Multi-Modal Impact Fees

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Abstract

This paper documents recent efforts in Seattle, WA and Portland, OR to implement multimodal impact fee programs. Both of these programs have similar methodologies, although the authorizing legislation is very different in each state.

Washington State has allowed local jurisdictions to impose an impact fee to mitigate development impacts on the transportation system since 1990. However, the state's Growth Management Act (GMA) restricts the imposition of impact fees for vehicle-related road improvements only. In response, the City of Seattle has developed a multi-modal development impact mitigation program under the State Environmental Policy Act (SEPA). As a pilot program, Seattle is breaking new ground for other jurisdictions in the state.

Portland, Oregon implemented a multi-modal system development charge (aka impact fee) program in 1997. The program has been very successful in generating needed funds for streets, transit, and non-motorized facilities in the city. The program was updated in 2007 using a similar approach.

The paper describes the methods used to develop these unique development mitigation programs. Topics covered include (1) How to obtain trip generation rates for walking, bicycling, ridesharing and transit modes, (2) How to estimate existing deficiencies for different modes, (3) How to forecast pedestrian and bicycle trip growth, and (4) How to calculate the cost per trip for each mode of transportation.

Background

Multi-modal impact fee programs have evolved under two sets of rules within the States of Washington and Oregon. In the Growth Management Act (GMA) of 1990, the Washington State legislature authorized local jurisdictions to impose impact fees on new developments; fees that would be used to mitigate traffic impacts to roads caused by the development. Since then, many jurisdictions have adopted impact fee ordinances to supplement the costs of road improvements. However, the GMA authorization did not enable local jurisdictions to improve facilities for other transportation modes such as pedestrian, bicycle and transit improvements with impact fees. Rather, the statute specifies that impact fees can be charged for 'streets and roads' with no further definition.

The City of Seattle concluded that, while the City had been growing with redevelopment, it needed to make multi-modal facility improvements that accommodated all modes of travel. There was a sense that the road network within the city had been established and new opportunities to build new roads or widen the existing roads were extremely limited. Seattle decided to take a unique approach to mitigate the transportation impacts of new development and fund transportation improvements for all modes with development impact mitigation payments. Instead of using the GMA authorization, the city chose to use the “voluntary agreement” provision in the State Environmental Policy Act (SEPA). The City could ask developers to fund planned multi-modal transportation facilities through development impact mitigation payments. Although Seattle could not legislate impact fee payments through an ordinance, it has developed an impact mitigation payment program to fund multi-modal facility needs under the SEPA “voluntary agreements” provision.

In 1989, the State of Oregon adopted the Oregon Systems Development Act (ORS 223.297 - 223.314) to “provide a uniform framework for the imposition of system development charges by local governments.” The statutes outline the types of charges that are considered to be Transportation System Development Charges (TSDCs) and impose a variety of requirements on governments that impose TSDCs. TSDC’s are the same as impact fees.

