



**TOWN GRAY**  
**GRAY TOWN COUNCIL WORKSHOP**  
**AGENDA • MARCH 16, 2021**

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**Gray Town Council Workshop**    **Online via Microsoft Teams**    **Link will be posted to [graymaine.org](http://graymaine.org) the day of meeting**

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**6:00 PM**

**OPENING STATEMENT**

*Due to the Governor's latest Executive Order, this Workshop will not take place in person. This workshop will be held online with a link provided on the Town website ([www.graymaine.org](http://www.graymaine.org)) the day of the session.*

**CALL to ORDER**

Roll Call

**WORKSHOP 6:00 PM - 6:55 PM**

- Weight Limits - Short Mayall/Shaker Road
  - Weight Restricted Road Ordinance
  - Letter to Businesses
  - Discussion on next steps
- Diversion Study
  - Discussion on plan to utilize Diversion Study

**ADJOURNMENT**

Motion to Adjourn

*\* The Town of Gray is an equal opportunity employer and complies with all applicable equal access to public accommodations law. If you are planning to attend a Town Council or Town committee or board meeting and need assistance with a physical disability, please contact the Town Manager's office at least 48 hours in advance of the meeting to have the Town assist you. 657-3339. TTY 657-3931.*

## **Sample Ordinance Restricting Vehicle Weight on Posted Ways**

Prepared by the Maine Municipal Association, Legal Services Department

This is presented as a sample only. The municipal officers must adopt an ordinance if they want to restrict vehicle weight on local roads. Also, weight limitation signs posted on local ways must specifically cite as their authority the local ordinance restricting vehicle weight or they are not otherwise enforceable.

### **Section 1. Purpose and Authority**

The purpose of this "~~Ordinance Restricting~~ Vehicle Weight Restrictions on Posted Ways Ordinance" (hereinafter, the "Ordinance") is to prevent damage to town and urban compact ways and bridges in the Town of Gray Damage which may be caused by vehicles of excessive weight, to lessen safety hazards and the risk of injury to the traveling public, to extend the life expectancy of ~~town~~ these ways and bridges, and to reduce the public expense of their maintenance and repair. This Ordinance is adopted pursuant to 30-A M.R.S.A. § 3009 and 29-A M.R.S.A. § § 2395 and 2388.

### **Section 2. Definitions**

Except as otherwise provided herein, the definitions contained in Title 29-A M.R.S.A. shall govern the construction of words contained in this Ordinance. Any words not defined therein shall be given their common and ordinary meaning.

### **Section 3. Restrictions and Notices**

The municipal officers may, either permanently or seasonally, impose such restrictions on the gross registered weight of vehicles as may, in their judgment, be necessary to protect the traveling public and prevent abuse of the highways, and designate the town ways and bridges to which the restrictions shall apply.

Whenever notice has been posted as provided herein, no person may thereafter operate any vehicle with a gross registered weight in excess of the restriction during any

29 applicable time period on any way or bridge so posted unless otherwise exempt as  
30 provided herein.

31 Pursuant to 29-A M.R.S.A. § 2395, the notice shall contain, at a minimum, the following  
32 information: the name of the way or bridge, the gross registered weight limit, the time  
33 period during which the restriction applies ([Is this required of a permanent, year round](#)  
34 [limit?](#)), the date on which the notice was posted, and the signatures of the municipal  
35 officers. The notice shall be conspicuously posted at each end of the restricted portion of  
36 the way or bridge in a location clearly visible from the traveled way.

37 Whenever a restriction expires or is lifted, the notices shall be removed wherever posted.  
38 Whenever a restriction is revised or extended, existing notices shall be removed and  
39 replaced with new notices. No person may remove, obscure or otherwise tamper with any  
40 notice so posted except as provided herein.

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43 **Section 4. Exemptions**

44 • ~~The following vehicles are~~ This ordinance does not apply to any vehicle exempt under  
45 State law: ~~Any vehicle delivering home heating fuel or organic animal bedding and~~  
46 ~~operating in accordance with a permit issued by the~~  
47 MDOT under 29-A M.R.S.A. § 2395 (4) and, when necessary during a period of drought  
48 emergency declared by the governor, any vehicle transporting well-drilling equipment for  
49 the purpose of drilling a replacement well or for improving an existing well on property  
50 where that well is no longer supplying sufficient water for residential or agricultural  
51 purpose and operating in accordance with a permit issued by the MDOT under 29-A  
52 M.R.S.A. § 2395 (4-A).

53 ~~Frozen road exemption: This ordinance shall not apply to any restricted road which is~~  
54 ~~frozen. The highway is considered “frozen” only when the air temperature is 32° F~~  
55 ~~or below and no water is showing in the cracks of the road. Both conditions must~~  
56 ~~be met.~~

57 The following vehicles are also exempt under the specific provisions of this  
58 ordinance:

- 59 1. ~~Any vehicle or combination of vehicles registered for a gross weight of 23,000~~  
60 10,000 pounds or less.
- 61 2. ~~Any vehicle or combination of vehicles registered for a gross weight in excess~~  
62 ~~of 23,000 pounds and traveling without a load other than tools or equipment~~  
63 ~~necessary for the proper operation of the vehicle. This exemption does not~~  
64 ~~apply to special mobile equipment. It shall be a defense to a violation of this~~  
65 ~~sub-section if the combined weight of any vehicle or combination of vehicles~~  
66 ~~registered for a gross weight in excess of 23,000 pounds and its load is in~~  
67 ~~fact less than 23,000 pounds.~~
- 68 3. MaineDOT vehicles or other vehicles authorized by MaineDOT or a  
69 municipality or county to maintain the roads under their authority.
- 70 4. Authorized emergency vehicles as defined in 29-A M.R.S.A. § 2054, school

71 buses, a wrecker towing a disabled vehicle of legal weight from a posted  
72 highway, and vehicles with three axles or fewer under the direction of a  
73 public utility and engaged in utility infrastructure maintenance or repair.

74 5. Any two axle vehicles registered for a gross weight in excess of 23,000  
75 pounds and less than or equal to 34,000 pounds that are carrying any of the  
76 Special Commodities may operate without a permit. Special Commodities  
77 includes any of the following:

- 78 a. Home delivered heating fuel (oil, gas, coal, stove size wood that is  
79 fewer than 36” in length, propane and wood pellets);
- 80 b. Petroleum products;
- 81 c. Groceries;
- 82 d. Bulk milk;
- 83 e. Bulk feed;
- 84 f. Solid waste;
- 85 g. Organic animal bedding;
- 86 h. Returnable beverage containers;
- 87 i. Sewage from private septic tanks or porta-potties; or
- 88 j. Medical gases.

89  
90 **Section 5. Permits**

91  
92 The owner or operator of any vehicle not otherwise exempt as provided herein may apply in writing to  
93 the municipal officers for a permit to operate on a posted way or bridge notwithstanding the restriction.  
94 The municipal officers may issue a permit only upon all of the following findings:

- 95
- 96 a) no other route is reasonably available to the applicant;
- 97 b) it is a matter of economic necessity and not mere convenience that the applicant use the way  
98 or bridge; and
- 99 c) the applicant has tendered cash, a bond or other suitable security running to the  
100 municipality in an amount sufficient, in their judgment, to repair any damage to

101 the way or bridge which may reasonably result from the applicant's use of same.

102

103 Even if the municipal officers make the foregoing findings, they need not issue a permit if  
104 they determine the applicant's use of the way or bridge could reasonably be expected to  
105 create or aggravate a safety hazard or cause substantial damage to a way or bridge  
106 maintained by the municipality. They may also limit the number of permits issued or  
107 outstanding as may, in their judgment, be necessary to preserve and protect the highways  
108 and bridges.

109 In determining whether to issue a permit, the municipal officers shall consider the  
110 following factors:

- 111 a) the gross registered weight of the vehicle;
- 112 b) the current and anticipated condition of the way or bridge;
- 113 c) the number and frequency of vehicle trips proposed;
- 114 d) the cost and availability of materials and equipment for repairs;
- 115 e) the extent of use by other exempt vehicles; and
- 116 f) such other circumstances as may, in their judgment, be relevant.

117 The municipal officers may issue permits subject to reasonable conditions, including but  
118 not limited to restrictions on the actual load weight and the number or frequency of  
119 vehicle trips, which shall be clearly noted on the permit.

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## 121 **Section 6. Administration and Enforcement**

122 This Ordinance shall be administered and may be enforced by the municipal officers or  
123 their duly authorized designee [such as road commissioner, code enforcement officer or  
124 law enforcement officer].

125

126 **Section 7. Penalties**

127 Any violation of this Ordinance shall be a civil infraction subject to a fine of not less than  
128 \$250.00 nor more than \$1000.00. Each violation shall be deemed a separate offense. In  
129 addition to any fine, the municipality may seek restitution for the cost of repairs to any  
130 damaged way or bridge and reasonable attorney fees and costs. Prosecution shall be in  
131 the name of the municipality and shall be brought in the Maine District Court.

132

133 **Section 8. Amendments**

134 This Ordinance may be amended by the municipal officers at any properly noticed  
135 meeting.

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137 **Section 9. Severability; Effective Date**

138 In the event any portion of this Ordinance is declared invalid by a court of competent

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## Town of Gray Letterhead

Date

Salutation, Business Owner's Name,

The Town Council has begun work on an ordinance that will give the Town the authority to permanently limit the gross weight of vehicles on designated Town or Urban Compact roads and bridges. The purpose of the ordinance is to “...lessen safety hazards and the risk of injury to the traveling public, to extend the life expectancy of these ways and bridges, and to reduce the public expense of their maintenance and repair.”

This effort began over a year ago when the Council received a petition from the residents along the section of Mayall Rd. mentioned below. Since then the Council has held several preliminary discussions and one workshop about creating this ordinance all of which have been open to the public.

The proposed ordinance complies with Maine State law and allows exemptions for (this is not a complete list): School buses, wreckers, utility vehicles, sewage removal trucks, heating fuel trucks, and the non routine delivery of freight or use by construction vehicles to a specific address on a posted way. There will be a permitting process for any qualifying exceptions.

Currently the Council is considering weight restricting two sections of road in town.

1. Mayall Rd. from Depot Rd. to Yarmouth Rd. (Rte. 115).
2. Shaker Rd. from Main St. (Rte. 100/202) to the intersection of Rte. 26 & 26A (the bypass).

The Council has just completed a rough first draft for people to consider and would like to hear more from residents and businesses. Before an ordinance is enacted the Council, following the process outlined in our Town's Charter and will hold:

- One or more workshops and discussions to create a final draft of the ordinance.
- A public hearing and “First Reading” of the ordinance.
- Then at least 7 days later a “Second Reading” of the ordinance.
- The Planning Board will hold a public hearing at one of their regularly scheduled

meetings.

All of these workshops, readings and hearings are open to the public. You may obtain a copy of the proposed ordinance from the Town's website (include link here) or by contacting the Town offices at 657-3339.

Salutation,



## TOWN OF GRAY

24 Main Street  
Gray, Maine 04039

Maine Turnpike Authority Board of Directors  
2360 Congress Street  
Portland, Maine 04102

May 21<sup>st</sup>, 2019

RE: Consideration of recommended toll changes

Dear Mr. Stone and Board Members:

We send this letter to discuss a long-standing issue which continues to negatively impact our Community by increasing financial pressures on our residents through direct transportation costs and property taxes and by reducing quality of life through congestion and road conditions. The issue at hand is toll inequity. The Town of Gray has spent considerable time and resources evaluating our substantial traffic issues and working to identify all possible options for relief. We have held meetings with both MDOT and MTA representatives to bring these concerns to light, to discuss possible solutions and work to create plans to execute changes.

One effort was recently brought to the MTA Board as part of the discussion to subscribe to Streetlight Data and the Town of Gray looks forward to participating in the planned comprehensive Diversion Study. Other efforts involving the MDOT are also under discussion as well.

During our meetings with MTA Representatives, the issue of Toll inequity was discussed, and two questions were asked (1) what toll changes would the Town recommend, if toll changes were made and (2) given the MTA Board has not changed tolls for 7 years, is it time for another review? These points have prompted this letter.

The current Toll structure is well known with several barriers charging the largest tolls in the system (1) York at \$3.00 (2) New Gloucester at \$2.25 and (3) W. Gardiner at \$1.75. In addition, the southbound Gray toll is \$1.50 while all other entry points (south) are only \$1.00. Commercial vehicles going through the NG barrier face a \$10.15 toll (between exiting at Gray vs exiting at Auburn). We recognize the use of EZPass reduces these Cash prices and one of the action items identified was more promotion of EZpass use. However, 2017 MTA data provided in November 2018 demonstrates that 23.5% (Gray), 23% (NG) and 28.7% (W. Gardiner) of tolls collected were cash. While these percentages are lower than they were in 2011, they still represent a large volume of users. Total toll dollars collected show the New Gloucester barrier accounted for 12% of the total money collected, second only to York at 40.1%. West Gardiner accounted for only 5.2% of the total. The Gardiner 1-95 toll (103) accounted for only 5% of the total.

We believe it is fair to state that much effort is put into ensuring out of state tourists pay their fair share for roadway use during the peak summer/fall months. The York toll booth's \$3.00 charge is evidence of this effort; however, Tourist entering the state from the North are not asked to pay their share. Anyone spending any time traveling from the Bangor/Augusta area to the southern part of Maine have seen the mass exodus that occurs at the Gardiner 103 Exit which charges only \$1.00 to enter I295 and travel all the way to Portland.

Staying on the turnpike costs \$1.75 at W. Gardiner and unless the traveler exits the turnpike at Auburn, an additional \$2.25 at the NG booth.

As a community, we are bookended with higher Tolls on both sides of our Town – heading southbound we pay \$1.50 when most other Communities south of us pay only \$1.00. There are only 10 miles between Gray and the West Falmouth interchange which means Gray residents are paying .50 for those additional 10 miles. Heading northbound – we are immediately hit with \$2.25 toll – which could be for a little as 12 miles (Auburn) or 17 miles (Lewiston).

The Northbrook Business and Industrial Park is located directly off the Gray interchange and is the home to Enercon Technologies, a company started in Gray. However, marketing our Town to new companies is challenging when the prime location of our business park is offset immediately by the 2<sup>nd</sup> Highest Tolls on the turnpike (2<sup>nd</sup> only to the starting points on both ends). The toll structure acts as a dam, stopping the flow of economic development from the south part of the state to the north.

It also creates diversion off the turnpike to avoid these tolls. This creates a larger volume of vehicles (commercial vehicles, in particular) traveling through Gray. Being part of the Urban Compact moves a larger portion of the increased road maintenance costs caused by this ‘through’ commercial traffic onto our residents via increased property taxes. These taxes should be offset with economic development which as detailed above, is stymied by the same toll structure. Additionally, bicycle and pedestrian safety issues increases our need for that infrastructure which can be at odds with MTA bridge replacement timelines (50 year lifespan). Recent requests for design changes have been denied. Increased congestion, reduced safety and impacts to air quality all impact the quality of life for our residents.

And finally, the MTA has a large Maintenance Facility located just off the Gray interchange in what is considered prime commercial property. This is mentioned as it is another sacrifice the residents make in the area of economic development.

