

The Anticipated Effects of Land Use Policies On
Rural Residential Development:
A Case Study of the Rural Municipality of
Springfield, Manitoba

By
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THE ANTICIPATED EFFECTS OF LAND USE POLICIES ON
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ABSTRACT

Policies have been proposed to regulate land use in Manitoba. The objective of this study was to anticipate some of the effects which the policies would have on rural residential development in the Rural Municipality of Springfield.

There were three main phases to the research. The present trends of residential development were examined in order to determine where future residential activity might take place without new land use policies. A computer grid mapping technique was used to model areas of residential suitability. The policies were examined to determine where they would permit and prohibit residential activity.

In analysing the results, it was found that the probable areas for future residential activity with no land use policies were quite different from the areas which remained available for residential uses within the terms of the policies. Generally, the areas where residential development was permitted by the policies were much more suitable for residential development than the areas which probably would be chosen in the absence of the policies. In addition, there were other reasons to suggest that the implementation of the land use policies would be beneficial for rural residential development and for the Province.

The policies have changed since this project was conducted. The views expressed in the paper are not necessarily the same as the views of the government.

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CHAPTER 1

INTRODUCTION TO THE STUDY AND STATEMENT OF METHOD

BACKGROUND

The trend of rural to urban migration still has momentum. However, in recent years, more of the total pattern of migration has been from smaller urban areas to larger ones, and rural residences have become established as an alternative to an urban lifestyle.

Problems can develop when portions of a rural area, already being used for various economic activities, are subdivided for rural residential purposes. Intensive agricultural enterprises (notably hog-barns, feedlots, etc.) pose aesthetic and environmental difficulties for neighbouring exurban rural residents, and scattered residential uses can disrupt and fragment agricultural areas.

Frequently, the locations chosen for residential use are unsuitable. Basic physical considerations for choosing sites should include flooding threat and drainage potential, soil suitability for foundation construction, soil suitability for private septic fields, dominant land use in the area, and the adequacy of the local water supply.

Scattered residential uses in rural areas can lead to higher costs of public services on a per household basis. The costs of "linear" services such as drainage, roads, streetlighting, telephone, and electricity are proportional to length, and are more expensive on a per household basis in less densely populated areas. As more people move into agricultural (and other rural) areas, other capital expenditures on service can be expected to increase. Examples include expenditures for schools, additional teachers, more school busing, street building, improvements, and maintenance, larger police forces, more

fire protection, and, additional personnel to process and administer subdivisions, housing and building codes, etc.

As early as 1971, a growing demand for rural residential subdivisions could be noticed within a commuting radius of 30 miles around Winnipeg. Because the impacts of such development on the resource base (particularly agriculture) were unknown, the Winnipeg Region Study was initiated by the Manitoba Department of Municipal Affairs. The primary goal of this study was to collect and analyse data from which a set of policies could be established to optimize the land use in the area. On January 1, 1976, the Planning Act came into effect in Manitoba. Subsequently, the Provincial Land Use Committee (P.L.U.C.) requested that the land use policies be formalized in order to direct the Province's responsibilities under the new act. The policies had not been implemented when this study was undertaken.

THE PROBLEM

Statement of the Problem

The land use policies were designed to provide a framework for the provincial evaluation of municipal development plans, to expedite the subdivision approval process, and to reduce social and economic costs to government. The suggestion was made that the implications of the policies should be monitored closely, and that changes might be recommended to P.L.U.C. in order to ensure that the policies function properly.¹ This study is intended to serve as part of that monitoring process.

¹Manitoba Department of Municipal Affairs, "Provincial Land Use Policy Proposals" (unpublished manuscript, Winnipeg, 1977.)

The real consequences of implementing the land use policies are not yet known. Within this general area of concern, a number of smaller problems can be identified. The purpose of this study is to determine the effects which the policies will have on rural residential development. The study is focussed on the Rural Municipality of Springfield, Manitoba. See Figure 1.

Research Objectives

There are four objectives to be achieved in the sequence outlined below.

The first objective is to secure an understanding of the present situation of rural residential development in the municipality. That is, to determine from past experience where future residential activity might be expected in the absence of the policies.

The second objective is to determine (according to specified criteria) which areas in Springfield are suitable and unsuitable for rural residential development. The results from this portion of the investigation will serve as one of the means by which the impact of the proposed policies on rural residential development can be assessed.

The third objective is to interpret the policies and then apply them to the physical situation in Springfield. The intention is to determine which areas will be affected by development constraints and which areas will remain available for residential uses within the terms of the policies.

The final objective is to assess the impact which the land use policies are likely to have on rural residential development in Springfield. This assessment will involve subjective interpretation of

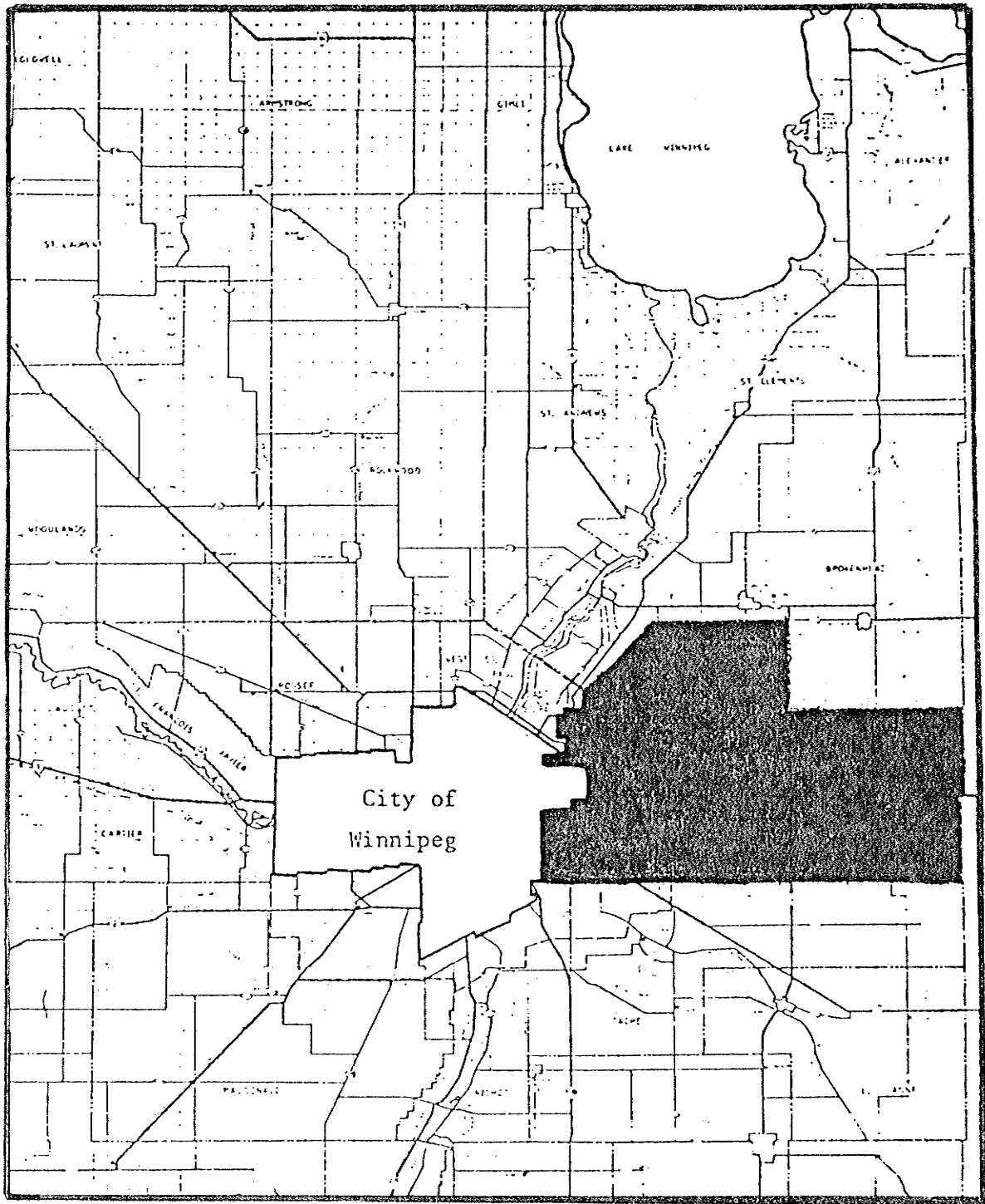


Figure 1
Location of the Rural Municipality of Springfield

some of the consequences which the policies can be expected to impose on residential uses.

The Delimitations

The effects of implementing the land use policies can be expected to be numerous and extensive, but only certain ones can be examined in a study of this scope. The primary focus of this research is on the effects which the policies will have on rural residential development. Springfield was recommended as a study area because there is intense pressure for residential development there and because the geographical diversity of the area allowed most of the policies to be applied.

The Assumptions

It was assumed implicitly that residential uses are acceptable in rural and agricultural areas and that space should be designated to accommodate these uses. However, serious problems can develop when residential development proceeds on an unplanned basis.

It was assumed that landowners will object to the policies if they think that the policies can curtail the freedom they have with their land. It was assumed that all of the policies were implemented simultaneously and completely. (When this project was begun, none of the policies had been approved or implemented.)

METHODOLOGY

Method for Objective #1

Current residential activity in Springfield was examined from several points of view. Different measures of development activity

(including numbers of land division plans registered each year, numbers of land sales each year, numbers of entries on the tax roles each year, and numbers of building permits issued each year) were investigated to determine if development activity was increasing or decreasing. The locations of active residences were noted from land use maps that had been prepared by the Resource Planning Consultants Group Limited for their study, An Historic and Present Land Use and Open Space Inventory of the Winnipeg Region. The locations of recently built residences were noted from the descriptions on approved building permits. Residence locations were analysed in terms of certain parameters including: situation within a section; proximity to major roads; proximity to natural waterways; proximity to urban communities in the municipality; and travel time to Winnipeg.

Method for Objective #2

Suitable locations for residential development in Springfield were identified by means of a computer grid mapping technique. The technique is explained in Appendix 3.

Method for Objective #3

The land use policies were examined individually. In order to determine how each policy would affect residential activity, the physical areas affected by each policy were noted and then compared with information about current and expected residential activity.

Method for Objective #4

In achieving the first three objectives, the following information emerged:

where future residential activity might be expected in the absence of the proposed policies;

where future residential activity might take place when the policies are implemented; and,

where the most suitable and unsuitable areas for residential uses are located.

In order to assess the impact of the policies on rural residential development, this information was compared and contrasted, and a subjective interpretation was made of some of the consequences of locating residences in the areas which remained acceptable for these uses within the terms of the policies.

THE IMPORTANCE OF THE STUDY

Perhaps the prime importance of this study lies in the fact that it serves as a test of the land use policies from which strengths and weaknesses can be identified, and recommendations for changes suggested. In addition, it provides a detailed base for further experimentation with the policies.

Over the past few decades, demands for land have increased, and such demands can be expected to increase even further in the future. This consideration underscores the importance of sound land use planning and regulation.

An understanding of some of the expected consequences of implementing the land use policies is important. It is possible that the policies will be thought to be overly restrictive or unfair by those persons who consider the subdivisions of rural land to be an undeniable right, and by those persons who, as a result of the policies, will have greater difficulty in realizing their goal of a semi-rural lifestyle.

CHAPTER 2

SUMMARY OF FINDINGS ABOUT RESIDENTIAL DEVELOPMENT

SPRINGFIELD ¹

The Rural Municipality of Springfield occupies an area of approximately 410 square miles to the East and Northeast of Winnipeg. See Figure 2. Residents of the area have easy access both to jobs and to goods and services which are available in Winnipeg.

Springfield is mainly agricultural. Although the overall trends in land use have shown a decline in the wooded and rough pasture areas and an associated increase in intensive agricultural areas, a more detailed analysis shows that a significant amount of land is being taken out of agriculture and put into residential use. At the present time, there are just under 200,000 acres zoned as low as five acre minimums for residential purposes.

There have been large fluctuations in the total population of Springfield. The population in 1951 (5375) was approximately the same as the population in 1921 (5345). Between these two lows, the population in 1941 (6863) was almost as high as the population in 1976 (6944). Recently, the population of Springfield has been increasing rapidly. The evidence suggests an in-migration of young families with children. Studies have established the presence of, and some of the

¹See Appendix 1 for more detail.

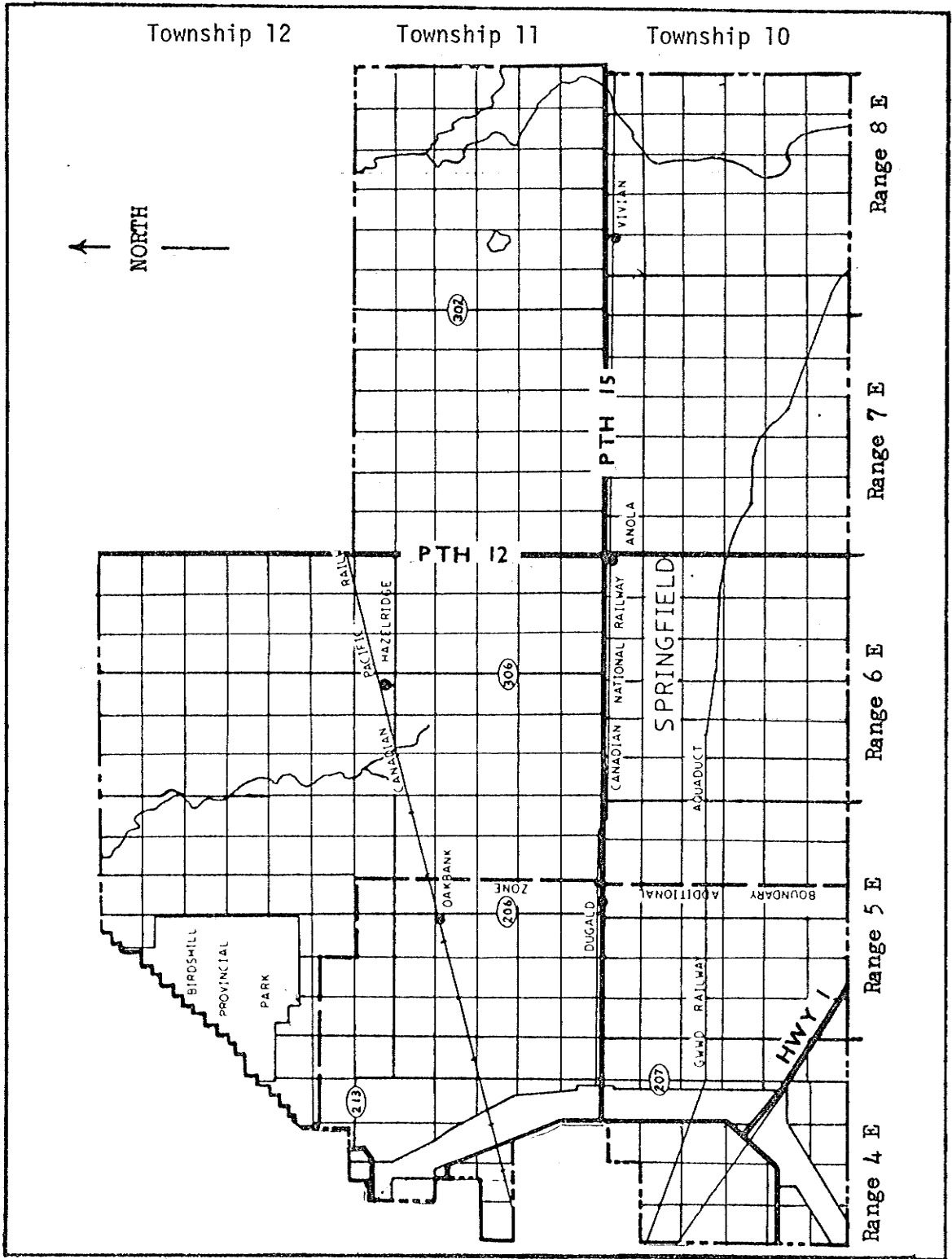


Figure 2
The Rural Municipality of Springfield

characteristics of exurbanites in Springfield.¹ Other studies have indicated that there are public costs associated with the increasing presence of exurbanites in similar, predominantly agricultural areas.²

The heaviest population concentrations in Springfield are in the Northwest area. Population density gradually decreases to the South and East.

RESIDENTIAL DEVELOPMENT IN SPRINGFIELD³

Trends in Development Activity

The data on residence development trends were difficult to interpret. Generally, the rough estimates of development activity (including numbers of plans of land division registered each year, numbers of land transactions registered each year, and increases in numbers of tax bills and entries on realty rolls each year) indicated that residential activity might be decreasing. These data conflicted with what were thought to be more reliable indicators (including population increase, increase in numbers of residential lots created each year, and increases in the number of building permits issued each year for the construction of new residences). It was concluded that residential building activity cannot be expected to decrease in Springfield in the near future.

¹See for example, Paterson Planning and Research Ltd., Lifestyle Preferences of Rural Non-farm Residents: R.M. of Springfield, Manitoba: An Analysis. Toronto, 1973.

²See for example, Real Estate Research Corporation, The Costs of Sprawl. Washington, 1974.

³See Appendix 2 for more detail.

Patterns in the Locations of Residences

As might be expected, an historically complete count of the plans of land division in each township indicated a general trend of greater activity closer to Winnipeg and less activity with increasing distance from Winnipeg.¹

An examination of the land use maps which were prepared by the R.P.C. Group Ltd. for the Winnipeg Region Study indicated certain trends in the locations of existing residences.

1. Residences tended to be located on the periphery of sections.
2. Residences tended to be located preferentially along the major roads (especially Provincial Trunk Highway 15 and P.T.H. 12, and Provincial Roads 206, 207 and 213).
3. Residences tended to be more common along the major natural waterways.
4. Residences tended to be more common within a one mile radius of communities (for example Anola, Dugald, Hazelridge, and Oakbank). However, residence density decreased very quickly to background levels at a radius of two miles.
5. Residences were more concentrated in the area around Winnipeg and in the Northwest portion of the municipality. Generally, residence density decreased as travel time to Winnipeg increased.

See Data Level #3 in Appendix 3.

A more general examination of residence locations, based on the legal descriptions from building permits issued from 1971 to 1976 provided similar kinds of evidence. However, there were some differences between locations of recently built residences and the locations of all active residences. The residence location trends from the recent building permits were as follows.

¹See Appendix 2, page 84 for an explanation of the terms "Township", "Section", etc.

1. Residence location could not be analysed in terms of location within a section. However, the assumption of peripheral locations was verified in those cases where complete legal descriptions were recorded on building permits.
2. Residences tended to be located next to the better quality roads. This finding suggested the possibility that in the absence of new land use policies, residence density might increase in an area following road improvements.
3. Although the number of residential building permits issued and the number of available locations were too small for an accurate analysis, it appeared that the recently built residences were not located preferentially along the major natural waterways.
4. There was a tendency for the new residences to be clustered around Anola, Dugald, and Oakbank; but again, residence concentrations decreased very rapidly to background levels by a radius of two miles.
5. The tendency for new residences to be located close to Winnipeg was not as pronounced. A surprising number of new residences were located in Township 11-7E. There was a tendency for new residences to be clustered around Birds Hill Park.

See Data Level #15 in Appendix 3.

Conclusions

Because the population was found to be increasing, and because the total number of building permits issued annually for new residence construction is increasing, it was concluded that the current trends of residential development will probably persist in the near future.

From an examination of building permits issued, it became apparent that residential activity exists in two forms. There is an incremental type of growth through which the character of an area can be changed slowly as residence numbers and density increase. Additionally, there are residential developments which take place in larger steps as illustrated by the larger subdivisions.

This distinction is elementary but important. Different areas of Springfield are subjected to different amounts of these two types of development. Although in the short run the incremental or marginal kind of change would appear to be less threatening, it is difficult to guard against; and, in the long run, the cumulative effects of persistent incremental residential growth are the same as the effects of larger subdivisions. Both types of residential development require attention, monitoring, and guidance if major land use conflicts are to be avoided.

Residential building activity will probably increase in some fashion as population increases. In the absence of new land use policies, further residential activity can be expected around urban communities, along the Provincial Trunk Highways and Provincial Roads, in the areas on the South and East sides of Birds Hill Park, and in the area to the Northeast of Anola in Township 11-7E. See Figure 3.

Areas of Residential Suitability and Impact ¹

A physical suitability model for residential use was developed (based on dominant land cover, soils suitability for septic fields, soil bearing strength for foundation construction, and drainage problem areas). A resource impact model was developed (based on considerations of soils potential for agriculture, aggregate minerals, and groundwater pollution). In addition, two suitability models of amenity considerations were developed (based on open space and wooded area

¹See Appendix 3 for more detail.

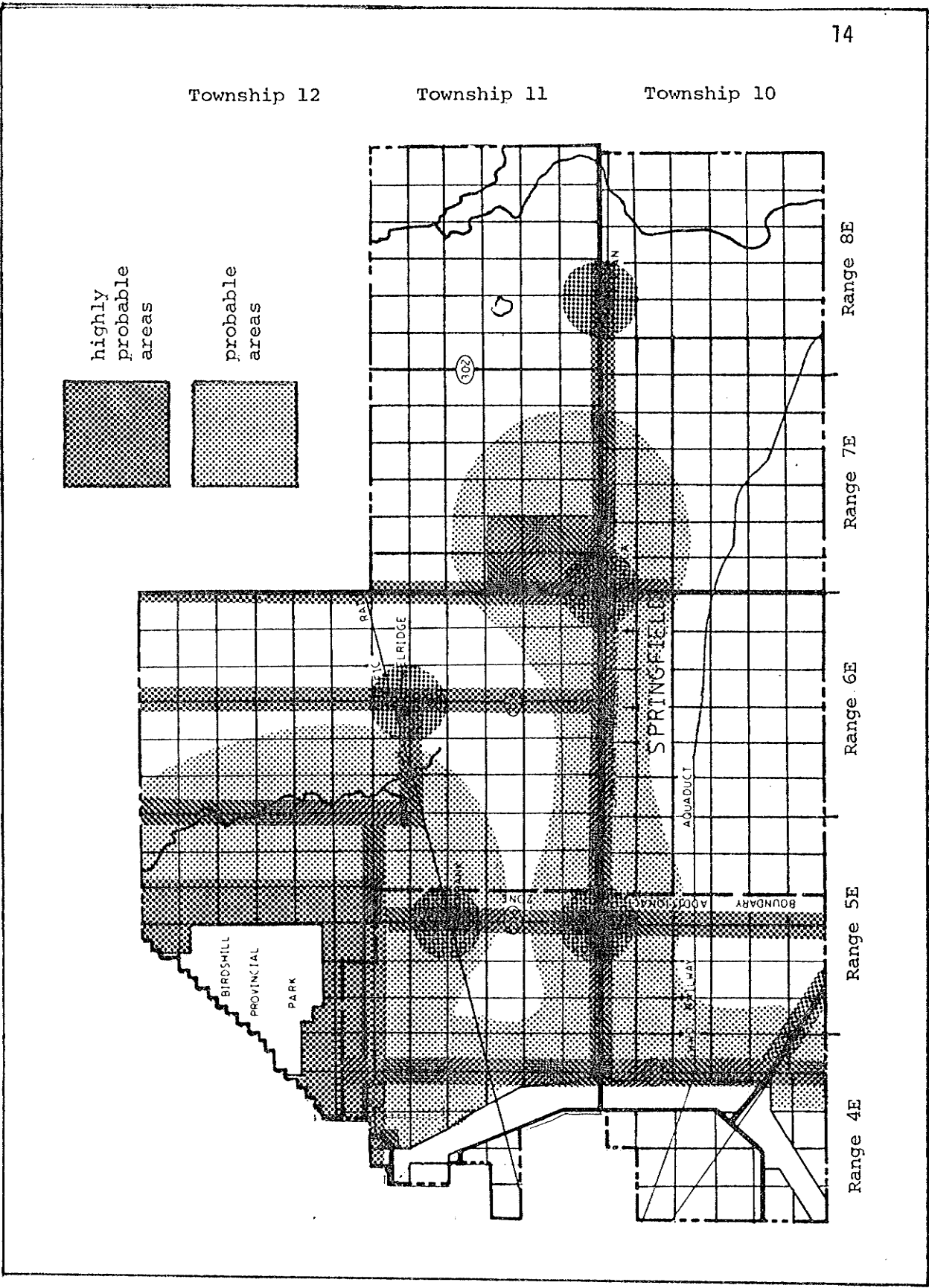


Figure 3
Probable Locations of Future Residences
With No Change in Land Use Policies

preferences for residential locations, and proximity to hydro lines, railways, urban communities in Springfield, and travel time to Winnipeg).

In order to approximate the optimal locations for residential uses (based on these considerations) a comparison was made of areas with:

- a) a physical suitability value of more than 5
- b) a resource impact value of less than 5
- c) i) an open space preference suitability value of more than 5
- ii) a wooded area preference suitability value of more than 5

With regard to the open space preference for residence location, there was the equivalent of approximately 40 sections in Springfield which satisfied the criteria. Approximately 3 quarter sections were situated along the Southeast edge of Birds Hill Park. Additionally, there was a thin strip of suitable land (approximately 1/4 mile in width) which extended for about 1.5 miles to the South from the Southwest corner of Birds Hill Park. There were approximately 12 quarter sections situated in the Southeast corner of Township 11-6E. The equivalent of almost 20 quarter sections was situated in the southern part of Township 11-7E. Twice as much suitable area (approximately 48 quarter sections) was dispersed throughout Township 11-8E. Townships 10-7E and 10-8E each had about 30 quarter sections. Apart from the Northwest corner around Birds Hill Park, and the areas in the East, there were no other suitable locations for residential uses (according to these criteria).

