National Capital Region Transportation Planning Board

TPB Travel Forecasting Model, Version 2.3

Specification, Validation, and User's Guide

DRAFT

June 30, 2008

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The Metropolitan Washington Council of Governments (COG) and the National Capital Region Transportation Planning Board (TPB).

COG serves as the regional planning organization for the Washington metropolitan area. COG works toward solutions to regional problems, especially those related to regional growth, transportation, housing, human services, and the environment. The TPB is the designated Metropolitan Planning Organization (MPO) for transportation for the Washington region. Members of the TPB include representatives of local governments; state transportation agencies; the Maryland and Virginia General Assemblies; the Washington Metropolitan Area Transit Authority; and non-voting members from the Metropolitan Washington Airports Authority and federal agencies.

Credits

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Abstract: This report describes the latest version of the regional travel model, Version 2.3, for the Washington, D.C. area including the model specification, the model validation, and a user's guide. This work represents a continuation of an ongoing models development plan that was formulated in FY-93 by the Travel Forecasting Subcommittee (TFS), a subcommittee of the TPB's Technical Committee.

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Chapter 1 Introduction

The Metropolitan Washington Council of Governments (COG) serves as the regional planning organization for the Washington, D.C. metropolitan area. The National Capital Region Transportation Planning Board (TPB) is the designated Metropolitan Planning Organization (MPO) which functions to coordinate transportation planning among the various federal, state, and local agencies in the Washington region. Like most major MPOs in the United States, the TPB maintains a four-step transportation planning model that is used to evaluate transportation plans and programs, including air quality planning, in accordance with federal requirements. This report documents a travel model that is currently in development, known as Version 2.3. Version 2.3 will eventually replace the currently adopted Version 2.2 model after a period of evaluation and review.

The oversight body of the TPB's Models Development program is the Travel Forecasting Subcommittee (TFS) - a subcommittee of the Transportation Planning Board's Technical Committee that is comprised of representatives from state and local transportation agencies, local transportation consultants, and interested citizens. Many TFS members have a stake in the TPB's technical methods because the regional model is commonly used or adapted by the local agencies for project planning. The TFS will closely monitor the development and testing of Version 2.3 during FY-2009.

The Version 2.3 model has been developed using Version 2.2 as a starting point. The Version 2.3 model is distinguished by two major refinements: 1) the update of medium and heavy truck models and 2) the replacement of the sequential multinomial mode choice model used in the Version 2.2 model (and used in several earlier-generation TPB models) by a nested logit (NL) mode choice model. Both of these features have been in formulation over the past few years. The calibration year used for the truck model was 2005, the most recent year for which vehicle classification counts were available. The NL mode choice model used in Version 2.3 model was calibrated to year-2002 data, the year for which the most recent Metrorail survey data was available.

The remainder of this chapter provides greater detail regarding the refinements of the Version 2.3 model (Sections 1.1-1.2), an overview of the model (Section 1.3), and a discussion regarding special applications of the model (Section 1.4). The report subsequently addresses the model specification (Chapters 2 through 8), the model validation results to date (Chapter 9), and a description of the model application (Chapters 10 through 23). Finally, a series of technical appendices follow at the end of this document, including jurisdictional travel summaries, program scripts, and flowcharts that graphically depict the modeling process.

1.1 *Revised Medium- and Heavy-Weight Truck Models*

The revised truck models are a key refinement of the Version 2.3 model. Most regional travel models include an explicit truck modeling component, although the planning needs associated with the truck market vary between metropolitan areas. The TPB's ability to account for truck travel is primarily necessary to address the concerns of air quality planning, as trucks contribute to nitrogen oxides (NOx) and particulate levels. While the approaches used for modeling trucks differ from area to area, most MPOs would agree that collecting travel data from the truck operators is very difficult, if not impossible. Consequently, many MPOs chose to use either 'borrowed' truck models from comparable regions or to use truck models comprised of default parameter values taken from the literature. Recognizing that the TPB's existing truck models have not been evaluated for many years, TPB initiated a project in FY-2005 to develop a new commercial vehicle model and to revise the existing truck models using locally collected data. A consultant was retained to support this multi-year effort, which involved the development of an innovative truck modeling approach that obviated the need to collect operator-based information. This project resulted in a commercial vehicle model that was released during FY-2007 which was included in the Version 2.2 model (Allen, 2007). The project also produced revised truck models which were released the following year (Allen, 2008). The revised truck models are now included in Version 2.3.

TPB travel models have historically distinguished two types of trucks: medium-weight and heavy-weight. Medium-weight trucks are defined as single unit, two-axle vehicles with six tires, or, in other words, vehicles with dual rear wheels. Typical examples are recreational vehicles (RVs) or medium-duty delivery trucks. Heavy-weight trucks are defined as any multi-unit vehicle with three or more axles, such as tractor trailer vehicles.

The existing TPB truck models consisted of a standard trip generation and distribution formulation for developing daily trip tables, and a time-of-day procedure used to apportion daily trips among the three modeled time periods. The existing truck model assigns total trucks (medium and heavy) to the highway network as a separate and distinct market (trip table). The revised truck models are similar to the existing models in many respects. As with the existing model, the revised model includes generation, distribution, and time-of-day procedures, which are applied as TP+ scripts. The distinguishing feature of the revised truck models is that they were developed solely on the basis of truck counts, without the use of reported trip record-based (i.e., origin/destination) information. The generation and distribution components, therefore, make use of transferred parameters that have been adjusted (or 'informed') by the observed counts using procedure known as 'adaptable assignment.' This procedure enabled the development of an 'observed' trip table (built directly from the observed counts) that was used as a basis for adjusting the generation and distribution models. The end-product of the revised truck modeling effort was an updated generation, distribution, and time-of-day modeling specification, and a zonal adjustment (or 'delta') matrix. The delta matrix is used to fine-tune the trip table resulting directly from trip distribution so that the assigned link volumes will more closely match observed counts. The delta matrices are, therefore, an integral component of the revised truck models and are assumed to remain constant for both base and forecast model executions.

The traffic assignment procedure used in Version 2.2 has also been modified as a result of the revised truck models. The Version 2.2 traffic assignment involves the loading of five trip tables: 1) SOVs and Commercial Vehicles, 2) 2-occupant HOVs, 3) 3+ occupant HOVs, 4) total (medium and heavy) trucks, and 5) airport passenger vehicles. In contrast, the Version 2.3 assignment process now involves six trip tables, the same as those used in Version 2.2, except that medium and heavy trucks are now assigned as two separate and explicit markets. An additional trip table in the traffic assignment is not desirable because it increases the computation time, but, on the other hand, it affords the opportunity for TPB to explore the option of treating medium and heavy trucks as varying passenger car equivalents (or PCEs) in the assignment process. This option is but one of many that will be evaluated in the coming months

The revised truck modeling work has resulted in an updated process for reflecting observed travel patterns in the Washington, D.C. area. However, staff has gained a renewed appreciation of the complexity of truck travel in the region. Staff also recognizes that the TPB's truck modeling procedures will need to be assessed more frequently given that truck travel is affected by many influences that are not accounted for in conventional travel models.

1.2 *Nested-Logit Mode Choice Model*

The second key feature of the Version 2.3 model is a nested-logit (NL) mode choice model, which replaces the existing sequential multinomial (SMNL) mode choice model used in Version 2.2 and earlier models. The NL model affords a more exhaustive choice set in relation to that of the existing SMNL model. Whereas the SMNL model distinguishes between three auto modes and two transit modes, the NL model includes three highway choices (identical in name to those in the MNL model, though defined differently: See Chapter 6) and 12 transit sub-modes. The NL modeling framework has been established to accommodate the four standard purposes currently used in the Version 2.2 model (HBW, HBS, HBO, and NHB).

The NL model is applied using a specially designed application program known as AEMS, which replaces the COGMC program used to execute the SMNL model. Like the COGMC application program, the AEMS program integrates well within the Cube/TP+ environment, as it reads and writes the Cube/TP+ binary matrix format. And like the COGMC application program, four mode choice models have been calibrated for each of the modeled purposes used in the current (and previous) TPB models. See Chapter 6 for more details.

It is important to point out that the NL model choice models were not simply 'plugged into' the Version 2.2 model. Any mode choice model change has potentially significant implications for the remaining steps in the model chain. There are also implications for network coding that need to be understood. TPB staff has implemented several modifications to the regional model during the NL model implementation. The primary changes to date are listed below:

- The ArcInfo-based process to generate zonal short/long walk-shed areas for the COGMC model have been converted into ArcGIS-based routines and updated to meet walk-shed specifications of the NL mode choice model.

- The highway network now includes Metrorail station 'centroids' representing PNR lots. This is necessary in order to more accurately develop zonal drive-access times to the stations.

- The input file containing rail station information has been modified to include new fields for that better represent park-and-ride (PNR) lots found at many stations, including parking costs, parking capacities, and optional shadow costs (this last item is not implemented yet).

- Special utility programs used to generate walk- and auto-access links prior to transit network building have been replaced. The transit network building process has been completely reformulated to accommodate the additional level-of-service (LOS) information by access type and sub-mode. Eleven sets of LOS path information are generated by time period (AM peak and off-peak).

- The transit fare building process has been overhauled to accommodate the above mentioned transit paths.

- The transit accessibility variable used in the Version 2.2 vehicle availability model was originally based on the 'best' (walk-/drive-access) AM transit access to jobs. This accessibility has been updated to respect the more detailed Version 2.3 transit network, where walk- and drive-access paths are built by sub-mode. As before, the 'best' AM path is still selected for developing accessibility. The vehicle availability model was adjusted to account for the definitional change in AM transit accessibility.

- The composite (highway and transit) time function in trip distribution has been updated to use the more detailed transit time skims. The trip distribution has been modified to produce person trips as real numbers (i.e., two-decimal, floating-point values, not integers). Person trips were expressed as integer values in the Version 2.2 model, which was necessary in the application of the COGMC application program.

- Several Fortran utility programs have been removed (COGMCA1, GIS_PROC, NODESTB, SORTLINE, and WALKLNK) or replaced (STAPROTP is replaced by STAPROTP_V1). Several scripts have been updated to accommodate the AEMS program conventions or streamlined to remove variables that are no longer considered in the Version 2.3 model.

The AEMS-based nested-logit mode choice model now affords TPB the ability to perform transit assignments. The current procedure is comprised of two assignment steps:

1) AM transit assignment, in which HBW trips are assigned to the AM peak transit network; the transit trips are assigned in production/attraction (P/A) format.
2) Off-peak assignment, in which HBS, HBO, and NHB trip s are assigned to the off-peak transit network, again in P/A format.

1.3 *Overview of the Version 2.3 Model*

The Version 2.3 travel model, like its predecessors, Version 2.2 and Version 2.1D #50, is an aggregate, trip-based, four-step model that uses the TPB's existing 2,191 transportation analysis zone (TAZ) system. The study area is comprised of 22 jurisdictions in all, extending over the District of Columbia and three states: Maryland, Virginia, and West Virginia, as shown on Figure 1-1. It is important to note that this study area extends well beyond the COG member area, as well as, beyond the non-attainment area that is used in air quality planning work. A graphic showing the essential flow structure of the Version 2.3 modeling process is shown on Figure 1-2.

The demographic models are used to disaggregate the total number of zonal households across 64 cross-classes: 4 household income groups[1] by 4 household size groups (1, 2, 3, 4+ persons) by 4 vehicle availability groups (0, 1, 2, and 3+ vehicles available). The allocation of households to each cross-class is made at traffic analysis zone (TAZ) level. The figure indicates that peak-period transit accessibility measures are used as part of the demographic (vehicle availability) sub-model step.

The trip generation models are next applied to compute daily person trip productions and attractions by purpose. The modeled purposes include four resident travel types (home-based work [HBW], home-based shop [HBS], home-based other [HBO], and non-home-based [NHB]), a commercial vehicle purpose (consisting of both autos and light duty trucks), and two truck types (medium and heavy). Medium trucks are those with two axles and 6 or more tires. Heavy trucks comprise all combination vehicles.

Trip generation involves the application of daily trip rates to the number of households in each of the 64 classes and to jobs. The HBW trip rates reflect both motorized (i.e., transit and automobile) and non-motorized (i.e., bicycle and walk) person travel. Trip rates associated with the remaining modeled purposes represent motorized (i.e., transit and automobile) person travel only. The non-motorized component of HBW trip-ends is subsequently extracted from the total trip-ends prior to trip distribution. Trip attractions are computed by purpose as a function of gross land use categories. External (i.e., external-to-internal, X/I, and internal-to-external, I/X) productions and attractions are entered as an exogenous input, by purpose, into the trip generation process. External travel relates to auto person, commercial vehicle and truck travel only. External transit travel is not represented in the external trip inputs and is not estimated in the travel model. The trip generation process yields productions and attractions, which are stratified by the four income levels for the home-based purposes, and un-stratified for the NHB, commercial vehicle, and truck-related purposes.

[1] The income levels used approximate household income quartiles, based on the 2000 CTPP.

Figure 1-1 Modeled area: 2,191 TAZ, 22 jurisdictions

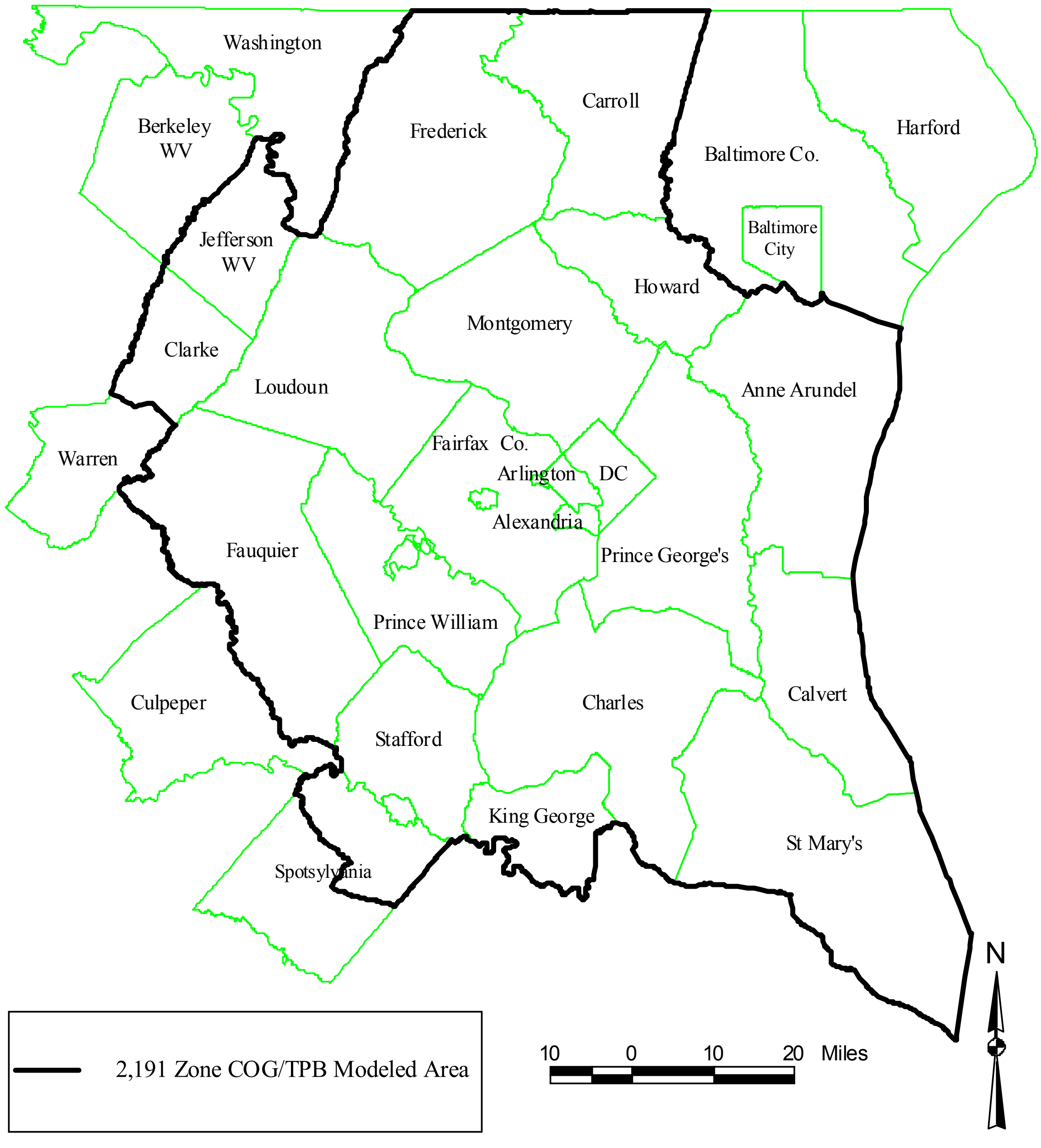
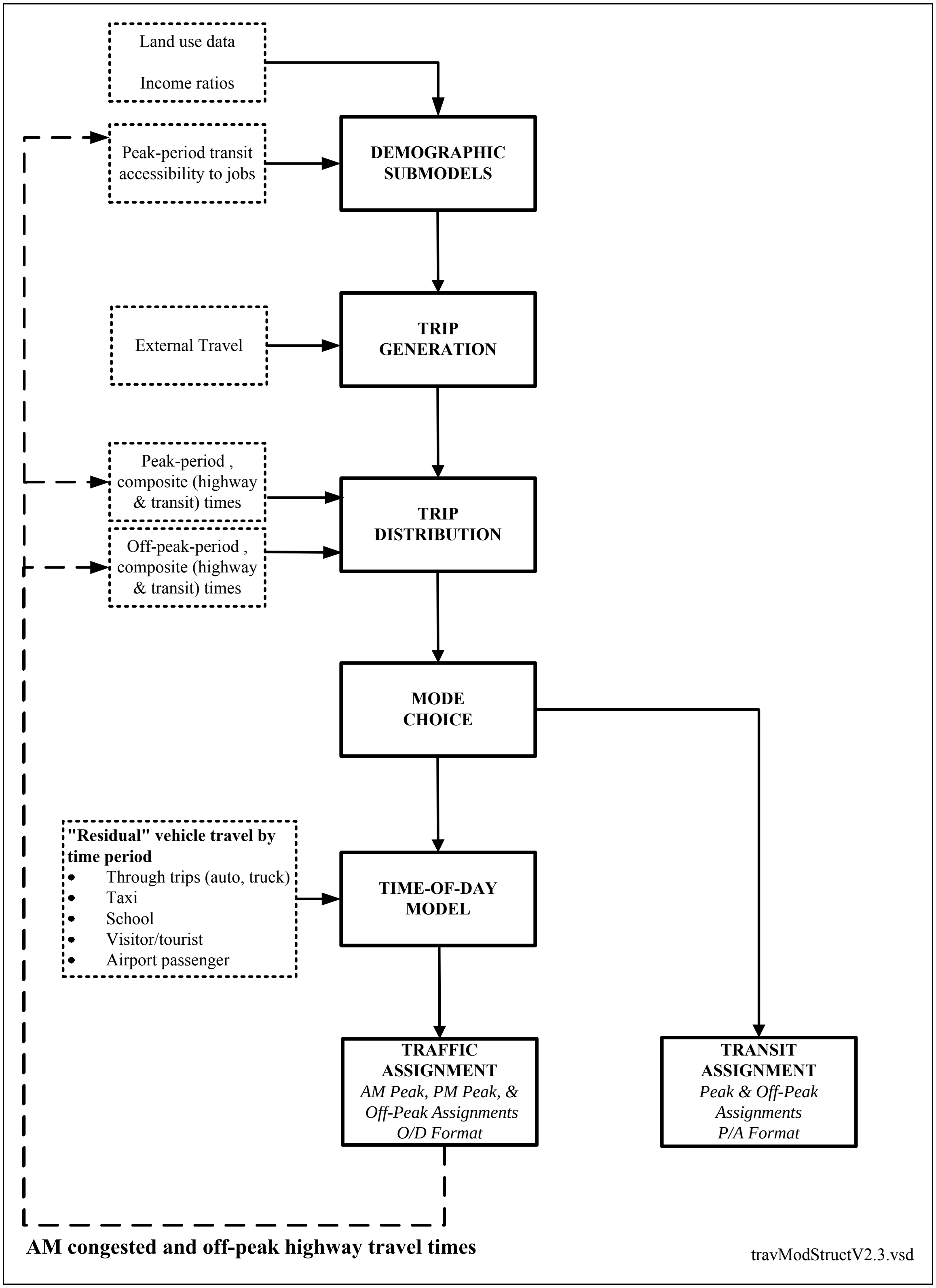


Figure 1-2 Version 2.3 Travel Model Structure



Ref: I:\ateam\docum\FY09\Version2.3_modelDoc_2008-07\travModStructV2.3.vsd

The trip distribution model uses a standard gravity model formulation and makes use of a composite time function that represents a blending of transit and highway travel times. The distribution step involves separate gravity model runs for 27 travel markets, given that home-based purposes are income stratified, and external travel is modeled separately by purpose and facility type (interstate travel vs. non-interstate). However, the trip distribution process ultimately results in seven daily trip tables corresponding to the basic motorized person, commercial, and truck purposes.

The mode choice process consists of four models corresponding to the HBW, HBS, HBO and NHB purposes. The mode choice models are 15-choice, nested-logit mode choice models, which apportion total motorized person trips across three auto modes (drive alone, shared ride 2, and shared ride 3+), four transit modes (commuter rail, all bus, all Metrorail, and combined bus/Metrorail), and three modes of access to transit (park and ride, kiss and ride, and walk).

The time-of-day model apportions daily resident travel among three time periods: AM peak period (6:00 AM - 9:00 AM), PM peak period (4:00 PM - 7:00 PM) and off-peak period (all remaining hours). The model consists of survey-based factors that are applied on the basis of purpose, mode, and directionality, i.e. home to non-home or non-home to home. This step also includes provisions for apportioning daily residual travel[2] and truck travel among the three time periods. The time-of-day process ultimately produces three 'total vehicle' trip tables, one for each of the three time periods.

The Version 2.3 traffic assignment process consists of three separate assignment executions corresponding to the above mentioned time periods. Each traffic assignment execution consists of a fixed-number (60) of user equilibrium iterations (or UEIs). To respect the various highway path options and prohibitions in the Washington region, six separate markets (trip tables) are loaded during each assignment execution: single-occupant vehicles (including commercial vehicles), 2-occupant vehicles, 3+occupant vehicles, medium trucks, airport passenger vehicles, and heavy trucks. Although separate link volumes are developed for each of the six markets, the final loaded links file ultimately contains total volumes, speeds, and V/C ratios for each time period. The highway assignment report file includes a number of equilibrium closure statistics, the newest of which is the "relative gap" (RELGAP)[3].

The Version 2.3 transit assignment process, as mentioned in the previous section, consists of two separate assignment executions corresponding to the AM-peak and off-peak periods. The AM peak assignment is executed with HBW transit trips, while the remaining purposes are combined and assigned to the off-peak network. The trip tables are assigned to the network in production/attraction format. It should be added that the TRNBUILD-based transit assignment algorithm assigns transit trips on the basis of a single 'best' path.

[2] Residual travel, also referred to as 'miscellaneous' travel, represents special travel markets that are typically not (or not well) represented in home-interview surveys. It is comprised of taxi, school, visitor/tourist, and air-passenger auto driver travel.

[3] The relative gap closure statistic was added to TP+ in Version 4.0.

Figure 1-2 also indicates that the modeling process includes a speed feedback loop. The AM and off-peak SOV restrained times resulting from the traffic assignment step are fed back into trip generation (via transit accessibility), trip distribution, and mode choice steps. In standard application, the four-step process is executed a total of seven times, including an initial pass that uses 'synthetic' highway speed inputs and exogenous mode choice percentages, and six subsequent passes where traffic assignment-based highway speeds are used and the mode choice model is executed. A link-level method of successive averaging (MSA) process is applied after each successive highway assignment process to ensure that highway volumes (and hence speeds) will stabilize. The MSA averaging is performed on the basis of total (non-segmented) link volumes, and is performed individually for each time period.

1.4 *Special Modeling Applications*

A standard 'stand-alone' model execution is sometimes insufficient for representing a special policy condition that is relevant to a particular travel forecast. In these instances, the travel model execution will utilize modeling outputs generated from a previous model execution. Recently, there have been two such special modeling procedures that have been used in this regard in the TPB's Version 2.2 model: 1) applying a transit constraint through the regional core, to account for the limited capacity of the Metrorail system, and 2) high-occupancy toll (HOT) lane modeling. HOT lanes are planned for Northern Virginia on I-495, I-395, and I-95. Although applied significantly in Version 2.2, the transit constraint procedure has not been adopted to the Version 2.3 model, so it is currently unavailable (See Chapter 20, Mode Choice, for more details). By contrast, the HOT lane modeling procedure has been re-implemented in the Version 2.3 travel model and will be described below.

The HOT lane modeling procedure involves a modeling technique developed by TPB staff, known as the "HOV-3+ skims substitution." Modeling the planned Virginia HOT lanes has proven to be especially challenging given:

1. The special operating characteristics of the facility (i.e., the tolls will change in real time to maintain a service speed at or near free-flow levels);
2. The stipulation that SOVs and 2-occupant HOVs will pay for the HOT lane access while 3+ occupant HOVs will be allowed access at no charge; and
3. The stipulation that the HOV travel market will suffer no service degradation from the HOT lane operation.

Obviously, a central modeling objective in representing HOT lanes is to specify detailed toll rates that will result in demand levels that do not degrade the prevailing speed on the HOT facility. Another modeling objective is to ensure that HOV 3+ service levels will remain unaffected by the HOT operation. To achieve these two objectives, the following four steps are currently undertaken on a year-by-year basis to simulate HOT lanes in Virginia.

1) The travel model is fully executed whereby all Virginia HOT lanes in the highway network are coded as HOV 3+-priority lanes. The resulting HOV 3+ LOS skim files

corresponding to each iteration (pump-prime, iteration 1,…, iteration 6) are preserved for later use. This step is known as the 'base' execution.

2) The travel model is fully executed again. This time, the Virginia HOT lanes are coded as general-use lanes (i.e., allowing access by both SOVs and HOVs). The HOT lanes are assigned a 'straw' toll level of 20 cents per mile during the peak periods and 15 cents per mile during the off-peak. The toll is included into the overall highway impedance during path building in the traffic assignment step. Therefore, the toll level impacts the loading in the HOT lane facility.

3) The final (i.e., iteration 6) highway assignment process (including three traffic assignments, one for each time period) resulting from Step 2 is run iteratively, on a trial-and-error basis, to identify HOT lane toll rates (cents/mile) which yield optimum speeds on the facility. The toll rates are developed on a freeway segment-by-segment basis. The queuing delay function (discussed in Chapter 8, Traffic Assignment) is disabled on the HOT lane facility during this particular step as such delay will presumably be minimal given the special operating conditions of the facility. At the end of each assignment execution, the segment level volume and speed is evaluated and the toll rate is adjusted incrementally. The toll level is increased when the desired segment speed is too low. The result of this process is a file containing 'final' toll rates for each HOT lane freeway segment, by time period.

4) The model is again executed as in Step 2, such that: 1) the final HOT lane toll rates developed in Step 3 are invoked and 2) the HOV 3+ skims developed in Step 1 are used as 'overrides' to the HOV 3+ skims that would be normally developed as part of the modeling process. The result of this execution produces the final loaded links (this step is referred to as the 'final' run).

In summary, TPB travel forecasts involving HOT-lane scenarios are developed using two separate model executions: 1) the 'base' run from which HOV 3+ skims are developed, and 2) the 'final' run which uses specially developed HOT lane toll rates and the HOV 3+ skims from the base run.

Highway skims used by the mode choice model normally consist of time, distance and toll matrix tables. The TPB travel model distinguishes tolls on variably priced facilities from tolls charged on fixed-price facilities. Variably priced facilities are those that levy differential toll charges by time period (such as the planned ICC electronic toll lanes (ETLs) in Maryland or the planned HOT lanes in Virginia). Fixed-price toll facilities are those that levy toll charges that do not fluctuate during the day. The TPB model expresses toll values on variably priced facilities as equivalent minutes that are added to the highway time, rather than as monetary values expressed in the toll matrix. Tolls charged on fixed price facilities, however, are expressed as monetary values. This conversion is made prior to the mode choice step, so the mode choice model sees the results of this conversion.

Chapter 2 Inputs to the Travel Model

This chapter describes the land use and exogenous travel files that have been prepared for the Version 2.3 model application. Zonal land use forecasts are periodically updated from COG's Cooperative Forecasting Program. The most recent land use release is known as Round 7.1 and it was released in August 2007[4]. Exogenous trip files used in the Version 2.3 model represent special travel markets that need to be accounted for in the regional forecast. Such markets include external trip-ends, through trips, airport passengers trips, and 'miscellaneous' (or taxi, school, and visitor/ tourist) trips.

2.1 *Round 7.1 Land Use*

The Version 2.3 model requires that a zonal land use file be provided in a standard format for each simulated year. The Cooperative Forecast provides of zonal projections of households, household population, group quarters population, and employment by category (i.e., retail, office, industrial, and other). The land use file also includes a jurisdiction code that is utilized by the travel model, ranging from 0 to 23. The Cooperative Forecasting program's Round 7.1 land use forecasts were provided for the years 2000 through 2030, in five-year increments.

Procedures to prepare standardized land use files supporting the TPB travel model have, in recent years, included a provision to factor employment on a jurisdictional basis to account for definitional differences between planning agencies. These employment adjustments were applied to the Round 7.1 files (COG/TPB, 2007.08.27), but the adjustments were made only to jurisdictions outside of the COG member area. In addition to land activity data, the standard zonal land use file includes additional data that do not vary by year, including zonal area, a zonal household income index (the ratio of the zonal median income to the regional median income), and the airline distance to the nearest external station. The index is used in the demographic modeling process, specifically, the household income sub-model. The household income index was recently updated using the 2000 CTPP (COG/TPB, 2006.08.11). The index used in previous files was based on the 1990 CTPP.

The Round 7.1 regional land use totals over time are listed on Table 2-1. The totals shown in between the five-year increments have been linearly interpolated. (Intermediate years are typically required for air quality planning work, and so files are generally prepared for all years between the base and horizon year in a given land use round).

[4] August 24, 2007 Memorandum from Paul Desjardin to Michael Clifford on the Subject: Final Round 7.1 Cooperative Forecast TAZ File.

Table 2-1 Round 7.1 Land Use Forecasts for Version 2.2 Modeling (w/ CTPP Employment Adjustments)

Year	HH	HHPOP	GQPop	TotPop	TotEMP(1,2)	OffEMP	RetEMP	IndEMP	OthEMP
2000	2,143,451	5,632,014	116,105	5,748,119	3,441,381	1,630,149	628,912	459,906	722,414
2001	2,186,197	5,737,713	119,668	5,857,403	3,494,997	1,654,026	638,140	471,719	731,144
2002	2,228,949	5,843,440	123,244	5,966,696	3,548,630	1,677,886	647,362	483,533	739,902
2003	2,271,740	5,949,100	126,863	6,075,951	3,602,284	1,701,726	656,573	495,275	748,657
2004	2,314,492	6,054,827	130,439	6,185,244	3,655,917	1,725,586	665,795	507,089	757,415
2005	2,357,238	6,160,526	134,002	6,294,528	3,709,533	1,749,463	675,023	518,902	766,145
2006	2,399,015	6,262,725	134,639	6,397,389	3,782,185	1,789,143	687,011	527,266	778,735
2007	2,440,792	6,364,933	135,301	6,500,236	3,854,849	1,828,871	699,005	535,604	791,360
2008	2,482,578	6,467,172	135,966	6,603,136	3,927,538	1,868,563	711,001	543,962	804,021
2009	2,524,355	6,569,380	136,628	6,705,983	4,000,202	1,908,291	722,995	552,300	816,646
2010	2,566,132	6,671,579	137,265	6,808,844	4,072,854	1,947,971	734,983	560,664	829,236
2011	2,605,822	6,761,365	137,755	6,899,125	4,133,475	1,981,003	744,821	568,523	839,049
2012	2,645,490	6,851,197	138,245	6,989,465	4,194,092	2,014,020	754,692	576,407	848,893
2013	2,685,233	6,941,005	138,795	7,079,777	4,254,748	2,047,081	764,628	584,336	858,783
2014	2,724,901	7,030,837	139,285	7,170,117	4,315,365	2,080,098	774,499	592,220	868,627
2015	2,764,591	7,120,623	139,775	7,260,398	4,375,986	2,113,130	784,337	600,079	878,440
2016	2,798,787	7,201,940	140,165	7,342,114	4,434,370	2,144,237	794,157	607,441	888,528
2017	2,833,031	7,283,227	140,562	7,423,813	4,492,772	2,175,337	803,969	614,806	898,609
2018	2,867,273	7,364,519	141,012	7,505,507	4,551,188	2,206,497	813,828	622,173	908,741
2019	2,901,517	7,445,806	141,409	7,587,206	4,609,590	2,237,597	823,640	629,538	918,822
2020	2,935,713	7,527,123	141,799	7,668,922	4,667,974	2,268,704	833,460	636,900	928,910
2021	2,964,737	7,593,499	142,396	7,735,893	4,720,353	2,296,094	841,147	644,028	939,011
2022	2,993,788	7,659,857	142,998	7,802,857	4,772,760	2,323,505	848,885	651,187	949,141
2023	3,022,842	7,726,221	143,619	7,869,838	4,825,216	2,350,939	856,635	658,369	959,315
2024	3,051,893	7,792,579	144,221	7,936,802	4,877,623	2,378,350	864,373	665,528	969,445
2025	3,080,917	7,858,955	144,818	8,003,773	4,930,002	2,405,740	872,060	672,656	979,546
2026	3,104,706	7,913,911	145,593	8,059,505	4,975,299	2,428,268	879,594	678,768	988,585
2027	3,128,522	7,968,819	146,384	8,115,193	5,020,598	2,450,796	887,174	684,894	997,668
2028	3,152,377	8,023,763	147,175	8,170,948	5,065,971	2,473,400	894,737	691,044	1,006,856
2029	3,176,193	8,078,671	147,966	8,226,636	5,111,270	2,495,928	902,317	697,170	1,015,939
2030	3,199,982	8,133,627	148,741	8,282,368	5,156,567	2,518,456	909,851	703,282	1,024,978

Notes: (1) - Rnd 7.1 Employment has been adjusted with CTPP-based factors.
(2) -The sum of emp. subcategories may not exactly equal the total emp. figures for interpolated years due to rounding

Ref: I:\ateam\mod_inputs\lu\Rnd71_2000CTPPIncRatio_2007_8_24\Rnd71_70a_Comparison.xls

2.2 *External and Through Forecasts*

External and through travel files are geographically referenced to 46 external stations which represent the entry and exit points of the highway network located at the periphery of the modeled study area. The stations are numbered from 2145 to 2191. The Version 2.3 model requires four files relating to external (I-X and X-I) and through (X-X) travel, for a given simulation year. These include:

1. A through auto driver trip table file (excluding commercial vehicle trips);
2. A through commercial vehicle and truck (medium/heavy) trip table file;

3. A file containing external auto-person, commercial vehicle, and truck productions by purpose, at the external station level;
4. A file containing external auto-person, commercial vehicle, and truck attractions by purpose, at the external station level;

External and through trips are generally developed using an assumed growth rate at each external station, and an observed traffic 'profile' at each external station, indicating the proportion of through and external travel and the proportions of travel modes and purposes (the proportions were developed from previous external surveys). The external traffic forecasts are currently based on varying growth rates depending on the station location, from 1.1% to 3.0% depending on location. The average annual growth rate across all stations is approximately 1.8%. Previous documents detail the development of the external traffic rates (COG/TPB, 2006.06.30, Chapter 2).

