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ENVIRONMENTAL IMPACT STATEMENT

PROPOSED
SAGANAGA LODGE & TOWNHOUSES
BY
FARMAKER, INC.
COOK COUNTY, MINNESOTA

TX
931
.S25

PREPARED BY
MINNESOTA DEPARTMENT OF NATURAL RESOURCES

1975

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SAGANAGA LODGE AND TOWNHOUSES

PROPOSED BY:

FARMAKER, INC.

Cook County, Minnesota

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Prepared by:

Minnesota Department of Natural Resources

April 16, 1975

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PROPOSED SAGANAGA LODGE AND TOWNHOUSES
ENVIRONMENTAL IMPACT STATEMENT

I. DESCRIPTION OF PROPOSED ACTION

The Saganaga Lodge and Townhouse project involves the development of 25 townhouses, two dormitories and a lodge on 9.7 acres of land fronting approximately 1900 feet of shoreline on Saganaga Lake and Seagull River. The project is situated near the end of the well-known Gunflint Trail in Cook County in Government Lot 5, Section 19, Township 66 North, Range 4 West. The tract is entirely private land owned by Farmaker Inc. and lies within the Boundary Waters Canoe Area (BWCA) as shown in Figure 1. The entire proposal represents a 1.5 million dollar investment.

The site plan, found in Figure 2, shows townhouses grouped in clusters of two to four units. The appearance of individual townhouses may vary since three types of units with six possible floor plans are offered. The structures will be finished in rough-sawn pine and stained a color that blends with surrounding vegetation. The proposed water supply is Saganaga Lake and to conserve water use, low-flow fixtures are planned for toilets, showers and sinks. Present plans are to construct these units gradually over a three year period. After sale, owners will have the option of renting their units. The 1974 prices varied between $25,900 to $38,900 depending upon the plan selected. The two dormitories are designed for 25 staff and employees comprised of ten full time and ten to fifteen seasonal workers. The lodge is designed to hold 80 guests and would contain the following services: two dining rooms, recreation room, cocktail lounge, trading post, sauna and storage rooms.

Approximately 45 to 50 parking spaces are planned which allow 1.5 spaces for each unit, six for staff, and a few for visitors. Electricity will be used for all needs except lodge cooking for which propane is planned. Water, telephone and electric lines will be buried on the site.

Proposed recreational facilities include: tennis court, horseshoe pits, shuffleboard, badminton, beach and marina (Figure 2). The boat docking facility would be of the floating type and would provide mooring for 20 boats. This dock extends 75 feet into Saganaga Lake at which point the water depth is 23 feet. The marina would be used primarily by residents and boat launching by transients would not be allowed. However, some boat traffic by non-residents is expected to occur while utilizing lodge facilities and purchasing gasoline. Aircraft will not be allowed to land at this site because it lies within the BWCA.

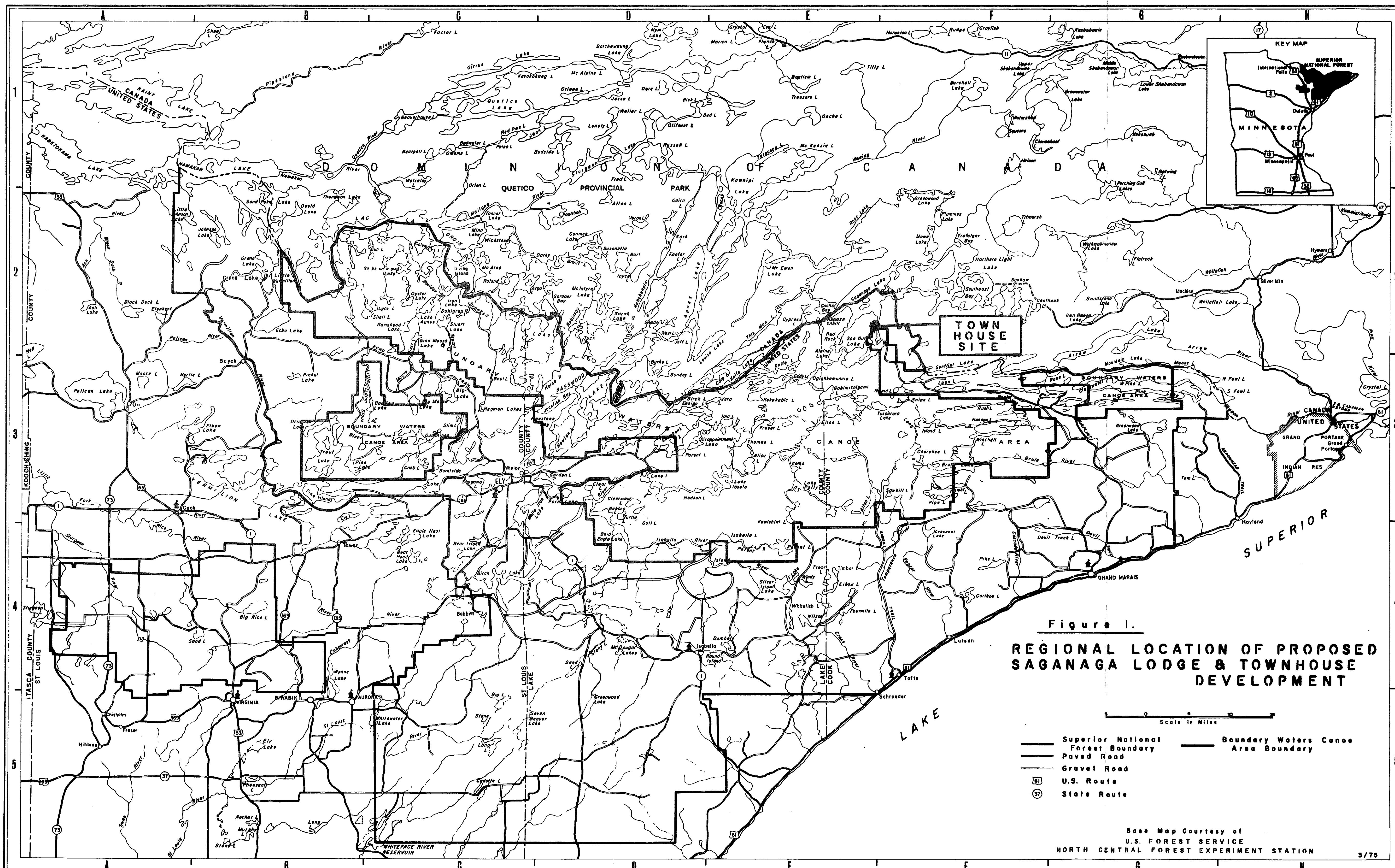
TOWN HOUSE SITE
KEY MAP
SUPERIOR NATIONAL FOREST
MINNESOTA
DOMINION OF CANADA
QUETICO PROVINCIAL PARK
BOUNDARY WATERS CANOE AREA
LAKE SUPERIOR
Scale in Miles
Superior National Forest Boundary
Boundary Waters Canoe Area Boundary
Paved Road
Gravel Road
U.S. Route
State Route
Base Map Courtesy of
U.S. FOREST SERVICE
NORTH CENTRAL FOREST EXPERIMENT STATION
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Figure I.

