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Chittenden County Regional Planning Commission

EXIT 12 TRANSPORTATION IMPROVEMENT DISTRICT

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PREPARED FOR:
CHITTENDEN COUNTY REGIONAL PLANNING COMMISSION

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LIST OF ABBREVIATIONS

ATMS	advanced traffic management system
CCRPC	Chittenden County Regional Planning Commission
DDI	diverging diamond interchange
DEC	District Environmental Commission
ITE	Institute of Transportation Engineers
ITS	intelligent transportation systems
LOS	level-of-service
NHTS	National Household Travel Survey
PMT	person miles traveled
STIP	State Transportation Improvement Program
TDM	traffic demand management
TID	Transportation Improvement District
VMT	vehicle miles traveled

EXECUTIVE SUMMARY

The Chittenden County Regional Planning Commission (CCRPC) worked alongside the Vermont Agency of Transportation (VTrans) and the Town of Williston to evaluate the feasibility of creating a Transportation Improvement District (TID) at the Exit 12/Taft Corners area in Williston, Vermont. RSG was retained by CCRPC to analyze and evaluate the potential TID and identify a pathway toward implementation.

In 2014, the Vermont General Assembly passed an Act Relating to Transportation Impact Fees, Act 145 (H.740). The Act establishes a Transportation Impact Fee that may be required by an Agency of Natural Resources District Environmental Commission (DEC) or by VTrans to help pay for transportation improvements that directly benefit proposed or future developments. One mechanism by which Transportation Impact Fees can be assessed is through a TID, defined in the legislation as "a discrete geographic area that includes and will benefit from one or more capital transportation projects included in the (VTrans) Capital Transportation Program…" The District Commissions moved quickly to incorporate Act 145 fees into Act 250 project review. VTrans and the DEC agreed on an approach and have been using it successfully since the start of 2016.

VTrans and the regional DECs are assessing the Act 145 fees on developments which increase net vehicle traffic (PM peak hour) when a development requires an Act 250 permit. The Act 145 language states that the fee should be based on vehicle trips and capital costs shall include all modes that benefit or mitigate the impacts of the land-use project (see § 6106(2)).

VTrans has established a methodology which attempts to capture a fair share cost allocation based on the proportion of impact by assessing new vehicle trips an impact fee based on the amount of capacity consumed. Projects in the State capital program are evaluated to determine the future capacity, and any trip consuming the available capacity is charged a fair share impact fee. VTrans has been assessing each of the projects in the State Transportation Improvement Program (STIP) and recommending a fee to be imposed by the DEC. The fee equation is:

$$Fee = {Project\ Cost}\ /_{Total\ Capacity}$$

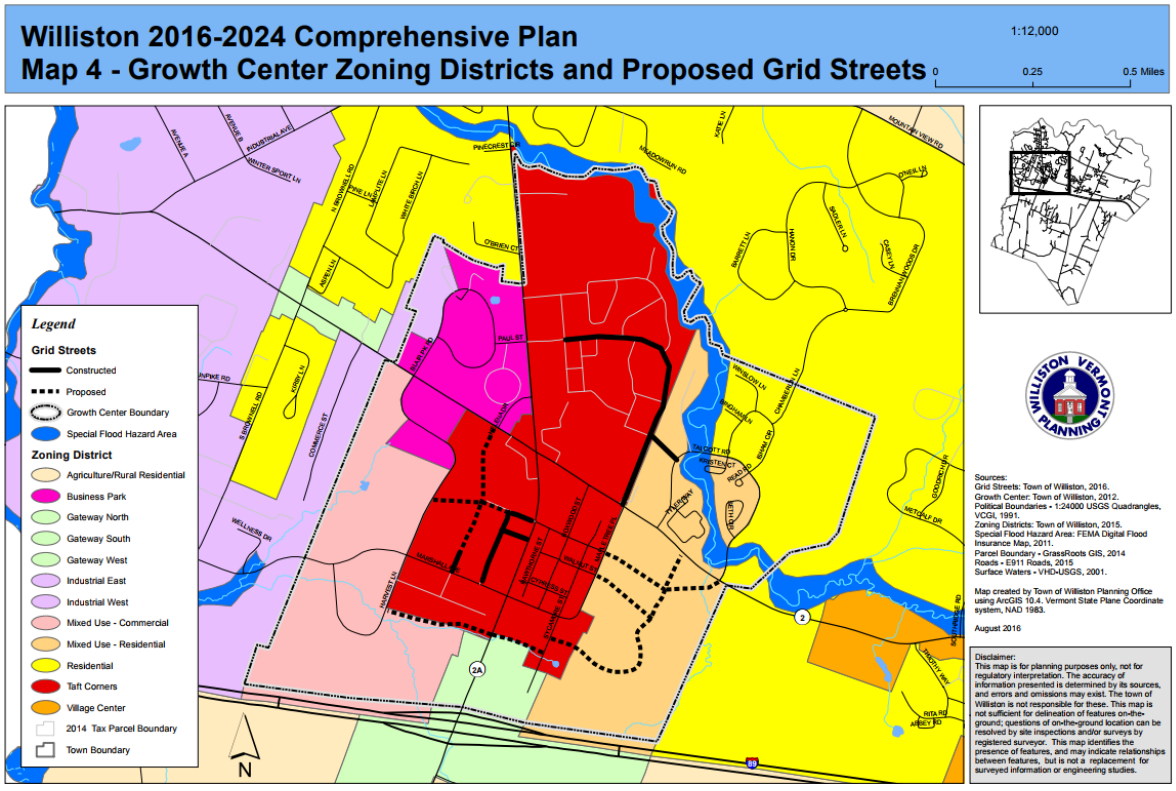
The project cost can be reduced to account for deferred maintenance and other project-specific funds allocated to the project (e.g., safety). Act 145 § 6106(a3) states that existing capacity must be accounted for and cannot be paid for in the impact fee calculation (i.e., cannot pay twice for the same capacity). As many of the projects increase the capacity of existing facilities, rather than create brand new facilities, it is critical to determine how existing capacity is accounted for within the project cost. The total capacity is often a theoretical maximum based on maximum flow rates and optimal conditions providing a high bound difficult to achieve in

reality. The net fee is further adjusted by VTrans to reflect a variety of other aspects of the land-use development (such as transportation demand management and location within a designated growth center).

Transportation Improvement District

The Exit 12 study area in Williston, Vermont has been the focus of intense land-use development starting back in the late '80s and continuing today. As one of the first statewide recognized growth centers – the Taft Corners area in the general vicinity of Exit 12 on I-89, VT2A, and US2 – it has evolved to become increasingly diverse in land uses with more recently residential developments infilling the predominately retail focused area. The growth center presents an excellent opportunity to assess the TID option on an established boundary with a clearly identified growth plan and identified infrastructure to accommodate that growth and development.

FIGURE 1: GROWTH CENTER ZONING AND STREETS



source: 10-Year Review of the Town of Williston's Growth Center Designation

The transportation capital projects in the Exit 12 TID area include an array of new roadway links, minor roadway widening and multimodal improvements, several on-road and off-road bicycle improvements, traffic signal enhancements, and the construction of a diverging diamond

interchange at VT 2A/I-89. Providing additional capacity to the transportation network is the key criterion upon which all projects are compared against. A project must increase capacity to comply with impact fee fundamentals.

Demonstrating the rational nexus between the land-use project creating a burden on the existing infrastructure and the Act 145 fee as a method of mitigating that impact is a critical legal construct. Case law has supported municipal boundaries as a reasonable bound to assign benefits and impacts to a project used in municipal impact fees. The reality is geographic extent of benefits can be large, as any improvement to capacity in one part of the network can unlock capacity far from the physical improvement by inducing changes in traffic distribution. The geographic extent of any land-use impact is most often determined by a trip distribution conducted within a traffic impact study. However, as inferred in the VTrans Traffic Study Guidelines[1] it has not always been necessary to estimate traffic impact or distribution of project traffic when the land use is anticipated to generate fewer than 75 peak hour trips.

However, since Act 145 DEC impact fees are being assessed on all sizes of development (as long as the land-use development triggers Act 250), it is possible to charge an impact fee on any of these land-use developments, not only the ones generating more than 75 peak hour trips. This requires a traffic practitioner to determine the number of trips and distribute those trips onto the transportation network for all land-use developments that have Act 250 review. This new condition should be reflected in an amended traffic impact study guideline document.

The Act 145 legislation defines specific criteria for the creation of a TID. Within the Exit 12 study area, many of the TID criteria are already well understood given the level of scrutiny and investment that has been made in planning the growth center. The geographic extent and land uses are established, and the project list has evolved over time and is well defined. The infrastructure is multimodal in nature and the planning work that has been conducted provides a strong rational nexus between the need for the projects associated with the growth and development in the area and the beneficiaries of the capital improvements.

A range of fee mechanisms could be implemented in the Exit 12 TID study area, each with their own advantages and disadvantages, and different fee and revenue values. As described further in this report, the selected *total cost/total capacity* has a number of advantages that make this fee option highly desirable and straightforward to implement.

The Exit 12 TID project list identifies 16 State funded projects totaling $35 million (nonlocal share) and provides 108,900 total person capacity during the PM peak hour. This results in a base fee of $322 per vehicle during the PM peak hour for trips within the TID. This fee estimate treats the TID zone as a boundary, incorporating the costs and capacities to facilitate the continued growth and land-use development within its borders. Given that the fee can only be

[1] http://vtrans.vermont.gov/planning/development-review-services

collected on vehicle trips associated with land-use changes within the TID, it is estimated that by 2035 an additional 1,357 PM peak hour trips will be generated. The revenue raised by local vehicle growth within the TID is $436,000. This represents only 1.25% of the State (nonlocal) cost of the infrastructure projects.

The cost used in this analysis is only the State (and federal) portion of the overall capital costs. It is anticipated that local match is needed for some of the capital projects, and in the case of the TID, the local match for the identified projects would be just over $7 million. Raising local funds to meet the $7 million local match requirement is clearly the role for local municipal impact fees (and other local funds such as sales and property taxes), as the need is directly tied to the new infrastructure to facilitate and enable the growth and development within the growth center.

The different approaches between the Act 145 and local municipal impact fees suggest that the two fees should remain separate. This may lead to confusion locally about which fees are being paid, where the money is going, and concern about paying twice for the same project. However, all these concerns can be addressed and clarified. The Act 145 fees should be clearly identified as funding the State and federal portions of projects and the municipal local impact fees are funding the local portion of projects.

Growth and land-use development are likely to demand that any TID be periodically revisited to check growth rates, changes in land-use assumptions, and relevance of remaining future capacity projects. A periodic update of the TID should be scheduled for a period of not more than 10 years upon initiation. The update should include an analysis of forecast growth and land-use development adjacent to the TID to attempt to account for any capital infrastructure needs within the TID but associated with growth external to the TID.

Maintaining a record of remaining capacity and tracking project funds will be an ongoing responsibility of VTrans. As the number of projects funded by Act 145 revenues continues to grow every year, this task is likely to increase the administrative burden on the agency. VTrans capital planning staff will monitor, track, and estimate incoming revenues and expected outflows for Act 145 eligible projects.

At the conclusion of this review, VTrans, the Town of Williston, and the CCRPC agreed that a TID is not a viable impact fee structure for the Exit 12 area but that the report provides a review of methodologies and approaches that could be used in the analysis of other potential TIDs elsewhere in Vermont.

1.0 INTRODUCTION AND REPORT STRUCTURE

The Chittenden County Regional Planning Commission (CCRPC) worked alongside the Vermont Agency of Transportation (VTrans) and the Town of Williston to evaluate the feasibility of creating a Transportation Improvement District (TID) at the Exit 12/Taft Corners area in Williston, Vermont, and more specifically investigate ways that a TID could be implemented at this area. RSG was retained by CCRPC to analyze and evaluate a potential TID in the Exit 12 area and identify a pathway toward implementation.

This study outlines and analyzes a process of establishing a pilot TID. The goal is to understand the overall process, identify issues and risks inherent in a new process, provide guidance on whether a TID should be pursued at Exit 12 and provide guidance for creating future TIDs in the State. This study relies on existing information to provide a best estimate of project inputs rather than collecting new information.

This study and report includes a review of the following tasks:

- Establish TID Geography
- Compile Previous Studies, Infrastructure Projects, Performance Standards
- Establish Desired Performance Standard
- Develop and Evaluate Fee Calculation Options
- Implementation

This report provides a background on the general overview of Act 145 and Impact Fees, summarizes the projects identified for the TID, outlines the preferred fee approach, and presents an implementation strategy for the Exit 12 TID that can be applied to other possible TIDs around the State.

2.0 IMPACT FEES—THE BIG PICTURE

2.1 ACT 145

In 2014, the Vermont General Assembly passed an Act Relating to Transportation Impact Fees, Act 145 (H.740). The Act establishes a Transportation Impact Fee that may be required by an Agency of Natural Resources District Environmental Commission (DEC) or by VTrans to help pay for transportation improvements that directly benefit proposed or future developments. One mechanism by which Transportation Impact Fees can be assessed is through a TID, defined in the legislation as “a discrete geographic area that includes and will benefit from one or more capital transportation projects included in the VTrans Capital Transportation Program…”

The District Commissions moved quickly and implemented the Act 145 fees into Act 250 project. review. VTrans evaluated several methods to develop a fee that would be used on a project-by-project basis around the State. VTrans and the DEC agreed on an approach and have been using it successfully since the start of 2016.

2.2 BASIC IMPACT FEE LEGAL CRITERIA

Impact Fees nationally have been used at the local municipal level since the mid-‘80s. Through refinements and case law, the impact fee became an accepted and common form of land-use regulation. Today, nearly 40 states have statutes or other enabling legislation allowing local jurisdictions to implement impact fees. All impact fees have fundamental criteria that make up what defines an impact fee:

- Rational nexus meaning that the benefits and infrastructure is reasonably linked to the impacts of the land-use development.
- New development should not be required to pay twice for the same improvements through other taxes and fees.
- New development is responsible for the costs attributable to growth, and not held responsible for the correction of existing capacity deficiencies.
- Fees should be proportional to the degree of impact of the land-use development.

The Vermont State Statute (24 V.S.A § 5201) states, "impact fee" means a fee levied as a condition of issuance of a zoning or subdivision permit which will be used to cover any portion of the costs of an existing or planned capital project that will benefit or is attributable to the users of the development or to compensate the municipality for any expenses it incurs as a result of construction. The fee may be levied for recoupment of costs for previously expended capital outlay for a capital project that will benefit the users of the development.

2.3 TWO PRIMARY METHODS

Impact fees have been developed for a range of capital expenditures nationally. Jurisdictions and State statutes vary as to how they enable or require specific capital items to be planned for

and funded through impact fees. Impact fees generally follow one of these two primary methods: standards-based and plan-based.

1. **Standards-Based (also known as consumption method or inductive method)**
   - Typically applied in a linear ratio of an amount of capital investment per capita. Standards-based methodologies use a system-wide level-of-service (LOS) standard, such as the system-wide ratio of road capacity to demand or the existing capital investment per service unit.
   - Often derived as cost per capacity.
   - The VTrans and DEC fees currently being implemented is a type of standards-based.
2. **Plan-Based (project based, Infrastructure based, etc.)**
   - Frequently found in Vermont and New Hampshire. Mandated explicitly in Pennsylvania, Oregon, and Washington State (not exclusive list). More common for transportation infrastructure and increasing in popularity for its stronger nexus incorporating multimodal capacity as part of the overall transportation system.
   - Plan-based methodologies are generally based on modeling and geographically-specific LOS standards (e.g., “all road segments and intersections shall function at LOS D or better”) and rely on a facility master plan to create the nexus between the cost of planned improvements and the projected growth over a defined time period.

Additional Considerations

In addition to the type of fee, standards or plan-based, other common considerations are found in most impact fee systems.

Performance Standard

Performance standards are used to define a level to which future capacity will be designed. The performance standard also sets the baseline to assess if the current standard is not being met, and that growth cannot be held responsible to fund solutions to existing deficiencies. For example, a transportation fee based on a master plan that determines the cost to maintain LOS D on all roadways over the next 20 years should identify any existing roadways that currently function at a LOS D or lower (i.e., LOS E or F) and develop a funding plan to remedy the deficiencies.

Existing deficiencies are often funded through general obligation funds (e.g., property tax). Since a ‘double payment’ would occur for the same capacity (property tax and impact fee), a revenue credit must be derived. Many impact fee studies that use the plan-based approach omit this critical component. Act 145 states in §6106 chapter (3), “conditions not attributable to the transportation impacts of the land use project include forecasted growth in background traffic and existing infrastructure and capacity deficiencies.”

When the impact fee is developed over several zones, funding districts, or facilities, the standards can vary by district. There are many ways to use transportation performance standard. For example, variable performance criteria can be established to prioritize specific modes within specific districts. For example, downtown districts would favor a good or excellent LOS for bikes/pedestrians and possibly transit, with lower LOS tolerated for vehicles. This pattern might be reversed in a rural or more suburban context with a greater focus on mobility rather than access.

Further, there is a fundamental requirement that the fees do not create an improvement beyond the existing performance standard. This component is also one that is often omitted but also not explicitly excluded in Vermont statute.

Plan-based methods can often inadvertently design and fund additional capacity beyond that needed in the near-term. Impact fees should account for the cost of existing excess capacity. Instead, they focus solely on future costs to be incurred, and generally exclude any future costs to retire debt on existing capacity.

Regardless of the methodology used, an impact fee calculation must comply with the legal principles established by impact fee legislation and in some instances, case law.

3.0 EXIT 12 STUDY AREA

The Exit 12 study area in Williston, Vermont has been a focused area of intense land-use development starting back in the late '80s and continuing today. As one of the first statewide recognized growth centers – the Taft Corners area in the general vicinity of Exit 12 on I-89, VT2A, and US2 – it has evolved to become increasingly diverse in land uses with more recently residential infilling the predominately retail focused area.

The growth center presents an excellent opportunity to assess the TID option on an established boundary with a clearly identified growth plan and identified infrastructure to accommodate that growth and land-use development. Other potential TIDs in the State would require a land-use development planning and infrastructure analysis prior to any investigation of fees.

The Exit 12 growth center, and TID area shown in Figure 2, is at the nexus of two State highways, US 2 and VT 2A, and includes an interchange with Interstate 89. In addition to projects and improvements planned for these State facilities, the Town has identified several local streets and local improvements. Many of the projects identified were the result of numerous planning studies conducted for the study area. Table 1 lists the relevant recent planning studies for the TID area.

