to address concerns about toxic air pollution adjacent to the Ted Steven Anchorage International Airport. Of the 10 monitoring sites sampled, sites located in areas with the most motor vehicle activity had the highest benzene concentrations (MOA 2003).

13.2.4 Ozone

Ozone has been monitored at two locations in the Municipality of Anchorage between April and December of 1983. At both locations, the highest one-hour average concentrations of ozone were found to be about one-half of the NAAQS in effect at that time. Since then the 1-hour ozone NAAQS was revoked and replaced with an 8-hour average NAAQS. In 1985, the last year ozone data was collected in Anchorage, peak hourly ozone levels in Anchorage were lower than 95 percent or more of the stations operating in the U.S. (MOA 2009). No monitoring has been performed in Anchorage for NO_2 or VOC, which are precursors to the formation of ozone.

13.2.5 Greenhouse Gases

The Alaska Greenhouse Gas Inventory and Reference Case Projections, 1990–2020, prepared by the Center for Climate Strategies, February 2007 for DEC took a first comprehensive look at all potential anthropogenic sources of GHG emissions in the state. The MAG prepared a report that presented a refined analysis of the GHG inventory and presented recommendations on measures that might be included in a GHG reduction strategy. This study determined the principal source of Alaska's GHG emissions is residential, commercial, and industrial fuel use, accounting for 49 percent of total state gross GHG emissions in 2005 (MAG 2009).

The next-largest contributor to the total gross GHG emissions is the transportation sector, which accounted for 35 percent of the total Alaska Gross GHG emissions in 2005. The transportation sector accounts for emissions associated with fuel consumption by all on-road and non-highway vehicles, including aircraft and marine vehicles. Cars, trucks, and other on-road mobile sources account for around 7% of total emissions in Alaska. The percentage can be much higher in other states. The main contributor to transportation sector GHG emissions in Alaska is jet fuel (MAG 2009).

13.3 BIBLIOGRAPHY

[CDOT] Colorado Department of Transportation. 2008. *Draft Environmental Impact Statement Air Quality Technical Report*. November 2008.

[EPA] U.S. Environmental Protection Agency. 1990. *Final report on the Operations and Findings of the Toxic Air Monitoring System*. Atmospheric research and Exposure Assessment Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. 1990.

———. 1994. *Environmental Fact Sheet, Air Toxics from Motor Vehicles*. August 1994.

———. 2004. "Approval and Promulgation of Implementation Plans: State of Alaska; Anchorage Carbon Monoxide Nonattainment Area; Designation of Areas for Air Quality Planning Purposes." 40 CFR Parts 52 and 81. *Federal Register:* June 23, 2004 (Vol. 69, No. 120; 34,935). Available online at http://epa.gov/airquality/greenbk/frn/6934935.html.

———. 2010. *National Ambient Air Quality Standards (NAAQS)*. Codified at 40 CFR 50, and published online at http://www.epa.gov/air/criteria.html.

[MAG] Alaska Climate Change Strategy's Mitigation Advisory Group. 2009. Final Report Greenhouse Gas Inventory and Forecast and Policy recommendations Addressing Greenhouse Gas Reduction in Alaska. August 2009.

[MOA] Municipality of Anchorage. 2003. *Ted Stevens Anchorage International Airport Air Toxics Monitoring Study*. Report prepared by Environmental Quality Program Environmental Services Division Department of Health and Human Services. April 2003.

———. 2009. *Air Quality in Anchorage, A Summary of Air Monitoring Data and Trends 1980-2008*. Report prepared by Air Quality Program Environmental Services Division Department of Health and Human Service. March 2009.

[Taylor] Taylor, Morris. 1994. *Final Report on the Operations and Findings of the Anchorage VOC Monitoring Project*.

[WRCC] Western Regional Climate Center. 2010. *Anchorage WSCMO AP, Alaska – Climate Summary*. Published online at http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak0280.

Chapter 14: Noise
Affected Environment

Table of Contents

14.1 INTRODUCTION 1
14.2 REGULATORY SETTING 2
14.3 METHODOLOGY 4
14.4 AFFECTED ENVIRONMENT 4
14.4.1 Existing ambient noise level measurements 4
14.4.2 Existing Noise Levels by Area 5
14.5 BIBLIOGRAPHY 10

List of Tables

Table 14-1. Sound Levels of Common Sources and Noise Environments 3
Table 14-2. Noise Abatement Criteria 3
Table 14-3. Range of Measured Existing Ambient Noise Levels 6

List of Figures

Figure 14-1. Ambient Noise Monitoring Locations 7
Figure 14-2. Noise-Sensitive Land Uses 8

14.1 INTRODUCTION

The H2H noise analysis followed the guidance of state and federal transportation agencies to identify the H2H alternatives' potential noise consequence, and to consider and evaluate mitigation measures to minimize project-related noise impacts, if necessary. The guidelines and standards for analyzing and mitigating highway noise are established by the Federal Highway Administration (FHWA) and the Alaska Department of Transportation and Public Facilities (DOT&PF; see bibliography for guidelines and standards). The information presented in this section draws from the information included in the H2H *Noise Technical Memorandum*.

Noise is defined as unwanted sound. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels (dB). The decibel is a logarithmic unit that expresses the ratio of the sound pressure level being measured to a standard reference level. Sound is composed of various frequencies, but the human ear does not detect (hear) all frequencies with the same level of efficiency. Frequencies to which the human ear does not respond well must be filtered out when measuring highway noise levels so that measurements reflect the way people actually hear sound. Sound-level meters are usually equipped with weighting circuits that filter out selected frequencies. It has been found that the A-scale on a sound-level meter best approximates the frequency response of the human ear. Sound pressure levels measured on the A-scale of a sound meter are abbreviated as dBA.

In addition to varying in frequency, noise intensity fluctuates over time. To summarize these variations into a single number, the equivalent sound level (L_{eq}) is used. L_{eq} is equivalent to a steady, A-weighted sound level over a specific period of time which contains the same amount of acoustic energy as the varying, A-weighted sound level over the same specified time period. If the time period is one hour, the descriptor is the hourly equivalent sound level, $L_{eq(h)}$, which is widely used to describe traffic noise. Unless otherwise indicated, all noise levels discussed in this environmental impact statement (EIS) are $L_{eq(h)}$ noise levels.

Noise Fundamentals:

How do decibels relate to loudness?

The human ear generally is not well suited to detecting very slight up or down changes in noise levels. The smallest change in noise level that a human ear can perceive is about 3 dBA, while increases of 5 dBA or more are clearly noticeable. For most people, a 10-dBA increase in noise levels is judged as a doubling of sound level.

What is an adjusted decibel?

The decibel is a unit of relative sound intensity. For highway traffic noise, an adjustment (weighting) of the high- and low-pitched sounds is made to approximate the way an average person's ear actually hears sound. The adjusted sounds are called "A"-weighted levels (dBA).

What does L_{eq} mean?

An L_{eq} is an "equivalent sound level" that would be the same as a steady A-weighted sound level over a specified period of time (such as one hour) that has the same acoustic energy as a fluctuating noise during that period. It is a measure of cumulative acoustical energy and is used to describe how much noise a specific location would experience during a fixed period of time.

A few general relationships may be helpful to understand how sound is generated and how it travels. From the source to the receptor, noise levels and the frequency spectrum both change. The most obvious change is that noise levels decrease with distance from the noise source—in this case, a highway. The manner in which noise decreases with distance depends on the following important factors:

- *Geometric spreading from point sources and linear sources.* The L_{eq} from a linear source, such as a road, will decrease by approximately 3 dBA each time you double the distance between the source (road) and the receptor (noise-sensitive land use). Subjectively, a 10-dBA change in noise levels is perceived by most people to be approximately a twofold change in loudness (e.g., an increase from 50 dBA to 60 dBA causes the perceived loudness to double).

- *Ground absorption.* Hard surfaces such as pavement tend to reflect noise, making it travel farther, whereas soft surfaces such as vegetation tend to break up and reduce noise.
- *Atmospheric effects and refraction.* Atmospheric conditions can affect how well noise travels near highways. Wind is the single most important meteorological factor within approximately 500 feet, and vertical air temperature gradients are more important over longer distances. Other factors such as air temperature, humidity, and turbulence can also have significant effects.
- *Shielding by natural and man-made features, noise barriers.* Noise levels can also decrease due to shielding from topographic features (such as hills) or structures (such as buildings) between the noise source and the receptor.

Generally, 3 dBA is the minimum change in outdoor sound levels that can be perceived by a person with normal hearing. Sound levels produced by common noise sources are shown in Table 14-1.

14.2 REGULATORY SETTING

For highway transportation projects with FHWA involvement, the Federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) regulate the analysis and mitigation of highway noise. In Alaska, DOT&PF's *Traffic Noise Abatement Guidance* provides the basis for analyzing and abating highway traffic noise impacts. These noise regulations and guidance govern noise prediction requirements, noise analyses, noise abatement criteria, and requirements for informing local officials. Noise abatement criteria (NAC) are used to determine if a noise impact is predicted to occur, and whether mitigation needs to be considered. The NAC differ depending on the type of land use that will be subject to the noise. For example, the FHWA NAC for residences (67 dBA) is lower than the NAC for commercial areas (72 dBA). There are no regulatory criteria for undeveloped land or construction noise. The NAC are predicted at the exterior of structures during peak-hour noise conditions. The NAC are listed in Table 14-2.

Table 14-1. Sound Levels of Common Sources and Noise Environments

Thresholds/ Noise Sources (distance from source)	Sound Level (dBA)	Subjective Evaluations	Possible Effects on Humans
Human threshold of pain Carrier jet takeoff (50 ft)	140	Deafening	Continuous exposure can cause hearing damage
Siren (100 ft) Jackhammer, power drill	130		
Loud rock band Auto horn (3 ft)	120		
Busy video arcade Baby crying	110		
Lawn mower (3 ft) Noisy motorcycle (50 ft)	100	Very Loud	
Heavy truck at 40 mph (50 ft) Shouted conversation	90		
Kitchen garbage disposal (3 ft) Busy urban street, daytime	80	Loud	
Normal automobile at 65 mph (25 ft) Vacuum cleaner (3 ft)	70		Speech interference
Large air conditioning unit (20 ft) Normal conversation (3 ft)	60	Moderate	
Quiet residential area Light auto traffic (100 ft)	50		Sleep interference
Library Quiet home	40	Faint	
Soft whisper (15 ft)	30		
Broadcasting studio	20	Very Faint	
Threshold of human hearing	0-10		

Note: Both subjective evaluations and possible effects on humans are continuous, without true threshold boundaries. Consequently, there are overlaps among categories of response that depend on the sensitivity of the noise receptors. Source: EPA 1971.

Table 14-2. Noise Abatement Criteria

Land Use Category	Land Use – Primary Activity	FHWA Noise Abatement Criteria (L_{eq} in dBA)	DOT&PF Noise Abatement Criteria (L_{eq} in dBA)
A	Tracts of land for which serenity and quiet are of extraordinary significance, and which serve an important public need. Such areas could include amphitheaters, particular parks or portions of parks, open spaces, or historic districts dedicated to or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.	57 (Exterior)	56 (Exterior)
B	Picnic areas, recreation areas, playgrounds, active sports areas, and parks that are not included in Category A, and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.	67 (Exterior)	66 (Exterior)
C	Developed lands, properties, or activities not included in Categories A and B above.	72 (Exterior)	71 (Exterior)
D	Undeveloped lands.	--	--
E	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.	52 (Interior)	51 (Interior)

DOT&PF is responsible for implementing FHWA regulations in the State of Alaska. The Alaska DOT&PF's *Traffic Noise Abatement Guidance* (DOT&PF 2009) explains the DOT&PF noise policy, and

is based on the FHWA policy in 23 CFR 772. The DOT&PF *Traffic Noise Abatement Guidance* was updated in 2009, and has been approved by FHWA.

A noise impact occurs if predicted noise levels *approach* the FHWA NAC in Table 14-2, or *substantially exceed* existing noise levels. Each state defines quantitative levels considered to approach the NAC or substantially exceed existing noise levels. The criteria are applied to the peak noise impact hour. DOT&PF considers an "absolute" traffic noise impact to occur if predicted noise levels approach within 1 dBA of the FHWA criteria. This accounts for the 1-dBA difference between the federal NAC and the state NAC shown in Table 14-2. A "relative" noise impact is considered to occur if predicted noise levels substantially exceed the existing noise levels. DOT&PF considers a 15-dBA increase over existing noise levels to be substantial. The NAC used to evaluate noise levels for the H2H project are those presented in Alaska DOT&PF's *Traffic Noise Abatement Guidance* (DOT&PF 2009), and which are shown in the right-hand column of Table 14-2.

14.3 METHODOLOGY

The H2H noise analysis evaluates noise levels with and without the project at first-row noise-sensitive land uses adjacent to the reasonable alternatives. First-row noise-sensitive land uses are those receptors that would be the nearest properties to the new or modified roadway, and are typically within 500 feet of those roadways. Traffic noise levels were calculated using FHWA's Traffic Noise Model (TNM® Version 2.5). TNM computes highway traffic noise at nearby receptors and aids in the design and evaluation of mitigation measures. Inputs to the model include three-dimensional descriptions of roadway alignments, vehicle volumes by class of vehicle (car, medium truck, heavy truck, etc.), vehicle speeds, traffic control devices (e.g., stoplights), and data on the characteristics and locations of specific ground surfaces, topographical features, and other elements that influence the transmission of vehicle noise between the roadway and the receptor.

What is a Receptor?

"Receptors," with regard to noise, are locations where people can hear noise from the roadway (backyards, for instance), and where increases in noise could potentially cause a negative affect to the occupancy, use, or enjoyment of the location.

Receptors are also specific locations modeled in the computer noise model to predict existing and future noise levels with and without a project. For certain locations, such as an apartment building or a school, there may be multiple receptors for the multiple outdoor use areas or units that they contain.

Existing conditions and future No Action and build conditions under the reasonable alternatives were modeled. Because the H2H project area is large and encompasses a very large number of individual properties, taking existing ambient peak traffic hour measurements at every location to establish existing ambient noise levels was not practical. Therefore, in accordance with DOT&PF guidance (DOT&PF 2009), the FHWA TNM was run with existing peak traffic data to predict existing noise levels at each modeled receptor in the study area.

Baseline existing ambient noise level measurements were taken in the project area between August 24 and September 1, 2009 to help calibrate and validate the FHWA TNM, and to present general information on project area existing noise levels. Existing ambient noise level measurements are discussed further in the *Affected Environment* section below.

14.4 AFFECTED ENVIRONMENT

14.4.1 Existing ambient noise level measurements

Baseline existing ambient noise level measurements were taken in the project area between August 24 and September 1, 2009. The existing ambient noise-monitoring methodology for the H2H project was developed in accordance with guidance presented in the FHWA *Measurement of Highway-Related Noise* (FHWA 1996) and in the DOT&PF *Traffic Noise Abatement Guidance* document.

Short-term (15-minute) noise measurements were taken at 15 individual locations adjacent to the reasonable alternatives during the morning or evening peak traffic periods to try and capture maximum daily traffic noise levels. Existing traffic count data in the project area indicated that the peak traffic periods were between 7 a.m. and 9 a.m. and between 3 p.m. and 6 p.m. All measurements were taken within these peak traffic periods. These existing noise levels were measured for use in validation of the TNM prior to predicting noise levels under different conditions for the technical noise analysis, and are presented here for general information only. For the purposes of the noise analysis, peak noise hour traffic conditions are used in conjunction with the TNM to establish an existing baseline for the existing condition. For the purposes of determining locations where a substantial noise increase, as defined by the DOT&PF, may occur as a result of the project, TNM modeled existing noise levels, rather than existing monitored noise levels, are used.

Monitoring locations were selected so that the noise measurements obtained generally represented the most common types of noise environments in the project study area. Because noise measurements were primarily taken to aid in TNM validation, the noise monitoring was conducted principally to capture noise from highway sources only. Other noise sources exist within the project area (such as aircraft noise, community noise [dogs, people, lawn mowers etc.], trains, and industrial noise), and these were noted at each monitoring location. However, during noise monitoring, sources of non-highway noise that were significant enough to increase L_{eq} noise levels above the level of background noise levels generated by traffic were filtered out of the measurements. Therefore, it should be noted that ambient noise levels presented may not include some local sources that would contribute to an extent to general background noise levels.

The areas selected for noise monitoring emphasize residential land uses because of the noise-sensitive nature of these types of land use. However, institutional land uses (such as churches and hospitals) and commercial land uses were also included. At least two measurements were conducted at each location to improve the statistical reliability of the measurement results. Table 14-3 shows the range of measured Leq noise levels at the each of the 15 sites where ambient noise was measured. Figure 14-1 shows the ambient noise monitoring locations where existing noise levels were measured.

The data show that existing peak hour noise levels in the vicinity of the reasonable alternatives ranges from the mid 50 dBAs to the mid 70 dBAs. The data also show that, generally speaking, the highest measured noise levels occurred in Midtown, and the residential areas to the east of Midtown typically exhibited lower measured levels. In some cases, existing measured noise levels are in excess of the applicable NAC at both residential and commercial properties in the project area.

14.4.2 Existing Noise Levels by Area

Land uses in the project corridors are a mixture of residential, commercial, light and heavy industrial, parks, schools, churches, and other institutional uses with varying sensitivity to noise (See Figure 14-2). The project study area can be generally divided into six broad land use regions with varying existing ambient noise levels and varying sensitivity to noise. These are: Midtown, Downtown, Ship Creek Industrial Area, Chester Creek/Fairview, Airport Heights, and Mountain View/Russian Jack. The general limits of these areas, for the purposes of this discussion of noise environments, are defined below and shown in Figure 14-2.

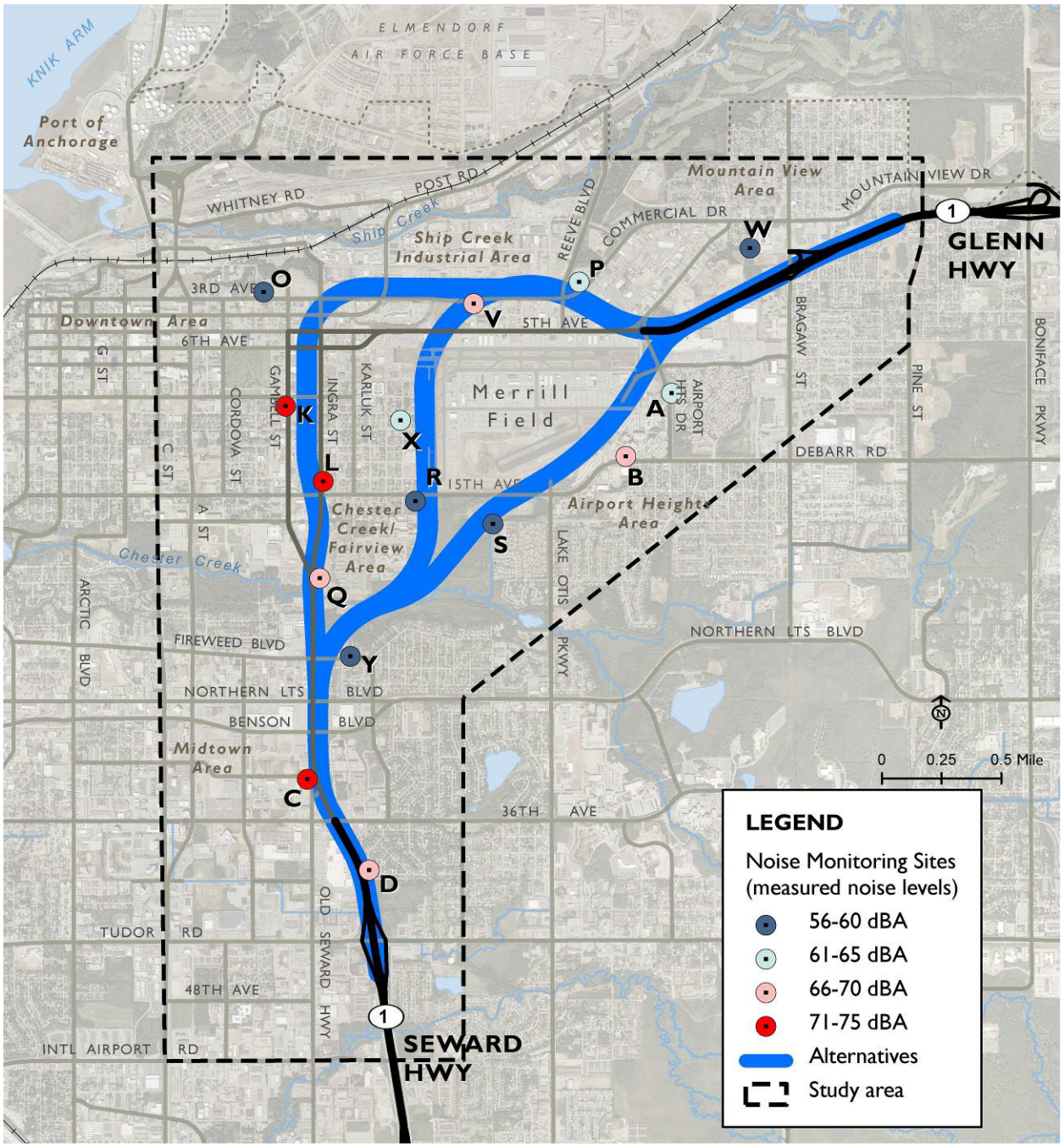
Table 14-3. Range of Measured Existing Ambient Noise Levels

Site ID	Location in Anchorage, AK	Land Use	Range of Measured L_{eq} (dBA)[1]
A	Unit #192, Penland Park Mobile Home Facility	Residential	64 - 65
B	Alaska Regional Hospital, 2801 Debarr Road	Medical (Residential)	66 - 67
C	Moose's Tooth Pub, 3300 Old Seward Highway	Commercial	70 - 71
D	3931 Helvetia Drive	Residential	69
K	Falafel King Restaurant, 930A Gambell Street	Commercial	74
L	910 E 14th Avenue	Residential	74 - 75
O	Alaska Native Medical Center, 522 E 3rd Avenue	Medical	58
P	Laborers International Union of N. America, 2501 Commercial Drive	Commercial	62 - 64
Q	Shiloh Baptist Church, 855 E 20th Avenue	Church	68
R	1520 Orca Street	Residential	59
S	Eastridge Apartments, Sitka Avenue	Residential	56
V	Mush Inn Motel, 333 Concrete Street	Residential	66 - 67
W	Unit #33, Unnamed Trailer Park Facility, SE corner of Mountain View Drive and Commercial Drive	Residential	58 - 59
X	1020 Nelchina Street	Residential	61
Y	1013 Fireweed Lane	Residential	56 - 57

[1] *At least two noise measurements within 2 dBA of each other were taken at each location to demonstrate the representativeness of the measurement results. The range presented above shows the minimum and maximum levels recorded. Where a range is not presented, the two measurements yielded the same noise level each time.*

Midtown. The Midtown area extends from the southern limits of the project up to Chester Creek, and is centered on the Seward Highway. In this segment of the project, land uses are predominantly commercial (Land Use Category C) west of the Seward Highway, and a mixture of commercial retail, office buildings (Land Use Category C); and single- and multi-family residential, a small number of hotels/motels, and churches (Land Use Category B) east of the Seward Highway. Noise sources in this area are dominated by traffic on the Seward Highway, but also include aircraft from Merrill Field Airport and community noise sources (such as lawn mowing, landscaping, recreation, etc.). Existing peak measured noise levels in this area (see data for sites C, D, and Q in Table 14-3, and site locations in Figure 14-1) ranged from 68 to 71 dBA.

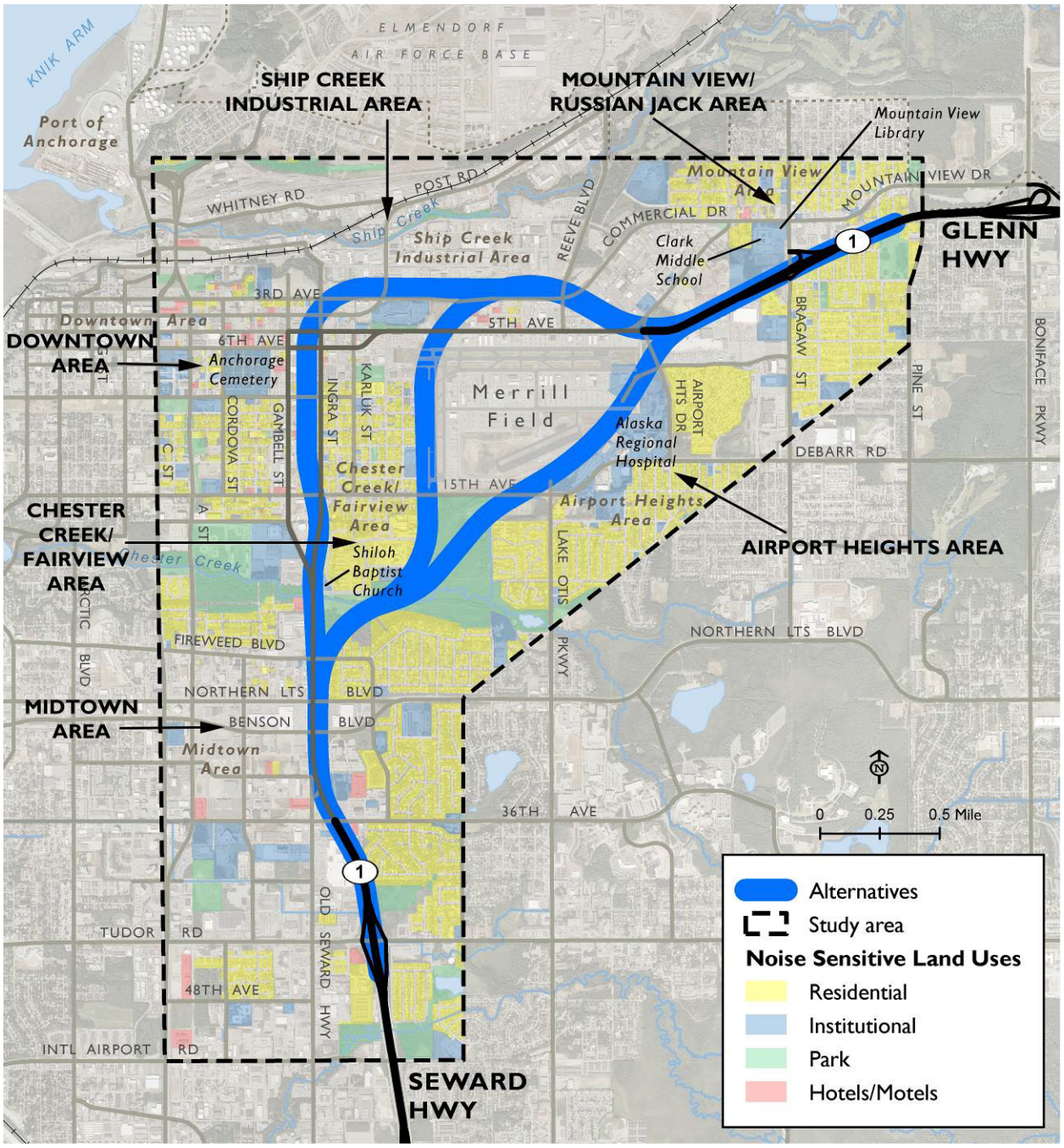
Figure 14-1. Ambient Noise Monitoring Locations



Downtown. The Downtown area is located between 15th Avenue in the south and 3rd Avenue in the north, and between Fairbanks Street in the west and Juneau Street in the east. Land uses between 15th Avenue and 6th Avenue in this segment are a mixture of single-family and multi-family residential (Land Use Category B) and commercial retail uses (Land Use Category C). Additional noise-sensitive uses in this area include the True Vine Christian School at 13th Avenue and Hyder Street, the Anchorage Native Assembly Church at 11th Avenue and Ingra Street, and a small number of hotels/motels (all Land Use Category B). North of 6th Avenue, land uses transition to predominantly commercial uses with only

isolated pockets of residential properties. Noise sources in this area are dominated by traffic on the surface streets, but also include aircraft from Merrill Field Airport and Joint Base Elmendorf-Richardson (JBER). Existing peak measured noise levels in this area (see data for sites L and K in Table 14-3, and site locations in Figure 14-1) ranged from 74 to 75 dBA.

Figure 14-2. Noise-Sensitive Land Uses



Ship Creek Industrial Area. The Ship Creek Industrial Area is located north of 3rd Avenue and east to Mountain View Drive. Land uses in this area are almost exclusively light industrial and commercial (Land Use Category C), with some institutional-residential uses such as the Anchorage Correctional Complex at 4th Avenue and Post Street, and the Brother Francis Shelter at 1st Avenue and Karluk Street;

as well as a small number of hotels, motels, bed-and-breakfasts, and hostels (all Land Use Category B). Due to the predominantly commercial nature of the land uses in this area, this area generally contains the least noise-sensitive of the project-affected land uses. Noise sources in this area are dominated by traffic on the surface streets and by industrial noise from the various facilities in this area, but also include aircraft from Merrill Field Airport, the Alaska Railroad, and JBER. Existing peak measured noise levels in this area (see data for sites O, P, and V in Table 14-3, and site locations in Figure 14-1) ranged from 58 to 67 dBA.

What is a Noise-Sensitive Land Use?

A noise-sensitive land use is a property in the vicinity of an alternative that is identified in the noise abatement criteria as being particularly susceptible to changes in noise levels as a result of the project. Some land uses are more noise-sensitive than others because of the activities that occur there. For example, the most noise-sensitive types of land uses are generally accepted to be residences, hotels, schools, hospitals, churches, libraries, public meeting rooms, auditoriums, and outdoor recreational areas. FHWA and DOT&PF analyze noise affects on noise-sensitive uses.

Chester Creek/Fairview. The Chester Creek/Fairview area is centered on the Chester Creek Greenbelt and Sitka Street Parks, and the various developments on the boundaries of these open spaces, as well as the portion of the Fairview neighborhood located north of 15th Avenue and immediately west of Merrill Field Airport. Land uses in these areas are predominantly either recreational or residential (both Land Use Category B), but also include the Anchorage Senior Activity Center on 19th Avenue and Orca Place, and Fairview Elementary School at 13th Avenue and Nelchina Street. Noise sources in this area are dominated by traffic on the surface streets and aircraft from Merrill Field Airport. Other noise sources include JBER, as well as community noise sources. Existing peak measured noise levels in this area (see data for sites R, S, X, and Y in Table 14-3, and site locations in Figure 14-1) ranged from 56 to 61 dBA.

Airport Heights. The Airport Heights area is generally defined as the portion of the project area located along the southeast edge of Merrill Field Airport. Land uses in this area are a mixture of single- and multi-family residential (Land Use Category B), and institutional or commercial land uses (Land Use Category B or C, depending on whether there are overnight stays at the specific facilities). The Alaska Regional Hospital is located in this part of the project area; the hospital has approximately 250 beds (Alaska Regional Hospital, 2010) and is considered a residential facility (Land Use Category B) for the purposes of the noise analysis. Other noise-sensitive land uses in this area include the UAA Aviation Technology School located on the east side of Merrill Field Airport. Noise sources in this area are dominated by traffic on the surface streets and aircraft from Merrill Field Airport. Other noise sources include JBER, as well as community noise sources. Existing peak measured noise levels in this area (see data for sites A and B in Table 14-3, and site locations in Figure 14-1) ranged from 64 to 67 dBA.

Mountain View/Russian Jack. The Mountain View/Russian Jack area is generally the portion of the project area northeast of Merrill Field Airport. Land uses in this area are predominantly commercial (Land Use Category C) or institutional, with some single- and multi-family residential (Land Use Category B) properties toward the east end of the project limits. Clark Middle School (Land Use Category B) occupies a significant portion of this area just west of Bragaw Street on the north side of the Glenn Highway. Noise sources in this area are dominated by traffic on the Glenn Highway, and aircraft from Merrill Field Airport. Other noise sources include JBER, as well as community noise sources. Existing peak measured noise levels in this area (see data for site W in Table 14-3, and site locations in Figure 14-1) ranged from 58 to 59 dBA.

Insert discussion of existing conditions modeling results once traffic forecast is done and the TNM modeling is completed.

14.5 BIBLIOGRAPHY

Alaska Regional Hospital. 2010. *About Us.* Published online at http://www.alaskaregional.com/.

[DOT&PF] Alaska Department of Transportation and Public Facilities. 2009. *Traffic Noise-Abatement Guidance*. April 2009.

[FHWA] Federal Highway Administration. 1995. *Highway Traffic Noise: Analysis and Abatement Policy*. June 1995.

_____. 1996. *Measurement of Highway-Related Noise*. May 1996.

_____. 1997. 23 CFR 772. *Procedures for Abatement of Highway Traffic Noise and Construction Noise*.

U.S. Environmental Protection Agency. 1971. *Community Noise.*

Chapter 15: Water Quality
Affected Environment

Table of Contents

15.1 INTRODUCTION 1
15.2 REGULATORY OVERVIEW 1
15.2.1 Water Quality Standards 1
15.2.2 Impaired Waters and Total Maximum Daily Loads 2
15.2.3 Surface Water Discharges 3
15.3 AFFECTED ENVIRONMENT 4
15.3.1 Resource Identification Methods 4
15.3.2 Watershed and Surface Waters 4
Ship Creek 4
Chester Creek 5
Fish Creek 6
Campbell Creek 7
15.3.3 Storm Water 8
15.3.4 Ground Water Quality 10
15.3.5 Surface Drinking Water 10
15.3.6 Existing Water Quality Restoration and Enhancement Efforts 10
15.4 BIBLIOGRAPHY 12

List of Tables

Table 15-1. Designated Beneficial Uses in Alaska 2
Table 15-2. 303(d) List Categories 3
Table 15-3. Ship Creek Water Quality Data by Season, In Study Area 5
Table 15-4. Chester Creek Water Quality Data by Season 6
Table 15-5. Fish Creek Water Quality Data by Season, Downstream 7
Table 15-6. Campbell Creek Water Quality Data by Season 8

List of Figures

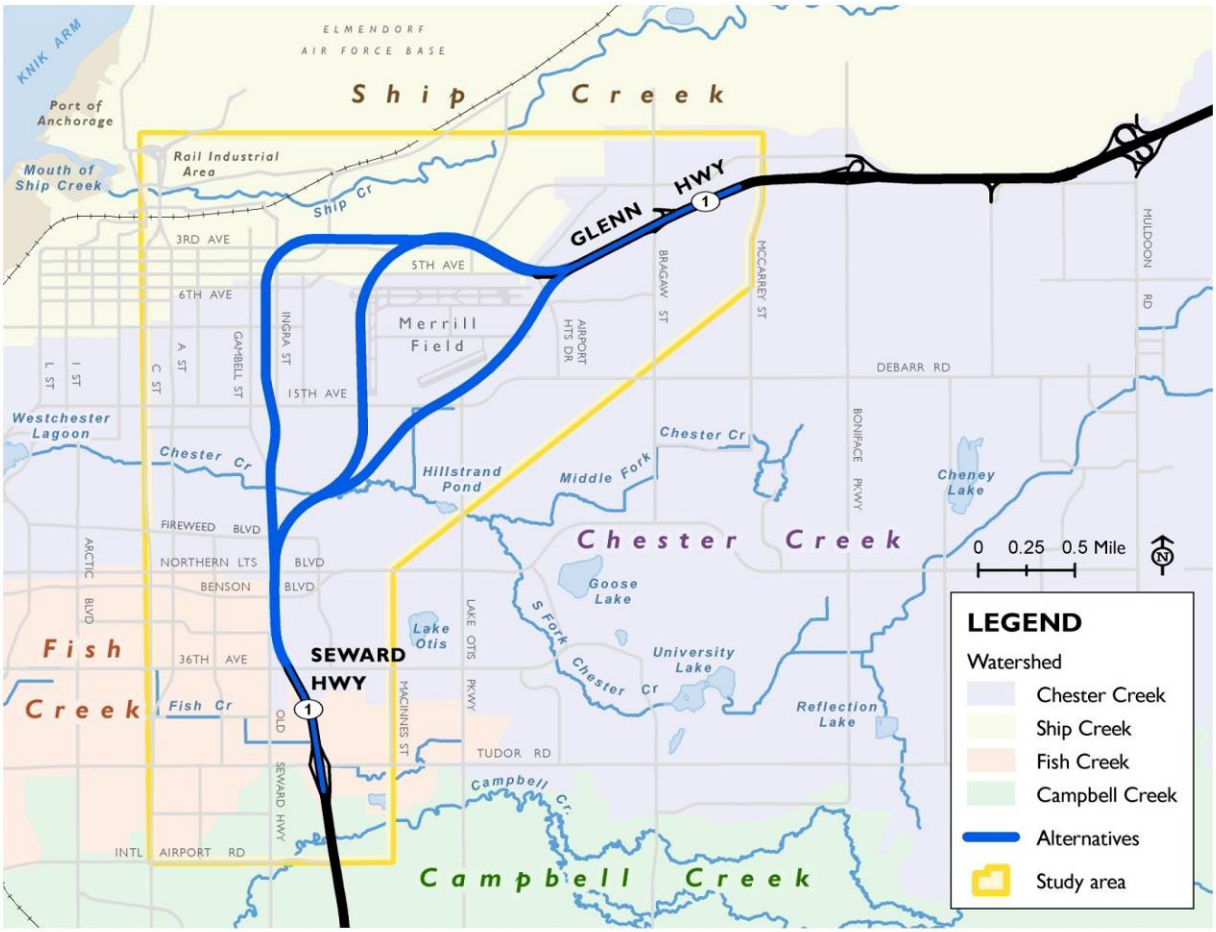
Figure 15-1. Watersheds in Study Area 1
Figure 15-2. Storm Water Outfalls 9

15.1 INTRODUCTION

This chapter describes the existing conditions of surface water (groundwater information can be found in Chapter 20, Contaminated Sites) in the H2H project area.

The affected area to consider for water resources are adjacent water bodies such as Ship Creek, Chester Creek, Fish Creek, and Campbell Creek along with their associated watersheds. The main water bodies of importance are Ship, Chester, Fish, and Campbell creeks. See Figure 15-1.

Figure 15-1. Watersheds in Study Area



15.2 REGULATORY OVERVIEW

Water quality in Alaska is regulated by the U.S. Environmental Protection Agency (USEPA) through the federal Clean Water Act Sections 401,402, and 404 and by the regulations of the Alaska Department of Environmental Conservation (ADEC) Division of Water and Division of Environmental Health, as outlined in the Alaska Administrative Code, 18 AAC 70 and 18 AAC 80.

15.2.1 Water Quality Standards

Under the Clean Water Act, a state must establish and maintain water quality standards designed to protect, restore, and preserve the quality of water in the state. These standards consist of three parts: narrative standards for all waters, numeric standards for chemical and biological criteria specific for each beneficial use, and antidegradation policies.

In Alaska, there are three main beneficial uses for which a fresh water body can be designated. They include water supply, water recreation, and growth and propagation of fish, shellfish, other aquatic life, and wildlife. Numeric standards are set for each beneficial use so as not to degrade the water body for that particular use. Narrative standards are general statements that prohibit degraded water quality conditions. The antidegradation policy protects and maintains the existing uses of a water body (18 AAC 70.015 (a)(1)), protects outstanding national resource waters (ONRW) (18 AAC 70.015 (a)(3)), and allows high quality waters uses to be lowered by regulated conditions with a public review (18 AAC 70.015 (a)(2) (A-E)).

ADEC classifies surface water bodies in Alaska according to beneficial use and has associated numeric standards (18 AAC 70.020). Table 15-1 describes the classes and their beneficial uses.

Table 15-1. Designated Beneficial Uses in Alaska

Class	Description
1	Fresh Water
A	Water Supply
(i)	Drinking, culinary, and food processing
(ii)	Agriculture, including irrigation and stock watering
(iii)	Aquaculture
(iv)	Industrial
B	Water Recreation
(i)	Contact recreation
(ii)	Secondary recreation
C	Growth and Propagation of Fish, Shellfish, Other Aquatic Life, & Wildlife
2	Marine Water
A	Water Supply
(i)	Aquaculture
(ii)	Seafood processing
(iii)	Industrial
B	Water Recreation
(i)	Contact recreation
(ii)	Secondary recreation
C	Growth and Propagation of Fish, Shellfish, Other Aquatic Life, & Wildlife
D	Harvesting for Consumption of Raw Mollusks or Other Raw Aquatic Life

Source: (ADEC 2009)

15.2.2 Impaired Waters and Total Maximum Daily Loads

The EPA's Impaired Waters 303(d) list is a list of water bodies within the state of Alaska that do not meet the water quality standards for their designated uses. The list is required under the Clean Water Act (CWA) and once a water body is listed, an analysis of the parameters that are impairing the water body from the intended beneficial use, called a Total Maximum Daily Load (TMDL), must be prepared. The

ADEC Division of Water is in charge of identifying and establishing TMDLs within the state. The 303(d) list has five categories that water bodies are listed under based on usage and the degree which water quality goals are attained (ADEC 2008). The categories and their descriptions are detailed in Table 15-2.

Table 15-2. 303(d) List Categories

Category	Description
1	All the water quality standards for all designated uses are attained.
2	Some of the water quality standards for the designated uses are attained, but data and information to determine if the water quality standards for the remaining uses are attained are insufficient or absent.
3	Data or information is insufficient to determine that the water quality standards for any of the designated uses are attained.
4	The waterbody is determined to be impaired but does not need a Total Maximum Daily Load (TMDL). • **Category 4a**. Impaired waters with an established and EPA-approved TMDL. • **Category 4b**. Impaired waters with established ―other pollution control requirements‖ to meet water quality standards. • **Category 4c**. Impaired waters that fail to meet a water quality standard which is not caused by a pollutant, but instead is caused by other types of pollution.
5	Water quality standards for one or more designated uses are not attained and the waterbody requires a TMDL or recovery plan. Category 5 waters are the Section 303(d) list of impaired waters.

Source: (ADEC 2008)

TMDL studies determine not only which parameters are impairing a water body, but also the maximum load of a contaminant that the water body can accept and still meet the standard. Numeric limits are assigned for each point source discharger that state the maximum amount that particular discharger can discharge of the particular contaminant.

15.2.3 Surface Water Discharges

The EPA delegated the authority for the National Pollutant Discharge Elimination System (NPDES) program in Alaska to ADEC as of October 31, 2008 with the gradual transfer of authority over certain program components. As of October 31, 2009, the APDES program has authority over domestic discharges, log storage and transfer facilities, seafood processing facilities, hatcheries, federal facilities, storm water, pretreatment program, and miscellaneous non-domestic discharges. Under this program, permits are required to discharge wastewater, storm water, or other pollutants into water bodies to protect and minimize impacts on water quality.

Discharges from the Alaska Department of Transportation and Public Facilities (DOT&PF) and Municipality of Anchorage (MOA) combined storm sewer system is regulated by Section 402 of the CWA. Section 402 (p) of the CWA requires permitting of municipal storm water discharges. The DOT&PF and MOA are co-permittees on the current NPDES municipal separate storm sewer system (MS4) permit that regulates storm water discharge from these systems into the waters of the United States. The most current MS4 permit was issued by the EPA and is enforced by the ADEC and became effective on February 1, 2010. The MS4 permit establishes conditions, prohibitions and management practices for discharges of storm water from the MS4s owned or operated by the MOA and DOT&PF. The permit requires the continued implementation of a jurisdiction-wide municipal storm water management program (SWMP) and outlines the actions and activities to be used by both permittees to control pollutants in urban storm water discharges to the maximum extent practicable. Monitoring of

certain storm water discharges is required to determine the effectiveness of best management practices and to estimate pollutant loading to impaired receiving waters (USEPA 2009).

Another permit that regulates storm water discharges to water bodies is the Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit (CGP). The CGP regulates storm water and non-storm water discharge from construction sites that are larger than one acre and requires implementation of best management practices to minimize the amount of pollution introduced into water bodies (ADEC 2010). All construction projects one acre or larger in Alaska fall under the requirements of this permit.

15.3 AFFECTED ENVIRONMENT

15.3.1 Resource Identification Methods

A variety of resources were used to describe the affected environment. These include information from the Clean Water Act 303(d) list, the Anchorage Water and Wastewater Utility, ADEC, Alaska Department of Natural Resources (DNR), existing United States Geological Survey, and MOA stream gauging and water quality records, MS4 permit, and Salmon in the City projects.

The impacted area lies within four watersheds: Ship Creek watershed, Chester Creek watershed, Fish Creek watershed, and Campbell Creek watershed. See Figure 15-1.

15.3.2 Watershed and Surface Waters

Ship Creek

Ship Creek watershed is a 123-square-mile watershed that has boundaries stretching from the Chugach Mountains to the Knik Arm of Cook Inlet. The watershed includes sections of Chugach State Park, Joint Base Elmendorf-Richardson. Ship Creek originates in the Chugach Mountains. The main stream then flows northwest as it reaches the MOA, where it then turns west and flows to where it discharges into Knik Arm. The elevation in the watershed ranges from 5,000 feet in the Chugach Mountains to sea level at the mouth of the creek as it flows into Knik Arm. The channel of Ship Creek is approximately 29 miles long. In the eastern mountainous region of the drainage, the gradient is steep and has a fall of 931 feet per mile. In the western portion of the drainage, the fall averages 73 feet per mile, but near the mouth it is extremely low (Alaska Department of Environmental Conservation 2004).

Ship Creek is designated for all uses. However, a TMDL was created and approved by the EPA for Ship Creek in 2004 after it was determined that the creek was impaired due to high fecal coliform counts. For fecal coliform, Ship Creek is a Category 4a water body from the Glenn Highway down to the mouth, but is also listed as a Category 5 impaired water body for petroleum products from the Glenn Highway down to the mouth (ADEC 2008)). A TMDL report is expected to be submitted to the EPA in June 2011 for petroleum products. Table 15-3 shows basic water quality parameter averages based on data from 1999 to 2010.

Table 15-3. Ship Creek Water Quality Data by Season, In Study Area

Season	pH (STD Units)	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)
Spring	8.11	44.58	11.70	209
Summer	7.92	51.76	10.28	187
Fall	7.78	38.75	12.54	213
Winter	7.90	34.79	13.50	257

Source: (Anchorage Waterways Council 2010)

Chester Creek

Chester Creek watershed is located in the Anchorage bowl and is approximately 30.3 square miles. The Drainage is bordered by the Ship Creek Drainage to the north, Knik Arm to the west, Campbell Creek Drainage to the south, and the Chugach Mountains to the east. Chester Creek Drainage is divided into five sub-drainages: Westchester, North Fork Chester, Middle Fork Chester, South Fork Chester, and Reflection Lake. The headwaters are located in the Chugach Mountains and the main stem flows northwest until it enters the MOA, where it turns west and drains into University Lake, then flows west and drains into Westchester Lagoon, and then into Cook Inlet. Elevations in the drainage range from 1,357 feet in the Chugach Mountains to sea level at Cook Inlet. The gradient of the drainage area is the same as Ship Creek watershed (ADEC 2005).

Chester Creek is designated for all beneficial uses, but in 1990, Chester Creek was placed on the 303(d) list of Impaired Water Bodies in the State of Alaska for non-compliance for fecal coliform (ADEC 2008). In 1993 a water quality assessment identified several parameters of concern, but identified only fecal coliform as a limiting parameter. In 2005, a TMDL, which listed 4.1 miles as area of concern, was completed and approved by the EPA and now the water body is listed as a Category 4a impaired water body. The TMDL requires a monthly wasteload allocation for the MS4 since it is the only permitted source of fecal coliform and implementation of BMPs (ADEC 2005).

Table 15-4 shows basic water quality parameter averages based on data from 1999 to 2010. There are two water quality sample sites on Chester Creek that are shown in the table, one located in the study area next to the New Seward Highway, the other downstream of the study area. The data are separated by season due to seasonal affects on all parameters.

Table 15-4. Chester Creek Water Quality Data by Season

Area of Stream	pH (STD Units)	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)
In Study Area				
Spring	7.45	48.65	11.9	323
Summer	7.59	56.61	10.2	299
Fall	7.46	43.50	11.6	276
Winter	7.40	33.64	13.0	332
Downstream				
Spring	7.55	44.44	10.8	286
Summer	7.63	54.97	10.0	251
Fall	7.38	41.00	11.0	245
Winter	7.59	33.93	11.7	246

Source: (Anchorage Waterways Council 2010)

Fish Creek

Fish Creek watershed is located south of Chester Creek watershed. Its headwaters are located within the MOA just north of the Lake Otis Parkway and Tudor Road intersection. Fish Creek flows on the surface from this intersection into a wetland area just south of Tudor Road. The creek is then piped underground from just east of the New Seward Highway to Minnesota Drive. At this point, depending on the level of flow, the creek could go in one of two different directions. During low flow the creek follows the natural channel on the surface starting at Minnesota Drive and flows south until Northwood Drive, where the channel turns north. The creek follows this path until it reaches the mouth southwest of Westchester Lagoon. During high flow events the water also follows another path, where the water goes into a piped route that flows along 36th Avenue until it reaches a natural channel just south of Northern Lights Boulevard. It then flows in a natural channel until it reaches the mouth of the creek. The watershed is relatively low in elevation and mostly urban and developed.

