

APPENDIX A

EXISTING CONDITIONS ANALYSIS



EXISTING CONDITIONS ANALYSIS

A The planning process begins with an evaluation of a community's characteristics, such as population, housing, workforce, income, local market potential, development patterns, natural resources and other pertinent factors. Once a database of existing conditions is compiled, a community can evaluate the findings, which are used as goals are set and implementation strategies are determined.

The following information provides an update to the existing condition analysis conducted in the General Development Plan prepared by the Township in 1992.

POPULATION & HOUSING

Population

As shown in Table ECA 1 below, Bridgewater Township had a 13.9 percent increase in population between 1970 and 1980. Except for Freedom Township and the Village of Manchester, other adjacent communities grew at a higher rate during this decade. Between 1980 and 1990, the Township had a 4.9 percent decrease in population, while the communities adjacent to the Township had varying degrees of modest growth.

Table ECA 1
Population, Bridgewater Township & Adjacent Communities

| | 1970 | 1980 | '70 - '80 # Change | '70 - '80 % Change | 1990 | '80 - '90 # Change | '80 - '90 % Change |
|---------------------------------|---------|---------|-----------------------|-----------------------|---------|-----------------------|-----------------------|
| Bridgewater Twp. | 1,204 | 1,371 | 167 | 13.87% | 1,304 | -67 | -4.89% |
| Freedom Twp. | 1,267 | 1,436 | 169 | 13.33 | 1,486 | 50 | 3.48 |
| Manchester Twp. | 1,206 | 1,540 | 334 | 27.69 | 1,739 | 199 | 12.92 |
| Saline Twp. | 922 | 1,221 | 288 | 31.24 | 1,276 | 55 | 4.50 |
| Sharon Twp. | 831 | 1,363 | 532 | 60.02 | 1,366 | 3 | 0.22 |
| Manchester | 1,650 | 1,686 | 36 | 2.18 | 1,753 | 67 | 3.97 |
| Washtenaw County | 243,103 | 264,740 | 21,637 | 8.9 | 282,937 | 18,197 | 6.87 |
| Clinton (Lenawee County) | 1,677 | 2,342 | 665 | 39.65 | 2,475 | 133 | 5.70 |

Source: 1970 U.S. Census, 1992 Bridgewater Township General Development Plan

For the purpose of evaluating the constant proportion method of projecting future population (discussed in more detail below), it is useful to compare the Township's population trends to the County's. Table ECA 2 below shows the Township's share of the County's growth. Between 1970 and 1980, Bridgewater comprised 0.52% of the County's population, and 0.77% of the County's growth. However, between 1980 and 1990, the Township comprised a slightly lower percent (0.46%) of the County's population, and a negative 0.37% of the County's growth.

Table ECA 2
Growth as a Percent of Washtenaw County, 1970 - 1990

| Year | Bridgewater Township Population | Washtenaw County Population | Township Share of County Population | Township Share of County Growth |
|------|---------------------------------|-----------------------------|-------------------------------------|---------------------------------|
| 1970 | 1,204 | 243,0103 | 0.50% | -- |
| 1980 | 1,371 | 264,740 | 0.52% | 0.77% |
| 1990 | 1,304 | 282,937 | 0.46% | -0.37% |

Source: 1970, 1980, 1990 U.S. Census Bureau, 1992 Bridgewater Township General Development Plan

Households and Housing

As discussed above, Bridgewater's population decreased between 1980 and 1990. However, when evaluating the increase in the number of households (see Table ECA 3), it appears as if this decrease can be partially explained by a decreasing household size. In particular, we note that while the Township

had a loss of population, it had a concurrent increase in the number of households.

This assumption is supported by data regarding trends in household size. As discussed in the 1992 General Development Plan, in 1980, Bridgewater Township's average household size was 3.24 persons, while in 1990, there were 2.89 persons per household. This change follows a national trend of smaller household sizes, which is expected to continue over the next two decades. According to the Southeast Council of Governments (SEMCOG), the household size in Bridgewater was projected to be 2.67 persons per household in May 2000. Furthermore, SEMCOG projects that in 2010 and 2020, the average household will have 2.6 and 2.56 persons respectively.

Table ECA 3
Households, Bridgewater Township & Adjacent Communities

| | 1980 | 1990 | # Change | % Change |
|-------------------------------------|--------|---------|----------|----------|
| Bridgewater Twp. | 423 | 451 | 28 | 6.62 |
| Freedom Twp. | 486 | 536 | 50 | 10.28 |
| Manchester Twp. | 488 | 586 | 98 | 20.08 |
| Saline Twp. | 382 | 412 | 30 | 7.85 |
| Sharon Twp. | 414 | 462 | 48 | 11.59 |
| Manchester | 617 | 651 | 34 | 5.51 |
| Washtenaw County | 92,937 | 104,528 | 11,591 | 12.47 |
| Clinton (Lenawee County) | 904 | 929 | 25 | 2.80 |

Source: 1992 Bridgewater Township General Development Plan

Table ECA 4 provides information regarding the change in the number of total housing units, households, and specific household characteristics between 1980 and 1990. During this decade, the number of non-family households increased more than the number of family households. However, the number of female-headed households decreased, which is contrary to national trends.

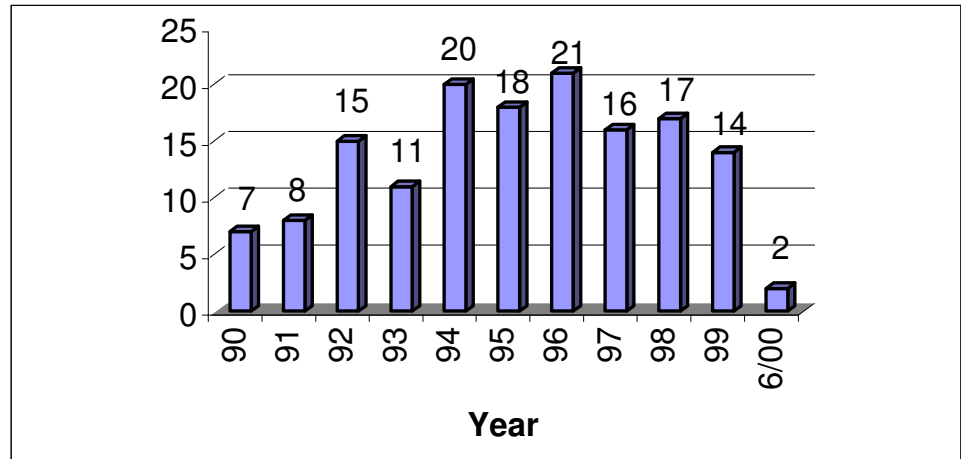
Table ECA 4
Bridgewater Township Household Characteristics, 1980 -1990

| | 1980 | 1990 | 1980-1990 # Change | 1980-1990 % Change |
|---------------------------------|------|------|--------------------|--------------------|
| Total Housing Units | 445 | 478 | 33 | 7.4 |
| Number of Households | 423 | 451 | 28 | 6.6 |
| Family Households | 365 | 375 | 10 | 23.7 |
| Non-Family Households | 58 | 76 | 18 | 31.0 |
| Female Headed Households | 27 | 23 | -4 | -14.8 |
| Persons Per Household | 3.24 | 2.89 | -0.35 | -10.8 |

Source: 1992 Bridgewater Township General Development Plan

According to SEMCOG, between January, 1990 and June 2000, 149 residential building permits were issued in the Township. This represents a 31.2 percent increase in housing units over the past decade. According to the 1992 General Development Plan, between 1980 and 1990, there was only a 7.4% increase in housing units. Figure ECA 1 shows the specific trends in residential building activity over the past decade.

