Issue Paper # 4

Date: August 16, 2007

To: City of Hillsboro Ad-Hoc Transportation Finance Committee

cc: Tom Arnold, P.E., Mary Gruss, Don Odermott

From: DJ Heffernan

Re: Hillsboro Transportation Utility Fee Methodology

Methodology Explanation

The methodology for allocating costs to utility customers involves a series of steps. The process is not complicated and involves no higher-order mathematics. The following chart depicts how the monthly utility fees will be developed.

Step Sequence		Description	Source(s)
1	Unit Cost Calculation	Used to estimate the cost to maintain a square yard of pavement for each type of street classification.	City of Hillsboro Public Works
2	Benefit Analysis by Customer Class	Estimate of the benefit that each customer class derives from each type of street based on travel behavior.	Metro Regional Traffic Model
3	Cost Share Allocation	Calculation using estimated benefit for each class of customer times the annual program maintenance cost.	City of Hillsboro Public Works
4	Cost per Trip Analysis	Calculation using cost allocated to each customer group divided by estimated system trips for that group.	Metro Traffic Model
5	Customer Grouping by Class	Analysis that groups various utility customers into groups based on common traffic use characteristics. EG. All single family residences are treated as one group.	Hillsboro Land Use Inventory; International Traffic Engineer Manual
6	Residential Customer Accounts	Calculation that applies the cost per trip factor to the estimated daily trips for each group of residential customers.	City of Hillsboro Finance; Hillsboro Community Development
7	Commercial Customer Accounts	Calculation that applies the cost per trip factor to the estimated daily trips for each group of commercial customers.	City of Hillsboro Finance; Hillsboro Community Development
Step Sequence		**Description**	**Source(s)**

8	Industrial Customer Accounts	Calculation that applies the cost per trip factor to the estimated daily trips for each group of industrial customers.	City of Hillsboro Finance; Hillsboro Community Development
9	Institutional Customer Accounts	Calculation that applies the cost per trip factor to the estimated daily trips for each group of institutional customers.	City of Hillsboro Finance; Hillsboro Community Development
10	Administrative Procedures	Documentation for invoicing, collecting, spending, and monitoring utility revenue and also an appeals procedure for reviewing individual customer fees.	City of Hillsboro Finance

Maintenance Program Investment by Street Classification

The cost to maintain various types of city streets varies depending on the attributes of the street. For example, lane widths are different on residential streets and collector streets. Some streets have parking, some have center left turn lanes, and some have bike lanes. In addition, the type of treatment used to maintain a street varies depending on its operational demands. Arterial and collector streets require thicker and more frequent overlays than residential streets. Finally, the length of time that an overlay lasts varies from street to street. Once the street reaches a certain level of decay, it is no longer feasible to repair it and it must be rebuilt. For residential streets, that life expectancy is roughly 40 years. For higher volume streets, the duration is less.

Table 1 - Cost Distribution by Street Classification: Life-Cycle Cost Basis

Street Class	Lane Miles	Pave Area (in sq. ft.)	Sq. Yards	Cost/Yd		Cost	Distribution
Arterials	17.73	1,541,177	171241.889	20.9	$	3,578,955	36.5%
Collectors	112.26	1,183,083	131453.667	20.9	$	2,747,382	28.1%
Neighborhood Routes	51.23	427,627	47514.1111	13.45	$	639,065	6.5%
Local Streets	262.2	1,892,591	210287.889	13.45	$	2,828,372	28.9%
Totals	443.42	5,044,478	560497.556		$	9,793,774	100.0%

Comments: Lane miles represent travel lane not center lane miles.
Pavement areas include parking, center turn lanes, and bike lanes.
Costs represent idealized management program with no deferred or emergency repairs.

Source: City of Hillsboro, Public Works

Table 1 shows an analysis of the level of investment the city would make under ideal conditions if all city streets were brand new and were maintained according to an ideal maintenance schedule. This was done to provide an apples-to-apples comparison of the relative level of investment that the city makes in maintaining the various types of streets over time; the estimate covers a 40-year horizon. This ensured all residential streets would go through at least one rebuild cycle. The number of lane miles represents that actual amount of pavement the city maintains segregated in four categories: local, neighborhood route (a local street that carries

more traffic), collector, and arterial. For each street type, a maintenance cost per square yard of pavement was developed using expected treatments over a 40-year time horizon. This average cost was multiplied times the total amount of pavement being maintained today. Those costs were then totaled and a percentage distribution was developed that represents how much investment the city will need to make to maintain the various categories of streets. In the end, the average cost to maintain local streets and neighborhood routes were estimated to be the same. In later calculations, these street categories are combined, but in this table they are separated to show how the investment percentages were calculated.