A 6.4-mile reach of concern on Fish Creek, which is designated for all beneficial uses, was listed as an impaired water body in 1990 for non-attainment of the fecal coliform and turbidity standard. In 1995, a water body assessment concluded that the creek was impaired only by fecal coliform. In March 2004 a TMDL was approved by the EPA, and today Fish Creek is a Category 4a impaired water body (ADEC 2008). The TMDL included a seasonal wasteload allocation for the sole permitted discharger for fecal coliform (MS4) and required implementation of BMPs (ADEC 2004).

Table 15-5 shows basic water quality parameter averages based on data from 1999 to 2010. There is one water quality sample sites on Fish Creek that is shown in the table located downstream of the study area. The data are separated by season due to seasonal affects on all parameters.

Table 15-5. Fish Creek Water Quality Data by Season, Downstream

Season	pH (STD Units)	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)
Spring	7.31	40.17	9.90	444
Summer	7.29	54.86	8.19	498
Fall	7.06	40.21	9.90	452
Winter	7.28	33.69	9.90	531

Source: (Anchorage Waterways Council 2010)

Campbell Creek

Campbell Creek watershed is located in the southern portion of the MOA and is south of Chester Creek and Fish Creek watersheds. The creek headwaters are located in the Chugach Mountains and drain to the Turnagain Arm. Campbell Creek watershed is approximately 72 square miles. The watershed has three major tributaries: South Fork Campbell Creek, North Fork Campbell Creek, and Little Campbell Creek. The upper portion of the watershed is located in Chugach State Park and is characterized as having forested areas and steep gradients. The lower portion of the watershed has gentle slopes and is dominated by urban landscape. Elevation in Campbell Creek watershed ranges from 5,000 feet to sea level. The highest elevation is in the Chugach Mountains and the lowest is at the mouth of the creek in Cook Inlet (ADEC 2006).

Campbell Creek is designated for all beneficial uses, and was listed as an impaired water body in 1990 for non-attainment of fecal coliform. In 1994, a water body assessment, which included studies of other parameters, concluded that 10 miles of the creek was impaired only by fecal coliform. In 2005, water quality sampling was performed and determined that Campbell Creek was impaired for fecal coliform only. In 2006 a TMDL was approved by the EPA, and today Campbell Creek is a Category 4a impaired water body (ADEC 2008). The TMDL requires a seasonal wasteload allocation for the MS4 since it is the only permitted fecal coliform discharger to Campbell Creek. The TMDL also requires best management practices (BMP) to be implemented such as installation of rain gardens and yard breaks (ADEC 2006).

Table 15-6 shows basic water quality parameter averages based on data from 1999 to 2010. There are two water quality sample sites on Campbell Creek that are shown in the table, one located in the study area next to the New Seward Highway, the other downstream of the study area. The data are separated by season due to seasonal affects on all parameters.

Table 15-6. Campbell Creek Water Quality Data by Season

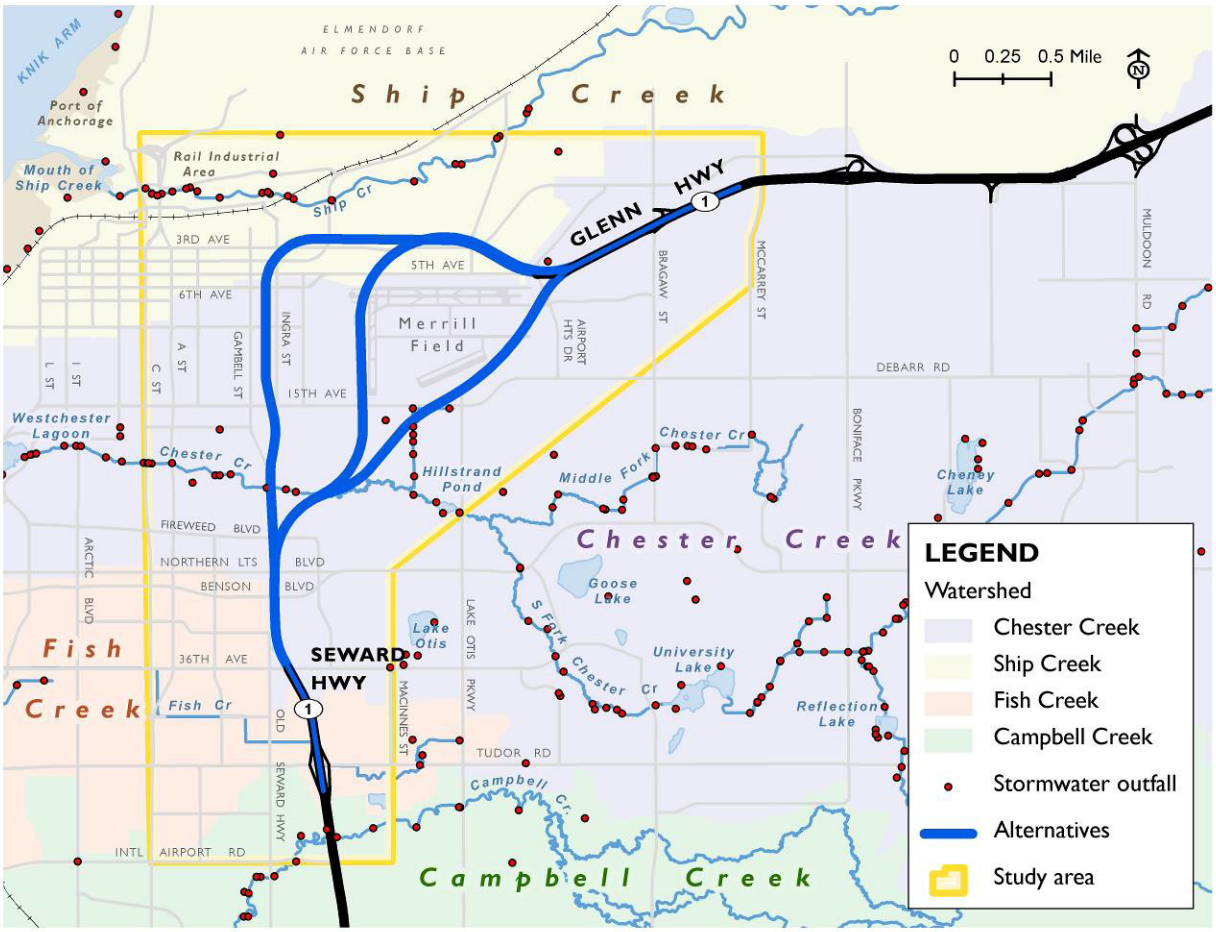
Area of Stream	pH (STD Units)	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)
In Study Area				
Spring	6.95	41.63	12.0	105
Summer	7.09	52.93	10.9	104
Fall	6.86	38.68	16.0	124
Winter	7.22	39.43	11.9	148
Downstream				
Spring	7.54	44.73	11.0	129.2
Summer	7.63	55.22	10.0	115
Fall	7.40	38.48	11.5	162
Winter	7.12	33.08	11.6	137

Source: (Anchorage Waterways Council 2010)

15.3.3 Storm Water

Some storm water discharges have been monitored in study area. Illicit discharges from storm drain outfalls in the project area have been measured during dry weather events. An illicit discharge is a discharge into a MS4 that is not associated with a precipitation event.

Figure 15-2. Storm Water Outfalls



The outfalls in the Ship Creek drainage and in the project area were found to have a neutral pH (between 6 and 8 standard units) (Municipality of Anchorage 2009). The copper concentrations were also measured to be non-detectable. The turbidity[1] of the discharge was 0.81 nephelometric turbidity units (NTU) at the outfall located north of the 3rd Avenue/Commercial Drive curve. The turbidity of discharge at the outfall located downstream of the project area was 1.62 NTU (MOA 2009). According to ADEC Water Quality Standards, turbidity may not exceed 25 NTU above natural conditions in streams. The outfalls that discharge storm water to Ship Creek drain the project area north of 5th Avenue.

Illicit discharges from the storm water drain system into Chester Creek were also sampled. Two sample sites are located just west of the New Seward Highway and south of the Sullivan Arena. The results showed that the pH levels were near neutral and that copper was non-detected. The turbidity values were higher than those found in the Ship Creek outfalls, with values from 6.17 to 10.5 NTU (MOA 2009). The outfalls that discharge to Chester Creek drain the project area south of 5th Avenue, west of Lake Otis Parkway, and north of 36th Avenue.

The Fish Creek storm water outfalls were also measured for illicit discharges. The outfalls that were tested are located near the mouth of the stream and where the piped section enters into the natural stream

[1] Turbidity is the amount of small particles of solid matter suspended in water as measured by the amount of scattering and adsorption of light rays caused by the particles (Brooks et al. 2003).

channel. Turbidity at the piped section and natural channel intersection of the stream was recorded at 37.5 and 40.0 NTU. Just downstream at the next outfall, the illicit discharge was recorded at 7.02 and 7.93 NTU (MOA 2009). The outfalls that discharge to Fish Creek drain the portion of the project area around 36th Avenue.

No storm water outfalls in Campbell Creek watershed were sampled for illicit discharge. In the project area, any storm water runoff south of Tudor Road would run off into the wetlands that are in the Fish Creek watershed, or into the Campbell Creek watershed and possibly into Campbell Creek.

15.3.4 Ground Water Quality

In general, the depth to the water table is predominantly influenced by surface drainage and topography and varies from shallow (4 to 10 feet) below the ground surface in low lying areas (generally associated with streams or creeks) to more than 80 feet in elevated areas. There are nine permits for well water rights in the project vicinity, ranging in depth from 85 feet to more than 550 feet. The reported uses for the water consist of industrial cooling, small domestic water systems, and water for the Joint Base Elmendorf-Richardson Hatchery.

Glass (2001) conducted groundwater quality studies in 1999 and 2000 in the Cook Inlet Basin. As part of his study, he sampled seven groundwater drinking water wells in the Anchorage area. Most of these wells drew water from the confined aquifer. The results of analysis conducted on samples from the Anchorage wells generally indicated the water quality was good, although some samples contained elevated levels of Radon-222 and one sample contained elevated concentrations of arsenic. Water quality can be influenced by chemical hazards, such as hydrocarbons entering the groundwater, or by environmental hazards such as earthquakes altering groundwater flow characteristics.

For more information on subsurface conditions and groundwater see Chapter 18, Subsurface Conditions, and for more information on contamination see Chapter 20, Contaminated Sites.

15.3.5 Surface Drinking Water

There are no surface drinking water sources or surface drinking water protection areas located in the project area. For more information on drinking water see Chapter 8, Utilities. For information on wells and wellhead protection areas see Chapter 18, Subsurface Conditions.

15.3.6 Existing Water Quality Restoration and Enhancement Efforts

As discussed above, many of the creeks located within the study area are degraded. Restoration projects have been going on since the late 1990s, due to water quality and hydraulic degradation in the streams located in the MOA. Ship Creek restoration projects included replacing culverts at the creek mouth and relocating utility lines in 2005. As part of the ongoing restoration project, angler access was partially completed in 2009 by creating paths and walkways to the creek (and thereby reducing damage to the creek bank). Educational kiosks were also installed to educate the public about the restoration efforts being done on Ship Creek (MOA N.d.). There are other enhancement projects listed that have yet to be completed including reconnecting existing floodplains, off-channel habitat, and wetland by removing the manmade berm downstream of the ARRC crossing on the north side of the creek.

Chester Creek restoration projects have also been done to mitigate water quality degradation. In lower Chester Creek, sewer and petroleum pipelines were relocated as part of the first phase of restoration. This portion was completed in June of 2007, a new access channel at the creek mouth was constructed to enable fish passage and fish viewing access and educational kiosks were constructed just downstream of an ARRC culvert installed in 2009. In the upper portion of Chester Creek near Towncenter located in Muldoon, the creek channel was restored to its natural meander and revegetation took place to stabilize the banks over a five year period starting in 2002 (MOA N.d.).

Several additional projects have been identified as high priority to improve fish passage upstream in Fish Creek in a 2000 study done by USACE. These include replacement of the existing culvert at Seward Highway and Chester Creek (3rd highest priority); relocation of the North Fork into its original channel (4th highest priority) (USACE 2000); cable relocation and bank restoration at Karluk Street pedestrian bridge (10th highest priority); and bank stabilization and relocation of storm drain outfall at Seward Highway downstream (11th highest priority).

Fish Creek was originally placed underground through midtown Anchorage by containing the creek in an underground pipe in the 1960s. In 2004 and 2005 a realignment of the piped stream was begun. At the intersection of 36th Avenue and Minnesota Drive a weir was installed that detects the level of flow in the pipe. At base flow conditions, the water from the piped section of the creek is directed into the natural channel. This allows for sediments to be captured at the weir during the base flow conditions and for flows to be restored to the natural channel. During high water events the weir directs the water through another pipe section of the stream and pushes the sediments that are captured during base flows through the pipe and out into the natural channel near the mouth. A treatment facility for sediment is currently under construction to capture the high levels of sediment coming out of the end of the pipe during high flow events (Spencer 2010).

In 2008 construction of Cuddy Park enhancements was completed. This project created a flood detention storage facility that brings Fish Creek to the surface and allows for settling of many constituents, such as iron and sediments. In the past year, submerged aquatic vegetation gradually increased in the pond; this vegetation should help increase dissolved oxygen content of the water and increase constituents that can settle out of the pond and be available to be taken up by plants (Spencer 2010).

15.4 BIBLIOGRAPHY

[ADEC] Alaska Department of Environmental Conservation. 2004. *Total Maximum Daily Load (TMDL) for Fecal Coliform in the Waters of Ship Creek in Anchorage, Alaska.* Anchorage: ADEC.

———. 2005. *Total Maximum Daily Load for Fecal Coliform in Chester Creek, University Lake, and Westchester Lagoon, Anchorage, Alaska.* Anchorage: Alaska Department of Environmental Conservation.

———. 2008. *Alaska's Final 2008 Integrated Water Quality Monitoring and Assessment Report.* Division of Water, Alaska Department of Environmental Conservation, Anchorage: ADEC.

———.2009. *Water Quality Standards*.

———. 2010. *General Permit for Discharges from Large and Small Construction Activities.* Anchorage: ADEC.

Anchorage Waterways Council. 2010. *Citizens Environmental Monitoring Program Database.* Anchorage: Anchorage Waterways Council.

Brooks, Kenneth N., Peter F. Folliott, Hans M. Gregersen, and Leonard F. DeBano. 2003. *Hydrology and the Management of Watersheds.* Third. Ames, Iowa: Blackwell Publishing.

Glass, Roy L. 2001. *Ground-water quality in the Cook Inlet Basin, Alaska, 1999*. U.S. Geological Survey Water-Resources Investigations Report 01-4208. Available online at http://pubs.usgs.gov/wri/wri01-4208/.

Hem, John D. 1985. *Study and interpretation of the Chemical Characteristics of Natural Water.* United States Geological Survey, United States Printing Office.

[MOA] Municipality of Anchorage. 2009. *Illicit Discharge Program Dry Weather Screening: 2009 Project Report.* Watershed Management, Municipality of Anchorage, Anchorage.

———. 2010. *Community Planning & Development Current Projects.* Available online at: http://www.muni.org/Departments/OCPD/salmon/Pages/CurrentProjects.aspx (accessed March 24, 2010).

Spencer, Bill. 2010. *Fish Creek Restoration Projects.* Interview by Cindy Milligan (March 25, 2010).

[USACE] U.S. Army Corps of Engineers. 2000. *Chester Creek 206 Study: Aquatic Habitat Restoration Project.* Prepared by HDR Alaska, Inc.

[USEPA] U.S. Environmental Protection Agency. 2009. *Municipal Storm Sewer System Permit.* U.S. EPA.

Chapter 16: Ecosystem
Affected Environment

Table of Contents

16.1 INTRODUCTION 1
16.1.1 Regulatory Setting 1
16.2 AFFECTED ENVIRONMENT 2
16.2.1 Resource Identification Methods 2
16.2.2 Vegetation 3
Forest 3
Shrub 5
Herbaceous 5
Urban Vegetation 5
16.2.3 Invasive Plant Species 5
16.2.4 Wetlands 6
16.2.5 Waterbodies 8
16.2.6 Wildlife–Terrestrial Mammals 10
16.2.7 Wildlife–Birds 13
16.2.8 Wildlife–Amphibians 14
16.2.9 Wildlife–Aquatics (Fish and Macroinvertebrates) 14
16.2.10 Essential Fish Habitat (EFH) 17
16.2.11 Special Status Wildlife Species 18
16.2.12 Sensitive Plant Species 22
16.2.13 Threatened or Endangered Species 22
16.3 BIBLIOGRAPHY 23

List of Tables

Table 16-1. Invasive Plant Species in the Study Area 6
Table 16-2. Summary of Wetlands in Study Area 8
Table 16-3. Waterbodies in the Study Area 10
Table 16-4. Birds in Study Area 14
Table 16-5. Special-Status Bird Species That Could Occur in Study Area[1] 19
Table 16-6. Rare Plant Species Documented in the Anchorage Bowl 22

List of Figures

Figure 16-1. Vegetation Types 4
Figure 16-2. Location of Wetlands and Waterbodies in the Study Area 7
Figure 16-3. Vehicle/Moose Collisions, 2005-2009 12
Figure 16-4. Aquatic Habitats 17

16.1 INTRODUCTION

This chapter describes the ecosystem within the study area including: vegetation; invasive plant species; wetlands; waterbodies; wildlife (terrestrial mammals, birds, amphibians, and aquatics); special status species and any threatened or endangered species; fish and macroinvertebrates and their habitats; and Essential Fish Habitat. The environmental consequences section (Section 16.4) identifies anticipated impacts to the identified ecosystem. Analysis has been conducted according to the Federal Highway Administration's (FHWA) guidance on Wetland Impacts, Water Body Modification and Wildlife Impacts, and Threatened and Endangered Species under Technical Advisory T6640.8a, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents.*

The study area is situated in a developed urban setting and encompasses nearly 23 percent of the Chester Creek watershed and small portions of the Ship Creek, Fish Creek, and Campbell Creek watersheds. The ecosystem in Chester Creek is described in more detail relative to other watersheds, due to its close proximity to the proposed alternatives. Most terrestrial and aquatic habitat in the study area has been disturbed by past development, which filled wetlands, cleared riparian areas, displaced native plant species, created impervious surfaces, provided drainage for runoff, and straightened stream channels. More than 80 percent of the native vegetation in the study area has been cleared, paved, and/or replaced by non-native plants. Important wildlife habitat remains, primarily along the relatively undeveloped greenbelts; throughout small wetland complexes; and within small pockets, or fragments, of forested habitat in the study area. The study area also provides important habitat for both anadromous and resident fish.[1]

16.1.1 Regulatory Setting

A number of federal and state agencies have regulatory authority over various aspects of the ecosystem environment. The following laws, regulations, and plans are most pertinent. The agencies with primary jurisdiction are identified:

Regulation	Agency
Federal	
Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act of 1899	United States Army Corps of Engineers (USACE)
United States Endangered Species Act of 1973	U.S. Fish and Wildlife Service (USFWS) National Marine Fisheries Service (NMFS)
Bald and Golden Eagle Protection Act of 1940 (16 U.S. Code (U.S.C.) 668-668c)	USFWS
National Bald Eagle Management Guidelines 2007	USFWS
Executive Order 13186: Migratory Birds (2001)	USFWS
Migratory Bird Treaty Act (MBTA; 16 U.S.C. 703-712)	USFWS
Fish and Wildlife Coordination Act	USFWS
Magnuson Stevens Fishery Conservation and Management Act	NMFS
Executive Order 13112: Invasive Species	United States Department of Agriculture
Coastal Zone Management Act	National Oceanic and Atmospheric Administration (NOAA)

[1]Anadromous fish hatch in freshwater, migrate to the saltwater for a portion of their adult life, and return to freshwater to spawn. Resident fish spend their entire lives in freshwater. Some species, such as Dolly Varden char, can have both anadromous and resident populations.

Regulation	Agency
Wetlands Delineation Manual	USACE
2007 Alaska Regional Supplement	USACE
State	
Alaska Coastal Management Program	Alaska Department of Natural Resources (ADNR)
Anchorage Coastal Management Plan	ADNR Municipality of Anchorage (MOA)
The Anadromous Fish Act (Alaska State Statute (AS) 16.05.871)	Alaska Department of Fish and Game (ADF&G)
The Fishway Act (AS 16.05.841)	ADF&G
Local	
Anchorage Wetlands Management Plan	MOA

More details on state and federal regulations pertinent to ecosystem resources are described in technical reports (Appendices A, B, C). Chapter 29, Permits and Clearances, identifies specific permits and clearances that will be necessary for the H2H project. Chapter 23 contains additional information on the Coastal Zone Management Act, Alaska Coastal Management Program, and Alaska and Anchorage Coastal Management Plans. Chapter 15 contains additional information on water quality.

Ecosystem: "An ecological community together with its environment, functioning as a unit." (*The American Heritage Dictionary of the English Language*, Fourth Edition)

Wetlands are "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (USACE 1987).

16.2 AFFECTED ENVIRONMENT

16.2.1 Resource Identification Methods

Methods used to develop this chapter include conducting literature and data reviews, consulting with resource agencies, performing field surveys, interpreting aerial photographs, and updating spatial resource data using geographic information system (GIS) databases. Details on the methods specific to each resource category are described in the paragraphs below and further described in their respective technical reports.

Vegetation: Vegetation types were identified by using the existing vegetation maps, aerial photography, a topography map, the National Wetlands Inventory (NWI) map, the Municipality of Anchorage (MOA) Wetlands Atlas (2004), and on-site investigations conducted in 2009. Vegetation type boundaries were identified using two-foot resolution aerial photography and digitized in GIS.

Wetlands and Waterbodies: Wetland and waterbody locations and boundaries of areas potentially to be affected were verified through field investigations in 2009. Wetlands and waterbodies not likely to be directly affected by the project were identified based on published wetland maps and aerial photography.

Wetland assessments completed by the MOA (MOA 1996) were reviewed and scores were adapted for functions and services of wetlands that were not field-verified. The functions of all field-verified wetlands were assessed using the methodology used by the MOA. Four functional components were assessed: hydrological, habitat potential, species occurrence, and social function. Details of score calculation for each wetland can be found in Wetlands Technical Report (Appendix A). The method of designating A, B, and C wetlands used by the Anchorage Wetlands Management Plan (MOA 1996) was applied. Table 16-3 displays primary functions and designations for each of the wetland complexes.

Wildlife: Information on wildlife species and habitat conditions was obtained through a literature review and correspondence with resource agency experts and local experts and limited field surveys conducted in 2009. Information on fish and aquatic habitat was obtained through a literature review and correspondence with resource experts from local, state, and federal agencies and universities. To verify that resources applicable to Section 404 and EO11990 were accurately defined, field surveys were conducted. A bald eagle nest survey was conducted to document any bald eagle nest locations (none were found). To ensure the limit of fish presence and EFH were accurately defined, field surveys were conducted in stream channels adjacent to project alternatives not previously mapped as anadromous waters.

16.2.2 Vegetation

Although the study area is located in an urban environment, several different types of vegetation are present. Four general vegetation types are present in the study area: forest (needleleaf, broadleaf, and mixed), shrub, herbaceous, and urban vegetation (Figure 16-1).

Forest

Forest is the largest vegetation type in the study area, covering approximately 1,185 acres. This general vegetation type combines three types of forests: needleleaf, broadleaf, and mixed forest. Closed and open forests are present in the study area.

Forest is vegetation with at least 10% cover of trees over 10 feet in height.

Shrub is vegetation with less than 10% cover of trees over 10 feet in height and 25% or more shrub cover.

Herbaceous communities lack woody plants or have less than 10% tree cover and less than 25% shrub cover.

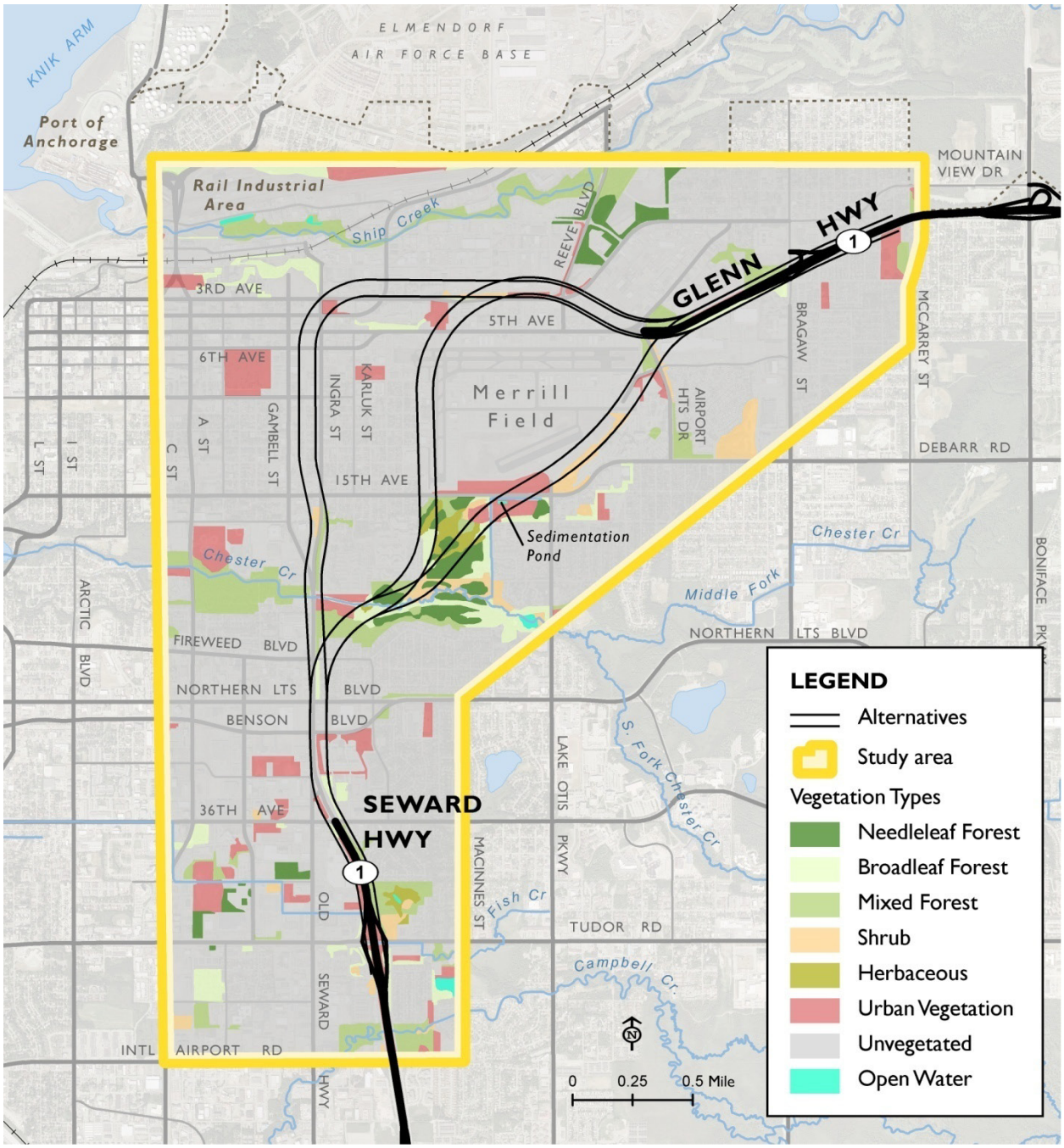
(Viereck et al. 1992)

White spruce-paper birch mixed forest in Chester Creek Greenbelt Park.

Needle leaf forest occupies poorly drained wetland soils and is dominated by black spruce, with a very sparse shrub understory. Broadleaf forest is prominent along the riparian corridor of Chester Creek on well-drained soils. Vegetation is dominated by paper birch, quacking aspen, and balsam poplar with alder, willow, and European bird cherry in understory. Mixed needle leaf-broadleaf forest occurs on floodplains and slopes in poorly drained soils. Black spruce, white spruce, and either paper birch or balsam poplar dominate the vegetation.

All types of forest serve important habitat functions to wildlife, in particular, food, shelter, and migration corridors. Forest zones separate greenbelt multi-use trails from highways and residential areas. The study area encompasses important forested habitat along the Chester Creek Greenbelt Park.

Figure 16-1. Vegetation Types



Shrub

Approximately 140 acres of the study area are covered with shrub communities that are formed mostly by alder or willow, with sparse bluejoint reedgrass in the understory. Shrub stands are common throughout the study area on formerly disturbed ground, such as fill embankment of roads or trails. Low shrubs that are formed predominantly by dwarf birch, sweetgale, Labrador tea, and abundance of moss are common on poorly drained peat soils. Shrub habitats at Chester Creek Greenbelt wetlands are especially important for birds and wildlife.

Sweetgale-grass shrub-bog with black spruce forest in background in Chester Creek Greenbelt Park.

Herbaceous

Natural herbaceous communities are the least common vegetation type (67 acres) and only mapped in two areas: Sitka Street Park and Helen Louise McDowell Sanctuary area. Wet sedge-grass meadows and marshes are dominated by bluejoint reedgrass, water sedge, Northwest Territory sedge, and water horsetail. Mesic bluejoint reedgrass meadows also occur on better-drained soils. Meadows and marshes provide habitat for birds and small mammals, and forage for large mammals, especially in early spring.

Sedge-grass wet meadow west of Orca Street.

Urban Vegetation

Areas that are covered with human-created vegetation communities within the study area include lawns, sport fields, roadsides, and areas planted with ornamental trees and shrubs (313 acres). In addition to ornamental plant varieties, invasive or weedy native species adapted to frequent disturbances are also present in these areas. Uniformity of layers and constant disturbance (maintenance) tend to prevent urban vegetation from providing good habitat for animal species.

Areas associated with residential, commercial, and industrial development were identified as unvegetated. Individually planted trees or remnants from native vegetation can be present there; however, those plants do not typically form a plant community and were not delineated.

16.2.3 Invasive Plant Species

Executive Order 13112 requires all federal agencies to prevent the introduction of invasive species, provide for their control, and minimize their impacts (economic, ecological, and human health). Non-native invasive species are present throughout the study area, mainly along roads and trails. The European bird cherry is well established in relatively undisturbed riparian corridors of Chester Creek. Non-native plants of more concern are those with the greatest ability to compete with native vegetation and to alter the structure, composition, and functions of natural plant communities. Such plants are identified in the ranking system developed by the Alaska Natural Heritage Program. Table 16-1 lists the species within the study area with the highest invasiveness rank (50 and above).

Table 16-1. Invasive Plant Species in the Study Area

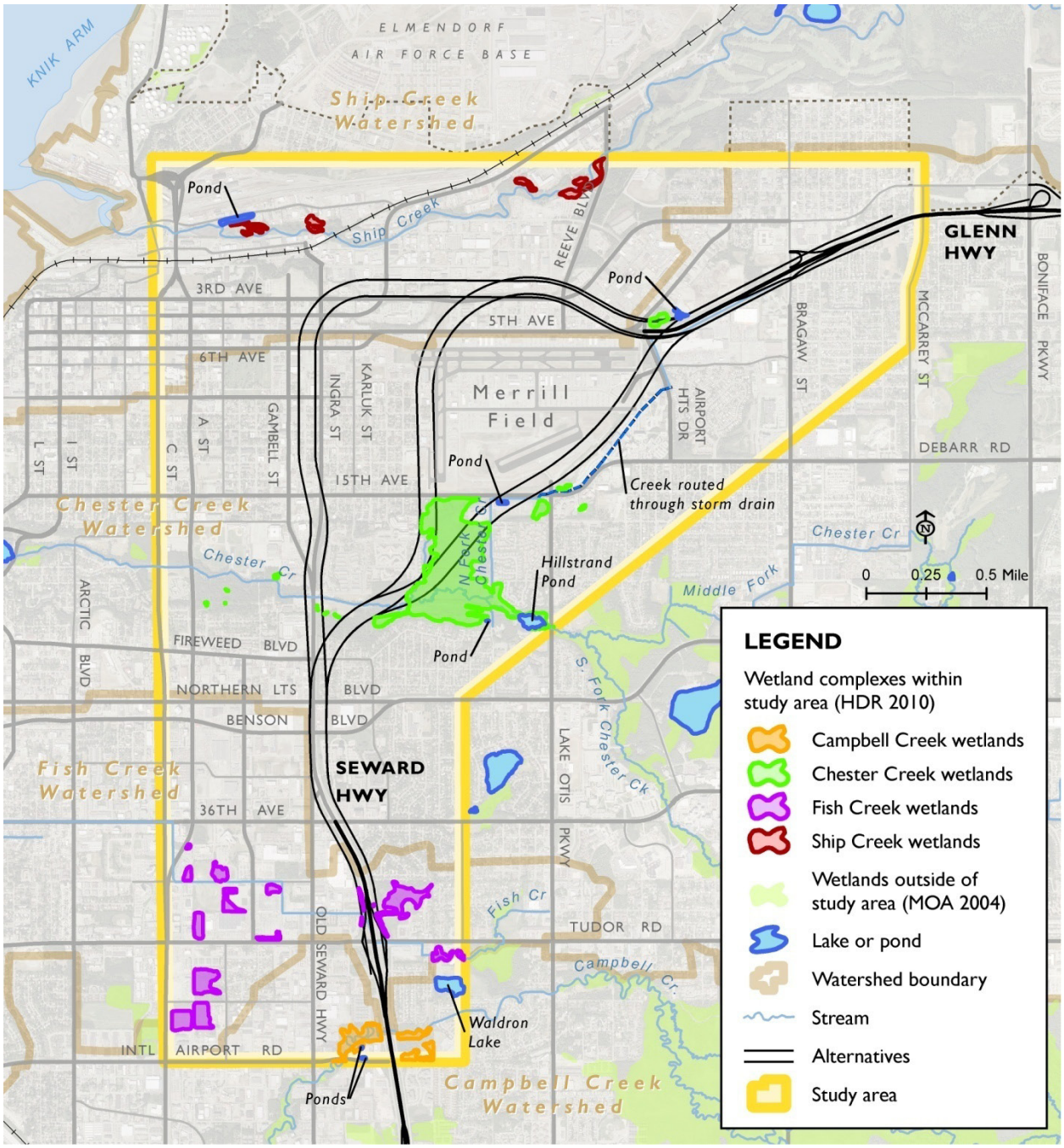
Common Name	Invasiveness Rank 0 – 100 (low to high)
White sweetclover	80
Canada thistle	76
European bird cherry	74
Bird vetch	73
Yellow toadflax	69
Foxtail barley	63
Ox-eye daisy	61
Perennial sowthistle	61
Quackgrass	59
White clover	59
Common dandelion	58
Alsike clover	57
Timothy	56
Annual hawksbeard	54
Red clover	53
Sheep sorel	51

16.2.4 Wetlands

This section describes wetlands within the study area, and evaluates functions and services that wetlands currently provide. The majority of the wetlands in the study area are located along the creeks: Campbell Creek, Chester Creek, North Fork Chester Creek, Ship Creek, and the historic channel of Fish Creek. Figure 16-2 shows the location of wetlands in the study area.

Wetlands are "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (USACE 1987).

Figure 16-2. Location of Wetlands and Waterbodies in the Study Area



The most extensive wetlands in the study area are located along the Chester Creek Greenbelt. Campbell Creek also has contiguous wetlands along the floodplain; a portion of these wetlands falls within the study area. Wetland complexes located at the Seward Highway and Tudor Road area, and other smaller wetlands, drain directly into Fish Creek. Several small wetlands and beaver ponds have been mapped within the Ship Creek drainage. The study area also includes smaller isolated wetlands around the Debarr Road and Lake Otis Parkway intersection; some wetlands also remain near the intersection of the Glenn Highway and Mountain View Drive. Table 16-2 summarizes the wetland type, size, designation, and primary functions for each wetland complex.

Table 16-2. Summary of Wetlands in Study Area

H2H Wetland Complex	Wetland Type	Size (acres)	Class*	Functions
Campbell Creek Wetlands	Forested	13.5 13.7	A C	Store storm water. Detain runoff from adjacent roads. Provide wildlife habitat and a migration corridor. Provide open space for recreational activities.
Fish Creek Wetlands	Forested, Scrub and shrub, sedge and grass	10.6 10.3	B C	Retain storm water and filter sediments and other pollutants in runoff from the road and adjacent parking areas. Export organic matter and nutrients to the stream and slow the flow of runoff to Fish Creek. Provide fish and wildlife habitat. Open space for recreational use. Aesthetic value.
Chester Creek Wetlands	Forested, scrub and shrub, sedge and grass	85 4.3	A and B C	Receive and detain runoff of poor quality: from roads, parking lots, snow disposal sites, Merrill Field airport. Store excess runoff, and release this water over extended dry periods. Areas at the toe of slope discharge ground water, which is an important source for the wetlands. Isolated small wetlands recharge groundwater. Provide wildlife habitat and migration corridor. Designated open space for active public use. Aesthetic value.
Ship Creek Wetlands	Forested	8.3	A	Retain storm water. Provide wildlife habitat. Recreational and sport fishing area.

**Wetlands are designated for special management consideration based on the value of functions each wetland is thought to perform, within the context of the Anchorage Bowl.*

Class A *wetlands are to be maintained in their natural state to the maximum extent practicable. Minor encroachments for roads, utilities, and trails at these wetlands' fringes will be considered if no other alternatives exist.*

Class B *wetlands are slated for retention of their functions, while also allowing for their economically viable use. Development in these wetlands is to be planned to preserve key functions.*

Class C *wetlands are the least valuable of Anchorage wetlands. Development within them is to be allowed, as necessary, to allow for community expansion, but development "should have an insignificant cumulative impact on overall functions and values of Municipality of Anchorage wetlands" (MOA 1996).*

16.2.5 Waterbodies

Major streams in the study area are Campbell Creek, Fish Creek, Chester Creek, and Ship Creek (Figure 16-2). The creeks flow westward and discharge into Knik Arm. The Seward Highway currently crosses all creeks except Ship Creek. Smaller streams include the North Fork Chester Creek, unnamed fork of Chester Creek at Orca Street, and an unnamed fork of Fish Creek. The unnamed fork of Fish Creek enters the main channel via a culvert.

Chester Creek. The Chester Creek watershed extends from the Chugach Mountains west to Knik Arm and drains an area of approximately 27 square miles. Terrestrial habitats, stream channels, and adjacent riparian areas in the uppermost portion of the watershed (east of Muldoon Road) are in a natural, relatively undisturbed condition. This portion of the watershed, upstream of the study area, provides high-

quality fish and wildlife habitat. More than half the watershed (including the entire study area) is located in urban Anchorage and has been negatively influenced by development. Nearly 60 percent of the study area lies within the urban Chester Creek watershed. Specifically, the study area encompasses portions of lower Chester Creek, lower Middle Fork, lower South Fork, and the entire North Fork channel (Figure 16-2). The majority of flow contribution into the study area originates from storm water drains, springs, and drainage from wetlands (HDR 1993).

Ship Creek. Ship Creek flows for nearly 30 miles from its headwaters at Ship Lake in Chugach State Park and drains approximately 123 square miles. Most of the watershed transects state park and military land. Upstream from the study area, Ship Creek flows naturally for more than 20 miles through its relatively undisturbed upper drainage before its flow is interrupted by a dam on the Joint Base Elmendorf-Richardson (JBER) military base. Lower Ship Creek flows through urban Anchorage's industrial areas and empties into Cook Inlet near the Port of Anchorage. Habitat in the lower drainage has been adversely affected by human development. The study area encompasses less than two miles of lower Ship Creek (Figure 16-2).

Fish Creek. Fish Creek has a drainage area of approximately 6 square miles. Fish Creek is roughly 6 miles in length and flows west from its headwaters near Tudor Road and Lake Otis Parkway, then north, before emptying into Knik Arm. The entire Fish Creek watershed is located in the most densely urbanized area of Anchorage (HDR 2003). Fish Creek has been diverted, relocated, buried in a pipe, and channelized to accommodate urban development. All water flowing in and out of Fish Creek is, in some manner, controlled (HDR 2003). Only 14 percent of the study area lies within the Fish Creek watershed (Figure 16-2).

Campbell Creek. The Campbell Creek watershed is approximately 72 square miles (DOT&PF 2006). The watershed is fed by the North Fork, South Fork, Lower Campbell Creek, and Little Campbell Creek drainages. The upper portion of the watershed is located in Chugach State Park and flows relatively undisturbed through forested areas. The lower portion of the watershed has gentle slopes and is dominated by urban landscape. Lower Campbell Creek is approximately 8 miles long and begins at the confluence of the North and South Forks. A large portion of the creek is bounded on either side by parkland (i.e., Campbell Creek greenbelt). Less than 5 percent of the study area is located within the Campbell Creek watershed (Figure 16-2).

Lakes and Ponds. There are two lakes, Waldron Lake and Hillstrand Pond Lake, and several small ponds in the study area (Figure 16-2). Hillstrand Pond is the only water body in the study area that has a distinct inlet and outlet. Two man-made ponds at International Airport Road have outlets, and therefore are connected to down gradient waters. Waldron Lake and other smaller ponds do not have outlets, and therefore are isolated.

Table 16-3 provides information on size, type, and functions of waterbodies in the study area.

Table 16-3. Waterbodies in the Study Area

Name/Location	Approximate Area / Length within Study Area	Ecosystem Functions
Ponds at northwest corner of New Seward Highway and International Airport Road	0.1 acres (two ponds together)	Retain sediments and other pollutants from local runoff. Detain storm water (reducing creek flood peaks). Aesthetic value.
Campbell Creek	0.9 miles	Provide aquatic and riparian habitats.
Fish Creek	2 miles	Functions within study area are limited due to confinement to a storm drain system.
Waldron Lake	4.7 acres	Retain sediments and other pollutants from local runoff. Provide fish and wildlife habitat. Aesthetic value.
Pond between 20th Avenue and 24th Avenue, at the north end of Maplewood Street	0.02 acres	Detain water from local runoff (reducing creek flood peaks).
Chester Creek	2.1 miles	Provide aquatic and riparian habitats. Transport nutrients to the down gradient water body.
Hillstrand Pond. South Fork Chester Creek. Northwest of Lake Otis Parkway and East 24th Avenue	2.5 acres	Convey flow, transport nutrients to the down gradient waters. Detaining storm water (reduce creek flood peaks). Provide fish and wildlife habitat. Recreational use. Aesthetic value.
Pond, southeast corner of 15th Avenue and Sitka Street. Municipality snow disposal site	0.3 acres	Detain poor quality run off from municipality snow disposal site (reduce creek flood peaks). Retain sediments and other pollutants from snow disposal site. Potential bird habitat.
Ship Creek	2.3 miles	Provide fish and wildlife habitat. Recreational and sport fishing.
Pond above the dam in Ship Creek floodplain	1.6 acres	Detain storm water (reduce creek flood peaks). Provide fish and wildlife habitat.
Ponds at northeast of Glenn Highway and Mountain View Drive intersection	0.5 acres (three ponds together)	Retain sediments and other pollutants from local runoff. Detain storm water (reduce creek flood peaks). Aesthetic value.

16.2.6 Wildlife–Terrestrial Mammals

A total of fifty-two species of mammals are found in the Anchorage area (ADF&G 2000). Portions of the study area are regularly used by moose and occasionally by brown and black bear, coyote, fox, and other mammals. Feral rabbits are the only non-native terrestrial mammal found in the Anchorage area (ADF&G 2000). Many mammals that typically occur in the Anchorage Bowl use the Chester Creek greenbelt corridor (USACE 2004). Because of resource agency interest, moose, black bear, and brown bear are the primary focus of the terrestrial mammal discussion in this section. Appendix X provides additional descriptions of terrestrial mammals in the study area.

Terrestrial mammal habitat in the study area is limited largely to the Chester Creek, Campbell Creek, and Ship Creek greenbelts, and small patches of forested parks and undeveloped land. The terrestrial environment in the Anchorage area has been significantly altered by development activities. Much of the native vegetation has been cleared, paved, and/or replaced by non-native plants. Terrestrial habitats within

the study area consist of upland forest, shrub communities, and herbaceous meadows and marshes; these habitats are important to terrestrial mammal species residing in the Anchorage Bowl (see previous section on Vegetation for descriptions). Urban vegetation in the study area also provides habitat for moose (MOA 2007).

Moose. Moose are year-round residents of the Anchorage Bowl, ranging from sea level to an elevation of 3,500 feet. Currently the Anchorage Bowl supports approximately 200 to 300 moose during the summer and 700 to 1,000 moose during the winter, when moose from JBER, Chugach State Park, and Far North Bicentennial Park move into more developed areas (Sinnott 2010). The Anchorage Bowl is considered important general moose habitat (MOA 2007; Sinnott 2010). Moose in Anchorage concentrate their activities in greenbelts; parks; riparian, forested areas; and low-density subdivisions (Sinnott 2010).

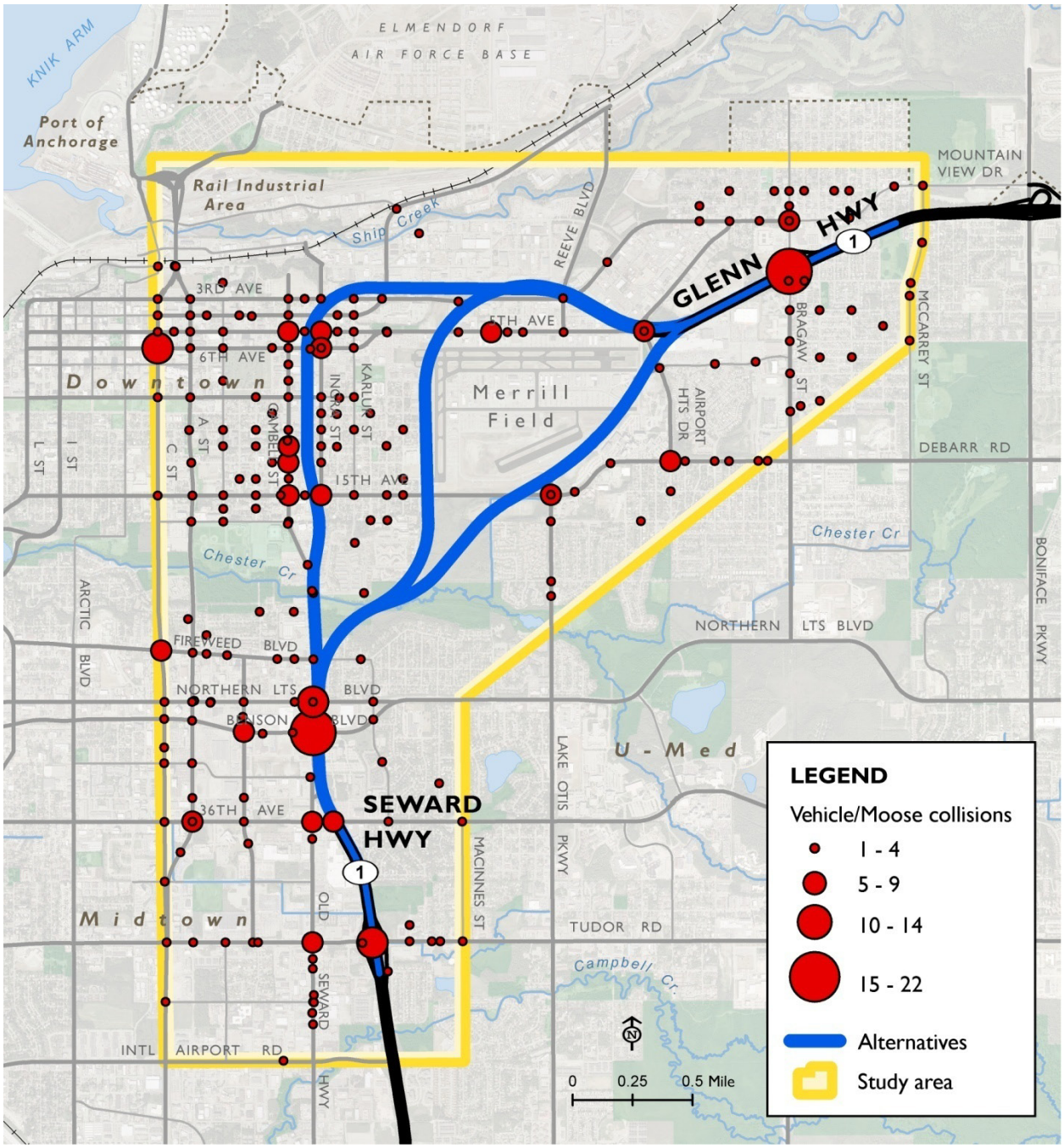
The Chester Creek greenbelt is a major link between the University-Medical District and Far North Bicentennial Park on the east side to moose habitat on the west side along the coast (including Westchester Lagoon, Earthquake Park, and natural areas and wetlands surrounding the Ted Stevens Anchorage International Airport). The Chester Creek greenbelt and associated parks and undeveloped areas provide food, water, and cover, as well as a movement corridor with relatively few road crossings (Sinnott 2010).

