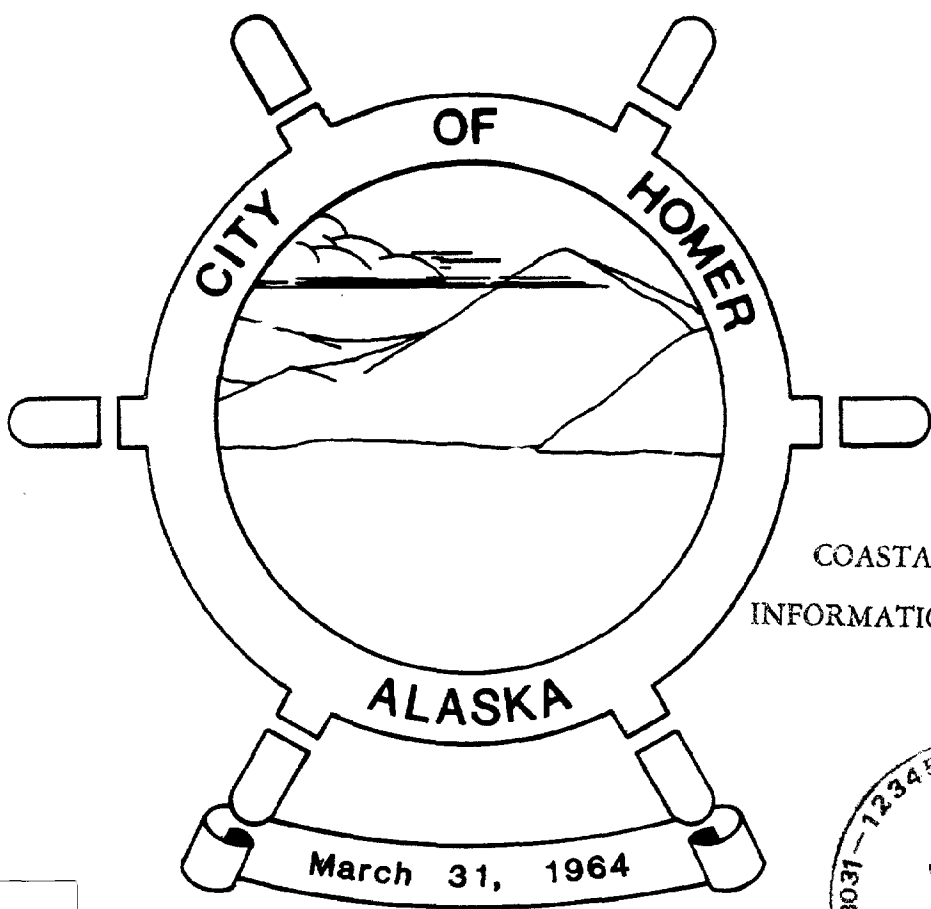


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Alaska, Coastal Zone Management Program

MASTER PLAN FOR ROADS AND STREETS



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1984



PREPARED BY:
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CITY OF HOMER
MASTER ROADS AND STREETS PLAN

December, 1984

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PREFACE

This report, written in 1984-85, presents a master plan for the integrated and rational development of Homer's roads and streets system.

In its definitive form, it is a single map covering the corporate limits of the city of Homer and graphically depicting the routes of existing and proposed future arterials, collector streets and local service roads. In its broader context, it examines the physical needs and deficiencies of the existing transportation system, proposes alternatives, and outlines a set of policy and capital project programming recommendations to implement the plan. Its success is predicated upon the accuracy of the plan's perceptions of future development trends, existing street problems, future transportation needs, and, upon the application of sound transportation planning and management principles.

Homer's roads and streets, both existing and proposed, are products of, and operators upon, the larger community environment. The expansion of the roads and streets system should be viewed in relation to the physical needs of the existing system and as part of the overall community's development needs. The 1980's represent a transitional growth period for Homer. Rural settings are being replaced with suburban development. Country roads, once adequate for low volume traffic, are now impacted with commuter traffic. Core commercial roads which were never designed and constructed to urban standards are carrying in excess of 8,000 vehicles per day. The situation of Homer's street system must be brought into focus with the dynamic growth situation of Homer also in clear view.

Originally, this Master Roads and Streets Plan was conceived as a physical facilities plan to augment the 1979 Master Roads and Streets Plan (Silvers Engineering). It was to include preliminary engineering and plan and profiles of roads proposed in the 1979 report. Immediately, it became apparent that such a project could not be undertaken without a concomitant re-evaluation of the community's growth patterns and existing system's deficiencies.

This plan presents revised and updated inventory data necessary for rational decision-making. Hopefully, the plan and its recommendations will generate serious discussion on the very nature of the issues, problems and opportunities facing Homer as it develops its road transportation network.

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SUMMARY

EXECUTIVE SUMMARY

This Master Roads and Streets Plan was prepared to supply the necessary background data to recommend improvements, management, and expansion of the street system. The Plan contains specific project recommendations, policy recommendations and a Master Plan Map which classifies each street in the system as to its function and ultimate design standard. Adoption and implementation of this plan will direct government and individuals' actions along a planned course of street development, which will ultimately produce an integrated and functioning street system.

As demonstrated in the text of the plan, the condition of the Homer street system is clearly the result of many individuals' and governments' past and current policy decisions and practices. By continuing to allow the construction of substandard streets and driveways in public rights-of-way, and by ignoring the impact of increased traffic volumes on existing streets, the City is assuming an enormous financial and safety liability.

Substandard streets will eventually become the future road network for the City. And public pressure to "do something about" the deficiencies will, more than likely, increase. The solution is to stop the proliferation of the problems and begin to correct the deficiencies on the existing streets.

In order to stop the proliferation of substandard streets, draft ordinances, contained in Appendix 3, were prepared and are recommended for adoption by the City Council. These ordinances are currently undergoing review. Passage will guarantee that no more substandard streets will be allowed to be built within subdivisions. Streets will have to be built to a specified City standard. These "standards" are not out-of-line with how roads need to be built to withstand the soil conditions, topography and drainage of the area. Paving is not a requirement; but the plan does recommend that paving begin on arterial and collector streets. This recommendation is made because gravel roads are uneconomical and unsuitable for urban areas where increased traffic volumes contribute to road surface degradation.

Homer's traffic volumes are far in excess of the norm for gravel roads. According to Oglesby in Highway Engineering, 4th Ed. (Wiley 1982): "The upper limit of traffic volumes for which untreated (gravel or crushed rock) road surfaces are economical varies, but is low; possibly in the range of 100 to 250 vehicles per day when vehicle operating costs are considered."

By comparison, Ben Walters Lane had 744 average daily traffic volumes (ADT) in the summer of 1984; East Hill Road had 1000 ADT; Fairview Avenue had 830 ADT; Kachemak Bay Drive had 2000 ADT; Kachemak Way (south of Pioneer Avenue) had 1731 ADT; and Main Street had 1708 ADT. All these roads are gravel surfaced.

Stopping the proliferation of substandard streets in Homer will only solve part of the street system's problems. Correcting the deficiencies on the existing streets is also essential. As the plan points out in Chapters 3 - 5 nearly all the arterials, collectors and local service roads have problems. Major intersections, such as: Homer Bypass and Lake Street; Pioneer Avenue and Main Street; Pioneer Avenue and Lake Street; Fairview Avenue and Hohe Street; are unsafe and poorly defined. Streets functioning as arterials do not have any access control, thereby reducing their effectiveness. Few streets have sidewalks and most road prisms are too narrow to safely accommodate both pedestrians and vehicles.

The existing problems occur, and will continue, because neither regulations nor enforcement nor funding has kept current with Homer's rapid development.

By adopting a Master Plan for street development, the City can begin corrective measures. The master plan map for roads and streets, Figure 1, represents the visual plan for the road system for Homer. The map is basically a modification and refinement of the 1979 Master Roads and Street Plan (Silvers Engineering). It identifies by functional classification the existing road rights-of-way and proposed future corridors. The functional classification of arterial/collector/local service roads is used in this plan. Where existing roads now function on a different level of service, they will need to be brought into compliance with the plan.

The map accommodates two levels of planning: system-wide planning and localized planning. On a system-wide basis, the map reflects the routes needed to provide travel continuity, efficiency and corridors for movement. It attempts to avoid concentrating additional traffic on existing congested streets. Planned route extensions were chosen to complement the upgrade of existing roads.

On a localized level the plan recommends specific route selections. Design criteria for intersection spacing, curve radii, topographic constraints, land use, and sight distances were used to determine the best route. Where preliminary engineering has been performed for selected roads, the route is generally established. As part of this plan, preliminary engineering has been done for Fairview Avenue (west extension), Grubstake Avenue, Svedlund Street,

Bayview Avenue extension, and Beluga Lake North Shore Road. In other cases where detailed engineering is lacking, additional analysis will be necessary.

The natural tendency of a community to concentrate on existing road upgrades, to the exclusion of new road construction, is counter-productive and ineffective. New roads may be necessary to improve mobility or alleviate traffic volumes on congested streets. Both levels of improvements are necessary to achieve an operable transportation network.

In order to plan and phase the necessary improvements for the street system, a capital budgeting program should be established. This program would phase right-of-way acquisition costs, with construction costs based on the classification of the road and the appropriate cost-sharing mechanism. The plan recommends that a criteria-based ranking system be established which would determine the phasing of long-range improvements. Need and the willingness of property owners to participate in road improvements should be weighed heavily in any ranking system.

The plan also recommends that roads be built concurrently with water and sewer extensions since these improvements encourage development and increase traffic loads on the road. It is also recommended that sidewalks and/or bike paths be built concurrently with arterial or collector street upgrades or extensions.

CHAPTER 1

CHAPTER ONE - BACKGROUND FOR PLANNING

Political Environment

The City of Homer is a first class city organized pursuant to Alaskan Statute Title 29 under a council-manager form of government. Homer was incorporated on March 31, 1964. Powers exercised by the City include police, water and sewer utilities, roads, port and harbor, zoning, parks and recreation, library and a volunteer fire department.

Homer is also included as a unit of government within the Kenai Peninsula Borough, an organized second class borough. The Borough has assumed four area-wide powers: assessment and taxes; education; planning, zoning and platting; and solid waste collection.

There is also one special service area, the South Kenai Peninsula Hospital Service Area.

Physical Environment

Topography.

The city limits encompass an area of approximately 6,400 acres, or 10 square miles, located on the north shore of Kachemak Bay on the southern Kenai Peninsula, see Vicinity Map, Figure 2. City development has occurred on a natural bench below a steep escarpment known as Diamond Ridge. This bench area is characterized by a man-made lake (Beluga Lake), wetland areas, low knolls and hummocks, tidal flats, and major drainages and minor gullies. The Homer Spit, a natural sand spit, protrudes from this bench area approximately 4.5 miles into Kachemak Bay. The City's topography extends from sea level (Homer Spit) to approximately 1,000 feet elevation (Diamond Ridge). Most of the City's core development is between 70 to 400 feet elevation.

The net effect of these major topographic features is to constrain development in a linear east-west direction, and to also provide an opportunity for natural segregation of incompatible land uses. Industrial areas are concentrated around the Homer airport and Beluga Lake (a float plane facility). The Homer Spit houses the port, harbor, marine industrial and marine commercial uses. Retail commercial and residential areas are stratified along the bluff's footslope with residential sites occupying the elevated "view" properties.

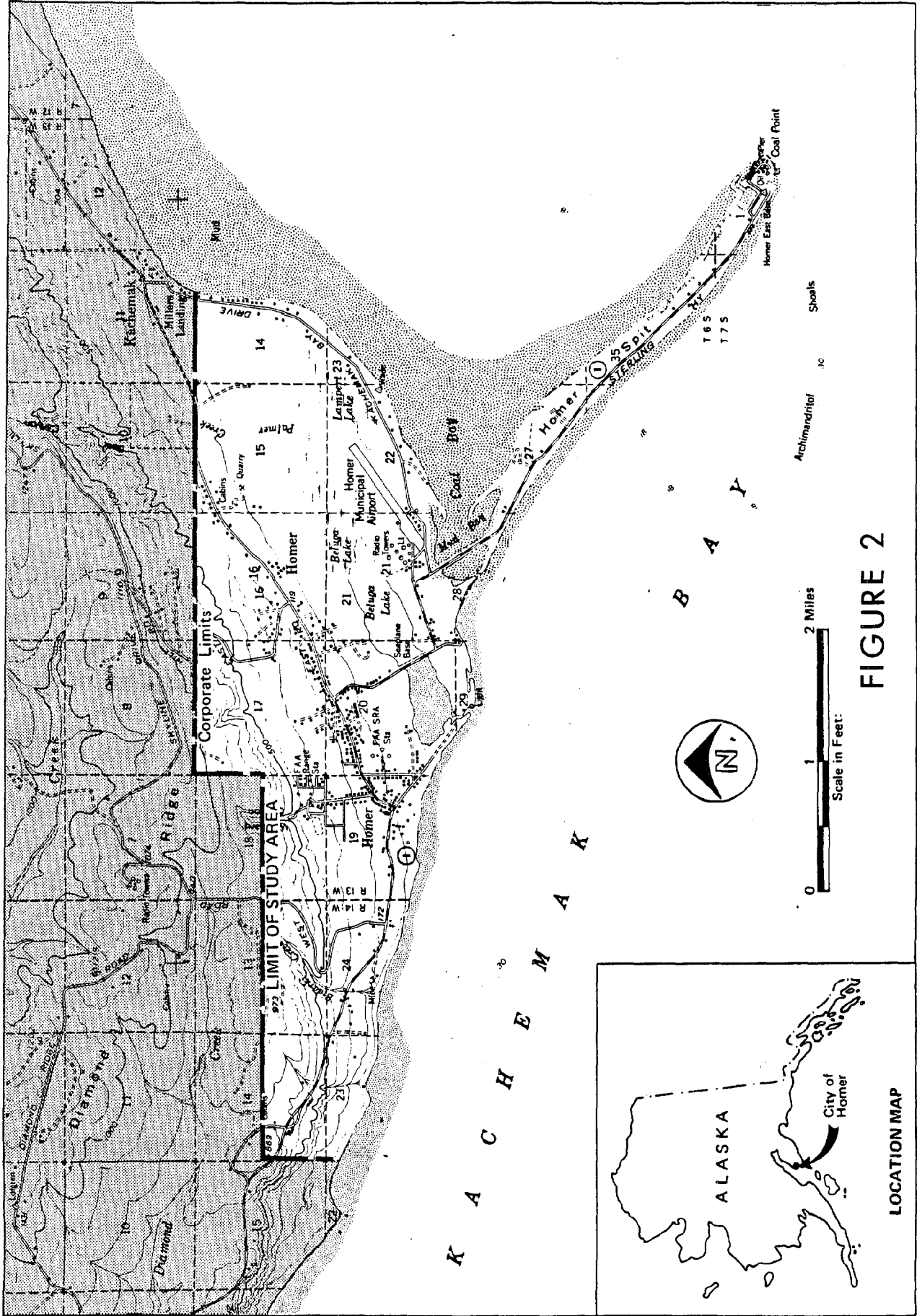


FIGURE 2

Geology.

Homer's topographic features are a result of the area's geologic history which has been marked by repeated glaciation, seismic activity, volcanic ash depositism, erosion and sedimentation. The underlying geology of the entire area is known as the Kenai Formation, a layer of sand, silt, clay, sandstone, shale and conglomerates interbedded with lignite coal, to a depth of 10,000 feet. Knowledge of the subsurface rock strata and glacial deposits is important in the planning process as subsurface features provide a method of cleansing waste deposits, support heavy construction activity, and are a source of water and mineral deposits. Structural damage to roadways and buildings can result from improper use or disregard of subsurface geology.

Soils.

The major soil types overlaying the Kenai Formation are the Beluga soil series and the Kachemak soil series. The bluff areas are composed of the Kachemak soils with the top 20 to 30 inches comprised of volcanic ash deposits. The footslopes below the 400 foot elevation are of Beluga series, comprised mainly of glacial fill, clay, lake sediments, glacial outwash and colluvium.

Less prevalent soils scattered throughout the bench area include Mutnala soils, tidal silt and beach deposits, morainal deposits, a combination of Mutnala-Beluga soils, and peat deposits.

From an engineering and construction standpoint, the soils in the Homer area are considered marginal to poor with low shear strength and high frost susceptibility. The groundwater table tends to be close to the surface in almost all areas, causing soil saturation and further reducing bearing capacity. Development is therefore dependent on drainage of the native soils, and importation of sandy gravels. The nearest quality gravel pits are located a haul distance of approximately 10 to 15 miles from Homer.

Drainage.

Homer's drainage flows in a north-to-south direction, via both surface runoff and groundwater seepage, terminating in Kachemak Bay.

The largest drainageways are Bidarki Creek (a/k/a Coal Creek), located west of West Hill Road; Woodard Creek (a/k/a Woodward Creek), located west of Bartlett Street; and Palmer Creek (a/k/a Bear Creek or Nordby Creek), which is east of the Cooper Subdivision area. Each of these creeks has gouged large canyons into Diamond Ridge. Woodard Creek and Palmer

Creek have repeatedly flooded, demonstrating their capacity to cause property damage.

Numerous other smaller drainages emerge as seepage from bluff areas, cut rills or gullies, and cross the footslopes. This downslope drainage may take many forms, either as "sheet" drainage, open channel flow, or infiltration and seepage. There are also open drainageways which at low elevations burrow beneath the vegetative layer such that they disappear and "flow underground".

Much of Homer is considered wetlands by the U.S. Army Corps of Engineers and is subject to permit review under the River and Harbor Act; Clean Water Act; and Marine, Protection, Research, and Sanctuaries Act. The largest single wetlands complex is the Beluga Lake area, including the Palmer Creek flats which feed into Beluga Lake; and the Beluga tidal flats, the outlet of Beluga Lake.

Vegetation.

The four major vegetative zones in Homer are dune and beach grass; fresh water marsh and muskeg; sitka spruce forest; and native grasslands. This cover material is important in stabilizing the shoreline and bluff, preventing soil erosion, providing wildlife habitat and contributing to scenic amenities.

Climate.

Homer's climate, classified as "maritime" by the Natural Oceanic and Atmospheric Administration, is among the mildest in Southcentral Alaska. Because the area is protected by surrounding mountain ranges, the average annual precipitation of 24 inches is well below the other Alaskan maritime coastal communities. The average annual snowfall is from 5 to 24 inches at sea level, but increases dramatically to 105 inches (average) at the 1,000 foot elevation of Diamond Ridge.

Temperatures are moderate for Alaska. The coldest month of the year is January, with a mean temperature of 21°F; the warmest months are July and August with mean temperatures of 52°F. During severe winters the soils can freeze to depths of 7 feet, though generally freeze depth is limited to 4-5 feet. The air freezing index (which is used to calculate frost penetration in designing embankment structures) is 1,750 to 1,820 frost degree days.

Spring "break-up" usually occurs from mid-April to mid-May, with heavy surface run-off continuing until late May. Break-up is a poor construction period due to soil saturation and truckload limits on local roads.

Social Environment

The north shore of Kachemak Bay was settled by coal prospectors beginning in the 1800's. As coal mining diminished in the early 1900's, subsistence homesteaders and fishermen slowly began to develop the area. By 1964, when the City was incorporated, there were estimated to be approximately 800 residents. Growth accelerated during the 1970's spurred in part by the Trans-Alaskan Oil Pipeline construction so that by 1980 there were 2,209 residents. The most recent population survey estimates 3,432 people in the city for an average annual growth rate from 1970-1980 of 10.4%, see Table 1.

Homer also serves as a regional trade and service center for a service area of approximately 50 square miles. As can be seen in Table 1, the population base in this area has also been increasing rapidly. Combining the area's population counts with the city's population reveals that the City services over 6,000 residents.

The Homer Comprehensive Plan (1983) prepared future population projections for Homer and the surrounding area; Table 1. The Comprehensive Plan proposed low, intermediate and high projections based on different growth rates. The intermediate projection, which uses a 7.5% growth rate to 1985, 6.5% to 1990 and 5.5% thereafter, is used for this study. Increases are projected to triple the population over the next two decades, to 9,400 people in the city and 18,200 for the entire area.

Economic Environment

Homer's economic base is a combination of activities that draws income into the city (basic income) or recycles it through respending (non-basic income). As Homer's economy has matured with the expansion of the services and trade sector, more and more money is being respent locally creating a healthy diversified economic base.

In the past the fishing industry has generated most of Homer's income. Even today, fishing comprises 43% of the basic source of income; see Table 2. Government spending represents the second highest basic source of income, 27%. Sales to nonresidents and tourism represent the next highest sources of new income to Homer.

Non-basic income is lead by the retail and wholesale trade sector. Transportation is the next highest industry recycling money in the economy.

Economic projections prepared by the 1983 Comprehensive Plan anticipate growth in the manufacturing, transportation, retail and service sector and business industry.

TABLE 1

Past Population Trends in the City of Homer
and Surrounding Area*

	City of Homer		Surrounding Area		Total Homer Area	
		Annual Growth Rate		Annual Growth Rate		Annual Growth Rate
1964	Approx. 800		N/A	N/A		N/A
1970	1,083	2.1%	N/A	N/A		N/A
1980	2,209	10.4%	N/A	N/A		N/A
1982	2,897	15.6%	2,069	N/A	4,966	N/A
1984	3,432	9.2%	2,837	13.5%	6,269	10.4%

* Surrounding area comprises Diamond Ridge and Fritz Creek.

Source: U.S. Bureau of the Census, Kenai Peninsula Borough, Alaska
Department of Labor

Projected Population Growth Trends in the City of Homer
and Surrounding Areas

	City	Surrounding Area	Total Homer Area
1985	3,400	2,800	6,200
1995	6,200	5,600	11,800
2000	8,100	7,500	15,600
2005	9,400	8,800	18,200

*Surrounding area comprises Fritz Creek and Diamond Creek election
precincts.

Source: Homer Comprehensive Plan 1983, Pacific Rim Planners &
Engineers, Intermediate Projection

Table 2
 Homer's Economic Base
 (Major Sources of Basic Income)
 Millions of 1980 Dollars

	<u>Dollars</u>	<u>Percent of total</u>
Fish & Fish Processing (1)	\$42.0	42.9%
Federal Government (2)	\$13.7	13.0%
Other Sales to Non-residents (3)	\$10.7	10.9%
Tourists & Other Visitors	\$10.5	10.7%
State Government (4)	\$ 7.7	7.9%
Household Income Earned Outside of Homer (5)	\$ 6.5	6.6%
Local Government (6)	\$ 5.0	5.1%
Contract Construction	\$ 1.9	1.9%
TOTALS	\$98.0	100.0%

NOTES;

1. Figures revised to avoid double counting of sales revenues
2. Direct spending by Federal agencies, including Post Office and Coast Guard.
3. Principally sales to Anchor Point, Seldovia, English Bay, Port Graham, and Halibut Cove residents and businesses.
4. Direct spending by State agencies.
5. Primarily pensions, investments, and outside wage and salary earnings.
6. Includes spending by Borough and local spending financed by grants.

Source: Pacific Rim Planners & Engineers, Olympic Assoc. Co.

CHAPTER 2

CHAPTER TWO - INTRODUCTION

Purpose, Scope and Methodology

The goal of this plan is to present data sufficient to provide a rational basis for improving, managing and expanding the Homer street system. The products of this plan are inventory data, policy recommendations, a revised master plan for arterials and collectors, and implementation proposals.

The boundaries of the study area are the corporate limits of the City. While the effects of the traffic influx into and out of Homer were not ignored, any improvements for outside the city limits are beyond the scope of this plan. The planning period under consideration is a twenty year time frame.

As a prerequisite to this study, it was necessary to examine the existing street infrastructure and re-examine the 1979 Master Roads and Streets Plan's recommended extensions. Analysis of the data was based on perceived needs of the community's transportation network within the framework of recent and proposed land use patterns which ultimately determine travel patterns.

Nature of Street System

The City of Homer is experiencing a period of rapid population growth. Its growth rate, of approximately ten percent per year, sustained over the past decade, makes this the greatest period of development in its history. This growth is transforming Homer from a remote rural settlement into a regional economic center. The impact on its public facilities infrastructure is exacting; with the most poignant and difficult infrastructure problem being the City's roads and streets system. Amidst the increasing development pressure and rising community expectations for better roads, is the need for a well-integrated and well-constructed transportation system.

In order to give an insight into Homer's needs, it is necessary to examine the nature and function of street systems. The common perception is that streets exist primarily to serve two functions: travel between destinations (mobility) and access to properties. To some degree these two functions lack compatibility. The access function provides the tie-in of streets with land use on abutting property, while the mobility function allows traffic emerging from properties to travel over extended distances to different destinations; ideally, with minimal interference and at maximum design speed.

In the way that the network serves these functions, it also defines the design of the road. Lane widths, type of surfacing, geometric elements such as grades and curvatures, driveway and intersection spacing are all reflected in design. Additionally, physical constraints, such as the bearing capacity, frost susceptibility, and groundwater table influence design.

Elements extraneous to the vehicular travelled way, such as water, sewer, telephone and electric must also be accommodated in the design aspect of many streets. Miscellaneous other features may be present in the border area between the roadway's edge and the abutting property line, such as curbs and gutters, ditches, driveways, street lights, fire hydrants and guardrails. Street rights-of-way also transmit, in addition to vehicular traffic, pedestrian and bicycle traffic.

All these diverse demands demonstrate that streets are infrastructure spines as well as conduits for motorized and non-motorized traffic. Thus, there is a great deal of planning necessary to ensure that warranted improvements are included at the design and construction phases. This intertwine of elements is the essence of the design process which calls upon engineers, planners, developers, financiers and others to carefully craft plans and consider the streets as segments in relation to the whole system.

CHAPTER 3

CHAPTER THREE - SURVEY OF EXISTING CONDITIONS

Roads and Streets - General Situation

Perhaps the most striking feature of the Homer street system to the casual observer is the prevalence of unpaved roads. While most of Homer's major arterials are now paved, almost every side street is gravel. The road base and surface for these side streets consist of gravel, sand or native material. The quality of these road types is variable. In 1985 there are estimated to be 40.5 miles of streets within the city limits, exclusive of private drives. The acceptance of these roadways by the City for maintenance, upgrade and repair is dependent on past policy decisions and current voluntary construction standards. The City does not require subdividers and developers to construct dedicated road rights-of-way at the time of subdivision development. The result of this policy is that Homer has nearly one quarter of its road system only minimally maintained or not maintained by the City. The City fully maintains approximately 13.25 miles of streets. An additional 5 miles gets only winter maintenance of snowplowing. And, 4 miles of roads get no maintenance at all.

Arterial Streets

The bulk of maintained roads in Homer are those that the State of Alaska Department of Transportation and Public Facilities (DOT/PF) maintains. Approximately 18 miles of roads are maintained by the State. These roads also happen to be the major traffic carriers and provide the skeletal and spinal framework for the entire road system. With the exception of the Homer Bypass, each of these roads has existed for over 30 years. These roads are:

- o Sterling Highway (The only road linking Homer with the rest of the Alaskan road system.)
- o Pioneer Avenue/East End Road (These roads link the areas east of Homer with the Sterling Highway; Pioneer Avenue is, in addition, the center of the City's commercial activity.)
- o East Hill Road/West Hill Road (Although these are two separate facilities, their overall function is identical: they link Homer with the Diamond Ridge area and provide access to abutting hillside properties.)
- o Lake Street/Ocean Drive/Spit Road (These streets provide the road link to the end of the Homer Spit.)
- o Homer Bypass (This provides a direct link between the Sterling Highway and the Lake Street/Ocean Drive/Spit Road link to the Spit, effectively "bypassing" the existing commercial strip on Pioneer Avenue.)

- o Kachemak Bay Drive (This road, while less important than the others due to its lower volumes and decentralized location, is the only access to the Homer Airport and is the sole alternate access to the Spit, aside from Lake Street and Ocean Drive.)

The function of these roads serve to provide continuous, direct service over long trip lengths, hence forming important links in the regional and statewide transportation network. Some of these roads also serve as access roads to abutting properties, thus eroding their purpose of mobility. All of these roads can be considered as "arterials" since their primary function is to provide mobility. Moreover, all, except for East Hill Road and Kachemak Drive (east of the Homer Airport), are paved. The State also has paved (and maintains) the road access via Bartlett Street, Fairview Avenue, and Hohe Street to the South Peninsula Hospital. No city maintained roads are paved.

The Homer arterial system is set up to promote west-to-east movement and movements linking the western entrance of the City with the end of the Spit. A driver may, for instance, drive from the City's western entrance to the end of East End Road without encountering a stop sign. Westbound movements along the same route do encounter stop signs. Similarly, a driver entering the City (western entrance) may proceed to the Homer Bypass, via Lake street, Ocean Drive, and the Spit Road to the proximal end of the Spit without stop control. The reverse movement is also free of stop signs. Except for the southbound parts of the Bypass-Lake Street-Ocean Drive-Spit Road route, most southbound movements on north-south roads are interrupted by stop signs. Currently, no traffic signal lights exist in the City of Homer.

A particularly noteworthy link in the arterial system is Lake Street. This street, which traverses the Beluga Tidal Flats, provides a direct link between the central business portion of the City with the industrial sections of town. The roadway embankment acts as an impoundment structure for the freshwater drainage upstream of the roadway, thereby creating Beluga Lake. Beluga Lake is itself an important component of Homer's transportation system, as it serves as float plane base. The lake also has recreational value, serving as a skating area and automotive ice-racing area.

Non-Arterial Street System

The non-arterial street system is composed of streets which serve as collector and local service roads. Collectors serve to funnel traffic from abutting properties to the arterial system. Local service roads function to access individual properties. With few exceptions, these roads are maintained (if maintained at all) by the City. These non-arterial roads are generally the creation of subdivision activity and

constructed by private developers. The City and State have reconstructed several collector streets over the past five years (Kachemak Way, north Main Street); but, almost all new additions to the street system have been constructed by private developers.

Except for a portion of Main Street and Fairview Avenue, Hohe Street, and Bartlett Street (Pioneer Avenue to Fairview Avenue), the non-arterial streets are unpaved. Many of these gravel streets do not meet minimum city performance and construction standards. They are, in many cases, too narrow, lack proper drainage, and/or lack sufficient fill for structural stability. The City maintains these roads but in principle does not accept any more such streets for permanent maintenance.

Traffic Data Inventory

Traffic data counts were compiled and analyzed to gain insights into the traffic loads on various Homer streets. Most of the counts were taken in the summer of 1984, but any previous counts taken by the State were also included. Appendix 1 contains the traffic data summary.

The traffic volumes recorded do not cover all city streets. The City attempted to collect data at the most significant roads and at the most important intersections.

Pioneer Avenue was found to have the heaviest traffic volumes. Pioneer Avenue is the City's main thoroughfare through the central business district. The highest volumes on the roadway occurred between Svedlund Street and Lake Street (the location of the only post office in Homer). Weekday traffic counts were tabulated at approximately 11,500 vehicles per day (vpd) (summer 1984).

The next highest traffic counts occurred at the Sterling Highway, west of the Bypass/Pioneer Avenue intersection, followed closely by volumes at the East End Road, Lake Street/Pioneer Avenue intersection. The recorded figures for the Sterling Highway, 8120 vpd in May 1984 and 7051 vpd in October 1984, may represent an inflated passenger vehicle figure due to heavy truck traffic entering the City at that point. The method of recording requires the traffic counters to assume all vehicles have two axles. If heavy truck (more than two axles) traffic occurs, the data will represent an overestimate of actual traffic volumes.

Accident Record Summary

Accidents, considered synonymous with collisions, are the result of a combination of factors. Conditions that must be present for an accident to occur include motion, human or

mechanical failure, and physical components. In order for an accident to occur, there must be a vehicle in motion, inertia of motion against avoidance of collisions, and evasive action. A human operator must fail to negotiate the road or vehicle, or the vehicle must fail to operate sufficiently. Thirdly, there may be physical conditions that are present which either directly contribute to the lack of control or lay in wait.

Accident data has been summarized in Table 3. From January 1, 1981 to December 31, 1983, there were 191 accidents reported in the State of Alaska's statistical surveys. Table 3 lists all the streets in Homer in which more than two accidents were reported. These fourteen streets represent 90 percent of all of the accidents reported.

As might be expected the arterial and collector system accounted for the majority of the accidents. The arterial system represents the bulk of roadway miles; thus, the more miles the more exposure to accident potential. Other factors which make the arterial system more susceptible to increased accident potential are the higher traffic volumes and travel speeds, the poor geometric design, and the unlimited and ill-defined ingress/egress points.

In terms of gross numbers, the highest incidence of accidents occurred on Pioneer Avenue and the Homer Spit Road, which each sustained 33 accidents. East End Road from Lake Street to the eastern city limits boundary was next highest with 22 accidents. The Sterling Highway from the western city limits boundary to Pioneer Avenue had 19 accidents, Lake Street had 17 accidents and Ocean Drive had 12 accidents. Noteworthy, and disproportionately high, the Homer Spit Road had three of the six traffic fatalities, as well as eight of the twenty-six major injuries sustained in vehicle accidents.

These observations, while instructive, do not provide a legitimate basis for comparison of the travel safety aspect of a roadway for several reasons. As one would expect, a higher traffic volume road will, all other things being equal, sustain a higher accident rate than a low volume road since more traffic invites more conflict opportunities. Likewise, for any given volume of traffic, the number of accidents should be proportionate to the roadway length: a greater length provides more conflict opportunity. These two observations show that the safety effectiveness of a road should at least be indexed to the number of accidents per million trips and the number of accidents per unit length of roadway. This index would provide a measure of the geometric safety, or the number of physical problems in the unit length of the road.

