AN INVENTORY REPORT ON THE

NATURAL RESOURCE
SAND, GRAVEL, AND QUARRY ROCK

CITY AND BOROUGH OF JUNEAU, ALASKA

1988

Prepared for:

U.S. Department of Interior
Bureau of Mines

Juneau, Alaska

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R&M

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INTRODUCTION

In 1978, the City and Borough of Juneau, Alaska, requested that our firm perform an inventory of the borrow and quarry resources accessible from the present road system within the borough. This task was completed with the results compiled in a report entitled "Natural Resource Inventory, Sand, Gravel, and Quarry Rock, City and Borough of Juneau, Alaska."

In the intervening ten years, the local economy has undergone the biggest housing and population expansion in recent history. A significant fraction of the borrow and quarry rock resource was consumed in the "construction boom." New sources have been opened up and old sources have been depleted. It is the purpose of this report to attempt to summarize the changes that have occurred since 1978.

SOURCE IDENTIFICATION

The list of sources existing in 1988 was partially taken from the 1978 report discussed above. Sources not referenced in the 1978 report were added and those sources no longer in production for various reasons were

deleted. The results of this process are presented on the summary tables in the appendix of this report.

Identification and classification of the various sources were fairly simple in most cases as it was in the 1978. R & M is thoroughly familiar with most production sources through our materials testing laboratory service. Permitting, land engineering, and aerial surveying are other services R & M Engineering provides and which furnish timely information of borrow sources.

Interviews of borrow source owners were conducted, where possible, in an attempt to gain knowledge of their production rates and future plans.

Interviews of local and state government agency representatives were conducted to attempt to determine their plans with regard to development of properties in their control.

Source site visits and rough measurements were taken where land owners had no knowledge of pit size or could not be readily contacted.

BORROW SOURCE DESCRIPTION

Each of the sources identified in this and the 1978 report were assigned a numbered row on the comprehensive summary table which is attached to this report. Column headings are self-explanatory and attempt to answer the most frequently asked questions affecting any borrow source.

Source G - Gastineau Millsite

Activity at this site since 1978 includes construction of mine buildings to serve a tailings-reworking project (gold mine) which went bankrupt. One of the structures now houses the Thane Ore House, a tourist restaurant.

Source H - Treadwell Millsite

Since 1978, minor placer mining activity has occurred at this location. No material removed from the site.

Source J - State of Alaska Tidelands

Since 1978, no borrow activity has occurred on this site.

Source K - U.S. Forest Service

Since 1978, no borrow activity has occurred on this potential site. The Ludwig Pit has been expanded in the direction of this site.

Source L - Van Kirk Tidelands

No borrow activity has occurred on this site since 1978.

Source M - Hilda Creek Fan

No borrow activity has occurred on this site since 1978.

Source N - Eagle/Herbert Rivers

No borrow activity has occurred on this site since 1978. The area has the potential for being the premier source of natural aggregate for Juneau

if economics, population growth, and sound conservation practices ever approach a consensus on development. Plans suggested by Juneau's Senator Jim Duncan for creation of a State Park in this area could conflict with orderly development of this source. Transportation corridors and mining areas should be given a fair hearing before a final plan for any such park is set forth.

Source O - Vanderbilt Hill

This area is now the site of Mountainside Estates, a residential subdivision. Borrow activity and site grading have resulted in considerable use of on-site borrow. No borrow activity is likely in the future, save that required for site grading for future lot development.

Source P - Montana Creek Road Backslope

No borrow activity has occurred at this site since 1978.

Source Q - U.S. Survey Nos. 1529 and 1527

Some minor grading activity has occurred since 1978 related to development of Erin Manor Subdivision. The amount is unknown, but quite small. Use of this site for borrow in the future is unlikely as the land is quite valuable for a residential reserve use.

UPDATE STATEMENT - EXISTING SOURCES

Source 1 - Upper End Echo Bay Spur

This quarry site has not been utilized since 1978.

Source 2 - U.S. Forest Service/Bureau of Public Works - Kowee Creek

This quarry site has not been utilized since 1978.

Source 3 - State of Alaska/Eagle River

This borrow site has had some use since 1978. Hillside stabilizing material was transported to the old Glacier Highway cut "behind" the Fred Meyer complex.

Source 4 - Kodzoff Herbert River (U.S. Survey No. 1174)

This borrow site has not had significant use since 1978.

