# MARTEN FALLS INDIAN RESERVE PROPOSED DEVELOPMENT PLAN

# INDIAN AND NORTHERN AFFAIRS CANADA


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# MARTEN FALLS INDIAN RESERVE

# PROPOSED DEVELOPMENT PLAN

## 1. INTRODUCTION

The Marten Falls Reserve is located on the Albany River at its confluence with the Ogoki approximately 140 miles north of Geraldton. The present community is comprised of about 30 dwellings, strung along the shore of the river. Past development has not been carried out in any kind of planned way; consequently, the houses are in a single line facing the single street of the community and the river on the other side. At present the only central services in the town serve the infrastructure constructed by the Department of Indian Affairs, that is, the school, the Band office, the community hall, the teacher's house and the dwelling used by itinerant government employees. Electricity is available to these few buildings from a small generating plant which normally operates, at least in the winter, at full output. The airstrip servicing the community was constructed in 1979 by the Provincial Ministry of Transportation and Communication to handle light aircraft.

In the course of the 1980's a number of major development projects are planned in the town. They include electrification of the town, the construction of a domestic water system, sewer services, a new school, road construction, at least 19 new houses, a new Band office, a new community hall, renovations to the Band's

warehouse. In addition, the Band proposes to acquire a new truck, to build a new store, to renovate the police cell, to renovate a number of existing houses, and to implement a number of other projects designed to improve the quality of the community.

These activities follow on the heels of several major construction projects that resulted, among other things, in a new airstrip, the opening up of a townsite to the east of the existing townsite, and the construction of a significant number of new houses on the new townsite. They indicate that the town has started a major development program that will lead to important improvements in life on the Reserve.

To assist the Band in making these improvements, and in making sure they will benefit all members of the Band to the highest degree possible, it is necessary to prepare a town plan. The first objective of such a plan is that it assists the Band in making effective use of the land available for the new townsite. A 1971 study of the terrain in the area surrounding the town[1] indicates that only a limited amount of land is suitable for permanent development. The area involved is large enough to accommodate all residents that live in the community today and, if laid out well, it can also accommodate future population growth. Although increases in population have been limited in recent years, it is possible that the many improvements planned for implementation in the near future will stimulate further growth, and the need to construct additional housing units.

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(1) Terrain Evaluation of the Community and Surrounding Area for Marten Falls No. 65 Indian Reserve (Ogoki)
Bird & Hale Report, June 1971

A second important objective of a town plan is to identify the location of the town centre with its many services and facilities (Band office, community hall, store, school, clinic, etc.), the location for the fuel (gasoline and propane) storage, garage and warehouses, and other industrial uses, and the location of areas for residential development.

A third objective is to identify the location for water and sewer services required to serve all buildings in the new townsite. The high costs involved in the construction of these services makes it essential that agreement on a proposed town plan is reached before any construction work can begin. Once the services are in the ground, they will determine the direction of future development in the town for many years to come.

A fourth objective of a town plan is to help create a community that is attractive to the poeple who live in it, that provides easy access to the town centre and its services and limits walking distances to the school, the clinic, the Band office, the store and other facilities and that provides a choice in areas where housing may be built. As the town centre will also be the place where the fire protection and related emergency services will be located, it is essential that all parts of the townsite be readily accessible from the centre.

These objectives are taken into account in the proposed plan for the town presented in this report. The first section of the report provides a brief description of the site chosen for the

town. It is followed by a review of the town's development history, its economic base and its prospects for further growth, the proposed plan, with suggestions for its implementation and site servicing.

In the course of the preparation of this plan, the consultants visited Ogoki and surveyed the town, met with the Chief and the Band council, and obtained information from the District Superintendent of Local Government and the District Planner of the Nakina District of the Department of Indian Affairs and Northern Development.

## II. SITE DESCRIPTION

The engineering study conducted by Bird and Hale in 1971 identified an elevated area of approximately 30 acres east of the existing townsite as suitable for a new townsite for the Marten Falls Indian Reserve. The terrain conditions in this area are well suited for development. The soils are well drained and have a high bearing capacity. The water table is at least five feet below the surface in most of this area. The study emphasized that maintenance of the protective vegetation on the site is important in preventing wind erosion problems. Also, the availability of protective vegetation was seen as important in reducing wind chill and heating costs.

The suitability of this elevated 30 acre site for townsite development is in sharp contrast to the lower surrounding lands. The most serious problems of these lower lands, including those in the existing townsite, are high water tables and poor internal drainage which makes the area unsuitable for any form of permanent development. Within the boundaries of the Reserve only one area suitable for a new townsite (along the Albany River) could be located.

The site itself is an elongated east-west ridge about 4,000 feet long and about 900 feet wide at its widest point. The north-western part of the ridge narrows rapidly and requires careful subdivision if it is to be used for townsite development. The central and eastern parts of the ridge are already partially developed on the basis of an existing plan of subdivision (Figure 1).

A total of 21 houses and a warehouse have been built in this area in recent years. A telephone transmission station has also been built here.

The soils are stratified in horizontal layers of six inches to two feet in thickness, ranging from clays to coarse sands. Water wells may be drilled in this area to a point below a dense clay layer, and three feet below the lowest annual level reached by the river, thus providing protection from infiltration by surface contaminants.

With these considerations in mind, well designed septic tile beds will perform without problems in all areas of the proposed new townsite. The tile beds will have sufficient subsurface retention time and the impervious clay layers will prevent contamination of the water supply. This ability of the soils to handle septic tile beds will permit individual housing lots to be reduced to 10,000 square feet per dwelling, if this is necessary.

Such favourable soil conditions will permit efficient use of the site for townsite development with or without piped services. They also permit the flexibility to phase in water and sewer services through various stages of development of the town. This means that, upon approval of the town plan, construction of the school and other buildings and houses may proceed without delay on the basis of tanks and septic tile beds. All buildings may be hooked up to a piped water system as it is installed.

The Bird and Hale study also advises that well graded, clean gravel is available in abundant supply within a hauling distance of one mile of the new townsite. These deposits, located in the vicinity of the new airstrip, will be of great value in the construction of roads and buildings on the new site.

## III. RECENT DEVELOPMENT AND ECONOMIC PROSPECTS

The Marten Falls Indian Reserve, more commonly known as Ogoki Post, is located approximately 150 miles north of Geraldton on the northern bank of the Albany River at the confluence with the Ogoki River. Until recently the community was accessible only by light chartered aircraft during the winter and summer. The recently completed airstrip now provides, theoretically, year round access by air but many of the pilots in the area are reluctant to use it, particularly in the spring during break-up. It is reported that the runway is poorly graded and bumpy with inadequate drainage. In addition, most of the aircraft are equipped with floats and skis, rather than wheels, which permit them to operate from the lakes and rivers throughout the region.

The Reserve occupies an area of approximately 19,000 acres of which only 500 acres, stretched over approximately two miles along the river bank, is used by the community as a town site. Ogoki's population averages close to 150 people; however, the size of the population varies and is lowest during the trapping season.

In recent years, Ogoki has entered an important phase in its development. Partial construction of the airstrip was the first of a number of major construction projects designed to improve living conditions for the people. Several important projects are now in the planning stages and will be implemented in the next few years. Most important among these is the relocation of the community to a new townsite located immediately to the east of the existing townsite.

This relocation is desirable for a number of reasons. Much of the town is now located on poorly drained soils with high water tables. These soils are not suitable for any form of permanent settlement and create undesirable living conditions during the spring breakup and during periods of wet weather. The soils are not well suited to the operation of septic tile beds and make it difficult to install piped services. The distances between the buildings and houses make their provision prohibitively expensive.

Since the results of the Bird and Hale terrain evaluation study have been available, the Band, in cooperation with the Nakina District Office of the Department of Indian Affairs and Northern Development, have prepared a development plan (Figure 1) for the new townsite and have started the implementation of a community relocation program by locating all new construction in this area. By early 1980 a total of 21 new houses had been built on the new site but by 1981 this had been reduced to 19. A further 19 new houses are planned to be built here in the near future. The Band has also built its new warehouse in the new townsite and proposes to build a new school, a new community hall, and a new Band office. A new Band store is also planned for this site and ultimately the entire community with its central buildings and services will be located in this area.

The funds for these important changes will be provided through the Band's capital allocation plus applicable subsidies. The result will be the creation of a modern, well serviced community

that will not only house the Reserve's entire population but will also provide space for any future expansion when required.

The Reserve's population has remained virtually stable during the last ten years. The 1969 study by Resources Management Consultants[2] estimated that Ogoki's population fluctuated between a high of 200 during the summer and a low of 30 during the winter. The Nakina District Office estimates that the community's current population numbers approximately 150. Although the majority of the people in Ogoki are still involved in trapping, a greater proportion of the residents now live in the town on a year-round basis.

The reasons for this are primarily economic. Trapping is still an important source of income for many of the residents. However, its economic significance has tended to decline in recent years and the decline has not been balanced by the creation of a significant number of alternative employment opportunities on the Reserve. As a result, it is difficult to find work either on or off the Reserve, which is an important reason for the lack of population growth as people search for jobs in other areas of the province.

The Reserve now provides between 15 and 20 full-time jobs and a number of part-time jobs. The full-time jobs include those provided by the Band, the airport, the school, and the clinic. The part-time jobs, in addition to hunting, fishing and trapping activities, include guiding, firefighting, tree planting, airport work, sawmill work and various construction activities. The

majority of these full-time and part-time jobs are filled by members of the Band.

The Reserve is visited regularly by a health inspector, by nurses, a doctor, a dentist and by staff from the Nakina District Office of the Department. These are essentially "roving" jobs and are important in supporting some of the full-time jobs.

Little change has taken place in the employment picture during the last ten years. The snow shoe manufacturing plans, considered in the early 1970's, have not materialized. Based on discussions with Chief Moonias and other officers of the Band, it now appears unlikely that it will pursue this venture any further and snow shoe making is likely to remain a craft for which Ogoki is well known. Other craft activities are limited and little of the production is actually sold (through the Ontario Native Crafts Council).

The Band has been experimenting with the raising of livestcck and is considering expanding this program (goats, rabbits). It is also interested in encouraging the growing of vegetables in the town. These activities, if successful, will provide some employment and will reduce the community's dependence on supplies brought in from the outside. Guiding was also identified as an activity with significant future (summer) employment potential. One of the members of the Band has established a successful hunting and fishing camp and employs Ogoki people as guides.

Data on the income earned per household in the community is not readily available. The Ministry of Natural Resources estimates

that a total of $154,000 was earned by trappers from Ogoki during 1979-80. The income flowing into the community from family assistance programs is estimated at $216,000. Income earned from the various full-time and part-time jobs and the sale of snow shoes is estimated, conservatively, to be in the $250,000-280,000 range. These figures would indicate that annual community income would be approximately $620,000-650,000 or an average of approximately $16,000 per household (1980).

