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Introduction

Transportation is a critical element for a developing or redeveloping area. Growth may be impeded without a safe, efficient, transportation network. The land use and travel generation relationship is constant because changes in one ultimately affect changes in the other. Transportation and land use must be coordinated to ensure a rational use of land, and a viable transportation network that continues to serve the community and region.

A major key to economic growth for many communities is to have a convenient link to and from outside markets. Such access provides a way for goods to be available, as well as needed goods, services and/or employment that may not be found within the community. The most prevalent modes of transportation within Orleans are highways, streets, and roads, as well as waterways and sidewalks where available. The remainder of this section will give an overview of the transportation system, with the greatest focus given to the existing road network.

Road Mileage

Vehicle traffic within the Town travels along various state, county, town, and private roads and highways. Table 2 shows that Town roads comprise the greatest amount of mileage in Orleans, with about 55.2 miles of roads, consisting of 48.8% of the total road system. State Roads comprise the second most amount of mileage, with about 31.9 miles consisting of 28.2% of the system. County Roads include about 25.0 miles,

consisting of about 22.1 % of roads in the Town.

Table 2. Town of Orleans Road Mileage (NYS DOT 2011)

Ownership/ Maintenance	Mileage	Percent
Town of Orleans	55.2	48.8%
Jefferson County	25.0	22.1%
New York State in Town	31.9	28.2%
Other	0.9	0.8%
Total	113	

While state roads make up the 2nd most total mileage, they have the highest level of traffic or number of vehicles traveling along such roads every day.

Road Types

By and large, roads offer the primary means of transport into and out of a given area or neighborhood. They also provide access to properties of all types. As noted in the brief history section, their design can affect growth, access to commercial markets, and commuting patterns. Roads serve various functions throughout a given community. Arterials, major and minor collectors, and local streets and roads have various capacities and serve in different ways.

Arterial highways are designed to carry major traffic loads through and within a given area or region. Arterials carry the highest volume of traffic and much of the traffic consists of longer trips. In rural areas, they serve as major thoroughfares. For planning purposes, property access to abutting land should be subordinate to the movement of traffic loads. Interstate 81,

NYS Routes 12, 180, and 411 are considered arterial highways in the Town of Orleans.

Major collectors are streets that carry moderate traffic loads, gathering traffic from local streets and then emptying it into arterials. Similarly, **minor collectors** gather traffic from local streets, but also run through residential, commercial or industrial areas providing property access and traffic movement functionality. County Routes 3, 15, 100, and, 181 serve as Collector Roads within the Town of Orleans.

Primarily, **local roads** provide land access and have lower traffic volumes. Local roads typically make up the largest volume of mileage, but carry only a small portion of total vehicle miles of travel. Local streets offer the lowest level of traffic mobility and

thru-traffic is often discouraged. Where on-street parking is permitted, they serve to store vehicles as well.

Road Design Capacities

In order to gauge the adequacy of a road and measure proposals that could affect levels of service, generally recognized capacities can be examined. The numbers of expected vehicles per hour and average daily traffic levels is one technique to weigh potential project impact relative to current traffic levels and road capacity. Example design capacity standards are shown in Table 1 and can be used for general planning purposes. They are flexible, however, and will be affected by other factors which must be taken into account during the design or approval of new streets and/or projects. The

Table 1. General Street Design Capacity

street / road type	Practical Capacity - vehicles per hour	Design Capacity - average daily traffic
2-lane city street, 2-way	600-750	6,500-8,500
2-lane city street, 1-way	900-1,100	10,000-12,000
3-lane city street, 1-way	1,300-1,800	12,000-14,000
4-lane city street, 2-way	1,100-1,600	12,000-18,000

Note: The capacities are based on typical traffic flow characteristics; 10% of total daily flow in peak hour; 60 to 65% of peak hour traffic in predominant direction of flow; 20% turning movement; 10% trucks; 50% green signal time.

Source: International City Management Association, 1979

need for a developer sponsored traffic study should be considered when appropriate.

