TRANSPORTATION

INTRODUCTION

There is a strong link between land uses and transportation in Genoa Township. In addition to residential growth in the Township, there is significant new development in the surrounding townships. The area's population growth has increased the demand for retail services and has been a catalyst for economic development. A significant portion of the county's commercial and industrial development has been in Genoa Township along Grand River Avenue between the cities of Brighton and Howell. One of the more visible impacts of this growth is the increase in traffic volumes. Traffic volumes have increased even faster than the population growth.

Improvements to the road system have not kept pace with the development. One challenge for the Township is to manage growth and road improvements to provide a safe and efficient system without compromises to the natural features that give the Township its character.

To some degree, there is a conflict between the need for road improvements and other goals of the Township and residents. The same natural features that make Genoa Township a desirable place to live can be viewed as constraints to road improvements. The rolling topography, sharp curves, and limited sight distances contribute to difficult driving conditions, especially during adverse weather. Adjacent land uses and numerous road intersections at curves and areas with poor sight distance cause traffic flow restrictions and potential safety hazards.

The transportation issues to be addressed in this chapter include:

- What road improvements are needed to accommodate the projected volumes?
- How can the Township preserve its visual features and still provide safe and efficient traffic flow?
- What innovative regulatory and financial techniques can help preserve capacity and accelerate improvements?
- How can the Township ensure the impacts of each incremental development are considered and addressed?

EXISTING TRAFFIC CONDITIONS

Genoa Township is linked to the overall region by I-96, with full movement interchanges in both of the adjacent cities of Brighton and Howell; and a partial interchange in the center of the Township for traffic traveling to and from the southeast.

Within the county, Genoa Township is linked to adjacent communities by Grand River Avenue and a number of county primary roads such as Chilson and Brighton Roads.

Genoa Township's local transportation network is segmented by I-96, an east-west limited access highway that passes through the community. The division created by the expressway separates the northern third of the Township containing a majority of the commercial and industrial land from the southern two-thirds containing the majority of residential lands. Only two roads cross the six mile length of I-96 through the Township (Chilson and Dorr Roads).

Because traffic patterns are closely related to land use, it is vital that road development be coordinated with the overall land use plan for the Township.

Among the roads in Genoa Township, I-96 and the western half of Grand River Avenue are under the jurisdiction of the Michigan Department of Transportation. Primary and local roads are maintained by the Livingston County Road Commission with the State Motor Vehicle Highway Fund matched by Township funds.

Grand River Avenue is a five lane roadway that runs between the cities of Howell and Brighton. This roadway is discussed in greater detail in the Grand River Avenue Corridor Subarea Plan, a separate document considered part of this Master Plan.

The county primary roads are generally two lane paved roadways. Many of these roads have limitations due to topography, sharp curves and poor sight distance.

Future traffic patterns within the road network will be closely related to land use. Because of this, it is vitally important that road development be coordinated with the overall plan for the Township.

EXISTING TRAFFIC VOLUMES

Existing traffic volumes for roadways throughout Genoa Township vary, depending upon the location of the segment studied or the date the study was conducted. Specific studies of intersections are possible and encouraged, depending upon development trends in the Township. Recent traffic counts for several arterial, collector and local streets throughout Genoa Township are shown on Map 12.

These traffic counts demonstrate several of the Township's most traversed roadways. It is important to consider existing traffic volumes when considering future development within the Township, plans for roadway upgrading or widening or projection of future capacity.

It is impossible to apply general formula to each of the Township's many arterial and collector streets to establish a threshold of maximum expected roadway capacity. The Township should work with the Michigan Department of Transportation and the Livingston County Road Commission to evaluate existing conditions and establish an action plan for review of specific traffic management issues.