The Version 2.3 external and through trip forecasts were recently updated to accommodate the revised truck models. Previously, the external and through trip forecasts were developed from base-year (year-2000) counts at each external station. The updated forecasts, however, were built from 2005 counts, the year for which the revised truck models were calibrated. Care was taken to respect the same traffic growth levels for 2030 that were established previously. A summary of the revised external and through trips are shown on Table 2-2. The projected total level of external travel between 2000 and 2030 is shown to grow from 1,215,800 to 2,082,900, which reflects an average annual growth rate of about 1.8%. External productions and attractions are shown by travel mode and purpose, in Table 2-3 and Table 2-4, respectively.

Table 2-2 External and Through Auto/Truck Trips by Year

Year	AAWDT	Auto Driver Control	Truck Control	Auto Extl Trip-Ends	Auto XX Trip-Ends	CV Extl Trip-Ends	CV XX Trip-Ends	MedTrk Extl	MedTrk XX Trip-Ends	HvyTrk Extls	HvyTrk XX Trip-Ends
2000	1,215,783	1,120,101	95,682	948,199	73,797	66,720	5,499	16,242	10,058	22,323	47,058
2001	1,253,817	1,155,255	98,562	978,778	75,191	69,065	5,641	16,734	10,332	23,025	48,470
2002	1,291,850	1,190,409	101,441	1,009,357	76,584	71,409	5,782	17,226	10,606	23,727	49,881
2003	1,329,884	1,225,563	104,321	1,039,936	77,978	73,753	5,924	17,718	10,880	24,430	51,293
2004	1,367,917	1,260,717	107,200	1,070,516	79,371	76,098	6,065	18,210	11,154	25,132	52,704
2005	1,405,951	1,295,871	110,080	1,101,095	80,765	78,442	6,207	18,702	11,428	25,834	54,116
2006	1,438,693	1,325,807	112,886	1,126,800	82,957	80,410	6,365	19,152	11,693	26,523	55,518
2007	1,472,053	1,356,307	115,746	1,152,989	85,190	82,416	6,527	19,611	11,963	27,225	56,947
2008	1,506,043	1,387,384	118,659	1,179,672	87,465	84,459	6,691	20,078	12,239	27,940	58,402
2009	1,540,674	1,419,046	121,628	1,206,859	89,783	86,541	6,858	20,554	12,519	28,669	59,885
2010	1,575,958	1,451,306	124,652	1,234,559	92,145	88,662	7,029	21,039	12,805	29,412	61,396
2011	1,603,509	1,476,496	127,014	1,256,189	93,989	90,318	7,162	21,418	13,028	29,991	62,576
2012	1,631,459	1,502,050	129,409	1,278,130	95,860	91,999	7,297	21,802	13,255	30,580	63,773
2013	1,659,812	1,527,973	131,840	1,300,390	97,757	93,703	7,434	22,192	13,484	31,176	64,987
2014	1,688,576	1,554,271	134,305	1,322,970	99,683	95,432	7,573	22,587	13,717	31,782	66,219
2015	1,717,755	1,580,949	136,806	1,345,878	101,636	97,186	7,714	22,988	13,954	32,396	67,468
2016	1,744,375	1,605,287	139,088	1,366,775	103,418	98,787	7,843	23,354	14,169	32,956	68,608
2017	1,771,341	1,629,942	141,399	1,387,945	105,223	100,408	7,973	23,725	14,388	33,523	69,763
2018	1,798,657	1,654,917	143,741	1,409,390	107,051	102,050	8,105	24,101	14,609	34,098	70,933
2019	1,826,328	1,680,216	146,112	1,431,113	108,903	103,713	8,239	24,481	14,833	34,681	72,118
2020	1,854,360	1,705,845	148,515	1,453,119	110,780	105,399	8,374	24,866	15,060	35,270	73,318
2021	1,878,341	1,727,771	150,571	1,471,946	112,385	106,840	8,490	25,196	15,254	35,775	74,345
2022	1,902,586	1,749,938	152,649	1,490,980	114,008	108,298	8,607	25,529	15,451	36,285	75,384
2023	1,927,097	1,772,348	154,750	1,510,222	115,648	109,771	8,726	25,866	15,649	36,801	76,433
2024	1,951,877	1,795,003	156,874	1,529,675	117,307	111,261	8,846	26,207	15,850	37,323	77,494
2025	1,976,930	1,817,909	159,021	1,549,343	118,984	112,767	8,967	26,551	16,053	37,850	78,567
2026	1,997,752	1,836,946	160,806	1,565,689	120,378	114,019	9,067	26,838	16,221	38,288	79,459
2027	2,018,762	1,856,155	162,607	1,582,184	121,784	115,282	9,169	27,126	16,392	38,730	80,359
2028	2,039,963	1,875,539	164,424	1,598,827	123,203	116,556	9,272	27,418	16,563	39,176	81,266
2029	2,061,354	1,895,097	166,257	1,615,621	124,635	117,842	9,375	27,712	16,737	39,626	82,182
2030	2,082,938	1,914,831	168,107	1,632,565	126,080	119,140	9,479	28,009	16,911	40,081	83,107

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Table 2-3 External Auto/Truck Productions by Year

Year	HBWXI AutoDrv	HBSXI AutoDrv	HBOXI AutoDrv	NHBXI AutoDrv	ComvXI Vehs	HBWXI AutoPsn	HBSXI AutoPsn	HBOXI AutoPsn	NHBXI AutoPsn	ComVeh XI Psn	Med XI	Hvy XI	Auto XI Drv	TruckXI Total
2000	242,195	41,991	120,220	58,299	33,360	278,525	68,866	193,554	74,623	42,701	8,129	11,171	496,069	19,300
2001	249,612	43,772	124,081	59,977	34,532	287,054	71,787	199,770	76,771	44,201	8,376	11,522	511,977	19,898
2002	257,029	45,553	127,942	61,655	35,704	295,583	74,707	205,987	78,919	45,701	8,622	11,874	527,886	20,496
2003	264,446	47,334	131,803	63,333	36,876	304,112	77,628	212,204	81,066	47,201	8,868	12,225	543,795	21,093
2004	271,862	49,115	135,665	65,011	38,047	312,642	80,549	218,420	83,214	48,700	9,115	12,577	559,703	21,691
2005	279,279	50,896	139,526	66,689	39,219	321,171	83,469	224,637	85,362	50,200	9,361	12,928	575,612	22,289
2006	285,937	52,028	142,999	68,058	40,203	328,827	85,326	230,228	87,115	51,460	9,586	13,273	589,228	22,859
2007	292,720	53,182	146,537	69,454	41,206	336,628	87,218	235,924	88,901	52,744	9,816	13,624	603,101	23,440
2008	299,631	54,357	150,142	70,875	42,228	344,575	89,146	241,728	90,720	54,051	10,050	13,982	617,236	24,032
2009	306,672	55,555	153,814	72,323	43,268	352,673	91,110	247,641	92,574	55,384	10,288	14,347	631,637	24,635
2010	313,847	56,775	157,557	73,799	44,329	360,924	93,111	253,666	94,463	56,741	10,531	14,719	646,310	25,250
2011	319,449	57,728	160,479	74,951	45,157	367,366	94,674	258,371	95,938	57,801	10,721	15,009	657,767	25,729
2012	325,132	58,694	163,443	76,120	45,997	373,901	96,259	263,143	97,434	58,876	10,913	15,303	669,390	26,216
2013	330,897	59,675	166,450	77,306	46,849	380,531	97,867	267,985	98,952	59,967	11,108	15,602	681,181	26,710
2014	336,745	60,669	169,501	78,509	47,714	387,257	99,498	272,896	100,491	61,074	11,306	15,905	693,143	27,211
2015	342,678	61,678	172,595	79,729	48,591	394,080	101,153	277,879	102,054	62,197	11,507	16,212	705,277	27,719
2016	348,091	62,599	175,419	80,843	49,391	400,305	102,662	282,424	103,479	63,221	11,690	16,492	716,347	28,182
2017	353,574	63,532	178,279	81,970	50,202	406,610	104,192	287,029	104,922	64,258	11,876	16,776	727,561	28,652
2018	359,128	64,476	181,176	83,113	51,023	412,997	105,741	291,693	106,384	65,309	12,064	17,064	738,920	29,128
2019	364,755	65,433	184,111	84,270	51,855	419,468	107,310	296,418	107,866	66,374	12,254	17,355	750,428	29,609
2020	370,454	66,402	187,084	85,442	52,697	426,022	108,900	301,205	109,366	67,452	12,447	17,651	762,084	30,098
2021	375,330	67,232	189,627	86,445	53,418	431,630	110,260	305,299	110,650	68,375	12,612	17,903	772,057	30,515
2022	380,260	68,070	192,198	87,459	54,147	437,299	111,635	309,439	111,948	69,308	12,779	18,159	782,140	30,937
2023	385,244	68,918	194,798	88,484	54,883	443,031	113,025	313,625	113,260	70,251	12,947	18,417	792,333	31,364
2024	390,282	69,775	197,426	89,521	55,628	448,825	114,430	317,856	114,587	71,204	13,118	18,678	802,637	31,796
2025	395,376	70,641	200,083	90,569	56,381	454,683	115,851	322,134	115,928	72,168	13,290	18,942	813,056	32,232
2026	399,610	71,361	202,291	91,439	57,007	459,552	117,032	325,689	117,042	72,969	13,434	19,161	821,715	32,595
2027	403,882	72,088	204,520	92,318	57,639	464,465	118,224	329,277	118,167	73,778	13,578	19,382	830,452	32,961
2028	408,193	72,821	206,768	93,205	58,276	469,422	119,426	332,897	119,302	74,593	13,724	19,605	839,268	33,330
2029	412,543	73,560	209,037	94,099	58,919	474,424	120,639	336,550	120,447	75,416	13,871	19,831	848,164	33,702
2030	416,931	74,307	211,326	95,002	59,568	479,471	121,863	340,235	121,603	76,247	14,020	20,058	857,140	34,078

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Table 2-4 External Auto/Truck Attractions by Year

Year	HBWIX AutoDrv	HBSIX AutoDrv	HBOIX AutoDrv	NHBIX AutoDrv	ComvIX Vehs	HBWIX AutoPsn	HBSIX AutoPsn	HBOIX AutoPsn	NHBIX AutoPsn	ComVeh IX Psn	Med IX	Hvy IX	Auto IX Drv	TruckIX Total
2000	149,843	41,426	169,213	58,291	33,360	172,319	67,938	272,433	74,612	42,701	8,129	11,171	452,130	19,300
2001	154,804	42,675	174,822	59,969	34,533	178,025	69,987	281,463	76,760	44,202	8,376	11,522	466,801	19,898
2002	159,765	43,925	180,431	61,647	35,705	183,730	72,037	290,493	78,908	45,703	8,622	11,874	481,471	20,496
2003	164,727	45,175	186,039	63,325	36,878	189,436	74,086	299,524	81,056	47,204	8,868	12,225	496,142	21,093
2004	169,688	46,424	191,648	65,003	38,050	195,141	76,136	308,554	83,204	48,704	9,115	12,577	510,812	21,691
2005	174,649	47,674	197,257	66,681	39,223	200,846	78,185	317,584	85,352	50,205	9,361	12,928	525,483	22,289
2006	178,449	48,731	202,135	68,050	40,207	205,217	79,919	325,437	87,104	51,465	9,586	13,273	537,571	22,859
2007	182,321	49,809	207,104	69,445	41,210	209,669	81,686	333,438	88,890	52,749	9,816	13,624	549,888	23,440
2008	186,266	50,906	212,167	70,867	42,232	214,206	83,486	341,590	90,709	54,056	10,050	13,982	562,437	24,032
2009	190,285	52,024	217,326	72,315	43,273	218,828	85,320	349,895	92,563	55,389	10,288	14,347	575,222	24,635
2010	194,380	53,164	222,583	73,791	44,333	223,537	87,188	358,358	94,452	56,746	10,531	14,719	588,249	25,250
2011	197,578	54,053	226,687	74,943	45,161	227,215	88,648	364,966	95,927	57,806	10,721	15,009	598,421	25,729
2012	200,822	54,956	230,850	76,111	46,001	230,945	90,128	371,669	97,423	58,882	10,913	15,303	608,740	26,216
2013	204,113	55,871	235,074	77,297	46,854	234,730	91,629	378,469	98,940	59,973	11,108	15,602	619,208	26,710
2014	207,451	56,800	239,359	78,500	47,718	238,569	93,152	385,368	100,480	61,079	11,306	15,905	629,828	27,211
2015	210,838	57,742	243,706	79,720	48,595	242,463	94,698	392,366	102,042	62,202	11,507	16,212	640,601	27,719
2016	213,927	58,602	247,671	80,834	49,395	246,016	96,107	398,751	103,467	63,226	11,690	16,492	650,429	28,182
2017	217,057	59,473	251,688	81,961	50,206	249,616	97,535	405,218	104,910	64,264	11,876	16,776	660,384	28,652
2018	220,227	60,355	255,757	83,104	51,027	253,261	98,982	411,770	106,373	65,315	12,064	17,064	670,469	29,128
2019	223,439	61,248	259,880	84,261	51,859	256,955	100,447	418,406	107,854	66,379	12,254	17,355	680,686	29,609
2020	226,692	62,154	264,055	85,433	52,701	260,696	101,932	425,129	109,354	67,458	12,447	17,651	691,035	30,098
2021	229,476	62,928	267,628	86,436	53,422	263,897	103,202	430,881	110,638	68,380	12,612	17,903	699,889	30,515
2022	232,290	63,711	271,240	87,450	54,151	267,133	104,486	436,696	111,936	69,313	12,779	18,159	708,840	30,937
2023	235,134	64,502	274,891	88,475	54,888	270,405	105,784	442,574	113,248	70,256	12,947	18,417	717,889	31,364
2024	238,010	65,303	278,582	89,511	55,633	273,712	107,096	448,517	114,574	71,210	13,118	18,678	727,038	31,796
2025	240,918	66,111	282,314	90,559	56,386	277,056	108,423	454,526	115,915	72,174	13,290	18,942	736,287	32,232
2026	243,335	66,784	285,416	91,429	57,012	279,835	109,526	459,520	117,030	72,975	13,434	19,161	743,975	32,595
2027	245,773	67,462	288,546	92,308	57,643	282,639	110,638	464,559	118,154	73,783	13,578	19,382	751,732	32,961
2028	248,234	68,147	291,704	93,195	58,280	285,469	111,761	469,644	119,289	74,599	13,724	19,605	759,559	33,330
2029	250,717	68,838	294,891	94,089	58,923	288,324	112,894	474,774	120,434	75,422	13,871	19,831	767,457	33,702
2030	253,222	69,535	298,106	94,992	59,572	291,205	114,037	479,951	121,590	76,252	14,020	20,058	775,426	34,078

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2.3 *Miscellaneous and Airport-Passenger Trip Forecasts*

The remaining exogenous travel markets consist of taxis, school, and visitor/tourist auto driver trips (collectively referred to as 'miscellaneous trips') and airport-passenger auto driver trips. The miscellaneous trip totals, shown by year on Table 2-5, are based on surveyed travel patterns that have been growth factored through time. The airport-passenger forecasts are shown on Table 2-6. The airport trips have been recently updated using the 2000 COG Air Passenger Survey (COG/TPB, 2006.06.30, Chapter 6). The trip tables represent auto travel to each of the three major airports serving the Washington/Baltimore area.

Table 2-5 Miscellaneous Auto Driver Forecasts

Year	School	Taxi	Visitor/ Tourist
2000	250,448	111,246	222,227
2001	255,129	113,337	226,490
2002	259,809	115,428	230,753
2003	264,490	117,518	235,016
2004	269,170	119,609	239,279
2005	273,851	121,700	243,542
2006	278,407	123,715	247,527
2007	282,964	125,730	251,512
2008	287,520	127,746	255,496
2009	292,077	129,761	259,481
2010	296,633	131,776	263,466
2011	300,347	134,043	267,660
2012	304,060	136,310	271,853
2013	307,774	138,578	276,047
2014	311,487	140,845	280,240
2015	315,201	143,112	284,434
2016	318,127	144,191	286,834
2017	321,053	145,270	289,234
2018	323,979	146,350	291,633
2019	326,905	147,429	294,033
2020	329,831	148,508	296,433
2021	332,552	149,544	298,480
2022	335,273	150,580	300,527
2023	337,994	151,616	302,574
2024	340,715	152,652	304,621
2025	343,436	153,688	306,668
2026	346,932	155,598	309,981
2027	350,429	157,508	313,294
2028	353,925	159,418	316,607
2029	357,422	161,328	319,920
2030	360,918	163,238	323,233

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Table 2-6 Air Passenger Auto Driver Trips by Year and Airport

	Airport			
Year	National	Dulles	BWI	Total
2000	18,746	16,585	14,486	49,817
2001	18,339	16,595	14,810	49,744
2002	17,933	16,603	15,134	49,670
2003	17,526	16,612	15,459	49,597
2004	17,119	16,620	15,783	49,522
2005	16,713	16,630	16,107	49,450
2006	17,199	18,405	17,333	52,937
2007	17,687	20,180	18,559	56,426
2008	18,174	21,956	19,785	59,915
2009	18,662	23,731	21,011	63,404
2010	19,149	25,506	22,237	66,892
2011	19,346	27,459	23,126	69,931
2012	19,543	29,412	24,014	72,969
2013	19,740	31,365	24,903	76,008
2014	19,937	33,319	25,792	79,048
2015	20,135	35,272	26,681	82,088
2016	20,331	36,754	27,341	84,426
2017	20,528	38,237	28,001	86,766
2018	20,725	39,720	28,662	89,107
2019	20,921	41,203	29,322	91,446
2020	21,118	42,685	29,982	93,785
2021	21,314	43,657	30,375	95,346
2022	21,511	44,630	30,767	96,908
2023	21,711	45,603	31,161	98,475
2024	21,908	46,576	31,553	100,037
2025	22,104	47,548	31,945	101,597
2026	22,299	48,630	32,337	103,266
2027	22,495	49,713	32,729	104,937
2028	22,695	50,796	33,121	106,612
2029	22,891	51,879	33,513	108,283
2030	23,086	52,961	33,905	109,952

Ref: I:\ateam\mod_inputs\airport\2007-08-24_Rnd71Based\Airport_Summary.xls
I:\ateam\docum\FY09\Version2.3_modelDoc_2008-07\extrnalPsAs_V2.3.xls, worksheet: misc

Chapter 3 Demographic models

This chapter describes the specification of demographic modeling process used within the Version 2.3 model. The demographic models refer to the household size, household income, and vehicle availability models. The models are applied at the zone level and are used to apportion the total number households among size, income, and vehicle availability cross-classes. The demographic models are substantially similar to those used in Version 2.2, except for minor adjustments made to vehicle availability model.

3.1 *Demographic Sub-models*

The demographic models are used to distribute the total number of households in a given zone among 64 classes. The classes are established by three dimensions:

- Household size (1, 2, 3, or 4+ persons per household);
- Household income (Income "quartile" 1, 2, 3, or 4); and
- Vehicle ownership/availability (0, 1, 2, or 3+ vehicles per household).

According to the 2000 CTPP, the median household income for the TPB modeled area is approximately $63,800 in 1999 dollars. The household income quartiles based on the 2000 CTPP and are defined as discrete ranges shown on Table 3-1.

Table 3-1 2000 CTPP Household Income Quartile Ranges

Quartile	Income range (1999 dollars)
First	Less than $36,199
Second	$36,100 to $63,799
Third	$63,800 to $100,699
Fourth	$100,700 or more

It is important to point out that the number of households in each income range, as tabulated from the Census, does not equal 25% precisely as one might expect. The Census data does not provide individual household income data, but rather, reports household income tabulations *at zone level* in terms of the number of households falling in 26 discrete income ranges. The reported income ranges at zone level do not conform neatly to the regional quartile ranges shown above, and so, there is some degree of approximation in the tabulation of the number of zonal households in each quartile group.

A sub-model was developed for each of the three socio-economic dimensions. The household size sub-model uses Census-based relationships to estimate the percent of households in each integer class of household size, given the zone's average household size. The household income sub-model uses similar Census-based relationships to estimate the percent of households in each income class, given the zone's median household income. Lastly, the vehicle ownership model uses a disaggregate logit formulation to estimate the percentage of households in each of the four vehicle-availability classes. The logit model makes use of the household size and income information developed in prior steps. The model specifications are detailed below.

3.2 Household Size Sub-model

The household size sub-model is an "aggregate share" model. The model is essentially a family of four curves used to allocate the total number of households among integer size levels, based on the average household size of a given zone. Each curve uses the same independent variable:

Curve	Dependent variable	Independent variable
1	Percent of HHs with 1 person	Average zonal household size
2	Percent of HHs with 2 persons	Average zonal household size
3	Percent of HHs with 3 persons	Average zonal household size
4	Percent of HHs with 4+ persons	Average zonal household size

The final model is shown in graphical form in Figure 3-1 and in tabular form in Table 3-2.

Figure 3-1 Household size sub-model: Graphical form

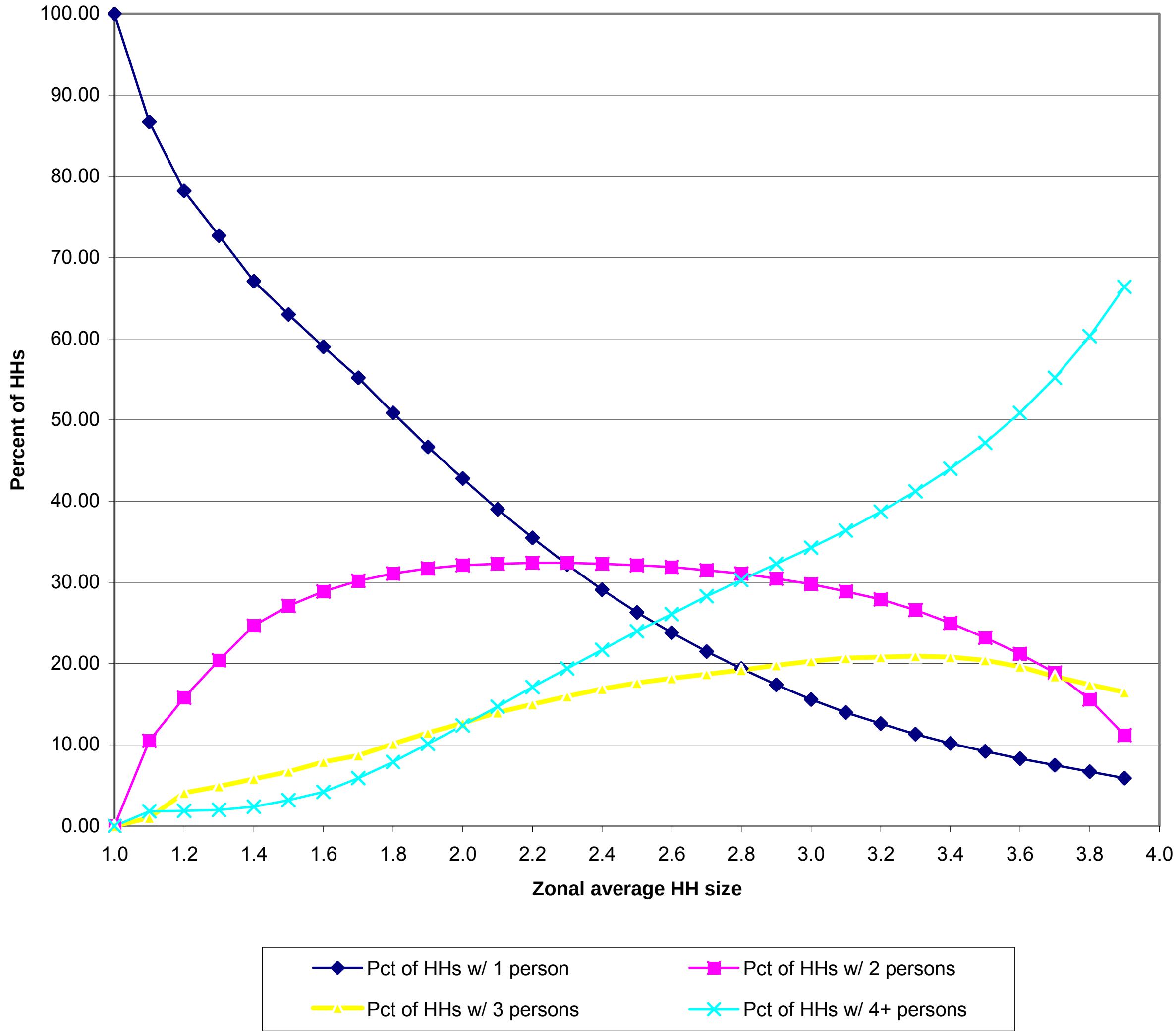

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Table 3-2 Household size sub-model: Tabular form

Ave zonal HH size	Pct of HHs with 1-pers.	Pct of HHs with 2-pers.	Pct of HHs with 3-pers.	Pct of HHs with 4+pers.	Total percent
1.0	100.00%	0.00%	0.00%	0.00%	100.00%
1.1	86.70%	10.50%	1.00%	1.80%	100.00%
1.2	78.20%	15.80%	4.10%	1.90%	100.00%
1.3	72.70%	20.40%	4.90%	2.00%	100.00%
1.4	67.10%	24.70%	5.80%	2.40%	100.00%
1.5	63.00%	27.10%	6.70%	3.20%	100.00%
1.6	59.00%	28.90%	7.90%	4.20%	100.00%
1.7	55.20%	30.20%	8.70%	5.90%	100.00%
1.8	50.90%	31.10%	10.10%	7.90%	100.00%
1.9	46.70%	31.70%	11.50%	10.10%	100.00%
2.0	42.80%	32.10%	12.70%	12.40%	100.00%
2.1	39.00%	32.30%	14.00%	14.70%	100.00%
2.2	35.50%	32.40%	15.00%	17.10%	100.00%
2.3	32.20%	32.40%	16.00%	19.40%	100.00%
2.4	29.10%	32.30%	16.90%	21.70%	100.00%
2.5	26.30%	32.10%	17.60%	24.00%	100.00%
2.6	23.80%	31.90%	18.20%	26.10%	100.00%
2.7	21.50%	31.50%	18.70%	28.30%	100.00%
2.8	19.40%	31.10%	19.20%	30.30%	100.00%
2.9	17.40%	30.50%	19.80%	32.30%	100.00%
3.0	15.60%	29.80%	20.30%	34.30%	100.00%
3.1	14.00%	28.90%	20.70%	36.40%	100.00%
3.2	12.60%	27.90%	20.80%	38.70%	100.00%
3.3	11.30%	26.60%	20.90%	41.20%	100.00%
3.4	10.20%	25.00%	20.80%	44.00%	100.00%
3.5	9.20%	23.20%	20.40%	47.20%	100.00%
3.6	8.30%	21.20%	19.60%	50.90%	100.00%
3.7	7.50%	18.90%	18.40%	55.20%	100.00%
3.8	6.70%	15.60%	17.40%	60.30%	100.00%
3.9	5.90%	11.20%	16.50%	66.40%	100.00%

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3.2 *Household Income Sub-model*

The household income sub-model is also an "aggregate share" model and is, therefore, similar in form to the household size sub-model. The household income sub-model is used to estimate the share of households in each of the four income quartiles in each zone, given the median household income for the zone. As a surrogate for the median zonal household income, the following normalized variable was used as the independent variable for the model:

Equation 3-1 Income ratio equation

$$\text{Income ratio} = (\text{zonal median HH income}) / (\text{regional median HH income}) \quad \text{in 1999 dollars}$$

The final model is shown in graphical form in Figure 3-2 and in tabular form in Table 3-3.

Figure 3-2 Household income sub-model: Graphical form

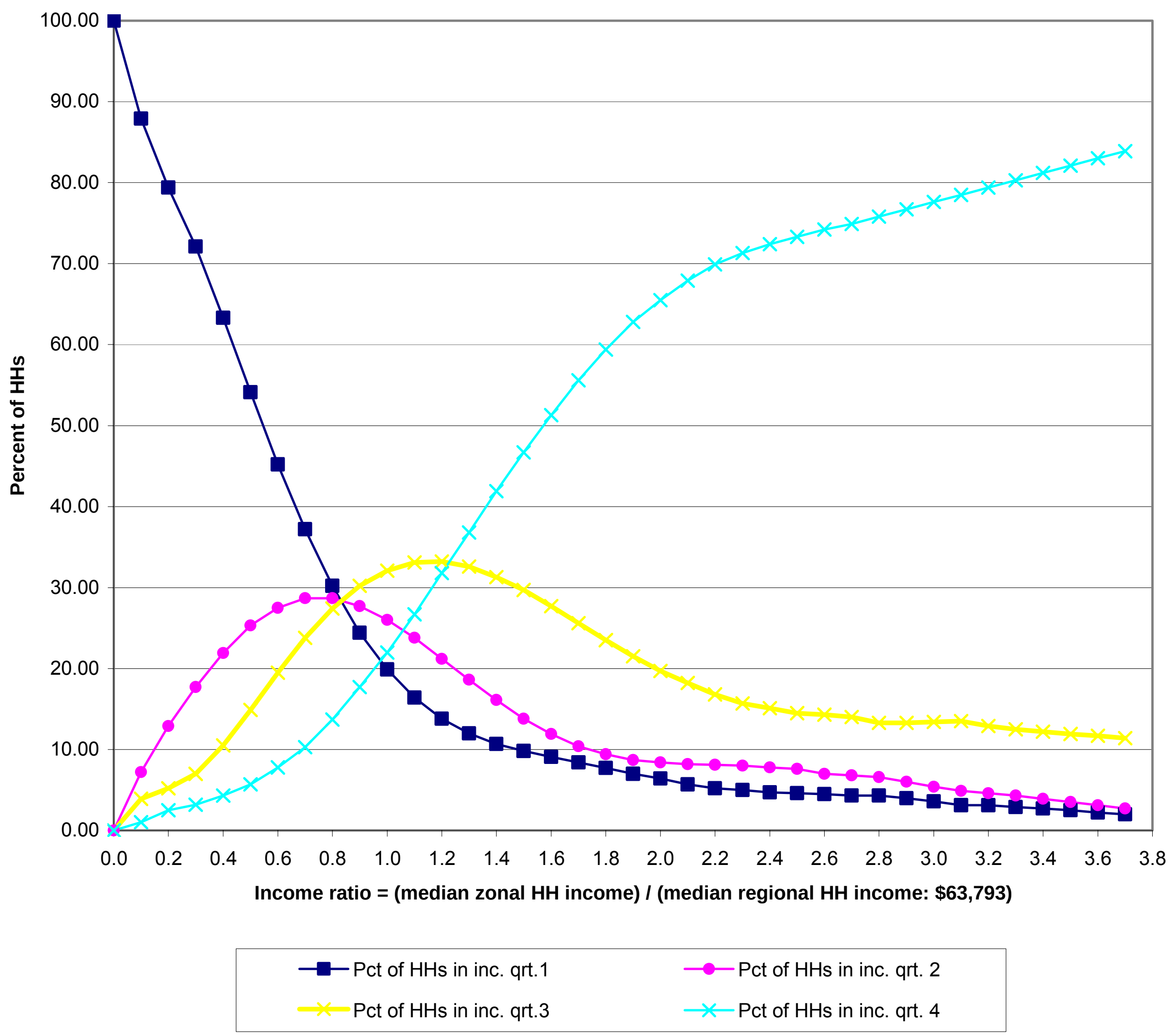

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Table 3-3 Household income sub-model: Tabular form

Income ratio	Pct of HHs in inc. qrt.1	Pct of HHs in inc. qrt. 2	Pct of HHs in inc. qrt.3	Pct of HHs in inc. qrt. 4	Total percent
0.0	100.00%	0.00%	0.00%	0.00%	100.00%
0.1	87.90%	7.20%	3.90%	1.00%	100.00%
0.2	79.40%	12.90%	5.20%	2.50%	100.00%
0.3	72.10%	17.70%	7.00%	3.20%	100.00%
0.4	63.30%	21.90%	10.50%	4.30%	100.00%
0.5	54.10%	25.30%	14.90%	5.70%	100.00%
0.6	45.20%	27.50%	19.50%	7.80%	100.00%
0.7	37.20%	28.70%	23.80%	10.30%	100.00%
0.8	30.20%	28.70%	27.40%	13.70%	100.00%
0.9	24.40%	27.70%	30.20%	17.70%	100.00%
1.0	19.90%	26.00%	32.10%	22.00%	100.00%
1.1	16.40%	23.80%	33.10%	26.70%	100.00%
1.2	13.80%	21.20%	33.20%	31.80%	100.00%
1.3	12.00%	18.60%	32.60%	36.80%	100.00%
1.4	10.70%	16.10%	31.30%	41.90%	100.00%
1.5	9.80%	13.80%	29.70%	46.70%	100.00%
1.6	9.10%	11.90%	27.70%	51.30%	100.00%
1.7	8.40%	10.40%	25.60%	55.60%	100.00%
1.8	7.70%	9.40%	23.50%	59.40%	100.00%
1.9	7.00%	8.70%	21.50%	62.80%	100.00%
2.0	6.40%	8.40%	19.70%	65.50%	100.00%
2.1	5.70%	8.20%	18.20%	67.90%	100.00%
2.2	5.20%	8.10%	16.80%	69.90%	100.00%
2.3	5.00%	8.00%	15.70%	71.30%	100.00%
2.4	4.70%	7.80%	15.10%	72.40%	100.00%
2.5	4.60%	7.60%	14.50%	73.30%	100.00%
2.6	4.50%	7.00%	14.30%	74.20%	100.00%
2.7	4.30%	6.80%	14.00%	74.90%	100.00%
2.8	4.30%	6.60%	13.30%	75.80%	100.00%
2.9	4.00%	6.00%	13.30%	76.70%	100.00%
3.0	3.60%	5.40%	13.40%	77.60%	100.00%
3.1	3.10%	4.90%	13.50%	78.50%	100.00%
3.2	3.10%	4.60%	12.90%	79.40%	100.00%
3.3	2.90%	4.30%	12.50%	80.30%	100.00%
3.4	2.70%	3.90%	12.20%	81.20%	100.00%
3.5	2.50%	3.50%	11.90%	82.10%	100.00%
3.6	2.20%	3.10%	11.70%	83.00%	100.00%
3.7	2.00%	2.70%	11.40%	83.90%	100.00%

Ref: Demographic_v22.xls HHIncT

3.4 Vehicle Availability Sub-model

The vehicle availability sub-model is the last demographic sub-model. It is a disaggregate choice model that apportions households among vehicle availability levels. The variables considered are household size, household income (furnished by the previous sub-models), the area type, and transit accessibility defined as the number of jobs accessible in 40 minutes using the 'best' AM transit service. The best transit service is defined as the minimum AM walk-/ drive-access transit time among the modeled sub-modes (commuter rail, bus-only, Metrorail/Bus, and Metrorail Only). The vehicle availability model specification is detailed on Table 3-4.