Table 3, column 7, represents the "raw accident rate" (RAR) which is the number of accidents per trip per mile, expressed as the order of ten to the minus sixth, or the number of accidents per million trip miles. This number is reached by

TABLE 3 - ACCIDENT SUMMARY (1981-83)

Column:	1	2	3	4	5	6	7	8	9
	Tot. Acc.	Tot. Fat.	Maj. Inj.	Min. Inj.	Weekday Traffic Volume (Fall 1984) (VPD)	Length of Section (Miles)	Raw Accident Rate Per Trip Per Mile	Severity Index (S) *	Adjusted Rate AAR Per Trip Per Mile
<u>STREET/SECTION</u>	<u>81-83</u>								
Bartlett Street (Pioneer to Fairview)	7	0	1	2	2,600	0.39	6.3×10^{-6}	11	10.0×10^{-6}
Ben Walters Lane	4	1	1	3	750	0.61	8.0×10^{-6}	12	23.9×10^{-6}
Bypass	5	0	0	3	3,200	0.98	1.5×10^{-6}	8	2.4×10^{-6}
East End Road (Lake St. to East Hill Road)	12	1	2	6	6,550	0.80	2.1×10^{-6}	25	4.4×10^{-6}
East End Road (East Hill Road to city limits)	10	0	4	2	2,350	1.69	2.3×10^{-6}	20	4.6×10^{-6}
East Hill Road (to city limits)	4	0	0	2	1,000	1.55	2.4×10^{-6}	6	3.5×10^{-6}
Homer Spit Road	33	3	8	15	2,000 (est.)	4.43	3.4×10^{-6}	73	7.5×10^{-6}
Kachemak Drive	4	0	0	1	2,050	3.09	0.6×10^{-6}	5	0.7×10^{-6}
Kachemak Way (S.) (Klondike to Pioneer)	3	0	0	0	1,750	0.095	16.9×10^{-6}	3	16.9×10^{-6}

* Severity Index = [(Column 1 + Column 4) + 2(Column 3) + 3(Column 2)]

TABLE 3 - ACCIDENT SUMMARY (1981-83)
(Continued)

Column:	1	2	3	4	5	6	7	8	9
	Tot. Acc.	Tot. Fat.	Maj. Inj.	Min. Inj.	Weekday Traffic Volume (Fall 1984) (VPD)	Length of Section (Miles)	Raw Accident Rate Per Trip Per Mile	Severity Index (S) *	Adjusted Rate AAR Per Trip Per Mile
STREET/SECTION	81-83								
Kachemak Way (N.) (Pioneer to Bayview)	3	0	0	1	650	0.44	9.6×10^{-6}	4	12.7×10^{-6}
Lake Street	17	0	3	4	5,756 (est.)	0.91	3.0×10^{-6}	27	4.7×10^{-6}
Main Street	3	0	0	1	1,350	0.97	2.1×10^{-6}	4	2.8×10^{-6}
Ocean Drive (Spit Road to Lake Street)	12	0	0	1	4,450	0.54	4.6×10^{-6}	13	4.9×10^{-6}
Pioneer Avenue	33	0	3	14	10,000	1.00	3.0×10^{-6}	53	4.8×10^{-6}
Sterling Highway (Pioneer to West Hill Road)	7	0	0	2	7,050	0.93	1.0×10^{-6}	9	1.3×10^{-6}
Sterling Highway (Past West Hill and Baycrest)	12	1	4	9	4,500 (est.)	2.08	1.2×10^{-6}	32	3.1×10^{-6}
West Hill Road	<u>2</u>	0	0	0	950	1.59	1.2×10^{-6}	2	1.2×10^{-6}
TOTAL:	171	6	26	66					

* Severity Index = [(Column 1 + Column 3) + 2(Column 4) + 3(Column 2)]

dividing the total number of vehicle trips (column 5) over the three year period*, divided by the number of miles in the roadway section under examination, (column 6).

The raw accident rate (RAR) yields interesting comparisons. The highest rate was recorded on the south section of Kachemak Way (Klondike to Pioneer Avenue) at 16.9, with the next highest rate on Kachemak Way from Pioneer Avenue to Bayview Avenue at 9.6. All of these accidents occurred prior to, or during, reconstruction of Kachemak Way. The main problem areas are around the switchback north of Rainbow Avenue, the intersection of Kachemak Way and Klondike Avenue (which had been previously channelized in a poor manner), and the intersection of Kachemak Way and Pioneer Avenue, which has poor sight distance and which has a high volume driveway located nearby.

The next highest rate is found on Ben Walters Lane, with a rate of 8.0. Several accidents, including one fatality and a major injury, occurred due to incompatibility between travel speeds and alignment curvature. Bartlett Street also experienced a relatively high RAR, at 6.3. Accidents included pedestrian collision and several angle collisions due to relatively high speeds for traffic, the large number of driveways, and possibly inattentive drivers. Ocean Drive from Lake Street to Spit Road was next highest, at a rate of 4.6, followed by Homer Spit Road at 3.4 and Pioneer Avenue at 2.0. East End Road had surprisingly low rates considering the rollercoaster topography, the unmarked intersections (leading to surprise stops), the poor sight distance at many driveways and intersections, the narrow width, and the relatively high speeds. The rates were 2.3 east of East Hill Road and 2.1 west of East Hill Road. The Bypass also had a low accident rate at 1.5, as did the Sterling Highway. (The Sterling Highway may be deceptive, considering the high recorded volumes during the fall 1984 period.) These areas will be further analyzed in Chapter Three - Problem Areas.

Table 3 presents a refinement of the raw accident rate according to accident severity. As noted, the raw accident rate uses only the total number of recorded accidents, without regard to severity. Column 8 in Table 3 presents the results of weighting accidents according to the number of injuries. A severity index is defined as the gross number of accidents added to the number of minor injuries plus twice the number of major injuries plus three times the number of fatalities. The severity index thus represents a weighting of accidents incidence; the severity index is divided by the number of trips times roadway length, to yield an "adjusted accident rate" (AAR), (column 9, Table 3).

* Based on the average weekday traffic volumes measured in October 1984 assumed to be equivalent to the three year period under examination.

The AAR is not in itself quantitatively meaningful. It clearly represents the equivalent of adding apples and oranges, and it further could be manipulated to yield altogether different results. Nonetheless, as a first cut, it at least weights data in the manner equal for all streets, and it can serve as an index, albeit flawed, of the hazard potential.

Using the AAR, Ben Walters Lane rates highest. Kachemak Way and Bartlett Street also show high AAR values, as does the Spit Road. The moderate range is occupied by East End Road, Lake Street, Ocean Drive and Pioneer Avenue, which show almost identical values. Lower values are exhibited for the Sterling Highway, East Hill Road, Main Street, the Bypass and West Hill Road. Again, the Sterling Highway figures should be treated with some caution.

The RAR and AAR figures provide a quantitative basis for evaluating the safety of individual roadway segments. However, there are several significant error sources, which should be considered prior to wholesale acceptance of the figures. Some of the errors are identified below:

- a) The accident statistics are based primarily on State summaries of police accident reports. Unreported accidents constitute an undetermined percentage of the reported accidents and are, of course, omitted. Also, failure to enter the accident records into the data bank can and does occur.
- b) Intersection related accidents are assigned to one or the other cross street. Often such an accident is caused by actions or factors related to both streets; the assignment to one street may artificially create a higher rate on one and a lower one on the other.
- c) The AAR and RAR values are sensitive to the roadway length used for study. The Kachemak Bay Drive statistics provide an illustration of this: it appears likely that three of the four reported accidents occurred between the intersection with Spit Road and the beach access road; however, this is unprovable in the absence of complete accident reports, which are no longer available. The use of a longer section may artificially depress the accident rate in a particularly dangerous section and mask the presence of a dangerous stretch. The Baycrest Hill area is an area which also appears to be so masked.
- d) The nature and causes of the accidents are not available using this approach. Analysis must often refer to the diagrams shown on the original accident reports.
- e) Traffic volumes recorded in October 1984 may, for some reasons, be unrepresentative of the 1981-83 period. It

is suspected that the Sterling Highway at Baycrest Hill recorded a much higher volume during that period, relative to the changes on other streets.

- f) Accidents may have discrete, identifiable causes related to roadway character and condition and traffic volumes. They are also to some extent random and probabilistic in nature. A short, low volume street recording two accidents in a year period may appear to have a high accident rate, but this may really be atypical of most years, and represent a statistical quirk.

Despite these shortcomings, this approach, combined with the qualitative analysis of accident reports and the inventory of existing conditions, is useful in deriving the problem areas detailed in Chapter Three.

CHAPTER 4

CHAPTER FOUR - PROBLEM AREAS

The traffic volumes and accident report data from Chapter three suggest that there are general problems and specific problem areas throughout the Homer street system. These problems can relate to the operational nature, structural integrity, maintenance, or design of the road. Extensive problems exist on many streets.

The root cause of many of these problems can be traced to the lack of required performance standards for street construction. Prior to 1974, the City had no street construction standards. After 1974, the City adopted voluntary standards, with City maintenance as the incentive for compliance. This approach has only worked in a few cases where subdivision developments sought federally insured home loans. Many more subdivisions have been "paper platted" with rights-of-way dedicated (required by Kenai Peninsula Borough and City Codes), but no road construction or minimal road development. The result has been that land is being sold for residential lots with the buyers constructing minimal access roads. This practice has proliferated substandard streets throughout the City. The problem is then compounded as more and more lots are sold and the substandard road extends further into the subdivision. Increased traffic on the road deteriorates the bed which causes the residents to look to the City for repairs and maintenance. A liability has been created with pressure on the City to "do something about it". Local improvement districts can be initiated but usually the district is rejected because taxpayers believe the City is responsible for paying for the road.

The problem of substandard roads exists throughout the City; but, equally alarming is the impact of increased traffic volumes on main arterial and collector streets. The community's rapid growth has accelerated degradation of these roads. Heavy traffic volumes can promote rapid formation of transverse corrugations or subbase contamination, which deteriorates the road. Only high maintenance costs or reconstruction is the answer at this point. The main streets in Homer, with major problem areas, are:

Bartlett Street

Bartlett Street is an existing paved collector street of about 20 feet to 22 feet width. Shoulders are very narrow, 1 foot or less. Prior to 1984, no sidewalk existed, and the dedicated right-of-way was only 30 feet wide, thus forestalling sidewalk construction. Lack of sidewalks presented a safety hazard in that pedestrians (who were present in relatively large numbers) were forced to walk in the roadway, and compete with the relatively high automobile traffic volumes on the street. Although a walkway has now been constructed, it is little more

than a temporary structure. The walkway is susceptible to glaciation and is therefore not usable during much of the winter. The City does not maintain the sidewalk. Therefore, pedestrians are still forced to walk in the roadway at certain times. Drainage, topography and existing conditions on the roadway and on abutting property made construction of a permanent concrete sidewalk difficult to build, as well as costly.

Traffic operation is also complicated by the large number of side drives, and the moderately steep grade, promoting excessive speeds on downhill runs. The road embankment is in some areas excessively elevated above abutting properties and ditching is not defined. Exiting from abutting properties is hazardous and perhaps diverts the drivers' attention from oncoming traffic. At least one major accident in the 1981-83 period resulted from egress movement.

Pavement on Bartlett Street is observed to be fatigued and failing in some areas. The alignment wanders within the right-of-way, but this is not as noticeable.

Ben Walters Lane

Ben Walters Lane is an existing collector street with one of the highest accident rates in the City. This accident rate does not reflect the many unreported cases in which vehicles end up in the side ditches during winter months due to an inability to negotiate curves.

The curvature of this roadway appears designed to slow the traffic, an objective basically incompatible with the road's function and character. The lower section (south of Nielsen Avenue) serves commercial and office land uses, which generally promote higher speeds during business hours. The upper section (north of Nielsen Avenue) serves numerous residential cul-de-sacs. Moreover, the entire road serves as a bypass or shortcut around the Lake Street/ East End Road intersection. The traffic character thus tends towards high speeds. There is particular difficulty observed in negotiating the long curve north of Nielsen Avenue and the south section of Ben Walters Lane. This intersection and curve area accounts for most of the accidents in this section.

The problems are compounded by the lack of sight distance at the Ben Walters Lane/Nielsen Avenue intersection and the use of a yield sign, instead of a stop sign.

The reverse curvature does not encourage slower traffic: it merely encourages encroachment into oncoming lanes. The high speeds maintained in the area also create dry-weather dust problems. Additionally, sight distances from driveways are restricted because of curvature or foliage in some locations, causing hazardous egress.

East End Road

East End Road serves as the major arterial linking the city center with the eastern section of the City, Kachemak City and areas beyond. The population east of Homer's city center is rapidly increasing, and the traffic volumes on East End Road are growing rapidly.

This arterial is observed to have several operational problems. The major problems are related to the roadway width, insufficient shoulder width, lack of pedestrian and bicycle amenities, "roller coaster" or "hidden dip" profile, steep approaches (caused partially by the embankment height), unmarked intersections, lack of illumination, relatively high speeds, and growing traffic volumes.

The posted speed on East End Road is 35 mph. The travel speed on East End Road is observed to vary between 40 and 45 mph; frequently speeds are dangerously in excess of this figure. The narrow road width and rolling profile places vehicles in conflict with opposing lanes, and with any bicycles or pedestrians on the roadway. Several intersections or driveways are effectively hidden at the base of dips, restricting sight distance and promoting a high accident potential. This is particularly evident at the intersection of East End Road and Rochelle Street.

Properties and subdivisions on the south side of East End Road must approach East End Road at a steep grade in many cases. These steep approaches, which are partially due to the steep embankment height, are problematic in that they inhibit speed of egress, increasing exposure time at intersections. This is particularly true during the winter when snow and ice make approaches very slick.

The road lacks illumination and street signs, making it difficult to identify intersections at night or in some cases, to distinguish between individuals' driveways and public roads. This adds to the safety hazards, in that lack of warning leads to sudden braking action or to such unsafe maneuvers as backing up to an intersection after passing it.

The accident rate along East End Road is observed to be relatively moderate, despite the operational problems. It should be noted, however, that traffic growth on this road has been substantially greater than the average growth rate of traffic along roads where historical data is available. Thus, the use of 1984 data for computation of the accident rate yields a disproportionately depressed accident rate.

East Hill Road

East Hill Road is presently serving as a major residential collector. The existing road is a silty-sandy-gravel of poor quality. During dry summer months, this causes formation of transverse corrugations, and generation of a great deal of airborne dust. During wet periods, drainage and seepage promote subgrade failure and pumping of subgrade into pond embankment material. The worst period, however, is in the spring breakup period, when the road may become virtually impassable due to the mud depth. (The worst area for this is north of the westerly switchback.)

While the accident rate is demonstrably low, probably because of the restricted speeds imposed by road surface conditions and the difficult alignment, the road is not without its hazards. Snow or ice conditions can make it extremely difficult to negotiate around the curves; there have been many reported incidents in which drivers barely avoided sliding into the canyon at the end of the western switchback. There have been cases, also, in which cars have slid off of the East Hill Road embankment.

Fairview Avenue/Hohe Intersection

This intersection was first noted as a conflict area in the 1979 "Master Plan for Roads and Streets", and has not been corrected. This is a three-leg intersection with Hohe Street intersecting Fairview Avenue from the north. Because the main access to the South Peninsula Hospital is along the paved Bartlett Street - Fairview - Hohe alignments, the intersection is constructed in a manner favoring left turns from Fairview to Hohe and, conversely, right turns from Hohe to Fairview. This 90° bend is super-elevated to promote through movement. Through movement westbound along Fairview is controlled by a stop sign at Hohe.

The east and west approaches of Fairview Avenue to Hohe Street are staggered. The eastern section of the roadway is centered on the right-of-way centerline. The western section, however, is offset and lies almost entirely within the southern 30 feet of the right-of-way. The western section is also of substandard width (18.5 feet pavement width) as is the Hohe Street roadway.

The intersection approach at Fairview has restricted sight distance; moreover, the intersection confronts the driver with an unnatural set of required movements. Through-traffic sweeps around a 90° bend on a narrow pavement strip, while Fairview Avenue movements are required to stop and judge approach speeds.

As a practical matter, there is no good reason why the through-movement between west Fairview and Hohe must be preserved. This does not significantly improve the access to the hospital.

Homer Spit Road

This road is observed to have a high incidence of accidents due to high traffic volumes, high speeds and driver inattention. Wave action acting on the road embankment is another problem. One portion of the road is particularly exposed to this wave action, due to the proximity of the embankment to the western mean-sea-level shoreline. This has promoted erosion of the Spit in this area and has caused significant damage to the roadway structure. Riprap and seawall maintenance have been costly.

There are no near term solutions to these problems. In the long term the best answer may be widening of the road and relocation of the road closer to the Mud Bay side.

Kachemak Bay Drive

Kachemak Bay Drive serves as both a residential collector and an industrial route. The major problems with this road are the poor drainage promoting subgrade failure, the dry-weather dust problem, and the poor driving quality of much of the road. The first 0.36 miles of the road is paved, but only 20 foot wide and minimal shoulders. This section from the Homer Spit Road to the airport, although paved, has poor recovery from slippage, etc. due to the geometrics of the road.

Lake Street

This two lane road, which serves as the major corridor linking Homer with the airport and the Homer Spit, has several problematic features. Traffic volumes are growing; creating congestion areas between Pioneer Avenue and the Bypass. Acute congestion occurs at the Pioneer Avenue intersection, the Lakeside Mall driveway, the Nielsen Avenue intersection, the Ben Walters Lane intersection, and, at various business driveways. Congestion can develop readily at any driveway or intersection along the street; usually by left turns impeding oncoming traffic which in turn impedes the progress of through-traffic.

The congestion problem is worst at the intersection of Lake Street and the Pioneer Avenue/East End Road junction, where long queues develop on Lake Street's northbound approach at peak hours. At present the intersection is controlled by stop signs at the westbound approach of East End Road and the northbound approach of Lake Street; eastbound traffic along Pioneer Avenue is not stopped. No channelization is designed. Vehicles on Lake Street must await clearance of Pioneer Avenue drivers prior to execution of turning movements, and during peak hours this can mean a long delay.

The Lake Street/Bypass intersection is another particularly dangerous intersection due to the design curve. Several accidents have occurred on Lake Street due to the curves between

Pioneer Avenue and the Bypass. The relatively steep grades and arterial character of the roadway tend to speed traffic to or beyond the design speed of the curves, creating the potential for loss of control, particularly during periods of snow and ice. This preponderance of accidents related to curves has been on the curve north of Nielsen Avenue, although numerous others have occurred on the curve south of Nielsen Avenue. A further effect of curves has been to restrict sight distance at various driveways and intersections inhibiting execution of turning movements.

There is insufficient room for walking and bicycling along Lake Street. Pavement distress and corrugation also occurs at some places on the road.

Main Street

Main Street currently suffers from deficiencies with respect to both the road surface and the cross-section. The poorest section, from the Homer Bypass to Pioneer Avenue, is subject to extensive subgrade failure and heaving as a result of poor drainage, insufficient embankment depth and lack of separation between embankment and subgrade. The surface of this section is particularly silty and creates a dust problem during dry periods. The road carries about 1700 vehicles per day, making it an important collector street; yet, it is actually underutilized because most drivers avoid use of it in favor of better alternative north-south routes. This result creates additional traffic loads on Pioneer Avenue and Lake Street.

The section of Main Street north of Pioneer Avenue is, by comparison, structurally sound. The major problems are caused by the fact that the road is unpaved. The result is severe corrugation, and a dry-weather dust problem. In addition, no sidewalk exists along the road and pedestrians must walk in the roadway.

Main Street is the only constructed street, other than Lake Street, connecting the Homer Bypass and Pioneer Avenue. The intersections with both of these streets deserve consideration as problem areas. Main Street and Pioneer Avenue intersect at an acute angle, causing difficulty in executing turning or through-movement. This problem, however, will be corrected by the Pioneer Avenue reconstruction project. The intersection of the Bypass and Main Street has problems caused by the Main Street approach. The approach's vertical alignment is such that the Bypass is obscured and the driver is visually led to believe that there is no road there. The majority of accidents on this Homer Bypass in the 1981-83 period were congregated at this intersection, and most of these were related to the approach problem.

Pioneer Avenue

Pioneer Avenue, at the time of this study, suffered from a number of deficiencies, which have been documented in project study documents, see Problem Issue Identification, Technical Memo #2, Pioneer Avenue Reconstruction Project, by the Transpo Group, May, 1984. The 1985 Pioneer Avenue reconstruction project is intended to mitigate all of the major problems.

CHAPTER 5

CHAPTER FIVE - POLICY AND PRACTICE INVENTORY

The Homer street system is the cumulative result of many individuals' or governments' policy decisions. Some of these decisions have been based on certain design philosophies or planning rationales related to route selections or cross-section designs. Othertimes, decisions have been based on immediately tangible, pragmatic considerations. Passable access has often been the highest goal and the "accepted street standards" might consist of the easiest and cheapest road that would suffice for access. The approach taken at any given time depended on prevailing local and state government ordinances and philosophies, lending institution regulations, and/or economic conditions.

The expansion and management of Homer's streets - including traffic management - has taken place in a social atmosphere in which individuality and property rights have been highly valued and opinions on governmental control, local or otherwise, have been mixed. Nonetheless, area development has led to an increased demand for improved basic services. These in turn have led to increased municipal services, and regulations controlling use of these services. What has emerged in Homer is a mixture of regulations (parking/ traffic laws, zoning, and right-of-way controls) and non-regulation (nonenforcement of laws and ordinances, lack of subdivision improvement installation requirements, and permits to construct substandard access on city rights-of-way). This mixture defines Homer's transportation activities and practices. It follows that an understanding and appreciation of the existing conditions on Homer's streets depends in part on an understanding of the legal/social/administrative environment, past and present, which has helped shape them.

The first roads in Homer were not really built to any "standards". The test of the road's acceptability was its ability to carry traffic. No governmental entity assumed maintenance responsibility. Gravel or sand was apparently added by users as needed; often extracted from the beach or the Spit.

The Homer Public Utility District, which was created in 1949 and disbanded in 1964 (with the creation of the City of Homer), did not assume road maintenance responsibilities. No City equipment existed with which to perform maintenance. The State of Alaska had already assumed responsibility for constructing, reconstructing and/or maintaining some of the city's streets.

The assumption of City maintenance began after the Homer water supply system was constructed (circa 1966-67). The water system demanded the addition of City personnel to operate and maintain the system. It is reported that the City Council determined if water maintenance personnel were on staff then they could also be used for part-time City road maintenance work. Thus, a

grader was purchased, and maintenance began on all non-State-maintained roads then in existence.

The City, for most of its history, relied exclusively on private developers and the State for street development. It is reported, however, that some subdivision roads were developed with City aid. Also, the City authorized incidental road upgrades as part of some water and sewer improvement projects, such as upper Bartlett Street. It was in about 1980 that the City began to take on street improvement projects in their own right. Svedlund Street, upper Heath Street, Main Street, Fairview Avenue, and Kachemak Way have all been constructed or reconstructed as City projects, using State grant monies. At this writing, the City is also establishing a new precedent by taking over the design and construction management for the reconstruction of Pioneer Avenue, a State-maintained roadway. This followed a successful lobbying effort to obtain funding for the street. Both the lobbying and the City assumption of project responsibility represent departures from the previous practice of promoting and managing City street facilities, while leaving State roads to State jurisdiction.

In 1974, the City adopted two ordinances: the first governed the installation of driveways and activities in rights-of-way, and the second was a street construction ordinance. Each was of major significance. The "driveway" ordinance asserted City control over right-of-way usage and access. The street construction ordinance was written as a "standard" for City streets. If a street was built to this standard, it would be accepted for city maintenance; if not, it would not be maintained.

The construction and maintenance of streets has often been a controversial issue. A particularly sensitive issue has been City assumption of street maintenance responsibility. Because maintenance has been the sole "incentive" for construction to City specifications, the City has been reluctant to accept any road for maintenance until certain criteria are met. Moreover, maintenance equipment and budgets are limited; and maintenance of all roads, no matter how substandard, is financially infeasible.

The conditions existing on Homer's streets are directly related to certain policies and practices. The following pages review what these policies and practices are, and the effect they have on the street system. The analysis is broken down into four parts: Ordinances, Administrative Regulations, Plans, and Capital Improvement Programs.

ORDINANCES

The City of Homer has adopted several ordinances and policies pertaining to street management and construction. Ordinances governing "Street Construction," "Driveways," and "Construction In Right-Of-Way" have been adopted; other related ordinances include those governing local improvement districts, off-street parking, and zoning. Adopted State laws include administrative code and statute provisions regarding highways and the function of the Department of Transportation.

TITLE 7, VEHICLES AND TRAFFIC, Homer Municipal Code, contains the traffic regulations applicable to the City of Homer. It contains prohibitions against stopping and parking vehicles, dangerous maneuvers, snowmobile use, intoxicated driving, etc. It also contains the off-street parking ordinance, with modifications recommended by the 1979 Master Roads and Streets Plan.

Chapter 7.04, entitled "General traffic provisions," adopts by reference all laws of the State of Alaska and any rule or regulation adopted by any duly authorized agency of the State of Alaska pertaining to motor vehicles, their licensing, safety measures, rules of the road, and any and all other rules and regulations pertaining to motor vehicles..." The laws and regulations adopted by reference are generally patterned after the "Uniform Vehicle Code." The most recently updated version is 1979, and it is published by the National Committee on Uniform Traffic Laws and Ordinances, an independent, non-profit, voluntary association representing governments and industries interested in traffic laws.

The off-street parking section of Title 7 is probably the most controversial section of the ordinance. Enforcement of its provisions has been difficult due to unavailability of staff and budgetary constraints.

TITLE 11, STREETS, SIDEWALKS, DRIVEWAY CONSTRUCTION Ordinance, was enacted in 1974. The ordinance suffers from three flaws. First, its intent is unclear. It was never established what roads it was to apply to, or where requirements were to be uniformly enforced. Second, there are problems with the ordinance content, in that some sections are contradictory and a number of key terms are undefined. Finally, actual construction practices evolved past the ordinance, and some requirements have become outmoded.

The street and right-of-way width section typifies some of these flaws. No definition is established for any of the design classes (arterials, secondary, etc.), and the ordinance carries two standards related to right-of-way widths. The standards also deviate from those recommended in the 1979 "Master Plan for Roads and Streets," and arterials or collector rights-of-way widths are not the same as the Kenai Peninsula Borough's subdivision ordinance. The net effect of these contradictions

is that it is difficult to obtain a right-of-way width in excess of 60 feet, since the contradictions and ambiguities usually default to the 60 feet minimum.

The cross-section requirements are perhaps the most flawed of the ordinance. There is a great deal that is not accounted for, yet the ordinance reads like a substitute for plans and specifications. Variations in site conditions are not adequately addressed by this "boiler-plate" approach, nor is there any control of vertical alignment (profile). The base course and leveling course requirements were established considering frost penetration in the area, rather than on a subgrade strength basis; however, they were reportedly scaled back based on economics. These standards predate the use of geotextiles in Homer, which has allowed thickness reductions in certain applications. The slope provisions contained in the ordinance could be interpreted as the opposite of what was intended.

The minimum driveway culvert length is specified at 21 feet, but culverts typically come in 20 foot lengths. It is also impractical to conform to the 0.1 foot requirements in some cases and the provision is routinely ignored. The requirement that the construction shall leave no possibility of scour is not well defined.

The plan and profile requirements do not specify that they are actually required prior to street construction; they only specify that, if the plan and profile are provided, they must adhere to certain guidelines. (However, the "driveway" ordinance includes a provision suggesting that plans and profiles as as-builts are required.)

The staking requirements do not explain what information is to be placed on the stake, nor what the intent or procedure involved in "staking."

The ordinance states some "requirements" for street design and construction; however, there are in practice no actual requirements. They are, in reality, standards to be followed by any road builder or subdivider wishing the City to assume maintenance. The ordinance does not state this, however, nor does it state whether it applies to new subdivision roads or existing roads. The question of applicability can also be extended to certain of the requirements. For instance, will the City refuse to accept for maintenance a designated arterial or collector which has not been constructed to its full width; or, will the City accept a lesser width as an interim standard until the volumes actually warrant full-width standards.

It was originally intended that this ordinance, by stipulation of standards, would control the quality of roads which the City assumed maintenance responsibility for. To the extent that the ordinance aimed at this goal, it failed. Some roads built after the ordinance was adopted were not built to these standards, yet

were accepted for "winter maintenance" (snowplowing and sanding) and some have been upgraded to permanent maintenance.

Chapter 11.08, Driveway Construction Permits requires permits before performing driveway construction (or any other construction within the right-of-way of City streets, roads or trails) and prohibits certain kinds of disruptive or destructive actions within "road" or "street" rights-of-way. "Roads" or "streets" are defined as "any dedicated public right-of-way 21 feet or more in width, which may or may not be in use as a travelled way."

This chapter (which predates the street construction chapter by several months) attempts to establish basic control over public rights-of-way. Its objectives, as noted in the ordinance preamble, are as follows:

- "(a) To provide maximum protection to the public through the orderly control of traffic moving onto and off of a road or street.
- (b) To provide a uniform practice in the design and construction of entrances and exits.
- (c) To provide the necessary drainage."

However, its scope was considerably broader. While the preamble's objective probably led to the ordinance's misleading label ("Driveway Construction Permits"), the ordinance clearly did establish regulations over all rights-of-way construction, as well as certain noxious behaviors impacting travel on rights-of-way. The most noxious problem was the electric and telephone utilities installation in the right-of-way. Prior to this chapter, the City was in the position of paying for street repair after the electric and phone companies excavated in City streets.

Section 11.08.050, subsections "a." "b." and "c." were originally labelled a. "Driveway, approaches," and b. and c. were labelled "Traveled ways or streets." These headings were apparently administratively deleted in 1981 when the Homer Municipal Code numbering system was revamped. This action had a major effect on the section's meaning. Previously, the section requires all streets to be designed and constructed according to the requirements of the street construction ordinance, and would, if enforced, have halted construction of substandard streets in City rights-of-way. The deletion of the heading renders the section ambiguous. It is not clear that street construction is affected by this section. Realistically, the section was never enforced, and the construction of substandard roads continues well after passage of the ordinance.

The design requirements have been the subject of some review and controversy in the recent past. Some sections contain ambiguous clauses, which restricts their enforceability. The most

controversial section is that which bars more than two driveways per lot, unless approved by the Public Works Director. The implied guarantee is that each property is guaranteed at least two driveways. If this is the meaning, then the objective of consolidated access on major streets can easily be defeated. In such circumstances, common driveways or single driveways per lot are the desire from a traffic viewpoint. Finally, the design requirements do not specify approach widths. In practice, the City has adhered to the DOT's design standards for appropriate widths for different business types.

Chapter 11.12, Street and House Numbering establishes an addressing system in the city limits and a nomenclature system for right-of-way naming. The system specifies, for example, that "streets" are north-south thoroughfares, while "avenues" run east and west. It is also stated that "street names shall not duplicate others in the City."

Chapter 11.16 Construction in Right-of-Way was enacted in November 1979, modified in 1981, and requires a permit before proceeding with any construction, or any other act which would alter the condition of a public right-of-way. A bond is required "in an amount deemed adequate by the City Manager" in order to pay for damages to public or private property or for personal injuries. Typically, this bond is in the amount of \$1,000.00. Denial of a permit can, by the ordinance, be appealed to the City Council.

Permit issuance is currently handled, for the most part, at City Hall by City staff, often in conjunction with driveway permits and/or building permits. The permit itself costs \$5.00; where plans and specifications are "required," a \$25.00 fee is charged. The plans and specifications requirement is enforced for construction of water and sewer mains, but not for construction of substandard roads on City rights-of-way.

In 1983, the City began to issue a separate permit for construction of utilities (i.e., telephone and electrical utilities with possible future application to natural gas and cable TV) in public rights-of-way. The permit form was adapted from the State DOT's utility permit form. The reason a separate permit was devised is that construction of utilities in rights-of-way is a one-time affair; yet, once constructed, utilities are operational. Operation often leads to maintenance or repair, and utilities must sometimes be relocated during future construction projects. The City has, in the past, allowed telephone and electrical cable to be buried almost randomly within right-of-way, with little inspection to determine that the cable was buried where shown on plans. When street, water and/or sewer projects are undertaken; the City must often pay the price of relocating buried utilities elsewhere in its own right-of-way, in spite of the fact that the utilities themselves or their contractors may have been responsible for causing the problems. In addition, no as-builts were required. The original construction in right-of-way permit did provide the

City some control over construction, however, the permit did not address utility problems, and the utility permit was devised to fill that void. To date, however, issuance of these permits has been erratic. The utility permit is administered strictly by the Public Works Department.

Title 17, IMPROVEMENT DISTRICTS, governs formation of local improvement districts (LID's). Improvement districts (also known as "assessment district") are a means by which part or all of the cost of capital projects are borne by those who actually benefit. In Homer, LID's have usually provided part or all of the funding for water and sewer projects; however, their use in funding street projects has been erratic. Nonetheless, street project are eligible for LID funding and, in fact, one street construction project has been undertaken on that basis.

Chapter 17.04 of the code lays out the basic mechanism for the formation of improvement districts. The mechanism is primarily derived from the Alaska Statutes, Title 29, which governs assessment district processes. The intent of the formation process is to ensure that LID creation is done with proper public notification, follows due process, and generally done with the consent of those affected. According to State law, however, a city can force an LID under certain circumstances.

The use of LID's has been primarily for water and sewer improvements. A check of City resolutions does not reveal any street improvement district proposals prior to 1978. At that time, property owners along Fairview Avenue (between Mullikin and Wright Streets) petitioned the City to form an LID for upgrading the street. The improvement district was expanded by the City to include the section from Mullikin Street to Bartlett Street. Although a public hearing was held in 1978, the issue was not resolved until 1981, when it was defeated. The road itself was eventually upgraded by City Public Works crews, over a period of years. The reason the petition was initiated was that no other funding source existed, and the City was not pursuing street upgrade projects.

Since the Fairview Avenue LID proposal, there have been eleven street improvement districts proposed: Hansen Avenue, Bay Avenue, "New Street" (Chamberlain-Watson Subdivision), "No-View Avenue," Soundview Avenue, Main Street (Fairview to Bayview), Cityview Avenue (Bartlett to Main), Kachemak Way, Shannon Lane, Rangeview Avenue and Heath Street (Pioneer Avenue to Bypass). This list does not include resubmittals of, or substitutions for, the same LID's. As of the fall of 1984, only the Main Street (Fairview to Bayview) project has been constructed as a Local Improvement District, and assessments covered only a modest share (20%) of project costs. The rest of these improvement district proposals were either withdrawn by the petitioners or failed in the ratification process. Others were passed and authorized by City Council but were not constructed. These were Hansen Avenue, Bay Avenue, and "New Street." At least one street LID (Heath Street from Klondike Avenue to the

Bypass) was approved by the property owners but was not approved by the City Council.