Maintenance Program Benefit Analysis

The benefit analysis attributes street use by customer classes with system benefit. In this analysis, we used Metro's estimated daily traffic use for different land use categories as a proxy measure for the benefit each customer group derives from using the street system. DKS Associates took data developed from origin destination traffic surveys that is represented in the Metro traffic model for Hillsboro. Those data are reported for three land use categories: residential, commercial, and industrial. They were compiled for all road links in the regional traffic model, which includes all freeways, arterials and collector road links throughout the city. An explanation of the analysis method they used to extract and compile these data is attached.

The Metro model does not report trips attributed to other types of land uses. These uses include schools, parks, government offices, fraternal organizations, etc. We elected to allocate 5% of trips from the Commercial customer group to this customer group. This assumption will be verified later in the process when the team develops account information for these customers. We will compare the trip distribution that results from that work with the percentage estimate used here and make adjustments if necessary.

The Metro traffic model does not include local streets so there are no Metro data for customer use on the local street network. There is limited data for traffic on Neighborhood Routes, which function as local collectors to funned traffic from neighborhood to higher-order streets. That distribution is similar to the distribution for arterials: 45% residential, 40% Commercial, 15% Industrial.

We assumed that traffic use on local streets includes a significant number of residential to residential trip ends. On that assumption, we developed the following estimated distribution for local streets: 60% residential uses; 25% Commercial; 10% Industrial; 5% Other.

The following table shows the result of this analysis. By multiplying the distribution of use factors that emerge from the Metro traffic model times the distribution of benefit factors from Table 1 above, we derived a cost allocation percentage for each customer group. For example, 36.5% of maintenance investment is expected to be on arterial roads (per Table 1), and 45% of arterial road use is attributed to residential customers. Multiplying these factors, the resulting value represents the percentage of arterial road maintenance costs that should be paid by residential customers. By adding the sum of all those interacting factors, a benefit/cost distribution emerges.

The aggregate benefit calculation is shown in the bottom part of the table. In total, the resulting distribution of costs by customer group is as follows: Residential – 62%; Commercial – 23%; Industrial – 10%; Public/Quasi-public – 5%.

Table 2 - Benefit Distribution by Street Classification

			Travel Patterns by Land Use Origin *				
Street Class	**Lane Miles**	**Cost Share**	**Residential**	**Commercial**	**Industrial**	**Public/ Quasi**	
Arterial	17.73	36.5%	0.45	0.35	0.15	0.05	1.00
Collector	112.26	28.1%	0.5	0.3	0.15	0.05	1.00
Local **	313.43	35.4%	0.6	0.25	0.10	0.05	1.00
	443.42	100.0%					

Weighted Average Benefit Allocation	**Residential**	**Commercial**	**Industrial**	**Other**	
Arterial	16.4%	12.8%	5.5%	1.8%	36.5%
Collector	14.0%	8.4%	4.2%	1.4%	28.1%
Local	21.2%	8.9%	3.5%	1.8%	35.4%
Benefit Share	51.7%	30.1%	13.2%	5.0%	100.0%

* - Source: Metro Regional Traffic Model

** - Includes the cost share for Neighborhood Routes

Annual Revenue Allocation

On an annual basis, the cost to maintain city streets needs to be recovered from each customer group in proportion to the benefit that group realizes through its use of the street system. In Issue Paper #2, we estimated the street maintenance program cost for the 2007-2008 fiscal year would be $2,265,000. This figure may need to be adjusted to account for administrative costs that are already funded. A separate analysis is being performed to assess that issue but the outcome at most will alter the program cost by around ½ of 1%, so for estimating purposes, no adjustment to the draft revenue requirement is made here.

We applied the benefit distribution from Table 2 to the 2007-08 revenue requirement and established a revenue contribution target for each customer group. The next steps in the process will be to verify the revenue contribution target assigned to the Other category (institutional customers), and to establish rates for invoicing customers in each group. An important finishing step in the analysis will be to test the rate for utility customers to make sure the amount charged is in line with the revenue contribution assigned to each customer group. The revenue contribution analysis is shown in the Table 3.

Table 3 –Estimated Revenue Contribution by Customer Group

Customer Class	**Residential**	**Commercial**	**Industrial**	**Other**	**Total**
Cost/ Benefit Allocation	51.7%	30.1%	13.2%	5.0%	100.0%
2007-08 Revenue Target	$ 1,171,306	$ 680,790	$ 299,654	$ 113,250	$ 2,265,000

Sources: Metro Traffic Model, DKS Associates, Angelo Planning Group