Source 5 - Talus 21 Mile Glacier Highway

Personal use for decorative stone is continuing at this easily accessible site which appears to be largely depleted on the surface, but is actually "self-sustaining."

Source 6 - State of Alaska MS 961-008-3

This site is split with the northerly two-thirds largely untouched since 1978. The southerly one-third has been developed and is the site of the Lynn Canal Fire Station. Approximately 50,000 cubic yards of material was borrowed from the general site for various construction projects by the contractor who landscaped and planted the site after borrow operations were completed.

Source 7 - State of Alaska - 13 3/4 Mile Glacier Highway/Auke Bay Ferry Terminal - North Side

This borrow site has not had significant use since 1978.

Source 8 - Lena Beach Road

This borrow site has seen no development since 1978.

Source 9 - State of Alaska/Auke Lake

This borrow site has been partially developed for a water storage tank for the CBJ water system and must now be considered "unavailable."

Source 10 - Green/Montana Creek

This site has been developed considerably since 1978. Mr. Pat Barrett is the present owner. His aggregate production company, "BARANA," produces D-1 processed aggregates. Between the aggregate production/sales and usage of common borrow from this site to develop a nearby residential subdivision, approximately 250,000 cubic yards have been depleted. The owner presently estimates several million (or more) cubic yards of material remains (if one includes this site and adjacent land which may be purchasable).

Source 11 - Barrett/Back Loop Road

No material has been borrowed from this site since 1978 and no plan for development is known.

Source 12 - State of Alaska/U.S. Forest Service

This borrow site has not had significant use since 1978. It is now part of the Dredge Lakes "dispersed use" area administered by the U.S. Forest Service. We have been told that, in the near future, hearings will be conducted to give various potential user groups a voice in a long-range plan. This could include limited borrow extraction operations.

Source 13 - Reed Pit

The Reed Pit has had no sigificant usage since 1978. This pit is approximately 90% filled with construction waste and is the future site of an equipment yard. No resource is available from this site.

Source 14 - Kaiser

This borrow source was utilized to a minor extent in the early 1980's as a source of common borrow. No record of the volume utilized is known to exist. A remote potential exists to expand this source to the northwest, into uplands. We estimate that 120,000 cubic yards of material, primarily sand, is available. Various owner problems exist regarding CBJ greenbelt corridor plans.

Source 15 - Smith/Gee Street

No significant development has occurred since 1978. The site is presently closely surrounded by residential development. The site can no longer be considered a borrow area for practical purposes.

Source 19 - Smith/West Mendenhall Flats

This borrow source has had sporadic development since 1978. Approximately 250,000 cubic yards have been mined since that time. No future mining is allowed by administrative agreement.

Source 20 - Airport Float Plane Pond

No sigificant usage of this area has occurred since 1978. A plan for construction of the "parallel taxiway" at the airport would serve to deepen the float plane pond through removal of 300,000 cubic yards of material. Other potential projects in the immediate area could utilize another 100,000 cubic yards in the near (ten years) future.

Source 22 - Smith/Honsinger

This borrow source was utilized in 1983 for borrow for the embankment for the Fred Meyer complex. Test borings suggest a limited amount of marketable material remains overlying extremely silty material. Marine dredging is the only practical method of removal for the remaining usable material. Permits currently exist, but renewal of such may be difficult due to the surrounding Mendenhall Wetlands State Game Refuge.

Source 23 - Helin, Horn & Shanks/Valley Court

This area has been extensively developed as a borrow source and is operated by Gastineau Sand and Gravel as a source of common borrow. A substantial amount of material has been removed and a substantial amount (see table) remains under the present development plan. At the present rate of depletion, less than five years' supply of material remains in this source.

Source 24 - State of Alaska MS 95-8-001-3

This borrow source has not had significant development since 1978. Ownership has been transferred from the State of Alaska to CBJ. A single access road traverses the westerly one-half of the site and serves as a road for clearing, grubbing, and waste haul trucks which deposit the waste over the bank between Lemon Creek and the natural bluff. Future development of this source is certain.

Source 25 - Scott & Schneider/U.S. Survey No. 2121

This high quality borrow source has been utilized sporadically since 1978; approximately 150,000 cubic yards being utilized to provide fill for a planned 13.5-acre shopping center. A significant volume remains and is usable under present land use regulations and permitting.