We formally request that you review the current Toll structure and consider the inequity created by the location and the individual tolls being charged at the barriers. We request that you consider the following changes to alleviate that inequity for the residents of Gray.

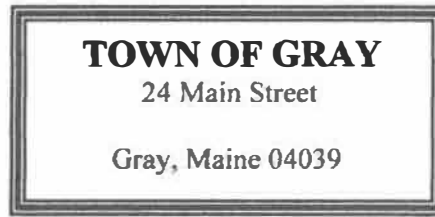
- Reduce the Gray Southbound Toll from \$1.50 to \$1.00
- Reduce the New Gloucester Barrier Toll from \$2.25 to \$1.75
- Increase the Gardiner 103 – I295 Toll from \$1.00 to \$2.00
- Leave the W. Gardiner Barrier Toll at \$1.75

We believe these changes will encourage more people to remain on the Turnpike in lieu of diverting onto I295, will shift some of the toll burden to Northern tourists, will reduce the incentive for vehicles to exit at Auburn to avoid the NG Toll Booth and will encourage more southbound travelers to enter the Turnpike in Gray instead of traveling Route 100 to avoid the .50 surcharge. The MTA Board approved the current toll rates in 2012 and we believe it is time to reconsider the equity of those Tolls.

Respectfully,



Bruce Foshay, Gray Town Council Chair  
on behalf of Gray Town Council



To:  
Senator Cathy Breen  
Representative Susan Austin  
Representative Steve Moriarty

Dec. 4<sup>th</sup>, 2019

**RE: Assistance with Blue Ribbon Transportation Funding Commission submission and MTA Complete Streets Policy**

Dear Legislative Team,

Please see attached letter submitted to the Maine Turnpike Authority Board and Mr. Peter Mills, Executive Director on behalf of the Gray Town Council as follow up to a May 2018 meeting. The letter's focus is on what the Council believes is a detrimental toll inequity which causes substantial toll diversion onto MDOT/local roads. The response received from Mr. Mills is also attached. Although the Council looks forward to the planned comprehensive diversion study with the MTA, we find the response to our concerns disappointing. In particular, the complete lack of response to our concerns regarding the New Gloucester toll booth's location and costs and the clear diversion of southbound vehicular traffic onto I295 at exit 103 in West Gardiner.

It is evident the MTA is unwilling to review the current toll location and cost structure after seven years in effect. Therefore, we are looking for assistance with alternative routes for consideration. Governor Mills has set up a new Blue Ribbon Commission to examine issues with current transportation funding and identify any/all options for future long term funding. We believe there is a direct correlation between the diversion to avoid the current toll structure/costs and MDOT maintenance/construction costs.

Vehicles exiting the turnpike system or driving around it to avoid tolls increase traffic on DOT and local roads, with heavy commercial vehicles having the most severe impact, as DOT/local roads are not constructed to handle such traffic. This creates an unsustainable cycle of maintenance which falls on all users. For those towns in the urban compact, such as Gray, local taxpayers pick up a higher portion of the costs for users driving through, but not residing in, the Town. Drivers using GPS can select 'toll avoidance' in identifying routes, and in our case, that means they are directed to exit/enter the turnpike in Gray and Auburn to avoid the New Gloucester toll plaza.

Commuters who have access to non-toll roads I95 (from Augusta North) or I295 create an inequity with those forced to use the I95 toll section. I95 toll users pay for the usage of the turnpike, but also pay via gas tax, registrations, property taxes, etc. for all other roads being used by everyone. It is no wonder they seek to avoid the tolls where they can.

And finally, the additional thru traffic impacts our residents' quality of life. Not only dealing with the congestion itself (longer travel times for locals, safety issues with speeds/volume, environmental impacts, etc.), but by having to sacrifice local priorities in the area of services and initiatives due to budget constraints caused by the need to fund a larger share of infrastructure costs.

We respectfully ask that this information be shared with the Blue Ribbon Commission for consideration and ask that you provide whatever support or assistance you can to ensure its thorough consideration in the process. The fact that the MTA is an autonomous entity leaves us with limited options and we believe it is time the residents of Gray (and Maine) have more say over the Turnpike, tolls and infrastructure planning.

The MTA's 2018 annual report (Sustainable section) states:

“(3) Sustainable Communities – This highway mobility allows regional traffic to stay on the Turnpike where we want it, and off local roads where we don't, which facilitates the development of complete streets in cities, villages, neighborhoods making them more walkable, bicycle-friendly, and livable.”

We would argue toll equity should be a clear target to obtain this stated goal – allowing regional traffic to stay on the Turnpike. In addition, this section brings us to our next request.

We are seeking a way to provide more leverage for Municipalities to enforce the adopted MTA Complete Street Policy when working with the MTA on projects.

As you know, the Turnpike runs through the middle of Gray creating the need for (5) five MTA bridges in our Town. Bridges have a 50 year lifespan. In discussing options for adding bicycle and/or pedestrian lanes to these bridges, the MTA response is always “does the Town have or does it plan to build sidewalks up to the bridge in the *near* future”. If the response is no, that is the end of the conversation. However, we believe the question should be “is there a reasonable expectation that in the next 50 years, sidewalks will exist?”. Once a bridge is replaced the Town is locked in for the 50 year lifespan. If the MTA is serious about their Complete Street policy, then Municipalities need the ability to require bike/ped infrastructure when bridges are replaced and located in an area of increasing bike/ped activity. Towns like Gray sacrifice a great deal having the Turnpike running through our Town, at the very least we should have a say on the ability for our residents to traverse those bridges safely.

We believe legislative action may be needed to accomplish this goal. If there is an alternative other than engaging with the MTA, we are willing to consider that as well.

As always, we appreciate your continued support in representing the residents of Gray and look forward to hearing back from you on our specific requests.

Cordially,



Sandy Carder

Gray Town Council Chair

[scarder@graymaine.org](mailto:scarder@graymaine.org) (207) 657-4715

On behalf of the Gray Town Council



<b>Date</b> September 15, 2020	<b>To</b> File
<b>Project Correspondence</b>	<b>From</b> HNTB
	<b>Subject</b> Peer Review of the GPCOG New Gloucester Toll Diversion Study

At the request of the Maine Turnpike Authority, HNTB has conducted a peer review of the New Gloucester Toll Diversion Study (Study) prepared by the Greater Portland Council of Governments (GPCOG), submitted August 20, 2020. The purpose of the peer review is to determine if the methodology use and identified level of diversion in the Study is reasonable and accurate based on the data summaries and analysis performed.

**During this review, HNTB determined:**

- The Study overestimates diversion due to an oversimplification of the diversion estimating process and an inaccurate understanding of what constitutes a true toll diversion;
- The Study focuses on cash toll rates only, when in fact the majority of vehicles traveling through the New Gloucester Toll Plaza are paying the E-ZPass rate, which is significantly lower than the cash rate. This over emphasis on the cash rate biases the perception of diversion in the Study; and
- Traffic volumes at the at the New Gloucester toll have increased over the last 20 years while volumes along Route 4/100/202 have remained flat based on comparison of historic and current traffic volumes. If diversion were occurring to the magnitude identified in the Study and as a result of historic toll adjustments, it is reasonable to assume that volumes would also increase along this parallel route.

The following sections summarize HNTB’s peer review of the Study.

Route Choice:

The Study defines diversion as all trips between Gray and Auburn whose travel time would be quicker if they used the Turnpike, but who choose to use local roads instead. This is an inaccurate and over-simplification of potential diversion. The Streetlight data source used to estimate the diversion values does not account for short stops in a trip (up to 5 minutes) which may be attributed to common activities like purchasing gas, dropping off passengers, or any short duration intermediate stop. In general, there are four factors that influence route choice: trip origin and destination, trip purpose, total cost of the trip, and the availability of an alternative route.

- Trip origin and destination has the strongest influence on route choice. People will generally follow the shortest, most direct or most reliable path between their origin and destination.
- Trip purpose is important in determining if a trip is diverting. People will be less likely to divert from the fastest path if the trip purpose is important – such as a work trip or time critical trip. The Study does not take into consideration trip purpose as the data used is not able to determine this.
- The value of time for a trip is an important factor, with values reaching upwards of \$50 per hour for specific trip purposes. The vast majority of trips would likely not divert based on this value of time for avoiding a nominal toll that could add several minutes to a trip.

- While toll costs can influence cash users, numerous MTA studies have established that cost is not a substantial factor in route choice for E-ZPass users due to the reduced rate and digital payment that these customers pay. The majority of users through the New Gloucester toll plaza are E-ZPass users and the number of drivers that have a Maine E-ZPass continues to grow. Additionally, E-ZPass users can qualify for additional discounts of up to 50% based on frequency of usage.
- While Route 100/202/4 provides a reasonable and viable parallel alternate route, it adds additional time to a trip between Gray and Auburn and is not as direct and reliable a route.

Based on our evaluation of the Study data combined with previous diversion estimates, true diversion of vehicles circumventing the toll is on the order of magnitude of 170 total vehicles per day as currently estimated by HNTB for the Maine Turnpike Authority, rather than the 2,400 vehicles per day estimated by the Study.

**Based on these factors, we believe the Study’s estimate of diversion is overstated due to an oversimplification of the definition of diversion and diversion methodology.**

Cash vs. E-ZPass Toll Rates and Diversion Over Time

In the Background Section of the Study, it states that “the Town of Gray is concerned that the steady increase in tolls at the New Gloucester toll plaza since 2005 has created an incentive for passenger and commercial vehicles to exit the Turnpike and travel through Gray Village in order to avoid the toll in New Gloucester.”

- The Study overplays the magnitude of toll costs and solely focuses on Cash tolls. The majority of users traveling the Maine Turnpike through the New Gloucester toll plaza are E-ZPass users. E-ZPass penetration at the New Gloucester Toll is one of the highest on the Turnpike, with approximately 80% of transactions involving an E-ZPass. Maine E-ZPass users receive a discount of up to 60%, significantly reducing the price of the toll from \$2.25 to \$.90 (for Class 1 vehicles). The amount of discounts for commercial vehicles users are even more significant with commercial E-ZPass customers (Class 5 vehicles) paying a \$9.00 cash toll vs. a \$3.60 E-ZPass toll. Numerous MTA studies have established that cost is not a substantial factor in route choice for E-ZPass users. In addition to this, tolls have not changed in nearly 8 years. The following table shows the difference in toll rates and penetration rates for E-ZPass and Cash users through the New Gloucester Toll Plaza.

User	Toll Rates through New Gloucester Toll Plaza (Passenger Car/Tractor Trailer)	Percentage of Users through Toll Plaza
Cash Customer	\$2.25/\$9.00	21.4%
E-ZPass Customer	\$0.90/\$3.60	78.6%

Additionally, Maine E-ZPass users can qualify for additional discounts of up to 50% based on frequency of usage, further reducing the true cost of a trip on the Turnpike.

- The Study does not establish anything in terms of diversion trends but merely states a volume of diversion. Based on the available data from the Maine Turnpike Authority and MaineDOT, diversion is diminishing. As shown in Table 4 on page 9 of the Study, traffic volumes on Route 100/202/4 at the New Gloucester town line have remained stagnant between 2000 and 2019. Meanwhile, traffic at the New Gloucester Toll Plaza over the same time period increased by approximately 18% - or approximately **3,300 vehicles per day**. This suggests that the Maine Turnpike is carrying a larger and growing share of the traffic between Gray and Auburn. If the magnitude of diversion were occurring as indicated by the Study coupled with the historic toll increases, it would be reasonable to see an increase

in traffic volumes along Route 4/100/202. The following table summarizes the increase in traffic volumes along the Maine Turnpike and Route 4/100/202 since 2000.

Location	Year		Percent Growth
	2000	2000	
Route 202/4 at Auburn/New Gloucester TL	8850	8580	-3%
New Gloucester Toll Plaza: I-95 B/t Exit 63 and 75	18,085	21,390	+18%

**Toll increases have not increased diversion rates over time. Diversion of the New Gloucester Toll Plaza is likely decreasing based on historic traffic volumes and the significant toll reduction that E-ZPass user pay vs. cash users.**

Circumventing the Toll:

The Study asserts that approximately 300 vehicles per day circumvent the toll, getting off the Turnpike prior to the New Gloucester Toll and getting back on after the toll. Circumventing the toll plaza is the only true diverted trip estimated in this Study.

The Study makes the surprising claim that roughly half of the drivers that are circumventing the New Gloucester Toll Plaza are using Route 26 or “other routes” rather than Route 100/202/4 (the more direct and faster route). This indicates that there are likely other quick-stop reasons for leaving and re-entering the Turnpike besides simply avoiding the toll.

**True diversion is the circumvention of the toll plaza by getting off and back on the Turnpike. The only diversion route that should be considered is Route 100/202/4, as this is the only direct, reasonably comparable alternate route.**

Is it a Problem?

The Study estimates that diversion is approximately 2400 vehicles per day but does not discuss if this level of diversion is a concern.

- Using the overestimated diversion rates in the Study, 2,400 vehicles per day equates to roughly one vehicle diverting every minute per direction, which is then distributed into multiple routes.
- Under the concept that circumventing the toll and using Route 100/202/4 is true diversion, HNTB has calculated that this equates to less than 1 vehicle every 20 minutes per direction, which is then distributed into multiple routes.

**While the GPCOG Study significantly overestimates the magnitude of that diversion, as long as a reasonable alternate route is available, some diversion is likely to occur.**

Other Considerations:

The following were not evaluated in the Study and would be anticipated in a typical diversion Study:

- Truck diversion rates – these have been a concern from the Town in previous studies and are estimated by HNTB to be approximately 23 heavy vehicles per day northbound and 14 heavy vehicles per day southbound based on a detailed evaluation of truck volumes at the New Gloucester toll plaza;
- How the dates and times were selected for travel time analysis: There is no information regarding how travel times vary (if at all), what dates were selected for analysis, nor how the 3-minute threshold used for “quicker routes” was determined;

- How normal population and economic growth has resulted in an increased traffic volume through Gray Village and along identified routes;
- The effect of the construction of the Gray Bypass and whether it has improved or worsened the diversion issue; and
- The effect of the investment in Gray by the Maine Turnpike that includes the reconfigured interchange, bridge improvements, and new park and ride that provide enhanced access to improved economic opportunity. These investments may be contributing to increased volumes in the area.

**Conclusions:**

Upon review of the Study, there are two key takeaways:

- The methodology used in the Study over-simplifies and over-estimates diversion rates. Likely diversion of vehicles circumventing the toll is on the order of magnitude of approximately 170 total vehicles per day as estimated by HNTB for the Maine Turnpike Authority, rather than the 2400 vehicles per day estimated by the Study.
- Diversion is likely decreasing. Based on the steady growth of the Turnpike in comparison with the relatively stagnant volumes on Route 100/202/4, there is no correlation between the increase in tolls and a sustained increase in diversion. In fact, these volumes indicate that diversion is decreasing over time.

## RESPONSE TO MTA/HNTB COMMENTS

### NEW GLOUCESTER TOLL DIVERSION STUDY

#### Background

GPCOG would like to thank the Maine Turnpike Authority (MTA) and HNTB for the comments on the New Gloucester Toll Diversion Study. The comments identify some interesting considerations, most of which focus on the study's methodology and scope of work. GPCOG's charge and scope was limited, however, and is happy to provide clarification on the key points raised by HNTB. It is also worth noting that GPCOG sent a scope for the New Gloucester Toll Diversion Study to members of the Maine Turnpike Authority (MTA) and HNTB on December 19, 2019. No comments were received from the MTA or HNTB on the scope.