Orleans Traffic Levels

Automobiles, trucks and other vehicles use the road system in their round-trip daily commute to work, recreation trips, goods purchases at retailers and many other purposes. Also, tourist travel, deliveries, and other traffic travels through the Town on its way to other destinations. Such traffic is measured periodically, as well as estimated by the New York State Department of Transportation and by the Jefferson County Highway Department on their respective roadways. This is performed to measure traffic levels to help ensure the roadways are operating within their design capacity levels or to identify areas of concern. Please refer to the Average Daily Traffic Level Map or Table 3. Average Traffic Levels.

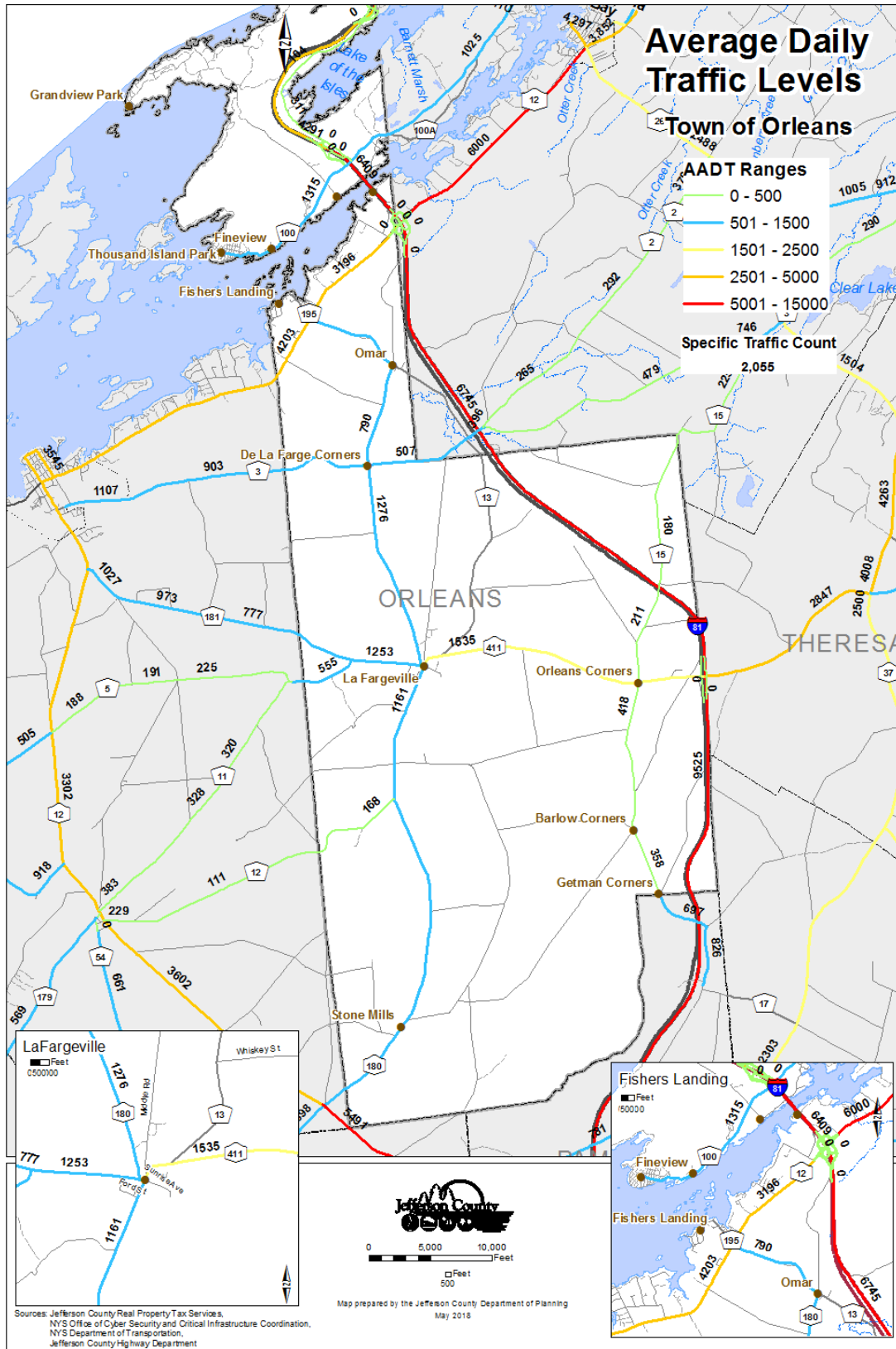
Table 3. Average Traffic Levels – State and County Roads