Ship Creek is another important corridor that links large tracts of moose habitat on JBER in the Ship Creek drainage with the Ship Creek greenbelt corridor and into the northern part of the study area, where moose tend to disperse through the industrial area into Mountain View, Airport Heights, and Downtown (Sinnott 2010).

Moose frequently cross the Seward Highway near Tudor Road. The Seward Highway is fenced south of the Tudor interchange; however, the fence is down in many locations and moose tend to use these gaps to follow the riparian habitat and greenbelt up and down Campbell Creek (Sinnott 2010).

The Anchorage Police Department collision database reported an average of 106 moose killed each year in vehicle collisions in the study area between 2005 and 2009 (APD 2010). Many moose that are hit by vehicles are not reported, or the moose walks away, severely injured, and is euthanized or dies days or weeks later. Those that are not euthanized may not be found until the following spring. Therefore, the actual number of moose-vehicle collisions in the study area may be higher (Sinnott 2010). Figure 16-3 provides a figure showing vehicle/moose collision locations in the study area for 2005-2009.

Figure 16-3. Vehicle/Moose Collisions, 2005–2009



Bears (Black and Brown). The Anchorage Bowl supports 40 to 50 black bears (MOA 2007). Important black bear habitat is located across the sub-alpine and upper wooded fringes of the Chugach Front Range and at lower elevations in forested habitat on the coastal plains, primarily along greenbelts and in larger parks (MOA 2007). Black bears spend at least part of the summer in or adjacent to residential areas in the Anchorage Bowl (ADF&G 2000). The Chester Creek greenbelt provides a travel corridor for black bears moving from Chugach State Park to the coast. ADF&G radio collaring data have documented black bears occasionally traveling through the study area.

There are typically 5 to 10 resident brown bears in the Anchorage Bowl. Habitat use is concentrated along the Chugach Front Range foothills, and along the upper riparian corridors of the major salmon streams.

The Chester Creek greenbelt is currently not high value brown bear habitat and is only used occasionally (Farley 2010). The Chester Creek Aquatic Ecosystem Restoration project at the mouth of Chester Creek resulted in the construction of a new creek channel to provide passage for salmon between Chester Creek and Cook Inlet, which could potentially draw more brown bears (Farley 2010; Sinnott 2010).

Furbearers and Small Mammals. A variety of furbearers are likely present in the study area, including coyote, snowshoe hare, red fox, and least weasel. There is generally little trapping of these species in the Anchorage Bowl (Peltier 2007). Other small mammals in the study area include beaver, porcupine, red squirrel, northern flying squirrel, little brown bat, mice, voles, and shrews (ADF&G 2000).

16.2.7 Wildlife–Birds

A total of 244 bird species have been recorded in the Anchorage area, of which 152 species occur annually (112 breeders and 40 regular migrants) (Myers N.D.). The study area provides important nesting, brood rearing, molting, winter, and migration habitat for many bird species. In Alaska, all native birds except grouse and ptarmigan are protected by the MBTA and Executive Order 13186.

Approximately 68 species of birds have been documented in the vicinity of the study area during Alaska Landbird Monitoring Surveys (ALMS), breeding bird surveys conducted along Chester Creek. The ALMS was developed to monitor breeding populations of landbirds, and therefore most species documented during the surveys are probable breeders in the area (Handel 2010). For more detailed information regarding birds in the study area, refer to Table 16-4 or Appendix X.

Table 16-4. Birds in Study Area

Species		Habitat in Study Area	Presence in Study Area
Ducks, Geese, & Swans • Canada goose • Trumpeter swan • American widgeon • Mallard	• Northern pintail • Green-winged teal • Greater scaup • Lesser scaup • Common merganser	Wetlands and waterbodies provide nesting and brood rearing, molting, migration, and winter habitat.	Hillstrand Pond Chester Creek near Lake Otis Pkwy Ship Creek
Loons and Grebes • Common loon • Pacific loon	• Red-throated loon • Red-necked grebe	No breeding habitat in study area; may stop over to rest.	Possibly Hillstrand Pond Study area lakes
Raptors • Sharp-shinned hawk • Northern goshawk	• Bald eagle • Great horned owl	Greenbelts and forested areas.	All present, but no bald eagle nests or trees capable of supporting nests.
Shorebirds • Greater yellowlegs • Lesser yellowlegs • Spotted sandpiper • Greater yellowlegs	• Short-billed dowitcher • Wilson's snipe • Semi-palmated plover	Intertidal mudflats, tidelands, coastal wetlands, estuaries, meadows, freshwater deltas in spring, summer, fall.	Cook Inlet is major migration corridor in spring and fall. Documented in study area.
Gulls and Terns • Bonaparte's gull • Mew gull • Herring gull	• Glaucous-winged gull • Arctic tern	Intertidal mudflats, meadows, wetlands, lakes and rivers.	All documented in study area.
Terrestrial Birds • Belted kingfisher • Rock pigeon • Downy woodpecker • Hairy woodpecker • Olive-sided flycatcher • Western wood-peewee • Alder flycatcher • Gray jay • Steller's jay • Black-billed magpie	• Common raven • Tree swallow • Violet-green swallow • Black-capped chickadee • Boreal chickadee • Red-breasted nuthatch • Brown creeper • Golden-crowned kinglet	Mixed needleleaf/deciduous forest and woodlands shrub communities, herbaceous meadows, and landscaped and developed areas.	Chester Creek, Ship Creek, and Campbell Creek greenbelts. Chester Creek trail from Lake Otis Pkwy to Westchester Lagoon.

16.2.8 Wildlife–Amphibians

The only amphibian that occurs in the Anchorage area is the wood frog. Wood frogs breed anywhere that has standing water for at least part of the summer, including ponds, bogs, marshes, temporary pools, tire tracks, or roadside ditches (ADF&G 2008). Wood frogs may occur in greenbelts, ponds, and marshes in the study area (ADF&G 2009b).

16.2.9 Wildlife–Aquatics (Fish and Macroinvertebrates)

Campbell Creek. Campbell Creek drainage provides high-quality aquatic habitat relative to other urban Anchorage streams. The majority of habitat in Lower Campbell Creek is considered good for invertebrates but only moderate for fish; however, good fish habitat is also present (GeoNorth 2009). The study area encompasses less than one mile of Lower Campbell Creek. Habitat in the study area is considered optimal for invertebrates but only moderate for fish (GeoNorth 2009). Chapter 15 describes existing water quality conditions in Campbell Creek. Campbell Creek provides habitat essential for anadromous coho, Chinook, sockeye, and pink salmon and Dolly Varden char (ADF&G 2009a). Resident

rainbow trout and Dolly Varden char also use Campbell Creek. All six species are known to occur in the study area.

Fish Creek. The portion of Fish Creek encompassed within the study area currently flows through a 48-inch corrugated metal pipe under the New Seward Highway (DOT&PF 2006). Upstream of the study area, Fish Creek flows above ground for less than one mile through a wetland complex prior to being conveyed under the highway. Fish Creek does not provide good-quality aquatic habitat in the study area. Chapter 15 describes existing water quality conditions in Fish Creek. Although fish use in the underground storm drain system within the study area is unlikely, resident Dolly Varden occur upstream from the New Seward Highway (KABATA 2007).

Chester Creek. The study area includes roughly four miles of urban Chester Creek. Surrounding urban development has caused bank damage; influenced the creek's substrate, instream cover, channel morphology, stream processes, and riparian functions; decreased habitat variability; and therefore directly impacted aquatic and terrestrial communities in Chester Creek. For example, elevated sediment loads resulting from changes to Chester Creek's flow regime have reduced the availability of suitable spawning substrates. These factors have degraded habitat and water quality for fish and invertebrates and contributed to reduced Chester Creek salmon stocks (USACE 2004).

Nearly half of Chester Creek's channels within the study area have been highly modified by human influence, which typically causes lower-quality habitats. For example, nearly 60 percent of Chester Creek's aquatic habitat in the study area is considered poor quality for fish, and nearly 40 percent is poor quality for invertebrate communities (Appendix C).

Development has also led to the placement of instream structures (e.g., culverts or pipes at road crossings, dams). If designed improperly, instream structures can physically block or limit fish movement as a result of changing flow regimes. Instream structures that restrict fish movement were identified as the primary reason for the decline of Chester Creek's anadromous fish populations (USACE 2004). One of the nine restrictive culverts in Chester Creek is located downstream of the study area, and five are located within the study area (O'Doherty 2009).

Although the quality of aquatic habitat has been negatively impacted by development, urban Chester Creek provides important habitat for anadromous and resident fish. A small portion of the study area is considered optimal for fish (9 percent) and invertebrates (25 percent). It should be noted that only 20 percent of Chester Creek's channel in the study area is relatively unmodified (Appendix C).It is important to note that the only habitat rated as optimal for fish in urban Chester Creek is located within the study area (Figure 16-4).

Chester Creek provides important habitat for anadromous pink salmon and coho salmon; anadromous and resident Dolly Varden char; and resident rainbow trout, slimy sculpin, and three-spine stickleback. Rainbow trout and Dolly Varden were recently identified as the most abundant species in lower and South Fork Chester Creek (Appendix C).

Pink salmon spawn in lower Chester Creek and typically do not migrate into the study area (Bosch 2009). While rainbow trout typically spawn lower in the drainage, they occur throughout the drainage (Bosch 2009). Coho salmon and Dolly Varden char spawn and rear throughout the entire length of Chester Creek; juveniles also use the North Fork Chester Creek year-round (Figure 16-4). The Middle Fork Chester Creek is spring-fed and receives a nearly constant flow during winter months, and therefore has the potential to provide important overwintering habitat. However, the presence of multiple fish passage barriers (culverts, piped sections) currently precludes use of Middle Fork by anadromous fish (Appendix C).

Historically, Chester Creek supported relatively large returns of coho salmon and anadromous Dolly Varden char and provided viable spawning habitat throughout its tributaries (USACE 2004). Local knowledge indicates that Chinook salmon historically spawned in Chester Creek and that pink salmon

spawned farther upstream in the drainage. Populations of anadromous fish species initially declined as a result of a dam constructed near the mouth in 1971, and continued to decline in response to other migration barriers, and degraded habitat and water quality.

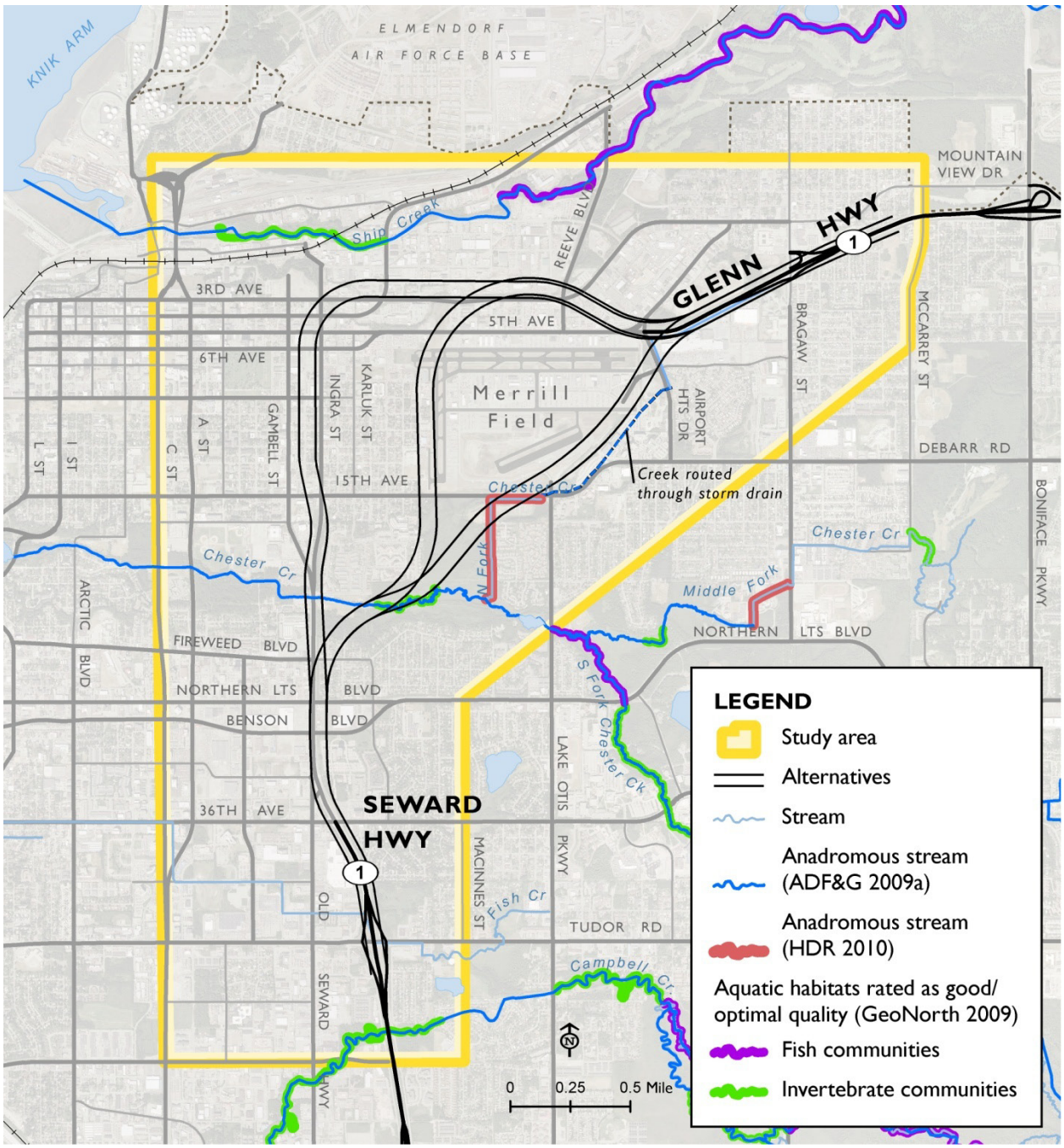
Fish species composition in Chester Creek is expected to change markedly in the near future. In 2009, the downstream-most fish passage barrier was removed and a new channel was created to improve habitat between Knik Arm and Westchester Lagoon. It is expected that migration numbers of adult coho salmon will increase as a result.

Invertebrate samples collected from Chester Creek upstream of urban influence were composed of a fairly even distribution of the five major invertebrate groups, which typically indicates healthy biotic conditions (Glass and Ourso 2006). Invertebrate samples collected just downstream of the study area were overwhelmingly dominated by the non-insect group (primarily worms) (Glass and Ourso 2006), which typically indicates decreased stream health (Appendix C). Chapter 15, Water Quality, provides additional water quality information for Chester Creek.

Ship Creek. The study area encompasses less than two miles of lower Ship Creek (Figure 16-4). Habitat quality in lower Ship Creek has been negatively affected by adjacent urban and industrial developments, including instream structures that interrupt its natural flow and limit fish migration. Despite these impacts, Ship Creek does provide areas rated as optimal for fish and invertebrates (Figure 16-4). Chapter 15 describes existing water quality conditions in Ship Creek.

Ship Creek provides roughly 10 miles of habitat for anadromous coho, Chinook, chum, and pink salmon throughout its lower drainage, including within the study area (ADF&G 2009a), and resident Dolly Varden char and rainbow trout. The ADF&G Ship Creek hatchery operations enhance the Chinook and coho salmon run, and to a lesser degree the pink and chum salmon runs (KABATA 2007).

Figure 16-4. Aquatic Habitats



16.2.10 Essential Fish Habitat (EFH)

The study area is considered EFH for all five species of Pacific salmon. Specifically, Ship Creek is designated EFH for Chinook, coho, pink, and chum salmon. Chester Creek is designated EFH for coho, pink, and sockeye salmon. Lower Fish Creek is designated EFH for coho salmon; however, anadromous fish habitat does not extend into the study area. Campbell Creek is designated EFH for coho, Chinook, sockeye, and pink salmon.

Essential Fish Habitat are those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

An EFH Assessment was completed and is included in Appendix D-EFH. Life history information for species with EFH designated in the project area is described in the EFH Assessment. In accordance with the EFH requirements of the Magnuson-Stevens Fishery Conservation and Management Act, the EFH Assessment presents information about the project, the affected fish habitat, an analysis of impacts to the habitat, documentation of the agency consultation process, and an agency determination on the effect of the project on EFH.

The nearby marine waters of Cook Inlet, outside the study area, are also designated as EFH for all five species of pacific salmon, and marine species (NOAA 2009). Because the project will not have impacts to EFH species in Cook Inlet, the EFH Assessment does not include the marine waters of Cook Inlet.

16.2.11 Special Status Wildlife Species

No special status terrestrial mammals, amphibians, fish or macroinvertebrates have been documented in the study area; however special status bird species have been documented in the study area. Table 16-5 lists species that have been listed as species of special concern by the State of Alaska, Birds of Conservation Concern for the Southcentral and Interior Alaska Regions by USFWS, and Audubon WatchList species. These lists cover the appropriate regions but include a broader range of habitat types than occur in the study area.

The terrestrial based species are neotropical migrants observed in the study area, but no local abundance or trend information is available (Handel 2010; Scher 1993; eBird 2010). All these species arrive in Alaska in May or early June, forage on insects during the breeding season, and start their southward migrations in August. A major conservation concern for these species is habitat loss in both nesting and wintering areas due to logging, fire suppression, and road building. Pesticide contamination and increased predation as a result of habitat fragmentation are also concerns (Boreal Partners in Flight 1999).

Table 16-5 provides a summary of habitat preferences and occurrence in the study area for the special status bird species.

Table 16-5. Special-Status Bird Species That Could Occur in Study Area[1]

Special-Status Bird	Species of Special Concern[2]	Birds of Conservation Concern[3]	Alaska Watch-List[4]	Nesting/Breeding	Habitat/Behavior	Presence in Study Area
Olive-sided flycatcher	X	X	X	Nests in conifers. Uncommon breeder in Anchorage.	Openings, including muskegs, meadows, burned and logged areas; streams, beaver ponds, bogs, lakes; use dead tree snags or partially dead trees to perch for singing and hawking insects.	Documented during annual breeding bird surveys.
Varied thrush			X	Breeds in wet coniferous or mixed forests. Common breeding species in Anchorage.	Prefers mature forests with a closed canopy.	Documented in study area during annual breeding bird surveys
Townsend's warbler	X			Nests in large conifer trees, contiguous forest. Rare fall visitor and uncommon breeder in Anchorage.	Open forests, forest gaps, woodland and muskeg edges; most abundant in large, undisturbed tracts of contiguous forest.	Although no contiguous forest exists in project area, portions could be used for resting, feeding, and roosting during migration; has been documented during annual breeding bird surveys.
Blackpoll warbler	X		X	Females build nests near ground in conifers and occasionally on ground. Uncommon breeder in Anchorage.	Shrub with a small percentage of forest overstory (usually needleleaf woodland); also broadleaf woodlands, riparian areas, tall shrublands, dwarf spruce forests.	Documented during annual breeding bird surveys.
Horned grebe		X		Nest on small, shallow freshwater ponds and marshes, in solitary isolated pairs, and loose colonies occasionally form on lakes with rich extensive feeding areas. Breed April to August.	Winters along coasts and on large bodies of water; during non-breeding season, remain solitary or forage in pairs or small groups, although flocks of up to 500 may gather on the sea in winter.	Observed in ponds.

Special-Status Bird	Species of Special Concern[2]	Birds of Conservation Concern[3]	Alaska Watch-List[4]	Nesting/Breeding	Habitat/Behavior	Presence in Study Area
Hudsonian godwit		X	X	Nest on ground in sedge marsh, open woods, and ponds; may no longer nest in Anchorage, with exception of 1 or 2 pairs in Turnagain Bog. Uncommon breeders in Anchorage; typically need large territory; new developments and construction between bog breeding areas and coast have impacted brood movement.	Majority of Cook Inlet populations stage along western shore of Cook inlet from Earthquake Park to Ship Creek each fall; non-breeders concentrate in Cook Inlet area during summer.	Reported in the vicinity.
Short-billed dowitcher		X	X	Breeds mostly in open bogs, forest clearings, marshes, and lake edges within coniferous forests. Common breeders in Anchorage.	Majority of Cook Inlet populations stage along western shore of Cook inlet from Earthquake Park to Ship Creek each fall.	Documented during annual breeding bird surveys.
Arctic tern		X		Nest near fresh or salt water in open, treeless environments. Common breeder in Anchorage.	Fish is primary prey species.	No nesting habitat in project area; have been documented in vicinity of study area during annual breeding bird surveys.
Trumpeter swan		X		Nest in undisturbed marshes adjacent to small lakes. Rare breeders in Anchorage area.	Prefers to nest in areas with a low level of human disturbance; a stable water level; at least 100 meters (328 feet) of unobstructed runway for takeoff; and an early ice-free date.	Documented during annual breeding bird surveys.
Rusty blackbird			X	Prefer to nest in tall shrubs. Uncommon breeder in Anchorage area. Rare during winter.	Favor habitat near open water/ found throughout most of mainland Alaska; may be found along streams and wetlands, beaver ponds, lakes and adjacent marshes.	Present in study area.
Gray-cheeked thrush		X		Rare breeder in Anchorage. Typically arrives in Alaska late May and leaves in early September	Coniferous forest (primarily spruce) and upland and riparian deciduous woodlands.	May migrate through Chester Creek greenbelt.

Special-Status Bird	Species of Special Concern[2]	Birds of Conservation Concern[3]	Alaska Watch-List[4]	Nesting/Breeding	Habitat/Behavior	Presence in Study Area
Solitary sandpiper	X		X	Only shorebird that nests in trees; typically nests in wooded wetlands in muskeg bogs, spruce forest, and deciduous riparian woodlands.	Nearly identical to habitat of Rusty Blackbird.	Documented in study area during migration.
Lesser yellowlegs			X	Common breeder in Anchorage. Nests on the ground, typically close to water in sheltered sites.	Typically nests in open boreal forest and forest/tundra ecotone with scattered shallow wetlands.	Documented in study area during annual breeding bird surveys
Bald eagle	X	X		No nest sites documented in project area.	Commonly seen perched in trees along riparian areas or flying.	Occur year-round.

[1] *(ADF&G 2010; Andres 1999; Audubon 2005; BirdLife International 2009; Cotter and Andres 2000; de Zeeuw 2009; eBird 2010; Gotthard and Jansen 2004; Gotthard and Jansen 2006; Handel 2010; Hannah 2004; MOA 2007; Myers N.D.; National Audubon Society 2002).*
[2] *Alaska Species of Special Concern (ADF&G 2009c);*
[3] *Birds of Conservation Concern (USFWS 2008);*
[4] *WatchList (Kirchoff and Padula 2010)*

16.2.12 Sensitive Plant Species

There are sensitive plant species being tracked by the Alaska Natural Heritage Program that have been found in the Anchorage Bowl, in habitats similar to those in the study area (2004). It is possible, but unlikely, that any of these species occur in the study area. Table 16-6 lists those species and state status.

Table 16-6. Rare Plant Species Documented in the Anchorage Bowl

Common Species Name	Species	State Status
Slenderbeak sedge	*Carex athrostachya*	Critically imperiled to imperiled
Crawford's sedge	*Carex crawfordii*	Rare or uncommon
Dewey sedge	*Carex deweyana var. dewayana*	Imperiled (status inexact)
Inland sedge	*Carex interior*	Critically imperiled
Kamchatka spikerush	*Eleocharis kamtschatica*	Imperiled to rare or uncommon
Thinleaf cottonsedge	*Eriophorum viridicarinatum*	Imperiled
Fowl mannagrass	*Glyceria striata var. stricta*	Imperiled
Northern bugleweed	*Lycopus uniflorus*	Rare or uncommon
Bog adder's-mouth orchid	*Malaxis paludosa*	Rare or uncommon
Muskeg lousewort	*Pedicularis macrodonta*	Rare or uncommon
Horned pondweed	*Zannichellia palustris*	Rare or uncommon

16.2.13 Threatened or Endangered Species

There are no occurrences of federally listed threatened and endangered plant species in the study area. Currently, the USFWS and National Oceanic and Atmospheric Administration (NOAA) Fisheries indicate that there are no threatened or endangered species listed under the Endangered Species Act (ESA) in the study area.

However, the Cook Inlet beluga whale can be found throughout Upper Cook Inlet. Beluga whales reside in Knik Arm in late summer-autumn and in Turnagain Arm/Chickaloon Bay in autumn. During the winter, they are often found in the middle of Cook Inlet, while in spring-early summer they occupy the Susitna/Beluga River area (NOAA Fisheries 2004). The Cook Inlet beluga whale was listed as an endangered species on October 22, 2008 by NOAA. On December 2, 2009, NOAA proposed designating critical habitat for the Cook Inlet beluga whale under the ESA. Two areas are proposed, comprising 7,809 square kilometers (3,016 square miles) of marine habitat (NOAA 2009). The critical habitat designation will likely be finalized in late summer or fall 2010 (Smith 2009). NOAA fisheries requested that the project consider potential impacts to primary constituent elements (PCEs) of Cook Inlet beluga whales. PCEs are the physical or biological features that are essential to the conservation of the Cook Inlet beluga whale and which may require special management considerations or protection). The PCEs for the Cook Inlet beluga whale that are of concern in the study area are Chinook salmon (Smith 2009).

16.3 BIBLIOGRAPHY

[ADF&G] Alaska Department of Fish and Game. 2000. *Living with Wildlife in Anchorage: A Cooperative Planning Effort*. April 2000. Published online at http://www.alaskabears.alaska.gov/index.cfm?adfg=planning.anchorage.

———.2008. *Wildlife Notebook Series: Frogs and Toads.* Text by Kevin Broderson, updated by Dave Tessler 2008. Published online at http://www.adfg.state.ak.us/pubs/notebook/amphibia/amphib.php

———.2009a. *Fish Distribution Database Mapping* for the Anadromous Waters Catalog. Published online at http://gis.sf.adfg.state.ak.us/AWC_IMS/viewer.htm (accessed August 3, 2009).

———.2009b. Nongame Program. Personal communication and email correspondence between David Tessler and Marian Snively (ADF&G) and Erin Cunningham (HDR Alaska, Inc.). Record on file with HDR.

———.2009c. *Alaska Species of Special Concern.* Published online at http://www.adfg.state.ak.us/special/esa/species_concern.php (accessed October 26, 2009).

———.2010. *Wildlife Notebook Series: Trumpeter Swans.* Text by Dan Rosenberg and Tom Rothe. Published online at http://www.adfg.state.ak.us/pubs/notebook/bird/swans.php.

Alaska Natural Heritage Program. 2004. Alaska Natural Heritage Program, Environment and Natural Resources Institute, University of Alaska Anchorage. University of Alaska Anchorage. Web page updated 11-4-2009 by Susan C. Klein Research and Consulting. Published online at http://aknhp.uaa.alaska.edu/ (accessed November 24, 2009).

American Heritage Dictionary of the English Language. 2006. 4th Edition. Houghton Mifflin Company. Published online at http://dictionary.reference.com/help/ahd4.html.

Andres, B.A. 1999. *Landbird Conservation Plan for the Alaska Biogeographic Regions.* Boreal Partners in Flight. U.S. Fish and Wildlife Service.

[APD] Anchorage Police Department. 2010. Personal communication between Lew Reed, Crime Analyst (APD) and Erin Cunningham and Sirena Brownlee, Biologists (HDR Alaska, Inc.). Record on file with HDR.

BirdLife International. 2009. *Species factsheet: Podiceps auritus*. Published online at http://www.birdlife.org (accessed March 31, 2010).

Boreal Partners in Flight Working Group. 1999. *Landbird Conservation Plan for Alaska Biogeographic Region*., Version 1.0. Unpubl. rep., U. S. Fish and Wildlife Service, Anchorage, Alaska.

Bosch, Dan. 2009. Correspondence between Dan Bosch (ADF&G) and Erin Cunningham (HDR Alaska,Inc.). November 2009. Record on file with HDR.

Cotter, P. A., and B. A. Andres. 2000. *Breeding Bird Habitat Associations on the Alaska Breeding Bird Survey.* Information and Technology Report USGS/BRD/ITR – 2000-0010.

deZeeuw, M. 2009. Correspondence between Maureen de Zeeuw (FWS) and Sirena Brownlee (HDR Alaska, Inc.). December 2009. Record on file with HDR.

[DOT&PF] Alaska Department of Transportation and Public Facilities. 2006. *New Seward Highway – Rabbit Creek Road to 36th Avenue. Environmental Assessment.* Volume 1. July 2006.

eBird. 2010. A real-time, online checklist program, launched by the Cornell Lab of Ornithology and National Audubon Society. Published online at http://ebird.org/content/ebird (accessed March 2010).

Farley, S. March 2010. Correspondence between Sean Farley (ADF&G) and Sirena Brownlee (HDR Alaska, Inc.).

GeoNorth. 2009. Municipality of Anchorage Watershed Management Services Hydrography Database Data Dictionary.

Glass, Roy L., and Robert T. Ourso. 2006. *Water Quality Conditions of Chester Creek, Anchorage, Alaska, 1998-2001.* USGS National Water-Quality Assessment Program. Scientific Investigations Report 2006-5229.

Gotthardt, T.A., and A. Jansen. 2004. *Gray-cheeked Thrush*. State Conservation Status, Element Ecology, and Life History. Published online by NatureServe 2005.

———. 2006. *Solitary Sandpiper*. State Conservation Status, Element Ecology, and Life History. Published online by NatureServe 2005.

Handel, C.M. 2010. The Alaska Landbird Monitoring Survey: Survey data for 1999-2009 for Chester Creek. U.S. Geological Survey, Alaska Science Center.

Hannah, K.C. 2004. *Status review and conservation plan for the Rusty Blackbird (Euphagus carolinus) in Alaska*. Draft Report. Fairbanks, AK: Alaska Bird Observatory.

HDR Alaska, Inc. 1993. *Chester Creek 92-16 Conceptual Design Report.* Prepared for the Municipality of Anchorage, Department of Public Works.

———. 2003. *Fish Creek Improvements Phase IV Draft.* Prepared for the Municipality of Anchorage, Department of Project Management and Engineering.

[KABATA] Knik Arm Bridge and Toll Authority, and Alaska DOT&PF. 2007. *Final Environmental Impact Statement and Section 4(f) Evaluation.* Published online at http://www.knikarmbridge.com/project_docs.html#FEISDecember2007 (accessed March 2010).

Kirchhoff, M. and V. Padula. 2010. *The Audubon Alaska WatchList 2010*. Audubon Alaska, Anchorage, AK 99501.

[MOA] Municipality of Anchorage. 1996. *Anchorage Wetlands Management Plan.* Department of Community Planning and Development.

———. 2004. *Municipality of Anchorage Wetlands Atlas, MOA Watershed Mapping. Volume I: Anchorage Bowl.*

———. 2007. *Anchorage Coastal Management Plan*. Published online at http://www.muni.org/Departments/Planning/Publications/Pages/ACMP.aspx (accessed October 2009).

Myers, Eric. No Date. *Anchorage Birding Map*. Anchorage: Audubon Alaska.

National Audubon Society. 2002. *The Christmas Bird Count Historical Results*. Published online at http://www.audubon.org/bird/cbc/hr/index.html (accessed March 2010).

[NOAA] National Oceanic and Atmospheric Administration 2009. *Cook Inlet Beluga Whales*. Published online at http://www.fakr.noaa.gov/protectedresources/whales/beluga.htm (accessed December 15, 2009).

[NOAA Fisheries] National Oceanic and Atmospheric Administration. National Marine Fisheries Service. 2004. *Subsistence Harvest Management Plan for Cook Inlet Beluga Whales as Part of Proposed Regulations Governing the Taking of the Cook Inlet, Alaska, Beluga Whales by Alaska Natives*. Docket #000922272-0272-01. April 30, 2004.

O'Doherty, Gillian. 2009. Correspondence between Gillian O'Doherty (ADF&G) and Erin Cunningham (HDR Alaska, Inc.). August through October 2009. Record on file with HDR.

Peltier, T. C. 2007. "Unit 14 black bear management report." In *Black bear management report of survey and inventory activities 1 July 2004-30 June 2006.* ed. P. Harper, 155-176. Juneau, AK: Alaska Department of Fish and Game. Project 7.0.

Sinnott, R. 2010. Correspondence between Rick Sinnott (ADF&G) and Sirena Brownlee (HDR Alaska, Inc.). March 2010. Record on file with HDR.

Smith, B. 2009. Personal communication between Sirena Brownlee (HDR Alaska, Inc.) and B. Smith (NOAA). December 16, 2009. Record on file with HDR.

[USACE] U. S. Army Corps of Engineers. 1987. *Corps of Engineers Wetland Delineation Manual.* Environmental Laboratory. Vicksburg, MS.

———. 2004. Chester Creek Aquatic Habitat Ecosystem Restoration Draft Report and Environmental Assessment Anchorage Alaska. U.S. Army Engineer District, Alaska.

[USFWS] United States Fish and Wildlife Service. 2007. *National Bald Eagle Management Guidelines.* Published online at http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf.

———. 2008. *Birds of Conservation Concern.* FWS Division of Migratory Bird Management, Arlington, West Virginia, December 2008. Published online at http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf.

Viereck, L.A, C.T. Dyrness, A.R. Batten, and K.J. Wenzlick. 1992. *The Alaska Vegetation Classification.* USDA. Forest Service, Pacific Northwest Research Station. General Technical Report PNW-GTR-286.

Chapter 17: Floodplain
Affected Environment
Table of Contents

17.1 INTRODUCTION 1
17.2 REGULATORY SETTING 2
17.2.1 Federal 2
17.2.2 Local 3
17.3 METHODOLOGY 4
17.4 AFFECTED ENVIRONMENT 4
17.4.1 Chester Creek 4
17.4.2 Fish Creek 5
17.5 BIBLIOGRAPHY 7

List of Figures

Figure 17-1. Floodplains With and Without Encroachments 1
Figure 17-2. Study Area, with Alternatives and Mapped Flood Zones ..... **Error! Bookmark not defined.**
Figure 17-3. Chester Creek Floodplain 4
Figure 17-4. Fish Creek Floodplain 6

17.1 INTRODUCTION

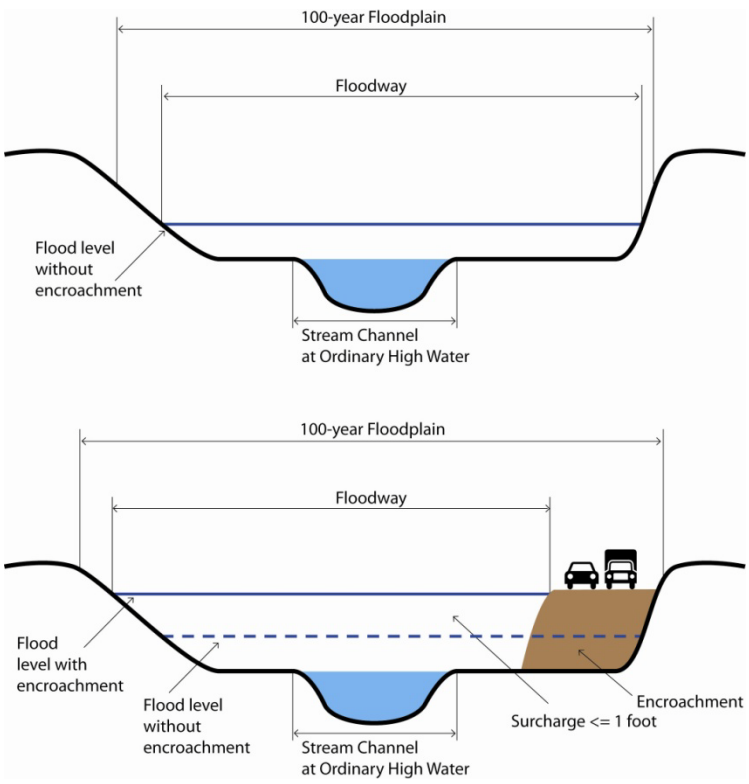
Floodplains are areas next to streams, rivers, or other waterbodies that become submerged periodically during periods of high runoff or snowmelt. Floodplains act as buffers to surrounding areas by storing and conveying flood overflow and then releasing it back into the stream or waterbody. Development within a floodplain can reduce the normal overflow storage and conveyance area or reduce stream flows thereby backing up floodwaters, either of which can impact adjacent areas by displacing floodwaters into areas not typically subject to flooding.

> **Floodplains** are defined in Executive Order (EO) 11988 as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year" (*Federal Register* 1977).

This chapter presents the regulatory framework for floodplain development; describes the floodplain risks and natural and beneficial floodplain values of the existing floodplain environment in the H2H study area; discusses environmental consequences of project alternatives on floodplains; and identifies measures to minimize floodplain impacts and to restore and preserve the natural and beneficial floodplain values.

Understanding Flood Zones. The **floodway** is the channel of a river or stream (and the overbank areas adjacent to that channel) that carries the bulk of the floodwater downstream; it is usually the area where water velocities and forces are the greatest during a flood. The floodway must be kept open and free from development or other structures that would obstruct or divert flood flows onto other properties. The regulatory floodway is required to convey the 1 percent chance (100-year) event with a 1 foot or less rise (see Figure 17-1). The **100-year flood plain or zone** is the area adjoining a river, stream, or waterbody that would be covered by water in the event of a 100-year flood (which is the flood having a 1 percent chance of being equaled or exceeded in magnitude in any given year, also known as the base flood event). The **500-year floodplain or zone** is the area adjoining a river, stream, or waterbody that would be covered by water in the event of a 500-year flood (which is the flood having a 0.2 percent chance of being equaled or exceeded in magnitude in any given year).

Figure 17-1. Floodplains With and Without Encroachments



17.2 REGULATORY SETTING

17.2.1 Federal

Federal Emergency Management. In response to escalating taxpayer costs for flood disaster relief, Congress established the National Flood Insurance Program (NFIP). This program is a voluntary mitigation program administered by the Federal Emergency Management Agency (FEMA). Under this program, the federal government makes flood insurance available in those communities that practice sound floodplain management. In the 1980s, FEMA performed location hydrologic and hydraulic studies to identify and map special flood hazard areas within communities. A result of the FEMA studies is the development of flood insurance rate maps that show the floodplain for each river, lake, or other surface water resource that was studied.

Flood zones have been mapped by FEMA for portions of Ship Creek, Chester Creek, Fish Creek, and Campbell Creek drainages within the study area (see Figure 17-2). The Chester Creek and Fish Creek drainages are proposed to be traversed by the alternatives, and therefore are the only floodplains that would be affected. Figure 17-2 depicts the H2H project study area, the H2H alternatives, and the published flood zone mapping.

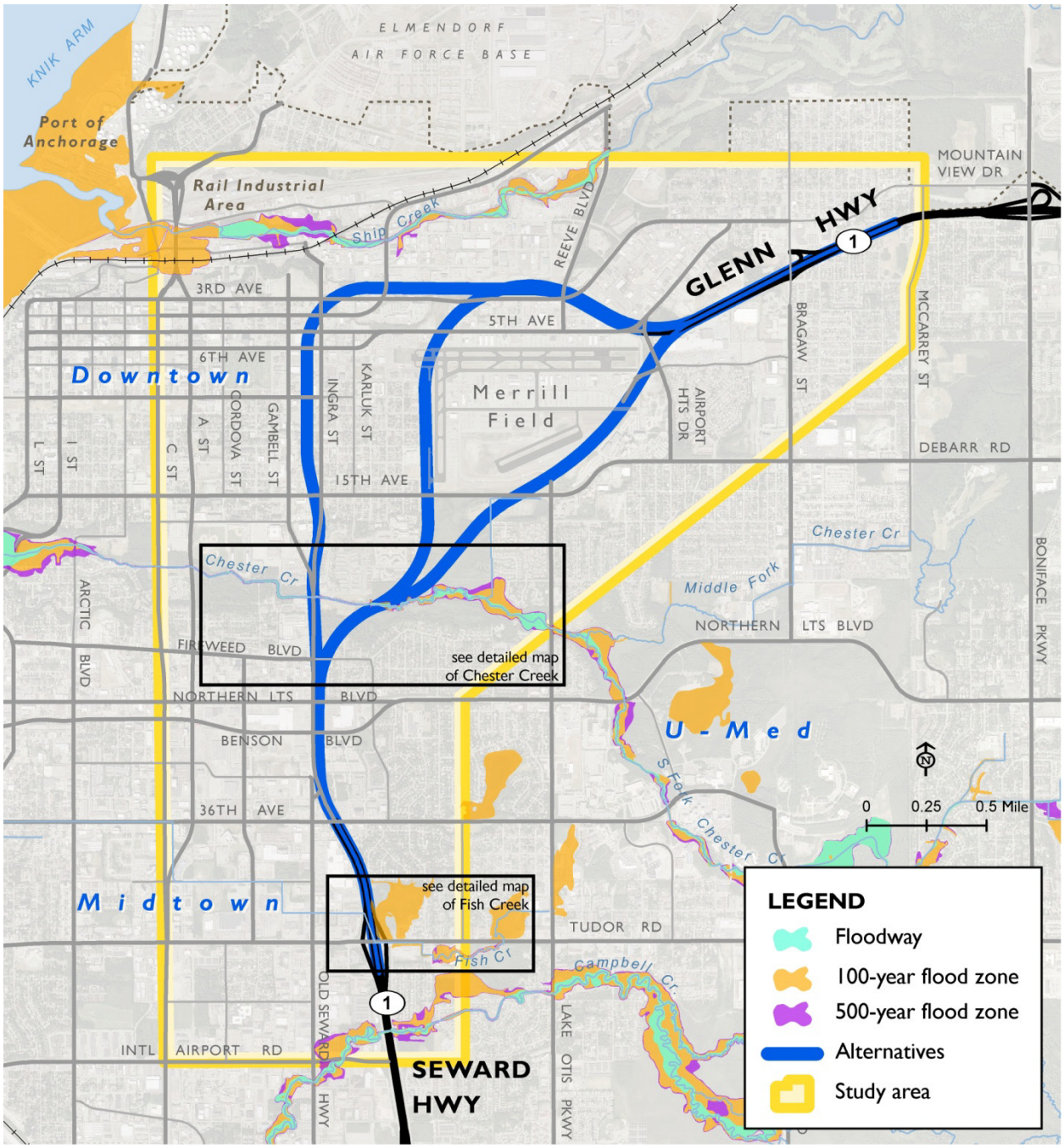
Executive Order 11988. In 1977, the president enacted Executive Order (EO) 11988, which directs federal agencies to reduce flood losses and losses to floodplain functions, to avoid actions within or adversely affecting floodplains if possible, to mitigate losses if avoidance is not practicable, and to establish a process for evaluating flood hazards. Flood hazards are assessed using the 100-year base flood standard of the NFIP. Federal agencies are responsible for implementing the EO 11988 through their own regulations, and for complying with NFIP regulations.

Federal Highway Regulations. Based on EO 11988, the Federal Highway Administration (FHWA) adopted regulations governing the development of projects that could have impacts on floodplains (Title 23 CFR 650A). According to Section 115, *Design Standards* the design of encroachments must be consistent with standards established by the FEMA, State, and local governmental agencies for the administration of the NFIP where a regulatory floodway has been designated. The regulation also requires that the FHWA will not approve a significant encroachment unless the FHWA finds that the proposed significant encroachment is the only practicable alternative.

According to 23 CFR 650A Sec. 650.103, it is the policy of the FHWA:

- To encourage a broad and unified effort to prevent uneconomic, hazardous, or incompatible use and development of the nation's flood plains,
- To avoid longitudinal encroachments, where practicable,
- To avoid significant encroachments, where practicable,
- To minimize impacts of highway agency actions that adversely affect base flood plains,
- To restore and preserve the natural and beneficial flood-plain values that are adversely impacted by highway agency actions,
- To avoid support of incompatible flood-plain development,
- To be consistent with the intent of the Standards and Criteria of the National Flood Insurance Program, where appropriate, and
- To incorporate "A Unified National Program for Floodplain Management" of the Water Resources Council into FHWA procedures.

Figure 17-2. Study Area, with Alternatives and Mapped Flood Zones



Note: Detailed inset maps are depicted in Figures 17-3 and 17-4.

17.2.2 Local

The Municipality of Anchorage (MOA) participates in the NFIP, which makes available federally backed flood insurance for homeowners and businesses. Membership within NFIP—and the availability to municipal residents of flood insurance—requires the MOA to manage its floodplain in ways that meet or exceed FEMA standards (MOA N.d.).

MOA *21.04.080D Flood Hazard Overlay District.* This municipal ordinance promotes the public health, safety, and general welfare by minimizing losses due to flooding. This ordinance restricts or prohibits

uses and structures that are dangerous to health, safety, or property during a flood, or that cause increased flood heights or velocities. The ordinance provides for the establishment of flood hazard districts, which have special development and construction regulations, as well as permit requirements (MOA 2009b). According to the ordinance, "any encroachments, new construction, fill obstructions, substantial improvements, and other development or action within the regulatory floodway that would result in any increase in flood levels during the occurrence of a base flood are prohibited" (MOA 2009a; 2009b). To minimize damage to structures during flood events, the Municipality of Anchorage requires a Flood Hazard Permit for all new construction in the floodplain.

17.3 METHODOLOGY

Flood Insurance Rate Maps (FIRMs) (FEMA 2009) were reviewed and analyzed for the study area, as was the *Flood Insurance Study* (MOA 2009a, Volumes 1 and 2) for information on determining flooding risks. Figures 17-2, 17-3, and 17-4 were developed using GIS shapefiles and data obtained by the MOA and validated against the FIRM maps.

17.4 AFFECTED ENVIRONMENT

The MOA has close to 10,000 acres of floodplain and more than 3,500 individual parcels that are partially or entirely located within the floodplain (MOA N.d.). Rainfall runoff and snowmelt from the Chugach Mountains contribute substantially to flooding risk, and ongoing development within the MOA continues to displace natural areas that have historically functioned as flood storage. This section describes the floodplain environment that could be affected by the H2H alternatives.

17.4.1 Chester Creek

Chester Creek watershed is approximately 30.3 square miles. The headwaters are located in the Chugach Mountains, and the main stem flows northwest until it enters the developed area of Anchorage, where it flows westward through University Lake, the study area, Westchester Lagoon, and ultimately into Cook Inlet. The affected area includes the Chester Creek floodplains between C Street on the west and Lake Otis Parkway on the east, as depicted in Figure 17-3.

Figure 17-3. Chester Creek Floodplain

Chester Creek is channelized between C Street and approximately Karluk Street (extended). In this stretch, the creek flows linearly under the C and A street bridges until it bends sharply as it flows below a pedestrian bridge located at approximately Cordova Street. This linear stretch of the creek contains the floodway, 100-year floodplain, and 500-year floodplain in a narrow channel. East of approximately Karluk Street (extended), Chester Creek becomes more sinuous, flowing in a natural, unaltered channel.

This sinuous section of Chester Creek has much broader 100-year and 500-year flood zones that spread out considerably beyond the floodway.

Inundation of the floodplain is generally associated with spring snowmelt, winter thaw events, or large rainstorms. The engineering of the culverts and channelization of the creek maintain the creek within the mapped floodplain zones, and no severe flooding problems have been identified with the existing creek in the study area.

