

APPENDIX B:
LOCAL PLANNING AND ZONING
ASSESSMENT TOOL

INTRODUCTION

A. Purpose

The Watershed Protection Planning and Zoning Assessment Tool has been developed for the purpose of evaluating the effectiveness of water quality protection strategies by local governments within the Saginaw Bay Watershed. This pilot assessment specifically analyzes the Master Plans and Zoning Ordinances of communities located within the Rifle River, the Cass River, the Pigeon/Pinnebog Rivers sub-watersheds.

B. Method

The Team at the Planning & Zoning Center at MSU will implement the Assessment Tool to determine the level of each community's adherence to contemporary goals, regulations, standards, and practices as they apply to protecting surface water quality. Determining a community's existing level of adherence will be accomplished by identifying the presence of three fundamental aspects of watershed protection by means of local planning and Zoning Ordinances: 1) identification of goals and objectives for water quality protection and improvement; 2) identification of specific strategies and best management practices for meeting goals and objectives; and 3) an

analysis of opportunities and barriers to implementing key land use strategies as they apply to watershed management. An analysis will be provided for each community in each sub-watershed as they relate to surface water quality. This is not a comprehensive assessment of Master Plans and Zoning Ordinances, it is only an assessment relative to water quality protection.

C. Organization and Content

The assessment tool is designed as a survey-style form with "yes" and "no" questions and space for a comment.

D. How to Use the Assessment

After obtaining the Master Plan and Zoning Ordinance of each jurisdiction within each sub-watershed, apply every question in the assessment to each document and fill in the appropriate response.

E. Defined Terms

"Master Plan" refers to a plan prepared by a local Planning Commission pursuant to the Michigan Planning Enabling Act, P.A. 33 of 2008, as amended.

"Zoning Ordinance" refers to the Ordinance adopted by a local governing body pursuant to the Michigan Zoning Enabling Act, P.A. 110 of 2006, as amended.

F. Notes

When completing the assessment questions, **always cite the page number of document.**

COMMUNITY ASSESSMENT TOOL

Name of Jurisdiction: _____.

Who Completed the Assessment:

_____.

Date Prepared: _____.

Background

County: _____.

Sub-Watershed: _____.

- A. What is the population of the community based on the 2010 Census Data?:

_____.

- B. Is there a County Drain Commissioner or Local Stormwater/Sewer Authority? Yes: ___ or No: ___. If yes, list the name and contact information:

_____.

_____.

_____.

_____.

C. Which Health Department serves the community?

_____.

D. Does the community have a Master Plan? Yes: ___ or No: ____.
Title: _____.
If yes,
• Creation date: _____.
• Last updated: _____.
• Prepared by: _____.

If answered “No,” does the township, city, or village claim that they are covered under the county Master Plan? Yes: ___ or No: _____. If yes, what does the county Master Plan state relative to that specific community and is it adequate for county zoning? (Individual sub-section for each jurisdiction must be clearly identified within the county Master Plan).

_____.

E. Does the community have an adopted Zoning Ordinance? Yes: ___ or No: ____.
If yes, list the title:
_____.

- If no, name the entity whose zoning regulations the community falls under, if there is one:
_____.
- Creation date: _____.
- Last amended (list each amendment that pertains to water quality):

_____.
- Prepared by: _____.

F. Conformance with Michigan Planning and Zoning Enabling Acts (Answer questions in Table A-1.)

General Questions, Provisions, and Supplementary Information

A. What standards does the County Drain Commissioner use to review new development against?

_____.

B. What standards does the Health Department use to review on-site septic systems against?

_____.

C. Does the community make use of an environmental permits checklist that includes requirements from county, state, and federal agencies? Yes: ___ or No: _____. If yes, when was this document last updated? Provide a copy if possible.

_____.

Master Plan

A. Background

To determine acres and percentages of land use and land cover categories, see the method described in the Attachments section, on page A-31.

1. In the Master Plan, what is the approximate makeup of land uses in the community?
 - Agricultural: ___ %.
 - Forested: ___ %.