FIGURE 2: PROPOSED EXIT 12 TID BOUNDARY

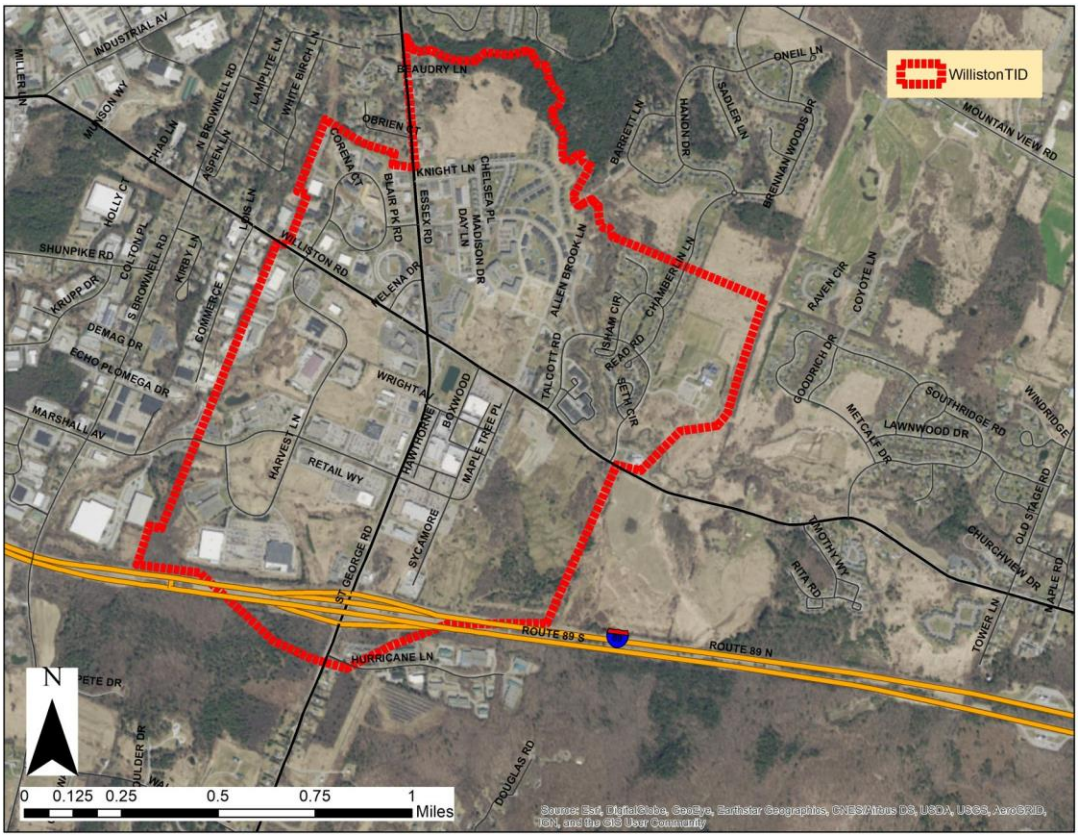


TABLE 1: TID STUDY AREA PLANNING STUDIES

STUDY NAME	DATE
Williston Grid Street Evaluation	Oct-06
US Route 2 Corridor Management Plan	Aug-07
James Brown Drive Scoping Report	Sep-09
Shared Use Path Connection over Muddy Brook (2006 Study Update)	Oct-10
North Williston Road and Mountain View Road Intersection Study	Jul-12
Industrial Avenue Corridor Study	Apr-13
CIRC Alternatives Task Force Final Report	Jan-14
Mountain View Road Bicycle/Pedestrian Facilities	Feb-14
VT 2A Scoping Study – Industrial Avenue/Mountain View Road to River Cove Road	Feb-14
VT Route 2A & Harvest Lane Bicycle/Pedestrian Facilities	Mar-14
Williston Road (U.S. Route 2) Multimodal Transportation Study	Mar-14
Williston - Essex Network Transportation Study (WENTS)	Mar-14
I-89 Exit 12 & VT 2A Scoping Study	May-14

4.0 CAPITAL PROJECTS

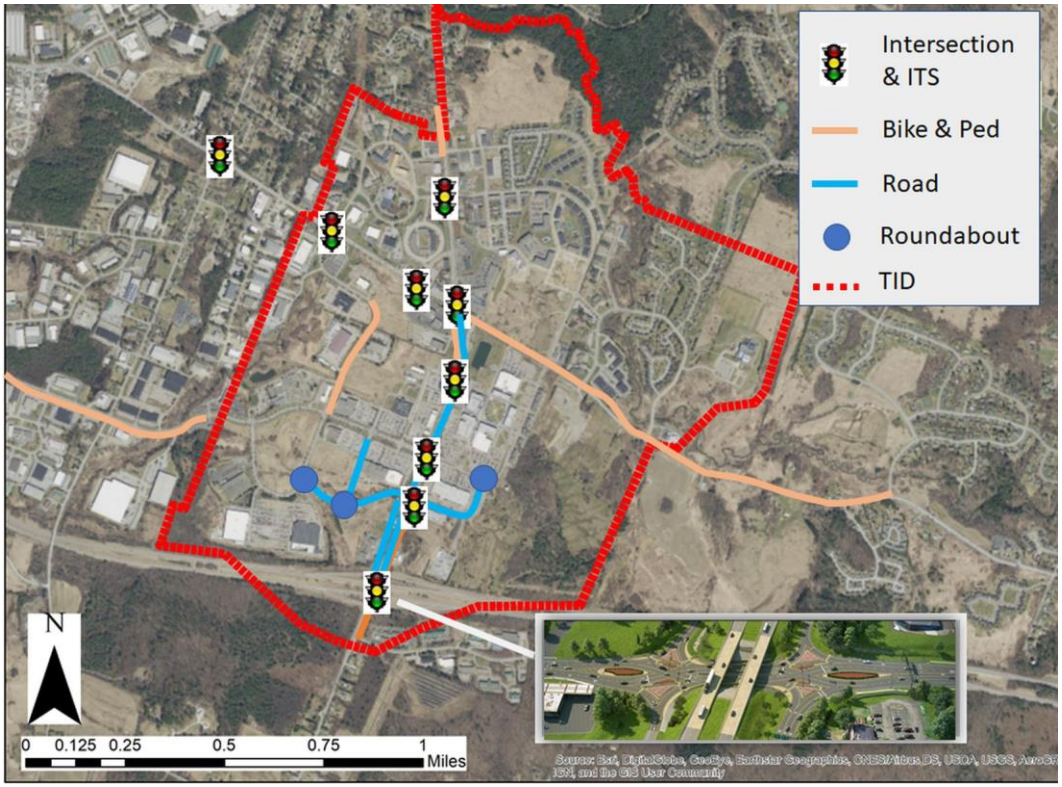
4.1 PROJECT OVERVIEW

The transportation capital projects in the Exit 12 TID area include new roadway links, minor roadway widening and multimodal improvements, several on-road and off-road bicycle improvements, traffic signal enhancements, and the construction of a diverging diamond interchange (DDI) at VT 2A/I-89.

Projects within the study area have been obtained from the planning studies identified in Table 1 and other sources including:

- Town of Williston's Development Bylaw;
- CCRPC Transportation Improvement Plan (TIP);
- VTrans State Transportation Improvement Plan (STIP); and
- VTrans Capital Program.

FIGURE 3: EXIT 12 TID IDENTIFIED PROJECTS



For the purposes of this study, projects in the study area have been categorized by infrastructure type:

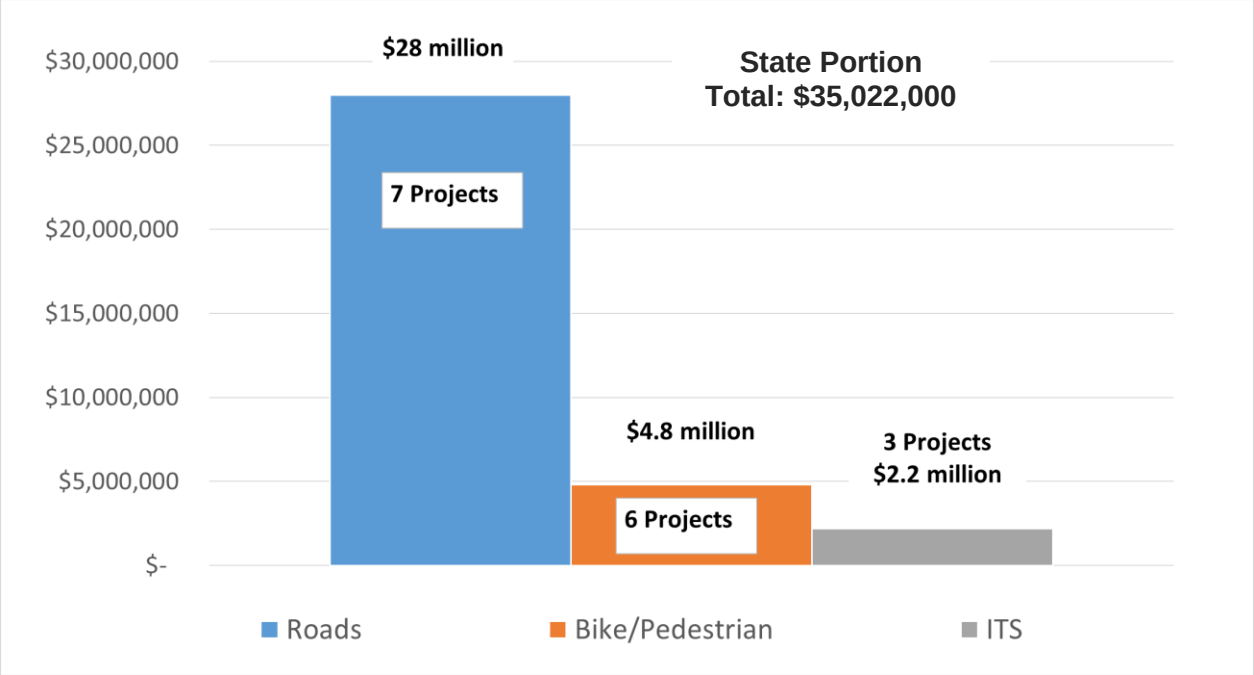
- Bicycle/Pedestrian: including bicycle lanes, sidewalks, and shared use paths.
- Intelligent Transportation Systems (ITS): Traffic Management Systems and other signal-related capacity improvements.
- Road: including new roads and intersection reconfigurations.

It is noted that the Complete Street legislation (Act 34 of 2011) ensures that any transportation project considers the needs of all transportation users and that attempts will be made to plan, build and maintain appropriate facilities for all modes.

The Exit 12 TID area includes an identified 17 projects with an estimated cost of $45.4 million. The Park and Ride facility is excluded from this analysis as it is a unique type of project in the way it creates capacity on the overall network by attracting trips to the Exit 12 area. It is not necessarily adding capacity as a benefit to the local land-use development. The 16 remaining projects total $42.3 million with approximately $7.3 million allocated to the local (Town of Williston) match and the $35 million balance allocated to the State for funding.

The costs were taken from the most recent study available for each project. Therefore, any fee derived is only indicative of the true costs as some may have increased due to inflation.

FIGURE 4: TYPES OF TRANSPORTATION PROJECTS WITHIN THE TID



The project types provide general categories for the projects, although most projects incorporate a variety of components, all enhancing and adding capacity to network. Table 2 shows the breakdown of the costs between the local and State portions estimated for the projects identified within Exit 12. The TID fees developed in this study are based on the State portion of the project costs.

TABLE 2: EXIT 12 TID PROJECT TYPES

	TOTAL ESTIMATED COST	STATE PORTION	LOCAL MATCH	TOTAL NUMBER OF PROJECTS
Roads	$35,000,000	$ 28,000,000	$ 7,000,000	7
ITS	$ 2,200,000	$ 2,200,000	-	3
Bike/Pedestrian	$ 5,115,000	$ 4,822,000	$ 293,000	6
Total	**$42,315,000**	**$ 35,022,000**	**$ 7,293,000**	**16**

4.2 PROJECT CAPACITIES

Providing additional capacity to the transportation network is the key criteria upon which all projects are compared against. It is critical that a project adds capacity to the network to comply with legal impact fee fundamentals.

The estimated total capacity of the projects is expected to be 108,900 users during PM peak hour. The capacity includes an estimated 13,500 nonmotorized (bike and pedestrian) users and 95,400 motorized users. Transportation capacity on the Exit 12 TID study area projects is expected to increase by 29,800 users during the PM peak hour by funding the estimated $42.3 million worth of transportation projects in the study area.

TABLE 3: TID PROJECTS AND FUTURE CAPACITIES BY MODE (PM PEAK HOUR)

PROJECT TYPE	EXISTING TOTAL CAPACITY	TOTAL FUTURE MOTORIZED CAPACITY	TOTAL FUTURE NONMOTORIZED CAPACITY	TOTAL FUTURE CAPACITY
Bike/Pedestrian	4,700	3,200	7,610	10,810
Roads	11,851	25,700	5,490	31,190
ITS	63,051	66,500	400	66,900
Grand Total	**79,602**	**95,400**	**13,500**	**108,900**
		87.6% of Total Future Capacity	12.4% of Total Future Capacity	+29,298 Increase in Total Capacity

Act 145 § 6106(a3) states that existing capacity has to be accounted for in the impact fee equation and cannot be paid for in the impact fee calculation (i.e., cannot pay twice for the same capacity). This section covers both the current Act 145 fees that the DEC impose and any other formulae that may arise within a TID. As many of the projects increase the capacity of existing facilities, rather than create brand new facilities, it is critical to determine how existing capacity is accounted for within the project cost.

Table 4 outlines how the project cost within the TID changes after accounting for the existing capacity of the project. The volume-to-capacity (V/C ratio) of each facility or project was determined for the current 2017 condition and the future 2030 condition[2]. For example, the total cost of the DDI is $15 million and the project will increase overall capacity, of which 41% is new capacity, which results in $6.15 million in cost related to new capacity. The proportion of project cost allocated to new capacity is the value which this study will use for the derivation of fees.

TABLE 4: TID COST FOR NEW CAPACITY (BASED ON % OF NEW CAPACITY)

	NEW MOTORIZED CAPACITY	NEW NON-MOTORIZED CAPACITY	STATE PORTION OF PROJECT COST	STATE PORTION COST OF NEW CAPACITY
Roads	13,849	5,490	$ 28,000,000	$ 18,558,368
ITS	3,549	300	$ 2,200,000	$ 246,145
Bike/Pedestrian	0	6,110	$ 4,822,000	$2,276,546
Total	**17,398**	**11,900**	**$ 35,022,000**	**$21,081,059**

[2] Volume to Capacity is a quantified measure of capacity taken from operational analyses in the planning studies. Capacity was derived for each project in the TID to compare pre- and post- project to obtain new capacity.

5.0 ACT 145 EXISTING DEC FEE

5.1 DEC FEE OVERVIEW

VTrans and the regional DECs are assessing the Act 145 fees on developments which increase net vehicle traffic (PM peak hour) when a development requires an Act 250 permit. The Act 145 language states that the fee should be based on vehicle trips and capital costs shall include all modes that benefit or mitigate the impacts of the land-use project (see § 6106(2)).

VTrans has established a methodology which attempts to capture a fair share cost allocation, using capacity as the metric. Each vehicle consumes equal amounts of capacity. Projects in the State capital program are evaluated to determine the future capacity, and any trip consuming available capacity is charged a fair share impact fee. VTrans has been assessing each of the projects in the STIP and recommending a fee to be imposed by the DEC. The fee equation is:

$$Fee = {Project\ Cost}/{Total\ Capacity}$$

The project cost can be reduced to account for deferred maintenance and other project-specific funds allocated to the project (e.g., safety). The total capacity is often a theoretical maximum based on maximum flow rates and optimal conditions that are difficult to achieve. The net fee is further adjusted by VTrans to reflect a variety of other aspects of the land-use development. These include:

- Location of the development. The fee is reduced by 50% when the development occurs within a designated area for growth (growth center, village center, new town center, and designated downtown).
- Transportation Demand Management. When the land-use development includes operational, financial, and physical infrastructure to reduce the number of net vehicle trips generated by the project. Often these include ways to encourage walking, cycling and transit use.

5.2 MULTIPOINT ACT 145 FEES

The majority of VTrans STIP projects eligible for Act 145 impact fee funding are single point projects, such as a bridge, interchange, or intersection. However, there are additional complexities when the Act 145 fee is applied to complex roadway projects that include different multimodal facility improvements (intersections, shoulders, sidewalks, bike lanes, etc.).

One of the earlier Act 145 fee projects was the I-89 Exit 16 DDI and US7 Corridor Upgrades in Colchester, which created an aggregated impact fee for the overall project by summing each impact fee for the project components to get an area wide fee. The Exit 16 area fee is $1,170 per PM peak hour vehicle trip.

TABLE 5: EXAMPLE MULTINODE ACT 145 FEE (EXIT 16 COLCHESTER)

INTERSECTION	PROJECT CAPACITY COST	BASELINE PEAK HOUR VOLUMES	BUILD CAPACITY VOLUMES	ELIGIBLE TRIPS	COST PER TRIP (TOTAL CAPACITY)	ANTICIPATED COST RECOVERY
Variable	[D]	[E]	[G]	[H]	[I]	[J]
Formula				= G-E	= A/G	=H*I
Rathe Rd/Champlain Dr.	$1,486,895	2,758	4,274	1,517	$348	$527,608
Mountain View Dr.	$1,844,847	4,115	6,502	2,387	$284	$677,222
Interchange	$3,363,225	4,496	6,249	1,753	$538	$943,639
Total	**$6,694,967**	**11,369**	**17,026**	**5,657**	**$1,170**	**$2,148,469**

By structuring the fee in this way (identifying the fee per intersection), it is important that the collection of the fee be managed to avoid over-collecting as well as minimizing the administrative complexity. Rather than charge a vehicle for each possible node of impact, the fee has been aggregated and the project, as a whole, is treated as one entity. This means that *any vehicle* affecting *anywhere within* the Exit 16 project area will be assessed the $1,170 per PM peak hour vehicle.

More recently, multipoint projects have used a slightly amended methodology which calculates the average cost of total capacity throughout the entire project. This approach treats the entire project as one entity as most projects are difficult to allocate specific costs to individual areas of the project. The Champlain Parkway (Burlington, VT) example in Table 6 shows the updated methodology for a combined project capacity and fee derived by dividing the project cost by the capacity.

TABLE 6: EXAMPLE MULTIPOINT ACT 145 FEE (CHAMPLAIN PARKWAY)

ESTIMATED COST OF CHAMPLAIN PARKWAY PROJECT #: MEGC M 5000(1)	$37,100,000
Total Traffic Capacity of Intersections (Veh/Hour)	14,778
Total Traffic Capacity for New Champlain Parkway Lanes (Veh/Hour)	3,800
Total Traffic Capacity for Lake Champlain Parkway Project	18,578
Base Transportation Impact Fee per PM Peak Hour Trip Passing Through the Champlain Parkway (cost/capacity)	$1,997

5.3 DEC FEE PROJECT CASH FLOW SCHEDULES

The Act 145 language allows VTrans to collect fees once a project has been identified and placed into the STIP for up to 15 years before the project is constructed. The language also allows VTrans to collect fees after the project has been constructed while capacity remains, with *no explicit time limitations imposed*.