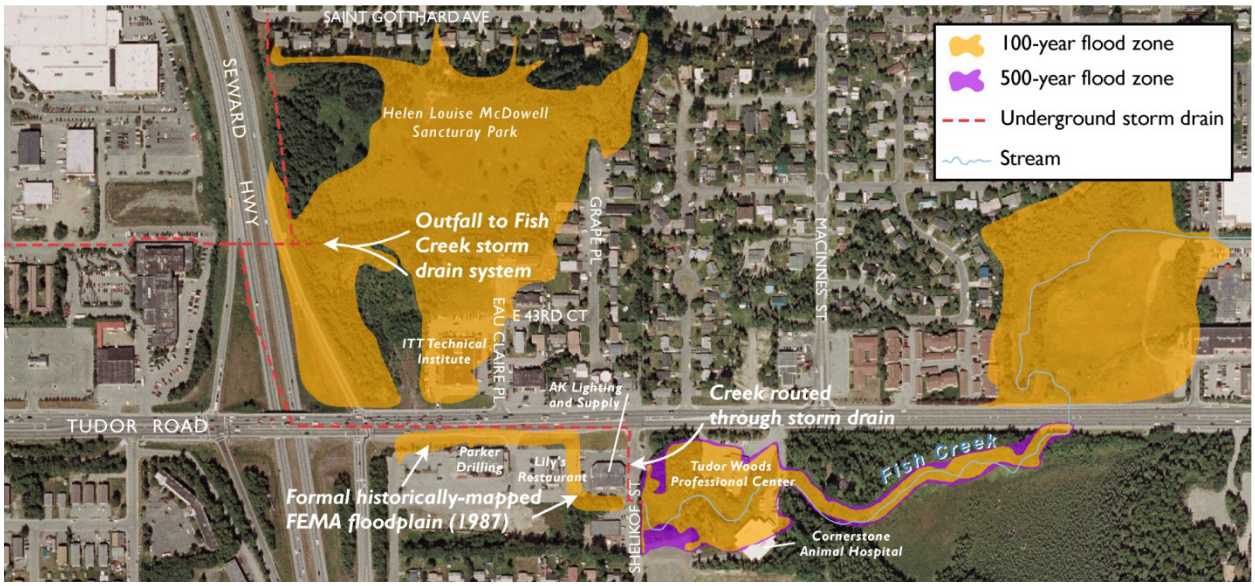
Development in the mapped floodplains is generally limited to park and open-space land uses, the Chester Creek trail and a number of private residences. Because of the continuous greenbelt park and bike trail through the study area, the Chester Creek floodplain supports recreational and open-space values. In Anchorage's Coastal Management plan, the creek/greenbelt is designated as a "recreational use area." See more in Chapter 23, Coastal Zone. While, all segments of the creek support fish and wildlife values, the sinuous, natural creek channel and its adjacent floodplain (from approximately Karluk Street to Lake Otis Parkway) support high value fish and wildlife habitat and are contiguous with a large wetland complex that supports beneficial floodplain values associated with fish, wildlife, plants, open space, natural moderation of floods, water quality maintenance, and groundwater recharge. For more detailed information on habitats and wetlands, see Chapter 16, Ecosystem. For more information on recreational values, see Chapter 22, Section 4(f) and 6(f) Evaluation, and Chapter 6, Social Impacts.

17.4.2 Fish Creek

Fish Creek is approximately 6.3 miles in length and flows west from its headwaters near Tudor Road and Lake Otis Parkway to Knik Arm. Fish Creek has a drainage area of approximately 5.6 square miles. According to FEMA mapping, the creek is routed north under Tudor Road to the Helen Louise McDowell Sanctuary, where the 100-year floodplain overlays a substantial portion of the sanctuary and some adjacent development. FEMA maps indicate that from the Helen Louise McDowell Sanctuary, Fish Creek is routed in a pipe to the west and flows under the Seward Highway to Fairbanks Street, north to 40th Avenue, and then west along 40th Avenue to the Cuddy Family Midtown Park.

The analysis that developed the regulatory flood hazard zone for upper fish creek mapping, however, was completed in the 1970s and was based on creek, ground, and piping conditions at that time. Road, storm drain, and property development has occurred that has likely altered the Fish Creek flood hazard zone in this area. The storm drain mapping currently depicts that Fish Creek flows through Bancroft Park toward Shelikof Street. At Shelikof Street, MOA storm drain mapping indicates the creek is now piped along Shelikof Street and Tudor Road traveling west, and then crosses the Seward Highway at the Tudor Road interchange. From here the storm drain is suspected to connect to the storm drain system at 42nd Avenue (no mapping or designs have been located to validate this assumption). The pipe terminates west of the Seward highway and is suspected to connect the storm drain system, as shown on Figure 17-4. The water then flows in municipal storm drains along 42nd Avenue, Fairbanks Street, and 40th Avenue westward to Midtown Park and on to Cook Inlet.

Figure 17-4. Fish Creek Floodplain



The storm drain mapping also indicates that there is no longer a culvert directing Fish Creek flow to the Helen Louise McDowell Sanctuary from the south side of Tudor Road. The Helen Louise McDowell Sanctuary acts as a flood storage area for the flow of storm water from adjacent land uses. A storm drain pipe under the Seward Highway northbound ramp collects overflow water from the sanctuary, discharges it through a pipe under the Seward Highway, and connects to the storm drain system along 42nd Avenue.

Much of the Fish Creek watershed in the study area has been substantially altered. Terrestrial habitat associated with the Fish Creek floodplain within the study area has been replaced by impervious surfaces, and Fish Creek no longer provides good-quality aquatic habitat in the study area. Although traps placed in Fish Creek upstream from the New Seward Highway did not capture any fish, resident Dolly Varden may use habitat in this area (HDR 2010). For more detail see Chapter 16, Ecosystem. As mentioned above, the Helen Louise McDowell Sanctuary acts as a retention and treatment basin collecting adjacent storm water runoff. There are important wildlife and recreational floodplain values associated with the floodplain in the sanctuary. Approximately 1.7 acres of wetlands lie within the sanctuary. These wetlands provide functions of storm water retention and filtration of sediment and other pollutants from nearby roads and parking areas, export of organic matter and nutrients to the piped stream, and provide wildlife habitat. For more detailed information, see Chapter 16, Ecosystem.

17.5 BIBLIOGRAPHY

Davis, Cecile. 2010a. E-mail conversation between Cecile Davis (HDR Alaska, Inc.) and Jeffrey Urbanus (MOA, Flood Insurance Administrator). May 24, 2010. Record on file with HDR, Inc.

———. 2010b. Verbal Communication between Cecile Davis (HDR Alaska, Inc.) and Jeffrey Urbanus (MOA, Flood Insurance Administrator). May 25, 2010. Record on file with HDR, Inc.

[FEMA] Federal Emergency Management Agency. 2009. *Flood Insurance Rate Maps.* Published online at http://www.fema.gov/hazard/map/firm.shtm.

[HDR] HDR Alaska, Inc. 2000. *Chester Creek 206 Study: Aquatic Habitat Restoration Project.* Draft report prepared for the U.S. Army Corps of Engineers.

———. 2010. *Fish and Wildlife Technical Report.* Report prepared for the Alaska Department of Transportation and Public Facilities.

[MOA] Municipality of Anchorage. No date. *Flood Hazard.* Project Management and Engineering. Published online at http://www.muni.org/Departments/project_management/Pages/FloodHazard.aspx.

———. 2009a. *Flood Insurance Study.* Report prepared for the Federal Emergency Management Agency.

———. 2009b. *AO 2009-07.* Published online at http://www.muni.org/Departments/Assembly/legislation/2009%20Ordinances/ao2009-097.PDF.

Chapter 18: Subsurface Conditions
Affected Environment

Table of Contents

18.1 INTRODUCTION 1
18.2 REGULATORY SETTING 1
18.3 METHODOLOGY 1
18.4 AFFECTED ENVIRONMENT 1
18.4.1 Geology and Soils 1
Glacial Deposits 2
Recent Alluvial and Colluvial Deposits 3
Landslide Deposits 3
Artificial Fill Deposits 4
18.4.2 Hazards 4
Permafrost 4
Earthquake Hazards 5
Slope Failure 6
Liquefaction and Densification 6
18.4.3 Groundwater 7
Existing Water Rights 8
Wellhead Protection 9
18.5 BIBLIOGRAPHY 10

List of Tables

Table 18-1. Project Area Existing Water Rights 9

List of Figures

Figure 18-1. Geologic Units 2
Figure 18-2. Subsurface Hazards 5
Figure 18-3. Groundwater 8

18.1 INTRODUCTION

This chapter describes the subsurface conditions pertaining to geology, soils, earthquake hazards, and groundwater in the H2H project area and identifies potential impacts associated with those conditions. Geology and soil conditions include general soil type and material and information on the formation of soil deposits, the likely presence or absence of permafrost, and potential slope stability concerns. Seismic conditions include a discussion of ground shaking, slope failure, liquifaction, and induced settlement. The chapter also addresses groundwater within the project area. Subsurface contamination is discussed in Chapter 20, Contaminated Sites. Surface water and water quality are addressed in Chapter 15, Water Quality.

18.2 REGULATORY SETTING

The State of Alaska regulates the use and extraction of soil and groundwater through the Alaska Department of Natural Resources (ADNR). The provisions for general land use are contained in 11 AAC 96 and apply to any state-owned land along the existing and proposed corridors. The use of large amounts of water (more than 30,000 gallons per day) is regulated by water management regulations contained in 11 AAC 93. Temporary groundwater use for large construction dewatering projects is governed by 18 AAC 72.

18.3 METHODOLOGY

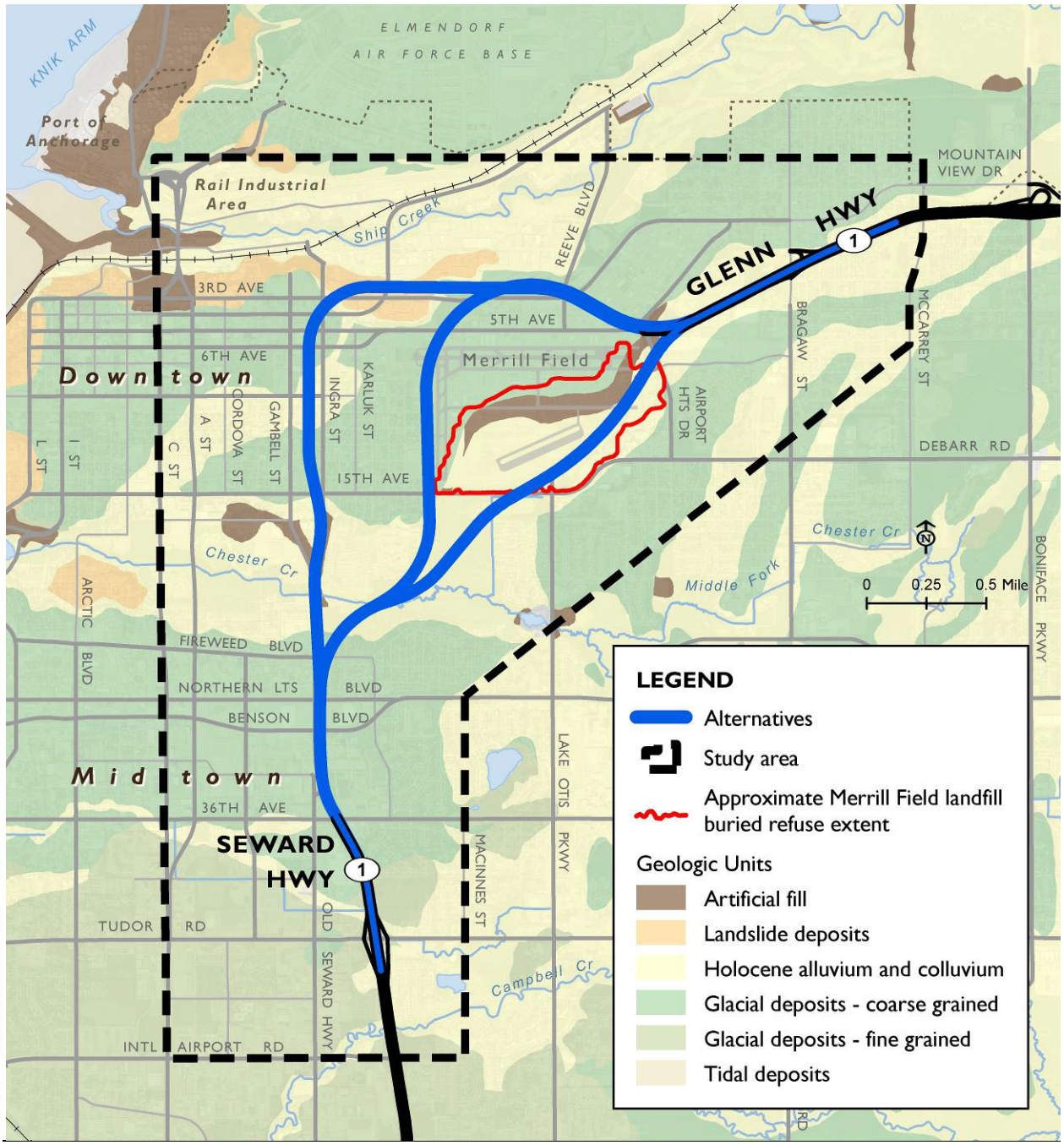
A variety of sources were used to describe the affected environment, including state and municipal regulations, U.S. Geological Survey maps, public soil investigation reports, and research articles.

18.4 AFFECTED ENVIRONMENT

18.4.1 Geology and Soils

This section provides a discussion of the geological and soil conditions likely to be encountered within the project area. Most of the upper Cook Inlet area is overlying rock formations of varying densities, which consist of shale and sandstones with coal beds. These rock formations are exposed closest to the study area along Eagle River, west of the Border Ranges fault, and more extensively in the Matanuska Valley and on the Kenai Peninsula (Magoon et al. 1976; Winkler 1992). The proposed alignments in the study area will encounter a broad range of soils, including glacial deposits, alluvial (material deposited by rivers and streams), and colluvial (unsorted deposits near the base of slopes that have been transported by gravity alone). Boring logs in the project area indicate the sediments are typically greater than 500 feet deep. Figure 18-1 presents a generalized distribution of major soil units within the project area, which are described below.

Figure 18-1. Geologic Units



Glacial Deposits

The existing topography of the project area and surrounding vicinity is the result of numerous glacial periods. In fact, the upper Cook Inlet area near Anchorage has endured at least five glacial events in the last 2 to 3 million years (Karlstrom 1964). The most recent events include the Knik Glaciation and the Naptowne Glaciation, both of which occurred within the past 75,000 years.

During the Knik Glaciation (30,000 to 75,000 years ago), thick sediment, known as the Knik Ground Moraine, was deposited as glaciers retreated. Within the vicinity of the study area, these deposits extend from Eagle River valley to Point MacKenzie and Point Woronzof, and lie mostly below sea level. The

deposits generally consist of poorly sorted till sediment deposited directly by glacial ice (Karlstrom 1964; Mat-Su Borough 1995).

The Naptowne Glaciation (11,000 to 30,000 years ago) left most of the glacial deposits currently found in the Anchorage area. At its maximum, the Naptowne Glaciation extended across the Anchorage Bowl area from the north and terminated at Point Woronzof and Point Campbell (Reger and Pinney 1997). The Bootlegger Cove Formation was formed during this time, in ice-free areas of the Susitna River valley, lower Knik Arm, and Upper Cook Inlet (Reger et al. 1995). Bootlegger Cove sediments consist generally of materials such as clays and silts, with lesser amounts of sand and scattered pebbles and cobbles (Schmoll et al. 1984; Updike and Carpenter 1986). Around the same time, material was being shed out of the uplifting Chugach Mountains through alluvial processes (Hamilton 1994), causing wedges of sand and gravel to interfinger with and underlie the clay in many areas of the Anchorage Bowl.

Overlying the Bootlegger Cove Clay Formation are sand and gravel glacial deposits, including the Elmendorf Moraine and the Naptowne Outwash. Approximately 14,000 years ago, the Elmendorf Moraine was formed at the end of the Knik-Matanuska glacier and is now a prominent topographic feature on both sides of Knik Arm. The Elmendorf Moraine consists of a wide variety of sediments with a wide variety of grain sizes north of Ship Creek. The Naptowne Outwash is a flat sprawling apron of sediment deposited by glacial meltwater that overlies much of the Bootlegger Cove Formation on both the east and west sides of Knik Arm south of the Elmendorf Moraine. This material was deposited by large, braided streams that contained sand and gravel and flowed from the Knik-Matanuska glacier. These sediments were subject to constant reworking by glacial runoff, and consist of a variety of sorted sediment that has been deposited in front (south) of the Elmendorf Moraine. Locally, this outwash has been named the Mountain View Fan, and underlies parts of Government Hill, Mountain View, and Downtown Anchorage.

In Figure 18-1, the glacial deposits are divided into coarse-grained (primarily sand and gravel) and fine-grained deposits.

Recent Alluvial and Colluvial Deposits

Small streams once crossed low-lying areas of Anchorage. These streams created alluvial fans along the mountain front, leaving alluvial deposits that consist predominantly of sand and gravel with some silt (Dobrovolny and Schmoll 1972a). They can be found along active and abandoned stream channels and terraces. In the study area, alluvial deposits have been identified along Ship and Chester creeks. Alluvial deposits along slower-moving streams may also include thick organic layers and peat. Colluvial deposits are unsorted soils that are generally located near the base of bluffs, deposited there by gravity. As shown in Figure 18-1, the alluvial and colluvial deposits in the project area generally occur along the Chester Creek and Ship Creek drainages.

Landslide Deposits

Numerous landslide deposits occur along the Ship Creek bluff (Updike and Carpenter 1986). Older slides may be characterized by hummocky surfaces, heavy vegetation, and continuous soil cover. More recent slides exhibit ridge-and-trough topography, ponded surface water, recent vegetation, and discontinuous soils; they generally occur directly downslope from identifiable scarps (cliffs formed by faulting or erosion) and overlie older slide material. Several prominent slides occurred during the 1964 earthquake in the study area as a result of failures in clays of the Bootlegger Cove Formation. Landslide deposits caused by earthquakes can be found on the Ship Creek bluffs and, to a lesser degree, the Chester Creek bluffs. These landslide deposits are generally associated with poor foundation soil and high to very high earthquake-induced ground failure hazards (Figure 18-2).

Artificial Fill Deposits

Artificial fill deposits can be found within the Anchorage Bowl, generally associated with developments that required a change in grade. Artificial fill deposits vary in size and composition, but generally consist of granular soils, often loose to dense mixtures of sand, gravel, and silt. The largest artificial fill area that could be affected by the project is the Merrill Field Landfill (Figure 18-1). The Merrill Field Landfill contains more than 3 million tons of refuse and 1.7 million tons of cover soil, nearly half of which was deposited there between 1982 and 1987. The landfill covers approximately 200 acres and is filled with soil and refuse to an average depth of 30 feet below the ground surface (Brunett 1990). Additional information regarding the Merrill Field Landfill appears in Chapter 20, Contaminated Sites.

18.4.2 Hazards

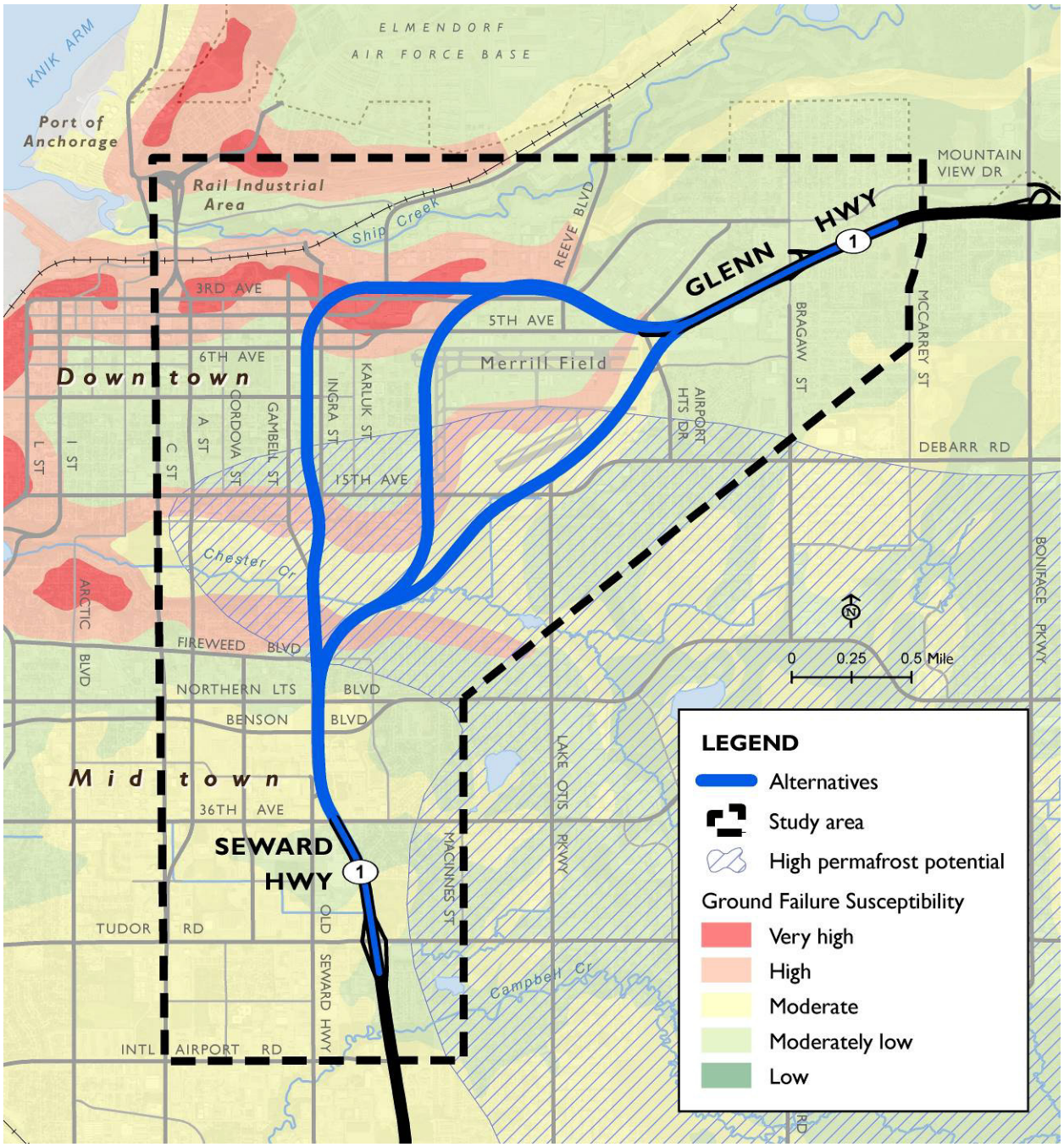
Permafrost

Permafrost is ground that remains at or below 32° Fahrenheit for two or more years and can consist of ice and/or soil. Permafrost can form a strong and stable foundation material if it remains frozen, but if it is allowed to thaw, the soil will lose its strength and fail. Permafrost can thaw due to human disturbance or climate change.

Anchorage lies near the southern extent of areas containing permafrost in Alaska, and permafrost in the vicinity is discontinuous and sporadic. The Anchorage area is generally free of permafrost (HDR 2004). Several areas in Anchorage that were known to contain permafrost during earlier development, such as the Dimond Mall vicinity, are now apparently thawed. Numerous structures and several buried utilities constructed in the 1980s in east Anchorage, however, were damaged by settlement associated with melting of ice-rich permafrost. Extensive ground ice was also encountered in 2005 in Birchwood, Alaska, where the Alaska Railroad was evaluating conditions for possible curve straightening on their main line track.

Figure 18-2 shows areas with the greatest potential for encountering permafrost in the project area (HLA 1983). Much of the area mapped as high potential for permafrost is developed, and permafrost in these areas has already likely thawed. Permafrost was reported in the Fairview/Merrill Field Area in 2007. Within the study area, the Sitka Street Park area, which is currently undeveloped and lies south of Merrill Field, contains black-spruce bogs that are characteristic of permafrost conditions.

Figure 18-2. Subsurface Hazards



Earthquake Hazards

Alaska experiences approximately 24,000 earthquakes per year, which account for 52 percent of all earthquakes in the United States (AEIC N.d.). The Upper Cook Inlet region is one of the most seismically active areas of Alaska due to the motion between the Pacific and the North American Plates. Larger earthquakes, such as the 1964 Alaska earthquake, are associated with the Pacific Plate subducting under the North American Plate. The 1964 earthquake was the largest ever recorded in North America, registering 9.2 on the Richter scale. Anchorage, being located near this tectonic plate boundary, can

experience frequent and intense earthquakes, which may cause damage from ground shaking, slope failure, liquefaction, surface fault rupture, and tsunamis.

In the Anchorage vicinity, two shallow crustal faults present known earthquake hazards. The Castle Mountain-Lake Clark-Bruin Bay Fault system is a northeast-trending fault that lies on the west side of the Knik Arm, roughly parallel to Cook Inlet. In the Susitna lowland, near-surface sediments have been displaced 23 feet horizontally and 7.5 feet vertically by earthquakes from this fault. The Border Ranges Fault runs approximately 620 miles northeastward from Kodiak Island, across the Kenai Peninsula, and along the front of the Chugach Mountains. There are no known faults with recent movement underlying the proposed project alignments.

Slope Failure

Slope failure was one of the primary causes of damage during the 1964 earthquake. The southern slopes near Ship Creek experienced slope failure and slid northward up to 15 feet toward Ship Creek. Deep block-type landslides occurred in downtown Anchorage and the Turnagain Heights area during the 1964 earthquake and had displacements of a few feet to hundreds of feet. According to the Anchorage Area Soils Studies (Shannon & Wilson, Inc. 1964), the slides were caused by loss of strength and failure of the sensitive soils in the Bootlegger Cove Clay Formation. Similar soils may be present in the study area. These areas are also shown in Figure 18-1 as landslide deposits, and Figure 18-2 identifies these areas as having high to very high ground failure susceptibility.

Shallow slides and slumps also occurred during the 1964 earthquake along coastal and stream bluffs. Such areas can be found in the Chester Creek drainage, which is mapped as moderate to high ground failure susceptibility. This area experienced minor slumping and cracking during the 1964 earthquake. No significant sliding occurred in the area, but existing slopes may be marginally stable under dynamic conditions and may experience failures during earthquakes.

In addition to the potential landslides caused by earthquakes, there may be slope areas in the study area that are unstable under static conditions. This instability may result from the construction of infrastructure or the addition of fill near the top of a slope, the removal of soils from the base of the slope, or high moisture content within the soil. Areas of concern for slope stability include the bluffs along 3rd Avenue and the slopes associated with the Chester Creek drainage. Such conditions can also exacerbate the potential for sliding during an earthquake.

Liquefaction and Densification

An earthquake can increase the water pressure in certain saturated soils, causing the soil to lose its strength and behave in a fluid-like manner. Liquefaction can cause landslides, movement of bridge supports and structures, and failure of retaining walls. The intensity and duration of an earthquake determines whether liquefaction will occur. Liquefaction is typically limited to soils above the 50-foot depth, with a relatively shallow groundwater table and low relative density.

Liquefaction is suspected to be a concern in loose to medium dense, saturated soils that are associated with the alluvium and colluvium deposits shown in Figure 18-1. Clay can be particularly susceptible to liquefaction. Soft or sensitive clays from glacial deposits have been identified within the study area near Mountain View, and soft clays have also been found in the Merrill Field area.

Densification of dry and moist sandy materials has been observed after several earthquakes, particularly in hillside fill material (Pradel 1998). Densification of liquefiable soils below the water table may also occur when subject to earthquakes, resulting in potential ground settlement. The areas of concern for earthquake-induced settlement are anticipated to be similar to the areas of concern for liquefaction.

18.4.3 Groundwater

Anchorage is underlain by an unconfined aquifer[1], a confining clay and silt layer, and a confined aquifer[2] over consolidated sedimentary rocks. Groundwater is predominantly recharged along the Chugach Mountains to the east and flows westward toward Cook Inlet within the unconfined and confined aquifers.

The confined aquifer is located approximately 100 and 300 feet below the ground surface, with the shallower depths closer to the recharge area along the mountains. Water table depth for the unconfined aquifer is predominantly influenced by surface drainage and topography. The depth of the water table varies from shallow (4 to 10 feet below the ground surface) near streams or creeks to more than 80 feet in elevated areas. Approximate contours and elevation of the unconfined water table are presented in Figure 18-3. The groundwater table generally experiences seasonal fluctuations of 3 to 5 feet.

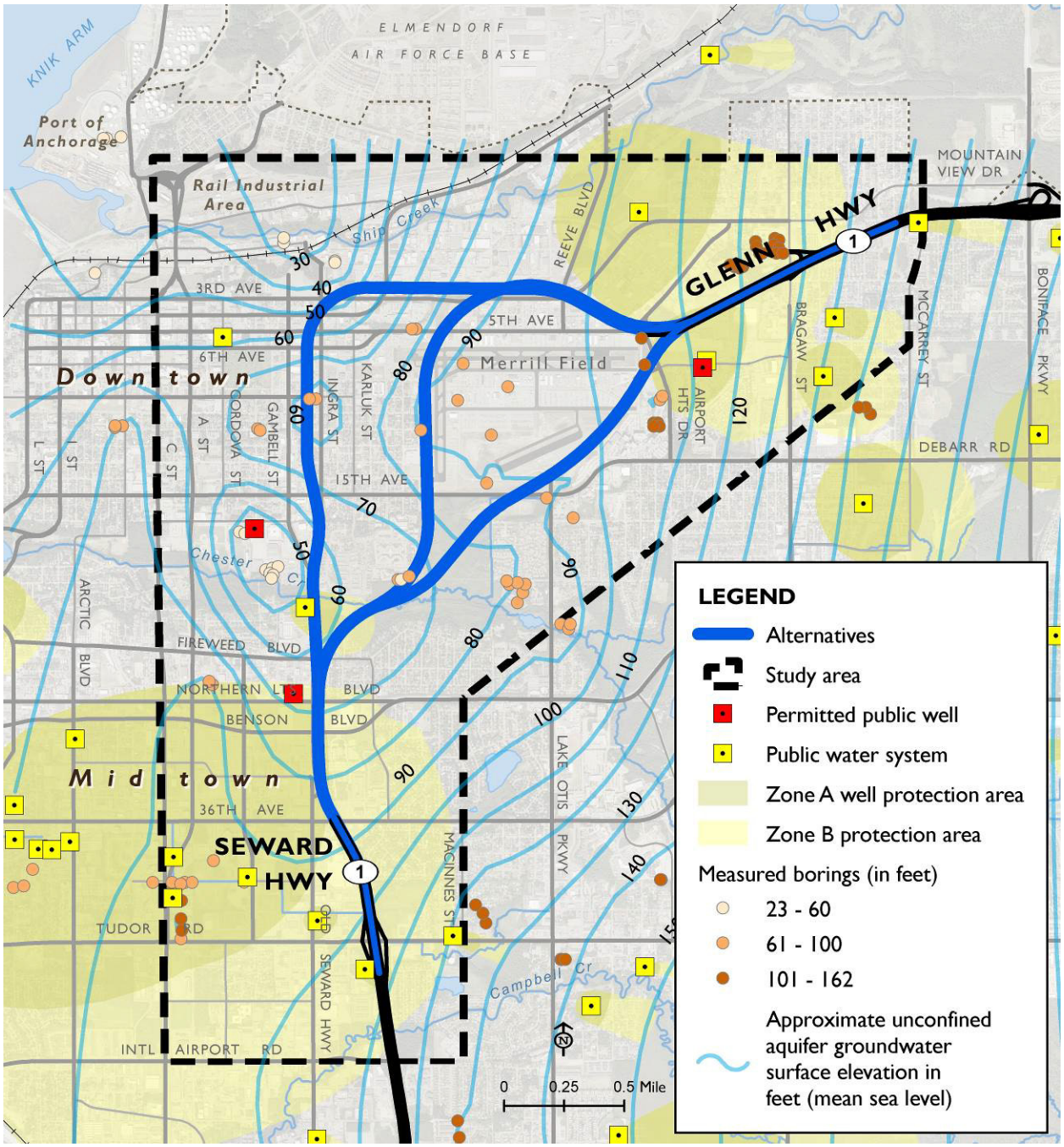
Periodic measurements of the groundwater table depths have been taken at several sites in the project area. As part of an ongoing remediation project at 1405 Bragaw Street (ADEC File Number 2100.26.017), Shannon & Wilson measured the groundwater table quarterly between 1992 and 1995. Water table measurements at this site indicate the depth typically varies between 9 feet below the ground surface in the fall and approximately 11 feet below the ground surface in the spring. Historic measurements as shallow as 8.5 feet and as deep as 11.5 feet have been recorded.

More extensive groundwater monitoring has been conducted at the Merrill Field Landfill as part of the long-term groundwater program. The unconfined aquifer is monitored around the perimeter of the landfill to detect movement of leachate from the refuse. A majority of the groundwater beneath the refuse appears to flow toward the southwest; however, a hydrogeologic divide running approximately beneath the east-west runway routes the northern landfill groundwater toward the northwest.

[1] **Unconfined aquifer:** an aquifer whose upper water surface (water table) is at atmospheric pressure, and thus is able to rise and fall. http://ga.water.usgs.gov/edu/dictionary.html

[2] **Confined aquifer:** soil or rock below the land surface that is saturated with water. There are layers of impermeable material both above and below it and it is under pressure so that when the aquifer is penetrated by a well, the water will rise above the top of the aquifer. http://ga.water.usgs.gov/edu/dictionary.html

Figure 18-3. Groundwater



Existing Water Rights

The ADNR water rights database identifies nine well permits that have been issued in the project vicinity (see Table 18-1). The well depths generally appear to be tapped into the confined aquifer. The reported uses for the water were industrial cooling, small domestic water systems, and water for the Joint Base Elmendorf-Richardson Hatchery.

Table 18-1. Project Area Existing Water Rights

Customer Name	Well Depth	Quantity
Penland Park Associates	164 feet	140,000 gpd*
Sullivan Sports Arena	330 feet	500 gpm**
Three B Company	Unknown	31,250 gpd
James Fitts	Unknown	4,200 gpd
Creekwood, LLC (DBA Creekwood I) NN & RV Park	Unknown	4,100 gpd
Providence Health System (2 wells)	553 feet	1,200 gpm
	520 feet	1,200 gpm
Alaska Isle, LLC (DBA Monoog's) Isle Mobile Home Court	220 feet	132,000 gpd
Providence Health System	85 feet	207,360 gpd
Department of Fish and Game Sport Fish Division Region II (9 wells)	Unknown	2,100/ 1,700 gpm
	Unknown	2,100/ 1,700 gpm
	Unknown	2,100/ 1,700 gpm
	Unknown	2,100/ 1,700 gpm
	Unknown	2,100/ 1,700 gpm
	Unknown	2,100/ 1,700 gpm
	Unknown	2,100/ 1,700 gpm
	Unknown	2,100/ 1,700 gpm
	Unknown	2,100/ 1,700 gpm

Source: Alaska Department of Natural Resources, 2010, Water Rights and Reservations of Water: Available: http://dnr.alaska.gov/mlw/mapguide/water/wr_start_tok.cfm.
**Gallons per day. **Gallons per minute.*

Wellhead Protection

Public water wells exist within the project area. Each well has a wellhead protection area around it, which is defined as the surface and subsurface area surrounding a well that supplies a public water system, through which contaminants are reasonably likely to move toward and reach the well (EPA 2002). A "Zone A Well Protection Area" is the area in which contaminants may reach the well within several months. A "Zone B Well Protection Area" is the area in which contaminants may reach the well in within two years. Figure 18-3 shows the existing public water wells and the protection areas around them.

18.5 BIBLIOGRAPHY

[ADNR] Alaska Department of Natural Resources. 2010a. *Water Rights and Reservations of Water*. Available online at http://dnr.alaska.gov/mlw/mapguide/water/wr_start_tok.cfm.

——. 2010b. *Well Log Tracking System*. Available online at http://www.navmaps.alaska.gov/welts/.

[AEIC] Alaska Earthquake Information Center. No date. http://www.aeic.alaska.edu.

Bartsch-Winkler, S. 1982. Physiography, Texture, and Bedforms in Knik Arm, Upper Cook Inlet, Alaska, During June and July 1980. U.S. Geological Survey Open File Report 82-464.

Brunett, Jillian O. 1990. Lateral Movement of Contaminated Ground Water From Merrill Field Landfill, Anchorage, Alaska. U.S. Geological Survey Open-File Report 89-624.

Colonell, J., and D. Jones. 1990. *An Investigation of Sedimentation Processes in the Vicinity of the Ship Creek Waterfront Development.* Woodward-Clyde Consultants and Coastline Engineering, Anchorage.

Dobrovolny, E., and H.R. Schmoll. 1974a. *Slope-Stability Map of Anchorage and Vicinity, Alaska*. U.S. Geological Survey Misc. Geo. Inv. Map I-787-E. Scale 1:24,000.

——. 1974b. *Foundation and Excavation Conditions Map of Anchorage and Vicinity, Alaska*. U.S. Geological Survey Misc. Geo. Inv. Map I-787-D. Scale 1:24,000.

[EPA] Environmental Protection Agency. 2002. *Consider the Source: A Pocket Guide to Protecting Your Drinking Water*. Office of Ground Water and Drinking Water, EPA. Available online at http://www.epa.gov/safewater/sourcewater/pubs/guide_swppocket_2002.pdf.

Glass, R.L. 2001. *Ground-Water Quality in the Cook Inlet Basin, Alaska, 1999*. U.S. Geological Survey Water-Resources Investigations Report 01-4208.

Haeussler, P.J., R.L. Bruhn, and T. Pratt. 2000. "Potential Seismic Hazards and Tectonics of the Upper Cook Inlet Basin, Alaska. Based on Analysis of Pliocene and Younger Deformation." *Geological Society of America Bulletin*, 112:9, pp. 1414–29.

Hamilton, T.D. 1994. "Late Cenozoic Glaciation of Alaska," in *The Geology of Alaska*. Geological Society of America, Boulder, Colorado.

Hart Crowser. 1988. Landfill Gas Assessment, Merrill Field Landfill, Anchorage, Alaska. A-8099.

[HDR] HDR, Alaska, Inc. 2004. *All Hazard Mitigation Plan*. Prepared for the Municipality of Anchorage Project Management and Engineering Department. October. Anchorage, Alaska.

[HLA] Harding Lawson Associates. 1983. *Marine Seismic Reflection Survey, Knik Arm Crossing, Anchorage, Alaska.* Report prepared for EMPS-Sverdrup, J. V.

Jibson, R.W., and J.A. Michael. 2009. *Map Showing Seismic Landslide Hazards in Anchorage, Alaska.* Denver, CO: U.S. Department of the Interior, U.S. Geological Survey.

Karlstrom, T.N.V. 1964. Quaternary Geology of the Kenai Lowland and Glacial History of the Cook Inlet Region, Alaska. U.S. Geological Survey Professional Paper 443.

Magoon, L.B., W.L. Adkison, and R.M. Egbert. 1976. Map Showing Geology, Wildcat Wells, Tertiary Plant Fossil Localities, K-Ar Age Dates, and Petroleum Operations, Cook Inlet Area, Alaska. Prepared for U.S. Geological Survey Misc. Investigation Series Map I-1019. Scale 1:250,000.

Matanuska-Susitna Borough. 1995. *Point MacKenzie Area Which Merits Special Attention (AMSA) Plan.* Effective date May 23, 1993, printed November 1995.

[MOA] Municipality of Anchorage. 2001. *Seismic Dataset.* GIS shapefile and metadata, last modified 1998. Digitized from Winterhalder et al. (1979). Original scale 1:63,360.

Nelson, G.L. 1982. *Vertical Movement of Ground Water Under the Merrill Field Landfill*. U.S. Geological Survey. Open-File Report 82-1016.

[NRCS] National Resources Conservation Service. 2001. *Soil Survey of Anchorage Area, Alaska*.

Plafker, G., L.M. Gilpin, and J.C. Lahr. 1993. "Neotectonic Map of Alaska," in G. Plafker and H. C. Berg, eds. *The Geology of Alaska, Geology of North America, Volume G-1.* Geological Society of America. Boulder, Colorado. Scale 1:2,500,000.

Pradel, D. 1998. "Procedure to Evaluate Earthquake-Induced Settlements in Dry Sandy Soils." *Journal of Geotechnical and Geoenvironmental Engineering*. 124:4, p 364-368.

Schmoll, H., L. Yehle, C. Gardner, and J. Odum. 1984. *Guide to Surficial Geology and Glacial Stratigraphy in the Upper Cook Inlet Basin.* Prepared for Alaska Geological Society, Anchorage.

Shannon & Wilson, Inc. 1964. *Anchorage Area Soils Studies.* Geotechnical Report. Anchorage.

——. 1971. *Knik Arm Crossing, Anchorage*. Synopsis of Studies for May 1971 Conference. State of Alaska Department of Highways,

——. 1994. *Ingra Street Extension, Anchorage*. Geotechnical Report (A-517-2).

——. 1997. Site Characterization Defense Fuel Support Point, Anchorage. (Y-5693).

——. 2003. Sand and Gravel Assessment, Elmendorf Moraine, Port MacKenzie, Alaska, October. (32-1-01622).

——. 2004. *Knik Arm Bridge Project, Anchorage*. Preliminary Geotechnical Report (32-1-01536).

——. 2005. *TOFC Road and Rail, Port of Anchorage.* Geotechnical Report (32-1-01719).

SLR Alaska. 2008. Municipality of Anchorage Solid Waste Services Landfill Water Quality Monitoring Program 2007 Annual Interpretive Report.

Updike, G. Randall, and Bruce A. Carpenter. 1986. *Engineering Geology of the Government Hill Area, Anchorage, Alaska*. Prepared for U.S. Geological Survey Bulletin 1588.

Updike, R.G., H.W. Olsen, H.R. Schmoll, Y.K. Kharaka, and K.H. Stokoe II. 1988. *Geologic and Geotechnical Conditions Adjacent to the Turnagain Heights Landslide, Anchorage, Alaska.* U.S. Geological Survey Bulletin 1817.

Wahrhaftig, C. 1965. *Physiographic Divisions of Alaska.* U.S. Geological Survey Professional Paper 482. Scale 1:2,500,000.

Wesson, R.L., A.D. Frankel, C.S. Mueller, and S.C. Harmsen.1999. *Probabilistic Seismic Hazard Maps of Alaska*. U.S. Geological Survey Open-File Report 99-36, <http://geohazards.cr.usgs.gov/eq/>.

Winkler, G.R. 1992. *Geologic Map and Summary Geochronology of the Anchorage 1° x 3° Quadrangle, Southern Alaska.* U.S. Geological Survey Misc. Investigation Series Map I-2283. Scale 1:250,000.

Winterhalder, E.C., T.L. Williams, and J.M. England. 1979. *Geotechnical Hazards Assessment, Municipality of Anchorage, Anchorage, Alaska.* Report prepared by Harding-Lawson Associates for the Municipality of Anchorage. H-LA Job. No. 5502,009.08.

Youd, T.L., C.M. Hansen, and S.F. Bartlett. 2002. "Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement." *Journal of Geotechnical and Geoenvironmental Engineering*, 128:12, p 1007-1017.

Chapter 19: Cultural Resources
Affected Environment

Table of Contents

19.1 INTRODUCTION 1
19.1.1 Study Area and Area of Potential Effect 1
19.1.2 Regulatory Setting 2
19.1.3 Agency and Tribal Consultation 3
19.2 AFFECTED ENVIRONMENT 3
19.2.1 Resource Identification Methods 3
Previous Investigations 4
Previously Documented Cultural Resources 5
19.2.2 Existing Archaeological and Historic Resources 7
Existing Archaeological Resources 7
Archaeological Resources in the APE 8
Existing Historic Resources 8
Historic Dena'ina 8
Early Development of Anchorage (1915–1938) 8
World War II (1939–1945) 9
Cold War Era (1946–1963) 10
Great Alaska Earthquake and Response (1964–1967) 11
Oil Boom (1968–Present) 12
Historic Resources in the APE 12
19.2.3 Results of the 2009 Investigations 12
Archaeological Investigations 12
Built Environment Investigations 14
19.2.4 Historic Properties in the Area of Potential Effect 15
Determinations of Eligibility for Archaeological Resources in the Area of Potential Effect 16
Determinations of Eligibility for Historic Built Environment Resources in the Area of Potential Effect 16
Individual Property Evaluations 16
Multiple Property Evaluations 16
Historic District Evaluations 17
Summary of Eligibility Determinations 17
19.3 BIBLIOGRAPHY 18

List of Tables

Table 19- 1. Eligible for or Listed in the NRHP in the Area of Potential Effect 7
Table 19- 2. Summary of Potential Archaeological Features in the Area of Potential Effect 13

List of Figures

Figure 19-1. Map of Cultural Resources Study Area, Survey Focus Area, and Area of Potential Effect 2
Figure 19-2. Cultural Resources Determined Eligible for or Listed on the National Register of Historic Places in the Areas of Potential Effect 6
Figure 9-3. Buildings Constructed On or Before 1967Identified in the Areas of Potential Effect 15

19.1 INTRODUCTION

This chapter describes the applicable federal and state regulations and identifies documented cultural resources[1], including archaeological and historic resources, in the study area and area of potential effect (APE) for the H2H project. Information for this section is based on the Alaska Heritage Resources Survey (AHRS) maintained by the Alaska Department of Natural Resources, Office of History and Archaeology (ADNR, OHA N.d.), the H2H *Cultural Resources Historic Context*, the H2H *Archaeology Survey Report* and the *Section 106 Evaluations and Recommendations* report.

19.1.1 Study Area and Area of Potential Effect

The H2H project is a large and complex project located in the core of a developed municipal area. Because of the project's location, many potential historic properties[2], consisting primarily of historic[3] period buildings, could be affected by the proposed project. The Federal Highway Administration (FHWA), working with the Department of Transportation and Public Facilities (DOT&PF) and Federal Transit Authority (FTA), has consulted with the State Historic Preservation Officer (SHPO) and the Municipality of Anchorage (MOA) to determine and document the APE[4].

Early in consultation, a broad study area was identified, with the caveat that this study area would be refined into an APE as project alternatives were further developed. The study area was subsequently used for development of a historic context and identification of potential consulting parties. More intensive fieldwork to identify and document potential historic properties, including archaeological and historic resources (e.g., sites, buildings, structures, or districts), was conducted in the survey focus area—a smaller portion of the broad project study area. Figure 19-1 illustrates the study area, survey focus area and APE for each alternative.

Further refinement of the focus area became possible when alternatives were recommended by DOT&PF for further analysis in the Environmental Impact Statement (EIS): Gambell-Ingra, Orca, and 15th Avenue alternatives. This decision allowed for the identification and delineation of a proposed APE. The APE was delineated based on the location of the edge of pavement, slope limits, and right-of-way to encompass potential effects of construction and operation of these alternatives on potential historic properties that included direct effects (e.g., removal or destruction of the property) as well as indirect and cumulative effects such as noise, visual changes, vibration, traffic changes, and neighborhood connectivity. Based on consultation, the APE thus includes a buffer area of 500 feet from edge of pavement for each alternative, to encompass direct effects and the potential effects from noise and other indirect effects (e.g., visual, vibration, traffic, and connectivity).

---

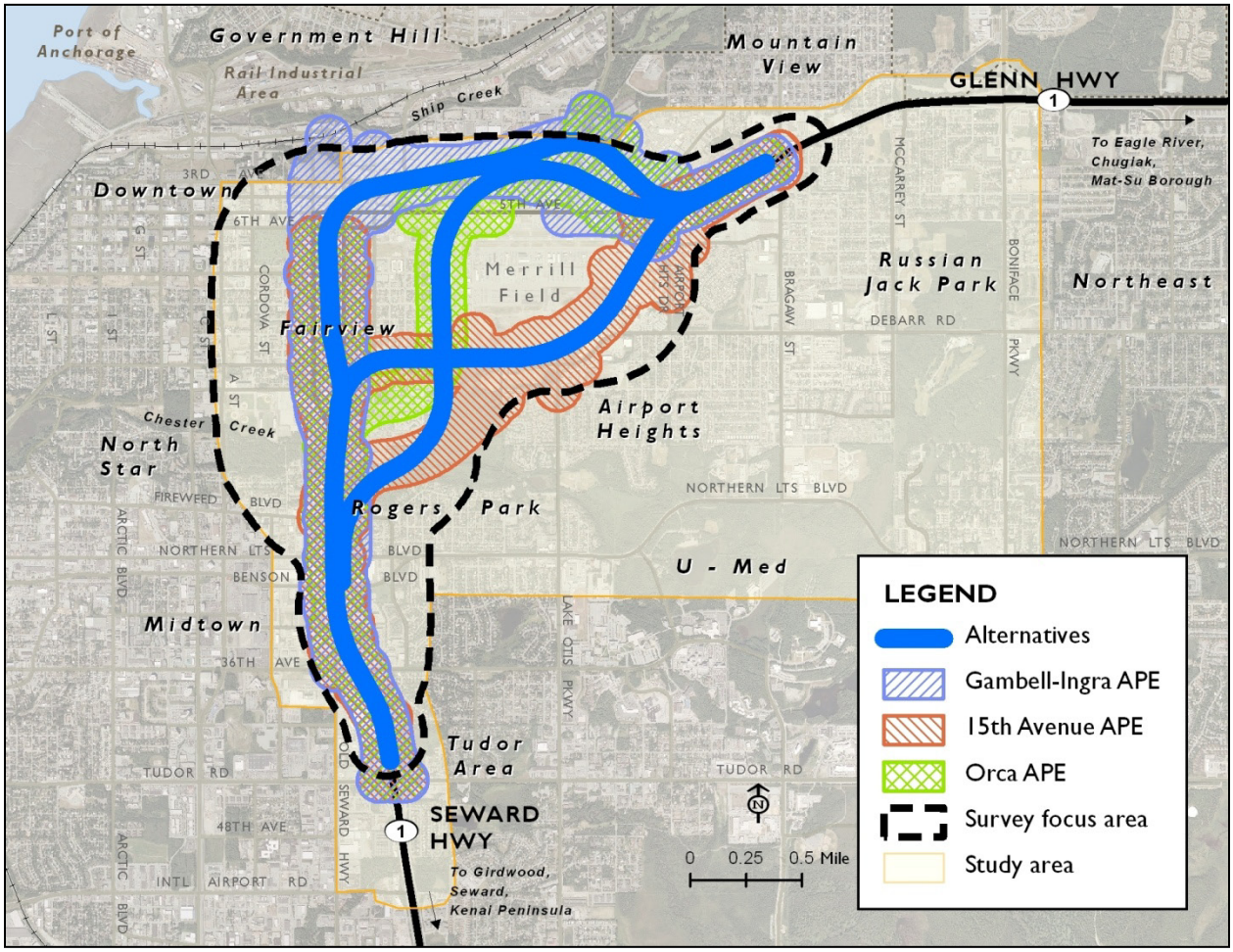
[1] While not formally defined in NEPA or other federal regulations, cultural resources are generally defined as encompassing any resource that is cultural in character including social institutions, artifacts, documents, traditional ways of life, and archaeological, traditional, and built environment resources, which include, but are not necessarily limited to, buildings, structures, objects, districts, and sites.