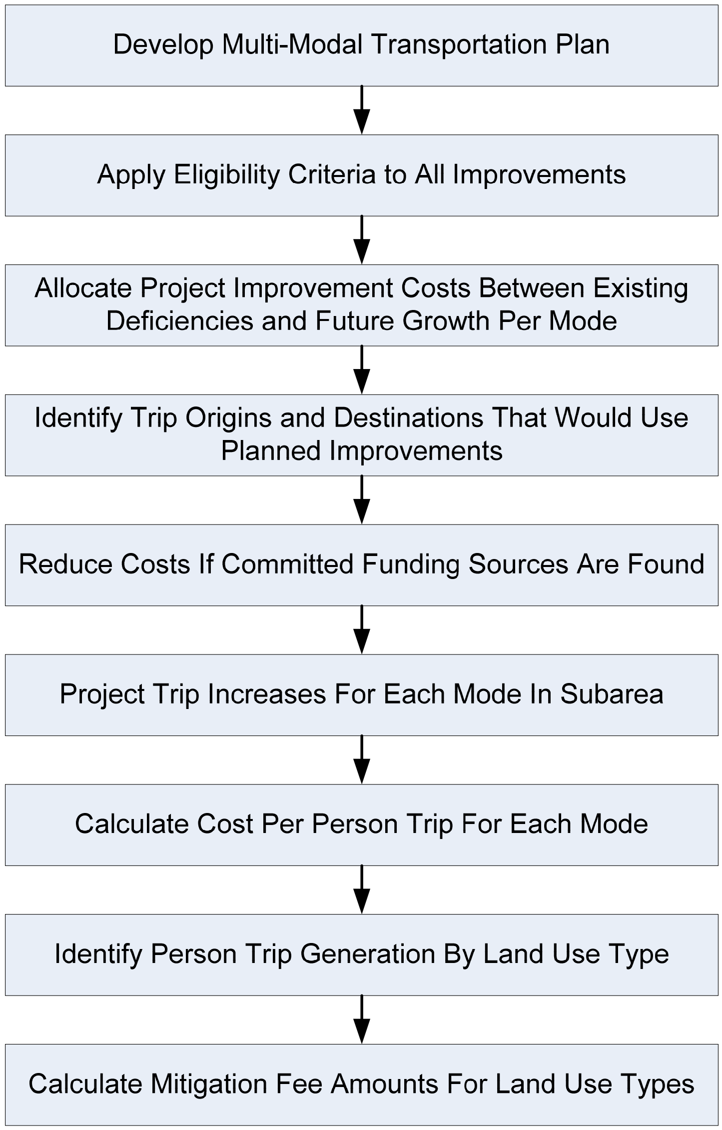
The Oregon statutes limit TSDCs to five types of capital improvements: transportation, water, sewer, drainage, and parks and recreation. The transportation definition provides greater latitude than Washington in allowing different modes of transportation to be included within the impact fee program.

The following sections describe the key elements of the Seattle and Portland programs, followed by summary observations on key elements of a multi-modal impact fee system.

Seattle Experience

To develop a multi-modal development mitigation payment program, Seattle had to address several difficult technical problems. **Figure 1** shows the nine critical steps needed to develop Seattle’s multi-modal development mitigation payment program.

Figure 1. Steps Applied to Develop Seattle's Multi-Modal Mitigation Payment Program



Eligible Project List

The first step in developing the multi-modal mitigation payment program was to develop a list of the facility improvements for pedestrian, bicycle, transit and vehicle modes needed to accommodate the projected growth. This was the most expensive and complex task among the nine steps. Seattle developed Multi-modal transportation plans to support the projected growth in various subareas All transportation plans were developed as financially constrained plans.

The second step screened the improvement projects in the comprehensive multi-modal transportation plan. The Seattle program established three project eligibility criteria:

Would the improvement add capacity to the transportation system?
Would the improvement provide for better mobility?
Would it reduce congestion directly or indirectly?

Non-capital improvement projects such as parking management programs, travel demand management actions, and transit service enhancement projects were excluded.

Examples of qualifying projects are those that result in:

Improved roadway connections
Improved transit service
Increased travel demand in non-single occupant vehicle modes of travel
Improved or maintained travel times
Improved or maintained average vehicle delay

Projects that satisfy one or more of these criteria are considered to have the ability to reduce or eliminate the transportation impacts that would otherwise result from new development-related travel demand.

Deficiency Analysis

Washington state laws prohibit jurisdictions from requiring development mitigation payments to fix or eliminate existing deficiencies. For this reason, it became critical to define performance measures and benchmarks that would identify the existing deficiencies for each transportation mode in the multi-modal plans.

Bicycle and Pedestrian Facilities- The measure for bicycle performance measure was defined using a bicycle level of service (LOS) for each bike route. A simplified bicycle LOS concept was adapted by the city. It defined deficiencies as LOS C or worse on the subarea arterials. The adequacy of the existing pedestrian facilities was evaluated with system-wide performance measures. For example, the benchmark measuring the adequacy of the sidewalks along arterials that link a neighborhood to an urban center was defined to have 90 percent of the sidewalks meeting City's sidewalk standards.

Transit Facilities- Planned transit facilities were grouped into three categories: 1) bus shelter improvements, 2) transit signal priority, and 3) streetcar improvements. Separate performance criteria and benchmarks were developed for each.