Table 3-4 Vehicle availability model

No. of vehicles 0	1	2	3+	Variable name	Coeff.
	x			Constant	0.9402
		X		Constant	-2.4555
			x	Constant	-5.2989
		X		HH size	0.8700
			x	HH size	1.3026
	x			Income level 2 dummy	1.2376
		X		Income level 2 dummy	1.7892
			x	Income level 2 dummy	1.8221
	x			Income level 3 dummy	1.3285
		X		Income level 3 dummy	2.4831
			x	Income level 3 dummy	2.7395
	x			Income level 4 dummy	1.9991
		X		Income level 4 dummy	3.7372
			x	Income level 4 dummy	4.1987
	x			Tot emp w/in 40 min transit	-1.10E-06
		X		Tot emp w/in 40 min transit	-1.82E-06
			x	Tot emp w/in 40 min transit	-2.05E-06
	x			Area type (1 to 7)	0.0668
		X		Area type (1 to 7)	0.2783
			x	Area type (1 to 7)	0.4093
	x			DC dummy	-0.9246
		X		DC dummy	-1.0751
			x	DC dummy	-1.6334

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Alternative-specific constants updated 4/21/08.

Chapter 4 Trip Generation

The Version 2.3 trip generation process computes zonal trip productions and trip attractions, for each modeled purpose. This chapter details the trip generation model pertaining to resident, commercial vehicle, and truck purposes.

4.1 *Model Structure*

The generation model is used to compute the number of daily motorized person trips and truck trips produced by and attracted to each traffic analysis zone. Motorized person trips are defined as those using automobile, motorcycle, or transit modes. Resident trips consist of four purposes:

- Home-Based Work (HBW)
- Home-Based Shopping (HBS)
- Home-Based Other (HBO)
- Non-Home-Based (NHB) – excluding Commercial trips

Truck trips are developed for two vehicle types:
- Medium (single unit, two axles, 6 or more tires)
- Heavy (all combination vehicles)
- Commercial vehicles (autos and light duty trucks)

The commercial vehicle purpose was subsumed within the NHB purpose in the Ver. 2.1 and previous TPB models. Like the Version 2.2 model, the Version 2.3 model now accounts for commercial trips as a separate and distinct trip purpose. Both the NHB and commercial trips are inclusive of light trucks. The trip generation process also estimates productions and attractions associated with HBW non-motorized (walk and bicycle) trips. The non-motorized trips are ultimately removed from the 'final' trip-ends prior to the trip distribution step. The trip generation model produces home-based productions and attractions which are stratified by the four income levels.

The resident trip generation process can be envisioned as a series of five sequential steps. These are:

1) Trip production model;
2) Internal-to-external trip extraction model;
3) Non-motorized HBW trip extraction model;
4) Trip attraction model; and
5) Home-based attraction income disaggregation model.

These five models are specified below.

4.2 *Trip Production Model*

The trip production model is a cross-classification type model involving the application of trip rates that are applied to households in specific socio-economic categories. The trip rates are specific to each purpose. The cross-classes established for the Version 2.3 model are structured by the four household income, four household size, and four vehicle availability levels developed by the demographic models. The total number of cross-classes equals 64 (i.e., 4 x 4 x 4). The trip rates are displayed, by purpose on Table 4-1, Table 4-2, Table 4-3, and Table 4-4.

Prior to the Version 2.2 travel model, TPB travel models included the application of a global trip production factor of 1.50 to the non-work (i.e., HBS, HBO, and NHB) trip productions so that the traffic assignment model would validate to counts. This underestimation of the model was believed to be due principally to the under-reporting of non-work trips and the fact that there was no explicit commercial vehicle model, so these trips were included in the NHB purpose. Without such an adjustment factor, the simulated vehicle miles of travel (VMT) assigned to the highway network would fall short of the observed VMT. This factoring of non-work trips procedure is carried forth into both the Version 2.2 and 2.3 models, except that the global factor applied to the NHB purpose has been reduced from 1.50 to 1.168, to avoid the double-counting of commercial trips, which were subsumed in earlier models. Appendix A contains a description of all the adjustment factors using in the travel model.

4.3 *The Internal-to-External Trip Extraction Model*

External (I-X, X-I) travel is entered exogenously into the trip generation process and is passed through to the final trip-ends, unaltered. Since the trip production rates reflect both internal and internal-to-external (I-X) travel generated by households in the modeled area, it is, therefore, necessary to remove the I-X portion of total trip productions to avoid double-counting. The model used to remove I-X trips is specified as the following equation, and is shown graphically in Figure 4-1:

Equation 4-1 Percent of total trips productions that are I-X

$$\mathrm{IXP} = 0.079\mathrm{Exp}(-0.088 * \mathrm{DNE})$$

where:

IXP	=	the percent of total trip productions that are I-X
DNE	=	the 'straight-line' distance to the nearest external station (in miles)
Exp	=	the exponential function

This function captures the fact that, as the distance to the nearest external station increases, the share of total trip productions that is attracted to external locations (I-X) drops.

Figure 4-1 Internal-to-External Trip Extraction Model

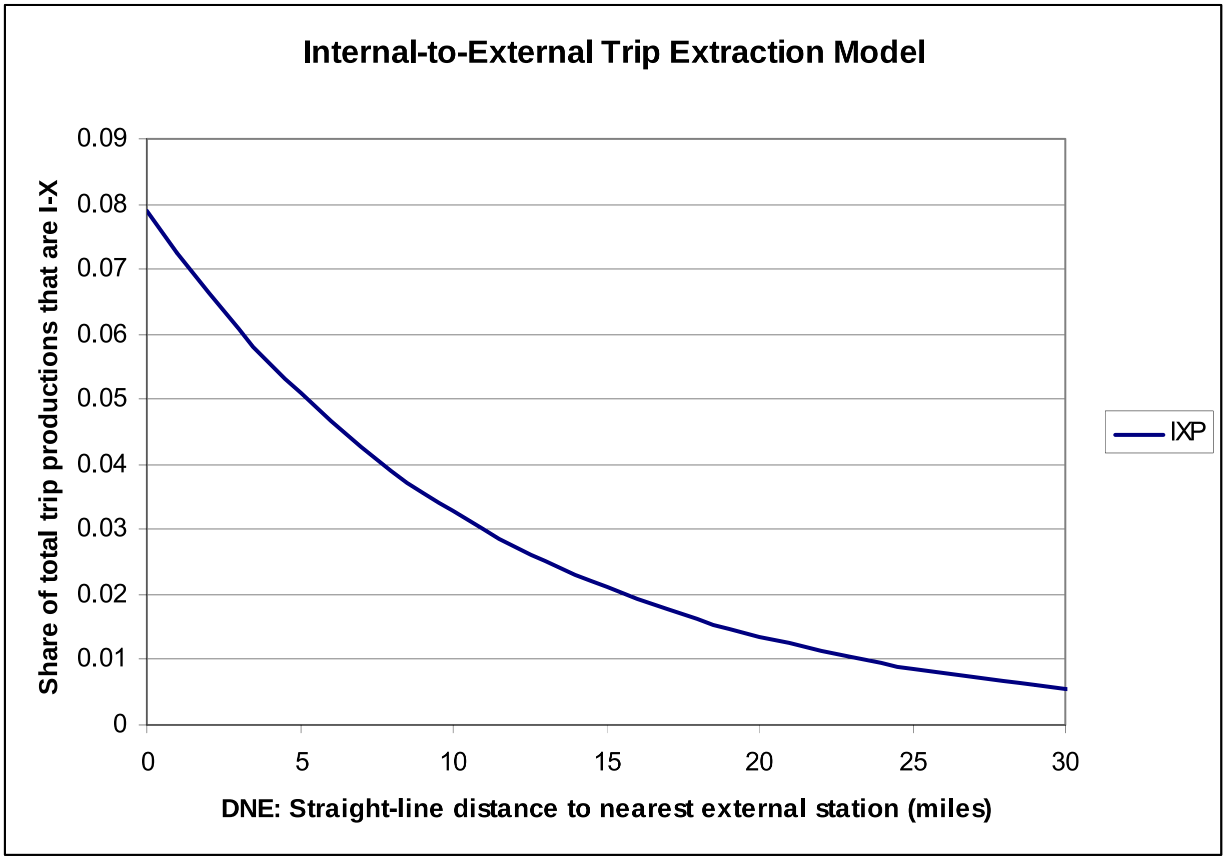

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Table 4-1 Final HBW Trip Production Rates

Income Level	HH Size	Vehicles 0	1	2	3+	Sub-Total
1	1	0.69	0.85	0.75	0.96	**0.79**
	2	1.08	1.08	1.41	1.41	**1.22**
	3	1.10	1.52	1.94	1.94	**1.66**
	4+	1.66	1.66	1.94	1.94	**1.81**
	Subtotal	**0.91**	**1.07**	**1.58**	**1.74**	**1.20**
2	1	1.02	1.18	1.30	1.53	**1.17**
	2	1.35	1.35	1.53	2.12	**1.53**
	3	1.66	1.66	1.79	2.12	**1.85**
	4+	1.85	1.85	2.05	2.43	**2.10**
	Subtotal	**1.21**	**1.34**	**1.73**	**2.23**	**1.61**
3	1	1.02	1.22	1.22	1.22	**1.20**
	2	1.46	1.46	1.84	2.15	**1.77**
	3	1.66	1.66	2.02	3.02	**2.36**
	4+	2.30	2.30	2.30	3.08	**2.55**
	Subtotal	**1.31**	**1.46**	**2.03**	**2.87**	**2.04**
4	1	1.33	1.33	1.33	2.00	**1.34**
	2	1.45	1.45	1.84	2.15	**1.80**
	3	1.67	1.67	2.02	3.02	**2.43**
	4+	3.33	3.33	3.33	3.36	**3.35**
	Subtotal	**1.67**	**1.72**	**2.34**	**3.05**	**2.42**
	TOTAL	**1.05**	**1.33**	**2.02**	**2.72**	**1.85**

Table 4-2 Final HBS Trip Production Rates

Income Level	HH Size	Vehicles 0	1	2	3+	Sub-Total
1	1	0.22	0.60	0.60	0.63	**0.46**
	2	0.22	0.68	0.68	0.68	**0.60**
	3	0.22	0.68	0.84	0.84	**0.68**
	4+	0.22	0.68	0.96	1.00	**0.76**
	Subtotal	**0.22**	**0.64**	**0.77**	**0.85**	**0.58**
2	1	0.22	0.60	0.60	0.63	**0.55**
	2	0.29	0.68	0.68	0.84	**0.68**
	3	0.40	0.96	0.96	1.04	**0.96**
	4+	0.45	0.96	1.00	1.10	**1.01**
	Subtotal	**0.27**	**0.70**	**0.83**	**1.01**	**0.76**
3	1	0.29	0.67	0.67	0.67	**0.62**
	2	0.43	0.68	0.90	0.96	**0.83**
	3	0.50	0.96	1.00	1.14	**1.05**
	4+	0.60	0.96	1.14	1.40	**1.21**
	Subtotal	**0.38**	**0.73**	**1.00**	**1.22**	**0.96**
4	1	0.43	0.86	0.86	0.86	**0.81**
	2	0.89	0.89	0.96	0.98	**0.95**
	3	0.90	1.04	1.15	1.20	**1.16**
	4+	1.09	1.28	1.33	1.66	**1.46**
	Subtotal	**0.68**	**0.95**	**1.11**	**1.39**	**1.16**
	TOTAL	**0.27**	**0.72**	**0.97**	**1.22**	**0.88**

Table 4-3 Final HBO Trip Production Rates

Income Level	HH Size	Vehicles 0	1	2	3+	Sub-Total
1	1	0.42	1.12	1.44	1.44	**0.89**
	2	0.54	1.70	1.77	1.80	**1.54**
	3	1.28	2.40	2.61	2.39	**2.29**
	4+	1.36	2.90	4.27	3.82	**3.29**
	Subtotal	**0.62**	**1.61**	**2.45**	**2.74**	**1.66**
2	1	0.69	1.16	1.47	1.47	**1.12**
	2	0.89	1.89	1.97	2.04	**1.90**
	3	1.35	2.50	3.19	3.47	**3.02**
	4+	0.75	3.49	4.27	5.67	**4.40**
	Subtotal	**0.81**	**1.72**	**2.88**	**3.99**	**2.42**
3	1	0.71	1.04	1.47	1.47	**1.04**
	2	0.89	2.16	2.46	2.66	**2.34**
	3	1.55	2.84	3.19	3.56	**3.28**
	4+	3.45	4.65	5.39	6.50	**5.68**
	Subtotal	**1.00**	**1.95**	**3.68**	**4.70**	**3.37**
4	1	0.71	1.09	1.08	2.00	**1.05**
	2	1.57	1.81	2.46	2.46	**2.28**
	3	3.45	3.45	3.94	3.94	**3.89**
	4+	4.15	4.84	5.92	6.74	**6.17**
	Subtotal	**1.57**	**2.22**	**3.81**	**5.02**	**3.84**
	TOTAL	**0.75**	**1.81**	**3.40**	**4.52**	**2.88**

Table 4-4 Final NHB Trip Production Rates

Income Level	HH Size	Vehicles				Sub-Total
		0	1	2	3+	
1	1	0.20	1.26	1.26	1.26	**0.88**
	2	0.30	1.26	1.43	1.43	**1.17**
	3	0.40	1.43	1.43	1.43	**1.26**
	4+	0.50	1.50	1.60	1.70	**1.42**
	Subtotal	**0.27**	**1.30**	**1.45**	**1.52**	**1.11**
2	1	0.30	1.26	1.40	1.49	**1.14**
	2	0.40	1.26	2.20	2.20	**1.83**
	3	0.50	1.76	2.60	2.80	**2.36**
	4+	0.60	1.98	2.80	2.97	**2.64**
	Subtotal	**0.36**	**1.39**	**2.42**	**2.69**	**1.90**
3	1	0.40	1.52	1.57	1.57	**1.39**
	2	0.50	1.62	2.33	2.54	**2.10**
	3	0.60	2.48	2.89	2.89	**2.83**
	4+	0.61	2.19	2.92	4.20	**3.26**
	Subtotal	**0.46**	**1.73**	**2.64**	**3.41**	**2.50**
4	1	0.60	1.76	1.76	2.40	**1.64**
	2	0.70	1.76	2.40	2.69	**2.30**
	3	0.80	2.72	2.81	3.10	**2.92**
	4+	0.90	1.54	3.35	4.38	**3.62**
	Subtotal	**0.68**	**1.84**	**2.77**	**3.67**	**2.83**
	TOTAL	**0.33**	**1.50**	**2.48**	**3.21**	**2.13**

4.4 Non-Motorized HBW Trip Extraction Model

The HBW trip rates reflect both motorized and non-motorized travel. The inclusion of non-motorized trips was intended to allow the modeler the ability to relate land use policy (e.g. land use mix, density, etc.) to the level of walking and bicycling, and its explicit effect on the reduction of motorized HBW travel. However, the decision was also made early on that non-motorized trips should not be carried forth into trip distribution and mode choice steps given that the non-motorized trips are extremely dissimilar in spatial scale compared to that of motorized travel (non-motorized trips predominantly occur within zones, or between adjacent zones). The model is based on the area type variable, an index ranging from 1 to 7 that is based on both population density and employment density within 1 mile of a given zone, as shown in the table below:

Table 4-5 Area Type Definitions (1-7) as a function of population and employment density

One-Mile 'Floating' Population Density (pop/sq mi)	One-Mile 'Floating' Employment Density (Emp / Sq mi)						
	0-100	101-500	501-1,500	1,501-5,000	5,001-15,0000	15,001-35,000	35,001+
0-100	7	7	5	5	2	2	2
101-350	7	5	5	5	2	2	2
351-1,500	6	6	5	5	2	2	2
1,501-3,500	6	6	4	3	2	2	2
3,501-6,500	4	4	3	3	2	2	1
6,501-10,000	4	3	3	3	2	2	1
10,001+	3	3	3	2	2	2	1

The area type code, therefore, represents both the intensity of land use development as well as the mix of home and job locations. This variable is also used as a basis for highway link capacities and free-flow speeds. The model, shown on Table 4-6, expresses the share of non-motorized travel based on the area type designation of the zone

Table 4-6 Average share of HBW non-motorized productions as a function of area type

Area Type	Avg. Share of HBW Non-Motorized Productions
1	0.4033
2	0.1116
3	0.0320
4 – 7	0.0235

The extraction of non-motorized trips at the attraction end is done using the equation below.

Equation 4-2 Extraction of non-motorized trips at the attraction end of trip

NMAttrs = 0.8982 * NMProds

where:

NMAttrs = The number of non-motorized attractions
NMProds = The number of non-motorized productions

Subject to following condition:

If NMAttrs > Total Attractions, then NMAttrs = Total Attractions * 0.187%

4.5 *Trip Attraction Model*

The trip attraction models are essentially regression equations which are detailed on Table 4-7. In the case of HBS and NHB trips, the equations vary further by area type. The equations were developed using district-level data from the 1994 Household Travel Survey.

Table 4-7 Summary of the Trip Attraction Models

Trip Purpose	Area Type	No. of Obs.	Independent Variable(s)	Attraction Rates
HBW	All (Area Type 1-7)	253	Total Employment	1.11
HBS	Area Type 1	8	Retail Employment	0.29
	Area Type 2	32	Retail Employment	2.44
	Area Type 3-7	180	Retail Employment	3.35
HBO	All (Area Type 1-7)	266	Retail Employment	1.30
			Non-Retail Employment	0.30
			Household Population	0.77
NHB	Area Type 1	9	Non-Retail Employment	0.42
	Area Type 2-7	257	Retail Employment	2.77
			Non-Retail Employment	0.49
			Household Population	0.28

Notes:

- HBW model reflects motorized and non-motorized person travel.
  HBS, HBO, and NHB models reflect motorized person travel only.

4.6 *HB Trip Attraction Income Disaggregation Model*

The trip attraction model provides the *total* number of trip attractions for each purpose. In order to support the income stratified trip distribution process (discussed in the next chapter), a technique for allocating total home-based attractions among four income levels is necessary. The stratification of trip productions is not problematic since income is one of the dimensions used in the cross-class structure.

A simple technique is used to apportion total HB attractions among the four income groups. Income shares, developed from the 1994 Household Travel Survey, are applied on the basis of purpose and area type, as shown on Table 4-8. The table indicates that the distributions of attractions by income group, for each purpose, generally do not vary dramatically on average.

Table 4-8 Income Distribution (Percents) of Home-Based Trip Attractions

Purpose	Area Type Code	Income 1	Income 2	Income 3	Income 4	Total
HBW	1	12.20	17.82	28.97	41.01	100.00
	2	15.59	17.14	30.06	37.21	100.00
	3	15.23	21.53	33.30	29.94	100.00
	4-7	20.62	25.01	32.36	22.01	100.00
HBS	1-2	17.65	17.90	30.66	33.78	100.00
	3	15.01	20.10	37.32	27.57	100.00
	4-7	14.46	20.55	30.51	34.48	100.00
HBO	1-2	15.88	16.65	30.39	37.08	100.00
	3	9.71	16.26	38.42	35.61	100.00
	4-7	13.09	21.19	34.56	31.16	100.00

Source: 1994 HTS

4.7 *Truck Model*

As mentioned above, the Version 2.3 truck models have been revised (Allen, 2008). The origin/destination trip generation rates are based on area types and land activity variables as shown Table 4-9. The truck trip generation model also includes provisions to remove external trucks generated because external truck travel is accounted for exogenously as explained in Chapter 2. The truck trip generation process also includes network checks provisions to ascertain whether or not truck access from each TAZ to the highway network is valid. There are some zonal centroids in the regional network that have a single connection to a parkway where trucks are prohibited. In these types of cases, truck trip generation is suppressed. Finally, the truck model also considers a limited number of special generator TAZs, or locations where truck traffic generation is known to be more intensive. Global trip generation adjustments are applied to the special generator TAZs. The medium truck generation is factored by 2.70 while heavy trucks are factored by 5.3.

Table 4-9 Truck trip generation rates as a function of truck type, area type, and land use category

Vehicle Type	Area Type	Land Use Category: Office	Retail	Industrial	Other	HH
Medium Truck (Single Unit 6+ Tires)	1 (CBD)	0.004	0.088	0.088	0.014	0.070
	2 - 4	0.005	0.125	0.125	0.020	0.100
	5	0.006	0.150	0.150	0.024	0.120
	6	0.006	0.150	0.150	0.024	0.120
	7 (rural)	0.006	0.150	0.150	0.024	0.120
Heavy Truck (All Combination Vehicles)	1 (CBD)	0.001	0.027	0.055	0.002	0.011
	2 - 4	0.002	0.039	0.078	0.003	0.015
	5	0.002	0.043	0.086	0.003	0.017
	6	0.002	0.043	0.086	0.003	0.017
	7 (rural)	0.002	0.043	0.086	0.003	0.017

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4.8 *Commercial Vehicle Model*

The trip generation of zonal commercial vehicle trips is developed with the equation shown below (Allen, 2007):

Equation 4-3 Trip generation of commercial vehicle trips

COM productions = (0.056 * indemp + 0.168 * offemp + 0.494 * retemp + 0.082 * othemp + 0.130 * HH) * ATFAC

(attractions = productions, by zone)

where:

indemp = industrial employment
offemp = office employment
retemp = retail employment
othemp = other employment
HH = households
ATFAC = area type adjustment factor:

Area type	Factor
1	1.05
2	0.90
6	1.20
7	1.15

Note: no factor is applied to area types 3-5.

Chapter 5 Trip Distribution

The Version 2.3 trip distribution model involves a standard gravity model approach and the use of a composite (highway and transit) travel time impedance measure. The model also employs income stratification as well as special external (i.e., external-to-internal, X/I, and internal-to-external, I/X) auto and truck distribution models. The Version 2.3 trip distribution process is identical to that of Version 2.2, except that: 1) The truck F-Factors have been revised (Allen, 2008), and the output formats of trip table have been changed from an integer format to a real number (two-decimal) format. A detailed discussion of the model structure follows below.

5.1 *Model Structure*

The Version 2.3 trip distribution model is used to develop zonal trip tables corresponding to the six basic purposes established above: HBW, HBS, HBO, and NHB motorized person trips, commercial vehicle trips, and medium and heavy truck trips. The Version 2.3 trip distribution process consists of several different distribution models that are developed for special travel markets within the six basic purposes. Table 5-1 indicates the 27 specific trip markets that are modeled.

Table 5-1 Trip distribution markets

Purpose/Mode	Internal Person Models	External Person Models
HBW person	4 Income Strata	2 Facility Types (Interstate /Arterial)
HBS person	4 Income Strata	2 Facility Types (Interstate /Arterial)
HBO person	4 Income Strata	2 Facility Types (Interstate /Arterial)
NHB person	1 (non-stratified)	2 Facility Types (Interstate /Arterial)
Commercial Vehicles	1 (non-stratified)	1 (non-stratified)
Medium Truck	1 (non-stratified)	1 (non-stratified)
Heavy Truck	1 (non-stratified)	1 (non-stratified)
Total Intl./Extl. Markets	**16**	**11**
Total Markets Modeled	**27**	

5.2 *Internal Motorized Person Models*

The Version 2.3 trip distribution model includes income stratification for the home-based trip purposes. The model also makes use of a composite time formulation involving both highway and transit travel times. The composite time formulation is desirable since many corridors in the Washington region are well served by transit, and the consideration of highway time only (as has been used in some previous model versions) has the potential to understate accessibility. The definition of the composite time is:

Equation 5-1 Composite time

$$\mathrm{CT_i} = \frac{1.0}{1.0/HT + P_i/TT}$$

Where:

CT_i = composite time for income group 'i' for a given interchange.
HT = un-weighted highway time (including terminal times)
TT = un-weighted transit time (in-vehicle and out-of-vehicle time)
P_i = regional transit share of income group 'i' for a given purpose

The highway and transit times used in the formulation vary by purpose. AM peak highway/transit times are used for the HBW purpose and off-peak highway/transit times are used for the remaining HBS, HBO, and NHB purposes.

The regional transit shares used in the formulation vary by purpose and income group. The transit shares, shown in Table 5-2, have been taken from the COG 1994 Household Travel Survey. The table indicates that work transit shares (shown as percents) vary by income, from 0.1402 to 0.2572. The transit percentages for the remaining purposes vary by income group from 0.0075 to 0.0755. Since these values are relatively small, the effect of highway times will be generally more predominant on the overall composite time function compared to the effect of transit times for most interchanges.

Some points can be made regarding the composite time function. First, for interchanges that are not served by transit, the composite time function reflects highway time. Second, the presence of transit service will generally contribute small benefit to the travel time since the regional transit shares are relatively small. Nonetheless, the composite time function will still reflect *some* travel time benefit with the presence of competitive transit service. This benefit would not be captured with an impedance measure based on highway time alone.

The highway time in the composite time function consists of both over-the-network time combined with terminal times (both production and attraction-end times). The highway time also includes toll values accumulated along the path that have been transformed into equivalent minutes. The time-cost equivalents are provided by income level and purpose, and are shown on Table 5-3. These equivalents were developed using 2000 CTPP income data and are described in greater detail in Chapter 11.

Table 5-2 Summary of Motorized Trips by Purpose, Mode, and Income Level

Source: 1994 COG/TPB Household Travel Survey
All trips geocoded within the HTS survey area

Purpose	Mode	Income Level				Total
		<30k	30k - 50k	50k - 75k	>75k	
HBW	Auto Driver	265,104	402,570	660,332	742,078	2,070,084
	Auto Passenger	41,854	47,055	73,652	76,477	239,038
	Auto Person Subtotal:	306,958	449,625	733,984	818,555	2,309,122
	Average Auto Occupancy	*1.2*	*1.1*	*1.1*	*1.1*	*1.12*
	Transit	106,263	78,376	116,054	133,428	434,121
	Auto Person & Transit Subtotal:	413,221	528,001	850,038	951,983	2,743,243
	Transit Percentage	*25.72%*	*14.84%*	*13.65%*	*14.02%*	*15.83%*
HBS	Auto Driver	179,240	222,468	395,854	361,316	1,158,878
	Auto Passenger	42,034	51,234	85,486	90,586	269,340
	Auto Person Subtotal:	221,274	273,702	481,340	451,902	1,428,218
	Average Auto Occupancy	*1.2*	*1.2*	*1.2*	*1.3*	*1.23*
	Transit	12,092	6,601	4,521	3,435	26,649
	Auto Person & Transit Subtotal:	233,366	280,303	485,861	455,337	1,454,867
	Transit Percentage	*5.18%*	*2.35%*	*0.93%*	*0.75%*	*1.83%*
HBO	Auto Driver	378,412	541,343	1,003,575	1,044,304	2,967,634
	Auto Passenger	158,697	210,756	465,074	478,663	1,313,190
	Auto Person Subtotal:	537,109	752,099	1,468,649	1,522,967	4,280,824
	Average Auto Occupancy	*1.4*	*1.4*	*1.5*	*1.5*	*1.44*
	Transit	43,863	24,177	27,803	38,078	133,921
	Auto Person & Transit Subtotal:	580,972	776,276	1,496,452	1,561,045	4,414,745
	Transit Percentage	*7.55%*	*3.11%*	*1.86%*	*2.44%*	*3.03%*
NHB	Auto Driver	317,239	488,048	859,926	878,859	2,544,072
	Auto Passenger	74,157	108,357	215,941	239,842	638,297
	Auto Person Subtotal:	391,396	596,405	1,075,867	1,118,701	3,182,369
	Average Auto Occupancy	*1.2*	*1.2*	*1.3*	*1.3*	*1.25*
	Transit	28,671	28,320	46,358	58,052	161,401
	Auto Person & Transit Subtotal:	420,067	624,725	1,122,225	1,176,753	3,343,770
	Transit Percentage	*6.83%*	*4.53%*	*4.13%*	*4.93%*	*4.83%*
All Purposes	Auto Driver	1,139,995	1,654,429	2,919,687	3,026,557	8,740,668
	Auto Passenger	316,742	417,402	840,153	885,568	2,459,865
	Auto Person Subtotal:	1,456,737	2,071,831	3,759,840	3,912,125	11,200,533
	Average Auto Occupancy	*1.3*	*1.3*	*1.3*	*1.3*	*1.28*
	Transit	190,889	137,474	194,736	232,993	756,092
	Auto Person & Transit Subtotal:	1,647,626	2,209,305	3,954,576	4,145,118	11,956,625
	Transit Percentage	*11.59%*	*6.22%*	*4.92%*	*5.62%*	*6.32%*

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Table 5-3 Work & Non-Work Time – Toll Dollar Equivalents by Income Level

Annual Household Income Quartile	(b) Work Equivalent (minutes per 1994 $)	(c) Non-Work Equivalent (minutes per 1994 $)
1	21.1	30.2
2	7.8	11.1
3	4.6	6.6
4	2.3	3.3

5.3 *External Auto Person / Truck Models*

The external trip distribution models segment markets by purpose and facility. Facilities are distinguished as interstates (or interstate-like facilities) and arterial facilities. The rationale behind this distinction is that arterial facilities tend to serve more localized traffic associated with shorter trip lengths while interstate travel is associated with longer trip lengths. In contrast, the external truck models (medium and heavy) are not segmented by facility types.

The modeled network contains 47 external stations, numbered consecutively from 2145 to 2191. Among these stations interstate-type facilities are defined as I-95 North and South (external stations 2149, 2182), US 301 (2146), US 15/29 (2154), I-66 (2156), I-70 East and West (2166, 2180), US 15 North (2179), US 1& I-195 (2183), MD 295 (2184), I-97 (2187), and US50/301, Bay Bridge (2191). All remaining stations are defined as arterial-type facilities.

The highway time is used as the impedance measure in the distribution of external trips. AM peak time is used for the HBW purpose and off-peak times are used for all remaining purposes. The external calibration does not make use of time penalties added into the impedance files. However, the impedances are altered in that extremely large time values were inserted into internal and through (I-I, X-X) interchanges to preclude those types of interchanges from occurring in the trip distribution process.