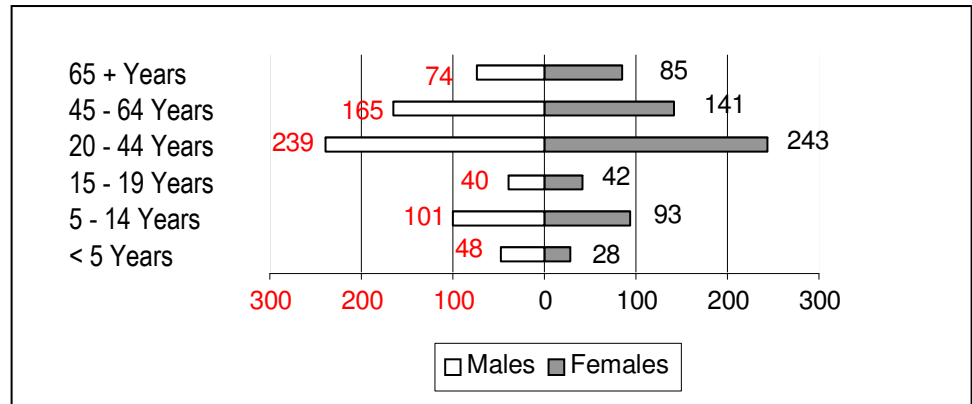
Figure ECA 1
Residential Building Permits, January 1990 - June 2000



Source: SEMCOG Building Permits

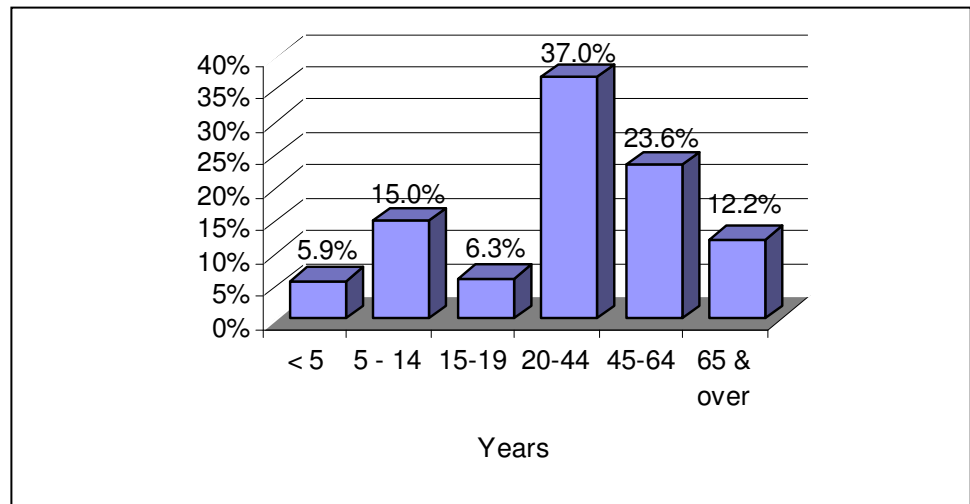
In addition to total population, housing unit and household size, it is also important to examine overall age groupings, and the age/sex distribution of a population. The age/sex distribution provides information regarding females of child-bearing age in a community. The overall age grouping provides figures for the number of school-age children, the size of the workforce (i.e., 20-64 years groups), and size of the elderly population. This data can be used for school enrollment projections, planning for recreation facilities, special services for the elderly, and other governmental services. Figure ECA 2 illustrates the age/sex distribution, and Figure ECA 3 provides the overall age distribution of the Township's residents.

Figure ECA 2
Bridgewater Township Age/Sex Distribution, 1990



Source: 1990 U.S. Census

Figure ECA 3
Bridgewater Township, Age Distribution, 1990



Source: 1990 U.S. Census

Population Projections

It is important to have a good estimate of the future population so that planning for infrastructure, municipal services, and administrative capabilities can be well-managed and directed for the growth and development that occurs. Planning for a population that is less or more than expected renders the community unprepared. To properly plan for Bridgewater Township’s future, an accurate estimate of its population for the next twenty years is necessary.

Because the 2000 U.S. Census data is not yet available, it is helpful to first derive an estimate of the Township's current population. SEMCOG's July 2000 estimate is 1,572 persons. As noted above, over the past decade, 149 residential building permits were issued. If SEMCOG's May 2000 household size estimate (2.67 persons/H.H.) were used, it can be estimated that the Township's population increased by 398 persons since 1990. Therefore, the Township's June 2000 population could be as high as 1,702 persons.

SEMCOG also prepares periodic *Regional Development Forecasts* for its seven county region within southeast Michigan. Recent population projections for Bridgewater Township, adjacent communities and Washtenaw County are provided in Table ECA 5 below.

Table ECA 5
SEMCOG Population Projections
Bridgewater Township & Adjacent Communities

| | 2000 | 2010 | 2020 | 2000 - 2020 % Change |
|---------------------------|---------|---------|---------|-------------------------|
| Bridgewater Twp. | 1,403 | 1,471 | 1,569 | 11% |
| Freedom Twp. | 1,563 | 1,631 | 1,708 | 9% |
| Manchester Twp. | 2,086 | 2,329 | 2,557 | 22% |
| Saline Twp. | 1,416 | 1,495 | 1,568 | 16% |
| Sharon Twp. | 1,806 | 2,153 | 2,508 | 38% |
| Manchester Village | 2,455 | 2,916 | 3,311 | 34% |
| Washtenaw County | 313,130 | 340,274 | 373,362 | 19% |

SEMCOG: Community Profiles

Over the next 20 years, SEMCOG forecasts a modest growth of 11% for Bridgewater, in comparison to adjacent communities. However, the forecast growth is only eight percent lower than the County's overall projected growth.

It is important to note that SEMCOG's 2000 population projection of 1,403 (prepared in 1996) is significantly lower than SEMCOG's July 2000 estimate of 1,572. Because all projections have a certain margin of error, it is useful to consider other population projection methodology.

While SEMCOG uses a complex computer modeling program to forecast population, there are also a variety of less complex mathematical methods that can be used to project the Township's future population. The constant proportion, growth rate, and increasing proportion methods are relatively easy to administer and can lend alternative projections based on historical growth rates.

The constant proportion method assumes that the Township will maintain the same percentage of the county's projected 2000 and 2010 population as it experienced in 1990. Bridgewater Township contained 0.46 percent of the County's 1990 population. Projections for the Township using SEMCOG projections as the County population are as follows:

| | <u>Washtenaw County</u> | <u>Bridgewater Township</u> |
|-----------------|-------------------------|-----------------------------|
| 1990 Population | 282,937 | 1,304 |
| 2000 Projection | 313,130 | 1,443 |
| 2010 Projection | 340,274 | 1,568 |
| 2020 Projection | 373,362 | 1,720 |

The constant proportion method assumes that the Township's percentage of County population will remain the same. In the last thirty years this proportion has fluctuated by only 0.04%, indicating that the constant proportion method may be an appropriate methodology for the Township. However, as shown above, the 2020 projected population (1,720) is only slightly higher than the June 2000 estimate of 1,702, which was derived from the '90's residential building activity. Therefore, without an accurate 2000 population figure, this projection is likely much too low.

The growth rate method assumes that the 1990-2000 growth rate will be the same as between 1980-1990, and the 1990-2010 growth rate will be the same as between 1970 and 1990. This method of projection results in the following projections:

| | |
|------------------------|--------|
| 1990 Population | 1,304 |
| 1980 - 1990 - % Change | -4.89% |
| 1970 - 1990 - % Change | 8.30% |
| 2000 Projection | 1,240 |
| 2010 Projection | 1,412 |

This methodology is also a poor indicator of future population for the Township. The 2000 population projection is lower than the 1990 population. However, this is not possible due to the increased residential building activity of the 1990's. In addition, due to the decrease in population between 1980 and 1990, the 2010 projection is also too low.