Existing bus passenger boardings at each bus stop were evaluated with the presence of a bus shelter meeting King County Metro's bus shelter standard. Bus stops having more than 50 passenger boardings per day without a shelter were determined deficient locations.

For bus routes that would receive benefit by installing transit signal priority system, the bus travel time performance was evaluated. The transit on-time travel performance was evaluated against King County Metro's definition of "on-time", "early" and "late" arrivals at the bus stops.

In the South Lake Union area, Seattle had proposed to add a street car facility (since opened in 2007). The study of the streetcar evaluated the transit load factors on existing transit routes serving the same corridor. The premise was that if the existing routes were over capacity, it constituted an existing deficiency that should be attributed to fixed guideway or trolley transit because they were likely to serve the same passenger population.

To determine the existing roadway deficiencies, the study used two sets of roadway performance measures: 1) intersection level of service, which was measured with average delay, and 2) arterial corridor level of service, which was measured by average speed on a minimum one-mile segment during the PM peak period. In the Urban Centers, the target corridor levels of service were set at LOS D for the streets that serve transit and LOS E for other arterials and it accepted the intersection levels of service to be at LOS E.

Paying for Through Trips

Seattle needed to identify through trips, those trips which do not have trip ends within the mitigation payment area, and identify funds to pay for them. Seattle has a travel demand model and selected link assignment runs with the model were applied to determine the extent of through trips that would use the planned improvements. For example, in the Northgate area, about 43 percent of the trips that would use the proposed improvements were found to be through trips. The study allocated 43 percent the improvement costs as the "public share", to be paid by other sources, such as taxes, fees, and grants, not from the development mitigation payments.

Growth of Trips for Each Mode

It was necessary to calculate the travel demand trip growth based on the projected land use growth. This projection was done by using Seattle's travel demand model, a refined version of a three county-wide regional model. The Seattle model contained trip tables for single-occupant driving, carpooling, bicycling, walking and transit modes. The travel growth for each mode was obtained from the model.

Mitigation Payment Amount

The basic formula used to determine the amount of development mitigation payment was the following:

Cost per person trip times number of person trips generated by the new development equals the payment

For a typical impact fee under the GMA, local jurisdictions calculate cost per vehicle trip for each land use category based on this formula. However, for the multi-modal mitigation payment program, person trips were the basis.

Table 1 shows an example calculation of cost per person trip end using the Northgate area of Seattle.

Table 1. Example Calculation of Cost per Person Trip End

TRAVEL MODE	MITIGATION COST OF LOCAL TRIPS	OTHER FUNDING AVAILABLE	UNFUNDED COST OF LOCAL TRIPS	GROWTH TRIP ENDS		
Bicycle	$ 854,850	$ 0	$ 854,850	1,054		
Pedestrian	4,318,367	0	4,318,367	2,894		
Transit	78,300	0	78,300	1,660		
Roadway	4,919,446	0	4,919,446	9,302		
Totals	10,170,963	0	10,170,963	14,910		
Cost per Growth Trip End			$ 10,170,963	÷ 14,910	=	$ 682.16

Quantification of Trip Generation Rates by Different Types of Development

The last step was to develop a table showing fees for each land use type, such as office, shopping center, grocery store and restaurant. To develop the fee schedule table, it was necessary to identify the trip generation rates of all modes for each land use type. While we could use ITE's trip generation rates for the vehicle mode, there were no readily available trip generation rates for pedestrian, bicycle and transit modes for land use categories. To overcome this problem, the study developed a process where total daily person trips per land use category were estimated with factors, derived from the regional household activity survey conducted by the PSRC in 1999. Among the activity categories in the regional travel survey, ratios of person trips to vehicle trips. For example, for the “work” activity, the ratio was 1.19 and for the “shopping” category, it was 1.59. These factors enabled to calculate total person trips generated by the activities. By applying the factors to the land use categories, the total person trips were calculated. Then, model split factors from the same activity survey were applied to the total person trips to obtain the person trip generation for each mode for each land use type. For example, a shopping center having the 35 vehicle trips per 1,000 square feet was determined to generate 56.16 person trips with a factor of 1.59. Then, a mode split factor of 1.8 percent was applied to the total person trips to estimate transit trips that would be generating by a shopping center. After completing this process for all land use categories, a development mitigation payment fee table was completed.