With regard to the wooded area preference for residence locations, there were approximately 35 quarter sections which satisfied the criteria. There were a few suitable sites situated on the East side of Birds

Hill Park, and the equivalent of about 10 quarter sections were situated in Township 11-6E. Townships 11-7E, 10-7E, and 10-8E had between 32 and 36 quarter sections of suitable land, and Township 11-8E had approximately 20 suitable quarter sections.

Overall, within the limits of these models, there were suitable areas for wooded space and open space locations in the Northwest corner around Birds Hill Park, and in the eastern townships. The total area of approximately 80 sections was represented by parcels which ranged in size from about 40 acres to about 7000 acres. See Figure 4. (Also refer to the models in Appendix 3).

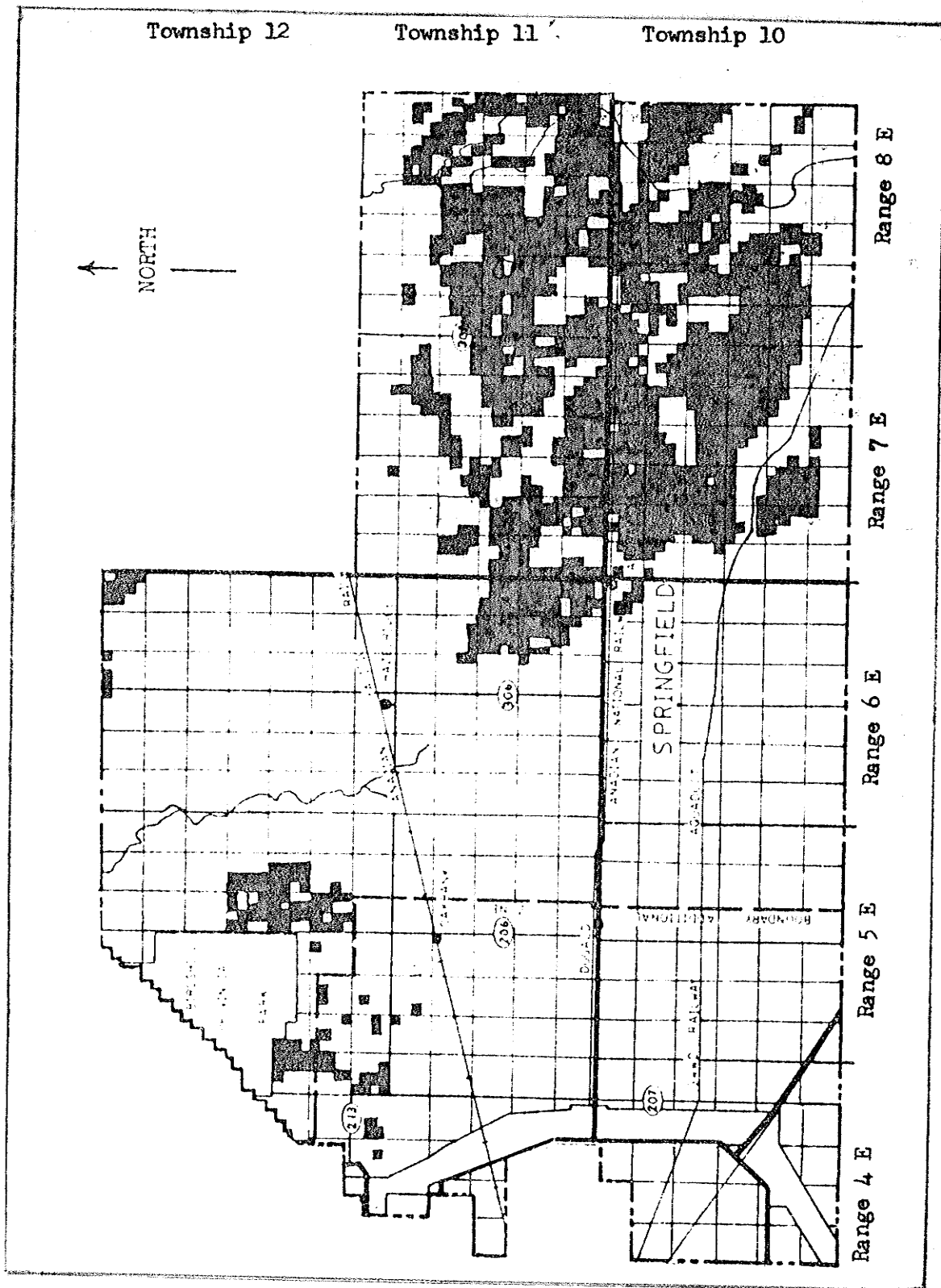


Figure 4
Areas of Residential Suitability

CHAPTER 3

THE LAND USE POLICIES

DISCUSSION OF THE POLICIES

Some of the policies were examined in more detail than others. There are three parts to the discussion of each of the proposed land use policies. The statement of each policy is followed by an outline of the physical area which can be expected to be influenced by the policy and a general discussion of the degree of conflict which the policy might impose on residential activity.

Although most of the policies are designed to assist in the management of natural resources, others are intended to protect public investments (for example, highways). Certain of the policies are explicit statements of restrictions on land uses, while others are more flexible. There was a considerable degree of overlap among the areas affected by the various policies. A Township map of Springfield is included for reference as Figure 5. Italicized phrases are defined in the Glossary in Appendix 4. The definitions are specific to the policies.

Policy #1 part 1

Policy Statement. Areas should be reserved for a *full range of agricultural activities* where agriculture is in the *dominant position* on *prime agricultural land*.

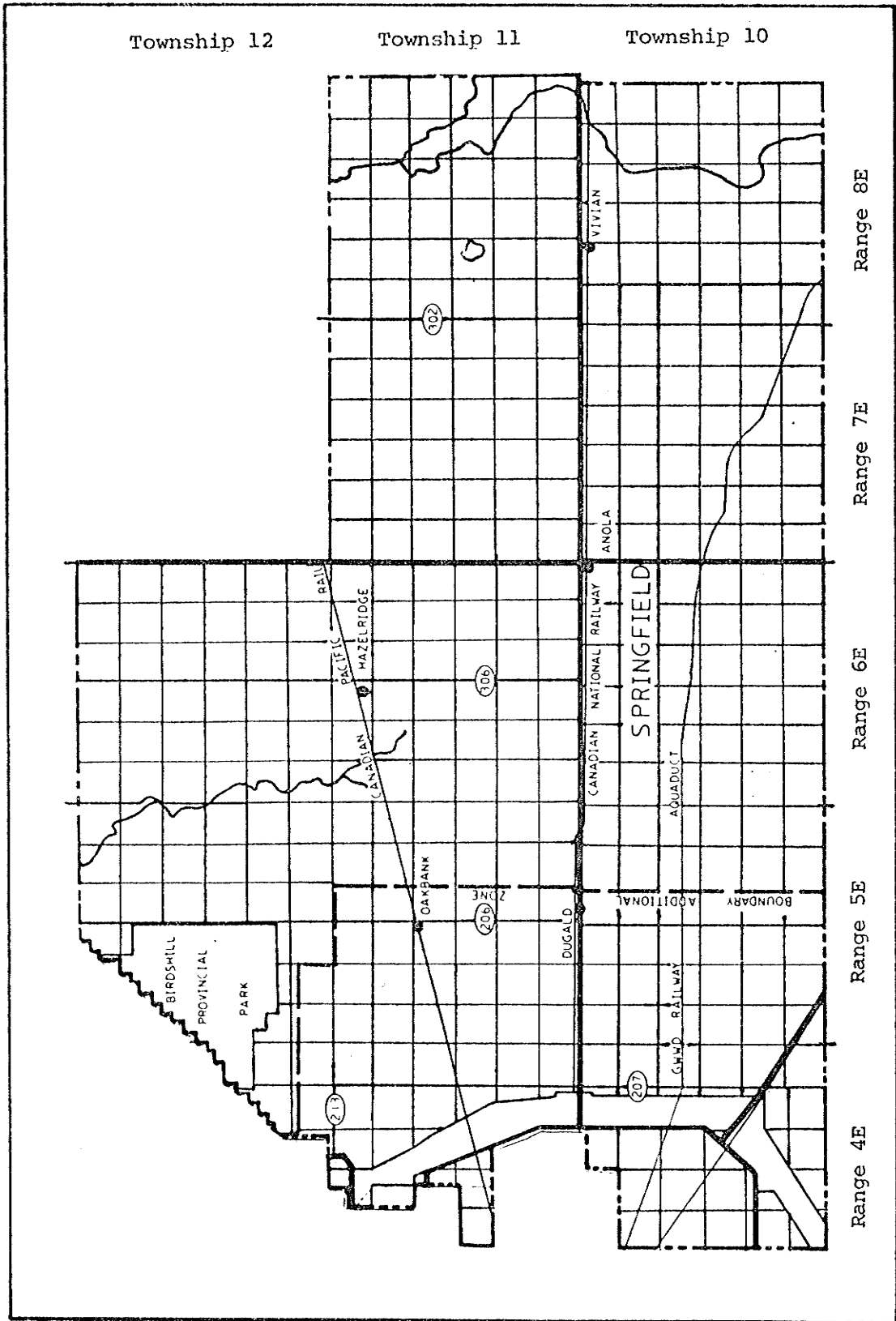


Figure 5
Township Map of Springfield

Physical Area Affected. The implementation of Policy #1 will protect all quarter sections of which more than 75% is used for agricultural purposes, and of which more than 60% is comprised of land defined as having Canada Land Inventory (C.L.I.) agricultural capability of class 1, 2, or 3, and upon which there are no more than three residences. The wording of this policy is so precise that there is little room for differences in interpretation.¹

It was determined that approximately 200 square miles of agricultural land in Springfield would be affected by this policy. Protection for agricultural uses would be secured for a large block of land situated on the longitudinal axis of the municipality in Townships 10-5E, 10-6E, 11-5E, 11-6E, and 12-6E. Much of the eastern townships would remain unaffected by Policy #1 because of the presence of marshes, wooded areas, other non-agricultural areas, and because of the presence of poor quality soils in the agricultural areas. (See data level #4). A maximum of approximately 19 sections in the four eastern townships are eligible for protection under Policy #1. (This figure represents only about 13% of the total area of these townships.) Approximately one half of the area which could be protected in the eastern townships lies on the western fringe of the main body of protected prime agricultural land. The remainder is comprised mainly of quarter sections which are scattered widely throughout the area. See Figure 6.

¹ For the purposes of this analysis, the quarter sections protected under Policy #1 were interpreted as having three or more legal subdivisions in agriculture (data level #4) three or more legal subdivisions of CLI classes 1, 2, or 3 for agriculture (data level #5) and less than three residences (data level #3).

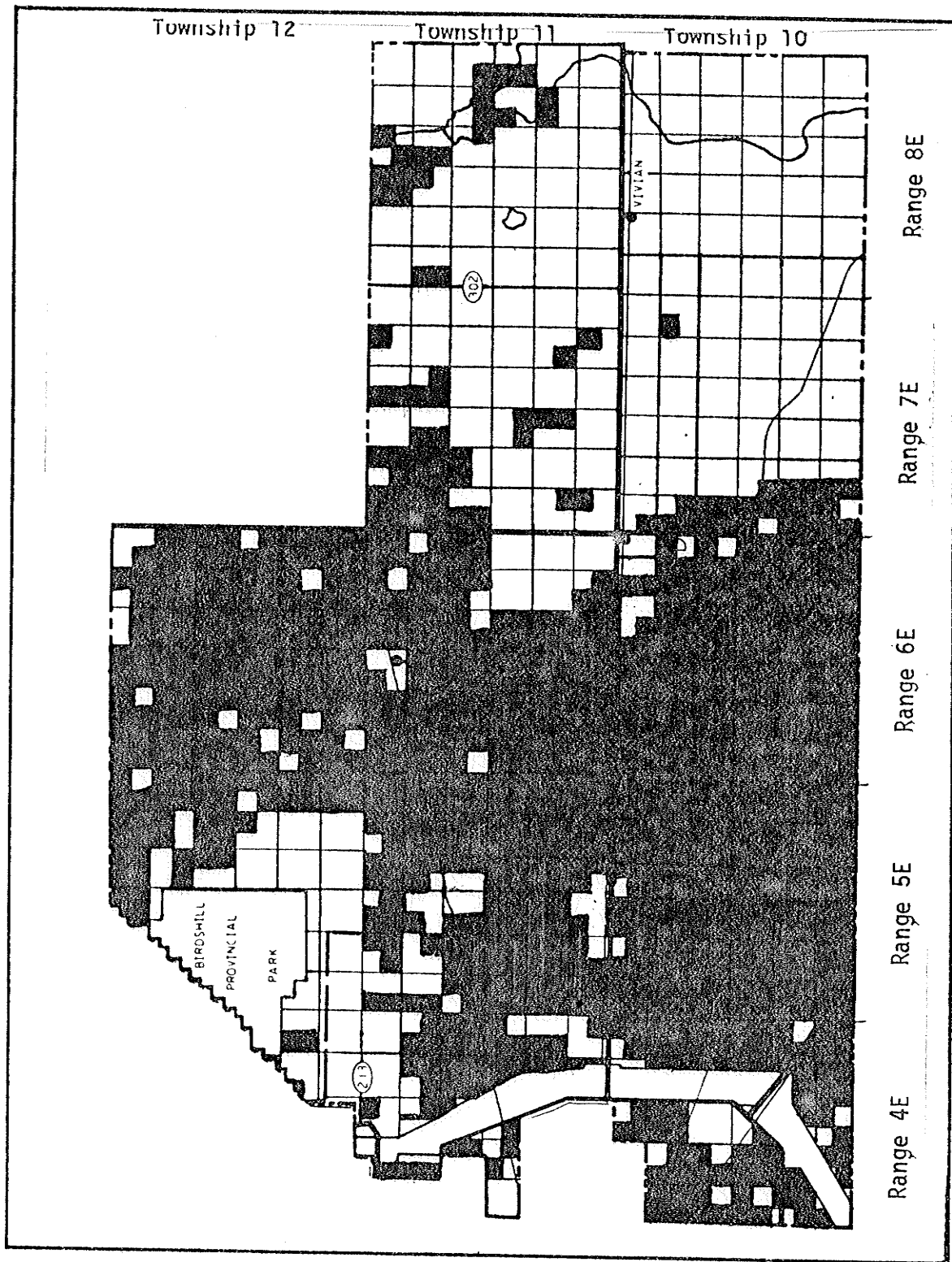


Figure 6
General Portrayal of Prime Agricultural Areas

In the western portion of the municipality, in addition to the presence of non-agricultural areas, and some poor quality soils in the Northwest, the numbers of residences per quarter section becomes an important factor in excluding prime agricultural land from protection under Policy #1. Owing to the requirement of no more than three residences per quarter section, it can be appreciated that prime agricultural areas which are under greater pressure for rural residential use will tend to be less protected by this policy.

Impact on Residential Activity. The identification of prime agricultural areas under Policy #1 is intended to preclude further rural residential activity in these areas. Township 11-5E has been consistently popular both in terms of active residences and in terms of the proportion of all building permits issued for new residential construction from 1971 to 1976. Similarly, Townships 11-6E and 12-6E have been equally consistent and almost as popular in this regard. Conflicts with rural residential uses which are generated by Policy #1 part 1, can be expected to arise mainly in Townships 11-5E, 11-6E, and 12-6E.

Assuming that there are no changes in the present demand for rural residences, the implementation of Policy #1 part 1 by itself might be expected to direct future residential activity as follows:

In the Northwest, residential growth will be directed onto agricultural land of classes other than CLI 1, 2, or 3, for agricultural use.

In the western and central regions (and to a certain extent in the Northwest corner) some growth will be directed into quarter sections which are situated on prime agricultural land but which have more than three residences and which have not been preserved for limited agriculture under Policy #2. A positive outcome of this possibility is the concentration of future rural residential activities into certain areas.

In the eastern townships, residential developments will be guided into non-agricultural and non-prime agricultural areas. Because these areas constitute about 85% of the total area of these townships, this amounts to very little direction.

Policy #1 part 2

Policy Statement. Areas should be reserved for a *full range of agricultural activities* where agricultural activities are dominant on *lower class lands* and it is *desirable* to protect such activities.

Physical Area Affected. The area affected by Policy #1 part 2 will depend largely upon the interpretation of the term "desirable". Policy #1 part 2 has a discretionary application. The main effects of Policy #1 part 2 can be expected to occur in the eastern townships and in the Northwest corner of the municipality where areas of low quality soils are used for agricultural purposes. In the Northwest area, around Birds Hill Park, agricultural activities are dominant on poorer quality soils in a maximum of approximately 25 quarter sections. In the eastern townships, agricultural activities are dominant on a maximum of approximately 150 quarter sections with lower quality soils.

Impact on Residential Activity. The impact which Policy #1 part 2 can be expected to have on residential activity also depends upon the discretionary interpretation of the term "desirable". The major impact on residential development can be expected in the Northwest corner where the pressure for such development is the greatest. Additionally, some impact can be expected in the area to the Northeast of Anola in Township 11-7E, where considerable residential activity has occurred recently and some agriculture is practised on lower grade soils.

Policy #2

Policy Statement. Areas should be reserved for *limited* agriculture where because of the *mixture* of the land use a full range of agricultural activities may no longer be possible. Within certain portions of the areas falling under this policy, residential development may occur under Policy #3.

Physical Area Affected. The physical area which will be affected by Policy #2 will depend upon local interpretation of the term "mixture". The policy automatically applies to all river lots, and it is intended to be applied to areas where, because of the encroachment of other uses, full agricultural utilization cannot be realized. In Springfield, two main areas can be identified where Policy #2 might be applied. There are approximately 40 predominantly wooded quarter sections situated on prime agricultural soils, located mainly in Townships 10-7E and 11-7E. Additionally, there are approximately 60 quarter sections of prime agricultural land, mainly in the West, which are not protected under Policy #1 part 1 because of the presence of more than three residences per quarter section.

Impact on Residential Activity. The impact of Policy #2 on residential activity cannot be determined precisely at this time. It is certain that in the western portion of the municipality there are many quarter sections which contain more than three residences, and which might come to serve as centres where future residential activity will be concentrated. Ultimately, local planners will make these decisions. From the point of view of this study, the concentration of such activity

under Policy #2 is a desirable outcome.

There has been a considerable amount of recent residential activity in township 11-7E, and because agricultural uses are small and scattered in this area, Policy #2 might also find some application in this region. However, the main impact of Policy #2 on rural residential activity can be expected to occur in the western portion of the municipality. The main effect will be to concentrate future residential development.

Policy #3

Policy Statement. Lands may be designated for *rural residential development* provided the siting and design of such development shall reflect its role as an alternative to the urban lifestyle, and not as an evolutionary step towards an urban environment. In addition, the development shall be planned to minimize conflict with resource related industries and activities.

Physical Area Affected. Generally, rural residential development may not be permitted in three types of areas:

areas which are suitable for a full range of agricultural activities (as outlined in Policy #1);

areas which have been identified as resource protection areas for parks, wildlife, ecological, hazard land, aggregate minerals or other purposes (unless it can be demonstrated that the proposed development will not conflict with the stated resource goals); and,

areas which are within two miles of the boundary of an incorporated centre or the built up area of an unincorporated urban centre.

In Springfield, the major areas where rural residential activity may be

permitted are situated in the eastern townships, and in those portions of the western and central areas which fall under the influence of Policy #2, in which rural residential uses are approved uses.

Impact on Residential Activity. This policy applies directly to residential development. The possible effects of a restriction of rural residential activity in those areas which are suitable for a full range of agricultural activities were discussed in the section on Policy #1. The possible effects of restricting residential activity from resource protection areas for parks, wildlife, ecological, hazard land, aggregate minerals, and other purposes will be discussed in sections dealing with the other policies (especially Policy #5, 7, 8, 9, 11, and 13).

The main impact of the restriction of rural residential activity within two miles of the built up area of urban centres will be felt around the communities of Anola, Dugald, Oakbank and to a lesser extent, Hazelridge. The greatest proportions of urban-centred rural residential development have taken place in these areas. Accordingly, for the purposes of this study, it was assumed that Policy #3 was directed at these communities. (However, with a broader interpretation of the term "unincorporated urban centre" the policy might be extended to include the communities of Glass, Prairie Grove, and Vivian, and possibly even further to include Cooks Creek, Navin, Ostenfeld, etc.) Under Policy #3, future bursts of growth (such as the one which has taken place in Oakbank in the past few years) could be prevented effectively (if this

growth is of a rural nature).¹

Policy #4

Policy Statement. Proposed urban land uses shall be directed toward the strengthening of existing centres rather than establishing new competing centres. Growth of existing centres:

- 1) will be in a manner such that water and sewer services can be made available at an economically feasible cost.;
- 2) bordering on one side of a major highway shall, wherever feasible, be restricted to the same side of that highway.;
- 3) may necessitate their expansion onto adjoining lands. In these instances, the land requirements of the *urban centres* shall normally have priority over the existing use of that land.

Physical Area Affected. The primary effect of this policy will be to centralize diffuse urban land uses into recognized urban centres. For the purposes of this study, it was assumed that the diffuse urban land uses will be gathered mainly from the larger roads (Provincial Trunk Highways and Provincial Roads). Presumably, local authorities have full responsibility for distinguishing rural from urban land uses.

Impact on Residential Activity. A possible effect of this policy might be to make proportionately more land available for rural residential use. If it is the case that future "urban" uses will be more concentrated in urban areas, then there will be an equivalent amount of frontage on Provincial Roads left available for other uses, including

¹In Oakbank, at least 8 plans of residential subdivisions were registered in the four years from 1972 to 1976. More than 100 building permits were issued for the construction of new residences in the interval from 1971 to 1976. The Census population of Oakbank rose from 352 in 1971 to 1168 in 1976.

rural residential.¹ The better quality roads are frequently chosen as routes along which rural residences are located. The effect of this policy, in concentrating urban land uses, might be to increase the area available for rural residential development along the Provincial Roads. Concentrations of rural residences along Provincial Roads can be expected to increase in those areas where such activities are permissible.

Policy #5

Policy Statement. Development plans shall identify areas of *high recreation capability* and existing recreation developments of regional and provincial significance.

Physical Area Affected. It is the intention of this policy to prohibit development (including residential subdivision) on lands which have high recreation capability until such time as development plans are in place. In the establishment and design of development plans, recreation uses normally will be given priority over residential, commercial, or other uses.

Policy #5 is intended to affect only very small areas. In municipalities such as Springfield which have no areas of CLI classes 1, 2, or 3 for recreational purposes, consideration can be given to

¹ The highways policy (Policy #12) prevents uncontrolled rural residential activity (and other developments) from taking place along Provincial Trunk Highways and along Provincial Roads within one half mile of their intersection with Provincial Trunk Highways. However, intensive developments are not prohibited automatically from the areas adjacent to all Provincial Roads.

lower quality areas. Additionally, excavated gravel pits, lakes, and rivers might also be examined for their recreation potential.

In Springfield, the principal areas with recreation potential are situated in the eastern and western extremities. The eastern townships have been recognized to have some recreational potential; in particular, the Brokenhead River corridor looks promising. Birds Hill Park in the Northwest has been developed both for upland and shoreland recreation. The Red River floodway has some recreation potential, particularly at vehicle access points. Additionally, the Cooks Creek corridor and excavated gravel pits throughout the municipality may have some potential.

Impact on Residential Activity. Not all of the previously mentioned areas are likely to be protected for recreational use under Policy #5. However, in the event that any of them comes to be protected, the available space for rural residential development will be reduced accordingly. As a general rule, areas of high recreation potential which lie closer to large urban centres will be more highly valued than areas with similar potential which are more remote. Characteristically, these are the areas of greater pressure for rural residential development. Owing to the priority of recreation uses over other uses in the areas with high recreation potential, Policy #5 has the potential to generate conflict with rural residential uses. There is a possibility that the western portion of Springfield, being closer to Winnipeg, will be examined carefully for sites of recreation potential. There is potential for future conflicts because of the higher demand for rural residential uses in this area.

Policy #6

Policy Statement. *Recreation Developments* shall be permitted only to the *carrying capacity* of the resource being utilized.

Physical Area Affected. Apparently, the physical area to be affected by Policy #6 will be contained exactly within the limits of the areas outlined for protection as recreation resources in Policy #5.

Impact on Residential Activity. Because rural residential activity will be restricted or prohibited in high quality recreation areas, there can be no additional impact on rural residential activity from Policy #6. Any impacts on residential development which are associated with Policy #6 derive directly from Policy #5.

Policy #7

Policy Statement. *Shoreland* of waterways and waterbodies having environmental, recreational, or other general *significance* to the public should be afforded protection.

Two types of proposed shoreland reserves are:

environmental reserves which require protection for flora, fauna, soil, and other reasons; and,

public reserves which require protection for historical, cultural, recreational, and other reasons.

Physical Area Affected. Theoretically, all shorelands are eligible for protection under Policy #7. However, it is intended that the identification of those shorelands which require protection will be accomplished in the establishment of area development plans. It is

expected that only certain specified shorelands will come to be protected under this policy. The extent of the protection offered by Policy #7 cannot be determined precisely; accordingly its impact on rural residential development can only be suggested. The two major natural waterways in Springfield are the Brokenhead River in the East, and the downstream portions of Cooks Creek in the North Central area. (See data level #8). The area which ultimately may come to be protected by Policy #7 is expected to be a small fraction of all shorelands.

Impact on Residential Activity.