[2] Historic properties are any cultural resource that has been determined eligible for or is listed in the National Register of Historic Places (NRHP).

[3] For the purposes of this project, the historic period is identified as 1967 or earlier based on a 45-year threshold for evaluations of historic significance. Generally, properties less than 50 years old are not considered eligible for the NRHP unless they are of exceptional importance. Fifty years is considered a general estimate of time needed to develop historic perspective to be able to properly evaluate significance. However, given an allowance for project development timelines, properties are evaluated for significance if they are 45 years or older. Thus, the 1967 threshold was identified during consultation based on the estimated date of completion for the EIS in late 2012.

[4] The APE is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by an undertaking" (36 CFR 800.16(d)).

Figure 19-1. Map of Cultural Resources Study Area, Survey Focus Area, and Area of Potential Effect



19.1.2 Regulatory Setting

Various federal and state laws and regulations, guidance, and standards apply to the H2H cultural resources investigations. The National Historic Preservation Act (NHPA) (16 USC 470 et seq.) requires agencies to identify and manage historic properties under their jurisdiction or control; to consider activities that will advance the purpose of the NHPA and avoid actions contrary to the intent of the NHPA; to consult and cooperate with others carrying out historic preservation activities; and to consider effects of federal undertakings on historic properties. Section 106 of the NHPA requires coordination with other reviews such as the National Environmental Policy Act (NEPA), the Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act, the Archaeological and Historic Preservation Act as amended (aka Reservoir Salvage Act, Moss-Bennett Act, or Archaeological Data Preservation Act), and Section 4(f) of the Department of Transportation Act.

Of particular importance for the H2H project is coordination with NEPA and Section 4(f). NEPA requires federal agencies to consider the effects of federal actions on the environment, including the cultural environment (i.e., historic properties, other culturally valued places, cultural use of a biophysical environment, and social attributes). For the proposed H2H project, FHWA intends to coordinate Section 106 compliance with the requirements of NEPA. Compliance with Section 106 will also inform Section 4(f), which prohibits any agency of the Department of Transportation from implementing a transportation

project that uses a historic property that is on or eligible for listing in the National Register of Historic Places (NRHP) unless there is "no prudent and feasible alternative" to doing so, and all possible planning is carried out to minimize harm.

Regulations regarding cultural resources on State lands include the Alaska Historic Preservation Act (AS 41.35.010-240), which establishes a policy to preserve and protect the historic, prehistoric, and archaeological resources of Alaska from loss, desecration, and destruction, and to retain the scientific, historic, and cultural heritage embodied in these resources. The MOA currently has no laws or regulations governing cultural resources.

Guidance for cultural resource investigations, evaluation, and documentation include the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation, the National Park Service (NPS) Technical Briefs and Bulletins series, and the Alaska Department of Natural Resources Historic Preservation Bulletin series. The Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation are used to establish a comprehensive approach to the identification, evaluation, registration, and treatment of historic properties.

19.1.3 Agency and Tribal Consultation

Consultation under Section 106 includes the following agencies/organizations:

- Federal: FHWA, FTA, U.S. Army Corps of Engineers, Joint Base Elmendorf-Richardson, Federal Aviation Administration, Advisory Council on Historic Preservation;
- State: State Historic Preservation Officer, Alaska Housing Finance Corporation;
- Local government: MOA, Anchorage Memorial Park Cemetery, Anchorage Historic Preservation Commission;
- Federally recognized Alaska Native Tribal governments, Native villages, and regional corporations: Cook Inlet Region, Inc. [CIRI], Knik Tribal Council, Native Village of Eklutna, Eklutna Inc., Knikatnu Inc.;
- Anchorage community councils in the study area;
- Historic associations/organizations: Cook Inlet Historical Society, Anchorage Historic Properties, Anchorage Museum, Alaska Association for Historic Preservation, National Trust for Historic Preservation; and
- Other interested parties: Alaska Railroad Corporation, Cook Inlet Housing Authority, Alaska Center for the Environment, various individuals.

The general public was invited to participate in consultation (including discussions of cultural resources) through a series of public scoping meetings for the NEPA process. Section 106 consultation was initiated in August 2008 and has continued throughout the Section 106 and NEPA process.

19.2 AFFECTED ENVIRONMENT

19.2.1 Resource Identification Methods

Sources of cultural resource data that were used for background research as part of the identification process for the H2H project include: existing survey reports and historic building inventories within the study area and APE; databases of documented cultural resources, such as the AHRS database[5] and the NRHP[6]; MOA tax assessor records, building permits, and tract and subdivision maps; Sanborn maps; historic photographs; published local histories; period newspaper articles; and period architectural publications. Researchers utilized local repositories including the National Archives and Records

[5] The AHRS is an inventory of all cultural resources in the State of Alaska that have been reported to the ADNR, OHA and includes objects, structures, buildings, sites, districts, and travelways that are generally more than 50 years old.

[6] The NRHP is an official federal list, administered by the NPS, of sites, districts, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture located throughout the United States.

Administration Pacific Alaska Region; Anchorage Museum at Rasmuson Center archives; ADNR, OHA; University of Alaska Anchorage and Alaska Pacific University Consortium Library; Alaska Resources Library and Information Services; Z. J. Loussac Library (Alaska Collection); Alaska's Digital Archives and the Statewide Library Electronic Doorway; the MOA property appraisal online database[7]; the ADNR Recorder's Office online database; and the Bureau of Land Management's Alaska Spatial Data Management System Web site.

While review of the AHRS and NRHP databases is an essential first step in conducting background research for the purposes of identifying cultural resources in the project area, these data are limited because they includes only those cultural resources reported to the State, in the case of the AHRS, and only those places nominated and approved for listing, in the case of the NRHP.

, Following background research, a field reconnaissance was conducted within the proposed project study area between July and October 2009, to identify and evaluate potential historic properties that could be affected by the proposed project. The survey and research were guided by consultation conducted before and during the survey. Researchers also collected oral history studies by conducting interviews with knowledgeable parties identified during consultation.

Previous Investigations

Multiple cultural resource surveys have been conducted in the study area prior to the survey identification efforts undertaken by the H2H project. Previous studies include: an inventory of prehistoric and historic period sites and buildings in the city of Anchorage and along the northern shore of Turnagain Arm in 1985 (Carberry and Lane 1986); a survey of historic period buildings in the Mountain View neighborhood of north Anchorage in 2005 (North Wind Inc. 2005); an inventory of historic buildings on Government Hill and Ship Creek and a traditional cultural property in the area north of Ship Creek for the Knik Arm Crossing Project in 2005 (Stephen R. Braund & Associates 2006a, 2006b); an inventory of historic period buildings in Fairview in 2008 (BGES 2008); and various Determinations of Eligibility (DOEs) conducted on several individual buildings within the study area by Housing and Urban Development (HUD). Inventories of Fairview and Mountain View have not received SHPO concurrence on recommendations of eligibility. In addition, the Fairview report assessed only buildings constructed prior to 1962, and the Mountain View report assessed only buildings constructed prior to 1959 for NRHP eligibility[8]. For the H2H project, buildings constructed in 1967 or earlier are considered for NRHP eligibility; thus, the Fairview and Mountain View reports are limited in providing background information on these areas for the purposes of the H2H project,

In the general Anchorage area, there have also been limited archaeological surveys completed previously. Much of Anchorage has never been surveyed for archaeological sites, with only a few primarily construction-related project surveys conducted to date, such as those associated with oil and gas exploration and development,[9] and with roads projects, gravel extraction activities, and other development or research purposes[10]. Both Fort Richardson and Elmendorf Air Force Base (now Joint

[7] The MOA property appraisal database includes information on property location, owner, construction date, style, materials, building and lot size, improvements, ancillary structures, and condition.

[8] For the H2H project, buildings constructed in 1967 or earlier were assessed for NRHP eligibility.

[9] e.g., Kent, Matthews and Hadleigh-West 1964; Reger and Hanable 1975; Mobley 1993.

[10] e.g., Dumond and Mace 1968; CINA 1975; Reger and Antonson 1977; Dixon and Johnson 1973; Rabich 1976; Veltre 1978; Reger 1985; L. Yarborough 1986; Hanson 1998; Schweigert 1999; DePew 2000; Buzzell 2001; CRC 2005; Yarborough et al. 2009; Shaw 2000b; Potter et al. 2002; Mobley 2004, 2005, 2009; Stephen R. Braund & Associates 2006c; Stone 2008; Pendleton and Yarborough 2008; Rogers and Yarborough 2009

Base Elmendorf-Richardson) have similarly been subjected to archaeological and built environment surveys since the 1970s[11].

Previously Documented Cultural Resources

Based on a review of AHRS and NRHP records, there are 331 previously documented cultural resources located in the combined APEs: 194 within the Gambell-Ingra APE, 251 within the 15th Avenue APE, and 272 within the Orca APE. The previously documented cultural resources in the study area are all historic period buildings, with the exception of the Anchorage Memorial Park Cemetery, which is a documented historic district. Only one resource in the combined APEs (Anchorage Memorial Park Cemetery, ANC-00766) is listed on the NRHP; however, there are two resources immediately west of the combined APEs that are listed on the NRHP (Pioneer School House, ANC-00244; and McKinley Tower Apartments, ANC-01422; Table 19-1 and Figure 19-2). Two resources () within the Gambell-Ingra APE had been previously determined eligible for the NRHP, but were subsequently demolished: the Anchorage Hospital and Quarters Building, ANC-00910 and ANC-00911, formerly located on the corner of 3rd Avenue and Gambell Street. No properties previously determined eligible for the NRHP are located in the Orca or 15th Avenue alternative APEs (see Table 19-1 and Figure 19-2). Six resources in the combined APEs (four in the Gambell-Ingra APE, five in the Orca APE, and two in the 15th Avenue APE) have been found not eligible for the NRHP, and the remaining resources have either not been evaluated for NRHP eligibility or SHPO has not to date concurred with the recommendations of eligibility (Figure 19-2).

[11] e.g., Workman 1978; Steele 1980; L. Yarborough 1981; McMahan and Holmes 1996; Shaw 2000a, 2001; Hollinger 2001; Fall et al. 2003; USARAK 2007; Neely 2008; Callina et al. 2010

Figure 19-2. Cultural Resources Determined Eligible for or Listed on the National Register of Historic Places in the Areas of Potential Effect

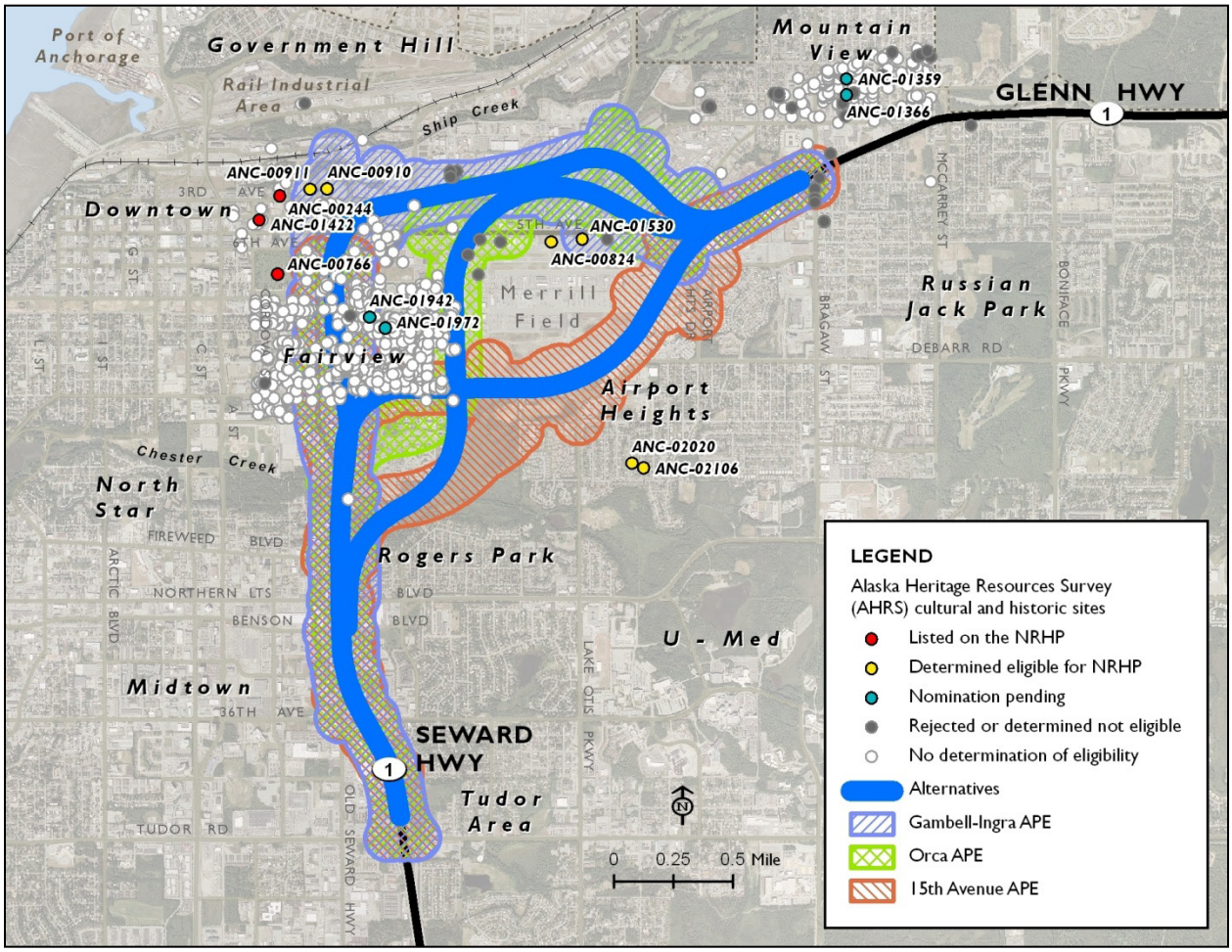


Table 19- 1. Eligible for or Listed in the NRHP in the Area of Potential Effect

AHRS #	Resource Name	Address	Date	NRHP Status*
ANC-00244	Pioneer Schoolhouse	616 Eagle Street	AD 1915	NHR
ANC-00766	Anchorage Memorial Park Cemetery	535 East 9th Avenue	AD 1915	NHR
ANC-00824	CAA Communication and Administration Building	n/a	AD 1942-1951	NRE (Demolished)
ANC-00910	Anchorage Hospital, Alaska Native Services [ANS]	n/a	AD 1953 to AD 1963	NRE (Demolished)
ANC-00911	Quarters Building, Alaska Native Health Services [ANS]	n/a	AD 1953 to AD 1983	NRE (Demolished)
ANC-01422	McKinley Tower Apartments (McKay Building)	337 East 4th Street	AD 1952	NHR
ANC-01530	Reeve Airmotive Hangar (Pacific Air Motive, HANGAR.NET)	2424 East 5th Avenue	AD 1944	NRE

** NHR = Listed on the NRHP; NRE =Determined eligible for the NRHP. Source: ANDR, OHA n.d.*

19.2.2 Existing Archaeological and Historic Resources

Existing Archaeological Resources

The existing archaeological environment is summarized below. For more detailed information, see the *Cultural Resources Historic Context.*

The earliest documented human presence in the upper Cook Inlet area is at the Beluga Point site, an archaeological site on the north shore of Turnagain Arm located south of Anchorage (Reger 1981, 1996, 1998), which includes artifacts associated with the Paleoarctic culture dating generally between 8,000 and 10,000 years before present (BP). Additional Paleoarctic sites are located throughout the Cook Inlet region (Reger and Pipkin 1996; Hadleigh-West 1996; Dixon 1985; Holmes 1985). The Northern Archaic culture followed the Paleoarctic culture, dating from 4,000 to 6,000 BP in areas extending to the Cook Inlet shoreline (Smith and Shields 1977; Dixon 1985).

The Ocean Bay culture has been documented at archaeological sites in the Cook Inlet area and dates to between 6,500 BP (Ocean Bay I) and to between 4,500 and 3,900 BP (Ocean Bay II). The Kachemak Culture has been identified at Beluga Point, dating to around 4,200 BP, and spread over much of the Cook Inlet basin during the period from 2,500 to 1,000 BP (de Laguna 1975; Clark 1984; Workman 1977:33; Workman and Workman 1988; Reger and Boraas 1996).

The Norton tradition, generally recognized as an Eskimo culture, is present in the Cook Inlet area starting at around 3,000 BP. The appearance of Eskimo culture in Southcentral Alaska followed the disappearance of Norton sites on the Alaska Peninsula. Material remains from the Thule tradition—another Eskimo culture—appear in the local archaeological record in the Cook Inlet area, Beluga Point, and the Fox Farm Site, which were occupied starting between 1,300 and 800 BP (Reger 1981; Reger and Boraas 1996; Workman, Lobdell and Workman 1980).

Archaeological and linguistic evidence suggests that an Athabascan-speaking Dena'ina (formerly "Tanaina") population occupied Cook Inlet by 1,500 to 1,000 BP (Kari and Fall 2003). Dena'ina is one of 13 Na Dene family languages spoken in Alaska under the Athabascan grouping of Subarctic Na Dene languages. The Dena'ina is the only Athabascan language-speaking group in the state to dwell in a coastal

environment. By the end of the 17th century, Dena'ina people occupied traditional Eskimo territories in the upper Cook Inlet; however, by the mid-18th century it becomes difficult to differentiate between Eskimo and Dena'ina archaeological deposits (Townsend 1981; Lobdell 1998). Dena'ina sites during this period are typically fish camps and villages with large, multi-room houses and storage (or cache) pits.

Archaeological Resources in the APE

There are no previously documented archaeological resources identified in the APE. Much of the evidence of prehistoric and historic Dena'ina habitation in the Anchorage area has been destroyed or buried by urban development. It should be noted, however, that much of Anchorage has never been surveyed for archaeological sites.

Existing Historic Resources

The existing historic environment is discussed in the *Cultural Resources Historic Context* and is summarized below.

Historic Dena'ina

Early explorers in Cook Inlet described Native settlements and fish camps located at sources of fresh water along both sides of Knik Arm and inland. The inhabitants were the *K'enaht'ana*, or Knik Arm Dena'ina, speakers of the "Upper Cook Inlet" dialect of the Athabascan language (Fall 1981). The lower Knik Arm area is rich in Dena'ina place names, fish camps, village sites, and other traditional places (de Laguna 1975; Fall et al. 2003; Kari and Fall 2003; Mobley 2005; Stephen R. Braund & Associates 2006a). Fish camps were located at *Tak'at* near Cairn Point, Ship Creek (*Dgheyay kaq'*), Campbell Creek (*Qin Cheghitnu*), Chester Creek (*Chanshtnu*), Point Woronzof (*Nuch'ishtunt*), Fire Island (*Nutuł'iy*), and other east- and west-side Knik Arm drainages. Until the 1950s, Point Woronzof was a fish camp and meeting place for Dena'ina people from throughout Cook Inlet (Reger and Hanable 1975). The nearby Point Campbell area (*Ułchena Huchilyut*, "where we dug up Alutiiqs") was associated with famous Dena'ina chiefs and a battle with Alutiiq people from the Pacific Coast, who came over Portage Glacier and pass from Prince William Sound (Kari and Kari 1982). Nunaka Valley, and possibly the south fork of Chester Creek, is *Nungge*, *Nunegge*, or *Nungge Betnu*, meaning "Upland Area" and may have been used historically for caribou hunting and berry picking (Kari and Fall 2003: 334, 339, 341). The tidal flats (*Tiq'a*) between Point Woronzof and Fire Island are deeply incised by drainage channels, which may have been used prehistorically and historically for trapping salmon, seals, and beluga whales for harvest as the extreme tides came in and went out. The tides leave vast areas of mud flats exposed and only small channels, easily blocked with wooden fences, for aquatic species harvests.

During World War II, the displacement of the Dena'ina peaked with the destruction of the fish camp at *Tak'at*, the loss of houses and camps along Chester Creek (*Chanshtnu*), and the ban on fishing at Point Woronzof (*Nuchis'tunt*) (Kari and Fall 2003). In a short period, the Dena'ina of upper Cook Inlet were disallowed from fishing at the best locations, and alienated by the threat of force and legal action from upland hunting areas and camps. Descendents of the Knik Arm Dena'ina currently live in Eklutna, Knik, Anchorage, the Matanuska-Susitna Valley, and elsewhere. Despite the historic trend of dislocation from traditional areas, there is a strong, continued cultural attachment to many of the traditional and historic places and activities. The Knik Arm Dena'ina continue to harvest traditional local resources, such as salmon and moose in the Cook Inlet area, as they have for centuries. The Eklutna Tribe and the Knik Tribe conduct educational fisheries in Knik Arm, where children are taught how to harvest and process salmon to maintain links with the traditional uses of salmon. The State allows out-of-season hunts for "customary and traditional" Alaska Native ceremonies, usually funerals or memorial potlatches.

Early Development of Anchorage (1915–1938)

Anchorage's early history and the properties associated with this period are directly related to the construction of the Alaska Railroad and the early development of Anchorage. Anchorage began in 1915

as a tent camp, in anticipation of impending railroad construction, on the flats alongside Ship Creek. Similar to other railroad towns, the Alaska Engineering Commission (AEC) laid out the original Townsite in a grid pattern with streets running east and west designated numerically, and those running north and south alphabetically. The Townsite was bounded on the west by Cook Inlet, the east by what is now Cordova Street, the north by the bluff above Ship Creek, and the south by 9th Avenue. Anchorage quickly expanded beyond the limits of the original Townsite. To the east of A Street, the "East Addition" included townsite-sized, one-acre lots and suburban, five-acre lots, with all of the latter located east of Gambell Street. This grid form was seen throughout the early history of Anchorage and is a distinctive characteristic of early Anchorage development compared to many other Alaskan communities. This grid form was less prevalent after World War II when curvilinear streets became a common characteristic.

Construction occurred rapidly during the early years of Anchorage's development. Residences were strewn throughout the Townsite, with the earliest homes built close to the commercial district, centered on 4th Avenue as the commercial "Main Street," and others built later in comparatively remote areas. The Anchorage Memorial Park Cemetery (535 E. 9th Ave., ANC-00766; listed on the NRHP), located within and adjacent to the APE, was established in 1915. By 1917, Anchorage was a thriving town with an estimated population of 6,500 utilizing a school, multiple bakeries, banks, barbershops, Turkish baths, hotels, clothing stores, restaurants, and churches. The AEC made water, electricity, and telephone service available by 1916 and started a sewer system in 1917 to serve the town (Carberry and Lane 1986). The development of the railroad and town attracted multiple homesteaders who settled on lands around Anchorage.

Anchorage's growth slowed in response to World War I and an economic slump in Alaska in the 1920s. By the time that Anchorage was incorporated in 1920, the population had dropped to less than 2,000. The 1920s and 1930s were a period of civic construction using federal funds, rather than residential development; for example, Merrill Field (1929) and City Hall (1936) were constructed during this period. Although unemployment in Anchorage was high, the Great Depression did not have as substantial an effect in Anchorage as it did in the Lower 48. However, population growth, as well as corresponding development, was still limited during this period.

Most of Anchorage's earliest buildings, both residential and commercial, were of simple wood-frame construction, although some small log cabins were also built during this period. Very few buildings from this period in Anchorage are still standing, and most are located within or near the original Anchorage Townsite located west of the APE. While only a few residential and commercial buildings remain from this period, the basic layout of the city remained in the Townsite and adjacent areas and influenced future development both within and outside the original Townsite.

World War II (1939–1945)

Anchorage was changed irrevocably by Alaska's place in the United States' defensive strategy during and following World War II, a period of rapid military development during which several military bases were built in Alaska. In 1939, President Franklin D. Roosevelt signed an executive order designating a military base near Anchorage and the federal government withdrew 20,000 acres northeast of the city. Construction of an airbase and an army post began in 1940. Federal spending directed towards improving or increasing the state's infrastructure, such as roads, resulted in Anchorage becoming a boom town. The Alaska-Canada Highway was built in 1942 to connect Alaska with the Lower 48 states. The road was used strictly for military and government purposes throughout the war. The Glenn Highway connected Anchorage to the Richardson Highway, which connected to the Alaska-Canada Highway, by 1943 (North Wind, Inc. 2005, 18). Federal agencies opened offices in Anchorage because of its increasing ease of access by road and air to the Lower 48. Between 1939 and 1940, Anchorage's population grew from 4,229 to 30,060 (Greater Anchorage Area Borough [GAAB] 1974, 9). This rapid growth was unexpected and no plans had been made to accommodate all these people.

The increased demand for housing created a housing crisis. In response to this rapid population growth, areas to the south and east of the city were platted, roads were paved, and highways were built. Homesteaders began to subdivide and sell their homesteads in the 1940s. Developers began acquiring land, subdividing it, and selling it for residential development. For example, portions of the APE such as Third Addition (Fairview area, 1939-1940), East Addition (Fairview area, 1940), and Fourth Addition (Fairview area north of Merrill Field, 1940) were platted in 1939-1940. The housing situation was so dire that landlords rented out trailers, caravans, one-room shacks, and even chicken coops to meet the housing demand, often for outrageous rents. As a result, Anchorage was designated as a defense rental area in 1942 in an attempt to prevent price gouging and provide decent housing for war workers. One obstacle to relieving the housing shortage was that every building permit during wartime had to go through the War Production Board because building materials were required for the war effort; justification was needed from individuals and developers to purchase lumber and other materials. It became increasingly difficult for a non-federal agency to construct new housing.

While individuals and developers struggled to construct residential buildings, several commercial and civic structures were constructed in Anchorage during this period (e.g., the U.S. Post Office and Courthouse [1939-1941], Federal Building [1939] and the Anchorage Depot [1942]). A change in building materials used for these larger structures included more use of reinforced concrete, and architect-designed buildings were commissioned. Some small businesses were constructed during this period, but they generally used the same makeshift building practices used in residential construction.

Cold War Era (1946–1963)

While the World War II boom shaped the future of Anchorage, it was the post-war/Cold War period that substantially changed the built environment of Anchorage. Although construction during World War II was limited, the restrictions on construction lifted after the war. Anchorage experienced another construction boom in which the city played catch-up for the persistent housing shortage and both residential and commercial properties developed rapidly.

Alaska's geography put it at the frontline for Cold War warning and defense. Because of this, several military construction projects were undertaken during this period. A new Fort Richardson was activated in 1950, just seven miles north of the original Anchorage post. With its activation came more servicemen, as well as non-military personnel, seeking work on military construction projects. Defense systems were constructed, including Aircraft Control & Warning (AC&W) stations (first one in Anchorage in 1950), components of the Distance Early Warning (DEW) system (in Anchorage by 1957), and the White Alice Communication Systems (WACS).

In addition to the military build-up, the Alaska Railroad began rehabilitation of its infrastructure in 1947. A number of governmental (non-military) bureaus (e.g., Alaska Native Service, Bureau of Reclamation, Civil Aeronautics Authority, and Alaska Road Commission) and agencies (e.g., Department of Aviation, National Guard, Alaska Housing Authority [AHA], Chugach Electrical Association) established offices and engaged in construction projects in the Anchorage area. Due to the surge in military/defense and governmental construction in Anchorage during this period, Anchorage became the construction capital of Alaska and the population of transient workers grew, resulting in increased demand for housing.

Factors contributing to a lack of housing in Anchorage included population increases outpacing construction, the high cost of building materials, and the small number of lending institutions in Alaska with limited capital available to private developers. After the passage of the National Housing Act in 1949, AHA was appointed to work with Alaska's communities toward urban renewal and address housing needs.

With the opening of Anchorage International Airport in 1951, Anchorage also became a transportation hub. A road development program for the Territory of Alaska, requested by the Army for national defense needs, was approved by Congress in 1948 and resulted in the construction of the Seward highway

(constructed in 1950-1951 and paved in 1954) and improvements to the Glenn highways (improvements completed in 1950), facilitating transportation between Anchorage and surrounding areas, as well as to other parts of the state and the Lower 48 (i.e., the Alaska-Canada Highway opened for public use in 1948). Changes in transportation, specifically an increased importance and reliance on automobiles, directly affected the development of Anchorage.

Several neighborhood areas were platted in Anchorage during the Cold War period, including Fairview and Fairview Extension (Mountain View and the area between Bragaw Street and Pine Street) in 1946 and Rogers Park in 1951. Annexation of areas outside the original Townsite occurred during this period to address the haphazard nature of subdivisions springing up around the city and the lack of zoning controls and infrastructure that caused problems with sanitation, building codes, and regulations. Rogers Park, Mountain View, and a large area that included what is now Airport Heights (Annexation Area Number 4) were annexed in 1954. The Fairview annexation was long and controversial, with two portions annexed in 1954, another in 1958, and the majority in 1960.

By 1952, many AHA-sponsored projects were in progress or completed, including developments in Rogers Park and Airport Heights. These projects used Federal Housing Authority (FHA) guidelines, which eschewed the traditional right-angle grid pattern, to design the layout of the neighborhoods. Technological advancements in the construction field, including use of assembly-line techniques, new construction methods, bulk purchasing, and better planning, allowed for the construction of new subdivisions such as Anchor Homes in Airport Heights (252 homes) in 1952 and Nunaka Valley (400 homes and a school) in 1954. These homes were small, simple, and affordable to those living on military wages.

Commercial development was also booming during this period. Just outside the city limits, car dealerships began to spring up along Gambell Street to take advantage of a growing market for increasing automobile dependency. Grocery stores, restaurants, and shopping centers were built in outlying areas of the city, such as the one opened by Larry Carr at the corner of 13th Avenue and Gambell Street in a Quonset hut in 1950. Cultural, educational, and religious buildings were also constructed during this period (e.g., the original Z.J. Loussac Public Library in 1954-1955 and Alaska Methodist University in 1957-1959).

Great Alaska Earthquake and Response (1964–1967)

The most significant event during the Earthquake and Response period was the Great Alaska Earthquake in 1964. The destructive force of the Great Alaska Earthquake (9.2 on the Richter scale) on March 27, 1964 literally reshaped parts of Anchorage including Downtown, Government Hill, Turnagain Heights, and Bootlegger's Cove located west of the APE, as the earthquake and accompanying landslides destroyed buildings in these areas. The devastation jump-started revitalization efforts throughout the city. While construction had slowed just prior to the earthquake, federal money quickly poured in following the earthquake to help rebuild. The City of Anchorage hired a California-based planning firm to help develop revitalization plans that included "superblocks," a concept that became popular throughout the country in the mid-20th century and consisted of a block larger than the traditional city block, with greater setbacks for buildings and public pedestrian spaces in lieu of through-streets. This was a substantial departure from previous, more traditional planning and development in Anchorage.

Following the earthquake, newly annexed areas slated for improvement due to lack of zoning and poor housing standards were addressed with re-development plans containing full provision for utilities, roads, and zoning laws. One such area was Rogers Park, located in and adjacent to the APE, where all properties judged to be in non-compliance with the new laws were bought and cleared. Residents were assisted in relocation or given preference on the repurchase of their lands. The chronic need for housing was not alleviated by single-family homes in suburban subdivisions, so the Alaska State Housing Authority (ASHA) began to focus its efforts on multi-family dwellings and apartments. To meet the needs of poorer

residents who could not afford home ownership, ASHA constructed several apartment complexes in the area surrounding downtown and in Fairview. A trend to move away from the City Center began as more development occurred in outlying areas.

Oil Boom (1968–Present)[12]

The discovery of oil at Prudhoe Bay in 1968 had a great effect on Alaska and Anchorage. The oil boom created jobs and brought thousands of transient workers to Anchorage. The rebuilding and revitalization of the downtown area proceeded at a rapid pace. In 1975, the Greater Anchorage Area, which included all small subdivisions and developments on the outskirts of town, was unified and all areas within the Anchorage Bowl came under one jurisdiction: the Municipality of Anchorage. This meant more regulation and zoning for areas that previously had no building regulations and marked the beginning of standardized street paving and traffic enforcement. While several new subdivisions were incorporated into the city, the need for fast, efficient housing construction remained. Because of high construction costs, townhomes, condominiums, and zero-lot-line housing as well as mobile home parks began to be built as a way to gain more space on a limited amount of land. In 1977, the city began the "Systematic Housing Code Compliance Program" to help bring 40 percent of the city's failing structures up to code. Needed demolition of buildings through the program, however, only worsened the housing shortage.

As initiated during the Earthquake and Response period, superblocks were created downtown and several major commercial buildings were built (e.g., the 5th Avenue Mall, constructed in 1987). The design and scale of buildings built during this period were new and innovative, breaking away from traditions of previous Anchorage architecture and creating a new modernity that represented progress and wealth. This development frequently resulted in the demolition of older wood frame buildings. There also was a shift of commerce from the downtown area into other parts of town such as the Midtown area. Project 80s was a significant event during this period. Notable among the Project 80s developments were the William A. Egan Civic and Convention Center (1983), the Alaska Center for the Performing Arts (1985), the George M. Sullivan Arena (1983), the new Z. J. Loussac Anchorage Public Library (1982-1986), and Town Square.

Historic Resources in the APE

There are 331 previously identified historic resources, all historic period buildings with the exception of the Anchorage Memorial Park Cemetery, in the combined APEs: 194 within the Gambell-Ingra APE, 251 within the 15th Avenue APE, and 272 within the Orca APE (Figure 19-2). Most of these resources have not been evaluated for NRHP eligibility. Please see *Previously Documented Cultural Resources* section above for further information.

19.2.3 Results of the 2009 Investigations

Field surveys of the archaeological and historic built environment were conducted for the H2H project between July and October 2009 to identify and document potential historic properties in the survey focus area (see Figure 19-2). The results of the archaeological and built environment surveys are summarized below.

Archaeological Investigations

As part of the archaeological investigations in the study area, the Project Team consulted with SHPO, Tribal governments and organizations and other interested consulting parties. Following consultation, a literature review and reconnaissance survey was conducted in order to identify broad patterns of current land use. Based on these initial investigations, a reductive model was developed to define archaeological survey focus areas based on land ownership, wetlands, development, distance from fresh water sources and proposed APEs.

[12] As discussed above, this period is not considered historic because it occurs after 1967.

Archaeological surveys were conducted in October 2009. The principal goal of the archaeological survey was to locate previously unrecorded, but potentially eligible, prehistoric and historic archaeological sites. The field survey effort included systematic pedestrian surveys of the ground surface and subsurface testing. Twenty-seven potential cultural features, consisting primarily of surface depressions (or pits), were identified in the survey focus area (M. Yarborough et al. 2010). These features were relatively common throughout the survey focus area; they are widely spaced on the landscape with most found in isolated areas. Investigations in and around the features did not provide an indication of their age, origin, or function. Based on these investigations, the depression-like features documented during the 2009 survey are thought to represent natural features or products of the recent past. Seven potential cultural features were identified in the combined APEs (Figure 19-3, Table 19-2). After consultation with OHA, only three sites were found to have sufficient historic significance to be assigned AHRS numbers and be evaluated for NRHP eligibility: two trash dumps (ANC-03376 and ANC-03377) located within the 15th Avenue APE, and a single surface depression (ANC-03378) that is located outside of the combined APEs.

Prehistoric and historic use of the study area by the Dena'ina, based on literature review and interviews with knowledgeable Dena'ina Elders, is discussed in Sections 3.4.4 and 3.4.5 of the *Draft Cultural Resources Historic Context*. One area discussed consistently throughout the Tribal Elder interviews and in consultation with the Tribes was the cultural importance of Chester Creek (*Chanshtnu*) and the mouth of Chester Creek (*Chansh Kaq*). A village, as well as seasonal fish camps, was located on Chester Creek (outside the APE). Some Dena'ina were forced away from their fish camps and homes in this area in the 1920s and 1930s and moved to other areas such as Point Woronzof (*Nuch'ishtunt*), and Fire Island. Chester Creek, as well as other areas in Anchorage, were used for hunting, trapping, and gathering of bird eggs, plants, and berries. However, no evidence of Dena'ina use in the form of archaeological sites or features has been documented in the vicinity of Chester Creek or in the combined APEs during the 2009 survey.

Table 19- 2. Summary of Potential Archaeological Features in the Area of Potential Effect

	AHRS #	Description
		One rectangular depression on a slope - 2 m long by 1 m wide by 45 cm deep
		Two depressions on a slope: 1 m long by 25 cm wide by 54 cm deep rectangular depression; 1 m long by 1 m wide by 28 cm deep oval depression
		1930s General Motors coupe
	ANC-03376	Trash dump - mound of dirt and trash that has been pushed up around a power pole for support is roughly 4 m long and 3 m wide across its northern end. The dump includes a dog-sized animal bone, a mustard-sized glass jar, a clear-glass jar base, a clear-glass bottle base, a champagne bottle finish wrapped with foil, fragments of a leather boot, some cans, and part of a possible kettle.
		Stove parts buried under a tree stump located near Features 6 and 7
		Two indistinct rectangular depressions: 2 m long by 1 m wide by 35 cm deep; 1 m long by 1 m wide by 35 cm deep
	ANC-03377	Trash dump - moss- and vegetation-covered trash dump that covers a roughly 3 m long by 6 m wide area and contains cans, bottles and window glass.
		Fragment of glass found 15 cm below the surface in a shovel test

Source: M. Yarborough et al. 2010

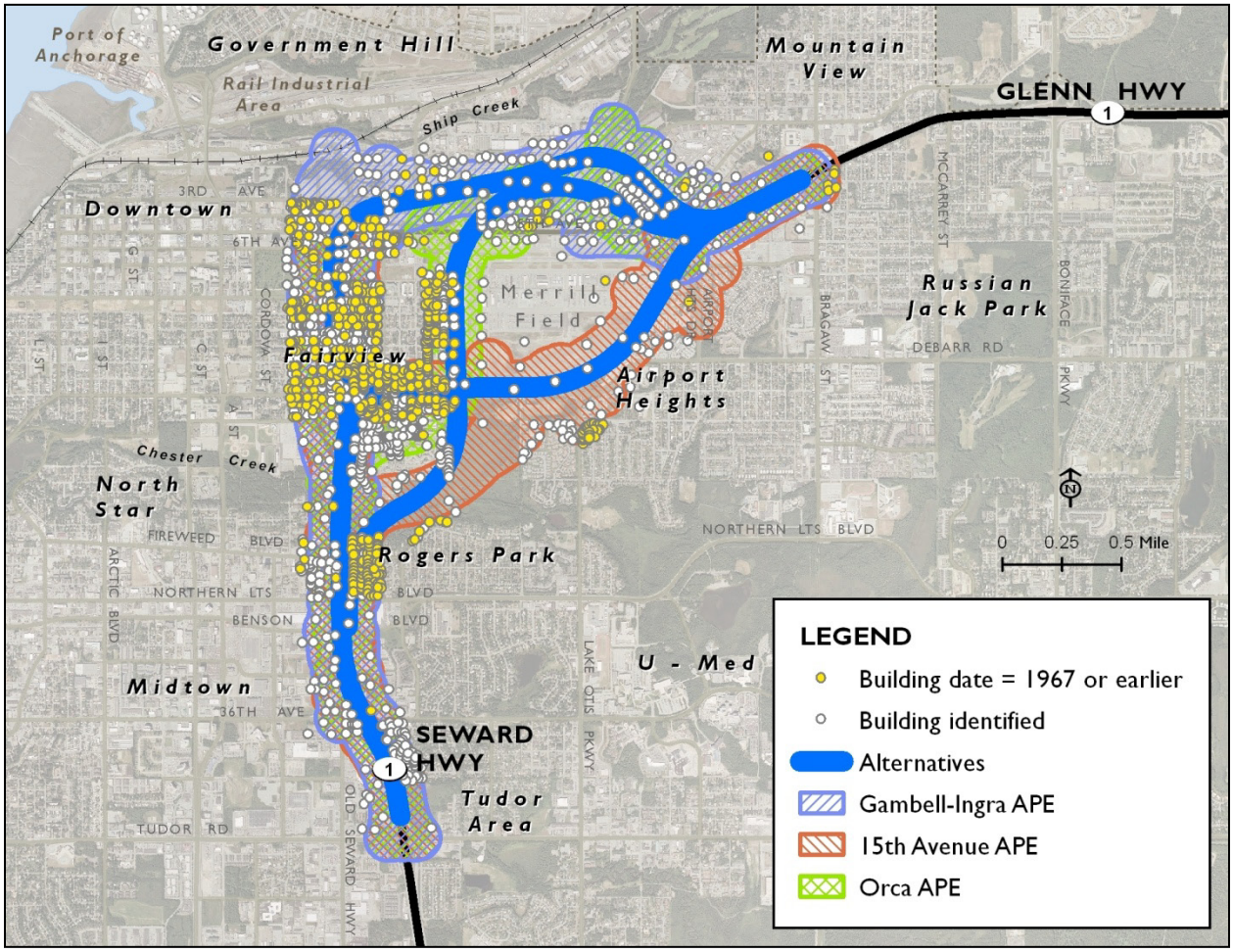
Built Environment Investigations

As part of the built environment investigations in the study area, the Project Team consulted with SHPO and other Section 106 consulting parties, and a literature and archive review, as well as reconnaissance and intensive surveys was conducted. The goal of the reconnaissance-level survey was to identify broad patterns of development, as well as geographical locations and concentrations of specific property types (e.g., single family, multi-family, commercial, industrial, etc.) and architectural styles throughout the study area.

Intensive historic built environment survey efforts focused on the documentation of buildings in the survey focus area (Figure 19-1). Documentation of individual buildings was captured in the field using an electronic survey form which had been loaded onto a personal field computer with integrated Global Positioning System (GPS). Because of the efficiency of collecting data with the new technology, the documentation efforts were expanded to document all buildings, regardless of age, within the survey focus area.

Based on APEs for each alternative, the Gambell-Ingra APE includes 380 buildings constructed during or before 1967; the 15th Avenue APE includes 413 buildings constructed during or before 1967; and the Orca APE includes 416 buildings constructed during or before 1967 (see Figure 19-4). Buildings identified in the APEs during the 2009 survey were evaluated for NRHP eligibility as individual buildings and contributing elements to potential historic districts. The results of these evaluations are included below.

Figure 9-3. Buildings Constructed On or Before 1967Identified in the Areas of Potential Effect



19.2.4 Historic Properties in the Area of Potential Effect

A determination of eligibility for listing in the NRHP is based on an evaluation of a potential historic property, including a description, statement of significance, and a selected list of sources, maps, photographs, or other illustrations. Consideration is given to both the significance and the overall integrity of the property. The evaluation must consider the historic context of the property, including but not limited to its relation to other known historic properties. To evaluate a potential historic property for eligibility for the NRHP, the Criteria for Evaluation (36 CFR 60.4) are applied, which state that "The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
B. That are associated with the lives of persons significant in our past; or
C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. That have yielded, or may be likely to yield, information important in prehistory or history."

As discussed above, properties listed on or previously determined eligible for listing in the NRHP in the combined APEs include:

- ANC-00766, Anchorage Memorial Park Cemetery, 535 East 9th Avenue, listed on the NRHP in 1993.
- ANC-00910 and ANC-00911, the Anchorage Hospital and Quarters Building (formerly located on the corner of 3rd Avenue and Gambell Street) – demolished.

Merrill Field (ANC-01946), constructed in 1929, is located within the APE. It was Anchorage's municipal airport between 1930 and 1950 and was significant in the air transportation history of Alaska. A NRHP determination of eligibility was previously conducted for Merrill Field, and while it was found to have historic significance under Criterion A, it was found to be lacking sufficient integrity to be considered eligible for the NRHP (Faith et al. 2005).

Determinations of Eligibility for Archaeological Resources in the Area of Potential Effect

Based on research, consultation, and survey conducted for archaeological resources identified during the H2H project, only three of the seven archaeological features were determined to have sufficient potential historic significance to be assigned AHRS numbers and be evaluated for NRHP eligibility: two trash dumps (ANC-03376 and ANC-03377) located within the 15th Avenue APE, and a single surface depression (ANC-03378) that is located outside of the combined APEs. The single surface depression (ANC-03378) could not be related to a particular period or cultural group, and subsequently lacks any historic context within which to evaluate the importance of information to be gained. Shovel tests in the vicinity revealed no cultural material. In general, isolated or small clusters of surface depressions with no cultural association are not usually determined to have enough historic significance to be eligible for the NRHP; however in this case……. While the two trash dumps (ANC-03376 and ANC-03377) probably date to the 1930s and 1940s based on the materials found within them, thus allowing for the establishment of an historic association, secondary disposal areas such as these are not generally significant in and of themselves and are not likely to answer important research questions. Therefore, it was recommended that these three archaeological features do not have sufficient historic significance to be eligible for the NRHP under any of the four criteria for evaluation (M. Yarborough et al. 2010).

Determinations of Eligibility for Historic Built Environment Resources in the Area of Potential Effect

Historic built environment resources in the APE were evaluated for NRHP eligibility as individual properties, part of multiple property assessments, and as contributing elements to potential historic districts.

Individual Property Evaluations

To be completed.

Multiple Property Evaluations

NRHP guidance has recommends a multiple property approach for evaluating "common resources" (Wyatt 2009). Many of the buildings documented in the 2009 survey can be considered "common resources"—that is, as any property type[13] that is ubiquitous and, therefore, difficult to evaluate (Wyatt 2009?). Property types are united by shared historical or cultural attributes, such as relationships to important persons, activities or events, dates of construction and cultural affiliations. Examples of

[13] A property type is a group of individual properties characterized by common physical attributes, such as architectural style, size, scale, proportions, design, architectural details and methods of construction.

property types that are considered common resources include apartment buildings, schools and many post World War II and mid-twentieth century house types. Under National Register Criterion A, common properties include resources related to common historical themes (e.g., education, commercial buildings, etc.). Under Criterion C, common resources include popular architectural styles and forms (e.g., ranch houses and other mid-twentieth century architectural styles as well as some vernacular forms). Based on the 2009 historic built environment survey and the results of research to date, the most representative architectural styles and property types found in the APE were evaluated using a multiple property evaluation approach. Common resource types identified in the H2H APEs include: FHA Minimum Houses (including Minimal Traditional, Small Ranch, and Small Cape substyles), Mid-Century Modernism assessed by subtypes (e.g., Ranch, Contemporary, and Split Level), and Local Vernacular – Log houses.

Historic District Evaluations

To be completed.

Summary of Eligibility Determinations

Based on research, survey and consultation conducted for the H2H project, X buildings and/or districts were found to be eligible for the NRHP…

19.3 BIBLIOGRAPHY

[ADNR] Alaska Department of Natural Resources. No date. Recorder's Office. Online database located at http://dnr.alaska.gov/ssd/recoff/search.cfm

[AMATS] Anchorage Metropolitan Area Transportation Solutions. 2007. *Anchorage Pedestrian Plan.* Published online at: http://www.muni.org/Departments/traffic/AMATS/Documents/PedestrianPlan_Web.pdf.

[MOA] Municipality of Anchorage. 2000. *MRI Master Plan*. Published online at: http://www.muni.org/Departments/merrill_field/Pages/MasterPlan.aspx.

———. 2006. *Anchorage Bowl Park, Natural Resource and Recreation Facility Plan.* Published online at: http://www.muni.org/Departments/Planning/Publications/ParkPlan_2006/Parks_MP_2006.pdf.