The outlook for the 1980's is that this average household income may increase somewhat, primarily as a result of the projected earnings in various construction activities.

A substantial number of jobs is expected to be provided in the next few years in various construction activities. The Band proposes to construct 19 new houses on the new townsite in the near future. This will bring the total number of houses on the new townsite to 38. The 19 new dwelling units will take care of existing demand for new houses, and of new family formation (at an average rate of three new families per year). It will lead to the investment of more than $500,000* over the next five years in house construction alone.

It is expected that, when these 19 new units are completed, as many as 20 to 25 units will still remain in various locations on the existing townsite. If the majority of the families in these houses are relocated in the course of the next five to ten years,

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*1980 Capital Plan

the new townsite may need to accommodate as many as 60 to 65 dwelling units by 1990 to house the existing population.

The electrification project, scheduled to get underway during 1982, will lead to an investment in the community of approximately $733,000* by the time it is completed. A construction period of three years is envisaged. The construction of a domestic water system is also expected to require approximately three years to complete at an estimated cost of $700,000.

A budget of $39,000* has been set aside over the next five years for renovations to existing dwelling units (involving 24 major renovations). A budget of $269,000* has been allocated for the construction of new roads over the next five years. This amount will cover the building of an access road to the airport and completion of the roadways in the new townsite. The Band proposes to use its tractor and crawler in this work (when this equipment is available) and may also use the new truck scheduled for purchase in the course of the 1981-82 budget year.

An important project now in the planning stages is the construction of a new school on the new townsite. The school will have a gymnasium attached to it and will be designed to serve both the educational and recreational needs of the community. The total capital costs for this new building are estimated at $665,000.*

A new Band office will also be constructed on the new townsite at an estimated capital cost of $38,000.* A new community hall at a capital cost of $100,000* is planned for the 1984-85 fiscal year, also to be built on the new townsite. Approximately $9,000*

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* 1981 Capital Plan

will be spent during the 1981-82 fiscal year for renovations on the existing community hall so that it can continue to serve until the new hall is completed. Similarly, the existing school, the police cell and the warehouse will be renovated at a total capital cost of $85,000.*

These various projects will lead to a total investment of $3.14 million in new construction over the next few years. Almost all of this will take place on the new townsite and is expected to create a substantial number of jobs. This employment, in addition to the existing full-time and part-time jobs, may be expected to reduce the needs for Ogoki's people to look elsewhere in the province for employment for a number of years to come which in turn should lead to renewed population growth in the community.

Planning for the new townsite must consider each of these projects as well as the likelihood of new population growth for at least a decade. Space for at least 65 dwelling units must be created on the new townsite and room for an additional 15 to 20 housing units provided to accommodate growth in the population.

The following table summarizes the estimated housing requirements, in addition to the existing 19 units in the new townsite, for the next 20 years.

| Timing | Quantity |
|---|---|
| 1981-1986 | 20 (1) |
| 1986-1990 | 25 (2) |
| 1990-2000 | 20 (3) |

(1) To satisfy existing requirements

(2) Relocation of families living in old townsite

(3) To accommodate future population growth

*1981 Capital Plan

## IV. PROPOSED DEVELOPMENT PLAN

### Description of the Plan

The proposed development plan is presented on Figure No. 2. It is based on the plan prepared by the Department of Indian Affairs and Northern Development several years ago (Figure No. 1) but has been modified somewhat to provide a larger number of housing lots and to accommodate those which have already been constructed.

Due to the need to make efficient use of the limited land available for the development of the town, it will be necessary to change the road system of the existing plan. A further reason for this recommended change is the long cul-de-sac (900 feet) on the existing plan. When the area along this cul-de-sac is fully built up with houses, the single road will not provide the flexibility in access required in cases of emergency nor does it facilitate efficient servicing of the development.

The proposed road system creates the maximum number of building lots possible on the available land. It provides flexible and safe access to all locations in the townsite and supports the creation of a town centre or core. The roads will also form the corridors along which the piped water system will eventually be located and may also provide the right-of-way for the electric power lines.

The core of the new town will consist of a number of important public buildings that must be highly accessible, including the school, the Band offices, the community hall, the clinic and the new Band store.

It is proposed that the school and gymnasium be located on a large lot (0.75 Ha.), large enough to accommodate the new building, a new ice rink, and other recreational facilities. It is suggested that the school and gymnasium building be orientated so that they face the Band office and warehouse.

The school will be a key facility in the town. It will generate a large amount of traffic and must be easily accessible from all parts of the community. The Band offices will be the administrative centre of the town and will also be a major traffic generator. It is recommended that it be located across the street from the school on the lot already occupied by the Band's warehouse.

A third important central land use will be the new Band store. It is recommended that it be located in the core of the new town, along the existing road parallel to the river.

Facilities for the sale of stove oil, gasoline, diesel oil, etc. to the Band members should be developed adjacent to the store. The recommended location for the community's fuel storage depot is the site west of the store along the river road.

The community hall and the clinic are also an important part of the town centre. Their recommended location is across the street from the school and the Band offices. Part of the community hall may be used to house the town's library of books and video tapes, while other parts may serve as a meeting place and pool hall. The recreational use of the community hall will complement the

recreational use of the school facilities. The clinic should be easily accessible from all parts of the town, and the most desirable location is identified on Figure No. 2.

One or two churches may be expected to express interest in locating in the new town. Because of their role as community centres as well as places of worship, a core area location should be reserved for them. It is recommended that the river bank adjacent to the townsite be used for docking and open air storage. The Telecast station is already located in this area. The sloping nature of this site permits use of the area for storage of various materials without danger, or significant visual impact on the town.

The plan as shown provides for approximately 92 residential lots, 19 of which are already occupied. The size of the lots range from approximately 12,500 to 18,000 square feet, which exceeds the minimum requirements for septic tanks and will provide adequate separation between buildings for fire control. Due to the outline of the buildable land in the new townsite, residential development will be located east and west of the town centre.

It is recommended that the Band consider locating at least some of the 19 new houses to be built in the near future in the western part of the new town. By opening up the lots around the town centre first, the Band will be able to quickly establish the basis for a new and attractive community.

As noted in the Bird and Hale terrain evaluation study, part of the new townsite is covered with tree growth that may play a significant role in reducing wind chill during the winter. Because

of the east-west orientation of the townsite and the prevailing west/northwest winds in the area during both winter and summer, it is recommended that an effort be made to retain as many of the trees as possible.

Soil conditions in the old townsite are not suitable for septic tank systems and houses in this area will have to continue using pit privies. However, it is recommended that all houses in the new townsite be provided with indoor plumbing, septic tanks and tile beds. The soil conditions here will permit tile beds to function indefinitely. In addition, immediate consideration should be given to providing the existing houses in the new townsite with septic tanks and internal plumbing systems.

An important part of the management of the community will be the garbage disposal system developed by the Band. When more houses are built on the townsite and the density of development increases, efficient removal of garbage becomes essential in maintaining an attractive, safe and healthy environment. The existing dump adjacent to the road to the airport is inadequate although convenient. It is too close to the road, and much too close to the proposed new townsite.

It is recommended that a new dump site be established further up the road, and as much as possible of the refuse at the existing site be removed to the new one. Any materials remaining at the site to be abandoned should be buried and any further dumping at this location prohibited.

It is also recommended that refuse be collected throughout the town on a regular basis and disposed of at the new site by the Band.

Implementation

To facilitate an organized development of the new townsite all the lots in the central portion destined for development over the next five years should be staked as soon as the plan is adopted. In addition, the entire proposed road system within the new townsite should be cleared and grubbed so that the Band can be continuously aware of the relative locations for future services and building lots.

Consideration should be given to relocating the Band's central facilities to their proposed locations in the new townsite as soon as possible, and funds be expended on new construction rather than renovations.

## V WATER SUPPLY SYSTEM

In developing a practical water supply and distribution scheme for the community a number of alternatives were identified and evaluated. Considering the water supply, only two sources are available and each was reviewed on the basis of ease of construction, maintenance, dependability and cost. The first, and most obvious, is the Albany River but this was rejected because of the high initial cost to construct an intake in the fast flowing water, the complexity of the mechanical equipment which would be required for filtration and chlorination and the potential problems associated with heavy ice flows during breakup. The second, and recommended alternative, is ground water which will require the development of a high capacity well or wells but once installed will need little attention for extended periods of time. In addition, water from this source will be acceptable for human consumption without further treatment although chlorination may be desirable in the future. With the entire community relocated to the new townsite, substantial quantities of water should be available in the granular overburden at this location resulting from a direct connection between the aquifer and the river and also because of the extensive swamps abutting the esker throughout its length. The existing 3 wells in the old townsite were installed in 1978 and these continue to function very adequately with hand pumps.

Accepting ground water as the preferred source, consideration was first given to providing each dwelling with a separate well but rejected in favour of a central well or system of wells which

can be integrated more readily into a future water distribution system.

With a central well as a source, the distribution system can develop in a natural progression. The well can be equipped with a hand pump, and the water carried in containers by the inhabitants initially, until such time as a pressure distribution system can be built and each home has a plumbing system installed.

Recognizing the constraints imposed by time, financing, and the lack of commercial power, this entire progression is the most practical route to follow in providing the community with a dependable source of safe drinking water in the immediate future.

It is therefore recommended that a well drilling program be given first priority. Each home should also be equipped with a water storage reservoir, a sink and the necessary piping, as shown schematically in Figure 3.

When the water distribution system is installed, it should be constructed with feeds to each individual building and these should, at least initially, be connected to water storage tanks through float activated valves. This will permit the Band members to follow their normal life styles and vacate their dwellings for extended periods of time with little concern for frozen water pipes or flooded homes. When life styles change, and the houses are continuously heated during the winter, complete plumbing systems can be considered.

The connection from the water main to the homes should be polyethylene pipe, buried over its entire length and to well within the interior of the building below the depth of frost penetration. The vertical riser into each should be installed with an internal electric heating element to be used only when the pipe is frozen. Inside, the piping should be installed in close proximity to the stove so that it too may be rapidly thawed when necessary.

The water distribution system should be of conventional design and buried at sufficient depth (at least 10 feet) and insulated in heavy traffic areas to prevent freezing. To minimize transportation cost (which is a very substantial component of the constructions costs), all compents should be of plastic, wherever possible. The proposed system is based on the use of 6 inch diameter P.V.C. pipe. It will, when required, have sufficient capacity throughout the proposed development for fire purposes.

The initial installation should include the area identified on the layout drawing (Figure 4) as the "Primary Area" with the mains being extended into the other areas when additional building lots are required.