Annual Average per 24 hour period	
Roadway	Number of Vehicles
NYS Route 12	
segment 1	4,203
segment 2	3,196
NYS Route 180	
segment 1	1,161
segment 2	1,276
Segment 3	790
NYS Route 411	
Segment 1	1,535
Interstate 81	
segment 1	9,525

Table 3. Average Traffic Levels – State and County Roads

Annual Average per 24 hour period	
Roadway	Number of Vehicles
segment 2	6,745
segment 3	6,409
segment 4	4,291
County Route 100	
segment 1	1,315
segment 2	1,025
County Route 181	
segment 1	1,253
segment 2	777
County Route 15	
Segment 1	358
Segment 2	418
Segment 3	211
Segment 4	180
County Route 3	
Segment 1	903
Segment 2	507

Sources: County Roads - Jefferson County Highway, State Roads - NYS Dept. of Transportation, Region 7 (2015)



NYS Route 12 Corridor

NYS Route 12 serves as the arterial highway for the northern and central portions of Jefferson County. It stretches from the City of Watertown through the Towns of Pamela, Brownville, Clayton, Orleans and Alexandria. It connects Orleans in Fisher’s Landing to Clayton to the west and I-81 and Alexandria Bay to the east, along with Morristown and Ogdensburg further to the east in St. Lawrence County. NYS Route 12’s connection to Interstate 81 provides residents with a direct link to Canada to the north and to Watertown and Syracuse to the south.

NYS Route 12 Corridor Access

In some areas near the Interstate 81 interchange, some curb cuts are wide openings onto NYS Rt. 12, larger than recommended by NYS DOT standards. The NYS Route 12 corridor between Alexandria Bay and Interstate 81 can often be heavily congested in the summer months. As mentioned previously, the NYS DOT restricts curb cut width and the distance between driveways on all NYS controlled roads. A preferred method of accessing numerous businesses on a NYS controlled road is to have one access road or shared driveway accessing many businesses, or at least requiring connected parking areas to alleviate traffic pressure from neighboring uses. This limits the number of conflict points along the highway, allowing traffic to flow more efficiently.

Expected Trip Generation

With most proposed projects, their expected trips can be weighed or compared to existing traffic levels. For example, roads or intersections are typically designed to handle a given number of vehicles. If a proposed project is reviewed that could generate a greater number of vehicles than the design capacity of the road or intersection, then improvements to the roadway in terms of the number of lanes, turning lanes, or intersection improvements could be considered to handle a significant increase in vehicles per hour.

For reference purposes, a sample of expected trips generated by a handful of

Table 4. Sample Trip-Generation Rates by Land Use

Type of Development	Average Weekday Trip-Ends
Single-family, detached	9-10 per dwelling unit
Townhouse / Apartment	6 per dwelling unit
Fast food restaurant with drive-thru	500 per 1,000 sq. ft. of floor area
Supermarket	111 per 1,000 sq. ft. of floor area
Shopping Center	50 per 1,000 sq. ft. of floor area
Office Building	3 per employee
Light industrial	3 per employee

Source: Institute of Transportation Engineers "Trip Generation." 6th Ed, 1997
 common land uses can be found in Table 4.