#### Comments and Responses

1. **Comment:** One of HNTB's primary comments states *"the study overestimates diversion due to an oversimplification of the diversion estimating process and an inaccurate understanding of what constitutes a true toll diversion"*.

**Response:** GPCOG assumed that every vehicle that *could* save time by taking the Turnpike, but chooses another route, instead, is diverting the Turnpike and GPCOG's study reflects that definition. HNTB offers that "true diversion is the circumvention of the toll plaza by getting off and back on the Turnpike", which implies that there is no other form of diversion. While GPCOG appreciates the comment, the statement perhaps contradicts the scope of HNTB's 2014 Gray Diversion Study, which did, in fact, include diversion from communities in the "diversion zone", most of which were the same communities that are referred to as the "northern analysis area" in the GPCOG study.

2. **Comment:** HNTB also states that the *"only diversion route that should be considered is Route 100/202/4."*

**Response:** GPCOG's analysis found there are some TAZs in the northern analysis area where Route 202/4/100 is not the fastest route to divert around the tolls. For example, southbound trips that start in Minot, Buckfield, or Hebron will save an average of about 2 minutes by traveling on the Turnpike from Auburn to a point south of Exit 63 compared to traveling on Route 26 to reach the same point. Trips that start in these zones and use Route 202/4/100 to enter the Turnpike at Exit 63 will be an average of 3-5 minutes longer compared to traveling on Route 26. GPCOG did not highlight this finding in the document because the report was focused on toll diversion rates, but GPCOG did use this result to identify trips that are traveling longer to avoid the tolls. GPCOG shared the data with HNTB and this result can be verified by examining the deliverable for Task 1.

3. **Comment:** HNTB asserts that *“the Study focuses on cash toll rates only when in fact the majority of vehicles traveling through the New Gloucester Toll Plaza are paying E-ZPass rate, which is significantly lower than the cash rate.”*

**Response:** The scope of this study did not include developing a model that used toll rates to estimate diversion. The scope of this study was to quantify existing traffic patterns. The traffic patterns developed by Streetlight data were used solely in our calculations. Toll rates have no bearing in the scope of this study.

4. **Comment:** HNTB mentions that *“If diversion were occurring to the magnitude identified in the Study and as a result of historic toll adjustments, it is reasonable to assume that volumes would also increase along this parallel route.”*

**Response:** That would be true if diversion has increased over time, however, the GPCOG study does not capture changes over time, but instead focuses on diversion during 2018. This level of diversion could have happened 20 years ago, but the technology did not exist to quantify it like this study did. The **2014 HNTB study** estimated that 1 of every 10 vehicles entering the Turnpike at the Exit 63 on-ramp are diverting around the New Gloucester tolls. The estimated magnitudes presented in Executive Summary Table 1 or Table 24 in the report show that on an average day:

- an estimated 368 trips from the northern analysis area enter the Turnpike in Gray instead of Auburn,
- an estimated 154 trips to the southern analysis area enter the Turnpike in Gray instead of Auburn,
- an estimated 96 trips exit the Turnpike in Auburn and re-enter in Gray.

These estimated magnitudes total to 617 (not 618, due to rounding), which is 9% of the 2018 traffic volume at the Exit 63 southbound on-ramp, as reported in Table 3 of the report. This result is comparable to the estimate presented in the 2014 HNTB study.

Although GPCOG’s study did not discuss the results of the **2007 HNTB New Gloucester Toll Diversion Study** in the report, the results from the 2007 study are also similar to the GPCOG study results. The 2007 study tracked the license plates of personal vehicles and trucks traveling between Exit 63 in Gray and Exit 75 in Auburn. The study collected data on January 31, 2007 between 7:00 am and 12:00 pm. Data for southbound travelers were collected between 7:00 am and 8:35 am, and data for northbound travelers were collected between 9:30 am and 11:30 am. The study found that about 3.3% of southbound trips and 2.9% of northbound trips may have diverted around the tolls during the period when data were

collected. These percentages are calculated based on the volume of traffic traveling through the New Gloucester toll booth during the data collection period. The results from the 2007 study are not directly comparable to those of the GPCOG study, so GPCOG cannot use our results to calculate a change in diversion rates over time, but GPCOG's results are of a similar order of magnitude.

The results presented in Table 7 of GPCOG's report show that during the peak AM period 2.3% of southbound trips between Exit 75 and Exit 63 exit the Turnpike in Auburn and re-enter the Turnpike in Gray. The results presented in Table 13 of the report show that during the peak AM period 2.8% of northbound trips between Exit 63 and Exit 75 exit the Turnpike in Gray and re-enter in Auburn, and on a typical day about 4.7% of northbound trips between Exit 63 and Exit 75 exit in Gray and re-enter in Auburn. The peak AM values from GPCOG's study are not directly comparable to the 2007 HNTB study because the data collection periods in the 2007 study differ from the peak AM period used in GPCOG's study. The daily average is higher for northbound trips because a higher percentage of vehicles divert during the peak PM period. GPCOG is not able to compare this result because the 2007 study did not collect data during the peak PM period. The results in the 2007 study are presented relative to the volume of traffic traveling through the New Gloucester toll booth during the data collection period, while the percentages in GPCOG's study are based on the total trips between Exit 63 and Exit 75 or between Exit 75 and Exit 63 for the time periods included in GPCOG's study. Although the results from GPCOG's study are not directly comparable to the results presented in the 2007 study, they are similar.

5. **Comment:** HNTB mentions that the Study does not take into consideration trip purpose as the data used is not able to do this.

**Response:** The scope of this study was to quantify existing traffic patterns and was not intended to capture reasons for diversion (or trip purpose). The traffic patterns developed by Streetlight data were used solely in GPCOG's calculations.

6. **Comment:** HNTB identifies a lack of information about which dates were selected for analysis.

**Response:** GPCOG has added a sentence to the Data Sources paragraph, explaining that the results presented in the paper represent an average daily (or peak AM, peak PM, or weekend day) value based on StreetLight data collected between January 1, 2018 - December 31, 2018. GPCOG selected 2018 for this study because this matched the year of the most recent available traffic count data for the Turnpike when the study began.

## RESPONSE TO MAINEDOT COMMENTS

### NEW GLOUCESTER TOLL DIVERSION STUDY

GPCOG would like to thank the MaineDOT for the comments on the New Gloucester Toll Diversion Study.

#### Comments and Responses

1. **Comment:** Calculate and include a percentage error to report.

**Response:** Please see the Percentage Error Technical Appendix that was developed in response to the MaineDOT comments.

2. **Comment:** Include a narrative about typical toll barrier diversion and add at least one contextual Maine example. If 2,000+ people drive longer to avoid paying a toll in Gray, is this more or less than expected on a percentage basis given trip distance/ time and toll cost?

**Response:** GPCOG will add some text describing the diversion estimates that have come from other Maine Turnpike diversion studies.

3. **Comment:** Associate the 2,000+ vehicles per typical day with LOS. 2,000+ is a large number but when broken down into 1) NB/ SB and 2) peak hour/ non-peak hour, what is the effect on congestion? Would significantly reducing this diversion (toll prices do not account for 100% of the diversion) have a noticeable impact on LOS? Would it be tangible for the average driver?

**Response:** A LOS analysis was not part of the scope of this study. GPCOG will include a recommendation in the report for a LOS analysis.

4. **Comment:** Add readily available contextual information from the Gray Bypass EA? Is village congestion in Gray today as bad as it was before the bypass opened?

**Response:** A LOS analysis was not part of the scope of this study. GPCOG will include a recommendation in the report for a LOS analysis.

5. **Comment:** Background. Where did the request for this study originate --- with Gray? New Gloucester?

**Response:** GPCOG will add this information to the report.

6. **Comment:** In no part of the document does it mention that the Maine Turnpike is I-95.

**Response:** GPCOG will reference I-95 in the report.

7. **Comment:** Specifically, what are the “other routes” (not SR 26 or US 202)?

**Response:** GPCOG will add an explanation to the report. Basically, the other routes represent trips taken to get from an origin to a destination without traversing one of the three middle filters set up.

8. **Comment:** Page 33, Limitations of This Study. Is it really a toll diversion trip if a motorist leaves the Turnpike, stops to accomplish a task, and returns to the Turnpike? The task could not be accomplished by staying on the Turnpike.

**Response:** GPCOG will add some text to explain this and mention that the off-the Turnpike and back on-the Turnpike trips would include some of these travelers who are not necessarily diverters.

9. **Comment:** Those who divert have reasons for making that decision. For some, the cost of a toll is not justified for the potential time savings they would receive. Since the definition of a diverted trip is one that could be made faster by using the Turnpike, another way of looking at the diverted trips is the possible shift to the Turnpike if there was no toll between Gray and Auburn.

**Response:** GPCOG will add some text to explain that not all the trips who do not use the Turnpike because they could save time are necessarily trips that would use the Turnpike if there were no tolls.

10. **Comment:** It would be useful to calculate what percentages of SR 26 and US 202 traffic made up of toll diversion traffic.

**Response:** GPCOG will add this information to the report.

DECEMBER 9, 2020

# NEW GLOUCESTER TOLL DIVERSION STUDY

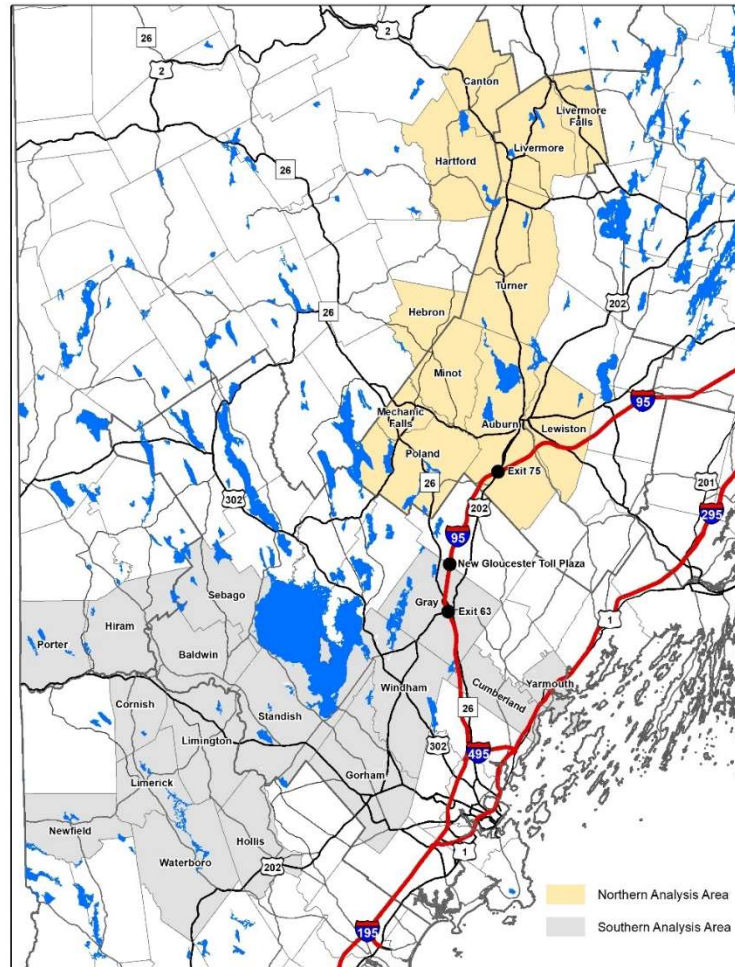
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# EXECUTIVE SUMMARY

## Purpose

The purpose of this study is to understand the levels of traffic that likely divert around the New Gloucester Toll Plaza on the Maine Turnpike (I-95) between exits 63 and 75. The study approximates diverting traffic volume on the Maine Turnpike (I-95) and alternate routes by time of day (e.g. AM peak period). The following figure shows the study area.



**EXECUTIVE SUMMARY FIGURE 1: STUDY AREA**

For the purposes of this study, the diversion around the New Gloucester Toll Plaza will be defined as vehicles that travel additional time to avoid traveling the Maine Turnpike (I-95) between Exit 63 in Gray and Exit 75 in Auburn. We will also look at vehicles that travel equal time on alternate routes to avoid traveling the Maine Turnpike (I-95) between Gray and Auburn.

## Methods

GPCOG staff (“we”) used traffic analysis zones from the regional travel demand model to identify geographic areas that have a travel time savings when taking the Maine Turnpike (I-95)

through Gray and New Gloucester compared to other routes. We then analyzed cell phone data (using StreetLight, a third-party data vendor) to identify the magnitude of trips originating or ending in these zones that divert around the tolls in New Gloucester.

The full report and appendices that accompany this Executive Summary provide additional detail on the study’s methodology and results. The full data used in this study is available upon request from GPCOG.

## Key Findings

- Although toll diversion occurs at low rates relative to the volume of traffic on the Maine Turnpike (I-95), we estimate that more than 2,000 vehicles divert around the tolls on a typical day. This is approximately 10% of the total traffic that travels through the New Gloucester Toll Plaza.
- Northbound and southbound toll diversion occurs throughout the day and the week.
- The following table shows the estimated number of vehicles that divert around the New Gloucester tolls on a typical day. It is important to remember that these are estimates, not actual counts, and are intended only to estimate the magnitude of toll diversion.

**EXECUTIVE SUMMARY TABLE 1: ESTIMATED VEHICLE DIVERSION**

Type of Diversion	Direction of Travel	Estimated Average Daily Diverters	Route 26 Diverters	Route 100 Diverters	Other Diverters
Diversion to Northern Analysis Area	Northbound	529	195	334	NA
Diversion from Northern Analysis Area	Southbound	368	114	254	NA
Short trips from Route 202	Northbound	361	121	239	NA
Short trips to Route 202	Southbound	355	87	268	NA
Diversion from Southern Analysis Area	Northbound	173	0	173	NA
Diversion to Southern Analysis Area	Southbound	154	0	154	NA
Northbound Diversion	Northbound	138	6	92	40
Southbound Diversion	Southbound	93	6	51	35
Short trips to Center Rd	Southbound	22	0	22	NA
Short trips from Center Rd	Northbound	17	0	17	NA
<b>Total Northbound</b>		<b>1,218</b>	<b>322</b>	<b>855</b>	<b>40</b>
<b>Total Southbound</b>		<b>991</b>	<b>207</b>	<b>749</b>	<b>35</b>
<b>Total</b>		<b>2,209</b>	<b>530</b>	<b>1,604</b>	<b>75</b>

**The largest source of diversion is vehicles that access the Maine Turnpike (I-95) in Gray to and from the northern analysis area.**

- We estimate on a typical day 368 southbound trips from the northern analysis area and 529 northbound trips to the northern analysis area divert around the toll.
- About 7% of northbound trips between Exit 63 and the communities in the northern analysis area exit the Maine Turnpike (I-95) in Gray even though they would have a time savings from exiting the Turnpike in Auburn
- On a typical day about 5% of southbound trips between the communities in the northern analysis area and Exit 63 enter the Maine Turnpike (I-95) in Gray even though they would have a time savings from entering the Turnpike in Auburn.
- Trips from or to the northern analysis area are more likely to use Route 100 than Route 26 to divert around the tolls.