When the distribution system is completed, a large submersible pump can be installed in the well and this can be operated initially

on an intermittent basis (either on a timer or manually) to refill the storage tanks in all of the connected buildings.

At this time a diesel driven fire pump and fire hydrants can be installed on the system to be supplied from a wet well at the river. It would be activated by any sudden drop in pressure which would occur if a hydrant were opened. When the emergency had passed the mains would require flushing with potable water and chlorination.

In the future, when plumbing systems have been installed and the homes and buildings are heated continuously throughout the winter, an elevated storage tank can be added to the system so that the pumps can be shut off at times to conserve energy.

The scheduling for the construction of the water supply and distribution system should be coordinated with building construction in the new townsite. The immediate requirement is for a series of wells to be installed throughout the new townsite.

The construction of the wells should be planned so that all material and equipment can be transported into and out of the site during the 1981-82 winter season while the river is frozen. Water storage tanks and plumbing supplies for their installation in all existing houses should be purchased and transported to the site for installation during the summer of 1982.

The design of the pumping station and the water distribution system should be commenced toward the end of 1981 so that well testing can be coordinated while the drillers are on the site and to ensure that contracts have been finalized and all approvals obtained to facilitate the purchase and delivery of all necessary

material to the site during the 1982-83 winter for construction of the system in the primary area during the summer of 1983. At that time water requirements for the remainder of the new townsite can be reassessed to establish requirements for further expansion of the system, a fire pump and hydrants and a storage tank.

## Water Supply

### Design Criteria

#### Population

The present permanent population of the Marten Falls Reserve is approximately 150 but this fluctuates considerably depending upon employment opportunities in the area. Over the past few years it has dropped to considerably less than 100 and at present is at about the maximum. The rapid recent growth is attributed to the return of many original inhabitants who temporarily relocated in other communities offering more social amenities. The leaders of the Band believe that with better services in the townsite the trend will continue and the community will grow rapidly to fill all the available developable land. It therefore is recommended that the design be based on the ultimate development of the new townsite with construction phased to match the growth rate.

The population which can be accommodated in the new townsite at full development is determined on the basis of 6 persons per unit.

Maximum reserve population:

100 lots x 6 persons = 600 persons

Demand

Design requirements for domestic water demand are based on studies of consumption rates for similar communities. The Department generally recommends an allowance of 180 to 227 l.p.c.d. (40 to 50 i.g.p.c.d.) which we agree is a realistic estimate. It is recommended that the figure of 180 l.p.c.d. be used.

Total average daily requirement:

600 persons x 180 litres per person = 108,000 L
(24,000 gal.)

This is equivalent to average flow rate of 75 l.p.m. (16.5 g.p.m.)

Water demand is not uniform throughout the day and peaking factors are used to account for daily fluctuations in water flow (e.g. high water demand during evening hours, minimal flow during pre-dawn hours).

It is recommended that the maximum ultimate hourly consumption be estimated using a peak factor of 4.0. This is somewhat lower than the peak factor normally used by M.O.E. for larger urban areas, but we consider it realistic for this community.

Maximum hourly consumption:

75 l.p.m. (average) x 4.00 = 300 l.p.m. (maximum)
(66 g.p.m.)

Water Sources

The community of Ogoki has essentially two alternate sources for a water supply, the Albany River and ground water which can be obtained from limestone bedrock or, in the new townsite, from the overburden. Each source has particular advantages and disadvantages. When considering disolved minerals river water is the best as it has a relatively low hardness (75 ppm Ca $CO_3$) and acceptable quantities of iron compared to the bedrock wells with hardness and iron at about 300 ppm Ca $CO_3$ and 3.0 ppm Fe. It is assumed that wells in the granular overburden at the new townsite will be somewhere between the two on both counts. The major implication of both hardness and iron is most apparent when washing. The hardness requires more soap to form suds and the iron can produce a rusty tinge on clothes.

Using ground water as the source for potable water will require the drilling and development of a number of wells in the new townsite and it is recommended that at least six be drilled while the equipment is on the site. In this area it is assumed, from the topography and surface soils, that sufficient quantities can be obtained in the overburden which will be acceptable without further treatment.

Water Distribution

The costs associated with the construction of a water distribution system are dependent to a very significant degree on the costs of transporting material and equipment to the site rather than the purchase price of the material. It is for this reason that the recommended distribution system is comprised of pipe sized to accommodate future fire flow requirements. As shown on Figure 4 it is proposed that the new townsite ultimately be serviced with a complete water distribution system which will serve any future water requirement. This system will be comprised of 3 submersible pumps, an elevated and insulated water storage tank with a capacity of 5,000 gallons and fire hydrants distributed throughout the townsite. The construction of the system can be phased, but all the wells should be drilled at one time. The central well can initially be equipped with a small submersible pump. This can be replaced at some future date with a larger pump when the central portion of the distribution system is installed and can be operated intermittently to fill storage reservoirs in each dwelling unit. As the community grows, the distribution system can be expanded and connected, initially, to a well at the south end of the townsite and finally to one at the north end, both of which will be equipped with submersible pumps to satisfy the growing demand. When a sufficient number of buildings have been provided with complete internal plumbing systems, requiring a continuous supply of water, it will be necessary to install the elevated water tank, primarily as an energy conservation measure.

Finally, when demand warrants, fire hydrants can be installed on the mains as shown. A diesel driven fire pump, drawing from the river, can be added if the wells and water tank prove to be inadequate for fire-fighting purposes. Should this approach be adopted, the entire distribution system would require flushing and disinfecting each time the fire pump was operated.

The following estimate is based on 1981 costs and is broken down into segments representing the construction phasing identified in the foregoing. Included in the estimate is an item for individual storage reservoirs in the initial phase but nothing has been included for future plumbing systems.

| | | | |
|---|---|---|---|
| 1. | Wells | | |
| | Well casings | $40,000 | |
| | Drilling and development | 45,000 | $85,000 |
| 2. | Garage and pumping station 24 x 30 ft. including concrete slab, insulation, lighting and heating 750 sq. ft. @ $100 | | 75,000 |
| 3. | Submersible pump in Well No. 1 including piping and electric supply | | 3,000 |
| 4. | Domestic water storage reservoirs and plumbing 30 units @ $1,500 | | 45,000 $208,000 |

Primary Area Distribution System

| | |
|---|---|
| Mains including pipe and valves 6" Ø pvc 3,600 ft. @ $65 | 234,000 |
| Submersible pump and controls | 5,500 |
| Pumping station internal piping and valving | 10,000 |

| | | |
|---|---|---|
| Polyethelene service connections | | |
| from main to building | | |
| 55 @ $1,500 | 82,500 | 332,000 |
| **Easterly Extension of Distribution System** | | |
| Mains including pipe and valves | | |
| 6" Ø pvc 1,200 ft. @ $65 | 78,000 | |
| Submersible pump and controls | 6,500 | |
| Polyethelene service connections from | | |
| main to building | | |
| 15 @ $1,500 | 22,500 | 107,000 |
| **Westerly Extension of Distribution System** | | |
| Mains including pipe and valves | | |
| 6" Ø pvc 1,500 ft. @ $65 | 97,500 | |
| Submersible pump and controls | 6,500 | |
| Polyethelene service connections | | |
| from main to building | | |
| 24 @ $1,500 | 36,000 | 140,000 |
| **Elevated Storage Tank** | | |
| 5000 gallons capacity | | |
| Insulated glass reinforced plastic | | |
| Supply | 55,000 | |
| Installation | 15,000 | 70,000 |
| **Fire Fighting System** | | |
| Fire hydrants | | |
| 14 @ $4,000 | 56,000 | |

| | | |
|---|---|---|
| Diesel fire pump | 50,000 | |
| Pumphouse and wet well | 25,000 | |
| Intake | 15,000 | 146,000 |
| | | 1,003,000 |
| Engineering and contingencies | | 200,000 |
| | | $1,203,000 |

In all of the foregoing a reasonable allowance has been included for transportation costs of materials. It has been assumed that the Band will endeavour to acquire some basic construction equipment which will be available at the site for construction work and no allowance has been made to cover the costs if equipment is to be brought in for this work only.

## VII. FIRE PROTECTION

As with all the servicing options, the problem of fire protection in Ogoki is compounded by the lack of a dependable power system. In the winter it is difficult to maintain access and possibly impractical to open water on the river close to the shore. Without any heated storage space a pumper and water truck would be impossible to maintain.

In the future, when power is available, equipment of this nature can be acquired. As outlined in the Section, Water Supply and Distribution, the town can be serviced with a pressure system sized for fire flows and the necessary ancilliary equipment, hydrants and a fire pump, can be installed when warranted.

When the Band initiates fire protection as one of its central services it will be necessary for it to ensure that a reliable and trained team is available at all times. As in most small communities the majority of the members should be volunteers but a nucleus of permanently employed key people will be required who will maintain the equipment in working order and direct the volunteers in the event of an emergency. In Ogoki these individuals would probably be the Band's permanent staff normally employed for other specific duties. For instance, the person to be responsible for the water system could be the principal fire fighter and in the event of his absence another Band employee, trained for the responsibility, would take over.

## VI. SEWAGE DISPOSAL SYSTEM

It is the intent of the Band at Marten Falls to equip all of the buildings in the townsite with a modern sewage disposal system. To satisfy this requirement a number of practical systems were identified and each was evaluated on the basis of its practicality in the cold environment at Marten Falls and its ability to go through a number of freeze-thaw cycles until such times as the homes are heated continuously throughout the winter. To accommodate this latter condition precludes the use of conventional toilets with water seal traps, at least initially. A number of dry systems were investigated but all were rejected because of their high maintenance requirements, their need for a continuous heat supply and their regular demand for organic material (vegetable wastes, leaves, moss, etc.)

The system best suited to Marten Falls is a standard septic tank installation and a tile field for each building. The soils in the new townsite are quite permeable on the surface and are ideally suited to such installations. These are on top of a much less permeable layer of silt or clay which will inhibit the effluent getting into the ground water aquifer. The tanks will have to be used, though, with mechanical seal toilets which require that they be installed almost directly over the tank. New houses can be constructed with washroom facilities laid out in such a way that the tank can be partially installed under the house so that access to the cleanouts will not be obstructed. The existing houses in the new townsite can have a washroom added to the outside and these,

too, can be constructed partially over the septic tank. Each home will require a tile field comprised of about 100 feet of tile which will be charged on an intermittent basis by a syphon built into each tank. The school, Band office and other buildings can be similarly serviced. Details for a septic tank installation are shown on Figure 5.

Well built septic tank systems will function with little or no maintenance beyond infrequent pumping for many years and can prove to be the most practical means of sewage disposal.