Reviewing the history of these LID's, one can deduce several reasons underlying their failure.

1. The expense was more than property owners wanted to bear.
2. Property owners felt that the City somehow was obligated to bear the costs of upgrading the road.
3. In cases where the Council itself killed LID's, it was often because the Council felt the project would somehow create adverse impacts on existing neighborhoods.

As previously mentioned, LIDs arose because no alternative funding sources were available. Street projects were often not vigorously promoted for capital funding since many other project priorities existed. Policy for prioritizing and financing street projects had been developed in the Capital Improvement Program packages submitted to the State legislature. Street improvements were prioritized by the City Council and funding requests for those projects were submitted to the legislature, generally according to the citizens' input at public hearings. If funding was not awarded to a project, persons desiring a street improvement would either form an LID to fund it, or press for the project to be placed on the next year's capital improvement program to be funded by the State. It is not surprising therefore, that the State legislature became the most popular potential funding source; however, there were limits to the amount of money that could be obtained from the State through the legislative process.

In late 1981 and early 1982, the City attempted to establish clearer policy guidelines for street funding. Some City personnel and council-persons were opposed to full City funding of residential street projects, because it would lead to an inequitable disbursement of funds, and to subsidies of neighborhood improvements on an unequal basis. Also the limited grant money that was being devoted to a single project could be allocated to several worthy projects, and it was felt by some that a method should be adopted to achieve the most widespread benefits. This philosophy was endorsed in a non-binding resolution (Resolution 82-65), which states "the City Council may set aside a percentage" of State street construction funds by allocating 25% of such funds to neighborhood streets, 25% to commercial streets, and 50% to arterial streets or "emergency routes." As a matter of policy, benefitting property owners on commercial and neighborhood streets were to participate in costs by providing 20% of project funding, while no assessments would be applied to projects upgrading "arterial streets" or "emergency routes."

This policy has never been implemented. To the contrary, the Kachemak Way street improvement districts failed with the proposal of 80% City funding and 20% assessments. Failure was based largely on the property owners' apathy and/or opposition

to assessments. However, the Council decided to go ahead and fully fund the street improvement project in spite of the beneficiaries' unwillingness to participate. Under Resolution 82-65, as noted, the full funding could be warranted by designating Kachemak Way as an "emergency route". However, it must be pointed out that every street can be considered to be an emergency route for its residents.

An important factor in the defeat of many LID's has been the lack of long-term financing mechanisms. In residential districts, 20 or 30 year assessment district bonds can be sold to the Farmer's Home Administration, depending on its financial constraints. In commercial districts, financing must be obtained from a commercial bank, usually with a three to five year payback period.

Issuance of long-term assessment district bonds, with sale to the open market may appear to be attractive. However, there is no guarantee that such bonds could be sold.

Sale to an agency such as the Alaska Municipal Bond Bank also has some advantages, except that such bonds would have to be backed by the full faith and credit of the City, so that the City would probably have to have general obligation bonds. Such bonds, besides requiring voter approval, would affect the City's bond rating (which is affected also by existing school district and hospital service area bonds) and perhaps limit its ability to finance projects of widespread community benefit.

Title 21, ZONING, of the Homer Municipal Code, was enacted in 1982, after many years of development and debate. This ordinance will have a significant impact on the future Homer street system because land use has a direct relationship with the street system and its use.

The zoning ordinance divides the City of Homer into eight zoning districts: Rural Residential (RR), Urban Residential (UR), General Commercial 2 (GC2), Marine Commercial (CM), Marine Industrial (IM), and Open Space-Recreational (OSR). The district boundaries are established by an official map, which has been revised several times since the zoning ordinance enactment, see Figure 3.

The zoning ordinance impacts the road and street system in a number of ways. It promotes the type of development allowed in each district, which, in turn, affects land value. The timing and intensity of land development affects the number of trips made on the road system, which affects the timing of improved transportation facilities. Improved transportation facilities then lead to further increases in accessibility and land value, which leads to even more intense land development. Trip-generation characteristics are related to the specified uses.

Other aspects of the zoning ordinance affect development density on steep slopes. These provisions, in their present form, are

regarded as basically unenforceable by the City administration. The slope provisions, for example, specify no definition of slopes, nor how the area's slopes are to be calculated. Although all developed area is to be counted, there is potential that two parties could not agree on what area is to be considered developed.

Drainage provisions are also very broad, and cover mainly those areas mapped in the drainage management plans. Much of the City is not included in these plans.

The provision requiring shared access for entrances onto arterials and collectors is controversial, but could be effective in preventing proliferation of driveways, if enforced.

Title 20, SUBDIVISIONS, of the Kenai Peninsula Borough code, regulates subdivision of lands in the City. Title 20 falls within the planning, platting, and zoning powers which the State, AS 29.33.070, requires for Boroughs.

Subdivisions must be approved by the Borough Planning Commission prior to transfer, sale, or entry into a contract to sell any "lots, tracts, parcels, or other division of land" within the Borough. With certain exceptions, a plat is required for commission approval and subdivisions must be surveyed. Monumentation requirements are specified.

The Borough requires that in a first-class or home-rule city, a subdivider first submit a preliminary plat to the Borough, and the Borough will transmit three prints of the plat to the City Advisory Planning Commission for its review. The ordinance states (KPB 20.12.050): "Recommendation of the City Advisory Planning Commission based upon lawful ordinance shall be incorporated into the final plat. The final plat will only be submitted to said City for review when the design deviates from the preliminary in a manner which has not been recommended by the City." The preliminary plat must be acted upon by the Borough Planning Commission (i.e. approve, disapprove, or conditionally approve). The subdivider's responsibility is then to prepare a final plat which incorporates the conditions or corrections of the planning commission, , and the final plat must be approved by the Borough Planning Commission. If the final plat is not received within one year of the preliminary plat, the Borough Planning Commission may require submission of a new preliminary plat. In many cases, the Planning Commission grants extensions on preliminary plats. As a result of this policy, a number of preliminary plats which are outdated as a result of subdivision activity on abutting property or by revision of comprehensive street plans are, nevertheless, ready for filing at any time.

There are certain design requirements which each subdivision must comply with, unless a variance can be obtained. The design requirements include a number of standards governing street

dedication and access requirements, lot sizes and designs. Each lot must abut a dedicated street; lots must be at least 6,000 square feet if water and sewer are available, 40,000 square feet if both well and sewer systems are on-site, 20,000 square feet if either public water or sewer is available.

Finally, if a first-class or home-rule city requires installation of improvements, no final plat of a subdivision can be recorded prior to compliance with such ordinance.

The ordinance as written allows subdivision of land and street dedication without requiring actual construction. All lots must abut on a dedicated street, and the subdivider's responsibility is only to demonstrate that, if the street is constructed it can meet the requirements of the Borough's ordinance. Because the City of Homer has its own street standards, the onus falls on the City to check for compliance. However, the ordinance does provide a mechanism whereby street construction may be required by the City under an installation agreement.

While the ordinance does state that the City Advisory Planning Commission's recommendations are to be included, the Borough Commission has, on occasion, overruled the City in the past.

Some of the particular Borough design standards deviate from those of the City of Homer. It is common practice for the Borough Planning Commission to require adherence to City standards within the City limits if the City Planning Commission recommends adherence to them.

The width requirement for arterials in the Borough code is only 60 feet wide. This is considerably less than the City's requirement and is viewed as an important area of conflict between the City and Borough ordinances. Prior to 1981, the Borough required an arterial width of 100 feet. This was scaled back because some subdividers contended the requirement unjustly penalized properties abutting or traversed by an arterial. The Borough is, again, in 1985, contemplating a return to the 100 foot standard.

ADMINISTRATIVE REGULATIONS

No codified policies exist regarding street maintenance, however, administrative policies do exist. At present, five maintenance classifications exist for Homer's streets. These classes are as follows:

- A) State-maintained roadways (permanent maintenance)
- B) Permanent City-maintained roads
- C) Roads maintained by the City only in winter (winter snowplowing and sanding only)
- D) Roads not maintained by City or State
- E) "Nonexistent" roads (i.e., vacant rights-of-way)

State Maintained Roads

State maintained roadways in Homer actually constitute the majority, in mileage, of Homer's maintained roads (about 18 miles). State roads in Homer include the Sterling Highway, West Hill Road, Pioneer Avenue, the Homer Bypass, East End Road, Lake Street, Ocean Drive, Homer Spit Road, Kachemak Bay Drive, East Hill Road, Lower Main Street, and a portion of Bunnell Avenue and Olsen Lane. Maintenance programs of the State Department of Transportation (DOT) Homer Maintenance shop include grading and repair of gravel roads (which are now limited in the city to East Hill Road and Kachemak Bay Drive), pavement patching, culvert thawing, ditching, and winter snowplowing and sanding. Snow is not removed to dump sites, but is instead plowed to the side of the road.

Homer's only sidewalks or walkways are along State-maintained roads (the Bypass, a portion of the Sterling Highway and Pioneer Avenue near the Homer Middle School site, East End Road, Bartlett Street, and Lake Street area/East End Road, and across the Beluga Lake tidal flats.) The State's graders blade off snow on the Bypass sidewalk, and the walks on East End Road, Pioneer Avenue and the Sterling Highway. These walkways were State-constructed and abut the roadway. The State does not maintain the Bartlett Street and Lake Street sidewalks, which were City-built and privately-constructed, respectively.

The State typically runs a grader blade over all asphalt surfaces on a daily basis in the winter to combat icing (aufeis) problems. Street sweeping is usually performed once a year, after the end of spring break-up, to rid streets of winter sand. The State must rent a sweeper or hire a contract sweeper to perform the work. Additional sweeping may be performed if restriping work is done. It is apparent from visual inspection that the once-a-year sweep is inadequate. Large quantities of dirt, spilled from dump trucks or carried from abutting gravel parking lots and gravel streets end up on the paved roadways.

The State also claims regulatory jurisdiction over all its maintained roadways. Driveway permits onto the State system are

issued by the DOT under State driveway regulations. The DOT may also impose axle load limits to prevent roadway damage in the spring. The local DOT maintenance foreman determines the timing and duration of the limit period, based on continuous monitoring. The load limits affect the start of construction projects in the spring of each year, making it uneconomical to haul until the load limits are lifted.

Finally, responsibility for funding, and usually contract administration, of reconstruction projects on State roads is considered a State responsibility. The 1984-85 Pioneer Avenue project is an exception to the contract administration generality, in that the City is supervising planning, design, and inspection; however, the State has fully funded the project. No serious proposal has been advanced in Homer to require or allow project cost-participation by property owners abutting on and benefitted by a State road for reconstruction projects.

The State maintains its roads on a permanent basis; no "winter snowplowing only" category exists. The DOT does not, in practice, accept new roads for maintenance unless it is constructed under DOT auspices; thus, there is little or no chance that existing City-maintained or non-maintained streets could be transferred to the State for maintenance. The City attempted some transfers in 1972, but was refused.

City Maintained Roads

Approximately 13.25 miles of roadway are "accepted" by the City of Homer for permanent maintenance. All of these are gravel roads.

Maintenance programs are carried out by the City Public Works Department. These programs include grading; repair of roadway during breakup (usually by adding gravel), or at other times as needed; culvert and catch-basin thawing on an as-needed basis (normally by steam-thawing); and ditch maintenance, on an as-needed or pre-programmed basis. Each year, the Public Works Department schedules and budgets for ditching of City-maintained streets to expedite surface drainage, remove sloughed material and debris. Surface repair is also undertaken. In 1984, for instance, a great deal of gravel was added to Kachemak Way to replace lost material.

Prior to 1984, the City oiled many of its streets to control dust. In 1984, the State Dept. of Environmental Conservation prohibited use of waste oil for that purpose. The Public Works Department is now experimenting with alternate methods of stabilizing roadways. Lignosulfate was tried on Kachemak Way in the summer of 1984, but that caused significant damage. The City has budgeted for application of asphalt emulsions in 1985 for the worst areas, i.e., Main Street and Kachemak Way. The City has, in the past, also leased a water truck to help control dust, but this has been very expensive and ineffective.

City street maintenance rolling stock is now confined to a sander, steam truck, loader, and two graders. Other equipment is owned by the City, but is not normally used for street maintenance. A backhoe is available for ditching, however. The graders consist of a ten year old Champion and a fifteen year old Wabco; the latter was intended as a standby but is in fact employed full-time. The Public Works Department has for a number of years, requested funding for a replacement grader (costing about \$120,000), but has been unsuccessful.

The Public Works Director estimates the street maintenance equipment needs for the foreseeable future as two graders (including the replacement grader), a loader, a sander, and one other vehicle for plowing (front-end plow truck). If the City takes over maintenance of Pioneer Avenue, and/or constructs and maintains some new paved urban-type streets, the City will have to acquire additional equipment. Public Works estimates that a snow blower, a large wheel loader, and 10-cubic yard end dump will be needed for snow removal. Pavement maintenance will require a distributor truck and tank, and possibly a spreader.

Graveling to repair or maintain the City's roads is usually done for the City by contractors. Streets which have recently required this repair include Crittenden Drive, Bunnell Avenue, Olsen Lane, Soundview Avenue, Mullikin Street, the Hillside Campground Road, Danview Avenue, Fairview Avenue, Bayview Avenue, and Kachemak Way. Gravel used for such purposes is usually a "dirty" mix (i.e., 10% to 12% by weight of gravel passed through a No. 200 standard sieve in a shaker). This mix is supposed to "bind" better than a standard specification gravel, which would have a finer content of around 0% to 5%.

Street lighting and signage are rare and inconsistently applied. Street signs are typically furnished and installed by Public Works. The City does not require developers to install them. Very little money is available for street signage, and there is a problem of theft and vandalism of street signs that are installed.

Although not specifically codified, maintenance has historically been the City's major weapon in attempting to ensure that streets were built to "City standards." If a road is not constructed to standards, then theoretically, the City will not accept maintenance responsibility. The theory was simple: the street would not be a problem or concern for the City if the City did not have to maintain it. It would not be within City jurisdiction, so no liability for reconstruction could be assigned to the City, and there would be no maintenance costs. If abutting property owners wanted the City to grade and provide winter services, they would first be required to upgrade the road to "City standards," as specified in the street construction ordinance.

The question of which roads have been actually accepted for maintenance, and why, is interesting and somewhat controversial. As mentioned earlier, the City simply did not maintain roads prior to the construction of the water system. When water system maintenance personnel were added (circa 1966-67), the City decided to use these personnel on a part-time basis for grading the streets that then existed; thus a grader was purchased. Later, the City determined that it was no longer acceptable to take on any road for maintenance, and that some criteria should exist to determine what roads warranted maintenance. At that time, many of the "roads" on public rights-of-way were little more than foot-trails. This led to the streets ordinance, Title 11. A policy was established that streets had to be built to the standards of the ordinance, or would not be accepted for maintenance on either permanent or winter-only basis.

In many ways, however, the ordinance's intent was undermined. Intermittent maintenance on roads that were not accepted has occurred. Most streets in lower Glacier View Subdivision, for instance, were never constructed to any acceptable standard, have never been accepted for permanent maintenance, yet the City has dumped a considerable amount of gravel on these streets. In fact, the streets' present condition (marginal but driveable) is due largely to the Public Works Department's efforts. The City had apparently felt compelled to respond to the residents' complaints, despite the City's proclamations of non-responsibility.

A further degradation of the street standards policy developed from a practice that reportedly existed in the mid-1970's. At that time, the City is reported to have participated in constructing streets with private firms. City equipment and operators, while on maintenance duty, would spread and shape gravel for private contractors. Streets allegedly included in this practice were Ocean Drive (in Oscar Munson Subdivision), Williams Road, Fairview Avenue (Main to Hohe), Early Spring Street and Mark White Avenue, a portion of each Bayview Avenue, Heath Street, and Main Street (Pioneer to Fairview).

Finally, the City accepted winter maintenance responsibilities, based on certain criteria that did not include the street's construction standards. According to some, the City had in practice been maintaining streets on a winter-snowplowing-only basis for a number of years prior to official adoption of the policy allowing this practice. According to present policy, the City must plow and sand a road in the winter if the following criteria are met:

- "1. The entrance to the road by the individual user is within 500 feet of the nearest neighbor or another maintained travelway, either City or State.

2. The average of road users shall equal at least one user to each 500 feet of road or street to be maintained.
3. Distances as used herein shall be determined by measure from the point of private entrance to the public travelway, or the non-private entrance where road is maintained.
4. The roadway must be built to a standard to allow City equipment to operate in a normal manner; the roadway must be wide enough and firm enough to accommodate a grader, front end loader or similar snow removal and/or sanding equipment without damaging the roadway and allow maneuvering room for turning around and disposing of snow.
5. Driveways leading onto the public travelway must be kept clear of vehicles and obstructions to allow snow removal and sanding.

THE CITY OF HOMER WILL NOT BE RESPONSIBLE FOR MAINTENANCE OF CULVERTS, DRAINAGE PROBLEMS OR GLACIATION..."

This policy was perhaps the deathknell to the effectiveness of the maintenance-incentive policy.

Maintenance responsibility has been assumed by the City under the following circumstances:

- a) It existed at the time the City first began maintenance, and was thus always maintained as a matter of course.
- b) It was accepted for full-time maintenance subsequent to that time, either by administrative action or City Council action, (often without regard to whether it was built to standards).
- c) It was accepted because it was built to City standards; and all development requirements were met.
- d) It was never accepted for permanent maintenance, but was accepted for winter maintenance because it met the above criteria.

The results of these policies has been displayed on a map prepared by the Public Works Department, showing maintenance responsibilities. This map has been an item of controversy, because of the absence of specific accepted procedures for streets being added or subtracted.

It can be seen that the consequences of accepting a street for maintenance are broader than simply requiring expenditure of funds to send graders to blade it. It entails an assumption of

responsibility for the road's condition and public liability for ensuring passability and emergency ingress and egress. Thus, once a street is accepted for maintenance, it is difficult to quit maintaining it, even when the road becomes a quagmire, requiring great expenditures of maintenance monies, and abutting property owners refuse to participate in the cost of the road's upgrade. Thus, the City may be trapped into paying the full cost of reconstruction.

Denial of acceptance of substandard roads for maintenance is thus viewed by many as the solution to the problem. However, this strategy has not worked. Inevitably, population growth will, under current rules, warrant winter maintenance, and the City has often provided summer maintenance on "unaccepted" roads. Moreover, the basic premise of this strategy, that the City can refuse liability for its unaccepted rights-of-way, is perhaps questionable, in light of the fact that it has assumed regulatory jurisdiction over construction in its rights-of-way.

PLANS

There are seven planning documents that impact the street system of Homer: the Homer Comprehensive Plan (1983), Homer Master Roads and Streets Plan (1979), Homer Comprehensive Sewer Plan (1983), Homer Comprehensive Plan for the Distribution of Water (1983), Homer Drainage Management Plan (1979), Homer Revised Drainage Management Plan (1982), and the Kenai Regional Transportation Study (1981-83).

1. The Homer Comprehensive Plan was prepared in 1982 and enacted by the Borough and City in 1983. The plan included a land use plan, a transportation plan, improvement plans for water and sewer, and proposed policies. Goals, objectives and policies were included for the City with two areas receiving special treatment: the Central Business District (CBD) and the Homer Spit.

The CBD plan called for fostering an area which would serve as the community's focal point. To that end, the plan stated an objective of improving "pedestrian safety, convenience, (and) business viability." Specific actions proposed included establishment of "a program to encourage more intensive (commercial) development of the node areas," and development of "a plan and program to improve parking and pedestrian safety by identifying and designing parking areas, sidewalks and drainage improvements in public right-of-way and private property." The plan also called for "attract(ing) private investment into the CBD while retaining and enhancing the district's positive features." This included City actions such as providing "advisory design information" on amenities such as boardwalks and landscaping on private property, and exploring "a program of tax breaks or other incentives" to encourage merchants

and property owners to accommodate public uses, such as parking and pathways, on their property.

The Homer Spit Land Use Plan called for organization and expansion of parking areas, and encouraged the institution of shuttle-bus service.

The Comprehensive Plan also set forth goals and policies for management of drainage, and water and sewer utilities. The water and sewer policies included the recommendation that water and sewer extensions be programmed so that "areas of higher existing or potential population density and industrial areas where it is feasible to operate and maintain the system" will receive service first. Drainage recommendations included "a provision for adoption of a drainage ordinance, construction of key drainage improvements, and acquisition of drainage easements via plats."

The plan also detailed a capital improvement program, which included an analysis of the City's capital improvement financial potential and a list of potential projects, including a large number of street projects. The projects expected to be fully funded and constructed by the State or other agencies were omitted, with the notable exception of port and harbor facilities.

The capital improvement projects were evaluated by each department according to perceived need, numbers of users to be served, cost effectiveness, and the degree to which the project was compatible with adopted plans and policies. Departments used a "high," "medium," or "low" criteria system to rate each project. Twelve street projects were rated, totalling \$6.2 million (December '82), most of which involved upgrade of local or collector streets. They are: pave Main Street, upgrade lower Main Street, upgrade Glacierview Subdivision roads, upgrade Danview Avenue, upgrade Soundview Avenue, upgrade Fairview Avenue, upgrade Bayview Avenue, extend Fairview to Heath Street, CBD parking lots and sidewalks, upgrade Cityview Avenue, upgrade roads in Cooper Subdivision, and put in street signs. Only one new street project (Fairview extension to Heath Street) was included, and it was rated "very low."

The transportation section of the Comprehensive Plan included eight policies and sixteen "actions" to achieve the land transportation goal to "provide safe, durable and cost effective road access to all existing or planned developed areas of the City in a manner which allocates costs equitably." The seven policies are:

- Policy 1: Road extensions and improvements shall be designed to promote the objectives and policies of the comprehensive plan while providing access for the greatest numbers of existing and future residents.
- Policy 2: Traffic flow and safety shall be improved through consideration of intersection and parking area design for collector and arterial roads.
- Policy 3: Road standards and construction methods shall recognize the variability of local soil substrate and hydrologic conditions, while providing a cost effective solution to road transportation needs and functions.
- Policy 4: The bypass road shall be maintained as a limited access major arterial corridor from Pioneer Avenue to Lake Street, with Main Street the principal cross-section point.
- Policy 5: In recognition of traffic congestion and safety problems, business owners shall be responsible for providing adequate parking for employees, customers and other visitors.
- Policy 6: In recognition of the public support for pedestrian facilities, the City shall support the development of a master plan for the inventory and development of trails, pathways and sidewalks.
- Policy 7: Responsibility for financing initial construction, upgrading and maintenance of roads shall reflect their use and function.
2. The Homer Master Plan for Roads and Streets (Silver's Engineering, 1979) included a review and analysis of existing conditions, analysis of physical constraints, existing facilities, traffic volumes, circulation patterns, network geometrics, and laws and ordinances. Population trends and demographics were analyzed, and problem areas were identified. Road and street standards and functional use guidelines were proposed. Finally, a master map for road and street extensions was presented.
- The plan was prepared during the construction of the Homer Bypass and was somewhat reserved about the impact the Bypass would have on congestion along Pioneer Avenue. It identified the basic problems along Pioneer Avenue and recommended several actions to alleviate them.

Concerning the Bypass, the plan states:

"One particular decision that should be made immediately, is whether or not to allow direct frontage on the Bypass Road.

It is recommended that frontage be controlled, providing as few access points as possible to preserve the true function of Bypass Road, a major arterial that provides access around the CBD. If policies regarding this issue are not resolved and guidelines established, it is foreseen that the Bypass Road will develop in a similar pattern as Pioneer Avenue, to the detriment of the City as a whole. It is therefore recommended that a detailed analysis of the core area be accomplished and policies and guidelines be established that preserves the central core and allows development to occur along a pattern that enhances the natural amenities of the City."

Among other elements contained within the plan, five specific segments of Homer's road network were identified as needing substantial improvements. First, the intersection of Pioneer Avenue, Lake Street and East End Road was determined to be inadequate and redesign of the intersection was suggested, (via creation of a separate eastbound to southbound lane and channelization of the intersection). Nearby, the plan also recommended redesign of the intersection of Lake Street and Nielsen Avenue to improve traffic flow around the Lakeside Center Mall by installing a left turn storage lane southbound, an acceleration lane for westbound to southbound traffic and widening and channelizing the Nielsen Avenue approach. Third, the plan called for redesign of the Main Street and Pioneer Avenue intersection by reconstruction of the approaches of Main Street, channelization, and restriction of parking along Pioneer Avenue in the vicinity of the Main Street approaches. Fourth, the plan called for structural improvements to improve access to the hospital by providing stop sign control on Hohe Street, a four-way stop at the intersection of Bartlett Street and Fairview Avenue and paving Bartlett Street to the hospital. Finally, the plan called for upgrading Pioneer Avenue to relieve the problems caused by numerous left-turning movements and on-street parking, by consolidating the number of access points, restricting on-street parking and creating a left-turn lane.

In response to these recommendations, funding priority was established for each of these projects (excepting the Bartlett Street project) through their inclusion in the Kenai Regional Transportation Study. This study

constitutes the basis upon which State funding is awarded for projects of such nature within the Borough.

The Master Plan identified issues and other portions of the surface transportation network where additional research and analysis were needed. First, the Master Plan called for the issuance of City policy guidelines on the function and use of the Spit because of the growing and diverse demands which might be placed upon this unique feature of the City. As the plan points out, traffic volumes are directly related to land use and guidelines should be established to govern or control the long-term use of the land along the Spit; and, therefore the corresponding traffic demand. It was also suggested that future traffic volumes on the Spit Road might warrant expansion to four lanes.

The Master Plan classified Homer's present and proposed future street network into three categories, "Major Arterial," "Neighborhood Arterial," and "Collectors." The designated major arterials included the Sterling Highway, Pioneer Avenue, East End Road, Lake Street, Fairview Avenue, East and West Hill Roads, Bypass Road, Ocean Drive, Kachemak Bay Drive, the Homer Spit Road, East Lane, and the Beluga Lake North Shore Road. These major corridors would receive the most traffic and provide the basic circulation system for the City.

Neighborhood arterials were those which route the "neighborhood" traffic to the major arterials. The neighborhood arterials included Bartlett Street, Main Street, Heath Street, Bayview Avenue, Fairview Avenue, and Ben Walters Lane. Proposed extensions included a link between Main Street and Lake Street, through the Central Business District, via Grubstake Avenue, and Fairview Avenue extended to West Hill Road.

- 3-4. The Homer Comprehensive Sewer Plan and the Comprehensive Plan for Distribution of Water were updates of the City's 1977 plans. The plans were prepared by the same engineering firm (CH2M-Hill) which performed most of Homer's municipal engineering services from the mid-1970's to 1982.

The water comprehensive plan recommends several map improvements, included a new 18 inch water pipeline to replace the existing Homer Spit water line, and development of a new water source to replace the Bridge Creek dam (which was estimated to operate at capacity by 1989). The plan also recommended various water extensions and improvements throughout the City.

The Sewer Comprehensive Plan recommended various sewer extensions throughout the City and expansion of the Homer Sewer Treatment Plant.

Both plans recommended phased development of the systems, concentrating development in the City center with extensions to more remote areas as demand warranted. The plans have not accurately anticipated much of the actual extensions in Homer. Because project financing typically is provided in part, or in whole, by property owners or developers benefitting from the extensions, the timing of extensions is dictated almost entirely by their desires.

The availability of adequate sewer treatment capacity is a critical issue. If the capacity of the existing sewage lagoons is not expanded, it is probable that new sewer hookups will not be allowed. This would in turn slow the City's development or at least promote development in places where lot size allows construction of septic tank/soil absorption systems.

Likewise, if water demand exceeds supply, much of the same impact will occur. A 1982-83 study recommended construction of a dam at Fritz Creek to supply water to the City of Homer. The dam and transmission line were found by the study's consultants to be the most cost-effective supply source. The most competitive alternate source was China Poot Lake, located across Kachemak Bay from Homer. Costs for China Poot Lake were \$22.5 million in 1982, as opposed to \$19.3 to \$28.1 million for the Fritz Creek Dam, depending on size. The City is currently pursuing reservation of the Fritz Creek watershed for possible dam construction.

The development of Homer's water and sewer system is relevant to its road system, in that all three provide the necessary infrastructure for land development. At present, the existence of municipal water and sewer service is the most important advantage the City of Homer provides to developers.

Another important feature of the relationship between roads and water/sewer utilities is that utilities are normally constructed within public rights-of-way underneath roadbeds. This arrangement has advantages and disadvantages. The advantages are that the utilities are in accessible locations and can be conveniently extended or repaired, and that utility easements need not be required across private property. The disadvantages are that repairs, extensions, or service additions can be costly (due to the need to repair the road after construction) and disruptive or dangerous to traffic and workmen. Typically, right-of-way widths are insufficient to allow placement of utilities outside some portion of the roadway prism. Also, if water and sewer are constructed prior to the street construction, the street profile may necessitate raising or lowering or relocating the water or sewer lines. These disadvantages can be compensated for by constructing all

improvements simultaneously. In addition, simultaneous utility construction averts the adverse policy consequences of extending water and sewer into a subdivision with unconstructed or poorly constructed streets. Such extensions encourages population influxes and result in demands for the City to upgrade the street. It also eschews the problem inherent in "restoration" of a previously substandard road to the same level once utilities are extended. Local residents insist that the road's poor condition is the City's fault and demand that the City upgrade it.

- 5-6. The Homer Drainage Management Plan (1979) and the Homer Revised Drainage Management Plan (1982) were prepared in response to a rising awareness of drainage and "potential flooding" problems in the Homer area. Much preparatory work was done by the U.S. Department of Agriculture in the mid-1970's including a history of flooding (compiled mostly from anecdotal sources), and a potential flooding study.

The major impetus for plan preparation was a moratorium imposed by the Farmer's Home Administration (FmHA) in the 1970's on a number of home loans in Homer. This moratorium, was to be effective until the City established legal control of its drainageways. The City responded with a three phase program proposal:

- a) Prepare a drainage management plan.
- b) Prepare plans and specifications for construction of drainage improvements.
- c) Construct the drainage improvements.

Thus far, parts (a) and (b) have been completed: these were the objectives of the original "Drainage Management Plan" and the revised plan, respectively.

The issue of drainage is relevant to the road system in that surface and subsurface drainage has been one of the most critical design problems in roads. Moreover, if the City does assert control over its drainages, its control will center on the culvert crossings on roadways and on underground storm drain systems. The choice of drainage modes (open ditch vs. buried storm drain) has an undeniable impact on the character of the roadway; it is the choice between rural design and urban/ suburban design.

The original drainage plan (1979) included an inventory of all cross-culverts then in existence, and established for each culvert the existing culvert capacity (in cubic feet per second) as compared to the required design capacity (based generally on 25-year recurrence interval storms). The inventory also established required future culvert locations for unconstructed streets. This present and future inventory provided the basis for a complete drainage system made up of "trunk drainageways" and "local

drainageways." The system was designed to take advantage of natural creeks, and improvements would be designed to include construction of open ditches. Buried storm drains would be avoided because of "high capital and maintenance costs (due to) icing and sediment blockage problems." The plan also discouraged storage detention ponds. The plan included standard details for culverts and erosion-control elements and established a program for drainage plan implementation, including a suggested drainage ordinance.

The 1981 revised plan presented a plan/profile mapping of drainageways in the downtown core area complete with culvert size, alignment, and proposed drainageway slopes. Accompanying the plans and profiles was a set of standard construction specifications for drainageways. The revised plan also mapped several drainageways not specifically included in the original plan: these included drainageways feeding into Beluga Lake and those which drain off the bluff area south of the Sterling Highway. In addition, a design plan/profile of the Fairview Avenue west extension (Ridgeview Acres to West Hill Road) was drawn and culverts were sized for it. Finally, a revised and simplified drainage ordinance was included.

It should be noted that some of the proposed drainage improvements have been constructed; however, actual design practice has considerably deviated from the plan recommendations. Land values in the downtown area have escalated to the point that storm drain systems are preferred to natural drainageways which, in many cases, bisect and sometimes inundate private properties. Drainage easement acquisition, recommended by both plans, has been pursued on an erratic basis, mostly during the subdivision platting process. The City still has little control over drainage, although the zoning ordinance does include some regulations.

The design proposed cross-culverts, included in the revised plan, cannot be regarded as final: in reality, the culverts may conflict with buried water and sewer lines, and erosion may have changed the channel configuration since the original design was completed.

7. The Kenai Regional Transportation Study (KRTS) was one of a series of regional, multimodal transportation planning efforts conducted in the early 1980's by the State of Alaska Department of Transportation and Public Facilities. The study was conducted in three phases:

- The Phase I report (completed February 1981) was a data and information assembly effort that included traffic network analysis and preliminary forecasts of transportation needs.
- The Phase II report (issued August 1981) was an analysis of community and economic development needs for transportation improvements and alternative ways of meeting these needs. It included a "demand analysis and forecast for transport services."
- Phase III report (issued March 1983) identified Kenai Peninsula transportation improvement projects and classified them according to priority.

The KRTS reports examined all modes of public transportation impacting the Kenai Peninsula economy. Thus, facilities that were examined included roads, rail, air, and ports. The study's conclusions found that the Borough is served "by a comparatively extensive, well developed multimodal system. If it were not for the significant development potentials, the system might be considered overdeveloped for the size of the regional economy and population." This did not mean that additional improvements were not necessary, rather that most major links were currently under-utilized or operating with a significant unused capacity. The railroad, some pipelines, some air services, most ports, and many roads fell into this category.

The plan found that of "all the modes, the regional and local road networks provide the least acceptable level of service. Thus, while their design capacities are not fully utilized, road conditions restrict their use - sometimes severely. Community priorities focused almost exclusively on the need for better levels of service on these local and regional roads to meet present traffic demands.

In general, current road design capacities were not found to be a problem. The demand/capacity evaluations for highways did not result in the identification of any major new demands or overall network improvements even when traffic forecasts for the year 1980 were used as demand functions. The few facilities requiring added design capacities by 1990 included the Homer Spit Road, portions of the Kenai Spur, the Soldotna Frontage, and East End Road in Homer. The implications of this finding are that the present regional system, if upgraded to provide a minimum level of service, would satisfy most development needs."