VTrans capital planning staff will monitor, track, and estimate incoming revenues and expected outflows for Act 145 eligible projects. Maintaining a record of remaining capacity record and

tracking project funds will be an ongoing responsibility of VTrans. As the number of projects partially funded by Act 145 revenues continues to grow every year, this task is likely to increase the administrative burden on the agency. Table 7 shows a sample tracking sheet for a VTrans capital project that is being partially funded by Act 145 funds imposed by the DEC.

TABLE 7: SAMPLE - CAPACITY MONITORING

DESCRIPTION	DATE	INITIAL TRAFFIC VOLUME	ACT 145 TRIPS	ADJUSTED TRAFFIC VOLUME	% CAPACITY UTILIZATION	REMAINING CAPACITY INITIAL: (4,211 VPH)
Base Volume When Fee Established	9/29/15	1,481	0	1,481	35.2%	2,730
6 Unit Office Bldg.	9/29/15	1,481	11	1,492	35.4%	2,719
10 Unit Subdivision	4/10/16	1,492	8	1,500	35.6%	2,711
60,000sf commercial development	10/21/16	1,500	40	1,540	36.5%	2,671
Background Growth Roundabout PM Count	10/1/17	1,540	0	2,040 (500 cars)	48.4%	2,171
30 seat Restaurant	11/14/17	2,171	20	2,191	52%	2,151

See Section 9.0 for further discussion of the future complexity of administering the Act 145 fee on each stand-alone project.

VTrans can continue to collect fees for the upgrade until the capacity created by the project is exhausted. Eventually, as the available capacity becomes limited, there may be the need for additional capacity improvements. If additional improvements are to be made, then the fee would be revised to reflect the new *total cost/total capacity*, based on the new project cost and new capacity. This cycle could potentially repeat itself as growth demands additional capacity.

Sample Cash Flow for a Project

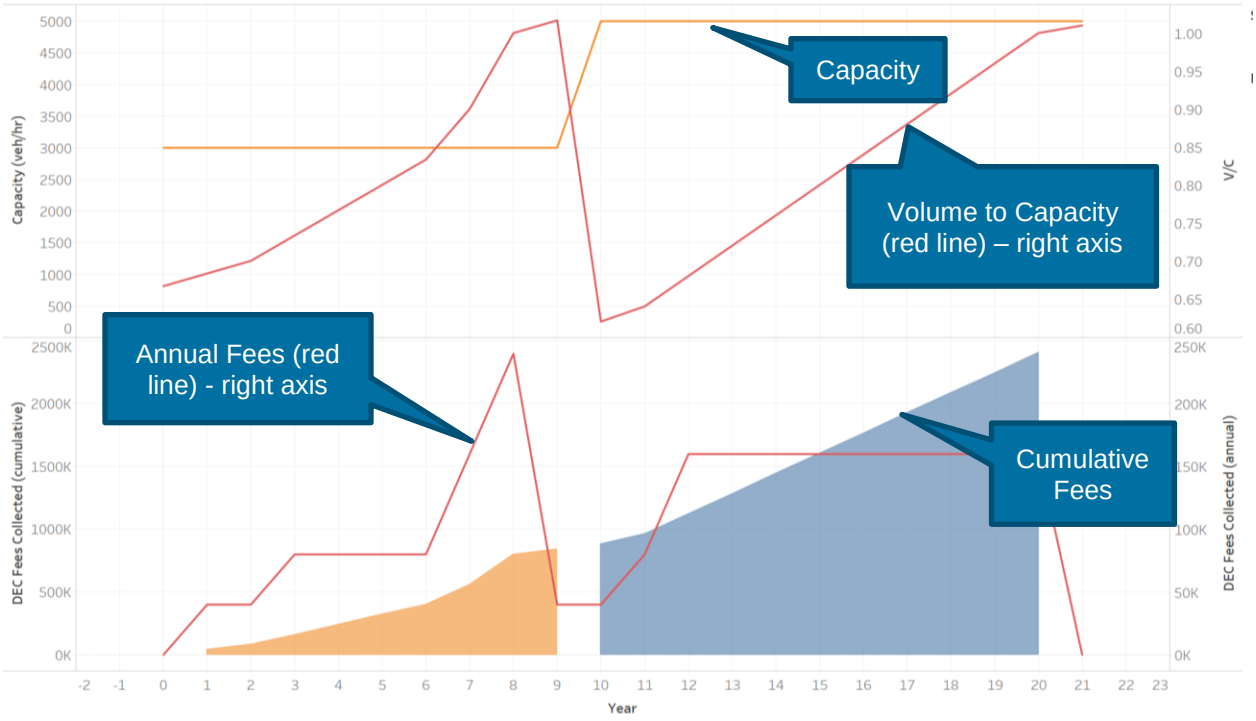
This example outlines the typical process for an Act 145 fee project over a period of time. For simplicity and alignment with existing methods, one project and only vehicle capacity (rather than nonmotorized capacity) is being assessed in this example.

- Total cost: $4 million
- The project increases the capacity from 3,000 vehicles per PM peak hour to 5,000 vehicles per PM peak hour
- Cost per capacity: $800 per PM peak hour vehicle ($4 million/5,000 vehicles)
    - Fee collection starts 9 years pre-project. V/C = 1.0 in year 9 at old capacity (3,000 vehicles per hour)

- Fees continue to be collected for 10 years post-project when new capacity (5,000 vehicles per hour) is reached
- Cumulative fees collected: $2.4 million for the project

Figure 5 shows the two dynamics, volume-to-capacity (top portion) and revenues collected (bottom portion).

FIGURE 5: ACT 145 DEC CASH FLOW ANALYSIS



Several assumptions and comments on this fee collection structure:

- The top half of the figure shows the capacity (left axis) and volume-to-capacity ratio (right axis) for each year. The bottom half shows the annual impact fee collection (left axis) and the cumulative impact fees collected (right axis) for pre- and post- construction.
- The project has an existing demand which will not be charged an impact fee. In this example, the existing demand, at year 0, already consumes 70% of the project capacity (5,000 vehicles per hour).
- Once the project fee has been identified by VTrans and imposed by the DEC, only new users who go through an Act 250 planning process are paying the Act 145 fee for the new facility.
- This example assumes assessing the fee on 100% of new traffic through the facility, which is not guaranteed. Periodically, the volume-to-capacity ratio must be analyzed to determine when the excess capacity has been consumed by traffic growth. There will be a portion of background growth that will consume the project capacity that may not have been assessed an impact fee. See the example in Table 7, line 5.

The amount of revenue that can be collected is limited by the difference between the final capacity and the volume-to-capacity at the time the fees are established. The smaller the gap between existing demand and future capacity, the less revenue will be collected under the Act 145 fee and a greater share of non-Act 145 dollars must be allocated to pay for the facility.

The example discussed here is for a single, isolated project. Developing a cash flow and revenue forecast around a multipoint project using the Act 145 fee is difficult because it requires determining when the capacity will be exhausted. There may be some capacity at one node, but not at other parts of the project. VTrans will need to establish how multipoint projects will be monitored and when revenue collection will terminate.

5.4 DISTANCE FROM PROJECT

Demonstrating the rational nexus (impact and benefit) between the land-use project and Act 145 is a critical legal fundamental construct. Case law has generally supported municipal boundaries as a reasonable legal boundary to which assign benefits and impacts to a project could be used in municipal impact fees. In Vermont, local jurisdictions are empowered to define local policies and plans (e.g., Comprehensive Plans) that the state must pay deference[3].

The geographic extent of the impact is most often demonstrated by a trip distribution conducted within a traffic impact study by a traffic engineer. However, as inferred in the VTrans Traffic Study Guidelines[4] it has not always been necessary to provide an estimate of traffic impact or distribution of project traffic when the land use is anticipated to generate fewer than 75 peak hour trips.

However, since Act 145 DEC impact fees are being assessed on all sizes of development (as long the land-use development triggers Act 250), it is possible to charge an impact fee on all sizes of land-use developments, not only the ones which may generate more than 75 peak hour trips. This requires a traffic practitioner to determine the number of trips and distribute those trips onto the transportation network for all land-use developments that have Act 250 review. This new condition poses a challenge to the traffic engineering profession given that the 75 vehicles per hour threshold is removed. Does this suggest that an estimate of location and distance for every trip generated? How far does one go with the distribution?

Distance between a trip generator (land-use development) and an Act 145 project is important for establishing legal jurisdiction within the rational nexus test, but it is also important when there may be more than one Act 145 eligible project proximate to a land-use development.

To address the question of distance, RSG analyzed trip lengths within Vermont by trip purpose obtained from the 2009 National Household Travel Survey. Trip purpose can be associated with

[3] Is home rule the answer? Clarifying the influence of Dillon's rule on growth management. Bookings. Richardson, Jr., Jesse and Gough, Meghan. January 2003. https://www.brookings.edu/wp-content/uploads/2016/06/dillonsrule.pdf

[4]https://vtrans.vermont.gov/sites/aot/files/planning/documents/trafficresearch/TISGuidelinesRevisedSeptember2018CGC.pdf

land uses and this information can inform a 'trip shed' or distribution for any specific development. The average person trip length is shown for the following generalized land-use types. Note, a trip is a one-directional leg of a journey (e.g., going to work from home is a trip). Person trips were used rather than vehicle trips, as the person trip is mode agnostic.

TABLE 8: AVERAGE VERMONT PERSON TRIP LENGTHS BY LAND USE (2009 NHTS[5])

	HOUSEHOLD	RETAIL	COMMERCIAL	INSTITUTIONAL
Average Person Trip Length (mi)	10.3	6.3	15.4	7.4
	To work and back, recreation trips, walking dog, visiting friends, other	Shopping/errands, groceries/clothing/ hardware Buy gas Get/eat meal Fast Food	Work based trips	To school, religious activity, library

The average person trip length is a method to determine the influence area associated with a land-use development the range of State Act 145 projects or TIDs which may be affected. Two challenges exist to a simple distance-based account of impact:

1. As the distance from the land-use project increases, the route choice and the rational nexus to any specific project becomes less certain. Urbanized areas have numerous paths and many more destinations along the travel path. Urbanized areas often have shorter trips than suburban and rural areas. It would be expected that Chittenden County would have shorter trip lengths than other counties in Vermont due to the greater degree of urbanization.
2. The actual capacity impact of land-use development may be double counted if two developments (a generator and an attractor) are located within the average travel distance to each other. The trip length is the distance between an origin (generator) and a destination (attractor). Whereby only one person/car made the trip, if each land use was being permitted separately, each land use would view that one person separately as a trip end.

Each of these challenges can be addressed in numerous ways. The following have been suggested in this study:

1. Travel models and other Origin-Destination data can be used to determine a possible route choice given the specific size and nature of the land use relative to the region. The Chittenden County Regional Transportation Demand model[6] could be employed for developments in Chittenden County. Alternatively, locally observed urban area trip

[5] RSG obtained trip length by purpose from 2009 NHTS Vermont sample and aggregated general purposes.
[6] A TransCAD regional demand model owned and operated by the CCRPC

lengths could be used. Lastly, a manual distribution could occur down to a threshold of <10 peak hour trips[7].

2. To reduce the possibility of double counting the trip at each end of the trip, the average trip length can be divided by two, which would enable each permitted trip end to consider their length separately. The person trip length table is changed to the values in Table 9.

TABLE 9: DISTANCES FOR PROJECT INFLUENCE BY LAND-USE TYPE

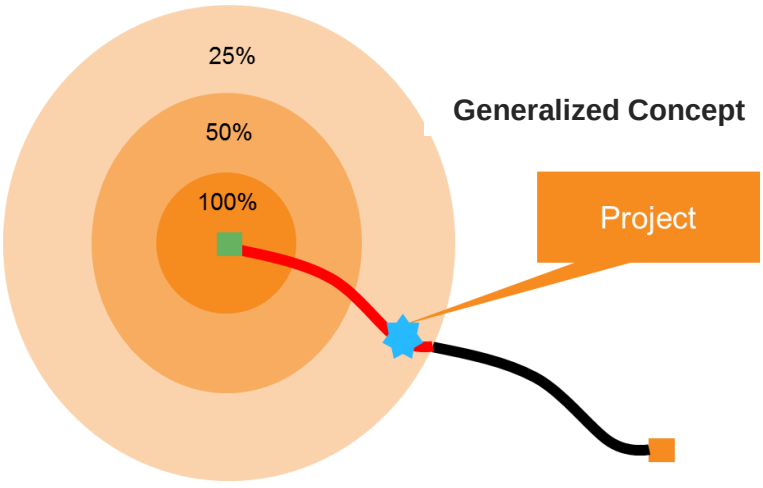
	HOUSEHOLD	RETAIL	COMMERCIAL	INSTITUTIONAL
Average Person Trip Length (mi.)	5	3	7	3

The distances in Table 9 may be most appropriate in suburban and rural areas with limited network and routing options, longer linear paths of travel, lower density of generators and attractors given they are based on the statewide average travel distances.

Applying the distance threshold is done using the following steps:

1. Determine the distance threshold in Table 9 based on the land use(s) found in the project development. Mixed-use projects (those with more than one of the uses) would use these distances for each of the external trips on the adjacent highway network for each land use after any mixed-use internal trip reductions[8].
2. Distribute the trips generated by the project on the adjacent highway network using these distances to determine the number of trips from the project site toward the VTrans Act 145 project.
3. A review as to the effects that intersections have on the distribution between the project site and the land-use development(s), which provides opportunities for project trips to dissipate along the network. If there are relatively few intersections, there might be grounds for a significant portion of projects trips to travel further away from the development, but if there are a number of substantial intersections, then it would be logical that fewer trips may travel the full distance to the project site. The level of attractiveness for any side road between the land-use project and the Act 145 could be generally

FIGURE 6: GENERALIZED DISTANCE CONCEPT



[7] It is assumed that there is little confidence in the assignment of fewer than 10 trips to a network
[8] Typical reductions used in traffic studies to account for trips which do not leave the project site.

assessed as a weighted gravity model based on the annual average daily traffic of the facility. See Figure 8 and Figure 7 for an example of this.

An initial guideline to start the analysis is shown in Table 10.

TABLE 10: GENERIC TRIPS VS DISTANCE REDUCTION

		MILES FROM PROJECT			
		Household	Retail	Commercial	Institutional
Avg. Trip Length		5	3	7	3
% of Trips	100%	< 0.5	< 0.5	< 0.5	< 0.5
	75%	1.00	0.75	1.25	0.75
	50%	2.00	1.25	2.75	1.25
	25%	3.5	2.00	4.75	2.00

The generic distance-based reductions on the number of trips that may reach certain distances away from the land use can be altered to reflect whether the project is in an urban, suburban, or rural area (see Table 11 to Table 13). The key difference between these different land-use contexts is the dissipation rate of trips as the distance from the land-use project increases. The general phenomenon is displayed in Figure 7.

TABLE 11: URBAN TRIPS VS DISTANCE REDUCTION

		MILES FROM PROJECT			
		Household	Retail	Commercial	Institutional
Avg. Trip Length		5	3	7	3
% of Trips	85%	< 0.5	< 0.5	<.70	< 0.5
	75%	0.75	.60	.85	0.60
	50%	1.25	1.00	1.75	1.00
	25%	2.75	1.75	3.5	1.75
	15%	3.75	2.00	4.75	2.25
	5%	4.50	2.50	6.25	2.60

TABLE 12: SUBURBAN TRIPS VS DISTANCE REDUCTION

		MILES FROM PROJECT			
		Household	Retail	Commercial	Institutional
Avg. Trip Length		5	3	7	3
% of Trips	85%	< 0.6	< 0.5	<.75	< 0.5
	75%	1.00	.70	1.25	.70
	50%	2.00	1.25	2.50	1.25
	25%	3.25	2.00	4.75	2.00
	15%	4.25	2.40	5.75	2.40
	5%	4.75	2.75	6.50	2.75

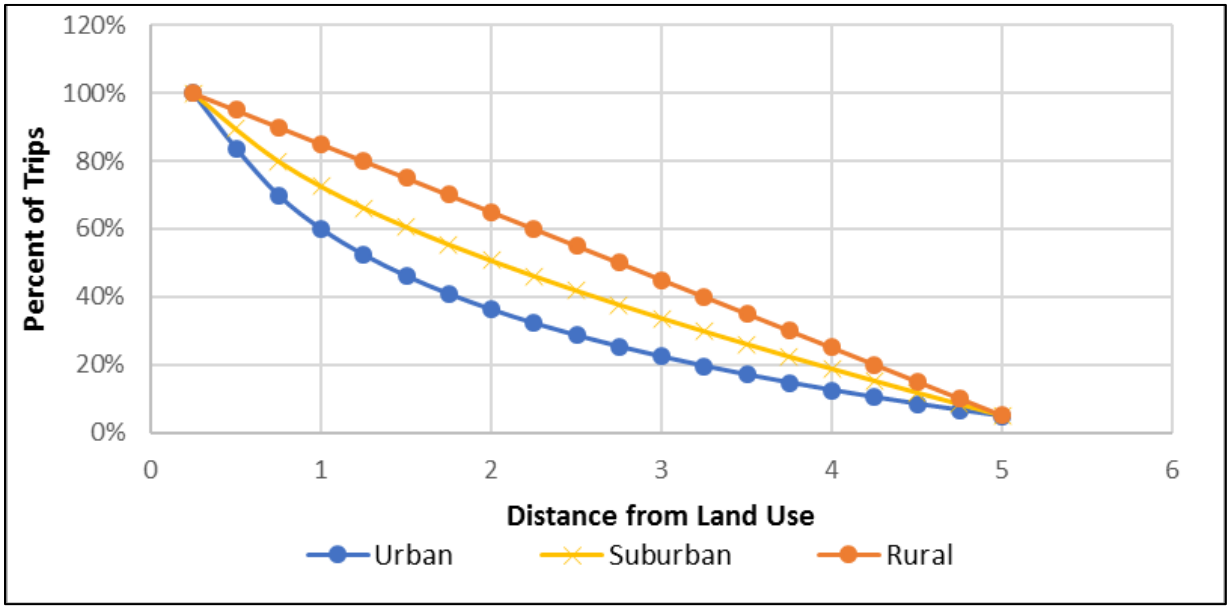
TABLE 13: RURAL TRIPS VS DISTANCE REDUCTION

		MILES FROM PROJECT			
		Household	Retail	Commercial	Institutional
Avg. Trip Length		5	3	7	3
% of Trips	85%	< 1.0	< 0.5	<1.25	< 0.5
	75%	1.5	0.65	2.00	0.65
	50%	2.75	1.60	3.50	1.60
	25%	4.00	2.25	5.25	2.25
	15%	4.50	2.6	6.00	2.6
	5%	5.00	3.0	6.75	3.0

An example for a household trip distribution for urban, suburban and rural regions is shown in Figure 7**.** The rural area is assumed to have a general linear distribution over distance, with the urban being more inverse logarithmic in nature, with the suburban being an average of the two.

Option one is the straight-line distance approach.