As previously noted, the septic tanks will have to be pumped out infrequently and for this purpose a wagon equipped with a 1,000 gallon tank and a hydraulic system driven by the power take-off on the tractor for the pump will be required. This effluent can be spread on the ground remote from the town.

In the existing older portions of the community the soil conditions are not suitable for septic tanks and this area will have to continue with pit privvies.

Of all the processes available the simplest, on the basis of operating and maintenance, is the individual septic tank and tile field. These installations can be made to work almost anywhere but they require a properly sized tile field and considerable attention to details during construction. The soils in the new townsite sppear to be extremely conducive to this approach. On the surface they are relatively coarse, free draining sands which will encourage rapid assimilation and evaporation of the tank effluent. Beneath the surface are layers of relatively impervious silts and

clayey silts which will inhibit any downward flow into the ground water aquifer. To establish the actual requirements for the tile beds a number of permeability tests will be required throughout the new townsite.

For the following cost estimates to be comparable the work proposed for each stage represents the ultimate development.

Septic Tanks

| | | |
|---|---|---|
| Primary Area | | |
| Institutional (school, clinic, etc.) | | |
| 3 @ $10,000 | $30,000 | |
| Residential | | |
| 42 @ $3,500 | 147,000 | |
| Pump out tank and trailer | 18,000 | $195,000 |
| Westerly Extension of Townsite | | |
| Residential | | |
| 15 @ $3,500 | | 52,500 |
| Easterly Extension of Townsite | | |
| Residential | | |
| 33 @ $3,500 | | 115,500 |
| Engineering and Contingencies | | 60,000 $423,000 |

In the foregoing it is assumed the tanks and tile beds will be installed using equipment avilable at the site.

## VIII. ROADS

Roads within the community are essentially foot paths connecting the various service centres. There are no vehicles other than the Band's tractors and snowmobiles; consequently, there has been little need for much more, except that these roads become almost impassible in wet weather. In the older part of the community the soils are fine textured silt and clay which are totally inadequate for a roadway or a path. In the proposed development area the soils are granular in nature and more suitable for foot paths but this will be inadequate as more central services are provided and the Band creates more vehicular traffic.

Throughout the proposed development area formal roadways should be constructed with details similar to those of Figure 7 utilizing the granular materials available in close proximity to the townsite. It is the type of work which can be carried out by the Band members as resources become available. In the original portion of the community, where conditions are most unacceptable, a granular base should be constructed along the pathway for immediate improvement and, again, as funds become available, this can be upgraded to the details shown.

The road to the airport has been cut along the top of the sandy ridge throughout its length and except for isolated silty areas is in a reasonable state of repair. No attempt has been made to incorporate any drainage facilities (ditches and culverts) so at times it is probably impassable because of standing water and mud. The road should be upgraded with a gravel base, culverts where necessary and ditches.

Because of the use of the two tracked vehicles in the community for hauling and transportation the existing roadways are badly chopped up and not satisfactory for pedestrian traffic. This practice should be discouraged, particularly in the old area, and prohibited when the roadways are improved.

For the Band to undertake the proposed roadwork on its own will require the purchase of a few pieces of construction equipment and this requirement should be considered before funds are dedicated to other vehicles. It will be necessary for the Band to purchase a small dump truck and a front end loader for working in the pit. In addition, some type of screen will probably be required to remove cobbles and stones from the gravel. The material can be spread with the bulldozer, available in the community, but a roller to compact the gravel will be required.

The front end loader should also be equipped with a back-hoe attachment which will permit the Band to undertake any excavating jobs in the townsite such as septic tank and tile bed installations.

This equipment, if purchased by the Band, could be rented to any contractor working within the community on any of the many proposed capital works which could affect to a very considerable degree, their prices for the work. They would not be faced with the very substantial costs of bringing in their own equipment for the work.

Any equipment of this nature, purchased by the Band, should be equipped with diesel engines to minimize the use of gasoline and, consequently, the size of its fuel storage area and to optimize the use of the diesel fuel storage facilities.

Road Construction

| | |
|---|---|
| Central Servicing Area | |
| 3600 feet - 12" granular base, | |
| 12 feet wide @ $30.00 | $108,000 |
| Easterly Area | |
| 1200 feet - 12" granular base, | |
| 12 feet wide @ $30.00 | 36,000 |
| Westerly Area | |
| 1500 feet - 12" granular base, | |
| 12 feet wide @ $30.00 | 45,000 |
| Road to Airport | |
| 4000 feet - 12" granular base, | |
| 12 feet wide @ $30.00 | 120,000 |
| Old Townsite | |
| 6000 feet - 6" granular base, | |
| 8 feet wide @ $12.00 (immediate) | 72,000 |
| 6000 feet - 12" granular base, | |
| 12 feet wide @ $22.00 (upgrading) | 132,000 |
| Engineering and Contingencies | 75,000 |
| | $588,000 |

In addition to the estimated construction costs identified above the following capital cost of the recommended equipment must be included.

| | |
|---|---|
| 1 - Single Axle Dump Truck | $ 20,000 |
| 1 - Wobble Wheel Compactor | $ 5,000 |

No allowance has been made to transport the equipment into the site but should a Hercules aircraft be scheduled for the area during the winter it would be practical to purchase the equipment for delivery at that time when such an aircraft could land on the river ice adjacent to the south shore. All of the above equipment would comprise a single load and transportation costs would be minimized.

## IX. SOLID WASTE DISPOSAL

The disposal of solid waste in Ogoki is not presently a problem because of the small quantities generated and the size of the community. As the population increases it may become necessary to institute a formal collection system which can be organized by the Band using its present equipment. Should scavenging animals become a problem to the community as a result of the dump it may, in the future, become necessary to burn the garbage and bury the residue with locally available material.

When the community is equipped with a bulk fuel storage area the accumulation of oil drums will cease and this very significant problem will end. At present most of these abandoned containers have been stockpiled at the disposal site behind the existing Band office and school and the use of this site for the continuing disposal of fuel containers may be continued. It is screened from the river and any contaminants leaking from the degrading containers will be retained in the relatively impermeable soil in the area.

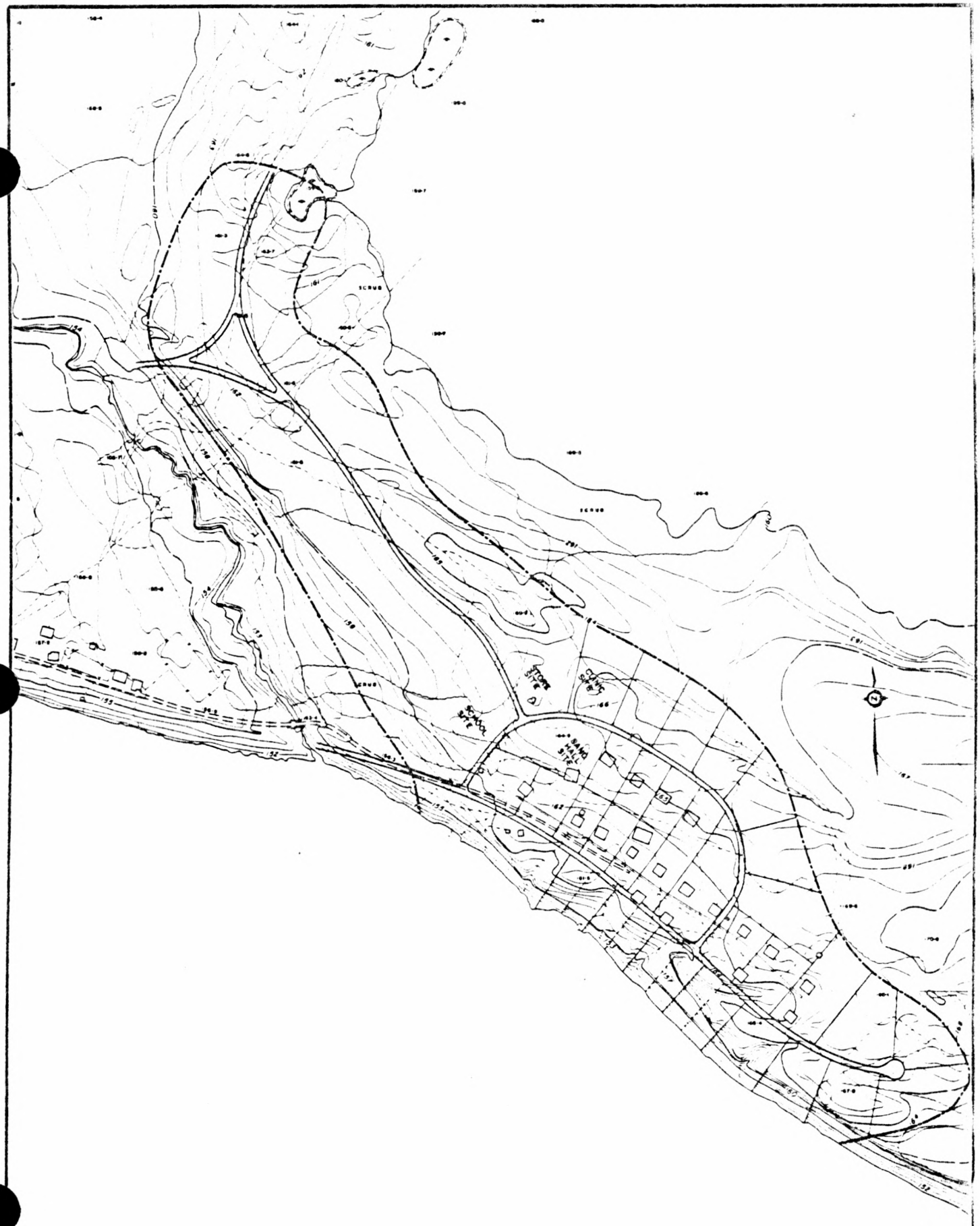
The new dump site being used by the community is adjacent to the road to the airport and much too close to the eastern extremity of the new townsite. A new site is required which should be located much further up the road to which the refuse in the existing site should be moved. Once the existing site is abandoned it should be graded and backfilled to bury any remaining debris. It is estimated that this will cost in the order of $5,000 when a truck is available to remove the waste and bring in backfill material.