In those instances where full rights of ownership are purchased by the public sector, the inevitable result must be a decrease in the amount of land which is available for rural residential development. Because much of the area along the Brokenhead River is unsuitable for residential construction, existing residences are more concentrated along Cooks Creek. The major impact from Policy #7 might be expected in the Cooks Creek area. (However, rural residential development is precluded in most of the area adjacent to Cooks Creek by Policy #1.)

Although there were recognized problems of accuracy, the evidence from recently issued building permits suggested that riverene quarter sections are not chosen preferentially over other quarter sections as locations for new residences. Although this observation cannot reasonably be framed as a generalization for the entire province, it suggests that the impact of Policy #7 alone in Springfield might be insignificant.

Policy #8

Policy Statement. Recreation and resource areas shall be afforded protection from adjacent uses that would degrade or endanger their primary function.

Physical Area Affected. Owing mainly to a lack of definitions, the physical areas affected by Policy #8 cannot be determined precisely. This situation could be corrected by providing definitions for terms such as "recreation areas" and "resource areas" and by providing some guidelines for determining the appropriate width of buffer strips. Generally, the areas which will be protected under Policy #8 will be thin buffer strips around recreation and resource areas. In the case of Springfield, a good example is provided by the areas on the South and East borders of Birds Hill Park in Townships 12-4E and 12-5E.

Impact on Residential Activity. Under Policy #8, no intensive residential activity which potentially could be detrimental to Birds Hill Park would be permitted in a peripheral zone around the park. This area has been a particularly desirable location for rural residences.

The impact which Policy #8 will exert on rural residential development can only be approximated. It was assumed that a buffer strip of one mile in width was established around Birds Hill Park, and that no residential activity was permitted in this area. To illustrate the popularity of this area for rural residential uses, and to illustrate the potential for conflict which might be generated by this policy, it can be noted that in the 11 square mile area of the buffer strip, approximately 80 building permits were issued for the construction

of new residences in the interval from 1971 to 1976. Therefore, although the area affected by Policy #8 might be small, Policy #8 could produce a sizeable impact on rural residential development. The one mile wide buffer strip around Birds Hill Park includes some area (about six quarter sections on the South side of the park) in which rural residential development might not otherwise be prohibited.

Policy #9

Policy Statement. *Areas critical to the existence of rare or endangered plants or animals, significant natural features, and cultural and historic sites of the region shall be identified and should be designated and preserved. No subdivision or development should be approved for these areas.*

Physical Area Affected. The total area which will be affected by Policy #9 depends upon the Rare or Endangered Species Areas List, the Significant Natural Features List, and the Cultural and Historic Sites List which are to be approved by the Provincial Land Use Committee. Generally, it is expected that the sites which will be protected under Policy #9 will be few in number and relatively small in size.

Impact on Residential Activity. Because it is expected that the protected sites will be small and rare, the impact on residential activity will be minimal. Policy #9 would have the effect of preventing rural residences from being developed on these sites. Wherever these sites are located in areas with strong pressure for such development, conflicts can be expected.

Policy #10

Policy Statement. Areas should be identified, designated, and reserved for renewable resource production, utilization, and preservation by outlining:

- 1) areas of existing prime *wildlife habitat*
- 2) existing *exceptional forestry value areas*
- 3) areas of existing *prime fish habitat*
- 4) *other areas of renewable resource significance.*

No subdivision or development shall be approved for recognized resource areas if there is a possibility that they will conflict with the resource value.

Physical Area Affected. Wooded areas of CLI classes 1, 2, 3, or 4 for wildlife (ungulates) will be protected under Policy #10.

All wetlands of forty acres or more, and those wetlands of less than forty acres which are situated in areas of CLI classes 1, 2, or 3 for wildlife (waterfowl) will be protected. Additionally, under Policy #10, areas listed on the Renewable Resources Areas List for forestry or other resources, and land adjacent to highly productive fishing waters, stocked waters or spawning beds will be protected from conflicting uses.

In the case of Springfield, there are approximately 72 square miles of wooded land, situated mainly in the eastern townships but also around Birds Hill Park in the Northwest. Of this amount, approximately 80% is of CLI classes 1, 2, 3, or 4 for ungulates. (Classes 1 and 2 are not represented in Springfield.) Additionally, there is a major wetland area in the Southeast corner of the municipality adjacent to the Brokenhead River. Much of this area is Crown land. (See Figure 7) In Springfield, there are no areas of exceptional forestry value, or

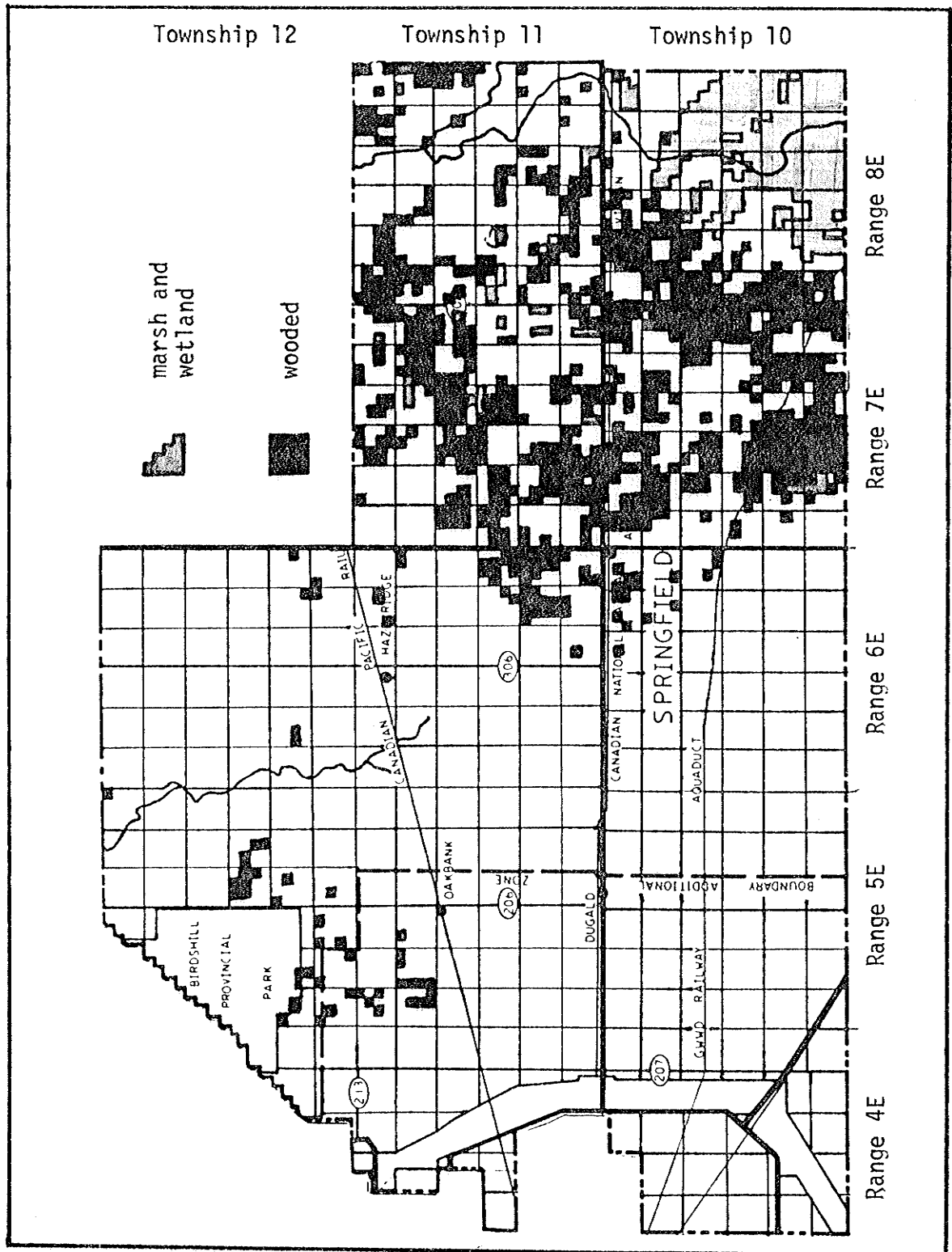


Figure 7
General Portrayal of Wooded and
Wetland Areas Protected Under Policy #10

areas of prime fish habitat.

Impact on Residential Activity. The potential for conflict from Policy #10 is situated mainly in the wooded areas because the wetlands generally are unsuitable for residential purposes. A prohibition of residential activity in wetland areas is not likely to cause much inconvenience. However, the wooded area protected under Policy #10 is extensive (approximately 60 square miles). Some of this area, particularly around Birds Hill Park, probably would receive more residential development in the absence of the policies. Therefore, in Policy #10, there is some potential for conflict with residential activity.

Policy #11

Policy Statement. Lands subject to hazards such as flooding or erosion should be retained for open space or agricultural use. More intensive development should only be considered where the hazard can be eliminated or where the use would be compatible with the risk.

Physical Area Affected. Generally, on *lands subject to flooding, lands subject to water erosion, and lands subject to other hazards,* only extensive agricultural, or open space recreational activities should be permitted, and any other higher intensity uses should be prohibited. Depending upon interpretation, the area in Springfield which might be affected by Policy #11 could be quite extensive. Historically, the western edge of Springfield, adjacent to Transcona, was subject to flooding from the Red River. However, since the establishment of flood

control structures, this threat no longer prevails. For the purposes of this study, the major flood threat to Springfield was seen to be centred on smaller waterways in the municipality (for example, the Brokenhead River, and the undyked areas along the downstream portions of Cooks Creek.)

Owing largely to the vagueness of definitions (for example as regards the phrase "subject to erosion") an extensive area in Springfield could be affected by Policy #11.

Impact on Residential Activity. It can be observed that much of the Winnipeg region is situated on a flood plain, and that a considerable amount of development has taken place in this area. The major effect of a strict application of Policy #11 would be to restrict land use in much of this area to extensive agricultural or open space recreational activities. For Springfield, the implementation of Policy #11 could mean the restriction of residential activities from the areas along the creeks and rivers, and in some of the central low-lying areas with inadequate drainage. The effects of such restrictions will be felt most strongly in the Northwest area of the municipality where the pressure for rural residential development is the greatest.

Policy #12

Policy Statement. New development should be restricted in the vicinity of provincial highways so as to avoid any interference with the main function of this regional transportation network.

Physical Area Affected. The intention of Policy #12 is to keep certain types of land use far enough away from provincial highways in rural areas to avoid conflicts and problems such as strip development.¹ Some provision was made for the (discretionary) inclusion of the areas immediately adjacent to the non-major provincial arteries (such as Provincial Roads).

The main effects of Policy #12 can be expected along PTH #12 and PTH #15. (Additionally, there will be some effect felt along PTH #59 and PTH #101.) There will be effects where protected nodes are created at certain intersections (such as at the intersection of PTH #15 with PR 206, PR 207, and PR 306; or PTH #12 with PR #213.)

Impact on Residential Activity. It has been established that there is a tendency for existing residences to be located on the periphery of sections; and it has been suggested that there is a similar tendency for new residences to be located at the periphery of sections. Generally, the areas within one legal subdivision from the centreline of roads and highways are chosen frequently as locations for residences. Therefore, although the total area affected under Policy #12 is quite small, the policy could have a significant impact on residential activity. An examination of data levels #3 and #11 and #15 (existing residences, major highways, and recently issued building permits) shows that the

¹ Along the major Provincial Trunk Highways located outside of urban centres, residential (and other intensive) developments should not be permitted within 1,000 feet of the centreline of the Provincial Trunk Highway or within one half mile of the intersection of a Provincial Trunk Highway with either another Provincial Trunk Highway or a Provincial Road.

areas adjacent to PTH #15 and PTH #12 are conspicuously popular as choices for residence location. Provincial Roads #206, 207, 302, and 213 are also attractive. Provincial Road #306 does not appear to be especially attractive in this regard.

Instead of forcing residential developments back from the highways, a restriction of residential activity within 1,000 feet of the centreline of Provincial Highways might have the effect of increasing the frequency of choice of residential locations along those Provincial Roads which have not been protected under the policy. Therefore, it may be beneficial to specify an extended restriction to residential uses within 1,000 feet of the centreline of all Provincial Roads as well.

Frequently road improvements tend to follow increased residential development. However, the results of this study suggested that increased residential activity might follow road improvements. In this regard, it is interesting to observe that road improvements are planned for PTH #15 out to Anola, and for Provincial Roads in the Northwest area of the municipality around Birds Hill Park. Therefore in the absence of Policy #12, it can be expected that more intense "ribbon" development will take place in these areas.

Policy #13

Policy Statement. High quality *aggregate* should be protected from surface land uses that would interfere with its future exploitation.

Physical Area Affected. High quality aggregate deposits were

defined in terms of size, location, and composition.¹ Presently, the Mineral Resource Branch of the Manitoba Department of Mines, Resources, and Environmental Management is producing "Stop-Caution-Go" maps to direct the development of the Province's aggregates. The major areas with aggregate potential are located in the eastern townships, and in the area around the South border of Birds Hill Park (mainly in Townships 11-4E, 11-5E and 12-5E. (See data level #14.)

Impact on Residential Activity. Notwithstanding the fact that it is premature to discuss the impact of Policy #13 without having access to the "Stop-Caution-Go" maps, it can be seen that there is some potential for conflict in Springfield between aggregates and rural residential development. The Northwestern deposits are situated in areas of intense residential development. It may be the case that much of this aggregate potential has already been overlain by intensive residential development or by agricultural practises on prime agricultural land.

¹ Policy #13 is intended to protect deposits of more than 100,000 metric tonnes of gravel of which there would be 40 to 70% stone retention on a one quarter inch sieve. The ratio of overburden to gravel thickness should not exceed 3:1, and the source should be within three miles of a town or village, within 25 miles of communities of 20,000 or more, and within 50 miles of communities of 100,000 or more people. The aggregate resource in such a site may be considered to be unextractable when more than 30% of the deposit is overlain by a conflicting land use (for example, prime agricultural land).

AREAS WHERE RESIDENTIAL ACTIVITY IS
ACCEPTABLE UNDER THE POLICIES

In Springfield, the major influence from the application of the policies was in the amount of prime agricultural land which was preserved under Policy #1, part 1. There were other major influences which derived from the protection of wooded areas of CLI classes 1, 2, 3, and 4 for wildlife (ungulates); from the restriction of building in wetland areas; and from the restriction of building rural residences within a two mile radius of the built up areas of urban communities.

In five townships (10-4E, 10-5E, 10-6E, 11-5E, and 12-4E) less than one section of land remained available for rural residential development within the terms of the land use policies. In four other townships (11-4E, 11-6E, 12-5E, and 12-6E) the areas which were not affected by the policies ranged from one section to about five sections. The four eastern townships (11-7E, 11-8E, 10-7E, and 10-8E) all had more than ten sections remaining available for rural residential use. The largest areas which remained available for rural residential use under the policies were situated in the eastern townships.

The total area which remained available for rural residential development was determined to be about sixty square miles. See Figure 8. Additionally, there were about 60 to 70 quarter sections in which residential infill might be permissible under Policy #2. The majority of these were situated in the western portion of the municipality.¹

¹No provision was made for the protection of agricultural enterprises in non-prime agricultural areas, or for the protection of recreation areas, shorelands, or critical resource sites. Some losses to the total area remaining available for residential uses might be expected from these sources. However, it is thought that sixty sections (situated mainly in the eastern townships) is a reasonable approximation of the area remaining available for residential development under the land use policies.

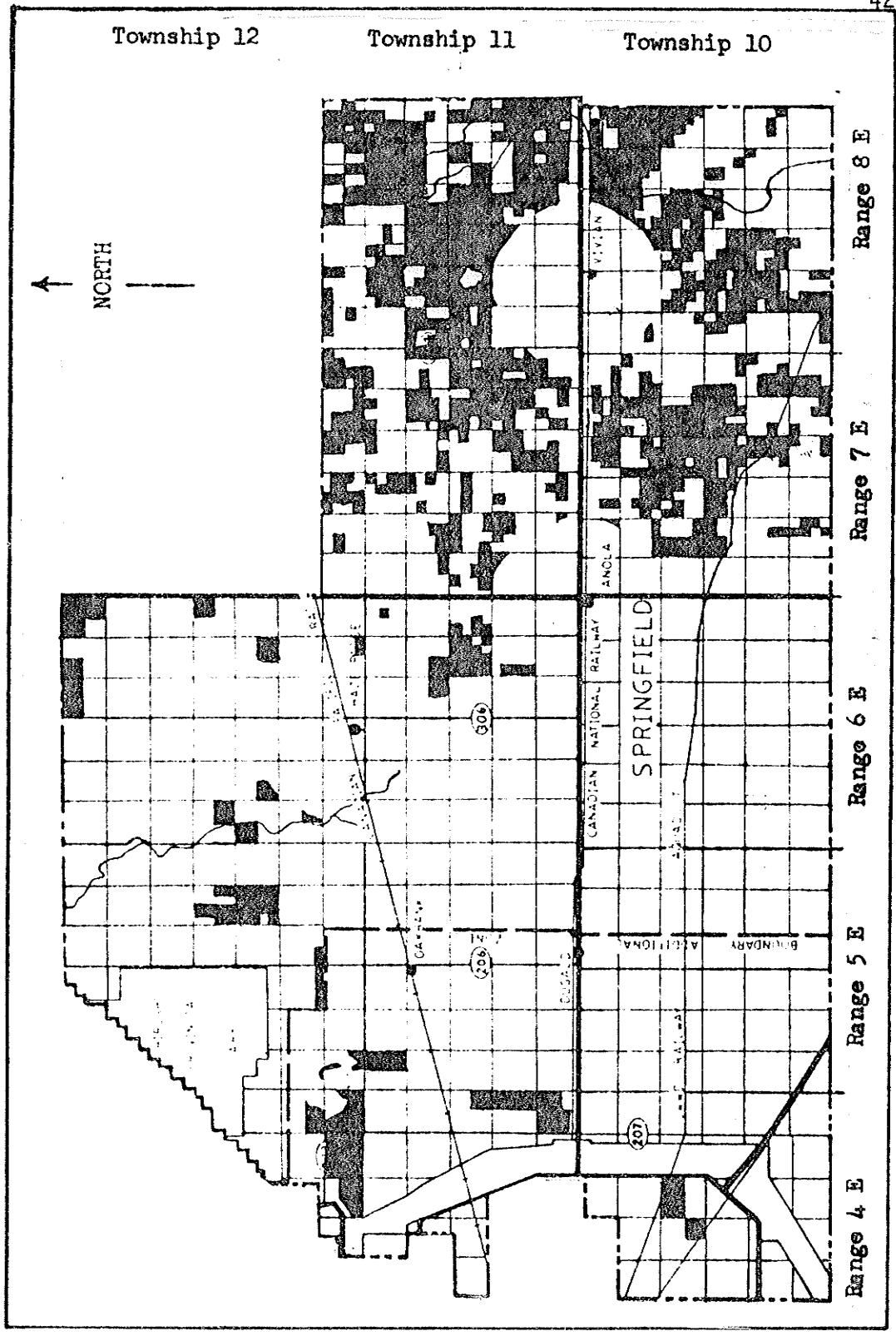
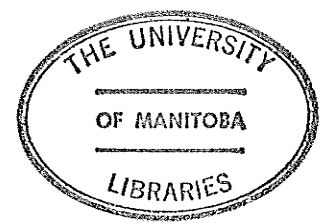


Figure 8
 Areas Where Residential Activity Is
 Acceptable Under the Policies



ADDITIONAL COMMENTS
AND SUGGESTIONS

Additional comments should be made about some of the policies. The comments are in the order of the policies.

Policy #1, part 1 concerned the reservation of areas for a full range of agricultural activities where agriculture is in the dominant position on prime agricultural land. There is a clerical error in the policy which could cause confusion. It is stated that in order to qualify under the term "dominant" there may be up to three residences per quarter section. It is also stated that no rural residential subdivision can take place on quarter sections where there are less than three residences. While both statements could be true, the intended meaning of the second statement is probably that no rural residential subdivision can take place on quarter sections where there are three residence or less.

There will probably be cases in which, for example, a large heavily wooded (i.e. non-agricultural) area is situated on soils of CLI classes 1, 2, or 3 for agriculture. Such an area would be excluded from protection under Policy #1 because it is not in agricultural use. Because agriculture is so important to the economy of Manitoba, it would be desirable to have Policy #1 expanded to express an interest in the fate of all land of CLI classes 1, 2, or 3 for agriculture, regardless of present uses whenever alternative uses are proposed for these areas.

For the purposes of implementing this policy, it would be useful to specify an exhaustive list of potential land based activities. Such a list would aid in making the decision as to whether or not an

area is 75% agricultural. It might also aid in resolving possible disputes which could develop in the event that a land owner withdraws his prime agricultural land from agricultural production in order to make it exempt from the subdivision and development constraints in Policy #1.

Presently, there are approximately 75 quarter sections of prime agricultural land which have three residences situated on them. With continuing pressure for more residential development, any delay in approving the policies will almost certainly mean the loss of part of this area from eligibility for protection under Policy #1, part 1.

Policy #1 part 2 concerned the reservation of areas for a full range of agricultural activities where agricultural activities are dominant on lower class lands and it is desirable to protect them. Agricultural enterprises such as intensive livestock confinement operations can be practised on a fraction of a legal subdivision or an insignificant fraction of a quarter section. Accordingly, there is a possibility that such an activity could be situated on quarter sections which are classified as completely non-agricultural. In such a situation the agricultural operation could not be protected under the policy. To accommodate this circumstance, either Policy #1 part 2 or the definition of the term "dominant" might be expanded to protect such activities.

Policy #2 concerned the reservation of areas for limited agriculture where a full range of agricultural activities would not be possible. Residential infill might be permitted in some of these areas.

No size guidelines were suggested, and some of the areas which might be reserved for limited agriculture under Policy #2 therefore could be less than one quarter section in area. More probably, it was

intended that an agricultural parcel must be at least a quarter section in area in order to qualify for inclusion under Policy #2. For the purpose of protecting valuable agricultural land, it is suggested that the traditional view of four quarter sections (i.e., Northwest, Northeast, Southeast, and Southwest) be abandoned and replaced by the broader concept of any four 40 acre legal subdivisions which form a square. This would create a situation in which there are nine quarter sections in each square mile.

Policy #3 applied directly to rural residential development. Policy #3 outlined areas in which rural residential uses should not be permitted. As a positive extension of these prohibitions, local planners might be encouraged to model areas of residential suitability according to the technique outlined in Appendix 3. Alternatively, they should be given access to models which have already been developed where such models are available. The primary advantage of modelling areas of residential suitability is that it requires a thorough and complete consideration of relevant factors and it provides for a consistent, if necessarily imperfect, analysis which can be used as an aid in subjective decision making.

In Policy #3, the term "urban centre" was not defined precisely. Problems of consistency in the application of the policy could derive from this imprecision.

Policy #5 specified that development plans should outline areas of recreation potential so that they might not be lost inadvertently. Generally, all of the policies are intended to dedicate certain areas to specific uses. However, Policy #6 amounts to a broad definition of the manner in which recreational activities are to be practised in recreational areas; i.e., how acceptable uses are to be practised.

The inclusion of Policy #6 in the set of land use policies should be reconsidered. Recreation areas probably will be publicly owned, and it is more reasonable for the policies to argue for the wise use of publicly owned land than privately owned farmland, for example. However, because Policy #6 is substantially different from the other policies, it might be deleted or included as part of Policy #5.

Policy #10 concerned the reservation of certain areas for renewable resource production. It urged that no subdivision or development should be approved for recognized resource areas if there was a possibility that they would conflict with the resource value.

Residential and other uses can develop in small increments or by larger degrees. Policy #10 can deal more effectively with the latter than with the former. Because marginal changes have only marginal impacts on resource value, all incremental developments might be permitted under this policy.

Policy #11 suggested that lands which are subject to hazards such as flooding or erosion should be reserved for open space or agricultural use. The vagueness of the definitions in Policy #11 might cause some difficulty. For example, the definition that "lands subject to water erosion" are "all lands which would be affected by (water) erosion within a fifty year period" is not useful in its present form.

Policy #11 probably is not intended to be applied in a strict and rigorous fashion. Rather, it likely is intended to serve as an aid in judging the risks of development. If this is the case, there is a substantial difference between this policy and most of the other policies. The policy statement and applications might be redesigned to reflect its intention more accurately.

In Policy #3 some indirect provision is made for the protection of groundwater by specifying that lot sizes should be large enough to accommodate efficient septic fields. Policy #8 recognized that water table draw down can be a problem. However, the land use policies do not make any direct provision for the protection of groundwater. This oversight possibly could be corrected by extending some direct protection to groundwater under Policy #11.

Policy #13 concerned the protection of high quality sand and gravel deposits. Aggregate resources are non-renewable, and generally have only local or regional significance. The demand for aggregates cannot be expected to change (in the absence of price changes) as the higher quality aggregate deposits approach depletion. As the better quality deposits become depleted, the significance of lower quality deposits in the region is likely to increase. Policy #13 provides protection for the high quality resources only. In Springfield, many aggregate areas, whose significance could increase in the future, will not be protected by Policy #13. Therefore, it might be argued that Manitoba's aggregate resources have not been protected as stringently as certain other resources (for example, prime agricultural farmland).

Because of good percolation, there is a grave threat of groundwater pollution in aggregate areas. This consideration might be enlisted to argue for the restriction of rural residential (and industrial) uses from aggregate areas until the aggregate resources have been extracted and the areas have been rehabilitated with less threatening percolation characteristics.