The increasing proportion method assumes that the rural areas and small Townships on the fringe of growth centers will expand over the next two decades as the growth centers approach their build-out. This method requires that the forecaster apply a growth rate to the community. The data below assumes that Bridgewater Township will comprise 0.55 percent of the

County population in 2000, 0.60 percent in 2010, and 0.65 percent in 2020 (i.e., a 0.05 percent increase per decade). The results are as follows:

| | <u>2000</u> | <u>2010</u> | <u>2020</u> |
|----------------------|-------------|-------------|-------------|
| Washtenaw County | 313,130 | 340,274 | 373,362 |
| Increasing % | 0.50% | 0.55% | 0.60% |
| Bridgewater Township | 1,565 | 1,871 | 2,240 |

The increasing proportion method appears to be the most reasonable forecast, especially when comparing the 2000 projection of 1,565 to the earlier July 2000 estimate of 1,572. Therefore, for the purposes of this plan, the population projections obtained using the increasing proportion method will be assumed to be the most accurate.

Employment

According to the 1992 General Development Plan, there were 653 Bridgewater Township residents employed in 1990. Of those persons, 48.3% traveled under 30 minutes, 47% traveled between 30 to 60 minutes, and 4.7% traveled over one hour to work. Almost 50% of these persons work within the Managerial & Professional, and Technical, Sales, & Administrative Support occupational categories. While Bridgewater Township is still a predominantly agricultural community, only 8.8% of those employed worked within the Farming, Forestry & Fishing occupation. However, a relatively small number of large agricultural operations can have a large impact on the rural character of a community. When compared to the County, Bridgewater has a much larger agricultural economy.

Table ECA 6
Employment by Occupation & Industry
Bridgewater Township & Washtenaw County, 1990

| Occupation | Bridgewater Township | | Washtenaw County | |
|--|----------------------|--------------|------------------|--------------|
| | Number | % of Total | Number | % of Total |
| Managerial & Professional | 152 | 23.3 | 56,310 | 37.0 |
| Technical, Sales, & Administrative Support | 168 | 25.7 | 46,980 | 31.2 |
| Service | 49 | 7 | 19,413 | 12.8 |
| Farming, Forestry, & Fishing | 57 | 8.8 | 1,697 | 1.2 |
| Precision Production Craft, Repair | 106 | 16.2 | 11,633 | 7.6 |
| Private Household Occupations | 2 | 0.3 | 542 | 0.3 |
| Operators, Fabricators, & Laborers | 119 | 18.2 | 15,105 | 9.9 |
| TOTALS | 653 | 100.0 | 151,680 | 100.0 |
| Industry | | | | |
| Agriculture, Forestry, Fisheries & Mining | 59 | 9.0 | 2,143 | 1.4 |
| Construction | 36 | 5.5 | 5,480 | 3.6 |
| Manufacturing | 210 | 32.1 | 26,647 | 17.6 |
| Transportation | 8 | 1.2 | 4,068 | 2.7 |
| Communications & Other Public Works | 9 | 1.3 | 1,893 | 1.2 |
| Wholesale Trade | 18 | 2.7 | 3,917 | 2.6 |
| Retail Trade | 74 | 11.3 | 23,335 | 15.4 |
| Finance, Insurance & Real Estate | 28 | 4.3 | 7,216 | 4.7 |
| Business & Repair Services | 25 | 3.8 | 6,937 | 4.6 |
| Personal, Entertainment, Recreation Services | 15 | 2.3 | 5,253 | 3.5 |
| Professional & Related Services | 157 | 24.0 | 60,739 | 40.0 |
| Public Administration | 14 | 2.5 | 4,052 | 2.7 |
| TOTALS | 653 | 100.0 | 151,680 | 100.0 |

Source: 1992 Bridgewater Township General Development Plan

Education

Table ECA 7 shows the education attainment levels for Bridgewater Township and Washtenaw County. As shown, compared to the County, more people in the Township graduated from high school in both 1980 and 1990. However, the County had a higher percentage of persons that obtained a bachelor's degree or greater in both 1980 and 1990.

Table ECA 7
**Educational Attainment, 1980-1990,
 Bridgewater Township & Washtenaw County**

| | Bridgewater Township | | Washtenaw County | |
|-------------------------------------|----------------------|-----------|------------------|--------------|
| | 1980 | 1990 | 1980 | 1990 |
| Not A High School Graduate | 194 (25%) | 137 (15%) | 26,667 (18%) | 21,387 (12%) |
| Graduated High School | 357 (46%) | 276 (32%) | 36,825 (26%) | 32,405 (19%) |
| Some College- No Degree | 116 (14%) | 253 (29%) | 25,955 (18%) | 43,406 (25%) |
| Bachelor's Degree or Greater | 108 (13%) | 191 (22%) | 51,376 (36%) | 70,015 (41%) |

Source: SEMCOG Community Profiles

Income

Table ECA 8 shows the per capita and median household incomes of Bridgewater Township and adjacent communities. From 1979 to 1987, Bridgewater's per capita and median household income increased, as did the surrounding communities and the County. Bridgewater's 1987 income levels fall in the mid-range in comparison to the Township's neighbors and Washtenaw County overall.

Table ECA 8
1979 & 1987 Income, Bridgewater Township and Adjacent Communities

| | 1979 Per Capita Income | 1987 Per Capita Income | 1979 Median Household Income | 1987 Median Household Income |
|---------------------------|------------------------|------------------------|------------------------------|------------------------------|
| Bridgewater Twp. | \$8,676 | \$13,865* | \$25,139 | \$44,922 |
| Freedom Twp. | 8,085 | 13,280 | 22,069 | 40,625 |
| Manchester Twp. | 8,519 | 13,798 | 24,718 | 40,123 |
| Saline Twp. | 8,418 | 14,456 | 24,420 | 46,136 |
| Sharon Twp. | 7,444 | 10,627 | 23,555 | 46,797 |
| Manchester Village | 8,337 | 14,167 | 21,632 | 34,479 |
| Washtenaw County | 8,703 | 14,245 | 20,696 | 36,307 |

Source: 1992 Bridgewater Township General Development Plan

* 2000 per capita income estimated to be \$34,000

NONRESIDENTIAL LAND USE MARKET POTENTIAL

An important part of the existing conditions analysis is an examination of demand or market potential for non-residential land uses. A balanced supply of commercial, office and retail development is critical to a community for a

number of reasons. If there are fewer acres available than the market can support, a community could lose potential tax base, employment opportunities and decrease the quality of life for residents who need the goods and services that such uses provide. If there is an over abundance of commercial, office and industrial land, marginal businesses may develop and/or building vacancy rates may increase creating the potential for blight.

Commercial Development

In order to determine how much commercial land Bridgewater Township can support, an analysis of income levels in Bridgewater is necessary. As noted earlier, in 1987, the per capita income of Bridgewater residents was \$13,865. The Bureau of Economic Analysis reported that by 1998, the per capita income of Washtenaw County increased to \$34,751, a 144 percent increase since 1987. By applying a similar, but slightly lower percentage to Bridgewater's 1987 per capita income, the 2000 per capita income in Bridgewater Township is estimated at \$34,000. Based on this income level, the table below estimates Bridgewater's 2000 ("current") retail expenditures and projected 2010 retail expenditures.