SUMMARY OF ESTIMATES

| Year | Population | Completed Houses | Water Supply | | Sewage Disposal | | Roads | | Solid Waste | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Capital | O & M | Capital | O & M | Capital | O & M | Capital | O & M |
| 1981 | 150 (Existing) | 19 | | | | | | | | |
| 1982 | 155 | 23 | 300,000(1) | 4,000 | 180,000(7) | | 160,000(8) | 2,000 | 5,000 | 2,000 |
| 1983 | 160 | 27 | 400,000(2) | 12,000 | 16,000 | 2,000 | 200,000 | 6,000 | | 2,000 |
| 1984 | 165 | 31 | | 12,000 | 16,000 | 2,000 | 200,000 | 10,000 | | 2,500 |
| 1985 | 175 | 35 | | 12,000 | 16,000 | 3,000 | 88,000 | 15,000 | | 3,000 |
| 1986 | 195 | 39 | 130,000(3) | 14,000 | 16,000 | 4,000 | | 20,000 | | 3,500 |
| 1987 | 215 | 43 | | 14,000 | 16,000 | 5,000 | | 20,000 | | 4,000 |
| 1988 | 240 | 48 | 83,000(4) | 20,000 | 20,000 | 6,000 | | 20,000 | | 4,500 |
| 1989 | 280 | 56 | 160,000(5) | 22,000 | 32,000 | 7,000 | | 20,000 | | 5,000 |
| 1990 | 320 | 64 | | 22,000 | 32,000 | 8,000 | | 20,000 | | 5,000 |
| 1991 | 330 | 66 | 170,000(6) | 30,000 | 8,000 | 8,000 | | 20,000 | | 6,000 |
| 1992 | 340 | 68 | | 30,000 | 8,000 | 8,000 | | 20,000 | | 6,000 |
| 1993 | 350 | 70 | | 30,000 | 8,000 | 8,000 | | 20,000 | | 6,000 |
| 1994 | 360 | 72 | | 30,000 | 8,000 | 8,000 | | 20,000 | | 6,000 |
| 1995 | 375 | 75 | | 30,000 | 12,000 | 10,000 | | 20,000 | | 7,000 |
| 1996 | 385 | 77 | | 30,000 | 7,000 | 10,000 | | 20,000 | | 7,000 |
| 1997 | 395 | 79 | | 30,000 | 7,000 | 10,000 | | 20,000 | | 7,000 |
| 1998 | 405 | 81 | | 30,000 | 7,000 | 10,000 | | 20,000 | | 7,000 |
| 1999 | 415 | 83 | | 30,000 | 7,000 | 10,000 | | 20,000 | | 7,500 |
| 2000 | 420 | 84 | | 30,000 | 7,000 | 10,000 | | 20,000 | | 7,500 |

19.7 /unit 27.3/unit
W ? S R, W ? S

1 Wells
2 Distribution System Central Area
3 Distribution System Easterly Extension
4 Elevated Storage Tank
5 Westerly Extension
6 Fire System
7 Septic Tanks for Institutions and Existing Houses and Pumpout Trailer
8 Road Building Equipment and Initial Road Works
9 Move Dump Site

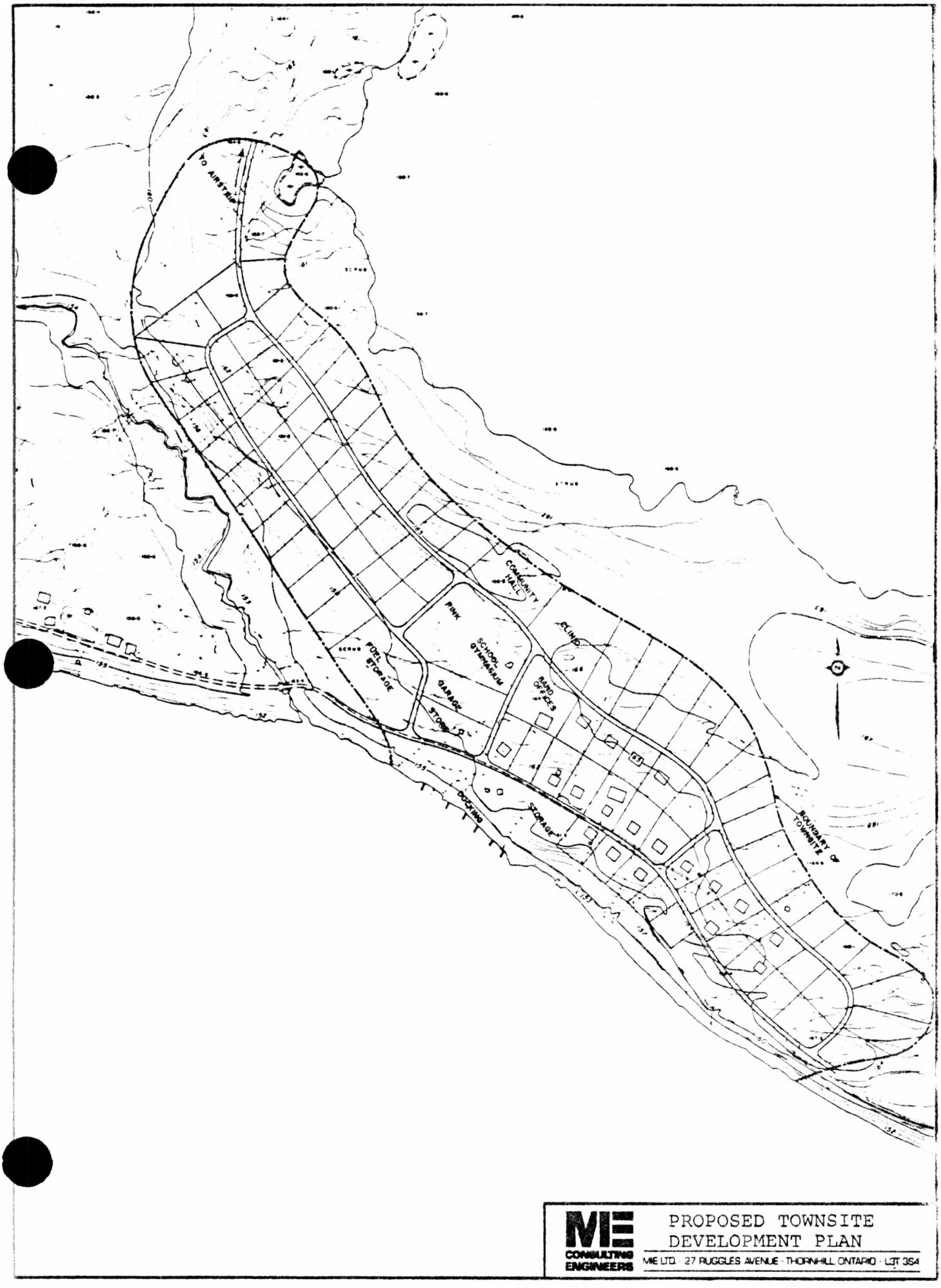



ME CONSULTING ENGINEERS

# EXISTING DEVELOPMENT PLAN

ME LTD. · 27 RUGGLES AVENUE · THORNHILL ONTARIO · L3T 3S4

Figure No.1

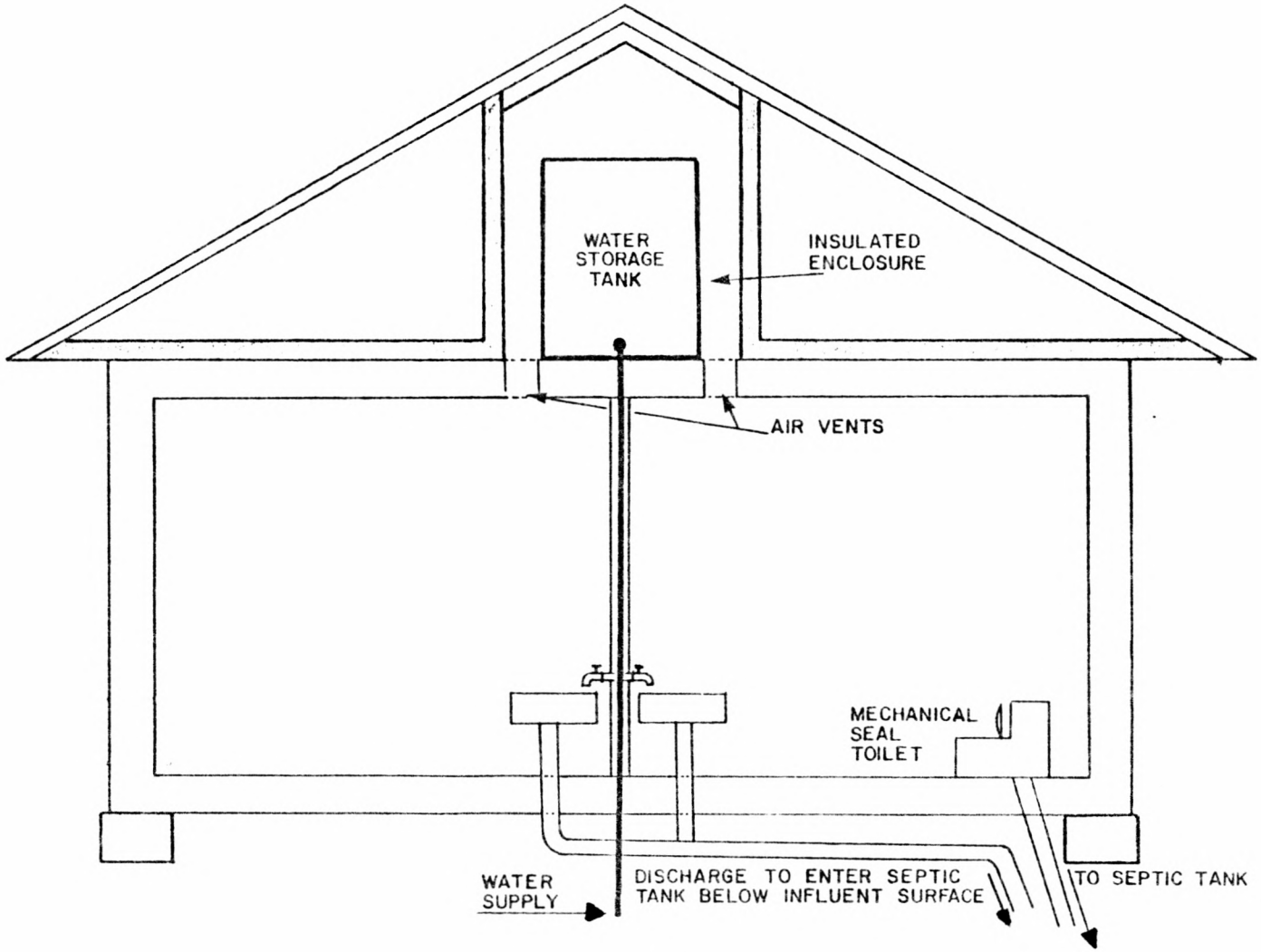



ME CONSULTING ENGINEERS

PROPOSED TOWNSITE DEVELOPMENT PLAN

ME LTD · 27 RUGGLES AVENUE · THORNHILL ONTARIO · L3T 3S4

Figure No.2




SCHEMATIC
WATER RESERVOIR
AND
INTERNAL PLUMBING

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CONSULTING ENGINEERS
ME LTD. · 27 RUGGLES AVENUE · THORNHILL ONTARIO · L3T 3S4