Table A-1: Conformance with Michigan Planning and Zoning Enabling Acts

Conformance with P.A. 33 of 2008 (Michigan Planning Enabling Act) and P.A. 110 of 2006, as amended (Michigan Zoning Enabling Act)	Circle One per Element
Notes:	
Has the Planning Commission updated the community's Master Plan to include <i>all</i> of the following elements, as required by the Michigan Planning Enabling Act of 2008?	Yes No Unable to Determine
1. Do both the Master Plan and Zoning Ordinance refer to the administrative body that maintains these documents as a "Planning Commission" and no other term? In other words, there is no longer any authority for "zoning boards." <i>(Note: This does not refer to the Zoning Board of Appeals (ZBA), which is a lawful entity pursuant to 2006 P.A. 110, MCL 125.3601.)</i> [2008 P.A. 33, MCL 125.3815 and 125.3301.]	Yes No Unable to Determine
2. Has the Master Plan either undergone an official five-year review/update by the Planning Commission, or does it cite a creation date within the last five years? [2008 P.A. 33, MCL 125.3845, (2)]	Yes No Unable to Determine
3. Does the Master Plan contain a <u>land use component</u> that identifies <i>all</i> of the following?: <ul style="list-style-type: none"> • Existing land use conditions and definitions of land use categories/districts. • Future land use plan. • Future land use map. • Recommendations for the future development of the jurisdiction. (If "No", indicate missing elements: _____.) [2008 P.A. 33, MCL 125.3833, (1) and (2)(a)]	Yes No Unable to Determine
4. Does the Master Plan contain an <u>infrastructure component</u> that includes data on the character, extent, expansions, and improvements for public infrastructure (utilities, roads, sewers, structures, etc.)? [2008 P.A. 33, MCL 125.3833, (2)(b).]	Yes No Unable to Determine

Note: This table continues on the next page.

- Commercial: __%.
- Industrial: __%.
- Institutional: __%.
- Parks/green space: __%.
- Residential: __%.
- Undeveloped: __%.
- 2. In the Master Plan, what is the approximate general makeup of land covers in the community?
- Agricultural land: __%.
- Surface water: __%.
- Wetlands, floodplains, and other intermittently inundated areas: __%.

Table A-1: Conformance with Michigan Planning and Zoning Enabling Acts (cont.)

Conformance with P.A. 33 of 2008 (Michigan Planning Enabling Act) and P.A. 110 of 2006, as amended (Michigan Zoning Enabling Act)	Circle One per Element
5. Does the Master Plan include redevelopment and rehabilitation plans for blighted areas? <i>(Note: May not be applicable to communities lacking a significant amount of blighted areas.)</i> [2008 P.A. 33, MCL 125.3833, (2)(c).]	Yes No Unable to Determine
6. Does the Master Plan contain a <u>zoning plan component</u> that identifies <i>all</i> of the following?: <ul style="list-style-type: none"> • A proposed schedule of regulations by district that includes at least building height, lot area, bulk, and setbacks. <i>(Note: this is intended to lay the groundwork for a schedule of regulations in the Zoning Ordinance.)</i> • Standards or criteria to be used when considering rezonings consistent with the Master Plan. • Suggested boundaries of zoning district. • An explanation of how the land use categories on the future land use map relate to the districts on the zoning map. (If “No”, indicate missing elements: _____.) [2008 P.A. 33, MCL 125.3833, (2)(d) and 125.3305, (a) and (b).]	Yes No Unable to Determine
7. Does the Master Plan offer recommendations for implementing any of the Master Plan’s proposals (goals and objectives)? [2008 P.A. 33, MCL 125.3833, (2)(e).]	Yes No Unable to Determine
8. Does the Zoning Ordinance contain (or is it accompanied by) a zoning map and text that indicates zoning districts within the jurisdiction, as well as regulations within these districts? [2008 P.A. 110, MCL 125.3305, (c).]	Yes No Unable to Determine

- Natural vegetation (includes forests, shrublands, fields, etc.): __%.
 - Urban or built-up: __%.
 - Roads: __%.
3. What is the approximate percentage of impervious land cover in the community: __%?