Table ECA 9
**Forecast Convenience Expenditures
Bridgewater, 2000 & 2010**

| Total Year 2000 Income | Current ('00) Retail Expenditures | Current ('00) Convenience Expenditures | Forecast 2010 Income | Forecast 2010 Retail Expenditures | Forecast 2010 Convenience Expenditures |
|-------------------------------|--|---|-----------------------------|--|---|
| \$53,300,000 | \$29,300,000 ² | \$9,700,000 ³ 5 | \$89,700,000 4 | \$49,300,000 | \$16,300,000 ^{3.5} |

1. \$34,000 x 1,569 people (2000 SEMCOG population estimate)
2. Assumes 55% of total income is spent on retail purchases (PAS Report #358, *Analyzing Neighborhood Retail Opportunities*, Published by American Planning Association)
3. Assumes 33% of total retail expenditures is spent in convenience goods stores, 40% spent in comparison goods stores (PAS Report #358, Published by American Planning Association)
4. \$47,950 x 1,871 people (2010 population estimate with income adjusted for 3.5% inflation)
5. Birchler Arroyo Associates, Inc. estimates that 50% of convenience item purchases made by Township residents could take place within the Township limits if additional retail development occurs in the future.

Once the amount of retail spending within a community is estimated, the amount of needed retail space (in square feet) should be estimated. This can

be determined by looking at two factors: supporting population and retail spending.

There are three shopping center classifications: neighborhood convenience, community comparison, and regional comparison. As the table below illustrates, neighborhood retail centers are the smallest and serve the daily needs of nearby residents by providing basic goods and services, such as groceries, hardware, dry cleaning, banking, etc. A population of 5,000 - 10,000 people living within a five to ten minute drive is generally required to support such a development. Bridgewater Township's population, estimated at 1,572 persons in 1998, and projected to be approximately 1,871 in 2010, is not sufficient to support a small neighborhood retail center alone. However, if located in close proximity to an adjacent community with a larger population, a small neighborhood retail center could possibly be supported within the Township. However, individual, or small clusters of convenience retail uses would probably be more viable.

Table ECA 10
Shopping Center Classifications

| Type | Leading Tenant | General Range (Typical GLA) | Minimum Site | Supporting Population |
|-------------------------------------|--------------------------------------|--|--------------|-----------------------|
| Neighborhood (Convenience) | Supermarket | 30,000 - 100,000 sq. ft. (50,000 sq. ft.) | 3 - 10 ac. | 5,000 - 10,000 |
| Community (Minor Comparison) | Junior Department or Discount Store | 100,000 - 300,000 sq. ft. (150,000 sq. ft.) | 10 - 30 ac. | 20,000 - 60,000 |
| Regional (Major Comparison) | 1 or more Full Line Department Store | 300,000 - 900,000 sq. ft. (400,000 sq. ft.) | 30 - 60 ac. | 60,000 - 100,000 |

Source: Shopping Center Development Handbook, 2nd edition, Urban Land Institute

According to the Urban Land Institute, in 1995 the average neighborhood convenience shopping center had a median annual sales figure of approximately \$335 per square foot (Dollars and Cents Shopping Centers, 1995, figure adjusted for inflation). With \$8,150,000 estimated (50% of forecasted 2010 convenience expenditures assumed to be spent within the community) available for convenience spending within the Township in 2010, Bridgewater Township could support 24,300 square feet of neighborhood retail. Based on the table above, neighborhood convenience development typically needs approximately one acre per 9,000 square feet. Therefore, in order to provide 24,300 square feet of neighborhood convenience shopping within Bridgewater, at least 2.7 acres of land would be needed for such uses. The total amount of land area planned for retail should be larger than this number because of two key factors: 1) business generated by pass-through,

non-resident traffic on US-12; and 2) limitations on total buildable area due to wetlands, steep slopes, etc.

The greater Bridgewater area, which includes the Township, adjacent Townships, and the Villages of Manchester and Clinton do not have enough population to support community retail at a comparison shopping scale. According to SEMCOG's Regional Development Forecast, it is estimate that by 2020 the population of the greater Bridgewater area will be slightly over 16,000.

Based on the data presented above, there is also not sufficient population in the greater Bridgewater area to support a regional shopping center. The cities of Ann Arbor and Jackson provide regional shopping opportunities for Bridgewater's residents.

Industrial Development

The demand for industrial development is related to many factors including materials, labor, transportation, energy, and public policy. Industrial developers examine the availability of utilities, affordable housing for the work force, suitable characteristics of the land, and good transportation access.

There are two common methods of forecasting future industrial needs for an area: 1) based on total population, and 2) based on total land area. According to *Urban Planning and Design Criteria*, a typical planning standard for industry is 12 acres per 1,000 population. Based on an estimated 2020 population of 2,427 for Bridgewater Township, approximately 29 acres of industrial land can be supported within the community. The total land area method forecasts that within a rural community industrial land typically consumes 2-5 percent of total land area. Two percent of the 23,359 acres of land area within the community equals 467 acres.

Given the rural character of Bridgewater, and the existing limited amount of industrial land uses within the community, the total population methodology of estimating industrial land use needs is more appropriate for the Township.

Office Development

There are two types of office buildings: single-tenant and multi-tenant. Single tenant buildings can be located in almost any location satisfactory to the tenant, who may also be the building owner. Multi-tenant office buildings, which are often built on the speculation that tenants will be found, are much more tied to market factors. Multi-tenant office developers look at access, proximity to professional and clerical labor, parking, transit opportunities, proximity to professional and personal services and the overall "image" of the community.

Almost half of the employed residents of Bridgewater (349) work in professions that typically occur within an office setting (i.e. managerial, technical, sales, service, etc.). In addition, 48.3% of employed residents travel less than 30 minutes to their workplace. Assuming that this commuting pattern occurs evenly among all office professions, 184 office professionals work within relative proximity to Bridgewater Township.

The Urban Land Institute estimates that approximately 202 square feet of office space is needed per employee. Based on this projection and the estimate of office employees within close proximity to Bridgewater Township, approximately 37,269 square feet of office space could be supported within the Township. However, it is not reasonable to expect that multi-tenant office buildings would be viable. Small professional office, medical office, and combination office/industrial buildings are likely to be more viable within the community over the next 15-20 years.

COMMUNITY FACILITIES

Since the 1992 General Development Plan, little has changed with regard to community facilities.

Township Facilities

The Bridgewater Township Hall is located on the west side of Clinton Road, at the intersection of Braun road. At this time, there are no plans to expand the Township Hall. In 2001, the Township purchased 7.93 acres of land adjacent to the Township's existing 2.3-acre site. Other than the Township Hall, there are no Township-owned buildings or facilities, such as parks, public service yards, or fire stations.



Bridgewater Township Hall

Police and Fire

The Township receives fire protection services from the Village of Manchester and the Village of Clinton. Both of these communities have mutual aid agreements with each other and other communities such as the City of Saline when necessary. Therefore, there are no fire station facilities located within the Township, nor are there plans for future facilities.

Police protection is provided by the County Sheriff's road patrol and the Michigan State Police. Therefore, there are no police station facilities located within the Township, nor are there plans for future facilities.

Sewer and Water

While no public sewer and water services currently exist within Bridgewater Township, in 2001 the Township Board took action that will likely lead to limited sanitary sewer service within the Hamlet area to correct failing on-site septic systems. Water service is not being planned. It is important to note that the private wells and septic systems within the Bridgewater Hamlet area are not functioning at ideal levels.

Outside of the Township, the closest public sewer and water services are provided within the Village of Manchester and the Village of Clinton. The Village of Manchester is located approximately 1/2 mile northwest of Bridgewater. Manchester Township surrounds the Village and borders Bridgewater's western boundary. The Village of Clinton borders Bridgewater's southwestern boundary.