FIGURE 7: HOUSEHOLD TRIP DISTRIBUTION BASED ON REGION-EXAMPLE

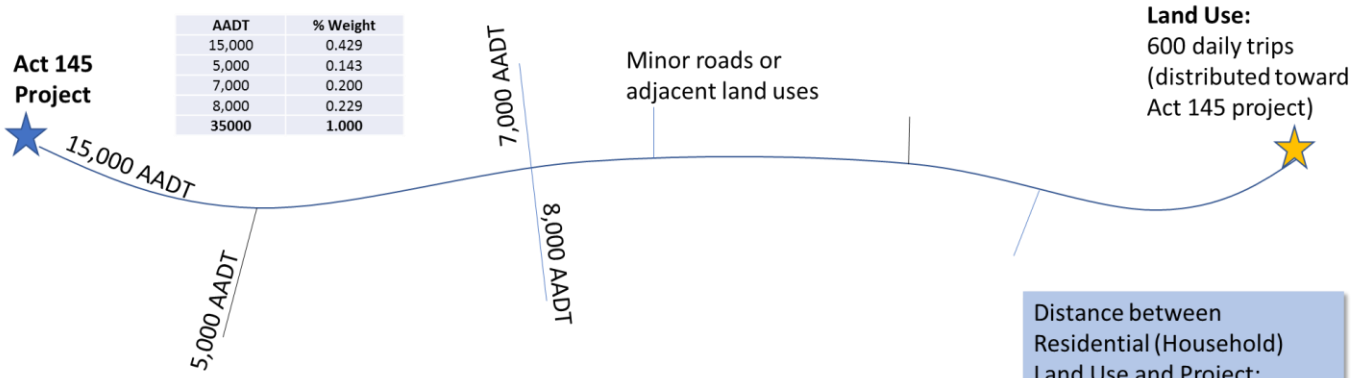


Option two combines the distance-based deterioration as well as accounting for major intersections between the land-use development and the Act 145 project.

Figure 8 explores two options on how integrating the distance profiles identified and intersecting roads, may affect the distribution of project traffic.

These approaches are built on high-level assumptions based on statewide National Household Travel Survey data. **Additional research is needed to develop Vermont-specific trip distance profiles**.

FIGURE 8: DISTANCE-BASED FEE OPTIONS



Option 1: Use Distance and Region Condition to inform trips.

- 600 x 25% = 150 daily trips
- 15 peak hour trips

Option 2: Use Distance and Weighted Distribution to discount total trips that may affect project

- Weighted Average distribution. Means that 43% of trips may reach project area.
- (43% x 600 = 258 daily trips)
- (25% x 258 = 64.5 daily trips)

= 6 peak hour trips

Option 2 "double counts" the dispersion effect of distance by taking the general distance reduction and accounting for major side roads.

Distance between Residential (Household) Land Use and Project: 3.1 miles

Suburban Condition: (Chittenden County, non-Burlington)

25% of trips may reach the project.

6.0 TRANSPORTATION IMPROVEMENT DISTRICT

The following chapters explore the feasibility of a TID in the Exit 12 area and the steps necessary to create and management it.

The Act 145 legislation defines specific criteria that must be met to create a TID[9]:

- Defined geographic extent;
- Land-use assumptions;
- Performance standards;
- Consistency with municipal and regional plans;
- Multimodal capacity (highway, transit, bicycle, and pedestrian infrastructure);
- Fee shall reflect the rational nexus between the need for improvements (proposed land-use projects) and the benefits provided; and
- Fee assessed shall be roughly proportional to the benefits and impacts.

Within the Exit 12 study area many of the TID criteria are already well defined given the level of scrutiny and investment that has been made in planning the growth center. The geographic extent and land use is established, and the project list has evolved with time and is well defined. The infrastructure is multimodal in nature and the planning work that has been conducted provides a strong rational nexus between the need for the projects associated with the growth and development in the area as well as the beneficiaries of those capital improvements.

The State portion (nonlocal) of the cost of the projects within the TID is adjusted to reflect the cost of new capacity associated with accommodating growth (See Section 4.2 Table 4). The projects are aggregated by each project type in Table 14.

TABLE 14: NEW CAPACITY PROJECT COSTS IN TID

PROJECT TYPES	STATE COST	NEW CAPACITY PORTION OF STATE COST
Bike/Pedestrian	$4,822,000	$2,276,545
Road	$28,000,000	$18,558,368
ITS	$2,200,000	$246,145
Total	**$35,022,000**	**$21,085,058**

[9] § 6105

7.0 FEE MECHANISMS

7.1 OVERVIEW

This chapter explores a range of fee mechanisms that could be implemented in the Exit 12 TID study area. Each method is described, advantages and disadvantages are discussed, and fee values are derived.

7.2 DEC FEE IN A TID SCENARIO

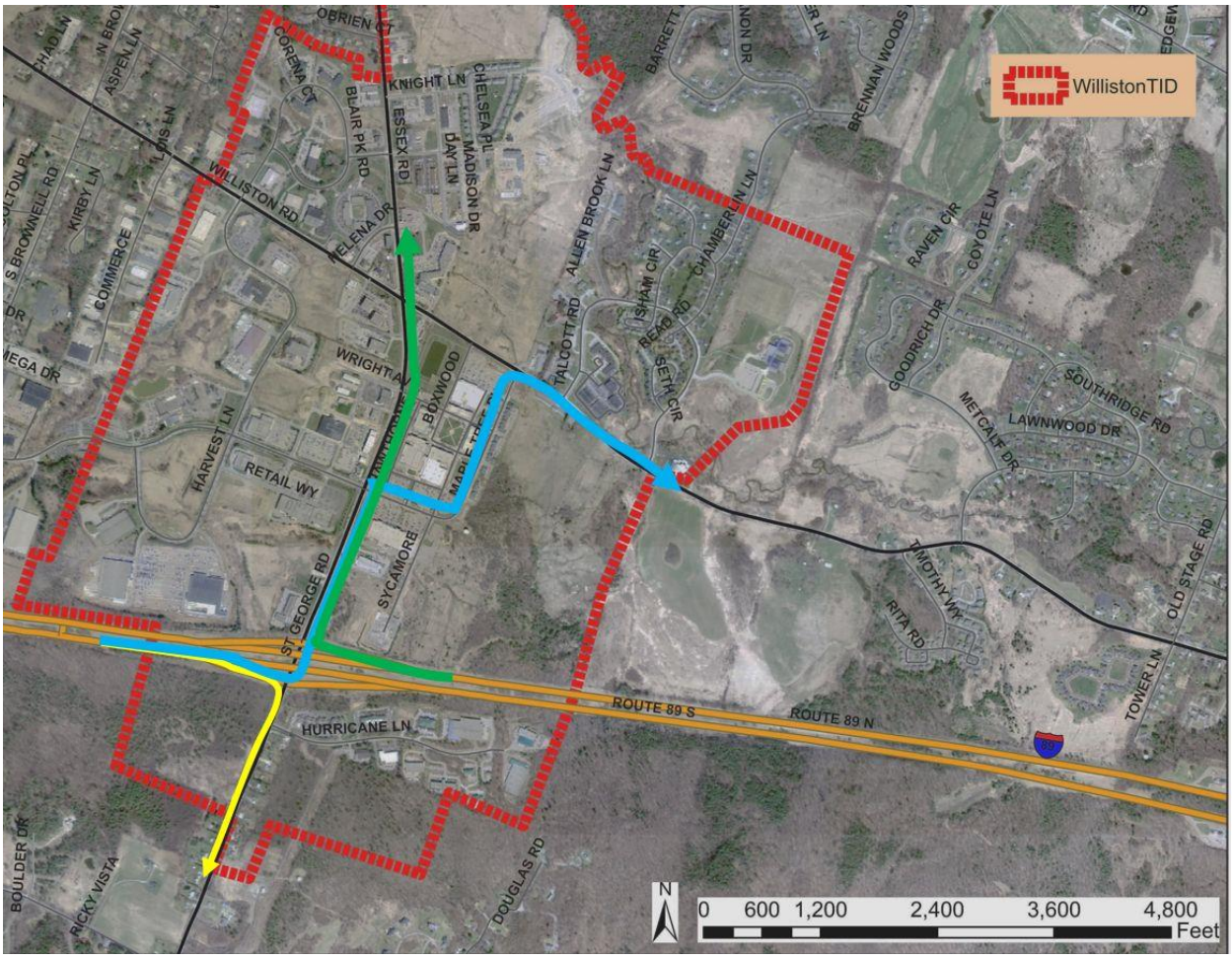
The Act 145 DEC impact fee has established a straight forward and rational connection between vehicle capacity projects and proposed traffic generators in proximity to the project. The DEC fee is more challenging to implement in larger projects, such as the Exit 16 project or Champlain Parkway, which include subelements or nodes to the overall project, each with their own costs and capacities. How these subelements combine to generate an overall project-specific fee can provide an initial framework for how using the existing Act 145 DEC fee structure might look when combining several projects together within a TID.

The Act 145 DEC fee method developed to date is *total cost/total capacity*. The approach taken at Exit 16 was to develop a node-by-node fee estimate and aggregate them into a total area fee. This approach increases the complexity and difficulty of tracking how capacity is consumed over time. In larger network projects versus the linear nature of the Exit 16 area, capacity is likely to be consumed in one location and not another. The fee must reflect the rational nexus that the impact fee is proportional to the level of impact, making network multi-nodal fees complex to manage.

The strength and benefit of the simple **cost/capacity** equation is that it treats all capacity equally and therefore is fair and proportional. It accounts for existing users and all future users paying for their level of capacity consumption at the same rate.

The challenge is that in a zone or TID type of approach, a vehicle or user who enters the zone will consume different amounts of capacity depending on the distance traveled or nodes affected within the zone. Therefore, it is more challenging to charge users fairly. See Figure 9 for a graphical representation of this issue. The different colors are various routes for traffic within the TID boundary. Each of the routes consume different amounts of total capacity within the system.

FIGURE 9: TID AREA WITH DIFFERENT TRIPS AND DIFFERENT USE OF CAPACITY



The DEC fee included within Act 145 operates under different rules than a TID. The additional requirements of the fee mechanism within a TID suggest that the current DEC approach needs modifications to account for the following additional criteria:

A. Incorporating multimodal capacity;

B. Identifying performance standards; and

C. Maintaining a proportional benefit vs fee.

A: Multimodal Capacity

Two approaches are identified to fund multimodal capacity; both would require an assessment of the types of trips to be generated by a proposed land-use development.

1) Cost of capacity for each mode and establishing what the relative cost of each project is when allocated to each mode. **Pros**: revenue collected will likely be higher, as vehicle modes are more expensive and will most likely reach capacity first. Having a different fee for each mode may encourage a higher nonmotorized demand and supportive land

uses. **Cons**: increased complexity requires more information to quantify proportional demands and costs by mode.

An example project in Table 15 shows the motorized fee at $480 per trip while the nonmotorized fee at $124 per trip. Each land-use development would then be required to identify which capacity mode they are generating to determine their impact fee value.

TABLE 15: DEC ACT 145 MULTIMODAL FEE EXAMPLE

MODE	NO BUILD CAPACITY	COST	BUILD CAPACITY	CHANGE IN PEAK HOUR CAPACITY	IMPACT FEE BY MODE COST/TOTAL CAPACITY
Motorized	2,500	$2.4 million	5,000	2,500	$2.4 million/5000 = $480
Nonmotorized	0	$200k	shared use path: 850	4,850	$600k/4,850 = $124
		$100k	sidewalk: 400		
		$300k	bike lanes: 3,600		
Totals	**2,500**	**$3 million**	**9,850**	**7,350**	**$3 million/9,850 = $305**

2) Combine the overall capacity. **Pros**: easier to obtain a fee per user. Treats all capacity equally, regardless of mode. **Cons**: may lower the fee and decrease the amount of revenue generated.

- The example above, the total cost/total capacity = $3,000,000/9,850 = $305 per user.
- If the vehicle capacity fills up first, only $762,500 will be collected ($305 * 2,500) versus $1,200,000 ($480 x 2,500).

For reference, the City of Portland, Oregon[10] uses a method similar to option 1, whereby they determine their mix of projects and establish the cost for each mode within each project. The City uses a regional model to forecast the number of trips for each mode and identifies a modal impact fee based on trips (i.e., a motorized cost per trip and nonmotorized cost per trip).

Each land-use project is then assessed by the number of generated person trips by land use and the fee is a prorated on the cost of motorized & nonmotorized projects. For example, a single-family residence generates 12 person trips per day, of which 8% are nonmotorized. Therefore, using the modal impact fees in Table 15, (1 * $124) is the nonmotorized fee component, and 92% is motorized, thus (11 * $480) is the motorized fee.

[10] https://www.portlandoregon.gov/bds/34186 (System Development Charges)

B. Performance Standards

Performance standards guide two areas of project and fee development. The first area is the size (i.e., capacity) and the associated cost of providing that capacity. A question exists as to which measure of LOS (e.g., delay, safety, reliability, volume-to-capacity ratio) should be used to define the performance standard. A question also exists as to which volumes that performance standard should be assessed: annual average daily volumes; peak periods; or the average day, the 30th highest hour, or other design hour (i.e., 100th or 200th highest peak design hour factors). VTrans LOS Policy currently uses delay (overall LOS "C") and the 30th highest hour during the year as their guidance for the standard and when to assess that standard. The selection of a low threshold for congestion will create a larger and more expensive facility. The marginal cost of each additional unit of capacity is assumed to rise, as more and more impacts are associated with the project.

The second area is the temporal equity that a user today paying taxes and using the infrastructure, or perhaps those who already paid an impact fee, have an expectation of using the capacity at a specified LOS to a point in the future. Although there may also be an intention to improve the LOS overtime, the gap between today's LOS and tomorrow's service standard must not be made up on the backs of tomorrow's growth. Tomorrow's growth can be responsible only for paying to **maintain**—not improve—the LOS that otherwise would have been there without their increased demand.

The existing total cost/total capacity must account for the performance standard if used within a TID. However, outside of a TID, no specific service standard is explicitly required per statute.

C. Maintain a Proportional Benefit vs. Fee

Demonstrating the nexus between those who benefit from a project and those who pay the impact fee is one of the most complex and difficult hurdles that impact fees must overcome.

A challenge inherent with any zone-based fee is how benefits are accounted for when a trip is on the edge or the border of any zone. There will inevitably be some trips that will not impact the extent of infrastructure planned in a TID, however each trip's marginal effect in aggregate creates the need for the overall set of improvements. In a network, just as each trip within a zone may not consume an equal amount of capacity, each capacity improvement improves the capacity and ability to service a higher total traffic flow in the zone.

Therefore, there is nearly always some impact by a trip in a zone, and fee calculations need to reflect a balance of the cost of each trip by avoiding assessing either the maximum or the minimum fee values. This is often achieved by finding an **average cost of impact** so that **some trips will be charged more than their actual impact and some trips will be charged less than their actual impact**, but **on average** all trips are contributing fairly and equally to the network solution.

7.3 EXIT 12 TID DEC FEE

This section reviews how adapting the existing DEC fee structure could work within a TID environment.

Average Capacity Method: This method aggregates the total costs and the total capacities to obtain an average cost of capacity in the Exit 12 TID area. This gives a value of **$322 per PM peak hour capacity**. The cost is derived in the Table 16.

TABLE 16: AVERAGE CAPACITY METHOD DEC FEE FOR EXIT 12 TID

PROJECT TYPES	TOTAL FUTURE CAPACITY	STATE COST
Bike/Pedestrian	10,810	$4,822,000
Roads	31,190	$28,000,000
ITS	66,900	$2,200,000
Total	**108,900**	**$35,022,000**
	Motorized Capacity: 95,400 Nonmotorized Capacity: 13,500	Total Cost/Total Capacity = $322

This approach can be administered in one of two ways. The first method is to charge any trip which enters the TID the base capacity charge, regardless of how much capacity the user consumes. The second is to attempt to understand the amount of capacity each new trip is consuming in the TID. This would require a trip distribution through the TID and more intense record keeping.

These two methods offer up the two extremes of logical fee collections using the total cost/total capacity methods. One method may be technically more accurate but comes with the burden of additional analysis and management time, while the other is more simplistic and efficient but will result in significantly lower revenue collected. See below for the derivation of $322 per trip in Approach 1 and $1,288 per trip in Approach 2.

Approach 1: Charge the **$322 per vehicle trip** that is generated or attracted by land-use development within the TID. Approach is summarized in Table 16.

Approach 2: The fee applies at each project within the network in which the trip consumes capacity. For example, a trip exiting I-89 and destined to Essex consumes capacity at each of the projects: Exit 12; optimized signals in Exit 12; new signal on VT2A; and the advanced traffic management system (ATMS) along VT2A.

The impact fee is then the result of:

$322 x (capacity consumed on network) = impact fee assessed

The example of one vehicle trip using Approach 2 as it travels through several projects within the TID is:

- Exit 12 DDI: $322 x 1 vehicle

- VT2A – Local Road signal: $322 x 1 vehicle
- VT 2A ATMS system upgrade: $322 x 1 vehicle
- VT2A signal retiming: $322 x 1 vehicle

Total Fee per Vehicle: $1,288

Approach 2 has the disadvantage in that it requires significant administrative time and detailed traffic studies with specific trip distribution for each project. While the benefit is additional revenue, the disadvantages could be substantial.

Minor Project Capacity Changes

When projects are assessed using capacity as the only metric, it may sometimes be difficult to determine the net change in capacity. Situations exist where improvements may be necessary to accommodate side-street access but may not increase in overall capacity. For example, an unsignalized side-street stop intersection may need to be upgraded to either an all-way stop or a traffic signal. The change in capacity overall may be minimal because it shifts capacity from the uncontrolled leg to the other side-street movements, enabling land-use development to occur.

Table 17 shows a simple intersection example highlighting the minor overall variation in capacity for different intersection control types for a simple 4-leg intersection.

TABLE 17: SAMPLE CAPACITIES FOR SIMPLE 4-LEG INTERSECTION

GENERALIZED CONTROL TYPE	ICU	CAPACITY (VEH/HR)	LOS (MAJOR/SIDE)
Unsignalized (side-street stop)	50.8	2334	A/F
All-way stop	50.8	2159	E/B
Signalized	51.6	2472	B/B
Roundabout	-	3174	B/A

This approach highlights the need to incorporate other funding sources in addition to the Act 145 fees. Side-street access and the associated changes from a side-street stop sign to a signal or roundabout is often predicated on local land-use change on the side-street. Therefore, that local land use should be responsible for funding a substantial amount of the project. Local (e.g. municipal) impact fees, special assessments, land development regulations and developer contributions, and official maps are the most common tools.

7.4 TID DISTRICT—PLAN-BASED APPROACHES

Plan-based fee mechanisms is a frequently used method found in many Transportation Impact Fee applications nationwide. Rather than total capacity, which was reviewed in Section 7.3, this approach attempts to charge for the cost of the necessary capacity to accommodate the growth at the specified service level.