Thousand Island Bridge

The Thousand Islands Bridge system consists of three bridges over the St. Lawrence River at Collins Landing near Alexandria Bay, New York to Ivy Lea near Gananoque, Ontario. They provide a direct connection between US Interstate Rt. 81 and Canada’s Highway 401.

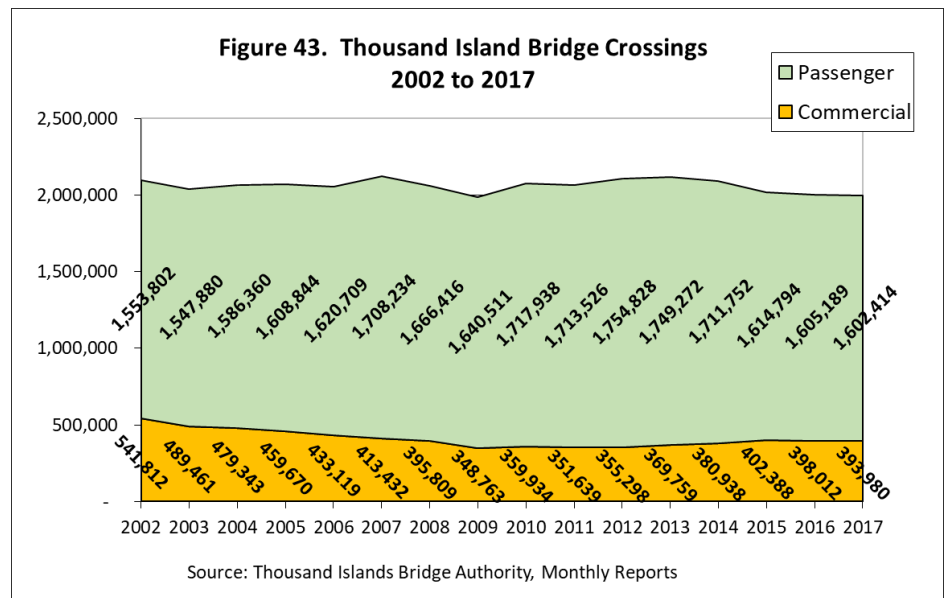
The crossing over the American channel of the St. Lawrence River, from the mainland to Wellesley Island, consists of a suspension bridge of 800 ft. (main span), with an under clearance of 150 ft. above the river. The American span from abutment to abutment is 4,500 ft.

In between the two large spans is the International Rift Bridge. While it is the smallest bridge of the three, it crosses the actual boundary between the two countries.

The Canadian crossing includes the 600 ft. continuous Warren Truss span connecting Hill Island to Constance Island, a steel arch of 348 ft. spans from Constance Island to Georgina Island and a suspension bridge of 750 ft. from Georgina Island to the Canadian mainland (Ontario) with the suspension span providing 120 ft. of under clearance above the river. The Canadian span from abutment to abutment is 3,330 ft.

TI Bridge Crossings

Bridge crossing numbers indicate the amount of vehicular traffic and commercial trucks that cross the American span of the bridge, as the source of data is the TI Bridge Authority.



From 2002 to 2017, passenger vehicles increased by 3.1%, while experiencing a series of increases and some decreases during the time period. Commercial trucks, however, experienced a 27.3% decrease over the past fifteen years. Although since 2009, commercial traffic has rebounded with an increase of 15.4% from 2009 to 2015.

Commuting Patterns

Commuting Patterns such as Place of Work, Travel Time to Work, and Time Leaving to go

to Work, for Town and LaFargeville residents can be found in Chapter 2.

Arterial/Major Collector Road Protection

New York State invests significant amounts of resources in its arterial road system. Such highways are vital links between communities and serve as essential corridors for commerce, trade, tourism, and recreational travel. However, in a familiar pattern, residential and commercial growth has occurred along many arterials serving the state's communities. This growth over time can create a need for costly highway improvements including additional travel lanes, bypasses, turning lanes, and intersection signalization. Unfortunately, few communities have enacted controls to address the rate and quality of this arterial roadside development, and taxpayers often bear the costs associated with strip development, traffic congestion, safety problems, and the resulting expensive remedial highway improvements.