The plan also identified 62 projects as high-priority on the basis of their being either:

- 1) Ongoing DOT/PF, KPB, or municipal projects.
- 2) High on the list of projects required to meet community development goals.
- 3) Required to support economic development potentials in the KPB, or
- 4) Their having current traffic or service levels higher than their design capacities or maintenance levels.

Generally, this process led to identification of State-owned, State-maintained roads (or other transportation facilities such as docks) in need of improvement. Very few of the road priorities (none of those identified in Homer) were locally maintained roads. Major road projects in, or impacting, the Homer area included the following:

- Upgrade Sterling Highway (MP 36-58, MP 79-95, and MP 120-175)
- Airport Bypass/Kachemak Bay Drive reconstruction
- Bear Creek Drive (Kachemak City) reconstruction (Note: this road had not been on the State system)
- Skyline Drive (widen, pave, install guardrails)
- East End Road reconstruction, Phase I to IV. (Includes as Phase III the reconstruction and repaving 5 to 32 feet of the section from the Lake Street intersection to Mil 9.81.)
- East Hill Road (reconstruct, widen, pave)
- Lake Street/Pioneer Avenue (reconstruct)
- Olsen Lane/Bunnell Avenue/Main Street (reconstruct, pave)
- West Hill Road (reconstruct, pave)

"Low priority" projects included:

- Homer Spit Road (widen to 4 lanes)
- Diamond Ridge Road (pave)
- Ohlson Mountain Road
- Bartlett/Fairview/Hohe reconstruction
- Tustemena Loop Road (East End Road to North Fork or Oilwell Road)

The projects outside the Homer city limits would generally be administered either by the State directly or by the Kenai Peninsula Borough with State funding.

In the Homer area, the West Hill Road and Bear Creek Drive projects have been completed, (1983-84), and the Pioneer Avenue reconstruction project is funded for construction in 1985.

A June 1983 worksession of the KRTS Advisory Board (which included DOT personnel, borough and local officials) led to the addition of two new Homer projects to the "high

priority" list: Lake Street/Bypass intersection and Bartlett/Fairview/Hohe (which was transferred from its low priority status). The Borough and City also requested that Fairview Avenue be added, because of its importance to the new Homer High School.

After the summer of 1983, there were turnovers of DOT/PF planning personnel; thus KRTS Advisory Board meetings have not been held recently, and the KRTS document's importance as a document guiding transportation funding has apparently declined.

CAPITAL IMPROVEMENT PROGRAMS

The City of Homer has adopted three comprehensive capital improvement programs. The first was a 1969-75 program prepared for the City by the Alaska State Housing Authority, as part of the original Homer Comprehensive Development Plan. The second was the 1975-81 program, developed in-house by the City of Homer staff.

The latest program was developed in 1984 by the City administration, and covers the period 1986 to 1991. Between 1980 and 1984, there was no comprehensive program, but, rather legislative priority lists were compiled on a year by year basis.

Street improvements proposed in the 1969 plan included the following projects (the status of each is given in parentheses):

- "Spit Road - repair and stabilize erosion damage" (Completed in 1969)
- "Spit Road - pave from Pioneer Avenue to Airport Road" (Completed in 1970)
- "Spit Road - pave from Airport Road to end of Spit" (Completed in 1971)
- "Sterling Highway - (realign) in front of high school" (not constructed)
- "Pioneer Avenue - reconstruct, pave, curb, gutter, sidewalk, and install storm drains from Sterling Highway to Spit Road" (Strip paving done in 1970 but degenerated rapidly, and was redone in 1976). (Reconstruction project underway summer 1985.)
- "Central Collector"/"Industrial Bypass Road" (These projects were combined, to become the Homer Bypass project, which was placed on the Central Collector's alignments and completed in 1979.)
- "Collector streets - construct gravel streets and storm drain"/"Collectors - pave, curb, and gutter". (One designated collector street, Main Street from Pioneer to Fairview was constructed in the early 70's and reconstructed in 1982. Bartlett Street and Fairview Avenue were reconstructed or upgraded in the late 1970's and early 1980's, and Kachemak Way was reconstructed in 1983.) The

only collector street paving as of 1984 has been on the Bartlett Street/Fairview Avenue/Hohe Street route to the South Peninsula Hospital, and on a portion of lower Main Street.

- "Residential access streets - reconstruct, pave, curb and gutter" (No construction by 1984).

Between 1969 to 1975, only the projects involving State roads were completed. The 1975-81 Comprehensive Plan noted that among the 1969-75 proposed projects, the largest portion of unconstructed projects were those involved with street improvements and drainage.

Other projects that were completed in that period included airport expansions, equipment purchases, hospital renovations, Hillside Park, the Spit (distal End) campground, main dock expansion, small boat harbor facilities, sanitary sewer system and treatment plant, Homer Public Works Building, Spit restrooms, dog pound, Bridge Creek water reservoir and

Lake Street to Fritz Creek in 1976.

The 1975-81 program included street improvements, storm drains, and street lights, but was not project specific. The estimated cost of street improvements (1975 dollars) was \$200,000, while the storm drain cost was \$2 million and the street light estimate was \$10,000. Other proposed projects included the public safety building (City's top priority); a new city hall; new water mains on Kachemak Drive, West Hill Road and the Spit; various sewer system collectors; equipment purchases; neighborhood parks, small boat harbor expansion; construction of a new fish dock; and main dock expansion. As of 1985, several of these projects have been completed; others are still in progress.

After 1980, the City adopted year-by-year priorities for capital funding. The projects that were continually promoted for funding were Fairview Avenue (Hohe to Main and Bartlett to Mullikin); Main Street (Pioneer to Fairview); and Kachemak Way. With the exception of Fairview Avenue from Bartlett Street to Mullikin Street, these projects were all eventually constructed. Other priorities were Svedlund Street (Pioneer Avenue to Senior Citizen's Center), Heath Street (Pioneer Avenue to Fire Station), and east Klondike Avenue. These, also, were constructed. All were financed by State grants.

In 1981, the City prepared a new capital improvement packet specifically for legislative requests. A total of \$6.6 million was requested for improvements of ten streets: Kachemak Way (Klondike to Bayview), Svedlund Street, Bartlett Street (Fairview Avenue to Hospital), Fairview Avenue East Extension (to East End Road), Fairview Avenue West Extension (to West Hill Road), Main Street (Pioneer Avenue to Fairview Avenue), Bayview Avenue, Rangeview Avenue, Heath Street, and Lucky Shot Street, (Klondike to Bypass). Lucky Shot Street would be new

construction. No State-maintained roads were included in the request.

The City, in 1982, designated as priority road projects, several State-owned roads: Kachemak Drive and East Hill Road (as "regional" projects) and lower Main Street from Pioneer Avenue to Lee Avenue. It should be noted that the lower Main Street project was not included in the final capital improvement priority list adopted in November 1982 for the 1983 legislature. This was the first time a yearly capital improvement program had been compiled for presentation to the State legislature with public hearing on improvement priorities. Local (city-owned) street projects designated as priority improvements in 1982 were Fairview Avenue (Main Street to Heath Street), Rainbow Avenue (Kachemak Way to Heath Street), Lucky Shot to Bypass, Fairview Avenue (Bartlett to Mullikin), and Soundview Avenue (Bartlett to Mullikin). None of these projects were funded by the 1983 legislature; however, the City's first priority, the Small Boat Harbor Expansion, was funded.

The City Council, in 1983, designated Lucky Shot to the Bypass as its first priority because of its perceived need as an emergency ingress-egress to lower Glacier View Subdivision. Ironically, this street had never been recommended in official plans. Moreover, it would have had few advantages to the transportation system as a whole, and would have benefitted as a service road only one large unsubdivided tract. Further consideration of such concerns caused the Council to shift its priority to lower Heath Street (Klondike to Bypass). The City was authorized, at that time, to acquire right-of-way for Heath Street from the Bypass to Pioneer Avenue. Funding for this project was to come from unspent funds remaining from prior legislative grants.

The 1983 capital improvement request list (prepared for the 1984 state legislature) did not include Heath Street because of the existing funding. In direct contrast to the packet prepared for the 1984 legislature, the City promoted, as top priority, several State roads for "upgrade and transfer to City maintenance": these were Pioneer Avenue, Bartlett Street/Fairview Avenue/Hohe Street and lower Main Street. The City also sought full funding for paving Main Street and Kachemak Way (both of which had recently been reconstructed to a high-type gravel standard) and upgrading Lake Street from Pioneer Avenue to the Bypass. "Regional projects" included the Fairview Avenue East Extension, and "State projects" included Homer Spit Road improvement, East Hill Road reconstruction, Kachemak Bay Drive and the Sterling Highway from Homer to Anchor Point. Street, road and highway projects constituted most of the 21 projects for which the City sought funding. Requests for port and harbor facilities were conspicuously absent probably due in part to public disenchantment with the preoccupation with port and harbor facilities. During the 1984 legislative session, the City lobbied for only one street project, Pioneer Avenue. The lobbying effort was successful, and the long-awaited project,

which would include sidewalks, storm drain, curbs and gutters, originally proposed in 1969, was funded for 1985 construction.

In 1984, the City administration decided to return to the five year CIP format. The program includes 50 construction and reconstruction projects, costing almost \$100 million. The projects include nineteen projects on State-maintained streets, nine on future City arterials, fifteen for City collectors (new or existing), and nine local neighborhood streets.

The 1985 legislative request package, prepared in 1984 from the five-year CIP document was also dominated by street projects. "Local" street projects included reconstruction and repair of lower Main Street (with sidewalks and storm drains), paving upper Main Street, and paving and sidewalks for Kachemak Way. Fairview Avenue from Bartlett Street to East End Road was proposed for construction with pavement and sidewalks.

CHAPTER 6

CHAPTER SIX - ANALYSIS OF EXISTING CONDITIONS

Nearly everyone in Homer will agree that there are problems with the street system, whether it be conditions on a particular road or the process for funding road improvements. The focus of this chapter is to address the general problems and issues, not the specific deficiencies on each road. The problems identified fall into three groups: inherent; planning and zoning; and maintenance and administration.

INHERENT PROBLEMS

Problems inherent to the street system involve topography, soil conditions, the social perception of change and the community's transportation needs, and the conditions of existing constructed streets.

Problem #1: Topography. The hillside slope and saturated lowlands constrain development in an east-west direction within buildable areas. The hillside area above approximate elevation 325 feet becomes progressively steeper with the increase in elevation. Maximum grades occur at around the 450 foot elevation. The slopes effectively limit development in much of the area from about 350 feet to 800 feet. In addition, the Diamond Ridge area is characterized by numerous canyons, gullies and rills. These constrict development laterally along the hillside. Further topographical irregularities are present in the form of knolls and/or steep grade transitions in the lower hillside reaches.

There are several street and road-related problems caused by the hillside topography. These include the following:

1. When snow and/or ice is present, a number of roads become difficult or impossible to climb. Even worse, it may be difficult or impossible to stop a vehicle heading downhill under icy conditions. The frequency of such incidents are lessened when road grades, particularly at intersection approaches, are kept to within City standards, as detailed in the Homer Municipal Code.
2. The City standards with respect to maximum grade and curvature cannot always feasibly be met. This is particularly true when existing roads are reconstructed. An example of this is East Hill Road, which could only meet all requirements if the road was radically realigned. However, a radical realignment would create additional problems and increase the cost.

The existence of these maximum grade and curvature requirements in the City code does allow the Homer Planning Commission to disapprove subdivision plats in steep areas

where requirements cannot be met. The Commission has exercised this option on occasion, and this has proven effective in controlling dangerous bluff development. However, the Commission has also granted exceptions and approved some nonconforming street dedications.

3. The existing topography often forces roadways to be designed with large cut and fill sections, particularly in steep or rolling areas. This leads to high project costs because the cut material is usually unsuitable for fill, and fill material must therefore be imported from distant pits. This also makes depressed (urban) street designs impractical or impossible in some cases.

Open ditches and/or high cut or fill banks are often unavoidable. These design elements use a great deal of space and little room is left for sidewalks. This problem is also manifested by the fact that driveways abutting roads in these areas often have very steep grades. The dilemma is that a street that maintains good design standards in these areas may necessitate excessive grade transitions to adjoining lots, and this makes for poor ingress and egress.

4. The slope gradients cause stormwater to assume high in-stream velocities. This can, in turn, lead to a rapid erosion and scour in ditches unless channels are armored and the side slopes vegetated. Revegetation is not always done, hence roadway embankments become undercut.
5. View lots will always be in demand in Homer. As lower hillside areas are developed, houses will compete with each other for views. The demand thus moves uphill to steeper areas. This development destabilizes the slope areas by removing vegetation and excavating steep slopes. Thus it could be argued that roads on these areas are problematic by their very presence. They allow access and hence encourage unwise development.

Problem #2: Soils. Many areas within Homer are characterized by saturated soil conditions. These areas include not only the lowlands around Beluga Lake, but upland areas are also subject to frequent saturation. This saturation is partly due to the slope gradient, which is in some areas steeper than the groundwater profile, thereby causing outcroppings of seepage into surface water. Moreover, the fineness of native soils causes saturation due to capillary rise from the groundwater table; and, low permeability causes low infiltration rates. Sheet drainage from various sources also figures prominently in this situation. This poor drainage is often accompanied by very poor soils, including thick peat layers. Such accompaniment is natural, as saturation helps cause peat bog formation and peat formation exacerbates drainage problems. The presence of these saturated conditions increase construction difficulty and costs. It has, in past years, also helped to bring about severe

"breakup" problems which decrease the service life of roadways and increase maintenance costs. Moreover, these factors have in the past made paving appear unattractive. Gravel roads were expensive enough to build and pavement would often disintegrate after a short time. This condition owed itself largely to poor subdrainage and to lack of subgrade separation. Proper design would mitigate this problem.

A legal facet of the groundwater problem is that the 1977 Clean Water Act requires that dredging or filling operations on wetland areas be permitted by the U.S. Army Corps of Engineers. This requirement has a substantial impact on the Homer area as large portions of the City, including hillside areas, are technically classified as "wetlands." Most such areas are not considered to be biologically sensitive; however, permit processes must be followed in every case and these can require long review periods.

The Beluga series soils predominate in the areas of greatest development potential. Peat formations of the Salamatof, Doroshin and Starichkof series are also present in spots. The Beluga Loams are unsuitable as a source of road fill due to low bearing capacity, susceptibility to frost heaving and poor drainage. Peat formations impose even more severe limitations on roads and street development potential.

Problem #3: Social Perceptions. An inherent part of any transportation project is the project's interaction with the people affected. Every project brings about physical changes; existing facilities are enhanced or new facilities are added. These changes allow or force modification of social behavior. Actions and/or opportunities will be different after a project than they were before. And each project has costs, not only in terms of money expended, but also in terms of opportunities and resources forfeited by project selection choice. A further cost is often necessary for ultimate project success: the facility's use after construction must be controlled. Transportation projects bring about these changes, costs and controls.

In Homer, these are felt very acutely. A number of people oppose change, even though they would like improvements. Such features of road projects as partial access control or street pavement are likely to find opposition from individuals who basically prefer the status quo. Controls as apparently innocuous as driveway width limitations have been hotly disputed by persons who contend that their access rights are being infringed. Some people in Homer are neither accustomed to nor favorably disposed toward such regulations. Projects that impact traditional land use will face strong opposition, as will those with some adverse environmental impact.

It is often true that road and street projects alter previous travel and development patterns. These alterations will be welcomed by some and opposed by others. Construction of new streets in undeveloped areas may be protested by those who feel

that investments should be made in existing streets. Upgrade of existing streets may be opposed by people who feel it will invite extra traffic and the negative effects of construction (i.e. inconvenience and dislocation).

Homer's sustained rapid growth has created a demand for new residences, businesses and apartments. These, in turn, demand development of new streets and new facilities on existing streets. The net effect has been to force increases in traffic on existing streets. The problem is how to adequately accommodate the growth in traffic and how to do so in a socially acceptable manner. The problem actually has two parts: first, how to handle the additional load on existing arterials and major collectors; second, how to develop new subdivision streets in an orderly controlled manner which fits in with the rest of the system.

If the problem is one of volumes approaching capacity on existing streets, then one must consider whether capacity can be increased by additional lanes. However, it must also be examined whether in the long term, new streets may need to be developed to keep traffic within acceptable limits.

If new streets are envisioned, is it possible to design them compatible with the existing street network? The objective is to provide a rational layout for new streets in order to maximize the utility of each street, new or existing. The challenge is how to do this, particularly when topographical constraints and existing tract geometrics work against an orderly layout. It is inevitable that if rational planning does not precede street development, disorder will occur. As one example, the actual function of a roadway may be misjudged and poor design criteria used. Another common complication in Homer has been created by the proliferation of tee intersections, particularly along Pioneer Avenue and East End Road. These lead to inefficient and circuitous travel patterns and increased congestion and conflicts along major through streets.

Street improvements and new construction are in large part arranged by existing demographics and growth patterns. The community's growth patterns are the warrants for such projects; however, these same growth patterns may occur in ways that preclude optimum route selections or right-of-way acquisition. The proposed Bypass Extension, for instance, may be very expensive if right-of-way is not secured in the near future, simply because of the development likely to occur there. Moreover, such an extension could be very controversial in that it would likely require extensive purchase and/or condemnation of existing lots. It would also skirt residential subdivisions. These project prerequisites have social and political significance in their own right. Indeed, the societal costs may be judged far more important than the technical benefits.

Problem #4: Existing Streets. Homer's street system incorporates a wide mix of street layout philosophies. Some routes were created by following the most advantageous path with regard to topography, soils and linkage to distant destinations. Others were created by subdivision according to aliquot parts. Some were created using modern residential subdivision philosophies. Others were crude layouts by paper plat.

The effect of this mix has been creation of a relatively randomized street system which, in turn, causes circuitous, inefficient travel patterns which artificially concentrate traffic onto arterials. Other undesirable design elements, such as acute street intersection angles, also have developed. Problems found on existing streets range from inappropriate layouts, to varying right-of-way widths, to varying building setback requirements or geometric deficiencies.

Some street layouts have been developed which are not appropriate to the traffic characteristics which they support. The best example of this is found in Lakeside Village Subdivision. This subdivision is laid out quite well for residential traffic service; curves were used to slow traffic. The subdivision has access to Lake Street on the west and East End Road to the north. Nielsen Avenue and Ben Walters Lane connect the two arterials. Unfortunately, the subdivision roads are being used as a detour around the Lake Street/Pioneer Avenue intersection for movements from Lake Street (northbound lane) to East End Road (eastbound). This is the very movement that the subdivider attempted to guard against, by use of curves. Traffic using Ben Walters and/or Nielsen for this purpose tends toward speeds in excess of the residential character of abutting lots, the condition of the roadway, and the curvature. This example provides a lesson in that the intention behind the geometric design has been defeated by actual usage.

Throughout the Homer street system, right-of-way (ROW) widths vary from street to street. The width has depended on the prevailing subdivision regulations at the time of dedication. This has resulted in inadequate widths in a number of cases, a condition which can severely impact the City's or State's ability to construct needed improvements. In some cases, lane and/or shoulder width is compromised. In other cases, pedestrian facilities are sacrificed. There is sometimes no alternative to right-of-way acquisition, and this can be very expensive, particularly if building relocation or demolition is involved. The ROW expense can easily deplete a project budget. After purchase, remaining funds may be insufficient for necessary improvements such as sidewalks. In such a case, the overwhelming temptation may be to save the money that would have gone toward ROW acquisition and divert it toward another more affordable project. The effect of this decision is to transfer the problem to the future, at which time ROW costs may be even higher.

Building setback requirements have also varied over the years, which can make road reconstruction impossible or costly. A 10 foot setback was in effect until the mid-Seventies, when 20 feet was adopted. Minimal building setbacks can lead to restricted sight distances at intersections or driveways, or cost prohibitive right-of-way acquisition expenses.

Examples of geometric deficiencies on some existing streets are:

- Insufficient lane and shoulder width for Bartlett Street, East End Road.
- The "roller coaster" profile of East End Road, which obscures sight distance to and from driveways and intersections.
- Steep grades and sharp curvature on West Hill and East Hill roads.
- Promotion of through-movements around 750 to 900 bends at intersections (these intersections include Fairview Avenue/Hohe Street, Bypass/Lake Street, Lake Street/Ocean Drive, and Ocean Drive/Spit Road). This generally becomes problematic only when third or fourth streets (or driveways) also join the intersection. There is no easy solution to the operational and traffic control problems that result.

PLANNING AND ZONING

Planning for future streets, both design and construction, creates numerous problems, as outlined below.

Problem Area #1: Undeveloped Rights-of-Way. Perhaps the City's most important underlying problem, arises from a loophole in the City zoning ordinance and the Kenai Peninsula Borough's subdivision ordinance. The problem is that subdividers are allowed to subdivide property and provide "legal access" to all subdivided parcels via paper platted rights-of-way. However, there is no obligation to actually construct the streets thus created. Thus a subdivider/developer is not required to build the roads, but, if he/she chooses to do so, he/she must theoretically follow the City's standards.

The justifications for this loophole are that construction requirements would impose undue hardships on so-called "mom and pop" subdividers, and that such requirements would also infringe on the rights of individuals to dispose of property as they choose. It has also been argued, somewhat speciously, that water and sewer should always be installed prior to, or concurrent with, street construction in order to hold down costs of later installation. The net effect is that these requirements would make lots very expensive and therefore difficult to sell.

The case against this loophole is that it causes a large number of adverse impacts not only on the area abutting the undeveloped right-of-way, but also on the community at large. Undeveloped and inaccessible lots are likely to be developed along substandard roads. Access to these lots is likely to be poorly constructed. Ultimately, the community often ends up providing the street improvements, at full public expense. Hence, the taxpayer subsidizes the subdivision's improvements. The loophole provides a means by which improvement costs are, in the end, transferred from the beneficiaries to the public. In this manner, Homer is gradually acquiring a large liability.

Problem Area #2: Master Plan/Plat Review. A second problem relates to the existing "Master Plan for Roads and Streets (1979)". The problem is how strictly to abide by the plan's stipulations, particularly with regard to route alignment. Moreover, should the City Planning Commission accept dedication of rights-of-way along its arterials (or even collectors) which are not specifically planned for and called out on the Master Plan?

There may be a number of local streets dedicated which were not anticipated by the Plan. This may lead to "unwanted" rights-of-way which do not conform to spacing requirements along major roads or which create staggered tee intersections. Therefore, the administration and Planning Commission face the problem of determining importance of these elements (as they apply on a case-by-case basis), and of developing reasonable alternatives which overcome problems. In the process, the legitimate access rights of subdividers must be balanced with the need to protect highway utility. The same can be said for exceptions to street construction guidelines.

Problem Area #3: Resubdivisions or Development on Substandard Roads. Individuals resubdividing lots on substandard roads are essentially creating additional traffic on roads which cannot service existing traffic. The only controls available to the City Planning Commission have been by means of conditional use permits, and to some extent, plats.

Problem Area #4: Access Control, Setbacks, Driveway Spacing/Frontage Requirements. A comprehensive, city-wide policy for access control, setbacks and driveway spacing has not been formulated. Access control measures are being applied on the Bypass and some other roads with limited success. Many developers feel "singled out" by the existing practice. Generally, developers would not object to control measures provided the treatment is equal and objective. Since the City has not adopted formal zoning regulations limiting access on roads such as the Bypass, restrictions have been placed on access during the subdivision plat process. There also appears to be a well entrenched school of opinion that the City is helpless without "access right" purchase; which is a dubious contention.

Problem Area #5: Existing Ordinances. Street construction standards are codified by means of Title 11, Homer Municipal Code. This ordinance was enacted to provide a minimum of quality standards which would serve as the basis for accepting or rejecting streets for maintenance. Its standards are, therefore, usually viewed as semi-voluntary guidelines, with City acceptance providing the only "incentive" to conform. However, the literal interpretation does, in fact, assert a minimum standard to be used for all street construction of whatever scale.

The ordinance has many drawbacks, however, and has not been well-respected in recent years. It predates the use, in Homer, of geotextiles for reinforcement and subgrade separation; a development which has altered actual practice in design and construction. A number of key terms are left undefined. It is unclear whether the street must be designed or not. Even if it is, prior approval by the City is not specifically required.

Acceptance of streets for maintenance is contingent on prior submission and approval of engineered plans and specifications, construction according to the plans, and preparation of "as-builts." Administrative policy has been to ignore those provisions of the ordinance that are outdated or counter productive.

To the extent that the ordinance is not literally enforced, the ordinance's power is diminished. Exceptions to its provisions have been taken as precedents. The problem, therefore, is that while standards were adopted, they were adopted in flawed and inflexible form.

Problem Area #6: Unpaved Roadways. Perhaps the street-related issue of greatest notoriety is Homer's gravel surface standard. Before dealing with this issue, it must be noted that the gravel roads constructed here in recent years are, by all accounts, superior to the earth/gravel roads built in former years. This improvement alone provides satisfaction to many long-time residents. Persons who endured the road conditions for years may therefore have difficulty understanding the complaints and demands of newer residents.

The gravel surface standard is used throughout the world; however, the use is normally limited to rural roads, where traffic volumes do not justify paving, or to areas where bituminous or concrete paving materials are unavailable and/or prohibitively expensive. These conditions are not truly present in Homer.

Oglesby's standard text, "Highway Engineering", 4th ed. (Wiley; 1982) reports:

"The upper limit of traffic volumes for which untreated (gravel or crushed rock) road surfaces are economical varies, but is low; possibly in the range of 100 to 250 vehicles per day when vehicles operating costs are considered. At higher traffic volumes, surface pitting, the formation of transverse corrugations, the cost of replacing materials that erode or blow away, and the dry-weather dust problem all militate against their use."

For comparison purposes, upper Main Street in May 1984, carried approximately 1300 vehicles per day. It is likely that volumes would be greater if the severe corrugation problem did not exist, causing traffic to divert to other streets.

It is also true that gravel roads are subject to degradation by many processes. For example, fines are lost as dust into the atmosphere, causing surface armoring and subsequent frictional degradation of aggregate. Moreover, the road surface is exposed and vulnerable to contamination by unsuitable material, usually when native clays and peats are spread or dropped onto the road surface by construction activities on abutting lots. On some streets, storm water washes down the street, carrying away suitable materials but depositing a residue of fines/organics. Such material can easily work into the base course. Over a period of time, contamination could progress to such an extent that frost-heaving and "pumping" could occur. At that point, the road will require reconstruction.

Problem Area #7: Sidewalks. There has been no standard policy regarding sidewalks or bicycle facilities on Homer's roads and streets. As a result, there are few sidewalks or bike paths, and those that exist are anomalous and discontinuous. Most major streets do not have them. This creates a conflict between pedestrians, bicyclists and automobiles. The conflict is particularly acute where shoulders do not exist or are commonly occupied by parking.

It is difficult to discretely quantify the benefits to the City (or State, in the case of State-maintained roads) by separating vehicles and pedestrians. This is largely a matter which involves such irreducible values as the need to protect human life. On a more litigious level, however, the City or State might not be held immune from tort liability for negligence if a plaintiff can prove, among other things, that a potentially dangerous defect existed (i.e. no reasonable facility for pedestrian use), that the defect was the proximate cause of an accident and that the responsible agency had actual prior knowledge of the hazardous condition. There are some areas, especially East End Road, in which the State in particular could be exposed to large claims due to lack of pedestrian facilities

should an accident occur. This may be one argument for adhering to generous design standards, including pedestrian ways. It could also represent a strong argument against City takeover of State-maintained roads before they are constructed and upgraded to proper standards.

Problem Area #8: Engineering Design, Testing and Analysis. It has previously been mentioned that the City does require that engineered plans and specifications be prepared, by a registered professional civil engineer, and approved prior to construction. Failure to do so will result in refusal to accept the road for maintenance. The process of preparing these plans always involves some level of field reconnaissance. At the very least, a survey must be performed and the designer must inspect the site. Often, good practice distates the need for more sophisticated reconnaissance techniques, especially soil testing and use of groundwater observation wells. These may not always be warranted; however, test results and actual test data are what provide the rationale behind roadway foundation design. The City has not stipulated requirements or even guidelines for when these tests are to be performed. Nor has it, in the past, consistently demanded an analytical and rational design approach to road design. This has tended to encourage, or even force, designers to adopt "cookie-cutter" design procedures, especially in private development designs. While engineers might prefer an analytical/empirical approach to design, such an approach can be expensive, and the expense is impossible to justify to clients if the City is ambivalent about the need for testing and analysis.

Problem Area #9: Capital Project Selection. In recent years, most of Homer's street projects have been new streets, constructed as part of private subdivision developments. These developments are, of course, undertaken for profit. City street projects are normally selected for different reasons. They are usually chosen via a political process which focuses attention on the problems of existing streets. This process is excellent for highlighting the needs of existing areas. It is almost axiomatic in transportation planning that if the public thinks a problem exists, then a problem exists. However, the process is flawed in several respects.

First, the political process magnifies reactions to problem symptoms. The danger with this is that decision makers will respond to these reactions sincerely and favorably, but without a larger perspective of the role of a particular street in the system and without an understanding of project's policy implications. Second, the pressure will almost always be in favor of improving existing streets. This may not necessarily be the most rational decision, given that the future viability of the transportation network (and the community it serves) may depend on construction of selected new streets or highways. Finally, the City of Homer has not, in the past, pursued a rational, independent project programming/feasibility analysis approach to complement the political process. Such an approach

would, if properly carried out, provide a means by which decision-makers could make capital allocation decisions on the basis of "most bang for the buck," instead of relying exclusively on compilation of requests, "wish lists" and complaints. This is not to suggest that citizen participation and input is without merit. To the contrary, it is a healthy and crucial part of the process. Feasibility reports and economic analyses are meant to complement citizen input.

Problem Area #10: Project Planning and Organization. Projects which are selected for capital funding are vulnerable to many problems which often were unexplored during the selection phase. Lack of sufficient right-of-way is often a major obstacle, as is location of funding sources. Local improvement districts (LID's) can be used to allow project costs to be borne, or at least shared, by actual beneficiaries. However, LID formation for streets is often resisted on the basis of cost. Property owners who would be eligible for LID assessments often argue that it is the City's or State's responsibility to fund or build the road.

In addition, LID assessments are, in Homer, computed on the basis of area immediately abutting the improvements. This is not the most equitable method for assessments for arterial and collector streets. It is more equitable to include and assess areas along side streets as well, since service will be provided to them. However, this assessment should not be as great as for abutting properties. This "ripple effect" mechanism cannot feasibly be used at present because Homer is not a home-rule city. It is bound by the requirements of the "Special Assessment Districts" Chapter Title 29, Alaska Statutes. These requirements effectively block use of the "ripple effect" or similar mechanisms to allow costs to be divided on an area-wide basis, rather than along a strip.

Problem Area #11: Improvement District Implementation. While LIDs are an attractive, equitable means of project funding, they are difficult to initiate, set up and administer. The law requires that due process be followed during the LID initiation. This process is designed to protect objectors. This is done by ensuring that all parties are notified and have reasonably correct information (regarding costs, project scope, etc.). The process therefore can have profound legal implication. Administrative work on LIDs is therefore cautious as well as cumbersome. Petitioners and administration alike are frustrated by the amount of time that is required. The time and detail that is applied may, in fact, place an upper limit on the number of LIDs that the City can produce without hiring additional staff.

Problem Area #12: City Involvement in State Projects. In the past, the City has failed to become involved in the planning and design of State road projects until the project progressed too far to allow changes. The result has been adoption of designs

which do not meet City standards or which cause numerous negative side effects when constructed.

Problem Area #13: Private Development. In the past, the City has been vigilant in assuring quality control on city-funded projects (including water and sewer as well as streets). However, there is little City quality control for privately constructed improvements which are to be turned over to the City for maintenance. This was not due to lack of interest; rather it is because the City did not have a full-time inspector. Even now, the City's project inspector must divide his time between City projects and private ventures. Moreover, inspection costs on private developments are being borne by the taxpayers. This is not consistent with the fact that City-sponsored improvement districts pay for their own inspection. In essence, this amounts to a development subsidy.

The private developer in Homer who wants the City to take over the improvements after project completion must first hire an engineer to prepare plans and specifications. The engineer submits these to the City for approval and/or changes. After revision and final approval, the developer's contractor begins work. The contractor sometimes tries to get variances from plan/specification requirements and the City generally refuses. Quality-control or material problems may appear and the City may require that portions of work be redone. This is sometimes a difficult thing to enforce. However, the City does have the option of not accepting any of the improvements until all work is done. For example, water won't be turned on until the street is fixed. Or a bond is required to guarantee project completion. Toward the end of a project, developers begin to assure realtors and private builders that work is done, or, under pressure to get the project completed, they say the City is stalling. This triggers a flood of phone calls from realtors, builders and prospective property owners demanding explanations for why the City isn't accepting the improvements. The City administration sometimes bows to the pressure and allows partial acceptance etc. which may weaken the ability to enforce completion of all project details.

Problem Area #14: Project Costs. Street construction costs have escalated in 1984, after a period of relative stability. This escalation is due in large part to escalation of gravel pit prices. Many individuals in and out of City government are alarmed at the increase and believe it unwarranted. (It has therefore been proposed that the City promote new sources or, perhaps, purchase its own borrow source.) The gravel costs threaten water and sewer projects, as well as street projects. In the long term, it is hoped that prices will stabilize, but for now, the City hopes that competitive free-market forces will lower the price.

Problem Area #15: Drainage. Drainage remains generally unregulated, in spite of the Drainage Management Plans of 1979 and 1981. Because of this lack of policy, property owners are

basically free to alter or disturb drainage patterns as they please. Cross-road drainage culverts are often placed in such a manner as to "daylight" stormwater onto private lots. Road improvements open up new areas for development, which increase the surface runoff and exacerbate surface drainage problems, even when drainage is confined to a natural drainageway. This not only leads to flooding, but also erosion upstream and sedimentation downstream. The sedimentation redirects drainage and causes additional trouble. The City has been responsible for increasing problems in some cases. The City has often requested drainage easements dedicated along property lines in new subdivisions. This ensures that drainage will be diverted into straight ditches in those locations. Unless these ditches are properly armored and energy dissipators provided, scour and erosion will occur and deposit sediment and random drainage downstream.

MAINTENANCE AND ADMINISTRATION

Maintenance on existing streets and administrative policy relating to enforcement of parking and street regulations raise additional problems.