Source 26 - Juneau Ready Mix/U.S. Mineral Survey Nos. 204 and 609

This borrow source in Lemon Creek has been utilized sporadically since 1978 and is subject to seasonal anadromous fish regulations and natural high water restrictions. The materials from this area now come from U.S. Survey No. 204 only.

Source 27 - Hildre Sand and Gravel

This borrow source in Lemon Creek has been utilized regularly since 1978.

Source 28 - Channel Landfill, Inc.

This borrow site has been utilized sporadically since 1978. Future use is limited to the area to the west of the present landfill embankment.

Source 29 - George Brothers/Salmon Creek

This borrow source has not been utilized since 1978. Future development is unlikely due to the wet/silty nature of the site.

Source 30 - Henri/Salmon Creek

This quarry source has had limited development since 1978. The owner's general plan calls for grading the former pit/waste area for use as part of future residential development. Nearby residential development precludes this as a source for new quarry rock. Site litigation also continues over past materials usage.

Source 31 - Green (Pit and D-1 Stockpile)/Southwest Salmon Creek

This area has been extensively developed for use as office building space. No material remains at this site.

Source 33 - Alaska Electric Light and Power Company

This source of mine-waste borrow has not been utilized since 1978. The site may be available, dependent on the owner's sales policy. At present, no borrow material is available.

Source 34 - A-J (Union Oil) Rock Dump

This source of mine-waste borrow has not been utilized since 1978, save for minor rehandling for gold extraction.

Source 36 - State of Alaska/Sheep Creek Alluvium and Tailings

No mining activity has occurred on this site since 1978 (to the best of

our knowledge). Economics and material quality are poor for other than local use. Currently, this source is the only one in the City and Borough of Juneau available for "personal" use.

Source 37 - Simpson/One-Half Mile North Douglas

This is the site of a new residence and out buildings. No activity has occurred since 1978 and the source may be considered closed.

Source 38 - Hanna & Wynn/2 1/4 Mile North Douglas

No activity has occurred at this site since 1978.

Source 39 - Ludwig Pit

This borrow site has had considerable usage since 1978. The original owner passed away and the pit is now owned and operated by a local excavating/trucking contractor. He estimates that a resource of 900,000 cubic yards remain.

Source 40 - Barrett & Campbell

This quarry site is now limited by residential development and can be considered closed.

Source 41 - State of Alaska/MS 953-003-3

This quarry site off of the Eaglecrest Road has been utilized several times since 1978, primarily as a source of riprap and shot rock borrow. Approximately 250,000 cubic yards of material have been removed since 1978, leaving 125,000 cubic yards in place. The site is under land transfer consideration by USDA/Forest Service.

Source 42 - State of Alaska MS 959-001-3/Burgess

No activity has occurred at this site since 1978 and none is likely in the future.

Source 44 - City and Borough of Juneau/Lemon Creek Pit

This borrow source was undeveloped in 1978 and was not mentioned in our report. It consists of 12 acres between what was the Valley Court Pit and State of Alaska MS 95-8-001-3. Approximately 250,000 cubic yards of the net reserve of 650,000 cubic yards have been removed.

Source 45 - Reddekopp/Lena Point

This quarry site, not mentioned in our 1978 report, is a source of hard, durable rock and rock aggregate. The quarry began as incidential excavation for subdivision grading. The estimated reserve at that time was 350,000 cubic yards. Approximately 50,000 cubic yards have been mined for off-site use. Approximately 300,000 cubic yards remain with half of that drilled and shot in place. On adjacent land to the north, across Lena Loop Road, approximately 20 acres is planned for development with 150,000 cubic yards of possible excavation for use off-site. A barge loading facility permit is in place and moderate scale quarry rock removal can proceed by this transport mode.

Source 46 - Crow Hill Quarry

This quarry site, not mentioned in our 1978 report, on the north side of Crow Hill was developed, in part, in connection with the Crow Hill Subdi-

vision by Red Samm, Inc., and associated individuals. This source of dark, slaty rock has been utilized on several local projects. The source is inactive at present. The original reserve of 350,000 cubic yards has been depleted to approximately 100,000 cubic yards.

Source 47 - Bonnie Brae Quarry

This quarry site, not mentioned in our 1978 report, located to the west of Bonnie Brae Subdivision, was the major source of shot rock fill for this project. Some local sales may have occurred, but the majority of rock produced was utilized in subdivision development. This quarry is inactive at present. Future utilization of the quarry will be accomplished with development of the remaining 80 acres of undeveloped land.