The cost of the infrastructure within the TID is adjusted to refer to the portion of the overall cost associated new capacity. The proportion of new capacity was applied to the State cost

(nonlocal) portion of each project to obtain the cost associated with the new capacity, estimated at $21,081,058 as summarized in Table 4.

Transportation Demand Growth

A review of the land-use forecasts within the regional traffic model informed the magnitude of anticipated land-use changes from 2010 to 2035. The land-use model was reviewed with the Town to confirm growth totals and locations of anticipated land-use changes. The land-use changes, measured in number of households and employees, are converted to trips using rates from ITE. These trips are shown in Table 18.

TABLE 18: NEW TRIPS (PM PEAK) GENERATED IN WILLISTON (2010-2035)

	HOUSEHOLD	RETAIL	COMMERCIAL	INDUSTRIAL	INSTITUTIONAL	ACCOMODATION	TOTAL
Townwide	1,557	924	1,255	272	981	246	**5,235**
TID	819	264	542	5	11	0	**1,642**
% of Town Traffic Growth occurring within the TID	52.6%	37.3%	43.7%	1.9%	1.3%	0%	**-**

The anticipated changes in land-use development to occur within the TID will generate an estimated 1,642 trips during the PM peak hour. This estimate was generated for the purposes of this study only and used past data to inform this process of estimating the base fee. Any future studies would have to conduct necessary planning and modeling work to more accurately estimate future land use and traffic demand in the study area. The table of land-use changes and base vehicle trips is included in the Appendix.

In addition to land-use development and vehicle trip generation within the TID, there will be growth outside the TID generating trips passing through, consuming some capacity within the TID. For trips that are generated within the TID there will be a portion that remain inside (origin and destination within the TID), while for others their destination may be external to the TID. For internal trips (internal origin and internal destination) the trip cannot be charged twice for the same actual vehicle, therefore the number of trip ends is divided by two. The internal capture rate (portion of new trips which have both an internal origin and destination) is estimated at 35% for the TID. This is based on the higher end of typical mixed-use reductions for site development[11]. Figure 10 shows the breakdown of internal and external trips passing through the TID.

[11] ITE Trip Generation Manual

FIGURE 10: LAND-USE ORIGIN-DESTINATION TABLE

	INTERNAL	EXTERNAL
Internal	(I to I)/2 = 576 / 2 = 288	534
External	535	1,380

Table 19 shows the derivation of the internal trip ends, the total growth in the TID and the Town, and the amount of external trip end growth. The resulting 2,737 trip ends are the new trips forecast (local growth and external growth) to be traveling within and through the TID, of which **1,357** are generated by land-use changes and eligible for impact fees (after accounting for an internal reduction in trips).

TABLE 19: DERIVATION OF CHANGE IN VEHICLE TRIPS IN TID (2010 – 2035)

VEHICLE TRIPS (PM PEAK HOUR)	DESCRIPTION
5,235	Total new Townwide trips associated with growth between 2010 and 2035
1,642	Total new trips associated with growth center development between 2010 and 2035
1,357	Growth center fee eligible trips after accounting for internal capture, estimated at 35%
1,840	Total new trips due to external growth traveling through Town (estimated that 74% of the growth is associated with local growth)
1,380	New external trips within the growth center (estimated at 75% of new external-to-external growth)
7,075	Total new trips in the Town of Williston (external and internal)
2,737	Total new trips in the TID (external and internal)

Using the estimated growth in vehicle trips the following analysis summarizes three different approaches, each of which is commonly used within different impact fee systems:

- Vehicle Trip based fee;
- Vehicle Miles Traveled (VMT) based fee; and
- Person Miles Traveled (PMT) based fee.

Vehicle Trip Fee

The vehicle trip fee approach is the most common plan-based transportation impact method. The base impact fee is determined by dividing the TID infrastructure costs of new capacity by the change in trip ends in the TID. Table 20 shows the base impact fee estimate at $7,704 per PM peak trip end.

- Trip Generation estimate for each development
- Per Trip Fee

TABLE 20: PLAN-BASED IMPACT FEE BY VEHICLE TRIP

	COST OF NEW CAPACITY (STATE PORTION)
TID Infrastructure Cost	$35,022,000
TID Cost of New Capacity	$ 21,081,058
Growth in Vehicle Trips in TID (internal & external)	2,737
Basic Fee per PM peak vehicle trip end	$7,704
Growth Center Trips (local trips)	1,357
Local Revenue	$10,451,840
TID Revenue Portion	29.84%
Impact fee funding gap in TID	($35 million – Local Revenue) $ 24,570,160

This approach suggests that VTrans could meet approximately 30% of the State's portion by implementing this fee. The gap in revenue is mostly a function of the percentage of a project devoted to rebuilding existing capacity and the large amount of through traffic (external-to-external trips).

Vehicle Miles Traveled Fee

An alternative approach to the vehicle trip fee that is becomingly increasingly more common around the country is based on VMT and in more recent evolutions, PMT. The miles traveled approach allows local travel conditions to be reflected by using National Household Travel Survey (NHTS) data (or other localized surveys) to inform trip lengths. Miles traveled is often perceived as a strong connection between the level of impact (more miles traveled) and the amount of infrastructure capacity used.

- VMT Table by land use
- Fee allocated to each mode. Specified by mix and types of projects or by;
- Future expectations of mode share

The 2009 NHTS data provides an estimate of the average vehicle trip length within the Town of Williston, at 9.43 miles[12]. The Townwide VMT was calculated using the statewide average rates[13] for each land use and then divided by the number of anticipated trips per land use. The

[12] 2009 NHTS Transfer data for Vermont. Town of Williston census block.
[13] VTrans analysis of NHTS data for Vermont by trip purpose. See Section 5.4 of report.

two calculations of the Townwide VMT was compared to develop a factor to adjust each land use to reflect the longer driving distances in Williston relative to the statewide average.

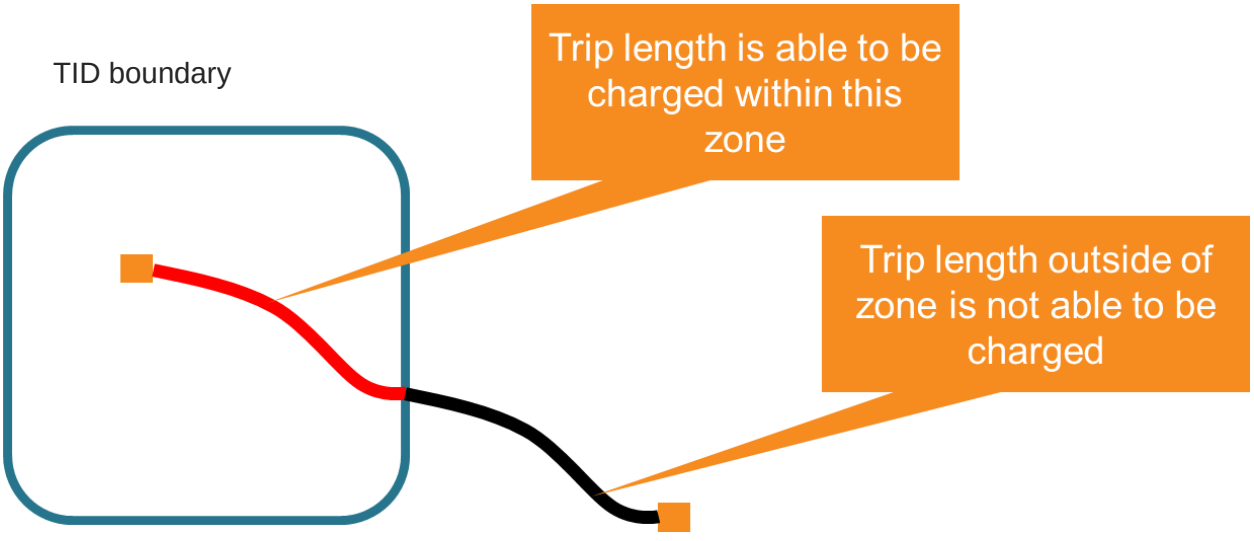
$$Local\ Factor\ = \frac{(9.43\ x\ Total\ Local\ Trips)}{(Trips\ by\ each\ Land\ Use\ x\ Statewide\ Avg.Trip\ Length\ per\ Land\ Use)}$$

The derived 'Local Factor' suggests that on average Williston drivers travel 2.7% further than the statewide averages.

TABLE 21: FUTURE VMT IN PM PEAK PERIOD

	HOUSEHOLDS	RETAIL	COMMERCIAL	INDUSTRIAL	INSTITUTIONAL	TOTALS
State Average Trip Length (mi)	10.33	6.34	15.43	15.43	7.43	
Local Trip Length Factor	1.027	1.027	1.027	1.027	1.027	
Townwide VMT Growth	16,527	4,609	19,665	4,319	6,405	51,525
Total new VMT in TID (incl. external-to-external)	11,412	2,600	12,134	1,177	1,711	29,034
New VMT per PM peak associated with land use in TID	7,175	1,418	7,092	69	68	15,822

While it is estimated that 15,822 new VMT will result from land-use changes within the TID, the amount of VMT occurring physically within the TID eligible to be charged for the infrastructure projects is only a fraction of this since the distance across the TID is approximately 1 mile.



The local TID trips (internal-to-external and external-to-internal) can only be charged for the VMT within the TID. Therefore, the amount of eligible VMT to be used in the fee calculation should be based on an estimate of VMT to occur within the TID.

Table 22 shows the derivation of the TID VMT estimate for the PM peak hour. The VMT generated within the TID and eligible for impact fee charges is 929 (2,309 total – 1,380 external). The distances are derived by knowing the distance across the TID is about 1 mile. For internal to internal trips, they would split the two trip ends equally. For external-to-external trips, they would pass through the full one mile. Then for the internal/external combinations it is estimated that they would travel slightly more than halfway across the TID.

TABLE 22: TID VMT

	VEHICLE TRIP ENDS (PM PEAK)	AVG. LENGTH OF TRIP (MILES)	VMT PM PEAK HOUR
Internal-Internal	576	0.5	288
External-to-Internal	534	0.6	321
Internal-to-External	534	0.6	321
External-to-External	1,380	1	1,380
Total	**3,024**	**-**	**2,309**

Table 23 shows the fee calculation per PM peak hour VMT, indicating that approximately $8.5 million may be raised by the State if this fee were to be implemented.

TABLE 23: PEAK HOUR VMT BASE FEE ESTIMATE

	COST OF NEW CAPACITY
TID Infrastructure Cost	$21,081,058
VMT	2,309
Basic Fee per PM VMT	$9,131
Growth Center VMT	929
Local Revenue	$8,483,468
TID Revenue Portion	24.22%
State (nonlocal) Portion	($35 million – Local Revenue) $26,538,532

Person Miles Traveled Fee

The impact fee can also be developed to demonstrate a mode-neutral basis using the person trip. PMT is captured in the NHTS survey and can be estimated once VMT is established. The 2009 NHTS data for Williston indicates that PMT is 138%[14] of VMT for those trips starting in Williston.

- PMT Table by land use
- Fee allocated to each mode. Specified by mix and types of projects or by;
- Future expectations of mode share

[14]http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/subject_areas/national_household_travel_survey/transferability_statistics Person miles traveled-to-Vehicle miles traveled ratio

TABLE 24: PMT

	VMT (PM PEAK HOUR)	PMT (PM PEAK HOUR)
PMT to VMT expansion factor		1.38
Internal-Internal	288	397
External-to-Internal	321	442
Internal-to-External	321	442
External-to-External	1,380	1,904
Total	**2,309**	**3,186**

The fee breakdown and project allocation based on PMT has some flexibility, as like VMT, PMT must be estimated for every project that is built within the TID.

TABLE 25: PMT COST BY MODE

	TID TOTAL (PM PEAK)	MOTORIZED	NONMOTORIZED
Future Mode Share	-	90%	10%
PMT	3,186	2,867	319
Project Costs by proportional capacity	$21,081,058	$7,570,514	$13,510,544
Cost per PMT		$2,640	$42,406

The cost split in this example was based on the mode share of the new capacity. An analysis of the projects within the TID indicates that 40% of the new capacity will be for nonmotorized users (see Table 4). The total impact fee for any specific land use will be based on the mode share anticipated for that land use or generally for the TID. Within the Exit 12 TID a 10% nonmotorized mode share is a modest target. PMT can be allocated to the different modes of travel in an area and can be estimated for each new development.

TABLE 26: SAMPLE PMT FEE FOR SINGLE-FAMILY DWELLING

LAND USE	ITE* LAND-USE CODE	ITE* PM TRIPS	PERSON TRIPS/UNIT (PM PEAK)	PM PEAK HR PMT (WITHIN TID)	PM PMT (MOTORIZED) 90%	PM PMT (NONMOTORIZED) 10%	TOTAL
Single-Family Dwelling	210	1	1.38	0.92	$ 2,193	$ 3,914	$ 6,107

**Institute of Transportation Engineers*

The strength of moving the fee toward a PMT approach is that land-use developments would contribute on the basis of their modal impact on the overall transportation network compared to the situation where if the fee is VMT based, the fee is biased toward only charging vehicle trip focused land uses. For example, a car wash would only be expected to generate vehicles and pay an impact fee, while a small café might generate almost all walking trips depending on its location.

Developing a PMT based fee mechanism would require an extensive analysis of land uses and provide practitioners methods for identifying what the trip lengths may be for motorized vs.

nonmotorized trips. However, the PMT solution could be applied like the trip based multimodal solution discussed in Table 15 on page 24, where a motorized/nonmotorized split could be applied to all land uses in the TID.

The PMT has emerged as an attempt to fairly acknowledge and charge impacts and become mode agnostic. It the most innovative application of impact fees nationally being applied in various ways.

7.5 TID DISTRICT: CONSUMPTION BASED

Consumption based impact fee approaches are based on the average costs to provide marginal capacity. This is different than a plan-based approach, which divides the cost of the infrastructure over an anticipated number of future users. The consumption approach divides the cost over a unit of capacity and any user consuming that capacity pays that fee.

The following explores different methods for developing fees using different consumption based approaches:

- Future Vehicle Trips: Costs/Total Vehicle Trips
- Total Future Capacity: Costs/Total Capacity
- Costs of New Capacity in TID

Future Vehicle Trips

A vehicle trip fee can be derived by dividing the total TID project costs by the total vehicle trips within the TID that will use the infrastructure. From the land uses and model data on the amount of local growth and external through traffic growth, it is estimated that by 2035 there will be 31,149 vehicle trips within the TID during the PM peak hour using the projects' capacity.

This approach would base the fee on the average cost to accommodate a vehicle trip in the future, accounting for the users who are currently using the infrastructure and future users. Of the 31,149 future vehicle trips within the TID during the PM peak hour, it is estimated that the fee can only be collected on the 1,357 new trips forecast to be generated by land uses within the TID.

TABLE 27: FEE BASED ON TOTAL FUTURE NEW TRIPS

	COST OF PROJECTS (STATE PORTION)
TID Infrastructure Cost	$ 35,022,000
Future Total Trips in Growth Center (2035) - [internal and external]	31,149
Base Fee per PM peak vehicle	$ 1,124
Estimated Growth Center Trips (local trips) Growth	1,357
Local Revenue	$ 1,525,263
TID Revenue Portion	4.36%
State (nonlocal) Portion	($35 million – Local Revenue) $33,496,737

This approach is fair and equitable in that it treats each vehicle trip the same, with new trips paying for the same right to access the infrastructure as any other vehicle trip.

The revenue collection would stop when the remaining capacity is exhausted. For example, one node might fail before others. This needs to be explored further if this method is used.

Total Future Capacity

A vehicle trip fee can be derived from dividing the total TID project cost by the total capacity that the projects have within the TID. This option is similar to what the DEC fee is based on, except the TID projects have to account for multimodal capacity. Using a full combined capacity, it is estimated that the projects cumulatively have 108,900 PM peak hour user capacity. Dividing the total cost by the total capacity results in a fee of $322.

Given that the Act 145 legislation states that the fee is based on vehicle trips, this fee would be levied on vehicle trips generated by land use within the TID.

TABLE 28: FEE BASED ON TOTAL FUTURE CAPACITY

	COST OF PROJECTS (STATE PORTION)
TID Infrastructure Cost	$ 35,022,000
Total Future Capacity (PM peak hour)	108,900
Base Fee per PM peak vehicle	$ 321.60
Estimated Growth Center Trips (local trips) Growth	1,357
Local Revenue	$ 436,279
TID Revenue Portion	1.25%
State (nonlocal) Portion	($35 million – Local Revenue) $34,585,721

This approach is fair and equitable in that it treats each vehicle trip the same, with new trips paying for the same right to access the infrastructure as any other vehicle trip. The approach would require monitoring of the capacity within the TID and developing a mechanism to identify when the fee collection process should be completed.

The revenue potential of this option is the lowest given that the amount of the total capacity already consumed by existing traffic, and the amount of nonmotorized capacity that is being created is substantial relative to the number of new vehicle trips generated by the TID land uses. This option creates capacity but only generates 1.25% of the cost of that new capacity, relying on the transportation fund to close the funding gap. The challenge of funding multimodal capacity while only charging for vehicle trips is the primary deficiency as to why the cost recovery is quite limited.

Costs of New Capacity

This approach develops a fee based on the aggregate cost of the new capacity divided by the change in user capacity within the TID.

TABLE 29: FEE BASED ON NEW FUTURE CAPACITY

	COST OF PROJECTS (STATE PORTION)
TID Infrastructure Cost	$35,022,000
Cost of New Capacity	$21,081,059
Change in Capacity	29,298
Base Fee per PM peak vehicle	$720
Estimated Growth Center Trips (local trips) Growth	1,357
Local Revenue	$976,125
TID Revenue Portion	2.79%
State (nonlocal) Portion	($35 million – Local Revenue) $34,045,875

This approach is fair and equitable in that it treats each vehicle trip the same, with new trips paying for the same right to access their new capacity in the infrastructure. The approach would require monitoring of the capacity within the TID and developing a mechanism to identify when the fee collection process should be completed.

The revenue potential of this option is low, given the high capacity and the potentially low overall demand for some of that capacity, and the use of that capacity by external traffic not generated by land use within the TID. Like the approach in Table 28, the high nonmotorized capacity and fee payment on vehicle trips limits the revenue potential of this approach.

7.6 FEE SUMMARY

An impact fee is the financial mechanism to equitably allocate the costs of the infrastructure to the new users who would benefit and require the additional capacity to mitigate their impact on existing users of the infrastructure. A wide variety of options for how the fee can be derived and assessed on new development are shown in Table 30 describing the fee mechanisms evaluated and their advantages and disadvantages.