**The second and third largest source of diversion is vehicles making short trips between Auburn and Windham.**

- We estimate on a typical day 355 southbound trips from the Auburn area to Route 202/4 and 361 northbound trips from Route 202/4, west of Exit 63, to the Auburn area divert around the toll.
- On a typical day about 54% of southbound trips between the Auburn area and Route 202/4, west of Exit 63, divert around the New Gloucester tolls.
- Short trips are more likely to use Route 100 than Route 26 to divert around the tolls.
- Trips between the Auburn area and Route 202/4 west of Exit 63 make up about 10% of the volume of traffic on Route 202/4, west of Exit 63.

**Each of the other types of toll diversion in this study represent a smaller number of vehicles but add to a significant total.**

- On a typical day about 4% of trips between Exit 63 and Exit 75 exit the Maine Turnpike (I-95) in Gray and re-enter the Turnpike in Auburn.
- An estimated 12% of northbound trips between the communities in the southern analysis area and Exit 75 enter the Maine Turnpike (I-95) in Auburn even though they would have a time savings from entering the Turnpike in Gray.
- An estimated 11% of southbound trips between Exit 75 and the communities in the southern analysis area exit the Maine Turnpike (I-95) in Auburn even though they would have a time savings from exiting the Turnpike in Gray.
- An estimated 2% of trips between Exit 75 and Exit 63 exit the Maine Turnpike (I-95) in Auburn and re-enter the Turnpike in Gray.

**Southbound vehicles diverting around the New Gloucester tolls contribute to approximately 9% of traffic on the Exit 63 southbound on-ramp.**

- The 2014 HNTB study found that 10% of passenger vehicles entering the Maine Turnpike (I-95) at the Exit 63 southbound on-ramp may be diverting around the toll in New Gloucester.
- This study found that about 9% of the traffic on the Exit 63 southbound on-ramp – an estimated 617 vehicles per day – is diverting around the New Gloucester toll, which is consistent with the earlier HNTB study.

**A significant volume of traffic traveling through Gray on Route 26 or Route 100 is not diverting around the toll in New Gloucester.**

- On a typical day 11% of southbound trips from the communities in the northern analysis area to the Maine Turnpike (I-95) south of Exit 63 travel on Route 26 because it is the fastest route.
- 9% of northbound trips from the Maine Turnpike (I-95) south of Exit 63 to the communities in the northern analysis area travel on Route 26 because it is the fastest route.
- 10% of northbound trips from the communities in the southern analysis area to the Maine Turnpike (I-95) north of Exit 75 travel on Route 100 because it is the fastest route.
- 9% of southbound trips from the Maine Turnpike (I-95) north of Exit 75 to the communities in the southern analysis area travel on Route 100 because it is the fastest route.
- Although these trips are technically not diverting around the tolls, they do contribute to the daily volume of traffic passing through Gray.

## **Conclusions**

The findings from this study, which are based on best-available-data, approximate the levels of diversion around the New Gloucester toll both. The results will inform subsequent discussions of potential policy and planning responses to toll diversion and other traffic issues in Gray and surrounding communities.

## **Recommendations**

To better understand the impacts of diversion, further study is recommended. A level of service (LOS) analysis in Gray Village should be conducted to quantify the impact of toll diversion on traffic level of service in the village.

# NEW GLOUCESTER TOLL DIVERSION STUDY

## Purpose

The purpose of this study is to understand the levels of traffic that likely divert around the New Gloucester Toll Plaza on the Maine Turnpike (I-95) between exits 63 and 75. The study approximates traffic volume on the Maine Turnpike (I-95) and alternate routes by time of day (e.g. AM peak period).

For the purposes of this study, the diversion around the New Gloucester Toll Plaza is defined as vehicles that travel additional time to avoid traveling the Maine Turnpike (I-95) between Exit 63 in Gray and Exit 75 in Auburn. GPCOG staff (“we”) also looked at vehicles that travel equal time on alternate routes to avoid traveling the Maine Turnpike (I-95) between Gray and Auburn.

## Data Sources

Cell phone data from a third-party company, StreetLight, was used to evaluate the route choice between origins and destination zones in the study area. StreetLight is location-based service data that provides origin and destination data for cars, medium to heavy weight trucks, and bicycles and pedestrians. The cell phone location data used in this study includes all modes of motorized travel, and may include cars, trucks, and buses. The time periods used in this study are defined in Table 1. Traffic count and public roads data included in this study were obtained from MaineDOT. All other GIS data shown in this study were obtained from the Maine Office of GIS.

**TABLE 1: TIME PERIOD DEFINITIONS**

Time Period	Definition
All Day	A 24-hour period beginning at 12 AM
Peak AM	6am-10am
Peak PM	3pm-7pm
Weekday	Monday through Thursday inclusive
Weekend Day	Saturday through Sunday inclusive

StreetLight data are reported as an index – normalized values based on sample trip counts that are used to calculate ratios or percentages to compare zones or routes. All StreetLight data included in this report will use the StreetLight Index expressed as a percentage of total vehicles traveling through a zone drawn across a roadway or to or from a destination or origin zone. The

results presented in this study represent an average daily (or peak AM, peak PM, or weekend day) value based on StreetLight data collected between January 1, 2018 - December 31, 2018. These percentages will be used in conjunction with recent MaineDOT traffic count data to estimate the number of vehicles that take different routes between origins and destinations.

Trip data from StreetLight were aggregated and analyzed by zones. This study uses a combination of Transportation Analysis Zones (TAZs) from the PACTS travel demand model combined with Census Block Groups as the unit of analysis (Zones) in this study. The PACTS TAZs were used for the portion of the study area that overlaps with the PACTS model area and Census Block Groups were used for the portion of the study area that is outside of the PACTS model area. The Google Maps directions algorithm was used to determine the shortest route between origin and destination Zones.

## **Background**

This study originated with a request from the Town of Gray. Between 2005 and 2012 the toll in New Gloucester has increased by 125%, from \$1.00 to \$2.25 for cash-paying Class 1 vehicles (HNTB, 2014). Class 1 vehicles entering the Maine Turnpike (I-95) at Exit 63 in Gray and exiting at Exit 75 in Auburn pay a total cash toll of \$2.25, or about 19 cents per mile. Class 1 vehicles that travel northbound between Exit 53 in West Falmouth and Exit 63 in Gray pay a cash toll of \$1.00 or about 10 cents per mile. The Town of Gray is concerned that the steady increase in tolls at the New Gloucester toll plaza since 2005 has created an incentive for passenger and commercial vehicles to exit the Maine Turnpike (I-95) and travel through Gray Village in order to avoid the toll in New Gloucester.

### **2014 HNTB Study**

In 2014 HNTB completed the *Gray Diversion Study* for the Maine Turnpike Authority. This study found that about 1 in 10 vehicles entering the Maine Turnpike (I-95) at the Exit 63 Southbound on-ramp may be diverting around the New Gloucester tolls. Some limitations of this study were it only included passenger vehicles, it only looked at vehicles that originated from the diversion zone north of Gray, it did not include vehicles that exit the Maine Turnpike (I-95) in Auburn or Gray and travel through Gray Village to re-enter the Turnpike in Gray or Auburn to avoid the toll in New Gloucester, and it assumed all vehicle trips originated from the address where the passenger vehicle was registered.

### **Traffic Trend Analysis**

The Maine Turnpike is a toll highway that coincides with Interstate 95 between Kittery and Augusta. Overall toll transactions on the Maine Turnpike (I-95) have increased by 35% between 2008 and 2018 (Maine Turnpike Authority, 2020). Passenger vehicle transactions increased by 39% over this time period, while commercial transactions grew by 5%. As a result of the growth in passenger vehicle traffic on the Maine Turnpike (I-95) since the 2008 recession, the share of commercial vehicle traffic has shrunk from 11.2% to 9.1% of total vehicle traffic on the Turnpike.

The following tables present MaineDOT traffic count data for the study area for the years 2000, 2003, 2005, 2010, 2013, and 2018 or 2019. These years were selected to establish a baseline in

2000, to compare changes in traffic volumes before and after the toll increases in 2005, 2009, and 2012, and to include the most recent available data.

In addition to the toll increases in 2005, 2009, and 2012 this time period also includes periods of full employment in 2000, 2005, and 2018-19, as well as periods of recession in 2001-2 and recession followed by sluggish economic recovery between 2008-15. Average traffic volumes in Cumberland County fell by 7% between 2008-13 but grew by 5% between 2013-18 as employment in Southern Maine continued to grow beyond pre-recession levels. The traffic counts in the study area generally follow this regional trend.

**NORTHBOUND TRAFFIC ON MAINE TURNPIKE (I-95)**

Table 2 shows northbound traffic counts on the Maine Turnpike (I-95) in the study area. In 2013 45% of the northbound traffic on the Maine Turnpike (I-95) exited in Gray, while in 2018 41% of the northbound traffic exited in Gray. Similarly, in 2013 44% of the northbound traffic on the Maine Turnpike (I-95) north of Exit 75 in Auburn entered the Turnpike in Auburn, while in 2018 43% of the northbound traffic north of Exit 75 entered the Turnpike in Auburn. Even though traffic volumes on both the northbound Exit 63 off-ramp and northbound Exit 75 on-ramp have increased since 2013, they have not increased as much as the volume of northbound traffic traveling through Gray on the Maine Turnpike (I-95).

**TABLE 2: NORTHBOUND TRAFFIC ON MAINE TURNPIKE (I-95) 2001-2018**

Traffic Count Location	Annual Average Daily Traffic								
	2001	2003	2005	2007	2010	2011	2013	2017	2018
I-95 NB South of Exit 63	13,640	14,000	14,900	14,670	13,970	13,720	12,800	14,740	15,080
Exit 63 NB Off-Ramp	5,410	5,460	5,770	6,100	5,830	5,690	5,740	6,370	6,200
I-95 NB North of Exit 63	9,660	10,080	10,590	10,130	9,640	9,500	8,430	10,050	10,460
Exit 75 NB On-Ramp	2,980	3,320	3,610	3,780	3,580	3,500	3,660	4,160	4,240
I-95 NB North of Exit 75	8,420	8,780	9,650	9,500	8,910	8,770	8,240	9,450	9,840

**SOUTHBOUND TRAFFIC ON MAINE TURNPIKE (I-95)**

Table 3 shows southbound traffic counts on the Maine Turnpike (I-95) in the study area. In 2013 44% of the southbound traffic on the Maine Turnpike (I-95) exited in Auburn compared to 42% in 2018. In 2013 southbound traffic entering the Maine Turnpike (I-95) in Gray accounted for 44% of the southbound traffic on the Turnpike south of Gray compared to 43% in 2018. Although the number of southbound vehicles exiting the Maine Turnpike (I-95) in Auburn or

entering the Turnpike in Gray has increased since 2013, this increase has not kept pace with the increase in southbound traffic traveling through Gray on the Turnpike.

**TABLE 3: SOUTHBOUND TRAFFIC ON MAINE TURNPIKE (I-95) 2001-2018**

Traffic Count Location	Annual Average Daily Traffic								
	2001	2003	2005	2007	2010	2011	2013	2017	2018
I-95 SB North of Exit 75	8,240	8,740	10,030	10,050	9,330	9,140	8,470	9,720	10,250
Exit 75 SB Off-Ramp	3,200	3,540	3,860	4,030	3,830	3,690	3,700	4,210	4,330
I-95 SB North of Exit 63	9,390	10,160	11,050	10,830	10,140	9,890	8,770	10,470	10,930
Exit 63 SB On-Ramp	5,420	5,610	5,930	6,200	5,970	5,900	5,790	6,510	6,840
I-95 SB South of Exit 63	13,320	14,230	15,480	15,430	14,580	14,300	13,100	15,110	15,840

**TRAFFIC ON ROUTE 100 IN NEW GLOUCESTER**

Table 4 shows traffic counts on Route 26 and Route 100, the two main routes for diverting around the New Gloucester tolls. Traffic volumes on Route 100 measured at the Auburn/New Gloucester town line grew by 11% between 2001 and 2005, but then fell by 12% between 2005 and 2011. Counter to the regional trend, traffic volumes on Route 100 increased by 13% between 2011 and 2013, but then fell by 12% between 2013 and 2019. Two projects that may have impacted traffic volumes in this region are the Open Road Tolling conversion at the New Gloucester Toll Plaza in 2013 and the intersection improvement project on Route 100 near the Upper Village in New Gloucester in 2017.

**TABLE 4: TRAFFIC VOLUMES ON STATE ROUTES NORTH OF GRAY 2000-2019**

Traffic Count Location	Annual Average Daily Traffic									
	2000	2001	2003	2005	2007	2010	2011	2013	2017	2019
Route 26 at Poland/New Gloucester TL	NA	6,370	7,340	6,270	6,600	5,930	NA	7,290	8,310	8,640
Route 100 at Auburn/New Gloucester TL	8,850	NA	9,030	9,810	8,960	NA	8,670	9,790	7,790	8,580

**TRAFFIC ON ROUTE 26 IN NEW GLOUCESTER**

Traffic volumes on Route 26 measured at the Poland/New Gloucester town line grew by 15% between 2001 and 2003, but then fell by 15% between 2003 and 2005 followed by an additional 5% decline between 2005 and 2010. Daily traffic volumes on Route 26 increased by 23% between 2010 and 2013 followed by an additional 18.5% increase between 2013 and 2019. Daily traffic volumes at this location on Route 26 are now higher than for any year over the past 20 years. The increase in traffic volumes since 2010 are likely explained by the opening of the Oxford Casino in 2012 and the growth in Maine’s economy since 2015.

**TRAFFIC ON ROUTE 202/4 IN GRAY**

Table 5 shows traffic counts for several locations in or near Gray Village. Average daily traffic volumes on Route 202/4 in Gray west of Exit 63 have declined moderately since 2007 but remain within 1% of the 10-year average of 12,990 vehicles per day. Unfortunately, there was not as much historical traffic data available for this location.

**TRAFFIC ON MAIN STREET IN GRAY VILLAGE**

The latest traffic count on Main Street in Gray Village shows the annual average daily traffic on Main Street in 2011 was 14,820. This count includes vehicles traveling in both directions on Routes 202, 100, and 26. The average volume of daily traffic for both directions of travel in Gray Village in 2011 is nearly equal to the average daily volume of traffic traveling only in the northbound lanes of the Maine Turnpike (I-95) south of the Gray interchange in 2018.

**TABLE 5: TRAFFIC VOLUMES NEAR GRAY CENTER 2007-2019**

Traffic Count Location	Annual Average Daily Traffic				
	2007	2010	2011	2013	2019
Route 202/4 West of Exit 63	13,240	13,050	NA	NA	NA
Route 202/4 EB West of Exit 63	NA	NA	NA	6,540	7,220
Route 202/4 WB West of Exit 63	NA	NA	NA	6,390	7,160
Center Rd Southwest of Gray Village	1,460	1,160	1,260	1,390	1,540
Gray Main Street	NA	NA	14,820	NA	NA

## **Diversion Analysis**

### **Task 1: Establishing Zones of Southbound Travelers**

The objective of Task 1 was to determine which zones in the northern analysis area have a time savings from using the Maine Turnpike (I-95) to travel through New Gloucester and Gray to reach a point south of Exit 63 compared to other routes.