Problem #1: Maintenance. The rural, gravel surface prevalent on almost all of Homer's roads cause many maintenance problems. Ditches must be maintained or be subject to siltation/aggradation, and loss of function because of vegetation growth. Some ditches must be armored and plunge basins constructed to prevent erosion. Unfortunately, the Public Works Department does not have sufficient resources to continually perform ditch maintenance. The work can only occur on selected streets on a programmed basis, or periodically as time allows.

The gravel surfaced roads are also subject to corrugation, particularly on uphill grades. The road must be bladed periodically to "smooth-out" the corrugations. However, there are some roads which are armored at the surface with large pitrun gravel and cannot be worked. It also becomes progressively more difficult to blade with any effect as the road ages, due to loss of material as dust into the atmosphere, and by other mechanisms. By that time, the only workable process may be scarification prior to grading, blading and recompaction. This can be very expensive, and the process will still not cure the problem. Corrugation would continue, albeit, perhaps at a retarded pace.

Roadway embankments are also subject to some degree of mass-wasting, as material on the slopes will invariably ravel, to some extent, under stress. This must be compensated by "pulling ditches". Unfortunately, this operation is likely to result in poor material on the road surface. This is the reason why the City has required full-depth crushed material, yet this kind of cross-section is not economical. A paved surface will, in the

long run, effect greater cost savings than the amount of crushed material required in the cross section.

The dust problem has been combatted in the past by oiling roadways. This practice is no longer allowed by the State Dept. of Environmental Conservation. The City has experimented with lignosulfate for dust control, however, the result was a tremendous increase in corrugation of Kachemak Way. Emulsions are now under consideration, however, application costs are very high and maintenance costs may be as well. This raises the issue of whether it may be, in fact, more economical to "bite the bullet" and pave, rather than continue gravel surface maintenance.

Problem #2: Enforcement. Many of the City's traffic regulations are regularly violated. The 25 mph speed limit on City streets is obeyed only if traffic volumes and road conditions do not permit higher speeds. The higher limits on the Bypass and Spit Road are also regularly ignored. The problem is, in part, lack of enforcement. However, it is also because speed limits have not been set by a rational method. It is widely agreed in the transportation engineering community that speeds should be set in the 5 mph increment above the 85th percentile of speed ranges. This is a way of acknowledging that drivers are generally good at regulating their speeds according to conditions, and that irresponsible drivers generally represent, in reality, a small proportion of the total. It has been found, in many traffic engineering studies that arbitrarily set low speed limits are not respected, therefore enforcement may be futile anyway.

On-street parking and loading regulations are also not enforced unless parked vehicles are clearly impeding traffic. There is a city ordinance that prohibits backing onto arterials or parking in such a manner as to require such maneuvers, and this ordinance is not being effectively enforced.

Deferred enforcement is also occurring with the Homer Off-Street Parking Ordinance, pending release of administrative staff personnel from other project commitments. The ordinance is controversial and requires a great deal of liaison and negotiation, and so may not have a speedy resolution.

Problem #3: Permitting. Construction within rights-of-way is regulated by the City. The permitting process is performed in a circuitous manner, with various branches of administration involved. Poor liaison frequently occurs. Inspection occurs as much as allowed under time constraints.

Problem #4: Spot Maintenance. The City denies permanent maintenance to substandard roads. However, "spot" maintenance is sometimes provided if the City's Public Works Department is directed to do so. Winter snowplowing is provided to many substandard roads. In some cases, this maintenance is done under severe operational problems, i.e. inadequate turnaround

for graders, etc. The denial of maintenance is the only substantial protection the City has against assumption of substandard private road development as public liability. However, the City's position on this policy may be weakened in that it does take stewardship of rights-of-way by means of the construction in the right-of-way permits.

Problem #5: Cost Sharing. The City has no operative policy regarding cost-sharing for street improvements. In 1982, a resolution (No. 82-6S) established some "guidelines" establishing levels of public participation to be established (as matches to LID assessments) for each functional classification of roadway. This resolution's provisions have never been followed. Kachemak Way, Main Street (Pioneer - Fairview) and Fairview Avenue (Main to Hohe) were all reconstructed without assessment contributions. Each is a collector street and provides service to other areas besides abutting properties. Thus, it is reasonable that abutting property owners should not have to bear all of the project costs. It appears inconsistent that the City has demanded no assessments from these benefitting property owners, while declaring that other property owners should pay their fair share.

Problem #6: Utility Installation Concurrent with Road Construction. Water and sewer have been installed in a number of areas prior to construction of City standard streets. Most recently, this has occurred in Cooper Subdivision and Fritz Subdivision. This encourages subdivision into smaller lots, and increased population. In turn, this increases pressure on the City to "do something about the road." Conversely, street construction which is undertaken prior to water and sewer installation forces increased utility installation prices when they are installed later.

CHAPTER 7

CHAPTER SEVEN - FUNCTIONAL CLASSIFICATION SYSTEM

The problems and issues identified in Chapters Four, Five and Six will be addressed in Chapters Seven through Nine. This chapter proposes a functional classification system, whereby the primary function of the roadways are identified and appropriate policies and standards are applied for each classification. Chapter Eight will address project recommendations; Chapter Nine will present policy recommendations.

The Homer roads and streets system is not a homogeneous entity. Within this system are many kinds of roads, built to various design standards and conditions. Some roads are minimally constructed roads originally built to service single residences or businesses, while others have been constructed to relatively high standards, including paving and generous shoulder width. Within the Homer road network, there are local roads in excellent condition and through-roads in poor condition. The road's function does not necessarily determine the level or degree of constructed condition.

In addition, all streets are not equal in their importance to the community. Some will service the entire population while others will channel only local traffic to abutting properties. The former category will include the highest volume roads and will generally include the most important internal roads; these are important to the social and economic well-being of the community. It is also generally true that the least important roads will have the least volumes. However, importance is not necessarily a function strictly of volume. The Sterling Highway is a vital link for Homer; however, its volumes are substantially less than most downtown streets.

There are several criteria which determine the traffic volume levels which any given road will sustain. Among these are the following:

- 1) ACCESS/MOBILITY. Does this road provide direct access to abutting properties? If so, what kinds of traffic generators exist on these abutting properties?
- 2) LOCATION. Is the road located proximate to major population areas within the City? Does it provide a smooth, direct link between the major traffic "producers" and traffic "magnets" within the community? Does it feed into other roads which provide the major traffic service?

- 3) SYSTEM CONTINUITY. How does this road fit in with the road system as a whole? Does the system allow direct, noncircuitous travel? Does the road fit as a link in the trip patterns - does it allow only local access or does it service longer "desire lines"? If it services longer "desire lines," is it because of lack of other, more direct links between areas? Does it link continuously with other roads servicing longer trip desire lines? Or does it provide intermediate service, in a hierarchy-like fashion, between streets providing only local access and roads providing through-service?
- 4) GEOMETRIC/STRUCTURAL DESIGN ELEMENTS. Is the road surface paved, gravel or earth? Is the surface fairly level, or are steep grades encountered? Is the horizontal alignment reasonably straight using large-radius curves? Is the shoulder width generous with separate pedestrian facilities, or are there no shoulders?

These factors define the desirability of travel along a given street or road for major movements; drivers will, as a whole, generally choose the most direct and favorable route for each trip and these criteria are the most important in their choices. Therefore, travel behavior defines roadway function. It follows that if a street system is developed in a random and unplanned fashion, travel patterns will evolve in a manner that is most user-favorable within the system.

It is therefore desirable to plan the street system in advance of actual street construction. Each road or street should have an identifiable function within the system; that is, it should play a specific role in serving the community's transportation needs. And the road should be designed and developed in accordance with the function.

Functional classification of a road is, therefore the foundation for the rational planning of a street system. It also forms the basis for the policies that will govern the system and the streets therein.

Given the import of the system, it is critical to understand the functions provided by the existing streets under existing conditions. This understanding is necessary before one can intelligently select future streets and the functional classifications of these streets.

FUNCTIONAL CLASSIFICATION HIERARCHIES: ACCESS VS. MOBILITY

The central idea behind functional classification hierarchies is that a road's basic goals are to provide

access to abutting lots and/or to provide mobility (speed and ease of travel to distant areas).

Access is described by "A Policy on Design of Urban Highways and Arterial Streets" (American Association of State Highway and Transportation Officials, 1973) as follows:

"Control of access is the condition where the right of owners or occupants of abutting land or other persons to access, light, air or view in connection with a highway is fully or partially controlled by public authority.

Full Control of access means that the authority to control access is exercised to give preference to through traffic by providing access connections with selected public roads only and by prohibiting crossings at grade or direct private driveway connections.

Partial Control of access means that the authority to control access is exercised to give preference to through traffic to a degree that, in addition to access connections with selected public roads, there may be some crossings at grade and some private driveway connections.

The type of highway to be built should be coordinated with the local land use plan to ensure that the desired degree of access control can be maintained through local zoning ordinances and subdivision regulations...

Access control is generally accomplished either by legally obtaining right of access from the abutting property owner, usually at the time of purchase of right-of-way, or by the use of frontage roads. Where a highway is developed on new location, access rights are acquired at no cost to the highway agency because the adjoining property owner generally has no inherent right of direct access to a highway that does not exist. This is separate and distinct from damages resulting from severance due to construction of the highway."

A road which provides unlimited access to a large number of abutting properties will by definition have a large number of driveways and/or intersections. These are the areas where conflict opportunities exist. These conflict areas diminish the road's desirability for through-movements and hence diminish the road's mobility function. A road which provides a high level of mobility must therefore have restricted access, and different levels of access control

must be established according to the level of mobility desired.

A functional classification hierarchy is arranged according to the emphasis on access or mobility. Freeways provide the highest mobility, followed in descending order by expressways, arterials, collectors, and local roads or streets. Conversely, local roads/streets provide the highest degree of access, followed in descending order by collectors, arterials etc.

EXISTING HOMER CLASSIFICATION SYSTEM

The Homer "Master Plan for Roads and Streets" (Silvers Engineering, 1979) proposed three basic classifications for the Homer road system: "arterial," "neighborhood arterial," and "collector." The distinctions between these classes are as follows:

- 1) ARTERIAL. An arterial "provides for through-traffic between areas and across the City. Direct access to abutting property is limited by control of entrances and exits, or eliminated by use of service roads or local-street-access-only development requirements."
- 2) NEIGHBORHOOD ARTERIAL. This type "services a subdivision or district of a city, provides for traffic movement between arterials and local streets, and provides direct access to abutting property."
- 3) COLLECTOR. A collector "provides for only local traffic movement with direct access to abutting property."

Associated with each of these functional classes is a set of design parameters for design speed, current average daily traffic (ADT), design hourly volume (DHV), etc.

One minor disadvantage of the Silvers system is its non-conformity with usual functional classification systems. Although it is true that roads and streets within a community should be classified relative to each other, it is also the case that classifications should be compatible with State standards or a national norm. Silvers' classification causes problems when interfacing with other agencies.

Other important considerations that the plan did not address include the following:

- The plan's classifications were applied strictly to future functions, and did not address present functions. While this allowed establishment of design

standards for ultimate future construction, it did not provide a basis for rational interim design or for interim policy development. This has led to confusion regarding treatment of these streets on a policy level. Fairview Avenue provides an excellent example of the problem. It is not an "arterial" according to the Silvers system. Yet one portion (from Main Street to Hohe Street) was reconstructed to future arterial width, far in advance of need. At the same time, no effort has been made to control access or establish setbacks in consideration of this design class.

- The policy implications of the functional classifications were not deeply explored which prevented certain controversial aspects of the plan from being openly discussed and debated; and, consequently, its importance is not fully understood.

COMPARISON TO OTHER AGENCY STANDARDS

Appendix 2 of this plan is a comparison of design standards applied to streets of similar classification categories from four agencies: the City of Homer, American Association of State Highway and Transportation Officials (AASHTO), the Municipality of Anchorage (MOA) and the State of Alaska DOT/PF. It should be noted that these other agencies have adopted the arterial-collector-local street nomenclatures and format. The Municipality of Anchorage has further subdivided the collector category into three types: neighborhood, local residential, and commercial industrial, with each of these types being assigned a specific standard road cross-section.

PROPOSED REVISED FUNCTIONAL CLASSIFICATION SYSTEM

This plan proposes a revised functional classification for each street in Homer, see Table 4. The purpose of this revision is to adopt standard engineering nomenclature, along with the generally accepted criteria and standards; to clarify the role of difference road types; and to provide a means of better distinguishing road types within the same classifications. The revised system is as follows:

- 1) **ARTERIALS.** "Arterials" will represent the highest level of mobility in the Homer road system. (It is not anticipated that highways of an expressway or freeway class will be warranted within the plan study period; therefore, these classes are discarded.) Generally, arterials are streets or highways which have controlled access and which promote through-movements.

TABLE 4 - FUNCTIONAL CLASSIFICATION - EXISTING STREETS

The current functional classification of Homer's streets, as they now exist and function, and the proposed functional classification, is as follows:

<u>NAME OF STREET/ ROAD/HIGHWAY</u>	<u>EXISTING FUNCTIONAL CLASSIFICATION</u>	<u>PROPOSED FUNCTIONAL CLASSIFICATION</u>
"A" Street	Local	Local
Aspen Lane	Local	Local
Augustine Drive	Local	Residential Collector
Bartlett Street	Residential Collector	Residential Collector
Bayview Avenue	Residential Collector	Residential Collector
Bayview Court	Local	Local
Bay Vista Pl./ Bay Vista Ct.	Local	Local
Ben Walters Lane	Residential Collector	Residential/ Commercial/Indus- trial Collector
Bishop's Beach Access (Beluga Avenue)	Local	Local
Bonanza Avenue	Local	Local
Bunnell Avenue	Local	Local
Bypass Road	Minor Arterial	Major Arterial
Calhoun Court	Local	Local
Calhoun Street	Local	Local
Cityview Avenue	Local	Local
Claudia Court	Local	Local
Clover Lane	Local	Local
Clover Place	Local	Local
Crittenden Avenue	Local	Local
"D" Street	Local	Local
Danview Avenue	Local	Local
"E" Street	Local	Local
Early Spring Street	Local	Residential Collector
East End Road	Minor Arterial	Major Arterial
East Hill Road	Residential Collector	Minor Arterial
Elderberry Court	Local	Local
El Sarino Court	Local	Local
FAA Tower Road	Local	Local
Fairview Avenue	Residential Collector	Minor Arterial
Forest Glen Drive	Local	Local
Frisbee Court	Local	Local
Gavin Court	Local	Local

<u>NAME OF STREET/ ROAD/HIGHWAY</u>	<u>EXISTING FUNCTIONAL CLASSIFICATION</u>	<u>PROPOSED FUNCTIONAL CLASSIFICATION</u>
Grubstake Avenue	Local	Commercial/Industrial Collector
Hansen Avenue	Local	Local
Heath Street	Local	Commercial/Industrial Collector
Herndon Street	Local	Local
Hillfair Court	Local	Local
Hillside Place	Local	Local
Hillview Place	Local	Local
Highland Drive	Local	Residential Collector
Jenny Lane	Local	Local
Kachemak Bay Drive	Commercial/Industrial Collector	Commercial/Industrial Collector, Minor Arterial
Kachemak Way	Residential Collector	
Klondike Avenue	Local	Local/Commercial Industrial Collector
Lakeshore Drive	Local	Local
Lakeside Drive	Local	Local
Lake Street (Pioneer to Ocean Drive)	Minor Arterial	Major Arterial
Lake Street (south of Ocean Drive a/k/a Munson)	Local	Local
Lambert Lane	Local	Local
Larkspur Court	Local	Local
Latham Lane	Local	Local
Lee Drive (Svedlund to Main Street)	Local	Local
Lee Drive (Svedlund to Heath Street)	Local	Local
Lucky Shot Street	Local	Local
Main Street (Upper: Pioneer - Bayview)	Residential Collector	Residential Collector
Main Street (Lower: Pioneer - Bishops Beach)	Commercial/Industrial Collector	Commercial/Industrial Collector
Mariner Drive	Local	Local
Mark White Avenue	Local	Residential Collector
Mattox Street	Local	Residential Collector
Meadow Drive	Local	Local
Mullikin Street	Local	Local
Mt. View Drive	Local	Local
Myhill Road	Local	Local
Nielsen Avenue	Residential Collector	Commercial/Industrial Collector
No-View Avenue	Local	Local

<u>NAME OF STREET/ ROAD/HIGHWAY</u>	<u>EXISTING FUNCTIONAL CLASSIFICATION</u>	<u>PROPOSED FUNCTIONAL CLASSIFICATION</u>
Ocean Drive (Lake St. to Spit Road)	Minor Arterial	Minor Arterial
Ocean Drive (Within Oscar Munson Subdivision)	Local	Local
Olsen Lane	Local	Local
Pennock Street	Local	Local
Pioneer Avenue	Minor Arterial	Major Arterial
Rainbow Avenue	Local	Local
Rangeview Avenue	Local	Local
Rochelle Road	Local	Local
Sabrina Road	Local	Local
Saltwater Drive	Local	Residential Collector
Shannon Court	Local	Local
Shannon Lane	Local	Local
Shelford Street	Local	Local
Soundview Avenue	Residential Collector	Residential Collector
South Slope Road	Local	Residential Collector
Spit Road	Minor Arterial	Major Arterial
Sterling Highway	Minor Arterial	Major Arterial
Svedlund Street	Residential Collector	Commercial/Indus- trial Collector
Tamara Street	Local	Local
Waddell Street	Local	Local
West Hill Road	Residential Collector	Minor Arterial
Wright Street	Local	Local

The primary use of an arterial street will be to transport high volumes of vehicles and goods. The primary goal of arterial design and layout will be to facilitate that kind of use, i.e., make it easier to accomplish high-volume transport using the facility. Therefore, access to abutting properties will be limited and on-street parking will be prohibited, unless specifically compensated for in the road's design.

There are two kinds of arterials:

MAJOR ARTERIALS. These streets or highways are the principal traffic movers to serve major cross-town traffic movements by interconnecting the major traffic generators. They provide a favored route for movements into and out of the urban area. Therefore, they should have continuity with rural arterials. The average annual daily traffic (AADT) volume should exceed 10,000 vehicles per day (vpd) to qualify as a major arterial. Speed limits should be set at relatively high levels (i.e., 35 to 55 mph) and access should be limited. Minimum spacing between access points should be 300 feet, with 600 feet preferred; therefore, access points should provide for major side streets, (i.e., minor arterials, collectors, and possibly ingress/egress points for major commercial developments). No more than one direct access should be allowed for each individual parcel; provided that the access points are no more frequent than one per 300 feet. It may be possible that an existing street functions as a major arterial in spite of historically uncontrolled direct access.

MINOR ARTERIALS. These streets are subordinate to the major arterials, even though they are critical links in the same basic network. They provide system continuity by linking directly with the major arterials. They mainly provide for moderate length intra-urban trips at a somewhat lower level of traffic mobility than the major arterials, and they do this because the areas to which they distribute traffic are smaller and/or less densely populated than those which major arterials service. Minor arterials should have speeds from 25 to 35 miles per hour, with access points preferably limited to block length (300 feet preferred, 150 feet minimum). Minor arterials should support present or expected future volumes between 3,500 and 15,000 vpd.

- 2) **COLLECTORS.** Collectors represent an intermediate level in the mobility/access spectrum. Their primary role is the distribution of trips from local streets or abutting generators to arterials, and vice-versa. Thus, collectors may cross neighborhoods or central

business district areas. Driveways are permissible, but access should be provided via local side streets or cul-de-sacs whenever possible. Collectors will generally consist of two sub-types: residential and commercial-industrial with different design standards for each. Traffic volumes for collectors will vary from 500 to 6,000 vpd. On-street parking may be permissible if parking lanes are designed.

- 3) LOCAL STREETS/ROADS. These are streets or roads which do not meet the requirements for arterial or collector classification. Their function is primarily, to provide access to abutting lots. On-street parking may be allowable if the road width permits. On-street parking is not permissible for any street classification when it blocks the travelled way. Typical kinds of local roads and streets include country lanes, subdivision feeders and cul-de-sacs.

Proposed design standards for future construction or upgrade of each classification is summarized in Table 5, Proposed Functional Classifications Design Standards.

POLICY IMPLICATIONS OF FUNCTIONAL CLASSIFICATIONS

There are at least two levels of policy implications that arise from functional classification. The first is how to treat existing streets or roads which have acquired their basic roles within the transportation grid by fact of usage. The second is how to plan for future extensions to accommodate growth or remedy system deficiencies. The former set of decisions considers the existing functional roles and distinctions and deals with the existing operational problems. The latter uses planning, design, decision-making and other arts to consider how to develop and manage new roads in an enhanced network; as such, functional classifications are assigned to the new roads. Designs and controls are established as necessary to protect the planned function.

Existing Streets

The problem of how to handle existing streets is a difficult issue. Pioneer Avenue is illustrative of this type of problem. It is a street which accommodates arterial-level traffic volumes and remains, even after construction of the Bypass, a crucial link for eastbound-westbound through-movements. Yet there has never been any access control. There is a proliferation of long-strip driveways and the road shoulders physically accommodate parking and loading, to the detriment of pedestrians and general safety. While some arterial design parameters are met, the right-of-way requirement is not, and this severely constrains the number

TABLE 5
CITY OF HOMER PROPOSED FUNCTIONAL CLASSIFICATION DESIGN STANDARDS

CRITERIA	NUMBER OF LANES	MIN. ROW WIDTH (ft)	ADT THOUSANDS	DEGREE OF CURVE	MAX. GRADE (%)	MIN. GRADE (%)	DESIGN SPEED MINIMUMS (MPH)	MIN. TRAV. WAY DIMEN. (ft)	MIN. SHOULDER WIDTH (ft)
DESIGN CLASS									
MAJOR ARTERIAL	3-6	100	10+	8	6 8 500'	0.30	50	36	8
MINOR ARTERIAL	2-4	80	3.5-15	8.5	8 10 500'	0.30	45	24	6
COLLECTOR RESIDENTIAL	2	60	0.5-6	11	10 8-curves 12 500'	0.30	40	24	4
COLLECTOR COMMERCIAL/INDUSTRIAL	2-4	70	0.5-6	8.5	8 6-curves 10 500'	0.30	40	24	4
LOCAL ROADS & STREETS	2	60	1	57	10 8-curves 12 500'	0.30	25	22	4

of lanes. Additional right-of-way would be prohibitively expensive in many areas because of buildings within setbacks. An examination of the existing system makes it clear that, in the short term, Pioneer Avenue must continue to serve a major portion of traffic movements. The design of the street must battle the reality of existing access dependency and substandard width.

Another problem is illustrated by the Homer Bypass. This road exists as a major through-route; indeed, it is at this time the only alternate to Pioneer Avenue for east-west movements within Homer. It also is centrally located within the central business district, which encourages commercial development of abutting property. The issue between desire to preserve the Bypass as an arterial for mobility vs. the desire to provide access must be resolved. The State DOT did not plan the Bypass as a limited access facility; instead, DOT officials declared that access control should be effected by zoning controls. The City has recognized the importance of access limitation in the 1983 Comprehensive Plan, but has not implemented any ordinances to require compliance.

A final illustration demonstrating the problem of existing streets is the case of Grubstake Avenue. It was recommended in the 1979 Master Roads and Streets Plan that Grubstake Avenue be developed from Main Street to Lake Street, as a middle east-west link. Yet the existing Grubstake Avenue section is characterized by a 50 foot right-of-way, no access control, and residential uses. Furthermore, the road is of extremely poor quality and was never constructed to even minimal standards. The area is zoned Central Business District. Clearly, a road improvement would benefit abutting properties, as long as it is assumed that access to existing lots would be preserved. Therefore, it is reasonable that a portion of the cost should be borne by abutting property owners by means of a local improvement district (LID). However, the exact proportion is likely to become an issue of controversy, because residents are likely to oppose the street extension due to the expected increase in traffic. This leads to questions of whether it is fair to the general taxpayer to bear the entire cost of improving a local street or collector street which was never accepted by the city or constructed in a proper manner.

New Street Extensions

With new street or road extensions, it is necessary to consider many factors. If a major arterial, or even a minor arterial, bisects a residential neighborhood, it can be certain that some negative impacts, i.e. increased traffic, will be inflicted on that neighborhood. Moreover, if an arterial is constructed along an existing street alignment

which abutting properties depend on for access, then the project design agency, i.e. City or State, must sacrifice access control, or pay heavy compensation to abutting owners for deprivation of access and loss of lot utility (this is known as "buying access rights"), or provide reasonable alternate ingress and egress to abutting properties, either via a frontage road or rear access road. A controlled access policy depends on an understanding of the rights regarding the ability to limit access points, and the importance of preserving mobility on high-volume roads.

There are also design standards for each class of roads for which some flexibility must be exercised, because of topography and other constraints. However, each variance to design standards will diminish the road's utility with respect to its design function. And it may also introduce undesirable design elements which would increase the opportunity for accidents.

Another controversial issue of new street extensions involves cost-sharing for development of new arterials or collectors. It has been deemed reasonable to require subdividers to dedicate the required right-of-way for each class of roadway, within the subdivision. A policy addressing compensation for right-of-way dedication for arterials has not been adopted. In addition, many local governments require that subdividers construct streets and other improvements prior to plat recording. Homer does, in practice, enforce proper right-of-way dedication for collector and local service roads, but there is no requirement that dedicated rights-of-way be developed. If developers are required to construct streets to City standards, it must be acknowledged that developers should have a reasonable right to access the roads they build. It should also be recognized that the roads they do construct should not greatly exceed their needs. For example, it is unreasonable to require a developer of a moderate-sized subdivision to dedicate an expansive right-of-way and construct a paved, high-type multilane facility to which he/she has been prohibited access. In consideration of these problems, some compromises and some degree of cost participation by the City may be warranted.

It should also be noted that the functional classification of existing roads has a substantial impact on how capital improvement funds are allocated. Clearly arterials have greater priority to the community than do local streets. Every direct access road is of vital importance to owners of properties abutting the road; however, such roads may not be of major consequence to the community as a whole. Invariably, the major collectors will sustain the heaviest loads, causing loss of structural quality and reduced levels-of-service. These have community-wide impact and, therefore, capital improvement and maintenance funds will be

tipped towards projects mitigating the problems on these roads.

CHAPTER 8

CHAPTER EIGHT - PROJECT RECOMMENDATIONS

This chapter presents specific capital improvement for some of Homer's major existing streets and project recommendations for proposed future streets.

SPECIFIC PROJECT RECOMMENDATIONS

It is not enough to draft a revised master roads plan designating future arterials and collectors, without addressing the needs of the existing systems. Chapter Four highlighted the needs of several of Homer's major streets. Since most of these roads are State roads, specific recommendations to address deficiencies are as follows: State Dept. of Transportation funding will be necessary.

Bartlett Street.

- a) Reconstruct entire road section to urban standards. Redesign roadway on centerline. Include curbs, gutter, sidewalks, street lighting, adjust grade.

Ben Walters Lane.

- a) Replacement of existing yield sign with stop sign and consideration of three-way stop control at the Ben Walters/Nielsen intersection.
- b) Realignment of existing reverse curve on south Ben Walters to direct north-south alignment.
- c) Paving, in order to mitigate the dry-weather dust problem.
- d) Enforcement of speed limits.

East End Road.

- a) Acquire additional right-of-way to 100 foot width.
- b) Redesign and reconstruct to eliminate "roller coaster" profile.
- c) Widen to four lanes, include sidewalks, street lighting, delineate intersections.

East Hill Road.

- a) Reconstruct entire roadway, to include pedestrian facilities.

Fairview/Hohe.

- a) Control intersection with a stop sign on Hohe Street approach favoring through-movements for Fairview Avenue.
- b) Reconstruct and realign Fairview segment to right-of-way centerline, west of Hohe.
- c) Reconstruct and widen Hohe with sidewalk.

Homer Spit Road.

- a) Continue to monitor bank stabilization efforts.
- b) Pursue long-range permanent solution to erosion problem.

Kachemak Bay Drive.

- a) Reconstruct entire road to 40 foot traveled-way urban standard to include paving, drainage, lighting, pedestrian facilities and grading.

Lake Street.

- a) Redesign the intersection at Lake Street/Pioneer Avenue/East End Road into a three-way stop. In the short-term, traffic volumes do not warrant installation of a traffic signal. It is recommended that traffic volumes should be monitored and a signal installed when warranted.
- b) Acquire additional right-of-way, or road easements to 100 feet width.
- c) Reconstruct roadway. Widen to three lanes with center turn lane between Pioneer Avenue and Homer Bypass, becoming four lanes along Ocean Drive. Realign intersection of Bypass/Lake Street to 90°. Construct sidewalks and street lighting. Realign roadway to straighten curves.

Bypass.

- a) Stripe roadway to delineate four lanes.
- b) Install additional street lighting.

- c) Control access at designated intersections.

Main Street.

- a) Pave upper Main Street (Pioneer Avenue to Bayview Avenue). Construct a sidewalk along one side at minimum, and install additional street lighting.
- b) Reconstruct to urban standards lower Main Street, include multi-lanes, paving, sidewalks and lighting, storm drains. Adjust vertical geometric at the Homer Bypass intersection, if possible.

PROPOSED FUTURE STREETS

Five future Homer streets are recommended as either new street construction or extensions from existing streets. They are: Fairview Avenue (extension to West Hill Road); Svedlund Street (construction Pioneer Avenue to Homer Bypass); Grubstake Avenue (reconstruction and construction Main Street to Lake Street); Bayview Avenue (construction from South Slope to Kachemak Way); and, Beluga Lake North Shore Road (construction Lake Street/Homer Bypass to East End Road).

Each of these roads have their genesis in the 1979 Master Roads and Streets Plan. While all have been evaluated and found important, or even vital, to Homer's future road system, there has been little concrete effort to ensure the roads will be built. In order to define the actual route, it was necessary to do reconnaissance work, route selection and plan/profile design. This information could then be used to provide subdividers guidance as they design road links in the system.

The common thread to each of these road and street extensions is that they are all, partially or wholly, situated on private land. Each is therefore of indeterminate status and subject to redesign or omission in the subdivision process, unless a preliminary design is officially adopted or endorsed.

Moreover, the interests of the land owner or prospective subdivider do not necessarily correspond with the "public interest" of improving the transportation network. For example, a subdivider does not normally wish to dedicate more than the minimum legally required right-of-way widths; also, in a developing residential zone, subdividers will usually oppose placement of an arterial, fearing that it will reduce the area's desirability for prospective buyers and hence, will decrease property values. Access to an arterial would also normally be limited to side streets at specified minimum spacings. This, too, runs contrary to subdivider's normal desires. The incentives are thus heavily weighted against cooperation with the intent of the "Master Plan for Roads and Streets" unless

positive steps are taken to identify the streets' corridors, and the rationale for each project is overt and explicit.

Fairview Avenue (extension to West Hill Road)

The 1979 "Master Plan for Roads and Streets" proposed that a link between West Hill Road and East End Road be constructed utilizing the Fairview Avenue right-of-way. This same project had, in essence, been proposed in the 1969 Homer "Comprehensive Development Plan," except that the plan also proposed that a through-link be constructed to the Sterling Highway.

The 1979 plan classified the link as a "major arterial"; in essence, the street would primarily serve as a conduit for east-west through-movements which lack origins or destinations on Pioneer Avenue. The street would also serve as a secondary (northerly) bypass around downtown Homer, and simplify and economize north-south movements when all existing or proposed Pioneer Avenue to Bypass links (i.e., Swatzell Street, Main Street, Svedlund Street, Heath Street, Lake Street) are completed or upgraded.

For many years, Fairview Avenue has been recognized as laying in a particularly strategic location; it is placed amidst some of Homer's most rapidly developing neighborhoods. Because it is centered on a section-line boundary (possibly subject to a section line easement), it has been very likely to be dedicated at least in half width as part of aliquot-part subdivisions. Therefore, it has been dedicated continuously between Ridgeview Acres and Heath Street and discontinuously in other areas. Moreover, and perhaps most importantly, the topography of the proposed route is favorable to a road with fairly gentle and even grades, and soil conditions are average or better for this area. Thus, Fairview Avenue provides a unique opportunity for Homer's transportation network.

Svedlund Street Extention

This project would consist of extending Svedlund Street - which presently ends at a tee intersection on the north side of Pioneer Avenue - approximately 1,500 feet south to the Homer Bypass. This extension is an integral part of the plan for the Homer central business district transportation system, first proposed in the 1979 Master Roads and Streets Plan. The system has periodically been re-evaluated; the most recent re-evaluation occurring as part of this study and as part of spinoff studies related to the Pioneer Avenue reconstruction project. Each re-evaluation has validated the need for and desirability of the system configuration proposed by the 1979 plan.

The 1979 plan showed four north-south streets linking Pioneer Avenue with the Bypass: Lake Street, Heath Street, Main Street

and an unnamed right-of-way known as New Street, or Swatzell Street extension. Actually, Svedlund Street was not depicted as linking directly with Pioneer Avenue: rather it would link indirectly by means of Klondike Avenue and Kachemak Way.

It can be safely surmised that the reason southern Svedlund Street was not depicted as linking with Pioneer Avenue was that the link could only be constructed if right-of-way was acquired through an existing private parking lot. The prevalent philosophy was that right-of-way purchase and/or condemnation should be avoided.

By 1984, it had become evident that development and planning in the City had escalated to the point that, in many cases, right-of-way purchase or condemnation could no longer be avoided. It had also become evident by 1984 that traffic volumes on Pioneer Avenue had grown to approximately the capacity of a two-lane street, and that was due largely to the absence of alternate through-streets and side streets. The lack of side streets in the Central Business District core was recognized as helping to cause a pattern of strip development, which particularly manifested itself on Pioneer Avenue. All of these interrelated factors point to the need for side streets penetrating into the core of the Central Business District.

Grubstake Avenue

Like the Svedlund Street Extension, Grubstake Avenue was envisioned in the 1979 plan as an integral part of the inner Central Business District street grid. It would essentially provide an internal east-west link between Main Street and Lake Street; the street would also effectively link Lakeside Village Subdivision with the Central Business District's center, because Grubstake would be extended to the Lake Street/Nielsen Avenue intersection.

