

CITY OF NEW BALTIMORE
PHYSICAL FEATURES

SECTION 2.0

INTRODUCTION

The purpose of this section is to discuss the inventory of physical features in the City of New Baltimore that have the potential of influencing the location and character of development. Specific topics covered in this inventory include geology, topography, flood hazards, watersheds, soils, water, woodlands and wetlands.

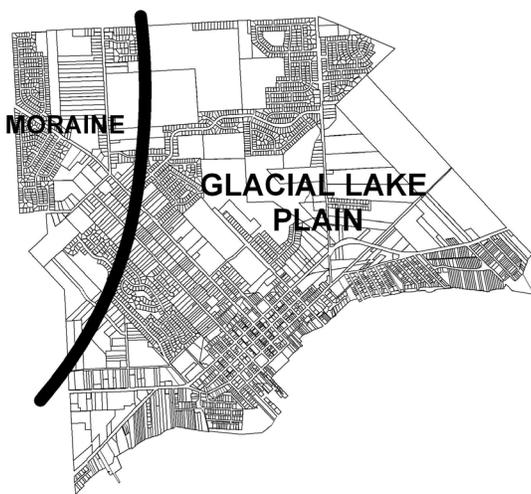
Existing physical features exert important influences in shaping the development of any specific area. They are nature's contribution to the City's environment. Collectively, these features can determine the overall physical character of the community.

When integrated thoughtfully into development proposals, physical features serve to enhance the character and appearance of the constructed environment. Conversely, ignoring physical features, or misusing them, can have significant, long-term negative consequences. Some well-defined physical features serve as a barrier to development and may be difficult to overcome, except at considerable expense. It is usually better to design with nature than to attempt to substantially change an area's physical environment.

GEOLOGY

Michigan's physical setting, as we know it today, including the Great Lakes that surround the State, is the result of the interaction of glacial action on the bedrock formation that underlay the State. These bedrock formations consist largely of sandstone, limestone and shale, which were particularly vulnerable to the weight and movement of the glaciers. The movement and weight of the glaciers depressed the land mass surrounding Michigan, forming basins that eventually became the Great Lakes.

ILLUSTRATION 5
SURFACE GEOLOGY



New Baltimore lies in an ancient lake bed covered by glacial material. This is part of a larger area known as the Erie-St. Clair Plain, which extends inland from the Lake for approximately 25 miles.

The plain stretches from Lake Huron on the north to Toledo on the south. It also extends east into Canada, encompassing the entire "panhandle" portion of southern Ontario. This plain is nearly level, rising gradually to the northwest. It is crossed by numerous water channels which empty into the Great Lakes system.

Evidence of glacial movements across this portion of the County is also noticeable in the northwest portion of Chesterfield Township and north of the City of New Baltimore. Glacial moraines are evident in both areas. Moraines define the edge of glacial movement in the neighboring community of Chesterfield Township and in the City. As temperatures warmed and melted the glacier at a rate equal to its forward movement, soil from the glacier was deposited in a line parallel to the leading edge of this sheet of ice. Neither of these moraines feature significant changes in topography that is the case for the more prominent Birmingham Moraine located in the northwest portion of the County.

The last period of glaciers that covered Michigan was directly responsible for the City's basic land forms. As these glaciers moved south, they accumulated large quantities of soil that were eventually deposited across southern Michigan and neighboring States. This fertile soil accounts for much of Michigan's productive agricultural land.

The City's glacial features help explain some of New Baltimore's other important physical characteristics, including its topography and flood hazard areas.

TOPOGRAPHY

Topographic conditions can have a significant influence on land development patterns. Topography, for example, can impact the site location, orientation and design of buildings, roads and utilities. Where topography is extreme, slopes become an important consideration due to concerns relating to the ability of the land to bear the weight of buildings and the danger of erosion. Sometimes, topographic variations offer opportunities to appreciate the scenic environment. The absence of significant changes in topography can result in the need for man-made drainage improvements, which is the case for New Baltimore.

New Baltimore's topography is a direct consequence of the glacial actions described earlier. The City is relatively flat with no significant changes in topography that represent a development limitation. The highest point in the City is located at the northwest corner of the community near the intersection of 25 Mile Road and Baker Road. From this high elevation, the City's land area slopes gradually to the southeast to the recorded low elevation of 578 feet along the Anchor Bay shoreline.

WATER

Surface water exists in many forms, such as lakes, rivers, creeks and open storm drains. The presence or absence of these features frequently has an important influence on the form and pattern of development that occurs in a community.