TABLE 13
Comparison of Trip Generation Rates

	Trips In Peak Hour	Trips In Average Weekday
Residential (per unit)		
Single Family	.74	9.55
Apartment	.51	6.47
Condominium	.44	5.86
Mobile Home	.40	4.81
Office (per 1,000 sq. ft. gross floor area)		
General Office Building	3.20	24.60
Medical Office Building	2.69	34.17
Research and Development	1.23	7.70
Commercial (per 1,000 sq. ft. gross floor area)		
Retail, General Merchandise	4.80	NA
Small Retail Strip	8.44	91.65
Moderate Retail Strip	6.56	70.67
Large Retail Strip	3.66	38.65
Quality Sit-down Restaurant	7.66	96.51
Fast Food Restaurant (w/drive through)	36.53	632.12
Service Station (per pump)	16.30	NA
Convenience Store	52.74	737.99
Drive-in Bank	51.23	265.21
Industrial (per 1,000 sq. ft. gross floor area)		
Light Industrial	1.08	6.97
Heavy Industrial	.68	1.50
Industrial Park	.86	6.97
Manufacturing	.75	3.85
Warehousing	.60	4.88
(Note: A trip is a one-way movement, 10 trips = 5 in, 5 out)		

Source: Institute of Transportation Engineers, Trip Generation Manual, 5th Edition.

FUTURE TRAFFIC VOLUMES

Future traffic volumes will be dependant upon the amount, type and intensity of development. The estimated traffic generation by land use type is provided in Table 12. Actual volumes in the future will be dependent on a variety of factors:

- Timing of development.
- Specific types of uses developed and their trip generation characteristics.
- Availability and price of gasoline.
- Characteristics of travel - how long the trips are and how frequently people drive.
- Amount of competing retail development.

The process for evaluating future traffic is as follows:

- Inventory existing traffic conditions.
- Project traffic production and attraction for future land uses at a designated time in the future.
- Estimate where the future traffic will travel.
- Distribute the future traffic on the road system.
- Add estimate for future through traffic.
- Identify needed transportation improvements.

Traffic counts are taken by MDOT and the LCRC on major roads in Genoa Township. The most recent existing traffic volumes are shown on Table 13 at the right.

Table 14

Existing Traffic Volumes

Roadway	2002 Volumes (vpd)
Grand River Ave. west of Chilson Rd.	22,202
Grand River Ave. west of Exit 141.	33,300
Grand River Ave. west of Dorr Rd.	16,475
Grand River Ave. east of Dorr Rd.	18,231
Grand River Ave. east of Euler Rd.	22,567
Latson Rd. north of Grand River	6,706
Chilson Rd. north of I-96	6,919
Brighton Rd. east of Chilson Rd.	14,487
Chilson Rd. north of Brighton Rd.	7,987
Bauer Rd. north of Brighton Rd.	9,712
Dorr Rd. south of Grand River Ave.	5,215
Hughes Rd. north of Grand River Ave.	3,929

Source: MDOT, SEMCOG, LCRC

CAPACITY OF THE ROADWAY SYSTEM

Traffic operations are typically evaluated by the extent to which motorists are delayed in their travel. Future traffic operations are evaluated by comparing projected traffic volumes to the capacity or the road network. Roadway capacity is defined as the number of vehicles that can travel through an intersection or roadway segment during a specified time period. Generally, traffic operations and capacity analysis is evaluated for the peak hours of traffic. Traffic engineers use a gradation scale of A through F. Generally a level of service of D or better is considered acceptable. Level of service E or F represents long, undesirable delays.

Determination of roadway capacity is dependent on a number of factors. Generally, a two lane paved roadway will have a 24 hour capacity of 8,000 to 10,000 vehicle trips for Level of Service A (unrestricted flow). This will be influenced by a number of factors that will define individual roadway capacity. These include:

- Intersection design, turning lanes and traffic control devices;
- Pavement condition and material;
- Roadway width and number of lanes;
- Topography (rolling or flat);

- Design setting (winding rural or unswerving urban);
- Location and frequency of curb cuts;
- Speed limits and other traffic control devices; and
- Sight distance limitations.

Roadway capacity is dependent on:

- ***Intersection design and control***
- ***Pavement condition***
- ***Width***
- ***Topography***
- ***Design***
- ***Curb cuts***
- ***Traffic control***
- ***Sight distance***

ACCIDENT (CRASH) DATA

Auto accidents occur more frequently on the major roads and intersections of the Township. Locations of relatively high accident locations are shown on the Traffic Conditions Map, based upon Livingston Road Commission Intersection Accident Rates between 1992 and 1996.