Strip development occurs so slowly that it is seldom viewed as a crisis until traffic problems become severe. Development therefore is often allowed to continue in a haphazard manner until significant problems occur.

Arterials that carry large volumes of traffic are attractive locations for strip development. Residential and commercial developments locate along the arterial over time until strip development becomes the predominant land use pattern. The ability of

the arterial to move traffic then becomes seriously compromised, resulting in increased traffic congestion and reduced safety.

Inefficient zoning, access points and street layout force businesses to connect access driveways to the arterial. If shared drives and/or side streets had been developed in concert, driveway access could have been rerouted to these streets. While NYS DOT has the right to restrict access on state roads to a point, they must allow access to properties adjacent to their roads, unless it is along a limited access roadway. Every parcel of land is required by law to have reasonable access to it, and it is not always possible to limit driveways to a set spacing throughout the length of an arterial. In many cases, municipalities zone and allow subdivision of properties in a section of land in such a way that many small parcels must be granted access onto the arterial or else they would have no access at all. Additionally, such growth occurs not only on state roads, but also along county roads.

Local governments have the potential to better control land development along arterials and collectors. If it is a state controlled roadway, the local municipalities and the state jointly control the roadway and access to it. Reasonable access does not mean that access has to be provided directly off a main street or highway. In some cases, reasonable access may be provided off side streets or roads. Local governments therefore can prepare and adopt comprehensive planning and zoning ordinances to guide the overall development patterns.

Pedestrian Considerations

Prior to the advent of the automobile, many communities flourished as pedestrian oriented, compact hamlets or villages. LaFargeville and Thousand Island Park reflect this pattern with their historic downtown structures and nearby walkable neighborhoods with churches and other destinations in close proximity. This development pattern precluded the need for many parking spaces at business locations.

More recently, automobile dependent development that is more spread out with larger parking areas, has resulted in building placement further from the street and often separates residential areas. This pattern reinforces automobile dependency, which can increase traffic levels and limits pedestrian options. Options for more mixed-use, more compact development should be examined to reverse this trend. Similarly, parking should be located to the side yard and/or rear with bicycle and pedestrian pathways included to provide better pedestrian access. Maintaining suitable pedestrian scale and convenient access benefits storefronts by increasing the variety and likelihood of customer traffic from drop-in and destination shoppers. Ongoing sidewalk maintenance from residential areas as well as along primary streets can affect the level of pedestrian access as well. Communities with sidewalks within downtown and neighborhoods nearby that connect to downtown should try to maintain them to enhance business access.

Great Lakes Seaway Trail National/ State Scenic Byway

NYS Route 12 comprises the Great Lakes Seaway Trail Scenic Byway within the Town of Orleans. The entire Great Lakes Seaway Trail is a 518-mile multi-state Scenic Byway that coincides with the scenic shoreline of Lake Ontario and the St. Lawrence River within Jefferson County (NYS Routes 3, 180, and portions of NYS Route 12E, and 12). It encompasses the military history, agricultural ingenuity, shipping heritage, and recreational resourcefulness that shape the distinct setting. It also serves as the main road through the northern portion of the Town providing access to Alexandria Bay and many other State Parks on the St. Lawrence River. The Great Lakes Seaway Trail is a preferred route for large numbers of bicyclists during warm weather.

St. Lawrence Seaway

The St. Lawrence River is traversed by a variety of boats and ships including pleasure craft of all sizes as well as freighters transiting this portion of the St. Lawrence Seaway. The St. Lawrence River and Lake Ontario are part of the 2,342-mile long St. Lawrence Seaway, the only commercial shipping route between the Great Lakes and the Atlantic Ocean. The locks of the Seaway accept vessels 740 feet long, 78 feet wide and up to 166.5 feet in height above the waterline. The Seaway handles 3,000 to 4,000 ship transits and 30,000,000 to 40,000,000 tons of cargo during a typical navigation season. Large freighters are commonly visible along the shorelines of the St. Lawrence River.