Source 48 - Goldbelt/Hidden Valley

This source is the "Boy Scouts" source cited under Potential Sources in the 1978 Report. Goldbelt, Inc. is now the owner. The site is being actively worked. Information is sketchy at best, but it is estimated that approximately 50% has been mined leaving approximately 600,000 cubic yards in reserve.

GENERAL SOURCE COMMENT

A list of permitted or operating borrow sources is presented as Figure 3 in the appendix of this report. A list of non-operational borrow sources is similarly presented as Figure 4.

CONCLUSION

The overall status of borrow sources development has remained nearly static relative to the conditions existing in 1978.

The major "new" sources of supply are on private land with the exception of the "City Pit" at Lemon Creek Valley. The opening of new sources has allowed the supply of material resource sand, gravel, and rock to be maintained at a level of relative abundance. This was unforeseen in the 1978 inventory. At the present rate of depletion and assuming an average population growth rate of ±2% per annum, the supplies available from these sources (primarily Lemon Creek alluvium) will be severely depleted by 2000 AD.

Alternative source supplies are available in abundance, but at a cost considerably greater than is presently enjoyed. In the not too distant future, mineral aggregates and common borrow fill can be obtained from shot rock sources such as those under CBJ and Goldbelt ownership within upper Lemon Creek Valley. Drilling, blasting, and crushing and classification costs will be borne by the consumer who presently pays only a fraction of these costs due to the abundance of natural granular material.

Mineral aggregate and common borrow fill can be obtained from alluvial sources but the nearest such large deposit of commercial grade material is located in the Eagle/Herbert Rivers drainages approximately 30 miles from Juneau. If the source remains available, the consumer will have to bear a transportation cost surcharge relative to the present relatively

abundant sources. Regulatory agency obstacles will have to be surmounted and a significant segment of the local population would have to be educated to the relative need to develop the Eagle/Herbert Rivers source. Additionally, news releases by Alaska Senator Jim Duncan stated that at least part of this area will be under consideration for a State Park. If this occurs, more restrictive development can be expected.

It is beyond the scope of this report to estimate the cost of developing and production from the alternative sources cited above. However, they have been presented in order of increasing cost.

CLOSURE

We appreciate the opportunity to furnish this updated version of our 1978 Natural Resource (Sand, Gravel, and Quarry Rock) Inventory Report to the U.S. Bureau of Mines.

Should there be questions, or if we may be of further assistance in any manner, please do not hesitate to contact us at your convenience.

Sincerely,

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Civil Engineer

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ENGINEERS GEOLOGISTS SURVEYORS