REGIONAL LOCATION OF PROPOSED SAGANAGA LODGE & TOWNHOUSE DEVELOPMENT

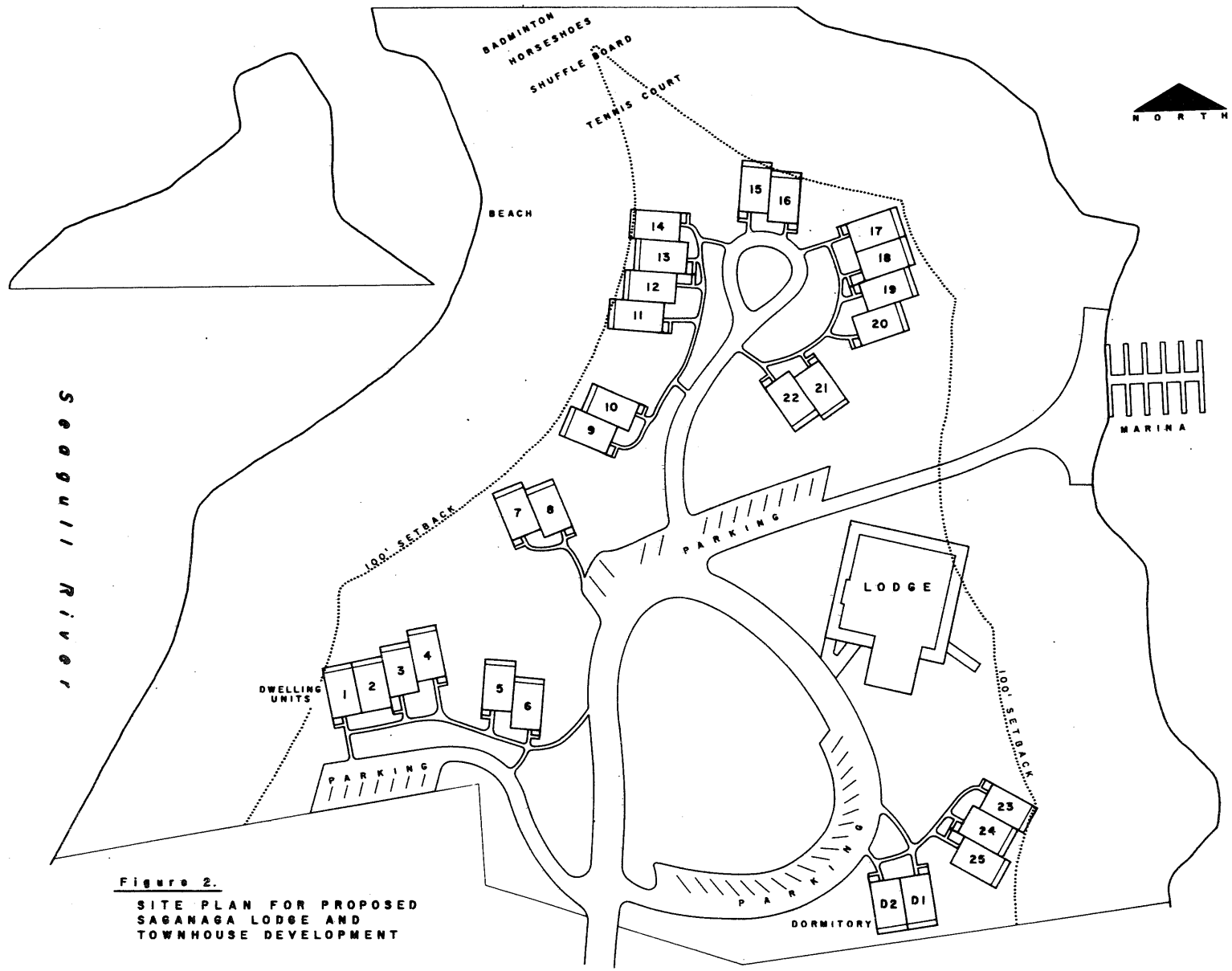

Figure 2.

SITE PLAN FOR PROPOSED
SAGANAGA LODGE AND
TOWNHOUSE DEVELOPMENT

II. ENVIRONMENTAL IMPACT OF PROPOSED ACTION

A. NATURAL ENVIRONMENT

1. Geology

Although this portion of Minnesota has been glaciated by four major geologic events dating back to a million years ago, the bedrock features remain the most dominant on this tract. This bedrock is commonly called "Saganaga Tonalite" (granite) and is the oldest intrusive granite in northeastern Minnesota. The bedrock is largely composed of pink to nearly white hornblende granite and aggregates of quartz. Frequently, dikes and other intrusions into the granite are visible. This granite is widely exposed on the proposed site as well as along the shoreline of Saganaga Lake. Both Saganaga and nearby Sea Gull Lakes are believed to be bedrock basins scoured by glacial erosion. These lakes are unlike many of the elongated lakes in the BWCA in that they are irregularly shaped.

The glacial drift which varies in thickness from several inches to only a few feet was deposited by the Rainy Lobe of the Wisconsin Ice Stage that occurred approximately 12,000 to 14,000 years ago. This drift is typically red and sandy because the source material was red sandstone and shale to the north and northeast of Minnesota.

Impact

There are no anticipated direct or indirect, adverse or beneficial, impacts on geology that would result from this proposed project. The bedrock exposed along the shoreline has a minor aesthetic value since more spectacular exposures are found elsewhere on Saganaga Lake.

2. Soils and Sewage Disposal

The general soils map for Cook County indicates that the following three major soil types plus minor soils are found on the proposed project area:

Type	Percent of Soil
Conic (gravelly sandy loam)	45
Insula (gravelly sandy loam)	35
Quetico (loam)	10
Minor soils	10

The Soil Conservation Service interpretation sheets for these soils indicate the following limitations for septic tank filter fields:

Type	Limitation	Reason
Conic	Severe	Bedrock at 20 to 40 inches, hardpan
Insula	Severe	Shallow to bedrock
Quetico	Severe	Extremely shallow to bedrock

Since these limitations apply to soils covering a wide general area, more specific information was obtained by a representative of the Soil Conservation Service during a field inspection in October, 1974. The conclusion of this inspection was:

> The overall rating for this site for on-land sewage disposal with septic tank filter fields is severe because of the loamy material which will cause slow permeability, shallowness to bedrock, steep slopes and small available areas of soil.

U. S. Forest Service soils information indicates that these soils are highly sensitive to disturbances based upon the following soil characteristics:

Soil Characteristic	Rating
Compactability	Moderate
Stability	Moderate
Fertility	Low
Erodibility	Moderate
Firmness to Windthrow	Low

These soils have been placed in a low capability[1] class because of the high sensitivity and low productivity.