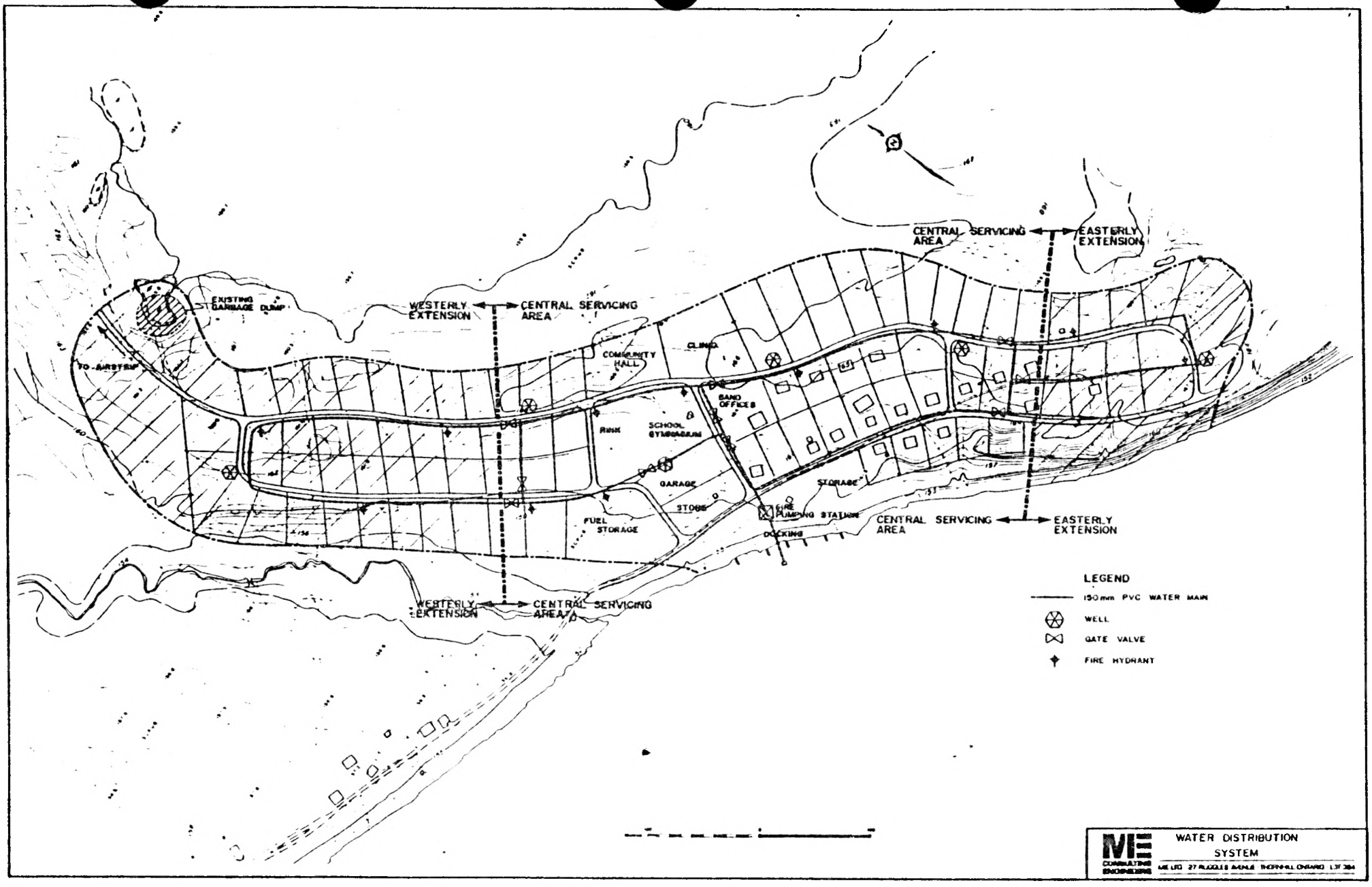
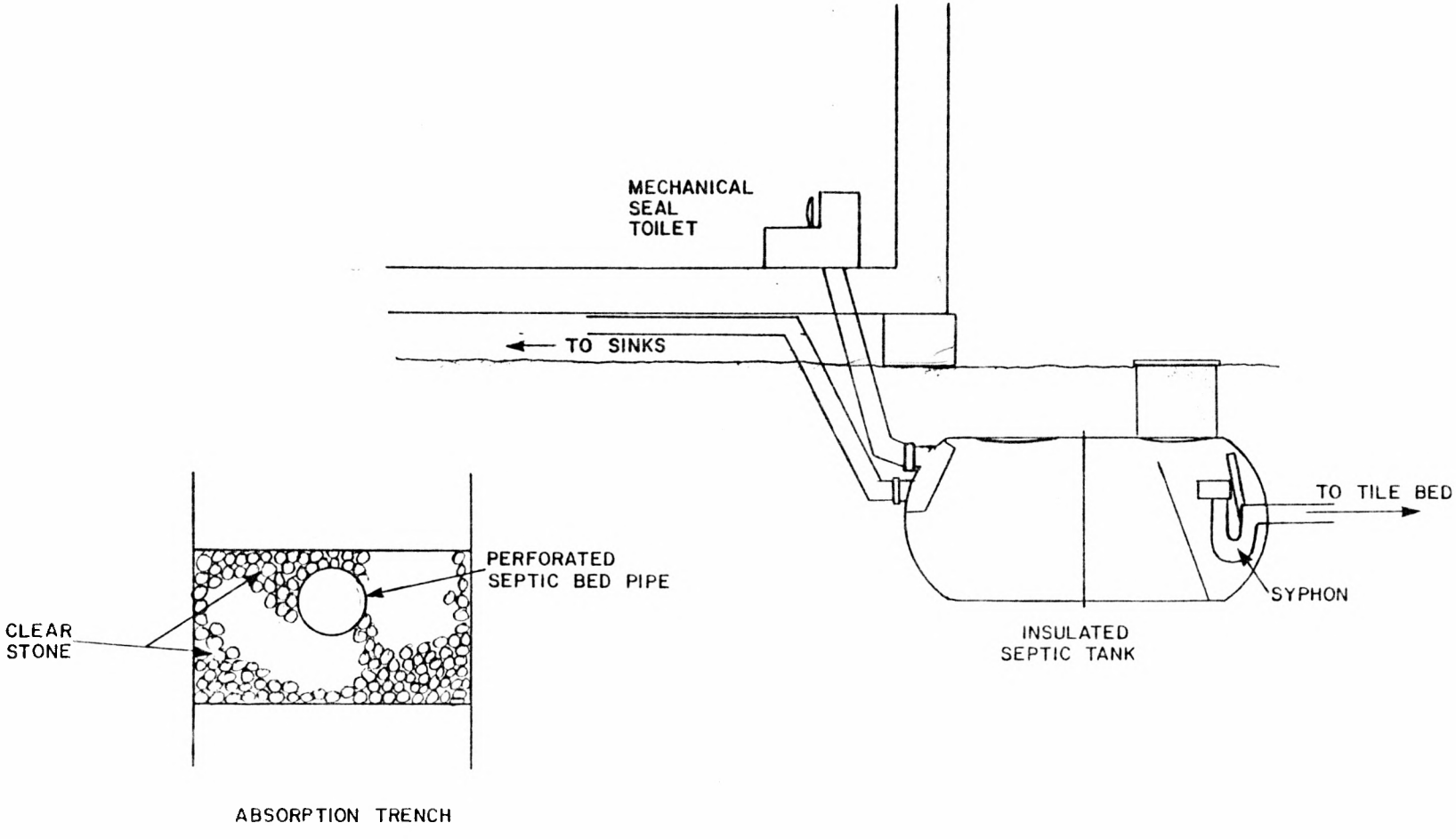

EXISTING GARBAGE DUMP
TO AIRSTRIP
WESTERLY EXTENSION
CENTRAL SERVICING AREA
COMMUNITY HALL
CLINIC
BAND OFFICES
RINK
SCHOOL GYMNASIUM
GARAGE
STORES
FUEL STORAGE
STORAGE
FIRE PUMPING STATION
DOCKING
CENTRAL SERVICING AREA
EASTERLY EXTENSION
WESTERLY EXTENSION
CENTRAL SERVICING AREA
CENTRAL SERVICING AREA
EASTERLY EXTENSION
LEGEND
150mm PVC WATER MAIN
WELL
GATE VALVE
FIRE HYDRANT
WATER DISTRIBUTION SYSTEM