According to the Livingston County Road Commission, intersection operation and design issues (sight distance limitations, too many driveways, etc.) are a major consideration in determining road safety conditions. The motorist on a roadway approaching an at-grade intersection with another roadway (including driveways) should have an unobstructed view of the entire intersection and sufficient distance to the intersecting roadway to permit control of a vehicle, thus avoiding accidents. At a minimum, the driver should be able to see the headlights of an approaching vehicle.

Unobstructed sight distances should be provided on all approaches at each intersection. After a vehicle has stopped at an intersection, a driver should have sufficient sight distance to make a safe departure through an intersection area. The intersection design should provide adequate sight distance for all of the various vehicular maneuvers required upon departure from a stopped position.

ROADWAY FUNCTIONAL CLASSIFICATION

Function, efficiency and safety of roadway movement in Genoa Township can be furthered through the establishment of a classification of roads and planning and designing these facilities for their specific purpose. A functional system or hierarchy of roads provides for movement of traffic as well as access to specific sites. This hierarchy will range from major arterials such as Grand River Avenue, which primarily serves for cross-town movement, to local subdivision streets which serve to access individual homes.

This system defines the roles of each street, in terms of operational requirements; which is in turn translated into planning, management and physical design features.

Expressway: I-96 serves as the principal route between the residential population of Genoa Township and major activity centers throughout the region.

Major Arterial: The Grand River Avenue Corridor is the major roadway through Genoa Township. This roadway serves a vital function towards connecting the Township with the adjacent cities of Brighton and Howell. Because of the amount of traffic on Grand River Avenue, commercial uses have developed along this corridor.

Arterial: There are a number of roadways which move traffic throughout the Township and provide connections with other adjacent communities including Brighton Rd., Chilson Rd., and Latson Rd. These roadways also provide access from other areas of Genoa Township to Grand River Avenue.

These roadways serve for longer trips within the Genoa Township and adjacent communities. Like Grand River Avenue, the primary function of these roads is to move traffic. Access to these roads must be managed in order to maintain safe and effective movement.

Collector: The collectors serve to assemble traffic from local subdivision streets of residential neighborhoods and deliver it to the arterial. Collectors will also serve to provide access to abutting properties. Many individual subdivisions will contain one or more collector streets which funnel traffic from the local streets and connects with adjacent neighborhoods.

Local Streets: Local streets serve primarily to provide access to property and homes. These roadways are generally short and discontinuous, and generally only provide connection to one or two collector streets.

The functional classification system has a four element hierarchy in Genoa Township:

- **Expressway- I-96**
- **Major Arterial - Grand River Ave.**
- **Arterial**
- **Collector**
- **Local**

CONSTRAINTS

Several natural and fiscal constraints impact the development and efficiency of Genoa Township's public roadway network. In a featureless environment, where no financial hindrances to development is present, the roadway system will most likely resemble a grid system, much like that which has developed in many Midwestern communities. Genoa, however, is not a featureless environment, nor does it benefit from infinite resources. As such, the following considerations must be examined to most effectively plan, prioritize and program the Township's transportation system:

- I-96 limited access freeway;
- Water bodies;
- Wetlands;
- Topography;
- Rights-of-way;
- Financing availability; and
- Cost effectiveness of proposed improvements.

IMPROVEMENTS

There are a number of improvements that will need to be made to the road network in Genoa Township. As the Township continues to develop, traffic levels will increase creating capacity deficiencies. Maintaining the capacity of the transportation network should be done through a comprehensive approach. Intersection improvements and signalization can be made at congested intersections or intersections with relatively high crash rates. Transportation management practices, such as access management, can be used to maintain the efficiency of the transportation network.

Grand River Avenue

Specific recommendations are made for Grand River Avenue, including signalization, road widening and service drives. These are contained in the Grand River Avenue Corridor Plan.