Historically, the development of New Baltimore is linked to its location along the shore of Anchor Bay. This location influenced the original settlement pattern along the shore of the lake. At that time, proximity to the lake was a necessity since shipping was the principal form of inter-community transportation.

Today, the presence of the lake has a much stronger recreational and aesthetic value. Since marinas and water-borne pleasure craft are increasing in number and popularity throughout the nation, it is evident that the Lake's attraction will increase in years to come. Waterfront property also has high value as residential building sites.

Aside from Lake St. Clair, New Baltimore's only other evident pure water feature is Crapaud Creek which enters the City at the northeast corner of the community. This creek empties into Anchor Bay at a point southwest of the downtown area.

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ILLUSTRATION 6
TOPOGRAPHY



FLOOD HAZARDS

Because of New Baltimore's nearly level terrain and shallow river valley, it is subject to periodic flooding hazards. A floodplain is an area of land along a lake, river or other water feature that is susceptible to being inundated by water as a result of heavy rains, snow melt, or other factors. Floodplains are naturally occurring physical features that provide for the temporary holding of this excessive water until such time as the receiving channel is capable of accepting the water.

In 1978, the Federal Insurance Administration prepared a Flood Insurance Rate Map and Flood Insurance Study for New Baltimore. The map identifies those portions of the City that are located within designated 100-year and 500-year floodplains. Areas subject to the potential for flooding along the Lake St. Clair shoreline are confined principally to Reudisale Pointe and Marsac Point. A flood hazard area is also indicated along the full length of Crapaud Creek.

The presence of these floodplains has an influence on the development of property located within the limits of designated flood prone areas. The City's Flood Hazards and Flood Damage Prevention Ordinance was adopted in 1978. The intent of this Ordinance is to minimize losses due to flooding. This ordinance limits the amount and type of construction that is permitted in designated floodplains. In general, a use may be permitted only if the following conditions apply:

- There is no increase in flood levels as a result of development; and
- New construction or substantial building renovation shall have the lowest floor level, including basements, elevated to or above the base flood elevation.

These regulatory measures are intended to preserve floodplains, minimize property losses due to floods, and to ensure that new development does not aggravate existing problems.

ILLUSTRATION 7
FLOOD BOUNDARIES



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SOILS

Soil characteristics have an important influence on the ability of land to support various types of land uses, including roads, buildings, utilities and agriculture. Four specific soil characteristics influence their ability to be used for various purposes. These include the following:

- **Bearing Capacity** — the ability to support the weight of roads, buildings or vehicles.
- **Erodibility/Stability** — the susceptibility of the soils to erosion hazards and the ability to accept weight, without causing mass movements such as mud flows and slides.
- **Drainage** — the capacity of soils to transmit and receive water. This characteristic is especially important for determining the ability of soils to absorb stormwater. Soil drainage characteristics are influenced by particle composition and water content.
- **Resource Value** — the economic worth of the soil for agricultural purposes, or as a fill or mined material.

New Baltimore's soil characteristics were identified as part of the larger Macomb County and St. Clair County Soil Surveys conducted in the late 1960's by the United States Department of Agriculture Soil Conservation Service. Categories of soils with different characteristics and physical properties were identified as part of the survey. This process resulted in a patchwork or jigsaw-like pieces that fit together to portray a larger overall picture of existing soil characteristics. A large number of individual soils types are present in the City. These individual categories are grouped together into several generalized classifications of soils that share similar characteristics. A total of nine of these grouped categories are located in Macomb County. Five of these cover the City of New Baltimore. The characteristics of these categories are described as follows:

Lenawee-Corunna-Lamson

This soil association occupies only a small portion of New Baltimore along the City's western boundary with Chesterfield Township. Poor drainage characteristics are one of the chief limitations of these soils for urban development. High water table and poor surface drainage characteristics create limitations in laying out streets and utility lines and in constructing houses. These Drainage problems also create limitations for agricultural uses. In extreme cases ponding occurs in low areas, especially after heavy rains. The lack of suitable outlets may compound the poor drainage characteristics.

Toledo-Paulding

This is the City's most predominant soil classification. It covers more of the City than any of the other soil categories. Soils in this association are comprised of poorly drained, nearly level soils that formed in lake-laid clay deposits. Those soils have moderate limitations for farming due to the clay content which limits drainage. This characteristic also presents limitations for the construction of buildings and roads. Structures have a tendency to heave and crack because the soils swell when wet and shrink when dry.

Selfridge-AuGres

This association is made up of somewhat poorly drained, nearly level to gently sloping soils. They have low natural fertility and are subject to soil blowing. Drainage improvements are also needed. Seasonally high water tables create limitations for the installation and operation of on-site sewage disposal systems.