5.4 *Friction Factor Summary*

The friction factors, or F-factors, for internal travel are shown in graphical form in Figure 5-1, Figure 5-2, Figure 5-3, and Figure 5-4. The same information is shown in tabular form in Table 5-4. The friction factors for commercial vehicle travel, both internal and external, are shown in Figure 5-5. The friction factors for external travel are shown in Figure 5-6, Figure 5-7, and Figure 5-8. The F_factors shown from Medium and Heavy trucks have been updated as part of the truck model revision that was recently undertaken (Allen, 2008).

Figure 5-1 Friction factors for HBW, internal travel

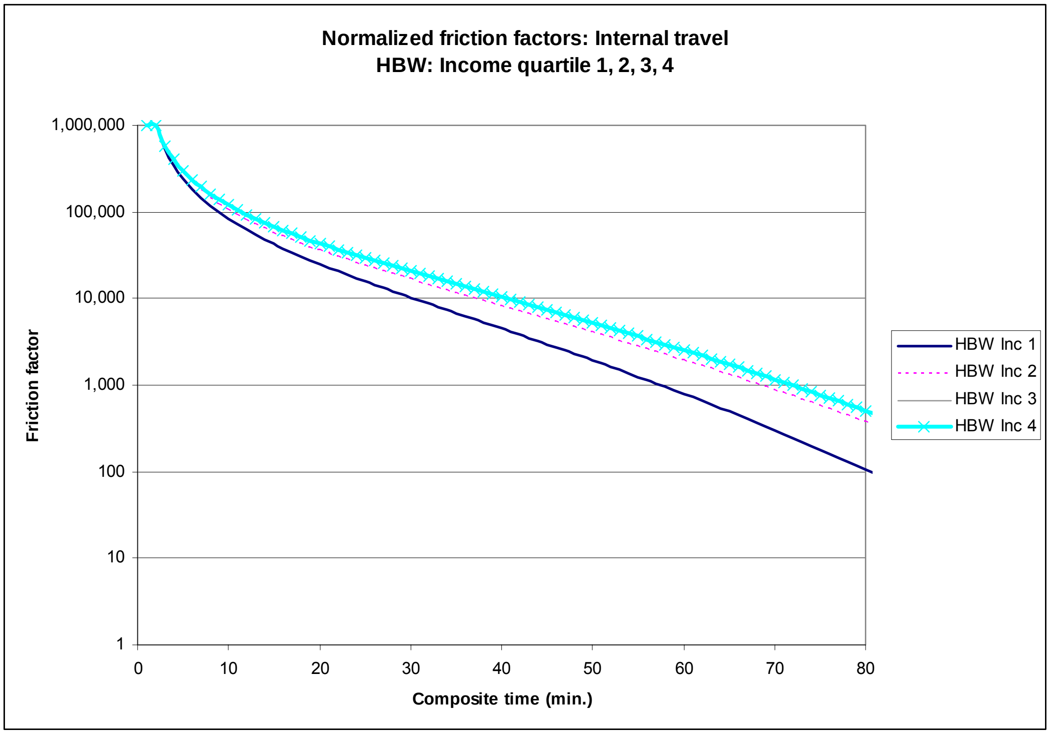

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Figure 5-2 Friction factors for HBS, internal travel

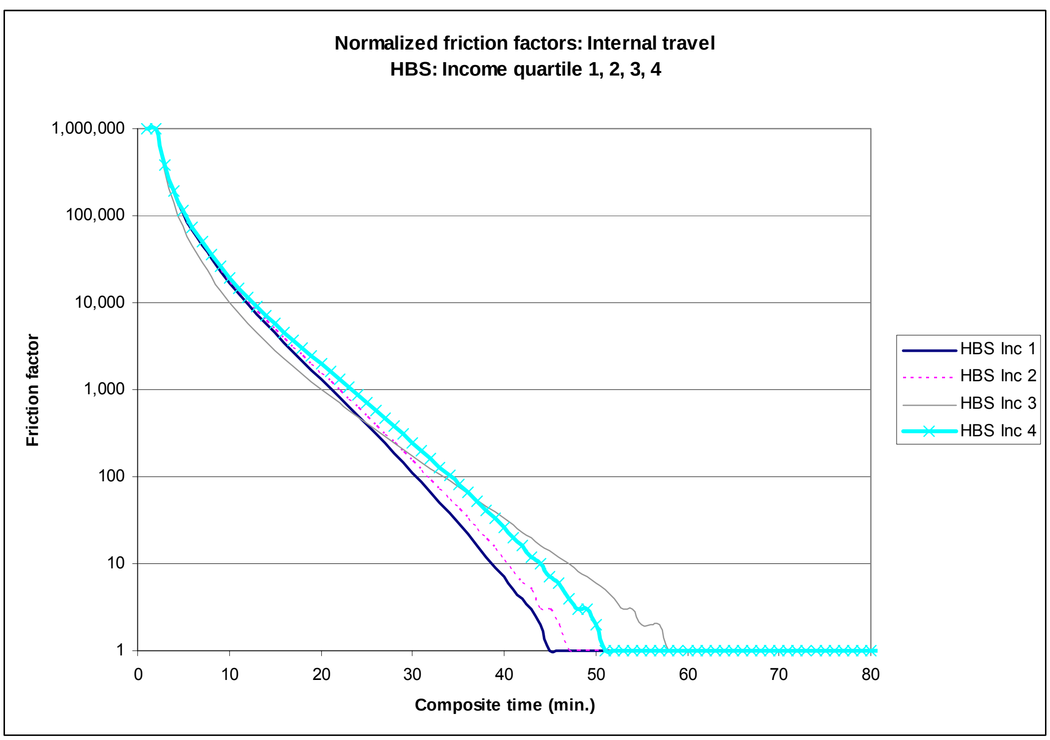

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Figure 5-3 Friction factors for HBO, internal travel

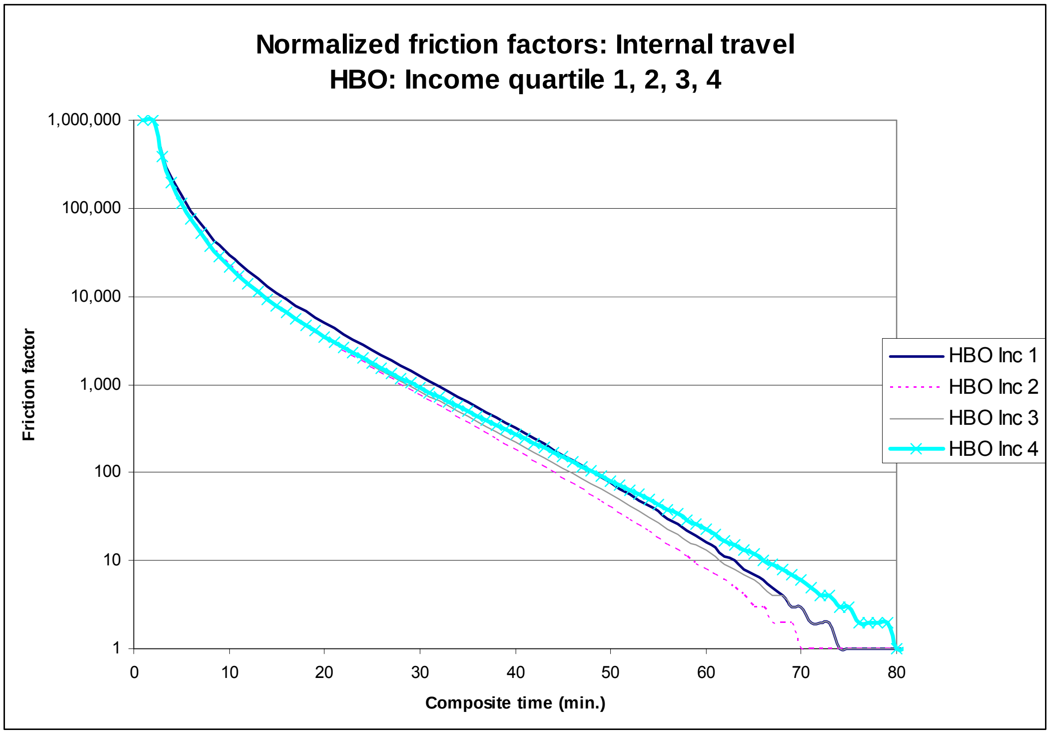

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Figure 5-4 Friction factors for NHB, internal travel

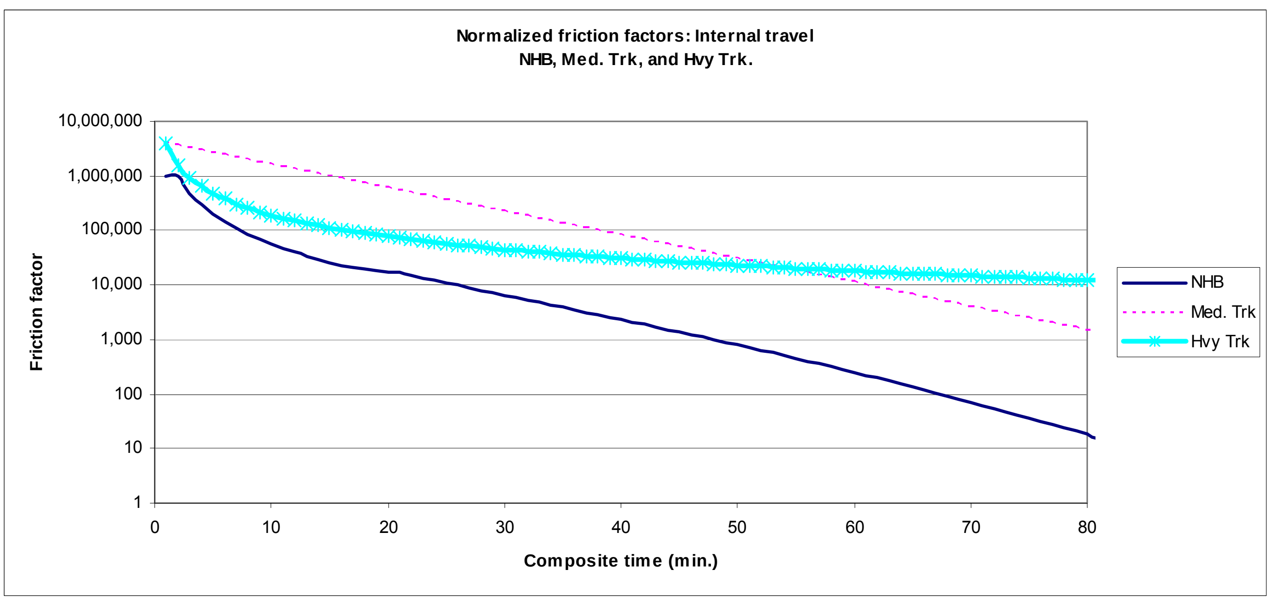

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Figure 5-5 Friction factors for commercial vehicle trips (both internal and external travel)

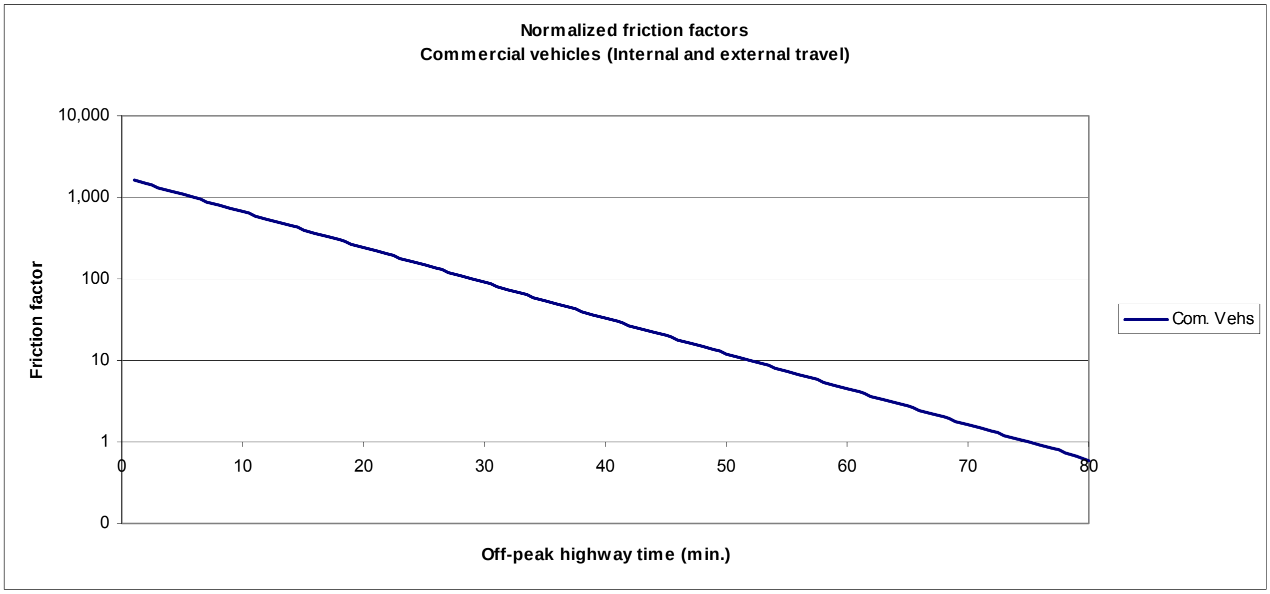

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Table 5-4 Friction factors for internal travel: HBW, HBS, HBO, NHB, commercial vehicles

Comp. Time	HBW				HBS				HBO				NHB	Com.		
(min)	Inc 1	Inc 2	Inc 3	Inc 4	Inc 1	Inc 2	Inc 3	Inc 4	Inc 1	Inc 2	Inc 3	Inc 4		Vehs	Med. Trk	Hvy Trk
1	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	1,629	4,071,768	4,000,000
2	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	1,474	3,684,288	1,602,140
3	534,862	566,562	586,872	584,487	375,164	376,643	318,181	382,415	416,158	387,467	387,021	382,823	486,880	1,333	3,333,682	938,123
4	346,225	382,193	405,901	403,096	187,206	188,666	142,136	193,948	225,057	199,164	198,868	195,320	294,634	1,207	3,016,440	641,713
5	246,589	281,175	304,449	301,683	107,995	109,279	75,734	113,614	139,174	118,391	118,244	115,574	199,021	1,092	2,729,388	477,991
6	186,490	218,449	240,292	237,689	68,132	69,246	45,071	72,786	93,608	77,092	77,050	75,064	144,039	988	2,469,652	375,751
7	146,952	176,174	196,388	193,977	45,635	46,606	28,927	49,529	66,675	53,422	53,452	51,966	109,278	894	2,234,634	306,571
8	119,294	145,983	164,616	162,394	31,883	32,735	19,608	35,182	49,498	38,721	38,800	37,680	85,782	809	2,021,980	257,028
9	99,042	123,469	140,645	138,600	22,971	23,723	13,848	25,796	37,907	29,031	29,143	28,294	69,089	732	1,829,563	220,019
10	83,678	106,108	121,966	120,081	16,935	17,600	10,098	19,374	29,737	22,343	22,479	21,834	56,765	662	1,655,457	191,452
11	71,688	92,358	107,029	105,291	12,704	13,295	7,552	14,824	23,778	17,557	17,708	17,220	47,384	599	1,497,920	168,819
12	62,115	81,228	94,831	93,226	9,658	10,183	5,764	11,509	19,307	14,030	14,190	13,823	40,064	542	1,355,374	150,501
13	54,323	72,054	84,694	83,208	7,418	7,884	4,475	9,038	15,875	11,366	11,532	11,260	34,232	491	1,226,393	135,411
14	47,879	64,375	76,143	74,767	5,741	6,155	3,522	7,163	13,190	9,314	9,482	9,284	29,506	444	1,109,686	122,792
15	42,476	57,863	68,839	67,564	4,470	4,836	2,805	5,718	11,054	7,705	7,873	7,735	25,619	402	1,004,086	112,104
16	37,892	52,279	62,533	61,349	3,495	3,819	2,256	4,590	9,331	6,424	6,591	6,501	22,381	363	908,534	102,949
17	33,964	47,443	57,035	55,935	2,742	3,026	1,829	3,701	7,926	5,393	5,557	5,506	21,000	329	822,076	95,031
18	30,566	43,219	52,203	51,181	2,155	2,404	1,494	2,995	6,767	4,554	4,714	4,693	19,073	298	743,845	88,125
19	27,605	39,500	47,925	46,974	1,695	1,913	1,227	2,429	5,802	3,864	4,019	4,022	18,426	269	673,059	82,055
20	25,006	36,206	44,112	43,228	1,334	1,524	1,014	1,974	4,994	3,292	3,442	3,465	17,350	244	609,009	76,683
21	22,711	33,269	40,696	39,873	1,050	1,215	841	1,606	4,312	2,814	2,959	2,997	17,014	220	551,054	71,900
22	20,674	30,638	37,618	36,852	826	968	700	1,308	3,733	2,413	2,552	2,602	15,196	199	498,614	67,618
23	18,857	28,269	34,833	34,120	648	771	585	1,065	3,239	2,075	2,207	2,267	13,598	180	451,165	63,765
24	17,228	26,126	32,302	31,639	508	613	490	867	2,815	1,787	1,914	1,980	12,190	163	408,231	60,281
25	15,764	24,182	29,994	29,377	398	487	411	705	2,451	1,543	1,663	1,734	10,944	148	369,382	57,119
26	14,442	22,410	27,882	27,309	310	386	346	573	2,136	1,333	1,447	1,522	9,838	134	334,231	54,237
27	13,246	20,792	25,944	25,412	242	305	291	466	1,864	1,154	1,261	1,338	8,852	121	302,425	51,601
28	12,160	19,309	24,161	23,667	187	241	246	377	1,628	999	1,101	1,179	7,972	109	273,645	49,183
29	11,171	17,947	22,517	22,058	145	190	208	306	1,422	866	961	1,039	7,185	99	247,604	46,956
30	10,270	16,693	20,997	20,572	112	149	175	247	1,243	751	841	918	6,478	90	224,042	44,901
31	9,447	15,536	19,590	19,196	86	117	148	199	1,086	652	735	811	5,844	81	202,721	42,999
32	8,693	14,467	18,284	17,919	66	91	125	160	950	565	644	718	5,272	73	183,430	41,235
33	8,002	13,477	17,072	16,734	50	71	106	129	830	491	563	635	4,759	66	165,974	39,593
34	7,368	12,560	15,943	15,632	38	55	90	103	725	426	493	563	4,294	60	150,180	38,063
35	6,785	11,708	14,892	14,605	29	42	76	82	634	369	432	499	3,875	54	135,888	36,634
36	6,249	10,916	13,913	13,648	22	33	64	66	554	320	378	442	3,497	49	122,957	35,297
37	5,755	10,179	12,998	12,754	16	25	54	52	483	277	331	392	3,156	45	111,256	34,043
38	5,300	9,493	12,144	11,920	12	19	46	41	422	240	290	348	2,846	40	100,668	32,866
39	4,881	8,854	11,346	11,140	9	15	39	33	367	208	254	309	2,566	36	91,089	31,758
40	4,494	8,258	10,599	10,411	7	11	33	26	320	180	222	274	2,313	33	82,420	30,714
41	4,137	7,701	9,901	9,729	5	8	28	20	279	156	194	243	2,083	30	74,577	29,729
42	3,808	7,181	9,247	9,090	4	6	23	16	242	134	169	215	1,876	27	67,480	28,799
43	3,504	6,696	8,635	8,491	3	5	20	12	210	116	148	191	1,688	24	61,059	27,918
44	3,223	6,242	8,061	7,931	2	3	16	10	183	100	129	169	1,519	22	55,248	27,083
45	2,963	5,818	7,524	7,406	1	3	14	7	158	86	113	150	1,365	20	49,990	26,292
46	2,724	5,422	7,020	6,913	1	2	12	6	137	74	98	133	1,226	18	45,233	25,540
47	2,502	5,051	6,548	6,452	1	1	10	4	119	64	85	117	1,100	16	40,929	24,825
48	2,298	4,704	6,106	6,019	1	1	8	3	103	55	74	104	987	15	37,034	24,145
49	2,109	4,380	5,692	5,614	1	1	7	3	88	47	65	92	885	13	33,510	23,496
50	1,935	4,077	5,303	5,234	1	1	6	2	76	40	56	81	792	12	30,321	22,878
51	1,774	3,793	4,940	4,878	1	1	5	1	66	34	49	72	710	11	27,435	22,288
52	1,626	3,528	4,599	4,544	1	1	4	1	56	29	42	63	634	10	24,825	21,724
53	1,489	3,280	4,280	4,232	1	1	3	1	48	25	36	56	567	9	22,462	21,184
54	1,363	3,049	3,981	3,939	1	1	3	1	42	21	31	49	505	8	20,325	20,668
55	1,247	2,832	3,701	3,664	1	1	2	1	36	18	27	43	451	7	18,390	20,173
56	1,140	2,630	3,440	3,408	1	1	2	1	30	15	23	38	402	7	16,640	19,699
57	1,041	2,441	3,195	3,167	1	1	2	1	26	13	20	34	357	6	15,057	19,244
58	951	2,264	2,966	2,942	1	1	1	1	22	11	17	29	318	5	13,624	18,808
59	868	2,099	2,752	2,732	1	1	1	1	19	9	15	26	283	5	12,328	18,388
60	791	1,945	2,552	2,536	1	1	1	1	16	8	13	23	251	4	11,154	17,985
61	721	1,802	2,365	2,352	1	1	1	1	14	7	11	20	221	4	10,093	17,596
62	656	1,668	2,191	2,180	1	1	1	1	11	6	9	17	196	4	9,132	17,223
63	597	1,544	2,028	2,020	1	1	1	1	10	5	8	15	174	3	8,263	16,863
64	543	1,427	1,877	1,871	1	1	1	1	8	4	7	13	154	3	7,477	16,516
65	493	1,319	1,735	1,731	1	1	1	1	7	3	6	12	136	3	6,765	16,181
66	447	1,219	1,604	1,601	1	1	1	1	6	3	5	10	119	2	6,122	15,858
67	406	1,125	1,481	1,480	1	1	1	1	5	2	4	9	105	2	5,539	15,547
68	368	1,038	1,367	1,367	1	1	1	1	4	2	4	8	92	2	5,012	15,246
69	333	957	1,261	1,262	1	1	1	1	3	2	3	7	81	2	4,535	14,955
70	301	882	1,162	1,165	1	1	1	1	3	1	3	6	71	2	4,103	14,673

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Figure 5-6 Friction factors for external travel on interstates

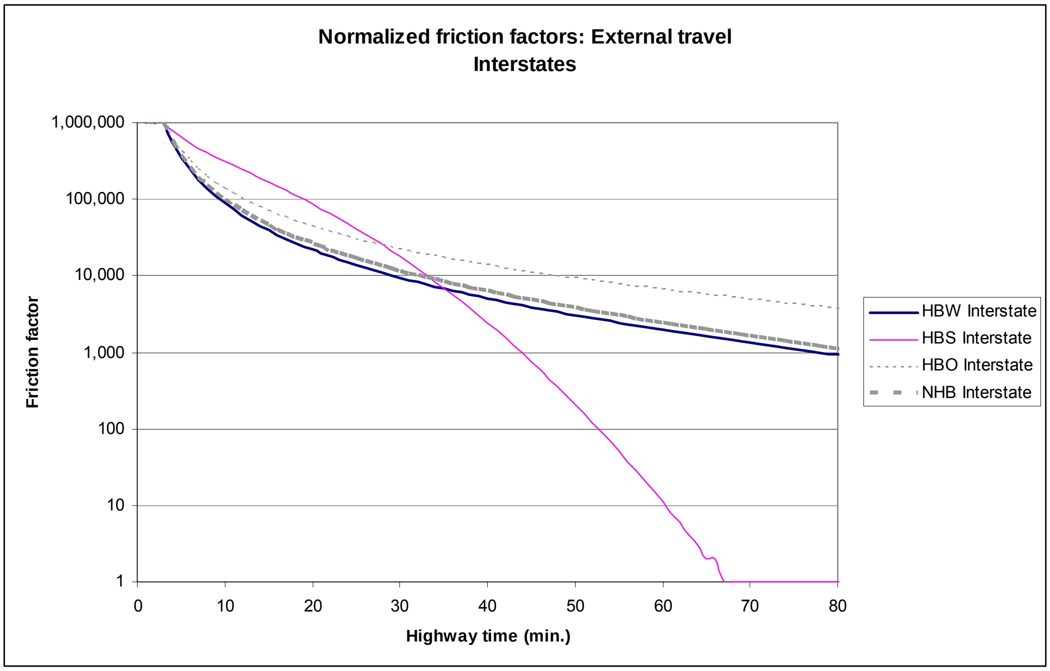

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Figure 5-7 Friction factors for external travel on arterials

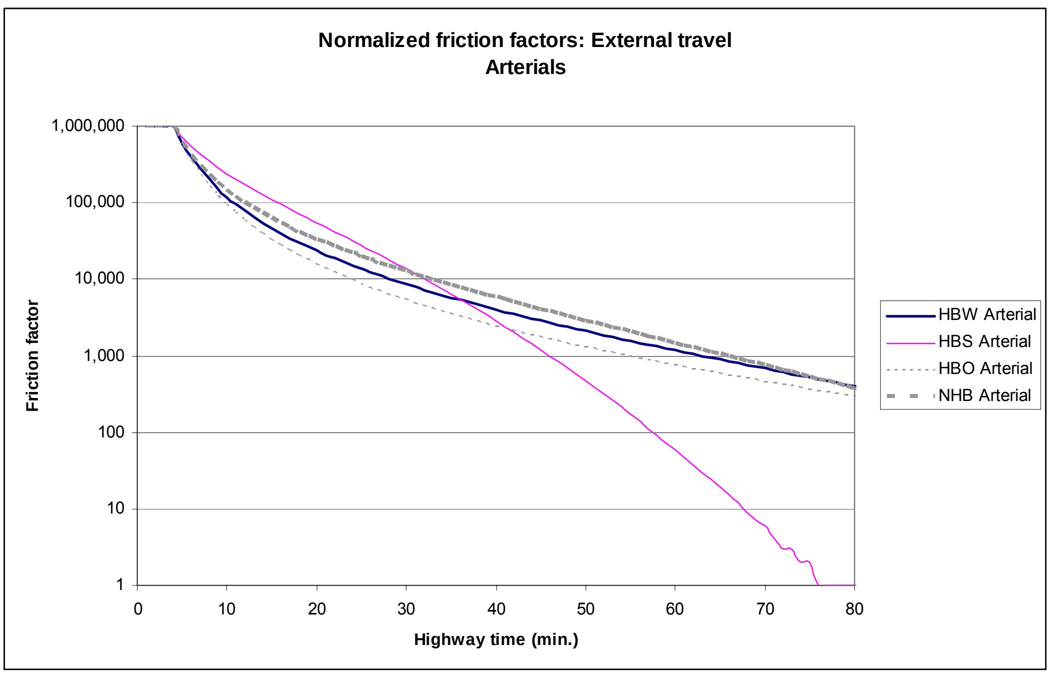

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Figure 5-8 Friction factors for external travel: Heavy and medium truck

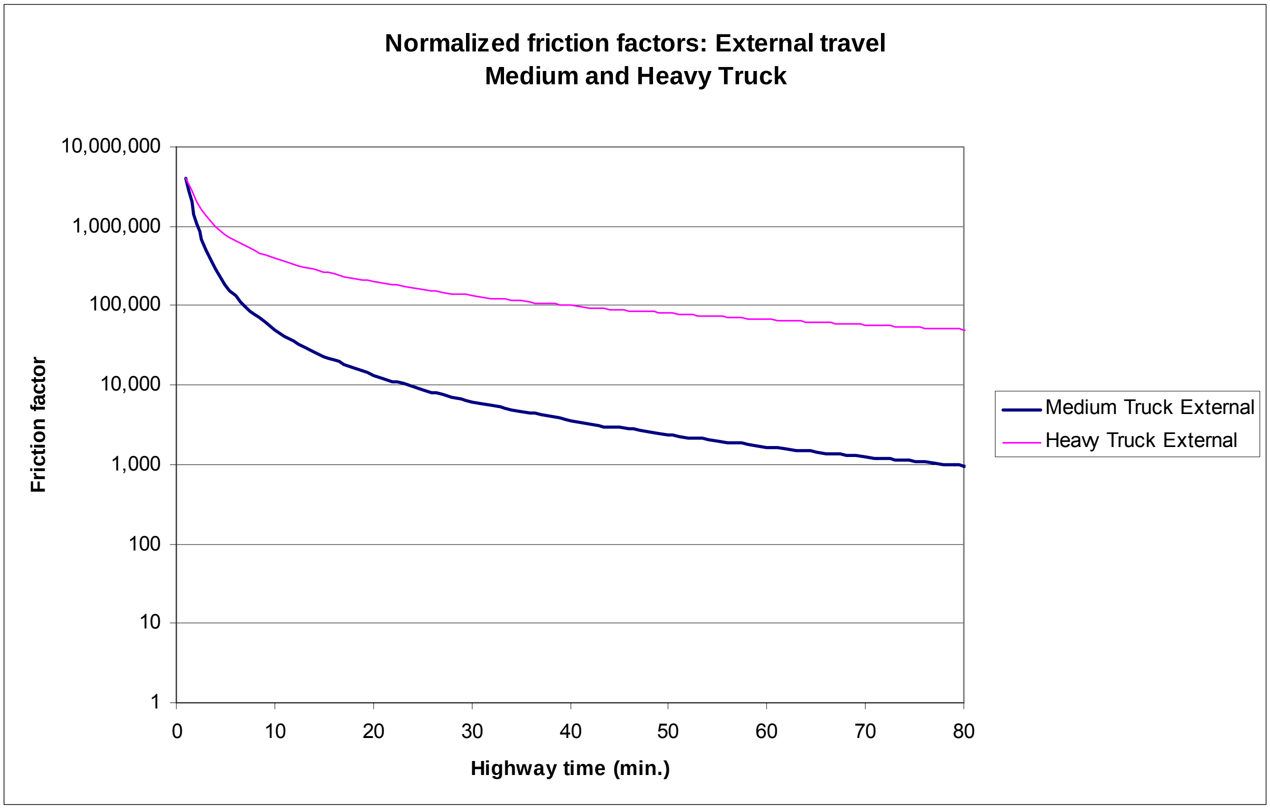

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Table 5-5 Friction factors for external travel: Interstate, arterial, medium & heavy truck, commercial vehicles