The policy applications considered the matters of subdivision,

development, or both subdivision and development. The terms "rural residential development" and "development" are defined in the policies. However, there is no definition of the term "subdivision". There is a connection between subdivision and development in that subdivision, a matter of boundary definition and proprietorship, frequently precedes development for higher uses. For example, in agricultural areas, residential development frequently follows subdivision. However, residential building activity is more a matter of development than a matter of subdivision. Recognizing that large proportions of all subdivision-created lots remain vacant for extended periods, it can be appreciated that a prohibition of further subdivision (for example as in Policy #5) does not necessarily mean the immediate end of developments.¹ A definition of the term "subdivision" should be included in the policies, and the policies might be reviewed to ensure that the terms "subdivision" and "development" have been used appropriately rather than interchangeably.

¹

Recently, the R.M. of Springfield conducted a survey of property ownership. It determined that of 4,891 parcels in the study area, 2, 772 (57%) were vacant. In such a situation, a prohibition of further subdivision might have little effect on development activity over the short and medium term.

CHAPTER 4

CONCLUSIONS AND ASSESSMENT

GENERAL COMMENTS

The land use policies were designed to guide the use and development of the land resources in Manitoba. Two of the intentions of the policies were to minimize needless losses of important resources and to maximize the utility of existing investments in infrastructure.

The case study of the anticipated effects of the land use policies on rural residential development in Springfield illustrated that there was overlap between the policies. Many areas were included in the sphere of influence of more than one policy. While the possibility of such overlaps was specified in the discussion of certain of the policies (most notably in Policy #10), generally, the linkages between the policies were not stated and had to be inferred or discovered by experimentation. Few areas were unaffected by any policy.

There is a problem inherent in policy formation which centres on the trade-off between local discretion and general guidance in planning decisions. The proposed policy statements were intended to guide decision making but to allow for necessary discretion on the parts of local planners. Although the general phrasing of most of the policies can be agreed to in principle on these grounds, it is recognized that a completely unspecific policy cannot offer any guidance to local planners. While certain of the policies were found to be very explicit, others allowed for more discretion in their interpretation and application to

local circumstances. For example, Policy #1 part 1 (specific) might be contrasted against Policy #11 (discretionary). Differences in the adequacy or precision of the definitions of terms may have contributed to this problem. Where wide powers of discretion are granted to local planners, it is possible that two or more local authorities simultaneously could interpret similar situations differently, or an individual planning authority could interpret similar situations differently through time.

The policies were addressed to different kinds of concerns. While most of the policies pertained to the protection of resources (for example prime agricultural soils, aggregate minerals, and shorelands and recreation and wildlife sites) others pertained to the protection of public investments and expenditures (for example, in highways, urban communities, and development in hazard areas) and one policy treated the manner in which an acceptable use was to be practised in certain areas (recreation uses to carrying capacity only).

Springfield was recommended as a study area for this exercise because most of the policies could be applied in the region. The prime effect of the land use policies on residential activity will be to restrict the area in which such developments are permissible. For any area, the potential for conflict to be generated over these restrictions can be viewed as a function of the existing pressure for residential developments in that area. Although some generalizations can be extended from the study area to the rest of southern Manitoba, it should be emphasised that because Springfield is subject to more pressure for rural residential development, the potential for conflicts deriving from the restriction of such activities must be greater in Springfield than for the

Province as a whole. Within Springfield, the potential for conflict will be greater in those areas which are subject to more pressure for residential uses.

IMPACT OF THE POLICIES ON RESIDENTIAL DEVELOPMENTS

Likely sites for future residential developments were approximated from past residential trends. In the absence of new land policies, future residential activity was predicted for the areas: around the urban communities; along the Provincial Highways and Provincial Roads; on the South and East sides of Birds Hill Park; and in the area to the Northeast of Anola in Township 11-7E. (See Figure 3 on page 14.)

Generally, there was a poor match between the areas where future residential activity could be expected in the absence of new land use policies, and the areas where residential activity remained acceptable within the terms of the policies. The largest areas which remained available for rural residential use under the policies were situated in the eastern townships where the pressure for such development is comparatively modest. In Township 11-7E there was some overlap between the areas where activity could be expected on the basis of past trends and areas where residential developments remained as acceptable land uses within the terms of the policies. (See Figure 8 on page 42). Conflict can be expected in proportion to the degree to which the acceptable future residence locations differ from the locations which otherwise would be chosen in the absence of the policies.

Residential suitability in Springfield was examined at the level of 40 acre cells according to considerations of physical suitability,

amenity features, and impacts on major natural resources. The models suggested that a total area (for both open and wooded area preferences) of approximately 80 square miles was suitable for residential uses. Although there were some suitable areas situated around Birds Hill Park, the greatest proportions of all suitable areas were located in the eastern townships. (See Figure 4 on page 17.)

Generally, there was poor correspondence between the modelled areas of residential suitability and the areas in which future residential activity might be expected in the absence of any new land use policies. Two areas of overlap were situated around Birds Hill Park in the Northwest and in Township 11-7E. However, it must be concluded that generally non-optimal locations for new residences would be chosen in the absence of new land use policies.

When the land use policies were interpreted and applied to the physical situation in Springfield, it was determined that there were approximately 60 sections left available for rural residential development. Approximately 80% of this area was located in the eastern townships. With the exception of Township 11-7E, this region has not been subjected to much pressure for residential development. Most of the remaining area which was available for residential uses was located around Birds Hill Park.

There was a comparatively good correspondence between the computer-modelled areas of residential suitability and the areas which remained available for rural residential development within the terms of the land use policies. (Compare Figure 4 on page 17 with Figure 8 on page 42.)

The good correspondence between the computer-modelled areas of residential suitability and the areas which remained available for rural residential development within the terms of the policies cannot be regarded as a foregone conclusion which derived directly from the method. The land use policies were designed to regulate a broad range of land uses, including residential uses. There was no a priori reason to think that there would be any areas left available for rural residential development within the terms of the policies. An independent suitability study was conducted for residential purposes only. In Springfield, it was determined that the areas which remained available for rural residential use within the terms of the land use policies corresponded closely to the computer generated areas of residential suitability.

The areas which remained available for residential use under the policies generally are not the same as the areas where future residential activity could be expected in the absence of the new land use policies. Dissatisfaction with the policies can be expected in proportion to the degree of mismatch between these areas. Because there is a poor fit between these areas in Springfield, and because there is considerable demand for rural residences in Springfield, the policies probably will not be well received in this area.

However, in general, the areas which remained available for residential use under the policies were better suited for this purpose than the areas which could be expected to be chosen if the policies were not implemented. Consequently, there are benefits from implementing the policies, and these benefits might justify a certain amount of conflict. Benefits to the homeowner take the form of better foundations for construction, more efficient septic fields, fewer drainage problems, etc.

Benefits to the public are in the form of less incursion into prime agricultural land, better protection of groundwater quality, better protection for aggregate reserves, etc.

Most of the area in which residential uses will be permitted under the land use policies is located in the eastern townships. Residents of this area will have less easy access to goods and services available in Winnipeg. Notwithstanding the fact that there is a suggestion (from recently issued building permits) of willingness to locate farther away from Winnipeg, this outcome is not particularly desirable for reasons such as increased transportation time and energy costs.

However, there are approximately 70 quarter sections, mainly in the western portion of the municipality, in which some residential infill might be allowed under Policy #2 and Policy #3. From the point of view of this study, this is a valuable opportunity to concentrate rural residences closer to Winnipeg. It is likely that local planners will allow residential infill in some of these areas. In this case, because of higher residence densities, there would be public benefits in the form of lower per household costs for "linear" services such as electricity, telephone, drainage, etc.

OTHER EFFECTS FROM THE POLICIES

An area of approximately 200 square miles of prime agricultural land could be protected by the policies. This figure represents most of the prime agricultural land in Springfield. The forestry potential in Springfield is generally of CLI classes 5 and 6, and there are no areas of exceptional forestry value. However, much of the estimated 70

square miles of wooded area in Springfield will be protected from indiscriminant residential uses because of its high capability to support ungulates.

In Springfield, many aggregate areas, whose significance could increase in the future, will be excluded from the protection offered by Policy #13. It might be argued that Manitoba's aggregate resources have not been protected as rigorously as certain other natural resources (for example, prime agricultural land). Overall however, with the exception of groundwater (the position of which is neither enhanced nor threatened by the policies) all natural resources considered in the policies will be better protected from irrational or conflicting uses following the implementation of the policies.

In addition to providing protection for natural resources, the land use policies provide security for certain infrastructure investments. The problems which are associated with strip development are well understood. In certain instances, such as along Provincial Trunk Highway #9 in the Rural Municipality of St. Andrews, strip development has already become a serious problem.

The primary function of a trunk highway is to provide for the high speed flow of long distance traffic. As increasing proportions of weekday traffic consist of commuter trips from residential developments to Winnipeg and back, the ability of the trunk highway to move the traffic load steadily and safely is reduced by the interference to through vehicles from turning vehicles. Because of strip developments along the highways, the prospect of widening the highway becomes prohibitively cumbersome and expensive. Ultimately as the traffic service continues to deteriorate, lower speed limits are required, and the character of the

highway changes from a high speed rural to a low speed urban route. Although the situation in Springfield is not as problematic as in St. Andrews, in the absence of the new land use policies similar problems can be expected (for example, along PTH #15 from Winnipeg to Anola).

In Springfield, the communities of Anola, Dugald, and Oakbank have been growing for the past decades while Hazelridge, Vivian, Prairie Grove, Navin, Glass, and other communities have shown more variability or a pronounced decrease in their populations. It is worthwhile to reinforce the viability of the existing communities rather than to create new competing centres which will also require large infusions of public support. The land use policies (especially Policy #12, Policy #3, and Policy #4) offer some systematic security against threats to highways and existing urban centres. The ability of the land use policies to restrict development on hazard lands (as defined in Policy #11) is questionable.

The land use policies left a considerable amount of land available for rural residential uses, and the areas outlined by the policies generally were better suited for this use than the areas which would be chosen otherwise. Additionally, the land use policies offered reasonable protection to valuable natural resources and to public investments in infrastructure. Although the policies probably could be improved in certain places (for example, definitions of terms, and conditions of policy applications) and although some dissatisfaction might be expressed about the policies, the results of this study of the likely effects of the land use policies on rural residential development suggest overall that the policies should be supported and implemented.

EXTENSIONS OF THE STUDY

The investigation of residence location did not include an analysis or interpretation of the reasons for locating in chosen areas. The locations of existing residences were assumed to be more or less ideal in the evaluation of rural residents. Residence densities were examined according to various parameters in order to arrive at some understanding of the more influential determinants of residence location. Although a more explanatory treatment would have been useful, it could not be achieved within the limits of this study.

In this study, the effects of the policies were examined individually, on a policy by policy basis. To the extent that the policies will apply simultaneously, such a fragmented analysis can be misleading. It was observed that many policies applied to some areas and that few areas were unaffected by all of the policies. Accordingly, there will be varying degrees of development constraint in different regions of the study area. This study did not examine these differences. The combined effects of the policies might deserve a more careful examination.

In this study, the primary focus was on the constraining effects which the policies would probably exert on future development. However, in a more positive sense, the policies could be used to direct future development. The study might have benefitted from a closer examination of the policies as a means of directing growth, rather than as a means for constraining growth.

The Rural Municipality of Springfield was chosen as the study area because rural residential development is a characteristic of the area and because the geographical diversity of the area permitted most

of the policies to be applied. Rural residential development is not equally characteristic of other municipalities in Manitoba, and geographical conditions vary. Although the criteria for the application of the policies will not change, the overall effects and impacts cannot be expected to be the same in other parts of the Province. Therefore, the findings from this study cannot be generalized immediately to the Province as a whole. It might be worthwhile to determine the degree to which the findings from this study can be generalized to other situations in Manitoba.

The City of Winnipeg is the planning authority for the western portion of Springfield that is situated in the Winnipeg Additional Zone. As observed in the case of residential construction around Oakbank, the City of Winnipeg has the capacity to make extensive changes in some situations. Population changes, such as those which have been taking place in Oakbank, can be disruptive to the normal functioning of a municipality. Therefore, it would seem worthwhile to examine both the ability of the City of Winnipeg to influence events taking place in the Winnipeg Additional Zone, and the limits of the responsibility of the City to the surrounding municipalities for the changes that it causes.

APPENDICES

APPENDIX 1

DETAILED EXAMINATION OF THE STUDY AREA

PHYSICAL CONSIDERATIONS

Location

The Rural Municipality of Springfield covers an area of approximately 410 square miles on the East side of Winnipeg in ranges 4E through 8E at the levels of Townships 10, 11, and 12. About 50% of the municipal area lies within 20 miles of the built up area of Winnipeg, and over 40% of the municipal area lies within 20 miles of the centre of Winnipeg. The residents of this area have easy access both to jobs and to goods and services which are available in Winnipeg.

The most westerly portion of the municipality falls within the "additional zone" of the City of Winnipeg. In this region, land use and development planning are under the jurisdiction of the City of Winnipeg. See Figure 1 on page 4 and Figure 2 on page 9.

Geography and Land Use

Springfield is drained by Hazel Creek and the Brokenhead River in the East, by Cooks Creek and Satans Creek in the North central region, by the Red River in the West, and by the English River in the South. The central portion of the municipality lies at about 800 feet above sea level and it rises gradually to about 850 feet in the Southeast. The land rises more irregularly and abruptly to about 850 feet in the Birds Hill area of the Northwest portion of the municipality.

Although there are sandy soils and some gravel deposits in the Northwest and East, the predominant soil type is a relatively impervious

plastic clay.¹ The agricultural potential of these soils is good, but it decreases in the Northwest and Southeast. The predominant land covers are cropland and wooded areas. The Southeast portion of the municipality is more heavily wooded than the rest.² The Red River Floodway is a prominent man-made landscape feature which passes through the western part of the municipality.

An historic and present land use inventory is presented in Table #1. The historic figures are a composite from aerial photographs which were taken in 1938, 1946, and 1948. The present figures represent the situation as it existed in 1974.

¹ See for example Manitoba, Winnipeg Region Study, Data Level #50. See also, Canada-Manitoba Soil Survey. Winnipeg Region Study Area Soils, Winnipeg, 1975.

² See for example, Bossenmaier and Vogel, Wildlife and Wildlife Habitat in the Winnipeg Region, Winnipeg, 1974.

TABLE 1
LAND USE INVENTORY SUMMARY
FOR SPRINGFIELD

Land Use Category	Approx. Area Under Specified Land Uses (acres)		Approx. Per Cent Specified Land Uses (%)		Approx. Land Use Change Over Time	
	historic	present	historic	present	acres	percent
DEVELOPED						
Agr. (intensive)	170,220	203,656	61.55	73.65	+33,436	+ 19
Horticulture	-	-	-	-	-	-
Built-Up	492	744	0.18	0.27	+ 252	+ 51
Quarries	730	1,488	0.26	0.54	+ 758	+104
Misc.-Special	1,275	7,027 ^a	0.46	2.54	+ 5,752	+451
SUB-TOTAL	172,717	212,915	62.46	76.99	+40,198	+ 23
OPEN SPACE						
Wooded	79,653	43,134	28.80	15.60	-36,519	- 46
Rough Pasture	14,400	10,083	5.21	3.65	- 4,317	- 30
Marsh & Bog	9,764	10,402	3.53	3.76	+ 638	+ 7
SUB-TOTAL	103,817	63,619	37.54	23.01	-40,198	- 39
TOTAL	276,534^b	276,534^b				

a) Includes Birds Hill Park, a portion of the Floodway and Industrial sites

b) The total shown includes the area occupied by roads and rail lines: this is distributed among all the land uses included in the table. The total shown excludes the area occupied by incorporated centre.

Source: RPC Group Ltd. An Historic and Present Land Use and Open Space Inventory of the Winnipeg Region, Winnipeg, 1975.

During the interval between the historical and present situations, the amount of land in agriculture increased by over 30,000 acres. Over the same interval, the amount of wooded land and undeveloped rough pasture decreased by about 35,000 acres and 4,000 acres respectively. However, this presentation does not accurately portray the real situation. Although at first glance one would be inclined to believe that land has been taken out of wooded and rough pasture uses only, it is also the case that prime agricultural land is being taken out of agricultural production for residential use. This circumstance requires that even larger tracts of lower quality land be brought into agricultural use to maintain production levels.

Communities¹

A number of unincorporated village communities and smaller settlements are situated in Springfield. These include Anola, Cooks Creek, Dugald, Glass, Hazelridge, Navin, Oakbank, Ostenfeld, Prairie Grove, and Vivian.

Three communities (Anola, Dugald, and Oakbank) have populations over 150 and are growing. The growth of these centres has resulted more from the expansion of their role as dormitory centres for Winnipeg workers than from the expansion of their role as industrial or service centres. It is expected that these three communities will continue to develop as dormitory towns. Both Dugald and Oakbank are serviced with municipal sewage systems.

¹The material in this section is based largely on Manitoba, Springfield Development Plan, Winnipeg, n.d.

Historically, the community of Hazelridge served as a service centre. The re-alignment of Provincial Road #213, its main access route to Winnipeg might result in dormitory developments similar to those in Anola, Dugald, and Oakbank provided that a suitable residential environment could be established.

The villages of Dugald and Oakbank fall in the "additional zone" of the City of Winnipeg and they have been designated as centres where a certain amount of low density expansion will be permitted. The planned expansion of these village communities is to include the future possibility of some limited form of local servicing. However, these limited services are not intended to be extensions of the Winnipeg systems.

The main infrastructural constraints to continued expansion in Oakbank lie in the capacity of the community's schools and centralized sewer-system. Dugald is capable of accommodating some growth before additions are required for the centralized sewage facility and the elementary school system. However, new development in this community would introduce additional pressure on the high schools in Oakbank.¹

In summary, the villages of Anola, Dugald, Oakbank and Hazelridge are the more significant population centres. The smaller settlements (Cooks Creek, Glass, Navin, Ostenfeld and Vivian) remain as established urban settlements which are entitled to protection from incompatible land uses.

¹Manitoba, Community Infrastructure and Growth Constraints, Winnipeg, 1975.

Roads and Highways

Portions of Provincial Trunk Highways #1, 12, 15, and 59 pass through Springfield. The major link to Winnipeg is PTH #15 which serves the central portion of the municipality including Dugald, Glass, Anola, and Vivian. In addition, PTH #15 is a preferred route of access to Winnipeg from Oakbank. The northern portions of the municipality are linked to Winnipeg by Provincial Road #213, and PTH #44 and PTH #59. Highway #1 serves a small portion of the municipality in the Southwest. All of these arteries intersect with the Winnipeg Perimeter Highway.

Railways

The Canadian National Railway mainline runs almost directly East-West through Springfield, adjacent and approximately parallel to PTH #15. It carries about 20 trains per day. A secondary line of the Canadian National Railway runs to the Southeast through the Southwest corner of the municipality parallel to Highway #1. It carries approximately 30 trains per day. The Canadian Pacific Railway mainline passes through the Northwest corner of the municipality running East Northeast from Winnipeg. It carries approximately 20 trains per day. The Greater Winnipeg Water District Railway and aquaduct pass through the southern portion of the municipality linking Winnipeg to Shoal Lake. It carries four or five gravel trains per day for five days a week, and offers limited passenger service on weekends. See data level #2.

Hydro Electric Power

Six major hydro transmission lines pass through Springfield and converge on Winnipeg. They extend to Slave Falls, Seven Sisters, Pinawa, Selkirk, Pointe du Bois, and Sprague. See data level #1.

Agriculture

Agriculture forms an important part of Springfield's total resource base. Generally, the amount of improved land under crops has been increasing, and summer fallow, pasture, and woodland have been decreasing. See data level #4.

Groundwater¹

Generally, throughout the municipality, groundwater is available for rural residential use. A possible exception is the eastern portion of the municipality beyond Provincial Road #302. Three kinds of aquifer occur in Springfield: a carbonate rock (limestone dolomite) aquifer; a sand or gravel aquifer; and a sandstone aquifer.

The main source of groundwater is the carbonate aquifer, and the water quality of the carbonate aquifers is fairly good. In most cases, the water can be used without treatment or can be improved readily with conventional types of domestic water treatment plants. However, in certain places in the vicinity of Dugald and Glass, the water is extremely hard and cannot be treated satisfactorily.

¹This section was taken from Manitoba Department of Mines, Resources and Environmental Management, Water Resources in the Winnipeg Region, Winnipeg, 1974.

The sand and gravel aquifers are common in the Birds Hill area and to the east of PR #302. Particularly around the Birds Hill area, the water quality of these aquifers is good to very good.

The sandstone aquifer is located under the carbonate aquifer. To the East of PR #302, the sandstone aquifer is located under surficial deposits. The sandstone aquifer has been developed for domestic use in the eastern portions of the municipality.

Approximately two million gallons per day could be developed for domestic and other uses. At an average rate of consumption of 400 gallons per residence per day, this quantity of water would be sufficient for 5,000 new residences. The groundwater pollution hazard is minimal except in those areas where sand and gravel aquifers are at the surface. See data levels #13 and #14.

Aggregate Minerals

Within Springfield, there are several deposits of sand and gravel. Historically, and at the present time, these deposits constitute an important source of industrial minerals for the construction industry (located mainly in Winnipeg). The deposits are located in the Northwest and in the eastern portions of the municipality. See data level #14.

Recreation

Birds Hill Park in the Northwest portion of the municipality has been developed for upland and shoreland recreation. The eastern townships (10-7E, 11-7E, 10-8E, and 11-8E) also have potential for recreational use. In particular, the Brokenhead River corridor can provide opportunities for water based recreation, hiking, and observing wildlife species

which are associated with riparian habitats. The Red River Floodway has some recreational potential, particularly at vehicle access points.

Crown Land and Zoning

In addition to Birds Hill Park in the Northwest, there are approximately 20 square miles of crown land in the Southeast part of the municipality. See Figure 9. Outside of the Winnipeg Additional Zone, Springfield is zoned for 5 acre minimum sites for residential purposes. Within the Winnipeg Additional Zone, the zoning is generally for 160 acre minimum sites, although there is an area of 80 acre minimum zoning and an area of 5 acre minimum zoning. See Figure 10. Presently, there are approximately 198,720 acres zones as five acre minimum size for residential use. First reading has been given to a development plan which will place greater restrictions (40 and 80 acre minimum site requirements) on about 80% of the land which is presently zoned for five acre minimum sites. Such a zoning control change would restrict opportunities for rural residential development.

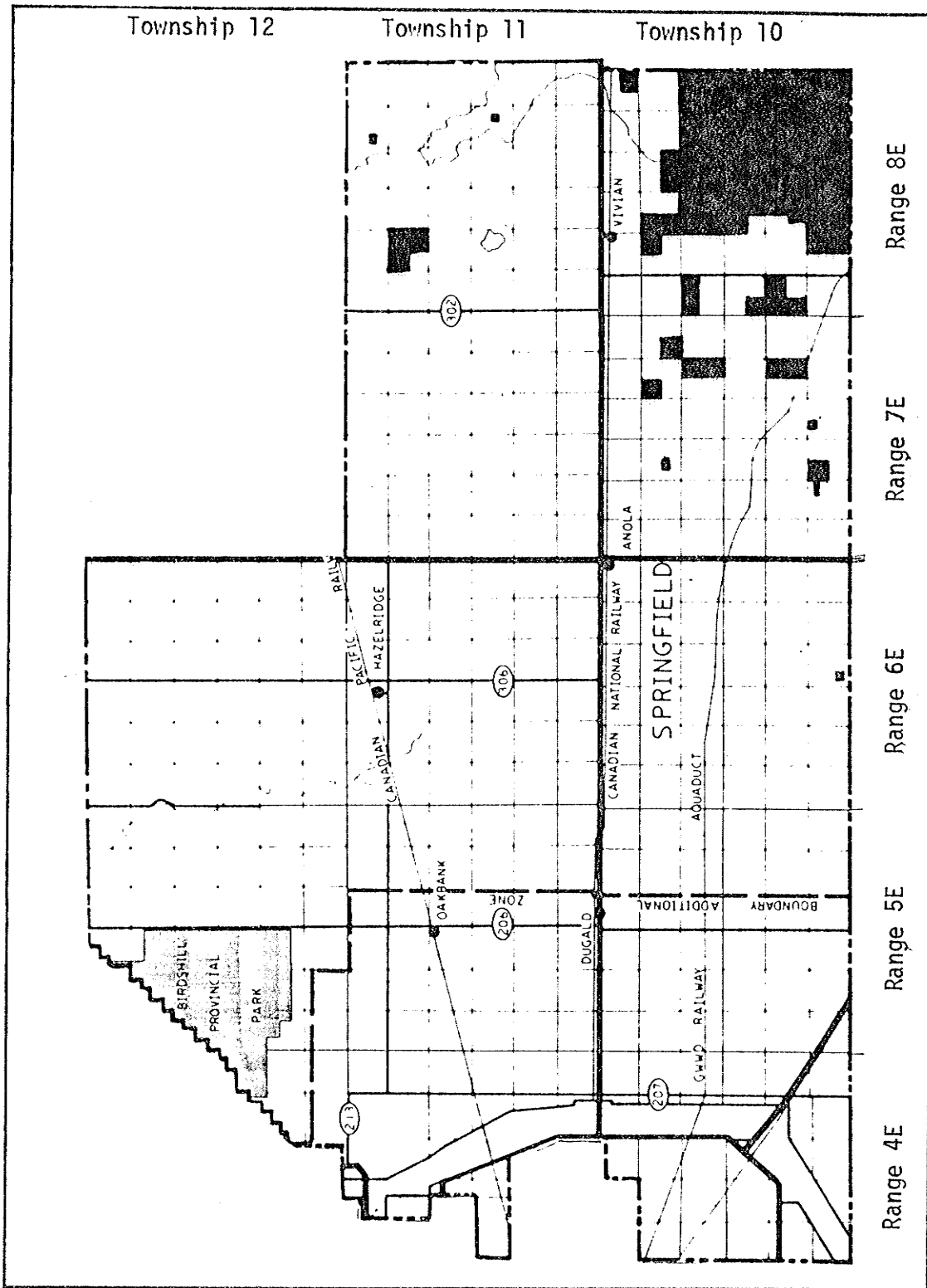


Figure 9
Crown Land In Springfield

Source: Crown Lands Handbook for Agro-Manitoba 1977 Winnipeg.