This association occurs in New Baltimore at the southwest corner of the City, generally between Jefferson and Lake St. Clair.

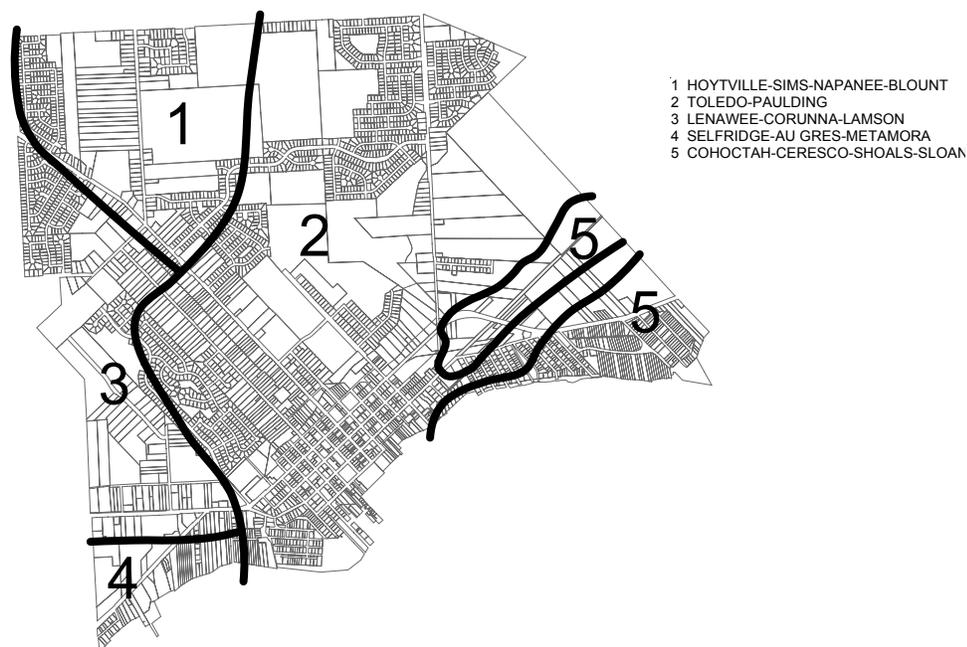
Hoytville-Sims-Napanee-Blount

Only small portions of the City are covered with these soils. They can be found in the extreme northwest corner of the City.

This association is made up of poorly drained and somewhat poorly drained, nearly level to gently sloping soils that formed in glacial till consisting of clay loam, silt clay loam, or clay. These soils are found on glacial till plains and moraines, and water-laid moraines. Soils within this association are well-suited to farming provided the drainage limitations can be overcome. High water table and poor drainage characteristics also pose problems for residential development.

Cohoctah-Ceresco-Shoals-Sloan

This association is made up of poorly drained and somewhat poorly drained, nearly level soils that formed in material deposited by streams. It occurs along major drainageways. The limitations for recreational and residential uses are severe. Periodic flooding causes damage to buildings, roads, and lawns, and, at times, causes the malfunction of sewage systems. Flooding is common during the spring and during wet periods.



- 1 HOYTVILLE-SIMS-NAPANEE-BLOUNT
- 2 TOLEDO-PAULDING
- 3 LENAWEE-CORUNNA-LAMSON
- 4 SELFRIDGE-AU GRES-METAMORA
- 5 COHOCTAH-CERESCO-SHOALS-SLOAN

ILLUSTRATION 8
SOILS

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WOODLANDS

At the time southeast Michigan was originally settled, the area was covered with dense hardwood forests. As the number of inhabitants increased, these forests were cleared for lumbering and farming purposes. Today, the quantity of land still occupied by mature vegetation has diminished. Where large contiguous woodlands remain, however, they provide benefits that need to be considered in the planning process.