At present, the only percolation test data available is one test performed in October, 1974 by a consultant for the developer. This test resulted in a percolation rate of 30 minutes per inch. This single percolation test is inconclusive, and additional percolation data will be needed to fully evaluate the suitability of these soils for on-site sewage disposal. However, this value was used for calculations in this statement because of a lack of more detailed data. The Department of Health recommends that one test should be taken for each 500 square feet of gross area used for sewage disposal. Based upon information supplied by the developer, 12,112 square feet of suitable soils are available for sewage disposal. Thus, 24 percolation tests are recommended.

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[1]The capability class is a measure of an area's ability to support plant and animal life and of its potential to heal itself from externally imposed disturbances.

A comparison of the capacity of the on-site sewage disposal system proposed by the developer and the capacity using Department of Health recommended standards is presented in Table 1. Three drain fields are proposed. The first serves 14 units; the second serves eight units; and the third serves three units, two dormitories and the lodge. The basic difference between the two determinations in Table 1 is the estimate of number of persons per unit. The proposer has assumed three persons per unit based upon an average of two bedrooms per unit and past experience. The Department of Health assumes four persons per unit since each unit could contain from two to four bedrooms, the average being three bedrooms. The number of persons assumed by the Health Department is one per bedroom plus one which equals four persons per unit. Another assumption used in both determinations is a percolation rate of 30 minutes per inch.

The lawn area required was determined by the following steps:

Total gallons = Total persons x gallons/person/day
Absorption area = Total gallons x 1.1 sq. feet/gallon[1]
Length of 3 feet wide trench = Absorption area ÷ 3
Lawn area required = Area necessary to accommodate the lengths of trench with 7.5 feet separation distance center on center

The areas available for sewage disposal were proposed by the developer. These areas will be further inspected as soon as weather permits to evaluate soil suitability.

Impact

An inspection of Table 1 indicates that the amount of area needed for sewage disposal exceeds that which is available. If such systems were installed, failure would be imminent with adverse impacts occurring to water quality and to the public health, safety and welfare. This aspect is further discussed in Section III.

3. Climate

The nature of precipitation in the vicinity of the proposed action is similar to Minnesota in general in that the major source is the warm moist air from the Gulf of Mexico. However, the influence of nearby Lake Superior modifies this major source. The normal annual precipitation of 29 inches is near the Minnesota normal maximum of 32 inches. Approximately 40 to

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[1] From Table 2, page 7, Department of Health Recommended Code Regulating Individual Sewage Disposal Systems.

Table 1: Capacity of On-site Sewage Disposal Systems for the Proposed Saganaga Lodge and Townhouses, Cook County

DRAIN FIELD NO. 1

Characteristic	Proposer	Health Standards
Units connected	14	14
Total persons	42	56
Gallons/person/day	50	50
Total gallons	2100	2800
Absorption area (x 1.1)	2310 sq. ft.	3080 sq. ft.
Trench length (3 ft.)	770 feet	1027 feet
Trench spacing	7.5 feet	7.5 feet
Lawn area required	5325 sq. ft.	7252 sq. ft.
Available area	6208 sq. ft.	6208 sq. ft.

DRAIN FIELD NO. 2

Characteristic	Proposer	Health Standards
Units connected	8	8
Total persons	24	32
Gallons/person/day	50	50
Total gallons	1200	1600
Absorption area (x 1.1)	1320 sq. ft.	1760 sq. ft.
Trench length (3 ft.)	440 feet	587 feet
Trench spacing	7.5 feet	7.5 feet
Lawn area required	2850 sq. ft.	3952 sq. ft.
Available area	2848 sq. ft.	2848 sq. ft.

DRAIN FIELD NO. 3

Characteristic	Proposer	Health Standards
A. Units connected	3	3
T Total persons	9	12
Gallons/person/day	50	50
Total gallons	450	600
B. Dorm employees	25	25
Gallons/person/day	25	50
Total gallons	625	1250
C. Lodge customer	80	80
Gallons/person/day	10	12
Total gallons	800	960
Total gallons (A+B+C)	1875	2810
Absorption area (x 1.1)	2062 sq. ft.	3091 sq. ft.
Trench length (3 ft.)	687.5 feet	1030.3 feet
Trench spacing	7.5 feet	7.5 feet
Lawn area required	4706 sq. ft.	7277 sq. ft.
Available area	3056 sq. ft.	3056 sq. ft.

[1]Calculations assume a percolation rate of 30 minutes per inch based on information supplied by developer.

50 percent of the annual precipitation occurs in the summer months of June, July and August. The normal annual snowfall of 60 inches is also near the maximum in the state of 70 inches. A snow cover of one inch can be found in this area on the average of 140 days per year.

This area is generally one of the coldest in the state with an average normal temperature of 35°F compared to a normal of 46°F for extreme southern Minnesota. The attenuating effects of Lake Superior on temperature do not extend inland as far as Saganaga Lake. Nearby Babbitt, Minnesota, has recorded a maximum temperature of 103°F and a minimum of -41°F.

Impact

There are no anticipated direct or indirect, adverse or beneficial, impacts on the macroclimate resulting from this proposed project. Minor impacts on the microclimate will occur from the construction of roads and buildings; however, these impacts are considered insignificant.

4. Hydrology

The Continental Divide forms the southern boundary of the Rainy Lake watershed in which this proposed action lies. Therefore, drainage flows northerly to the border lakes, then westward to Rainy Lake, and ultimately into Hudson Bay. Saganaga Lake covers a large portion of this watershed being 19,610 acres (31 sq. mi.) in area of which 7,880 acres occurs in Minnesota. The watershed feeding Saganaga Lake is also quite large, draining 740 square miles of which 205 square miles are in Minnesota.

Saganaga Lake is characterized by many islands with 198 of the total 375 islands being in Minnesota. Saganaga Lake is also the deepest lake in Minnesota, except for Lake Superior, with a maximum depth of 280 feet. The predominantly rocky shoreline is either exposed bedrock or boulder-rubble combinations. Sand and gravel beaches are rare.

The quality of the waters found in Saganaga Lake is indicated in Table 2. Values shown are means and represent Forest Service data collected from 1967 to 1972. Saganaga Lake was sampled in the main lake and Seagull Lake was sampled at the outlet to Seagull River. From inspection of Table 2 it is evident that Saganaga Lake is a very soft-water lake that is presently infertile but may be sensitive to increases in nutrient loading. These waters have characteristics common to oligotrophic waters. It should be noted that Seagull Lake is not of equal quality to Saganaga Lake and therefore some nutrient loading may occur from Seagull to Saganaga through Seagull River.