HighwayTime (min)	HBW Interstate	HBS Interstate	HBO Interstate	NHB Interstate	HBW Arterial	HBS Arterial	HBO Arterial	NHB Arterial	Medium Truck External	Heavy Truck External	Comm Vehs
1	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	4,000,000	4,000,000	1,629
2	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	1,071,773	2,000,000	1,474
3	984,609	984,609	984,609	984,609	984,609	984,609	984,609	984,609	496,055	1,333,333	1,333
4	554,679	777,594	615,654	570,003	984,609	984,609	984,609	984,609	287,175	1,000,000	1,207
5	355,325	641,659	427,667	372,910	590,136	709,738	556,119	622,434	187,939	800,000	1,092
6	246,882	543,380	317,518	263,572	388,216	539,905	348,612	427,490	132,915	666,667	988
7	181,418	467,715	246,809	196,487	272,306	425,824	234,823	310,836	99,168	571,429	894
8	138,887	406,863	198,396	152,294	200,170	344,544	166,714	235,615	76,947	500,000	809
9	109,702	356,371	163,619	121,600	152,496	284,052	123,206	184,340	61,518	444,444	732
10	88,811	313,505	137,691	99,391	119,490	237,502	93,977	147,852	50,357	400,000	662
11	73,343	276,499	117,780	82,787	95,778	200,729	73,538	120,982	42,016	363,636	599
12	61,571	244,160	102,114	70,039	78,219	171,065	58,769	100,633	35,614	333,333	542
13	52,404	215,648	89,538	60,031	64,886	146,728	47,805	84,862	30,589	307,692	491
14	45,127	190,357	79,269	52,027	54,546	126,484	39,474	72,397	26,572	285,714	444
15	39,254	167,832	70,762	45,522	46,379	109,454	33,020	62,377	23,307	266,667	402
16	34,444	147,722	63,624	40,161	39,827	94,994	27,933	54,206	20,617	250,000	363
17	30,457	129,747	57,568	35,689	34,498	82,624	23,864	47,458	18,374	235,294	329
18	27,114	113,682	52,381	31,919	30,111	71,975	20,567	41,823	16,483	222,222	298
19	24,284	99,334	47,898	28,709	26,461	62,763	17,863	37,070	14,874	210,526	269
20	21,868	86,539	43,995	25,954	23,394	54,761	15,623	33,026	13,493	200,000	244
21	19,787	75,154	40,573	23,571	20,795	47,789	13,749	29,558	12,298	190,476	220
22	17,983	65,048	37,553	21,495	18,575	41,699	12,169	26,562	11,258	181,818	199
23	16,410	56,104	34,873	19,675	16,667	36,370	10,826	23,959	10,346	173,913	180
24	15,028	48,213	32,482	18,071	15,014	31,701	9,676	21,682	9,542	166,667	163
25	13,808	41,278	30,339	16,650	13,576	27,607	8,686	19,681	8,830	160,000	148
26	12,727	35,203	28,410	15,384	12,316	24,016	7,828	17,913	8,196	153,846	134
27	11,763	29,905	26,666	14,252	11,208	20,866	7,080	16,344	7,629	148,148	121
28	10,901	25,301	25,083	13,235	10,229	18,104	6,426	14,947	7,120	142,857	109
29	10,126	21,318	23,642	12,319	9,359	15,684	5,850	13,697	6,660	137,931	99
30	9,427	17,888	22,325	11,489	8,585	13,565	5,341	12,576	6,245	133,333	90
31	8,795	14,946	21,119	10,736	7,892	11,712	4,890	11,566	5,868	129,032	81
32	8,221	12,435	20,010	10,051	7,270	10,093	4,488	10,654	5,524	125,000	73
33	7,699	10,301	18,989	9,425	6,710	8,681	4,129	9,828	5,211	121,212	66
34	7,222	8,495	18,045	8,852	6,205	7,452	3,807	9,079	4,923	117,647	60
35	6,785	6,976	17,172	8,326	5,747	6,383	3,517	8,396	4,659	114,286	54
36	6,384	5,702	16,361	7,841	5,331	5,456	3,256	7,774	4,417	111,111	49
37	6,016	4,641	15,607	7,395	4,953	4,653	3,019	7,206	4,193	108,108	45
38	5,676	3,760	14,905	6,982	4,608	3,959	2,805	6,685	3,985	105,263	40
39	5,362	3,032	14,249	6,600	4,292	3,361	2,610	6,207	3,793	102,564	36
40	5,071	2,434	13,636	6,245	4,003	2,846	2,432	5,768	3,615	100,000	33
41	4,802	1,945	13,062	5,916	3,738	2,404	2,270	5,364	3,450	97,561	30
42	4,552	1,547	12,524	5,609	3,494	2,026	2,121	4,992	3,295	95,238	27
43	4,319	1,225	12,017	5,323	3,269	1,703	1,985	4,648	3,151	93,023	24
44	4,101	965	11,541	5,055	3,061	1,428	1,860	4,330	3,016	90,909	22
45	3,899	757	11,092	4,805	2,869	1,194	1,745	4,037	2,890	88,889	20
46	3,709	591	10,669	4,571	2,692	996	1,639	3,764	2,772	86,957	18
47	3,531	459	10,269	4,351	2,527	829	1,540	3,512	2,661	85,106	16
48	3,365	355	9,890	4,145	2,374	687	1,450	3,278	2,557	83,333	15
49	3,209	273	9,532	3,951	2,232	569	1,365	3,060	2,459	81,633	13
50	3,062	209	9,192	3,768	2,100	469	1,287	2,858	2,366	80,000	12
51	2,924	160	8,869	3,596	1,977	386	1,215	2,670	2,279	78,431	11
52	2,793	121	8,563	3,434	1,862	317	1,147	2,495	2,196	76,923	10
53	2,671	91	8,271	3,280	1,755	259	1,084	2,332	2,118	75,472	9
54	2,555	69	7,994	3,135	1,655	212	1,026	2,180	2,044	74,074	8
55	2,445	51	7,730	2,998	1,561	172	971	2,038	1,974	72,727	7
56	2,342	38	7,478	2,868	1,473	140	920	1,905	1,908	71,429	7
57	2,243	28	7,237	2,745	1,391	113	872	1,782	1,845	70,175	6
58	2,150	21	7,008	2,628	1,314	91	827	1,666	1,785	68,966	5
59	2,062	15	6,788	2,518	1,242	73	785	1,558	1,728	67,797	5
60	1,979	11	6,578	2,412	1,174	59	745	1,458	1,673	66,667	4
61	1,899	8	6,377	2,312	1,110	47	708	1,363	1,622	65,574	4
62	1,824	6	6,184	2,217	1,050	38	673	1,275	1,572	64,516	4
63	1,752	4	5,999	2,127	993	30	641	1,193	1,525	63,492	3
64	1,683	3	5,822	2,040	940	24	610	1,115	1,480	62,500	3
65	1,618	2	5,652	1,958	890	19	580	1,043	1,437	61,538	3
66	1,556	2	5,489	1,880	843	15	553	976	1,396	60,606	2
67	1,497	1	5,332	1,805	798	12	527	912	1,357	59,701	2
68	1440	1	5181	1733	756	9	502	853	1,319	58,824	2
69	1386	1	5035	1665	717	7	479	798	1,283	57,971	2
70	1335	1	4895	1600	679	6	457	746	1,248	57,143	2

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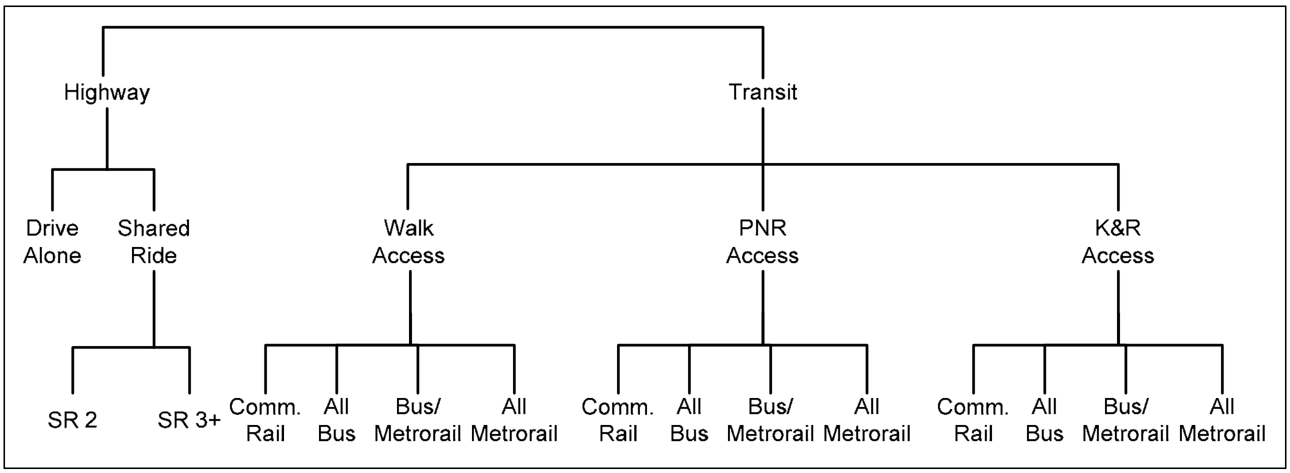
Chapter 6 Mode Choice

6.1 *Introduction*

A mode choice model is used to apportion motorized person trips by travel mode. The mode choice model in the TPB Version 2.3 travel model is a 15-choice, nested-logit mode choice (NL MC) model. The model includes three auto modes (drive alone, shared ride 2, and shared ride 3+) and four transit modes (commuter rail, all bus, all Metrorail, and combined bus/Metrorail) by three modes of access to transit (park and ride, kiss and ride, and walk), as shown in Figure 6-1.

Figure 6-1 Nesting structure of the nested-logit mode choice model in the Version 2.3 travel model



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The definition of high-occupancy vehicle (HOV) trips has changed, compared to the definition that was used in Version 2.2 and before. Previously, HOV trips coming out of the mode choice model referred to *only those that use HOV facilities for a substantial portion of their trip*. Similarly, in previous models, the definition of low-occupancy vehicle (LOV) included both drive-alone and carpools (provided the carpools did not use a preferential HOV facility). By contrast, in the Version 2.3 NL MC model, the term LOV refers to only the drive-alone trips. Similarly, HOV refers to all shared-ride 2 (2-person carpools) and shared-ride 3 (3+ person carpools), irrespective of whether they use an HOV facility or not.

Park and ride (PNR) is defined as accessing transit by driving to and then parking a car at a transit stop or station. Kiss and ride (KNR), also known as "ride to transit," is defined as accessing transit by driving in cases where one either 1) is dropped-off/picked-up or 2) rides with a PNR driver. Motorized person trips are those that occur in motorized vehicles, such as cars, trains, buses, and subways. Motorized trips exclude walk and bike trips. However, as noted above, walking is represented in the model as one of the three access modes to transit. The NL MC model is applied at the zone-to-zone interchange level after trip distribution and before highway and transit assignment (i.e., within what is known as the "speed feedback loop" of the four-step model). The model is applied using a Fortran program named AEMS (AECOM mode split modeling package). AEMS is completely parametric, i.e., all characteristics for any given mode choice model are specified in a control file. Characteristics represented in the control file include nesting structure, market segmentation, utility/disutility functions, and the values of coefficients and constants. AEMS can handle models with any nesting structure and up to 15 choices.[5] AEMS and its control files are described in more detail in Chapter 20 of the User's Guide section of this report.

There are four NL MC models – one for each trip purpose: home-based work (HBW), home-based shop (HBS), home-based other (HBO), and non-home-based (NHB). Each of the four models shares the same nesting structure (shown in Figure 6-1), but each has its own set of coefficients and constants (discussed later in this chapter). In model application, the inputs to the TPB Version 2.3 nested logit mode choice model are

- Motorized person trips, segmented by four income levels, in production/attraction format (these are output from the trip distribution step);
- Highway "skims" (i.e., zone-to-zone travel times and costs), which come from the highway path building and skimming process;
- Transit "skims," which come from the transit path building and skimming process; and
- Zonal attributes, such as parking cost, terminal time (i.e., the time to park and "unpark" a car), and the percent of each zone that is within walking distance to transit (where two walking distances are defined: short and long).

The HBW mode choice model was calibrated with and is applied with transit and highway skims corresponding to the AM peak period. The non work (i.e., HBS, HBO, and NHB) mode choice models were calibrated with and are applied with transit and highway skims corresponding to the off peak period.

Two of the most significant changes between the NL MC model and its predecessor (the sequential multinomial logit, or SMNL, mode choice model found in the Version 2.2 travel model) are that the NL MC model handles 15 choices (up from five, previously) and the NL MC model provides sufficiently detailed output, such that a transit assignment can be performed. Although not explicitly listed as one of the four transit travel modes, the NL MC model can also model light rail transit (LRT), bus rapid transit (BRT), and street car (Jain, 2008, p. 10). A description of how LRT, BRT, and streetcar are represented in the model can be found in the mode choice chapter of the user's guide (Chapter 20). Other significant changes, compared to past TPB mode choice models, include the new definition of HOV trips (mentioned earlier), revised methods for coding access to transit (both walk and drive), revised procedures for calculating the percent of each zone within walking distance to transit, and more detailed transit path-building procedures (transit paths by transit sub-mode and access mode, yielding 11 paths for each of the two time-of-day periods). Some of these will be discussed in more detail in the mode choice chapter of the user's guide (Chapter 20).

6.2 *Background*

TPB Version 2.3 nested-logit mode choice model is a descendant of an earlier nested-logit model developed by AECOM Consult, Inc. for the Washington Metropolitan Area Transit Authority (WMATA). The TPB nested-logit mode choice model and its predecessor, the

[5] A newer version of AEMS is now available that can handle up to 18 choices.

AECOM/WMATA nested logit mode choice model, share many traits, but also have some key differences. This section of the report will describe the history of this nested-logit mode choice model and highlight similarities and differences between the two models. There is a table at the end of this section comparing the characteristics of the two models (Table 6-3).

6.2.1 Development of a nested-logit mode choice model for the Washington, D.C. region

AECOM Consult, Inc. developed a 15-mode nested-logit mode choice model in 2004 and 2005 for WMATA. This AECOM/WMATA mode choice model was used to study light-rail transit (LRT) and other transit alternatives in Washington, D.C. and Arlington County, Virginia. The AECOM/WMATA mode choice model was a 15-mode nested-logit mode choice model with the structure already shown in Figure 6-1. Thus, the TPB and AECOM/WMATA models share the same choice set and nesting structure. However, the AECOM/WMATA mode choice model was applied as a post process to the regional travel model (AECOM initially used COG/TPB Version 2.1D #18, and then later Version 2.1D #50). The reason for developing a post-process mode choice model was that the DC and Arlington alternatives analysis study was focused on securing New Starts or Small Starts funding from the Federal Transit Administration (FTA).[6] The FTA requires that one use a fixed trip table in travel demand forecasting (This is in direct contrast to the air quality conformity regulations followed by MPOs in non-attainment areas, such as TPB, which require one to use "speed feedback," i.e., speeds from traffic assignment are fed back into trip distribution and mode choice in an iterative process until convergence is reached. Speed feedback results in trip tables that change from one iteration to the next). In particular, the FTA's Summit program for calculating user benefits requires a fixed trip table.

The AECOM/WMATA mode choice model was applied using the Fortran program AEMS that was mentioned earlier (By contrast, the sequential multinomial logit mode choice model in the TPB travel model was applied with a Fortran program called COGMC.EXE). The AECOM/WMATA NL MC model was calibrated using the following datasets:

- 2002 land use and networks
- Control data
  - 2002 published transit boarding counts by operator
  - 2002 WMATA Metrorail survey
- Other data
  - 2000 Regional Bus Survey
  - 2000 Census journey-to-work data
  - 2003 surveys of selected DC bus routes

The AECOM/WMATA mode choice model had only three trip purposes, since HBS and HBO were combined into one:

- Home-based work (HBW)
- Home-based shop and home-based other (HBS/O)
- Non-home-based (NHB)

[6] "New Starts" and "Small Starts" are two federal government programs used for funding construction of major fixed-guideway transit systems (e.g., bus rapid transit, light rail, commuter rail).

The AECOM/WMATA mode choice model had two time-of-day periods with regards to transit skims:

- the AM peak period (representing travel times and costs in both the morning and afternoon peak periods)
- the off-peak period (representing travel times and costs outside of the peak periods).

AECOM combined the three trip purposes and two time-of-day periods for transit skims in a manner that resulted in six mode choice models:

- HBW AM peak
- HBW off peak
- HBS/O AM peak
- HBS/O off peak
- NHB AM peak
- NHB off peak

Due to this six-model structure, the AECOM process involved using a series of splitting factors, prior to applying the model, which split the three purposes into the two times of day (AECOM, 2005, p. 4).

The AECOM/WMATA mode choice model made use of revised transit access coding, including

- Additional information to describe transit stations,
- A new way to code sidewalks and walk-access-to-transit links,
- A new way to code drive-access-to-transit links,
- Additional coding detail around Metrorail stations with "park and ride" access
- Revised procedures for calculating the percent of each zone that is within walking distance to transit

In transit path building, path weights were made to be consistent with the comparable weights used in mode choice (AECOM, 2004, p. 19):

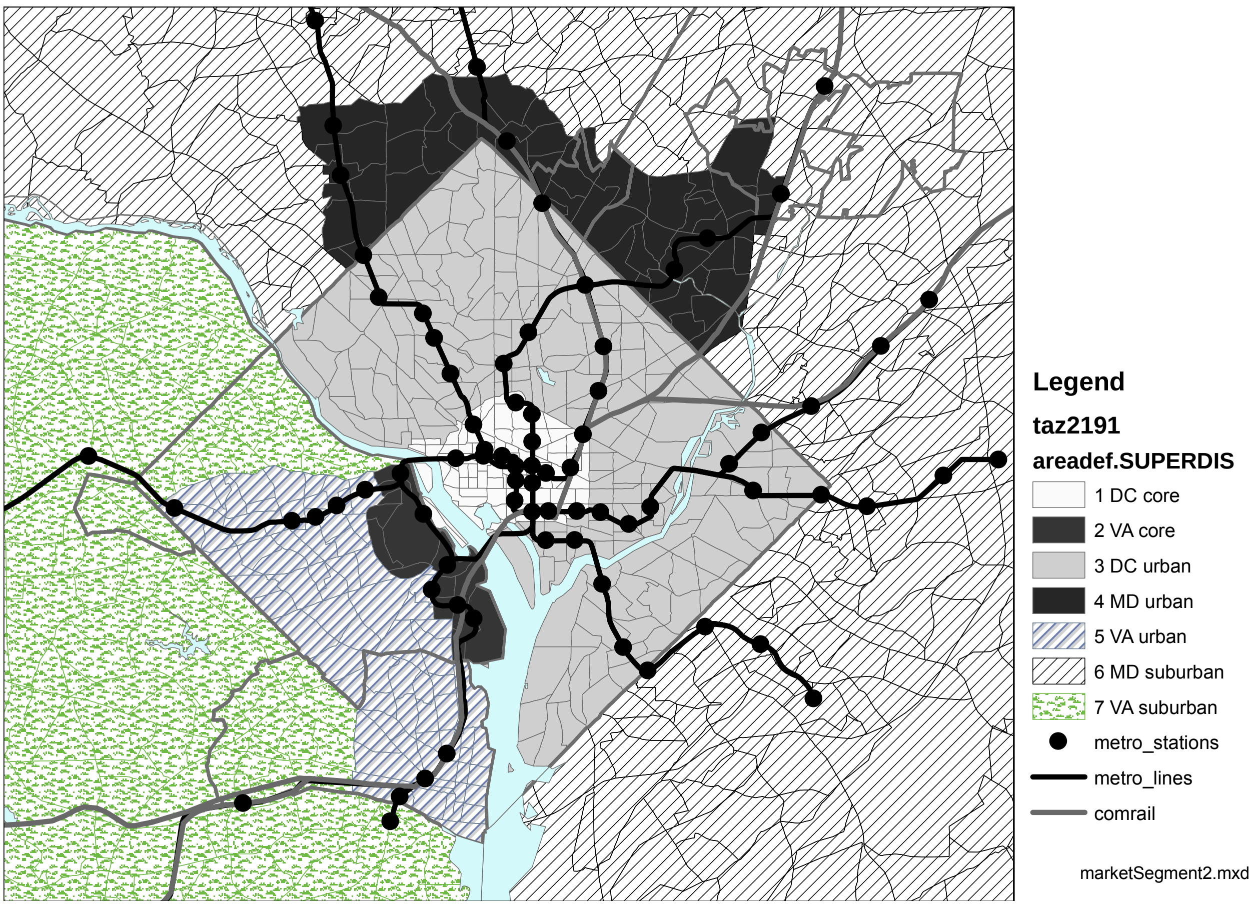
- Drive access time: Equal to 1.5 times the in-vehicle time
- Walk access time: Equal to 2.0 times the in-vehicle time
- Other out-of-vehicle time: Equal to 2.5 times the in-vehicle time

The AECOM/WMATA mode choice model was initially applied for the years 2002 and 2030. Later, it was also applied for the years 2010, 2020, & 2030 as part of a WMATA station access study.

Initially, while calibrating the mode choice model, AECOM tried a model structure that used trip-end production and attraction variables. However, calibration was problematic: Constant values from the utility equations were large and/or unstable and some markets were not calibrating well (AECOM, 2004, slide 30). Consequently, AECOM chose to use a geographic market segmentation. The modeled area was divided into seven superdistricts (See also Figure 6-2):

1. DC core
2. VA core
3. DC urban
4. MD urban
5. VA urban
6. MD suburban
7. VA suburban

Figure 6-2 Seven superdistricts used in the AECOM/WMATA mode choice model (and also the TPB NL MC model)



Ref: M:\model_dev\nest_log\marketSegment2.mxd

Although seven market areas could lead to 49 (= 7 x 7) geographic interchanges, these interchange were grouped into the following production/attraction areas:

Table 6-1 Production and attraction market segments used in the AECOM/WMATA mode choice model (and also the TPB NL MC model)

Production Areas	Attraction Areas
1. DC Core / Urban	1. DC Core
2. MD Urban	2. VA Core
3. VA Core / Urban	3. Urban
4. MD Suburban	4. Suburban
5. VA Suburban	

Ref: M:\model_dev\nest_log\marketSeg.xls

The five production areas and four attraction areas gave rise to 20 geographic market segments:

Table 6-2 20 market segments used in the AECOM/WMATA mode choice model (and also the TPB NL MC model)

	Production Area	Attraction Area
1	DC	DC core
2	DC	VA core
3	DC	Urban DC, MD, VA
4	DC	Suburban MD, VA
5	MD urban	DC core
6	MD urban	VA core
7	MD urban	Urban DC, MD, VA
8	MD urban	Suburban MD, VA
9	VA core/urban	DC core
10	VA core/urban	VA core
11	VA core/urban	Urban DC, MD, VA
12	VA core/urban	Suburban MD, VA
13	MD suburban	DC core
14	MD suburban	VA core
15	MD suburban	Urban DC, MD, VA
16	MD suburban	Suburban MD, VA
17	VA suburban	DC core
18	VA suburban	VA core
19	VA suburban	Urban DC, MD, VA
20	VA suburban	Suburban MD, VA

Ref: M:\model_dev\nest_log\marketSeg.xls

This same geographic market segmentation has been retained by TPB for its nested-logit mode choice model.

6.2.2 Summary of similarities and differences between the AECOM/WMATA mode choice model and the COG/TPB Version 2.3 mode choice model

The following section describes the similarities and differences between the AECOM/WMATA mode choice model and the COG/TPB Version 2.3 nested-logit mode choice model. Both models use the same choice set (15 modes) and nesting structure (See Table 6-3). Both models use the same Fortran program, AEMS, to apply the model. The AECOM/WMATA mode choice model was applied as a post process to the regional travel model. By contrast, the TPB NL mode choice model is applied as an integral part of the travel model, within the speed feedback loop. The AECOM/WMATA model used three trip purposes (HBW, HBS/O, and NHB). By contrast, the TPB NL mode choice model uses four trip purposes (HBW, HBS, HBO, and NHB). The AECOM/WMATA mode choice model was composed of six models (HBW AM, HBW OP, HBS/O AM, HBS/O OP, NHB AM, and NHB OP). By contrast, the TPB NL mode choice model is composed of four models (HBW AM, HBS OP, HBO OP, and NHB OP). Both models make use of consistent weights in transit path building and mode choice. Both models make use of the same geographic market segmentation (20 market segments) and economic market segments (4 levels of household income). Both models make use of the same set of revisions to transit access coding, except that, up to now, the TPB model has not adopted the additional coding detail around Metrorail stations with PNR access. In the future, depending on time constraints, the TPB staff may also adopt the additional coding detail around Metrorail stations with PNR access. Both models were calibrated using the same set of observed data (e.g., 2002 WMATA Metrorail survey; 2000 Regional bus survey; and Boarding counts for express bus and commuter rail). As for model calibration, both AECOM and TPB used a Fortran program called CALIBMS to perform calibration (the calibration process is described in more detail later in this chapter), though the two models have different sets of coefficients and constants, since the two models were calibrated under different conditions.

Table 6-3 A comparison of characteristics found in both the AECOM/WMATA NL MC model and the COG/TPB NL MC model

Item	AECOM/WMATA NL MC	COG/TPB NL MC
Travel modes	15 (3 auto, 12 transit)	Same
Nesting structure	3 levels, including auto by occupancy and transit by access mode	Same
Model application code	AEMS Fortran program	Same
How the mode choice model is applied	As a post process to the regional travel model	Within the speed feedback loop of the regional travel model (i.e., after trip distribution and before traffic assignment)
Trip purposes	3 (HBW, HBS/O, and NHB)	4 (HBW, HBS, HBO, and NHB)
Types of travel skims	2 (AM peak period and off peak period)	Same
Number of mode choice models	6 (HBW AM, HBW OP, HBS/O AM, HBS/O OP, NHB AM, and NHB OP)	4 (HBW AM, HBS OP, HBO OP, and NHB OP)
Weights used in path building and mode choice	Consistency	Same
Geographic market segmentation	7 superdistricts; 20 production/attraction interchanges	Same
Economic market segmentation	Households stratified by income (four levels)	Same
Revised transit access coding	• Additional information to describe transit stations; • A new way to code sidewalks and walk-access-to-transit links; • A new way to code drive-access-to-transit links; • Additional coding detail around Metrorail stations with "park and	Same, except the item in the fourth bullet has not been adopted: • Additional coding detail around Metrorail stations with "park and ride" access;

	ride" access; and • Revised procedures for calculating the percent of each zone that is within walking distance to transit	
Data used for calibration	2002 WMATA Metrorail survey; 2000 Regional bus survey; Boarding counts for express bus and commuter rail	Same
Calibration approach	Calibrated by AECOM for 6 models applied as a post process	Re-calibrated by TPB staff for 4 models applies as an integral part of the speed feedback loop
Calibration programs	Used the Fortran program CALIBMS to automate the process of calculating nesting constants	Same

6.3 *Detailed description of the TPB nested-logit mode choice model*

The NL MC model in TPB's Version 2.3 travel model can be thought of as consisting of four parts:

1. A set of available modes/choices (15) and a nesting structure;
2. Rules for market segmentation
3. A set of utility equations, which include time and cost coefficients and also income constants;
4. A set of nesting coefficients (a.k.a. logsum parameters or Φ) and nesting constants (NC).

Each of these is described below.

6.3.1 Choice set and nesting structure

The choice set and nesting structure are shown in Figure 6-1 and have already been discussed in Section 6.1 (Introduction).

6.3.2 Market segmentation

The TPB nested-logit mode choice model is market segmented by income, geography, and by access to transit. The income segmentation is the same that is used for the first two steps of the travel model (trip generation and trip distribution), namely households are segmented by the four household income levels described in Chapter 3 (Demographic models).

As for geographic market segmentation, the TPB nested-logit mode choice model makes use of the same set of 20 geographic market segments that were developed by AECOM for the AECOM/WMATA NL MC model (described in Section 6.2: Background). Table 6-4 show the same information as Table 6-2, however it also add the number of each superdistrict making up each of the 20 market segments.

Table 6-4 20 market segments used in the TPB NL MC model

Market Seg No.	Prod Superdis	Attr Superdis	Production Area	Attraction Area
1	1,3	1	DC	DC core
2	1,3	2	DC	VA core
3	1,3	3,4,5	DC	Urban DC, MD, VA
4	1,3	6,7	DC	Suburban MD, VA
5	4	1	MD urban	DC core
6	4	2	MD urban	VA core
7	4	3,4,5	MD urban	Urban DC, MD, VA
8	4	6,7	MD urban	Suburban MD, VA
9	2,5	1	VA core/urban	DC core
10	2,5	2	VA core/urban	VA core
11	2,5	3,4,5	VA core/urban	Urban DC, MD, VA
12	2,5	6,7	VA core/urban	Suburban MD, VA
13	6	1	MD suburban	DC core
14	6	2	MD suburban	VA core
15	6	3,4,5	MD suburban	Urban DC, MD, VA
16	6	6,7	MD suburban	Suburban MD, VA
17	7	1	VA suburban	DC core
18	7	2	VA suburban	VA core
19	7	3,4,5	VA suburban	Urban DC, MD, VA
20	7	6,7	VA suburban	Suburban MD, VA

Ref: M:\model_dev\nest_log\marketSeg.xls

Table 6-5 shows which TAZs are located in which super districts.

Table 6-5 Super district definitions used in the TPB NL MC model

#	Name	TAZs
1	DC Core	1-88
2	VA Core	1230-1242,1244,1245
3	DC Urban	89-319
4	MD Urban	329-335,343-347,350-367,369,647-671,677-679,690
5	VA Urban	1243,1246-1268,1274-1291,1296-1303,1330-1360,1363-1368
6	MD Suburban	320-328,336-342,348,349,368,370-627,640-646,672-676,
6	MD Suburban	680-689,691-1020,1030-1053,1060-1073,1080-1099,1110-1142,
6	MD Suburban	1150-1163,1170-1190,1200-1223
7	VA Suburban	628-639,1021-1029,1054-1059,1074-1079,1100-1109,1143-1149,
7	VA Suburban	1164-1169,1191-1199,1224-1229,1269-1273,1292-1295,1304-1329,
7	VA Suburban	1361,1362,1369-2191

Source: AECOM Consult, Inc. (2005-03, March). Post MWCOG – AECOM Transit Component of Washington Regional Demand Forecasting Model: User's Guide. March 2005.

Finally, the mode choice model is segmented by access to transit:

- Park and ride (PNR),
- Kiss and ride (KNR, or "ride to transit"), and
- Walk

Walk-access is further segmented by the length of walk to transit:

- Short walk (<= 0.5 miles)
- Long walk (> 0.5 miles and <= 1.0 mile).

This contrasts with the Version 2.2 mode choice model, which used slightly different definitions of short walk (0 to 0.3333 mile) and long walk (0.3333 mile to 1.0 mile).

6.3.3 Revised transit access coding

The new transit access coding enhancements cover five areas

1. The consolidation station file/database (the file used to track information about rail stations, express-bus bus stops, and PNR lots);
2. Sidewalk links and zonal walk links;
3. Zonal auto-access links;
4. Station transfer links; and
5. Zonal percent walk to transit calculations.

Consolidation station file/database

The consolidated station file/database is a text file (sta_tpp.bse) that contains information about Metrorail stations, commuter rail stations, light rail stations, bus rapid transit stations/stops, street car stations/stops, express-bus bus stops, and park-and-ride lots that serve these stations/stops. Each station file is associated with one scenario, with the most typical scenarios being the "modeled year" (e.g., 2002, 2005, 2030). This file normally contains information such as:

- The mode code, a single-letter code indicating Metrorail (M), commuter rail (C), etc.
- A flag indicating whether the station is active in the given year/scenario (Y/N)
- A flag indicating whether the station PNR lot is active (Y/N)
- Station name

Further detail about the station file can be found in the User's Guide section of this report (Chapter 11 Set-Up Programs and Highway Network Building). Six new columns/variables were added to the station file that were not present in earlier versions of the regional travel model (e.g., Ver. 2.2 and before). Only the first four of these six are currently used:

1. Access distance code
2. Parking capacity
3. Peak-period parking cost
4. Off-peak-period parking cost
5. Peak-period shadow price (not used)
6. Off-peak-period shadow price (not used)

The full list of variables in the station file can be seen in Table 6-6. These six new variables are shown in yellow (gray). These new fields are described in more detail in Chapter 20 of the User's Guide section of this report or in the Network Coding Guide (Jain, 2008).

Table 6-6 Six added variables/columns added to the consolidated station file (sta_tpp.bse)

Sequence #	Mode	Access Distance Code	PNR?	Active?	Station Name	Centroid	TAZ	Rail Node	Parking Node	Bus Node 1	Bus Node 2	Bus Node 3	Bus Node 4	Parking Capacity	X Coordinate	Y Coordinate	Peak Parking Cost	Off-Peak Parking Cost	Peak Shadow Price	Off-Peak Shadow Price	First Year
81	M	1	Y	Y	Shady Grove	2331	482	7301	7501	19019	19020			5253	1265919	528848	400	50			1990
82	M	2	Y	Y	Rockville	2332	479	7302	7502	19017	7605			659	1270919	516348	400	50			1990
83	M	2	Y	Y	Tw inbrook	2333	416	7303	7503	19013	19014			1075	1278519	507948	400	50			1990
84	M	2	Y	Y	White Flint	2334	405	7304	7504	19016				991	1280319	503348	400	50			1990
85	M	2	Y	Y	Grosvenor	2335	403	7305	7505	19012				650	1283219	494948	400	50			1990
86	M			Y	Medical Center	2336	346	7306		3054				0	1284819	484948	0	0			1990
87	M	2	Y	Y	Bethesda	2337	344	7307	7507	3048				500	1285519	479748	500	50			1990
88	M			Y	Friendship Heights	2338	204	7308		9140	20401			0	1287919	471348	0	0			1990
89	M			Y	Tenleytow n	2339	207	7309		9117	20403			0	1289519	466648	0	0			1990
90	M			Y	Van Ness-UDC	2340	113	7310		9153				0	1294219	465148	0	0			1990
91	M			Y	Cleveland Park	2341	117	7311		9156				0	1295619	462248	0	0			1990
92	M			Y	Woodley Park-Zoo	2342	117	7312		9163	20501			0	1297319	458248	0	0			1990
93	M	9		Y	Dupont Circle	2343	46	7313		8901	8905			0	1299919	452648	0	0			1990
94	M	9		Y	Farragut North	2344	17	7314		8440	20416			0	1301119	450348	0	0			1990
95	M	9		Y	Metro Center	2345	19	7315		8912	8919			0	1304319	448448	0	0			1990
96	M	9		Y	Gallery Place	2346	23	7316		8955	20118			0	1306119	448448	0	0			1990
97	M	9		Y	Judiciary Square	2347	26	7317		8474				0	1307519	447948	0	0			1990
98	M	9		Y	Union Station	2348	634	7318		8656	8654	7601		0	1310319	448248	0	0			1990
99	M	3	Y	Y	Rhode Island Ave	2349	146	7319	7519	9422				350	1313319	456848	350	50			1990

Source: Jain, M. (2008, February). "MWCOG network coding guide for Nested Logit Model." A draft memorandum from Manish Jain – AECOM Consult, to Ron Milone and Mark Moran – MWCOG.

Table 6-7 shows the mode codes that are used in the consolidated station file/database. Notice that station centroids are needed for only Metrorail and commuter rail.

Table 6-7 Mode codes used in the consolidated station file/database (sta_tpp.bse)

Mode	Mode Code	Station Centroid Range
Metrorail (Mode 3)	M	2250-2500
Commuter rail (Mode 4)	C	2250-2500
Light rail transit (Mode 5)	L	Not used
Bus rapid transit; street car (Mode 10)	N (for New mode)	Not used
Bus (Modes 1, 2, 6-9)	B	Not used

Sidewalk links and zonal walk links

In the Version 2.2 travel model and earlier models, there was a walk network (sidewalk network), used for transferring from one transit line to another, in downtown DC and downtown Silver Spring, Maryland. In the Version 2.3 travel model, there is a sidewalk network in almost the entire modeled area. The regional sidewalk network is generated automatically using a Fortran program written by AECOM Consult (WALKACC.EXE). Walkacc.exe creates a sidewalk network by converting all suitable highway links into sidewalk links (Mode 13). Examples of highway links that are not converted into sidewalk links include freeways, parkways, and ramps (Facility Type = 1, 5, or 6). In order to limit the size of the sidewalk network to links that are likely used for walking, walkacc.exe eliminates sidewalk links from zones where the "percent walk to transit" is zero. There is also a way to supply the program with a list of sidewalk links to be manually added or subtracted to the automated list of sidewalk links. For example, one can manually add a sidewalk link for Memorial Bridge, and one can manually remove sidewalk links that should not exist due to a physical barrier. See the User's Guide or Jain (2008) for more details.