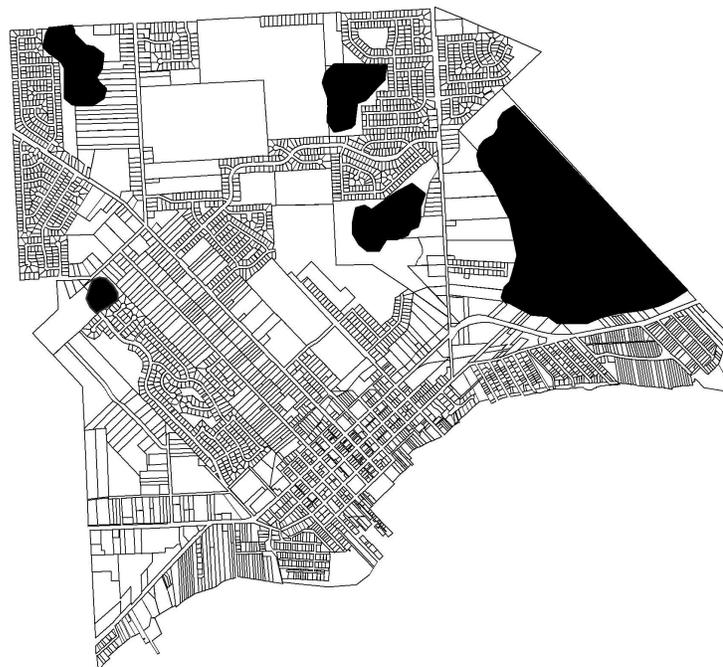
Woodlands are frequently only considered valuable as a visual amenity enhancing the natural or constructed environment. Trees serve many other useful environmental purposes that should be recognized for planning purposes. These include the following:

- Slope stabilization and erosion control
- Conserving water quality
- Maintaining a micro-climate
- Filtering pollution from the atmosphere
- Decreasing noise
- Providing a habitat for wildlife.

Recognizing these important physical properties and integrating woodlands into future development can improve the community's overall environmental quality and enhance the visual character of the constructed environment.

Several large, undisturbed wooded areas are evident in New Baltimore. The most extensive one is located along the City's eastern boundary, north of M-29 and east of County Line Road. Other woodlots are available in the central portion of the City and along the City's western boundary with Chesterfield Township. It is important to recognize the probable link between wetlands or areas subject to flooding and the remaining woodlands within the City. These areas are shown in Illustration 9.

ILLUSTRATION 9
WOODLANDS



WETLANDS

Wetlands are an important element of Michigan's landscape. Before experiencing settlement in the late 18th and early 19th centuries, Michigan was thought to contain over 11 million acres of wetlands. Like the extensive forests that once covered the State, the unique physical characteristics of many of these wetlands were permanently altered as a consequence of the settlement of the State. This change occurred as forests were logged and swamps drained for farming purposes. Between 25 and 50 percent of these original wetlands remain in Michigan today.

Wetlands are areas characterized by the presence of water that either saturate the soil or cover the land most or all of the year. Because of this characteristic, wetlands have the ability to support unique varieties of plants and animals. Not all wetlands are similar, however. Several categories of wetlands are found in Michigan. These varieties are the result of differences in climate, bedrock geology, soil characteristics and land forms that are unique to different portions of Michigan. The characteristics of wetland vegetation provide the basis for making a distinction between different types of wetlands. The two basic types of wetlands are forested and unforested. The largest share of remaining State wetlands are of the former variety. Many of these forested wetlands have soils that are seasonally saturated with water during seasonal periods. These wetlands are commonly referred to as swamps. Swamps differ from unforested wetlands more commonly known as marshes, wet prairies, wet meadows, fens and bogs.

Marshes are those areas that normally occur along the edges of lakes and streams. These areas are flooded for much of the year with average depths of under five feet. Commonly occurring vegetation in marshes include emergent plants such as bulrushes, cattails, sedges, grasses and floating or underwater plants.

Wet prairies consist of land located between marshes and abutting farm land. Their existence is a result of fluctuating water levels and Indian fires, which prevented the establishment of more permanent vegetation, including trees and shrubs. Few of these unique wetlands exist today. Many of these areas have been absorbed into the adjoining agricultural acreage. Wet prairies are recognizable by the striking vegetation that inhabit these areas, such as asters, goldenrods, mints, rare milkweed, Indian plantain and assorted prairie grasses.

Fens, are a common herbaceous wetland located in areas characterized by saturated, lime-rich soils. Fens are commonly found at the bottom of ridges where poor drainage conditions exist. Like wet prairies, farming has absorbed many of these wetlands.

The remaining category of non-forested wetlands are known as bogs. The most striking feature of a bog is the thick acidic peat mats that cover these areas. These are formed as a result of the decomposition of sphagnum mosses and sedges. Many bogs have been permanently changed as a consequence of peat mining activities, especially those located in the more populated portions of southeast Michigan.

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In spite of these differing characteristics, wetlands share some common physical properties that have important consequences for planning purposes. Wetlands serve a number of necessary environmental functions. These include the following:

- Protecting downstream water supplies by providing clean ground water as a result of the nutrient retention and sediment removal. Wetland vegetation traps these sediments and pollutants, thereby preventing them from being deposited in surface water bodies.
- Functioning as effective natural storage basins for flood water. Wetlands may be considered large sponges that absorb large quantities of seasonal precipitation, gradually releasing it when the receiving channels are able to accept it.
- Protecting the shoreline from erosion caused by wind and wave action and effectively serving as environmental shock absorbers.
- Providing a habitat for many types of plants and animals that thrive in the type of physical environment created by wetlands. These plants and animals provide an economic and recreational benefit as a result of hunting, fishing and other leisure activities.