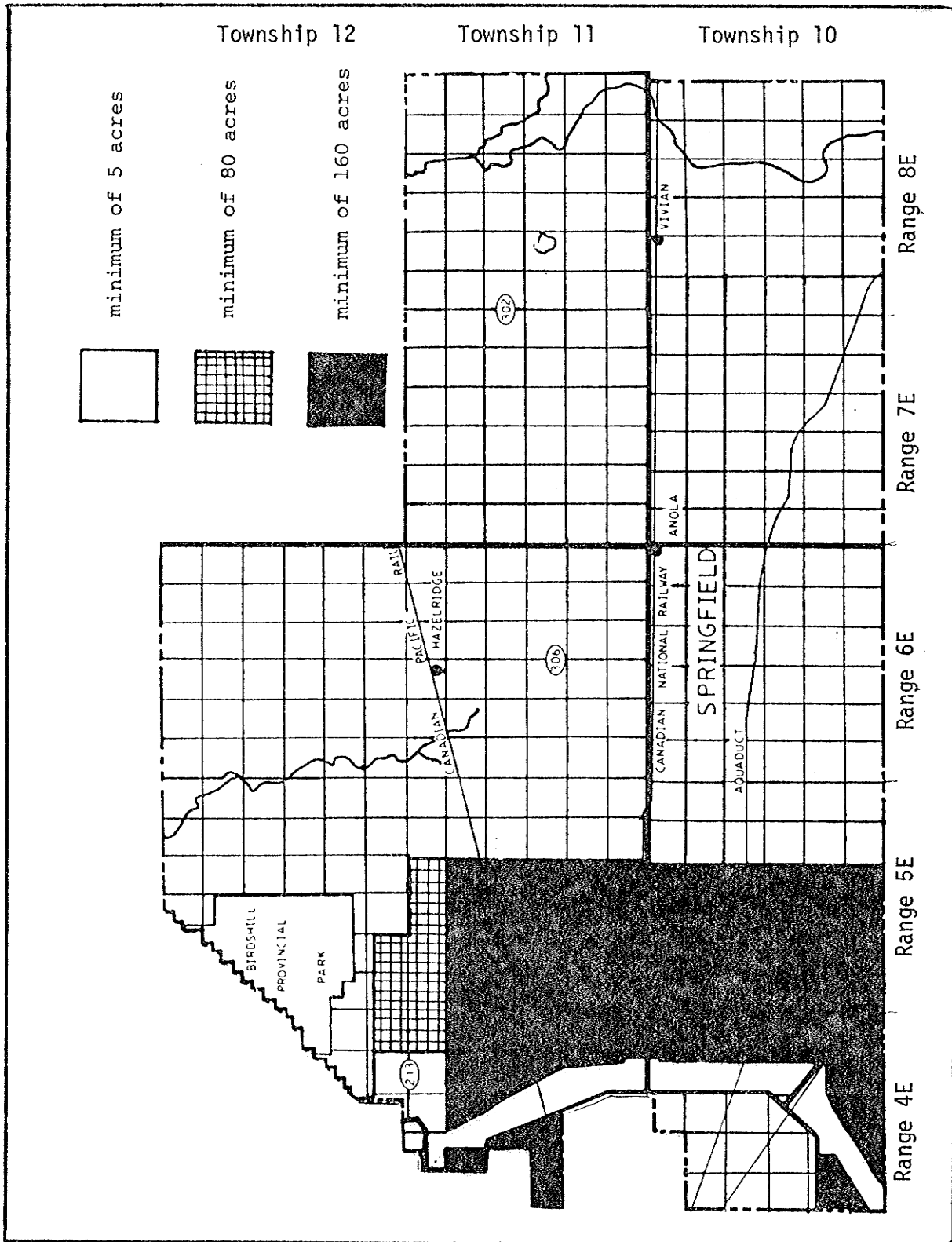


Figure 10
Zoning in Springfield

POPULATION

Population Change

Population counts for Springfield are presented by census year in Table 2 below.

Table 2
Springfield Population at Five Year Intervals

Year	Population	Change	% Change
1951	5,375		
1956	5,120	-255	- 4.7%
1961	5,608	+488	+ 9.5%
1966	5,670	+ 62	+ 1.1%
1971	5,955 ^b	+285	+ 5.3%
1976 ^a	6,944	+989	+16.6%

^a preliminary figures from 1976 Census of Canada

^b division boundaries changed due to annexation of part of Springfield to Transcona

Source: 1971 Census of Canada Catalogue #92-702, Table 2, pp. 80-81.

The population fluctuations of the last twenty-five years, as illustrated by Table 2 were not moderated by extending the time period back to 1921. The population of Springfield is presented in Table 3 at ten year intervals of census years.

Table 3
Springfield Population at Ten Year Intervals

Year	Population	Change	% Change
1921	5345		
1931	6079	+ 734	+ 13.7%
1941	6863	+ 784	+ 12.9%
1951	5375	-1488	- 21.7%
1961	5608	+ 233	+ 4.3%
1971	5955 ^a	+ 347	+ 6.2%

^adivision boundaries changed due to annexation of part of Springfield to Transcona.

Source: 1971 Census of Canada Catalogue # 92-702

The massive fluctuations in the population of Springfield over the interval from 1921 to 1971 are illustrated in Figure 11.

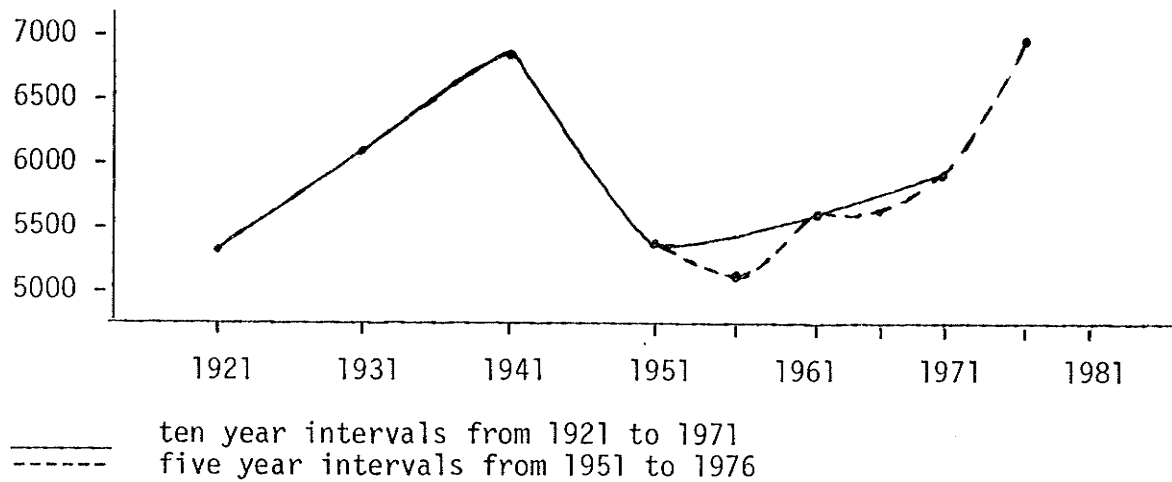


Figure 11
Springfield Population Change

If it is assumed that, beginning in 1976, the population decreases at a rate equal to the rate of population decline in the interval from 1941 to 1951, then by 1986 the population would be reduced to about 5439. If this is taken to represent the most drastic possible population decline, then by 1981, the minimum population would be about 6200. This is approximately equal to the population which results from extrapolating the ten year interval population values from 1971. If it is assumed that the recent growth rate of 16.6% per five years is a maximal rate, then the maximum expected population for 1981 would be about 8100. The mean change per five year interval was an increase of 5.5%. Applying this value to the 1976 population figure suggests that by 1981, the population of Springfield will be about 7300. The maximum, minimum, and mean population projections are illustrated in Figure 12.

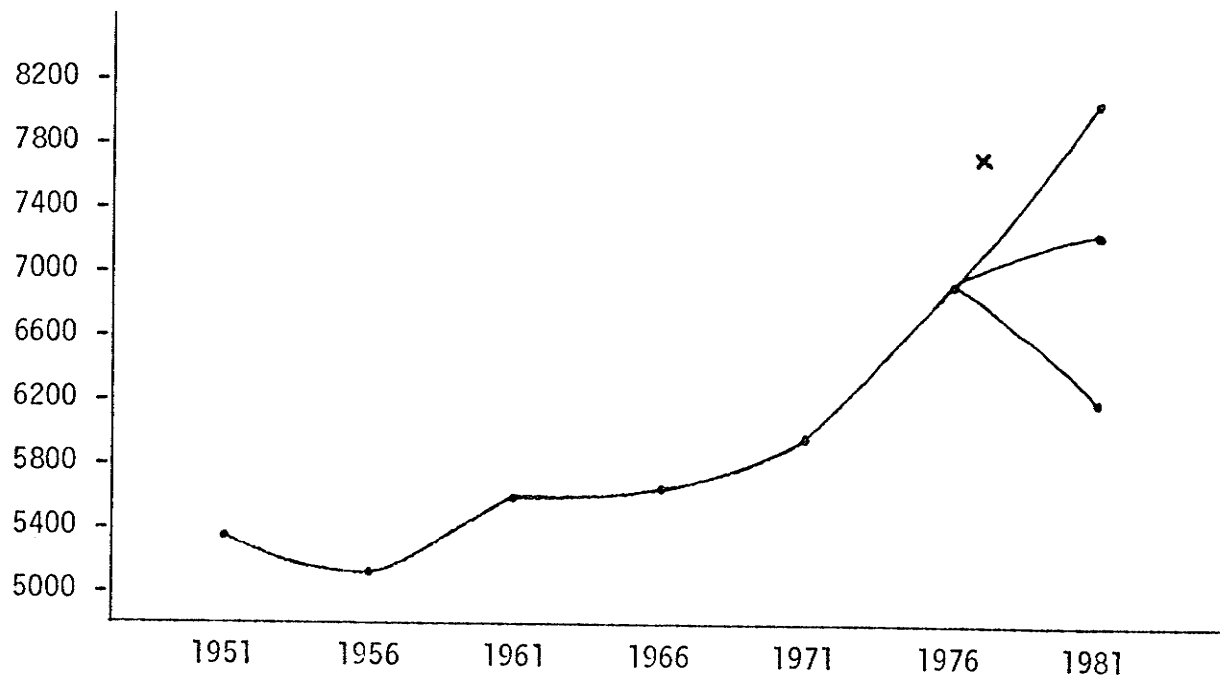


Figure 12

Maximum, Minimum, and Mean Population
Projections for Springfield

Although differences must be expected between municipal and Canada census figures, it is interesting to observe that a municipal census which was conducted in the spring of 1977 showed a total population count of 7759. This figure (marked with an X in Figure 12) suggests that the maximum population projection outlined above might be the most accurate.

Population Distribution

The results of the 1977 municipal census are presented in Figure 13. Generally, the municipal census areas corresponded to townships. There are three exceptions in which census areas crosscut township lines.

Figure 13 illustrates that generally population concentration is highest in the Northwest, and that it gradually decreases to the South and East.

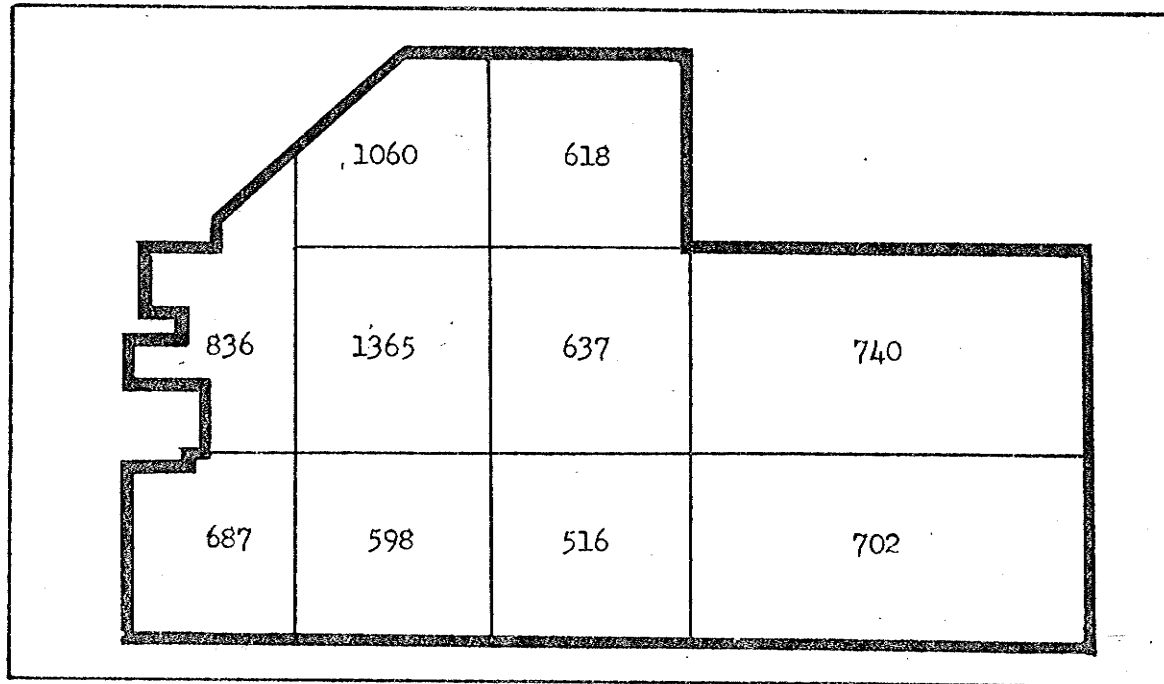


Figure 13
Population of Springfield

Age-sex distributions for 1961, 1966 and 1971 are presented in Table 4.

Table 4
Age-Sex Distributions for Springfield

AGE	1971		1966		1961	
	M	F	M	F	M	F
70+	170	150	199	143	182	127
65-69	115	75	85	82	118	78
55-64	310	250	292	205	245	202
45-54	355	300	347	285	354	285
35-44	350	310	363	317	366	334
25-34	330	330	298	304	334	283
20-24	195	155	172	139	186	122
15-19	325	260	267	199	266	236
10-14	360	385	342	292	302	266
3- 9	365	360	319	359	345	288
0- 4	<u>250</u>	<u>260</u>	<u>348</u>	<u>313</u>	<u>328</u>	<u>361</u>
SUB-TOTALS	3125	2835	3032	2638	3026	2582
TOTALS	<u>5960</u>		<u>5670</u>		<u>5608</u>	

In analysing this distribution, beginning in 1961, the number of persons in any particular age category was compared with the number of persons in the next highest category in the following census year. For example, the number of males in the 1961 age category of 15-19 was compared to the number of males in the 1966 category 20-24.

In 1966 and 1971, increases were observed in the categories 25-34 and 35-44. By 1971, an increase was noticed in the categories 5-9 and 10-14. The increases in the number of persons in the category 25-34 from the

category 20-24 in the preceding census year can be explained simply by the fact that one class covers a five year age span while the other class covers a ten year age span. However, the increases shown in the 35-44 category and the 1971 increase in the categories 5-9 and 10-14 suggest an in-migration of young families with children.

APPENDIX 2

RESIDENTIAL DEVELOPMENT IN SPRINGFIELD

DEVELOPMENT TRENDS

Rough Estimates of Residence Building Activity

In this section, rough estimates of building activity are examined under the headings of (1) plans of subdivision, (2) numbers of land sales, and (3) tax bills and realty roll entries.

Plans of Subdivision. A record of plans of subdivision which is maintained by the Surveys Section of the Winnipeg Land Titles Office was examined. Recent plans of residential subdivision in Springfield were investigated and counted by the year of their registration. The number of plans of subdivision registered annually was found to be increasing. Generally, the number of residential lots created in each plan also was found to be increasing. The findings are summarized in Table 5.

The data for 1977 were incomplete. However, they did not suggest a future decrease in the numbers of residential lots created each year. The available information suggests that the number of residential lots being created each year probably is increasing.

Table 5
 RECENT PLANS OF SUBDIVISION AND NUMBERS OF
 RESIDENTIAL LOTS

YEAR	NUMBER OF PLANS	NUMBER OF LOTS	MEAN NUMBER OF LOTS PER PLAN
1970	0	0	----
1971	2	10	5.0
1972	4	48	12.0
1973	3	28	9.3
1974	4	29	7.3
1975	5	138	27.6
1976	10	239	23.9

Numbers of Land Sales. The record of land sales which is maintained by the Municipal Assessment Branch of the Department of Municipal Affairs was examined. Recent land sales in Springfield were counted by the year of their registration.¹ The annual numbers of recorded land sales increased until 1975, and have been decreasing since then. The findings are presented in Table 6.

¹ This record has been maintained since 1971, but it includes transactions from 1968 and earlier. For the purposes of this exercise, all land sales were counted if they had been assigned a transaction number by the Department of Municipal Affairs.

Table 6
NUMBERS OF ANNUAL LAND SALES

YEAR	NUMBERS OF SALES	CHANGE
1970	168	134
1971	248	80
1972	292	44
1973	395	103
1974	454	59
1975	673	219
1976	440	-233

The data for 1977 were incomplete. They suggested that the number of sales in 1977 would not be as large as the number of sales in 1976. This information suggests that the number of land sales taking place each year has recently begun to decline.

Tax Bills and Realty Roll Entries. The available data on numbers of tax bills and realty roll entries were insufficient for conclusive findings. Numbers of parcels of property can be expected to increase naturally over time. In order for the number to decrease, a legal consolidation of titles would be required. Therefore, in this examination, the annual rate of increase was noted (rather than the annual increase). The record of the annual number of tax bills which is maintained by the Municipal Services Branch of the Department of Munici-

pal Affairs was examined. A record of the number of entries on the municipal realty rolls, which is maintained by the Department of Municipal Affairs, also was examined.¹ The annual rates of increase were found to increase until 1976, and to decrease thereafter. This information suggests that the number of properties created each year may have begun to decline recently.

Problems With the Rough Estimates

Frequently, residential lots that are created by subdivision remain vacant for some time. One of the studies which was undertaken by the Winnipeg Region Study group indicated that approximately one half of all lots remained vacant for periods of at least five years.² For this reason, annual numbers of plans of land division are not necessarily reliable indicators of current rural residential building activity.

Land is bought and sold for a variety of reasons other than residential construction. A record of annual land sales cannot be a good indicator of residential building activity.

There can be no assurance that increases in numbers of tax bills correspond to increases in numbers of properties because in situations where more than one person buys a property, each receives a separate

¹ The record of tax bills included billings for real property, commercial property, and personal property. Data were easily available only for 1975, 1976, and 1977. The record of entries on the municipal realty rolls covered the interval from 1972 to 1976.

² Manitoba Department of Municipal Affairs, Municipal Planning Branch, Land Division in Manitoba: Study of Selected Towns and Municipalities. Winnipeg. 1975.

tax bill. Entries on realty rolls are equally unreliable. There can be no assurance that the new properties are created for residential use.

The Examination of Building Permits

To clarify the uncertainties, the records of building permits issued for residential purposes were consulted.¹ Building permits were thought to be a more precise approximation of building activity. The number of residential building permits issued by Springfield each year increased from 1971 to 1975 but remained constant thereafter. The numbers of permits issued for Springfield each year by the City of Winnipeg fluctuated in the interval from 1971 to 1975, but remained small by comparison with the number of permits issued in 1976.² The findings are presented in Table 7.

¹ Depending upon the location of a site, building permits are issued either by the municipality, or (if they are situated in the Winnipeg Additional Zone) by the City of Winnipeg Planning Authorities. The records of issued permits indicated the purpose for which each proposed building was being constructed. For the purposes of this exercise, permits were included in the count if they had been issued for the construction of a new dwelling (including staff dwellings), moving a house onto a new site, or locating a mobile home on a site. Other building permits, which may have been issued for such purposes as alterations, or the construction of commercial, storage, or other secondary buildings were not included.

² In 1976, at least 74 building permits were issued for new residential construction in Plans of Subdivision #12583 and #12416, adjacent to Oakbank.

Table 7
RESIDENTIAL BUILDING PERMITS ISSUED FOR SPRINGFIELD

YEAR	NUMBER ISSUED BY SPRINGFIELD	NUMBER ISSUED BY WINNIPEG	TOTAL NUMBER OF PERMITS
1971	34	23	57
1972	44	37	81
1973	70	50	120
1974	99	40	139
1975	117	47	164
1976	115	112	227

Overall, this evidence suggests that the combined numbers of building permits issued annually are increasing. Although Springfield has recently begun to issue fewer permits, there is no indication that the annual numbers of permits are reaching a plateau. See Figure 14.

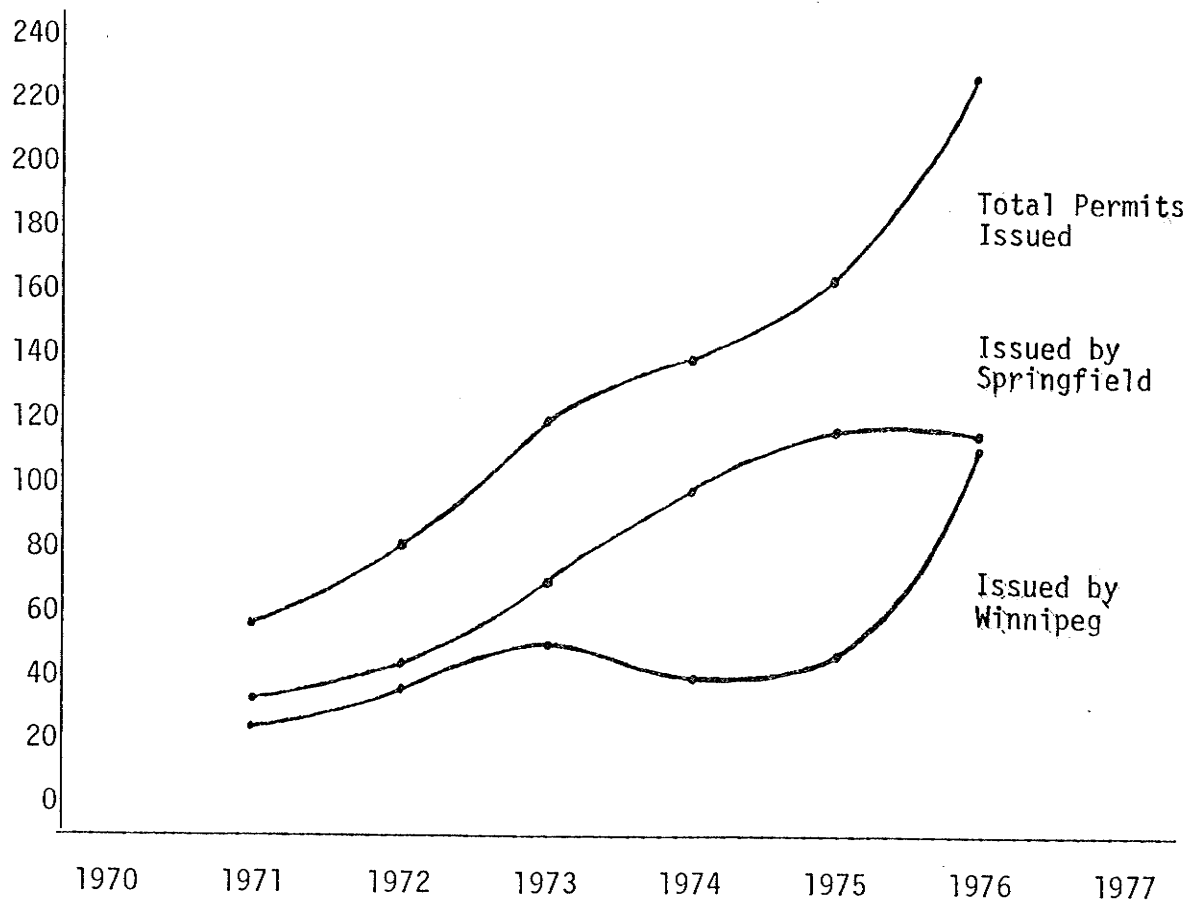


Figure 14
RESIDENTIAL BUILDING PERMITS ISSUED FOR SPRINGFIELD

Although there were some suggestions that annual amounts of residential building activity may be decreasing, the conclusion which was drawn from the available evidence is that residential building activity cannot be expected to decline in the near future.

LOCATIONS OF RESIDENCES

In this discussion of residence location, frequent references are made to townships, sections, quarter sections, legal subdivisions and cells. A township is a square land area with dimensions of six

miles by six miles. It contains 36 square miles or sections of 640 acres each. Each section can be divided into four quarter sections of 160 acres or into 16 legal subdivisions of 40 acres. The legal subdivision was the smallest unit of analysis in this study. Legal subdivisions are also referred to as cells in the study.

Distribution of Plans

The record of plans maintained by the Surveys section of the Winnipeg Land Titles Office was searched. The legal descriptions of the locations of all residential plans of land division in Springfield were recorded. Generally, the number of plans of land division decreased as the distance from central Winnipeg increased.