Note: In order to determine the percentage of impervious surfaces in a municipality, a current land use chart is necessary. The percent of impervious surface can be calculated by summing the amount of land covered by roofs, roads, and parking lots, then dividing by the total.

If a current land use chart is unavailable, then use the approximate makeup of land uses in the question on the Master Plan (A.1) on page A-19, and in Table A-2.

4. What are the predominant land uses, within a one-mile perimeter, in the principal (predominant zoning districts) zones along the major and minor streams? If mixed, indicate approximate percent of each land use.
- _____
- _____

Table A-2: Example of a Land Use Chart

Land Use Category		Acres	% Impervious	Impervious Acres
Residential	Low-density		19	
	Medium-density		38	
	High-density		50	
	Mobile home		60	
Institutional			30	
Commercial/Industrial			80	
Agricultural Land			2	
Open Space			2	
Surface Water			100	
Outdoor Recreation			11	
Road*	Local, subdivision		45	
	Major, highway/freeway		50	
TOTAL Imperviousness				
TOTAL Acres				
Percent Impervious				

*Includes road right-of-way.

5. In the future land use maps, what are the predominant land uses in the principal (predominant zoning districts) zones along the major and minor streams in the future land use maps?

6. Does the community indicate that they have worked with or discussed water quality management with adjacent jurisdictions? Yes: ___ or No: ___. If yes, which jurisdictions?

B. Goals and Objectives

1. Are goals present that indicate the community's desire to protect water resources? Please list.

- Do they focus on groundwater, surface water, or both?

- Do they focus on protection, remediation or both?

2. Does the plan inventory water resources and describe water quality issues? Yes: ___ or No: ___.
3. Are any of the water quality protection measures listed in Table A-3 included in the Master Plan's goals, objectives, strategies, or action items? Yes: ___ or No: ___.

Table A-3: Water Quality Protection Measures

	Yes	No
Coordinated Site Plan Review		
Land division		
Buffer strips		
Impervious surface reduction		
Resource Protection Overlay District		
Conservation easements		
Green streets bioretention		
Natural feature and drain setbacks		
Improving groundwater recharge		
Pollution prevention: <i>Wellheads, chemical storage and disposal, storm drain inlet labeling, building and demolition materials storage and disposal</i>		
Floodplain protection		
Woodland protection and reforestation		
Wetland protection/restoration/creation		
Accumulation and disposal of waste (junk and yard waste), and other materials		
Septic systems		
Public Education: <i>Agricultural best management practices</i>		
Public Education: <i>Open space protection</i>		
Public Education: <i>Water quality monitoring</i>		
Public Education: <i>Drain clearing</i>		
Public Education: <i>Road and bridge repair, and stream crossings</i>		
Road construction/repair BMPs		
Stream and drain crossing/bridges		

4. Are goals present that indicate the community’s desire to conserve open space/undeveloped land? Yes: ___ or No: ___.

- If so, please list them?

- If so, are lands adjacent to drains, streams, and rivers a priority? Yes: ___ or No: ___.

5. Does the Master Plan acknowledge state and federal development rights agreements? Yes: ___ or No: ___. If so, which ones? Check all that apply.

- Farmland and Open Space Preservation Program (P.A. 116).
- State parks.
- Wetlands.
- Environmental areas.
- Floodplains.
- State game areas.
- National parks.

6. Does the plan acknowledge the concept of “smart growth” (or any other development principles)?
Yes: ___ or No: ___.

7. Are any of the following tenets of smart growth present in the plan?
Yes: ___ or No: ___. If so, check all that apply below and indicate how they are proposed to be achieved?

Create a range of housing opportunities and choices.

_____.

_____.

Create walkable communities.

_____.

_____.

Encourage community and stakeholder collaboration in development decisions.

_____.

_____.

Foster distinctive, attractive communities with a strong sense of place.

_____.

_____.

Make development decisions predictable, fair, and cost-effective.

_____.

_____.

Mix land uses.