[ADNR, OHA] Alaska Department of Natural Resources. No date. Office of History and Archaeology. *Alaska Heritage Resources Survey.* Database on file at the Office of History and Archaeology. Anchorage, Alaska.

[BGES] Braunstein Geological & Environmental Services. 2008. *Fairview Neighborhood Historical Building Survey*. Prepared for the Municipality of Anchorage, by BGES, Inc., Anchorage.

Bureau of Land Management. No date. *Alaska Spatial Data Management System*. Available online at http://sdms.ak.blm.gov/sdms/.

Buzzell, Rolfe. 2001. *Cultural Resource Surveys on the West Side of Bird Creek in the Vicinity of Mile 101.5 of the Seward Highway, 1999-2000*. Office of History and Archaeology Report Number 80. Division of Parks and Outdoor Recreation, Anchorage, Alaska.

Callina, Phyllys, Kristinba Neptun, Jennifer Wehrmann, and Stephen Witzman. 2010. *Archaeological Site Evaluation, Phase II, Elmendorf Air Force Base, Alaska*. Project No. FXSB 11-6112A. Jacobs Engineering, Inc.

Carberry, Michael, and Donna Lane. 1986. *Patterns of the past: an inventory of Anchorage's historic resources*. Anchorage, Alaska: Municipality of Anchorage, Community Planning Department.

Clark, Donald W. 1984. "Prehistory of the Pacific Eskimo Region." Pp. 136-148 in Arctic (D. Damas, ed.) *Handbook of North American Indians, Volume 5*. (W. Sturtevant, gen. ed.). Smithsonian Institution. Washington, DC.

[CINA] Cook Inlet Native Association. 1975. *Cook Inlet region inventory of Native historic sites and cemeteries*. Compiled by the Cook Inlet Historic Sites Project. Anchorage: Cook Inlet Region, Inc.

[CRC] Cultural Resource Consultants LLC. 2005. *2003 Inventory and Assessment of Archeological and Historical Resources Cooper Lake Project* (FERC No. 2170). Report prepared for Chugach Electric Association, Inc.

de Laguna, Frederica. 1975. *The Archaeology of Cook Inlet, Alaska*. Reprinted. Anchorage: The Alaska Historic Society. Originally published 1934. Philadelphia: University of Pennsylvania.

DePew, Alan D. 2000. *Archaeological Survey of Proposed Pedestrian and Bike Pathway Near Bird Point, Alaska, ADOT&PF Project No. 54434*. Archaeological Survey Unit Short Report 2000-2. Office of History and Archaeology, Alaska Department of Natural Resources, Anchorage.

Dixon, E.J. 1985. Cultural Chronology of Central Interior Alaska. *Arctic Anthropology* 22(1):47-66.

Dixon, R. G., and W. F. Johnson. 1973. *Survey of the prehistoric and historic value of 48 waysides of the Alaska State Park System.* Manuscript on file at the Office of History and Archaeology, Anchorage, AK.

Dumond, Don E., and Robert L. Mace. 1968. "An archaeological survey along Knik Arm." *Anthropological Papers of the University of Alaska* 14(1):1-21.

Fall, James A., Nancy Yaw Davis, and the Dena'ina Team. 2003. *An Overview of Dena'ina Athabascan use of Sites on and Near Elmendorf Air Force Base, Alaska*. Prepared for the U.S. Army Corps of Engineers, Anchorage.

[GAAB] Greater Anchorage Area Borough. 1974. *Inletview Fairview Neighborhood Survey*. Anchorage: Greater Anchorage Area Borough.

Hadleigh-West, Frederick. 1996. *American Beginnings: The Prehistory and Paleoecology of Beringia*. University of Chicago Press. Chicago, IL.

Hanson, Diane K. 1998. *Cultural Resources Reconnaissance of the Alaska Railroad Quarry Near Eklutna, Alaska*. Office of History and Archaeology Report Number 67. Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation, Anchorage.

Hollinger, Kristy. 2001. *Homesteads on Fort Richardson, Alaska*. Center for Ecological Management of Military Lands. Colorado State University, Fort Collins. CEMML TPS 01-4.

Holmes, Charles E. 1985. *Progress Report, Project F-021-2(15)/(AO9812), Sterling Highway Archaeological Mitigation: Phase I Excavations at Four Sites on the Kenai Peninsula* (C.E. Holmes, ed.). Alaska Division of Geological and Geophysical Surveys. Fairbanks, AK.

Kari, James, and James Fall. 2003. *Shem Pete's Alaska. The territory of the Upper Cook Inlet Dena'ina*. 2nd ed. University of Alaska, Fairbanks.

Kent, F. J., J. V. Matthews and F. Hadleigh-West. 1964. "An archaeological survey of portions of the northwestern Kenai Peninsula." *Anthropological Papers of the University of Alaska* 12(2):101-134.

Lobdell, John E. 1998. *A Cultural Resources Reconnaissance of the Proposed Moquawkie and Nephaline Exploration Wells, Upper Cook Inlet, Alaska*. Lobdell & Associates, Inc., Anchorage, AK.

McMahan, J. David, and Charles E. Holmes. 1996. *Archaeological Survey of Elmendorf Air Force Base, Alaska: Final Report*. Office of History and Archaeology Report No. 61. Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation, Office of History and Archaeology, Anchorage.

[MOA] Municipality of Anchorage. No date. Property Appraisal Public Inquiry Online Database. Available online at http://redirect.muni.org/propappraisal/public.html.

Mobley, Charles M. 1993. *Cultural Resource Survey of the Clitheroe Center Utility Corridor, Anchorage, Alaska. Report prepared for ENSTAR Natural Gas Company, Anchorage*. Charles M. Mobley and Associates, Anchorage.

———. 2004. *Cultural Resource Information for Chugach Electric Fire Island Wind and Transmission Line Feasibility Study*. Report prepared under contract to URS Corporation, Anchorage, for Chugach Electric Association, Anchorage.

———. 2005. *Cultural Resource Investigations for the Fire Island Wind Power and Transmission Line Project, Cook Inlet, Alaska*. Report prepared under contract to URS Corporation, Anchorage, for Chugach Electric Association, Anchorage.

———. 2009. *Background Information for the Fire Island Wind Power Project's realignment south of Anchorage International Airport*. Letter submitted to Brian F. Kovol, URS Alaska/TNH, Anchorage.

Neely, Burr. 2008. *Elmendorf Air Force Base, Gravel Pit Expansion Project, Phase I Cultural Resource Survey*. Prepared for Jacobs Engineering Groups Inc. and the Air Force. Center on Engineering and the Environment/3rd Civil Engineer Squadron, Elmendorf Air Force Base, Anchorage. Northern Land Use Research, Inc., Anchorage.

North Wind, Inc. 2005. *Mountain View Historic Properties Survey Report. Volume 1: Historic Context. Draft, Revision 2*. Prepared for Anchorage Historic Properties, Inc., by North Wind, Inc., Anchorage.

Pendleton, Catherine L. and Michael R. Yarborough. 2008. *Archaeological and Historical Review for the Chester Creek Trail Realignment Project 55066/CM-0001 (262)*. Report prepared for DOWL Engineers, Anchorage, AK.

Potter, Ben A., Bruce A. Ream, Christopher B. Wooley, Peter M. Bowers, and Stacie J. McIntosh. 2002. Cultural Resources Survey of the Eklutna Railroad Siding, South-central Alaska. Report prepared for the Alaska Railroad Corporation, Anchorage. Northern Land Use Research, Inc., Fairbanks.

Reger, Douglas R. 1981. *A Model for Culture History in Upper Cook Inlet, Alaska*. Ph.D. dissertation, Washington State University. University Microfilms. Ann Arbor, MI.

Reger, Douglas R. 1985. "Beluga Point in Prehistory." *Heritage* 23 (January-March).

Reger, Douglas R., and Joan M. Antonson. 1977. "Girdwood Archaeological and Historic Site Survey." In *Archaeological Survey Projects, 1976,* 1-13. Miscellaneous Publications, History and Archaeology Series No.16. Anchorage: Office of History and Archaeology, Alaska Division of Parks.

Reger, Douglas R. and Alan Boraas. 1996. "Overview of the Radiocarbon Chronology in Cook Inlet Prehistory." Pp. 156-171 in *Adventures Through Time: Readings in Anthropology of Cook Inlet, Alaska*. (N.Y. Davis and W.E. Davis, eds.). Proceedings of a Symposium. Cook Inlet Historical Society. Anchorage, AK.

Reger, D. and W. Hannibal. 1975. *Archaeological survey along the proposed Tesoro Gas Pipeline Routs, Point Campbell to the Tesoro Terminal Portion*. Alaska Department of Natural Resources, Division of Parks, Office of History and Archaeology. Anchorage.

Reger, Douglas R. and Mark Pipkin. 1996. Round Mountain Microblade Locality. In *American Beginnings: The Prehistory and Palaeoecology of Beringia*. Ed. by F. H. West, 430-433. Chicago: University of Chicago Press.

Rogers, Jason, and Michael R. Yarborough. 2009. *Archaeological Survey of the Proposed Extension of East 40th Avenue between Laurel Street and Folker Street*, Anchorage. Report prepared for DOWL HKM, Anchorage, AK.

Schweigert, Kurt P. 1999. *Survey and Evaluation of the Iditarod Trail, Connecting Trails, and Associated Properties in the Chugach National Forest, Final Report*. Volume I, Survey and Evaluation Report. Prepared for USDA Forest Service, Chugach National Forest, Anchorage. Cultural Research & Management, Inc., Englewood, CO.

Shaw, Robert D. 2000a. *Historic Properties and Paleontological Resources Survey for the Realignment of the Alaska Railroad Corporation Tracks Across Elmendorf Air Force Base and Fort Richardson, Alaska*. Report prepared for the Alaska Railroad Corporation, Anchorage. Robert Shaw Enterprises, Anchorage.

———. 2000b. *Archaeological Survey in Preparation for Straightening a Curve in the Alaska Railroad Mainline at Eklutna Village (Mile 141.97), Alaska*. Report prepared for the Alaska Railroad Corporation, Anchorage. Robert Shaw Enterprises, Anchorage.

———. 2001. *Descriptive Report for Excavation of Cabin 1 (ANC-1109) on Fort Richardson, Alaska*.

Smith, G. and H. Shields. 1977. *Archeological Survey of Selected Portions of the Proposed Lake Clark National Park, Lake Telaquana, Turquoise Lake, Twin Lakes, Fishtrap Lake, Lachbuna Lake and Snipe Lake*. Cooperative Park Studies Unit, University of Alaska, Anthropology and Historic Preservation Occasional Paper 7. Fairbanks, Alaska.

Steele, Julia L. 1980. *Archaeological Survey and Cultural Resources Overview, Fort Richardson, Alaska*. U.S. Army Corps of Engineers, Alaska District, Anchorage.

Stephen R. Braund & Associates. 2006a. *Knik Arm Crossing Project Section 106 Report, Determination of Eligibility for the National Register of Historic Places*. Volume I: Literature Review and Recommendations and Volume II: Description of Properties in the Degan-Erickson and Ingra-Gambell Couplet Study Areas, Government Hill and Ship Creek, Anchorage, Alaska. February 16, 2006. Prepared for HDR Alaska, Inc. by Stephen R. Braund & Associates, Anchorage.

———. 2006b. *Knik Arm Crossing Project, Recommendations for a Historic District(s): Government Hill, Anchorage, Alaska*. Volume I: Literature Review and Recommendations and Volume II: Description of Properties. July 25, 2006. Prepared for HDR Alaska, Inc. by Stephen R. Braund & Associates, Anchorage.

———. 2006c. *Port Intermodal Expansion Project, Cultural Resource Initial Site Reconnaissance, Cherry Hill Borrow Source*. Prepared for the Anchorage Port Expansion Team by Stephen R. Braund & Associates, Anchorage.

Stone, Daniel E. 2008. *Hninighi'iy Ka'a Archeological District (ANC-2881).* Report on file, Alaska Office of History and Archaeology, Anchorage.

Townsend, Joan B. 1981. *Tanaina.* Vol. 6. Handbook of North American Indians. Ed. June Helm. Smithsonian Institute, Washington, DC.

U.S. Army Alaska (USARAK). 2007. *Fort Richardson Archaeology: Archaeological Design 2003*. Fort Richardson, U.S. Army Alaska (USARAK), Anchorage, AK.

Veltre, D. 1978. *Report to Chugach Electric Association: Archaeological Survey of Right-of-Way from University Substation to Knik Arm (East Terminal)*. Anchorage.

Workman, Karen W. 1978. *Survey Report: East Terminal Site on Elmendorf Air Force Base, 5 June 1978*. Report Prepared for Environmental Systems, Chugach Electric Association, Inc. Report on file at the Office of History and Archaeology. Anchorage, AK.

Workman, K.W and W.B. Workman. 1988. "The Last 1,300 Years of Prehistory in Kachemak Bay: Where Later is Less." Pp. 339-354 in *The Late Prehistoric Development of Alaska's Native People*. (R.D. Shaw, R.K. Harritt and D.E. Dumond, eds.). Aurora No. IV. Alaska Anthropological Association. Anchorage, AK.

Workman, William B. 1977. "New Data on the Radiocarbon Chronology of the Kachemak Bay Sequence." *Anthropological Papers of the University of Alaska* 18(2):31-36.

Workman, W.B., J.E. Lobdell, and K.W. Workman. 1980. "Recent Archaeological Work in Kachemak Bay, Gulf of Alaska." *Arctic* 33(3):385-399.

Wyatt, Barbara. 2009. "Evaluating Common Resources for National Register of Historic Places Eligibility. A National Register White Paper." Available on the internet at

http://www.nps.gov/history/Nr/publications/guidance/NR_workshop_3-11-09/White_paper_on_common_resources_4-09.doc

Yarborough, Linda Finn. 1981. *Preconstruction archaeological survey for proposed well field, Ship Creek Hatchery*. State of Alaska, Department of Fish and Game.

———. 1986. *Archeological Survey of the Proposed Glenn Highway, Eklutna to Parks Highway Project*. Report submitted to the Alaska Department of Transportation Public Facilities. Cultural Resource Consultants, Anchorage.

Yarborough, Linda Finn, Lawrence J. Sommer, Catherine L. Pendleton, Sarah J. Meitl, Valerie Gomez, and Michael R. Yarborough. 2010. *Draft Cultural Resources Historic Context, Highway to Highway Project, Anchorage, Alaska*. Prepared for HDR Alaska, Inc. by Cultural Resource Consultants, LLC. Anchorage, AK.

Yarborough, Michael R., Catherine L. Pendleton, and Linda Finn Yarborough. 2009. *Archaeological Field Survey and Visual Assessment of Proposed Alternatives for Improvements to the Seward Highway between Mileposts 99 and 105*. Report prepared for DOWL HKM, Anchorage, AK.

Yarborough, Michael R., Linda Finn Yarborough, Catherine L. Pendleton, Aubrey L. Morrison, Erika E. Malo, and Sarah J. Meitl. 2010. *Archaeological Field Survey, Highway to Highway Project, Anchorage, Alaska*. Preliminary Draft for Review. Prepared for HDR Alaska, Inc. by Cultural Resource Consultants, LLC. Anchorage, AK.

Chapter 20: Contaminated Sites
Affected Environment

Table of Contents

20.1 INTRODUCTION 1
20.1.1 Regulatory Setting 1
20.1.2 Study Area 1
20.1.3 Methodology 1
20.2 AFFECTED ENVIRONMENT 2
20.2.1 Active LUST/Contaminated Sites 2
20.2.2 Other Hazardous Materials Sites 6
Industrial Sites 6
Merrill Field Landfill 6
20.3 BIBLIOGRAPHY 8

List of Tables

Table 20-1. Active LUST Site Locations Along the H2H Alignments 4
Table 20-2. Active Contaminated Site Locations Along the H2H Alignments 5

List of Figures

Figure 20-1. Active LUST/Contaminated Sites and Merrill Field Landfill 3

20.1 INTRODUCTION

This chapter describes the documented contaminated sites that could potentially be affected by the H2H project alternatives and evaluates the associated impacts. The sites discussed in this chapter include sites where releases of hazardous substnaces, hazardous waste, or petroleum have occurred to the environment. These sites include leaking underground storage tank (LUST) sites and sites where releases of other chemicals have been documented and are under investigation under State of Alaska or Federal jurisidiction. Special attention is given to the Merrill Field Landfill, a closed landfill in the corridor.

20.1.1 Regulatory Setting

Sites where chemical releases have occurred to the environment and where cleanup is required are regulated by the U.S. Environmental Protection Agency (EPA) and the Alaska Department of Environmental Conservation (ADEC). Investigation and cleanup activities in soil, groundwater and surface water are regulated under Alaska Administrative Code (AAC), including 18 AAC 60 (landfills), 18 AAC 78 (UST sites), and 18 AAC 75 (UST, LUST, industrial sites, and contaminated sites), and under the Code of Federal Regulations (CFR), including 40 CFR 260–280, and under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

20.1.2 Study Area

A broad study area was initially defined to identify constraints related to hazardous materials and assist in identification of reasonable alternatives. A second phase of investigation identified the final study areas as the Gambell-Ingra, Orca, and 15th Corridors. Identified sites of concern sites within the final study area are depicted in Figure 20-1. Sites that could potentially be affected are those within 500 feet of the right-of-way (ROW) of the reasonable alternatives.

20.1.3 Methodology

Data collection and fieldwork to develop the contaminated sites information were performed in multiple phases including an initial site assessment, field reconnaissance, and a preliminary site assessment of reasonable alternatives. Note, there may be sites that were closed prior to the applicable regulations taking effect (e.g., pre-regulation gas stations) that are therefore not listed in the researched databases. These pre-regulation sites may be within the project area, but were unable to be identified in the research. Some may have been closed under different, less stringent regulations and contamination may still be present.

Initial Site Assessment/Data Collection on a Broad Study Area. Preliminary research documented contaminated sites in a larger area to inform preliminary alternatives development and engineering. Data were obtained from state and federal databases listing known contaminated sites and other sites with documented environmental hazard issues. Additional information was obtained from utility companies and state environmental agency files. Constraint maps were developed in January 2009. Refer to the *H2H Contaminated Sites Technical Report* for copies of the constraint maps.

Field Reconnaissance. Based on traffic forecasting, engineering, and preliminary screening results, a field reconnaissance was conducted on a more limited, refined study area. The reconnaissance focused on observing properties that potentially contain large inventories of hazardous substances. Observations that were indicative of inventories of hazardous materials, such as drums, tanks, fueling stations, or mechanical service yards were noted and photographed Refer to the *H2H Contaminated Sites Technical Report, Appendix A* to review the *Draft H2H Preliminary Site Assessment Environmental Reconnaissance Report*.

Preliminary Site Assessment of Reasonable Alternatives. Based on additional engineering and screening analysis, the range of alternatives was reduced, and additional data collection and analysis were conducted to characterize the area that could be affected by the reasonable alternatives. In addition to the previously mapped LUST and state-lead contaminated sites, the mapping also identified UST, RCRA,

and CERCLA sites. The public files for the identified LUST and contaminated sites were obtained from the ADEC and reviewed. This information was used to evaluate the documented type and extent of contamination at each site. Refer to the *H2H Contaminated Sites Technical Report* for more details.

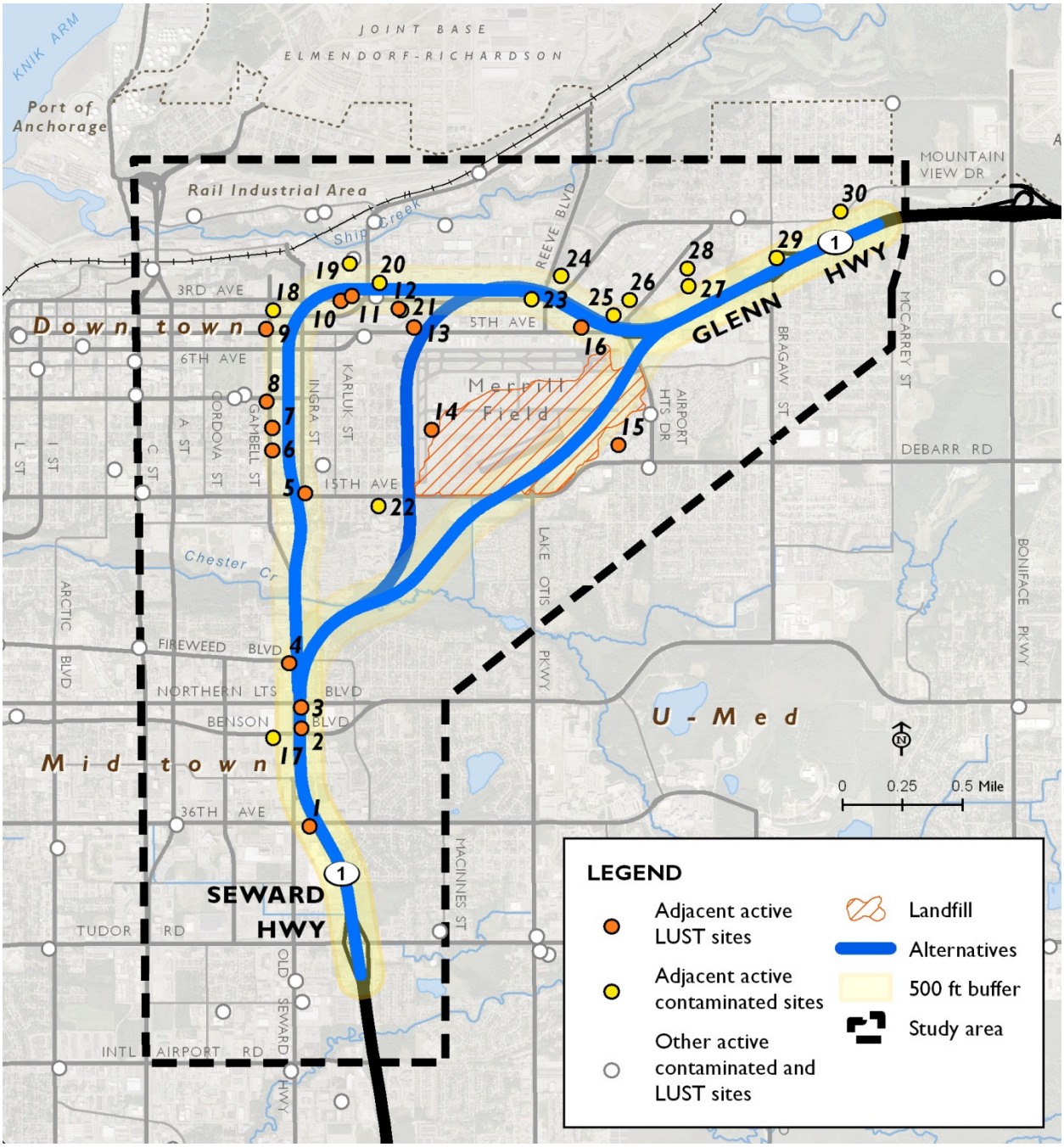
20.2 AFFECTED ENVIRONMENT

This chapter identifies LUSTs, contaminated sites, and other hazardous materials sites in the study area. Other hazardous materials sites include industrial sites, active UST sites, closed UST/LUST and contaminated sites, and the closed Merrill Field Landfill.

20.2.1 Active LUST/Contaminated Sites

Sixteen active LUST sites, 14 contaminated sites, and one landfill are located such that they could potentially be affected by the project alternatives (see Figure 20-1). Active LUST site locations and contamination information are described in Table 20-1. Active contaminated site locations, contamination information, and potential alignments affected are described in Table 20-2. For more detailed information on active LUST and contaminated sites, please see the *H2H Contaminated Sites Technical Report*.

Figure 20-1. Active LUST/Contaminated Sites and Merrill Field Landfill



Note: Parcel boundaries and additional information on the extent of contamination (if known) for each of the numbered LUST and contaminated sites can be found in the H2H Contaminated Sites Technical Report.

Table 20-1. Active LUST Site Locations Along the H2H Alignments

Site	UST / Other Materials Removed	Contaminants of Concern (Matrix)	Groundwater Monitored
854 East 36th Avenue (Site No. 1)	1995	GRO, DRO, and benzene (soil and/or groundwater)	Annually
2927 Seward Highway (Site No. 2)	1978	GRO, benzene, and ethylene dibromide (soil and/or groundwater)	Quarterly
2811 Seward Highway (Site No. 3)	1997	GRO, DRO, BTEX (soil and/or groundwater)	Semiannually
2500 Seward Highway (Site No. 4)	1989, 2005	GRO, DRO, RRO, PDBs, and benzene (soil and/or groundwater)	Annually
901 East 15th Avenue (Site No. 5)	1990	DRO, benzene (soil and/or groundwater)	Recommended by ADEC in 2009
1209 Gambell Street (Site No. 6)	1989	1,4-dichlorobenzene, PCE, TCE, BTEX, and GRO (soil and/or groundwater)	Semiannually
1035 Gambell Street (Site No. 7)	1989, 2000, 2004	GRO, DRO, and benzene (soil and/or groundwater)	Annually
920 Gambell Street (Site No. 8)	1990	BTEX, methylene chloride, 1,1-dichloroethylene, dichloropropane, GRO, TCE (soil and/or groundwater)	Scheduled
442 Gambell Street (Site No. 9)	Diesel tanks replaced in 1987 and 1998)	Benzene, PCBs, GRO, DRO (soil and/or groundwater)	Semiannually
1021 East 2nd Avenue (Site No. 10)	Between 1970 and 1974, 1994	TPH, DRO, GRO, lube oil (groundwater)	Monitoring wells installed in 2000
1201 East 3rd Avenue / 1130 East 3rd Avenue (Site No. 11)	1989, 1990, 1994	PCE, TCE, asphaltic oil, DRO, GRO, BTEX (soil and/or groundwater)	Monitoring wells installed in 1990
1400–1500 3rd Avenue (Site No. 12)	1992, 1993, 1998	DRO, TCE, vinyl chloride (soil and/or groundwater)	Monitoring wells installed in 1992, 2000
1525 East 5th Avenue (Site No. 13)	1990, 1991	BTEX (groundwater)	Monitoring wells installed in 1991
1100 Merrill Field (Site No. 14)	1997	GRO, DRO, benzene, and ethylbenzene (soil and/or groundwater)	Monitoring well installed in 1997
2801 DeBarr Road (Site No. 15)	1998	DRO, BTEX (soil)	Monitoring wells installed in 1990; decommissioned in 2007
2601 5th Avenue (Site No. 16)	1989	Benzene (groundwater)	Monitoring wells installed in 1989

Table 20-2. Active Contaminated Site Locations Along the H2H Alignments

Site	Source	Contaminant of Concern (Matrix)	Groundwater Monitored
MOA Gambell Street Right-of-Way near Benson Boulevard (Site No. 17)	Undetermined	GRO, DRO, RRO, BTEX (soil and/or groundwater)	Last sampled in 2009
717 East 4th Avenue (Site No. 18)	Former dry cleaning facility and former tire facility	Cis-1,2-dichloroethylene, toluene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, n-butylbenzene, sec-butylbenzene, p-isopropyltoluene, arsenic, chromium, lead, vinyl chloride, TCE, PCE, and DRO (soil and/or groundwater)	Last sampled in 2008
1201 East 1st Avenue (Site No. 19)	Inactive UST (removed 2009), transformer near the inactive UST is the likely source of PCB, TCE and PCE is attributed to area-wide contamination	DRO, PCB, TCE, PCE, and 1- and 2-methylnaphthalene (soil and/or groundwater)	Last sampled in 2009
135 Post Road (Site No. 20)	Heating oil UST (removed in 2000). TCE source does not appear to be on-site	DRO, TCE (soil and/or groundwater)	Annually
1400–1500 3rd Avenue (Site No. 21)	Buried drums	GRO, DRO, BTEX, cis-1,2-dichloroethene, TCE, and vinyl chloride (soil and/or groundwater)	Last sampled in 2003
1530 Nelchina Street (Site No. 22)	Heating oil UST	DRO (soil and/or groundwater)	Last sampled in 2008
301 Wrangell Street (Site No. 23)	Former heating oil tanks	DRO and chlorinated solvents (soil)	Last sampled in 2008
2501–2601 Commercial Drive (Site No. 24)	Off-site construction fill	PCBs,1,2,4-trichlorobenzene (soil)	NA
467 Chipperfield Way (Site No. 25)	Electrical transformers	PCBs, DRO, RRO, chloroform, carbon tetrachloride, TCE (soil and/or groundwater)	Last sampled in 2005
2839 Mountain View Drive (Site No. 26)	Electrical transformers on adjacent parcel	DRO, RRO, PCBs, arsenic, chromium, lead, TCE (soil and/or groundwater)	Last sampled in 2005
Porcupine Drive (aka Porcupine Pit) (Site No. 27)	Unknown; possible PCB-impacted soil on adjacent parcel	DRO, RRO, benzene, PCBs, arsenic, chromium, 1,4-dichlorobenzene (soil and/or groundwater)	Last sampled in 2006

20.2.2 Other Hazardous Materials Sites

Other hazardous material sites include industrial sites, active UST sites, closed UST/LUST and contaminated sites, and landfills. These sites were identified through windshield reconnaissance, ADEC UST database review, and landfill search of the study area. Closed sites, especially those that have institutional controls in place are expected to have contamination remaining and may pose a threat to human health or the environment. UST sites may pose a risk to health and the environment in the study area if releases have occurred but not been documented or if they occur in the future. The sites and their potential impact to the project area are described below.

Industrial Sites

During field reconnaissance, potential sites of concern observed included several automotive service shops and gas stations, and an industrial yard where several large above-ground storage tanks (ASTs) were observed. Several sites west of Merrill Field contained small inventories of drums. ASTs were present on the Merrill Field property.

Merrill Field Landfill

Merrill Field Landfill is a closed, unlined landfill located south of East 5th Avenue and north of East 15th Avenue (Debarr Road), between Orca Street and Airport Heights Drive in Anchorage. The landfill covers approximately 200 acres and is filled with soil and refuse to an average depth of 30 feet (Brunett 1990).

Merrill Field Landfill began operation in the late 1930s as an unsupervised garbage dump. It was originally filled by pushing refuse off a bluff near the east end of the current runway. Most of the refuse was burned (if combustible) and bulldozed into the former creek bed. After the City of Anchorage took over management of the landfill in 1957, the refuse was typically covered with soil at regular intervals. Frozen stockpiles of soil in the winter made this difficult, and snow was used as a substitute (Hart Crowser 1986). Operations continued until 1987, when it was capped and closed. It is estimated that approximately two feet of cover material were added to the landfill at that time. This thickness has likely changed over time as the debris settled. Repairs to the surface likely included adding fill or regrading the existing material to level the site. The current thickness of the cap is therefore likely variable.

It is estimated that the Merrill Field Landfill contains more than 3 million tons of refuse and 1.7 million tons of cover soil, nearly half of which was deposited between 1982 and 1987. Approximately 70 percent of the landfill contents were deposited after 1977 (Hart Crowser 1986). The active development areas within the landfill were initially located near the east end of Merrill Field Drive and, over time, generally moved toward the southwest.

In the early 1970s, the north fork of Chester Creek was diverted through a corrugated pipe that is now buried beneath the landfill, which terminated on the south side of East 15th Avenue, immediately west of Sitka Street. This pipe was later decommissioned and replaced by the current pipe that is located along the southeast perimeter of the landfill mass.

Merrill Field Airport and several commercial buildings currently occupy the site. The landfill is bounded to the north and east by commercial properties and to the west and south by residences, Sitka Street Park, and associated Merrill Field open space. A comprehensive water quality monitoring program began at the site in 1988.

Leachate is the product of water percolating through refuse contained by a landfill. After coming in contact with landfill materials, the contaminated water can potentially impact surface and groundwater, as well as accelerate corrosion of certain construction materials. Because the Merrill Field Landfill was not constructed using a geotextile liner and leachate collection system, leachate is in direct contact with a shallow, unconfined aquifer and flows either northwest or southwest. The unconfined aquifer is monitored around the perimeter of the landfill to detect horizontal movement of leachate from the refuse. A majority of the groundwater beneath the refuse appears to flow toward the southwest; however, a

hydrogeologic divide running approximately beneath the east-west runway routes the northern landfill groundwater toward the northwest. Vertical migration of groundwater is limited by at least two confining layers that separate two confined and one unconfined aquifer (Nelson 1982). According to former MOA Solid Waste Director Joel Greenwald, a cut-off wall and leachate collection system were placed along the north side of East 15th Avenue in 1996. The leachate collected from this system is pumped directly into the municipal sewage system from a lift station and treated at the Point Woronzof water treatment plant. Leachate is sampled semiannually from the lift station.

Seventeen groundwater monitoring wells and one surface water location are monitored annually as required by EPA and ADEC regulations. Groundwater samples are analyzed for volatile organic compounds, 14 metals, and nutrient and wastewater parameters (SLR Alaska 2008). In 2007, parameters that exceeded applicable water quality standards in at least one well include chloride, pH, sulfate, total dissolved solids, chromium, iron, manganese, nickel, sodium, and zinc. Leachate-impacted groundwater has been detected northwest of the landfill to an undetermined distance. Groundwater monitoring data indicate that the leachate collection system effectively prevents leachate from impacting groundwater south of the site. One monitoring well, located near the western edge of the site, appears to be unaffected by the leachate. Although landfill monitoring wells have detected groundwater contaminants in wetlands south of Merrill Field Landfill, concentrations are typically within EPA drinking water standards (Brunett 1990).

One byproduct of landfill decomposition is methane gas. Explosions caused by indoor methane accumulation are the primary concern for landfill methane production. Long-term exposure to methane can accelerate corrosion of some materials. Although Merrill Field Landfill was closed and capped more than two decades ago, methane production remains relatively high. According to Mr. Greenwald, a methane extraction system was installed in 1991–1992 to intercept methane gas migration into structures along Merrill Field Drive. Gas probes around the perimeter of the landfill mass are monitored quarterly by MOA, and methane gas is also monitored at several buildings near Merrill Field Landfill. Typically the highest concentrations of methane are measured near the northwest edge of the landfill; however, high readings have been measured along its southeast edge. Because Merrill Field Landfill was capped with gravel, methane is passively emitted into the air, thus reducing the amount of methane that would otherwise accumulate and migrate to areas adjacent to the landfill.

20.3 BIBLIOGRAPHY

Alaska Department of Environmental Conservation. 2003. 18 AAC 60, *Solid Waste Management.*

Brunett, Jillian O. 1990. *Lateral Movement of Contaminated Ground Water From Merrill Field Landfill, Anchorage, Alaska.* U.S. Geological Survey Open-File Report 89-624.

Environmental Protection Agency. 2010a. *Overview of the Federal UST Program*. Available online at http://www.epa.gov/OUST/overview.htm.

———. 2010b. *Contaminated Land.* Available online at http://cfpub.epa.gov/eroe/index.cfm?fuseaction=list.listBySubTopic&ch=48&s=313 (accessed September 10, 2010).

Gilfilian Engineering. 1991a. *Environmental Site Assessment – UST Removal, Nye Import Center.* July 12.

———. 1991b. *Phase I Environmental Site Assessment, Nye/Mercedes.* September 20.

———. 1992. *Release Investigation/Groundwater Characterization Study, Nye Import Center.* April 14.

———. 1994. *Final Report for Site Closure, Nye Import Center.* November 23.

Hart Crowser. 1988. *Landfill Gas Assessment, Merrill Field Landfill, Anchorage, Alaska.* A-8099.

Nelson, G.L. 1982. *Vertical Movement of Ground Water Under the Merrill Field Landfill*. U.S. Geological Survey. Open-File Report 82-1016.

SLR Alaska. 2008. *Municipality of Anchorage Solid Waste Services Landfill Water Quality Monitoring Program 2007 Annual Interpretive Report*.

Chapter 21: Visual and Aesthetic Resources Affected Environment

Table of Contents

21.1 INTRODUCTION 1
21.1.1 Regulatory Setting 1
21.1.2 Study Area 1
21.1.3 Methodology 1
21.2 AFFECTED ENVIRONMENT 1
21.2.1 Landscape Units 1
Neighborhood Landscape Unit 2
Creek/Greenbelt Landscape Unit 4
Commercial Landscape Unit 6
Downtown Landscape Unit 6
Industrial Landscape Unit 7
Airport Landscape Unit 8
Hospital Landscape Unit 8
21.2.2 Key Observation Viewpoints (KOPs) 9
21.3 BIBLIOGRAPHY 13

List of Tables

Table 21-1. KOP Summary 10

List of Figures

Figure 21-1. Landscape Units 2
Figure 21-2. Rogers Park Neighborhood (summer) 3
Figure 21-3. Fairview Neighborhood (summer) 3
Figure 21-4. Eastridge Condos (winter) 3
Figure 21-5. Airport Heights Neighborhood (summer) 3
Figure 21-6. Eastchester Park (view east, summer) 5
Figure 21-7. Chester Creek from Chester Creek Trail (view northeast, summer) 5
Figure 21-8. Eastchester Park (view east, winter) 5
Figure 21-9. Chester Creek. Culverts at Seward Highway (winter) 5
Figure 21-10. 15th Avenue and Gambell Street (view north) 6
Figure 21-11. Sears Parking Lot in Midtown (view southeast) 6
Figure 21-12. Ship Creek Industrial Area (view south, summer) 7
Figure 21-13. Ship Creek Industrial Area (view northwest, winter) 7
Figure 21-14. Merrill Field Airport (summer) 8
Figure 21-15. Merrill Field Airport (winter) 8
Figure 21-16. Alaska Regional Hospital (view south from Merrill Field Airport, winter) 9
Figure 21-17. Alaska Regional Hospital (view northwest from floor 5, summer) 9
Figure 21-18. Key Observation Viewpoints 12

21.1 INTRODUCTION

Highways and transit facilities can be highly visible facilities that affect the visual character of surrounding landscapes, positively or negatively. This EIS section describes the existing visual environment and discusses how the proposed project alternatives could alter the visual environment and impact visual quality. Visual study includes views both *from* and *of* the project. Analysis performed examined both visual resources and viewers to determine visual impacts and sensitivities to those impacts. Measures to avoid, minimize, or mitigate adverse visual impacts are also discussed.

The major viewer groups are roadway users and roadway viewers. Roadway users include drivers, passengers, bicyclists, and pedestrians. Roadway users have views of the roadway and views from the roadway of the surrounding landscape. Roadway viewers include pedestrians, residents, recreational users, businesses, visitors, and others. Roadway viewers have views of the roadway in a landscape setting.

Generally speaking, these two viewer groups have different sensitivities to the visual environment. For example, roadway users in heavy traffic are often focused on their immediate surroundings, traffic, and the roadway, and may not perceive the surrounding buildings or landscape. They may need visual simplicity to allow focus. On the other hand, roadway viewers tend to have a more comprehensive field of vision, time to observe the visual environment, a desire for visual interest or detail, and higher sensitivity to changes in visual quality.

21.1.1 Regulatory Setting

Analysis of visual impacts is required by Federal Highway Administration (FHWA) Technical Advisory T6640.8a "Guidance for Preparing and Processing Environmental and Section 4(f) Documents." The U.S. Department of Transportation (USDOT) and FHWA have provided guidance on how to conduct visual impact assessments in their publication "Visual Impact Assessment for Highway Projects" (1983). The visual assessment for the H2H project was conducted using FHWA's guidance.

21.1.2 Study Area

The study area for visual and aesthetic resources is the viewshed of and from the reasonable alternatives. Landscape units were identified within the general study area for reference (Figure 21-1).

21.1.3 Methodology

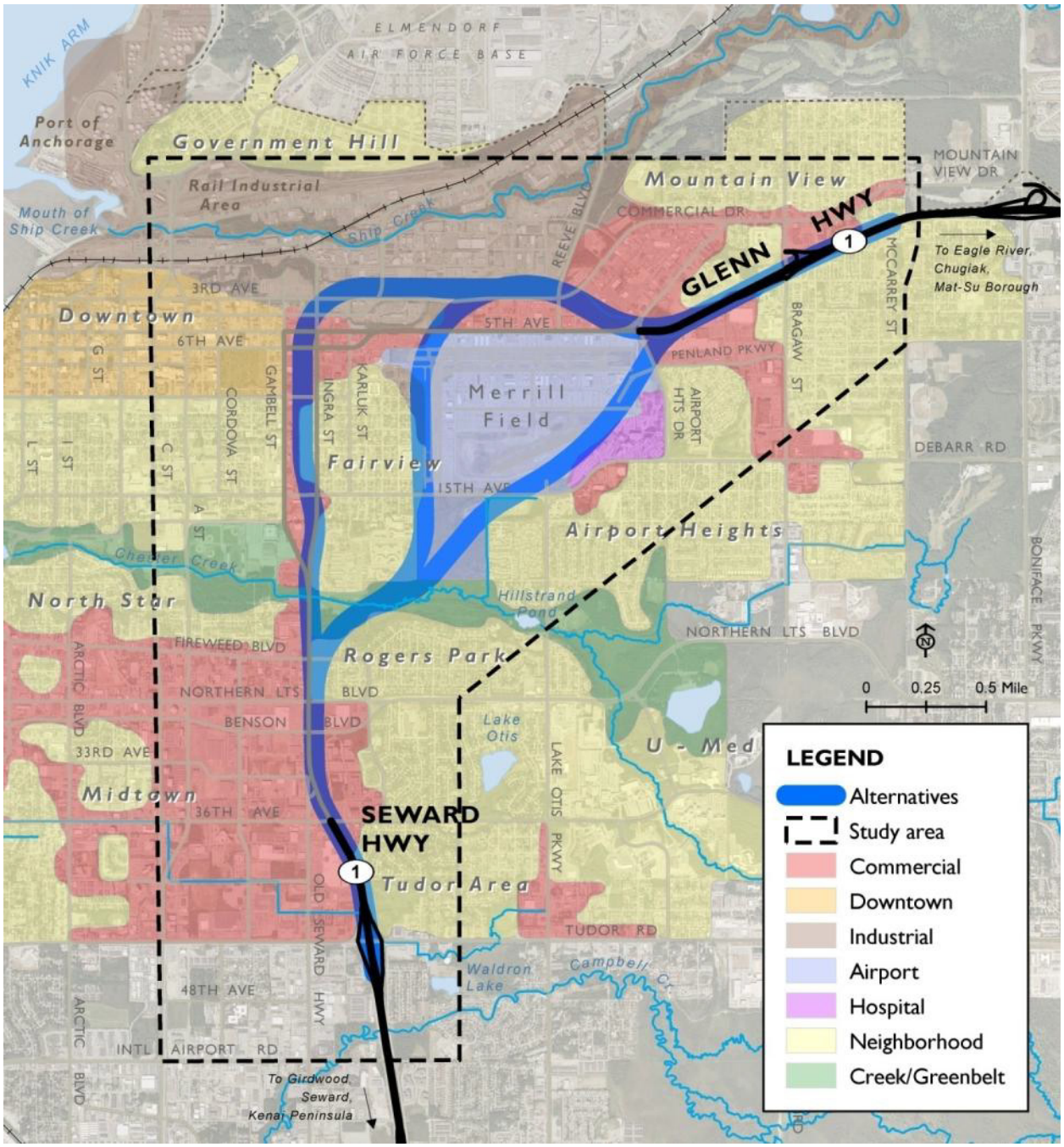
To describe the visual resources, landscape units were identified based on land use mapping and natural features and field verified with photographic documentation. Key observation viewpoints (KOPs) from which the reasonable alternatives would be visible were selected and representative photographs were taken from each KOP. The KOP's vividness, unity, and intactness were documented. Using the KOPs, photographs, and 3D modeling of the reasonable alternatives, visual simulations were completed to show how the visual environment would be altered by the alternatives.

21.2 AFFECTED ENVIRONMENT

21.2.1 Landscape Units

Anchorage is located in southcentral Alaska, bounded by Knik Arm to the north, Turnagain Arm to the south, Cook Inlet to the west, and the Chugach Mountains to the east. From within the study area, the Chugach Mountains are visible from many areas, although usually somewhat obstructed; a few views are afforded of Cook Inlet, Mount Susitna, and the Alaska Range in the background; Turnagain Arm is not visible from the project. Seven different landscape units were identified within the study area: neighborhood, creek/greenbelt, commercial, downtown, industrial, airport, and hospital. Figure 21-1 shows the landscape units, and detailed descriptions are provided following the figure.

Figure 21-1. Landscape Units



Neighborhood Landscape Unit

The neighborhood landscape unit is located throughout the study area and includes the neighborhoods of Tudor Area, Rogers Park, North Star, Fairview, Government Hill, Mountain View, and Airport Heights. The visual character of this landscape unit is defined by single-family, duplex, and multi-family dwellings, located on small parcels on a structured street grid. Development in these neighborhoods typically ranges from 1940s wood-framed dwellings to 1980s construction. Development usually includes lawns, some deciduous and evergreen trees and shrubs, and few sidewalks. The neighborhood landscape

unit includes elementary and middle schools. These urban neighborhoods are bounded by arterial streets. Buildings, trees, or fences generally block most views of the Chugach Mountains to the east, and of the arterial adjacent roads.

Figure 21-2. Rogers Park Neighborhood (summer)

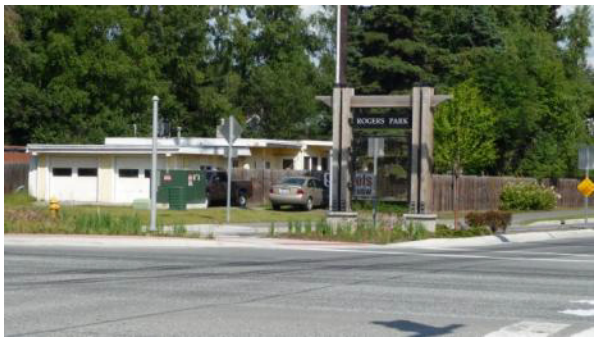


Figure 21-3. Fairview Neighborhood (summer)

Figure 21-4. Eastridge Condos (winter)

Figure 21-5. Airport Heights Neighborhood (summer)

Individual neighborhoods have some distinctive features worth noting.

- ***Tudor Area*** is made up primarily of single-family homes. Mature deciduous and evergreen trees screen views within the neighborhood. The Seward Highway is separated from the neighborhood by a tree buffer and commercial development.
- ***Rogers Park*** is made up primarily of single-family homes. Entrances to the neighborhood are heralded by distinctive signs and landscaping. Fences screen views of Northern Lights Boulevard to the south, and a 100-foot-wide buffer of sparse white spruce and paper birch somewhat screens views of the Seward Highway to the west, although the road is still visible. From within the neighborhood, the tops of some of the high-rise buildings in Midtown are visible.
- ***Fairview*** neighborhood is divided by Ingra and Gambell streets, which serve a high volume of vehicles, and by a commercial area along these streets; no visual buffers are located between these transportation facilities and the neighborhood. The original grid system has been blocked off strategically for traffic calming throughout the neighborhood, which shortens views. 15th Avenue is buffered somewhat from the neighborhood by a landscaped trail. Some entrances to the neighborhood are heralded by distinctive signs and landscaping. Fairview includes several public parks, Fairview Elementary School, and the Fairview Recreation Center.
- ***Government Hill*** neighborhood is located on a bluff above the Ship Creek Valley. Government Hill is the oldest neighborhood in Anchorage. Views of the industrial area to the south and the

Chugach Mountains to the east are largely screened by buildings and vegetation in the western portion of Government Hill. In the eastern portion of Government Hill along the bluff, views to the south take in the industrial area, the bluff to the south, and Downtown; long-distance views are of the Chugach Mountains.

- ***Airport Heights*** neighborhood is located south of Merrill Field Airport and Alaska Regional Hospital, and is made up primarily of single-family homes on a gridded street network. It includes the Eastridge condo development and the Penland Park trailer park to the south of Penland Parkway. Views of the industrial area to the south and the Chugach Mountains to the east are largely screened by buildings and vegetation. Views of 15th Avenue and Lake Otis Parkway are largely screened by vegetation. Views of Merrill Field Airport open space are screened by vegetation and topography.
- ***Mountain View/Russian Jack*** is divided by the Glenn Highway. Views from the neighborhoods are of the Glenn Highway traffic and the neighborhood. North of the highway the neighborhood is at a slightly higher elevation and appears to be a little more open where the freeway may be observed and there are a few glimpses of the Chugach Mountains.

Viewers in the neighborhood landscape unit consist primarily of residents, but also encompass travelers on the roads, recreationalists, and others. Viewers in the neighborhood landscape unit may be sensitive to view quality and changes to the visual environment because they have time to observe the views, and because they are likely to expect an attractive, familiar neighborhood environment.