Portland Experience

While Oregon’s statutes for system development charges (SDC’s) are broader than Washington’s, the issue of ‘rough proportionality is very important in the state. In 1994, the United States Supreme Court ruled in Dolan v. City of Tigard (Oregon) that exactions made by governments must be “roughly proportional” to the impacts caused by the development that is subject to the exaction. Synonyms for “roughly proportional” include (1) “rational nexus of benefit” between system development charges and development, and (2) “proportionate share” of public facilities to be paid by system development charges.

There are several ways that the city of Portland considered to fulfill the requirement that system development charges be roughly proportional to a development's impact on and need for public facilities, including:

<u>1. Demand (Impacts)</u>

Demands placed on public facilities vary among different types of development. The City of Portland transportation SDC is based on the number of trips generated on the transportation system by each type of development.

<u>2. Benefit Criteria</u>

Benefit criteria include personal use and use by others in the family or business enterprise (direct benefit), and use by persons or organizations who provide goods or services to the fee-paying property (indirect benefit). The City of Portland’s transportation SDC is based on the number of trips generated on the transportation system by each type of development. By basing the SDC on the number of trips, the SDC is proportional to the impacts generated and benefits received by the development.

<u>3. Levels of Service</u>

The City of Portland determines its needs for transportation facilities by reviewing a variety of factors, including the volume of traffic and levels of congestion on major roads.

4. Size of Development

System development charges are typically charged on the basis of the size of the development (i.e., number of dwelling units, or number of square feet of development). Portland's SDC rate schedule lists the SDC amount per unit of development (i.e., dwelling unit or square foot). The size of each proposed development is multiplied times the SDC rate per unit to determine the total SDC for that development.

The City of Portland Transportation TSDCs were designed to support the principal modes of travel in a multi-modal system. For the purpose of organizing and analyzing data that supports the Transportation TSDCs, the City identified three categories to encompass different modes of travel:

Motorized: travel by automobiles, trucks and motorcycles, but not buses or railcars.

Transit: travel by rail and bus.

Non-motorized: pedestrian and bicycle travel.

Criteria for Projects to be Eligible for TSDCs

The City used criteria to identify transportation capital improvement projects that are eligible for TSDCs. Developed to ensure "rough proportionality" and to meet the multi-modal transportation needs of the City, the criteria are described below.

Minimum Qualifications ("First Cut")

To identify the first pool of potential projects, the City applied the minimum criteria below to nearly 500 major transportation projects in the City's *Transportation System Plan* (TSP) adopted by the City of Portland in October 2004.

1. Project includes a component that adds capacity to the transportation system.
2. Project is in the Transportation System Plan.
3. Project is on a public street classified above local service, except for City bikeways and City walkways, exclusive of regional traffic and regional transit ways.
4. Project is designed to serve additional population and or employment over the next 10 years.
5. Project is not a maintenance project.
6. Project is not for purchase of equipment or rolling stock, but may be for facilities supporting rolling stock/equipment.

Evaluating Criteria ("Second Cut")

Once the list of projects was screened using the minimum qualification criteria above, the City conducted a second-level screening and ranking of the remaining 215 projects to guide development of the final TSDC project list. This screening used the approach described in **Table 2**. Each proposed transportation project had to meet one or more of Criteria 1, 2 or 3 and preferably one or both of Criteria 4 and 5.

Table 2 - Portland Project Evaluation Criteria

Criteria	Sub-Criteria
Level A: If a project did not meet any of Criteria 1 – 3, the project was not eligible for TSDC.	
1. Support bicycle, pedestrian and/or transit modes (i.e., add capacity, improve access, improve connections, remove bottlenecks, fill in missing links)	►Accommodates increased density ►Supports mixed-use development ►Supports 2040 Growth Concept land-use components ►Improves connections and access from neighborhoods to employment and industrial areas ►Fills a gap ►Improves safety
2. Improve movement of freight and goods	►Reduces conflicts between freight and non-freight uses ►Provides access to inter-modal terminals and related distribution facilities ►Fills a gap ►Improves safety ►Supports emergency services
3. Reduce congestion, improve access and/or circulation	►Benefits to community/economic development ►Among business districts ►To and within activity centers ►Fills a gap ►Improves safety ►Supports emergency services
Level B: If a proposed project met one or more of Criteria 1 – 3, above, it was further prioritized using the following criteria.	
4. Community and business priority	►Priority expressed by neighborhood and business interests ►Addresses equitable geographic distribution of projects
5. Strong potential leverage	►Amount and likelihood of potential funding from other sources