_____.

_____.

Preserve open space, farmland, natural beauty and critical environmental areas.

_____.

_____.

Provide a variety of transportation options.

_____.

_____.

Strengthen and direct development towards existing communities.

_____.

_____.

Take advantage of compact building design.

_____.

_____.

Note: Water quality benefits associated with smart growth techniques. “Using Smart Growth Techniques as Stormwater Best Management Practice,” <http://www.epa.gov/smartgrowth/stormwater.htm>.

8. Does the Plan state goals to reduce the community’s impact on global climate change? Yes: ___ or No:

- If so, explain objectives for reaching this goal:

_____.

_____.

C. Growth and Development

1. In the Master Plan, what is the approximate makeup of future land uses in the community?

- Agricultural: ___%.
- Forested: ___%.
- Commercial: ___%.
- Industrial: ___%.
- Institutional: ___%.

- Parks/green space: __%.
 - Residential: __%.
 - Undeveloped: __%.
2. In the Master Plan, what is the approximate general makeup of future land covers in the community?
- Agricultural land: __%.
 - Surface water: __%.
 - Wetlands, floodplains, and other intermittently inundated areas: __%.
 - Natural vegetation (includes forests, shrublands, fields, etc.): __%.
 - Urban or built-up: __%.
 - Roads: __%.
3. How does the community plan for higher-density development, based on a comparison of current and future land use maps? Check one.
- Future growth strives to maintain **low density**.
 - Future growth plans indicate an increasing concentration around commercial areas and **moderate density** residential developments.

- Future growth plans indicate a strategic grouping of **higher-density** residential and commercial districts and the mixing of uses around the core of the community and at key nodes.
4. Which of the following statements best describes the objective of the Master Plan with respect to the character of the community? Check one.
- Maintain a rural character (farm-like, forested, meadows, wetland, small estates, large lots) and/or promote the preservation of farmland.
 - Striving for growth and the attraction of new businesses.
 - Improving housing stock and building contemporary neighborhoods.
 - Preservation of natural features and scenic beauty.
 - Reinvigorating the urban core through redevelopment of blighted and underused areas.
5. Does the Master Plan state any of the following water quality protection goals: Check all that apply.

- Update the environmental inventory.
 - Protection of water quality or sensitive lands.
 - Protection of groundwater.
6. Does the community plan for an urban growth boundary, municipal/urban service limit line, or other similarly named boundary for managing urban growth, OR operate a Capital Improvements Program that manages infrastructure growth? Yes: ___ or No: ___.
- If yes, how much undeveloped land is included inside the boundary?
- _____.

Zoning Ordinance

A. General

1. On the zoning map, what is the approximate percentage of the total land comprised of each of the following zoning districts?
- Agricultural: __%.
 - Forested: __%.
 - Rural residential: __%.

- Suburban residential: __%.
 - Urban residential: __%.
 - Commercial: __%:
 - Downtown: __%.
 - Corridor: __%.
 - Interchange: __%.
 - Neighborhood: __%.
 - Industrial: __%:
 - Heavy: __%.
 - Light: __%.
 - Institutional: __%.
 - Parks/green space: __%.
2. What are the predominant land uses within a one-mile perimeter, in the principal (predominant zoning districts) zones along the major and minor streams? If mixed, indicate approximate percent of each land use.
- _____
- _____
- _____.
3. Are any of these identified in the zoning map? Check all that apply.
- Farmland and Open Space Preservation Program (P.A. 116) lands.
 - State parks.
 - Wetlands.
 - Environmental areas.
 - Floodplains.
 - State game areas.
 - National parks.
4. Is the application of any of the following low impact development techniques (for stormwater management or pollution prevention) required or encouraged by the Zoning Ordinance? Please fill out Table A-4.
5. Does the local Zoning Ordinance attempt to prevent livestock pollution of streams? Yes: ___ or No: ___. If so, how (i.e., secured manure ponds, exclusion from streams)?
- _____
- _____
- _____.
6. If the community's Zoning Ordinance contains provisions for planned unit developments, is open space design/cluster development a requirement for these places? Yes: ___ or No: ___. If so, what is the standard for the minimum amount of open space?
- _____.
- Does the same standard apply to site condominium development? Yes: ___ or No: ___.
7. Does the local Zoning Ordinance have provisions for conservation subdivisions? Yes: ___ or No: ___.
8. Does the Zoning Ordinance contain impervious surface area regulations or guidelines for individual lots? Yes: ___ or No: ___. If so, what is the standard?
- _____.
9. Does the Zoning Ordinance permit any of the following elements of alternative street design for controlling stormwater runoff: Check all that apply.
- Elimination of curb, gutters, and storm sewers.