The purpose of this street would be similar to that of Svedlund Street, except that it runs east and west. It would provide a spine for the development within the Central Business District in an east-west direction and would also allow east-west traffic an alternate to Pioneer Avenue and the Bypass: thus, it could help alleviate traffic congestion on these major streets by improving circulation.

Bayview Avenue Extension (Kachemak Way to South Slope Road)

This proposed road is important because it directly connects two separate areas of the City, the central portion of Homer's urban residential district and the East Hill Road area. It will also provide a tremendous improvement in the linkage between the East Hill/Diamond Ridge area and downtown Homer.

The 1979 Master Roads and Streets Plan showed two connections between Kachemak Way and East Hill Road. One was a north-easterly extension of Kachemak Way which would join Shellfish Avenue (in Barnett's South Slope Subdivision). The other was an easterly extension of Mountain View Drive to meet South Slope Road. Actually, other logical alternates were also available including the option to extend Bayview Avenue to South Slope Road; however, that was not recommended, probably because of the structure that exists at the eastern end of Bayview Avenue. Whichever option is chosen, however, it would be necessary to cross some rather deep and formidable drainage gullies.

After the adoption of the 1979 plan, an extension of Mountain View Drive was platted (as part of the Anderson 1980 Subdivision). Construction of this extension was completed in 1984. The alignment of this extension was not in strict accord with the 1979 plan, which called for a direct east-west connection. Rather the road was curved toward the northeast, which severely complicates a further extension to South Slope Road in the manner proposed in the 1979 plan. Therefore, the Bayview Avenue extension was re-examined and is being recommended.

Beluga Lake North Shore Road

The 1979 Master Roads and Streets Plan proposed that an east-west arterial be constructed on the north side of Beluga Lake. This arterial would link East End Road with Kachemak Bay Drive, beginning at Mattox Street and an east-west section-line street (commonly referred to as a portion of Fairview Avenue). Toward the eastern end of the road, connection would be provided to East End Road by means of a north-south connection to Kachemak Bay Drive. This follows the East Lane right-of-way, which now exists at the end of the airport runway.

The justification for the arterial are twofold. First, it will provide a spine for access and development in a large section within Homer's rural residential and general commercial zones. Second, it provides a much more direct link to the Kachemak Bay Drive area, which is likely to see increased development upon the inevitable water and sewer extensions in the area. The road would improve traffic circulation by taking some east-west traffic off of East End Road, particularly by providing an alternate access route to subdivisions such as Meadow-Wood, Bear Creek Heights, Tietjen and Mariner Park. Finally, it would aid system continuity by providing a much more direct link between the city center area and Kachemak Bay Drive, and by providing a second direct connection between two arterials (East End Road and Kachemak Bay Drive).

The alignment proposed by the 1979 plan has genuine inadequacies, some of which are related to the underlying philosophy of avoiding right-of-way purchase or condemnation at all costs. Thus, the simpler and more logical option of an

eastward extension of the Bypass extension was not considered. The Bypass extension would avert diversion of heavy traffic volumes onto Mattox Street. The geometrics of the Mattox Street link would be poor, the impact on the existing neighborhood would be negative, and it would still be necessary for traffic to use East End Road to get to this arterial. By contrast, the Bypass Extension would have avoided most of these problems, truly relieve traffic pressure on East End Road by providing a true bypass around the Lake Street/East End Road area, provide a direct link between the Central Business District and General Commercial area, and allow development of a truck route bypassing Pioneer Avenue and Lake Street. If the Bypass were extended, the same route east of the elementary school would be followed as proposed in the 1979 plan.

Preliminary route selection, drainage design, plan and profile, and cross sections have been prepared for each of these proposed roads, due to the importance each plays in the economic and transportation needs of the community.

CHAPTER 9

CHAPTER NINE - POLICY RECOMMENDATIONS

The recommendations proposed in this chapter primarily focus on policy changes, although recommendations are also made for specific actions and programs. The rationale for each recommendation is discussed, as are potential ramifications to the recommendations.

Recommendation #1: Adopt this revised Master Plan for Roads and Streets, including the revised functional classification system, the Master Plan Map, and design guidelines for streets of each functional classification.

The adoption of the plan will expedite a number of actions and opportunities, such as the following:

- a. The Homer Advisory Planning Commission may require, as part of the platting process, dedication of the rights-of-way required for construction of the streets detailed on the plan.

The Planning Commission should direct that where applicable, the right-of-way dedications conform to the alignments shown on the Homer Future Streets preliminary plans and profile sheets; in the case of other proposed streets, the Commission should ensure that R.O.W. is dedicated approximately along the corridor shown. Grade, access and curvature requirements must be adhered to, and unnecessary curvature and access can be eliminated at the platting stage.

- b. A logical collector/arterial grid will be established, and, if used in conjunction with access spacing and other design criteria, a logical local street grid can also be formed.
- c. The framework for right-of-way purchase and legislative street funding requests will be provided. Indeed, the major utility of a plan is that it can be pointed to as an indicator of community resolve regarding projects and as a source of project recommendations which have official sanction.
- d. Standards for project cost-participation and access spacing can be established; these standards can be enforced on new streets and, to a lesser extent, on projects upgrading existing streets.

Recommendation #2: Establish a program for right-of-way acquisition along designated future road/street corridors, with a portion of the City's Capital Improvement Budget being reserved for right-of-way acquisition.

Most of the proposed road and street extensions in the Master Plan either cross through "unsubdivided" parcels, thus allowing right-of-way acquisition to be accomplished during the platting process, or they basically take advantage of existing rights-of-way or stay within the large "unsubdivided" parcels.

Given the tremendous expense of constructing transportation facilities, it is more economical to construct a more expensive route that motorists will use than to construct a less expensive route that motorists will not use. Other circumstances can also dictate the need for right-of-way acquisition. There may not be an alternative. In other instances, alternatives exist but are poor and/or likely to exacerbate current traffic problems.

There are many miles of proposed road and street extensions shown on the Master Plan. Four such purchase areas are of critical importance now.

The first is a strip within the existing Acropolis parking lot, which is part of the proposed Svedlund Street Extension, from Pioneer Avenue to the Bypass.

The second area needed is a 30 foot strip immediately south of the access road to the "FAA tract," currently owned by Cook Inlet Region, Inc., and occupied by radio station KBBI. This is necessary for the Grubstake Avenue extension.

The third area is the intersection of Pioneer Avenue with the proposed Heath Street extension, which will require a large turn radius.

Fourth, the Bypass extension should be pursued. Right-of-way should be obtained immediately, particularly within Waddell Park and Lakeside Village Subdivision.

Recommendation #3: Require that subdividers construct streets dedicated by plat to City standards and under City supervision.

As pointed out earlier, it is now permissible in Homer to plat and sell lots without constructing the physical facilities for servicing the lots. This sets into motion a chain of events that is likely to culminate in City reconstruction of the street. Present City policy allows substandard access to be developed inside City rights-of-way, in order for property owners to get access to their land. What appears at face value to be a mutually beneficial practice for the City and property owner, eventually opens the door to public maintenance. Ultimately, the taxpayer pays the heavy cost of maintenance and reconstruction.

Recommendation #4: Develop an official set of minimum street design/construction standards, accompanied by required design/construction/inspection/acceptance procedures for construction of all streets.

The City's current street ordinance is outdated and often ambiguous. This has made the problem of street acceptance for maintenance a more sensitive issue. Street maintenance is contingent upon bringing the street up to "City standards" but the official standards are archaic and poorly defined. The standards need to be updated and adopted.

Recommendation #5: Establish and codify access spacing requirements for each classification in Homer's street functional classification system. Secure DOT's approval for the system.

It is in the interest of the City and State to control access onto newer road facilities, while the abutting properties remain mostly undeveloped. Such control also works to the property owner's advantage. Controlled access provides consolidation and logical ordering of accesses, so that conflict between through-movements and access movements is minimized. Access is actually expedited, in that it is simpler and more orderly. Also, the street's capacity is preserved. Unlimited access would diminish the road's capacity and the resulting congestion would discourage access and through-movement alike.

Recommendation #6: Establish a cost sharing allocation system for road improvement projects, depending on the functional classification of a given roadway. Secure funding for City's share of road improvement projects.

A cost sharing system can be used to allocate costs between the government agency and the developer in a proportion representing a ratio of public to private benefits. The cost sharing system is the most equitable in terms of allocating costs to those who receive benefits.

While it can be argued that streets are public ways and anyone may use them, the primary benefits usually accrue to abutting properties. The amount of costs borne by abutting properties should, however, bear some relation to the service received. A local street provides local benefit almost exclusively, and it is reasonable that the property owners bear the full cost burden. Collectors provide, in theory, less benefit to abutting properties and more general system benefits, therefore adjacent properties should have a substantially lessened cost burden. Arterials should provide little service to abutting properties and therefore funding should be more of a public burden. However, where properties abutting collectors and arterials are granted unrestricted access, it is not unreasonable to consider increased assessment costs.

Several methods exist for determining a cost sharing allocation system. It is recommended that the City administration conduct a study into the cost allocation's appropriate to each functional design class. Based on this study, an ordinance should be prepared and the cost sharing formula should be codified.

Recommendation #7: Establish a criteria-based ranking system for long term programming for streets construction.

A comprehensive street improvement criteria and ranking system that considers benefit/cost ratios, functional classification, and other appropriate factors could be developed to provide an objective means by which to program improvements.

A criteria based system would put the improvement priorities and allocation methods on a more rational basis, which will allow more effective allocation of public funds.

Recommendation #8: Require that water, sewer and street improvements be phased concurrently whenever possible; require that construction of water and sewer lines into undeveloped or new subdivisions be accompanied by road construction.

It is widely acknowledged that, given Homer's subsurface conditions, it is of great advantage to install water and sewer lines concurrent with the street. This is to prevent the need to excavate the roadway later, which will severely undermine the roads structural integrity and necessitate expensive repair work.

When water and sewer utilities are made available, a tremendous incentive for residential and commercial development occurs. "Passable" roads can be developed to provide access in most seasons, and that is all many people want (at first). Thus, development occurs around the water and sewer lines. Because the City has jurisdiction over these lines, it has a stake and investment in the roads (if only to get access to manholes, valves, meters, and pressure reducing stations). Moreover, the development will soon lead to demands for winter maintenance. As has been previously argued, this creates the chain of events leading to assumption of full City maintenance and, probably, public rebuild of the streets. Water and sewer extensions made without street construction requirements act to encourage, and often to initiate, this sequence of events, a sequence which can be described as a means by which private development costs are ultimately transferred to the public.

Many other communities have adopted requirements for improvements as a condition of subdivision activity because of the increasing awareness of public financing limitations, and

that private enterprise must accept their responsibility for development costs.

It is recommended that prior to plat approval, engineered plans and specifications for street improvements be required in order to verify that the proposed improvements will meet City standards.

Recommendation #9: Adopt a paved surface standard for arterial and collector streets and investigate feasibility of paving local streets.

There are many factors that make the gravel surface standard unsuitable for urban areas. These factors include: the dust problem, vehicle maintenance costs, road maintenance costs, and reconstruction costs due to degradation of roadway material by loss of fines, armoring, washouts, surface contamination, etc.

Pavement is part of the overall complex of urban street amenities, which can be very costly. Pavement is not, in itself, responsible for that high cost.

Roads are currently not paved for the following reasons. Paving is not required. Paving is perceived to be prohibitively expensive; and, Homer's soil conditions are such that advantages and economy is gained by deferring pavement operations until one or two years after the road is constructed. The problem is that paving, once deferred, usually continues to be deferred.

If a comprehensive paving standard was established, paving costs could be reduced in that at least one hot plant may establish locally. The economics of paving would thus be more favorable than at present, with no paving requirements and scattered paving jobs.

Recommendation #10: Require that sidewalks or bicycle paths be constructed alongside all streets of arterial or collector classification, as noted on the Master Plan Map.

The access and transport functions of roads and streets are not limited to motor vehicles. Pedestrian and bicyclists also play a major part of a city's transportation system.

Separation of motor vehicles from pedestrians and bicyclists is desirable. Pedestrians and bicyclists are basically incompatible with automobiles, and if facilities are not provided for them, their presence often creates a safety hazard for all concerned. Sidewalks (with curbs and gutters) can aid in defining the travelled way, thus enhancing space efficiency and defining ingress/egress points. There can be aesthetic benefits to sidewalks and/or bicycle lanes as opposed to simply reserving shoulder space.

Recommendation #11: Require that new driveway permits onto "unaccepted" City streets (those streets which have not been accepted for maintenance by the City) be issued contingent upon a waiver of the right to object to formation of a street improvement district.

This recommendation is intended to stop the problem of poorly constructed roads becoming public liabilities.

When a parcel is subdivided, right-of-way is dedicated to provide legal access to the subdivided lots. Lots are sold but the streets abutting the lots are not built. Lot purchasers who want immediate development are then faced with the problem of attaining access. They request City permission to construct driveways in the undeveloped right-of-way. When these owners construct their driveways they do not build them to City street standards. Adjacent property owners begin using the same driveway for access to their lots. Thus, once such a driveway is built, it encourages development of a neighborhood. When this occurs, the driveway becomes a local street.

This situation has repeated itself many times in many areas of the City. The streets created in this manner are too narrow for adequate residential traffic service. They meander within the right-of-way and sometimes onto adjoining lots. They usually have inadequate or unsuitable provisions for drainage. They may or may not adhere to minimal structural standards and additional increases in traffic will soon lead to rapid structural degradation of the roadbed.

When a neighborhood becomes well developed along a substandard "driveway" street (e.g., lower Glacier View Subdivision) public outcry often mandates remedial "quick fix" actions. The City's position is that these local "driveways" benefit primarily the street residents, and that it is unfair to burden the general taxpaying public with the responsibility to reconstruct a local service "driveway" that was never properly built. A street improvement district should be formed, and the abutting property owners should bear the improvement costs. Property owners, however, often resist street improvement districts because of the cost.

The recommended solution would be to require lot owners to sign an agreement for driveway construction on an unaccepted right-of-way (which would allow the lot owner to access the street), to stipulate that the permittee (or any future lot owner) waive his/her rights to object to the formation of a street improvement district. Then, as more people build along the street, additional waivers are collected. This continues until a sufficient number of property owners are committed and the street LID is formed.

This mechanism is recommended because it would simultaneously protect the City and public interest, while also serving the private individual's access needs.

Recommendation #12: Abandon the policy of acceptance of streets for winter maintenance.

The reason why maintenance is not provided on all roads is that the City established maintenance acceptance as the "incentive" to construct roads to City "standards." The advent of "winter maintenance" compromised the effectiveness of this policy, as it reduced the incentive to build roads to City standards.

As soon as the City provides winter maintenance on roads, the following consequences occur: population densities are likely to increase, as City winter maintenance is certainly attractive to prospective residents; political pressure will arise after a number of years to accept the street for full-time maintenance; this chain of events eventually culminates in a demand for total road rebuild.

Recommendation #13: Modify parking ordinance standards to allow liberalized space requirements for paved parking lots.

Homer parking lots are by and large, unpaved and unmarked. This condition makes space utilization inherently inefficient, because parking stalls are not marked. It is recommended that liberalized parking standards, in accordance with national standards, be adopted for paved and striped parking lots. This action will allow more efficient space utilization without compromise to the integrity of the standards, and it will also serve as an incentive for paving parking lots which will help to curb Homer's dust problem.

Recommendation #14: Enforce the "stopping and parking" ordinance.

This will prevent on-street parking and/or loading on arterials and will also stop the hazardous pattern of backing onto arterials.

CHAPTER 10

CHAPTER TEN - IMPLEMENTATION MEASURES

In order to achieve the upgrade of existing roads and the construction of new streets to proper standards, and to integrate the development of the street system, it is essential to formulate implementation measures to effectuate action. Questions as to how road improvements will be financed; how City's standards will be assured; and how future street rights-of-way will be safeguarded, will be addressed in this chapter.

IMPROVEMENT FINANCING

The major obstacle to constructing and/or improving roads is the difficulty of securing financing or funding. Funding sources are limited. Presently, most road improvements constructed by the City are funded by the State of Alaska either by special legislative grants, or grants via the Local Service Roads & Trails Program (LSRT). The former grants are awarded by the legislature on a year-by-year basis, subject to availability of State revenues. The City has prepared special capital improvement lists with priority ratings outlining requested projects.

The latter program, the LSRT program, awards grant funds based on a formula established by statutes, subject to availability of state revenues. Generally, these grants are too small to fund any major road projects.

Grant awards have been declining in recent years as State revenues have been declining, making it difficult to secure State funding for needed improvements, or anticipate funding levels for future projects. It must be recognized at the onset, that the City will never receive the amount of financial assistance necessary to fully fund all the various projects the City needs. Decisions must be made as to which projects are most needed in the short term and which ones can safely be deferred to the future. It must also be decided which improvements should be funded by the taxpayers-at-large and which should be funded by users or project beneficiaries.

Aside from State funding, other available funding sources for road developments could include private-sponsored projects, local improvement districts, or city bonding.

Private-sponsored. Private sponsored road improvements are those roads developed by private developers or as part of subdivision activity. At present, private-sponsored projects are voluntary. The recommendation of this plan is that subdividers be required to construct all streets dedicated by plat to City standards. In cases where the

road functions as an arterial or collector, a cost-sharing method should be used. The City's advantage for using this approach is that funding derives from the private sector and the benefitting properties share the cost. The subdivider's advantage is improved access and City maintenance.

Local Improvement Districts. Local Improvement Districts (LIDs) occur when a majority of private property owners organize to fund a local improvement and are assessed the cost of the project. The cost burden is placed on the benefitting properties.

It is recommended that the LID mechanism be used to finance the majority of local road construction projects. For arterial and collector projects, participation should be shared with the City providing for the upsizing of the facility. On arterials, if access is fully controlled, the costs should not be charged to properties because direct benefits are very difficult to ascertain.

There are several disadvantages of LIDs. They are difficult to organize, cumbersome to administer and politically unpopular. Since the project is publically sponsored and subject to State wage requirements, higher project costs accrue.

It is preferable for property owners on residential streets to privately organize construction of street improvements, via private improvement associations. This mechanism is experimental and places the burden of organization and construction on the property owners.

City Bonding. In order for the City to share in the cost of street improvements, it will be necessary for the City to secure funding separate from State legislative grants. One promising local source is through the use of sales tax revenue. Sales tax revenue could be reserved in a special account specifically for road improvements. This pool would be used as the matching share for local improvement districts.

Another opportunity to use sales tax revenue would be to back general obligation bonds. General obligation bond sales would require voter approval. A disadvantage of this approach is the amount of tax revenue required for debt service. While general obligation bonds could raise substantial capital in the short term, in the long term there would be a substantial amount of interest due.

Another source of local funds to generate city revenue is through property taxes. The City is at present committed to holding property taxes to 6 mils. The likelihood of voter approval of higher taxes is slim.

Financing Mechanisms

The most readily available source from private financial institutions is the Farmers Home Administration which will provide 20 year or more financing for public improvement projects in residential districts. It is also recommended the City explore means of providing long-term financing for commercially or industrially zoned projects.

IMPROVEMENT PROGRAMMING.

Assuming the City secures local funding for street improvements, the next objective is to establish a rational method for allocating those funds. It is recommended the the City develop prioritized improvement programs. This program would rate the proposed city street upgrade projects such that the project of the "highest need" would be listed as top priority, the project rated as second highest need would be the second priority, etc. The project of highest need would get the first chance of receiving a shared cost grant from the City. Thus property owners along an existing street would be given an opportunity to form an LID or private association to finance improvement projects, and the City would make the cost sharing funds available if they did so.

If property owners choose not to accept the City offer (by refusing to form an LID or association) then the grant money is simply made available to another project of lower priority. Each year, therefore, the City would make offers to all of the top priority projects which would be fundable, and declined offers would be made available to the lower priority projects. The City would re-evaluate the priorities annually.

IMPROVEMENT STANDARDS

Financing and programming the reconstruction of existing substandard streets will eliminate a large portion of Homer's street problems. It will not stop the proliferation of substandard streets. In order to prevent the problems from continuing it will be necessary to adopt a set of ordinances dealing with street design and construction standards, and subdivision improvement regulations. Draft ordinances have been prepared and submitted for City Council action, see Appendix 3.

The Street Design and Construction Standards ordinance replaces the existing street ordinance, Title 11, with revised and updated construction standards. The ordinances will apply to streets and utilities in existing rights-of-way, as well as new subdivisions. The ordinances requires that all new subdivisions have streets constructed to City standards.

In addition, the ordinances adopt the Street Master Plan, and require dedication of streets shown on the Master Plan in subdivisions through which the streets traverse. This effectively secures right-of-way dedication, at no cost to the public, through the subdivision platting process.

It should be noted that the street standards ordinance does not require paving of streets. It is recommended that the City consider phasing a paving requirement, first to perhaps apply to all new streets in the commercial and urban residential area, then to all new collector and arterial streets, and finally to all new streets in all districts.

CHAPTER 8

CHAPTER EIGHT - PROJECT RECOMMENDATIONS

This chapter presents specific capital improvement for some of Homer's major existing streets and project recommendations for proposed future streets.

SPECIFIC PROJECT RECOMMENDATIONS

It is not enough to draft a revised master roads plan designating future arterials and collectors, without addressing the needs of the existing systems. Chapter Four highlighted the needs of several of Homer's major streets. Since most of these roads are State roads, specific recommendations to address deficiencies are as follows: State Dept. of Transportation funding will be necessary.

Bartlett Street.

- a) Reconstruct entire road section to urban standards. Redesign roadway on centerline. Include curbs, gutter, sidewalks, street lighting, adjust grade.

Ben Walters Lane.

- a) Replacement of existing yield sign with stop sign and consideration of three-way stop control at the Ben Walters/Nielsen intersection.
- b) Realignment of existing reverse curve on south Ben Walters to direct north-south alignment.
- c) Paving, in order to mitigate the dry-weather dust problem.
- d) Enforcement of speed limits.

East End Road.

- a) Acquire additional right-of-way to 100 foot width.
- b) Redesign and reconstruct to eliminate "roller coaster" profile.
- c) Widen to four lanes, include sidewalks, street lighting, delineate intersections.

East Hill Road.

- a) Reconstruct entire roadway, to include pedestrian facilities.

Fairview/Hohe.

- a) Control intersection with a stop sign on Hohe Street approach favoring through-movements for Fairview Avenue.
- b) Reconstruct and realign Fairview segment to right-of-way centerline, west of Hohe.
- c) Reconstruct and widen Hohe with sidewalk.

Homer Spit Road.

- a) Continue to monitor bank stabilization efforts.
- b) Pursue long-range permanent solution to erosion problem.

Kachemak Bay Drive.

- a) Reconstruct entire road to 40 foot traveled-way urban standard to include paving, drainage, lighting, pedestrian facilities and grading.

Lake Street.

- a) Redesign the intersection at Lake Street/Pioneer Avenue/East End Road into a three-way stop. In the short-term, traffic volumes do not warrant installation of a traffic signal. It is recommended that traffic volumes should be monitored and a signal installed when warranted.
- b) Acquire additional right-of-way, or road easements to 100 feet width.
- c) Reconstruct roadway. Widen to three lanes with center turn lane between Pioneer Avenue and Homer Bypass, becoming four lanes along Ocean Drive. Realign intersection of Bypass/Lake Street to 90°. Construct sidewalks and street lighting. Realign roadway to straighten curves.

Bypass.

- a) Stripe roadway to delineate four lanes.
- b) Install additional street lighting.

- c) Control access at designated intersections.

Main Street.

- a) Pave upper Main Street (Pioneer Avenue to Bayview Avenue). Construct a sidewalk along one side at minimum, and install additional street lighting.
- b) Reconstruct to urban standards lower Main Street, include multi-lanes, paving, sidewalks and lighting, storm drains. Adjust vertical geometric at the Homer Bypass intersection, if possible.

PROPOSED FUTURE STREETS

Five future Homer streets are recommended as either new street construction or extensions from existing streets. They are: Fairview Avenue (extension to West Hill Road); Svedlund Street (construction Pioneer Avenue to Homer Bypass); Grubstake Avenue (reconstruction and construction Main Street to Lake Street); Bayview Avenue (construction from South Slope to Kachemak Way); and, Beluga Lake North Shore Road (construction Lake Street/Homer Bypass to East End Road).

Each of these roads have their genesis in the 1979 Master Roads and Streets Plan. While all have been evaluated and found important, or even vital, to Homer's future road system, there has been little concrete effort to ensure the roads will be built. In order to define the actual route, it was necessary to do reconnaissance work, route selection and plan/profile design. This information could then be used to provide subdividers guidance as they design road links in the system.

The common thread to each of these road and street extensions is that they are all, partially or wholly, situated on private land. Each is therefore of indeterminate status and subject to redesign or omission in the subdivision process, unless a preliminary design is officially adopted or endorsed.

Moreover, the interests of the land owner or prospective subdivider do not necessarily correspond with the "public interest" of improving the transportation network. For example, a subdivider does not normally wish to dedicate more than the minimum legally required right-of-way widths; also, in a developing residential zone, subdividers will usually oppose placement of an arterial, fearing that it will reduce the area's desirability for prospective buyers and hence, will decrease property values. Access to an arterial would also normally be limited to side streets at specified minimum spacings. This, too, runs contrary to subdivider's normal desires. The incentives are thus heavily weighted against cooperation with the intent of the "Master Plan for Roads and Streets" unless

positive steps are taken to identify the streets' corridors, and the rationale for each project is overt and explicit.

Fairview Avenue (extension to West Hill Road)

The 1979 "Master Plan for Roads and Streets" proposed that a link between West Hill Road and East End Road be constructed utilizing the Fairview Avenue right-of-way. This same project had, in essence, been proposed in the 1969 Homer "Comprehensive Development Plan," except that the plan also proposed that a through-link be constructed to the Sterling Highway.

The 1979 plan classified the link as a "major arterial"; in essence, the street would primarily serve as a conduit for east-west through-movements which lack origins or destinations on Pioneer Avenue. The street would also serve as a secondary (northerly) bypass around downtown Homer, and simplify and economize north-south movements when all existing or proposed Pioneer Avenue to Bypass links (i.e., Swatzell Street, Main Street, Svedlund Street, Heath Street, Lake Street) are completed or upgraded.

For many years, Fairview Avenue has been recognized as laying in a particularly strategic location; it is placed amidst some of Homer's most rapidly developing neighborhoods. Because it is centered on a section-line boundary (possibly subject to a section line easement), it has been very likely to be dedicated at least in half width as part of aliquot-part subdivisions. Therefore, it has been dedicated continuously between Ridgeview Acres and Heath Street and discontinuously in other areas. Moreover, and perhaps most importantly, the topography of the proposed route is favorable to a road with fairly gentle and even grades, and soil conditions are average or better for this area. Thus, Fairview Avenue provides a unique opportunity for Homer's transportation network.

Svedlund Street Extention

This project would consist of extending Svedlund Street - which presently ends at a tee intersection on the north side of Pioneer Avenue - approximately 1,500 feet south to the Homer Bypass. This extension is an integral part of the plan for the Homer central business district transportation system, first proposed in the 1979 Master Roads and Streets Plan. The system has periodically been re-evaluated; the most recent re-evaluation occurring as part of this study and as part of spinoff studies related to the Pioneer Avenue reconstruction project. Each re-evaluation has validated the need for and desirability of the system configuration proposed by the 1979 plan.

The 1979 plan showed four north-south streets linking Pioneer Avenue with the Bypass: Lake Street, Heath Street, Main Street

and an unnamed right-of-way known as New Street, or Swatzell Street extension. Actually, Svedlund Street was not depicted as linking directly with Pioneer Avenue: rather it would link indirectly by means of Klondike Avenue and Kachemak Way.

It can be safely surmised that the reason southern Svedlund Street was not depicted as linking with Pioneer Avenue was that the link could only be constructed if right-of-way was acquired through an existing private parking lot. The prevalent philosophy was that right-of-way purchase and/or condemnation should be avoided.

By 1984, it had become evident that development and planning in the City had escalated to the point that, in many cases, right-of-way purchase or condemnation could no longer be avoided. It had also become evident by 1984 that traffic volumes on Pioneer Avenue had grown to approximately the capacity of a two-lane street, and that was due largely to the absence of alternate through-streets and side streets. The lack of side streets in the Central Business District core was recognized as helping to cause a pattern of strip development, which particularly manifested itself on Pioneer Avenue. All of these interrelated factors point to the need for side streets penetrating into the core of the Central Business District.

Grubstake Avenue

Like the Svedlund Street Extension, Grubstake Avenue was envisioned in the 1979 plan as an integral part of the inner Central Business District street grid. It would essentially provide an internal east-west link between Main Street and Lake Street; the street would also effectively link Lakeside Village Subdivision with the Central Business District's center, because Grubstake would be extended to the Lake Street/Nielsen Avenue intersection.

The purpose of this street would be similar to that of Svedlund Street, except that it runs east and west. It would provide a spine for the development within the Central Business District in an east-west direction and would also allow east-west traffic an alternate to Pioneer Avenue and the Bypass: thus, it could help alleviate traffic congestion on these major streets by improving circulation.

Bayview Avenue Extension (Kachemak Way to South Slope Road)

This proposed road is important because it directly connects two separate areas of the City, the central portion of Homer's urban residential district and the East Hill Road area. It will also provide a tremendous improvement in the linkage between the East Hill/Diamond Ridge area and downtown Homer.

The 1979 Master Roads and Streets Plan showed two connections between Kachemak Way and East Hill Road. One was a north-easterly extension of Kachemak Way which would join Shellfish Avenue (in Barnett's South Slope Subdivision). The other was an easterly extension of Mountain View Drive to meet South Slope Road. Actually, other logical alternates were also available including the option to extend Bayview Avenue to South Slope Road; however, that was not recommended, probably because of the structure that exists at the eastern end of Bayview Avenue. Whichever option is chosen, however, it would be necessary to cross some rather deep and formidable drainage gullies.

After the adoption of the 1979 plan, an extension of Mountain View Drive was platted (as part of the Anderson 1980 Subdivision). Construction of this extension was completed in 1984. The alignment of this extension was not in strict accord with the 1979 plan, which called for a direct east-west connection. Rather the road was curved toward the northeast, which severely complicates a further extension to South Slope Road in the manner proposed in the 1979 plan. Therefore, the Bayview Avenue extension was re-examined and is being recommended.

Beluga Lake North Shore Road

The 1979 Master Roads and Streets Plan proposed that an east-west arterial be constructed on the north side of Beluga Lake. This arterial would link East End Road with Kachemak Bay Drive, beginning at Mattox Street and an east-west section-line street (commonly referred to as a portion of Fairview Avenue). Toward the eastern end of the road, connection would be provided to East End Road by means of a north-south connection to Kachemak Bay Drive. This follows the East Lane right-of-way, which now exists at the end of the airport runway.

The justification for the arterial are twofold. First, it will provide a spine for access and development in a large section within Homer's rural residential and general commercial zones. Second, it provides a much more direct link to the Kachemak Bay Drive area, which is likely to see increased development upon the inevitable water and sewer extensions in the area. The road would improve traffic circulation by taking some east-west traffic off of East End Road, particularly by providing an alternate access route to subdivisions such as Meadow-Wood, Bear Creek Heights, Tietjen and Mariner Park. Finally, it would aid system continuity by providing a much more direct link between the city center area and Kachemak Bay Drive, and by providing a second direct connection between two arterials (East End Road and Kachemak Bay Drive).

The alignment proposed by the 1979 plan has genuine inadequacies, some of which are related to the underlying philosophy of avoiding right-of-way purchase or condemnation at all costs. Thus, the simpler and more logical option of an

eastward extension of the Bypass extension was not considered. The Bypass extension would avert diversion of heavy traffic volumes onto Mattox Street. The geometrics of the Mattox Street link would be poor, the impact on the existing neighborhood would be negative, and it would still be necessary for traffic to use East End Road to get to this arterial. By contrast, the Bypass Extension would have avoided most of these problems, truly relieve traffic pressure on East End Road by providing a true bypass around the Lake Street/East End Road area, provide a direct link between the Central Business District and General Commercial area, and allow development of a truck route bypassing Pioneer Avenue and Lake Street. If the Bypass were extended, the same route east of the elementary school would be followed as proposed in the 1979 plan.

Preliminary route selection, drainage design, plan and profile, and cross sections have been prepared for each of these proposed roads, due to the importance each plays in the economic and transportation needs of the community.

CHAPTER 9

CHAPTER NINE - POLICY RECOMMENDATIONS

The recommendations proposed in this chapter primarily focus on policy changes, although recommendations are also made for specific actions and programs. The rationale for each recommendation is discussed, as are potential ramifications to the recommendations.

Recommendation #1: Adopt this revised Master Plan for Roads and Streets, including the revised functional classification system, the Master Plan Map, and design guidelines for streets of each functional classification.

The adoption of the plan will expedite a number of actions and opportunities, such as the following:

- a. The Homer Advisory Planning Commission may require, as part of the platting process, dedication of the rights-of-way required for construction of the streets detailed on the plan.

The Planning Commission should direct that where applicable, the right-of-way dedications conform to the alignments shown on the Homer Future Streets preliminary plans and profile sheets; in the case of other proposed streets, the Commission should ensure that R.O.W. is dedicated approximately along the corridor shown. Grade, access and curvature requirements must be adhered to, and unnecessary curvature and access can be eliminated at the platting stage.

- b. A logical collector/arterial grid will be established, and, if used in conjunction with access spacing and other design criteria, a logical local street grid can also be formed.
- c. The framework for right-of-way purchase and legislative street funding requests will be provided. Indeed, the major utility of a plan is that it can be pointed to as an indicator of community resolve regarding projects and as a source of project recommendations which have official sanction.
- d. Standards for project cost-participation and access spacing can be established; these standards can be enforced on new streets and, to a lesser extent, on projects upgrading existing streets.

Recommendation #2: Establish a program for right-of-way acquisition along designated future road/street corridors, with a portion of the City's Capital Improvement Budget being reserved for right-of-way acquisition.

Most of the proposed road and street extensions in the Master Plan either cross through "unsubdivided" parcels, thus allowing right-of-way acquisition to be accomplished during the platting process, or they basically take advantage of existing rights-of-way or stay within the large "unsubdivided" parcels.