SUMMARY OF UNDEVELOPED NATURAL RESOURCE BORROW MATERIALS SOURCES
WITHIN THE CITY & BOROUGH OF JUNEAU, ALASKA

SOURCE NO.	NAME OF SOURCE	LOCATION &/OR LEGAL DESCRIPTION	AVAILABLE LAND AREA (SURFACE ACRES)	MAXIMUM PIT AREA (ACRES)	EXISTING PIT AREA (ACRES)	EXISTING REMAINING PIT AREA	AVERAGE DEPTH OF PIT	MAXIMUM DEPTH OF PIT	ESTIMATED VOLUME REMOVED	ESTIMATED ORIGINAL VOLUME	ESTIMATED RESERVE VOLUME (CUBIC YARDS)	PROCESSED AGGREGATE	SELECT BORROW	COMMON BORROW	HAULING ECONOMICS	ZONING	CURRENT PERMIT	COMMENTS
A	SMITH/ST. PAUL	NORTH OF GLACIER HIGHWAY - EAST OF LOOP ROAD (U.S.S. 1194)	100+	10	N/A	10	N/A	15	0	250,000	250,000	X	X	X	GOOD-EXC.		NO	PART OF ABANDONED DAIRY FARM NORTH OF EGAN EXPRESSWAY. UNLIKELY TO DEVELOP.
B	TOM FILE	MENDENHALL FLATS (U.S.S. 2136 AND ACCRETED LANDS	47	43	N/A	43	N/A	30	0	2,100,000	2,100,000	X	X	X	GOOD	I	NO	SAND SOURCE ONLY - OWNERSHIP CLAIM - IN COURT LITIGATION
C	STATE OF ALASKA - MS 95-8-011-3	ENGINEERS'S CUT-OFF/F.A.A. FLIGHT PATH (U.S.S. 3127, L-1)	7.5	7.5	N/A	7.5	N/A	10	0	1,800,000	1,800,000	X	X	X	GOOD	RR	NO	QUARRY ROCK SOURCE
E	SALMON CREEK FAN/DREDGE AREA	SOUTHWEST OF EXPRESSWAY/SALMON CREEK CROSSING SUBMERGED ALLUVIUM	UNKNOWN	7.4	N/A	7.4	N/A	8	0	95,000	95,000		X	X	POOR-FAIR	N/A	NO	HIGH SILT CONTENT WITH PUCKETS OF ACCEPTABLE SAND & GRAVEL. MENDENHALL WETLANDS.
G	TREADWELL MILL SITE	DOUGLAS	UNKNOWN	4.2	N/A	4.2	N/A	15	0	99,000	99,000			X	POOR	RR	NO	MINE TAILINGS (FINE)
H	STATE OF ALASKA	OPPOSITE LUDWIG PIT/NORTH DOUGLAS HIGHWAY	UNKNOWN	8.8	N/A	8.8	N/A	8	0	125,000	125,000			X	FAIR-GOOD	WCI	NO	HIGH SILT CONTENT, SHALLOW DEPTH OF RESERVE
I	U.S. FOREST SERVICE	ADJACENT LUDWIG PIT/NORTH DOUGLAS HIGHWAY	UNKNOWN	11.5	N/A	11.5	N/A	20	0	370,000	370,000		X	X	GOOD	RR	NO	MATERIAL SIMILAR TO LUDWIG BUT UNPROVEN
J	VAN KIRK TIDELANDS	2 MILE NORTH DOUGLAS HIGHWAY (EAGLE CREEK)SUNSET TRAILER COURT	4	4	N/A	4	N/A	7	1,000	45,000	44,000			X	FAIR	WCI	NO	SIMILAR TO "H"
K	HILDA CREEK FAN	WEST SIDE DOUGLAS ISLAND (NATIVE LAND CONVEYANCE)	100+	100+	N/A	104	N/A	10	0	1,665,000	1,665,000	X	X	X	POOR	RR	NO	COARSE MATERIAL IS RELATIVELY THIN OVERLYING SAND AND FINE GRAVEL
L	MONTANA CREEK BACK ROAD SLOPE	EAST OF RIFLE RANGE ON ROAD SIDE	1	1	0.3	0.7	HILLSIDE	N/A	1,000	10,000	9,000		X	X	GOOD-EXC.	RR	NO	QUESTIONABLE SAND-GRAVEL AND QUARRY SOURCE
M	U.S.S. 1529/1527	SOUTH AND SOUTHWEST OF ERIN MANOR SUBDIVISION	10	4	1	3	20	30	25,000	135,000	110,000		X	X	GOOD	D-3	NO	SAND AND GRAVEL RESOURCE BETWEEN TWO DEVELOPED AREAS
N	EAGLE/HERBERT RIVERS BASINS	VALLEY BASIN, NORTH OF HIGHWAY	N/A	N/A	N/A	N/A	N/A	N/A	0	1,000,000	1,000,000	X	X	X	POOR	RR	NO	POSSIBLE SOLE SOURCE OF CONCRETE AGGREGATE IN JUNEAU IN FUTURE

VOLUMES OF GRAVEL PITS COMPUTED BY UTILIZING SURFACE AREA, CUT BACK TO GROUND WATER AT 2:1, THEN AT SUBMERGED SOILS ANGLE OF REPOSE FOR FINAL DEPTH.
*WITHOUT SOIL SAMPLES, AT DEPTH, THIS IS TRUELY A "GUESSTIMATE". SOILS COULD GRADE TO SILT, BECOMING TOTALLY UNWORKABLE EVEN AS COMMON BORROW.