Distribution of Residences from the RPC Group Ltd. Maps¹

In Springfield, there are 6563 legal subdivisions of approximately 40 acres. An examination of the land use maps which were prepared by the RPC Group Ltd. indicated that there were active residences located in 997 of the 6563 cells, i.e., 15.2% of all legal subdivisions were the sites for one or more residences. In addition to counting cells which contained residences, the actual numbers of residences were also

¹ For their study, An Historic and Present Land Use and Open Space Inventory of the Winnipeg Region, the RPC Group Ltd. constructed a set of maps on National Topographic Survey base mappings. These maps were on file with and made available by the Municipal Planning Branch of the Manitoba Department of Municipal Affairs.

considered.¹ The approximate total number of residences was (at least) 1384. This figure represents a density of 0.21 residences per cell. In all cases, the method of counting residences and the method of counting cells which contained residences provided similar information about residence density. For simplicity, this study treats only the approximate numbers of residences per cell, and does not deal with numbers of cells containing residences. (See data level 3.)

Location of Residences Within a Section. As expected, the distribution of residences apparently was greatly influenced by the location of roads. Dividing a section into 16 legal subdivisions of 40 acres produces a structure with 4 internal legal subdivisions, and 12 peripheral legal subdivisions which are adjacent to roads. There is three times as much area for residential use in peripheral as opposed to internal cells. Of the total of 1384 residences recorded, 1322 were located in peripheral cells and only 62 in internal cells. The approximate density of residences was 0.27 residences per peripheral cell, and 0.04 residences per internal cell. Compared to the background figure that for the entire municipality the average residence density was about 0.21 residences per cell, it can be seen that the density and number of residences tend to be higher in peripheral cells and considerably lower in internal cells.

¹The number of residences per cell was recorded as "0", "1", "2", or "3 or more". Therefore, the record can serve only as a minimizing approximation of the real number of residences, because in all cases where there were more than three residences per cell, the record shows only three residences.

Locations of Residences With Reference to Major Highways. A comparison of data level #3 and data level #11 (locations of residences and locations of major roads) illustrates the preference for residences to be located along the major arteries. Higher residence concentrations were found in sections adjacent to Provincial Trunk Highways 12 and 15 and adjacent to Provincial Roads 206, 207 and 213. The sections along the gravel roads on the North and South sides of PR 213 also had higher concentrations of residences. (See Figure 2 on page 9 for locations of Provincial Roads.)

Locations of Residences With Reference to Major Natural Waterways.

An examination of the land use maps indicated that there were 157 cells which had a river or a major creek flowing through them.¹ It was determined that there were 44 residences in the 157 riverine cells. This figure represents a residence density of 0.28 residences per cell, and is somewhat above the background density figure of 0.21 residences per cell.² Although it is thought that these numbers are not sufficient for a reliable analysis, it might be stated that residences tend to be more common along the major natural waterways than in the municipality generally.

¹ For the purposes of this exercise, smaller creeks, drains and the dyked and improved portions of the larger natural drains (such as the southern portion of Cooks Creek) were not included. It was thought that sites on the smaller, intermittent and unnatural watercourses would not be more attractive for residences than any other sites.

² Because so few cells could be examined in this exercise, these results cannot be taken to be very reliable.

Residence Location With Respect to Urban Areas.

The land use maps were examined in order to determine the numbers of residences that were located within a one mile radius and a two mile radius of six communities in Springfield. The six communities are: Oakbank; Dugald; Anola; Hazelridge; Vivian; and Glass. This section is not intended to argue that residence density is greater in urban areas than in non-urban areas. Rather, the point is to demonstrate how residence density approaches the background density for the municipality as distance from urban areas increases.

Within a radius of one mile of the communities, residence density was much higher than for the municipality generally. The total number of residences within one mile was 170. This figure represents a density of 0.56 residences per cell (compared to the background residence density for the entire municipality of 0.21 residences per cell).

The number of residences located between circles of one and two mile radii around the six communities was 196. This figure represents a density of 0.22 residences per cell which is very close to the residence density for the municipality as a whole. In summary, the tendency for residences to be clustered around urban communities is most noticeable within a one mile radius. Thereafter, residence density approaches average background levels by a radius of about two miles.

Residence Locations With Respect to Travel Time to Winnipeg.

The land use maps and the travel time contours of data level #6 were compared to determine how residence density varies with distance from Winnipeg. The residence distribution for the different travel time zones is present-

ed in Table 8.

TABLE 8
RESIDENCE DENSITY WITH REGARD TO TRAVEL TIME FROM WINNIPEG

ZONE	TRAVEL TIME	NUMBER OF CELLS	NUMBER OF RESIDENCES	RESIDENCES PER CELL
1	0-20	188	89	0.5
2	20-25	929	293	0.3
3	25-30	837	214	0.3
4	30-35	1290	344	0.3
5	35-40	1212	262	0.2
6	40-45	1058	125	0.1
7	45 +	1049	57	0.1

Table 8 demonstrates that residence density decreases as travel time to Winnipeg increases. The decline is most pronounced over the first and last intervals, and density remains steady over the middle portion of the range. This could be due in part to the presence of urban areas (Oakbank, Dugald, Anola, Glass, Hazelridge) in the middle range. Three general areas of residence density emerged. These areas are represented by travel times of: less than 20 minutes; 20 to 40 minutes; and more than 40 minutes.

Distribution of Residences From Recent Building Permits

In order to determine if recent trends in residence location are the same as the trends which emerged from the examination of locations of all existing residences (as indicated on the RPC Group Ltd. maps),

the locations of residences built in the period from 1971 to 1976 were examined from descriptions on residential building permits.¹

The numbers of building permits issued by all sources are presented by township in Figure 15.

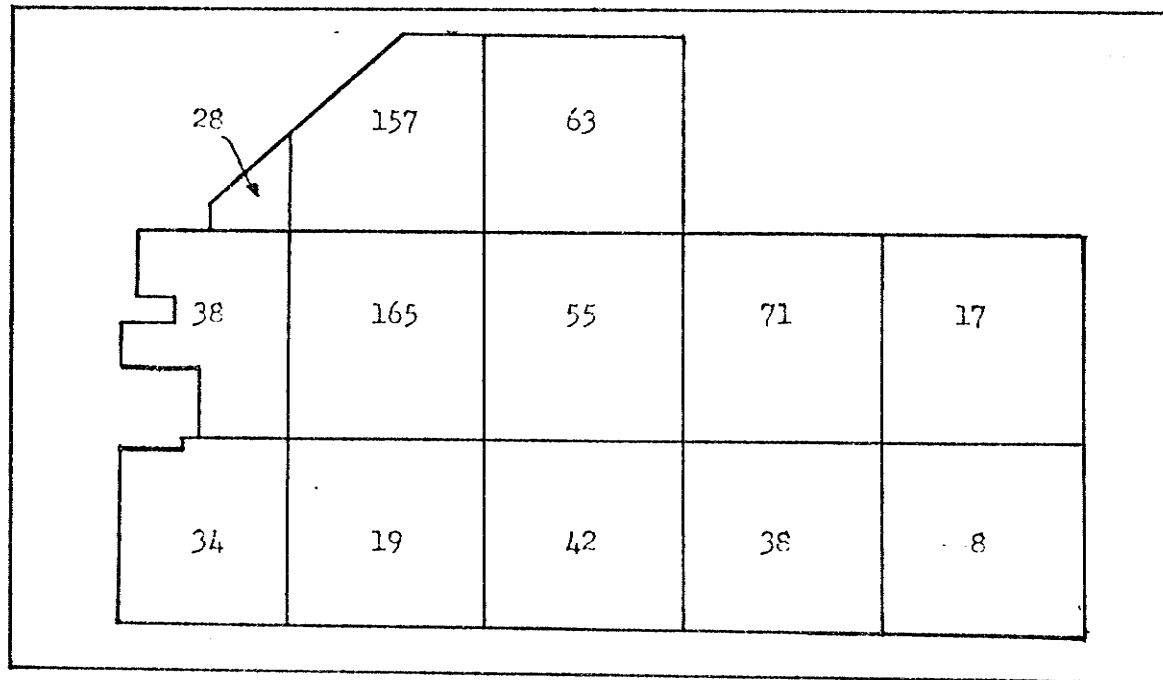


Figure 15
GENERAL LOCATIONS OF RECENTLY BUILT RESIDENCES (BY TOWNSHIP)

It is interesting to observe that Township 10-4E and 10-5E were chosen so infrequently while Township 11-7E was chosen so often. This distribution may reflect the clustering of new residences around urban centres.

¹Building permits are issued by either the Municipality of Springfield or the City of Winnipeg. Generally, the descriptions of residence locations recorded on building permits are accurate only to the level of the quarter section. Accordingly, this discussion is framed in very general terms.

Location of Residences Within a Section. It was not possible to conduct a precise examination of the locations of new residences within a section because the descriptions on the building permits were not sufficiently accurate. It was assumed that there was a tendency for these residences to be located on the periphery of each section, and this assumption was verified in those cases where more complete location descriptions were recorded.

Location of Residences With Reference to Major Roads. It is often observed that residential development precedes road improvements, i.e. that after an area reaches a certain population density and traffic threshold, road improvements follow. The evidence from the examination of building permits issued between 1971 and 1976 presents the other side of the argument. It was found that residential locations along the better quality roads were chosen more frequently than alternative sites. In particular, the areas adjacent to Provincial Trunk Highways 12 and 15 and Provincial Roads 206, 207, and 213 were notable. This evidence suggests that residential activity can be expected to follow road improvements or upgrading.

Location of Residences With Reference to Major Natural Waterways.

The numbers of sections available along waterways and the numbers of building permits issued for new residential construction in these sections were determined. From 1971 to 1976, twenty-six building permits were issued for the 33 available sections (approximately 0.8 building permits per section). Over the same interval a total of about 790 building permits were issued in the entire municipality of 410 square miles

(approximately 1.9 building permits per section). Although it is likely that the numbers are not sufficient to provide reliable results, on the basis of this information it appears that there is no tendency for new residences to be built along the major natural waterways. In part, this finding might be due to the fact that much of the area adjacent to the Brokenhead River is physically unsuitable for residential use.

Location of Residences With Reference to Urban Areas. For the interval from 1971 to 1976, the numbers of residential building permits issued annually for the areas around the communities of Anola, Oakbank, Dugald, Hazelridge, Vivian, and Glass were recorded. A tremendous increase was noted in the number of building permits issued in 1976 for the area around Oakbank.

The density of issued building permits within one mile of the communities was determined to be 9.7 building permits per section. The density of issued building permits in the area between one and two miles from the communities was determined to be 1.8 building permits per section, i.e. very close to the average density (of approximately 1.9 building permits per section) for the entire municipality.

In summary, there is a tendency for new residences to be clustered within one mile of urban communities. Residence density approaches the average background levels by about two miles from the communities.

Visual Impressions of the Building Permit Distribution From 1971 to 1976. An examination of data level #15 suggests that the urban communities, the area around Birds Hill Park, and part of Township 11-7E are popular areas for new residences.

CONCLUSIONS

It is reasonable to expect that residential building activity could increase in some fashion as population increases. The examination of development trends showed no positive suggestion of residential building activity declining in the near future.

In the absence of any change in current land use policy, further residential activity can be expected around the urban communities, along the Provincial Trunk Highways and Provincial Roads, and in the areas on the South, East and North sides of Birds Hill Park. Additionally, the area to the Northwest of Anola in Township 11-7E can be expected to attract more residences. See Figure 3 on page 14.

APPENDIX 3

RESIDENTIAL SUITABILITY STUDY

THE COMPUTER GRID MAPPING TECHNIQUE

Suitable locations for residential development in Springfield were identified by means of a computer grid mapping technique. Initially, the study area was analyzed into 6563 unique 40 acre cells, and each cell was defined by distinct grid co-ordinates.

Then, the entire study area was examined in terms of various "characteristics" which were thought to be pertinent in considering residential potential. Examples of such characteristics include "the bearing strength of soils for foundation construction" and "the suitability of soils to function as septic fields". For each "characteristic", or data level, an exhaustive range of possible identities was specified, and a number was attached to each identity. For example, within the data level "Dominant Land Covering", the possible identities (and their numbers) were as follows:

Agricultural and open grazing areas	(1)
Wooded areas	(3)
Marsh areas	(5)
Built up, or residential areas	(7)
Miscellaneous and special, industrial areas	(9)
Undefined (residual) areas	(0)

Each data level was treated in isolation from the others, and for each data level considered, a number identity was given to every

cell. It is important to observe that at this stage the number identities served only as a means to translate site information into a form which could be read easily by a computer. These numbers did not indicate or imply site values for any specific purposes. A series of separate data mappings was developed in this fashion; one data level for each relevant consideration. See Figure 16.

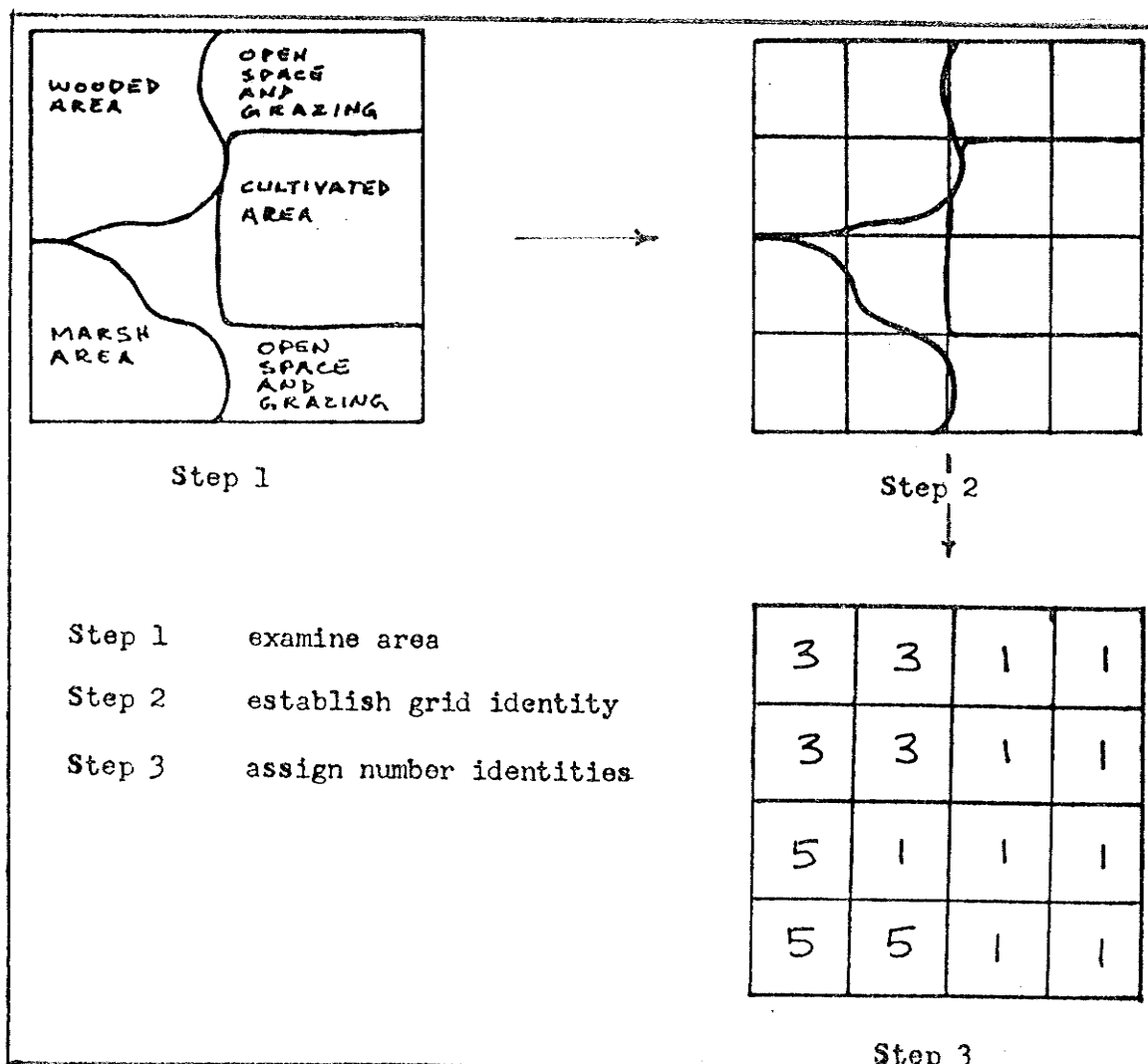


FIGURE 16
CONVERTING SITE INFORMATION INTO
COMPUTER DATA LEVEL

Following the establishment of an adequate data bank (consisting of a series of data levels entered into computer memory) the suitability of the different cells could be determined for various purposes (in this case residential purposes). In order to achieve this end, it becomes necessary to value the identity of each cell according to its suitability for the use in question. Therefore, all the possible numeric identities within each data level were given values which reflected their appropriateness for residential use. The evaluations were accomplished by applying a scale of numbers (from 0 to 9) which roughly corresponded to "highly inappropriate or unsuitable" to "highly appropriate or suitable". At this point, each data map or data level could be translated to provide information about the suitability of all cells for residential use (within the terms of that data level). This evaluation process is subjective. See Figure 17.

The evaluation procedure was repeated for each data level which pertained to residential use. The overall suitability of the various cells for a specific use then could be decided by determining an average value for each cell from the total series of data levels being considered. Recognizing that some data levels are more pertinent than others for various uses, certain data levels received more emphasis. This emphasis was provided by including the more significant data levels two, three, or more times in the total series of data levels from which average values were determined. The provision of emphasis by this means is also a subjective procedure. See Figure 18.

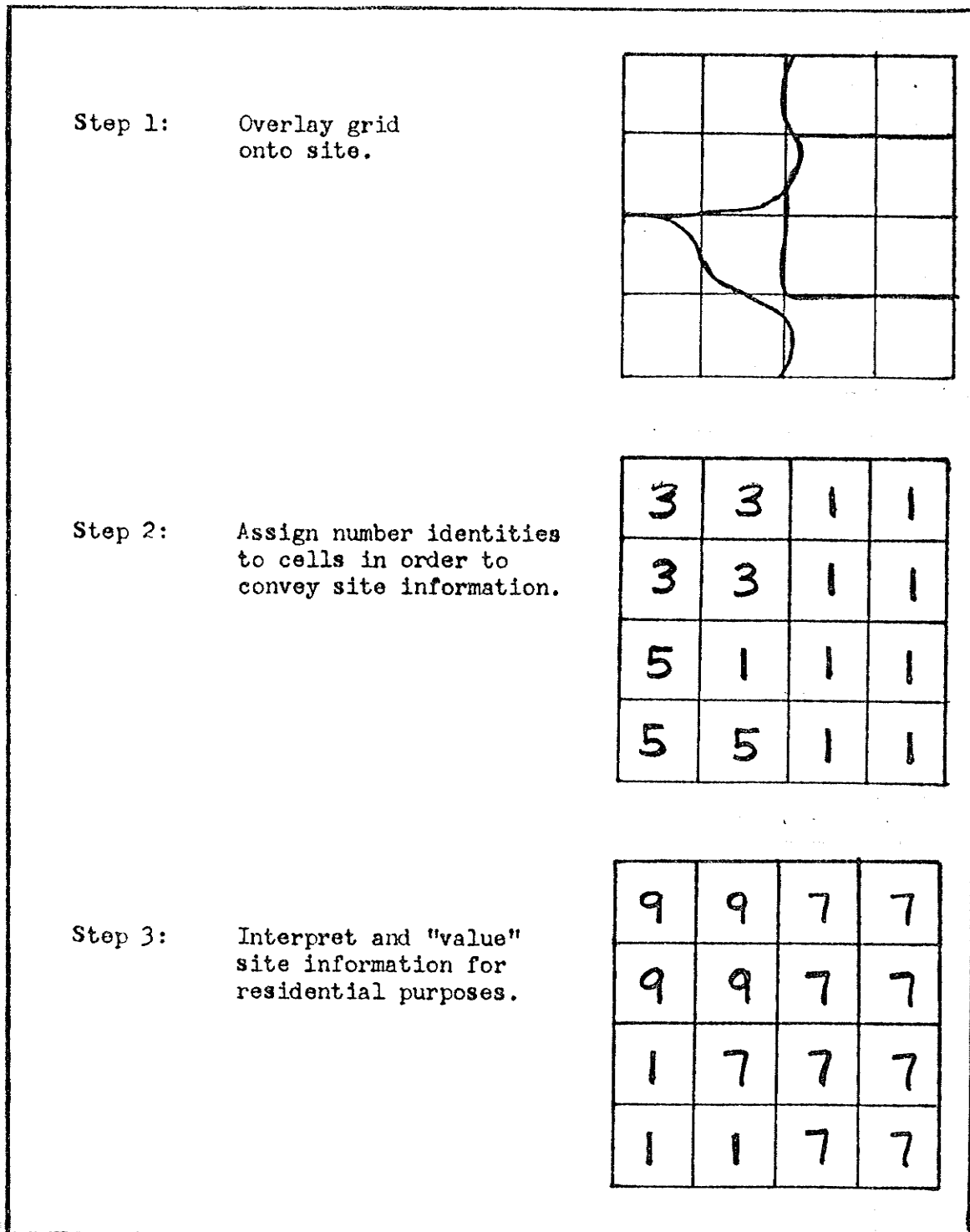


Figure 17
ASSIGNING VALUES FOR RESIDENTIAL USE

Data Level X

3	3	1	1
3	3	1	1
5	1	1	1
5	5	1	1

Values

9	9	7	7
9	9	7	7
1	7	7	7
1	1	7	7

Weight of 2

9	9	7	7
9	9	7	7
1	7	7	7
1	1	7	7

Data Level Y

2	2	9	7
5	5	9	4
1	1	4	4
1	3	4	4

Values

4	4	1	6
9	9	1	5
5	5	5	5
5	7	5	5

Weight of 1

4	4	1	6
9	9	1	5
5	5	5	5
5	7	5	5

Data Level Z

9	9	3	3
9	9	3	6
9	6	6	6
9	6	6	6

Values

9	9	5	5
9	9	5	3
9	3	3	3
9	3	3	3

Weight of 2

9	9	5	5
9	9	5	3
9	3	3	3
9	3	3	3

9	9	5	5
9	9	5	3
9	3	3	3
9	3	3	3

Sum of Values

40	40	25	30
45	45	25	25
25	25	25	25
25	15	25	25

Mean Values

8	8	5	6
9	9	5	5
5	5	5	5
5	3	5	5

Figure 18
Weighting or Emphasizing Data Levels

Impact models were developed in a similar way. In evaluating the impact of residential use on each cell, the range of values from 0 to 9 corresponded to impacts ranging from least impact to greatest impact.

Although the computer grid mapping technique involves subjective judgements, there are advantages to using it. It requires a systematic and thorough consideration of an issue such as residential suitability. Additionally, it provides a means by which operative assumptions can be specified openly to facilitate discussion and negotiation.

THE DATA LEVELS

The data levels which formed the data bank in the computer are outlined below. The meanings of the number identities are included.