As noted within the 1992 General Development Plan, Manchester Village upgraded the capacity of their wastewater treatment plant in the early 1990's and the plant still has several hundred thousand gallons of capacity remaining. The Village of Manchester has no plans to extend services into Manchester Township's 1-acre-lot residential area, which is directly west of Bridgewater Township. The Village of Manchester maintains its policy that services will not be extended into the Township unless the area served is annexed by the Village.

The Village of Clinton estimates their sewer system has approximately 100,000 gallons of capacity left in their wastewater treatment plant. The Village is beginning a planning process to evaluate the need for a new wastewater treatment plant. The water system currently provides approximately 200,000 gallons per day, with about 25% capacity remaining for growth. The Village has recently submitted a grant application to the state for an upgrade to the water service. As noted earlier, the Village of Clinton is involved in a multi-jurisdictional planning process. As a result of this process, Village officials may now be more open to extending services in the future beyond its boundaries without annexation.

Schools

There are three school districts within Bridgewater Township: Clinton Community Schools, Manchester Public Schools, and Saline Area Schools. There are no school facilities, either public or private, located within the Township's boundaries. In addition, at this time, there are no plans to build any new school facilities within the Township.

NATURAL FEATURES

The identification of the natural features that presently exist in the Township is an important step in the Master Plan process. With such knowledge, decision-makers can make informed decisions about the preservation and protection of the Township's natural resources.

Soils

Since Bridgewater does not have sanitary sewer service, except possibly for the small area of the Hamlet, new development is restricted by the soil's ability to support septic systems. Map ECA 1 indicates areas of the Township that have soils with slight to moderate limitations for developments that require sewage disposal systems. While a large portion of the Township has severe limitations to such development, this map does not suggest that development cannot occur in these areas. It does, however, generally portray those areas of Bridgewater that are best able to absorb new development.

Map ECA 2 indicates areas of the Township that have prime agricultural soils. As this map illustrates, the majority of Bridgewater Township contains soils that are prime for agricultural purposes. This is important to note when making decision regarding future land uses throughout the Township.



*A scenic change in topography
along Bemis Road*

Topography

Bridgewater Township's topography varies by 190 feet from the lowest point to the highest point. The lowest point of 820 feet is located in the southwest $\frac{1}{4}$ of Section 13, and the highest point of 1,010 feet is located in the northeast $\frac{1}{4}$ of Section 19. Map ECA 3 illustrates the Township's topography at 10-foot contour intervals.

***Bridgewater's
topography varies by
190 feet from the
lowest elevation to
the highest.***

Rolling hills in the Township provide views and add to Bridgewater's scenic beauty and character. However, significant changes in topography can present challenges to development. Map ECA 4 highlights areas with slopes greater than 12%. Steep slopes

should be given special consideration in the development process, as these areas are often vulnerable to excessive erosion.

Watersheds

Bridgewater Township falls within the River Raisin Watershed. Three subwatersheds cover the Township: the River Raisin and Saline River subwatersheds split Bridgewater roughly into east and west, while the Macon Creek subwatershed covers a small area in the southern portion of the Township.

Wetlands

Wetlands are valuable natural resources within the Township as they provide many important functions. They may serve as a storm water holding area to reduce flooding; provide for the settling of sediments and pollutants from surface water runoff; reduce stream bank erosion caused by storm water runoff; and provide habitat for fish and wildlife. Wetlands throughout the Township are depicted on Map ECA 5. Those which are five acres or more, as well as smaller wetlands hydrologically connected to large wetlands, are under the jurisdiction of the Michigan Department of Environmental Quality.

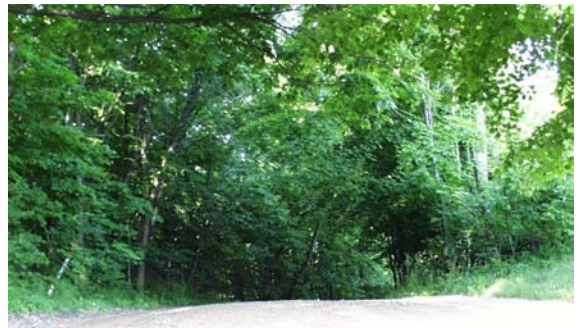


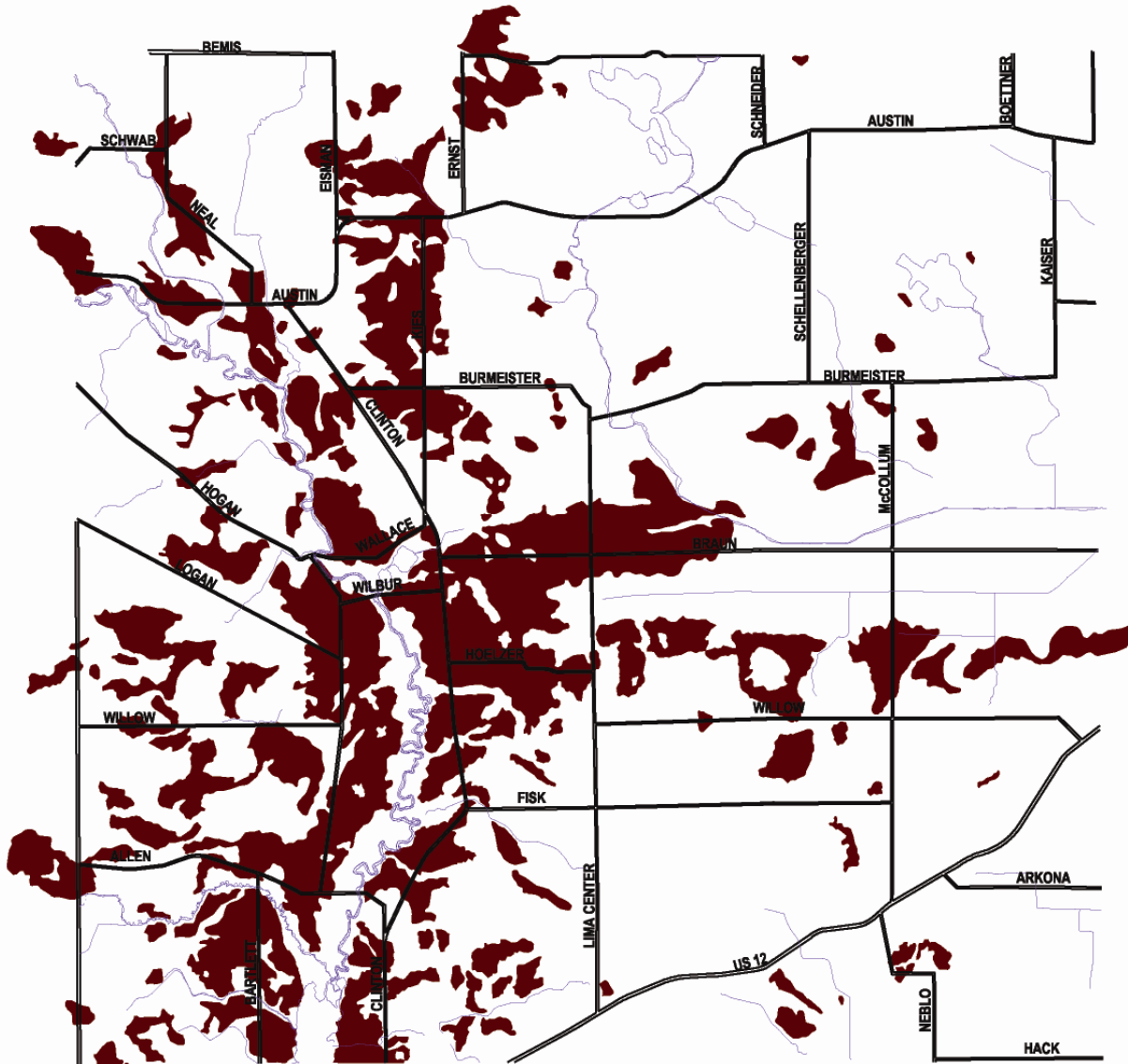
Groundwater Recharge

Water recharge areas are highly permeable areas where water on the surface travels rapidly through the soil into the groundwater. Map ECA 6 illustrates three groundwater recharge areas within the Township. The largest area is located along Clinton Road between Wallace and Fisk Roads. Two smaller areas are located in the northwest corner of the Township along Schwab and Austin Roads. Development near recharge areas should provide safeguards against negative impacts, as pollution of these areas could significantly affect the area's groundwater supply.