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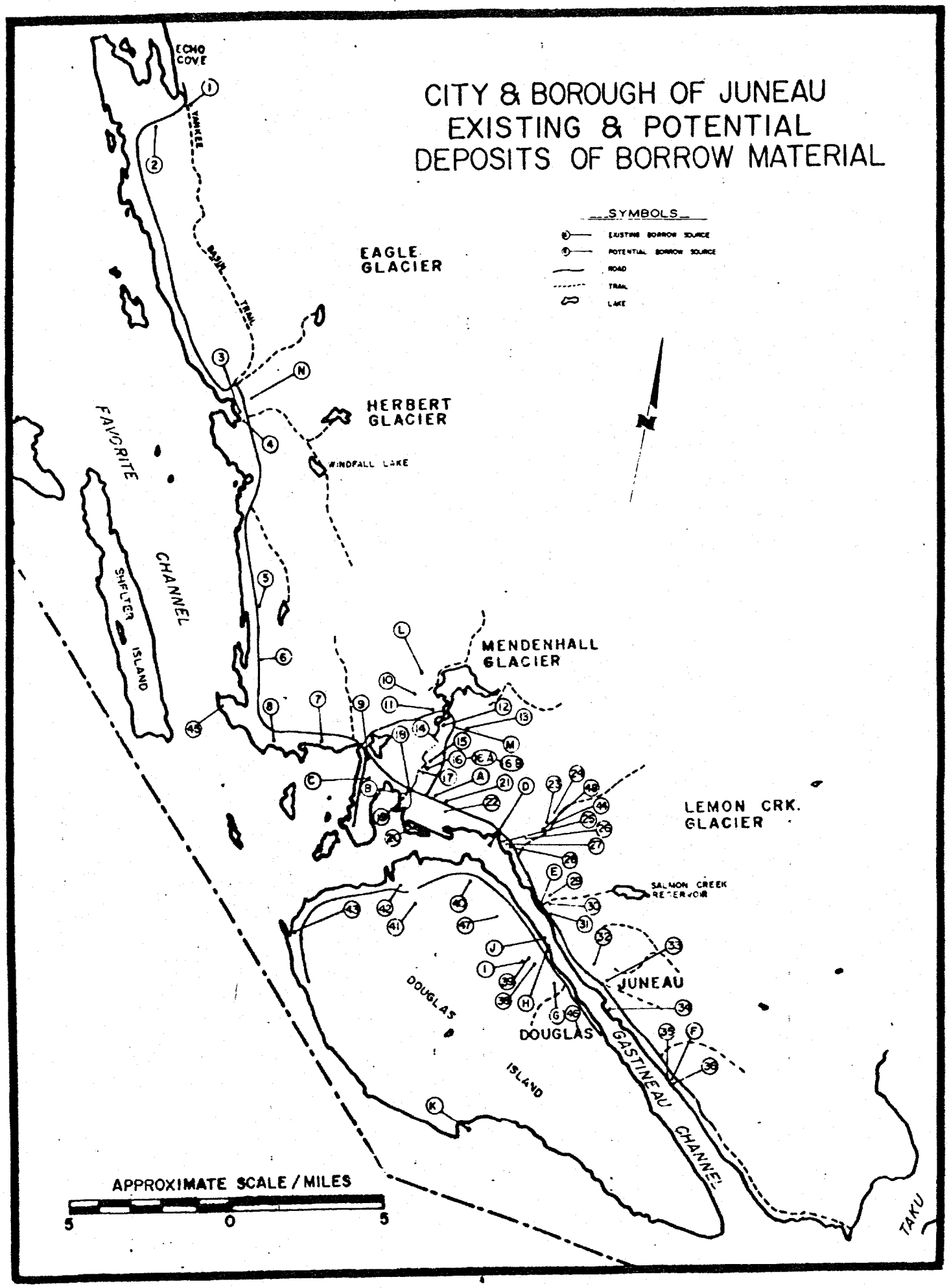

CITY & BOROUGH OF JUNEAU
EXISTING & POTENTIAL
DEPOSITS OF BORROW MATERIAL
SYMBOLS
EXISTING BORROW SOURCE
POTENTIAL BORROW SOURCE
ROAD
TRAIL
LAKE
ECHO COVE
YANKEE BASIN TRAIL
EAGLE GLACIER
HERBERT GLACIER
WINDFALL LAKE
FAVORITE CHANNEL
SHELTER ISLAND
MENDENHALL GLACIER
LEMON CRK. GLACIER
SALMON CREEK RESERVOIR
JUNEAU
DOUGLAS
DOUGLAS ISLAND
GASTINEAU CHANNEL
TAKU
APPROXIMATE SCALE / MILES
5
0
5

FIGURE 2

FIGURE 3

LIST OF PERMITTED AND/OR OPERATING SOURCES (1988)