Table 2: Selected Water Quality Parameters for Saganaga and Seagull Lakes, Cook County

Constituent	Saganaga Lake	Seagull Lake
Conductivity (MMhos/cm)	51.1	52.1
pH	7.02	7.03
Total Hardness (Mg/l $CaCo_3$)	20.0	18.6
Alkalinity (Mg/l $CaCo_3$)	13.1	14.0
Total Nitrogen (Mg/l)	0.352	0.335
Total Phosphate (Mg/l)	0.027	0.035
Total Coliform (No/100 ml)	0.3	4.1
Fecal Coliform (No/100 ml)	0.0	1.0

The proposed water supply for this development is Saganaga Lake. A permit for appropriating these surface waters is required from the Department of Natural Resources under the authority granted in Minnesota Statute Section 105.41.

Impact

The water balance for this tract will be only slightly modified by this project due to the effects of impervious surfaces, vegetation removal and compaction. These impacts are considered relatively minor. Also, withdrawal of water from Saganaga Lake to serve the needs of the proposed action is not expected to have an adverse impact on the water resource.

As indicated in the section on soils, the proposed areas available for on-site sewage disposal are insufficient for the density of development proposed. If such systems are allowed, failure is predicted and improperly treated sewage could reach the high quality waters of Saganaga Lake. There is little doubt that the input of this sewage would reduce the water quality in the immediate vicinity of the source. Deterioration of water quality would continue as long as nutrients were supplied.

The marina is anticipated to cause additional adverse impacts on water quality from gasoline and oil spills and prop wash. These impacts are not considered to be significant for a marina of this size.

5. Vegetation

The dominant vegetative species found on this tract are overmature jack pine, white spruce and aspen ranging in heights up to 70 feet. An understory of black spruce, balsam fir and paper birch is replacing mature trees as they die. Balsam fir reproduction is widely spread on this tract and aspen reproduction is scattered. Generally, this site is of little value for timber production due to shallow soils. Also, windfall is a serious problem on this tract due to wind exposure and shallow

soils. The previous jack pine stand was probably established by fire before the turn of the century and fire exclusion has prevented this species from perpetuating. There are no known rare or especially unique vegetative species on this tract.

Sufficient vegetation to provide for screening is generally inadequate for units 7, 8 and 9, 10. Screening on the remainder of the tract is generally satisfactory since tree heights exceed proposed building heights.

Impact

The vegetation on approximately 15 percent of the tract will be destroyed by the proposed project through the construction of roads and buildings. Additional impacts on vegetation will probably occur through attempts to "brush out" certain areas for view corridors.

Proposed landscaping and planting of abandoned roads will have a beneficial impact on this site by providing screening for units 7 and 8. An adverse aesthetic impact would occur because of insufficient screening for units 7, 8 and 9, 10.

6. Wildlife

This parcel is of little value to wildlife because suitable habitat is either lacking or absent. The understory is sparse and the overstory mature. Also, existing development on the remainder of the peninsula limits species to those that can tolerate man and his related activities.

A list of birds and mammals that may make use of this site is provided in Table 3. Use by each species is highly variable.

This tract also lacks suitable habitat for birds and mammals associated with aquatic environments and is of little value to them. Table 4 lists the birds and mammals that may make limited use of the aquatic environment. One osprey nest is known to be located near an unnamed lake in Section 4, Township 66 North, Range 4 West approximately three and a half miles away.

Other species that may pass through this parcel but to which this tract is of no particular importance include: deer, bear, moose, timber wolf, pine marten, fisher and lynx. This tract is of no value to these species because the habitat is unsuitable and the development is too dense. Almost all species listed are protected except for some of the small mammals and the lynx. None of these species are endangered but a few may not be abundant.

Table 3: Birds and Mammals in the Vicinity of Proposed Saganaga Lodge and Townhouses Associated With the Terrestrial Environment.

Birds

Sharp-shinned Hawk
Spruce Grouse
Spotted Sandpiper
Long-eared Owl
Saw-whet Owl
Great Grey Owl
Arctic Three-toed Woodpecker
Northern Three-toed Woodpecker
Traill's Flycatcher
Olive-sided Flycatcher
Blue Jay
Gray Jay
Boreal Chickadee
Red-breasted Nuthatch
Hermit Thrush
Swainson's Thrush
Golden-crowned Kinglet
Ruby-crowned Kinglet
Tennessee Warbler
Parula Warbler
Magnolia Warbler
Cape May Warbler
Myrtle Warbler
Black-throated Green Warbler
Black-throated Blue Warbler
Black Burnian Warbler
Bay-breasted Warbler
Pine Warbler
Evening Grosbeak
Purple Finch
Pine Grosbeak
Pine Siskin
Red Crossbill
White-winger Crossbill
Fox Sparrow

Mammals

Chipmunk
Red Squirrel
Flying Squirrel
Snowshoe Hare
Woodland Deer Mouse
Red-backed Vole
Bog Lemming
Masked Shrew
Pygmy Shrew
Short-tailed Shrew

Table 4. Birds and Mammals in the Vicinity of Proposed Saganaga Lodge and Townhouses Associated with the Aquatic Environment.

Birds

Eagle
Osprey
Loon
Black Duck
Mallard
Great Blue Heron
Herring Gull

Mammals

Beaver
Otter

Impact

The proposed action would eliminate some of the remaining habitat on this tract but the number of individuals or species affected would be small. Species intolerant to man will probably no longer visit the site; however, this impact is insignificant in that few such species utilize the area now. Also, extensive areas of more suitable habitat exist nearby within the BWCA. This development is not anticipated to have any adverse impacts on regional wildlife populations.

7. Fisheries

One of Minnesota's best known walleye runs occurs adjacent to this tract in the Seagull River creating heavy fishing pressure in the spring. A portion of this river approximately one mile upstream (south) from this tract is closed annually to protect the spawning run. Very little spawning is known to occur in the bay of Saganaga Lake on the east side of the tract.

Test netting has revealed that the following species are found in Saganaga Lake:

Northern Cisco	Northern Pike
Lake Whitefish	Yellow Perch
Lake Trout	Walleye
White Sucker	Smallmouth Bass
Longnose Sucker	Burbot

Test results from 1964 indicate that numbers and weights of cisco, whitefish and walleye are above statewide averages. Cisco and walleye catch rates were especially high. Lake trout were found to be larger than average but fewer in number. Yellow perch were substantially below averages. White suckers, northern pike and smallmouth bass were found to be below both statewide and local medians.

Walleyes were established by stocking in 1934 and these plantings continued until 1946. Lake trout have been stocked almost annually for the past 40 years and are currently the only species being stocked. Commercial fishing was permitted on Saganaga Lake from 1959 to 1964 but only cisco, whitefish, sucker and burbot were allowed to be taken.

Impact

The proposed marina is not anticipated to have a significant impact on fisheries either locally or regionally since walleye spawning is not known to occur in this bay of Saganaga Lake. Also, there is an abundance of more suitable spawning habitat in the Seagull River. The proposed action will probably add to the already intensive spring fishing pressure.