Woodlands

As shown on Map ECA 7, there are a significant number of wooded areas throughout the Township. Woodlands are valuable natural features, which serve as windbreaks, aid in the absorption of rainwater, replenish oxygen, create natural beauty and character, and provide wildlife habitat. Preservation of these areas is important, and the effects of development on woodlands throughout Bridgewater should be minimized.





 **AREAS WITH SLIGHT & MODERATE LIMITATIONS TO RESIDENTIAL DEVELOPMENT WITHOUT PUBLIC SEWERS**

LIMITATIONS TO DEVELOPMENT BRIDGEWATER TOWNSHIP

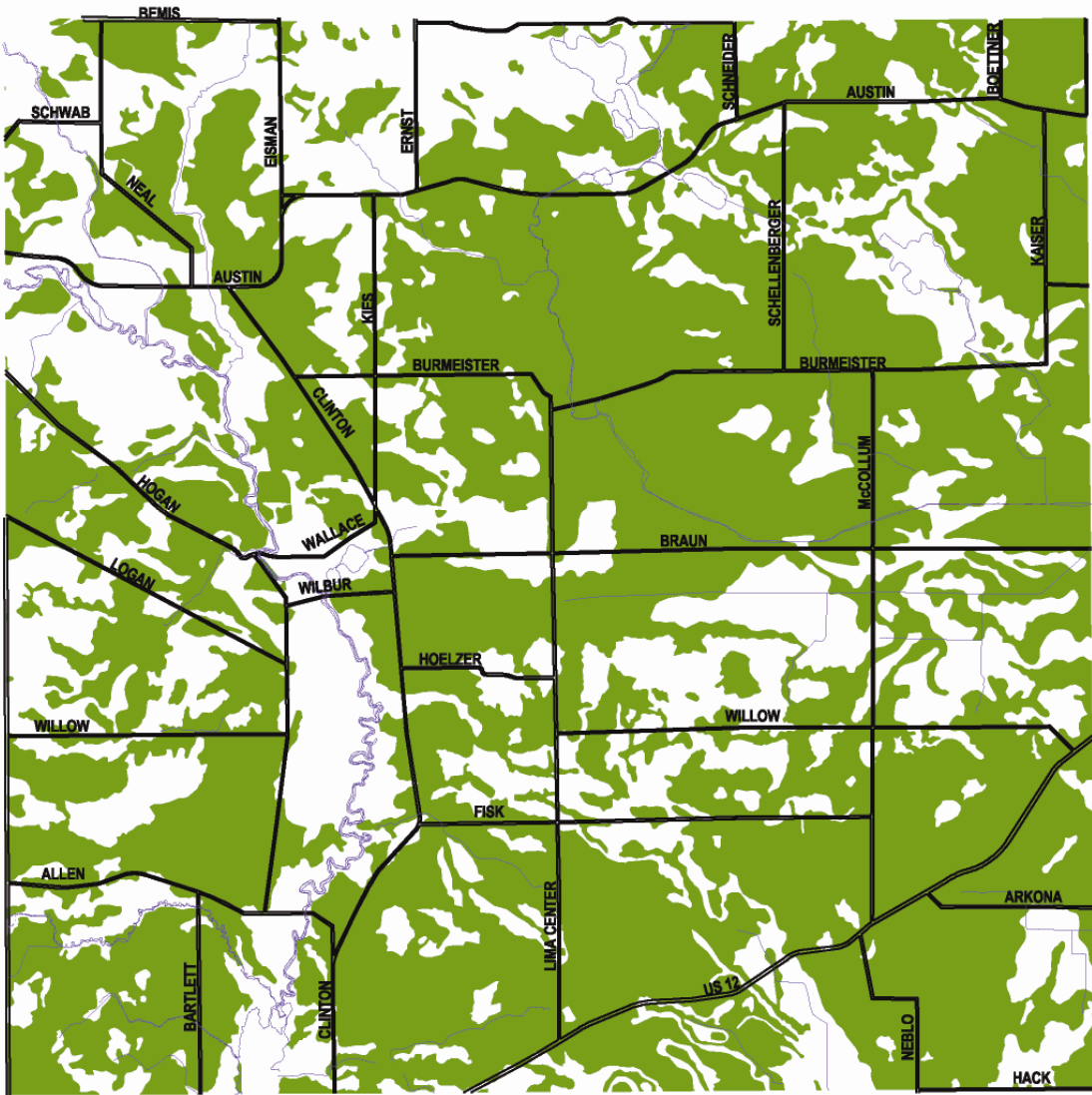
MAP ECA 1

Source: Washtenaw County
Metropolitan Planning Commission
Based on Information from
USDA - Soil Conservation Service



GIS by

BIRCHLER ARROYO ASSOCIATES, INC.



 PRIME AGRICULTURAL SOILS

PRIME AGRICULTURE BRIDGEWATER TOWNSHIP

MAP ECA 2

Source: Soil Survey of Washtenaw
County, Michigan 1973
USDA Soil Conservation Service



GIS by



BIRCHLER ARROYO
ASSOCIATES, INC.