Development in or around wetlands are regulated by several State statutes, the most prominent of which is Part 303 Wetland Protection of the Natural Resources and Environmental Protection Act 1994 P.A. 451 (as amended). This Act regulates the development of wetlands if they meet one or more of the following criteria:

- Are contiguous to the Great Lakes or Lake St. Clair, an inland lake, pond, river or stream.
- Are not contiguous to one of the water features noted above, but are greater than five acres in area and are located in counties with populations exceeding 100,000 persons.
- Are less than five acres, not contiguous to any water feature, and are considered necessary to the preservation of the natural resources of the State from pollution, impairment or destruction.

Permits are required by this legislation for the following activities: 1) depositing or placing fill material in a wetland; 2) dredging or removing soil from a wetland; 3) constructing, operating or maintaining any use or development in a wetland; and 4) draining surface water from a wetland. Specific categories of activities are exempt from the requirements of the Wetland Protection Act.

Other State statutes that have the effect of regulating wetland development include the Inland Lakes and Streams Act, the Floodplains Regulatory Act, the Great Lakes Submerged Lands Act, and the Shoreline Protection and Management Act.

Two sources of wetland information are available for the City of New Baltimore. The first source is the National Wetland Inventory Maps, prepared by the U.S. Department of the Interior. High altitude aerial photographs are used to identify wetlands based on vegetation, visible hydrology, and geography. Aerial photographs are also used by the Michigan Department of Natural Resources to map land characterized by the presence of wetlands. Both sources classify wetlands on the basis of vegetation characteristics. Neither source of information can be considered to offer conclusive evidence on the boundaries or extent of identified wetlands. On-site field investigations are necessary to verify this information.

Most of the wetlands occurring in New Baltimore coincide with the location of the previously identified woodlands. Designated wetlands at these locations consist primarily of lowland hardwood forests.

The preservation of the City's natural wetlands is a legitimate concern of local planning. This may be accomplished through cooperation with the DNR regulations that prevent development of these poorly drained geological areas. As part of the City's obligation to notify the State of potential wetland encroachment or violation, the City has enacted the policy of requiring wetland determinations made by the State Department of Environmental Quality. The DEQ provides a list of sources and a list of wetland consultants that can assist in the determination of the wetlands and their boundaries. The State then does a review of each of the wetland determinations or wetland mitigation plans. The State also investigates and causes corrections to be made of areas where wetlands have been impacted. The corrections and/or mitigations are ordered at the owner's expense.

WATERSHEDS

As water flows across the land, it gathers into any number of different sized channels, drains or waterways that are all interlaced together like branches of a tree. The sizes of the channels or drainage ways are also likened to a tree, the further from the base or roots, the smaller the branches or drainage ways. The tips of a tree have very small branches that connect to larger branches, which connect to main limbs that ultimately connect with the trunk and run to the base. The branches make up the overall drainage network. The land area feeding into these branches or drainage network makes up the actual watershed.

Modern land development often alters or impacts the natural flow and configuration of these drainage ways. The most common alteration to a "branch" of the watershed area is to both straighten and deepen the watercourse or to simply remove it in lieu of storm sewers. These alterations can have potentially serious environmental consequences. These include increased flooding, loss of aquatic habitat, reduced water supplies during low flow periods and lowered water quality. Aquatic animal habitat is provided within the rivers and streams, while land animal habitat is typically abundant within the floodplains and vegetation, which is found adjacent to these systems. Environmental preservation occurs by the cleansing of water, which runs off of roadways, parking lots, and even residential yards. The system of drains allows particulates, chemicals and other non-desirable sediments to filter out of the water as the runoff travels through the hierarchy of waterways. The more cleansing of the runoff water, which takes place along the route, the cleaner the water will be as it enters the Great Lakes and supporting waterways.

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CONCLUSION

As this chapter points out, the physical features of the community are nature's contribution to the City's environment. For a variety of reasons, different communities have different endowments. Physical features appear to either enhance or limit development. Until recent times, development limitations were considered an adverse circumstance and engineered solutions were often employed to overcome natural limitations. Experience has proven that cooperation with nature, using imagination and creativity, is preferable to removing and/or paving over natural features. The City should carefully examine each opportunity to complete its design in a manner that enhances the community's livability. Planning can best assist in accomplishing this by encouraging designs that respect and work with nature.