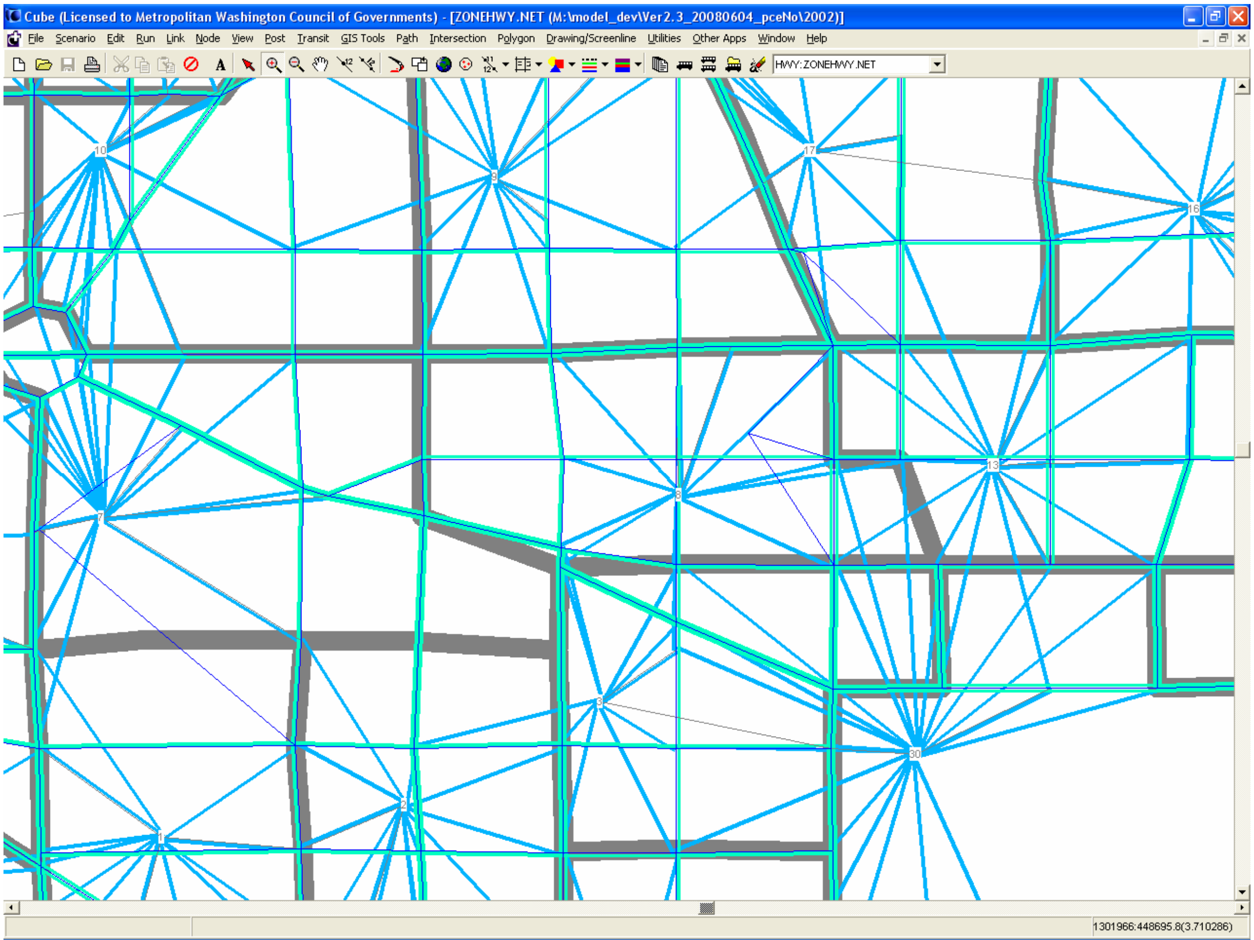
Walkacc.exe also generates zonal walk-access-to-transit links (Mode 16 links). It automatically sweeps each TAZ, generating walk-access links from the zone centroid to all transit stop nodes within a maximum walk distance (See Equation 6-1).

Equation 6-1 Maximum walk distance formula, used for generating walk-access-to-transit links

$$(\text{maximum walk distance}) = \sqrt{(\text{zonal area})} * 0.75$$

So, for a small, downtown zone with an area of 0.1 square miles, the program would calculate a maximum walk distance of 0.237 miles and connect all transit stop nodes that lie within that distance from the zone centroid. There is an absolute maximum of 1.0 mile, which would be obtained for zones with a size of 1.78 square miles or greater. The actual calculated (straight-line) distance and computed walk time are stored on each link. No walk-access links are generated for zones with a zero percent walk to transit. Figure 6-3 shows zonal walk access links and sidewalk links in downtown Washington, D.C., near Farragut Square (TAZ 8, which is in the center of the figure). The thickest lines are the TAZ boundaries, which are not part of the actual highway or transit network, but are shown for reference. The lines emanating from each TAZ centroid (light-blue, when the figure is viewed in color) are the zonal walk access links (Mode 16). The parallel (turquoise, when shown in color) lines over many, but not all roads, are the sidewalk links (Mode 13). Mode 13 and 16 links can be shown in Cube by adding the file support.asc as one of the transit layer files.

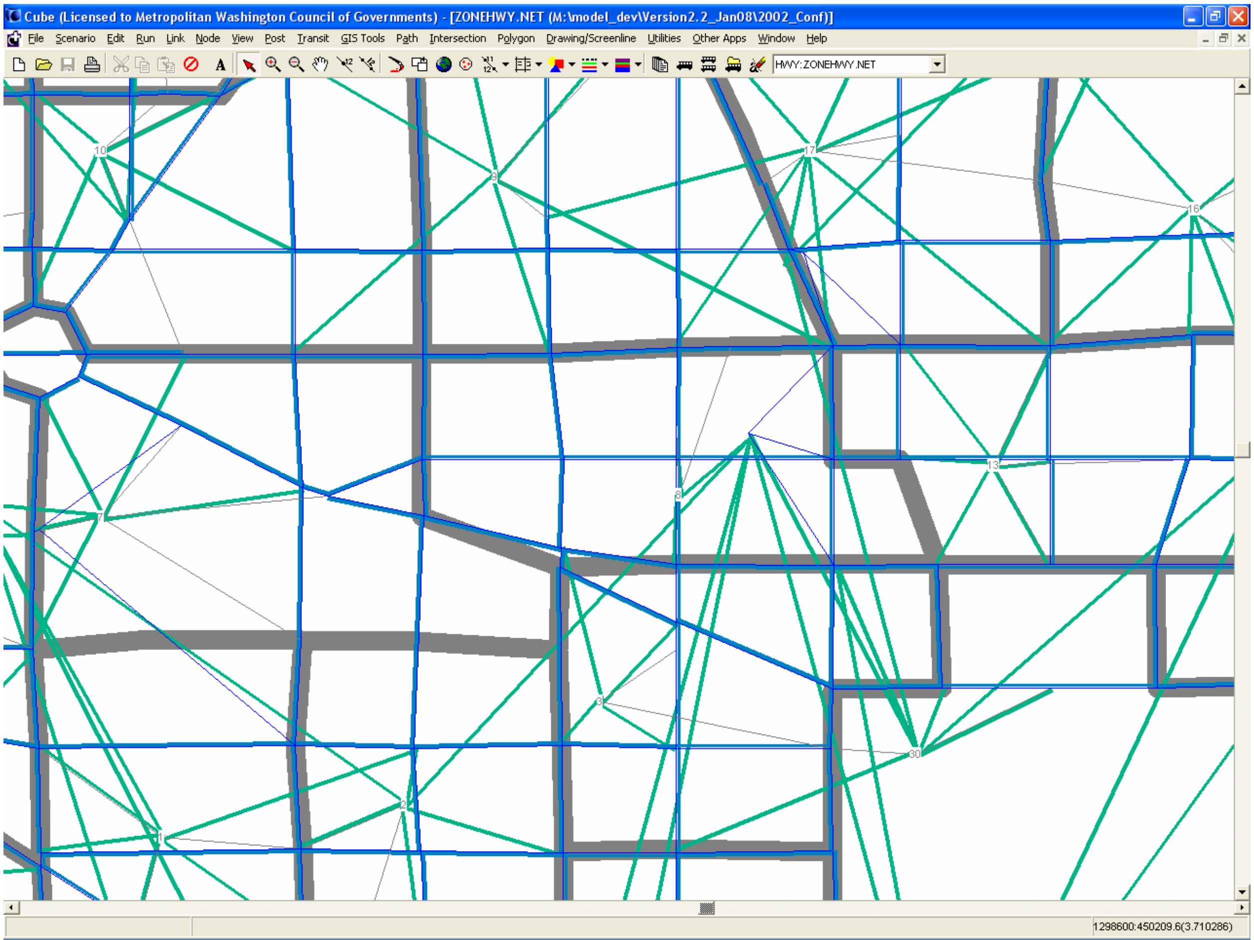
Figure 6-3 Zonal walk access links and sidewalk links in downtown DC near Farragut Square (Ver. 2.3 NL MC model)



Ref: M:\model_dev\Ver2.3_20080604_pceNo\2002\ZONEHWY.NET, ZONEHWY.VPR

As a point of comparison, Figure 6-4 shows the same information, but for the Version 2.2 multinomial logit (MNL) mode choice model.

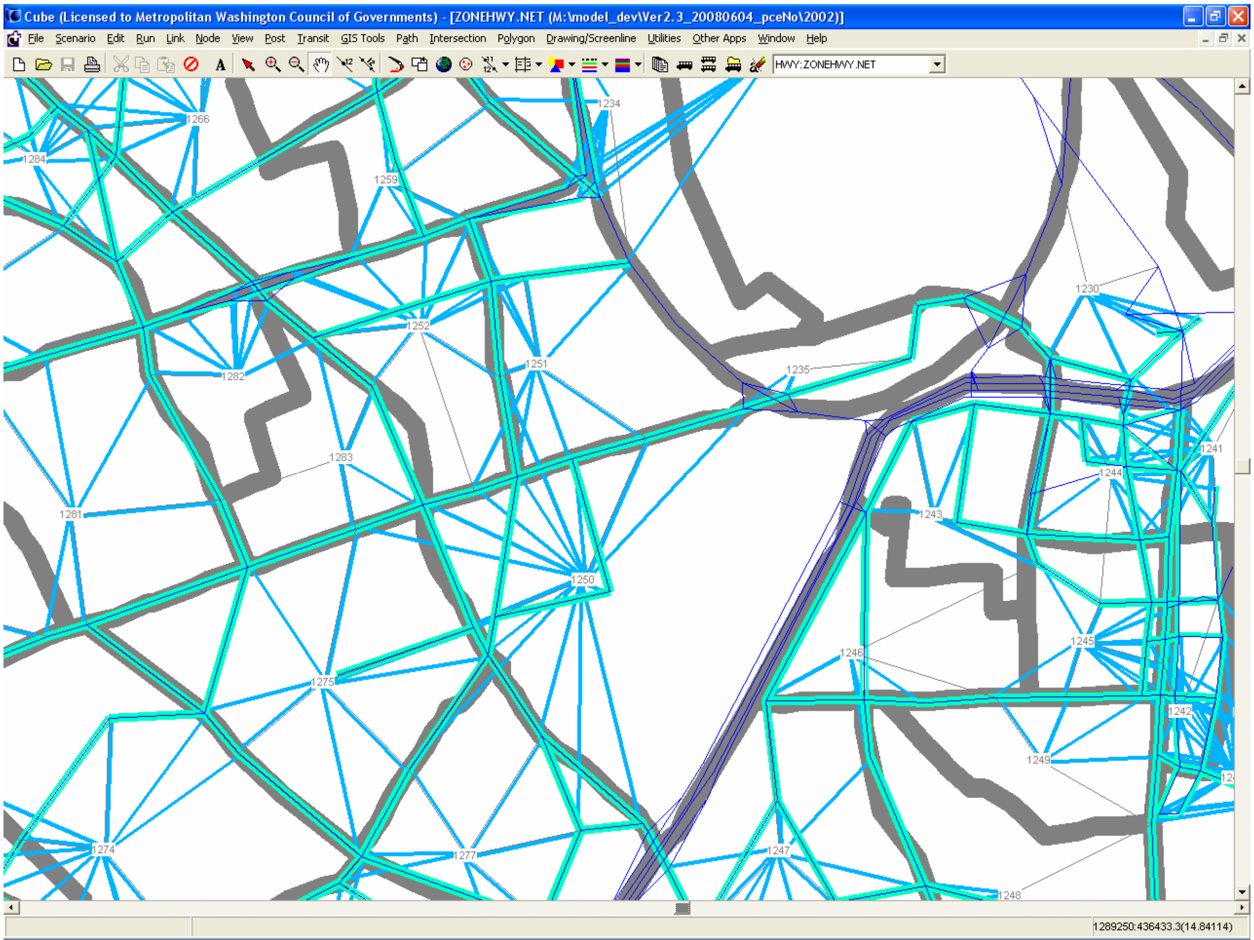
Figure 6-4 Zonal walk access links and sidewalk links in downtown DC near Farragut Square (Ver. 2.2 MNL MC model)



Ref: M:\model_dev\Version2.2_Jan08\2002_Conf\ZONEHWY.NET, ZONEHWY_forNL.VPR

Figure 6-5 shows zonal walk access links and sidewalk links around Columbia Pike and I-395 in Arlington County. Again, as a point of comparison,

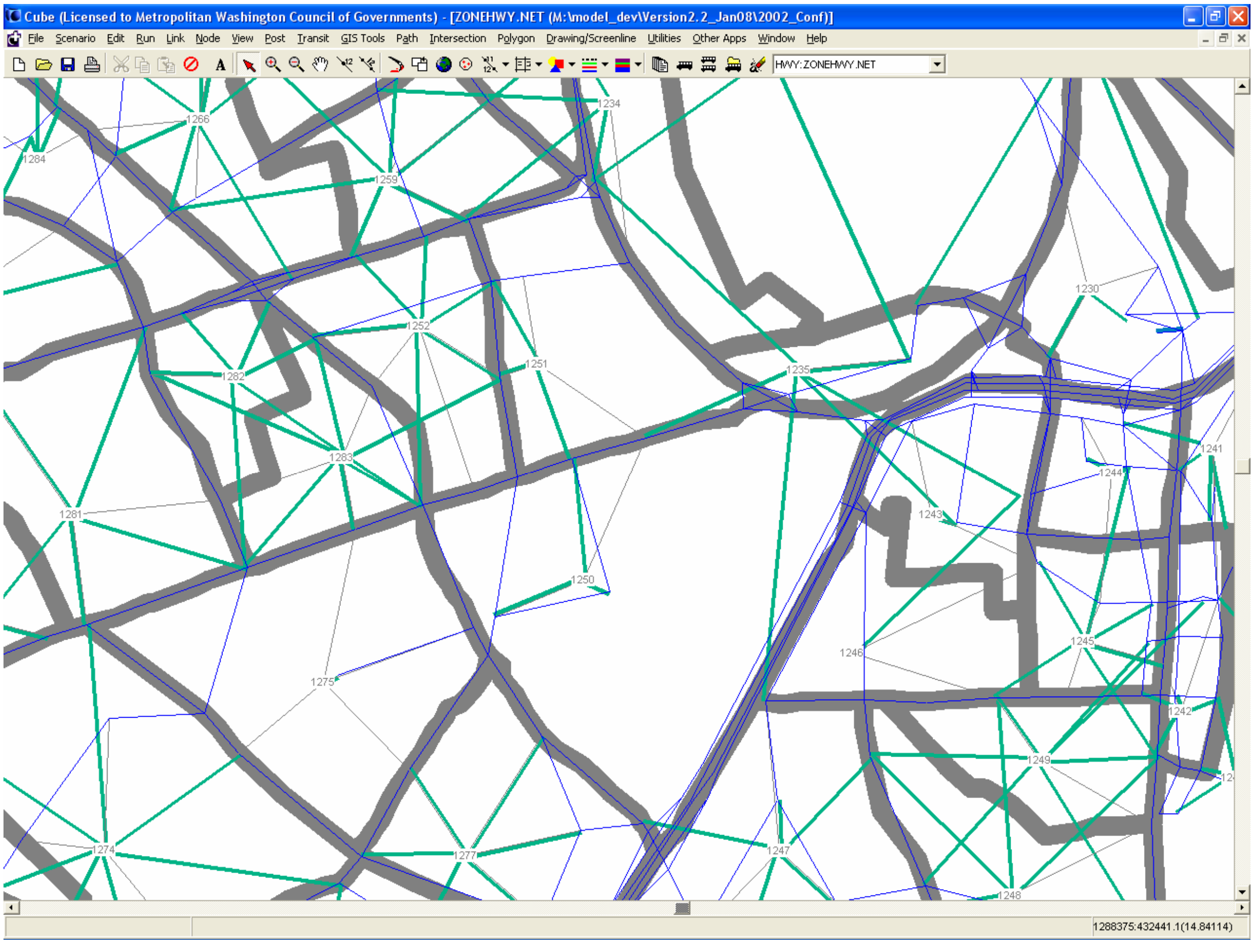
Figure 6-5 Zonal walk access links and sidewalk links around Columbia Pike and I-395 in Arlington, Co. (Ver. 2.3 NL MC model)



Ref: M:\model_dev\Ver2.3_20080604_pceNo\2002\ZONEHWY.NET, ZONEHWY.VPR

Figure 6-6 show the same information as Figure 6-5, but for the Version 2.2 multinomial logit (MNL) mode choice model.

Figure 6-6 Zonal walk access links and sidewalk links around Columbia Pike and I-395 in Arlington, Co. (Ver. 2.2 MNL MC model)



Ref: M:\model_dev\Version2.2_Jan08\2002_Conf\ZONEHWY.NET, ZONEHWY_forNL.VPR

Zonal auto-access links

The Fortran program AUTOACC4.EXE, written by AECOM Consult, is used to generate auto-access-to-transit links. Zonal auto access links are generated by transit mode (Metrorail, commuter rail, light rail, BRT, streetcar, and bus) for both the peak and off-peak time periods. Auto access links (Mode 11) are a function of multiple criteria:

- Orientation toward downtown (defined as TAZ 35, the Ellipse);
- A backtracking penalty and a prohibition of crossing the Potomac River (except for trips from Loudoun County to MARC commuter rail);
- A maximum link distance, which is a function of station type (e.g., terminal vs. non-terminal) and transit mode;
- Manually specified overrides; and
- Distances based on the highway skims from the 2500-zone network.

The "access distance code," which is a newly added variable in the consolidated station file and is used by autoacc4.exe, controls the number, extent, and directionality of PNR/KNR access links generated for each parking lot. Table 6-8 describes the meaning of each of the six access distance codes.

Table 6-8 Access distance codes (used in the consolidated station file) and their meaning for the autoacc4.exe program

Acc Dist Code	Interpretation
1	End-of-the-line station (e.g., Shady Grove Metro)
2	Intermediate station (e.g., Rockville Metro)
3	PNR close to a CBD (e.g., Rhode Island Ave. Metro, Fort Totten)
0	Only KNR-access links generated (e.g., Braddock Road, National Airport, Clarendon)
9	Metrorail sta. in use, but no PNR/KNR access (e.g., Dupont Circle, Farragut North, Metro Ctr.)
8	Pentagon Metro Sta., allows for very long KNR links, to represent "slugging" (informal carpool)

The access code, along with the transit mode, determines the maximum link distance for the drive-access-to-transit links generated by autoacc4.exe for the TPB nested-logit mode choice model, as shown in Table 6-9.

Table 6-9 Maximum link distances for drive-access-to-transit links: Ver. 2.3 NL MC model

Mode	Access Dist. Code	Maximum Connect. Length (miles)
Metrorail station PNR	1	15
Metrorail station PNR	2	5
Metrorail station PNR	3	3
Metrorail station PNR	0	3
Commuter rail station PNR	1	15
Commuter rail station PNR	2	10
Commuter rail station PNR	0	5
Bus PNR	1	5
Bus PNR	0	3
BRT/Street car PNR	1	5
BRT/Street car PNR	0	3
LRT PNR	1	5
LRT PNR	0	3

Ref: I:\ateam\meetings_conf\transitModelingGroup\2007-11-07\maxDistForAutoAccConnect.xls

As a point of comparison, the maximum link distance for the drive-access-to-transit links used in the Version 2.2 travel model (multinomial logit mode choice) are shown in Table 6-10. In both cases (Ver. 2.3 and Ver. 2.2), drive-access links should not cross the Potomac River except for origin zones in Loudoun County and Jefferson County since the MARC system in Maryland does serve commuters from those jurisdictions.

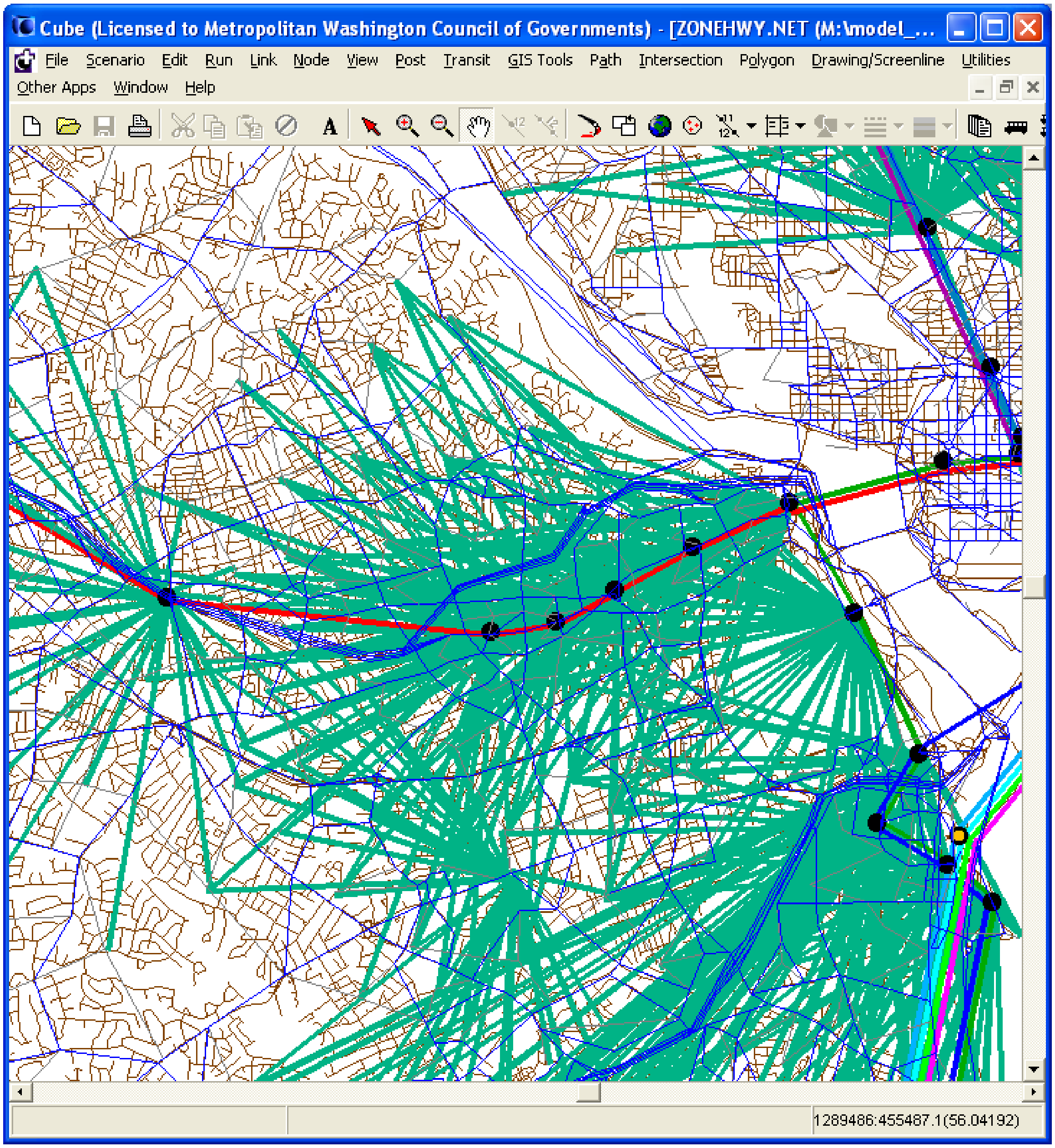
Table 6-10 Maximum link distances for drive-access-to-transit links: Ver. 2.2 MNL MC model

Jurisdiction	Maximum Connect. Length (miles)
DC	4
Arlington	4
Alexandria	4
Montgomery	5
Fairfax	5
Prince George's	5
All remaining jurisdictions	8

Source: Milone, R., et. al. (2008-03-01, March 1). *TPB Travel Forecasting Model, Version 2.2 Specification, Validation, and User's Guide*. March 1, 2008, p. 12-1.
Ref: I:\ateam\meetings_conf\transitModelingGroup\2007-11-07\maxDistForAutoAccConnect.xls

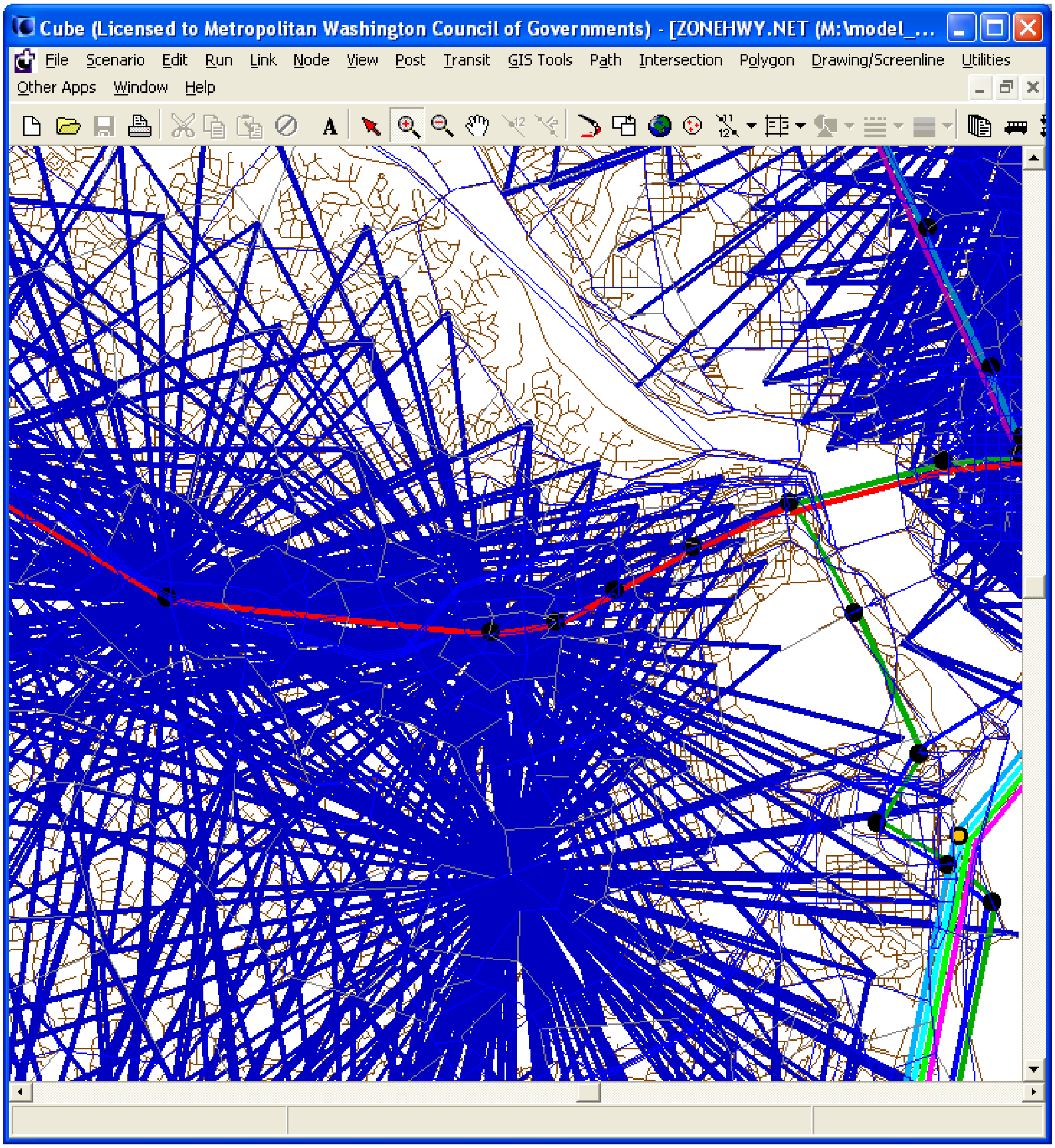
A graphical depiction of drive-access-to-transit links in Arlington, County, along the Metrorail Orange Line, can be seen in Figure 6-7. As a point of comparison, the same are of Arlington is shown in Figure 6-8, but with the drive-access-to-transit links that would be generated for the Version 2.2 MNL MC model. The "starbursts" for the Ver. 2.3 nested logit mode choice model resemble flattened circles, whereas the "starbursts" for the Ver. 2.2 multinomial logit mode choice model do not show the same flattening (since they do not take into account a backtracking penalty). Note also that for Version 2.2, there is only PNR access, but for Version 2.3, there is both PNR and KNR access. So, for example, in Figure 6-7, there are auto-access links to the Arlington Cemetery Metrorail station (in this case, these are KNR links), but in Figure 6-8 there are no auto-access links, since Arlington Cemetery Metrorail station has no parking lot (so it does not show any PNR access links, which were the only type of auto-access links in the Version 2.2 travel model). Notice also that, for the Version 2.3 model (Figure 6-7), there are no auto-access links (PNR or KNR) to the Dupont Circle Metrorail station (in this figure, two stations are shown on Metro's Red Line: Woodley Park and Dupont Circle), since the Dupont Circle station has an access distance code of "9," which means the Metrorail station is in use, but there is no PNR/KNR access. This code is used for stations that both lack a dedicated PNR lot and are also unlikely to have much access by auto-drop off, due to their location in congested urban areas.

Figure 6-7 Drive-access-to-transit links in Arlington County: Ver. 2.3 NL MC model



Ref: I:\ateam\meetings_conf\tfs\2008\2008-03-21\NLMC_tfs_2008-03-21c.ppt, year 2002

Figure 6-8 Drive-access-to-transit links in Arlington County: Ver. 2.2 MNL MC model



Ref: I:\ateam\meetings_conf\tfs\2008\2008-03-21\NLMC_tfs_2008-03-21c.ppt, year 2002

Station transfer links

Station transfer links are walk links connecting:

- Stations and sidewalks (Mode 12)
- Stations and bus service (Mode 12)
- Stations and PNR lots (Mode 15)

These links are generated automatically from data in the consolidated station file. For PNR-station transfer links, the walk time is a function of parking capacity and cost, which is described in more detail in Chapter 20 of the User's Guide or in Jain (2008). The Mode 15 links are generated by the Fortran program PARKER.EXE. The Mode 12 links are generated by the Fortran program STAPROTP_V1.EXE.

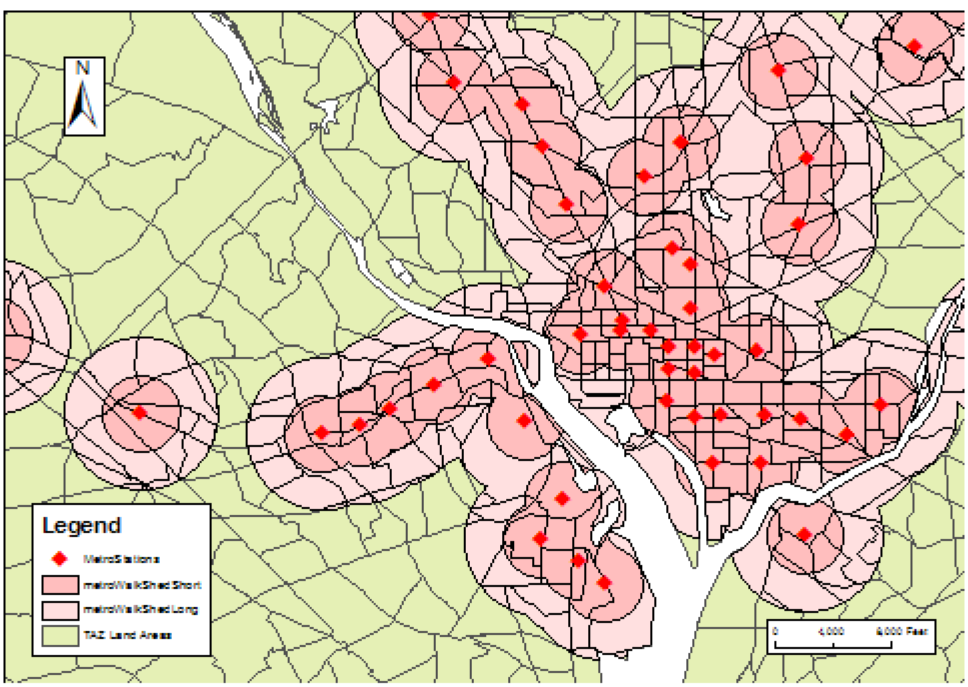
Zonal percent walk to transit calculations

The zonal percent walk is the percent of a zone's area that lies within walking distance to transit service (i.e., a transit stop node, such as a bus stop or rail station). As stated earlier, a short walk is defined as one that is less than or equal to 0.5 miles and a long walk is defined as one that is less than or equal to one mile. The following walk designations are used:

- Short walk to Metrorail (<= 0.5 miles);
- Long walk to Metrorail (>0.5 and <= 1.0 miles);
- Short walk to AM transit;
- Long walk to AM transit;
- Short walk to off-peak transit;
- Long walk to off-peak transit.