1988 SOURCE NUMBER	LOCAL NAME AND LOCATION	ESTIMATED RESERVE
10	Barrett/Hanna, Montana Creek	165,000 Cubic Yards
22	Smith/Honsinger - Airport Wetlands	2,100,000 Cubic Yards
23	Gastineau Sand and Gravel, Valley Court	250,000 Cubic Yards
24	State of Alaska No. 95-8-001-3 - Lemon Creek	925,000 Cubic Yards
25	S & S Development - Switzer Creek Area	310,000 Cubic Yards
27	Hildre Sand and Gravel, Lower Lemon Creek	700,000 Cubic Yards
28	Channel Landfill - Lemon Creek Area	200,000 Cubic Yards
36	State of Alaska (DNR) - Sheep Creek Delta	30,000 Cubic Yards
39	Ludwig Pit, North Douglas	900,000 Cubic Yards
44	CBJ Pit, Lemon Creek	400,000 Cubic Yards
45	Reddekopp Rock, Lena Point	400,000 Cubic Yards
48	Goldbelt, Upper Lemon Creek	600,000 Cubic Yards

FIGURE 4

LIST OF PHYSICALLY AND/OR ADMINISTRATIVELY "DEPLETED" SOURCES (1988)

1988 SOURCE NUMBER	LOCAL NAME AND LOCATION
A	Smith/St. Paul
B	Tom File
N	Gold Creek Fan
0	Vanderbill Hill
Q	U.S. Survey Nos. 1529 and 1527
8	Lena Beach Road Pits
9	State of Alaska - Auke Lake
11	Barrett - Back Loop Road, USS 1796
13	Reed Pit
15	Smith end of Gee Street
16A	Southeast Land & Development
16B	Southeast Land & Development/Red Samm
17	Red Samm Asphalt Plant/Valley Investment
18	Barrett & Gallagher, Mendenhall River Bar
19	Smith (Gastineau Contractors) West Mendenhall Flats and River
21	State of Alaska, 8 Mile Quarry
23	George Brothers - Salmon Creek Slope
30	Joe Henry - Salmon Creek Quarry
31	Green (Pit and D-1 Stockpile) at 3 1/2 Mile Glacier Highway
32	Toner Pit, Irwin Street
34	Union Oil Storage - Juneau Rock Dump
37	Simpson, North Douglas Residential Area
38	Hanna & Wynn - North Douglas Auto Sales Shop
40	Barrett & Campbell Quarry - North Douglas Quarry
42	State of Alaska - MS 953-003-3, Fish Creek
43	Stock & Grove, end of Douglas Highway/End Spur Road
47	Bonnie Brae Subdivision Quarry

CONCLUDING STATEMENT

The borrow/quarry sites mentioned in the 1978 report and not included in the two lists offered above are either;

1. Not operating due to owner not willing to continue mining at present.

2. Transportation economics are poor or material is marginally usable.

ZONING DISTRICTS

RESIDENTIAL

D-1 — **SINGLE-FAMILY & DUPLEX**
36,000 sq. ft. minimum lot size
1 unit per acre

D-3 — **SINGLE-FAMILY & DUPLEX**
12,000 sq. ft. minimum lot size
3 units per acre

D-5 — **SINGLE-FAMILY & DUPLEX**
7,000 sq. ft. minimum lot size
5 units per acre

D-10 — **MULTI-FAMILY**
6,000 sq. ft. minimum lot size
10units per acre

D-15 — **MULTI-FAMILY**
5,000 sq. ft. minimum lot size
15 units per acre

D-18 — **MULTI-FAMILY**
5,000 sq. ft. minimum lot size
18 units per acre

MU — **MIXED USE** Residential and Commercial
5,000 sq. ft. minimum lot size
60 units per acre

COMMERCIAL

LC — **LIGHT COMMERCIAL**

GC — **GENERAL COMMERCIAL**

WATERFRONT

WC — **WATERFRONT - COMMERCIAL**

WCO — **WATERFRONT - COMMERCIAL - OFFIC**

WCR — **WATERFRONT - COMMERCIAL - RETAI**

WCI — **WATERFRONT - COMMERCIAL - INDUSTRIAL**

OTHER

I — **INDUSTRIAL**

RR — **RURAL RESERVE**

ALL LANDS WITHIN THE CITY & BOROUGH OF JUNEAU NOT SHOWN ON THESE MAPS ARE ZONED RR.

(T) — **TRANSITION AREAS**

EXAMPLE:

D-1 (T) D-5
Existing zone — Density allowed after sewer and water are provided.

FIGURE 5