B. HUMAN ENVIRONMENT

1. Socio-Economic

Cook County, in which the proposed action is located, is substantially different from the average Minnesota County. The county population of 3,423 in 1970 was the lowest in the state as was the density of 2.5 persons per square mile. The low population is easily understood by recognizing that 91.9% of the county is in public ownership.

The large public ownership indicates that recreation is important to the economy of Cook County. The 1970 employment by industry shown in Table 5 supports the hypothesis that recreation is the economic base of Cook County as reflected in the service and retail trade industries. As experienced elsewhere, the number of retail establishments is declining while their total sales are increasing.

Table 5: Cook County Employment by Industry, 1970.

Industry	Per Cent of Total
Agriculture, Forestry, Fisheries	5.4
Mining	6.5
Construction	9.8
Manufacturing	7.3
Transportation and Utilities	7.1
Retail and Wholesale Trade	21.0
Services (Finance, Business, Repair, etc.)	32.9
Public Administration	10.0

During the decade of 1960-70, Cook County experienced a net outward migration of 290 persons or about 8.5 percent of the 1970 population. Thus, as expected, projections show a decreasing population over the next 20 years. Arrowhead Regional Development Commission population projections for Cook County from 1970 to 1990 are:

1970	3,423
1975	3,330
1980	3,220
1985	3,120
1990	3,020

Impact

Based upon a projected valuation of 1.5 million dollars for the proposed action, a beneficial impact of an estimated

$26,000 per year in direct taxes would be available for county use. However, it is anticipated that the proposed action will require additional county services, such as police and fire protection, schooling, and possibly a better access road, that may absorb this additional revenue. Added economic benefits would be generated by both direct and indirect spending for goods and services by employees and owners.

2. Land Use

The project site is presently zoned C-1, Commercial Recreation District, as are other resorts and canoe outfitters in the vicinity. This site is included in one of the original 17 Commercial Recreation "spot zones" that were created by the 1971 zoning ordinance along the Gunflint Trail. The purpose of such spot zoning was to prevent extensive resort development while allowing for the expansion of existing recreational facilities. In addition, this tract lies within the shoreland of Saganaga Lake (16-633) which has been classified as Recreational Development by the Department of Natural Resources. Thus, the minimum requirements, as stated in the Cook County Shoreland Ordinance, include:

Lot Area	40,000 sq. feet
Water Frontage	150 feet
Building Setback from Shoreline	100 feet
Soil Absorption Unit Setback from Shoreline	100 feet

This proposed development is also considered to be "cluster development" since it meets the definition of "... a pattern of subdivision development which places housing units into compact groupings while providing a network of commonly owned or dedicated open space".

As a cluster development, Section 4.14 of the Cook County Shoreland Ordinance applies and reads as follows:

> 4.14 Smaller lot sizes may be granted for planned cluster development under the provisions set forth in Section 6.0.
>
> 6.0 Cluster Development
>
> 6.1 Preliminary plans are first approved by the Commissioner of the Department of Natural Resources.
>
> 6.2 Central sewage facilities are installed which meet the standards, rules or regulations of the Minnesota Department of Health and the Pollution Control Agency.
>
> 6.3 Open space is preserved.

6.4 There is not more than one centralized boat Launching facility for each cluster.

6.5 Any attached conditions are met, such as limits on overall density, minimum size of the cluster development, restrictions to residential uses, or minimum length of water frontage.

Thus, as a cluster development, 25 units are proposed where 10.56 units would normally be allowed on this tract under ideal conditions for a typical lot-block subdivision. As shown in Figure 2, six units (1, 11, 14, 15, 16, 23) and the lodge do not meet the minimum setback requirement of 100 feet by relatively short distances. The proposed action will alter approximately 15 percent of the parcel by development of 6.4 percent of the area for structures, 7.7 percent for roads and parking and 0.9 percent for foot paths. The area that will be disturbed in the vicinity of the marina appears excessive (Figure 2). Also, if launching is proposed, then this access to the marina is poorly designed. A loop turnaround is commonly recommended. The shoreline at the marina location was created by past filling that also obliterated much of the original shoreline along the tract and encroached on the open waters of Saganaga Lake and Seagull River.

At present, there has been no preliminary approval by Cook County and therefore plans have not been submitted to the Department of Natural Resources. Agencies that have regulatory powers regarding the proposed action include: Cook County, Minnesota Department of Health, and the Minnesota Department of Natural Resources.

The existing development on the entire 204 acre peninsula consists of 27 cabins plus seven resorts of which six are outfitters. An additional five resorts and/or outfitters can be found within one-half mile of the peninsula. The outfitters on the peninsula are estimated to have approximately 130 canoes available for rental.

Impact

The proposed action will almost double the density of development that presently is found on the entire peninsula. Proposed setbacks are inconsistent with both county and state standards. Also, the rental option will result in more people on the site since normally vacant periods would be filled.

3. Transportation

The 55 mile long Gunflint Trail terminates near the site of the proposed action. This road is paved to within seven miles of the end of the trail and construction to upgrade the remainder is presently underway. Traffic counts 15 miles up the Gunflint Trail from Grand Marais in 1974 showed from 100

to over 600 vehicles per day with 500 to 600 vehicles per day occurring during July and August. Over 70 percent of these vehicles reach the end of the trail.

There is one access road that serves the entire peninsula and it is anticipated that an additional 45 to 50 vehicles will be using this road as a result of the proposed action. This gravel road is narrow and contains a number of steep hills and small-radius curves. The parking lot at the county landing on Saganaga Lake often overflows onto this access road during peak periods creating a traffic hazard.

Impact

The existing road presently serves approximately 50 vehicles for existing development and approximately 40 vehicles for the county landing; therefore, the proposed action would increase traffic on the access road by about one-third. Instances of vehicles meeting on hills and curves would be more frequent. The added residents, patrons and associated traffic would probably lead to pressures for a new road alignment resulting in numerous environmental impacts.

4. BWCA Use

As shown in Figure 1, the site of the proposed action lies within the BWCA boundary created by the Wilderness Act of 1964. To understand the significance of this location, a brief history of the BWCA is presented.

a. History

White man's exploration of the area began with the arrival of Pierre Raddisson and Sieur des Grosseillees in 1660. The era of the "Voyageur" or fur trader began about 1731. Prospectors and settlers frequented the region during the "Vermilion Gold Rush" of 1865-66 and evidence of this activity can be found on nearby Gold Island where a shaft was sunk into white quartz in search of gold and silver. Logging of the big pine began in 1893 and rapidly proceeded until the depression of the 1930's. Initial interest for preserving this area developed when logging began. Public involvement led to President Theodore Roosevelt designating the area as the Superior National Forest in 1909.

Following World War I, an influx of recreational visitors resulted in the creation of a primitive area within the Superior National Forest in 1926. Also, in 1930, Congress passed the Shipstead-Newton-Nolan Act that restricted logging and controlled water levels and development. Later in 1938, the Superior Roadless Primitive Area was established with boundaries similar to the present BWCA.