A GIS procedure is used to develop point buffers around transit stop nodes and then overlay these point buffers with zone (TAZ) boundaries. Finally, the six percent walk metrics are calculated. Figure 6-9 shows an example of the short- and long-walk buffers generated around Metrorail stations in Washington, D.C. and Arlington, Co. Both AECOM and TPB staff have developed separate procedures for generating percent walk to transit values. We are currently using the TPB-developed procedure.

Figure 6-9 Short- and long-walk buffers around Metrorail stations



Ref: M:\model_dev\GIS\apps\pct_walk\02_walkshedGen_nl\walkShedGenerator\doc\
WalkShedTechnicalReport2.doc

6.3.4 Transit path-building procedures

Given the segmentation in the model, 24 separate transit paths can be enumerated between each production zone and attraction zone:

- Three modes of access to transit
  - Walk
  - Park and ride (PNR driver)
  - Ride to transit/KNR (drop-off/pick-up, or ride with a PNR driver)
- Four transit modes/combinations
  - Commuter rail (alone and in combination with bus and/or Metrorail)
  - Bus-Metrorail (bus and Metrorail used in combination)
  - All bus (buses only)
  - All Metrorail (Metrorail only)
- Two time-of-day periods
  - AM peak
  - Off-peak

However, at present, PNR and KNR to commuter rail are combined as a single path, since, for commuter rail, the PNR- and KNR-access links are identical (since the majority of commuter rail PNR lots are free). Consequently, the number of transit paths built between each production/attraction zone pair is 22. Table 6-11 summarizes the paths and available transit sub modes in each path. Again, in this figure, "drive to commuter rail" and "K&R to commuter rail" are combined into one category.

Run times for transit routes are controlled by the RUNTIME keyword (TRNBUILD) and output bus IVT skims are adjusted to reflect the general level of road congestion using a factor table (LBUS_TimFtrs.ASC). As stated previously, path weights are consistent with the weights used in the mode choice model:

- Drive access time: Equal to 1.5 times the in-vehicle time
- Walk access time: Equal to 2.0 times the in-vehicle time
- Other out-of-vehicle time: Equal to 2.5 times the in-vehicle time

Headway combination between two or more transit routes is allowed to occur provided 1) the routes share the same transit mode code and 2) the difference between the run time and the minimum run time is less than a designated number of minutes (5 minutes for AM and 10 minutes for off peak). A maximum path time is set at 360 weighted minutes. There is not weighting of in-vehicle time by transit sub-modes (i.e., all transit modes have an IVT weight of 1.0). The maximum initial wait time for all ten transit modes is set at 60 perceived minutes. The minimum transfer wait time is 4.0 minutes for bus (Modes 1, 2, 6, 7, 8), 0 minutes for Metrorail (Mode 3), 4.0 minutes for commuter rail (Mode 4), 0 minutes for LRT (Mode 5), 10.0 minutes for express bus (Mode 9), and 4.0 minutes for Mode 10 (street car and/or BRT).

Table 6-11 Path-specific parameters used in transit path building

		Transit Submodes			
Path	**Path Parameter**	**Comm Rail**	**Express Bus**	**Local Bus**	**Metrorail**
Walk-to-Commuter Rail	Modes Available	X		X	X
	Weight	1.0		1.0	1.0
	Path Testing	must appear		can appear	can appear
Walk-to-Bus/Metrorail	Modes Available		X	X	X
	Weight		1.0	1.0	1.0
	Path Testing		either must appear		must appear
Walk-to-Bus	Modes Available		X	X	
	Weight		1.0	1.0	
	Path Testing		either must appear		
Walk-to-Metrorail	Modes Available				X
	Weight				1.0
	Path Testing				must appear
Drive-to-Commuter Rail	Modes Available	X		X	X
	Weight	1.0		1.0	1.0
	Auto access links to	CRsta. w/ parking		no	no
	Path Testing	must appear		can appear	can appear
K&R-to-Commuter Rail	Modes Available	X		X	X
	Weight	1.0		1.0	1.0
	Auto access links to	CRsta. w/ parking		no	no
	Path Testing	must appear		can appear	can appear
Drive-to-Bus/Metrorail	Modes Available		X	X	X
	Weight		1.0	1.0	1.0
	Auto access links to		all Bus park-ride lots		MRsta. w/ parking
	Path Testing		either must appear		must appear
K&R-to-Bus/Metrorail	Modes Available		X	X	X
	Weight		1.0	1.0	1.0
	Auto access links to		all Bus park-ride lots		all MRsta.
	Path Testing		either must appear		must appear
Drive-to-Bus	Modes Available		X	X	
	Weight		1.0	1.0	
	Auto access links to		all Bus park-ride lots		MRsta. w/ parking
	Path Testing		either must appear		
K&R-to-Bus	Modes Available		X	X	
	Weight		1.0	1.0	
	Auto access links to		all Bus park-ride lots		all MRsta.
	Path Testing		either must appear		
Drive-to-Metrorail	Modes Available				X
	Weight				1.0
	Auto access links				MRsta. w/ parking
	Path Testing				must appear
K&R-to-Metrorail	Modes Available				X
	Weight				1.0
	Auto access links				all MRsta.
	Path Testing				must appear

Source: AECOM Consult, Inc. (2005-03, March). *Post MWCOG – AECOM Transit Component of Washington Regional Demand Forecasting Model: User's Guide.* March 2005.

6.3.5 Treatment of Parking Costs and Terminal Times

Parking costs and highway terminal time assumptions

In applying the Version 2.3 model, prior to the execution of the mode choice model, a TP+ script (prefarv23.s) is used to generate zonal files containing zonal parking costs and highway terminal times. The files are, in turn, read into the mode choice model upon execution. A graph of daily HBW and hourly non-HBW parking costs, as a function of zonal employment density, is shown in Figure 6-10 (this function is the same as that used in the Version 2.2 travel model). The non-HBW hourly parking cost is assumed to be one-third of the daily HBW rate, subject to a minimum employment density of 80,000 employees per sq. mile.

Figure 6-10 Parking cost model for the Version 2.3 model set

Ref: I:\ateam\docum\FY05\Model_Jun04\parkingCostModelUpdate.xls

Highway terminal time is typically associated with the average time spent parking or "un-parking" an automobile. The current mode choice model application program considers highway terminal time only at the attraction end. Highway time is calculated as a function of employment density, as shown in Table 6-12.

Table 6-12 Highway terminal time as a function of employment density

Employment density range (Emp/Sq. Mi.)	Highway terminal time (minutes)
0 - 4,617	1
4,618 - 6,631	2
6,632 - 11,562	4
11,563 - 32,985	6
32,986 +	8

Auto Operating Costs

The auto operating cost in the mode choice model relate to expenditures directly associated with the requirements of an automobile trip including fuel, oil, maintenance, tire wear, etc. (auto ownership costs including insurance, registration fees, etc. are not included). The mode choice model expresses operating costs as a per mile rate (1994 cents) that is specified as a parameter in the nested-logit mode choice model control files. We are currently using 10 cents per mile and this rate is not varied over time (i.e., the auto operating cost for 2002 and 2030 are both assumed to be 10 cents per mile). This is in contrast to what was done with the Version 2.2 travel model, as can be seen in Table 6-13. The modeling assumptions about auto operating costs should probably be re-assessed in the near future, especially in light of the recent, sharp increases in fuel prices.

Table 6-13 Auto operating costs assumed in the Ver. 2.2 travel model

year	Auto Operating Cost Rate (1994 cents/mile)
1994	9.1
2000	8.5
2005	8.3
2010	8.2
2015	8.1
2020	8.0
2025	7.9
2030	7.8

6.3.6 Utility equations, including time and cost coefficients and income constants

The TPB nested-logit mode choice model has four utility equations, one per trip purpose. The time and cost coefficients used in the utility equations are shown in Figure 6-11.

Figure 6-11 Time and cost coefficients in the Version 2.3 nested-logit mode choice model

		Trip Purpose (4)			
Variable		**HBW**	**HBS**	**HBO**	**NHB**
In-vehicle time	ivt	-0.02128	-0.02168	-0.02322	-0.02860
Auto access time	aat	-0.03192	-0.03252	-0.03483	-0.04290
Walk access time	ovtwa	-0.04256	-0.04336	-0.04644	-0.05720
Other out-of-vehicle time*	ovtot	-0.05320	-0.05420	-0.05805	-0.07150
Cost - Income group 1	costinc1	-0.00185	-0.00202	-0.00202	-0.00994
Cost - Income group 2	costinc2	-0.00093	-0.00101	-0.00101	-0.00994
Cost - Income group 3	costinc3	-0.00062	-0.00067	-0.00067	-0.00994
Cost - Income group 4	costinc4	-0.00046	-0.00051	-0.00051	-0.00994

* Includes boarding penalty

Ref: M:\model_dev\nest_log\NLmcTimeCostCoef4.xls

A note about calibration and estimation of coefficient values

Some of the coefficients in Figure 6-11 are statistically estimated, others are set using professional judgment and rules of thumb. Before discussing which are statistically estimated and which are set using professional judgment, it is useful to understand how calibration approaches have changed in the past few years.

In previous mode choice models developed by COG/TPB staff (e.g., the sequential, multinomial-logit mode choice model in the Version 2.1 and Version 2.2 travel models), coefficients in the utility equations of the mode choice model were statistically estimated, typically with software such as Alogit. Following the estimation of coefficients, we would check the reasonableness of coefficients by using rules of thumb. For example, one rule of thumb was that the ratio of the out-of-vehicle travel time coefficient to the in-vehicle travel time coefficient (Covt/Civt) should be between 2.0 and 3.0. This rule of thumb has always been used by COG/TPB staff in mode choice model estimation and has also been proposed by the Federal Transit Administration (FTA, 2004). In cases where the estimated coefficients did not agree with the rule of thumb, one was left to ponder the cause of the discrepancy. For example: Was there a problem with the estimation data? Was a utility equation misspecified? Was the estimation software not used correctly? Did the discrepancy in the ratio value represent a true difference in travel behavior of Washington, D.C. area travelers compared to other travelers in the U.S? Or, since the values of the coefficients are, in part, a function of the other coefficients in the utility equation, would a different set of utility variables have resulted in coefficient values that met the rule of thumb? Due to issues such as these and the increased interest in getting proposed transit projects to pass muster with the FTA, many consulting firms and agencies have started taking a new approach in calibrating mode choice models: namely, using a combination of statistically estimated coefficients and coefficients that are set by fiat, typically based on rules of thumb. This latter approach is what was used by AECOM when they calibrated their nested-logit mode choice model in 2004-2005, and it is also the approach we have used in calibrating our NL MC model.

Discussion of coefficient values in the TPB nested-logit mode choice model

The in-vehicle time (IVT) coefficients are all about -0.02 and were statistically estimated using Alogit software. These come from earlier estimation work done by TPB staff, for the 2.1C and

2.1D travel models. These values are in the range of values expected by FTA, which expects IVT coefficients in the range of -0.03 to -0.02 (FTA, 2004, slide 53). The next three time coefficients have been set as multiples of the IVT coefficient. For example, the auto access time coefficient is set equal to 1.5 times the IVT coefficient, indicating that time spent in a car for accessing transit is perceived as 1.5 times as burdensome as time spent in the transit vehicle itself. Similarly, the walk-access time coefficient is set equal to 2.0 time the IVT coefficient, indicating that time spent walking to access transit is perceived as 2.0 times as burdensome as time spent in the transit vehicle. Lastly, the other-out-of-vehicle time coefficient is set to a value of 2.5 times the IVT coefficient. These last two out-of-vehicle time coefficients conform with FTA expectations that the ratio of Covt/Civt should be between 2.0 and 3.0, unless an agency can provide compelling evidence to the contrary. Next come four cost coefficients, one per household income group (income group 1, 2, 3, and 4). The first cost coefficient, like the IVT coefficient, was statistically estimated from a previous version of the regional travel model. The remaining three cost coefficients, in the case of the three home-based purposes, are set as factors of the cost coefficient for income group 1. Specifically, the cost coefficient for income group 2 is equal to ½ the cost coefficient for income group 1. Similarly, the cost coefficient for income group 3 is equal to 1/3 the cost coefficient for income group 1, and the cost coefficient for income group 4 is equal to 1/4 the cost coefficient for income group 1.

The TPB NL MC model also uses a set of income constants, which were developed for the AECOM/WMATA NL MC model and retained for use in the TPB model (See Table 6-14). AECOM introduced the income constants to help reduce the high number of modeled boardings in Northwest DC (AECOM, 2005).

Table 6-14 Income constants used in the TPB Ver. 2.3 NL MC model

	Income stratification		
Mode	**Low**	**Middle**	**High**
All auto modes	0.0	0.0	0.0
Walk to commuter rail	2.0	0.0	-2.0
Walk to all bus	2.0	0.0	-2.0
Walk to bus/Metrorail	2.0	0.0	-2.0
Walk to all Metrorail	2.0	0.0	-2.0
PNR and KNR to transit	0.0	0.0	0.0

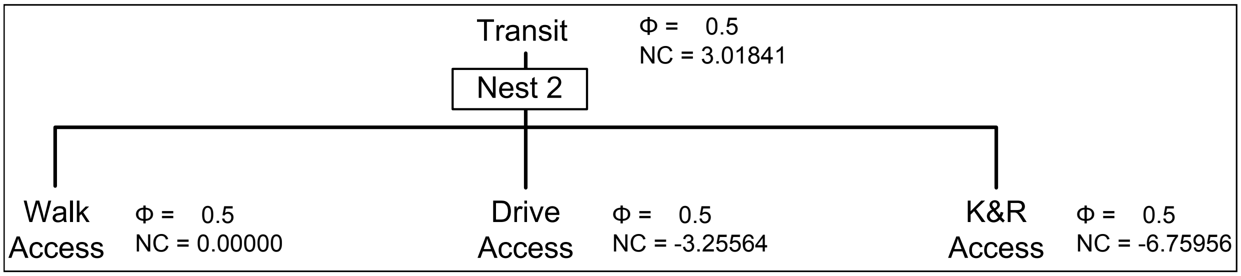
Ref: M:\model_dev\nest_log\NLmcTimeCostCoef4.xls

The income constants apply to all trip purposes. "Low income" means income group 1. "Middle income" means income groups 2 and 3. "High income" means income group 4. These income constants have the effect of increasing the probability (due to the +2.0) that low income travelers will choose walk to transit and decreasing the probability (due to the -2.0) that high income travelers will choose walk to transit.

6.3.7 Nesting coefficients and nesting constants

Each nest in a nested-logit mode choice model has at least two alternatives. For example, in the TPB NL MC model, the transit nest has three alternatives: PNR, KNR, and walk access. Each alternative has one nesting coefficient (a.k.a. logsum parameters, or Φ) and one nesting constant (NC), with the constraint that the number of nesting constants (NCs) in a nest is N - 1, where N is the number of alternatives in the nest. So, for example, in the example nest shown in Figure 6-12, the transit nest has three alternatives, and each alternative has one Φ and one NC (though the first NC is equal to zero, since there can be only N-1 NCs per nest).

Figure 6-12 Example of a nest in a nested logit mode choice model (with hypothetical values for Φ and NC)



Ref: M:\model_dev\nest_log\NestedChoice_Struct3.vsd

In the TPB NL MC model, nesting coefficients (Φ) have been set using professional judgment and nesting constants (NC) are estimated in the calibration process. This follows the lead set by AECOM in their calibration of the AECOM/WMATA NL MC model.

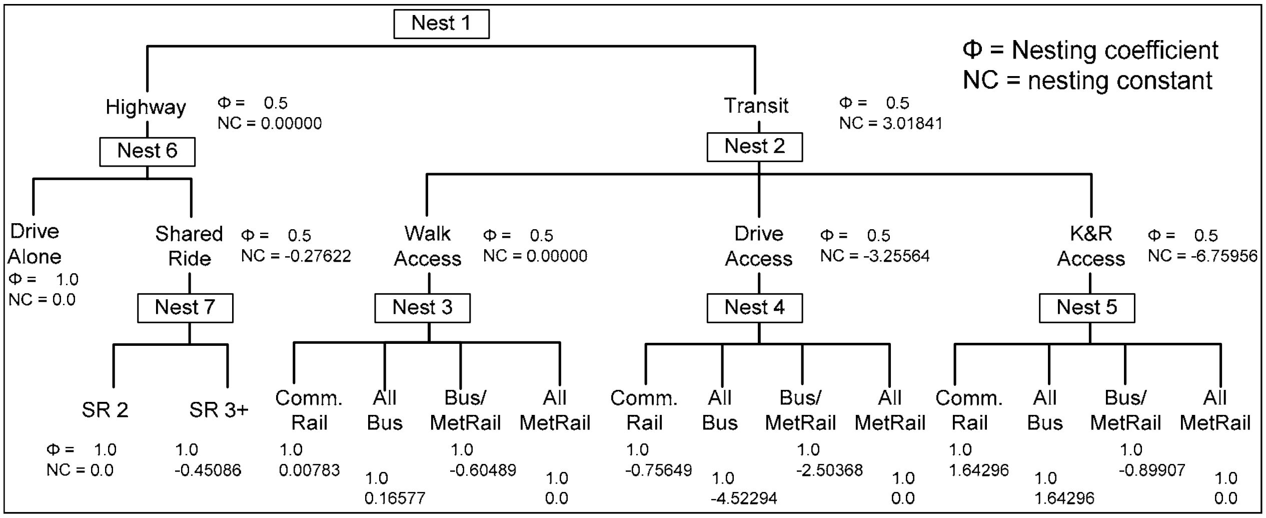
Nesting coefficients

The nesting coefficients (Φ) in a nested-logit mode choice model are a function of the underlying correlation between the unobserved components for pairs of alternatives in a nest, and they characterize the degree of substitutability between those alternatives. The values of the nesting constants should lie between 0 and 1, as indicated in Table 6-15. All the nesting coefficients in the TPB NL MC model have been set, by fiat, to 0.5. The TPB NL MC model has three layers of nests, but the bottom layer does not have nesting coefficients, so it has two layers of nests with nesting coefficients. The top-level equivalent of the nesting coefficients can be calculated by multiplying the nesting coefficient values of the two layers, i.e., 0.5 * 0.5 = 0.25, which is in the range of what would be considered reasonable (See Figure 6-13).

Table 6-15 Interpretation of nesting coefficient values in nested-logit mode choice models

Nesting coefficient value	Implication
$0 < \Phi < 1$	The range of acceptable values for Φ. Decreasing values of Φ indicate increased substitution among alternatives in a nest.
$\Phi = 0$	Implies perfect correlation between pairs of alternatives in the nest
$\Phi = 1$	Zero correlation among mode pairs in the nest. This means the nested-logit (NL) model becomes a multinomial logit (MNL) model.
$\Phi > 1$	Reject the nested-logit model

Figure 6-13 Examples of possible values for nesting coefficients and nesting constants



Ref: M:\model_dev\nest_log\NestedChoice_Struct3.vsd

Nesting constants

As stated earlier, AECOM developed 20 production/attraction market segments, based on seven superdistricts. We have chosen to retain this same geographic market segmentation in our model. There is one nesting constant for each market segment (20), each travel mode (15), and each trip purpose (4). Calibrating the nested-logit mode choice model essentially consists of estimating these nesting constants.

6.4 *Calibration*

6.4.1 Observed data and calibration targets

As was the case with the AECOM/WMATA NL MC model, the TPB NL MC model was calibrated using the following data:

- 2002 land use and networks
- Control data
  - 2002 published transit boarding counts by operator
  - 2002 WMATA Metrorail survey
- Other data
  - 2000 Regional Bus Survey
  - 2000 Census journey-to-work data
  - 2003 surveys of selected DC bus routes

Using these data sets, AECOM had developed a year-2002 calibration data set, whose control totals can be seen in Table 6-16. This table includes three trip purposes and two time-of-day periods, for a total of six stratifications. A "calibration target" is a control total value that is used in calibration. Usually, a "target" value is from observed data. In the case of auto trips (e.g., drive alone, shared ride 2, and shared ride 3+), however, the calibration "targets" come from a recent, similar travel model run for the year 2002, since we do not have observed auto trips by occupancy and purpose, segmented by the 20 geographic segments.

Table 6-16 Control totals for 2002 transit targets used by AECOM for the calibration of the AECOM/WMATA NL MC model

		HBW			HBO+HBS			NHB			ALL PURPOSE		
	Path #	PEAK	OFF-PEAK	DAILY	PEAK	OFF-PEAK	DAILY	PEAK	OFF-PEAK	DAILY	PEAK	OFF-PEAK	DAILY
All 20 Market Segments	*WK-CR*	*1,383*	*302*	*1,685*	*106*	*80*	*186*	*28*	*56*	*84*	*1,517*	*438*	*1,955*
	PNR-CR	*17,141*	*3,760*	*20,901*	*1,050*	*669*	*1,719*	*775*	*950*	*1,725*	*18,966*	*5,379*	*24,345*
	KNR-CR	*1,223*	*269*	*1,492*	*76*	*48*	*124*	*55*	*66*	*121*	*1,354*	*383*	*1,737*
	ALL-CR	19,747	4,331	24,078	1,232	797	2,029	858	1,072	1,930	21,837	6,200	28,037
	WK-BUS	*162,370*	*66,845*	*229,215*	*40,914*	*71,462*	*112,376*	*22,021*	*27,079*	*49,100*	*225,305*	*165,386*	*390,691*
	PNR-BUS	*12,169*	*5,007*	*17,176*	*554*	*966*	*1,520*	*1,671*	*2,056*	*3,727*	*14,394*	*8,029*	*22,423*
	KNR-BUS	*3,822*	*1,571*	*5,393*	*558*	*975*	*1,533*	*1,101*	*1,355*	*2,456*	*5,481*	*3,901*	*9,382*
	ALL-BUS	178,361	73,423	251,784	42,026	73,403	115,429	24,793	30,490	55,283	245,180	177,316	422,496
	WK-BUS/MR	*72,083*	*30,167*	*102,250*	*8,761*	*15,548*	*24,309*	*7,022*	*8,858*	*15,880*	*87,866*	*54,573*	*142,439*
	PNR-BUS/MR	*7,360*	*2,405*	*9,765*	*474*	*693*	*1,167*	*308*	*295*	*603*	*8,142*	*3,393*	*11,535*
	KNR-BUS/MR	*3,458*	*1,554*	*5,012*	*622*	*1,018*	*1,640*	*718*	*747*	*1,465*	*4,798*	*3,319*	*8,117*
	ALL-BUS/MR	82,901	34,126	117,027	9,857	17,259	27,116	8,048	9,900	17,948	100,806	61,285	162,091
	WK-MR	*82,286*	*45,708*	*127,994*	*12,908*	*28,408*	*41,316*	*26,649*	*48,809*	*75,458*	*121,843*	*122,925*	*244,768*
	PNR-MR	*105,453*	*36,048*	*141,501*	*6,770*	*11,612*	*18,382*	*3,915*	*5,219*	*9,134*	*116,138*	*52,879*	*169,017*
	KNR-MR	*28,816*	*10,377*	*39,193*	*2,450*	*3,725*	*6,175*	*1,700*	*3,255*	*4,955*	*32,966*	*17,357*	*50,323*
	ALL-MR	216,555	92,133	308,688	22,128	43,745	65,873	32,264	57,283	89,547	270,947	193,161	464,108
	GRAND TOTAL	***497,564***	***204,013***	***701,577***	***75,243***	***135,204***	***210,447***	***65,963***	***98,745***	***164,708***	***638,770***	***437,962***	***1,076,732***

Source: AECOM Consult, Inc., 11/28/06

Ref: M:\model_dev\nest_log\MWCOG_2002_Transit_Targets_112806.xls

TPB staff started with the above calibration data set, and then made the following changes:

1. Summed the peak and off peak trips, since the TPB model operates on daily trips (using AM peak period skims for HBW and off-peak skims for the three non-work trip purposes);
2. Applied a series of procedures to split the HBO+HBS purpose into two separate purposes: HBS and HBO (Milone, 2007).

Control totals for the TPB calibration file can be seen in Table 6-17.

Table 6-17 Control totals for 2002 transit and auto targets used by TPB staff to calibrate the TPB NL MC model

Market Seg.	Mode	HBW Targets	HBS Targets	HBO Targets	NHB Targets	Total
All 20 Segments	DR ALONE	2,472,132	2,084,762	5,562,444	3,319,069	13,438,407
	SR2	418,866	611,033	2,098,121	1,089,374	4,217,394
	SR3+	145,598	358,317	1,658,327	772,070	2,934,312
	WK-CR	1,685	8	178	84	1,955
	WK-BUS	229,215	23,216	89,160	49,100	390,691
	WK-BU/MR	102,250	3,674	20,635	15,880	142,439
	WK-MR	127,994	5,011	36,305	75,458	244,768
	PNR-CR	20,901	91	1,628	1,725	24,345
	KNR-CR	1,492	7	117	121	1,737
	PNR-BUS	17,176	274	1,246	3,727	22,423
	KNR-BUS	5,393	419	1,114	2,456	9,382
	PNR-BU/MR	9,765	122	1,045	603	11,535
	KNR-BU/MR	5,012	257	1,383	1,465	8,117
	PNR-MR	141,501	1,088	17,294	9,134	169,017
	KNR-MR	39,193	551	5,624	4,955	50,323
	Total	3,738,173	3,088,830	9,494,621	5,345,221	21,666,845
	Total transit	701,577	34,718	175,729	164,708	1,076,732
			HBS+HBO	210,447		

Ref: I:\ateam\docum\FY09\Version2.3_modelDoc_2008-07\calibTargetExample2.xls

To calibrate the NL MC model, you need a series of calibration "targets," which are simply daily person trips stratified by trip purpose (HBW, HBS, HBO, NHB); market segment (1-20); and travel mode (1-15). Targets for the 12 transit modes came from the observed data mentioned above. Targets for auto person trips were simulated, i.e., they came from a recent year-2002 run of the Version 2.2 travel model. As an example of the first part of the calibration file, Table 6-18 shows the targets for geographic market segment 1 (the other 19 are not shown here). The first three auto modes are simulated. The last 12 transit modes are from observed data.

Table 6-18 Example of calibration targets for market segment 1 (DC to DC core)

Market Seg.	Mode	HBW Targets	HBS Targets	HBO Targets	NHB Targets	Total
(1) DC to DC CORE	DR ALONE	23,074	10,639	52,529	45,514	131,756
	SR2	5,498	2,901	29,850	17,028	55,277
	SR3+	2,408	1,861	21,930	12,035	38,234
	WK-CR	0	0	0	0	0
	WK-BUS	57,803	1,121	19,605	12,397	90,926
	WK-BU/MR	13,458	240	4,199	4,326	22,223
	WK-MR	39,020	690	12,071	36,336	88,117
	PNR-CR	0	0	0	0	0
	KNR-CR	0	0	0	0	0
	PNR-BUS	750	5	93	102	950
	KNR-BUS	263	0	0	800	1,063
	PNR-BU/MR	280	1	15	42	338
	KNR-BU/MR	107	3	50	106	266
	PNR-MR	7,476	101	1,766	1,666	11,009
	KNR-MR	2,769	33	580	836	4,218
	Total	152,906	17,595	142,688	131,188	444,377
	Total transit	121,926	2,194	38,379	56,611	219,110

Ref: I:\ateam\docum\FY09\Version2.3_modelDoc_2008-07\calibTargetExample2.xls

One key point to note is that the mode choice models in the Version 2.3 travel model and previous travel models (e.g., Ver. 2.2, 2.1) were calibrated using different data sources and, thus, represent different travel patterns. The MNL mode choice model used in the Version 2.2, 2.1, and earlier travel models was calibrated using the 1994 COG/TPB Household Travel Survey and validated using the 2000 Census Transportation Planning Package (CTPP). By contrast, the Ver. 2.3 mode choice model was calibrated to a year-2002 conditions (with the primary data set being the 2002 WMATA Metrorail survey) and has been validated to 2005, with a focus on the highway assignment, since we had 2005 highway counts (from the Highway Performance Monitoring System, or HPMS), but did not have observed 2005 transit data.

6.4.2 Calibration results

Once again, calibrating the nested-logit mode choice model consists of estimating the nesting constants that are most consistent with the observed data. AECOM developed an automated mode choice calibration process, which is implemented with a Fortran program called CALIBMS (AECOM, 2006-06). TPB staff also made use of this same Fortran program for its NL MC model calibration work. CALIBMS is run iteratively, in conjunction with AEMS, until the model mode choice results match observed or target mode shares. We used 21 iterations for calibration. The output of the calibration process are the nesting constants, which are shown on Table 6-19, Table 6-20, Table 6-21, Table 6-22. The values shown on these four tables are "top-level equivalent" nesting constants. However, what comes out of the CALIBMS procedure are the lower-level equivalent constants, so one has to convert the lower-level values to top-level values. This conversion is currently done in an Excel spreadsheet (such as newSegSumm4purps2002.xls) and will also be explained in the next section of this chapter. A minus sign in Table 6-19, Table 6-20, Table 6-21, Table 6-22 has the effect of suppressing that category.