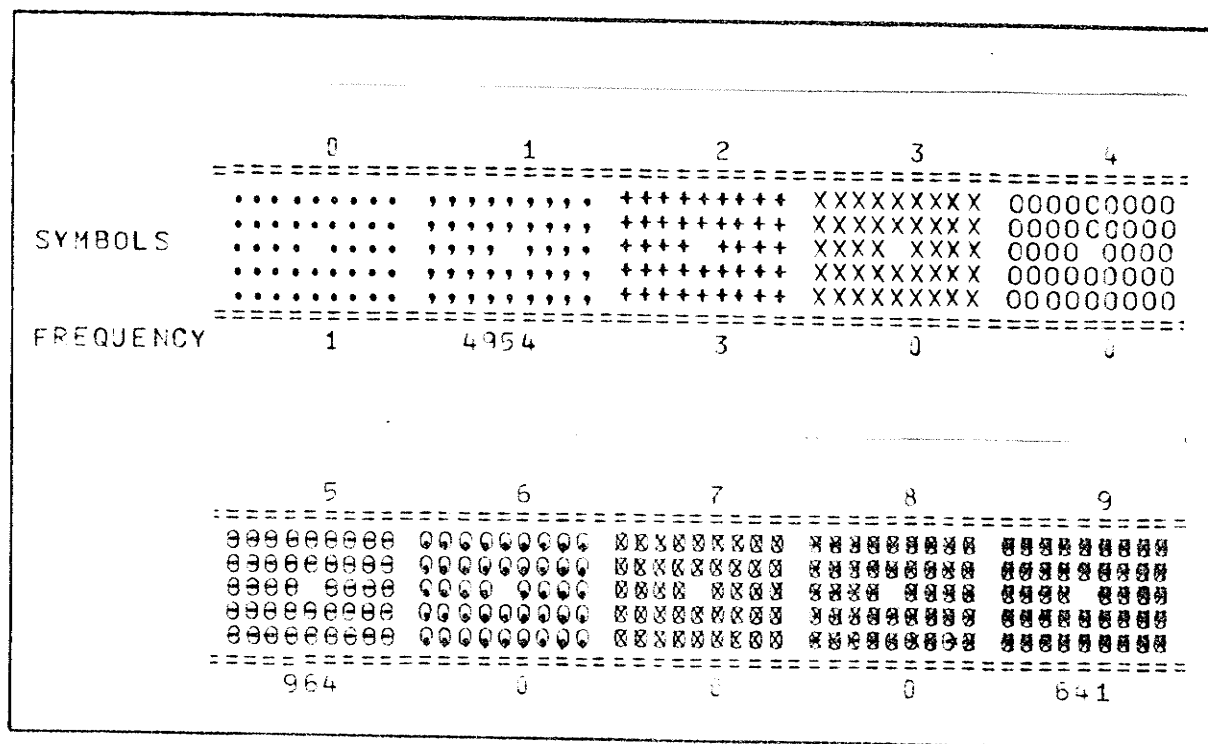
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Data Level #1: Location of Electrical Transmission Lines

(data obtained from NTS maps and Manitoba Hydro working maps)

- 0 = undefined
- 1 = transmission line more than two cells distant
- 2 = undefined
- 3 = undefined
- 4 = undefined
- 5 = transmission line within two cells
- 6 = undefined
- 7 = undefined
- 8 = undefined
- 9 = transmission line in cell



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Data Level #2: Location of Railways

(data obtained from NTS maps and verified by discussion with the railways)

- 0 = undefined
- 1 = any railway more than two cells distant
- 2 = undefined
- 3 = undefined
- 4 = G.W.W.D. line within 1 to 2 cells
- 5 = C.N. line within 1 to 2 cells
- 6 = C.P. line within 1 to 2 cells
- 7 = G.W.W.D. line within cell
- 8 = C.N. line within cell
- 9 = C.P. line within cell

	0	1	2	3	4
SYMBOLS	,,,,, ,,,,, ,,,,, ,,,,, ,,,,,	+++++ +++++ +++++ +++++ +++++	XXXXXXXXX XXXXXXXXX XXXX XXXX XXXXXXXXX XXXXXXXXX	000000000 000000000 0000 0000 000000000 000000000
FREQUENCY	5	5519	0	0	229

	5	6	7	8	9
	@@@ @@@ @@@ @@@	@@@ @@@ @@@ @@@	@@@ @@@ @@@ @@@	@@@ @@@ @@@ @@@	@@@ @@@ @@@ @@@
	299	163	115	148	82

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Data Level #3: Locations of Residences

(data obtained from RPC Group Ltd. maps on NTS base maps)

- 0 = undefined
- 1 = no residences in cell
- 2 = undefined
- 3 = one residence per cell
- 4 = undefined
- 5 = undefined
- 6 = 2 residences per cell
- 7 = undefined
- 8 = undefined
- 9 = 3 or more residences per cell

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FREQUENCY	0	5566	0	737	0

	5	6	7	8	9
	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
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	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
FREQUENCY	0	136	0	0	124

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Data Level #4: Dominant Land Cover

(data obtained from RPC Group Ltd. maps on NTS base maps)

- 0 = undefined
- 1 = agriculture, rough pasture, open space
- 2 = undefined
- 3 = wooded
- 4 = undefined
- 5 = marsh
- 6 = undefined
- 7 = built up, residential
- 8 = undefined
- 9 = industrial, miscellaneous, special

	0	1	2	3	4
SYMBOLS	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	++++	XXXX XXXX	0000 0000
	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	+++++	XXXXXXXXXX	000000000
FREQUENCY	2	4952	0	1146	0

	5	6	7	8	9
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
FREQUENCY	255	0	25	0	178

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Data Level #5: Soil Capability for Agriculture (CLI)

(data obtained from unpublished CLI working maps)

- 0 = organic soils
- 1 = primarily class 1 soils
- 2 = primarily class 2 soils
- 3 = primarily class 3 soils
- 4 = primarily class 4 soils
- 5 = primarily class 5 soils
- 6 = primarily class 6 soils
- 7 = primarily class 7 soils
- 8 = undefined
- 9 = undefined

	0	1	2	3	4
SYMBOLS	,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,,	+++++++ +++++++ +++++ + +++++++ +++++++	XXXXXXXXXX XXXXXXXXXX XXXX XXXX XXXXXXXXXX XXXXXXXXXX	000000000 000000000 0000 0000 000000000 000000000
FREQUENCY	167	0	1749	2692	717

	5	6	7	8	9
SYMBOLS	@@@@@@@@@@@ @@@@@@@@@@@@@ @@@@@ @@@@ @@@@@@@@@@@@@ @@@@@@@@@@@@@	OOOOOOOOOO OOOOOOOOOO OOOOO OOOO OOOOOOOOOO OOOOOOOOOO	XXXXXXXXXX XXXXXXXXXX XXXXX XXXXX XXXXXXXXXX XXXXXXXXXX	@@@@@@@@@@@ @@@@@@@@@@@ @@@@@@@@@@@ @@@@@@@@@@@ @@@@@@@@@@@	@@@@@@@@@@@ @@@@@@@@@@@ @@@@@@@@@@@ @@@@@@@@@@@ @@@@@@@@@@@
FREQUENCY	820	418	0	0	0

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068 X+X++++XX 068
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045 ++X+++X++++ 045
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Data Level #6: Travel Time to Downtown Winnipeg

(data obtained from Winnipeg Region Study maps)

- 0 = undefined
- 1 = undefined
- 2 = undefined
- 3 = less than 20 minutes
- 4 = 20 to 25 minutes
- 5 = 25 to 30 minutes
- 6 = 30 to 35 minutes
- 7 = 35 to 40 minutes
- 8 = 40 to 45 minutes
- 9 = more than 45 minutes

	0	1	2	3	4
SYMBOLS	,,,,	+++++	XXXXXXXXXX	0000000000
	,,,,	+++++	XXXXXXXXXX	0000000000
	,,,,	++++	XXXX XXXX	0000 0000
	,,,,	+++++	XXXXXXXXXX	0000000000
	,,,,	+++++	XXXXXXXXXX	0000000000
FREQUENCY	0	0	0	188	929

	5	6	7	8	9
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
FREQUENCY	837	1290	1212	1058	1049

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Data Level #7: Soil Bearing Strength for Foundation Construction

(data obtained from Canada-Manitoba Soils Survey)

- 0 = undefined
- 1 = very low to low
- 2 = undefined
- 3 = low to moderate
- 4 = undefined
- 5 = medium or moderate
- 6 = undefined
- 7 = moderate to good
- 8 = undefined
- 9 = good or high

	0	1	2	3	4
SYMBOLS	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	+++++	XXXX XXXX	0000 0000
	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	+++++	XXXXXXXXXX	000000000
FREQUENCY	248	5047	0	300	0

	5	6	7	8	9
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FREQUENCY	514	0	236	0	216

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Data Level #8: General Proximity to Major Natural Waterways

(data obtained from NTS maps)

- 0 = undefined
- 1 = more than 8 cells distant
- 2 = 7 to 8 cells distant
- 3 = 6 to 7 cells distant
- 4 = 5 to 6 cells distant
- 5 = 4 to 5 cells distant
- 6 = 3 to 4 cells distant
- 7 = 2 to 3 cells distant
- 8 = 1 to 2 cells distant
- 9 = 0 to 1 cell distant

	0	1	2	3	4
SYMBOLS	,,,,	+++++	XXXXXXXXXX	000000000
	,,,,	+++++	XXXXXXXXXX	000000000
	,,,,	+++++	XXXX XXXX	0000 0000
	,,,,	+++++	XXXXXXXXXX	000000000
	,,,,	+++++	XXXXXXXXXX	000000000
FREQUENCY	0	4925	179	175	180

	5	6	7	8	9
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
FREQUENCY	202	228	240	265	169

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Data Level #9: Generalized Proximity to Larger Communities Outside
 Winnipeg

(data obtained from NTS maps)

- 0 = undefined
- 1 = 0 to 4 cells distant
- 2 = 5 to 8 cells distant
- 3 = 9 to 12 cells distant
- 4 = undefined
- 5 = 13 to 16 cells distant
- 6 = undefined
- 7 = 17 to 20 cells distant
- 8 = undefined
- 9 = more than 20 cells distant

	0	1	2	3	4
SYMBOLS	,,,,,,	++++++	XXXXXXXXXX	0000000000
	,,,,,,	++++++	XXXXXXXXXX	0000000000
	,,,,,,	++++++	XXXX XXXX	0000 0000
	,,,,,,	++++++	XXXXXXXXXX	0000000000
	,,,,,,	++++++	XXXXXXXXXX	0000000000
FREQUENCY	0	431	1137	1638	0

	5	6	7	8	9
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
	0000000000	0000000000	0000000000	0000000000	0000000000
FREQUENCY	1683	0	931	0	293

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Data Level #10: Soil Limitations for Septic Fields

(data obtained from Canada-Manitoba Soils Survey)

- 0 = undefined
- 1 = slight limitation
- 2 = undefined
- 3 = slight to moderate limitation
- 4 = undefined
- 5 = moderate limitation
- 6 = undefined
- 7 = moderate to severe limitation
- 8 = undefined
- 9 = severe limitation

	0	1	2	3	4
SYMBOLS	+++++	XXXXXXXXXX	000000000
	+++++	XXXXXXXXXX	000000000
	+++++	XXXX XXXX	0000 0000
	+++++	XXXXXXXXXX	000000000
	+++++	XXXXXXXXXX	000000000
FREQUENCY	248	272	0	28	0

	5	6	7	8	9
	000000000	000000000	000000000	000000000	000000000
	000000000	000000000	000000000	000000000	000000000
	000000000	000000000	000000000	000000000	000000000
	000000000	000000000	000000000	000000000	000000000
FREQUENCY	260	0	718	0	5037

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Data Level #11: Generalized Proximity to Major Highways

(data obtained from Manitoba Department of Highways Maps)

- 0 = undefined
- 1 = more than 20 cells distant
- 2 = 17 to 20 cells distant
- 3 = 13 to 16 cells distant
- 4 = 9 to 12 cells distant
- 5 = 5 to 8 cells distant
- 6 = 4 cells distant
- 7 = 3 cells distant
- 8 = 2 cells distant
- 9 = adjacent

	0	1	2	3	4
SYMBOLS	,,, ,,, ,,,	++++++	XXXXXXXXXX	000000000
	,,, ,,, ,,,	++++++	XXXXXXXXXX	000000000
	,,, ,,, ,,,	++++	XXXX XXXX	0000 0000
	,,, ,,, ,,,	++++++	XXXXXXXXXX	000000000
	,,, ,,, ,,,	++++++	XXXXXXXXXX	000000000
FREQUENCY	0	236	440	740	1218

	5	6	7	8	9
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	@@@@@@@@@@	@@@@@@@@@@	@@@@@@@@@@	@@@@@@@@@@	@@@@@@@@@@
	@@@@@@@@@@	@@@@@@@@@@	@@@@@@@@@@	@@@@@@@@@@	@@@@@@@@@@
FREQUENCY	1778	519	522	561	549

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Data level #12: Drainage Problem Areas

(data obtained from Water Services Branch Field Report)

- 0 = undefined
- 1 = no problems identified
- 2 = undefined
- 3 = undefined
- 4 = undefined
- 5 = undefined
- 6 = undefined
- 7 = undefined
- 8 = undefined
- 9 = problem identified

	0	1	2	3	4
SYMBOLS	+++++	XXXXXXXXXX	0000000000
	+++++	XXXXXXXXXX	0000000000
	++++	XXXX XXXX	0000 0000
	+++++	XXXXXXXXXX	0000000000
	+++++	XXXXXXXXXX	0000000000
FREQUENCY	0	5543	0	0	0

	5	6	7	8	9
	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@
	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@
	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@
	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@
	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@
	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@	@@@@@@@@
FREQUENCY	0	0	0	0	1020

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Data Level #13: Groundwater Contamination Hazard

(data obtained from Canada-Manitoba Soils Survey)

- 0 = undefined
- 1 = little contamination hazard
- 2 = undefined
- 3 = undefined
- 4 = undefined
- 5 = possible contamination hazard
- 6 = undefined
- 7 = undefined
- 8 = undefined
- 9 = high contamination hazard

	0	1	2	3	4
SYMBOLS	,,, ,,, ,,, ,,, ,,,	++++ ++++ ++++ ++++ ++++	XXXXXXXXXX XXXXXXXXXX XXXX XXXX XXXXXXXXXX XXXXXXXXXX	00000000 00000000 0000 0000 00000000 00000000
FREQUENCY	244	5729	0	0	0
	5	6	7	8	9
	00000000 00000000 0000 0000 00000000 00000000	00000000 00000000 0000 0000 00000000 00000000	00000000 00000000 0000 0000 00000000 00000000	00000000 00000000 0000 0000 00000000 00000000	00000000 00000000 0000 0000 00000000 00000000
	63	0	0	0	27

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Data Level #14: Potential for Sand or Gravel

(data obtained from Canada-Manitoba Soils Survey)

- 0 = undefined
- 1 = very low to low
- 2 = undefined
- 3 = low to moderate
- 4 = undefined
- 5 = moderate
- 6 = undefined
- 7 = moderate to high
- 8 = undefined
- 9 = high or good

	0	1	2	3	4
SYMBOLS	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	++++	XXXX XXXX	0000 0000
	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	+++++	XXXXXXXXXX	000000000
FREQUENCY	134	5576	0	184	0

	5	6	7	8	9
	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO
	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO
	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO
	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO	OOOOOOOOO
FREQUENCY	403	0	41	0	225

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Data Level #15: Building Permits for New Residences 1971 to 1976

(data obtained from descriptions on building permits)

- 0 = no building permits issued per quarter section
- 1 = 1 building permit issued per quarter section
- 2 = 2 building permits issued per quarter section
- 3 = 3 building permits issued per quarter section
- 4 = 4 building permits issued per quarter section
- 5 = 5 building permits issued per quarter section
- 6 = undefined
- 7 = undefined
- 8 = undefined
- 9 = more than 5 building permits issued per quarter section

	0	1	2	3	4
SYMBOLS	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	++++	XXXX XXXX	0000 0000
	,,,,,,	+++++	XXXXXXXXXX	000000000
	,,,,,,	+++++	XXXXXXXXXX	000000000
FREQUENCY	5145	945	244	118	47

	5	6	7	8	9
	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
FREQUENCY	40	0	0	0	24

THE MODELS

One impact model and two suitability models were developed from the data levels. Each model was generated in two forms.

Impact Model

Rural residential activity was thought to have the capacity to impinge upon agricultural practises, groundwater quality, and access to aggregate minerals. The impacts on agriculture and aggregates were visualized as being most serious in those areas which had the greatest potential for these resources. The threat to groundwater quality derived from the operation of septic fields. This threat was determined to be greatest for those areas in which soil texture and percolation characteristics were physically most suitable for the operation of septic fields. Generally, in Springfield, these were the areas with the greatest potential for aggregate minerals. (Most of the other soils in Springfield are relatively impervious plastic clays.) Thus, in the impact modelling, the groundwater contamination and aggregate impacts were localized in the same small areas. It was suspected that the coincidence of these impacts might have the effect of minimizing the impacts of residential use in the large agricultural areas. Therefore, two impact models were developed. The second model was designed to provide some additional emphasis for the impacts on agriculture (data level 5). The impact models are outlined below. The ten entries under the heading, "Values of Variables", indicate the values which were given to the ten possible identities within each data level.

IMPACT MODEL #1

<u>Data Level</u>	<u>Values of Variables</u>										<u>Weight</u>
5	1	9	9	9	1	1	1	1	0	0	1.0
13	1	1	0	0	0	5	0	0	0	9	1.0
14	1	1	0	1	0	5	0	9	0	9	1.0

IMPACT MODEL #2

<u>Data Level</u>	<u>Values of Variables</u>										<u>Weight</u>
5	1	9	9	9	1	1	1	1	0	0	2.0
13	1	1	0	0	0	5	0	0	0	9	1.0
14	1	1	0	1	0	5	0	9	0	9	1.0

Although there were some differences between the print-outs of the two models, they conveyed the same basic information. Impact model #1 outlined areas of high impact in the Northwest corner, and in the eastern townships. These areas correspond closely to the areas of high aggregate potential (from data level 14) and areas of high potential groundwater contamination (from data level 13). The remaining portions of the municipality showed low impacts. The agricultural areas with high impacts were not distinguished satisfactorily from other areas of low impact.

Impact model #2 outlined smaller areas of high impact in the Northwest corner and the eastern townships. The loss of impact contrast in these areas derived from the fact that impact on agriculture had been emphasized preferentially over the other impacts. Impact model #2 clearly indicated the differences of impact between the agricultural and non-agricultural areas in the eastern townships. Impact model #2 is recommended as the more accurate statement of impacts. In impact model #2, the areas of high impact (impact values from five to nine) contained all of the agricultural, aggregate, and groundwater impact areas. The residual areas of low impact (values from zero to four) can be recommend-

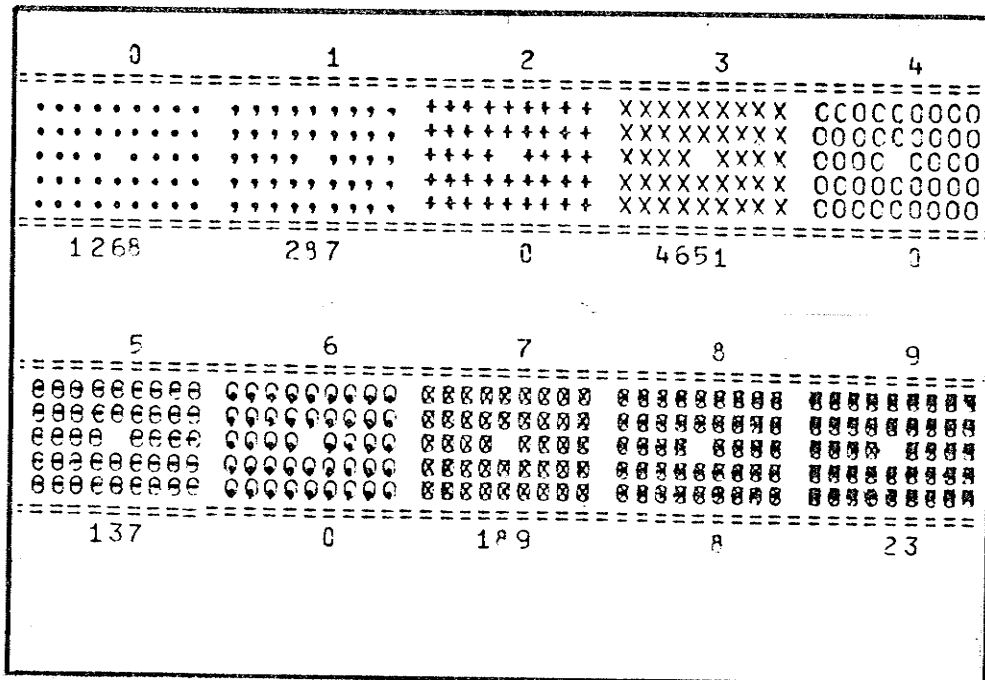
ed as suitable locations for residential uses (within the terms of this discussion).

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Impact Model #1

- 0 = least impact
- 1 =
- 2 =
- 3 =
- 4 =
- 5 =
- 6 =
- 7 =
- 8 =
- 9 = most vulnerable

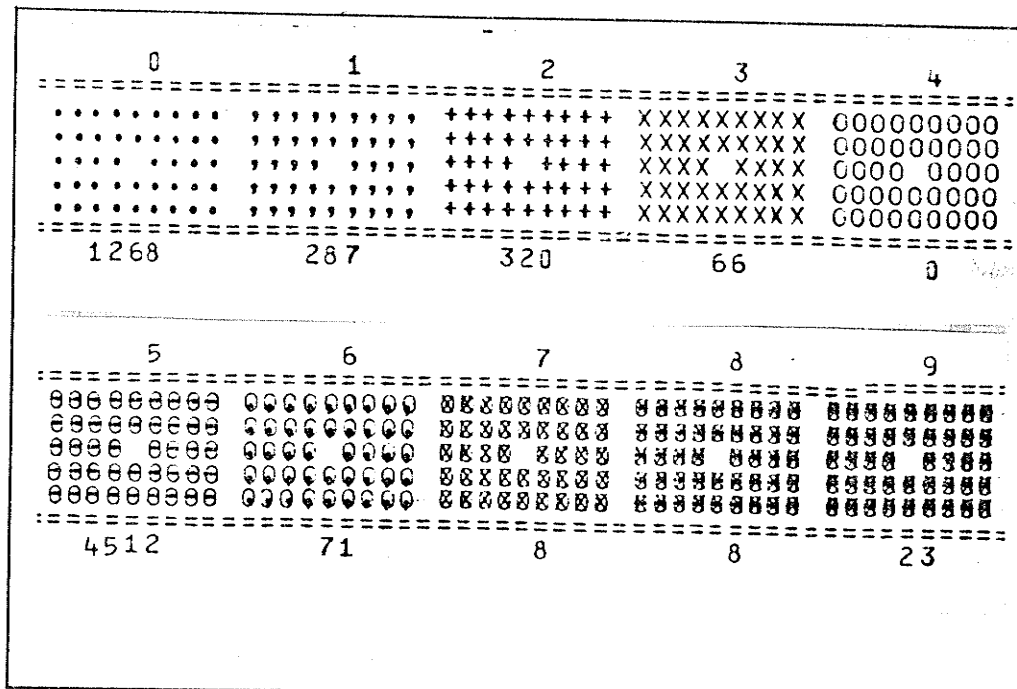


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Impact Model #2

- 0 =
- 0 = least vulnerable
- 1 =
- 2 =
- 3 =
- 4 =
- 5 =
- 6 =
- 7 =
- 8 =
- 9 = most vulnerable



Physical Suitability Model

Certain physical site characteristics were thought to be pertinent to the consideration of residence location. It was decided that the most rudimentary analysis of physical suitability should take account of soil suitability for foundation construction (data level 7) and soil suitability for the operation of private septic fields, (data level 10). Generally, the soils of Springfield have low bearing strength and poor percolation characteristics. The exceptions to this rule are provided by those small areas of sand and gravel which have higher bearing strengths and excellent percolation characteristics. (However, these areas have a high threat of groundwater contamination.)

It was thought that a model of physical suitability which was based solely on the considerations of soils bearing strength and soil suitability for septic fields would provide strong contrasts between the very suitable areas and the very unsuitable areas. However, it might fail to provide adequate discrimination along the range between these two extremes. Accordingly, a second model, which included surface information pertaining to land covering and drainage, was developed. The data level on land covering was given preferential emphasis in this model. This data level distinguished suitable agricultural and wooded areas, from less suitable industrial and special areas, from absolutely unsuitable marsh areas. Problems of unsuitable foundations and unsuitable septic field areas were thought to be more easily treated than certain of the gross physical problems presented by these distinctions in the data level concerning land covering. The physical suitability models are outlined below.

PHYSICAL SUITABILITY MODEL #1

<u>Data Level</u>	<u>Values of Variables</u>										<u>Weight</u>
4	1	9	0	9	0	1	0	5	0	1	3.0
7	1	1	0	1	0	5	0	9	0	9	1.0
10	1	9	0	9	0	5	0	1	0	1	1.0
12	0	9	0	0	0	0	0	0	0	1	1.0

PHYSICAL SUITABILITY MODEL #2

<u>Data Level</u>	<u>Values of Variables</u>										<u>Weight</u>
7	1	1	0	1	0	5	0	9	0	9	1.0
10	1	9	0	9	0	5	0	1	0	1	1.0

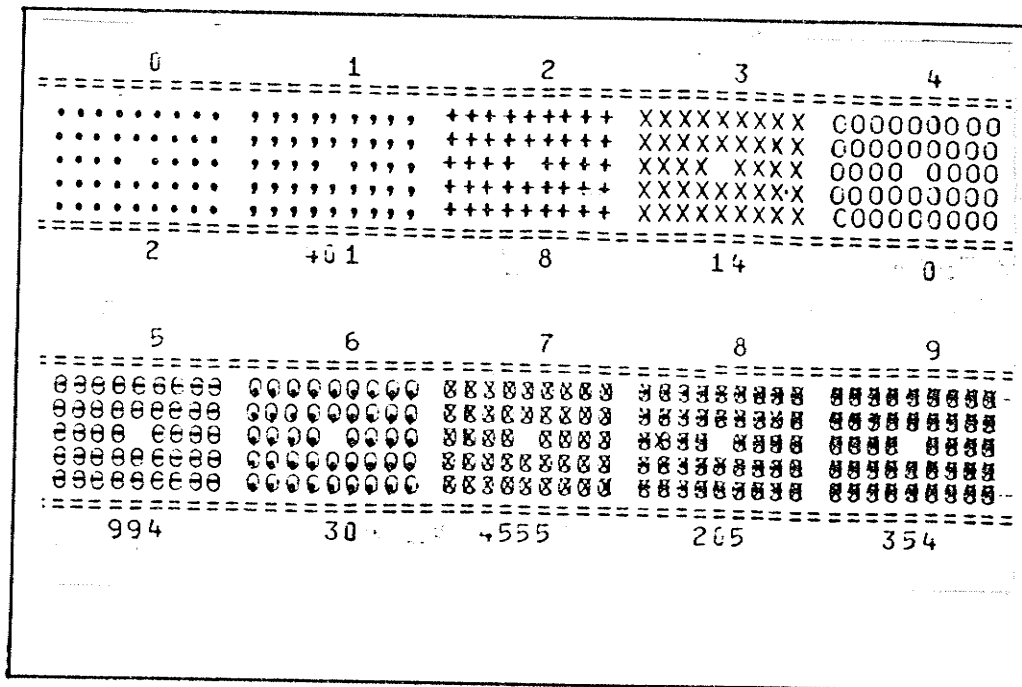
An examination and comparison of the physical suitability models is instructive. Model #2 indicated that the majority of the municipality has low physical suitability for residential use, but that there are small scattered areas of high suitability in the Northwest corner and the eastern townships (notably 11-7E and 11-8E). By way of contrast, model #1 indicated that the majority of the municipality was suitable for residential activity. However, model #1 also showed that the areas of marsh, industrial uses, and poor drainage were less suitable than other areas. Generally, the areas of high suitability were the same for both models. These areas can be recommended for residential uses within the terms of this discussion.