Given the tremendous expense of constructing transportation facilities, it is more economical to construct a more expensive route that motorists will use than to construct a less expensive route that motorists will not use. Other circumstances can also dictate the need for right-of-way acquisition. There may not be an alternative. In other instances, alternatives exist but are poor and/or likely to exacerbate current traffic problems.

There are many miles of proposed road and street extensions shown on the Master Plan. Four such purchase areas are of critical importance now.

The first is a strip within the existing Acropolis parking lot, which is part of the proposed Svedlund Street Extension, from Pioneer Avenue to the Bypass.

The second area needed is a 30 foot strip immediately south of the access road to the "FAA tract," currently owned by Cook Inlet Region, Inc., and occupied by radio station KBBI. This is necessary for the Grubstake Avenue extension.

The third area is the intersection of Pioneer Avenue with the proposed Heath Street extension, which will require a large turn radius.

Fourth, the Bypass extension should be pursued. Right-of-way should be obtained immediately, particularly within Waddell Park and Lakeside Village Subdivision.

Recommendation #3: Require that subdividers construct streets dedicated by plat to City standards and under City supervision.

As pointed out earlier, it is now permissible in Homer to plat and sell lots without constructing the physical facilities for servicing the lots. This sets into motion a chain of events that is likely to culminate in City reconstruction of the street. Present City policy allows substandard access to be developed inside City rights-of-way, in order for property owners to get access to their land. What appears at face value to be a mutually beneficial practice for the City and property owner, eventually opens the door to public maintenance. Ultimately, the taxpayer pays the heavy cost of maintenance and reconstruction.

Recommendation #4: Develop an official set of minimum street design/construction standards, accompanied by required design/construction/inspection/acceptance procedures for construction of all streets.

The City's current street ordinance is outdated and often ambiguous. This has made the problem of street acceptance for maintenance a more sensitive issue. Street maintenance is contingent upon bringing the street up to "City standards" but the official standards are archaic and poorly defined. The standards need to be updated and adopted.

Recommendation #5: Establish and codify access spacing requirements for each classification in Homer's street functional classification system. Secure DOT's approval for the system.

It is in the interest of the City and State to control access onto newer road facilities, while the abutting properties remain mostly undeveloped. Such control also works to the property owner's advantage. Controlled access provides consolidation and logical ordering of accesses, so that conflict between through-movements and access movements is minimized. Access is actually expedited, in that it is simpler and more orderly. Also, the street's capacity is preserved. Unlimited access would diminish the road's capacity and the resulting congestion would discourage access and through-movement alike.

Recommendation #6: Establish a cost sharing allocation system for road improvement projects, depending on the functional classification of a given roadway. Secure funding for City's share of road improvement projects.

A cost sharing system can be used to allocate costs between the government agency and the developer in a proportion representing a ratio of public to private benefits. The cost sharing system is the most equitable in terms of allocating costs to those who receive benefits.

While it can be argued that streets are public ways and anyone may use them, the primary benefits usually accrue to abutting properties. The amount of costs borne by abutting properties should, however, bear some relation to the service received. A local street provides local benefit almost exclusively, and it is reasonable that the property owners bear the full cost burden. Collectors provide, in theory, less benefit to abutting properties and more general system benefits, therefore adjacent properties should have a substantially lessened cost burden. Arterials should provide little service to abutting properties and therefore funding should be more of a public burden. However, where properties abutting collectors and arterials are granted unrestricted access, it is not unreasonable to consider increased assessment costs.

Several methods exist for determining a cost sharing allocation system. It is recommended that the City administration conduct a study into the cost allocation's appropriate to each functional design class. Based on this study, an ordinance should be prepared and the cost sharing formula should be codified.

Recommendation #7: Establish a criteria-based ranking system for long term programming for streets construction.

A comprehensive street improvement criteria and ranking system that considers benefit/cost ratios, functional classification, and other appropriate factors could be developed to provide an objective means by which to program improvements.

A criteria based system would put the improvement priorities and allocation methods on a more rational basis, which will allow more effective allocation of public funds.

Recommendation #8: Require that water, sewer and street improvements be phased concurrently whenever possible; require that construction of water and sewer lines into undeveloped or new subdivisions be accompanied by road construction.

It is widely acknowledged that, given Homer's subsurface conditions, it is of great advantage to install water and sewer lines concurrent with the street. This is to prevent the need to excavate the roadway later, which will severely undermine the roads structural integrity and necessitate expensive repair work.

When water and sewer utilities are made available, a tremendous incentive for residential and commercial development occurs. "Passable" roads can be developed to provide access in most seasons, and that is all many people want (at first). Thus, development occurs around the water and sewer lines. Because the City has jurisdiction over these lines, it has a stake and investment in the roads (if only to get access to manholes, valves, meters, and pressure reducing stations). Moreover, the development will soon lead to demands for winter maintenance. As has been previously argued, this creates the chain of events leading to assumption of full City maintenance and, probably, public rebuild of the streets. Water and sewer extensions made without street construction requirements act to encourage, and often to initiate, this sequence of events, a sequence which can be described as a means by which private development costs are ultimately transferred to the public.

Many other communities have adopted requirements for improvements as a condition of subdivision activity because of the increasing awareness of public financing limitations, and

that private enterprise must accept their responsibility for development costs.

It is recommended that prior to plat approval, engineered plans and specifications for street improvements be required in order to verify that the proposed improvements will meet City standards.

Recommendation #9: Adopt a paved surface standard for arterial and collector streets and investigate feasibility of paving local streets.

There are many factors that make the gravel surface standard unsuitable for urban areas. These factors include: the dust problem, vehicle maintenance costs, road maintenance costs, and reconstruction costs due to degradation of roadway material by loss of fines, armoring, washouts, surface contamination, etc.

Pavement is part of the overall complex of urban street amenities, which can be very costly. Pavement is not, in itself, responsible for that high cost.

Roads are currently not paved for the following reasons. Paving is not required. Paving is perceived to be prohibitively expensive; and, Homer's soil conditions are such that advantages and economy is gained by deferring pavement operations until one or two years after the road is constructed. The problem is that paving, once deferred, usually continues to be deferred.

If a comprehensive paving standard was established, paving costs could be reduced in that at least one hot plant may establish locally. The economics of paving would thus be more favorable than at present, with no paving requirements and scattered paving jobs.

Recommendation #10: Require that sidewalks or bicycle paths be constructed alongside all streets of arterial or collector classification, as noted on the Master Plan Map.

The access and transport functions of roads and streets are not limited to motor vehicles. Pedestrian and bicyclists also play a major part of a city's transportation system.

Separation of motor vehicles from pedestrians and bicyclists is desirable. Pedestrians and bicyclists are basically incompatible with automobiles, and if facilities are not provided for them, their presence often creates a safety hazard for all concerned. Sidewalks (with curbs and gutters) can aid in defining the travelled way, thus enhancing space efficiency and defining ingress/egress points. There can be aesthetic benefits to sidewalks and/or bicycle lanes as opposed to simply reserving shoulder space.

Recommendation #11: Require that new driveway permits onto "unaccepted" City streets (those streets which have not been accepted for maintenance by the City) be issued contingent upon a waiver of the right to object to formation of a street improvement district.

This recommendation is intended to stop the problem of poorly constructed roads becoming public liabilities.

When a parcel is subdivided, right-of-way is dedicated to provide legal access to the subdivided lots. Lots are sold but the streets abutting the lots are not built. Lot purchasers who want immediate development are then faced with the problem of attaining access. They request City permission to construct driveways in the undeveloped right-of-way. When these owners construct their driveways they do not build them to City street standards. Adjacent property owners begin using the same driveway for access to their lots. Thus, once such a driveway is built, it encourages development of a neighborhood. When this occurs, the driveway becomes a local street.

This situation has repeated itself many times in many areas of the City. The streets created in this manner are too narrow for adequate residential traffic service. They meander within the right-of-way and sometimes onto adjoining lots. They usually have inadequate or unsuitable provisions for drainage. They may or may not adhere to minimal structural standards and additional increases in traffic will soon lead to rapid structural degradation of the roadbed.

When a neighborhood becomes well developed along a substandard "driveway" street (e.g., lower Glacier View Subdivision) public outcry often mandates remedial "quick fix" actions. The City's position is that these local "driveways" benefit primarily the street residents, and that it is unfair to burden the general taxpaying public with the responsibility to reconstruct a local service "driveway" that was never properly built. A street improvement district should be formed, and the abutting property owners should bear the improvement costs. Property owners, however, often resist street improvement districts because of the cost.

The recommended solution would be to require lot owners to sign an agreement for driveway construction on an unaccepted right-of-way (which would allow the lot owner to access the street), to stipulate that the permittee (or any future lot owner) waive his/her rights to object to the formation of a street improvement district. Then, as more people build along the street, additional waivers are collected. This continues until a sufficient number of property owners are committed and the street LID is formed.

This mechanism is recommended because it would simultaneously protect the City and public interest, while also serving the private individual's access needs.

Recommendation #12: Abandon the policy of acceptance of streets for winter maintenance.

The reason why maintenance is not provided on all roads is that the City established maintenance acceptance as the "incentive" to construct roads to City "standards." The advent of "winter maintenance" compromised the effectiveness of this policy, as it reduced the incentive to build roads to City standards.

As soon as the City provides winter maintenance on roads, the following consequences occur: population densities are likely to increase, as City winter maintenance is certainly attractive to prospective residents; political pressure will arise after a number of years to accept the street for full-time maintenance; this chain of events eventually culminates in a demand for total road rebuild.

Recommendation #13: Modify parking ordinance standards to allow liberalized space requirements for paved parking lots.

Homer parking lots are by and large, unpaved and unmarked. This condition makes space utilization inherently inefficient, because parking stalls are not marked. It is recommended that liberalized parking standards, in accordance with national standards, be adopted for paved and striped parking lots. This action will allow more efficient space utilization without compromise to the integrity of the standards, and it will also serve as an incentive for paving parking lots which will help to curb Homer's dust problem.

Recommendation #14: Enforce the "stopping and parking" ordinance.

This will prevent on-street parking and/or loading on arterials and will also stop the hazardous pattern of backing onto arterials.

CHAPTER 10

CHAPTER TEN - IMPLEMENTATION MEASURES

In order to achieve the upgrade of existing roads and the construction of new streets to proper standards, and to integrate the development of the street system, it is essential to formulate implementation measures to effectuate action. Questions as to how road improvements will be financed; how City's standards will be assured; and how future street rights-of-way will be safeguarded, will be addressed in this chapter.

IMPROVEMENT FINANCING

The major obstacle to constructing and/or improving roads is the difficulty of securing financing or funding. Funding sources are limited. Presently, most road improvements constructed by the City are funded by the State of Alaska either by special legislative grants, or grants via the Local Service Roads & Trails Program (LSRT). The former grants are awarded by the legislature on a year-by-year basis, subject to availability of State revenues. The City has prepared special capital improvement lists with priority ratings outlining requested projects.

The latter program, the LSRT program, awards grant funds based on a formula established by statutes, subject to availability of state revenues. Generally, these grants are too small to fund any major road projects.

Grant awards have been declining in recent years as State revenues have been declining, making it difficult to secure State funding for needed improvements, or anticipate funding levels for future projects. It must be recognized at the onset, that the City will never receive the amount of financial assistance necessary to fully fund all the various projects the City needs. Decisions must be made as to which projects are most needed in the short term and which ones can safely be deferred to the future. It must also be decided which improvements should be funded by the taxpayers-at-large and which should be funded by users or project beneficiaries.

Aside from State funding, other available funding sources for road developments could include private-sponsored projects, local improvement districts, or city bonding.

Private-sponsored. Private sponsored road improvements are those roads developed by private developers or as part of subdivision activity. At present, private-sponsored projects are voluntary. The recommendation of this plan is that subdividers be required to construct all streets dedicated by plat to City standards. In cases where the

road functions as an arterial or collector, a cost-sharing method should be used. The City's advantage for using this approach is that funding derives from the private sector and the benefitting properties share the cost. The subdivider's advantage is improved access and City maintenance.

Local Improvement Districts. Local Improvement Districts (LIDs) occur when a majority of private property owners organize to fund a local improvement and are assessed the cost of the project. The cost burden is placed on the benefitting properties.

It is recommended that the LID mechanism be used to finance the majority of local road construction projects. For arterial and collector projects, participation should be shared with the City providing for the upsizing of the facility. On arterials, if access is fully controlled, the costs should not be charged to properties because direct benefits are very difficult to ascertain.

There are several disadvantages of LIDs. They are difficult to organize, cumbersome to administer and politically unpopular. Since the project is publically sponsored and subject to State wage requirements, higher project costs accrue.

It is preferable for property owners on residential streets to privately organize construction of street improvements, via private improvement associations. This mechanism is experimental and places the burden of organization and construction on the property owners.

City Bonding. In order for the City to share in the cost of street improvements, it will be necessary for the City to secure funding separate from State legislative grants. One promising local source is through the use of sales tax revenue. Sales tax revenue could be reserved in a special account specifically for road improvements. This pool would be used as the matching share for local improvement districts.

Another opportunity to use sales tax revenue would be to back general obligation bonds. General obligation bond sales would require voter approval. A disadvantage of this approach is the amount of tax revenue required for debt service. While general obligation bonds could raise substantial capital in the short term, in the long term there would be a substantial amount of interest due.

Another source of local funds to generate city revenue is through property taxes. The City is at present committed to holding property taxes to 6 mils. The likelihood of voter approval of higher taxes is slim.

Financing Mechanisms

The most readily available source from private financial institutions is the Farmers Home Administration which will provide 20 year or more financing for public improvement projects in residential districts. It is also recommended the City explore means of providing long-term financing for commercially or industrially zoned projects.

IMPROVEMENT PROGRAMMING.

Assuming the City secures local funding for street improvements, the next objective is to establish a rational method for allocating those funds. It is recommended the City develop prioritized improvement programs. This program would rate the proposed city street upgrade projects such that the project of the "highest need" would be listed as top priority, the project rated as second highest need would be the second priority, etc. The project of highest need would get the first chance of receiving a shared cost grant from the City. Thus property owners along an existing street would be given an opportunity to form an LID or private association to finance improvement projects, and the City would make the cost sharing funds available if they did so.

If property owners choose not to accept the City offer (by refusing to form an LID or association) then the grant money is simply made available to another project of lower priority. Each year, therefore, the City would make offers to all of the top priority projects which would be fundable, and declined offers would be made available to the lower priority projects. The City would re-evaluate the priorities annually.

IMPROVEMENT STANDARDS

Financing and programming the reconstruction of existing substandard streets will eliminate a large portion of Homer's street problems. It will not stop the proliferation of substandard streets. In order to prevent the problems from continuing it will be necessary to adopt a set of ordinances dealing with street design and construction standards, and subdivision improvement regulations. Draft ordinances have been prepared and submitted for City Council action, see Appendix 3.

The Street Design and Construction Standards ordinance replaces the existing street ordinance, Title 11, with revised and updated construction standards. The ordinances will apply to streets and utilities in existing rights-of-way, as well as new subdivisions. The ordinances requires that all new subdivisions have streets constructed to City standards.

In addition, the ordinances adopt the Street Master Plan, and require dedication of streets shown on the Master Plan in subdivisions through which the streets traverse. This effectively secures right-of-way dedication, at no cost to the public, through the subdivision platting process.

It should be noted that the street standards ordinance does not require paving of streets. It is recommended that the City consider phasing a paving requirement, first to perhaps apply to all new streets in the commercial and urban residential area, then to all new collector and arterial streets, and finally to all new streets in all districts.

APPENDIX 1

APPENDIX 1 - TRAFFIC COUNTS

	<u>STREET NAME/ LOCATION</u>	<u>DATE(S)</u>	<u>ADT (weekday)</u>	<u>ADT (weekly)</u>
1)	BARTLETT ST.			
	a) north of Pioneer	8/13/82-8/18/82	1622	1556
	b) north of Pioneer	5/23/84-5/24/84	2550	
	c) north of Pioneer	10/22/84-10/26/84	2617	
	d) north of Fairview	11/2/84-11/4/84	241	
2)	BAYVIEW AVE.			
	a) east of Main St.	10/28/84-10/30/84	336	
	b) west of Kachemak Way	10/28/84-10/31/84	274	
3)	BEN WALTERS LANE			
	a) south of East End Rd.	10/30/84-11/1/84	744	
	b) east of Lake St.	10/30/84-11/1/84	544	
4)	EAST END ROAD			
	a) east of Lake St./ Pioneer Jct.	8/13/82-8/18/82	5162	4960
	b) " "	8/1/83-8/7/83	6702	6299
	c) " "	8/16/84-8/21/84	7494	7035
	d) " "	10/18/84-10/24/84	6554	6106
	e) east of East Hill Road Jct.	10/22/84-10/24/84	2370	
5)	EAST HILL ROAD			
	a) north of East End Rd.	8/4/82-8/6/82	1001	
	b) " "	10/16/84-10/18/84	1008	
	c) south of Skyline Dr. (outside city limits)	8/4/82-8/6/82	332	
6)	FAIRVIEW AVE.			
	a) between Main St. and Hohe	10/26/84-10/28/84		285
	b) west of Bartlett	10/26/84-10/28/84	815	750
	c) between Bartlett and Hohe	10/19/84-10/21/84	(projected) 830	
7)	HOMER BYPASS			
	a) west of Lake St. Jct.	8/13/82-8/16/82	3532	3408
	b) east of Pioneer/ Sterling Jct.	8/13/82-8/17/82	3163	3117

<u>STREET NAME/ LOCATION</u>	<u>DATE(S)</u>	<u>ADT (weekday)</u>	<u>ADT (weekly)</u>
c) west of Main St. Intersection	8/1/83-8/7/83	3385	3295
d) east of Main St. Intersection	8/1/83-8/7/83	3856	3755
e) east of Pioneer/ Sterling Jct.	5/20/84-5/22/84	4541	
f) west of Lake St. Jct.	8/2/84-8/8/84	4249	4079
g) west of Main St. Intersection	10/18/84-10/26/84	2851	2639
h) west of Lake St. Jct.	10/18/84-10/24/84	3209	2956
8) KACHEMAK BAY DRIVE			
a) east of Spit Road	8/10/82-8/17/82	1844	1698
" "	9/20/84-9/24/84	1939	1762
" "	10/18/84-10/24/84	2057	1870
b) east of pavement end, before terminal/parking	8/10/82-8/12/82	1511	
c) east of airport terminals	10/18/84-10/24/84	948	855
9) KACHEMAK WAY			
a) north of Pioneer (one lane; doubled)	8/28/84-8/31/84	445	
b) " "	10/28/84-10/30/84	663	
c) south of Pioneer	8/29/84-8/31/84	1731	
10) LAKE STREET			
a) south of Pioneer/ East End	10/6/80-10/30/80	6168	5554
b) " "	8/13/82-8/18/82	7619	6924
c) " "	8/1/83-8/7/83	7869	7201
d) " "	8/17/84-8/21/84	7177	6700
(note: this is extrapolated from north-only data)			
e) north of Bypass Jct.*	8/2/84-8/8/84	7159	6886
f) south of Bypass Jct.*	8/2/84-8/8/84	8910	8774
* Extrapolated from north-only data			
g) south of Bypass Jct.	10/24/84-10/25/84	6008	
11) MAIN STREET			
a) south of Pioneer Avenue	8/13/82-8/18/82	1708	171
b) " "	5/10/84-5/14/84	1213	1169
c) " "	10/22/84-10/26/84	1338	
d) north of Pioneer Avenue	5/10/84-5/17/84	1380	1376

<u>STREET NAME/ LOCATION</u>	<u>DATE(S)</u>	<u>ADT (weekday)</u>	<u>ADT (weekly)</u>
12) OCEAN DRIVE	10/18/84-10/21/84	4450	4325
13) OLSEN LANE	8/13/82-8/18/84	638	647
14) PIONEER AVENUE			
a) west of Lake St./ East End Road	10/6/80-10/12/80	5732	5268
b) " "	8/13/82-8/18/82	9072	8457
c) " "	8/1/83-8/7/83	11441	10531
d) " "	4/29/84-5/5/84	9926	9308
e) " "	8/16/84-8/21/84	11404	10582
f) " "	10/16/84-10/21/84	10037	9277
g) " "	10/18/84-10/25/84	9913	9154
h) east of Kachemak Way	8/28/84-9/1/84	11229	
i) west of Kachemak Way	8/28/84-9/1/84	11376	
j) east of Svedlund St.	6/21/84-6/28/84	11642	10977
k) west of Svedlund St.	6/21/84-6/28/84	11064	10316
l) east of Shelford St.	4/29/84-5/5/84	9888	
m) east of Main St.	5/10/84-5/17/84	9641	9305
n) west of Main St.	10/7/80-10/14/80	5622	5148
o) " "	5/10/84-5/17/84	8582	8371
p) east of Barlett St.	5/23/84-5/25/84	5431	
q) west of Bartlett St.	5/23/84-5/25/84	4980	
r) north of Sterling Hwy/Homer Bypass	8/13/82-8/18/82	5124	4872
s) " "	5/20/84-5/22/84	6632	
15) ROCHELLE ROAD (south of East End Rd)	11/5/84-11/8/84	435	
16) SABRINA ROAD (south of East End Rd)	11/5/84-11/8/84	503	
17) SOUNDVIEW AVENUE (west of Bartlett St.)	11/2/84-11/4/84		795
18) SPIT ROAD			
a) north of Kachemak Drive	10/7/80-10/13/80	2246	2168
b) south of Kachemak Drive Jct.	1980 year round		
c) " "	1981 year round		
d) " "	1982 year round		
e) " "	1983 year round		2905

<u>STREET NAME/ LOCATION</u>	<u>DATE(S)</u>	<u>ADT (weekday)</u>	<u>ADT (weekly)</u>
19) STERLING HIGHWAY			
a) west of Homer Bypass/Pioneer (at Middle School)	10/7/80-10/13/80	2881	2778
b) " "	8/13/82-8/19/82	6022	5568
c) " "	5/20/84-5/22/84	8120	
d) " "	10/22/84-10/26/84	7051	
e) At Baycrest Hill (entrance to City)	10/24/84-10/26/84	4051	
20) STERLING LOOP (a/k/a RODGERS LOOP) (north of Sterling Hwy)	8/4/82-8/6/82	68	
21) SVEDLUND STREET (north of Pioneer Ave.)	6/25/84-6/28/84	672	
22) WEST HILL ROAD			
a) north of Sterling Hwy.	8/4/82-8/6/82	694	
b) " "	10/16/84-10/18/84	1000	
c) " "	10/22/84-10/26/84	953	
d) south of Diamond Ridge	8/4/82-8/6/82	340	

APPENDIX 2

APPENDIX 2

ROAD AND STREET DESIGN CRITERIA COMPARISON

Source of Criteria	Type of Facility	Number of Lanes	Minimum ROW Width (ft)	A.D.T. (thousands)	Max. Degree of Curve	Alignment Grade				
						Maximum (%)	L	Minimum (%)		
Homer ADOT/PF ASHTO MOA	MAJOR ARTERIAL	-	100	18-26	8	L	R	M		
		4-6				-	-			
		4-6				4	5	0.30		
Homer ADOT/PF ASHTO MOA	MINOR ARTERIAL	4-6	100	15-30	10 8.5	3	4	6	0.30	
		2-4				3	4	6	0.35	
		2-4				3	4	6	0.30	
Homer ADOT/PF ASHTO MOA	COLLECTOR: NEIGHBORHOOD	-	60	0.75-1.5	15 11	*(10,8 on Curves, 12 < 500')				
		2				6	8	9	0.30	
		2				6	8	9	0.35	
Homer ADOT/PF ASHTO MOA	LOCAL RESIDENTIAL	2	60	<4	11	*	6	8	9	0.30
		2				6	8	9	0.35	
		2				6	8	9	0.30	
Homer ADOT/PF ASHTO MOA	COMMERCIAL INDUSTRIAL	-	80	0.75-1.5	11	*	8	9	0.30	
		2-4				8	9	0.35		
		2-4				8	9	0.30		
Homer ADOT/PF ASHTO MOA	LOCAL RESIDENTIAL	2-4	70	0.75-1.5	6 6	*	8	9	0.30	
		2-4				8	9	0.35		
		2-4				8	9	0.30		
Homer ADOT/PF ASHTO MOA	LOCAL RESIDENTIAL	-	60	<0.1 <0.4 <0.4 <4.5	<57 49 49	*	8	11	16	0.30
		2				8	11	16	0.35	
		2				8	11	16	0.30	
Homer ADOT/PF ASHTO MOA	LOCAL RESIDENTIAL	2	50	<0.1 <0.4 <0.4 <4.5	<57 49 49	*	8	11	16	0.30
		2				8	11	16	0.35	
		2				8	11	16	0.30	

APPENDIX 2 - Continued
ROAD AND STREET DESIGN CRITERIA COMPARISON

Source of Criteria	Type of Facility	Design Speed Minimums (MPH)			Max. Side Slopes		Roadway Dimensions (ft)	Traveled Way Dimen.
		L	R	M	Fill	Cut		
Homer ADOT/PF ASHTO MOA	MAJOR ARTERIAL	60	55	50	1.5:1 2:1 2:1 2:1	2:1 2:1 2:1 2:1	52	68 36
Homer ADOT/PF ASHTO MOA	MINOR ARTERIAL				1.5:1 2:1 2:1 2:1	2:1 2:1 2:1 2:1	40	42 24
Homer ADOT/PF ASHTO MOA	COLLECTOR: NEIGHBORHOOD				1.5:1 2:1 2:1 2:1	2:1 2:1 2:1 2:1	28	30 20
Homer ADOT/PF ASHTO MOA	LOCAL RESIDENTIAL				1.5:1 2:1 2:1 2:1	2:1 2:1 2:1 2:1	28	30 20
Homer ADOT/PF ASHTO MOA	COMMERCIAL INDUSTRIAL				1.5:1 2:1 2:1 2:1	2:1 2:1 2:1 2:1	34	30 22
Homer ADOT/PF ASHTO MOA	LOCAL RESIDENTIAL	20	20	20	1.5:1 2:1 2:1 2:1	2:1 2:1 2:1 2:1	28	26 20

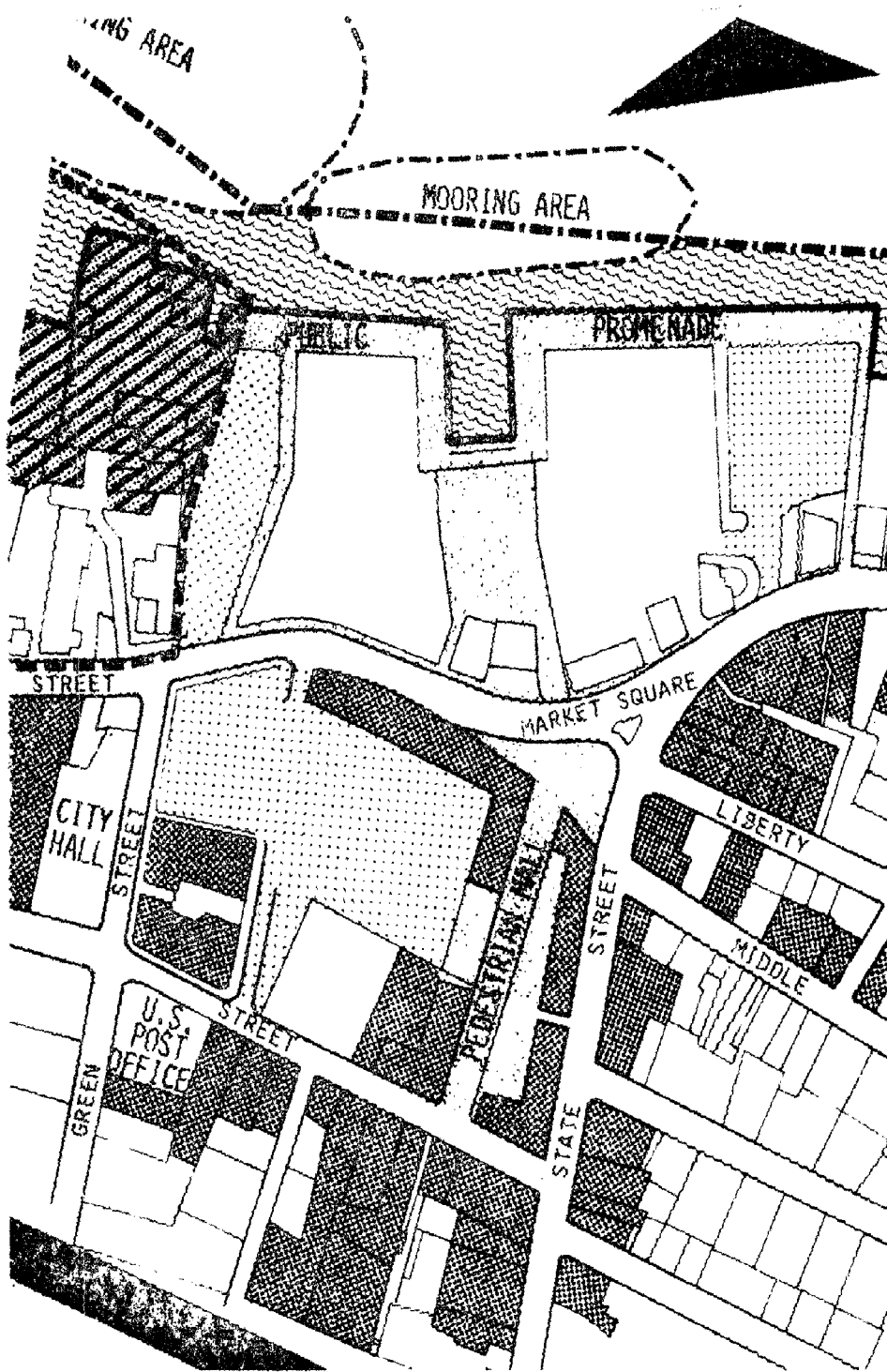


FIGURE VII.4.1 NEWBURYPORT WATERFRONT RENEWAL AREA
(This is an enlarged section of Figure II.1)

APPENDIX 3

FINAL DRAFT

Chapter 11.04
STREET DESIGN AND CONSTRUCTION
STANDARDS

Sections:

11.04.010	Intent
11.04.020	Applicability
11.04.030	Definitions
11.04.040	Street Design & Construction Requirements- General
11.04.050	Master Roads and Streets Plan
11.04.055	Official Maintenance Map - Adopted
11.04.058	Design Criteria Manual - Adopted
11.04.060	Geometric Design
11.04.070	Required Cross-section
11.04.080	Drainage and Erosion Control
11.04.090	Intersections
11.04.100	Utilities in Right-of-Way
11.04.110	Street Lighting
11.04.120	Sidewalks
11.04.130	Traffic Control Devices and Street Signs
11.04.140	Construction Requirements
11.04.150	Violation - Penalty

11.04.010 Intent. The intent of this chapter is to:

- a. Promote the safety, convenience, comfort, and common welfare of the public by providing for minimum standards to regulate design and construction of public streets, roads, and highways within the City.
- b. Minimize public liability for publicly and privately developed improvements by ensuring that roads and streets will be built to city standards.

11.04.020 Applicability. The requirements of this chapter shall govern the construction or reconstruction of roads and streets within the City of Homer.

11.04.030 Definitions. In this chapter, unless otherwise provided, or the context otherwise requires, the following words and phrases shall have the meanings set forth below:

- a. "Arterial" means a street or highway which provides as a major function the transmission of vehicular through-traffic along its prolongation or length (in preference to traffic entering the street or highway from an abutting lot or intersecting road), and which performs a major role in serving the transportation needs of the community (by serving relatively longer trip lengths with minimal interference and higher speeds), and which is identified as an arterial on the Homer Master Roads and Streets Plan.
- b. "As-built drawings" means the plan and profile drawings of the improvements as constructed, drawn to the same level of detail as the original design drawings.
- c. "Base Course" means a layer of crushed aggregate placed atop the subbase, according to a specified gradation.
- d. "City" means the City of Homer, a municipal corporation, acting through the City Manager and/or his designees.
- e. "Collector" means a street which collects traffic from local streets and/or relatively large traffic generators, and channels it into the arterial system, and is identified as a "commercial/industrial collector" or as a "residential collector" in the Homer Master Plan for Roads and Streets. (A "commercial/industrial collector" is a collector located in a commercial or industrial zoning district, while a "residential collector" is a collector located in a residential district.)
- f. "Cross culvert" means a culvert which crosses beneath the travelled way of a street, such that its ends are exposed on the embankment of each side of the street.
- g. "Cul-de-sac" means a street that is closed at one end and which is therefore required to provide a circular turnaround.
- h. "Design Criteria Manual" means a publication issued by the City of Homer entitled "Design Criteria Manual for Streets and Storm Drainage", dated April 1985.
- i. "Design engineer" is a professional civil engineer, registered in the State of Alaska, who shall perform the project design for the Developer.
- j. "Developer" means a person, firm, association, partnership, corporation, governmental unit, or combination of any of these which proposes to install street improvements, either as part of a subdivision development or as a development project on an existing right-of-way.

- k. "Drainage Management Plan" refers to the City of Homer's documents entitled "Drainage Management Plan - Homer, Alaska" (dated August, 1979) and "Revised Drainage Management Plan - Homer, Alaska" (dated February, 1982).
- l. "Driveway" means an entrance/exit roadway which provides lateral access to a private property from a public right-of-way, and which is located on private property except for its junction with the public road within such right-of-way.
- m. "Driveway intersection" means the junction of a driveway with a street or other public road.
- n. "Local street" is a street which services primarily relatively short trip lengths and low traffic, allowing transmission of traffic from abutting lots to the collector or arterial system, and which does not qualify for designation as a collector or arterial. For the purposes of this ordinance, local streets are segregated into two subclasses: "local residential" streets are those local streets situated in residential zoning districts and "local commercial/industrial" streets are those local streets located in commercial or industrial zoning districts.
- o. "Master Roads and Streets Plan" refers to the document labelled such, adopted by the City of Homer.
- p. "Permanent maintenance" means grading, pavement patching, ditching, culvert thawing, snowplowing, sanding, and other work, performed on an all-seasons basis for maintenance of city streets.
- q. "Right-of-way" means land, property, or interest therein, usually in a strip, acquired for or dedicated to the public for transportation purposes.
- r. "Road" is a general term denoting a public way or track, or any length thereof, generally in rural areas, used for purposes of vehicular travel.
- s. "Roadway" means the portion of a street, road, or highway, including shoulders, for vehicular use.
- t. "Shoulder" means the portion of the roadway contiguous with the travelled way for accomodation of stopped vehicles for emergency use, and/or for lateral support of base and surface courses.
- u. "Street" is a general term denoting a public way or track, or any length thereof, in urban settings, used for purposes of vehicular travel.