TABLE 30: FEE MECHANISMS OVERVIEW

	ADVANTAGES	DISADVANTAGES	AVG. FEE VALUE
New capacity costs/ New Vehicle Trips in TID	+ easy administration (set and forget) + vehicle trip is a common unit + high revenue	- requires land-use traffic generation - highest fee value - more complex analysis	$7,704 per PM vehicle trip end
New capacity costs/ Growth in VMT within TID	+ easy administration (set and forget) + high revenue	- requires land-use traffic generation - high fee value - more complex analysis - VMT is new concept	$9,131 per PM peak hour VMT
Total costs/Number of new trips in TID	+ vehicle trip is a common unit + low fee value + total cost can be used	- requires land-use traffic generation - lower - need to determine when fee collection stops	$1,124 per PM vehicle trip end
New Capacity costs/ New capacity of projects	+ vehicle trip is a common unit + new Capacity cost can be used + does not require land-use traffic modeling	- most administrative and management costs - low revenue	$720 per PM vehicle trip end
Total costs/Total capacity of projects	+ vehicle trip is a common unit + lowest fee value + total cost can be used + does not require land-use traffic modeling	- most administrative and management costs - low revenue	$322 per PM vehicle trip end

Total Cost/Total Capacity Fee

The project steering committee determined that the subsequent stages of the study would use the total cost/total capacity method to complete the analysis and implementation plan for the TID. It is not *the* preferred approach, only that it was aligned with the current DEC fee, and allowed a straightforward approach to further evaluate the TID.

The Exit 12 TID project list identifies 16 projects using State funds totaling $35 million and provides 108,900 total person capacity during the PM peak hour. This results in a base fee of $322 per vehicle trip during the PM peak hour for trips within the TID. The derivation of this fee is shown in Table 28.

This fee estimate treats the TID zone as a boundary, incorporating the costs and capacities to facilitate the anticipated growth and land-use development within its borders. Given that the fee can only be collected on vehicle trips associated with land-use changes within the TID, it is

estimated that by 2035 an additional 1,357 PM peak hour trips will be generated. The revenue raised by local vehicle growth within the TID is $436,000. This represents only 1.25% of the State (nonlocal) cost of the infrastructure projects.

Advantages

- Vehicle trip is a common unit: The fee is based on a vehicle trip generated during the PM peak hour. The fee is based on total capacity, of both nonmotorized and motorized users. This would enable the State to charge all generation from the land uses if is desires. However, the Act 145 language clearly states that vehicle trips will be the unit used for the fee.
- Lowest fee value: The total cost over total capacity resulted in the lowest per user fee. This spread the costs of the projects over a wide enough area, averaging out the cost for a trip to travel within the TID.
- Total Cost can be used: The cost can incorporate the cost of rebuilding existing capacity. Since new users are only paying for their fractional use of the total capacity, there is no need to protect new users from paying toward existing capacity. The existing, current users will remain and use the existing capacity in the new project.
- Fair: Capacity is equal for all users. Existing users and new users each consume capacity at the same rate. New users pay for the marginal average cost of total capacity within the TID.
- No local double payment: the fee is based on the State (nonlocal) portion of the project cost. The State portion of the project cost could be reduced to account for any specific grant monies or allocated funds to the project before developing the fee. Local matches and locally funded projects would develop a separate, stand-alone fee schedule. No property taxes paid by land use within the TID would be allocated to the State portion of the project. State income taxes sent to the general fund would be partially paying for the project depending the level of federal funds allocated to the project.

Disadvantages

- Medium administrative and management costs: The user fee is based on capacity, and when that capacity is exhausted, the fee cannot be charged. The TID would require oversight as to the remaining capacity within the TID and how that is determined. ***This requires additional investigation to develop this process.***
- Low revenue: The local land-use traffic growth in the TID is estimated to generate less than 2% of the overall State cost to construct these projects. The funding gap of 98% must be made up by other transportation funds.
- There may be a greater benefit that is not proportional to the fee being incurred. The new demand using the new capacity is paying the marginal cost of total capacity, not the marginal cost of new capacity. The new users are being subsidized by the rest of the State to the degree that nonimpact fee dollars are funding 98% of the cost.

8.0 IMPLEMENTATION

8.1 OVERVIEW

The Vermont Act 145 Statute (§ 6105) outlines the process to establish a TID within the State. The following steps are identified:

- Establish Need: Section (a). If one or more capital transportation projects in the Capital Transportation Program will benefit a discrete area.
- Consultation: Section (b.1): VTrans shall consult with regional, local, and public bodies to agree on the extent, the base assumptions, and performance criteria which will inform the fee.
- Capital Project List Section (b.2): VTrans shall identify the multimodal (highway, transit, bicycle, and pedestrian) infrastructure needs based on an agreed performance standard and the geographic extent of the TID.
- Fee Derivation. Section (b.2.C): Fee that reflects the national nexus between the transportation needs and the benefits of the proposed infrastructure and have the fee roughly proportional to the benefits of that infrastructure.
- Public Support. Section (b.3): VTrans and the Secretary shall engage the local public and landowners within the TID. Public hearings and testimony. The Secretary may approve or approve with revisions or deny the TID proposal.
- Termination. Section (e): The TID shall expire when the Secretary determines that the capital transportation projects no longer meet the approved performance standards.

8.2 ESTABLISH NEED

The Exit 12 TID area has been defined as a regional and municipal growth center for many years. During this time transportation capacity has been added by private land-use development and local and State government projects. As growth has occurred, the largest capital project, the Exit 12 interchange with I-89, has slowly reached capacity requiring a significant level of investment. The Exit 12 interchange is the definition of a large capital project which not only would unlock additional capacity to allow the growth center to continue developing, but also has regional travel implications given the cancelation of the planned Circumferential Highway[15].

The Exit 12 growth center area is a discrete area which would benefit from proposed projects, however it is important to not minimize the regional benefits of additional capacity in the project area. The magnitude of external traffic, both existing and future, consumes substantial amounts of capacity and depending on how new capacity is funded – it is costly for only new growth within the TID to fund. This tension between local growth and regional growth occurs within the Exit 12 TID by being a growth center located on an interchange and junction of VT2A and US 2.

[15] https://vtdigger.org/2011/05/21/shumlin-ditches-original-circ-highway-plan-calls-for-redesign/

8.3 CONSULTATION

VTrans will pursue public consultation if this preliminary investigation into a TID provides the stakeholders sufficient value to pursue a TID. The consultation process is not explicitly identified and how the public will be able to shape or affect the nature of the proposed TID. The size, shape, number projects and properties involved are all items which are important areas for community and public support.

8.4 CAPITAL PROJECT LIST

The Exit 12 growth center area has been the subject of numerous studies over the past decade and beyond. In 2014, the Exit 12 scoping study and Williston-Essex Network Transportation Study incorporated many of the individual projects into a consistent evaluation outlining the benefits and interconnected nature of the cumulative effects.

This Exit 12 TID study assembled the most recent list of infrastructure projects, their capacities, the base and future levels of service, and cost estimates.

8.5 FEE DERIVATION

This Exit 12 TID study developed several methodologies for structuring an impact fee for a TID. The fee methodologies explored in this study provide other TIDs examples of various fee ranges and approaches. Different TIDs may look to use different fee methods.

The fee that is likely to be recommended from this review of methodologies and fee values is a method similar to the approach that VTrans currently uses for District Commissions, which is a total cost/total capacity method. See Table 28 for this fee derivation.

8.6 PUBLIC SUPPORT

VTrans will pursue a public process to solicit input to the proposed fees and methods if this preliminary investigation into a TID provides the stakeholders sufficient value to pursue a TID.

The boundary issues of a TID become a focus when discussing the TID with the landowners within and adjacent to the TID. Landowners and developers within the TID would face additional costs per vehicle trip (as evaluated in this study) while land development just outside of the TID would avoid such fees. Those outside of the TID would likely benefit from the network improvements while avoiding the financial responsibility – creating a ‘free rider’ problem.

8.7 TERMINATION

The termination or dissolution of a TID occurs when the infrastructure projects capacity has been exhausted. In a TID this becomes a challenge because the recommended fee method is based on the collective capacity, and capacity for any mode or any part of the network could reach saturation before other parts of the network.

The benefit of a having the fee structured on total cost/total capacity is that each unit of capacity is valued equally. This means that as long as new trips are generated and consumes any of the capacity created within the TID, the fee should be assessed. *This will create a situation whereby the TID is unlikely going to terminate in any near-term planning horizon.*

9.0 MANAGEMENT

9.1 INTERACTION WITH MUNICIPAL IMPACT FEES

The TID fee structure has been based on establishing a fair and simple method of sharing the cost of necessary transportation infrastructure with those who will directly benefit. Future trips generated by land-use changes will be paying a fraction of the net benefit that they receive; it is anticipated that less than 2% of the cost of the project would be borne by new development in the case of Exit 12.

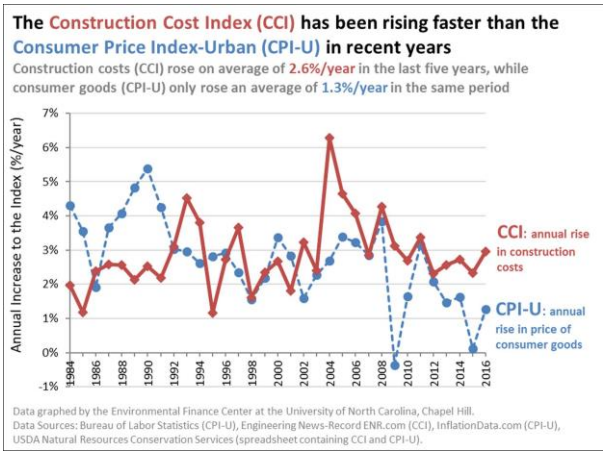
The cost used in this analysis is only the State (and federal) portion of the overall capital costs. It is anticipated that local match is needed for some of the capital projects, and in the case of the TID, the local match for the identified projects would be just over $7 million (see Table 2).

Raising local funds to meet the $7 million local match requirement is clearly a role well suited for local municipal impact fees, as the need is directly tied to the new infrastructure to facilitate and enable the growth and development within the growth center.

The TID fee structure is a separate stand-alone entity from the local Municipal Impact Fee. The two fee structures have different objectives and legal structures. Challenges to maintain both systems arise due to their inherent structural differences. These challenges include:

- The State impact fee structure currently assessed within the District Commissions (DEC fee), and that which is being recommended here, is based on the average cost of providing capacity within the project. This is **total cost/total capacity**. This approach values all capacity equally, regardless of when that capacity was installed or how much the additional marginal capacity costs.
- What we see is marginal cost of capacity increases over time as the 'easy capacity' gets built first. As right-of-way becomes constrained, costs go up to either purchase additional right-of-way, install stormwater, expand the pavement width and add other impervious surface that may abut buildings and result in more expensive traffic signals, pipes, etc.
- As new capacity occurs in the future there is a general trend that construction costs alone have outpaced inflation. Therefore, capacity added tomorrow costs more than capacity added today. See Figure 11.
- VTrans has been clear that the current DEC method and the average capacity cost is not designed to provide the majority of funding for

FIGURE 11: CONSTRUCTION COST VS CONSUMER PRICE INDEX



any one project. It is just one of several financial vehicles to finance growth related infrastructure. By offering base fee reductions to incentivize development within established growth centers or other downtown areas identified for growth, as well as offset for the use of traffic demand management (TDM) to reduce vehicle trips, the Act 145 fee is a financial driver for change. VTrans currently reduces the base Act 145 DEC fee by 50% when the land-use development is located in a designated downtown, growth center, or other area benefiting from significant TDM opportunities.

- Given the size and scope of the DEC or TID funding systems, it will be important to standardize as much as possible to maintain a flexible yet simple system to minimize administrative burdens.
- Municipal impact fees are a land-use regulation meant to mitigate the effects that new users have on the standards of service of existing users of the infrastructure. New capacity is often necessary, with a fair share fees charged in proportion to its impact on the LOS and demand on the infrastructure. Local impact fees will often avoid projects on State owned infrastructure as a means to avoid the perception of double funding.

The different approaches between the Act 145 and local municipal impact fees suggest that the two fees should remain separate. This may lead to confusion locally about which fees are being paid, where the money is going, and concern about paying twice for the same project. However, these concerns can be addressed and clarified.

The Act 145 fees should be clearly identified as funding the State and federal portions of projects and the municipal local impact fees are funding the local portion of projects.

9.2 NEARBY ACT 145 PROJECTS

Land-use development that occurs within the TID may trigger the need for additional infrastructure outside of the TID boundary. Depending on the size, nature of the land use, and the transportation network, some developments could generate a substantial number of trips that would generate effects a distance away from the project. See Section 5.4 for a discussion about distance from projects.

It would be reasonable to expect that during the course of a land-use application, there would be an assessment of the trip distribution and generation of any land use within a TID to determine the number of trips that may affect adjacent Act 145 projects near the TID.

The following protocol is suggested:

- Identify nearby (<10 miles) projects eligible for Act 145 funding.
- Use the distance-based impact assessment to estimate the degree that other Act 145 projects will be affected. The generic approach is summarized in Table 10.
- Any land-use project which pays a TID fee but has a clear impact outside of the TID will be given the 50% reduced Act 145 fee credit for developing within a TID as an area of targeted growth.

9.3 NEARBY DEVELOPMENT OUTSIDE OF THE TID

The Act 145 fees would be assessed if the land-use change requires an Act 250 DEC permit. The land-use review would require an assessment of trip generation and distribution. VTrans would then be responsible to determine what the Act 145 fee would be for the District Commission.

Land-use development that may occur in the near-term adjacent to a TID should be incorporated into the planning of the TID infrastructure. Therefore, it is logical that the trips should be levied a fee based on the number of trips at the TID border, similar to that of any other Act 145 project. The Act 145 fee would be:

Number of trips at TID border x TID fee = Act 145 fee

Based on the distance away from the TID and the nature of the proposed land use, it is reasonable to assess the TID fee on those likely number of trips who will consume capacity within the TID.

A question remains as to how to treat land-use development in the longer term that may require additional transportation capacity within the TID but is physically located outside of the TID.

9.4 MULTIPLE PROJECTS WITHIN TRAVEL DISTANCE

Projects within the TID or adjacent to the TID are likely to also affect other Act 145 projects. The sample route (see Figure 12) of 3.61 miles from Zephyr Road in Williston, which is located within the TID, north along VT2A passes through the US 2-Industrial Drive intersection project, the James Brown Drive project, Crescent Connector project, and VT2A-Susie Wilson Bypass. The project on Zephyr Road is within the TID and would generate trips destined for points outside of the TID, north along VT2A.

FIGURE 12: VT2A - ACT 145 PROJECTS

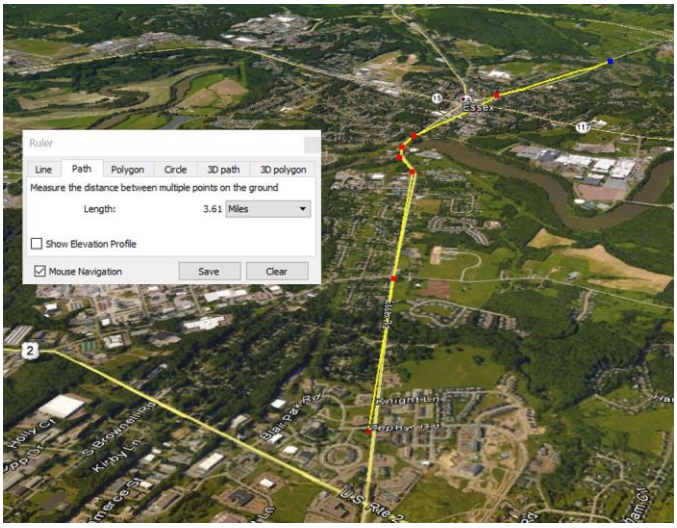


Table 31 summarizes a possible fee analysis for that development. Note it is assumed that VTrans would remain supportive of a 50% reduced fee value when the land-use project occurs within an area designated for growth, including a TID.

TABLE 31: MULTIPLE ACT 145 FEE PROJECTS

	ACT 145 FEE	DISTANCE FROM LAND USE	% OF TRIPS (SUBURBAN HOUSEHOLD) [SEE TABLE 12]	TRIPS	FEE
Land Use Generator: 25 trips north on VT 2A from Zephyr Drive. [Fees are discounted 50% because development occurred within a TID & Growth Center]	50% reduction			25	
US-2A and Industrial/Mountainview Dr.	~~$252~~-> $126	0.65	75%	18.75	$ 2,363
US-2A and James Brown Dr.	~~$189~~->$95	1.2	50%	12.5	$ 1,181
Crescent Connector	~~$2,788~~ >$1,394	2.5	25%	6.25	$ 8,713
US-2A/I-289/Susie Wilson Bypass	~~$241~~->$121	4.5	5%	1.25	$ 151
Land-Use Generator: 50 Trips Generated within TID	$322			50	$ 16,100
				Total	**$ 28,507**

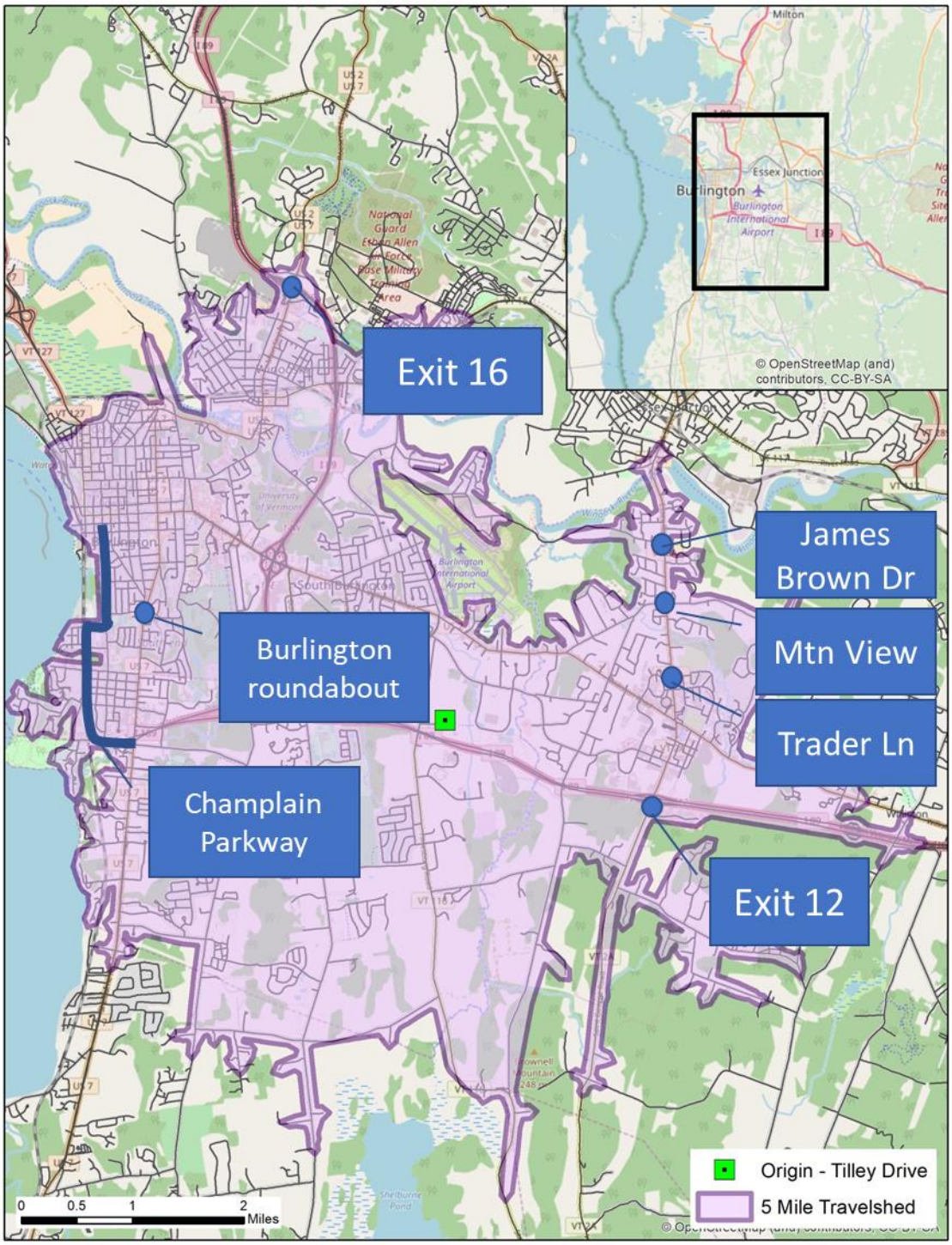
The analysis estimates the number of trips which may impact each of the Act 145 projects based on the distance for suburban household developments identified in Table 12.