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Physical Suitability Model #1

- 0 = very poor
- 1 =
- 2 =
- 3 =
- 4 =
- 5 =
- 6 =
- 7 =
- 8 =
- 9 = very good

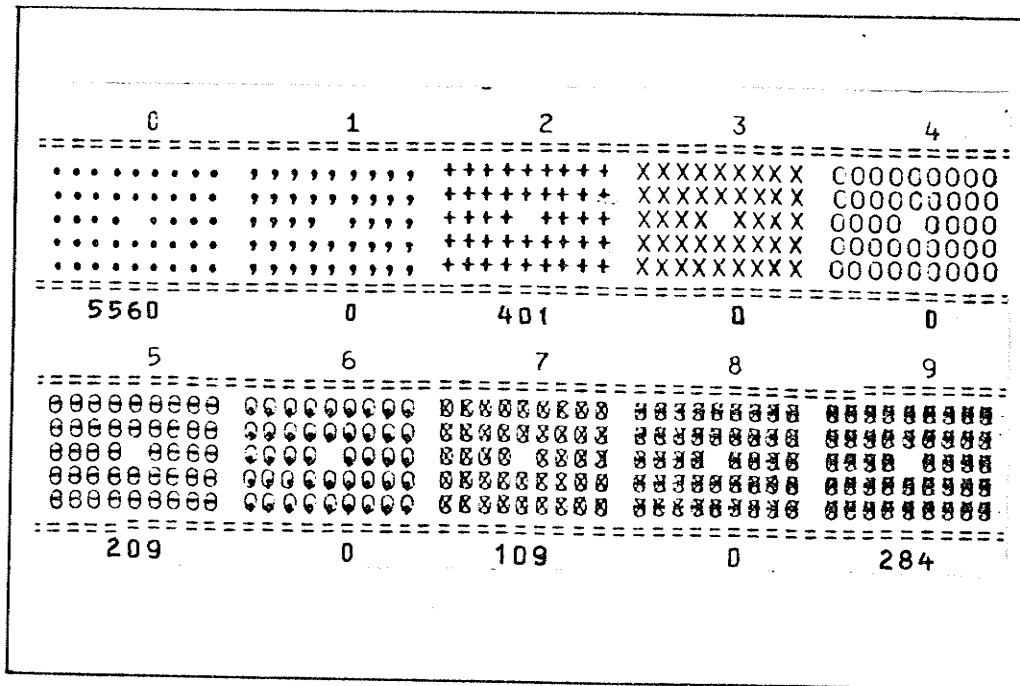


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Physical Suitability Model #2

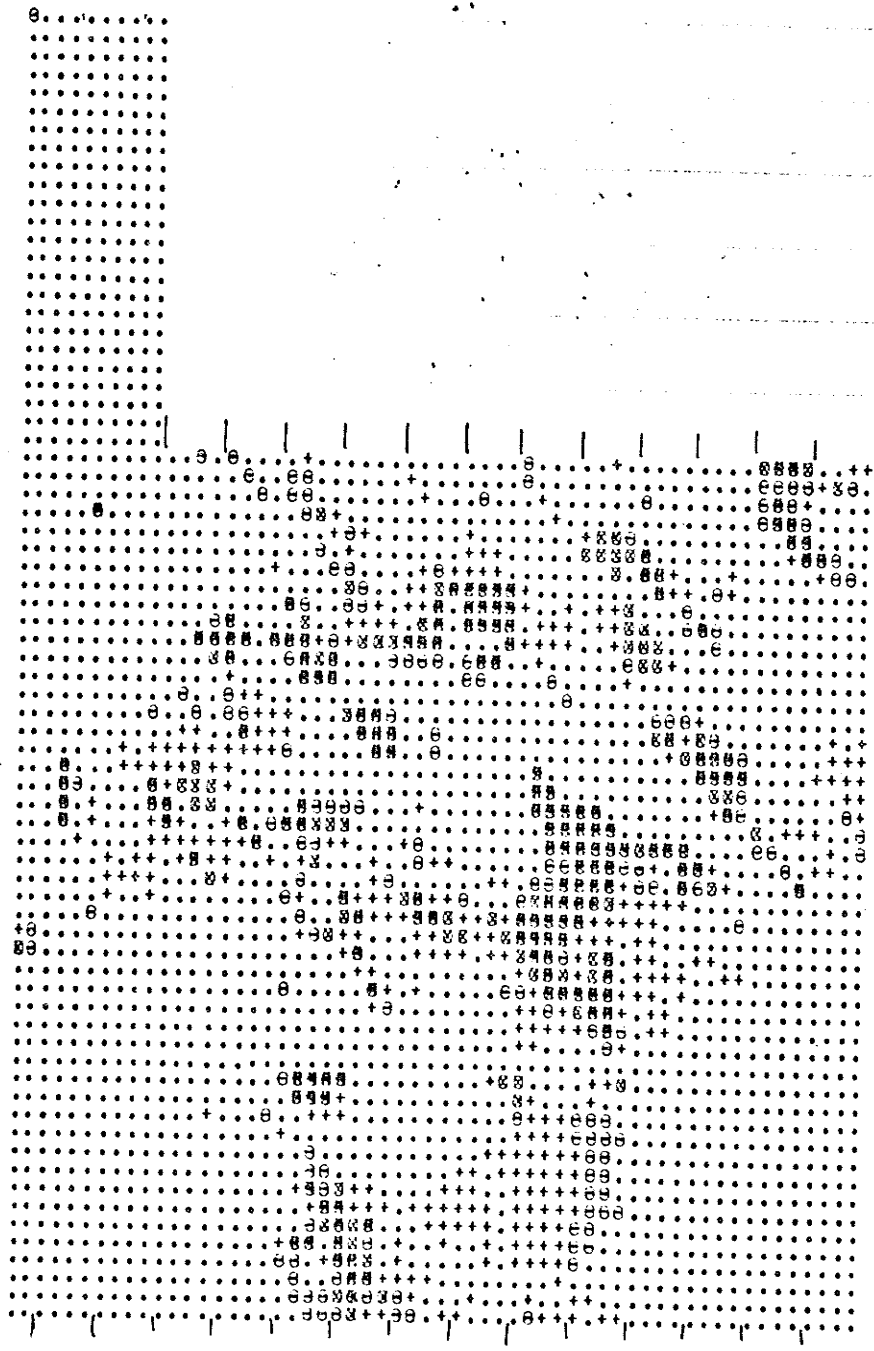
- 0 = very poor
- 1 =
- 2 =
- 3 =
- 4 =
- 5 =
- 6 =
- 7 =
- 8 =
- 9 = very good




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Physical Suitability
Model #2

Amenity Features Suitability

In addition to physical suitability, certain amenity features of location were modelled. It was thought that some amenity features might be even more influential determinants of residence location than physical considerations. Two models of amenity features were generated. They differed in their respective value assignments within data level #4 (dominant land covering). One was constructed for wooded area preference, and the other was constructed for open area preference. In order to have the models respond to the difference, data level #4 (which contained the contrasting elements) was given the greatest weight.

It was felt that residence location in terms of travel time to Winnipeg or in terms of proximity to larger urban communities in the area were more important considerations than either proximity to hydro transmission lines or proximity to railways. The latter features become aversive only at extremely close proximity, and are of less general significance than travel times to goods and services. Therefore, data level #6 and #9 received more emphasis than data levels #1 and #2. The models are outlined below.

Amenity Features (Suitability) Model #1 (Open Preference)

<u>Data Levels</u>	<u>Values of Variables</u>										<u>Weight</u>
1	9	9	0	0	0	5	0	0	0	1	1.0
2	9	9	0	0	5	5	5	1	1	1	1.0
4	1	9	0	3	0	1	0	3	0	3	3.0
6	0	0	0	9	9	5	5	5	1	1	2.0
9	0	9	9	9	0	5	0	5	0	1	2.0

Amenity Features (Suitability) Model #2 (Wooded Preference)

<u>Data Levels</u>	<u>Values of Variables</u>										<u>Weight</u>
1	9	9	0	0	0	5	0	0	0	1	1.0
2	9	9	0	0	5	5	5	1	1	1	1.0
4	1	3	0	9	0	1	0	3	0	3	3.0
6	0	0	0	9	9	5	5	5	1	1	2.0
9	0	9	9	9	0	5	0	5	0	1	2.0

The print outs from the two models were found to be patterned in complementary fashions. Generally, either model was the negative image of the other. Areas which scored highly in the open area preference model scored poorly in the wooded area preference model. On the whole, the values were higher for the open preference model.

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Amenity Suitability Open Space Preference

- 0 = very poor
- 1 =
- 2 =
- 3 =
- 4 =
- 5 =
- 6 =
- 7 =
- 8 =
- 9 = very good

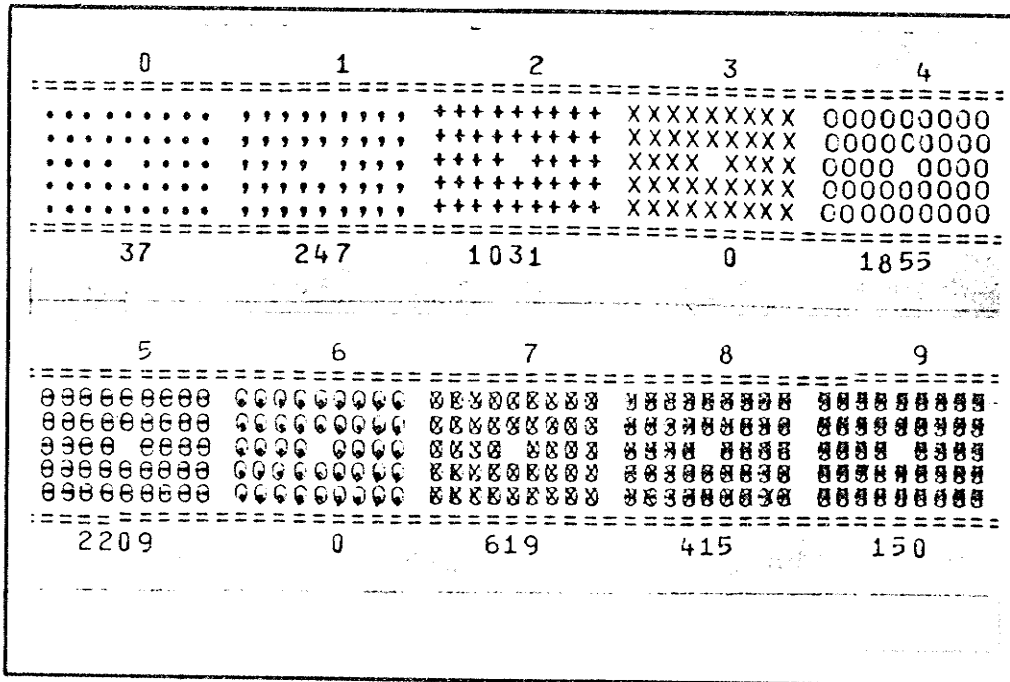
0	1	2	3	4
.....	,,,,,,	+++++	XXXXXXXXXX	COOOOOOO
.....	,,,,,,	+++++	XXXXXXXXXX	COOOOOOO
.....	,,,,,,	++++	XXXX XXXX	COOO OOOO
.....	,,,,,,	+++++	XXXXXXXXXX	COOOOOOO
.....	,,,,,,	+++++	XXXXXXXXXX	COOOOOOO
13	196	512	0	632
5	6	7	8	9
OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO	OOOOOOOO
591	0	1084	1890	1645

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Amenity Suitability Wooded Area Preference

- 0 = very poor
- 1 =
- 2 =
- 3 =
- 4 =
- 5 =
- 6 =
- 7 =
- 8 =
- 9 = very good



Conclusions

In order to approximate the optimal locations for residential uses (based on these considerations) a comparison was made of areas with:

- a) a resource impact value of less than 5
- b) a physical suitability value of more than 5
- c) i) an open space preference suitability value of more than 5
ii) a wooded area preference suitability value of more than 5

With regard to the open space preference for residence location, there was the equivalent of approximately 40 sections in Springfield which satisfied the criteria. Approximately 5 quarter sections were situated along the Southeast edge of Birds Hill Park. Additionally, there was a thin strip of suitable land (approximately 1/2 mile in width) which extended for about 1.5 miles to the South from the Southwest corner of Birds Hill Park. There were approximately 12 quarter sections situated in the Southeast corner of Township 11-6E. The equivalent of almost 20 quarter sections was situated in the southern part of Township 11-7E. Twice as much suitable area (approximately 48 quarter sections) was dispersed throughout Township 11-8E. Townships 10-7E and 10-8E each had about 30 quarter sections. Apart from the Northwest corner around Birds Hill Park and the areas in the East, there were no other suitable locations for residential uses (according to these criteria). See Figure 19.

With regard to the wooded area preference for residence locations, there were approximately 35 quarter sections which satisfied the criteria. There were a few suitable sites situated on the East side of Birds Hill Park, and the equivalent of about 10 quarter sections were situated in Township 11-6E. Townships 11-7E, 10-7E, and 10-8E had between 32 and

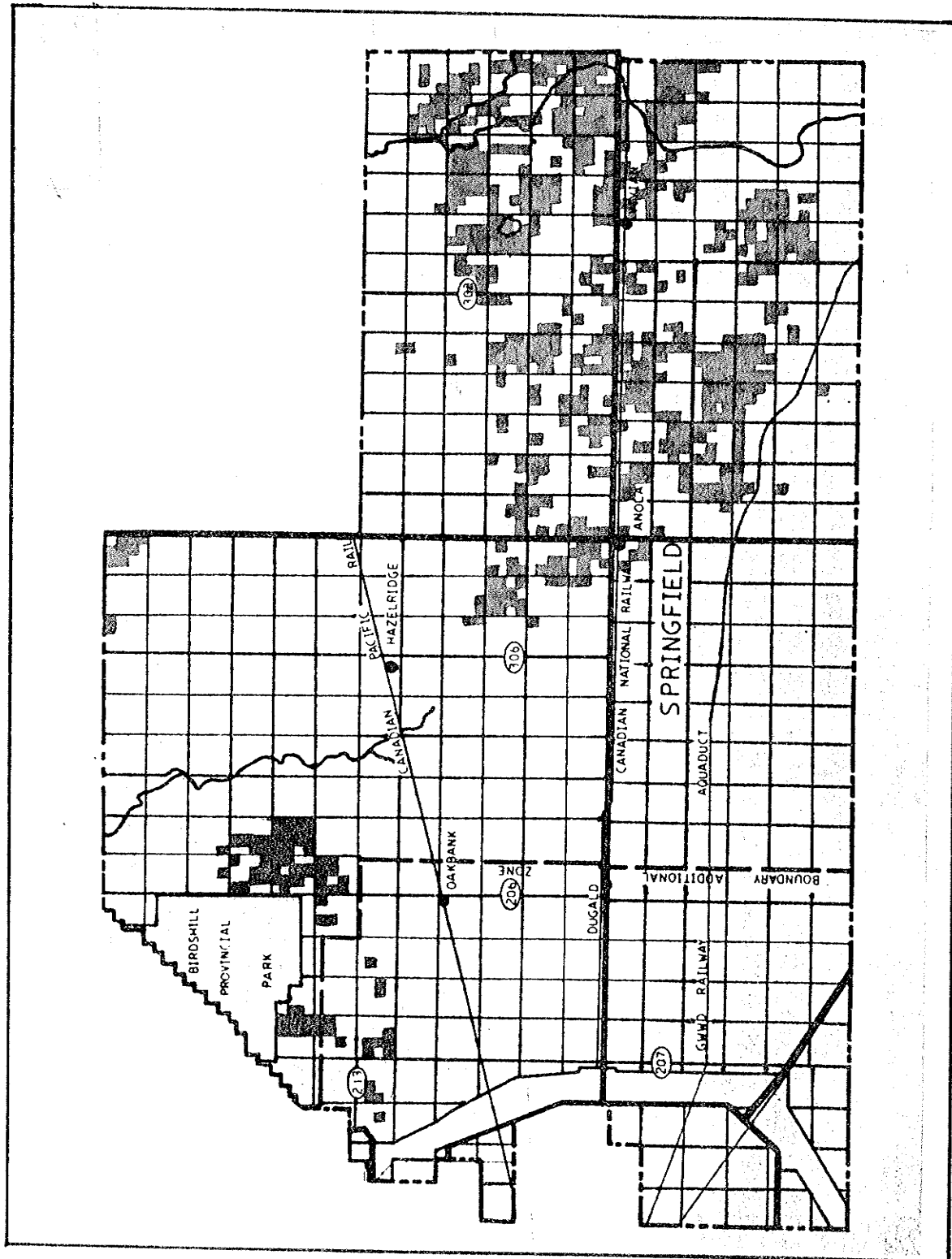


Figure 19
Suitable Areas for Open Space
Preferences Residential Use

36 quarter sections of suitable land, and Township 11-8E had approximately 20 suitable quarter sections. See Figure 20.

Overall, within the limits of these models, there were suitable areas for wooded space and open space locations in the Northwest corner around Birds Hill Park, and in the eastern townships. The total area of approximately 80 sections was represented by parcels which ranged in size from about 40 acres to about 7000 acres. See Figure 4 on page 17.

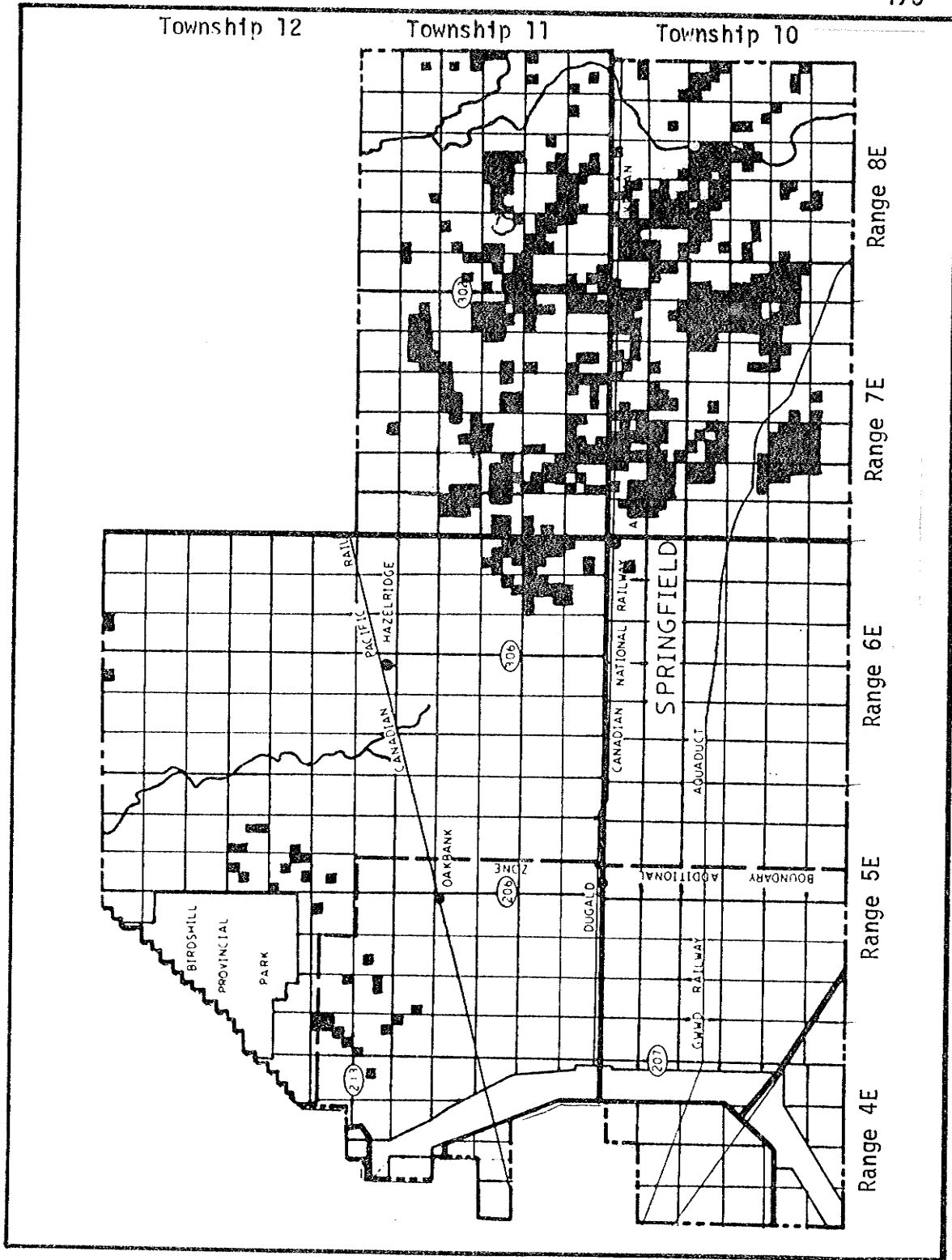


Figure 20
Suitable Areas for Wooded Preferences
Residential Use

APPENDIX 4

GLOSSARY OF TERMS

Aggregate: Sand and gravel (with a preponderance of gravel) or crushed rock.

Areas Critical to the Existence: For animals; breeding, denning and migration habitats, for plants; the area occupied by the identified plant species.

Carrying Capacity: The concept of carrying capacity represents the level of use an area can withstand while providing a sustained high quality of recreation. Physical carrying capacity refers to the amount of human impact a given recreation site can absorb without excessive deterioration of the resource and loss of aesthetic qualities. Psychological carrying capacity, on the other hand, refers to the limits of use an area can sustain without deterioration of the recreational experience through crowding and resource degradation. The latter, while much more difficult to establish, is no less real. Both types of carrying capacities can be enhanced through careful design and proper management practices. The deliberate creation of an artificial carrying capacity can substantially increase the potential of a natural site to absorb use and development.

Desirable: Shall be interpreted as any situation where there is an established pattern of agricultural land use providing a permanent economic support base to the existing social infrastructure.

Dominant: Shall be interpreted to categorize land where more than 75% of the land on a quarter section is used for agricultural activities excluding utilities, public reserves and water bodies. There may be up to 3 residences at the present time per quarter section of land excluding towns and villages.

Exceptional Forest Value Areas: Areas identified by the Department of Renewable Resources and Transportation Services and deemed to be significant for forestry purposes.

Full Range of Agricultural Activities: Any agricultural activity within the laws of the Province of Manitoba including all types and sizes of agricultural field and livestock operations.

Habitat: As per "The Wildlife Act", the soil, water, food and cover components of the natural environment that are necessary to sustain wildlife or exotic animals.

High Recreation Capability: Land within a municipality identified by the Canada Land Inventory as having a recreation capability in classes 1-3. In municipalities where these ratings are absent or minimal, lower class designations shall be considered. Exploited gravel pits, lakes and rivers may also have a high recreation capability potential.

Lands Subject to Flooding: All lands which are subject to flooding by the 100 year flood.

Lands Subject to Other Hazards: Those lands where actual effects of such hazards as bank instability, landslides, subsidence and wind erosion have occurred or have been predicted.

Lands Subject to Water Erosion: All lands which would be affected by erosion within a 50 year period.

Limited: All land uses are conditional uses. The limitations enforced would be those authorized by Municipal by-law.

Lower Class Lands: Lands which are not prime but which are used for agriculture or have the potential of being used for agriculture.

Mixture: Means those kinds of land uses which by virtue of their nature and their land uses are found in close proximity to each other with resultant conflicts.

Other Areas of Renewable Resource Significance: Those areas identified by concerned departments of government as having particular significance for renewable resource production, utilization or preservation.

Prime Agricultural Land: Land defined as Classes 1, 2 and 3 soils by the agricultural land capability system of the Canada Land Inventory and interpreted as such by the Soil Survey, Manitoba Department of Agriculture. A quarter section of land that has 60% or more prime agricultural land shall be considered to be prime agriculture in total.

Prime Fish Habitat: Areas identified by the Department of Renewable Resources and Transportation Services as highly productive fishing waters, stocked waters and fish spawning beds.

Recreational Development: Any development, whether intensive or extensive which facilitates recreation in a special area. e.g. campground development, cottage subdivision, trails, etc.

Rare or Endangered Plants or Animals: Plants and animals currently identified by the Federal Government of Canada and relevant to Manitoba and by the Provincial Government of Manitoba as having a rare or endangered status. Species identification will be in accordance with Federal and Provincial legislation.

Rural Residential Development: Can be defined for the purpose of this policy as the establishment of rural non-farm residences. Cottages or resort type developments would normally be excluded.

Shoreland: Land within 1,000 feet of the ordinary high water mark of a lake, sea or inlet thereof; or land within 300 feet of the ordinary high water mark of a river, stream, watercourse, creek, spring or other body of water; En. S.M. 1976, c.51, s.1.

Significance: Shorelands of significance will be those identified and designated for protection by municipalities, planning district boards, or the province.

Significant Natural Features: Natural land forms, flora and fauna which characterize a region and are in danger of being eliminated or reduced to such an extent as to become atypical. For example, tall grass prairie in the Winnipeg area, Carberry Sandhills, Colonial Nesting Bird areas.

Urban Centres: Includes incorporated cities, towns and villages, "unincorporated village districts", and those "local improvement districts" created for sewer and water purposes and may include any recognized settlement of 25 or more residences.

Wildlife: As per "The Wildlife Act", a vertebrate animal of any species or type excluding fish, that is wild by nature in the province.

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