I-96 Interchange

I-96 was constructed in the 1960s. The original Lake Chemung Interchange (Exit 141) was typical of many partial access facilities built in rural areas at the beginning of the Interstate Highway System. Interstate drivers going to a major community, such as Howell, were provided a smooth transition from the Interstate to the old highway which was usually the community's main street. A similar interchange, on the far side of the community allowed travelers, who had completed their business, to continue, via the

Interstate, to their next destination. As the area continues to grow, however, direct access to the freeway from both sides of the interchange becomes important in improving traffic conditions.

A Major Investment Study and Environmental Impact Statement was prepared to evaluate improvements to the original interchange. This study identified the following needs for transportation improvements and proposed major access modifications.

The resulting planned improvements consisted of two separate parts, with one half of the improvements being modifications to the existing Lake Chemung Interchange and the other half consisting of a new interchange at Latson/Nixon Roads. The modifications to the Lake Chemung Interchange, described below, have already been completed. The Latson/Nixon Roads interchange is part of MDOT's long-range transportation plan, although it is not programmed for construction within the time frame of this Master Plan. When a definite time frame is chosen for this new interchange, the Township's Master Plan should be updated to reflect the significant changes this improvement will have on the Township's transportation network.

The MIS/EIS identified the following needs:

- ***Rapid suburbanization.***
- ***Access to westbound I-96.***
- ***Congestion and safety.***
- ***Access south of I-96.***
- ***Long distance north / south access.***
- ***Limited improvement options at the Lake Chemung interchange.***
- ***Livingston County expected to grow significantly by 2020.***

The existing Lake Chemung Interchange (Exit 141) has been reconstructed with a new, longer ramp to the east replacing the existing exit ramp. The new exit ramp intersects Grand River at a signalized "T" intersection and requires drivers to slow and stop in order to execute right or left turns onto Grand River Avenue. The intersection with the existing entrance ramp has been reconfigured to "T" with Grand River Avenue so drivers from the east (westbound on Grand River Avenue) access the entrance ramp from a exclusive left turn lane. Eastbound Grand River drivers entering the ramp are required to slow and execute a right turn. This intersection has been signalized to allow safe left turns.

The planned redesigned interchange consists of a modified diamond interchange with two loop ramps at Latson/Nixon Roads and a revised ramp system at the existing interchange at Lake Chemung. The Latson/Nixon portion of the interchange will be constructed initially with the "T" ramps to the west providing I-96 access to and from the west; and, the two loop ramps designed to provide full local access to 1-96 to and from the east.

Other improvements would be required to Latson Road from the new interchange to Grand River Avenue. A five lane section is generally proposed with a northbound dual left turn at the Grand River/Latson intersection. A dual left turn is also recommended for westbound Grand River Avenue. The remaining two approaches to the Grand River/Latson intersection will be constructed for two left

turn lanes to balance lanes with the required dual left turns. Nixon Road south of the interchange will require two southbound lanes to the railroad tracks to accommodate vehicle queues when trains cross the road. As a practical matter, Nixon would be constructed as a five lane section through the interchange, transitioning to a two lane roadway south of the C.S.X. Railroad tracks. Nixon Road would be improved to a paved, two lane roadway from the railroad south to Chilson Road.

Latson road between I-96 and Grand River Avenue will be shifted to the west to minimize impacts to the school. Grand Oaks Drive will be relocated to the north to accommodate the westbound entrance ramps. Likewise, Beck Road east of 1-96 will also be relocated to accommodate ramps.

Road Widening

In order to preserve the rural character of Genoa Township, any future road widening should balance traffic needs with consideration of natural features. Excessive road widening would lead to increased traffic speeds and a more suburbanized appearance. The narrower roads which wind through the hills of the community add to the natural rural character of Genoa Township. Periodic congestion may be preferred over excessive widening for through traffic. In addition, the Road Commission does not have funding available for road widening.

Because road widening is not planned, improvements will need to be made at intersections to improve efficiency. Much of the improvements to roads will include left turn lanes at intersections.