Figure No. 4

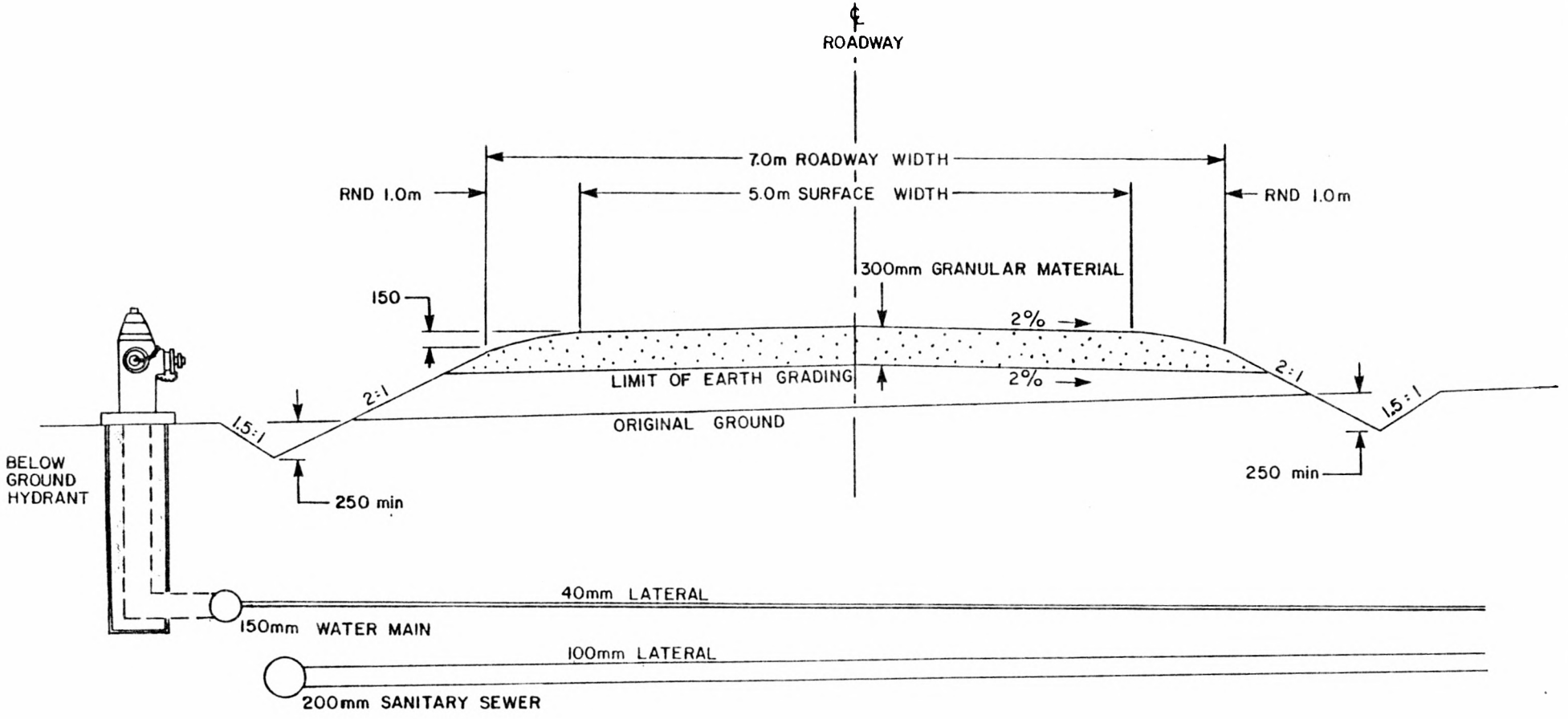



ME CONSULTING ENGINEERS

Septic System

ME LTD · 27 RUGGLES AVENUE · THORNHILL ONTARIO · L3T 3S4

Figure No. 5




NOTE:
ALL DIMENSIONS ARE IN MILLIMETRES OR METRES UNLESS OTHERWISE SPECIFIED.

ME CONSULTING ENGINEERS

Typical Road
Cross Section

ME LTD · 27 PUGGLES AVENUE · THORNHILL ONTARIO · L3T 3S4

Figure No.6

# APPENDICES

# APPENDIX A

## Soil, Terrain and Vegetation Analysis

# Photo-Interpretative
# Soil, Terrain and Vegetation Analysis
# of
# Marten Falls Indian Reserve No. 65

## 1. INTRODUCTION

The Marten Falls Indian Reserve is located on the Albany River at the confluence with the Ogoki tributary in Northern Ontario (51° 40' longitude). It is situated to the north of the river and comprises an area of approximately 27 square miles. The main settlement area is stretched along a two-mile section of the river. A new townsite area has been developed at the eastern end. A new airstrip has been developed about 1.5 miles north of the new settlement area.

## 2. TERRAIN

The soils and terrain conditions were reviewed through a systematic photo-interpretative analysis and a map overlay prepared showing the main landform, soils, drainage and topographic conditions.

The Reserve comprises a level plain with very little relief difference except for the banks of the river, some old channel remnants and small stream, and a kame/kettle and esker ridge formation which rises 20 - 30 feet above the plain.

The major part of the Reserve is composed of very poorly drained organic soils overlying the lacustrine/marine clays and silts. Other parts are made up of string bogs. Slightly incised in the landscape are two small stream systems which cut across the Reserve from north to south. The lands adjacent to these streams are slightly better drained.

In the central part of the Reserve is a distinct esker formation and kame/kettle feature left by the earlier glacial activity. These features are glacio-fluvial in origin and are composed mainly of sands with the possibility of some gravelly materials within the esker ridge. This site is well drained with a few poorly drained kettles or depressions.

The Albany River channel is incised about 15 - 20 feet below the general level of the plain. The banks throughout much of the Reserve are steeply sloping except at some sections in the settlement area where they are more gentle. The lands immediately above the banks are composed of a narrow levee formation or better drained elements of the clay plain.

In the south-eastern corner of the Reserve the photo pattern indicates earlier activity by a series of stream channels and meander scars. These scars and levee remnants reflect improved drainage conditions.

## 3. VEGETATION

The Reserve lies within the upper reaches of the Boreal Forest region and is part of the Hudson Bay Lowland subregion. Stunted black spruce cover much of the Reserve and are associated with the very poorly drained sections of the lacustrine/marine plain. Adjacent to the small stream channels and associated with slightly higher aspects of the terrain, the growth of black spruce is much better. On the well-drained site in the central part of the Reserve, the forests are mixed and composed of spruce, fir, poplar, aspen and birch. It is within this area that the new air

strip was cleared. From the recent aerial photography, it is evident that extensive areas of this forest stand have been burnt. Out of this stand of approximately 1,500 acres, about 20 percent has been destroyed. It is not known whether any of the materials were salvaged.

Other stands are found along the main river channel; however, these stands are very narrow and are seldom more than 1,000 feet wide. Similar stands are also found along the old channel scars in the south-east corner of the Reserve.

4. OPPORTUNITIES

It is understood that the Band has a small sawmill and is also involved in a cottage-type industry of making snowshoes. While the Reserve is not well endowed with forest resources, the good stand of timber in the central part of the Reserve is significant and an important source of fuel and saw log material. This forest should be protected against over cutting and fires. The forest along the river might be exploited; however, extensive exploitation of these stands could result in increased erosion activity and bank slumping.

There is very little indication of any agricultural or gardening activity in the settlement. The aerial photography shows some cleared sections within the settlement area.

In terms of crop production, the potential of the Reserve must be viewed in light of the climatic constraints and its location. It is not climatically suited to sustain agricultural production due to the short growing season and the risks of early frosts.

Climatic data for the region indicates the mean fall frost data occurs between August 31st and September 5th, and that the mean frost free period is between 80 - 90 days. The number of degree days above 42°F. is between 1750 and 2000. Weather records from Lansdowne and Nakina indicate that June and July are fairly wet and that traces of snow are possible in June.

Nevertheless, observations in other northern communities indicate that some vegetable crops can be grown. They, however, require careful attention and need to be started earlier indoors in order to be ready for transplanting in the latter part of June.

The introduction of hot houses into the system would ensure an early start for such cool climate vegetables as cabbage, carrots, lettuce, etc. On the sandier soils potatoes might even be successfully grown.

Land suitable for agricultural and horticultural production is limited. Utilization of the heavier clay soils would require the development of a surface water drainage system. The installation of tile drainage would help to remove soil water, aerate and warm up the soil. Lands immediately north of the settlement appear to have some suitability; however, further investigations should be done.

While the agricultural opportunities appear very limited, it is important that the settlement attempt to raise as much of its vegetable requirements as possible.


MARTEN RIVER INDIAN RESERVE
LP:OA/CL VP:1
LP:OA/CL VP:1
LP:OA/CL VP:1
LP:CL VP:1
LP:CL VP:1
LP:OA/CL VP:1
FPSW:CL VP:1
LEGEND
LANDFORM
LP Lacustrine Marine Basin
SB String Bog
GF Glaciofluvial
FP Fluvial Plain
FPcr Fluvial Plain channel remnant
FPI Fluvial Plain basin remnant
FPsw Fluvial Plain slack water
SOILS
Sand
Sandy Loam
Clay Loam
Organics
DRAINAGE
Significant Forest
Burn Area
Reserve Boundary
ME
CONSULTING ENGINEERS
ME LTD. · 27 RIGGLES AVENUE · THORNHILL ONTARIO · L3T 3S4

# APPENDIX B

Quotation on

Dry Chemical Fire Fighting Equipment

LEVITT

**LEVITT-SAFETY LIMITED**
Fire Protection Systems Division
51 Laird Drive
Toronto, Canada M4G 3S9
Telephone (416) 425-7230-1
Telex 06-22291

April 14, 1981

M.I.E. Consulting Engineers
27 Ruggles Avenue
Thornhill, Ontario
L3T 3S4

Attention: Mr. J.D. Jones

Re: Ansul 500 lb. Skid Dry Chemical System

Levitt Quotation #81-781

Dear Sir:

We are pleased to offer our quotation in the amount of $17,314.00 for your 500 lb. Skid Dry Chemical System detailed in the bill of material listed below. For your information, F.S.T. and P.S.T. are exempt.

Ansul 500 lb. Skid Dry Chemical System quoted contains the following list of materials:

Bill of Material

1 - SA500-C Foray Dry Chemical Skid Unit c/w the following equipment:

- 500 lbs. of Foray Dry Chemical
- 1 - Hose Reel
- 150' of 1" Non-collapsable Discharge Hose
- 1 - HF-70 Discharge Nozzle with a range of approx. 35'
- 1 - 400 cu.ft. Nitrogen Cylinder c/w Quick Actuating Nitrogen Valve.

Extras to above price:

One recharge kit for recharge on location. This would include 500 lbs. of Foray Dry Chemical powder.
One 400 cu.ft. Nitrogen Cylinder c/w quick opening valve - Total Cost $1,723.00

Training on the above unit in Toronto would be $250.00 per day plus above recharging kit to refill the skid unit.

Instruction manuals to be in native tongue with a cost of approximately $3,000.00

All prices are quoted F.O.B. Toronto, freight extra to site.

Delivery of goods will commence 60 to 90 days after the receipt of your Purchase Order. A delivery schedule will be provided by Levitt-Safety Limited.

This quotation is subject to cancellation or revision without further notice at any time after sixty days of the date of issue, unless written acceptance from the client has been received and acknowledged by Levitt-Safety Limited.

Please refer to the attached information sheets for additional descriptive information regarding your type of Ansul Skid Dry Chemical System.

Terms of payment shall be Net 30 Days.

We thank you for this opportunity to be of service to you and look forward to your acceptance of this quotation.

If we can be of further service to you, please contact us at your convenience.

Yours truly,

Barry Rowswell
Fire Protection Systems Division
BR/kl

cc: H.W. Kahler
Lorne Roberts, Sales Manager
Jerry Valiquette

# APPENDIX C

## Terms of Reference

TERMS OF REFERENCE

MARTEN FALLS INDIAN RESERVE NO. 65

Water and Wastewater Feasibility Study

Project No. 30191

## A. GENERAL

### 1.0 Description

The Marten Falls Indian Reserve No. 65 is located at the junction of the Ogoki and Albany Rivers, approximately 175 kilometres north of Nakina, Ontario. The closest highway is around 240 kilometres south. The on reserve population is over 150 living in approximately 30 houses.

The only existing water and sewer systems serve Federal facilities. Natives obtain their water by pail from the Albany River and use pit privies.

Problems and needs of the community are:

a) the community has no development plan;
b) a need for additional housing lots;
c) natives have no indoor plumbing; and
d) the water supply for the natives is contaminated.