After World War II, recreational use grew at an increasing rate. These pressures resulted in the Thye-Blatnik Act of 1948,

amended in 1956 and 1961, which allowed for the acquisition of lands by purchase or condemnation. Later, in 1948, this unique area was designated as the Superior Roadless Area. The present title of Boundary Waters Canoe Area was adopted in 1958.

Originally it was not intended that the proposed site should be within the BWCA. As stated in the 1972 Superior National Forest Land Adjustment Plan which reads as follows:

> This tract is a point of land lying between the Sea Gull River and the south bay of Saganaga Lake. The Boundary Waters Canoe Area lines run along the south side of Lot 5. There are cabins immediately to the south of Lot 5 facing on Saganaga Lake. The Forest Service feels the development of Lot 5 would be no more detrimental to the Boundary Waters Canoe Area than the improvements adjoining the tract just outside the area. Revision of boundary to exclude Lot 5 from Boundary Waters Canoe Area was recommended to the Quetico-Superior Committee by letter of November 14, 1958. The proposed revision of the Boundary Waters Canoe Area was approved by the committee.

However, the revision of the boundary never did occur and thus, this tract is still within the BWCA. Recently, the Forest Service has stated that the Land Adjustment Plan position assumed that the property would be developed for single family cabins.

b. Recreational Use

The Forest Service administrative travel zone, in which Saganaga Lake is located, is one of the most heavily used zones in the BWCA. In 1972, this zone received the highest use in total visitor days. Saganaga Lake is a popular starting point for canoe trips because it is located near the end of the Gunflint Trail.

There are two direct public accesses to Saganaga Lake. One is the county boat landing approximately three-quarters of a mile south of the proposed development. This access can readily accommodate large boats as well as canoes and has a 40 car capacity parking lot. The second direct access is the Forest Service landing at Trails End Campground that is designed more for canoes than for large boats and has a 60 car capacity parking lot. Indirect access occurs from the Seagull River and other border lakes.

Recently, there has been a steady increase in the recreational use of Saganaga Lake. Table 6 represents the magnitude of this use for the past five years together with its percentage of total BWCA use. From inspection of Table 6, it is evident

Table 6: The Number of Visits to Saganaga Lake and its Percent of Total BWCA Visits from 1969 to 1973.[1]

Year	Saganaga Visits[2]	% of Total
1969	7,510	6.6
1970	8,653	6.8
1971	11,033	7.8
1972	15,113	9.3
1973	17,164	10.2

that the number of visits has more than doubled within the past five years and use of this area is comprising an increasing percentage of the total BWCA use.

It is also interesting to examine the mode of travel for these large numbers of visitors as an indicator of watercraft traffic in the vicinity of the proposed action. Table 7 illustrates the mode of travel for groups entering the BWCA at Saganaga Lake in 1972. Use by motor boats is quite high. This is attributable in part to the large size of Saganaga Lake and also to the relative location of this lake which is mainly "traveled through" rather than "traveled on".

Table 7: Mode of Travel for Groups Entering the BWCA at Saganaga Lake and for the Total BWCA, 1972.

	Saganaga Lake		BWCA
Mode of Travel	Number	Percent	Percent
Paddel Canoe	1,294	34.4	47.5
Motor Canoe	285	7.6	10.8
Motor Boat	2,016	53.6	31.5
Snowmobile	128	3.4	6.6
Hiking	10	0.3	2.7
Other[3]	25	0.7	0.9
TOTAL	3,758	100.0	100.0

[1] Use data for 1974 is not yet available.

[2] Visits - means an individual who leaves his home to visit the BWCA.

[3] Includes horseback riding, rowboating, rafting, sailboating, snowshoeing, and cross-country skiing.

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Results of a 1971 Forest Service study indicate that while passing through Saganaga Lake, a traveler can expect to encounter three to five parties per hour, or 24 to 40 parties in an eight hour day. These frequent encounters have produced some dissatisfaction. In other research, over 50 percent of paddle canoeists indicated that they were dissatisfied with encountering other parties on Saganaga Lake. Only 10 to 20 percent of motor users indicated such dissatisfaction.

The high recreational use on Saganaga Lake occurs for a number of reasons. Nearby Canadian Customs Station, located in the main portion of Saganaga Lake, concentrates traffic from the south bay of the lake. This traffic passes by the proposed site on the way to Customs. Over 44% of those entering Saganaga Lake pass on to Canada reflecting in part, the number of people who have cabins on the Canadian side of Saganaga Lake. Presently, there are two resorts and approximately 40 cabins in Canada that require access across Saganaga Lake. Nearby Trails End Campground contains 30 units which averages 67 percent occupancy from mid-May to Labor Day. Also, the existing development on the peninsula, consisting of 27 cabins and seven resorts, contributes to recreational use on Saganaga Lake. Finally, most other outfitters on the Gunflint Trail and in Grand Marais send parties through Saganaga Lake.

c. Capacity

This travel zone has not yet reached its capacity in overnight use. Only 36 percent of available campsites were occupied in 1972; however, occupancy increased to 50 percent in 1973. Day use is significant on Saganaga Lake with 53.1 percent of the users being day users compared to 43.8 percent for the entire BWCA.

Presently there are 76 developed campsites and an additional 56 user sites on Saganaga Lake. Due to past site deterioration, 23 campsites have been permanently closed. According to the 1974 Forest Service Capacity Study for this travel zone, the aesthetic capacity has been determined to be 95 campsites and the physical capacity is 135 sites. The aesthetic capacity reflects the number of people that can be accommodated without sacrificing a wilderness experience and is based on such factors as line of sight and noise. The physical capacity reflects the number of people that a lake can accommodate as determined by physical characteristics including: the suitability of shoreline, vegetation type, soils type, water quality and the suitability for pit toilets. The Forest Service has indicated that the most serious campsite problem occurs regularly along the channel, adjacent to the proposed action, from the county boat landing to the main lake. All sites are occupied during the opening of walleye fishing season and during adverse winds.

Since the proposed action is located within the BWCA, it

is useful to know if users would object to the presence of townhouses. A 1970 interview study conducted on high use lakes, including Saganaga Lake, discovered that 81 percent of the outfitters and 86.1 percent of the campers oppose resorts and homes in the BWCA. The proposer has estimated that 50 percent of the users of the proposed action will be on Saganaga Lake at any one time during the summer season. This amounts to approximately 28 people per day.

Impact

The proposed development of townhouses, dormitories and lodge is totally incompatible with U. S. Forest Service management goals and objectives for providing a primitive recreational experience in the BWCA. The management theme that has dominated since the Forest Service became the custodian of the BWCA is reported in the 1974 Boundary Waters Canoe Area Management Plan and Environmental Statement which reads as follows:

> Preserve and perpetuate the primitive character of the area, particularly the lands with unique water-related characteristics in the vicinity of lakes, streams, portages and trails.