Private Boating on the St. Lawrence River

As a major market force and summer attraction to the area, water traffic ranges from canoes, kayaks, fishing boats, ski-boats, speed boats, cabin cruisers, sailboats, yachts, off-shore performance boats, other pleasure craft and tour boats. Recreation uses range from the obvious uses above to island and state park hopping, drifting/swimming as well as tourism related boating between islands, the mainland, and Canada. The prevalence of private boating along the St. Lawrence River is evidenced by the number of boat sales, boat repair, boat storage, and marinas in the Corridor as well as the overall area and Town.

In addition, the St. Lawrence Seaway, previously mentioned, is a major international shipping corridor serving the needs of the import/export needs of the Great Lakes region. Barges, riverboats, lakers and ocean going ships can often be seen using the Seaway throughout the shipping season.

From nearby Clayton and Alexandria Bay, several tour-boat lines offer day tours of the Thousand Islands, combined tours of Boldt Castle, Singer Castle in St. Lawrence County, and sunset and dinner cruises. Area tour boats stop in Alexandria Bay from Kingston, Gananoque, and Prescott Ontario, on their way to and from other destinations.

Airport Service

The Watertown international Airport, located in Dexter, just west of the City of

Watertown, approximately 30 minutes south of the Thousand Islands Bridge, serves the primary aviation needs of Jefferson County with daily commercial jet service to and from Philadelphia, Pennsylvania. Other nearby commercial airports include Syracuse Hancock International Airport (90 miles south), Ogdensburg International Airport (40 miles northeast) and Ottawa International Airport (95 miles north).

Limited Access to Shoreline Uses

Many of the waterfront uses in the shoreline areas use dead end Town or private roads. There are limited or no sidewalk systems in such hamlet areas, and most side roads have narrow or no shoulders which limited suitability for pedestrians or bicyclists. Transportation constraints such as pavement width and lack of sidewalks may restrict some types of development in some areas of the Town. Emergency vehicle access is also limited in the densely developed residential areas on the riverfront.

Town Transportation System Priorities:

- √ Maintain Arterial highway traffic flow by promoting interconnected projects between project parking areas, promote shared access, limit the number of access points along traffic arteries, and follow NYS DOT standards for driveway accesses. These steps should limit adding an excessive number of conflict points, cut-down on congestion, and maintain traffic safety.

- √ Consider an open space or coverage requirement along Arterial highways to limit access point frequency, maintain the area's unique rural character and views of the landscape, and promote interconnected sites.
- √ Increase pedestrian access and connectivity within parking areas and between project parking.
- √ Promote and seek out funding for a non-motorized trail along NYS Route 12 and portions of NYS Route 180 to provide an alternative to automobile use to get to such destinations thereby enhancing the area's appeal as a business corridor, recreation area, and pedestrian destination. A public snowmobile trail currently exists that connects the Villages of Chaumont, Cape Vincent, and Clayton through the Town of Orleans to near Alexandria Bay generally along NYS Route 12. (Please refer to the Recreation Facilities Map - Chapter 4 to see the section within the Town).
- √ Examine the feasibility and potential funding sources for a non-motorized trail along County Road 100 on Wellesley Island or at least connecting Wellesley Island State Park to nearby residential areas (Fineview and Thousand Island Park) or other destinations. Ideally, these connections will enhance safety for pedestrians and bikers especially during summer months, limiting pedestrian vehicular conflicts along County Route 100.
- √ Examine emergency vehicle access feasibility along seasonal roads, recommending solutions to maintain adequate access to such areas to maintain public safety.
- √ Seek out funding options to cover or fill sidewalk gaps in LaFargeville. Enhancing pedestrian safety throughout the Hamlet or at least to provide adequate access to school from residential areas would limit the need for busing children daily where they would otherwise walk or ride bicycles when residing within walking distance.