Projects ultimately selected were considered eligible for TSDC funding because they add new capacity to the transportation system or they enhance the movement of automobiles, trucks, motorcycles, buses, railcars and/or pedestrians. The project list covers improvements needed during the next 10 years. The City subsequently identified 43 multi-modal capacity improvement projects for TSDC funding. The total cost of these projects is approximately $415 million.

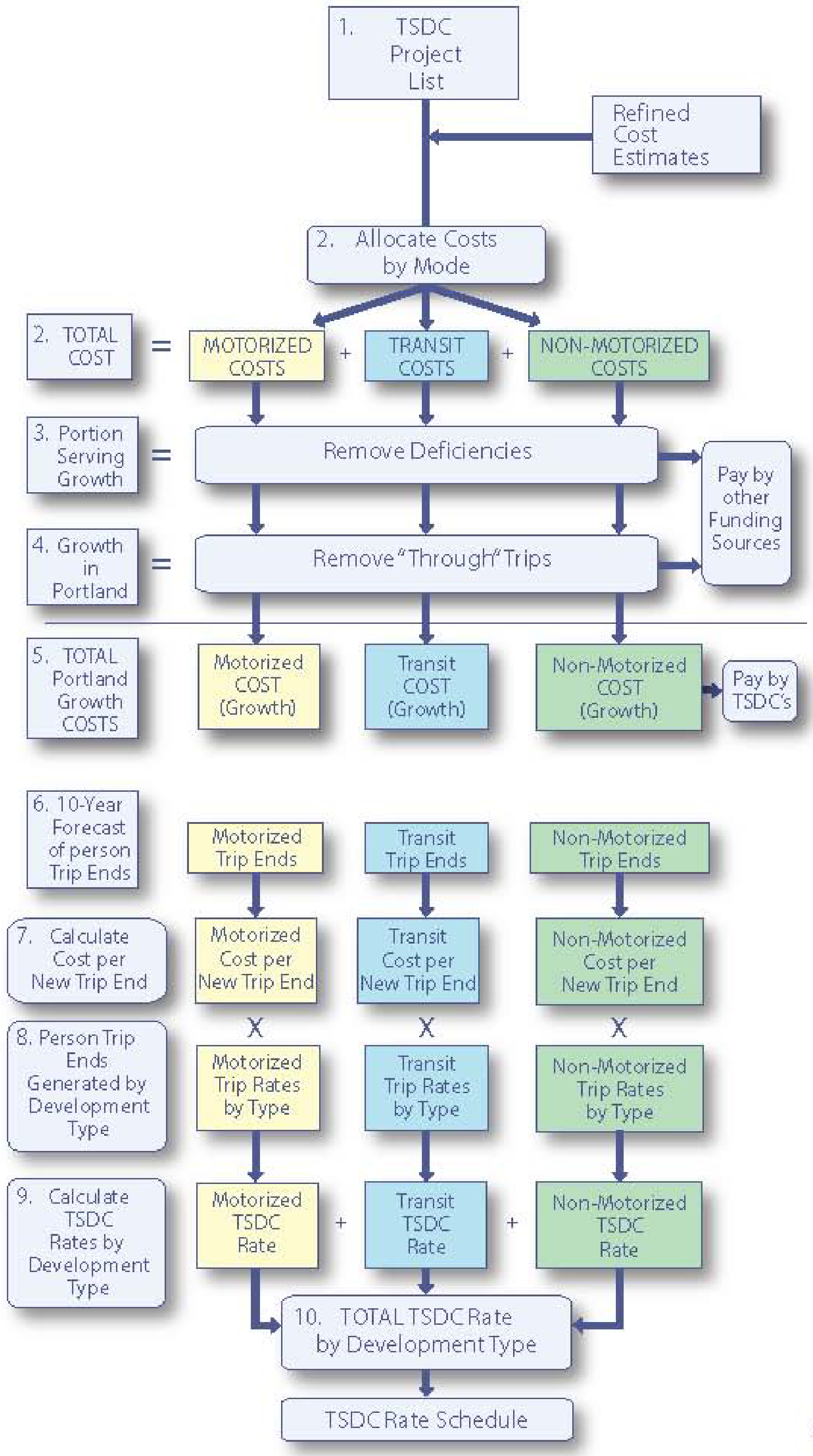
TSDC Calculations

TSDCs for the City of Portland were calculated using the following steps. These are diagrammed in **Figure 2**.

1. Identify transportation projects that are needed to serve new development.
2. Analyze each project to determine what portion of its cost should be allocated to the modes of travel: motorized, transit, and non-motorized (pedestrian and bicycle).
3. Determine the portion of the cost of the project that serves growth and the portion that addresses existing deficiencies. The growth portion becomes the basis of the TSDCs. The deficiency portion is excluded from TSDCs, and must be paid by other sources of revenue.
4. Identify the portion of the growth travel that begins and/or ends within the City, versus the “through” trips that do not start or stop in Portland. Trips that pass through the City without stopping are excluded from TSDCs and must be paid by other sources of revenue.
5. Calculate the amount of the project cost that can be attributable to growth within Portland. This calculation removes the deficiencies (Step 3) and “through” trips (Step 4).
6. Estimate the growth in trip ends[1] (over 10 years) that will be generated for each mode of travel.
7. Calculate the cost per new trip end (for each mode) by dividing the costs that are eligible for TSDCs (from Steps 1-5, above) by the number of new trip ends (from Step 6).
8. Calculate the number of new trip ends that are generated by various types of development. These trip ends are estimated for each modal type using the percentages of usage by each mode.
9. Calculate the TSDC rate for each type of development and for each mode.   The trip rates per development type (Step 8) are multiplied times the cost per trip end (Step 7) to produce TSDC rates. The TSDC rates are expressed in terms of costs per unit of development (e.g., housing units, square feet).
10. Combine the TSDC rates for each mode to determine the total TSDC for each type of development. The result is the composite TSDC that can be published as the TSDC rate schedule.