The number of projects potentially affected by a land-use development are much higher in denser, urban and suburban environments. For example, a potential future TID in South Burlington around Tilley Drive, with a 5-mile travel shed as shown in Figure 13, clearly affects numerous Act 145 eligible projects.

To assist in the management and administration of the Act 145 fees within Chittenden County, it may be valuable to use the Chittenden County Regional Travel Demand Model[16] to do a select link analysis when a major development is proposed to identify a likely dispersion of traffic impact. This may provide a 'best estimate' resource for assessing the trip distribution on the network given the myriad attractors and generators.

[16] https://www.ccrpcvt.org/

FIGURE 13: 5-MILE TRIP SHED FROM TILLEY DRIVE AND ACT 145 PROJECTS



Effects of TID Traffic on Region

Given the number of projects within a reasonable average travel distance from either the proposed Williston Exit 12 TID or a possible future TID on Tilley Drive, it may be valuable to perform a hypothetical regional demand model run with the cumulative land use anticipated within the TID as a single development, and do a “select link” analysis to understand the regional dispersion of the projects within the TID.

A cumulative fee could be added to the general TID fee to account for the overall impact of the external Act 145 projects.

Nonmotorized Distance

The distance analysis is recommended only to be applied to the motorized number of trips (cars, trucks, buses) for the land use. The portion of nonmotorized trips (bicycle and pedestrian) would only be charged the TID fee or the DEC fee for the specific land-use development and not be assessed for impacts to other nearby projects.

9.5 ADMINISTRATION

Within the TID, project fees are assessed when a land-use development requires either an Act 250 permit or a Section 1111 permit.

Outside of the TID, the District Commissions (DEC) assess Act 145 fees only when land-use developments require an Act 250 permit (regardless of a Section 1111 permit). This limits the overall administrative burden but also limits the revenue potential that could be generated by only assessing the Act 145 on projects which trigger Act 250. The threshold to trigger Act 250 is one of active and ongoing consideration at the Agency of Natural Resources as they look to create incentives for downtown redevelopment and streamline regulatory review processes. If development continues and adds traffic to State highways, but avoids the Act 250 process, VTrans should revisit the process for what initiates an Act 145 fee.

10.0 FUTURE MANAGEMENT

This section attempts to consider how the TID would continue to operate into the future. As noted in Section 8.7, it is unlikely that the TID would terminate in any near-term scenario. Capacity would likely exist in some form for many years to come after the TID is created. Similarly, the DEC fee structure for Act 145 projects is also likely to remain for many years to come for any of the eligible projects.

10.1 CREDITS FOR DEVELOPER FUNDED CAPACITY

Two potential conditions exist when privately funded capacity constructed on the State system can be partially reimbursed through a credit methodology. These are: when a private developer constructs a project on the STIP and a private developer constructs capacity on the State system but is not on the STIP.

The first condition occurs when an individual land-use development requires capacity at a location which has been identified within the State CIP (STIP) but has not yet been constructed. Opportunities exist for the private developer to be partially reimbursed for their construction by future impact fees.

This is in essence a credit, since the developer will be paying out of pocket for additional capacity for a State project which was included in the STIP.

The developer can subtract the cost of the project from any impact fees which would have been applicable. Often the infrastructure exceeds the amount of the impact fee which would have been paid. A portion of future impact fees collected within the TID could be returned to the developer in proportion to the cost of that project relative to the overall project mix in the TID, discounted for cost inflation.

The second condition is when a private land-use development installs additional State capacity that was not an existing, previously planned project within the STIP. Although the additional capacity or improvement may have been needed to satisfy other permitting criteria (such as local permits or Act 250), VTrans can reduce the Act 145 DEC fee by the construction value of the capacity improvement. This reduction or waiving of the Act 145 DEC fees should only be warranted when there is a net increase in capacity of any mode on the State system.

10.2 LAND-USE CHANGES IN AND AROUND TID

Growth and land-use development are likely to demand that any TID be periodically revisited to check growth rates, assumed land-use changes, and the relevance of any remaining future capacity projects. A periodic update of the TID should be scheduled for a period of not more than 10 years upon initiation. The update should include an analysis of forecast growth and land-use development adjacent to the TID to attempt to account for any capital infrastructure needs within the TID but associated with growth external to the TID.

10.3 URBANIZATION AND TRIP LENGTHS

As urbanization continues it will be important to understand the relative degree of impact any one specific land-use development may have on the transportation network. Depending on mode and the diversity of both other attractors and generators, and the trip lengths associated with entering and exiting trips will change.

It will be important to continue to monitor urbanization and reflect the trends in land use which may result in shorter (in some cases longer) trip lengths. This concept is the basis of California's new traffic impact guidance which uses VMT as its key determinate if a project has a "significant" impact on the system. If a project is shown to reduce trip lengths relative to a regional average, then this is a good thing. Site by site analysis occurs for localized safety and operational issues, but the intention is to increase density leading to reduced trip lengths.

10.4 EXPANDING COMPLEXITY

Status Quo

As new capital projects are identified and placed into the State program, over time the number of TIDs or Act 145 eligible projects will continue to increase, with the likelihood that many prior projects will remain eligible for new funds. This situation paints an increasingly complex picture to manage due to the overall number of Act 145 projects for each individual land-use development application. A trip distribution for each project would identify the number of Act 145 projects which would be affected by any one development.

County Impact Fee

An alternative approach which could present some administrative efficiencies is to develop a countywide impact fee. If the number of Act 145 eligible projects begins to have overlapping travel sheds and the probability of any one land-use development triggering more than two Act 145 projects, it may be worth investigating.

The concern of rational nexus and demonstrating the connection between land-use development and the need for additional capacity is an important one. Therefore, a key guide as to when a countywide fee may be appropriate is when there are projects in most municipalities.

Person Miles Traveled Conversion

The nexus between charging vehicle trips and funding multimodal capacity is partially strained and can be strengthened by changing the unit per fee to the person trip. Florida and California have started moving traffic impact studies and their related impact fee studies to a mileage traveled basis. Eventual transition to PMT can create a significantly stronger rational nexus between the impacts of person trip generation and the type of mobility capacity anticipated to be funded.

TABLE 32: ACT 145 PROJECT LIST

VTRANS CAPITAL PROJECT	PROJECT NUMBER	LOCATION	ACT 145 FEE (PER PM PEAK VEHICLE)
Reconstruction of US5 (PUTNEY RD.) beginning 0.83 miles north of the VT30 Jct. and extending north 1.25 miles to the intersection of VT9 East	STP 2000(23)	Brattleboro	$704
Champlain Parkway	MEGC M 5000(1)	Burlington	$1,997
Burlington Roundabout (Shelburne Rd, Willard St, St. Paul St)	HES 5000(18)	Burlington	$1,217
US-2/US-7/Bay Creek Rd.	STP 5600 (9)S	Colchester	$813
Intersection improvements for US-7 and Severance Rd.	STPG 5600(17)	Colchester	$1,071
Exit 16 DDI	HES NH 5600(12)	Colchester	$1,170
Crescent Connector (5 points in Essex)	STP 5300(13)	Essex	$2,788
US-2A/I-289/Susie Wilson Bypass	STP 5400(7)	Essex	$241
VT-15 and Sand Hill Road Signal	STPG 030-1(22)	Essex	$415
Improvements to the intersection of North Williston Rd. and VT 117 (River Rd.)	STP 5400(10)	Essex	$917
Installation of a Roundabout at US-5 and Sykes Ave.	STP 0113(59)S	Hartford	$728
US-7/Railroad St./Middle Rd. Hourglass	STP 5800(3)	Milton	$637
Installation of a Roundabout at the St. Albans State Highway and VT 104	044-1(2)	St. Albans	$580
Installation of a Roundabout at VT-100 and VT-2	STP SGNL (18)	Waterbury	$1,276
Williston Exit 12 Improvements	NH 5500(18)	Williston	$243
US-2A and Industrial/Mountainview Dr.	STP 5500(17)	Williston	$252
US-2A and James Brown Dr.	STP HES 5500(12)	Williston	$189
US-2 and Trader Lane	STPG 5500(14)	Williston	$210
Intersection Improvements and realignment of VT-14 and Merchant St.	HES 037-1(8)	Barre	
VT-15 and Quarry St. Traffic Signal	MEGC M 6000(11)	Barre	$1,278
Improvements to VT 14/Bridge St/ and Sterling Hill Rd.	HES STPG 6100(6)	Barre	
Improvements and Traffic Signal at Prim Rd. and Lakeshore Drive	STP 5600(20)	Colchester	
Intersection Improvements including left and right turn lanes at Blakely Rd. and Laker Lane	STP 5600(21)	Colchester	
Improvements to the VT116/TH1/TH7 intersection including left turn lanes on VT-116	HES 021-1(19)	Hinesburg	$1,109
Installation of left turn lane on VT15 Westbound in Jericho at the intersection of Browns Trace Rd. Also includes installation of a new traffic signal	STP HES 030-1(21)	Jericho	$1,056
Installation of a new traffic signal at the intersection of VT103 and VT100 North	HES SGNL(44)	Ludlow	$181
Roundabout at the Intersection of US-7 and Exchange St.	ST 019-3( )	Middlebury	$991
Intersection improvement at Main Street with Railroad Square	HES 034-2( )	Newport City	$400

VTRANS CAPITAL PROJECT	PROJECT NUMBER	LOCATION	ACT 145 FEE (PER PM PEAK VEHICLE)
Reconstruction of US-5 in Lyndon including left turn lanes	STP 0113(65)	Lyndon	
Traffic Signal and US-4 and Red Village Rd.	STPG SGNL(48)	Lyndon	
Traffic signal at US-2 and Main St. Plainfield	NH 028-3(41)	Plainfield	
New Traffic Signal at the US2/Ferry Rd. intersection	STP HES 028-1(22)	South Hero	$307
Traffic Signal and US-5 and VT-11 in Springfield	STP 016-2(23)	Springfield	
Intersection Improvements/Traffic Signal at VT-100 and Guptil Rd.	STP 2945(1)	Waterbury-Stowe	

11.0 CONCLUSIONS AND NEXT STEPS

11.1 SUMMARY

A TID is a specified funding mechanism authorized by Section § 6105 of Act 145, creating a statewide transportation funding source for capital projects managed by VTrans. The evaluation of a potential TID at the Exit 12 growth center in Williston, Vermont has concluded that the TID has significant challenges associated with the administration and management, potential legal complexities, and limited financial benefit given the development and implementation challenges.

Development and Implementation

- The Act 145 legislation has a clear, although time consuming and costly process to implement a TID. The creation of a TID requires initial extensive studies that are not dissimilar to typical impact fee studies. What is unique is the level of engagement with the community, stakeholders, and potentially affected parties.
- The physical area of a TID requires significant effort to determine the appropriate size and scale. The size of the TID balances the area of identified growth with a number of projects that fall within the boundary. Depending on the location of the facility, with Exit 12 being a good example, some of the infrastructure projects are serving a large amount of through traffic unrelated to the growth and development within the TID boundary. This increases the overall cost of the infrastructure within the TID.
- The boundary should attempt to encompass a large enough area to capture the growth that will benefit from any of the projects within the TID. An area of optimal size would include nearly all direct beneficiaries of the specific capital projects. This is a formidable challenge, as two issues are likely to be encountered: 1) statewide capital projects may be necessary at points of conflicting movements such as interchanges or major intersections. Given these are occurring on State highways, the benefits can accrue to a large geographic area of through traffic. The Waterbury roundabout is an example, with beneficiaries including recreation related traffic in the Mad River Valley. 2) growth and development may occur in the future just outside of the TID, using the capital infrastructure, but not affected by the TID fee.

Administration and Management

- TIDs and Act 145 cover the statewide VTrans portion of the costs of the capital projects. Depending on the type of the project, there are other funding sources, including local match, that need to be accounted for.
- TIDs can be created in an area that overlap with municipal impact fees. This situation occurs in the Exit 12 TID evaluated in this report. As long as the local impact fee covers the local match of any statewide project and the TID is associated with the State portion,

then there is no double counting of fees. Land owners and developers within the Municipal Impact Fee zone and the TID will be assessed two separate fees for their impact, and this could lead to confusion or unnecessary administration costs if the two fees are not clearly communicated to the developer.

- Long-term management of Act 145 eligible capital projects in general will become increasingly complex. If $\frac{\boldsymbol{Total\ Cost}}{\boldsymbol{Total\ Capacity}}$ remains the primary equation for the Act 145 projects, it may be many years before the fee will cease to be collected. As new capital projects are identified, the overall number of projects potentially in a TID or outside of the TID will rise. Managing and accounting for the remaining capacity will become an important component of the administration of any Act 145 eligible project.

Trade-offs of a TID

- The primary benefit of a TID is a predetermined financial contribution for off-site development impacts for any land-use development application within the TID, so long as the capital projects within the TID effectively mitigate the impacts of the land-use development.
- For the projects within the Exit 12 TID, the revenue recoupment was found to be in the order of magnitude of less than 2% of the cost of the infrastructure using the VTrans preferred funding equation. The minimal cost recovery requires that projects included in the TID would require more than 98% of funding from nonland development funds (i.e., statewide transportation funding sources). The revenue, at less than 2% of capital costs, may reflect a fee that is less than the benefits received from the investment.
- The time and costs associated with the creation and ongoing administration of the fee should be evaluated against the revenue anticipated to be collected. While the revenue is above zero, other mechanisms are available to VTrans and the DEC to apply land-use development regulations as it pertains to impacts on the transportation infrastructure. This could include proportional and fair share development agreements, reversion to the “last-in pays” model, or a revised Act 145 fee calculation.
- Additional indirect benefits of the Act 145 policies have been included to date such as 50% fee reduction for locating the development within a designated growth area (e.g., downtown, Town center, growth center), and fee reductions for progressive transportation demand management activities.

11.2 NEXT STEPS

The Vermont Agency of Transportation and CCRPC have identified several next steps to strengthen Act 145 and to maximize the future relevancy of land development regulations. These steps address specific information gaps identified during the course of this study of the proposed Exit 12 TID in Williston, Vermont.

- Congestion and LOS Policy

- Multimodal LOS
- Distance assessments for different land uses
- Long-term Act 145 Project Management

Congestion and Level-of-Service Policy

VTrans continues to use the traffic impact study guidelines and referenced LOS policy from October 2008 and May 2007, respectively. In locations of intense growth, there are often demand for policies to support a multimodal transportation system. There should be amendments to both documents to explicitly include greater flexibility and identify procedures to be carried out to facilitate a modal priority in the “standard of service,” if desired for specific modes. Recent changes in California are a bellwether for how some communities are switching to a daily VMT assessment of land-use development impact (http://opr.ca.gov/ceqa/updates/sb-743/). Identifying the standards of service to which capital projects comply is paramount to impact fee fundamentals. Impact fee systems require a standard of service to ensure that new growth and development is not paying more than its ‘fair share’ and improving the identified standard of service. Gaps exist between the standard of service that VTrans, the DEC, communities, and the public expect on the public highway system and this is causing issues when identifying mitigation for land-use development.

Multimodal Level-of-Service

The Highway Capacity Manual 6 (HCM 2017) strengthens the work initiated in the HCM 2010 on multimodal LOS calculations. In compliance with the spirit of the 2011 Complete Streets legislation (Act 34 of 2011), municipalities, regional planning commissions, and VTrans should start to define standards of service for all modes along corridors. This can set the standard of service that is expected to be constructed to meet the local and State expectations associated with land development and inform the scale and types of projects included in a TID.

Distance Assessments for Different Land Uses

The concepts identified in the study of assessing how far does one land-use development consider its effects requires an evaluation of distance or trip distribution. If Act 145 projects were to follow the typical assessment of traffic impact only in excess of 75 vehicles per hour (19 V.S.A. Ch. 11 § 1111) there could be sizable revenues not captured by the fee system. As most traffic studies do not show distribution patterns for trips below the 75-vehicle threshold, two approaches are considered for further review: 1) For any VTrans Section 1111 review and DEC application, a trip distribution to be requested of the applicant to a level of five peak hour trips or less. 2) A distance approach to be evaluated based on the land-use type for average trip lengths.

Long-Term Act 145 Project Management

The long-term management of Act 145 projects and TIDs requires further review and consideration. TIDs should be periodically reviewed to ensure that land-use projections remain relevant and that the projects within the TID are appropriate to mitigate and maintain the service standard. Stand-alone Act 145 projects assessed fees through the DEC are anticipated to be active for many years prior and postconstruction. Additional projects are likely in faster growing areas, increasing the chance that a land-use development would contribute to more than one Act 145 project and possibly a TID. The management of remaining capacity as well as identifying how many projects are impacted by any one land-use development will grow in complexity and time requirements.