Any development on this tract of land that generates more use of the already crowded Saganaga Lake is counter to this objective and would result in a deterioration of the quality of wilderness attached to Saganaga Lake and adjoining portions of the BWCA.

The present condition of the proposed site is essentially undeveloped. Therefore, the marina, dwellings and lodge and the resulting concentration of people will have an adverse aesthetic impact on BWCA visitors that are traveling adjacent waters. This impact is especially evident since an incoming BWCA visitor encounters a sign indicating that he is entering the BWCA prior to his passing the proposed site. There is little doubt that the proposed densities will increase day use on Saganaga Lake and therefore increase crowding and dissatisfaction, ultimately reducing the value of the wilderness experience. It is doubtful that the proposed action would add to the campsite problem along the channel, since these sites are so close to the proposed development. Actually, townhouse owners will probably object to the heavy use of nearby campsites.

5. Noise

Some blasting of rock is proposed during the construction of the lodge. General on-site noises from boats and automobiles would modify the relatively quiet environment.

Impact

The blasting of rock during construction would have an adverse aesthetic impact on users of the BWCA. This impact would be relatively short-term. Noises associated with the general use of the proposed site would also have an adverse impact on users of the BWCA. Such noises would not be as disruptive as blasting but would continue as long as the proposed development exists.

III. UNAVOIDABLE EFFECTS AND THEIR MITIGATION

A. NATURAL ENVIRONMENT

1. Soils

As indicated in the previous soils section, the area required for sewage disposal exceeds the amount of available area proposed by the developer. Overloading the soil will ultimately result in failure and improperly treated sewage can be expected to reach surface waters in the vicinity of the proposed action.

To fully understand this impact, Table 8 is provided which shows the number of townhouse units the site can support based upon the proposed available area for sewage disposal. It should be re-emphasized that these values are subject to change as available areas are field checked and more detailed percolation test data becomes available. Table 9 summarizes the number of excess units for each drain field based upon values proposed by the developer and values from Department of Health standards. Note that the proposer was credited with 2.32 units for drainfield No. 1 because the area required for sewage disposal was less than the area available. Also, Table 9 indicates that in order to meet Health Department Standards, the elimination of over 12 townhouse units will be required. The density of this development will have to be reduced to the point where the drainfield can adequately function with minimal chance of failure. Overloading the available soil capacity would result in adverse impacts of deteriorated water quality, inoperative plumbing facilities, noxious orders, and potential public health hazards.

2. Hydrology

As indicated in the previous section, the available area for sewage disposal is insufficient for the density of development proposed. Failure of these systems would result in water quality degradation and would jeopordize the public health, safety and welfare. These potential impacts on water quality can be mitigated by reducing the density of development to levels compatible with the resource.

3. Vegetation

The proposed action will eliminate the vegetation on

Table 8: Calculation of Excess Townhouse Units Based Upon Available Sewage Disposal Area.

DRAIN FIELD NO. 1

Characteristic	Proposer	Health Standards
Lawn area required	5325 sq. ft.	7252 sq. ft.
Area available	6208 sq. ft.	6208 sq. ft.
Difference	883 sq. ft.	1044 sq. ft.
Length of 3 ft. wide trench	127.7 ft.	147.8 ft.
Absorption area (x 3 ft.)	383.1 sq. ft.	443.5 sq. ft.
Total gallons (÷ 1.1)	348.3	403.2
Total persons (÷ 50)	6.97	8.06
Units	-2.32	2.02

DRAIN FIELD NO. 2

Characteristic	Proposer	Health Standards
Lawn area required	2850 sq. ft.	3952 sq. ft.
Area available	2848 sq. ft.	2848 sq. ft.
Difference	2 sq. ft.	1104 sq. ft.
Length of 3 ft. wide trench		164.0 ft.
Absorption area (x 3 ft.)		491.9 sq. ft.
Total gallons (÷ 1.1)		447.2
Total persons (÷ 50)		8.94
Units	0	2.24

DRAIN FIELD NO. 3

Characteristic	Proposer	Health Standards
Lawn area required	4706 sq. ft.	7277 sq. ft.
Area available	3056 sq. ft.	3056 sq. ft.
Difference	1650 sq. ft.	4221 sq. ft.
Length of 3 ft. wide trench	241 ft.	597.6 ft.
Absorption area (x 3 ft.)	723.1 sq. ft.	1792.9 sq. ft.
Total gallons (÷ 1.1)	657.4	1629.9
Total persons (÷ 50)	13.15	32.60
Units	4.38	8.15
or Dorm employees	26.30	32.60
or Lodge customers	65.74	135.8

Table 9: Summary of the Number of Excess Townhouse Units Proposed Based Upon Available Sewage Disposal Areas.

Drainfield	Number of Excess Units	
	Proposer	Health Standards
No. 1	-2.32	2.02
No. 2	0	2.24
No. 3	4.38	8.15
TOTAL	2.06	12.41

approximately 15 percent of the proposed site by the construction of roads and buildings. Additional vegetation removal will probably occur through attempts to clear areas for view corridors. To mitigate the overall impact on vegetation, a restriction could be added to the property owners association document that would prohibit clear cutting on the entire tract and limit vegetation removal in the 100 foot setback distance to dead and diseased trees.

B. HUMAN ENVIRONMENT

1. Land Use

The impact of nearly doubling the existing development density on the peninsula can only be mitigated by reducing proposed densities. The aesthetic impact of insufficient setback distances for the six townhouses and the lodge can best be rectified by requiring all structures to meet the minimum setbacks.

2. Transportation

The proposed action is expected to increase traffic on the access road to the site by approximately one-third. This impact can be mitigated by reducing densities or by upgrading the existing access road. However, a new road alignment will create additional environmental impacts on the land resource and reduce the quality of the wilderness experience.

3. BWCA Use

This project as proposed would result in unavoidable adverse impacts on the BWCA. The quality of wilderness would be reduced both by increases in physical use and by adverse impacts on aesthetics.

The adverse aesthetic impact on the BWCA created by the structures and marina can be mitigated by assuring proper vegetative screening and by reducing the proposed density. As

previously stated, screening is insufficient for units 7, 8 and 9, 10. Since additional screening is planned for units 7, 8 the overall aesthetic impact can be reduced by providing adequate screening for units 9, 10. To mitigate the adverse impact of increased use of the BWCA, townhouse densities could be reduced. Proposed densities are in excess of what would normally be allowed and, as previously discussed, are in excess of the capability of the land resource. Since the Forest Service predicts that the normal lot-block development of this tract would not be any more detrimental to the BWCA than existing development on the peninsula, the overall impact of the proposed action could be mitigated by only allowing a density of approximately 10.56 townhouse units. This density would meet state and county minimum standards.

4. Noise

To mitigate the adverse impact of noise from blasting of rock, the period when blasting would be permitted could be regulated. For example, no blasting should take place from Memorial Day to Labor Day which is the normal high use season. The overall impact of general on-site noises could be buffered by providing proper vegetative screening. Also, noise levels would decrease with a decreased townhouse density.