The remainder of this chapter describes these steps in greater detail.

Figure 2. How TSDC Rates were Developed



Mode Allocations

Each project was analyzed to determine the portion of its cost that was attributable to the three modes of travel:

- motorized (automobile, truck, and motorcycle),
- transit (rail and bus), and
- non-motorized (pedestrian and bicycle).

Allocation of project costs among the modes considered both **direct** and **common** costs. Direct costs were those that could be identified specific to a particular mode. Conversely, common costs were those that were "common" to all modes of travel. For example, costs of mobilization, right of way, etc., were considered to be common to all modes of travel, whereas, costs of sidewalk improvements were considered "direct" non-motorized costs.

Once the common costs were identified, they were put aside for later analysis. The remaining direct costs were then allocated to each mode. First, the direct costs of non-motorized facilities (bicycle and pedestrian) were identified. These direct costs typically included the cost of sidewalks and bicycle facilities.

Next, the remaining direct costs were allocated between transit and motorized modes. The transit portion of the direct costs was determined by comparing the transit passengers along the project route to the total of all persons ("passengers") moving on the same route in all motor vehicles. The motorized portion of direct cost was the remainder (after subtracting non-motorized costs)

The direct cost of each mode was then divided by the total direct cost of all three modes to identify the relative distribution of project costs among modes. Finally, the resulting percentage for each mode's direct cost was used to allocate the common costs among the three modes.

Growth Allocations

The growth portion of a project serves new development, contrasted to the deficiency portion that serves existing development. The growth portion is the basis of TSDCs. Each project on the TSDC list was analyzed to estimate the percentage needed to eliminate existing deficiencies.

The following general equation was used to determine the percent of the project available for growth:

Percent of project for growth = (100) minus (Percent for deficiency)

The calculation was performed separately for each mode (motorized, transit, and non-motorized).