#### **METHODOLOGY**

Census block groups were used as zones for the northern analysis area covering Auburn, Lewiston, Poland, Mechanic Falls, Minot, Hebron, Turner, Hartford, Livermore, Livermore Falls, and Canton. Google Maps was used to determine the travel time from a central point of an origin zone to a destination south of Exit 63. The top two routes recommended by Google were recorded as were the travel times to reach the destination using Route 26, Route 100, or the Maine Turnpike (I-95) to travel through New Gloucester and Gray. This process was repeated by swapping the origin and destination zones, and the top routes and travel times were recorded for each destination zone.

Travel time data collection was repeated for zones where the difference in travel time between the Maine Turnpike (I-95) and an alternative route was less than 3 minutes. Two additional rounds of travel time data collection were repeated for those zones on different days of the week and at different times of day. The average travel time from the three rounds of data collection was used to determine if trips originating from or destined for each northern analysis zone has a time savings by entering or exiting the Maine Turnpike (I-95) at Exit 75 instead of Exit 63.

#### **RESULTS**

The results show that most southbound trips from the northern analysis area have a time savings from taking the Maine Turnpike (I-95). The exception is Mechanic Falls and Poland, where the fastest route is to take Route 26 and enter the Maine Turnpike (I-95) in Gray. Most of the zones in Lewiston east of the downtown have a time savings from entering the Maine Turnpike (I-95) in Lewiston and traveling south. The remainder of the study area has a time savings from entering the Maine Turnpike (I-95) in Auburn and traveling south through New Gloucester and Gray.

The following alternative routes between the northern analysis area and the Maine Turnpike (I-95) south of Gray were identified during Task 1:

- North Raymond Road from Poland to Route 26 in Gray
- Route 196 from some parts of Lewiston, Auburn, and Turner to I-295 in Topsham to I-95 in Falmouth.

The results were similar for trips originating from south of Exit 63 destined for zones in the northern analysis area. Most zones have a time savings from taking the Maine Turnpike (I-95) to Exit 75 in Auburn. Trips to Lewiston east of the downtown have a time savings from exiting the Maine Turnpike (I-95) in Lewiston. Trips to Poland and Mechanic Falls have a time savings from exiting the Maine Turnpike (I-95) in Gray and continuing north on Route 26. One exception is the zone in the northeastern corner of Poland, where it is faster to take the Maine Turnpike (I-95) to Exit 75 in Auburn. The travel time to Hebron from points south of Exit 63 are equal for exiting the Maine Turnpike (I-95) at Exit 63 and continuing north on Route 26 compared to exiting at Exit 75.

The following alternative routes between the Maine Turnpike (I-95) south of Gray and the northern analysis area were identified during Task 1:

- Route 302 in Westbrook to Route 202 in Windham, Route 202 to Route 26A to Route 26 to North Raymond Road to Poland.
- Route 196 from I-295 in Topsham to some parts of Lewiston, Auburn, and Turner.

See Appendix A for more details of the results from Task 1.

## **Task 2: Estimating Southbound Diverting Vehicles**

The objective of Task 2 was to determine the percentage of trips from the northern analysis area that enter or exit the Maine Turnpike (I-95) in Gray to avoid the toll in New Gloucester and the percentage of trips that exit the Turnpike in Auburn and re-enter the Turnpike in Gray to avoid the toll in New Gloucester.

## **METHODOLOGY**

### **TOLL DIVERSION NORTH OF EXIT 75 THROUGH SOUTH OF EXIT 63**

A total of 3 analyses were run in StreetLight to determine the proportion of southbound vehicles that exit the Maine Turnpike (I-95) in Auburn and re-enter in Gray. An Origin-Destination analysis was used to measure the average trips between a zone in the southbound lanes of the Maine Turnpike (I-95) north of the Auburn Interchange (origin zone) and the southbound lanes of the Turnpike south of the Gray Interchange (destination zone) for all vehicles.

An Origin-Destination with Middle Filter analysis was used to assess the route choice for trips between the origin zone and the destination zone. One analysis was used to measure the proportion of trips that either remain on or exit the Maine Turnpike (I-95) in Auburn before reaching the destination zone south of the Gray Interchange. A separate analysis was used to measure the proportion of trips that travel on Route 26 or Route 100 through New Gloucester and Gray to reach the destination zone on the Maine Turnpike (I-95). Each analysis was completed for all vehicles.

One limitation of this methodology is it assumes people exit and re-enter the Maine Turnpike (I-95) to avoid the toll, but there may be other reasons for this behavior, such as stopping at a local business. Conversely, if the toll were removed from the New Gloucester Toll Plaza, not all the trips that appear to be diverting would use the Maine Turnpike (I-95).

**TOLL DIVERSION FROM NORTHERN ANALYSIS AREA**

The shapefile created in Task 1 was used in a total of 4 analyses in StreetLight. An Origin-Destination analysis was used to measure the average trips between zones in the northern analysis area and the destination zone in the southbound lanes of the Maine Turnpike (I-95) south of the Gray Interchange. These analyses were repeated using an origin zone in the northbound lanes of the Maine Turnpike (I-95) south of the Gray Interchange and the destination zones in the northern analysis area.

An Origin-Destination with Middle Filter analysis was used to assess the route choice for trips between zones in the northern analysis area and the destination zone south of the Gray Interchange. Middle filter zones on Route 26, Route 100, and on the Maine Turnpike (I-95) north of the Gray Interchange were used to determine the route choice. These analyses were repeated using an origin zone south of the Gray Interchange and the destination zones in the northern analysis area.

See Appendix B for maps showing the location of origins, destinations, and middle filter zones used in these StreetLight analyses.

**RESULTS**

**TOLL DIVERSION NORTH OF EXIT 75 THROUGH SOUTH OF EXIT 63**

Table 6 shows that on a typical weekday about 44% of the traffic on the Maine Turnpike (I-95) north of Exit 75 continues to a point on the Turnpike south of Exit 63. The proportion of traffic on the Maine Turnpike (I-95) that continues to a point south of Exit 63 reaches a maximum of 48% during the peak AM period and a low of 38% during the peak PM period.

**TABLE 6: SOUTHBOUND TRAFFIC BETWEEN EXIT 75 AND EXIT 63**

Time Period	% of Traffic Volume that is Through Traffic
Weekday All Day	44%
Weekday Peak AM	48%
Weekday Peak PM	38%
Weekend Day All Day	47%

**TABLE 7: ROUTE CHOICE FOR SOUTHBOUND TRIPS BETWEEN EXIT 75 AND EXIT 63**

Time Period	% Continuing Through New Gloucester Tolls	% Exiting and Re-Entering	% Route 26	% Route 100	% Other Route
Weekday All Day	97.9%	2.0%	0.14%	1.12%	0.77%
Weekday Peak AM	97.7%	1.3%	NA	1.3%	NA
Weekday Peak PM	98.0%	1.3%	0.3%	1.0%	NA
Weekend Day All Day	98.2%	1.7%	0.1%	0.9%	0.73%

Table 7 shows that 98% of trips continuing from Exit 75 through south of Exit 63 pass through the New Gloucester tolls. This means about 2% of southbound vehicle trips exit the Maine Turnpike (I-95) in Auburn and re-enter the Turnpike in Gray. Between 0.9% and 1.3% of trips use Route 100 to travel between Exit 75 and Exit 63 while less than 0.3% of trips use Route 26 to travel between Exit 75 and Exit 63.

The column in the table labeled as "Other Route" shows the percentage of total trips between the origin and destinations that do not pass through one of the middle filter zones. See Appendix G for more information about how percent error and percent other route were calculated for this analysis.

**TRIP VOLUME FROM/TO NORTHERN ANALYSIS AREA**

This section will provide a brief summary of the results of the StreetLight analyses for the northern analysis area. The full results are presented in Appendix B.

Table 8 shows that on a typical weekday about 50% of the southbound trips on the Maine Turnpike (I-95) south of Exit 63 originate in the northern analysis area. This proportion is slightly lower during the peak AM period and on weekend days. The results were similar for northbound trips, except northbound trips accounted for 61% of northbound traffic on the Maine Turnpike (I-95) south of Exit 63 during the Peak AM period.

**TABLE 8: PERCENTAGE OF MAINE TURNPIKE (I-95) TRAFFIC FROM/TO NORTHERN ANALYSIS AREA**

Trip Type	Percentage of Turnpike Traffic Originating from or Destined for Northern Analysis Area			
	Time Period			
	Weekday All Day	Weekday Peak AM	Weekday Peak PM	Weekend Day All Day
Southbound Trips	49.6%	44.1%	49.9%	44.6%
Northbound Trips	49.4%	60.9%	44.4%	44.8%

**COMPARISON OF ROUTES FROM THE NORTHERN ANALYSIS AREA**

The results from Task 1 show that Route 26 is the fastest route to reach the Maine Turnpike (I-95) south of Gray for trips that start in parts of the northern analysis area – Mechanic Falls and Poland (see Figure 1 in Appendix A). The StreetLight analysis show that on a typical weekday 16% of trips originating in the northern analysis area use Route 26 or Route 100 to enter the Maine Turnpike (I-95) in Gray. Most of these trips are not diverting around the tolls, they are following the optimal route based on the results from Task 1. Table 9 summarizes the route choice for southbound trips from the northern analysis area to the Maine Turnpike (I-95) south of the Gray interchange.

**TABLE 9: ROUTE CHOICE FOR SOUTHBOUND TRIPS FROM NORTHERN ANALYSIS AREA**

Expected Route	Weekday - All Day - All Vehicles			
	% of Total Relative Trip Activity Between Origins and Destinations			
	Turnpike	Route 26	Route 100	Other Trips
Route 26	2.3%	11.3%	0.1%	
Turnpike	78.3%	1.4%	3.2%	
Other Route				3.3%

The first column in the table shows the expected route choice based on the results from Task 1. The next three columns show the actual route choice based on the StreetLight analysis compared to the expected route choice. Trips that are expected to travel on the Maine Turnpike (I-95) through Gray but instead travel on Route 26 or Route 100 are diverting around the toll, in this case about 5% of the total southbound trips between the northern analysis area and Exit 63 in Gray. Eleven percent of the trips use Route 26 to travel through Gray because this is the optimal route, and 2% of trips that we would expect to use Route 26 to travel through Gray actually travel through the New Gloucester tolls.

The fifth column in the table labeled as "Other Trips" shows the percentage of total trips between the origin and destinations that do not pass through one of the middle filter zones. The Other Trips percentage includes a Percent Error component and a Percent Other Route component. For this analysis the Percent Error component was 2.1% and the Percent Other Route component was 1.2%. See Appendix G for more information about how percent error and percent other route were calculated for this analysis. Other Trips from the northern analysis area are not counted as toll diversion. Further study is needed to identify the alternative routes and if trips on the Other Routes would have a time savings from taking the Maine Turnpike (I-95).

**COMPARISON OF ROUTES TO THE NORTHERN ANALYSIS AREA**

The results from Task 1 show that Route 26 is the fastest route to travel north between the Maine Turnpike (I-95) south of Gray and parts of the northern analysis area – Mechanic Falls and most of Poland (see Figure 2 in Appendix A). The StreetLight analysis show that on a typical weekday 16% of trips destined for the northern analysis area exit the Maine Turnpike (I-95) in Gray and use Route 26 or Route 100 to reach a destination in the northern analysis area. Most of these trips are not diverting around the tolls, they are following the optimal route based on the results from Task 1. Table 10 summarizes the route choice for northbound trips from the Maine Turnpike (I-95) south of the Gray interchange to the northern analysis area on a typical weekday.

**TABLE 10: ROUTE CHOICE FOR NORTHBOUND TRIPS TO NORTHERN ANALYSIS AREA**

Expected Route	Weekday - All Day - All Vehicles			
	% of Total Relative Trip Activity Between Origin and Destinations			
	Turnpike	Route 26	Route 100	Other Trips
Route 26	1.3%	9.1%	0.1%	
Turnpike	77.6%	2.6%	4.5%	
Turnpike or Route 26	0.1%	0.1%	0.0%	
Other Route				4.6%

Table 10 follows the same layout used in Table 8. Trips that divert around the New Gloucester tolls by traveling on Route 26 or Route 100 account for about 7% of the total northbound trips between Exit 63 in Gray and the northern analysis area. Nine percent of the trips use Route 26 to travel through Gray because this is the optimal route, and 1% of trips that we would expect to use Route 26 to travel through Gray continue through the New Gloucester tolls. The fifth column in the table labeled as "Other Trips" shows the percentage of total trips between the origin and destinations that do not pass through one of the middle filter zones. The Other Trips percentage includes a Percent Error component and a Percent Other Route component. For this analysis the Percent Error component was 0.6% and the Percent Other Route component was 4.0%. See Appendix G for more information about how percent error and percent other route were calculated for this analysis. Other Trips to the northern analysis area are not counted as toll diversion. Further study is needed to identify the alternative routes and if trips on the Other Routes would have a time savings from taking the Maine Turnpike (I-95).

The results for other time periods are presented in Appendix B.

**TOLL DIVERSION FROM NORTHERN ANALYSIS AREA**

Table 11 shows the proportion of trips originating in or destined for the zones in the northern analysis area that divert around the New Gloucester tolls. On a typical weekday about 5% of southbound trips from the northern analysis area divert around the New Gloucester tolls. On a typical weekday about 7% of northbound trips on the Maine Turnpike (I-95) destined for the Northern analysis area divert around the New Gloucester tolls. This proportion was as high as 10% during the peak PM period and as low as 3% during the peak AM period.

**TABLE 11: TOLL DIVERSION FROM/TO NORTHERN ANALYSIS AREA**

Trip Type	Toll Diversion as Percent of Average Daily Trips Between Origin and Destination			
	Time Period			
	Weekday All Day	Weekday Peak AM	Weekday Peak PM	Weekend Day All Day
Southbound Trips	4.7%	4.1%	4.1%	4.4%
Northbound Trips	7.1%	3.1%	9.8%	6.7%

### **Task 3: Establishing Zones of Northbound Travelers**

The objective of Task 3 was to determine which zones in the southern analysis area have a time savings from using the Maine Turnpike (I-95) to travel through Gray and New Gloucester to reach a point north of Exit 75 compared to other routes.

#### **METHODOLOGY**

A combination of travel analysis zones from the PACTS travel demand models and Census block groups were used as zones for the southern analysis area covering Gray, Windham, Gorham, Standish, Cumberland, Yarmouth, Sebago, Baldwin, Cornish, Hiram, Porter, Limerick, Limington, Newfield, Lake Arrowhead, and Hollis, ME. Google Maps was used to determine the travel time from a central point of an origin zone to a destination north of Exit 75. The top two routes recommended by Google were recorded as were the travel times to reach the destination using Route 26, Route 100, or the Maine Turnpike (I-95) to travel through Gray and New Gloucester. This process was repeated by swapping the origin and destination zones, and the top routes and travel times were recorded for each destination zone.