Creek/Greenbelt Landscape Unit

The creek/greenbelt landscape unit is located along the Chester Creek valley, between Rogers Park/North Star and Fairview/Airport Heights. The visual character of this landscape unit is defined by an urban creek, surrounded by a vegetation buffer and associated park and recreation facilities. The Chester Creek valley is about 50 feet below the surrounding area. Few buildings occur within the landscape unit, although the unit is crossed by A Street, the Seward Highway, and Lake Otis Parkway, and accompanied by a paved multi-use trail. For most road crossings, the creek and trail are located in culverts under the roadway, obscuring most views of the road above. The vegetation is a mix of mature deciduous and evergreen trees. Adjacent wetlands have spotty vegetation of stunted black spruce trees, shrubs, and sphagnum.

Figure 21-6. Eastchester Park (view east, summer)

Figure 21-7. Chester Creek from Chester Creek Trail (view northeast, summer)

Figure 21-8. Eastchester Park (view east, winter)

Figure 21-9. Chester Creek. Culverts at Seward Highway (winter)

Along Chester Creek, the landscape unit includes adjacent parks and wetlands. The creek meanders naturally in places. The Chester Creek Sports Complex is located on the western portion of the landscape unit in the study area and includes Mulcahy and Kosinski Fields, Sullivan Arena, Ben Boeke Ice Arena, Anchorage Football Stadium and Track, and several outdoor hockey rinks. At the eastern end of the study area is Hillstrand Pond, which is fed by Chester Creek, and maintains its natural setting without development.

Vegetation in the landscape unit tends to block views from and of the surrounding neighborhoods and roadways. From within the landscape unit, views are characterized by the creek, trail, and vegetation; some glimpses of the Chugach Mountains to the east are afforded, although vegetation blocks most long distance views. Viewers in this landscape unit are recreationalists (trail users, park users, recreation facility users), travelers on the roadways that cross the unit, residents living adjacent to the unit, and visitors. Residents who can see the unit from their homes may be sensitive to changes in visual quality or views. Recreationalists, residents, and visitors are likely to be sensitive to views and visual quality because they expect to see a vegetated greenbelt, creek, and pleasant landscapes, and have time to enjoy the visual environment.

Commercial Landscape Unit

The commercial landscape unit is located throughout the study area, concentrated along larger volume roadways such as Glenn Highway, Commercial Drive, 5th and 6th avenues, Gambell and Ingra streets, and the Seward Highway. Commercial businesses include retail, medical, professional services office buildings, and food and beverage providers. Several large car dealerships are located in the unit with large vehicle-display lots. Examples of larger businesses located in the unit include Northway Mall, Glenn Square Mall, Kendall car dealerships, Cal Worthington car dealerships, First National Bank of Alaska, Fred Meyer, Carrs, Sears, BP Exploration, and University Center Mall. Development ranges from mostly one- or two-story buildings to several high-rise buildings of more than 10 stories. The majority of commercial buildings have large paved parking lots. Power lines and large light posts line the roadways. Sidewalks abut the curb. Vegetation is dispersed and limited.

Figure 21-10. 15th Avenue and Gambell Street (view north)

Figure 21-11. Sears Parking Lot in Midtown (view southeast)

Views in this landscape unit are limited to the manmade features in the foreground. Views of the Chugach Mountains are mostly obscured by buildings and vegetation. Viewers in this landscape unit are roadway travelers on the larger volume roadways and local streets including commuters, shoppers, and residents living near the unit. Residents who can see the unit from their homes may be sensitive to changes in visual quality or views. Commuters and non-recreational travelers tend to have fleeting views and focus on traffic rather than the surrounding scenery.

Downtown Landscape Unit

The Downtown landscape unit is bounded by 3rd Avenue to the north, 9th Avenue to the south, Knik Arm to the west, and Gambell Street to the east, and contains the downtown urban core of Anchorage. The landscape unit is characterized by dense development, with high-rise buildings and commercial businesses. Downtown features a complete sidewalk network (with wide sidewalks from the curbs to the doors of the buildings), fewer surface parking lots, and distinctive light poles with hanging flower baskets during the summer months. The tallest buildings include the Robert B. Atwood Building, Hilton Hotel, Captain Cook Hotel, ConocoPhillips Building, Sheraton Hotel, and Marriott Hotel. Many of these are landmark buildings and visible from other areas of town. The Downtown unit features busy surface streets with traffic lights and usually one lane of on-street parking. A few pedestrian overpasses connect larger buildings a story or two above the street level. The Downtown unit includes the Anchorage Memorial Park Cemetery, which has a different character of open lawns and few buildings. Several other small, landscaped, urban parks are found within the landscape unit.

At the street level, views in this landscape unit are limited to the manmade features in the foreground. At higher levels of multi-story buildings, views open up in all directions, providing an excellent overview of Anchorage and the environs.

Viewers in this landscape unit are residents, employees, shoppers, visitors, pedestrians, recreationalists, and roadway travelers. Residents, employees, shoppers, visitors, pedestrians, and recreationalists may have sensitivities to alterations in the visual environment because they may expect to see an attractive, familiar urban landscape.

Industrial Landscape Unit

The industrial landscape unit lies north of 3rd Avenue in the Ship Creek valley, and is bounded by a bluff to the north and south. The visual character of this landscape unit is defined by industrial development and transportation infrastructure, including rail tracks, local streets trafficked by large trucks, and an elevated roadway bridge. The unit includes the Alaska Railroad Industrial area, including rail depot, headquarters, a historic freight shed, and operations center; the Port of Anchorage; Anchorage Jail and Cook Inlet Pretrial facility; the elevated bridge that connects the A/C street couplet with East Loop Road in Government Hill; and Ship Creek. Building exteriors include metal siding and masonry in most areas. Along a small commercially developed section of East Ship Creek Avenue, the landscape is mixed, with landscaped sidewalks, distinctive light posts, and hanging flower baskets in the summer months. Most buildings are one-story with a paved parking lot. The rail yards, freight yards, and storage yards have chain link fences with razor wire. Power lines are visible on poles along larger roads.

Figure 21-12. Ship Creek Industrial Area (view south, summer)

Figure 21-13. Ship Creek Industrial Area (view northwest, winter)

Ship Creek is an urban creek landscape accompanied by a paved multi-use trail with distinctive lighting and structures. Scrub vegetation provides some screening of the creek from the industrial setting, but in most places the creek is visible from the industrial developments and vice versa. The banks along Ship Creek are bare, grey gravel, rock, and mud. There is only one small park associated with Ship Creek—the Ship Creek Overlook Park, which provides access to the trail and the creek. Ship Creek is a popular urban fishery, and in the summer months it is normal to see the banks lined with anglers.

Views in the landscape unit are limited to the immediate surroundings as topography, buildings, and vegetation obscure views of Downtown to the south (except for the tops of high-rise structures) and Government Hill to the north. Some views of Knik Arm and the Alaska Range to the west are available from upper levels of buildings, along some roadways, and at the west end of Ship Creek. The Chugach Mountains are visible to the east from upper levels of buildings, along some roadways, and along portions of Ship Creek.

Viewers in this landscape unit include industrial business owners and patrons, railroad employees and passengers, freight truck drivers, visitors, recreational path users, and anglers. People in the area for recreation or tourist travel may be sensitive to changes in visual quality because they have time to observe the views. However, the overall character of the landscape unit is predominantly industrial in character. Most viewers, including industrial and freight users, would not be as sensitive to changes in visual

character or quality because they are focused on traffic and not on surrounding scenery and expect to see an industrial setting in this location.

Airport Landscape Unit

The airport landscape unit is located between 15th Avenue and 5th Avenue on the south and north sides, respectively, adjacent to the Alaska Regional Hospital on the east side; it also includes airport-owned open space south of 15th Avenue. The visual character of this landscape unit is defined by Merrill Field Airport and its associated support and commercial facilities, tied down small airplanes, and paved airstrips. Merrill Field Airport sits on the old Anchorage Landfill, which is situated on a flat surface level with Downtown, but elevated above areas to the north, east, and south, with few to no trees or shrubs. Buildings are primarily one- to two-story, metal- or concrete-sided, with paved parking lots, and are located along the outer edges of the landscape unit. At the south end of the landscape unit, a veterans' memorial provides expansive views to the south and east. At the north end of the landscape unit, a large air traffic control tower dominates the horizon.

Figure 21-14. Merrill Field Airport (summer)

Figure 21-15. Merrill Field Airport (winter)

Due to the few vertical obstructions, views are open and expansive. There are open views of the Chugach Mountains to the east, some obstructed views of Mount Susitna to the west, and on clear days, of the Alaska Range views to the north. To the south and west, the tops of high-rise buildings in Downtown and Midtown Anchorage are visible. At the southeast end of the landscape unit, the Alaska Regional Hospital complex is prominently visible.

The airport-owned open space includes Runway Protection Zone 34 (see Chapter 4, Airports, for location), and is filled with spotty vegetation of stunted black spruce trees, shrubs, and sphagnum, and wetlands. Vegetation in the landscape unit tends to block views from the surrounding neighborhoods and roadways.

Viewers in this landscape unit are primarily aviation-use related, including pilots, airport employees, patrons of the support businesses, students at the UAA Aviation Technology Center, and visitors.

Hospital Landscape Unit

The hospital landscape unit is located east of Merrill Field Airport, south of 15th Avenue, and bounded by Airport Heights Drive on the east. It includes Alaska Regional Hospital and its associated medical office buildings. These buildings share a similar architectural façade composed of beige concrete and flush, glazed windows, and range from two to six stories. The unit includes paved surface parking and some landscaping with trees and shrubs within the parking lots.

Figure 21-16. Alaska Regional Hospital (view south from Merrill Field Airport, winter)

Figure 21-17. Alaska Regional Hospital (view northwest from floor 5, summer)

From the ground, Merrill Field Airport is not visible from within the landscape unit, and views in all directions are obstructed by buildings. From higher levels within the hospital complex, views to the west are of Merrill Field Airport and beyond, depending on the hospital floor level. Views to the north include Merrill Field Airport, the Anchorage Fire Training Center (characterized by empty structures and vehicles for fire training practice), and the commercial areas beyond. East side views are of the Chugach Mountains. Views to the south are of the Airport Heights neighborhood. In all directions, traffic and roadways are visible.

Viewers in this landscape unit include employees, patients, visitors, and roadway travelers. A few of these viewers such as hospital patients and employees may be sensitive to changes in visual quality because they would have time to observe the environment and may expect to see a tranquil setting.

21.2.2 Key Observation Viewpoints (KOPs)

Eighteen KOPs were identified for further analysis to determine visual impacts at these locations. Figure 21-18 shows the locations of the KOPs. At each KOP, visual quality was assessed based on FHWA's methodology by documenting the KOP's vividness, intactness, and unity (USDOT 1983). Vividness is defined as "the memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern" and is characterized by documenting the KOP's landforms, water, vegetation, and manmade development. Intactness is defined as "the integrity of visual order in the natural and man-built landscape, and the extent to which the landscape is free from visual encroachment." Unity is defined as "the degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern; […] refers to the compositional harmony or inter-compatibility between landscape elements." In addition, the position of the KOP to the future roadway and existing land uses are documented. Based on these definitions, each KOP was rated as having low, moderate, or high visual quality. Generally speaking, the greater the presence of manmade development and encroachments within the KOP, the lower the unity and intactness of the views from the KOP, resulting in lower overall visual quality.

For all KOPs, views in all directions have been altered by urban development, except for KOP 6 (Chester Creek Trail), where views are largely of natural vegetation. Summary descriptions and representative details are provided in Table 21-1. A comprehensive description of the baseline conditions for each KOP and the visual fieldwork methodology can be found in the fieldwork memo dated July 30, 2010.

Table 21-1. KOP Summary

KOP (view direction)	Landscape Unit	Viewshed	Visual Quality
1. Seward Highway at Benson Boulevard (south)	Commercial	**Foreground (F)[1]:** Views are dominated by roadway features, and buildings, vehicles, signage, the roadway, and power lines are visible **Middleground (M)[2]:** Same as foreground **Background (B)[3]:** Views of the Chugach Mountains are somewhat obscured by urban development	Low
2. Sears Parking Lot (east)	Commercial	**F & M:** The parking lot dominates the view, and commercial buildings, vehicles, roadways, and power lines are visible **B:** Views of the Chugach Mountains are somewhat obscured by urban development	Low
3. Rogers Park Neighborhood (west)	Neighborhood	**F:** Roadway, trail, vegetation, and fences and some vegetation is visible **M:** A few commercial buildings, light poles, and power lines are visible **B:** Obscured by vegetation, buildings, and topography	Low
4. Eastchester Park from Seward Highway (east)	Creek/ Greenbelt	**F:** Park open space, trail, roadway, vegetation, and other park infrastructure **M:** A few commercial buildings are visible **B:** Obscured by vegetation, buildings, and topography	Moderate
5. Chester Creek Parking Lot (east)	Creek/ Greenbelt	**F:** Park open space, trail, roadway, vegetation, parking lots, and other park infrastructure are visible **M:** Some residential buildings are visible **B:** Chugach Mountains are visible	Moderate
6. Chester Creek Trail (west and east)	Creek/ Greenbelt	Views are largely of natural vegetation. **F:** Paved trail, vegetation, and in some places the creek, are visible **M & B:** obscured by vegetation and topography	High
7. Senior Center (east)	Neighborhood	**F:** The roadway and buildings dominate views, and vehicles, a parking lot, and power lines are visible **M & B:** Obscured by vegetation, buildings, and topography	Low
8. 15th Avenue and Gambell Street (south)	Commercial	**F & M:** Views dominated by roadway features, and vegetation, buildings, parking lots, vehicles, and power lines are visible **B:** Chugach Mountains are visible	Low
9. Fairview: Hyder Street and 13th Avenue (north)	Neighborhood	**F & M:** Views dominated by roadway features, and buildings, parking lots, vehicles, and power lines are visible **B:** Obscured by vegetation, buildings, and topography	Low
10. Fairview: Ingra Street and 9th Avenue (west)	Neighborhood	**F & M:** Views dominated by roadway features, and buildings, parking lots, vehicles, and power lines are visible **B:** Obscured by vegetation, buildings, and topography	Low
11. Fairview: Hyder Street and 7th Avenue (south)	Neighborhood	**F & M:** Views dominated by roadway features, and buildings, parking lots, vehicles, light poles, and power lines are visible **B:** Views obscured by vegetation, buildings, and topography	Low

[1] 0 to ¼ miles from alternative
[2] ¼ to 3 miles from alternative
[3] beyond 3 miles from alternative
Source: USDOT/FHWA 1983.

KOP (view direction)	Landscape Unit	Viewshed	Visual Quality
12. Ship Creek (south)	Industrial	**F:** Ship Creek trail with bridges and fences, Ship Creek, and vegetation **M:** Visible urban development in the industrial area includes buildings, rail facilities, roadways, and storage yards **B:** Chugach Mountains are obscured by the bluff to the south; manmade development has highly altered the intactness and unity of the background views	Moderate
13. Government Hill Bench (southeast)	Industrial and Neighborhood	**F & M:** Visible urban development in the industrial area includes buildings, rail facilities, roadways, and storage yards **B:** Chugach Mountains and some buildings within Downtown Anchorage are visible	Moderate
14. Mountain View Drive (south)	Commercial	**F:** Views dominated by roadway features, and buildings, vehicles, power lines, and light poles are visible **M:** Views obscured by vegetation, topography, and buildings **B:** Views of the Chugach Mountains are somewhat obscured by urban development	Low
15. Airport Heights Drive (north)	Commercial	**F & M:** Views dominated by roadway features, and buildings, vehicles, power lines, and light poles are visible **B:** Views of the Chugach Mountains are somewhat obscured by urban development	Low
16. WWII Veterans' Memorial (northeast)	Airport	**F:** WWII veterans' memorial and the open bluff dominate **M:** Alaska Regional hospital, the intersection of Lake Otis Parkway and 15th Avenue, and Merrill Field Airport tie-down space **B:** Chugach Mountains are visible and distinct. Views of neighborhoods to the south, east, and west are obscured by vegetation.	Moderate
17. Sitka Street Park (southeast)	Creek/ Greenbelt	**F:** The park playground equipment, a picnic shelter, grassy lawn, and parking lot are visible **M:** Vegetation and somewhat obscures views of nearby roadways and the condo development **B:** Obscured by vegetation	Moderate
18. Eastridge Condos (northwest)	Neighborhood	Views in all directions have largely been altered by urban development, although views to the west of the airport protection zone appear to be natural. **F:** The roadway dominates views, and vehicles, the park facilities, and street lights are visible **M & B:** Obscured by vegetation, topography, and buildings	Low

Figure 21-18. Key Observation Viewpoints

21.3 BIBLIOGRAPHY

HDR Alaska. 2010. *Visual Resource Summer Field Reconnaissance Summary and Landscape Unit Descriptions.* September 2010.

[USDOT] U.S. Department of Transportation. 1983. *Visual Impact Assessment for Highway Projects.* Publication No. FHWA-HI-88-054. Federal Highway Administration. Washington, DC: Office of Environmental Policy.

Chapter 22: Section 4(f) Evaluation
Affected Environment

Table of Contents

22.1 INTRODUCTION 1
22.1.1 Regulatory Setting 1
22.1.2 Background Information 1
Dedicated Park Land 1
Park Classification 2
22.2 SECTION 4(F) PROPERTIES 2
22.1.3 Description of 4(f) Resources Potentially Affected 2
Parks and Recreation Areas 2
Historic Sites 7
22.3 BIBLIOGRAPHY 8

List of Tables

Table 22-1. Section 4(f) Parks and Recreation Areas 4
Table 22-2. Section 4(f) Historic Sites 7

List of Figures

Figure 22-1. Section 4(f) Parks and Recreation Areas 4
Figure 22-2. Section 4(f) Historic Sites 7

22.1 INTRODUCTION

This chapter provides information on Section 4(f) and 6(f) resources that could potentially be affected by alternatives proposed by the Seward Highway to Glenn Highway Connection Project (H2H). Section 4(f) resources are properties that include parks, recreation areas, wildlife and waterfowl refuges, and historic properties. Section 6(f) resources are public areas that have received Conservation Fund Act monies to acquire or develop public recreation facilities.

This chapter addresses only properties that have been determined applicable for Section 4(f) protection by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) within the Section 4(f) study area (Figure 22-1). No wildlife or waterfowl refuges occur in the Study Area.

Section 6.2.6 of Chapter 6, Social Environment, provides information on park and recreation resources that are not Section 4(f) resources or that were not evaluated because their locations are far enough from the project that they were not included in the Section 4(f) study area. Chapter 19, Cultural Resources, contains greater detail on archaeological and historical properties and features.

22.1.1 Regulatory Setting

Section 4(f) was originally established in the U.S. Department of Transportation (USDOT) Act of 1966 (49 United States Code (USC) Section 1653(f) and later recodified as 49 USC 303). Section 4(f) of the USDOT Act (as amended), 23 USC § 138, states:

> The Secretary shall not approve any program or project (other than any project for a park road or parkway under Section 204 of this title) which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of national, State, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use.

In August 2005, Section 6009(a) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) made the first substantive changes to Section 4(f) legislation since the 1966 USDOT Act that simplified the processing and approval of projects that have only *de minimus* impacts on properties protected by Section 4(f). A *de minimus* finding refers to a finding that a project will not affect the activities, features, or attributes of the Section 4(f) resource. Under the new provisions, once the USDOT determines that a transportation use of Section 4(f) property results in a *de minimis* impact on that property, after consideration of impact avoidance, minimization, and mitigation or enhancement measures, an analysis of avoidance alternatives is not required and the Section 4(f) evaluation process is complete.

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act (16 USC 4601 *et seq*.) applies to public properties that have received Conservation Fund monies to acquire, develop, or improve public recreation facilities. Section 6(f)(3) of the LWCF Act requires that no property acquired or developed with LWCF assistance shall be converted to a use other than public outdoor recreation unless the National Park Service approves substitution property of reasonable equivalent use and location and of at least equal fair market value.

22.1.2 Background Information

Dedicated Park Land

Some park land in Anchorage is “dedicated park land,” and some is not. “Dedicated park land” means the land was dedicated by the Anchorage Municipal Assembly via Assembly Ordinance (and prior to 1979,

also by Resolution). These actions are "permanent or long-term," requiring a vote of the people to reverse. The Anchorage Municipal Charter in Section 10.02, "Actions requiring an ordinance," states that, among other actions requiring an ordinance, the assembly shall use ordinances to:

> … (8) Convey or lease, or authorize the conveyance or lease, of any interest in lands of the municipality. An ordinance conveying an interest in real property dedicated to public park or recreational purposes is valid only upon approval by a majority of those voting on the question at a regular or special election.

This is further explained: "The term 'dedicated' is intended to indicate formal designation of the land in question for permanent or long-term park or recreational purposes."[1]

Anchorage Municipal Code 25.10.080B states: "The assembly, by ordinance, may dedicate specifically described property for permanent or long-term park or recreational purposes under the meaning of Charter Section 10.02(8)" (MOA 2010).

Park Classification

The *Anchorage Bowl Park, Natural Resource, and Recreation Facility Plan* (2006) classifies municipal park land in several ways: Neighborhood Use (NU), Community Use (CU), Special Use (SU), Natural Resource (NR), or Trails and Connections (TC). The plan does not distinguish between parks and Natural Resource Areas. A Natural Resource Area may be dedicated park land or may not be dedicated. Natural Resource Areas appear to be planned co-equally with lands of other classifications, such as Neighborhood Use Areas, which are more traditional developed parks with playgrounds and mowed grass, but Natural Resource areas may have little or no investment in facilities or maintenance.

The term Natural Resource Area "is synonymous with natural open space or open space, greenbelt, and habitat area" (MOA 2006). The plan also defines "public open space" as "land dedicated or reserved for the use by the public, including but not limited to parks, greenbelts, recreation areas, and school sites." The plan indicates that it is Anchorage's Natural Resource Areas that make its park system unique among city park systems in the nation. "Natural resource areas are lands set aside for preservation of significant natural resources, remnant landscapes, open space and visual aesthetics or buffering…The objective with these lands is to enhance the livability and character of the community by preserving as many of its natural amenities as possible …; serve as buffers between incompatible land uses; lend definition to neighborhood areas;" and several other reasons. Natural Resource Areas are considered the same as parks in the *Section 4(f) Parks and Recreation Applicability Tech Report* data sheets. The significance of each park is considered on its own merits.

22.2 SECTION 4(F) PROPERTIES

22.1.3 Description of 4(f) Resources Potentially Affected

All parks, recreation areas, and historic sites in the vicinity of the H2H project area were identified and the study was focused on those that could be affected by the proposed alignments and their rights-of-way (see Figure 22-1 and Table 22-1). FHWA has determined that 15 parks, 3 recreation areas, and ? historic sites would be subject to Section 4(f) protection. There are no wildlife or waterfowl refuges within the study area.

Parks and Recreation Areas

Figure 22-1 shows existing parks and recreational areas in the study area. Summary descriptions of the Section 4(f) park and recreation areas follow in Table 22-1. The *Section 4(f) Parks and Recreation*

[1] "Commission Commentary on Anchorage Municipal Charter: An aid to legislative history, to assist in the interpretation of the Charter document," August 20, 1975.

Applicability Tech Report provides additional detail that was used to determine Section 4(f) eligibility of individual park and recreation area properties.

Figure 22-1. Section 4(f) Parks and Recreation Areas

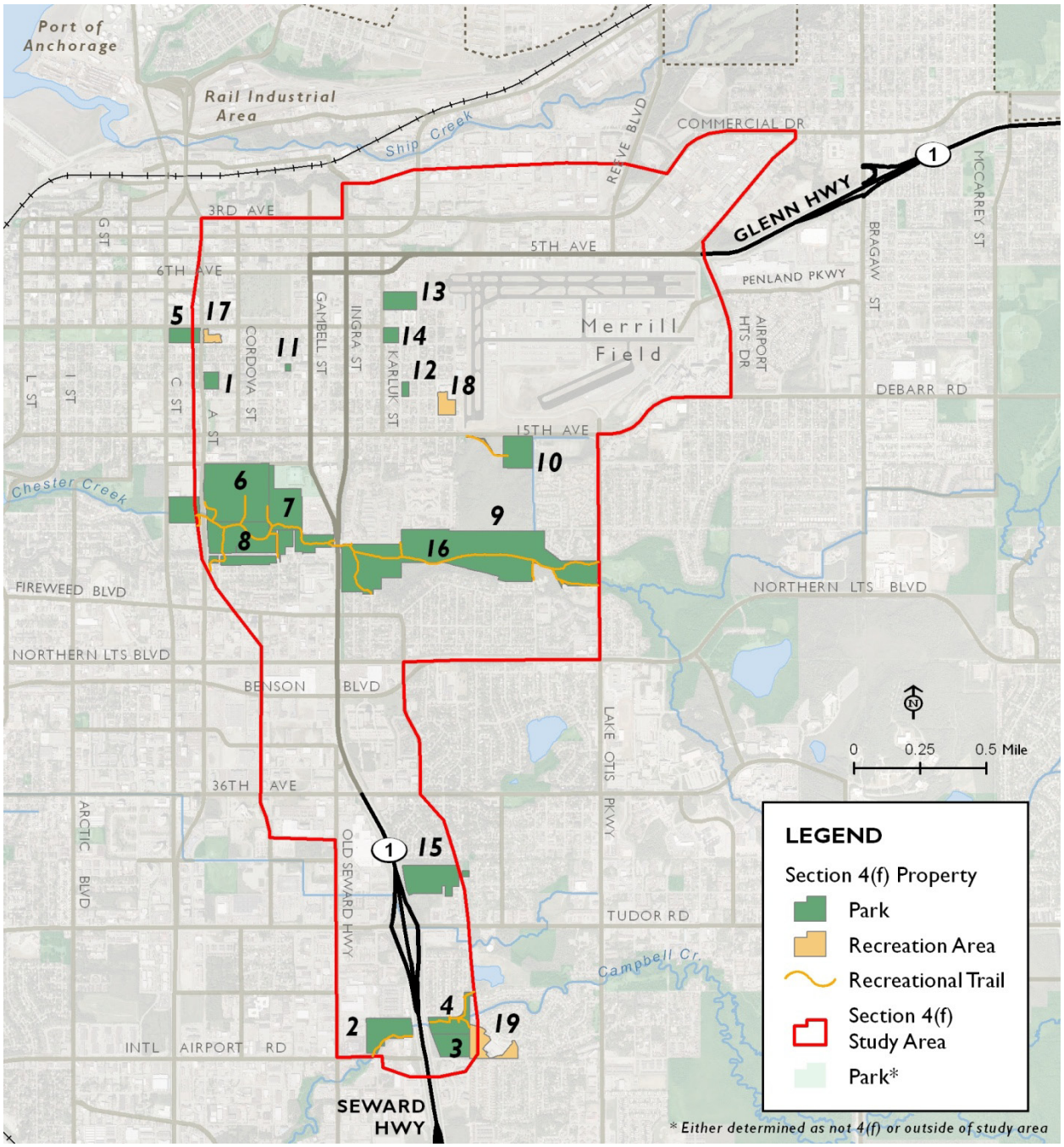


Table 22-1. Section 4(f) Parks and Recreation Areas

#	Section 4(f) Resource	Property Type	Location	Ownership and Management	Description
1	Earl & Muriel King Park	Park	1201 A Street	Municipality of Anchorage, Parks and Recreation Dept.	2.3 acres;* playing field, bench. Classified as Neighborhood Use.
2	Foxtree Park (Campbell Creek Greenbelt)	Park	Homer Drive and International Airport Road	Municipality of Anchorage, Parks and Recreation Dept.	10.4 acres; includes Campbell Creek multi-use trail; planned connection to upstream Campbell Creek Trail as part of Seward Highway upgrade. Classified as Natural Resource.
3	Bancroft Park (Campbell Creek Greenbelt)	Park	1497 Alpenhorn Avenue	Municipality of Anchorage, Parks and Recreation Dept.	7 acres; continuous with Wickersham Park and adjoins Tudor Elementary School playing fields; play equipment, ball field, picnic tables, portable restrooms, and access to Campbell Creek multi-use trail; planned facilities include trash cans, benches, and tables. Classified as Neighborhood Use.
4	Wickersham Park (Campbell Creek Greenbelt)	Park	East of Seward Highway at Campbell Creek	Municipality of Anchorage, Parks and Recreation Dept.	7.7 acres; continuous with Bancroft Park; Campbell Creek multi-use trail, spur trail and bridge over creek connect to Tudor Elementary School. Classified as Neighborhood Use.
5	Delaney Park (Delany Park Strip)	Park	West of A Street, between 9th and 10th avenues	Municipality of Anchorage, Parks and Recreation Dept.	2.2 acres; continuous with Delany Park Strip to the west; softball fields, pedestrian tunnel to Denali Elementary. Classified as Community Use.
6	Mulcahy and Kosinski Fields (Chester Creek Greenbelt)	Park	1860 A Street	Municipality of Anchorage, Parks and Recreation Dept.	34.2 acres; includes Anchorage Football Stadium (artificial turf football/soccer field with running track and bleachers) Mulcahy Baseball Stadium (semi-professional ball field with support facilities), Kosinski Fields (four baseball fields), trail connections to Chester Creek multi-use trail; adjoins Sullivan Arena and Ben Boeke Ice Arena. Classified as Special Use.
7	Ben Boeke Arena Park (Chester Creek Greenbelt)	Park	1600 Gambell Street	Municipality of Anchorage, management contracted through Community Planning and Development Dept.	13.4 acres; includes Chester Creek multi-use trail and Ben Boeke Ice Arena with indoor and outdoor rinks (public skating, rental ice for schools, hockey, figure skating), parking. Adjoins Sullivan Arena and Mulcahy/Kosinski Fields. Classified as Special Use.
8	Charles W. Smith Memorial Park (Chester Creek Greenbelt)	Park	Both sides of A Street, extending east along Seward Highway	Municipality of Anchorage, Parks and Recreation Dept.	39.7 acres; includes Chester Creek multi-use trail, basketball, playground, playing field, picnic tables, connection to A Street Trail. Classified as Neighborhood Use.

#	Section 4(f) Resource	Property Type	Location	Ownership and Management	Description
9	Eastchester Park (Chester Creek Greenbelt)	Park	Along Chester Creek between Lake Otis Parkway and Seward Highway	Municipality of Anchorage, Parks and Recreation Dept.	85 acres; includes Chester Creek multi-use trail, playground, parking, picnic area, playing fields, benches. Classified as Natural Resource.
10	Sitka Street Park	Park	Northeast corner of Merrill Field property; south of 15th Avenue, west of Sitka Street	Municipality of Anchorage, Merrill Field. Managed by Parks and Recreation Dept.	8 acres; includes 15th Ave. Trail, playground, play equipment, picnic shelter and tables, interpretive kiosk, lighting, sledding hill playing field, portable toilet, parking. Adjacent to Merrill Field property to the south. Classified as Neighborhood Use.
11	Fairbanks Park	Park	530 East 11th Avenue	Municipality of Anchorage, Parks and Recreation Dept.	0.3 acres; includes open grassy space, play equipment. Classified as Neighborhood Use.
12	Fairview Park	Park	1217 LaTouche Street	Municipality of Anchorage, Parks and Recreation Dept.	1 acre; includes play equipment, open fields, tennis court, picnic shelter, tables, and grill. Classified as Neighborhood Use.
13	Fairview Lions Park (also known as Karluk Park)	Park	1201 East 8th Avenue	Municipality of Anchorage, Parks and Recreation Dept.	5.5 acres; includes play equipment, open filed, sledding hill, softball, volleyball, picnic shelter, tables, benches, community garden, portable toilet. Classified as Neighborhood Use.
14	Fairview Community Recreation Center	Park	1121 East 10th Avenue	Municipality of Anchorage, Parks and Recreation Dept.	2.1 acres; includes community recreation center (gymnasiums, weight room, dance/martial arts studio, arts and crafts studio, saunas, multipurpose rooms, industrial kitchen, nursery, teen center, and computer lab) and parking. Classified as Special Use.
15	Helen Louise McDowell Sanctuary Park	Park	East of Seward Highway, south of 36th Avenue, north of Tudor Road	Municipality of Anchorage, Parks and Recreation Dept.	13.9 acres; includes wetlands, wildlife habitat, and soft trails. Classified as Natural Resource.
16	Lanie Fleischer Chester Creek Trail and Connecting Trails	Recreation Area	East/west along Chester Creek	Municipality of Anchorage, Parks and Recreation Dept. (crosses DOT&PF right-of-way under roads)	Multi-use trail serves transportation and recreation functions for bicyclists, walkers, runners, cross-country skiers, in-line skaters, and skateboarders.

#	Section 4(f) Resource	Property Type	Location	Ownership and Management	Description
17	Denali Elementary Playground & Playing Field	Recreation Area	952 Cordova	Municipality of Anchorage, Anchorage School District	>1 acre; includes playground with play equipment, playing fields, basketball.
18	Fairview Elementary Playground & Playing Field	Recreation Area	1327 Nelchina	Municipality of Anchorage, Anchorage School District	>1 acre; includes playground with play equipment, playing fields, basketball.
19	Tudor Elementary Playground & Playing Field	Recreation Area	1666 Cache	Municipality of Anchorage, Anchorage School District	>1 acre; includes playground with play equipment, playing fields, basketball.

**Acreage denotes portion of park that FHWA has determined is subject to Section 4(f) protection.*

Historic Sites

Figure 22-2 shows historic sites in the study area. Table 22-2 provides summary descriptions of historic resources that may be affected by the project. Both Chapter 19 *Cultural Resources* and the *Cultural Resources Technical Report* provide additional detail on historic sites, including detailed descriptions and photographs.

Figure 22-2. Section 4(f) Historic Sites

Insert figure here

Table 22-2. Section 4(f) Historic Sites

Resource #	Name	Location	Description	NRHP Criteria	SHPO Criteria

22.3 BIBLIOGRAPHY

[APF] Anchorage Park Foundation. No date. *Directory of Anchorage Parks by District*. Available online at http://www.anchorageparkfoundation.org/directory/index.htm (accessed October 13, 2010).

Aries Consultants. 2000. *Merrill Field Airport Master Plan*. Prepared for the Municipality of Anchorage.

Ayers, Jean M. 2010. E-mail message from Jean Ayers (Alaska Dept. of Natural Resources) to Leslie Robbins (HDR Alaska, Inc., Anchorage). August 20, 2010. Record on file with HDR.

Great Land Trust. No date. Helen Louise McDowell Sanctuary Conservation Easement, Anchorage. Available online at http://www.greatlandtrust.org/ourland/fish_mcdowell.html (accessed October 14, 2010).

[HDR] HDR Alaska, Inc. 2010. *Section 4(f) Applicability—Phase 1a of the Project Area*. Prepared for Alaska Department of Transportation and Public Facilities.

[MOA] Municipality of Anchorage. 1997. *Areawide Trails Plan.*

———. 2006. *Anchorage Bowl Park, Natural Resource, and Recreation Facility Plan.* April 2006.

———. 2010. *Anchorage Municipal Charter, Code and Regulations.* Available online at http://library5.municode.com/default-now/home.htm?infobase=12717&doc_action=whatsnew (accessed October 18, 2010.)

Rodda, John. 2010. Concurrence letter signed by John Rodda (MOA Parks and Recreation Director) to Jerry Ruehle (DOT&PF Central Region, Environmental Manager). January 27, 2010.

Chapter 23: Coastal Zone
Affected Environment

Table of Contents

23.1 INTRODUCTION 1
23.2 REGULATORY SETTING 1
23.2.1 Alaska Coastal Management Program 1
23.2.2 Anchorage Coastal Management Plan 2
23.2.3 Alaska Coastal Management Program Consistency Review Process 2
23.3 AFFECTED ENVIRONMENT 2
23.3.1 Anchorage Coastal Management Plan 2
23.3.2 Uses and Activities of Concern Identified in the MOA CMP 5
23.3.3 Enforceable Policies in the MOA CMP 5
23.4 BIBLIOGRAPHY 6

List of Figures

Figure 23-1. MOA Coastal Zone Boundaries 4

23.1 INTRODUCTION

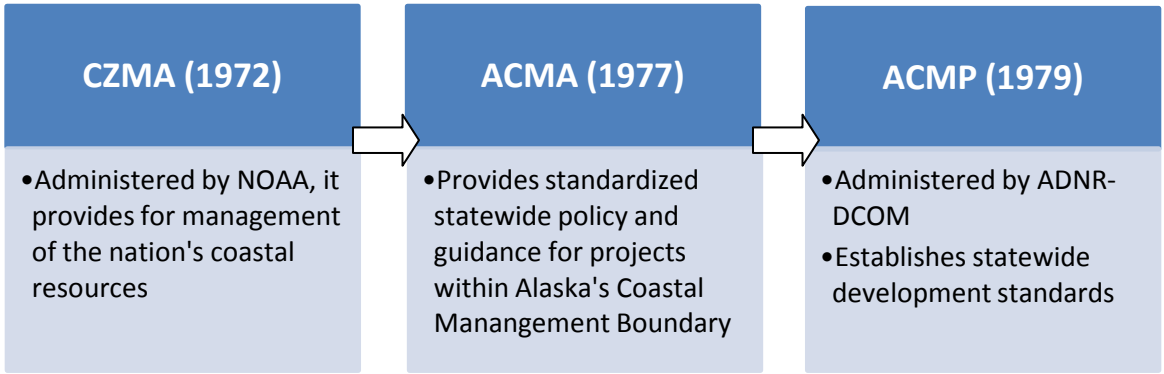
This chapter describes the applicable coastal zone regulations and plans, existing conditions of the coastal zone in the H2H study area, uses of local concern, and enforceable policies.

23.2 REGULATORY SETTING

Congress passed the Coastal Zone Management Act (CZMA) in 1972. Administered by the National Oceanic and Atmospheric Administration (NOAA), Office of Ocean and Coastal Resource Management, the Act provides for the management of the nation's coastal resources. Following the CZMA, the State of Alaska enacted the Alaska Coastal Management Act (ACMA) in 1977 to provide a standardized statewide policy and guidance for projects proposed within Alaska's Coastal Management Boundary. The ACMA also serves to guide the development of the Alaska Coastal Management Program (ACMP), which was federally approved in 1979. The ACMP is administered by the Alaska Department of Natural Resources (ADNR), Department of Ocean and Coastal Management (DCOM).

23.2.1 Alaska Coastal Management Program

The ACMP provides stewardship for Alaska's coastal resources to ensure a healthy Alaskan coast that efficiently sustains long-term economic and environmental productivity. Statewide standards (11 Alaska Administrative Code (AAC) 112) serve as benchmarks for evaluating projects that fall within or affect resources within the Coastal Management Boundary; statewide standards govern how various uses, activities, resources, and habitats are managed under the ACMP.



Activities associated with the proposed H2H project would trigger a review under the following statewide standards:

Transportation and Facilities: This standard makes it clear that all transportation routes and facilities must avoid, minimize, or mitigate alterations in surface and ground water drainage patterns, disruption in known or reasonably foreseeable wildlife transit, and blockage of existing traditional access.

Habitat: Several coastal zone habitats are subject to ACMP standards including avoidance, minimization, or mitigation of alteration to water flow and natural drainage patterns.

Air, Land, and Water Quality: The ACMP incorporates statutes and regulations of the Alaska Department of Environmental Conservation (ADEC) with respect to protection of air, land, and water quality identified in Alaska Statute (AS) 46.40.040(b), as guidance for protection of those resources.

Historic, Prehistoric, and Archeological Resources: The ACMP requires that designated areas of the coastal zone that are important to the study, understanding, or illustration of national, state, or local history or prehistory, including natural processes, shall comply with the applicable requirements of AS 41.35.010 – 41.35.240 and 11 AAC 16.010 – 11 AAC 16.900.

23.2.2 Anchorage Coastal Management Plan

The Anchorage Coastal Management Plan (MOA CMP) is a policy document that defines issues of local concern and guides the development needs of residents, businesses, and landowners within the Anchorage coastal zone boundary (MOA 2007, 1). Updated and re-adopted in 2007, the MOA CMP is a coastal district management plan in accordance with AS 46.40 and 11 AAC 114.3.

The MOA CMP identifies ten Areas Meriting Special Attention (AMSAs) and three Recreation Use Areas. AMSAs were classified because of "important physical, biological, and cultural attributes of each area and because of the biological productivity of resources in specific AMSAs" (MOA 2007, 4). Recreation Use Areas are designated by the MOA CMP, "providing the MOA with the legal authority to address prioritization of uses and activities in these areas" (41), for areas that receive "significant use" by recreationalists, or have the potential for recreational use because of cultural, biological, or cultural features (11 AAC 114.250); in Anchorage, these are the Tony Knowles Coastal Trail, Chester Creek Trail, and Kincaid Park.

To encourage protection of important fish and wildlife habitats, valuable wetlands, and riparian zones, and to encourage development and construction practices that minimize adverse impacts to the recreation areas and habitats within the MOA coastal zone, enforceable policies were developed for Recreation Use Areas (MOA 2007, 8). The enforceable policies are legally binding and provide the basis for a determination of consistency with the MOA CMP. Their purpose is to add clarification or specificity to statewide standards, but the policies cannot be made more stringent than statewide standards.

23.2.3 Alaska Coastal Management Program Consistency Review Process

The MOA CMP states that "federally licensed or permitted activities proposed within the coastal area and affecting coastal uses or resources must be consistent with the ACMP, including the MOA CMP" (MOA 2007, 47). Since H2H would be, in part, a federally funded project, it must be consistent with the ACMP and MOA CMP. The ACMP consistency review process (11 AAC 110) is the primary means by which proposed coastal uses and resources are evaluated for compliance and consistency with ACMP enforceable policies. The consistency review process coordinates the application of the state's enforceable policies, brings all relevant ACMP participants to the table, and establishes the authorities, responsibilities, and opportunities for participation in the review of proposed coastal projects.

AS 46.39.010 dictates that DNR shall render, on behalf of the state, all federal consistency determinations and certifications authorized by 16 U.S.C. 1456 (Sec. 307, CZMA of 1972) and each conclusive state consistency determination when a project requires a permit, lease, or authorization from two or more state resource agencies.

23.3 AFFECTED ENVIRONMENT

23.3.1 Anchorage Coastal Management Plan

The coastal zone study area includes the coastal resources identified in the MOA CMP that could be potentially affected by the H2H project. As illustrated in Figure 23-1, MOA Coastal Zone Boundaries, Ship Creek, Chester Creek, and Campbell Creek are drainage areas subject to the MOA CMP in the study area. According to MOA CMP, these drainages are important for a variety of reasons; they are areas for recreation, enjoyment, and beauty, and provide habitat for a diverse group of animals and fish. These creeks are all anadromous—meaning that salmon (and other fish) use them for migration, spawning, and rearing. There are no AMSAs within the H2H coastal zone study area boundary. One of the three Recreation Use Areas designated by the MOA CMP lies partially within the H2H coastal zone study area boundary: the Chester Creek Trail.

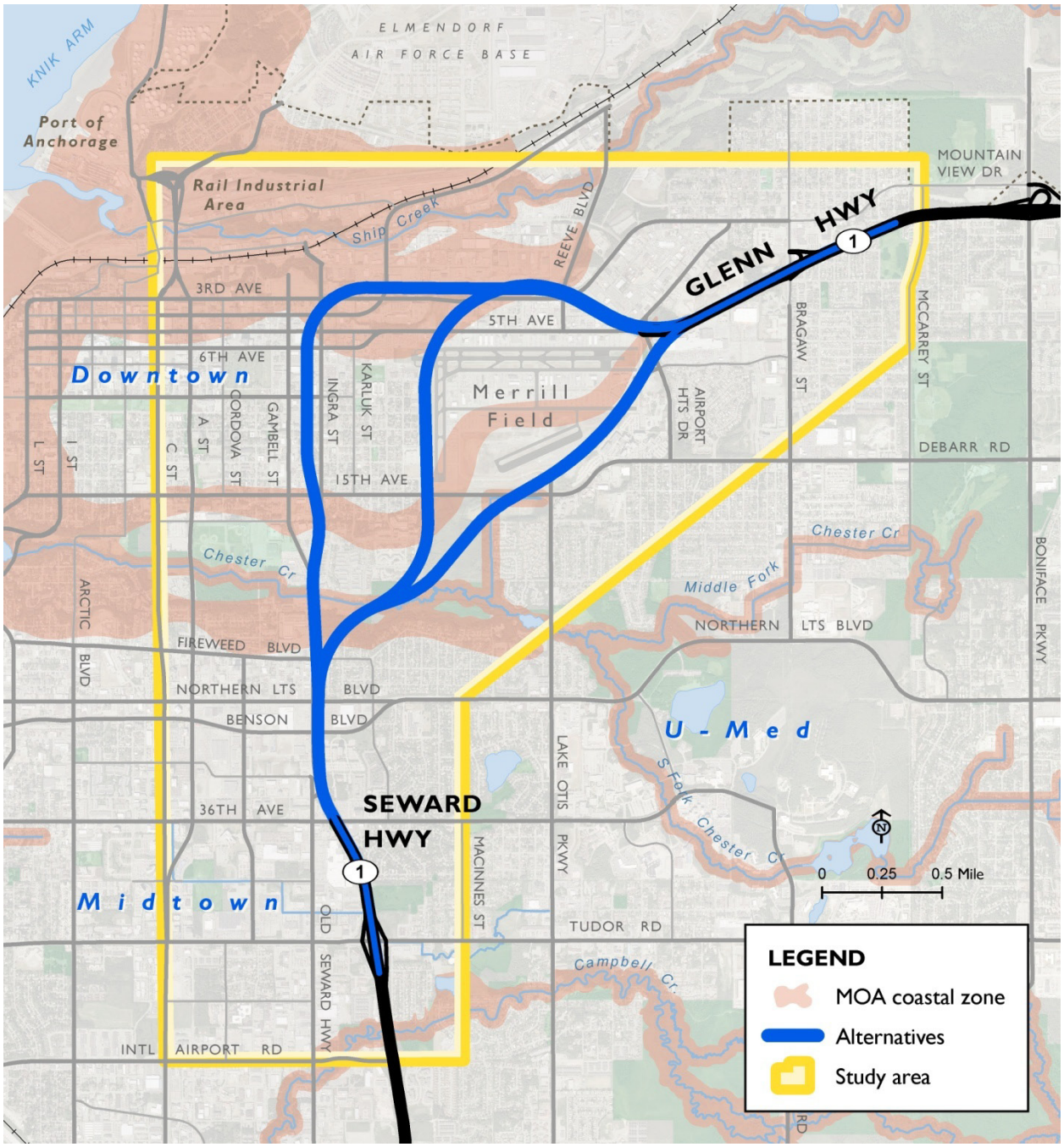
Other MOA CMP identified resources include the inland coastal boundary, which includes all lands and waters within:

- A zone extending 1,320 feet inland, measured horizontally, from the extent of the 100-year coastal floodplain;
- The 100-year floodplain or 200 feet from the center (whichever is greater) of each river and stream intersected by the 1,320-foot zone up to the 1,000-foot elevation contour; and
- Other areas as delineated on the Coastal Zone Boundaries of Alaska, MOA CMP, June 1988 (Map #94) (MOA 2007, 3).

The MOA CMP identifies issues of local concern and inventories resources within the coastal zone boundary. In the discussion of transportation routes and facilities, the MOA CMP notes that the goals of the *Anchorage Long-Range Transportation Plan* and *Anchorage 2020* include balancing growth with natural features and quality of life, and design and maintenance of a transportation system. The plan states "these goals are complementary to the MOA CMP and supported by the enforceable policies" (MOA 2007, 15). The following paragraphs summarize information included in the MOA CMP about resources within the H2H study area. For a more comprehensive description of creeks in the study area, see Chapter 15, Water Quality, and Chapter 16, Ecosystem.

Campbell Creek Watershed: The Campbell Creek greenbelt is noted as important "to fish habitat, flood control and recreation" (Appendix G, 18) and is called a "stream of local concern" because it is valued for its "recreational potential and important biological productivity" (MOA 2007, 14). Campbell Creek is also a water-based trail system in the project area. These waterways are important because they offer excellent recreational opportunities to residents and visitors alike, as well as crucial habitat for fish and wildlife. Water levels, water quality, riparian support, and access are key resource issues (MOA 2007, 15). The wetlands associated with the Campbell Creek watershed are important fish and wildlife habitat; the MOA CMP notes that the Campbell Creek watershed has lost larger overall percentages of wetland acres than other watersheds within the Anchorage Bowl, resulting in "plant community changes, plant diversity losses, introduction of exotics and less valuable plant species, increased long-term erosion runoff, and nutrient enrichment/contamination of lakes" (MOA 2007, 37–38). Campbell Creek watershed anadromous fish populations are continuously impacted and threatened, primarily by fish passage blockage through culverts and channelization, chronic sediment loading from construction and development activities, vegetation removal, and street maintenance operations (MOA 2007, 39–40).