Table A-4: Low Impact Development Techniques

LIDs	Required (pg. #)	Potential BMP(s) to apply	Notes (Citations, characteristics, etc.)
Stormwater management: Other Site Plan Review standards			
• Bioretention or rain gardens			
• Vegetated, grassed, or bio swale			
• Constructed surface or subsurface filters			
• Wet ponds or retention basins			
• Dry detention basins			
• Two-stage ditches/channels or naturalized ditches			
• Infiltration basins			
• Level spreaders			
• Pervious pavement			
• Stormwater planters			
• Vegetated filter strips			
• Water quality devices (such as hydrodynamic separators and baffle boxes)			
Wind barriers (such as no-till, shelterbelts, contouring farming, wind breaks)			
Steep slope protection (such as riprap, level spreaders, reinforced soil)			
Lot coverage			
Prohibiting the storage of potentially contaminating materials in floodplain			
Provisions for the rebuilding/demolition of nonconforming structures within a floodplain			

Note: This table continues on the next page.

Encourage medians with swales to channel and absorb stormwater.

10. Does the Zoning Ordinance permit a large car parking without providing for small cars? Yes: ___ or No: ___.
11. Does the Zoning Ordinance require/encourage shared use of parking between adjacent land uses? In what districts? Yes: ___ or No: ___.
12. Does the Zoning Ordinance provide for overflow parking? Yes: ___ or No: ___.
13. Does the Zoning Ordinance require/encourage parking lots to be paved? Yes: ___ or No: ___.
14. Does the Zoning Ordinance require/encourage pervious surface parking lots? Yes: ___ or No: ___.
15. Does the Zoning Ordinance require minimum landscaping standards in parking lots? Yes: ___ or No: ___. If yes, in what districts?

Table A-4: Low Impact Development Techniques (cont.)

LIDs	Required (pg. #)	Potential BMP(s) to apply	Notes (Citations, characteristics, etc.)
Utilization of overlay zoning to protect environmentally sensitive areas. Indicate the types of overlay zones used:			
• Riparian corridor			
• Wetlands			
• Woodlands			
• Groundwater recharge			
• Wellhead protection			
• Other			
Provisions for wastewater disposal systems to be setback from surface waters and natural features. What distance?			
Buffers between natural features and development activities. Width Required?			
Identification of stormwater drainage patterns, in respect to the final grading			
Other, specify: _____.			

16. Does the Zoning Ordinance allow for shared driveways? Yes: ___ or No: ___. If yes, in what instances and in what districts?

_____.

17. Does the Zoning Ordinance have a floodplain ordinance/provision? Yes: ___ or No: ___.

18. Is an area designated as a “Natural River” by the State of Michigan within the community? Yes: ___ or No: ___.

19. If the jurisdiction has local zoning regulations and Natural River zoning is present, how does the jurisdiction coordinate with the MDNR?

_____.

If zoning regulations are present are they consistent with Natural River zoning?