The Township should also request acceleration and deceleration lanes along major roads for all developments which require site plan review and passing lanes for projects that will generate moderate to high left turn volumes or where there are sight distance limitations.

Road Paving

Much of the expected road paving will be completed in conjunction with the proposed I-96 interchange improvements at Latson/Nixon Road. If the interchange is installed, Nixon Road, south of I-96 would be paved southward to Chilson Road. Crooked Lake Road is also in need of pavement to provide access to the Three Fires Middle School, however funding has not been allocated for this project.

Intersection Improvements

Selected intersection improvements should be made at locations which have experienced higher crash rates than other intersections. Improvements can include turn lanes, sight distance improvements, pavement improvements, signalization or other form of traffic control.

The major roadway improvement planned within the Township is the realignment of Challis Road at Bauer Road. The west approach of Challis Road is to be realigned to the south to line up with the east approach. This will create a regular "T" intersection with the south approach of Bauer road. The north section of Bauer Road will be accessed from the former west leg of Challis Road.

Another intersection under consideration for improvements is the intersection of Brighton Road and Chilson Road. This intersection is a four-way stop that currently meets at an odd angle. Also, there is a right-turn by-pass lane from northbound Chilson road to east bound Brighton Road. The by-pass may be eliminated and the intersection realigned to create more of a regular, 90 degree intersection.

Access Management

Typically the approach to addressing high traffic volume is to widen a road to 3, 4 or 5 lanes. However, widening can disrupt the rural atmosphere of an area. Maintaining safety and smooth traffic flow without costly, premature or even unnecessary widening is a goal of this Plan. One technique to help preserve capacity and promote safety while delaying or avoiding the need for widening is access management.

The lack of controls over the number and placement of driveways increases potential for traffic congestion and crashes. Poor but heavily used access systems conflict with the traffic movement function of the Township's major roads. Because of sight distance limitations in many areas of the Township, there are limited locations for optimum driveway and intersection placement.

Access management involves a series of tools to reduce traffic conflict points, and thus preserve capacity and improve safety. Access management standards regulate the number, spacing and design of access points, and requires the use of shared access systems where practical. The Township has adopted zoning standards for access management.

Number of Access Points: The number of access points should be limited to one where possible. Along major roads, driveways should be properly spaced from one another and from intersections with other major streets. Driveways should be aligned with those across the street or properly offset following the adopted zoning standards.

Alternative Access: Along major arterials, such as Grand River Avenue, alternative access should be encouraged, such as shared driveways, rear service drives or frontage roads. Commercial developments and parking lots should be connected through front or rear service drives. Frontage drives, rear service drives, shared driveways, and connected parking lots should be used to minimize the number of driveways, while preserving the property owner's right to reasonable access. Certain turning movements should be limited, especially left turns, where safety hazards may be created or traffic flow may be impeded.

High Traffic Generators: Uses that are high traffic generators should be located on the future land use and zoning maps where they can best be accommodated by the roadway system.

New Road Development

There are currently no plans or funding for the Livingston County Road Commission, or the Michigan Department of Transportation to construct new public roads. As presently planned, all new road construction within the Township will be the result of private development.

There are a number of areas in the Township that have un-subdivided parcels. The Township is currently experiencing a rapid rate of development with numerous new subdivisions, condominiums and lot splits. All newly created lots (and condominium units) are required by the Zoning Ordinance to have public road frontage, or frontage on a private road constructed to the standards of the Township Private Road Ordinance.

Development of future roads, whether public or private, needs to be well planned to ensure the establishment of a safe and efficient vehicular circulation system. Special attention needs to be given to the planning and design of roads for the following purposes:

- Protect the substantial public investment in the street system.

- Promote and coordinate effective and energy efficient development.

- Promote the orderly development of, and ongoing access to, land.
- Protect community character and minimize environmental impacts.
- Promote safe and efficient travel within the Township.
- Prevent duplication of roads.
- Ensure reasonable, though not always direct, access to properties.
- Ensure roads remain passable in all weather conditions and are adequate to provide safe, year-round access by fire, police and other public and emergency vehicles.
- Ensure roads are improved to properly handle development impacts.