TOPOGRAPHY

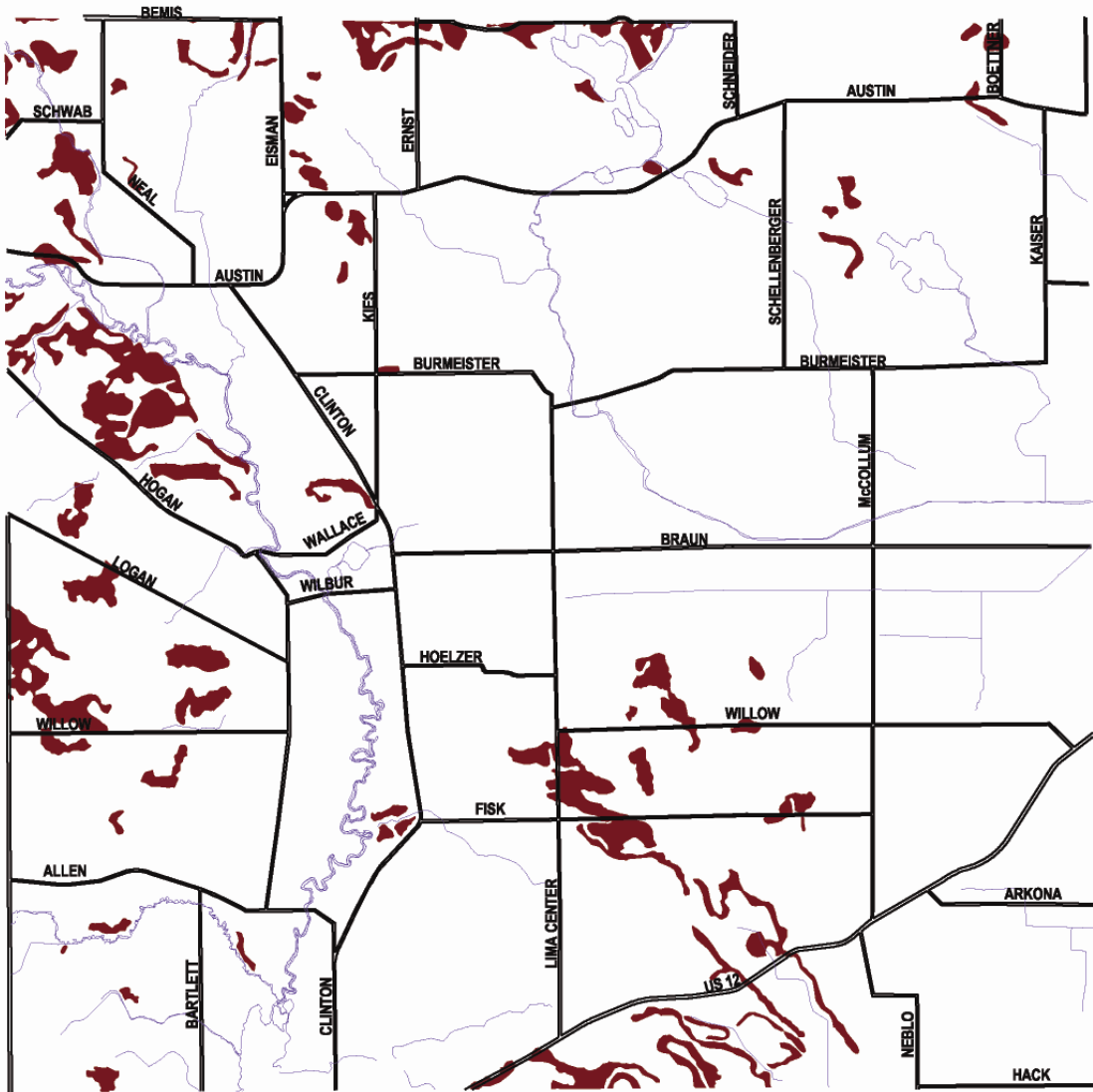
BRIDGEWATER TOWNSHIP

MAP ECA 3



BIRCOLER ARROYO
ASSOCIATES, INC.

Source: USGS
Copyright 2000 DeLorme
TopoTools Advanced Print Kit



 AREAS WITH SLOPES
GREATER THAN 12%

STEEP SLOPES BRIDGEWATER TOWNSHIP

MAP ECA 4

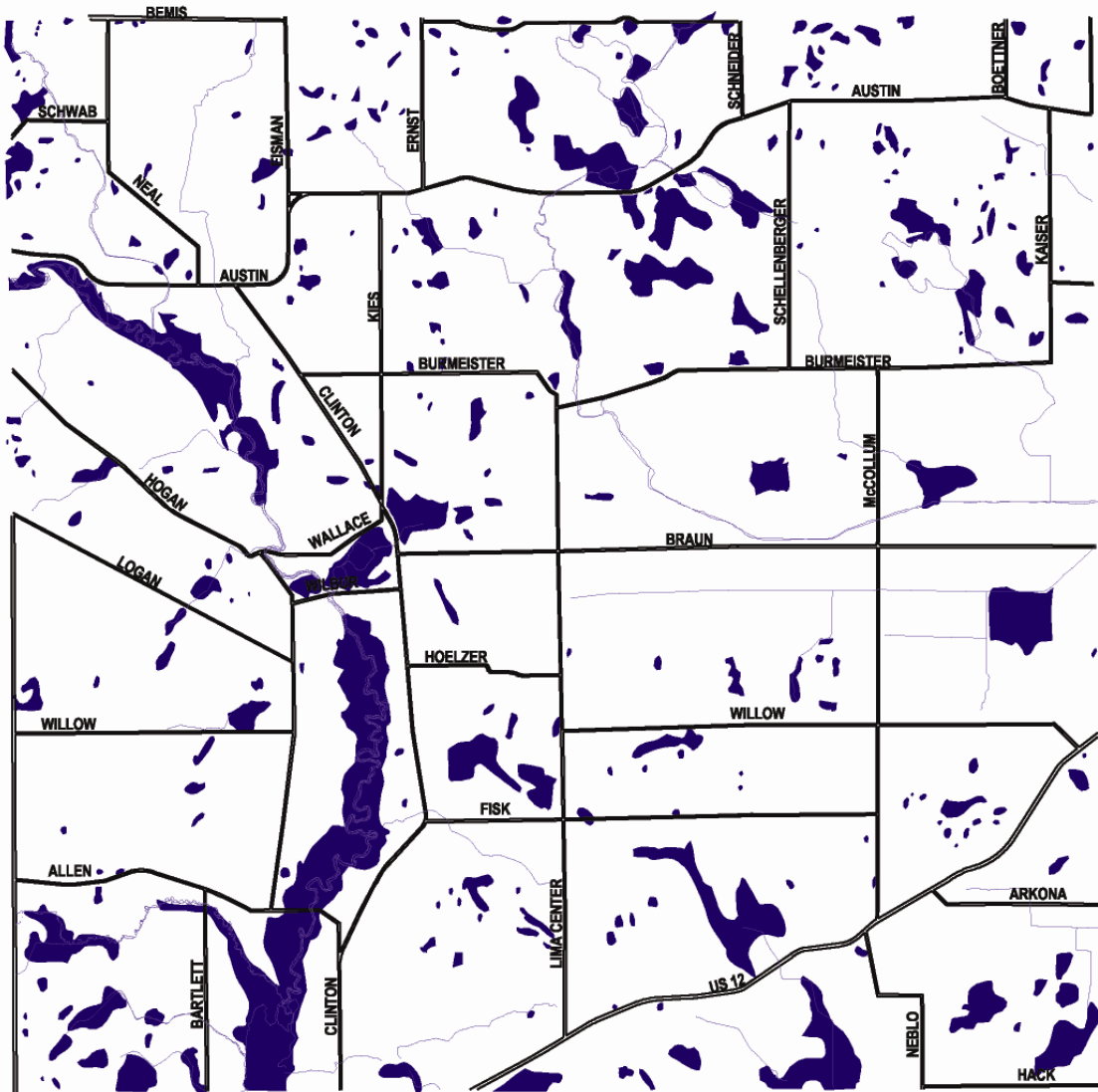
Source: Washtenaw County
Metropolitan Planning Commission
Based on Information from
USDA - Soil Conservation Service



GIS by



BIRCHLER ARROYO
ASSOCIATES, INC.