_____.

B. Site Plan Review (Indicate Section # _____) (Fill out Table A-5.)

1. In what instances is the Site Plan Review process required? (Insert actual ordinance language here.)

_____.

2. List the Site Plan Review standards related to water quality that must be met in order to get approval.

_____.

Table A-5: Checklist for Site Plan Review

Basic Information & Determination	
Whether the site requires any special reviews, because it is in a location subject to special regulations, such as the following:	
A. Designated high-risk of erosion areas.	
B. Designated natural river.	
C. Designated environmental area.	
D. Designated sand dune area.	
E. Designated historic district.	
F. Designated or known groundwater recharge area.	
G. Designated wetland.	
H. Adjoining an inland lake or stream.	
I. Identified hazardous waste area.	
J. Known site for disposal of solid waste.	
K. Whether the land is subject to a farmland or open space agreement.	
L. Others, specify: _____.	
Which other local, county, state and federal agencies need to be contacted for review and comment, and whether any other special permits have to be obtained from them, such as Wastewater or Air Discharge Permits. Possibilities include:	
A. Wastewater Discharge Permits.	
B. Pollution Incident Prevention Plans from the MDNR.	
C. Hazardous Waste Storage, Treatment or Disposal, or Septic Permits from the MDNR.	
D. Air Pollution Control Permits for Air Discharges of Industrial Processes or Burning of Solid or Hazardous Wastes from the MDNR.	
E. Dredging within 500 feet of a River, Stream, Creek, Ditch, Wetland, or Floodplain Permit from the MDNR.	
F. Dredging, Filling, or Construction in a Waterbody Permit from the MDNR.	
G. Others, specify: _____.	

Note: This table continues on the next two pages.

3. Are topography lines required on the site plan (existing and proposed)? Yes: ___ or No: ___.
4. Is it a requirement to identify existing vegetated areas and/or impervious surfaces? Yes: ___ or No: ___.
5. Is a parking plan required for site plan approval? Yes: ___ or No: ___.
6. Does the Zoning Ordinance prohibit land clearing or soil stripping prior to Site Plan Review? Yes: ___ or No: ___.
7. Is there a requirement for the identification of stormwater drainage patterns, in respect to the final grading? Yes: ___ or No: ___.
8. What other agencies review and comment on the site plan?
 - County Drain Commissioner.
 - Health Department.
 - Road Commission.
 - The Michigan Department of Transportation.
 - The Michigan Department of Environmental Quality.
 - Other entity (please be specific) _____.

Table A-5: Checklist for Site Plan Review (cont.)

Basic Information & Determination	
Risks of Natural Hazards	
Whether any risks of natural hazards from flooding, high-risk of erosion, slumping of steep slopes or sandy soils, subsidence or other natural event has been adequately considered.	
Drainage and Watercourse	
Whether proposed grades, drainage, and stormwater retention/detention is adequate and whether any required fencing thereof is indicated and of proper materials and sizes.	
Whether required sediment control plans are adequate.	
Whether proposed locations of structures and uses relative to wetlands, water recharge areas, and floodplains are adequate.	
Whether proposed bulkheads, docks, fill, or other structures in or adjacent to a watercourse meet local, state and federal requirements.	
Solid and Hazardous Waste	
Whether solid waste disposal is illustrated and adequate.	
Whether the location and specifications for storage of any chemicals, salts, flammable materials, or hazardous materials on the site meets local, state, and federal requirements.	
Other Environmental Impacts	
Whether any endangered plant or animal habitat would be affected.	
Whether any unacceptable pollution, impairment or destruction of the environment would occur if the site plan were approved.	
Have Comments Been Received from the Following Agencies?:	
<i>County and Local Agencies:</i>	
• Road Commission or Street Department.	
• Health Department (Septic/Well Permits).	
• Department of Public Works.	
• Drain Commissioner.	
• Fire Chief (water lines, hydrants, emergency vehicle access).	
• Sheriff's Department or Police Chief.	
• Engineering Department (easements , rights-of-way, utility lines).	
• Building Department (Building Code, sometimes Sign Codes).	

Note: This table continues on the next page.

9. Does the Zoning Ordinance allow the jurisdiction to withhold approval until evidence of receipt of permit requirements by other agencies has been received? Yes: ____ or No: ____.

C. Subdivision/Plot Regulations

- Does the community have subdivision/land division regulations? Yes: ____ or No: ____.
- What standards must be met to get approval of a land division adjacent to a river or stream?

D. Other Observations:

Table A-5: Checklist for Site Plan Review (cont.)