- v. "Street intersection" means the junction of two or more public roads, i.e., roads located within public rights-of-way.
- w. "Subbase" means the specified or selected material of planned thickness placed atop the subgrade and below the base course.
- x. "Subdivider" means a person, firm, association, partnership, corporation, governmental unit, or combination of any of these which may hold any recorded or equitable ownership interest in land being subdivided. The term shall also include all heirs, assigns or successors in interest, or representatives of the subdivider, owner, proprietor or developer.
- y. "Subdivision" means the division of a tract or parcel of land into two or more lots, sites, or other divisions for the purpose, whether immediate or future, of sale, lease, or building development, including any subdivision, and when appropriate to the context, the process of subdividing or the land subdivided. A "new subdivision" is a subdivision in which a plat is recorded after the effective date of this chapter.
- z. "Subgrade" means the basement soil material in excavation (cuts), embankment (fills), and embankment foundations immediately below the first layer of subbase and to such depth as may affect the structural design of the roadway.
- aa. "Traveled way" means that portion of the roadway reserved for the movement of vehicles, exclusive of shoulders.
- bb. "Winter maintenance" means snowplowing and sanding of roads during winter months; this definition specifically excludes culvert maintenance and prevention or alleviation of glaciation (aufeis) effects.

11.04.040 Street Construction, Design, and Dedication Requirements - General.

- a. All streets or roads hereinafter constructed or reconstructed within the City of Homer shall adhere to the dedication, design and construction standards set forth in this chapter and shall also be designed and constructed according to the procedures and standards set forth in Chapter 11.20.
- b. The City shall require new subdivisions to dedicate the rights-of-way according to the widths specified in Section 11.04.060(f) below, according to the appropriate functional classification. Arterials and collectors are as designated in the Master Roads and Streets Plan.

- c. The Planning Commission shall require the dedication of a half street if the other half of the street has been dedicated or can reasonably be expected to be dedicated, unless it determines the street would be unnecessary or undesirable. It shall further require half-street dedications if the street is on the Master Plan for Roads and Streets Map as a planned improvement or is the logical extension of an existing street.
- d. When a subdivision borders or contains a street designated an arterial on the Master Plan map, the Homer Advisory Planning Commission may require shared access or the dedication of a frontage street. Alternatively, an interior road may be required (along the rear lot lines of the lots abutting the arterial) which will serve the access requirements of all the lots fronting the arterial.

11.04.050 Master Roads and Streets Plan - Adopted.

- a. The City hereby adopts the functional classification system, Master Plan map, and preliminary plans and profiles of future streets contained in the Master Roads and Streets Plan.
- b. In all new subdivisions, excepting those specifically exempted in Chapter 22.10, the subdivider shall be required to dedicate street rights-of-way designated as arterials or collectors on the Master Plan for Roads and Streets map, in general agreement with the location and geometrics outlined on the map and, if preliminary engineering plans have been prepared, in general accordance with the route layout specified therein. The Planning Commission may require adjustments to the proposed plat at the preliminary platting stage if it finds that such geometrics and alignments are not adhered to.
- c. If a development includes a segment of an arterial or collector street as shown on the Master Plan, the developer shall construct the streets on the alignment adopted in the Master Roads and Streets Plan, and according to the geometric requirements (maximum grade, curvature, and intersection grade, and minimum intersection curb return radius) conforming to the respective classification. The developer, in such case, shall be required to construct the street to a 28 foot width (22 foot travelled way and 3 foot shoulder on each side), in accordance with the minimum requirements of a local residential street; provided, however, that the City may, upon direction of the City Council, elect to require construction to the full standards and reimbursement of the cost difference between the required street and the design street.

- d) The City Council, upon recommendation of the Homer Advisory Planning Commission, shall be empowered to designate additional routes as arterials and collectors beyond those adopted on the Master Plan map.

11.04.055 Official Maintenance Map - Adopted.

- a. The "Official Maintenance Map of the City of Homer" is enacted by reference and declared to be part of this chapter in its exact form as it exists on the date that this ordinance is adopted by the City Council. This map shall be kept in the City offices for public inspection.
- b. After the effective date of this ordinance, the City shall not accept maintenance responsibility for any roads, existing or future, which are not constructed or reconstructed to the standards of this ordinance, unless such road is shown on the "Official Maintenance Map of the City of Homer."
- c. City maintenance service, as specified on the official map, shall be provided on a permanent (year-around) basis and on a winter-maintenance-only basis (snowplowing and sanding only). In no case shall a winter-maintained road be upgraded to permanent maintenance unless it is reconstructed to the standards of this chapter.
- d. If the map becomes lost or damaged, the map or significant parts thereof remaining after partial destruction shall be preserved. The City Council may by ordinance enact a new map which shall be consistent with and supersede the old map.
- e. The map shall be signed by the City Clerk with a note of the date of enactment by the City Council. Amendments by ordinance shall be immediately added to the "Official Maintenance Map of the City of Homer" with a notation of the date of enactment of said ordinance by the City Council.

11.04.058 Design Criteria Manual - Adopted.

The City of Homer hereby adopts by reference the "Design Criteria Manual for Streets and Storm Drainage", dated April 1985. The "Design Criteria Manual" shall augment the standards of this chapter and shall govern site reconnaissance (survey and soils) and design for streets and storm drains.

11.04.060 Geometric Design Requirements.

The following design criteria shall be adhered to on all street construction within the City.

- a. Street alignment. The street construction shall coincide with the right-of-way centerline unless otherwise approved by the City.
- b. Street design. Streets shall be designed to meet the following objectives:
 1. To drain adjacent property where possible;
 2. To match existing driveways where possible, and in all cases to match existing cross-street grades;
 3. To minimize cross-street or driveway grades;
 4. To provide drainage of roadways;
 5. To facilitate continuity of natural drainage patterns if storm drains are not incorporated in accordance with the Drainage Management Plan.
- c. Grade and curvature maxima. The following design limitations shall apply to grades and curvature according to the street's functional classification:

CLASSI- FICATION	MAXIMUM GRADE (%)	SHORT DISTANCE MAXIMUM GRADE (%) (Less than 500')	MAXIMUM GRADE ON CURVE (%)	MINIMUM CURVE RADIUS (feet)*
Major arterial	6	8	6	700
Minor arterial	8	10	6	600
Collector Comm./Indus.	8	12	6	500
Local: Comm./ Indus.	8	12	6	500
Collector Res.	10	12	8	500 **
Local: Res.	10	12	8	150 **

- * Radius shall be measured to right-of-way centerline.
- ** In hilly terrain (as defined by the "Design Criteria Manual"), the minimum curve radius for residential collector streets may be reduced to 275 feet, and the minimum curve for local residential streets may be reduced to 120 feet, upon approval of the City Public Works Engineer.

- d. Street design criteria (e.g., pavement thickness, roadway widths, etc.) shall be based on 20 year traffic forecasts as approved by the City. Forecasts for local streets shall be based on estimated trip generation, said estimates to be obtained on per-unit basis from the "Design Criteria Manual" and standard texts and calculated by the design engineer for the given land-use intensity and type.

- e. Cul-de-sacs must not be longer than 600 feet and must have turnaround, with a minimum radius to outer edge of pavement or shoulder of 48 feet.
- f. Right-of-way, traveled way, and shoulder width standards for city streets shall, at minimum, be as follows:

<u>FUNCTIONAL CLASS OR TYPE</u>	<u>RIGHT-OF-WAY WIDTH (ft)</u>	<u>TRAVELED WAY WIDTH (ft)</u>	<u>SHOULDER WIDTH, EACH SIDE (ft) *</u>
Arterial - Major	100	36	8
Arterial - Minor	100	24	6
Collector - Comm./Indus.	80	24	4
Collector - Res.	80	24	4
Local (Comm./Indus.)	70	24	4
Local (Res.)	60	22	3
Cul-de-sac turnaround radius	50 (radius)	38 (radius)	2

- * Shoulder width reductions may be allowed on roads with curb and gutter.
- g. The right-of-way width standards of Section 11.04.060(f) above shall constitute minimum dedication requirements for subdivisions for respective street classification. Subdividers and developers shall be required to construct roadways to the width specified for local residential streets, regardless of the street classification.
- h. Other design criteria shall be as specified in the City of Homer "Design Criteria Manual for Streets and Storm Drainage." Further explanation and elaboration of the requirements in (c) through (f) above is also set forth in the "Design Criteria Manual."

11.04.070 Required cross-section.

- a. All cross-section designs shall be performed in conformance with the City of Homer Street Design Manual. Thickness shall be based on analysis of native soil and groundwater conditions, as detailed in the Street Design Manual using limited subgrade frost penetration, reduced subgrade strength, California Bearing Ratio, or other methods as appropriate for the functional classification of each roadway, provided that in no case shall the combined thickness of subbase and base course be less than 24". Base course thickness shall be 4" on paved roads and 6" on unpaved roads.

- b. Prior to the placement of roadway structural fill material, native material shall be excavated to subgrade, and geotextile fabric, of a type approved by the City, shall be placed atop of subgrade prior to placement of structural fill.
- c. Base course and subbase gradation shall be as specified in the Municipality of Anchorage Standard Technical Specification, except as otherwise approved or specified by the City Public Works Engineer.

11.04.080 Drainage and Erosion Control.

- a. An adequate drainage system, which may include necessary storm drainage facilities, drain inlets, manholes, culverts, bridges, and other appurtenances, shall be provided to conduct stormwater efficiently and to protect the roadway's integrity. The flow requirements for each particular drainageway shall be established by the City, using the City Drainage Management Plan as a data base.
- b. Hydraulic structures shall be designed in accordance with the "Design Criteria Manual".
- c. Underground storm drain systems will be required after preparation and official adoption of an official storm drain network plan, if the development occurs on the route of a storm drain, as provided on such official plan. Storm drains shall be designed in accordance with the "Design Criteria Manual".
- d. Cross culverts shall have a minimum inside diameter of 24", and shall be larger if the flow through said culvert will require larger diameter pipe, as determined by the City Public Works Engineer. Cross-culverts shall be fitted with end sections in all cases. Driveway culverts will be a minimum of 18" in diameter.
- e. Plunge basins or other methods, as approved by the City, shall be employed to dissipate energy at culvert outfalls where the City or design engineer determines such methods are necessary, in accordance with the "Design Criteria Manual".
- f. Ditch lining or other methods shall be required if necessary to prevent ditch erosion.

11.04.090 Intersections (Street and Driveway).

- a. Right-of-way requirements. Rights-of-way shall intersect at an angle as close to ninety degrees as feasible, and in no event at an angle less than sixty degrees.

- b. At all intersections, right-of-way radius returns shall be a minimum of 25 feet. Additional radius shall be required in cases where the intersection angle is less than ninety degrees; the rounding shall permit construction of curb returns or turning radii as required in (c) below, and radius returns in such cases shall not be less than 40 feet.
- c. Curb returns and turning radii. Turning radii at intersections shall be designed and constructed to accommodate the turning path of design turning vehicles with minimal encroachment on shoulders and opposing lanes; the design turning vehicles are as specified in the "Design Criteria Manual", according to the street's functional classification.
- d. The distance between street intersection centerlines shall be not less than 200 feet, measured along the centerline of the intersected street. Street intersections created by new subdivisions shall be spaced at intervals of not less than 600 feet on major arterials, 300 feet on minor arterials, and 200 feet on collectors.
- e. Intersection grades shall not exceed 3% within 60 ft. nor 4% within 100 feet, of the intersection with the through-road centerline. The through-road grade shall not exceed 7% approaching the intersection if possible.
- f. Intersections shall be planned and designed to provide sight distances in accordance with the "Design Criteria Manual."
- g. For new subdivisions, the Homer Advisory Planning Commission may specify separation intervals between driveway and/or street intersections on arterial and collector streets, not to exceed the street intersection interval specified above.

11.04.100 Utilities in Right-of-Way. New streets to be constructed for acceptance by the City shall also include the construction of applicable utilities in accordance with the Development Agreement. Placement of utilities in right-of-way shall be governed by the standards of the City of Homer "Design Criteria Manual."

11.04.110 Street Lighting. Street lighting shall be installed in all streets in conformance with the requirements of the City of Homer "Design Criteria Manual" and the standards of the electric utility.

11.04.120 Sidewalks.

- a. New streets to be accepted by the City may, at the Developer's option, have sidewalks and/or bicycle paths.
- b. Sidewalks and/or bicycle paths shall be designed in accordance with the design criteria of the City of Homer "Design Criteria Manual."
- c. The Planning Commission may require the dedication of additional right-of-way for pedestrian walkways where it finds that pedestrian walkways are necessary to convenient pedestrian circulation or to protect pedestrians from hazardous traffic, and the existing or proposed street right-of-way is insufficient for such purposes.

11.04.130 Traffic Control Devices and Street Signs.

- a. Street signs and other traffic control devices, including striping where applicable, shall be provided in accordance with the Alaska Traffic Manual.
- b. Street name signs shall be provided at all intersections, on fixtures and according to style specified in the Alaska Traffic Manual.

11.04.140 Construction Requirements. Street construction within right-of-way dedicated or to be dedicated to the public within the City shall be subject to the following:

- a. Construction methods, materials, and practices for all work related to streets within the City shall conform to the Standard Specifications of the Municipality of Anchorage; amendments to these specifications shall be subject to approval or shall be specified by the City of Homer.
- b. Construction procedures and responsibilities shall be as specified in Chapter 11.20.

11.04.150 Violation - Penalty. The violation of any provision contained herein shall be punished under Section 1.16.010.

FINAL DRAFT

Chapter 11.20
CONSTRUCTION PROCEDURES WITHIN
CITY RIGHTS-OF-WAY AND SUBDIVISIONS
(STREETS AND UTILITY MAINS)

Sections

11.20.010	Intent
11.20.020	Scope and Applicability
11.20.030	Definition
11.20.040	Development Permit Process
11.20.050	Permit Application
11.20.060	Design Phase Procedures
11.20.070	Preconstruction Requirements
11.20.075	Public Liability Insurance
11.20.080	Construction Inspection and Quality Control Requirements
11.20.090	Project Completion Procedure
11.20.100	Project Acceptance Procedure
11.20.110	Violation - Penalty

11.20.010 Intent. The intent of this chapter is to establish procedures for constructing streets and utility mains in existing rights-of-way or public rights-of-way or easements to be dedicated by plat.

11.20.020 Scope and Applicability. This chapter governs all street and utility main construction in public rights-of-way which are greater than 20' in width, excepting those rights-of-way which are specifically claimed for ownership and maintenance by the State of Alaska. It shall further govern such construction of streets and utility mains in rights-of-way or easements proposed to be dedicated as part of pending subdivision plats, as required in Chapter 22.10 of the Homer Municipal Code.

11.20.030 Definitions. In this chapter, unless otherwise provided or the context otherwise requires, the following definitions shall have the meanings set forth below:

- a. "As-built drawings" means plan and profile drawings of the improvements as constructed, drawn to the same level of detail as the design drawings.
- b. "City" means the City of Homer, a municipal corporation acting through the City Manager and/or his designees.

- c. "City Inspector" is an individual employed by the City of Homer, who shall monitor construction progress and quality on a daily basis to the satisfaction of the City of Homer, who shall record whether the project is proceeding according to the plans and specifications and who shall receive change requests and documentation related to the project, including "as-built" drawings, inspection field books and copies of the surveyors field notes.
- d. "City Public Works Engineer" means the individual carrying such title, who is employed by the City of Homer Department of Public Works.
- e. "Contractor" means the person or company providing labor, materials and other services necessary to construct and install street and utility improvements for the Developer, according to the plans and specifications.
- f. "Design Criteria Manual" means a publication issued by the City of Homer entitled "Design Criteria Manual for Streets and Storm Drainage", dated April 1985.
- g. "Design engineer" is a professional civil engineer, registered in the State of Alaska, who shall perform the project design for the Developer.
- h. "Developer" means the party proposing to install an improvement or improvements in existing public rights-of-way or subdivision developments, and assuming accountability for compliance with all city regulations pertaining to construction of such improvements; said party shall appoint or designate an individual, known as the Project Manager, to conduct its interactions with the City and to be responsible for Developer's adherence to all pertinent city regulations.
- i. "Erosion control plan" means a plan, submitted to the City for preventing erosion onsite and/or sedimentation offsite during construction.
- j. "Field change" means a change in the design of a project, made in the field by the Contractor under the approval of the Project Engineer, which is inconsequential in nature and which does not impact the integrity of the design or the intent of the project, and does not cause violation of city ordinances or design standards.
- k. "Inspector" is an individual employed by the Developer who shall monitor construction progress and quality on a daily basis, and who shall prepare daily inspection reports for submittal to the City.

- l. "Major change" means a change in the design which, if executed, would lead to a consequential deviation in its intent or integrity or to a violation of city standards or ordinances, in the opinion of the City Public Works Engineer.
- m. "Project Engineer" is a professional civil engineer, registered in the State of Alaska, who shall be employed by the Developer and whose responsibilities shall include, but not be limited to, the following:
 - Verify that all work is accomplished in accordance with the plans and specifications;
 - Supervise the Inspector, Surveyor, and Testing Firm;
 - Authorize and document minor deviations in the design, known as "field changes";
 - Submit proposals for major design deviations, known as "major changes" to the City;
 - Verify field notes and inspection reports as detailed in Section 11.20.080 below.
 - Sign and stamp "as-built" drawings.
- n. "Project Manager" is the person charged with representing the Developer with regard to project work, to the City on the Project.
- o. "Right-of-way" means land, property, or interest therein, usually in a strip, acquired for or dedicated to the public for transportation purposes.
- p. "Road" is a general term denoting a public way or track, or any segment thereof, used for purposes of vehicular travel.
- q. "Site" means the area of construction, as defined on the project plans.
- r. "Street" is a general term denoting a public way or track, or any segment thereof, and of any length and location within the City, used for purposes of vehicular travel. For the purposes of this ordinance, it is synonymous with the term "road".
- s. "Street construction" includes all clearing, grubbing, compaction, grading and drainage improvement work involved in building a street.
- t. "Subdivision" means the division of a tract or parcel of land into two or more lots, sites, or other divisions for the purpose, whether immediate or future, of sale, lease, or building development, including any subdivision, and when appropriate to the context, the process of subdividing or the land subdivided. A "new subdivision" is a subdivision in which a plat is recorded after the effective date of this chapter.

- u. "Surveyor" is a professional land surveyor, registered in the State of Alaska.
- v. "Traffic control plan" is the plan showing signage and traffic management on-site or entering/exiting the site during construction.

Other key terms are as defined in the text of the following regulations or, where no such definitions are found, as defined in Homer Municipal Code, Chapter 11.04.

11.20.040 Development Permit Process. No street or utility main construction shall be permitted within public rights-of-way prior to the Developer's receipt of a Development Permit, Notice of Design Approval, and Notice to Proceed with Construction.

11.20.050 Permit Application. Prior to issuance of the Development Permits, the Developer must submit an Application for Development Permit to the City. This application shall contain the following details at minimum:

- a) Design concept and preliminary layout showing location and extent of proposed improvements;
- b) Written scope of work, to consist of the type of improvements to be installed and approximate quantities.
- c) Identification of the Design Engineer, who shall be a professional civil engineer registered in the State of Alaska and who shall perform the project design for the Developer;
- d) Identification of the Project Manager, who shall be the Developer's representative authorized to contact and negotiate with the City.
- e) Estimated project completion date or duration.

Upon acceptance of the application, a Development Permit shall be issued by the City Public Works Engineer. This permit shall be a Notice to Proceed with design, based on approval of design concept and the preliminary layout, as required in (a) above.

11.20.060 Design Phase Procedures. After receipt of the Development Permit, the Developer shall prepare and submit to the City a design of the proposed utility or street extensions. This design (consisting of plans, specifications, and supporting material including, but not limited to, soil test data, survey notes, and design criteria reports) shall adhere to the following requirements:

- a) Design must conform to all pertinent City of Homer standards for street and utility construction, and shall be stamped and signed by the design engineer;
- b) Survey and soils data shall be obtained, and plans and specifications shall be prepared, in conformance with the standards of the "Design Criteria Manual".
- c) Design must be accompanied by a statement from the design engineer that he has personally inspected the site, and must be accompanied by the design report. Design report requirements are as specified in the "Design Criteria Manual."
- d) Design must also be accompanied by a signed and notarized statement from the Developer that the Developer has reviewed the design, and shall enforce adherence to the design during construction, excepting changes made in conformance with Section 11.20.080 below.
- e) If the Developer's proposed improvements include a water line extension, the design shall in all cases be accompanied by a design for reconstruction of the roadway to City standards, in accordance with this chapter; said reconstruction shall be required as part of the project work.
- f) The Developer shall provide copies of the following:
 - Approval or compliance certification letter for water and sewer facilities from the State of Alaska Department of Environmental Conservation.
 - Corps of Engineers permit for construction in wetlands as necessary.
 - Permits, where applicable, from the State Department of Transportation and Public Facilities.
 - Telephone and power installation or relocation agreements.

Upon satisfactory completion of these requirements, and approval by the City of the plans and specifications, the City shall issue a Notice of Design Approval to the Developer.

11.20.070 Preconstruction Requirements. Following receipt of the Notice of Design Approval, the Developer shall submit the following to the City:

- a) A construction schedule;
- b) Erosion control plan and traffic control plan for the area of the development project, if determined necessary by the Public Works Engineer.
- c) Identification of the following personnel, who shall be required to perform their respective duties during the construction of the project:
 - 1) Contractor
 - 2) Project Engineer
 - 3) Inspector
 - 4) Surveyor
 - 5) Testing Firm (a firm employed by the Developer to perform soils, compaction, and other tests deemed necessary by the Project Engineer to ensure conformance of work to plans and specifications).
- d) A development fee to cover costs of inspection and administration of the project. The fee shall be generally in relation to the design engineer's construction cost estimate, according to the following schedule below:

<u>Cost Estimate</u>	<u>Development Fee</u>
Less than \$100,000	1.0% of cost estimate, but not less than \$250
\$100,000 to \$500,000	0.75% of cost estimate, but not less than \$1,000
Above \$500,000	0.50% of cost estimate, but not less than \$3,750
- e) Design engineer's construction cost estimate. This cost estimate shall be accompanied by the calculations upon which the cost estimate is based. The estimate and calculations are subject to verification and concurrence by the City Public Works Engineer.
- f) A performance bond or other acceptable guarantee in the amount of 100% of the project cost, which bond shall be waived in the case of new subdivisions, in which right-of-way dedication, via plat filing or recordation, cannot occur until improvements are installed and accepted.
- g) Proof of liability insurance listing the City, as an additional insured in accordance with the requirements of Section 11.20.075 below. The insurance may be purchased and maintained either by the Developer or the Contractor.

- h) A notarized statement that the Developer shall hold the City harmless from any claims arising from construction including, but not necessarily limited to, liability or nonpayment of subcontractors or suppliers.
- i) The Developer shall submit to the City, in accordance with the form specified by the City, a quality control program for the construction of the improvements. The quality control program shall provide sufficient inspection and test procedures to determine compliance with all applicable plans, specifications, and safety requirements. The program shall include at least the following:
 - 1) The frequency and type of all tests to be performed.
 - 2) A list of all firms or persons who will perform tests and inspections.
 - 3) Procedures for coordinating testing and inspections with the City, and for providing advance notice to the City of all inspections and tests which the City may opt to witness.
 - 4) Procedures for reporting quality control activities, including discoveries of deficiencies in the work.

In addition, the Developer must sign a Performance Agreement with the City that work shall be completed according to the plans and specifications, and allowing the City the right to enter upon and inspect the project, and to order work stoppage, tests, and field changes in accordance with Section 11.20.080 below.

Upon completion of the above requirements to the satisfaction of the City, the City shall issue a Notice to Proceed with Construction.

11.20.075 Public Liability Insurance.

The Developer or Contractor is required to purchase, and maintain throughout the life of the project, such Public Liability Insurance as shall protect the City and the Developer and/or Contractor against losses which may result from claims for damages for bodily injury, including accidental death, as well as from claims for bodily damages which may arise from any operations related to the development project, whether such operations be those of the Developer, Contractor, or subcontractor or anyone directly or indirectly employed by any of these parties. Such Public Liability Insurance shall include coverage for the following:

1.	<u>Comprehensive General Liability</u>	<u>Minimum Limits</u>
	Bodily Injury and Property Damage Liability;	\$500,000
	Premises Operations including underground;	Combined Limit
	Products and Complete Operations;	Each Occurrence
	Broad Form Property Damage;	and Aggregate
	Blanket Contractual;	
	Personal Injury	
2.	<u>Comprehensive Automobile Liability</u>	<u>Minimum Limits</u>
	Bodily Injury and Property Damage, including all owned, hired and non-owned automobiles	\$500,000 Combined Limit per Accident

11.20.080 Construction Inspection and Quality Control Requirements. Following receipt of the Notice to Proceed, the Contractor shall complete the improvements under the inspection of the Project Engineer, the Inspector, and the City, according to the plans and specifications and the procedural requirements of this chapter. The inspection and quality control requirements shall be as follows:

- a) The Developer shall submit to the City, on the Monday of each week during construction, copies of all inspection reports, surveyor's field notes, and materials test reports of the prior week. The reports shall contain a specific listing of any changes, either field changes or major changes, made to the design in that week.
- b) The City may perform, in a timely manner, any and all inspections it deems appropriate for the project; it shall, moreover, reserve the right to enter the project site at any time for purposes of inspection and to require additional tests if in the City's opinion, testing by the Developer's testing firm has previously been inadequate. The Developer shall pay for such tests if the tests reveal noncompliance with construction or material requirements; any test which confirms compliance shall be paid for by the City. The City may also issue a notice of rejection of materials or methods to the Developer, which may state that the City will not release the performance bond or other accepted guarantee, or approve the project until the conditions cited in such notice are remedied. Furthermore, the City may issue an order to the Developer to stop work within 24 hours, under conditions including, but not necessarily limited to, the following:
 - 1) If inspection reports, field notes, and test reports are not submitted to the City when required;

- 2) If the project creates a condition that the City deems hazardous or detrimental to the public;
 - 3) If unauthorized deviations from the design occur which are, in the City's opinion, substantial and which the Developer refuses to remedy in a timely manner after Developer's receipt of notices from the City regarding these defects.
- c) Surveyor's notes must include horizontal and vertical data for all improvements as installed, and shall include the date of installation.
 - d) The Developer must submit to the City Public Works Engineer, and the City Public Works Engineer must approve in writing, any proposal for "major changes" in the design prior to authorizing such change and prior to such change being executed in construction.
 - e) The Project Engineer shall authorize any "field changes" in the design prior to such change being executed in construction; if requested by the City, the Project Engineer shall be required to give written justification of any such "field change."

11.20.090 Project Completion Procedure. Prior to issuance of Notice of Project Acceptance, the following are required:

- a) The Developer's Project Manager, Project Engineer, and the City Public Works Engineer must conduct an inspection to determine if the project is complete and if the project has been completed in accordance with the Contract Documents and if the Contractor has fulfilled all of his obligations. A written "punch list" shall be prepared identifying all observed defects, if any. Said defects shall be remedied, to the satisfaction of the City Public Works Engineer, and a final inspection conducted to verify that these have been remedied, prior to acceptance of the improvements by the City.
- b) The Developer must provide the City with a final submittal on the improvements that includes triplicate copies of project as-builts drawings. Said as-built drawings shall contain a record of all improvements as installed and shall show all field changes and major changes. The final as-built drawings will be on 3 mil mylar 24" x 36" sheets, and marked "AS-BUILT" in bold letters on all sheets of the plans. The as-built drawings shall use the design plan and profile drawings as a base, unless otherwise approved or specified by the City Public Works Engineer.

Included on the first sheet of the as-built drawings will be the following statement, stamped, signed and dated by the Project Engineer:

"The following sheets are record drawings prepared by the Project Engineer, (insert name), based in part on information provided to us by others. We have carefully checked this information and believe it to be a reasonable and accurate representation of the work as constructed."

- c) The Developer shall, following completion of all public improvements, restore all disturbed or destroyed monuments or lot corners.

11.20.100 Project Acceptance Procedure.

- a) After the City Public Works Engineer is satisfied that the improvements are 100 percent complete and acceptable, he shall forward to the Homer City Council a recommendation for project approval and acceptance for maintenance.
- b) The Homer City Council shall consider, and take action upon, the recommendation of project approval and maintenance prior to any formal acceptance and approval by the City administration. Acceptance for maintenance shall be as prescribed in Section 11.04.055 of the Homer Municipal Code.
- c) Within 15 days of formal project approval and acceptance for maintenance by the Homer City Council, the City Public Works Engineer shall write a letter to the Kenai Peninsula Borough stating that the improvements are complete and accepted by the City.
 - 1) In the case of new subdivisions, in which plat recording or filing is contingent upon improvement completion, this letter shall constitute notice of compliance with installation improvement regulations pursuant to Section 20.16.060 of the Kenai Peninsula Borough Code of Ordinances, and shall further authorize the Kenai Peninsula Borough to approve the final plat and forward the plat for filing and recording.
 - 2) This letter shall further constitute final authorization for the City to allow operation and maintenance of water, sewer, and street improvements.
- d) A one-year construction warranty on the work shall be established starting from the date the City takes over maintenance and operations of the improvements; the Developer shall correct any observed defects stemming from the design or construction methods within the one-year period, as directed by the City. To secure the Developer's performance of the warranty, the Developer

shall provide a warranty guaranty via warranty bond, deposit in escrow, letter of credit, or deed of trust. The amount of the warranty guaranty shall be the percentage of the estimated cost of all improvements determined by the following table:

<u>Estimated Cost of All Improvements</u>	<u>Percent to Secure Warranty</u>
0-\$500,000.00	10%
\$500,000.01-\$1,000,000.00	7.5%
\$1,000,000.01 and over	5%

If the Developer has provided a performance guaranty in accordance with Section 11.20.070(f) above, the Developer may elect to allow the City to retain the performance guaranty until the end of the warranty period, in lieu of a separate warranty bond.

11.20.110 Violation - Penalty. The violation of any provision contained herein shall be punished under Section 1.16.010.

CHAPTER 22.10
SUBDIVISION IMPROVEMENTS

Sections

22.10.010	Intent
22.10.020	Scope and Authority
22.10.030	Definitions
22.10.040	Applicable and Exempted Subdivisions
22.10.050	Improvement Requirements - General
22.10.060	Appeals
22.10.070	Violation - Penalty

22.10.010 Intent

The intent of this chapter is to specify regulations supplemental to the Kenai Peninsula Borough subdivision ordinance and to specify the improvements to be required for each subdivision, and exemptions to the requirements.

22.10.020 Scope and Authority

This chapter shall govern all subdivisions within the City of Homer under the authority of the Kenai Peninsula Borough Code, Chapter 20.

22.10.030 Definitions

The following words and phrases shall have the meanings set forth herein, unless otherwise provided or the context otherwise requires:

- a. "Subdivider" means a person, firm, association, partnership, corporation, governmental unit or combination of any of these which may hold any recorded or equitable ownership interest in land, and dividing or proposing to divide such land so as to constitute a subdivision as herein defined. This term shall also include all heirs, assigns or successors in interest, or representatives of the subdivider, owner, proprietor or developer.
- b. "Subdivision" means the division of a tract or parcel of land into two or more lots, sites, or other divisions for the purpose, whether immediate or future, of sale, lease, or building development, including any subdivision or resubdivision. When appropriate to the context, the term shall refer to the process of subdividing or to the land or areas subdivided.

22.10.040 Applicable and Exempted Subdivisions

The standards of this chapter shall apply to all subdivisions in the City of Homer. Exemptions from the requirements of Chapter 22 of the Homer Municipal Code may be granted concurrent with preliminary plat approval by the Homer Advisory Planning Commission under the following conditions:

- a. Resubdivision of existing subdivisions not to exceed three lots, and involving no new dedications of rights-of-way.
- b. Special conditions and circumstances exist which are peculiar to the property involved, and are not generally applicable to other properties in the City. These special conditions can not be caused by the actions of the applicant.
- c. Financial hardship or inconvenience shall not be reason for granting an exception.
- d. Previous exceptions shall not be considered grounds for granting exception.

22.10.050 Improvement Requirements - General

- a. No subdivision plat shall be approved by the Kenai Peninsula Borough, nor shall such plat be recorded or filed at the State Recorder's Office, until the subdivider or developer of such subdivision constructs streets in all rights-of-way dedicated by said plat, and all other utilities and other public improvements to be constructed in said rights-of-way, according to the standards and procedures required under Title 11 of the Homer Municipal Code. Subdivision plat approval, recording and filing shall not be performed until the City of Homer issues written approval of said street and utility improvements to the Kenai Peninsula Borough.
- b. Preliminary plat approval by the Homer Advisory Planning Commission shall, in all cases except for those subdivisions specifically exempted in Section 22.10.030 above, be contingent upon subdivider's receipt of a Development Permit as specified in Chapter 11.20 of the Homer Municipal Code.

- c. The subdivider shall be required to dedicate street rights-of-way according to the standards and specifications of Chapter 11.04, Homer Municipal Code, and the City of Homer "Design Criteria Manual". Horizontal alignments are subject to City review; the City may require realignment of streets on proposed plats if the alignments do not conform to Chapter 11.04 and the "Design Criteria Manual". Final plat approval shall thus be subject to the approval of horizontal alignments by the City Public Works Engineer.
- d. All street and utility main improvements to be constructed as part of a subdivision improvement project shall be constructed according to the procedures of Chapter 11.20, Homer Municipal Code. The City shall accept no such improvements unless a development agreement is executed prior to construction of such improvements.

22.10.060 Appeals

Any person or persons who are affected by an action or determination taken under this chapter, may appeal said action under the appeals procedure outlined in Chapter 21.68 of the Homer Municipal Code.

22.10.070 Violation - Penalty. The violation of any provision contained herein shall be punished under Section 1.16.010.