Requiring connections of local roads is essential to developing a local road network and maintaining the effectiveness of the Township's major roads. Providing road connections between adjacent subdivisions allows for the movement between adjacent neighborhoods without the need to access major roads. It also provides alternative means for residents within the subdivisions to access the major road network at locations that are most efficient for traveling to their destination, shortening trips and thereby minimizing traffic impacts to the major road network. It is important that connections between local streets be designed to discourage use by through traffic that does not have an origin or destination within the local neighborhood.

Residential Roads

The Township currently has standards in the Township Private Road Ordinance for development of local private roads. These standards are applicable to local streets with a primary function to provide access to abutting residential land, and not serve higher volumes of through traffic. While all roads are required to be designed to meet Livingston County Road Commission standards, the Township has the discretion to allow some modifications on private roads where significant natural features will be preserved.

Township roadway standards provides for a hierarchy of roads based upon function. The following are used to determine the necessary road widths in residential developments:

- Lower density developments are allowed to have roads with widths as narrow as 22 feet with gravel shoulders and open ditch drainage, particularly in the rural residential areas of the Township.

- Higher density developments are required to have wider roads of 26-28 feet with concrete curb and gutter.

- Wider roads are required where a larger amount of on-street parking is anticipated.

- Collector roads in higher density developments are required to be 30 feet wide to handle larger traffic volumes.

- The roads that serve as a single point of access for a relatively large number of residential units will need to be wider and boulevards should be provided into the development. The divided roadway in effect provides an alternate access for emergency vehicles in the event one side is blocked by an accident or fallen tree.

Implementation

A majority of the road improvements, including new road development and improvements to existing roads, will be privately implemented concurrent with development. These improvements are necessary to serve development. The Township should also work closely with the Michigan Department of Transportation and the Livingston County Road Commission to ensure that proper road improvements are being installed with development. This can include additional turn lanes or the dedication of future right-of-way.

A number of public road improvements will also be implemented by the Michigan Department of Transportation and the Livingston County Road Commission. The Township should continue to work with these agencies to ensure road improvements will meet the needs of Township residents and businesses.

The Township can also take a direct role in implementing public road improvements. Current practices and programs for funding maintenance and improvements to Genoa's roadways allow a range of options, including: dedicated millage, special assessments, bond programs, tax increment financing and Transportation Equity Act for the 21st Century (TEA-21).

OTHER MODES OF TRANSPORTATION

Rail

Genoa Township has two active railroad lines. The T.S.B Rail Road line runs north and south through the west side of the Township. The C.S.X. Rail Road line runs east and west through the center of the Township between the cities of Brighton and Howell. Both of these lines are fairly active. These rail lines are predominantly for freight transit.

Non-motorized

In the past, there has been limited development of pedestrian facilities within the Township. In response to the recommendations of the Grand River Avenue Corridor Plan, the Zoning Ordinance and Subdivision regulations have been amended to require sidewalks in medium to higher density residential developments and commercial frontages of Grand River Avenue.

Modes of transportation:

- ***Vehicular***
- ***Non-motorized***
- ***Rail***
- ***Air***

Commercial and residential development along Grand River Avenue have begun to install sidewalks. Sidewalks in this area are intended to maximize the benefit of providing higher density residential development within walking distance of complimentary commercial uses.

A number of recent developments within the Township have utilized Planned Unit Development (PUD) option for creating clustered housing surrounded by natural open space. Most of these types of development have included trail networks. Efforts should be made to create linkages between these PUD's to create an integrated community network.

Genoa Township currently has a Bike Path Committee that is working with the Livingston County Greenways Initiative to investigate locations for pedestrian facilities within the Township. The next chapter of this Master Plan deals with bike paths and greenways.

Air Ports

There are no airfields in Genoa Township. The nearest public airport to Genoa Township is the Livingston County Airport, northwest of the City of Howell. Detroit Metropolitan Airport is in the City of Romulus, approximately 45 miles southeast of Genoa Township.