For motorized projects, the amount of the project intended to address existing deficiencies was calculated using existing roadway traffic volumes, existing roadway capacity and future capacity provided by the TSDC project. The motorized deficiency value is the amount of the planned increase in capacity that will be consumed by the existing traffic volume.

For transit elements, the deficiency was evaluated using the average maximum load factor for TriMet bus routes serving the project. If the average maximum load factor for the peak direction, peak hour transit service is less than 1.0, there is no deficiency.

The non-motorized deficiency values were calculated by district, using both a pedestrian deficiency value and a bicycle deficiency value. The pedestrian deficiency for each district is the percent of arterials without sidewalks. This is based on the latest census of sidewalks on arterials throughout Portland. The bicycle deficiency for each district represents the degree to which each district is served by bicycle facilities (existing plus currently funded). Within each district, the mileage of bicycle facilities was divided by the number of households to compute a value of bike lane-miles per 1000 households. This value was then compared to a citywide average of bicycle lane-miles per 1000 households. If the district value was less than the citywide average, the percentage difference is considered to be the bicycle deficiency. .

Determining the City Cost Portion of Each Project

Trips on a transportation network have a beginning (origin) and end (destination). In the jargon of transportation planning, both are called "trip ends." Many trips that use Portland's transportation system have one or both "ends" within the City of Portland. Some trips, however, begin and end outside the City, and are known as "through" trips. The through trips are excluded from the TSDC calculation because TSDCs are charged to development that occurs in Portland, and through-traffic starts and ends at locations outside Portland. The cost of the through-trip portion of projects must be absorbed by the City because the City cannot collect TSDCs from development occurring outside the City.

Each mode of travel was analyzed separately to determine the "through" trips on each project on the TSDC project list. For motorized travel a "select-link" trip analysis was used. The select link technique uses the city's travel demand model to identify the origins and destinations of traffic using a specific roadway segment. For transit and non-motorized modes, the travel model was used to create trip matrices showing the trip origins and destinations of each trip. "City" trips for these two modes were defined as trips that started or ended within the TSP District where the project was located. Conversely, the proportions of trips that had a beginning or end outside the district were treated as "through" trips.

The equation for the cost allocation process multiplies the project cost times each of the three factors to determine the portion of project costs that is eligible for TSDC funding.

$$(\text{Project cost attributable to TSDC})_m = (\text{Project cost}) \times (\text{Mode \%})_m \times (\text{Growth \%})_m \times (\text{"City" \%})_m$$

Where ,m = mode (motorized, transit, non-motorized)

Cost per Trip

TSDC rates for each land use depend on two factors: (1) cost per trip and (2) number of trips generated by the new development. The cost per trip end for each mode is calculated by dividing the costs that are eligible for TSDCs by the number of trip ends by mode. **Table** 3 shows the resulting calculations.

Table 3. TSDC Rates by Mode

Mode	Cost Eligible for TSDC	10-Year Growth in Daily Person Trip Ends	TSDC per Daily Person Trip End
Motorized	$126,702,465	419,137	$302
Transit	$42,172,727	112,108	$376
Non-Motorized	$98,950,838	50,284	$1,968

Person Trips Generated by Various Types of Development

TSDC rates vary according to the impact on the transportation network caused by each type of development. Impacts are measured in "trip ends." Trip generation rates for each development type were derived from the Institute of Transportation's (ITE) report, *Trip Generation* (7th Edition, 2001). The ITE rates are expressed as daily vehicle trips entering and leaving a property.