Travel time data collection was repeated for zones where the difference in travel time between the Maine Turnpike (I-95) route and an alternative route was less than 3 minutes. Two additional rounds of travel time data collection were repeated for those zones on different days of the week and at different times of day. The average travel time from the three rounds of data collection was used to determine if trips originating from or destined for each southern analysis zone has a time savings by entering or exiting the Maine Turnpike (I-95) at Exit 63 instead of Exit 75.

#### **RESULTS**

The results show that most of the zones in the southern analysis area have a time savings from entering the Maine Turnpike (I-95) in Gray, or points south, to reach points north of the Auburn interchange. The shortest route for the area to the north and west of Little Sebago Lake was to use Route 26 and Route 122 to access the Maine Turnpike (I-95) in Auburn. The shortest route for the zones in North Gray and the northern portion of Yarmouth was to use Route 100 to access the Maine Turnpike (I-95) in Auburn. The shortest route for coastal Yarmouth was to travel on I-295 and Route 196 to Lewiston.

The following alternative routes between the southern analysis area and the Maine Turnpike (I-95) north of Gray were identified during Task 3:

- Snow Hill Road from Route 26 to Bald Hill Road to Route 122 to Route 100 in Auburn.
- Depot Road to Allen Road to Route 136 to Lewiston.
- I-295 from parts of Cumberland and Yarmouth to Route 196 to Lewiston.
- Route 11 from Baldwin or Sebago to Route 122 in Auburn to Exit 75 Interchange.

The following alternative routes between the Maine Turnpike (I-95) north of Gray and the southern analysis area were identified during Task 3:

- Route 196 from Lewiston to I-295 in Topsham to parts of Yarmouth and Cumberland.

See Appendix C for more details of the results from Task 3.

#### **Task 4: Estimating Northbound Diverting Vehicles**

The objective of Task 4 was to determine the percentage of trips from the southern analysis area that enter the Maine Turnpike (I-95) in Auburn to avoid the toll in New Gloucester and the percentage of trips that exit the Turnpike in Gray and re-enter the Turnpike in Auburn to avoid the toll in New Gloucester.

#### **METHODOLOGY**

##### **TOLL DIVERSION SOUTH OF EXIT 63 THROUGH NORTH OF EXIT 75**

A total of 3 analyses were run in StreetLight to determine the proportion of northbound vehicles that exit the Maine Turnpike (I-95) in Gray and re-enter in Auburn. An Origin-Destination analysis was used to measure the average trips between a zone in the northbound lanes of the Maine Turnpike (I-95) south of the Gray interchange (origin zone) and the northbound lanes of the Turnpike north of the Auburn interchange (destination zone) for all vehicles.

An Origin-Destination with Middle Filter analysis was used to assess the route choice for trips between the origin zone and the destination zone. One analysis was used to measure the proportion of trips that either remain on or exit the Maine Turnpike (I-95) in Gray before reaching the destination zone north of the Auburn Interchange. A separate analysis was used to measure the proportion of trips that travel on the Maine Turnpike (I-95), Route 26, or Route 100 through Gray and New Gloucester to reach the destination zone on the Turnpike. Each analysis was completed for all vehicles.

One limitation of this methodology is it assumes people exit and re-enter the Maine Turnpike (I-95) to avoid the toll, but there may be other reasons for this behavior, such as stopping at a local business. Conversely, if the toll were removed from the New Gloucester Toll Plaza, not all the trips that appear to be diverting would use the Maine Turnpike (I-95).

##### **TOLL DIVERSION FROM SOUTHERN ANALYSIS AREA**

The shapefile created in Task 3 was used in a total of 4 analyses in StreetLight. An Origin-Destination analysis was used to measure the average trips between zones in the southern analysis area and the destination zone in the northbound lanes of the Maine Turnpike (I-95) north of the Auburn Interchange for all vehicles. These analyses were repeated using an origin zone in the southbound lanes of the Maine Turnpike (I-95) north of the Auburn Interchange and the destination zones in the southern analysis area.

An Origin-Destination with Middle Filter analysis was used to assess the route choice for trips between zones in the southern analysis area and the destination zone north of the Auburn interchange for all vehicles. Middle filter zones on Route 26, Route 100, and on the Maine Turnpike (I-95) north of the Gray Interchange were used to determine the route choice. These analyses were repeated using an origin zone north of the Auburn Interchange and the destination zones in the southern analysis area.

See Appendix D for maps showing the location of origins, destinations, and middle filter zones used in these StreetLight analyses.

**RESULTS**

**TOLL DIVERSION SOUTH OF EXIT 63 THROUGH NORTH OF EXIT 75**

Table 12 shows that on a typical weekday about 25% of the traffic on the Maine Turnpike (I-95) south of Exit 63 continues to a point on the Turnpike north of Exit 75. The proportion of traffic on the Maine Turnpike (I-95) that continues to a point north of Exit 75 reaches a maximum of 31% during the peak AM period and a low of 24% during the peak PM or weekend day periods.

**TABLE 12: NORTHBOUND VEHICLE TRAFFIC BETWEEN EXIT 63 AND EXIT 75**

Time Period	% of Traffic Volume that is Through Traffic
Weekday All Day	25%
Weekday Peak AM	31%
Weekday Peak PM	24%
Weekend Day All Day	24%

Table 13 shows that 93-97% of trips continuing from south of Exit 63 through north of Exit 75 pass through the New Gloucester tolls. This means that, depending on the time of day, between 3-7% of northbound vehicle trips exit the Maine Turnpike (I-95) in Gray and re-enter the Turnpike in Auburn. This proportion is highest during the Peak PM period. Between 0.8% and 4% of trips use Route 100 to travel between Exit 63 and Exit 75 while less than 0.22% of trips use Route 26 to travel between Exit 63 and Exit 75.

The column in the table labeled as "Other Route" shows the percentage of total trips between the origin and destinations that do not pass through one of the middle filter zones. See Appendix G for more information about how percent error and percent other route were calculated for this analysis.

**TABLE 13: ROUTE CHOICE FOR NORTHBOUND TRIPS BETWEEN EXIT 63 AND EXIT 75**

Time Period	% Continuing Through New Gloucester Tolls	% Exiting and Re-Entering	% Route 26	% Route 100	% Other Route
Weekday All Day	95.3%	3.7%	0.2%	2.4%	1.07%
Weekday Peak AM	97.2%	2.0%	NA	0.8%	1.21%
Weekday Peak PM	93.0%	4.4%	0.22%	4.14%	0%
Weekend Day All Day	96.5%	3.2%	0.10%	1.83%	1.23%

**TRIP VOLUME FROM/TO SOUTHERN ANALYSIS AREA**

This section will provide a brief summary of the results of the StreetLight analyses for the southern analysis area. The full results are presented in Appendix D.

**TABLE 14: PERCENTAGE OF MAINE TURNPIKE (I-95) TRAFFIC FROM/TO SOUTHERN ANALYSIS AREA**

Trip Type	Percentage of Turnpike Traffic Originating from or Destined for Southern Analysis Area			
	Time Period			
	Weekday All Day	Weekday Peak AM	Weekday Peak PM	Weekend Day All Day
Northbound Trips	14.6%	17.6%	10.4%	18.3%
Southbound Trips	13.5%	10.6%	16.7%	18.5%

Table 14 shows that on a typical weekday about 15% of the northbound trips on the Maine Turnpike (I-95) north of Exit 75 originate in the southern analysis area. This proportion is slightly higher during the peak AM period and on weekend days. The results were similar for southbound trips, except southbound trips accounted for 17% of southbound traffic on the Maine Turnpike (I-95) north of Exit 75 during the Peak PM period.

**COMPARISON OF ROUTES FROM THE SOUTHERN ANALYSIS AREA**

The results from Task 3 show that Route 26 is the fastest route for trips that start in Gray west of Little Sebago Lake or north of North Raymond Road and west of Route 26 to reach the Maine Turnpike (I-95) north of Auburn (see Figure 5 in Appendix C). Figure 5 also shows that Route 100 is the fastest route to reach the Maine Turnpike (I-95) in Auburn for trips that start in North Gray or the northern half of Yarmouth. The StreetLight analysis show that on a typical weekday 23% of trips originating in the southern analysis area use Route 26 or Route 100 to access the Maine Turnpike (I-95) in Auburn. Some of these trips are not diverting around the tolls, they are following the optimal route based on the results from Task 3. Table 15 summarizes the route choice for northbound trips from the southern analysis area to the Maine Turnpike (I-95) north of the Auburn interchange.

**TABLE 15: ROUTE CHOICE FOR NORTHBOUND TRIPS FROM SOUTHERN ANALYSIS AREA**

Expected Route	Weekday - All Day - All Vehicles			
	% of Total Relative Trip Activity Between Origins and Destination			
Expected Route	Turnpike	Route 26	Route 100	Other Trips
Route 26	0.5%	0.2%	1.0%	
Route 100	1.2%	0.0%	9.9%	
Route 196	0.0%	0.0%	0.2%	
Turnpike	67.1%	0.0%	12.1%	
Other Route				7.7%

The first column in the table shows the expected route choice based on the results from Task 3. The next three columns show the actual route choice based on the StreetLight analysis compared to the expected route choice. Trips that are expected to travel on the Maine Turnpike (I-95) through Gray but instead travel on Route 26 or Route 100 are diverting around the toll, in this case about 12% of the total northbound trips between the southern analysis area and Exit 75 in Auburn. Ten percent of the trips use Route 100 to travel through Gray because this is the optimal route, and nearly 2% of trips that we would expect to use Route 26 or Route 100 to travel through Gray actually travel through the New Gloucester tolls.

The fifth column in the table labeled as "Other Trips" shows the percentage of total trips between the origin and destinations that do not pass through one of the middle filter zones. The Other Trips percentage includes a Percent Error component and a Percent Other Route component. For this analysis the Percent Error component was 4.8% and the Percent Other Route component was 2.9%. See Appendix G for more information about how percent error and percent other route were calculated for this analysis. Other Trips from the southern analysis area are not counted as

toll diversion. Further study is needed to identify the alternative routes and if trips on the Other Routes would have a time savings from taking the Maine Turnpike (I-95).

**COMPARISON OF ROUTES TO THE SOUTHERN ANALYSIS AREA**

The results from Task 3 show that Route 26 is the fastest route from the Maine Turnpike (I-95) in Auburn to reach destinations in Gray west of Little Sebago Lake while Route 100 is the fastest route for trips ending in North Gray or the northern portion of Yarmouth (see Figure 6 in Appendix C). The StreetLight analysis show that on a typical weekday 20% of trips destined for the southern analysis area exit the Maine Turnpike (I-95) in Auburn and use Route 26 or Route 100 to reach a destination in the southern analysis area. Some of these trips are not diverting around the tolls, they are following the optimal route based on the results from Task 3. Table 16 summarizes the route choice for southbound trips from the Maine Turnpike (I-95) north of the Auburn interchange to the southern analysis area on a typical weekday.

**TABLE 16: ROUTE CHOICE FOR SOUTHBOUND TRIPS TO SOUTHERN ANALYSIS AREA**

Expected Route	Weekday - All Day - All Vehicles			
	% of Total Relative Trip Activity Between Origin and Destinations			
Expected Route	Turnpike	Route 26	Route 100	Other Trips
Route 26	0.2%	0.0%	0.0%	
Route 100	3.0%	0.5%	8.8%	
Route 196	0.0%	0.0%	0.0%	
Turnpike	68.6%	0.0%	11.1%	
Other Route				7.9%

Table 16 follows the same layout used in Table 15. Trips that divert around the New Gloucester tolls by traveling on Route 100 account for about 11% of the total southbound trips between Exit 75 in Auburn and the southern analysis area. Nine percent of the trips use Route 100 to travel through Gray because this is the optimal route, and 3% of trips that we would expect to use Route 100 to travel through Gray actually travel through the New Gloucester tolls.

The fifth column in the table labeled as "Other Trips" shows the percentage of total trips between the origin and destinations that do not pass through one of the middle filter zones. The Other Trips percentage includes a Percent Error component and a Percent Other Route component. For this analysis the Percent Error component was 7.9% and the Percent Other Route component was 0%. See Appendix G for more information about how percent error and percent other route were calculated for this analysis. Other Trips to the southern analysis area are not counted as toll diversion. Further study is needed to identify the alternative routes and if trips on the Other Routes would have a time savings from taking the Maine Turnpike (I-95).

The percentage error for this StreetLight analysis was higher than any other analysis included in the report. The percentage error represents the difference between the total trips between an origin and destination and total trips between the same origin and destination that pass through middle filter zones. A higher percentage error means there are more trips counted in one analysis compared to a second analysis. The results presented in Appendix G show that this StreetLight analysis had a lower percentage error compared to other StreetLight analyses using zones closer to the Exit 63 Interchange. This analysis was re-run using cell phone data from 1/1/19 – 12/31/19, and the percent error for the 2019 data was 6%. These results suggest the percentage error for this analysis design is consistently higher than other analyses included in this report. See Appendix G for more discussion of the percentage error calculations, results, and a discussion of possible sources of error.

The results for other time periods are presented in Appendix D.

**TOLL DIVERSION FROM SOUTHERN ANALYSIS AREA**

Table 17 shows the proportion of trips originating in or destined for the zones in the southern analysis area that divert around the New Gloucester tolls. On a typical weekday about 12% of northbound vehicle trips from the southern analysis area divert around the New Gloucester tolls. This proportion was as high as 24% during the peak PM period and as low as 8% during the peak AM period. On a typical weekday about 11% of southbound vehicle trips on the Maine Turnpike (I-95) destined for the southern analysis area divert around the New Gloucester tolls. This proportion was similar for the peak AM and weekend day periods, but lower during the peak PM period.

**TABLE 17: TOLL DIVERSION FROM/TO SOUTHERN ANALYSIS AREA**

Trip Type	Toll Diversion as Percent of Average Daily Trips Between Origin and Destination			
	Time Period			
	Weekday All Day	Weekday Peak AM	Weekday Peak PM	Weekend Day All Day
Northbound Trips	12.1%	7.5%	23.5%	10.3%
Southbound Trips	11.1%	11.4%	7.8%	11.1%

## **Task 5: Establishing Zones of Travelers for Short Trips**

The objective of Task 5 was to determine which zones in the northern analysis area have a time savings from using the Maine Turnpike (I-95) to travel through New Gloucester and Gray to reach a point on Route 202/4 and Center Road west of Gray compared to other routes.

### **METHODOLOGY**

Census block groups were used as zones for the short trips analysis area covering Auburn, Minot, Turner, Hartford, Livermore, Livermore Falls, and Canton, ME. Google Maps was used to determine the travel time from a central point of an origin zone in the short trips analysis area to a destination on Route 202/4 in Windham. The top two routes recommended by Google were recorded as were the travel times to reach the destination using Route 26, Route 100, or the Maine Turnpike (I-95) to travel through New Gloucester and Gray. This process was then repeated by swapping the origin and destination zones, and the top routes and travel times were recorded for each destination zone.

Travel time data collection was repeated for zones where the difference in travel time between the Maine Turnpike (I-95) route and an alternative route was less than 3 minutes. Two additional rounds of data collection were repeated for these zones on different days of the week and at different times of day. The average travel time from the three rounds of data collection was used to determine if trips originating from or destined for each short trips analysis zone has a time savings from using the Maine Turnpike (I-95) to reach Route 202/4 in Windham compared to other routes.