### 2.0 Objective

The objectives of the feasibility study are:

a) to develop population projections, land use potential, a community plan and a subdivision plan, which will accommodate future needs and growth of the community for twenty (20) years;

b) to evaluate the existing water supply and wastewater systems and recommend required improvements to serve the proposed subdivision and existing and future needs of the community;

c) to determine the most feasible method of providing fire protection to the existing and future community; and

d) to determine the most economical road and drainage system for the proposed subdivision to meet minimum M.T.C. standards.

### 3.0 Policy

3.1 Contractor - The general responsibilities of the Contractor shall be:

a) to provide complete and comprehensive professional services in the speciality fields required to carry out the work;

b) to carry out the work in accordance with an accepted schedule presented by the Contractor with his proposal and to submit monthly reports describing progress and indicating milestones completed;

.../2

c) to make use of existing plans, reports and records to the maximum extent practicable; and

d) to affix his stamp or seal to all submitted plans and documents.

3.2 Department and Indian Band - The Contractor shall work closely with the Department and the Indian Band through liaison with the Departmental Project Manager (PM), the District Planner (Planner), the District Construction Supervisor or District Local Government representative (Supervisor) and the Band Council (Band). The PM is the DIAND officer responsible for this project.

3.3 Other Government Agencies - The Contractor shall deal directly with other departments and agencies to ensure that any system described, recommended or designed shall meet the requirements of all local, provincial and federal codes, guidelines and standards.

3.4 Reserve Access - The Contractor shall not commence site investigation or field work without first advising and seeking the concurrence of the Chief or Band Manager to do so.

3.5 Alternatives - The Contractor shall consider alternatives for serving the community. Suggested alternatives are not inclusive and all practical alternatives should be assessed. If the site conditions favour one specific system, the Contractor shall substantiate his selection. Besides the economical feasibility of any alternative, the Contractor shall consider the practicality of any proposed alternative with regards to:

a) availability of operation and maintenance parts and supplies;

b) availability of technical and mechanical experts for major equipment repair;

c) availability of local manpower skills for maintenance and minor equipment repair;

d) accessibility of system equipment requiring operation and maintenance during adverse weather conditions; and

e) general accessibility of the community.

3.6 Existing Data - The Contractor may visit the DIAND Regional Office in Toronto to personally review the files and make arrangements to obtain copies of existing data from previous reports and field surveys. Existing data on file is listed in Attachment No. 1.

3.7 Community Services - The Contractor shall be responsible for co-ordinating the existing and proposed services of the community to satisfy the objectives of the work and the needs of the Band.

3.8 General Design Considerations - For major projects, the Contractor shall consider the following:

a) Phased construction of systems to coincide with community plan.

b) Future expansion of these systems based on community plan and projected population.

c) Flexibility of community plan.

d) Isolated houses or small clusters of houses on the fringe of the community.

e) Adequate data to substantiate recommendations such as chemical and bacteriological samples for developing water supply sources and soil samples and topographic surveys for constructing water distribution systems, sewer collection systems, road construction, and applicable treatment facilities.

B. WORK STATEMENT

1.0 Reserve Planning

All work shall be carried out in consultation with the PM, the Planner, the Supervisor and the Band. The work shall include:

a) Analyse the data and compile pertinent information to facilitate community planning.

b) Prepare existing condition maps, including soils and topography, buildings, roads, vegetation, terrain, granular deposits, forest resources, etc.

c) Prepare the availability and condition of housing, schools, recreation, health services.

d) Prepare land use concepts (broad brush method)

e) Prepare a demographic analysis to include existing and projected population growth up to year 2000 at five year interval.

f) Prepare employment statistics, work force, income figures (e.g. trapping, fishing) and establish potential future work opportunities and commercial ventures.

g) Develop alternative concepts and schemes for an overall community plan and a subdivision plan to facilitate future projects and locate areas of special significance.

Guidelines for sizing the subdivision are in DIAND, Indian Housing Infrastructure Standards. Final subdivision plan shall show green areas, lots, approximate location of services (roads, watermains, water services, etc.) and construction phasing (approximately 5 year stages). Class "C" cost estimates for constructing each phase and each service of the phase shall be determined.

2.0 Water Supply/ Wastewater Disposal System

2.1 Brief - All work shall be carried out in consulation with the PM, Supervisor and Band. The design period and population projection shall be determined in Item B1. The Contractor shall review the adequacy of the existing water system and existing waste disposal practices, obtain all

relevant information and field data, identify deficiencies and prepare a report on assessed and recommended water and wastewater systems to properly serve the existing and future community.

2.2 Suggester Water Supply Alternatives - The following alternative systems or combinations thereof shall be considered:

a) Water source such as shallow wells, deep wells or surface water.

b) Central water source and distribution system (small diameter pipe, shallow or deep buried, etc.), individual system or combination.

c) Treatment and storage requirements based on difference sources.

d) Water distribution systems such as trucked system to water points and cisterns, piped system to water points, piped sytem to houses, small diameter and shallow buried piped system, recirculated piped system, etc.

2.3 Suggested Wastewater Disposal System Alternatives - The following alternative systems or combinations thereof shall be considered:

a) The adequacy of the use of septic tanks and soil absorption fields.

b) Sewage holding tanks, truck haulage and a central treatment facility.

c) Central piped collection system (gravity, pressure or vacuum) and treatment facilities.

d) Lagoon sewage treatment facilities.

2.4 Fire Fighting Considerations - The following items shall be considered:

a) Fire fighting capability using a piped water system and fire equipment.

b) Fire fighting capability using a trucked system.

c) Fire fighting capability using storage (if required) and dry hydrant system.

d) If fire fighting accessories and systems such as truck, fire truck garage, fire fighting team, etc., are not available at the community now, cost estimates for these accessories shall be presented as a separate item.

2.5 Assessment Considerations - The following items shall be considered:

a) The Reserve land use and community plan.

b) Location of the water intake and waste discharges with respect to currents and depths.

c) Possible use of waste generating plant heat.

d) Protection of piped service against weather conditions (depth of bury, heat tracing, insulation, recirculation, etc.).

e) If a piped water system is recommended, additional watering points besides house services shall be considered at practical locations and protected against weather and vandalism.

2.6 Analysis of Alternatives - The analysis of the alternatives shall be based on the Northern Utilities Delivery Design Manual, Environmental Canada, 1979, and the cost analysis for any piped or trucked system shall be partially based on the program contained therein as Appendix 1.

3.0 Road and Drainage System

The road and drainage system for the proposed subdivision shall be designed to meet minimum M.T.C. standards. Consideration shall be given to the practicality of the system to serve the subdivision, fit into the community plan and the need to provide any environmental controls on the drainage. The approved road and drainage system shall be adequately described and presented with a conceptual design, a plan and a typical cross section showing the road, ditch and any municipal service (sewer or water).

4.0 Scope of Services

The scope of services required of the Contractor for each stage of work is similar and includes:

a) review of existing plans, data and studies (see Attachment No. 1);

b) consultation with the PM, Planner, Supervisor and Band, to review the needs, proposed development sites, extent of proposed services and/or adequacy of existing facilities;

c) obtaining field data to develop population projections, preliminary plans and alternative systems and to verify surface and subsurface information;

d) preparation of draft documents including data presentation; existing system plan and evaluation, draft land use and community and subdivision plans, recommend alternative systems, rough cost estimates and proposed phased construction;

e) presentation of draft documents (50% stage) to the PM, Planner, Supervisor and Band, to obtain their comments and concurrence concerning the draft documents;

f) preparation of final documents based on the comments received and detailed evaluation and field investigation of recommended system;

g) presentation of final draft documents (90% stage) to the PM, Planner, Supervisor and Band to obtain their concurrence and the PM's approval; and

h) submission of final approved documents (originals and copies) to the PM.

5.0 Reports, Maps and Plans

5.1 Reports - Reports shall be Black and White 8 1/2 x 11 format, double

spaced in draft form and single spaced in final form with suitable cover. The reports shall be arranged to provide easy presentation of study results. Data substantiating any recommendations shall be presented in an appendix. All maps shall be of suitable size to facilitate reduction for binding within the report. The final report shall include sufficient charts, tables, drawings, maps and plans to clearly illustrate the programmes and schedules.

5.2 Description - Each alternative system shall be adequately described and presented with a conceptual design, located on a plan, and provided with a list of advantages and disadvantages.

5.3 Cost Estimates - Cost estimates shall be tabulated for each practical alternative system. List separately the central treatment, distribution and collection systems, any systems serving a cluster of houses and a typical individual water and wastewater disposal system. Costs shall be broken down into design, construction and operation and maintenance. Fire protection accessories reported in capital costs and annual operation and maintenance costs shall be reported separately.

5.4 Manpower Requirements - The Contractor shall identify the skills, total time and frequency required of an operator for the operation and maintenance of each practical alternative assessed.

5.5 Plans - The submitted original plans shall be the standard DIAND plan format, "Mylar" reproducible drawings. The PM can provide the Contractor with proper format for headings and title blocks for the drawings.

5.6 Document Presentation - All reports, maps and plans shall be in the English language and in metric units.

5.7 Draft Documents - Ten (10) copies of draft documents shall be provided to the PM two (2) weeks prior to scheduled meetings. Draft documents include report outlines, drawings, and preliminary cost estimates at approximately the 50% stage.

5.8 Final Draft Documents - Ten (10) copies of the final draft documents shall be provided to the PM two (2) weeks prior to scheduled meetings Final draft documents. include reports, maps, plans, and cost estimates at the 90% stage.

5.9 Approved Documents - Twenty (20) copies plus the original of each final approved document shall be submitted to the PM, the 100% stage.

Attachment No. 1

# MARTEN FALLS INDIAN RESERVE NO. 65

## Existing Plans and Reports

DIAND Regional Planning Section have the following mapping and plans available for the Contractor to examine:

1. Maps

   1968, Scale 1:100, A.P.M. Material

2. Aerial Photographs

   Flown in 1953, no scale
   Flown in 1968, two sets, no scale
   Flown in 1978, no scale

3. Reports

   a) A Feasibility Study for the Manufacture of Snowshoes, Resource Management Consultants, October 1969.

   b) Terrain Evaluation of the Community and Surrounding Area, Bird & Hale, June 1971.

DIAND Regional Engineering and Architecture Section have the following reports available for the Contractor to examine:

1. Electrification Study - B. J. Tworzyanski Ltd., July 1978.

Any legal survey plans of the study area may be obtained by the Contractor from the following:

1. Marten Falls Indian Band.

2. Lands & Membership Branch, DIAND, Toronto.

3. Energy, Mines, and Resources, Toronto.