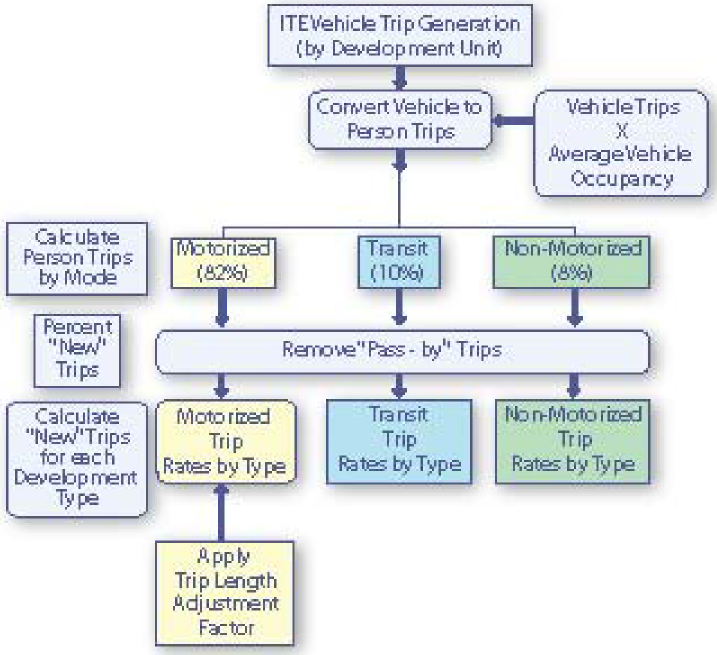
The ITE rates were adjusted to match the needs of the TSDC program. The three primary adjustments were the following:

1. Conversion of Vehicle to Person Trips
2. Removal of 'pass-by' trips
3. Separation into trips by mode (i.e. motorized, transit, non-motorized)

A further adjustment for trip lengths was made for the motorized trip component, as shown in **Figure 3**

The daily vehicle trips per unit were taken from the ITE *Trip Generation* manual. These rates represent national averages for land uses surveyed primarily in urban fringe and suburban areas. The conversion units for person trips were chosen to match these geographic conditions. Average vehicle occupancy of 1.13 was selected based on review of region-wide traffic count data for Portland and other national sources. Similarly, a motorized mode share of 90 percent was used to represent typical conditions to match the ITE trip generation survey geography. Combining these factors results in a factor of 1.26; this was multiplied by vehicle trip rates to create person trip rates. The person trips were split into the three modal categories by applying forecasted modal shares for 2017

Figure 3. Generation of Trips by Development Type



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TSDC Rate Schedule

The TSDC rate schedule is a table where rates are represented as dollars per unit of development for a variety of land use categories (as defined in ITE's *Trip Generation.* For each mode, the TSDC rate equals the person trip rate times the cost per person trip end. The equation for each mode's TSDC is:

$$(\text{Motorized TSDC})_{lu} = (\text{daily new motorized person trips/unit})_{lu} \times (\text{trip length adjustment factor})_{lu} \times (\text{cost per motorized trip end})$$

$$(\text{Transit TSDC})_{lu} = (\text{daily new transit person trips/unit})_{lu} \times (\text{cost per transit trip end})$$

$$(\text{Non-Motorized TSDC})_{lu} = (\text{daily new non-motorized person trips/unit})_{lu} \times (\text{cost per non motorized trip end})$$

Where lu = land use category

The total TSDC rate is the sum of the rates for each mode.

Observations

Seattle and Portland are among the first jurisdictions to implement multi-modal development impact mitigation payment programs. Several technical problems were overcome to develop each program. The Washington State legislature did not authorize jurisdictions to impose impact fees on modes other than roadways in the Growth Management Act. Seattle had to rely on the "volunteer agreement" provision of the State Environmental Policy Act. This provision is not as effective at raising funds uniformly as the GMA traditional impact fees. In fact, the City of Seattle has not been as successful in convincing developers to voluntarily use the mitigation payment program as an option to undergoing a more detailed SEPA review. Despite this problem, Seattle has been interested to expand this multi-modal development impact mitigation payment program other areas within the City.

The City of Portland TSDC program started the multi-modal trend in 1997. The program operated successfully for 10 years and was updated in 2007. The TSDC program closely matches the city's long term transportation goals, which emphasize improvements in transit and nonmotorized facilities.

Some of the technical challenges encountered by both cities in developing the multi-modal impact payment program remain. These include the need to convert ITE vehicle trip generation data into person trips and the difficulties in linking travel-model based mode split information with the land use-specific ITE data. Limited data for vehicle trip lengths also remains a challenge, but this data issue is not unique to multi-modal impact fee programs.

As options to build new roadways in urban areas rapidly diminish, it will be necessary to change the current vehicle-focused development impact mitigation to multi-modal mitigation approach. Further research into smart growth effects on development impacts and the relative impacts by mode will assist in future applications of multi-modal impact fee programs.

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