Basic Information & Determination	
Have Comments Been Received from the Following Agencies? (cont.):	
<i>County and Local Agencies:</i>	
• Water Department (water lines, hydrants, valves).	
• Wastewater Treatment Department.	
• Zoning/Planning Department.	
• School district(s).	
<i>State Agencies:</i>	
• Michigan Department of Transportation (Driveway Permits, access onto property along state or federal trunklines and freeways).	
• Michigan Department of Natural Resources.	
• Floodplains.	
• Inland Lakes and Streams Permits.	
• Wetland Permits.	
• Solid Waste Permits.	
• Hazardous Waste Permits.	
• Air Discharge Permits.	
• Michigan Department of Commerce.	
• Condominium approvals.	
• Plat approvals.	
• Mobile home park approvals.	
• Michigan State Police/Fire Marshall (Flammable materials storage).	
<i>Federal Agencies:</i>	
• U.S. Army Corps of Engineers (Permits for activities in certain wetlands, floodplains, and navigable watercourses along the Great Lakes and connecting waters).	

ATTACHMENT

To determine the number of acres in each land use and land cover category:

- A. Using the grid sheet (Figure A-1), multiply the length of a grid square by the map scale, and square the resulting sum. For example, if you are using a 1/4" grid, and a map with a scale of 1"=1,000', the calculation would be as follows⁹:

$$(1/4 \times 1,000)^2 = 62,500 \text{ ft}^2.$$

This calculation gives you the number of square feet in a grid square, according to the map scale.

- B. Convert the square foot per grid square identified into acres by dividing the calculated value by 43,560:

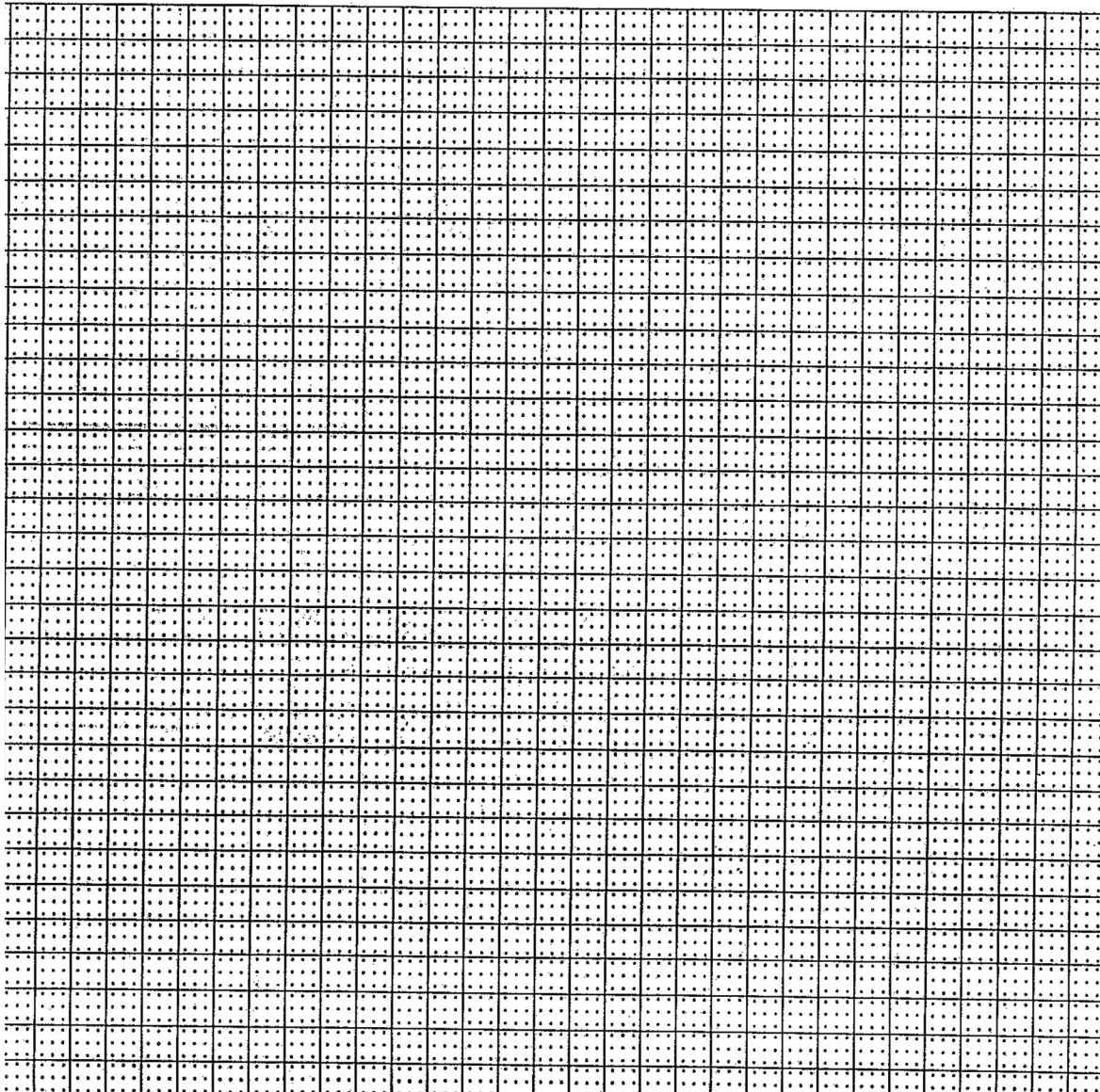
$$\frac{62,500}{43,560} = 1.43 \text{ acres}$$