### **RESULTS**

The results show that all southbound trips from the short trips analysis area have a time savings from taking the Maine Turnpike (I-95). The same is true for trips originating on a point on Route 202/4 and Center Road west of Gray destined for zones in the short trips analysis area. There was one zone in Minot where the travel time for the Maine Turnpike (I-95) was very close to the travel times for alternative routes, but three rounds of data collection showed this zone does have a time savings from taking the Turnpike.

No alternative routes were identified for trips between the short trips analysis area and Route 202 west of Exit 63 during Task 5.

See Appendix E for more details of the results from Task 5.

## **Task 6: Estimating Southbound Diverting Vehicles for Short Trips**

The objective as Task 6 was to determine the percentage of trips from the short trips analysis area that divert around the New Gloucester tolls for trips between the Auburn and Windham area.

## **METHODOLOGY**

The shapefile created in Task 5 was used in a total of 8 analyses in StreetLight. An origin-destination analysis was used to measure the average trips between zones in the short trips analysis area and a destination zone on Route 202/4 west of the Gray Interchange for all vehicles. These analyses were repeated using the zones in the short trips analysis area and a destination on Center Road southwest of Gray Village. Each analysis was repeated by swapping the origin and destination zones to measure the trips between Route 202/4 or Center Road and the short trips analysis area.

An origin-destination with middle filter analysis was used to assess the route choice for trips between zones in the short trips analysis area and a destination zone on Route 202/4 west of the Gray Interchange for all vehicles. Middle filter zones on Route 26, Route 100, and on the Maine Turnpike (I-95) north of the Gray Interchange were used to determine the route choice. These analyses were repeated using the zones in the short trips analysis area and a destination on Center Road southwest of Gray Village. Each analysis was repeated by swapping the origin and destination zones to measure the trips and route choice between Route 202/4 or Center Road and the northern analysis area.

See Appendix F for maps showing the location of origins, destinations, and middle filter zones used in these StreetLight analyses.

## **RESULTS**

### **SHORT TRIPS USING ROUTE 202/4 OR CENTER ROAD**

The following table shows the proportion of traffic that travels between Route 202/4 or Center Road in Gray and the short trips analysis zone. The first column shows the route traveled, which is either a southbound or northbound trip between the short trips analysis area and Route 202/4 or Center Road. The second column shows the percentage of traffic that travels between Route 202/4 or Center Road and the short trips analysis area.

**TABLE 18: PERCENTAGE OF WEEKDAY TRIPS BETWEEN SHORT TRIPS ANALYSIS AREA AND ROUTE 202/4 OR CENTER ROAD**

	Weekday - All Day - All Vehicles
	Trips Between Short Trips Analysis Area and Route 202/4 or Center Road
Route	% of Traffic Volume on Route 202/4 or Center Road that are Short Trips
Southbound Trips to Route 202/4	9%
Northbound Trips from Route 202/4	10%
Southbound Trips to Center Road	4%
Northbound Trips from Center Road	4%

Table 18 shows that on a typical weekday about 10% of the traffic on Route 202/4 west of Exit 63 originates in or is destined for the short trips analysis area. Four percent of the traffic on Center Road southwest of Gray Village originates in or is destined for the short trips analysis area. The results for the other time periods included in the study are shown in Appendix F. The results for the other time periods are similar to the results shown below, except there is a slightly higher percentage of trips between Center Road and the short trips analysis area on weekend days.

**TOLL DIVERSION FOR SHORT TRIPS USING ROUTE 202/4 OR CENTER ROAD**

The following table shows the route choice for traffic that travels between Route 202/4 or Center Road in Gray and the short trips analysis zone. The first column shows the route traveled, which is either a southbound or northbound trip between the short trips analysis area and Route 202/4 or Center Road. The next three columns show the percentage of traffic that travel between Route 202/4 or Center Road and the short trips analysis area on the Maine Turnpike (I-95), Route 26, or Route 202/4. The percentage in the % Other Route column is the percentage of total trips between the origin and destinations that do not pass through one of the middle filter zones.

**TABLE 19: WEEKDAY TRIP DISTRIBUTION BETWEEN THE SHORT TRIPS ANALYSIS AREA AND ROUTE 202 OR CENTER ROAD**

	Weekday - All Day - All Vehicles			
	% of Estimated Short Trips Between Origin and Destination			
Route	% Turnpike	% Route 26	% Route 100	% Other Trips
Southbound Trips to Route 202/4	37.8%	13.4%	41.0%	7.8%
Northbound Trips from Route 202/4	41.9%	17.6%	34.7%	5.9%
Southbound Trips to Center Road	10.0%	0.0%	70.0%	20.0%
Northbound Trips from Center Road	14.3%	0.0%	57.1%	28.6%

The results from Task 5 show that all trips between the short trips analysis area and Route 202/4 or Center Road in Gray have a time savings from traveling on the Maine Turnpike (I-95) through Gray. Table 19 shows that between 38-42% of trips between the short trips analysis area and Route 202/4 west of Exit 63 travel on the Maine Turnpike (I-95). Between 35-41% of trips from the short trips analysis area use Route 100 to travel through Gray while between 13-18% of trips use Route 26 to travel through Gray.

The Other Trips percentage includes a Percent Error component and a Percent Other Route component. The SteetLight analyses for Task 6 do not have a Percent Other Route component because it was not possible to calculate the percent of trips that use Other Route from the StreetLight data. Therefore, for the analyses for Task 6, the Percent Other Trips represent an error in the data and do not count as toll diversion. See Appendix G for more information about how Percent Error and Percent Other Route were calculated for these analyses.

The results for the other time periods included in the study are presented in Appendix F.

Table 20 summarizes the overall toll diversion rates for the trips between the short trips analysis area and Route 202/4 or Center Road. As many as 60% of southbound trips from the short trips analysis area to Route 202/4 divert around the New Gloucester tolls during the peak PM period, and as few as 46% of southbound trips to Route 202/4 divert around the tolls during the peak AM period. As many as 59% of northbound trips from Route 202/4 divert around the tolls during the peak AM period. While a much higher percentage of trips to or from Center Road divert around the tolls, these percentages represent a very small number of trips.

**TABLE 20: SHORT TRIP TOLL DIVERSION RATES**

Trip Type	Toll Diversion as Percent of Average Daily Trips Between Origin and Destination			
	Time Period			
	Weekday All Day	Weekday Peak AM	Weekday Peak PM	Weekend Day All Day
Southbound Trips to Route 202/4	54.4%	46.5%	60.6%	49.8%
Northbound Trips from Route 202/4	52.3%	59.1%	52.6%	48.3%
Southbound Trips to Center Road	70.0%	100.0%	50.0%	72.2%
Northbound Trips from Center Road	57.1%	0.0%	37.5%	65.0%

## Discussion

### Toll Diversion

The objective of this study was to estimate the percentage of vehicles that divert around the New Gloucester toll plaza. The results show that vehicles do divert around the New Gloucester tolls. Toll diversion is relatively small compared to the total volume of traffic on the Maine Turnpike (I-95). Even though the rate of toll diversion is relatively small, it consistently occurs with different modes of travel, directions of travel, and travel at different times of day and on different days of the week.

### NORTHERN ANALYSIS AREA

The results show that diversion is more common for northbound trips to the northern analysis area than for southbound trips from this area. The highest diversion rates are during the peak PM period. Northbound trips to this study area account for nearly 50% of the vehicles traveling north on the Maine Turnpike (I-95) south of the Gray interchange. Nearly 10% of those vehicles exit the Maine Turnpike (I-95) in Gray to avoid the New Gloucester tolls during the peak PM period.

## **SOUTHERN ANALYSIS AREA**

The results show that trips to or from the southern analysis area are more likely to divert around the New Gloucester tolls compared to trips to or from the northern analysis area. A maximum of 23.5% of northbound vehicles divert around the tolls during the peak PM period. Even though diversion occurs at higher rates for vehicles traveling to or from the southern analysis area, this percentage represents a smaller number of vehicles compared to vehicles traveling to or from the northern analysis area. The reason for this is the traffic volume on the Maine Turnpike (I-95) is higher south of Gray than it is north of Auburn and trips to or from the southern analysis area account for a smaller percentage of trips using the Turnpike north of Auburn. For example, northbound trips from this study area account for only 15% of the trips traveling north on the Maine Turnpike (I-95) north of Exit 75, while northbound trips to the northern analysis area account for 50% of the vehicles traveling north on the Turnpike south of Exit 63.

## **SOUTHBOUND EXITING AND RE-ENTERING**

The results show that about 2% of vehicles traveling south on the Maine Turnpike (I-95) between Exit 75 and Exit 63 exit the Turnpike in Auburn and re-enter the Turnpike in Gray. This is slightly more likely to happen during the peak AM period. Vehicles that exit in Auburn are more likely to use Route 100 than Route 26 to reach Gray. The annual average daily traffic volume for the origin zone on the Maine Turnpike (I-95) north of Exit 75 was 10,250 in 2018, which is about 5,000 less than the average daily volume of traffic traveling north on the Turnpike south of Exit 63.

## **NORTHBOUND EXITING AND RE-ENTERING**

The results show that about 5% of vehicles traveling north on the Maine Turnpike (I-95) between Exit 63 and Exit 75 exit the Turnpike in Gray and re-enter the Turnpike in Auburn. Diversion is more likely to happen during the peak PM period. Vehicles that exit in Gray are more likely to use Route 100 than Route 26 to reach Auburn. The annual average daily traffic volume for the origin zone on the Maine Turnpike (I-95) south of Exit 63 was 15,080 in 2018, which is about 5,000 higher than the average daily volume of traffic traveling south on the Turnpike north of Exit 75. This means that northbound vehicles that exit and re-enter account for a larger number of vehicles compared to southbound vehicles that exit and re-enter.

## **SHORT TRIPS**

The results show that trips to or from Route 202/4 west of Exit 63 are more likely to divert around the New Gloucester tolls compared to other types of diversion included in this study. On a typical weekday between 58% and 62% of trips from or to Route 202/4 divert around the New Gloucester tolls on a typical weekday. As many as 65% of trips from Route 202/4 during the peak AM period and 65% of trips to Route 202/4 during the peak PM period divert around tolls. The short trips diversion rates are much higher compared to other types of diversion included in this study. This represents one of the largest source of diversion in this study since, as is shown in Table 5, more than 7,000 vehicles travel in each direction on Route 202/4 on a typical day. Approximately 10% of these vehicles are traveling to or from the Northern analysis area, and about 60% of those vehicles divert around the New Gloucester tolls.

A smaller number of trips to or from Center Road divert around the New Gloucester tolls. Between 85-90% of trips between the short trips analysis area and Center Road do not use the Maine Turnpike (I-95) even though this is the fastest route. Even though this is a much higher diversion rate compared to other types of diversion, there are not as many trips between the short trips analysis area and Center Road, so the actual number of vehicles that divert around the tolls is much lower.

To summarize, the highest toll diversion rates are for trips to or from the southern analysis area. There is a higher rate of toll diversion for northbound trips to the northern analysis area than for southbound trips from the northern analysis area. Although diversion occurs at a higher rate for vehicles traveling between the southern analysis area and the Maine Turnpike (I-95), the diversion between the northern analysis area and the Turnpike represents a larger number of vehicles because trips to or from the northern analysis area account for a larger volume of traffic on the Turnpike. Through trips traveling north or south on the Maine Turnpike (I-95) are less likely to divert around the tolls, although between 2-5% of these trips do exit and re-enter the Turnpike to avoid the tolls. Diversion also occurs with short trips between Auburn and Windham, and these short trips are one of the largest sources of toll diversion in this study.

## **Interpreting Results**

The cell phone location data used in this study is reported using the StreetLight Index, which is a normalized value that represents the relative volume of trip activity. This is not the same as vehicle counts or trip counts. The toll diversion rates are reported as a percentage of the relative trip activity through an origin or destination zone or the relative trip activity between origin zones and a destination zone. These diversion rates need to be compared with recent traffic counts at the zones used in the analyses to provide context for the magnitude of diversion around the New Gloucester tolls.

A few simplifying assumptions are required to compare the results of this study to existing traffic count data. Annual average daily traffic counts were compared with average weekday diversion rates to estimate the volume of traffic diverting around the New Gloucester tolls on a typical day. Traffic count data on the Maine Turnpike (I-95) is available by the direction of travel, while traffic counts on State and local roads commonly include both directions of travel. Traffic counts from locations that include both directions of travel were divided in half to estimate the volume of traffic in one direction.

Table 21 shows the estimated magnitude of diversion for trips that exit and re-enter the Maine Turnpike (I-95) to avoid the toll in New Gloucester. The first column identifies the type of trip, either a southbound trip that exits in Auburn and re-enters in Gray or a northbound trip that exits in Gray and re-enters in Auburn. The second column shows the most recent traffic count, based on the values presented in Tables 2 and 3, for the origin zones on the Maine Turnpike (I-95). The third column shows an estimate of through trips on the Maine Turnpike (I-95) calculated by multiplying the traffic count by the percentage shown for weekday traffic in Tables 6 and 12. The next four columns show the results of multiplying the value in column 3 by the corresponding percentages shown in Tables 7 and 13 to get the estimated magnitude of diversion on each route. The results in Table 21 show that a greater number of northbound trips exit in

Gray and re-enter in Auburn and that most vehicles that exit and re-enter the Maine Turnpike (I-95) travel on Route 100 or another route.

**TABLE 21: ESTIMATED DIVERSION FOR TRIPS EXITING AND RE-ENTERING MAINE TURNPIKE (I-95)**

Trip Type	AADT at Origin Zone	Through Trips on Turnpike	Toll Diverters	Diverters on Route 26	Diverters on Route 100	Diverters on Other Route
Southbound Trips from North of Auburn	10,250	4,559	93	6	51	35
Northbound Trips from South of Gray	15,080	3,770	138	6	92	40

Table 22 shows exiting and re-entering diversion on Route 26 and Route 100 as a percentage of the most recent traffic counts at the middle filter zones, based on the traffic counts reported in Table 4. The traffic counts in Table 4 include both directions of travel, so the totals have been divided in half for each direction of travel. The results show that northbound trips that exit the Maine Turnpike (I-95) in Gray and re-enter in Auburn equal about 2% of average annual daily northbound traffic on Route 100, while southbound trips that exit the Turnpike in Auburn and re-enter in Gray account for about 1% of average annual daily southbound traffic on Route 100. Trips that exit and re-enter the Maine Turnpike (I-95) accounted for less than 0.2% of the average annual daily traffic on Route 26.