IV. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The site of the proposed action will change from a relatively undeveloped environment to that of a highly developed residential environment. This commitment is largely felt as a change in the pattern of land use rather than a depletion of non-renewable resources. It is probable that this change in land use is irreversible but other resources damaged may be renewable. Additionally the quality of the BWCA, viewed as a unique Minnesota resource, would be irreversibly reduced.

V. RELATIONSHIP BETWEEN LOCAL SHORT TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

The impact of vegetation removal will occur immediately rather than as a gradual encroachment that would occur with alternative types of development. However, this impact would be less severe for the proposal action in the long run. Because there are insufficient areas for on-site sewage disposal, risks to water quality and to the public health, safety, and welfare are expected if proposed densities are allowed. The pressures of increased traffic on the peninsula will probably result in a significant alteration of the existing access road. The potential road realignment would create additional environmental impacts. The proposed action would stimulate the economy of county both directly and indirectly as monies received will be further spent.

The dominant management theme for the BWCA is preserving and perpetuating water and related land resources. The proposed action would misuse these land and water resources resulting in reduced wilderness quality for the BWCA.

The success of the proposed action will probably stimulate similar proposals elsewhere in Cook County and the State of Minnesota. An increased number of similar proposals could only be beneficial to both the economy and the environment if plans are harmonious with the land and water resource capabilities.

VI. ALTERNATIVES TO THE PROPOSED ACTION

A. ALTERNATIVES

The description and environmental impact of the following six alternatives will be discussed individually:

1. Canoe Outfitting
2. Campground Development
3. Youth Camp
4. Single Resort Units
5. Lot-block Subdivision
6. No Action

1. Canoe Outfitters

For this alternative, the developer has indicated that the property would be split in half and two businesses would be started and later offered for sale. This alternative could result in a greater impact on the BWCA and the land resource depending upon the intensity and diversification of development. The proposed action would result in immediate changes whereas this alternative could result in a gradual encroachment with unknown consequences. Compared to the proposed action, there are few controls on this alternative that can regulate vegetative removal, number of structures and other alterations. The economic benefits of this alternative would probably be less because of seasonal use. This alternative does not seem practical since twelve other resorts and outfitters are located nearby.

2. Campground Development

This site is not ideally suited for the typical auto-campground since steep topography would be a limiting characteristic. Forest Service research has shown that 77 percent of campers using auto-campgrounds prefer to be near the waterfront and of this amount, 91 percent desire to be close to water because of the view. Thus, user wants would dictate that the shoreline would be extensively developed. A campground would also probably create a larger impact on vehicle traffic than the proposed action. The overall impact of a campground would vary with the density proposed and the willingness of the owner

to promote wise conservation measures. Similar to the canoe outfitting alternative, there are fewer controls on density and vegetative removal for a campground. The beneficial impact on the economy would also be less than the proposed action because of seasonal use, even though a substantial demand for campground sites probably exists.

3. Youth Camp

This alternative would be similar to a combination resort-outfitting business. Large groups would be utilizing the BWCA and large numbers of persons would be found on the site. Many buildings are often required for youth camps. Vegetative and density controls for this alternative are similar to resorts and are less restrictive than for the proposed action. The overall adverse impact from this alternative would probably be greater than for the proposed action. Economic benefits would be substantially less than those resulting from the proposed development.

4. Single Resort Units

This alternative would be similar to the proposed action except that units would be located individually rather than in clusters. The units would not be sold and thus the county cluster development controls would not apply. With a resort, open spaces would not be preserved, sewage would not be centralized, and docking facilities would be scattered. It is anticipated that this alternative would have the greatest adverse impact on the land resource.

5. Lot-block Subdivision

This alternative is surprisingly similar to a resort in terms of environmental impact. Approximately 10 clearings, 10 driveways, 10 sewage disposal fields, 10 structures, and 10 docks would be possible with this alternative. A problem with sewage disposal has already been isolated and would be compounded by attempting to find 10 separate suitable areas for sewage disposal. The cluster development concept provides for more protection, assuming that proposed densities are compatible with the land and water resources, in that vegetation removal is limited to building sites, driveways are combined, sewage disposal is centralized and multiple user docks are required. If developed to the maximum potential, this alternative would significantly alter the existing character of this tract of land with greater impacts on the land resource.

6. No Action

This alternative would reduce all adverse environmental impacts but would also eliminate any beneficial economic impacts. Unless purchased for wilderness use, the development of this tract is imminent.

B. MODIFICATION OF PROPOSED ACTION

The following modifications are presented to reduce unavoidable adverse environmental impacts:

1. Based upon calculations shown in Table 8, at least 12.4 units should be removed from the proposal of 25 units so that impairment of the public health does not occur by probable deterioration of water quality. This modification will also reduce adverse impacts on vegetation, land use, vehicle traffic and BWCA use both physically and aesthetically. This modification will also reduce the potential economic return to investors and the county. The marina and lodge capacities should be adjusted accordingly.

2. Vegetative cutting provisions should be included in the property owner's association document that would prevent clear cutting in all open space areas and limit vegetation removal within the setback distance to dead and diseased trees. Also, vegetative screening should be added for units 9 and 10. This modification will preserve open space and prevent adverse impacts on aesthetics and vegetation. Also, anticipated noise levels should be minimized by retaining existing vegetation.

3. Blasting of rock should not occur during the period of Memorial Day to Labor Day. This reduces the adverse impact of noise on BWCA users. This would modify but not unduly restrict the proposer's development schedule.

4. All structures should meet the required minimum setbacks. This includes units 1, 11, 14, 15, 16, 23 and the lodge. This modification should not affect the objective of the proposed action in any way.

5. The road access to the marina should be redesigned to reduce the area disturbed. A turn-around loop is recommended.

VII. THE IMPACT ON STATE GOVERNMENT OF ANY FEDERAL CONTROLS ASSOCIATED WITH THE PROPOSED ACTION

No Federal agencies have any regulatory powers concerning the proposed action except the joint state-federal airspace reservation over the BWCA of 4,000 feet above sea level.

VIII. THE MULTI-STATE RESPONSIBILITIES ASSOCIATED WITH THE PROPOSED ACTION

Minnesota is the only state that has responsibility associated with the proposed action. However, Saganaga Lake is a boundary water to Canada and common interests exist. The added recreational use impacts apply not only to the BWCA but also to the nearby Quetico Provincial Park.

IX. ORGANIZATIONS AND PERSONS CONSULTED

Federal

1. U. S. Forest Service
   Superior National Forest
2. U. S. Forest Service
   North Central Forest Experiment Station
3. U. S. Department of Agriculture
   Soil Conservation Service

State

1. Pollution Control Agency
2. Department of Health

Local

1. Arrowhead Regional Development Commission
2. Cook County Zoning Office

Other Individuals

1. Bruce Kerfoot
   Farmaker, Inc.
2. Close Associates, Inc.
   Consulting Architects

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