- C. Divide the number of acres in a grid square by the number of dots within a grid square. For example, the attached grid sheet has nine dots per grid square:

$$\frac{1.43 \text{ acres/grid sheet}}{9 \text{ dots/grid square}} = 0.16 \text{ acres/dot}$$

⁹ We recommend copying the grid sheet on a transparency or thin paper.

Figure A-1: Sample Gridsheet



Source: Grid sheet found in Workbook for Preparing or Updating a Master Plan and/or Preparing a Growth Management Plan, prepared for the Michigan Society of Planning Officials by the Planning & Zoning Center, Inc.

- D. On a separate sheet of paper create a worksheet to record your results. Write down all of the zoning classifications (i.e., A – Agriculture, B-2 Local Business, etc.) at the top and leave room to list the acreage of each area of that classification.
- E. Once the worksheet is complete, tape the zoning map to a light table, or identify a window in which you can hold the map up to.
- F. Place the grid paper on top of the zoning map so the different zoning districts can be seen through the map. Carefully calculate each individual zone and record the acreage of each instance.
- G. Once each zoning acreage has been calculated, sum each classification and divide that by the total amount of acreage in the municipality to determine the percent of each zoning classification that is represented in the city.

(Explanation found in the *Saginaw Bay Watershed Land Use & Zoning Study* prepared by the Michigan United Conservation Clubs with assistance of the Planning & Zoning Center, Inc.)

Photos by:

Front Cover Top Left: Michigan State University

Front Cover Top Right: Suzanne and Steve Klasen

Front Cover Lower Left: Jim Sorbie

Front Cover Lower Right: Mary Starr

Front Cover Center: USNASA Earth Observatory, 2010

Photo 1-1: USNASA Visible Earth, 2000

Photo in Figure 1-1: U.S. Environmental Protection Agency

Photo 1-2: Michigan State University

Photo 1-3: iStock

Photo 2-1: Douglas Jackson

Photo 2-2: Allison Dungan

Photo 2-3: Rob Zeilinger

Photo 3-1: Brandon Schroeder

Photo 3-2: Mary Starr

Photo 3-3: Al Braden

Photo 3-4: Northbrook Canoe

Photo 3-5: Michigan State University

Photo 4-1: Stephen Brown

Photo 4-2: Southeast Michigan Council of Governments

Photo 4-3: Google Maps

Photo 4-4: Michigan Department of Agriculture and Rural Development

Photo 4-5: Huron Pines

Photo 4-6: Huron Pines

Photo A-1: Blair Dyer

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