Figure 23-1. MOA Coastal Zone Boundaries



Chester Creek Watershed: The Chester Creek Trail (6 miles) is designated by the MOA as a "Recreation Use Area" because of its fish and wildlife habitat resource importance, in accordance with 11 AAC 114.250. Chester Creek is identified as a "stream of local concern" because it is valued for its "recreational potential and important biological productivity" (MOA 2007, 14). Chester Creek is also a water-based trail system in the project area. These waterways are important because they offer excellent recreational opportunities to residents and visitors, and crucial habitat for fish and wildlife. Water levels, water quality, riparian support, and access are key resource issues (MOA 2007, 15). Similar to Campbell

Creek, the wetlands associated with the Chester Creek watershed are important fish and wildlife habitat; the MOA CMP notes that the Chester Creek watershed has lost larger overall percentages of wetland acres than other watersheds within the Anchorage Bowl, resulting in "plant community changes, plant diversity losses, introduction of exotics and less valuable plant species, increased long-term erosion runoff, and nutrient enrichment/contamination of lakes" (MOA 2007, 37–38). Chester Creek watershed anadromous fish populations are all but blocked from the creek, primarily by culverts and channelization (MOA 2007, 39–40).

Ship Creek Watershed: Ship Creek is called a "stream of local concern" because it is valued for its "recreational potential and important biological productivity" (MOA 2007, 14), and is noted as an "accessible coastal site" (MOA 2007, 7). Ship Creek is also a water-based trail system in the project area. These waterways are important because they offer excellent recreational opportunities to residents and visitors alike, as well as crucial habitat for fish and wildlife. Water levels, water quality, riparian support, and access are key resource issues (MOA 2007, 15). Waterfowl habitats designated as critical have been identified in lower Ship Creek (MOA 2007, 28), and it is home to a unique urban salmon fishery (MOA 2007, 31).

23.3.2 Uses and Activities of Concern Identified in the MOA CMP

Uses and activities of concern identified in the MOA CMP include the following: "shoreline modifications, stream channel alterations, removal of shoreline vegetation and increases in impervious surfaces, (MOA 2007, 4) improper placement of drainage, (MOA 2007, 5) construction disturbances, (MOA 2007, 6) changes in surface hydrology, and (MOA 2007, 8) degradation of water quality" (MOA 2007, 35). These uses have been identified because they have the potential to adversely impact the physical, biological, and cultural attributes which are inherent to the recreational use of the streams, lakes, and wetlands within the coastal zone. The MOA CMP describes goals (long-term) and objectives (shorter term) for these uses.

23.3.3 Enforceable Policies in the MOA CMP

Enforceable policies of the MOA CMP apply to designated Recreation Use Areas. The proposed H2H project's effects on the Chester Creek Trail must be found consistent with these enforceable policies identified from the MOA CMP:

EP-1. Uses, Activities, and Setbacks: The policy states that transportation features are allowed and considered appropriate in a Recreational Use Area. The policy sets forth requirements stating that allowed uses are permitted if they include:

1. "A 50-foot setback from the Ordinary High Water (OH) of streams and/or waterbodies […] unless there is no practicable alternative location or the use or activity.
2. For streams or waterbodies with contiguous wetlands, setback distances ranging form 25 feet to 200 feet should follow those defined in Table 2 of the Anchorage Wetlands Management Plan…" (MOA 2007, Appendix A, 1).

EP-5. Capital Improvements: The policy states that "capital improvements on non-federal, publicly owned property shall incorporate walkway, shelters, viewing platforms, and landscaping wherever possible to enhance public access to coastal waters" (MOA 2007, Appendix A, 2).

23.4 BIBLIOGRAPHY

[ADNR] Alaska Department of Natural Resources. 2009. *Alaska State Statutes*. Published online at http://www.legis.state.ak.us/basis/folio.asp.

[MOA] Municipality of Anchorage. 2007. *Anchorage Coastal Management Plan.* Planning Department. Published online at http://www.muni.org/Departments/Planning/Publications/Pages/ACMP.aspx.

[NOAA] National Oceanic and Atmospheric Administration. April 22, 2004. *State Coastal Zone Boundaries.* Published online at http://coastalmanagement.noaa.gov/mystate/docs/StateCZBoundaries.pdf

U.S. Code of Federal Regulations. 2008. *Coastal Zone Boundaries of Alaska.* 43 CFR 3301.1. Published online at http://dnr.alaska.gov/coastal/MOA CMP/Explore/Dist_Cstl_Zone_Defs.pdf.

———. 2009. *Lakeward or Seaward Boundary*. 15 CFR 923.32. Published online at http://edocket.access.gpo.gov/cfr_2001/janqtr/pdf/15cfr923.33.pdf.

U.S. Department of Commerce. 1972. *Coastal Zone Management Act, Coordination and cooperation* (Section 307). NOAA Coastal and Ocean Resource Management. U. S. Code 16 U.S.C. 1456.

Chapter 24: Energy
Affected Environment

Table of Contents

24.1 INTRODUCTION 1
24.2 REGULATORY SETTING 1
24.3 METHODOLOGY 1
24.4 AFFECTED ENVIRONMENT 1
24.4.1 Energy Use 1
24.4.2 Alaska Energy Plan 2
24.5 BIBLIOGRAPHY 4

List of Tables

Table 24-1. Existing Highway Energy Consumption 2

24.1 INTRODUCTION

This chapter discusses the construction and operational energy requirements and conservation potential of the reasonable alternatives. The analysis compares the relative energy demands of the different alternatives and discusses options that could reduce energy consumption during project construction and operations. Energy would be consumed during the life of the project through the operation of vehicles along the highway. This energy use is discussed as a direct energy impact. Energy would be consumed during construction to operate construction machinery, transport materials, and perform construction tasks. Changes in the usage of automobiles could also result from construction of the project alternatives. Construction energy and the effects of changes in automobile usage are discussed under the indirect impacts section. The relationship and consistency of the alternatives to the state's energy plan are also discussed.

24.2 REGULATORY SETTING

Transportation energy efficiency is regulated largely through requirements on vehicle manufacturers rather than through transportation infrastructure. There are no established standards to determine when a transportation project has an energy "impact." This section was prepared in accordance with FHWA's Technical Advisory T6640.8a and the *Alaska Environmental Procedures Manual*.

24.3 METHODOLOGY

Energy uses associated with travel were calculated using the travel modeling completed for the EIS. Travel modeling was done to forecast both existing conditions and future conditions in 2035. Both automobile and truck trips were forecast in the modeled roadway network. The travel forecasting was completed using the Anchorage Metropolitan Area Transportation Solutions (AMATS) traffic model, which was updated to 2035 based on population and employment forecasts completed by the Institute of Social and Economic Research at the University of Alaska. Numbers of trips, and the lengths of those trips, were forecast in terms of vehicle miles traveled (VMT) for each alternative. This measure is akin to a cumulative odometer reading of all the trips forecast by the traffic model. Using average fuel efficiency statistics from the FHWA (USDOT 2010), fuel usage was computed for each of the alternatives. Different energy sources (petroleum, natural gas, hydropower, wind, solar) are typically measured in different units, such as gallons of fuel or watts of electricity. To compare energy amounts for all sources, this chapter converts energy measures to British Thermal Units (BTUs). One BTU is a unit of energy equal to the amount of heat required to raise one pound of water one degree Fahrenheit at one atmosphere pressure.

24.4 AFFECTED ENVIRONMENT

24.4.1 Energy Use

In 2008, gross energy use in the United States was estimated at an equivalent of 100.09 quadrillion BTUs (Energy Information Administration 2009). Of that total energy, 27.9 quadrillion BTUs are attributable to the transportation sector. Petroleum products are the source of 97.2 percent of the energy used by the transportation sector. Within this sector, 32.9 percent is used by automobiles, 27.4 percent by light trucks, and 18.8 percent by heavier trucks (DOE 2009).

According to the U.S. Energy Information Administration, Alaska has the highest per capita energy consumption in the country (1,062 million BTUs)—more than three times the U.S. average. According to Alaska Energy Authority (AEA), however, Alaska's geography and economy skew the numbers. For instance, jet fuel makes up 43 percent of total energy end-use in Alaska, but a substantial amount of that fuel is used for international flights and is not actually consumed in-state (AEA 2009). Similarly, a large amount of energy is used for oil and gas production. While this energy is consumed in-state, most of the product is shipped out of state (AEA 2009). In Alaska, the primary sources of energy are oil and natural gas. Alaska is the second-ranking oil-producing state in the U.S. and is a leading U.S. source of crude oil (DOE 2010). Energy consumption in Alaska broken down by sector is as follows:

- Residential: 54 trillion BTUs
- Commercial: 62 trillion BTUs
- Industrial: 356 trillion BTUs
- Transportation: 250 trillion BTUs (Energy Information Administration 2010, 2007 numbers)

Notably, transportation accounts for 35 percent of Alaska's total energy consumption.

Existing energy use associated with project area travel is summarized in Table 24-1. Energy used by the public traveling directly on the existing arterial connection indicates a daily fuel consumption of 14,000 gallons (1.7 billion BTUs). All trips made throughout the Anchorage/Mat-Su modeled area suggest a daily fuel consumption of more than 200,000 gallons, which equates to more than 30 billion BTUs.

Table 24-1. Existing Highway Energy Consumption

Vehicle Type	Daily VMT*	% of VMT	Average Fuel Consumption (miles per gallon)**	Daily Fuel Consumption[1] (gallons)	Daily Energy Consumption (BTU in billions)+
Existing Arterial Connection++					
Automobile	215,000	90%	21	10,000	1.1
Truck	25,000	10%	6	4,000	0.6
Corridor Total	240,000	100%	--	14,000	1.7
Anchorage/Mat-Su Modeled Area					
Automobile	4,200,000	93%	21	205,000	23.2
Truck	338,000	7%	6	54,000	7.6
Regional Total	4,538,000	100%	--	259,000	30.8

**Source: AMATS Travel Model, 2009.*

***Source: USDOT, Bureau of Transportation Statistics 2010.*

+BTU per gallon of gasoline = 113,500. Source: USEPA 2007; BTU per gallon of diesel = 139,000. Source: U.S. Energy Information Administration, no date.

++Calculated between the Tudor Road interchange on the Seward Highway and the Bragaw interchange on the Glenn Highway and includes travel on the Seward Highway, Gambell and Ingra streets, 5th and 6th avenues, and the Glenn Highway.

24.4.2 Alaska Energy Plan

AEA developed and published a draft long-term energy strategy for the State of Alaska in April 2010 (AEA 2010a). This planning effort, titled *Alaska Energy Pathway*, begins to establish overall policy direction for the state and sets targets for energy efficiency and conservation, as well as renewable energy development. The plan's two primary goals are to meet 50 percent of Alaska's electric energy needs through renewable energy resources by 2025 and to achieve a 20 percent increase in energy efficiency and conservation by 2020. The first step in the state's planning process resulted in the 2009 publication titled *Alaska Energy – A first step toward energy independence*. In that document, the AEA recognizes the role that transportation can have on energy use, stating:

> "Alaska's transportation policy can affect energy use by promoting either energy substitutes or energy compliments. Energy substitutes would decrease the demand for transportation energy. For example, state transportation policy can be used to reduce the amount of fuel used for transportation by promoting public transportation systems. An example would be a commuter rail line or increased bus service between the Valley and

[1] Does not include energy used idling.

> Anchorage that would allow commuters to switch from personal automobiles to far less fuel intense public transport." (AEA 2009)

A separate, step-down plan covering Anchorage and the rest of the Railbelt (communities from the Kenai Peninsula to Fairbanks) estimates that during the next 20 years, the Railbelt will spend more than $60 billion on fossil fuels for electricity generation, transportation, and heat, assuming current fossil fuel demand (AEA 2010b). The plan indicates that energy security and climate change will drive changes in the transportation sector and that new advanced technology vehicles will improve fleet energy efficiency and reduce carbon emissions. The plan forecasts that plug-in hybrid vehicles will put an increasing load on the region's power generation needs.

24.5 BIBLIOGRAPHY

[AEA] Alaska Energy Authority. 2009. *Alaska Energy – A first step toward energy independence.* Prepared in January by the Alaska Energy Authority and Alaska Center for Energy and Power.

———. 2010a. *Alaska Energy Pathway, A guide for Alaskan communities to utilize local energy resources* (DRAFT COPY FOR COMMENT). April.

———. 2010b. *Alaska Railbelt, Regional Integrated Resource Plan*. Prepared by Black and Veatch.

[DOE] U.S. Department of Energy. 2009. *Transportation Energy Data Book*. Center for Transportation Analysis, Energy and Transportation Science Division, Oak Ridge National Laboratory.

———. 2010. *Alaska.* Available online at http://www.energy.gov/alaska.htm (accessed on June 21, 2010).

Energy Information Administration. 2009. *Annual Energy Outlook 2010.*

[EPA] U.S. Environmental Protection Agency. 2007. *Fuel Economy Impact Analysis of RFG.* Available online at http://www.epa.gov/oms/rfgecon.htm (accessed August 8, 2010).

[FHWA] Federal Highway Administration. 1980. *Energy Requirements for Transportation Systems*. Office of Environmental Policy. June.

[USDOT] U.S. Department of Transportation. 2010. *Highway Statistics 2008*. Federal Highway Administration.

U.S. Energy Information Administration. No date. *Energy Kids: Energy Calculators.* Available online athttp://www.eia.doe.gov/kids/energy.cfm?page=about_energy_conversion_calculator-basics (accessed August 8, 2010).

Chapter 25: Construction and Construction Methods Affected Environment

Table of Contents

25.1 INTRODUCTION 1
25.2 CONSTRUCTION METHODS OVERVIEW 1
25.2.1 Survey 1
25.2.2 Utility Relocation 1
25.2.3 Excavation 1
25.2.4 Embankment 2
25.2.5 Muck Excavation and Surcharge 2
25.2.6 Bridges and Foundations 3
25.2.7 Retaining Walls 4
25.2.8 Paving 4
25.2.9 Maintenance of Traffic 5
25.3 CONSTRUCTION IMPACTS 5
25.4 MITIGATION 6
25.5 BIBLIOGRAPHY 7

List of Figures

Figure 25-1. Excavation with Backhoe 2
Figure 25-2. Motor Grader 2
Figure 25-3. Backhoe in Water 2
Figure 25-4. Driving Piles with a Vibratory Hammer 3
Figure 25-5. Setting Bridge Girder 4
Figure 25-6. Paving Machine Laying an Asphalt Layer 4

draft

25.1 INTRODUCTION

This chapter provides a general overview of methods likely to be used in construction of the reasonable alternatives, and identifies the impacts that could be expected during the construction phase of the project. Mitigation measures to address these impacts are also included. Specific construction methods will be finalized during the final design phase of the project. For information on construction phasing of alternatives, see Chapter 2, Alternatives Development Process.

This section was prepared in accordance with Federal Highway Administration (FHWA) Technical Advisory T6640.8A, *Guidance on Preparing and Processing Environmental and Section 4(f) Documents,* which requires a discussion of construction impacts in an Environmental Impact Statement (EIS), and with Alaska Department of Transportation and Public Facilities' (DOT&PF) *Alaska Environmental Procedures Manual*.

Construction details cannot be fully defined until design advances after the final Record of Decision. To perform the analysis in this chapter, assumptions were made to define how the alternatives are anticipated to be constructed given the information available at this time. However, many factors will influence final construction techniques.

Construction activities for the H2H reasonable alternatives could include survey, utility relocation, removal of existing roadways and structures, excavation, embankments, muck excavation and surcharge, bridge construction, retaining wall construction, and paving. Construction is anticipated to cause a number of temporary impacts to air quality, water quality, wetlands, noise levels, vibration, visual resources, cultural resources, wildlife, traffic and transportation, pedestrians and bicycles, utility service, and hazardous material sites.

A phased construction approach has been assumed over an extended timeframe. Chapter 2 provides information on anticipated project phasing. Following issuance of a Record of Decision (ROD), the project would proceed to permitting, design, and right-of-way acquisition, and then construction.

25.2 CONSTRUCTION METHODS OVERVIEW

This section gives an overview of the types of construction activities anticipated to take place, as a basis for understanding construction impacts. The following construction methods are anticipated to be used to construct the reasonable alternatives.

25.2.1 Survey

The first step in the construction phase is usually to have survey crews stake out the project improvements. The survey stakes tell the construction contractor what to dig out and what to build back.

25.2.2 Utility Relocation

Once the surveyor has located everything, including utilities, utility relocation work can begin. Utilities are typically moved either before or concurrent with the road construction work.

25.2.3 Excavation

Generally, the first major work on a highway construction project is the excavation and hauling away of the old roadway materials, or removing existing ground elevations down to the facility's new elevation. The digging is usually accomplished with a large backhoe (see Figure 25-1), front-end loader, or possibly an earthmoving scraper. Excavation can be a long, slow process if there is a lot of material to be dug out. To maintain a schedule, or even to accelerate the work, the contractor may have several excavation operations (excavator and several trucks) working at the same time in different areas within a project's limits.

draft

Dump trucks are used to haul materials away. These trucks may be slow moving when entering the highway, and occasionally small amounts of material will fall out onto the roadways, which can result in dirty roads. Under standard DOT&PF contract provisions, however, contractors are typically required to keep haul routes as clean and dust-free as possible.

Where excavation goes below the local groundwater elevation, the hole will often fill with water. A water-filled hole cannot be backfilled and compacted, so the excavation must be "dewatered." Depending upon the quality of the water, it may need to be pumped out and drained, or it may need to be contained and possibly treated before draining. Dewatering is time consuming and must be closely monitored.

Figure 25-1. Excavation with Backhoe

25.2.4 Embankment

The opposite of excavation is backfilling, or building up an embankment. This entails hauling in gravels or other sorted and approved materials to construct the embankment upon which the roadway will ultimately rest. These materials cannot be just placed and paved over; they must be placed in thin layers and compacted to a density called for in the design. To get acceptable compaction, the contractor's trucks will first dump the gravels in a pile, being careful not to segregate the aggregates. A motor grader (Figure 25-2) or bulldozer will then spread out the layer to the appropriate thickness, which is checked by the surveyor. If the layer meets the proper grade elevation, a vibratory compactor will then make several passes over the layer to tamp the materials to the desired density. This compaction can be noisy. To minimize noise concerns, the Municipality of Anchorage has a Noise Ordinance that establishes acceptable noise levels and vibrations, and requires permits to exceed the thresholds. Nighttime operations are generally limited to work in business areas or for operations that do not require noisy equipment.

Figure 25-2. Motor Grader

25.2.5 Muck Excavation and Surcharge

A unique type of excavation occurs in wet, boggy, peat areas. Typically called "muck excavation" (DOT&PF 2004), digging in wet areas is difficult. It is usually performed with a large backhoe (Figure 25-3) that can reach out and excavate down to a depth that extracts all the peat (until firm bottom is reached). The hole is backfilled with good, clean, free-draining gravels as quickly as possible. As a backhoe digs out a new alignment, the backfill

Figure 25-3. Backhoe in Water

operations follow close behind. A bulldozer pushes new material into the excavated hole, and a vibratory compactor compacts the material to the specified density. A density test is performed and if passable, then more material is pushed in and the process is repeated until the final grade is reached.

Excavated material is loaded onto trucks, which travel to an approved site where the excavation is placed. This location can be noisy, as drivers may need to bang the dump truck's tailgate repeatedly in an effort to dislodge the sticky material. Again, one of the drawbacks to muck excavation is the haul route can become muddy or dusty as it dries, if not promptly and continuously cleaned up.

Once the excavated material (waste from the project site) is transferred and placed at the appropriate site, the excavated material (waste) is regraded to match the existing contours of the surrounding area and is revegetated to minimize erosions.

If the wet area is too deep or it is not economical to excavate enough of the organic materials, the peat is sometimes "surcharged." This entails placing gravel materials thicker than needed to compress the underlying material until it reaches a point where it can carry the proposed loading. This technique requires spreading geofabric over the original ground and then carefully placing gravel in layers that slowly compress the organic material. The work is carefully scheduled so that the organics do not fail and the underlying material does not spread out beyond the embankment. After long-term settlement has been accomplished (usually several months), the difference between the material placed and the final profile elevation is removed, usually with a backhoe, and trucked away.

25.2.6 Bridges and Foundations

Bridges are typically constructed to cross over a feature. Bridge structures are usually founded on either a pile foundation or an on-grade concrete footing. In most cases in Alaska, the DOT&PF prefers to have its bridges constructed on piling.

Figure 25-4. Driving Piles with a Vibratory Hammer
(note temporary bridge at left)

For a simple free-span structure, access needs to be provided on each side for the workers, cranes, and trucks bringing in materials and supplies. In cases where access to each side is not convenient, a temporary crossing is usually provided. These temporary structures are usually of short span, and may require piles in locations that will not be permanent in the final alternative.

When access is in place, piles are driven with large impact or vibratory hammers suspended from cranes that incrementally pound the pile deep into the ground (Figure 25-4). This is a noisy operation. Depending on the hardness of the ground and the depth of the piles that need to be installed, this operation can take several days for one set of piles to be driven.

Once all the piles are in place, they are cut off to the proper elevation. Then the concrete forms can be installed around them, the rebar placed, and the concrete poured for the bridge abutments. Aggregates and cement are usually proportioned off-site and brought to the project in large transit mixer trucks. These trucks perform the final mixing and deliver the concrete directly to the forms. After the concrete has cured (about seven days), the cranes then lift the girders off the delivery trucks and set them on the new concrete foundations (Figure 25-5).

If the bridge is a multi-span structure, then one or more piers are constructed between the abutments. For the crossings of small waterways, bridges usually span the drainage, and no piling is placed in the water.

Figure 25-5. Setting Bridge Girder

25.2.7 Retaining Walls

A retaining wall is a structure that holds back surrounding soil from a structure or area. For instance, a retaining wall could hold back the natural ground to allow for a highway to be constructed in a depressed trench (cut wall), or to hold up the raised embankment of a roadway (fill wall). Retaining walls are built by digging out the ground, constructing the wall, and then backfilling behind the wall. Other walls are formed by driving a pile into the ground with either an impact or vibratory hammer, or drilling (auguring) a hole and setting the pile in with concrete and then using concrete panels or other materials to form the wall. Sheet pile walls, constructed often in Alaska, are made out of steel, and the entire sheet is driven into the ground. Pile driving with an impact hammer is noisy.

Retaining walls often include a tie-back system. Taller walls may need a tie-back anchor-block placed in the soil a distance behind the face of the wall. The anchor-block is then connected to the wall, usually by a threaded rod, or the contractor may drill a hole at a slight downward angle (either before or after the wall is in place), and then grout an un-tensioned threaded rod into place. After the grout has set, the rod is tightened. Retaining walls can also be temporary in nature (usually using sheet piles), meaning that after short-term use during construction, they can be removed or buried in place.

Providing proper drainage behind a retaining wall is critical to its performance. Drainage materials reduce or eliminate the ground water pressure and greatly improve the stability of the material behind the wall.

25.2.8 Paving

Hot mix asphalt pavement is a durable surface material that has been widely used since the 1920s. Asphalt pavement can sustain substantial driving impacts, although it will typically wear out (form potholes) from repeated driving over time. It is typically built on a crushed gravel base (base course layer). In areas with very soft or expansive subgrades such as poor draining soils or peat, thicker gravel layers may be required below the base course layer. As with embankments, the base course layer is placed, spread, and compacted.

Figure 25-6. Paving Machine Laying an Asphalt Layer

The materials used in paving are usually mixed off-site at a central plant and transported by truck to the point of placement. The mixture is placed into a unique piece of equipment designed expressly for placing the hot asphalt (a paving machine; see Figure 25-6). Once spread out with a paving machine, several rollers

will compact the asphalt to the specified density. These rollers may have a vibratory capability to assist in the compaction.

25.2.9 Maintenance of Traffic

During construction, public access must be maintained. Contractors are required to develop a Traffic Control Plan that addresses how traffic will be moved through the construction area, including permanent measures, temporary measures, news media coordination, and emergency services coordination. A worksite traffic safety supervisor is designated to respond to traffic control concerns.

25.3 CONSTRUCTION IMPACTS

draft

25.4 MITIGATION

draft

25.5 BIBLIOGRAPHY

[AASHTO] American Association of State Highway and Transportation Officials. 2001. *Policy on Geometric Design of Streets and Highway*. 2nd ed.

[DOT&PF] Alaska Department of Transportation and Public Facilities. 2004. *Standard Specifications for Highway Construction*. Available online at http://www.dot.state.ak.us/stwddes/dcsspecs/assets/pdf/hwyspecs/english/2004sshc.pdf.

_____. 2005. *Alaska Highway Preconstruction Manual.* Available online at http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/preconhwy/hwypcm_wholeenchilada.pdf

_____. 2006. *Alaska Construction Manual*. Available online at http://www.dot.state.ak.us/stwddes/dcsconst/assets/pdf/constman/const_allmanual.pdf

[MOA] Municipality of Anchorage. 2007. Department of Project Management and Engineering. *Design Criteria Manual*. Available online at X:\Engineering Reference\MOA\Manuals\Design Criteria Manual Jan 2007.

draft

Chapter 26: Short-Term Uses vs Long-Term Productivity
Affected Environment

draft

Chapter 27: Irreversible and Irretrievable Commitment of Resources
Affected Environment

draft

Chapter 28: Cumulative Impacts
Affected Environment

Table of Contents

28.1 INTRODUCTION 1
28.1.1 Methodology 1
Important Cumulative Impact Issues Associated with the Project 1
28.1.2 Study Area 2
Geographic Scope for the Analysis 2
Timeframe for the Analysis 2
28.2 OTHER ACTIONS AFFECTING THE RESOURCES, ECOSYSTEMS AND HUMAN COMMUNITIES OF CONCERN 3
28.2.1 Past Actions 3
Land Use Changes - 1915 to 1930 3
Land Use Changes - 1930 to 1940 3
Land Use Changes - 1941 to 1960 4
Land Use Changes - 1960s 4
Land Use Changes - 1970s 5
Land Use Changes - 1980s to the 2000s 5
28.2.2 Present and Future Actions 5
28.3 CUMULATIVE IMPACTS ANALYSIS BY RESOURCE 7
28.4 BIBLIOGRAPHY 8

List of Tables

Table 28-1. Key Resources Evaluated for Cumulative Effects 2
Table 28-2. Present, and Future Transportation Projects 5
Table 28-3. Development Projects 7

List of Figures

Figure 28-1. Transportation and Development Project Locations 7

28.1 INTRODUCTION

Cumulative effects analysis involves adding the incremental resource effects of the project alternatives to similar resource effects from past, present, and reasonably foreseeable actions. For there to be a cumulative effect, there must be a logical connection between the effect from a project alternative and other past, present, and reasonably foreseeable future actions. For there to be a cumulative impact, the project must have one or more direct or indirect effects on the resource that add to, or interact with, the effects of other actions on that resource, regardless of who is responsible for the other actions. If the project alternatives have no direct or indirect effects upon a resource, then they have no cumulative effects on that resource. The purpose of this analysis is to assess the type and level of cumulative effects related to the H2H project.

The cumulative impact analysis followed a systematic process starting with scoping and resource identification, geographic study area and time frame determination, identification of other past, present, and reasonably foreseeable future actions, and evaluation of the project's contribution to cumulative effects. The process was guided by Council on Environmental Quality (CEQ) and Federal Highway Administration (FHWA) guidance pursuant to National Environmental Policy Act of 1969 (NEPA) requirements. The results are discussed for the overall project, except where there are differences in effects among different alternatives.

28.1.1 Methodology

Key environmental resources warranting consideration for cumulative impacts were identified through the environmental analysis for the project and through the scoping process, which included consultation with interested local, state, federal agencies, Upper Cook Inlet tribes, and ANCSA Corporations. The U.S. Environmental Protection Agency (EPA) was the only agency to provide a formal comment letter related to the cumulative analysis. Past, present, and future actions that could affect key resources are identified, the study area is described, and a time horizon is identified.

The methodology for the cumulative analysis was based on the Council on Environmental Quality handbook *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ 1997). The analysis of cumulative effects in Section 28.3 for each key resource includes the following:

- A description of the resource conditions and trends;
- Summarization of the effects of the project on the key resource;
- Assessment of the potential effects of other actions on the resource; and
- An estimate of the aggregate impact on each resource and the incremental impacts of the proposed project.

Important Cumulative Impact Issues Associated with the Project

During the scoping process, members of the public, stakeholders, and agency representatives identified 14 key resources of concern because of past losses, sensitivities associated with the project location, acquisition of right-of-way, or importance from a regulatory standpoint. These resources and their basis for inclusion in the cumulative impact analyses are shown in Table 28-1.

Table 28-1. Key Resources Evaluated for Cumulative Effects

Key Resource	Basis for Inclusion (P = public comment; A= agency comment)
Acquisitions and Relocations	Level of direct effects (P)
Air Quality	Scoping request and regulatory importance (P, A)
Aquatic Resources, Wetlands, and Riparian Areas	Scoping request, past losses, and regulatory importance (A)
Climate Change	Scoping request, level of cumulative effects (A)
Ecological Connectivity	Scoping request, past effects (A)
Economic Impacts	Scoping request (P)
Endangered Species	Scoping request, past effects (A)
Environmental Justice	Scoping request and project location (P, A)
Historic, Archaeological, and Paleontological Resources	Scoping request, past losses, and regulatory importance (A)
Invasive Species	Scoping request (A)
Land Use/Community Cohesion	Past effects, Scoping request (P)
Noise	Scoping request and regulatory importance (P)
Water Quality	Scoping request and regulatory importance (A)
Traffic (travel patterns, accessibility, highway safety, and congestion)	Scoping request (P)

28.1.2 Study Area

Geographic Scope for the Analysis

The cumulative effects study area for a resource is the geographic area where the resource could be influenced by the direct or indirect effects of the project and other past, present, and reasonably foreseeable future actions. For key resources that are defined by patterns of movement (air quality, water quality, climate change, ecological connectivity, and endangered species) the geographic scope is specific to the resource and is described in Section 28.3, Cumulative Analysis by Resource. For the remaining key resources, the study area is the Municipality of Anchorage.

Timeframe for the Analysis

The timeframe for the cumulative effects analysis was identified through the scoping process and agency input as starting in 1915 and ending in 2035. The year 1915 was selected as the starting point because Anchorage was founded in that year. In 1915, the Upper Cook Inlet marine, freshwater, and terrestrial environments were close to pristine except in the immediate vicinity of the railroad survey and construction camp, which had been established approximately 2 years earlier on Ship Creek, near the present site of downtown Anchorage. In accordance with EPA guidance, this environmental reference point represents the study area in an ecologically sustainable condition (EPA 1999).The future end point of 2035 was used because it is the project design year and the horizon year for this EIS.

28.2 OTHER ACTIONS AFFECTING THE RESOURCES, ECOSYSTEMS AND HUMAN COMMUNITIES OF CONCERN

To assess cumulative effects, other past, present, and reasonably foreseeable future actions that have affected or might affect one or more of the key resources listed in Table 28-1 were evaluated. Information on these projects was obtained through review of local planning documents and consultation with the Municipality of Anchorage planning staff. The intent was not to provide an exhaustive list of every project in the study area, but to provide a reasonable characterization of projects that have affected or may affect the key resources under evaluation. A general historical account of past actions as they related to cumulative impacts is given below. Present and reasonably foreseeable future actions are subsequently discussed. These actions are provided in tables and are broken out into transportation and development categories.

28.2.1 Past Actions

The following historical summary focuses on the development of the physical environment within the boundaries of the Municipality of Anchorage, as it relates to past development and land use changes in the Anchorage area. The sources for this overview were Naske and Rowinski 1981, Atwood 1982, Tower 1999, and Strohmeyer 2001.

The Anchorage Bowl is a mostly built-out environment. Its development has occurred from key historical events that brought waves of people to the area such as the settlement opportunities provided by the New Deal, construction of military facilities for World War II and the Cold War, development of oil and natural gas resources, and the establishment of the tourist industry. Anchorage has developed into the transportation hub of Alaska. Suburban development has extended beyond the Anchorage Bowl to Eagle River and the Mat-Su Valley.

Land Use Changes - 1915 to 1930

A railroad was planned in the early 1900s to connect the deepwater port of Seward and the fast-growing mining town of Fairbanks. In the spring of 1915, the federal government decided to locate its primary construction camp for a railroad near Ship Creek because of its strategic location along the railroad route and the potential to construct a future port in this location. Hundreds of people arrived by boat from the west coast of the United States and Alaska to find work building the new railroad. They set up camp along the creek, forming a tent city. A new town was soon planned to accommodate the influx of workers and improve sanitation. On July 10, 1915, the federal government started selling lots in a new town of 350 acres just south of the tent city. New residential and commercial construction boomed in this new town, officially named “Anchorage.”

A deepwater dock was completed near Ship Creek in 1919, which greatly increased the efficiency of transporting cargo and decreased the cost of supplies in Anchorage. However, when the railroad was completed in 1923, thousands of construction jobs ended. At about this same time, the Navy started converting its ships to run on oil instead of coal and many jobs in the nearby coal mines ended. Many people left Anchorage to search for jobs elsewhere. The new town’s economy declined sharply.

Land Use Changes - 1930 to 1940

The declining economy of the 1920s continued with the Great Depression until New Deal programs were implemented in Alaska. The New Deal was a series of federal economic programs implemented between 1933 and 1936 to stimulate the economy. It included a program that relocated about 200 farming families from the Midwest to the Matanuska Valley and thus opened new territory in Southcentral Alaska for settlers. Each family received 40 acres of newly cleared land to farm, a house, a barn, and farm animals. The new farming community used the new railroad, supported the local economy, and grew food for Anchorage, all of which bolstered the local economy.

The economic and physical growth of Anchorage experienced another large boom when in 1939 President Roosevelt created a 50,000-acre military reservation, Fort Richardson and Elmendorf Air Force Base (now Joint Base Elmendorf-Richardson), adjacent to Anchorage. Hundreds of troops arrived in 1940 to construct the new facility, and thousands of workers were hired to help. Anchorage businesses, including the railroad, boomed during this period. Anchorage was soon established as the military hub of Alaska.

Land Use Changes - 1941 to 1960

This period is defined by the changing military presence in Anchorage that led to increased development of the Anchorage Bowl. The Army Corps of Engineers constructed a new road that would connect Alaska with the lower 48 states to allow the movement of military personnel, vehicles, and equipment to and from the Lower 48 during war time. This road, completed in 1942, extended 1,523 miles from Dawson Creek, British Columbia to the already completed Richardson Highway at Delta Junction, Alaska and was called the Alaska-Canada (Alcan) Highway. The Glenn Highway was also completed that same year, connecting Southcentral Alaska with the Alcan Highway. The year 1942 also marked the completion of a new rail route through the Chugach Mountains between Portage and a new military port at Whittier. This rail route was restricted to military use only.

Hundreds of thousands of military personal and others moved to Alaska during World War II. The population of Anchorage grew more than three-fold from 1940 through 1942, creating new business opportunities but overwhelming local public services and the real estate market.

Although the military population declined after 1945 with the end of World War II, both Fort Richardson and Elmendorf Air Force Base were expanded in the late 1940s and early 1950s during the Cold War period. During the 1950s, Anchorage continued to serve as the military hub of Alaska.

Many World War II veterans returned to Alaska after the war as homesteaders. During this time, residential and commercial development grew beyond the original boundaries of Anchorage, with little planning, public services, or utilities to support the development.

Anchorage International Airport was completed in 1951. Given its location, Anchorage soon became an important fueling stop for international flights to Asia. Numerous airport expansions followed. The economic future of Anchorage continued to grow when significant oil and natural gas deposits were found in the Kenai Peninsula in 1957.

Land Use Changes - 1960s

The forces that changed the physical environment of the Anchorage Bowl in the 1960s included the March 27, 1964, Good Friday earthquake, which measured 9.2 on the Richter scale, and continuing economic growth from the development of energy resources. The earthquake killed nine people and destroyed many commercial buildings and homes in Anchorage. In response, the Federal government provided funding to rebuild the city. Much of the rebuilt portion of Anchorage was designed in accordance with urban planning principles and with modern construction standards to withstand future large earthquakes.

During this decade, additional energy resources were discovered, leading to continued economic and population growth. As oil reserves were discovered in Alaska, oil companies established their headquarters in Anchorage to be close to federal agencies and major banking institutions. Development of natural gas resources also occurred during this time period. There were substantial natural gas reserves associated with oil deposits on the Kenai Peninsula. The energy became available to supply the growing population in Anchorage in 1961, with the completion of a gas pipeline. The supply of gas increased in the mid-1960s as additional wells were developed. In 1968, giant oil reserves were found in Prudhoe Bay.

Land Use Changes - 1970s

The 1970s were marked by the development of the Prudhoe Bay oil reserves as well as the extension of the urban boundary and protection of the natural environment.

In 1975, the Anchorage borough and city governments were combined into a single jurisdiction, the Municipality of Anchorage. This expedited the delivery of public services such as sewer services, fire protection, and public transit. As the population of Anchorage continued to grow, coordination between the Municipality of Anchorage and the State of Alaska to protect the surrounding watershed, wildlife populations, and natural landscapes led to the establishment of Chugach State Park in 1970.

The extraction of Prudhoe Bay oil in 1977 brought in State revenues that allowed lawmakers to fund a number of public work projects to develop schools, utilities and transportation projects in Alaska, and in Anchorage. Around this time, the Port of Anchorage and the Anchorage International Airport continued to expand. Anchorage was home to more than half of the state's population.

Land Use Changes - 1980s to the 2000s

During this period, the tourism industry expanded. The Municipality of Anchorage developed the tourism industry by taking advantage of its status as the transportation hub of Alaska. Tourists were soon arriving by road, rail, sea and air. Marketing campaigns succeeded by showing the outstanding wildlife and scenery around Anchorage. Anchorage International Airport was renovated and expanded to accommodate the increasing tourist demand. Downtown Anchorage was redeveloped to attract tourists, which greatly changed the character of downtown. Many hotel chains moved in and constructed large buildings in downtown Anchorage, further changing the landscape of the City.

By this time the Anchorage Bowl was mostly built out, with very little vacant land remaining. As Downtown Anchorage was redeveloped for the tourism industry, the population outside of Downtown Anchorage expanded. Development could potentially expand further to the west across the Knik Arm. In December 2010, the FHWA issued a NEPA Record of Decision for the Knik Arm Crossing, a bridge that would connect Anchorage with Point MacKenzie. If constructed, this project would allow for expanded development in the Point MacKenzie area.

28.2.2 Present and Future Actions

Generally, reasonably foreseeable transportation projects are those listed either in adopted long-range transportation plans, and those included in the No Action Alternative. The locations of transportation and development projects are listed in Tables 28-2 and 28-3, respectively, and are shown in Figure 28-1.

Table 28-2. Present, and Future Transportation Projects

Figure 28-1 Identifier	Project	Timeframe	Description
	Widening of Seward Highway (LRTP Project #303)	Future	Seward Highway, between O'Malley Road and 36th Avenue, would be widened to six lanes
	Glenn Highway HOV (LRTP Project #639)	Future	One high-occupancy vehicle (HOV) lane in each direction constructed on Glenn Highway from Boniface Parkway to Artillery Road in Eagle River
	Knik Arm Crossing (LRTP Project #810)	Future	Toll Bridge that will connect Anchorage with Point MacKenzie
	Pedestrian Crossing Seward at 36th Ave.(APP Project # 89)	Future	New separated pedestrian crossing over Seward Highway at 36th Avenue
	Seward Highway Pedestrian improvements (APP Project # 166)	Future	Pedestrian crossing improvements, Seward Highway at Benson and Northern Lights boulevards
	Pedestrian Improvements(APP Project # 90)	Future	Midblock separated crossing between Benson and Northern Lights boulevards

Figure 28-1 Identifier	Project	Timeframe	Description
	Sidewalk Improvements (APP Project #s 75, 138, & 114)	Future	Sidewalk improvements at or near Seward Highway
	Pedestrian Crossings at 15th Avenue (APP Project #s 42 & 43)	Future	Pedestrian crossings at 15th Avenue at Ingra Street and Gambell Street
	Crossing Improvements (APP Project #s. 79 & 125)	Future	Crossing improvements between Fireweed Lane and 5th Avenue
	Pedestrian Crossings at 5th Avenue (APP Project # 127)	Future	Pedestrian crossing improvements, 5th Avenue between LaTouche and Gambell streets
	Crossing Improvements (APP Project #s 87)	Future	Pedestrian crossing improvements, Glenn Highway at Airport Heights Drive
	Multiuse trail improvements under the 1997 Anchorage Areawide Trails Plan	Future	Paved multi-use trails on the Gambell-Ingra couplet
	92nd Avenue/Academy Drive Extension (LRTP Project #628)	Future	Extend 92nd Avenue from Brayton Drive to Abbot Road
	Jewel Lake Road International Airport Road Grade Separation (LRTP Project # 609)	Future	Interchange improvements at International Airport and Jewel Lake Road including a grade separation of the railroad and International Airport Road near Northwood Street
	Tudor Road Access Management (LRTP Project #s 705, 706)	Future	Add access management and turn restrictions; modify local connections
	40th Avenue Extension(LRTP Project #618)	Current	Extend 40th Avenue from Arctic Boulevard to Eureka Street
	Minnesota Drive Corridor (LRTP Project #627)	Future	Extend controlled access from International Airport Road through an interchange at Tudor Road and widen the arterial to 8 lanes north of Tudor Road
	Minnesota Drive/Tudor Road Interchange (LRTP Project #638)	Future	Construct grade-separated interchange
	Railroad Grade Separation at Spenard Road and at C Street (LRTP Project #709)	Future	Add railroad grade separation at Spenard Road near 36th Avenue and at C Street near Raspberry Road
	Boniface Parkway Access Management (LRTP Project #633)	Future	Add access management and turn restrictions, modify local connections
	Muldoon Road Interchange (LRTP Project #610)	Future	Reconstruct ramps at the intersection of Glenn Highway and Muldoon Road
	Glenn Highway HOV Lane (LRTP Project #710)	Future	Widen Glenn Highway to add an additional non-SOV lane in each direction, interchange upgrades at Peters Creek
	Glenn Highway at Eagle River (LRTP Project #707)	Future	Make necessary improvements at Hiland Road and Artillery Road interchanges and add a third lane northbound and southbound between Hiland Road and Artillery Road
	Lake Otis Parkway Extension (LRTP Project #632)	Future	Extend Lake Otis Parkway to Glenn Highway interchange at Airport Heights Drive

Note: LRTP=Long Range Transportation Plan, APP=Anchorage Pedestrian Plan

Table 28-3. Development Projects

Figure 28-1 Identifier	Project	Timeframe	Description
	Eagle River/Powder Reserve	Current	Master plan development on Eklutna Native Corporation land
	The Terrace	Current	Single family housing subdivision, approximately 170 Units
	Tikahtnu Commons	Current	A 95-acre retail center with 900,000 to 1 million square feet of retail and commercial
	Viewpoint South	Current	Residential subdivision of fewer than 100 housing lots
	Legacy	Current	Retirement home
	Loussac Manor	Current	High-density mixed income
	Solara	Current	216 mixed-density housing units
	Kincaid Estates	Current	23 single-family housing units

Source: Chambers 2011; spring 2011.

Figure 28-1. Transportation and Development Project Locations

[To be completed, once the project list is drafted.]

28.3 CUMULATIVE IMPACTS ANALYSIS BY RESOURCE

[This section is to be provided at a later date with contract approval and NTP. Currently NIC.]

28.4 BIBLIOGRAPHY

[AASHTO] American Association of State Highway and Transportation Officials. 2011. *Practitioner's Handbook 12, Assessing Indirect Effects and Cumulative Impacts Under NEPA*. Published online at: http://environment.transportation.org/center/products_programs/practitioners_handbooks.aspx

[AMATS] Anchorage Metropolitan Area Transportation Solutions. 2007a. *Anchorage Bowl 2025 Long-Range Transportation Plan with 2027 Revisions.* Published online at: http://www.muni.org/Departments/OCPD/Planning/AMATS/Pages/LRTP.aspx

———. 2007b. *Anchorage Pedestrian Plan.* Published online at: http://www.muni.org/Departments/traffic/AMATS/Documents/PedestrianPlan_Web.pdf

Atwood, E. 1982. *Anchorage: Star of the North.* Continental Heritage Press, Inc.: Tulsa, OK.

[CEQ] Council on Environmental Quality. 1997. *Considering Cumulative Effects under the National Environmental Policy Act.* Washington, DC: Executive Office of the President. 64 pp. plus appendices. Published online at: http://ceq.hss.doe.gov/nepa/ccenepa/ccenepa.htm

Chambers, Angela. 2011. Personal communication via phone between Angela Chambers (Municipality of Anchorage) and Heidi Loeffler (CH2M HILL). May 24, 2011.

[DOT&PF] Alaska Department of Transportation & Public Facilities. 2009. *Seward Highway to Glenn Highway Connection Scoping Summary Report*. Published Online at: http://www.highway2highway.com/TechnicalReports.html

[EPA] United States Environmental Protection Agency. 1999. *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*. Published online at: www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf

[MOA] Municipality of Anchorage. 2001. *Anchorage Bowl Comprehensive Plan.* Published online at: http://www.muni.org/Departments/OCPD/Planning/Publications/Pages/Anchorage2020.aspx#Documents

———. 2007. *Anchorage Downtown Comprehensive Plan.* Published online at: http://www.muni.org/Departments/Planning/Publications/Pages/CBD_CompPlan_Final07.aspx.

Naske, C.-M., and L.J. Rowinski. 1981. *Anchorage: A Pictorial History.* Donning: Virginia Beach/Norfolk, VA.

Spring, Jon. 2011. Personal communication via phone with Jon Spring (AMATS) with Heidi Loeffler (CH2M HILL). May 23, 2011.

Strohmeyer, J. 2001. *Historic Anchorage: An Illustrated History.* Historical Publishing Network: San Antonio, TX.

Tower, E. 1999. *Anchorage: from its Humble Origins as a Railroad Construction Camp*. City History Series. Epicenter Press: Kenmore, WA.

Chapter 29: Permits and Clearances

draft

Chapter 30: Environmental Commitments, Mitigation, and Monitoring

draft

Chapter 31: Community Outreach and Agency Involvement

draft

Chapter 32: List of Preparers

Management	First Name	Last Name	Company/Agency
CH2MHill			CH2M Hill
CRC			CRC
Tina Adair	Tina	Adair	HDR
Kristin Anderson	Kristin	Anderson	HDR
Vanessa Bauman	Vanessa	Bauman	HDR
Dan Billman	Dan	Billman	HDR
Winsome Bowen	Winsome	Bowen	HDR
Sirena Brownlee	Sirena	Brownlee	HDR
Sandra Cook	Sandra	Cook	HDR
Laurie Cummings	Laurie	Cummings	HDR
Erin Cunningham	Erin	Cunningham	HDR
Mark Dalton	Mark	Dalton	HDR
Cecile Davis	Cecile	Davis	HDR
Vivian Dietz-Clark	Vivian	Dietz-Clark	HDR
Beth Elliott	Beth	Elliott	HDR
Shawn Florio	Shawn	Florio	HDR
Elizabeth Grover	Elizabeth	Grover	HDR
Chris Hughes	Chris	Hughes	HDR
Vince Izzo	Vince	Izzo	HDR
Anna Kohl	Anna	Kohl	HDR
Irina Lapina	Irina	Lapina	HDR
John Lazzara	John	Lazzara	HDR
Anne Leggett	Anne	Leggett	HDR
Andra Love	Andra	Love	HDR
Rick Lovel	Rick	Lovel	HDR
Terry McConnell	Terry	McConnell	HDR
John McPherson	John	McPherson	HDR
Leslie Robbins	Leslie	Robbins	HDR
Jon Schick	Jon	Schick	HDR
RaeShaun Schmidt	RaeShaun	Schmidt	HDR
Patricia Sikowski	Patricia	Sikowski	HDR
Nancy Tankersly	Nancy	Tankersly	HDR
Brian Tooley	Brian	Tooley	HDR
Mike Tooley	Mike	Tooley	HDR
Crystal Vargas	Crystal	Vargas	HDR
Christine Whitaker	Christine	Whittake	HDR
John Wolfe	John	Wolfe	HDR
Katherine Wood	Katherine	Wood	HDR
NEI			Northern Economics
S&W			Shannon & Wilson
Mary Beth Baxter	Mary Beth	Baxter	
Stafford Glashan	Stafford	Glashan	
Jonathan King	Jonathan	King	
Ed Liebsch	Ed	Liebsch	

draft

Craig Milliken	Craig	Milliken
Jim Potts	Jim	Potts
Robin Senner	Robin	Senner
Larry Sommer	Larry	Sommer
Dustin Watson	Dustin	Watson

draft

Chapter 33: Distribution

draft

Chapter 34: Index

draft