**TABLE 22: EXITING AND RE-ENTERING DIVERSION AS PERCENTAGE OF TRAFFIC ON ROUTE 26 AND ROUTE 100**

Trip Type	AADT at Route 26 Middle Filter Zone	AADT at Route 100 Middle Filter Zone	Diverters on Route 26	Diverters on Route 100	Diverters on Route 26 as Percent of AADT	Diverters on Route 100 as Percent of AADT
Southbound Trips from North of Auburn	4,320	4,290	6	51	0.15%	1.19%
Northbound Trips from South of Gray	4,320	4,290	6	92	0.14%	2.14%
Total	8,640	8,580	13	143	0.14%	1.67%

**TABLE 23: ESTIMATED DIVERSION FOR TRIPS FROM NORTHERN AND SOUTHERN ANALYSIS AREA**

Trip Type	AADT at Origin or Destination Zone	Trips Between Analysis Area and Turnpike	Toll Diverters	Diverters on Route 26	Diverters on Route 100
Southbound Trips from Northern Analysis Area	15,840	7,862	368	114	254
Northbound Trips to Northern Analysis Area	15,080	7,450	529	195	334
Northbound Trips from Southern Analysis Area	9,840	1,432	173	0	173
Southbound Trips to Southern Analysis Area	10,250	1,385	154	0	154

Table 23 shows the estimated magnitude of diversion for trips starting or ending in the northern and southern analysis areas. The first column identifies the type of trip, either between the northern analysis area and the Maine Turnpike (I-95) or between the southern analysis area and the Turnpike. The second column shows the most recent traffic count, based on the values presented in Tables 2 and 3, for the origin or destination zones on the Maine Turnpike (I-95). The third column shows an estimate of trips between the analysis area and the Maine Turnpike (I-95) calculated by multiplying the traffic count by the percentage shown for weekday traffic in Tables 8 and 14. The next three columns show the results of multiplying the value in column 3 by the corresponding percentages shown in Tables 9, 10, 15 and 16 to get the estimated magnitude of diversion on each route. The results in Table 23 show that a greater number of diverters travel on Route 100 to or from the northern analysis area compared to other routes, and the volume of traffic diverting to the northern analysis area is greater than the traffic diverting from the northern analysis area. There is a greater volume of diversion from the southern analysis area compared to diversion to the southern analysis area, and all diversion from or to the southern analysis area was found to be on Route 100.

Table 24 shows diversion to or from the northern and southern analysis area on Route 26 and Route 100 as a percentage of the most recent traffic counts at the middle filter zones, based on the traffic counts reported in Table 4. The traffic counts in Table 4 include both directions of travel, so the totals have been divided in half for each direction of travel. The results show that diverted trips to or from the northern analysis area account for between 5.9%- 7.8% of average annual daily traffic on Route 100, while trips to or from the southern analysis area account for about 4% of the average annual daily traffic on Route 100. Diverted trips to or from the northern analysis area accounted for between 2.6%-4.5% of traffic on Route 26, while 0 diverted trips to or from the southern analysis area used Route 26.

**TABLE 24: DIVERSION FROM/TO NORTHERN AND SOUTHERN ANALYSIS AREA AS PERCENTAGE OF TRAFFIC ON ROUTE 26 AND ROUTE 100**

Trip Type	AADT at Route 26 Middle Filter Zone	AADT at Route 100 Middle Filter Zone	Diverter on Route 26	Diverter on Route 100	Diverter on Route 26 as Percent of AADT	Diverter on Route 100 as Percent of AADT
Southbound Trips from Northern Analysis Area	4,320	4,290	114	254	2.6%	5.9%
Northbound Trips to Northern Analysis Area	4,320	4,290	195	334	4.5%	7.8%
Northbound Trips from Southern Analysis Area	4,320	4,290	0	173	0.0%	4.0%
Southbound Trips to Southern Analysis Area	4,320	4,290	0	154	0.0%	3.6%
Total	8,640	8,580	309	915	3.6%	10.7%

**TABLE 25: ESTIMATED DIVERSION FROM SHORT TRIPS**

Trip Type	AADT at Origin or Destination Zone	Short Trips	Toll Diverter	Diverter on Route 26	Diverter on Route 100
Southbound Trips to Route 202 Westbound	7,160	653	355	87	268
Northbound Trips from Route 202 Eastbound	7,220	690	361	121	239
Southbound Trips to Center Rd Westbound	770	31	22	0	22
Northbound Trips from Center Rd Eastbound	770	30	17	0	17

Table 25 shows the estimated magnitude of diversion for trips between the short trips analysis area and Route 202/4 or Center Road. The first column identifies the type of trip, either between the short trips analysis area and Route 202/4 or Center Road. The second column shows the most recent traffic count, based on the values presented in Table 5, for the origin or destination zones on Route 202/4 or Center Road. The traffic count for Center Road has been divided in half since the count includes both directions of traffic. The third column shows an estimate of short trips calculated by multiplying the traffic count by the corresponding percentage shown in Table 18. The fourth column shows the total short trips that divert around the New Gloucester tolls, which is the sum of the values in the next two columns. The final two columns show the results of multiplying the value in column 3 by the corresponding percentages shown in Table 19 to get the estimated magnitude of diversion on each route. The results in Table 25 show that a greater number of diverters travel on Route 100 compared to other routes.

It is worth noting that due to the small number of trips between the short trips analysis area and Center Road, the estimated short trips to or from Center Road may not be statistically significant.

**TABLE 26: SHORT TRIPS DIVERSION AS PERCENTAGE OF TRAFFIC ON ROUTE 26 AND ROUTE 100**

Trip Type	AADT at Route 26 Middle Filter Zone	AADT at Route 100 Middle Filter Zone	Diverters on Route 26	Diverters on Route 100	Diverters on Route 26 as Percent of AADT	Diverters on Route 100 as Percent of AADT
Southbound Trips to Route 202 Westbound	4,320	4,290	87	268	2.0%	6.2%
Northbound Trips from Route 202 Eastbound	4,320	4,290	121	239	2.8%	5.6%
Southbound Trips to Center Rd Westbound	4,320	4,290	0	22	0.0%	0.5%
Northbound Trips from Center Rd Eastbound	4,320	4,290	0	17	0.0%	0.4%
Total	8,640	8,580	209	546	2.4%	6.4%

Table 26 shows short trips diversion on Route 26 and Route 100 as a percentage of the most recent traffic counts at the middle filter zones, based on the traffic counts reported in Table 4. The traffic counts in Table 4 include both directions of travel, so the totals have been divided in half for each direction of travel. The results show that diverted trips between Route 202 and the

short trips analysis area accounted for between 5.6%- 6.2% of average annual daily traffic on Route 100, while diverted trips between Route 202 and the short trips analysis area accounted for between 2.0%-2.8% of the average annual daily traffic on Route 26. Diverted trips between Center Road and the short trips analysis area accounted for as much as 0.5% of the average annual daily traffic on Route 100 and 0% of the average annual daily traffic on Route 26.

Table 27 summarizes the estimates for the magnitude of diversion around the New Gloucester toll plaza on a typical day. It is important to remember that these are estimates, not actual counts, and are intended only to estimate the magnitude of toll diversion on a typical day.

**TABLE 27: ESTIMATED MAGNITUDE OF TOLL DIVERSION**

Type of Diversion	Direction of Travel	Estimated Average Daily Diverters	Route 26 Diverters	Route 100 Diverters	Other Diverters
Diversion to Northern Analysis Area	Northbound	529	195	334	NA
Diversion from Northern Analysis Area	Southbound	368	114	254	NA
Short trips from Route 202	Northbound	361	121	239	NA
Short trips to Route 202	Southbound	355	87	268	NA
Diversion from Southern Analysis Area	Northbound	173	0	173	NA
Diversion to Southern Analysis Area	Southbound	154	0	154	NA
Northbound Diversion	Northbound	138	6	92	40
Southbound Diversion	Southbound	93	6	51	35
Short trips to Center Rd	Southbound	22	0	22	NA
Short trips from Center Rd	Northbound	17	0	17	NA
<b>Total Northbound</b>		<b>1,218</b>	<b>322</b>	<b>855</b>	<b>40</b>
<b>Total Southbound</b>		<b>991</b>	<b>207</b>	<b>749</b>	<b>35</b>
<b>Total</b>		<b>2,209</b>	<b>530</b>	<b>1,604</b>	<b>75</b>

Table 27 shows that the largest source of toll diversion on a typical day is trips between the Maine Turnpike (I-95) in Gray and the northern analysis area, followed by the short trips between the northern analysis area and Route 202/4. The other types of diversion account for a smaller share of the total. The total in Table 24 shows that more than 2,000 vehicles divert around the New Gloucester tolls on a typical day, and 73% of these vehicles travel on Route 100. To put this in context, the estimated 1,604 vehicles traveling in both directions on Route 100 at the Auburn/New Gloucester town line is about 19% of the most recent traffic count at that location, as shown in Table 4. The estimated 530 vehicles traveling in both directions on Route

26 at the Poland/New Gloucester town line represent about 6% of the most recent traffic count at that location, as shown in Table 4.

Table 28 summarizes the results presented in Tables 22, 24, and 26. Table 28 shows diverted trips account for about 19% of the average annual daily traffic on Route 100 and 6% of the average annual daily traffic on Route 26.

**TABLE 28: DIVERTED TRIPS AS PERCENTAGE OF TRAFFIC ROUTE 26 AND ROUTE 100**

Type of Diversion	Direction of Travel	AADT at Route 26 Middle Filter Zone	AADT at Route 100 Middle Filter Zone	Diverters on Route 26	Diverters on Route 100	Diverters on Route 26 as Percent of AADT	Diverters on Route 100 as Percent of AADT
Diversion to Northern Analysis Area	North	4,320	4,290	195	334	4.5%	7.8%
Diversion from Northern Analysis Area	South	4,320	4,290	114	254	2.6%	5.9%
Short trips from Route 202	North	4,320	4,290	121	239	2.8%	5.6%
Short trips to Route 202	South	4,320	4,290	87	268	2.0%	6.2%
Diversion from Southern Analysis Area	North	4,320	4,290	0	173	0.0%	4.0%
Diversion to Southern Analysis Area	South	4,320	4,290	0	154	0.0%	3.6%
Northbound Diversion	North	4,320	4,290	6	92	0.1%	2.1%
Southbound Diversion	South	4,320	4,290	6	51	0.1%	1.2%
Short trips to Center Rd	South	4,320	4,290	0	22	0.0%	0.5%
Short trips from Center Rd	North	4,320	4,290	0	17	0.0%	0.4%
<b>Total Northbound</b>		<b>4,320</b>	<b>4,290</b>	<b>322</b>	<b>855</b>	<b>7.5%</b>	<b>19.9%</b>
<b>Total Southbound</b>		<b>4,320</b>	<b>4,290</b>	<b>207</b>	<b>749</b>	<b>4.8%</b>	<b>17.4%</b>
<b>Total</b>		<b>8640</b>	<b>8,580</b>	<b>530</b>	<b>1,604</b>	<b>6.1%</b>	<b>18.7%</b>

### Some Trips Are Not Toll Diversion

An important finding from this study is a significant percentage of trips through Gray on Route 26 and Route 100 are not diverting around the New Gloucester tolls. These trips are to or from places where there is not a time incentive to take the Maine Turnpike (I-95). People traveling to or from these locations would generally have to drive further and pay more to take the Maine

Turnpike (I-95) compared to an alternative route. Although these trips are technically not diverting around the tolls, they do contribute to the volume of traffic passing through Gray every day.

### **Comparison to 2014 HNTB Study**

The 2014 HNTB study found that 1 out of every 10 passenger vehicles entering the Maine Turnpike (I-95) at the Exit 63 southbound on-ramp may be diverting around the toll in New Gloucester. This study found that about 2% of vehicles exit the Maine Turnpike (I-95) in Auburn and re-enter the Turnpike in Gray to continue a southbound trip. This study also found that 5% of vehicles traveling from the northern analysis area and 12% of vehicles traveling to the southern analysis area enter the Maine Turnpike (I-95) in Gray to avoid the toll in New Gloucester. Table 24 shows the estimated magnitude for these three types of diversion add up to 617 vehicles per day, which is 9% of the most recent traffic count on the Exit 63 southbound on-ramp, as shown in Table 3. This result is very similar to the result found in the 2014 HNTB study.

The 2014 HNTB study did not include short trips between Auburn and Windham that use Route 100 instead of the Maine Turnpike (I-95) between Auburn and Gray. This study found that short trips between Auburn and Windham are among the largest sources of diversion around the New Gloucester tolls.

The 2014 study found that the 2012 toll increase led to a decrease in traffic at the New Gloucester tolls. Since 2013 traffic at the New Gloucester tolls has increased by over 24% in both directions. The 2014 study found that traffic on Route 100 in New Gloucester was lower in 2010 than it was in 2002. Between 2011 and 2019 traffic on Route 100 at the Auburn/New Gloucester town line decreased by about 90 vehicles per day.

The 2014 study found that despite a temporary increase in traffic at the Exit 63 northbound off-ramp and southbound on-ramp following the opening of the Oxford Casino in June 2012, there has generally been a downward trend in traffic volumes at Exit 63. Since 2013 traffic volumes on the Exit 63 southbound on-ramp have increased by 18% or 1,050 vehicles per day, while traffic volumes on the Exit 63 northbound off-ramp have increased by 8% or 460 vehicles per day.

### **Limitations of This Study**

There are several limitations of the data used in this study. The StreetLight data is based on a sample, and this sample may not be representative of all traffic traveling through Gray. The StreetLight data show relative trip activity, but this is not the same as actual vehicle or trip counts. This study has provided an estimate of the magnitude of diversion around the New Gloucester tolls, but these are only estimates based on the results of this study and assumptions about the data.

Maine Turnpike (I-95) are doing so to avoid the toll, but there may be other motivations for this behavior, such as stopping at a local business. As a result, some diverted trips may include travelers who are not necessarily toll diverters.

This study assumed that trips that have a time savings from taking the Maine Turnpike (I-95) but use a longer route to reach their destination are traveling further to avoid paying the toll in New Gloucester. However, not all of the trips that travel further to avoid the New Gloucester tolls would use the Maine Turnpike (I-95) if there were no tolls. One reason could be the time savings from taking the Maine Turnpike (I-95) may be relatively insignificant compared to the total trip length.

This study assumed that the majority of vehicles would use Route 100, Route 26, or the Maine Turnpike (I-95) to travel through Gray. The results show there is a small percentage of trips between the study origins and destinations that do not pass through these middle filter zones. This discrepancy may be due to rounding errors or errors from classifying trips by time of day in the StreetLight data. Alternatively, this discrepancy may indicate that some trips take an alternative route through Gray that was not captured with the middle filter zones. There is not enough information to determine if the percentage of trips that use another route are diverting around tolls, if they are traveling on the optimal route, or if this is just an error created by StreetLight's algorithms.

## **Conclusions**

Cell phone location data from StreetLight was used to estimate the rate and magnitude of toll diversion around the New Gloucester toll booth. The results show that vehicles do divert around the New Gloucester tolls. Although this diversion occurs at relatively low rates compared to the volume of traffic on the Maine Turnpike (I-95), more than 2,000 vehicles divert around the tolls on a typical day. This study also found that a significant volume of traffic traveling through Gray on Route 26 or Route 100 is following the optimal route and is not diverting around the New Gloucester toll booth.

The findings from this study, which are based on best-available-data, approximate the levels of diversion around the New Gloucester toll booth. The results will inform subsequent discussions of potential policy and planning responses to toll diversion and other traffic issues in Gray and surrounding communities.

## **Recommendations**

To better understand the impacts of diversion, further study is recommended. A level of service (LOS) analysis in Gray Village should be conducted to quantify the impact of toll diversion on traffic level of service in the village.

## Sources

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