APPENDIX A. PROJECT INPUTS

Detailed breakdown of distance dispersion by land-use type and region classification

Land Use	Household			Retail			Commercial			Institutional		
Avg Trip Length	5	5	5	3	3	3	7	7	7	3	3	3
Location	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Distance												
0.25	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
0.5	84%	89%	95%	**81%**	86%	91%	94%	95%	96%	**81%**	86%	91%
0.75	**70%**	80%	90%	62%	**72%**	82%	80%	86%	93%	62%	**72%**	82%
1	60%	**73%**	85%	49%	61%	**73%**	**70%**	79%	89%	49%	61%	**73%**
1.25	**52%**	66%	80%	39%	51%	64%	62%	**74%**	85%	39%	51%	64%
1.5	46%	61%	**75%**	30%	42%	55%	56%	69%	81%	30%	42%	55%
1.75	41%	55%	70%	23%	34%	45%	50%	64%	78%	23%	34%	45%
2	36%	**51%**	65%	17%	27%	36%	46%	60%	**74%**	17%	27%	36%
2.25	32%	46%	60%	12%	19%	27%	42%	56%	70%	12%	19%	27%
2.5	29%	42%	55%	7%	12%	18%	38%	52%	67%	7%	12%	18%
2.75	25%	38%	**50%**	2%	6%	9%	35%	49%	63%	2%	6%	9%
3	22%	34%	45%	0%	0%	0%	32%	45%	59%	0%	0%	0%
3.25	20%	30%	40%				29%	42%	56%			
3.5	17%	26%	35%				26%	39%	52%			
3.75	15%	22%	30%				24%	36%	48%			
4	12%	19%	25%				21%	33%	44%			
4.25	10%	15%	20%				19%	30%	41%			
4.5	8%	12%	15%				17%	27%	37%			
4.75	7%	8%	10%				15%	24%	33%			
5	5%	5%	5%				14%	22%	30%			
5.25	3%	0%	0%				12%	19%	26%			
5.5							10%	16%	22%			
5.75							9%	14%	19%			
6							7%	11%	15%			
6.25							6%	8%	11%			
6.5							4%	6%	7%			
6.75							3%	3%	4%			
7							2%	1%	0%			

Exit 12 TID Nearby Act 145 Projects

VTRANS CAPITAL PROJECT	LOCATION	ACT 145 FEE (PER PM PEAK VEHICLE)
Champlain Parkway	Burlington	$1,997
Burlington Roundabout	Burlington	$1,217
Williston Exit 12	Williston	$243
US-2 and Trader Lane	Williston	$210
US-2A and Industrial/Mountainview Dr.	Williston	$252
US-2A and James Brown Dr.	Williston	$189
Crescent Connector	Essex	$2,788
US-2A/I-289/Susie Wilson Bypass	Essex	$241
VT-15 and Sand Hill Road Signal	Essex	$415
US-2/US-7/Bay Creek Rd.	Colchester	$813
US-7 and Severance Rd.	Colchester	$1,071
Exit 16 DDI	Colchester	$1,170

Exit 12 TID Projects

Proj_ID (GIS)	Project Type	Principle Project Type	Optional Category/Title	Project Description	VehCapacityFuture	Non-MotorizedCapFuture	Capacity in Motorized Change (hrly)	Capacity in Non-Motorized Change (hrly)	Capacity Change (hrly)	Total Final Capacity (hrly)	Total Cost Estimate	cost of New Capacity	PrincipalLocation	Funding Source	% Federal	Fed$	% State	State$	% Local	Local$	StateTotalCost	VehCapacityCost	Non-MotorizedCapacityCost	State cost of New Capacity	Vtrans Number	CCRPC#	In TIP?	Document Name	Document Year	Cost / Total Capacity (hrly)	Cost / New Capacity (hrly)
13	Bike/Pedestrian	Bike/Pedestrian	Harvest Lane	**5-ft sidewalk** on southeast side of Harvest Lane to connect the existing sidewalk north of Marshall Ave to the existing sidewalk north of the Goodwill. (1325 ft)	0	400	0	400	400	400	$ 255,000	$ 255,000	Local	STP	80%	$ 204,000	0%	$ -	20%	$ 51,000	$ 204,000	$ -	$ 204,000	$ 204,000	TAP TA14(3)	BP082	Yes	VT Route 2A & Harvest Lane Bicycle / Pedestrian Facilities	March-14	$ 637.50	$ 637.50
28	Bike/Pedestrian	Bike/Pedestrian		Construct a **10-ft shared use path** in South Burlington (3,000 lf remaining) and Williston (**4,500 lf** remaining). The Williston segment would start where Marshall Ave and Kimball St meet (just east of Gregory Dr), follow the south side of Marshall Ave, and end at the existing path on Marshall Ave. $1.21 million in Williston ($2.48 million total)	0	850	0	850	850	850	$ 1,210,000	$ 1,210,000	Local		80%	$ 968,000	0%	$ -	20%	$ 242,000	$ 968,000	$ -	$ 968,000	$ 968,000			No	Shared Used Path Connection over Muddy Brook	October-10	$ 1,423.53	$ 1,423.53
3	Bike/Pedestrian	Bike/Pedestrian	Short-Term (Stage 1)	**Extend the 10-foot shared-use path** on the east side of VT-2A from the State Police Barracks to Hurricane Lane (550 ft)	0	850	0	850	850	850	$ 400,000	$ 400,000	State	NHPP/STP	80%	$ 320,000	20%	$ 80,000	0%	$ -	$ 400,000	$ -	$ 400,000	$ 400,000	NH 5500(18)	HC016A	Yes	I-89 Exit 12 & VT 2A Scoping Study	May-14	$ 470.59	$ 470.59
12	Bike/Pedestrian	Bike/Pedestrian	Taft Corners	**10-ft shared use path** on western side of VT-2A between TD Bank and Northfield Savings Bank to connect the existing paths. (300 ft) ^ STP SDWK(21)? **5-ft sidewalk** on eastern side of VT-2A to connect the existing path north of Conner Way with the existing sidewalk near Rt 2. (550 ft)	0	1250		1250	1250	1250	$ 300,000	$ 300,000	State	STP	80%		20%		0%	$ -	$ 300,000	$ -	$ 300,000	$ 300,000		BP080	Yes	VT Route 2A & Harvest Lane Bicycle / Pedestrian Facilities	March-14	$ 240.00	$ 240.00
	Bike/Pedestrian	Bike/Pedestrian	Knight-O'Brien	**10-ft shared use path** on western side of 2A from Knight Ln to O'Brien Ct. (700 ft) Stripe the road for **4-foot shoulders**	0	2290		2290	2290	2290	$ 150,000	$ 150,000	State	STP	80%		20%		0%	$ -	$ 150,000	$ -	$ 150,000	$ 150,000		BP080	Yes	VT Route 2A & Harvest Lane Bicycle / Pedestrian Facilities	March-14	$ 65.50	$ 65.50
14	Bike/Pedestrian	Bike/Pedestrian		1) **Shared use path** on north side of Williston Rd between Taft Corners and Southridge Rd (approx 1.25 miles). 2) CCTA bus stop with RRFB crossing between Timothy Way and Southridge Rd 3) **Close eastbound truck lane** east of Southridge Rd and **add bike lanes and a sidewalk** on the north side. Approx 1200 ft 4) Rehabilitate the existing sidewalks in the village.	3200	1970	0	470	470	5170	$ 2,800,000	$ 254,545	State	STP	80%		20%		0%	$ -	$ 2,800,000	$ 1,733,075	$ 1,066,925	$ 254,545		BP079	Yes	Williston Road (US Route 2) Multi-Modal Transportation Scoping Study	March-14	$ 541.59	$ 5,957.45
2	Function and Performance Preservation	ITS	Short-Term (Stage 1)	**Optimize signal timings** at the Exit 12 interchange area	10000	0	649	0	649	10000	$ 100,000	$ 6,490	State	NHPP/STP	80%	$ 80,000	20%	$ 20,000	0%	$ -	$ 100,000	$ 100,000	$ -	$ 6,490	NH 5500(18)	HC016A	Yes	I-89 Exit 12 & VT 2A Scoping Study	May-14	$ 10.00	$ 154.08
10	Function and Performance Preservation	ITS		ATMS VT-2A and: I-89 SB ramps, I-89 NB ramps, Marshall Ave/Maple Tree Place, Conner Way/Wright Ave, US-2, Zephyr Rd/Paul St, Industrial Ave/Mountain View Dr US-2 and: North Brownell/South Brownell, Harvest Lane/Blair Park Rd, Boxwood St, Zephyr Rd/Maple Tree Place, Talcott Rd	54000	0	2700	0	2700	54000	$ 1,000,000	$ 50,000	State	STP	100%		0%		0%	$ -	$ 1,000,000	$ 1,000,000	$ -	$ 50,000	STPG SGNL(46)		Yes	Williston-Essex Network Transportation Study (WENTS)	March-14	$ 18.52	$ 370.37
11	Function and Performance Preservation	ITS		Traffic Signal at US-2 / Trader Lane. ($1425000 total, with 550000 for the signal)	2500	400	200	300	500	2900	$ 1,100,000	$ 189,655	State	STP	100%		0%		0%	$ -	$ 1,100,000	$ 948,276	$ 151,724	$ 189,655	STPG 5500(14)	HP109	Yes	Williston-Essex Network Transportation Study (WENTS)	March-14	$ 379.31	$ 2,200.00
4	Capacity Expansion	Roads	Mid-Term (Stage 2)	**Construct a new east-west grid street** from Harvest Lane (between Home Depot entrance and Retail Way) to Maple Tree Place. (Runs along the south side of the State Police Barracks then curves to the north, running along the east side of Dick's Sporting Goods). Approx. 2500 ft. No bike lanes. sidewalks on both sides	2500	800	2500	800	3300	3300	$ 4,500,000	$ 4,500,000	Local	NHPP/STP	0%	$ -	0%	$ -	100%	$ 4,500,000	$ -	$ -	$ -	$ -	NH 5500( )	HC016B	Yes	I-89 Exit 12 & VT 2A Scoping Study	May-14	$ 1,363.64	$ 1,363.64
5	Capacity Expansion	Roads	Mid-Term (Stage 2)	**Construct two single-lane roundabouts:** 1) at the intersection of Harvest Lane and the new grid street, and 2) at the intersection of Trader Lane and the new grid street.	2100	800	2100	800	2900	2900	$ 1,500,000	$ 1,500,000	Local	NHPP/STP	0%	$ -	0%	$ -	100%	$ 1,500,000	$ -	$ -	$ -	$ -	NH 5500( )	HC016B	Yes	I-89 Exit 12 & VT 2A Scoping Study	May-14	$ 517.24	$ 517.24
6	Capacity Expansion	Roads	Mid-Term (Stage 2)	**Upgrade the roundabout** at the intersection of Maple Tree Place and the new grid street.	2100	800	1100	800	1900	2900	$ 1,000,000	$ 655,172	Local	NHPP/STP	0%	$ -	0%	$ -	100%	$ 1,000,000	$ -	$ -	$ -	$ -	NH 5500( )	HC016B	Yes	I-89 Exit 12 & VT 2A Scoping Study	May-14	$ 344.83	$ 526.32
7	Capacity Expansion	Roads	Mid-Term (Stage 2)	At the intersection of VT-2A and the new grid street, **construct at-grade signalized intersection (preferred Alt A)**	3000	800	1500	800	2300	3800	$ 1,500,000	$ 907,895	State	NHPP/STP	0%	$ -	0%	$ -	0%	$ -	$ 1,500,000	$ 1,184,211	$ 315,789	$ 907,895	NH 5500( )	HC016B	Yes	I-89 Exit 12 & VT 2A Scoping Study	May-14	$ 394.74	$ 652.17
1	Capacity Expansion	Roads	Short-Term (Stage 1)	**Construct an additional southbound VT-2A lane** to allow for two through lanes (for vehicles continuing southbound as they enter the Exit 12 interchange area) and one right-turn lane (to get on I-89 N). RTL approx 210 ft.	1000	0	1000	0	1000	1000	$ 1,500,000	$ 1,500,000	State	NHPP/STP	80%	$ 1,200,000	20%	$ 300,000	0%	$ -	$ 1,500,000	$ 1,500,000	$ -	$ 1,500,000	NH 5500(18)	HC016A	Yes	I-89 Exit 12 & VT 2A Scoping Study	May-14	$ 1,500.00	$ 1,500.00
8	Capacity Expansion	Roads	Long-Term (Stage 3)	**Reconstruct the Exit 12 interchange as a diverging diamond interchange** with full bicycle and pedestrian connectivity throughout the interchange. $21 Million for whole thing. $6 million to replace existing bridge. Normal maintenance.	15000	850	5649	850	6499	15850	$ 15,000,000	$ 6,150,473.19	State	NHPP/STP					$	$ -	$ 15,000,000	$ 14,195,584	$ 804,416	$ 6,150,473	NH 5500( )	HC016C	Yes	I-89 Exit 12 & VT 2A Scoping Study	May-14	$ 946.37	$ 2,308.05
9	Capacity Expansion	Roads	Long-Term (Stage 4)	Reconstruct VT-2A between the new grid street (just south of the State Police Barracks) and Williston Rd (US-2) to **create a boulevard with a landscaped median, curbing, pedestrian and bicycle facilities, and other amenities. Capacity is from bike lanes (complete streets re-build).**	0	1440		1440	1440	1440	$ 10,000,000	$ 10,000,000	State	NHPP/STP	100%				$	$ -	$ 10,000,000	$ -	$ 10,000,000	$ 10,000,000	NH 5500( )	HC016C	Yes	I-89 Exit 12 & VT 2A Scoping Study	May-14	$ 6,944.44	$ 6,944.44

Williston and Growth Center Land Use Changes (2015 – 2035) and Base Trip Generation

TAZ	Municipality	Households 2035-2010_HH	0.85 Veh Trips	Employees 2035-2010_Retail	Veh Trips	Employees 2035-2010_Commercial	Veh Trips	Employees 2035-2010_Industrial	Veh Trips	Employees 2035-2010_Institutional	2035-2010_K12	Veh Trips	Employees 2035-2010_Accomodations	Veh Trips	Employees 2035-2010_College_University	Veh Trips	Employees 2035-2010_Special_Retail	Veh Trips	Employees 2035-2010_Special_Commercial	Veh Trips	Total Employment Change 2035-2010_Employ	Estimated Trips	Estimated Trips from the WENTS Modeling	
163	WILL	35	29.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	30		
164	WILL	7	6	0	0	1085	423.15	0	0	0	0	0	0	0	0	0	0	0	0	0	1092	429	635	
165	WILL	13	11	5	20	97	37.83	81	36	48	14	96	5	30	18	16.38	0	0	5	1.95	286	249	121	
166	WILL	0	0	8	32	43	17	37	16	22	6	43	1	6	8	7.28	5	20	1	0.39	131	142	90	
167	WILL	26	22	4	16	5	2	5	2	2	0	3	0	0	0	0	0	0	0	0	42	45	33	
168	WILL	16	14	0	0	44	17	36	16	23	5	43	2	12	8	7.28	0	0	2	0.78	136	110	57	
169	WILL	25	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	21	15	
170	WILL	49	42	0	0	7	3	5	2	5	0	8	0	0	0	0	0	0	0	0	66	54	61	
171	WILL	54	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	46	25	
172	WILL	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	3	
173	WILL	5	4	34	136	100	39	100	44	100	36	211	14	84	45	40.95	18	72	13	5.07	465	636	405	
174	WILL	100	85	0	0	5	2	5	2	5	0	8	0	0	0	0	0	0	0	0	115	97	66	
175	WILL	52	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52	44	25	
176	WILL	9	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	8	9	
177	WILL	22	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	19	22	
178	WILL	70	60	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	175	119	64	GrowthCenter
179	WILL	0	0	8	32	2	1	0	0	0	0	0	0	0	0	0	5	20	0	0	15	53	25	
180	WILL	70	60	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	175	119	380	GrowthCenter
181	WILL	0	0	5	20	2	1	0	0	0	0	0	0	0	0	0	5	20	0	0	12	41	51	
182	WILL	0	0	0	0	5	2	5	2	1	0	2	0	0	0	0	0	0	0	0	11	6	9	
183	WILL	0	0	9	36	63	25	53	23	33	10	67	5	30	11	10.01	5	20	5	1.95	194	213	104	
184	WILL	0	0	5	20	46	18	39	17	25	6	48	3	18	9	8.19	1	4	2	0.78	136	134	68	
185	WILL	70	60	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	175	119	42	GrowthCenter
186	WILL	70	60	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	175	119	9	GrowthCenter
187	WILL	7	6	0	0	20	8	16	7	11	5	25	0	0	5	4.55	0	0	0	0	64	50	45	
188	WILL	70	60	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	175	119	6	GrowthCenter
189	WILL	40	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	34	53	
190	WILL	70	60	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	175	119	32	GrowthCenter
191	WILL	0	0	13	52	55	21	47	21	29	9	59	5	30	11	10.01	5	20	5	1.95	179	215	138	
192	WILL	43	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	37	36	
193	WILL	70	60	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	175	119	52	GrowthCenter
194	WILL	63	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	54	82	
195	WILL	10	9	10	40	37	14	32	14	20	5	39	1	6	6	5.46	5	20	1	0.39	127	148	21	
196	WILL	0	0	10	40	79	31	66	29	41	11	81	5	30	16	14.56	5	20	5	1.95	238	247	139	
197	WILL	70	60	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	175	119	38	GrowthCenter
198	WILL	70	60	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	175	119	140	GrowthCenter
199	WILL	65	55	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	170	114	10	GrowthCenter
200	WILL	33	28	0	0	27	11	24	11	16	5	33	0	0	5	4.55	0	0	0	0	110	86	77	
201	WILL	28	24	0	0	6	2	5	2	5	0	8	0	0	0	0	0	0	0	0	44	36	27	
202	WILL	65	55	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	170	114	51	GrowthCenter
203	WILL	74	63	1	4	90	35	12	5	7	0	11	0	0	3	2.73	0	0	0	0	187	121		GrowthCenter
204	WILL	65	55	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	170	114	626	GrowthCenter
205	WILL	65	55	5	20	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	170	114	81	GrowthCenter
206	WILL	36	31	0	0	14	5	11	5	7	0	11	0	0	2	1.82	0	0	0	0	70	54	425	
207	WILL	38	32	0	0	16	6	13	6	9	1	16	0	0	5	4.55	0	0	0	0	82	64	97	
208	WILL	37	31	0	0	7	3	6	3	5	0	8	0	0	0	0	0	0	0	0	55	45		
209	WILL	37	31	0	0	9	4	8	4	5	0	8	0	0	0	0	0	0	0	0	59	46		
210	WILL	36	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	31	43	
211	WILL	42	36	0	0	16	6	13	6	9	0	14	0	0	4	3.64	0	0	0	0	84	65		
		1832.0	1557.2	177.0	708.0	3180.0	1240.2	619.0	272.4	428.0	113.0	838.6	41.0	246.0	156.0	142.0	54.0	216.0	39.0	15.2	6639.0	5235	4534	Townwide
		964.0	819.4	66.0	264.0	1390.0	542.1	12.0	5.3	7.0	0.0	10.9	0.0	0.0	3.0	2.7	0.0	0.0	0.0	0.0	2442.0	1644	1530	GrowthCenter
		52.62%	52.62%	37.29%	37.29%	43.71%	43.71%	1.94%	1.94%	1.64%	0.00%	1.29%	0.00%	0.00%	1.92%	1.92%	0.00%	0.00%	0.00%	0.00%	36.78%	**31.4%**	**33.8%**	% in Growth Cente

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