 WETLANDS

WETLANDS

BRIDGEWATER TOWNSHIP

MAP ECA 5

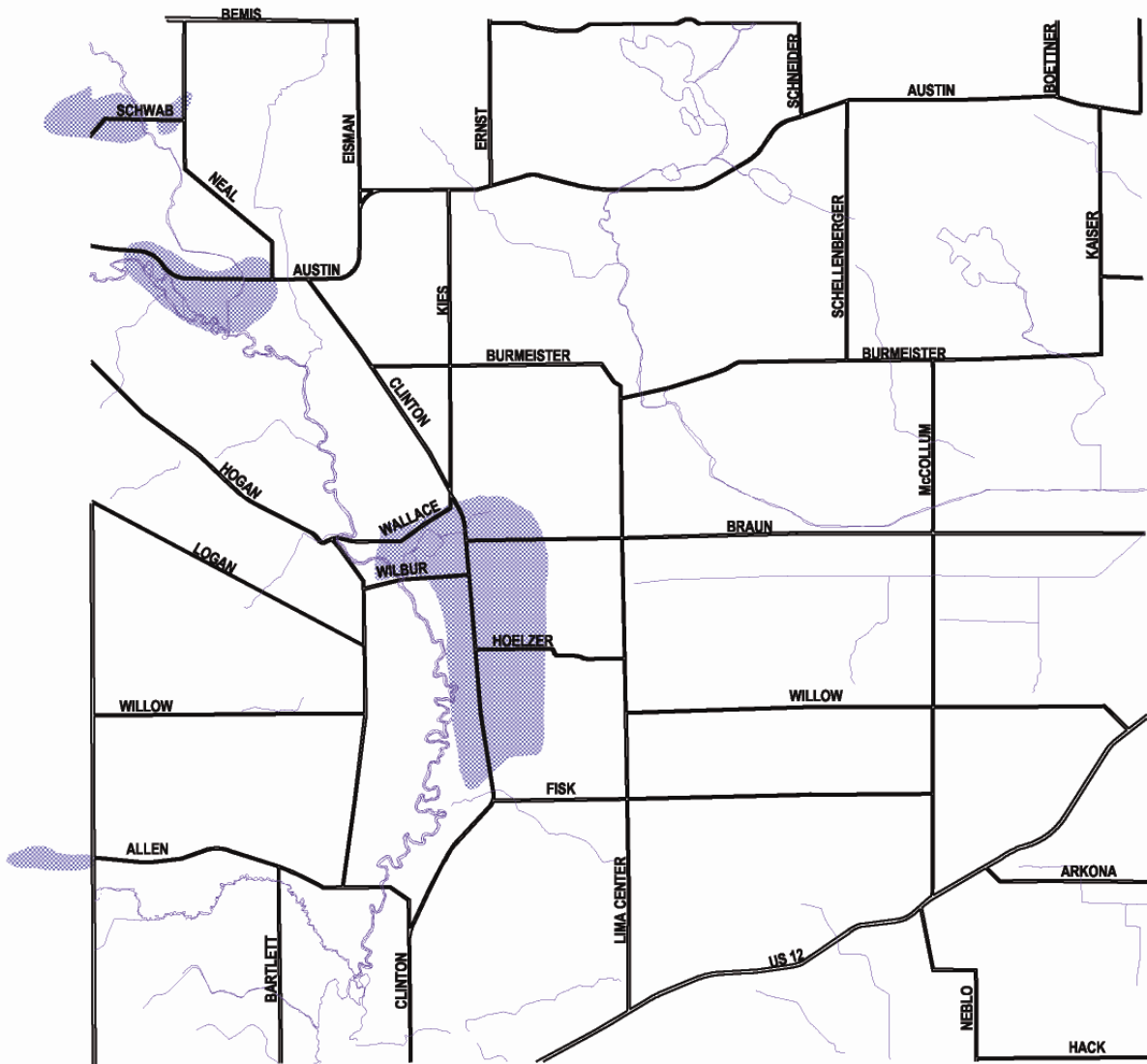
Source: Washtenaw County
Metropolitan Planning Commission
Based on Information from
US Dept. of Interior, 1990 Aerial Photos



GIS by



BIRCHLER ARROYO
ASSOCIATES, INC.



GROUNDWATER RECHARGE

BRIDGEWATER TOWNSHIP

MAP ECA 6

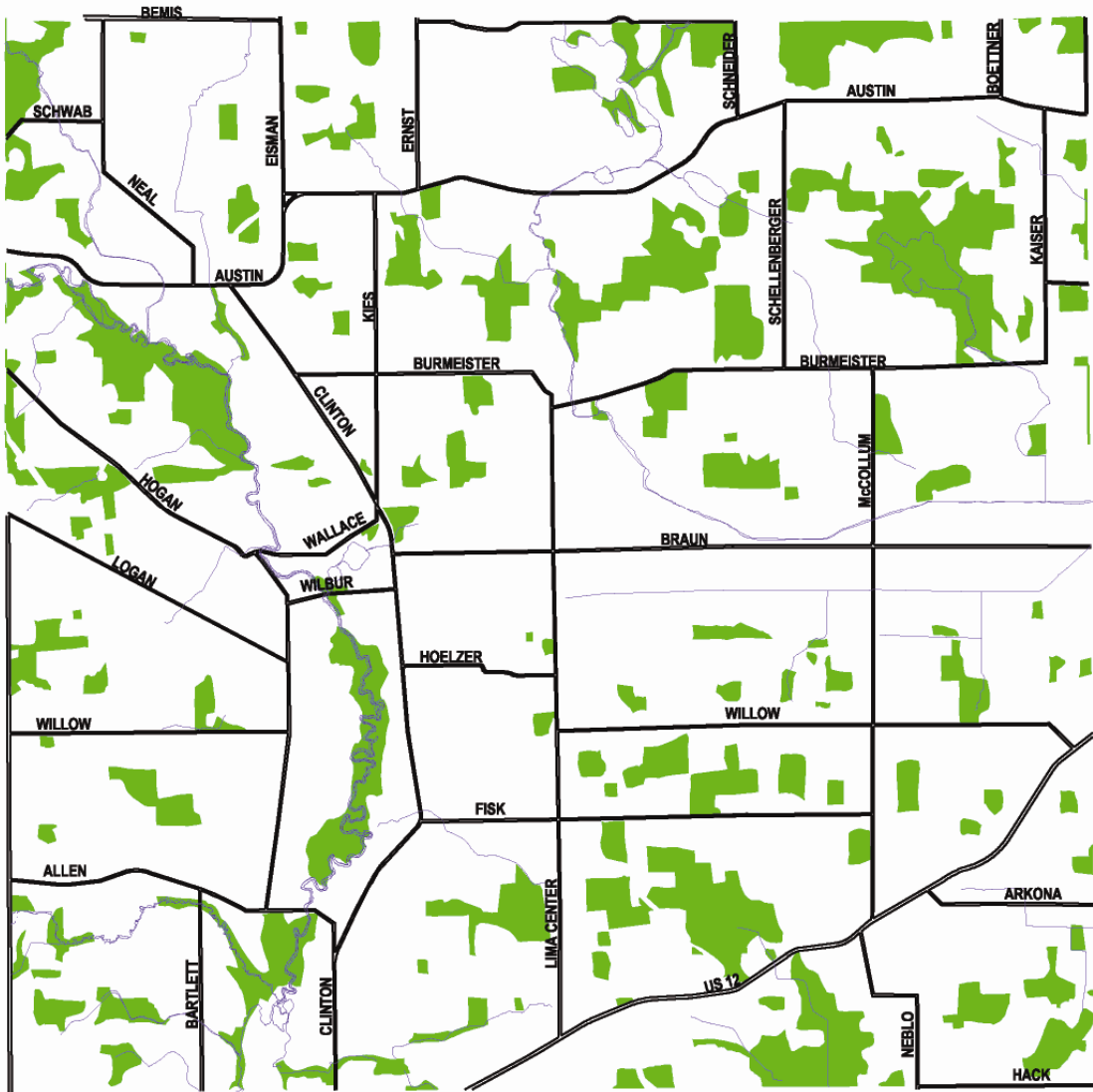
Source: Washtenaw County
Metropolitan Planning Commission



GIS by



BIRCHLER ARROYO
ASSOCIATES, INC.



 WOODLANDS

WOODLANDS

BRIDGEWATER TOWNSHIP

MAP ECA 7



Source: Washtenaw County
Metropolitan Planning Commission
Based on Information from
MIRIS, 1990 Aerial Photos

GIS by



BIRCHLER ARROYO
ASSOCIATES, INC.