Table 6-19 Top-level equivalent nesting constants for HBW

HBW - Top level equivalents of nest constants

		1 DC CORE / URBAN-DC CORE	2 DC CORE / URBAN-VA CORE	3 DC CORE / URBAN-URBAN	4 DC CORE / URBAN-OTHER	5 MD URBAN-DC CORE	6 MD URBAN-VA CORE	7 MD URBAN-URBAN	8 MD URBAN-OTHER	9 VA CORE / URBAN-DC CORE	10 VA CORE / URBAN-VA CORE	11 VA CORE / URBAN-URBAN	12 VA CORE / URBAN-OTHER	13 MD OTHER-DC CORE	14 MD OTHER-VA CORE	15 MD OTHER-URBAN	16 MD OTHER-OTHER	17 VA OTHER-DC CORE	18 VA OTHER-VA CORE	19 VA OTHER-URBAN	20 VA OTHER-OTHER
1	LOV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	HOV2	-0.6899	-0.6785	-0.9054	-1.0628	-0.6845	-0.6843	-0.8558	-0.9245	-0.7319	-0.7299	-0.8566	-0.9010	-0.6852	-0.6756	-0.8261	-0.9402	-0.7747	-0.7113	-0.7939	-0.9021
3	HOV3+	-0.9251	-0.9094	-1.0781	-1.1820	-0.9079	-0.8784	-1.1285	-1.1067	-0.8847	-1.0084	-1.0834	-1.1176	-0.9225	-0.9151	-1.0936	-1.4238	-0.9326	-0.9888	-1.0539	-1.3002
4	WLK CR	3.1101	1.2776	3.1487	0.8990	5.9174	1.6689	0.1335	-0.4656	3.6747	0.7442	0.5154	-0.2531	1.4942	0.7116	-1.2180	-1.8422	0.5043	0.7488	-1.5950	-2.6648
5	WLK BUS	3.0859	0.9097	3.3346	1.1475	5.3129	1.3573	0.1233	0.8423	2.8369	0.6522	0.1946	-0.5336	1.2149	1.3359	0.3359	-0.1630	0.9515	1.2333	-0.1802	-1.1855
6	WLK BU/MR	2.9487	1.2158	2.5976	0.3356	4.7331	0.9418	-0.1674	0.1812	3.6170	0.7235	-0.3782	-0.9045	1.0695	0.6590	-0.3390	-0.7848	1.0535	0.9788	-0.5619	-1.5814
7	WLK METRO	3.2068	1.4011	2.9464	2.1109	6.7719	2.2960	0.4457	0.6572	7.7124	0.8103	0.7368	1.5200	2.3034	1.0466	0.4125	-0.2929	3.4269	1.9115	0.7200	0.8894
8	PNR CR	1.1904	-0.5206	-0.1687	-0.2813	3.7691	-1.0919	-1.4329	-0.6254	3.6282	-0.0966	-1.6797	3.9024	0.8692	-0.2186	-1.6771	-3.3243	0.1229	0.0466	-1.8710	-5.0802
9	KNR CR	-0.5152	-1.5460	-0.7185	-1.3771	2.5956	-1.1429	-2.4338	-1.4328	0.1975	-2.2087	-3.0361	-2.5919	-0.5950	-1.1357	-3.0098	-4.8359	-1.3926	-1.4875	-3.2317	-6.4412
10	PNR BUS	0.1290	-0.5206	-0.7537	0.5248	2.6058	-1.0919	-2.1093	-1.5941	1.6643	-0.0966	-1.6797	-1.9682	0.1998	0.0083	-1.5092	-3.0263	-0.2837	-0.4844	-1.0935	-4.6334
11	KNR BUS	-0.3024	-1.5460	0.0401	0.0097	2.5822	-1.1429	-2.5260	0.6256	0.1975	-2.2087	-3.0361	-2.6205	-1.1527	-1.5432	-1.8673	-3.1496	-1.5524	-1.9850	-2.0104	-4.3911
12	PNR BU/MR	0.6301	-0.8858	-0.6916	-0.8140	2.9696	-1.0919	-2.3188	-2.0160	1.2419	-1.6118	-3.1919	-3.1964	0.3288	-0.2990	-2.0138	-3.1693	-0.2160	-0.5063	-2.2171	-5.1978
13	KNR BU/MR	-0.6875	-1.3343	-0.7861	-1.6961	2.1477	-0.6181	-2.3914	-1.5744	0.1975	-2.6926	-3.4996	-3.5434	-0.7075	-1.3736	-2.1369	-3.1645	-1.2515	-1.7994	-2.5995	-5.4041
14	PNR METRO	1.4218	0.0578	0.1352	-0.7044	3.3205	-0.6241	-1.6477	-1.9626	2.0422	-1.1681	-1.6804	-1.8407	0.6449	0.0430	-1.3953	-2.5234	0.2321	-0.1759	-1.6292	-1.8158
15	KNR METRO	-0.5132	-1.5448	-1.1153	-1.4893	2.4005	-1.0708	-2.3423	-1.3926	0.4854	-2.9578	-2.9401	-2.1229	-0.1903	-0.6322	-1.8437	-2.5056	-0.2687	-0.9101	-1.6949	-1.7975

Ref: M:\model_dev\Ver2.3_20080604_pceNo\Summary\newSegSumm4purps2002.xls
and: M:\model_dev\nest_log\calibms-2008-05a

Table 6-20 Top-level equivalent nesting constants for HBS

HBS - Top level equivalents of nest constants

		1 DC CORE / URBAN-DC CORE	2 DC CORE / URBAN-VA CORE	3 DC CORE / URBAN-URBAN	4 DC CORE / URBAN-OTHER	5 MD URBAN-DC CORE	6 MD URBAN-VA CORE	7 MD URBAN-URBAN	8 MD URBAN-OTHER	9 VA CORE / URBAN-DC CORE	10 VA CORE / URBAN-VA CORE	11 VA CORE / URBAN-URBAN	12 VA CORE / URBAN-OTHER	13 MD OTHER-DC CORE	14 MD OTHER-VA CORE	15 MD OTHER-URBAN	16 MD OTHER-OTHER	17 VA OTHER-DC CORE	18 VA OTHER-VA CORE	19 VA OTHER-URBAN	20 VA OTHER-OTHER
1	LOV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	HOV2	-0.5719	-0.4508	-0.5412	-0.4356	-0.8274	-0.7941	-0.7455	-0.3256	-0.9511	-0.8070	-0.6650	-0.4010	-1.0757	-0.6565	-0.4834	-0.5444	-1.2964	-0.4895	-0.3710	-0.4969
3	HOV3+	-0.7020	-0.6236	-0.6863	-0.5493	-0.8975	-0.8387	-0.9133	-0.4718	-1.0570	-1.0242	-0.8497	-0.5520	-1.1823	-0.7873	-0.6397	-0.6892	-1.4333	-0.6514	-0.5230	-0.6419
4	WLK CR	-1.5542	-0.3137	-0.7856	-2.1488	-1.3560	0.9156	-2.0818	-1.6656	-1.5213	-1.4474	-2.4686	-2.6885	-2.7574	-0.2701	-1.5244	-2.7101	-4.3226	0.6156	-1.7139	-19.0447
5	WLK BUS	-1.6580	-0.0362	-0.5450	-2.2236	-3.3694	0.9156	-2.1227	-1.5517	-3.3457	-3.9915	-2.6399	-2.8308	-2.7894	-0.3834	-1.8332	-1.7089	-4.3226	-0.6604	-2.0373	-2.3903
6	WLK BU/MR	-1.2690	-0.3350	-1.2981	-2.2354	-2.0112	0.0450	-2.0212	-2.0259	-1.9472	-1.6394	-2.2241	-2.3606	-2.8529	-0.5907	-1.7298	-1.9940	-2.4028	-0.7605	-1.9401	-4.8823
7	WLK METRO	-1.4532	-0.3592	-1.2284	-1.8249	-0.8050	1.6784	-1.9664	-2.0094	-1.1986	-0.8920	-2.1074	-1.4992	-2.5163	0.3170	-1.7076	-2.5693	-1.6908	0.7335	-1.5185	-0.7203
8	PNR CR	-1.7640	-1.7597	-3.2750	-3.3130	-2.8305	-0.7988	-2.7524	-3.1862	-3.0002	-2.6448	-6.1108	-6.1894	-1.7197	-1.2757	-2.8798	-4.2127	-0.9679	-0.5941	-2.6849	-5.6913
9	KNR CR	-3.7549	-3.9597	-3.9630	-4.0948	-3.9755	-1.1773	-4.8568	-3.4417	-5.0482	-5.4475	-7.1978	-6.6314	-3.4840	-1.6683	-3.8912	-5.3087	-5.5875	-2.0700	-3.9911	-6.8554
10	PNR BUS	-2.9152	-1.7597	-3.2410	-2.5243	-2.8305	-0.7988	-4.5106	-4.7239	-3.0002	-2.5492	-6.1108	-6.1894	-1.3392	-1.2757	-2.3288	-4.7701	-2.9986	-2.4648	-5.5024	-7.6491
11	KNR BUS	-3.7549	-3.9597	-2.8537	-3.4229	-3.9755	-1.1773	-4.3165	-1.8666	-5.0482	-5.4475	-7.1978	-6.6314	-3.4840	-1.6683	-3.2956	-4.6716	-5.5875	-3.2267	-5.2068	-6.7583
12	PNR BU/MR	-2.9879	-1.7597	-3.4863	-4.1475	-2.8305	-0.7988	-4.1882	-4.9533	-3.0002	-2.6448	-5.3045	-6.1894	-3.3260	-1.1456	-3.7515	-5.3876	-4.9997	-2.4790	-4.5935	-8.3011
13	KNR BU/MR	-3.8686	-3.9597	-4.5563	-3.9164	-3.9755	-1.1773	-4.7848	-3.5795	-5.0482	-5.4475	-7.1978	-6.3377	-3.7591	-1.2060	-3.6429	-4.5330	-5.5875	-3.2267	-4.4766	-8.0325
14	PNR METRO	-1.6059	-1.1680	-3.2120	-3.9271	-2.4037	-0.4776	-4.1923	-5.0734	-1.9845	-3.1280	-5.1781	-3.3316	-2.2596	-1.0632	-3.4416	-5.0873	-2.6451	-1.9328	-3.4131	-5.3881
15	KNR METRO	-3.5876	-3.7927	-4.4024	-4.8238	-3.2512	-0.9737	-4.9403	-4.6288	-4.1389	-5.3012	-6.0385	-4.4912	-3.2962	-1.4771	-4.0732	-5.1152	-3.7307	-2.6279	-4.3308	-5.5657

Ref: M:\model_dev\Ver2.3_20080604_pceNo\Summary\newSegSumm4purps2002.xls
and: M:\model_dev\nest_log\calibms-2008-05a

Table 6-21 Top-level equivalent nesting constants for HBO

HBO - Top level equivalents of nest constants

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		DC CORE / URBAN-DC CORE	DC CORE / URBAN-VA CORE	DC CORE / URBAN-URBAN	DC CORE / URBAN-OTHER	MD URBAN-DC CORE	MD URBAN-VA CORE	MD URBAN-URBAN	MD URBAN-OTHER	VA CORE / URBAN-DC CORE	VA CORE / URBAN-VA CORE	VA CORE / URBAN-URBAN	VA CORE / URBAN-OTHER	MD OTHER-DC CORE	MD OTHER-VA CORE	MD OTHER-URBAN	MD OTHER-OTHER	VA OTHER-DC CORE	VA OTHER-VA CORE	VA OTHER-URBAN	VA OTHER-OTHER
1	LOV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	HOV2	-0.1861	-0.1937	-0.2818	-0.2489	-0.1971	-0.3671	-0.3732	-0.1048	-0.1801	-0.4287	-0.4207	-0.1234	-0.2541	-0.3402	-0.1255	-0.4270	-0.3490	-0.1827	-0.1650	-0.3518
3	HOV3+	-0.2808	-0.2793	-0.3522	-0.3135	-0.2728	-0.4139	-0.4470	-0.1773	-0.2731	-0.5379	-0.5030	-0.2019	-0.3334	-0.4229	-0.2004	-0.4942	-0.4277	-0.2836	-0.2448	-0.4189
4	WLK CR	0.2778	0.7622	-0.5472	-1.2765	0.7632	3.9105	-1.7688	-0.8803	0.5211	-0.6943	-1.7731	-1.5671	1.8647	0.5914	-1.7537	-9.6957	1.3458	0.8142	-1.9285	-26.9673
5	WLK BUS	0.2937	0.9604	-0.4479	-1.4403	-0.8856	3.9105	-1.7180	-0.8418	-1.0554	-3.3766	-1.6922	-1.6226	-0.0494	0.6118	-0.8792	-1.2303	-0.7986	-0.7764	-1.5997	-8.5436
6	WLK BU/MR	0.2965	0.6711	-0.8148	-1.5076	-0.3168	2.5204	-2.0235	-1.1788	-0.7746	-0.7610	-2.1544	-1.6648	-0.4780	0.2563	-1.3445	-2.7540	-0.4653	-0.9050	-2.2068	-14.1603
7	WLK METRO	0.2473	0.7724	-0.7729	-0.4988	1.3355	5.4413	-1.7608	-0.7419	0.9594	-0.2322	-1.7685	-0.7981	-0.0099	1.1385	-1.2696	-1.9359	0.6196	0.5182	-1.6170	-2.7547
8	PNR CR	-0.9386	-1.2446	-3.1461	-2.7647	1.4254	1.8016	-2.2310	-2.2482	-0.5813	-1.8935	-5.3482	-5.1803	0.1884	-0.4764	-2.4930	-29.1201	0.8541	0.1284	-2.4706	-49.4692
9	KNR CR	-3.0119	-3.1029	-3.7107	-4.1022	0.2439	1.0377	-4.3202	-2.9812	-2.6902	-4.2781	-6.2972	-5.4955	-1.1863	-0.7078	-3.8374	-29.9786	-0.6217	-1.3283	-3.9111	-50.2395
10	PNR BUS	-2.2783	-1.2446	-3.2422	-2.0667	-1.3779	1.8016	-4.1655	-4.1252	-0.5813	-1.8792	-5.3482	-5.1803	0.4789	-0.4764	-1.8269	-8.2595	-0.1623	-1.7881	-5.2513	-42.6998
11	KNR BUS	-3.0119	-3.1029	-2.8484	-2.9355	-2.2993	1.0377	-4.0191	-1.3538	-2.6902	-4.2781	-6.2972	-5.4955	-0.9766	-0.7078	-2.7803	-7.5790	-1.9301	-2.5883	-6.0565	-33.4658
12	PNR BU/MR	-2.1001	-1.2446	-3.3191	-4.1786	-1.3740	0.7769	-3.8894	-4.7755	-1.6140	-1.8935	-4.8100	-5.1803	-0.8080	-0.4079	-3.3469	-29.9572	-0.5820	-1.6852	-4.9225	-42.4174
13	KNR BU/MR	-2.7865	-3.1029	-4.3647	-4.2344	-2.2993	1.0377	-4.4498	-3.5688	-2.4135	-4.2781	-6.2972	-5.4554	-1.2389	-0.3369	-2.8811	-17.6720	-1.2359	-2.5883	-4.7721	-35.1290
14	PNR METRO	-0.7810	-0.5093	-2.9944	-3.0614	-1.0426	1.9109	-3.7032	-4.2141	-0.9881	-2.4903	-4.5418	-2.5634	-0.6344	-0.4205	-2.8820	-10.8140	-0.4555	-1.4468	-3.3025	-26.7281
15	KNR METRO	-2.9119	-2.9182	-4.0765	-4.1642	-1.9690	1.3739	-4.3192	-3.8560	-2.8355	-4.1909	-5.1632	-3.7422	-1.4196	-0.6190	-3.1748	-6.2896	-1.2209	-2.1163	-4.1600	-23.1630

Ref: M:\model_dev\Ver2.3_20080604_pceNo\Summary\newSegSumm4purps2002.xls
and: M:\model_dev\nest_log\calibms-2008-05a

Table 6-22 Top-level equivalent nesting constants for NHB

NHB - Top level equivalents of nest constants

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		DC CORE / URBAN-DC CORE	DC CORE / URBAN-VA CORE	DC CORE / URBAN-URBAN	DC CORE / URBAN-OTHER	MD URBAN-DC CORE	MD URBAN-VA CORE	MD URBAN-URBAN	MD URBAN-OTHER	VA CORE / URBAN-DC CORE	VA CORE / URBAN-VA CORE	VA CORE / URBAN-URBAN	VA CORE / URBAN-OTHER	MD OTHER-DC CORE	MD OTHER-VA CORE	MD OTHER-URBAN	MD OTHER-OTHER	VA OTHER-DC CORE	VA OTHER-VA CORE	VA OTHER-URBAN	VA OTHER-OTHER
1	LOV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	HOV2	-1.3760	-0.7130	-0.6163	-1.2053	-1.2244	-1.1264	-0.7046	-0.8586	-1.3952	-0.9240	-0.6645	-0.9087	-2.1214	-1.6902	-1.0425	-0.8596	-2.1830	-1.1546	-0.9734	-0.7934
3	HOV3+	-2.0483	-1.0638	-0.8012	-1.5856	-1.8046	-1.5344	-0.9019	-1.2339	-2.1049	-1.3500	-0.9018	-1.2983	-3.0032	-2.3377	-1.4265	-1.2248	-3.0912	-1.7376	-1.3762	-1.1239
4	WLK CR	-1.2475	-0.5241	-1.7805	-2.3760	1.1460	1.2487	-1.9957	-1.6709	-2.3334	-0.7410	-3.2014	-2.9042	-0.8060	0.1672	-1.8938	-6.7969	-1.5401	-0.0364	-1.9722	-16.7091
5	WLK BUS	-1.7312	-0.8122	-1.3787	-1.8974	1.1633	1.2487	-1.8621	-1.3737	-2.6673	-1.9188	-2.8676	-3.0616	-1.6224	-0.2719	-0.8662	-1.0313	-2.5685	-1.7529	-2.0028	-3.9918
6	WLK BU/MR	-0.8812	-0.4364	-2.2340	-2.8109	0.5627	1.4578	-1.8143	-2.0024	-2.3670	-0.4093	-3.1759	-3.7309	-1.7050	-0.4755	-1.5996	-2.6817	-3.0485	-1.3706	-2.3740	-8.7111
7	WLK METRO	-1.0593	-0.5257	-2.8131	-2.7961	1.2982	1.3773	-2.2180	-2.3176	-2.3163	-0.6229	-3.4640	-2.1008	1.4746	0.6839	-2.3276	-2.5391	2.5207	2.4206	-2.6821	-3.1673
8	PNR CR	-2.2478	-1.3474	-4.0588	-2.4327	-0.6537	-1.1306	-1.5250	-2.3608	-2.7519	-1.6615	-4.4514	-4.3133	-1.6074	-2.0902	-2.2347	-10.0801	-1.9321	-0.6415	-2.2763	-21.0245
9	KNR CR	-3.1294	-1.9243	-3.9498	-2.3963	-1.6057	-1.9661	-3.9020	-4.6718	-4.3448	-3.8629	-6.0562	-6.1598	-3.1561	-2.7375	-3.7516	-11.6061	-3.3108	-1.9846	-3.7914	-21.7363
10	PNR BUS	-2.6233	-1.3474	-4.0588	-1.6114	-0.6537	-1.1306	-2.4209	-1.6152	-2.7519	-1.6615	-3.4762	-3.8181	-0.5906	0.6992	-2.3822	-2.6900	-2.7283	-1.7548	-4.6124	-6.5230
11	KNR BUS	-1.9779	-1.9243	-3.0493	-0.9185	-1.1536	-1.9661	-2.4289	-1.6477	-4.3448	-3.8629	-6.0562	-6.1598	-2.8158	-2.7375	-2.6818	-2.8756	-3.7124	-3.5252	-5.3866	-4.9613
12	PNR BU/MR	-2.3819	-1.1589	-3.2833	-3.2683	-1.0932	-0.4741	-4.3584	-4.2633	-2.7519	-1.5748	-4.4514	-4.3133	-2.5712	-2.0902	-3.1996	-14.3200	-3.3365	-2.3789	-4.4474	-18.2711
13	KNR BU/MR	-3.0792	-0.9169	-3.7077	-2.4082	-1.5470	-1.9661	-4.4689	-4.6718	-4.6994	-3.8629	-5.8259	-6.1598	-2.7303	-2.0907	-3.0471	-9.3385	-4.3209	-2.3038	-5.0988	-16.6252
14	PNR METRO	-2.2050	-1.3222	-3.4791	-2.5693	-1.0245	-1.1989	-4.4037	-4.1772	-2.7161	-1.5164	-5.2797	-3.7824	-3.1646	-2.3314	-3.5347	-5.4684	-4.0273	-2.8036	-4.2809	-9.2302
15	KNR METRO	-3.5045	-2.3806	-4.2856	-3.5744	-1.7132	-1.8892	-5.3474	-4.5616	-4.3627	-3.8089	-6.0707	-4.4635	-3.9652	-2.6850	-3.8684	-5.3687	-4.7573	-3.4775	-5.0748	-8.3844

Ref: M:\model_dev\Ver2.3_20080604_pceNo\Summary\newSegSumm4purps2002.xls
and: M:\model_dev\nest_log\calibms-2008-05a

Top-level constants are computed as follows:

Equation 6-2 Equation for calculating the top-level equivalent value of a nesting coefficient

Higher level constant = { (lower level nest constant) * (higher level nest coefficient) + (higher level nest constant) } and so on, up to top nest level

To help illustrate this, we will perform a sample calculation. Figure 6-14 contains a nested-logit mode choice model with the same structure as the TPB NL MC model. Nest 4 is the PNR or drive-access to transit nest. The figure shows hypothetical values for nesting coefficients and nesting constants, with all values being in lower-level equivalents (the same as what might come out of an automated mode choice calibration process such as CALIBMS). According to Figure 6-14, the lower-level nesting constant for the PNR bus/Metrorail choice is -2.50368. To convert this value to its upper-level equivalent, we multiply it by the nesting *coefficient* of the next higher level (the PNR nest, whose nesting coefficient value is 0.5). Then we add the nesting constant value of the PNR nest (-3.25564). Next, we multiply the result by the nesting coefficient of the next level up (the transit nest, whose nesting coefficient value is also 0.5). And finally, we add the nesting coefficient for the transit nest (3.01841), giving a result of 0.7647. This calculation can be seen below and on Figure 6-14.

Sample calculation:

PNR BU/MR (top level) = { (-2.50368)*(0.5) + (-3.25564) } * (0.5) + (3.01841) = 0.7647

In addition, to calculate the implied minutes of impedance, we divide the top-level constant value by the IVT coefficient, as shown in Equation 6-3.

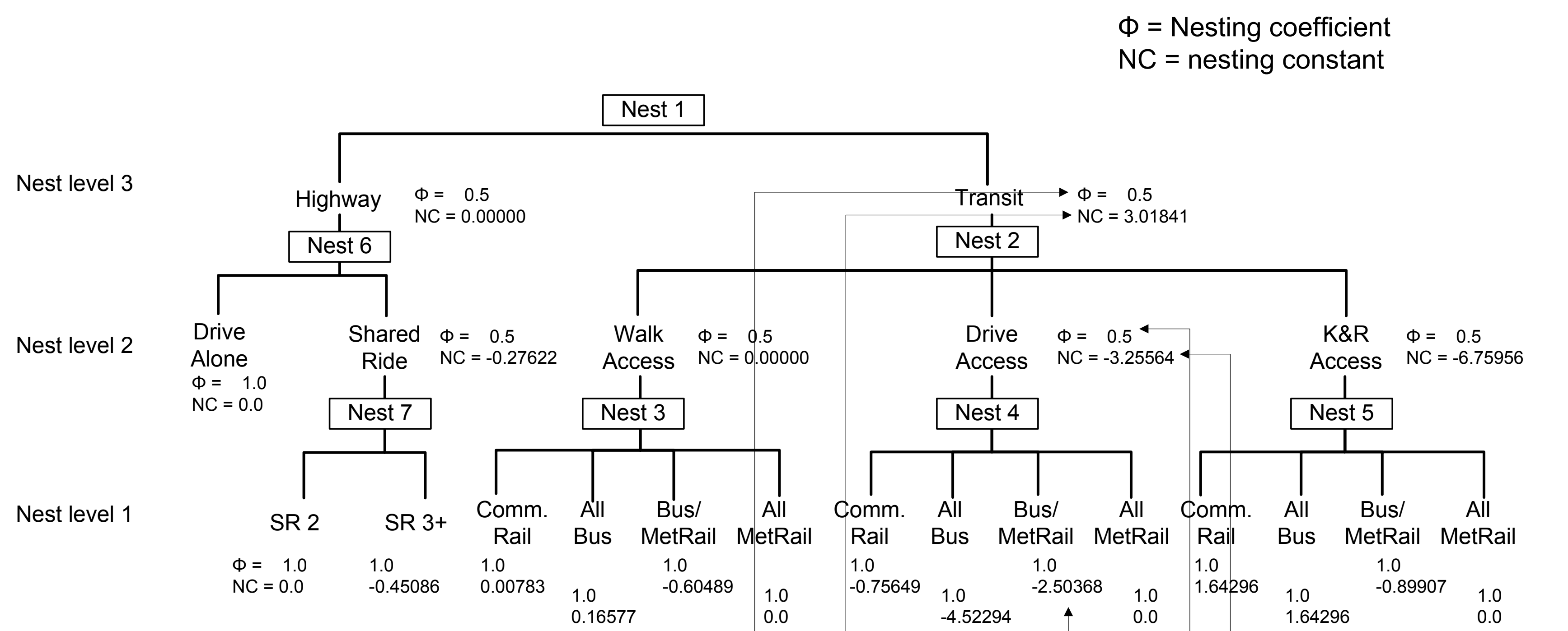
Equation 6-3 Equation for calculating the implied minutes of impedance of a top-level nesting constant

Implied minutes of impedance = (top level const) / IVT coefficient

Thus, continuing with the example,

Implied minutes of impedance = 0.7647/-0.02128 = 35.9 minutes.

Figure 6-14 Example of calculating a top-level nesting constant from the lower-level nesting constants that come out of CALIBMS



Top-level constants are computed as follows:

Higher level constant = { (lower level nest constant) * (higher level nest coefficient) + (higher level nest constant) } and so on, up to top nest level

Sample calculation:

PNR BU/MR (top level) = { (-2.50368)*(0.5) + (-3.25564) } * (0.5) + (3.01841) = 0.7647

Implied minutes of impedance = (top level const) / IVTT coeff = 0.7647/-0.02128 = 35.9 minutes

Ref: M:\model_dev\nest_log\NestedChoice_Struct3.vsd

6.5 *Model application*

6.5.1 Application of the model: 2002

The base year and calibration year of the nested-logit mode choice model is 2002. After calibration of the mode choice model, the full travel model was applied to year-2002 conditions using the calibrated mode choice model. Table 6-23 and Table 6-24 are year-2002 summaries showing the modeled and target daily trips coming out of the mode choice model. Table 6-23 shows trips by purpose and model. Table 6-24 shows trips by purpose and geographic market segment.

Table 6-23 Model application: 2002 modeled and target daily trips by purpose and mode

		HBW		HBS		HBO		NHB		ALL	
Seg	Mode	Target	Model	Target	Model	Target	Model	Target	Model	Target	Model
All 20 Segments	DR ALONE	2,472,132	2,478,597	2,084,762	2,086,029	5,562,444	5,563,029	3,319,069	3,321,546	13,438,407	13,449,200
	SR2	418,866	419,667	611,033	611,236	2,098,121	2,099,227	1,089,374	1,090,753	4,217,394	4,220,883
	SR3+	145,598	145,810	358,317	358,256	1,658,327	1,659,350	772,070	772,765	2,934,312	2,936,181
	WK-CR	1,685	1,779	8	51	178	263	84	198	1,955	2,291
	WK-BUS	229,215	230,690	23,216	23,031	89,160	87,324	49,100	48,322	390,691	389,367
	WK-BU/MR	102,250	106,144	3,674	3,738	20,635	20,913	15,880	16,323	142,439	147,119
	WK-MR	127,994	115,846	5,011	5,003	36,305	36,078	75,458	72,499	244,768	229,426
	PNR-CR	20,901	19,569	91	83	1,628	2,473	1,725	1,824	24,345	23,949
	KNR-CR	1,492	1,459	7	9	117	378	121	175	1,737	2,021
	PNR-BUS	17,176	18,594	274	288	1,246	1,098	3,727	3,777	22,423	23,757
	KNR-BUS	5,393	5,540	419	430	1,114	1,119	2,456	2,301	9,382	9,390
	PNR-BU/MR	9,765	10,159	122	131	1,045	1,535	603	797	11,535	12,623
	KNR-BU/MR	5,012	5,403	257	260	1,383	1,921	1,465	1,680	8,117	9,265
	PNR-MR	141,501	142,917	1,088	1,069	17,294	17,157	9,134	9,281	169,017	170,424
	KNR-MR	39,193	39,862	551	535	5,624	5,446	4,955	5,036	50,323	50,879
	Total Person	3,738,173	3,742,037	3,088,830	3,090,150	9,494,621	9,497,310	5,345,221	5,347,277	21,666,845	21,676,773
	Total Transit	701,577	697,963	34,718	34,629	175,729	175,704	164,708	162,213	1,076,732	1,070,510
	Transit Pct	18.8%	18.7%	1.1%	1.1%	1.9%	1.9%	3.1%	3.0%	5.0%	4.9%

Ref: M:\model_dev\Ver2.3_20080604_pceNo\Summary\newSegSumm4purps2002.xls
and: M:\model_dev\nest_log\calibms-2008-05a

Table 6-24 Model application: 2002 modeled and target daily trips by purpose and geographic market segment

Market Seg.			HBW		HBS		HBO		NHB		ALL	
			Target	Model	Target	Model	Target	Model	Target	Model	Target	Model
1	DC	DC core	152,906	152,400	17,595	17,491	142,688	141,522	131,188	129,774	444,377	441,186
2	DC	VA core	15,388	15,482	9,311	9,380	9,467	9,752	14,872	15,056	49,038	49,670
3	DC	Urban DC, MD, VA	97,018	97,366	138,146	138,488	478,481	478,053	222,864	222,899	936,509	936,807
4	DC	Suburban MD, VA	50,233	51,125	48,062	48,208	130,083	132,261	174,713	176,420	403,091	408,015
5	MD urban	DC core	29,660	29,534	773	803	12,682	12,669	11,152	11,176	54,267	54,183
6	MD urban	VA core	3,008	2,996	276	281	868	885	1,185	1,200	5,337	5,362
7	MD urban	Urban DC, MD, VA	37,279	37,294	57,639	57,437	158,350	157,473	77,048	76,639	330,316	328,843
8	MD urban	Suburban MD, VA	25,557	25,813	41,525	41,636	68,537	69,268	80,102	80,571	215,721	217,288
9	VA core/urban	DC core	49,745	49,791	404	458	28,724	29,256	33,410	34,020	112,283	113,524
10	VA core/urban	VA core	21,292	21,317	13,159	13,170	27,706	27,514	23,103	22,937	85,260	84,938
11	VA core/urban	Urban DC, MD, VA	45,858	46,067	93,067	92,868	226,591	226,081	129,300	128,890	494,816	493,906
12	VA core/urban	Suburban MD, VA	45,365	45,330	22,447	22,702	117,508	118,086	128,731	128,826	314,051	314,943
13	MD suburban	DC core	228,606	227,038	1,553	1,638	61,784	62,288	41,113	41,628	333,056	332,592
14	MD suburban	VA core	29,463	29,190	1,700	1,747	6,266	6,449	5,417	5,544	42,846	42,930
15	MD suburban	Urban DC, MD, VA	253,342	253,533	43,932	44,784	309,346	312,125	176,889	178,200	783,509	788,642
16	MD suburban	Suburban MD, VA	1,308,097	1,311,354	1,430,028	1,429,603	4,381,986	4,379,528	2,300,855	2,299,739	9,420,966	9,420,225
17	VA suburban	DC core	135,621	137,795	375	415	32,558	32,983	28,303	28,848	196,857	200,041
18	VA suburban	VA core	48,922	49,072	6,715	6,658	18,224	18,012	15,776	15,665	89,637	89,406
19	VA suburban	Urban DC, MD, VA	122,864	123,301	66,354	66,095	160,591	161,394	120,736	120,914	470,545	471,705
20	VA suburban	Suburban MD, VA	1,037,949	1,036,238	1,095,769	1,096,287	3,122,181	3,121,711	1,628,464	1,628,331	6,884,363	6,882,568
			3,738,173	3,742,037	3,088,830	3,090,150	9,494,621	9,497,310	5,345,221	5,347,277	21,666,845	21,676,773
			701,577	697,963	34,718	34,629	175,729	175,704	164,708	162,213	1,076,732	1,070,510
			18.8%	18.7%	1.1%	1.1%	1.9%	1.9%	3.1%	3.0%	5.0%	4.9%

Ref: M:\model_dev\Ver2.3_20080604_pceNo\Summary\newSegSumm4purps2002.xls

and: M:\model_dev\nest_log\calibms-2008-05a

The model matches the calibration targets well, but this is not surprising since the model was calibrated to these targets. A more detailed listing, showing each of the 20 market segments, can be found in Appendix C (Appendix C. Year 2002 mode choice output vs. targets). Appendix B contains year-2002 summaries of mode choice output at the jurisdiction-to-jurisdiction level (known as 23-by-23's, due to the number of jurisdictions, including splits for core and non-core).

With the new nested-logit mode choice model, one can now perform a transit assignment. Table 6-25 shows 2002 transit assignment results for HBW Metrorail trips. Note that this table contains results from a slightly earlier version of the travel model, though the modeled results of the two models should be very close. It is planned that these tables will be updated to reflect the latest model version in the next version of this report.

Table 6-25 Transit assignment: 2002 HBW Metrorail

		Observed 2002		Estimated 2002	
	Metrorail Segment	Prods	Attrs	Prods	Attrs
1	Red Line - "A" route MD outside Beltway	37,926	7,377	26,914	7,272
2	Red Line - "A" route MD inside Beltway	14,627	13,768	17,578	14,111
3	Red Line - "A" route DC non-core	18,047	7,429	23,610	5,058
4	Red Line - DC core	31,486	142,468	18,080	115,879
5	Red Line - "B" route DC non-core	22,810	6,003	26,360	3,776
6	Red Line - "B" route MD	30,632	6,134	41,550	6,055
7	Green Line - "E" route MD	21,582	3,646	13,902	2,725
8	Green Line - "E" route DC non-core	9,084	3,797	10,542	4,293
9	Green Line - DC core	7,632	41,771	8,042	43,313
10	Green Line - "F" route DC non-core	11,496	7,101	9,649	6,621
11	Green Line - "F" route MD	29,659	2,084	30,139	755
12	Blue/Yellow Line - VA Fairfax	28,329	1,826	35,938	1,507
13	Blue/Yellow Line - VA Alexandria	9,705	4,671	9,615	6,177
14	Blue/Yellow Line - VA Core	27,384	26,950	27,477	27,633
15	Orange Line - VA Fairfax	35,669	4,339	29,100	5,364
16	Orange Line - VA Arlington non-core	31,004	12,062	35,725	15,334
17	Orange/Blue Line - VA/DC core	15,018	133,239	13,352	165,238
18	Orange/Blue Line - DC non-core	10,381	2,747	10,081	2,570
19	Orange Line - DC/MD	24,183	2,410	26,763	1,883
20	Blue Line - DC/MD	14,164	993	21,382	334
	Total	430,817	430,817	435,799	435,898
	DC/VA Core Total	81,520	344,428	66,951	352,063
	Percent RMSE			64.7%	274.6%

Ref: M:\model_dev\Ver2.3_20080515_pceNo\2002\transum\mrBoardingSum2002.xls

Table 6-26 and Table 6-27 show the equivalency used for grouping stations in the transit assignment summary tables.

Table 6-26 Equivalency table for Metrorail segments (i.e., station groups), Part 1 of 2

Sta. No.	Station Name	Seg. No.	Segment Name
7301	Shady Grove	1	Red Line - "A" route MD outside Beltway
7302	Rockville	1	Red Line - "A" route MD outside Beltway
7303	Twinbrook	1	Red Line - "A" route MD outside Beltway
7304	White Flint	1	Red Line - "A" route MD outside Beltway
7305	Grosvenor	1	Red Line - "A" route MD outside Beltway
7306	Medical Center	2	Red Line - "A" route MD inside Beltway
7307	Bethesda	2	Red Line - "A" route MD inside Beltway
7308	Friendship Heights	2	Red Line - "A" route MD inside Beltway
7309	Tenleytown	3	Red Line - "A" route DC non-core
7310	Van Ness-UDC	3	Red Line - "A" route DC non-core
7311	Cleveland Park	3	Red Line - "A" route DC non-core
7312	Woodley Park-Zoo	3	Red Line - "A" route DC non-core
7313	Dupont Circle	4	Red Line - DC core
7314	Farragut North	4	Red Line - DC core
7315	Metro Center	4	Red Line - DC core
7316	Gallery Place	4	Red Line - DC core
7317	Judiciary Square	4	Red Line - DC core
7318	Union Station	4	Red Line - DC core
7319	Rhode Island Ave	5	Red Line - "B" route DC non-core
7320	Brookland-CUA	5	Red Line - "B" route DC non-core
7321	Fort Totten	5	Red Line - "B" route DC non-core
7322	Takoma	5	Red Line - "B" route DC non-core
7323	Silver Spring	6	Red Line - "B" route MD
7324	Forest Glen	6	Red Line - "B" route MD
7325	Wheaton	6	Red Line - "B" route MD
7326	Glenmont	6	Red Line - "B" route MD
7327	Greenbelt	7	Green Line - "E" route MD
7328	College Park	7	Green Line - "E" route MD
7329	PG Plaza	7	Green Line - "E" route MD
7330	West Hyattsville	7	Green Line - "E" route MD
7331	Georgia Ave	8	Green Line - "E" route DC non-core
7332	Columbia Heights	8	Green Line - "E" route DC non-core
7333	U-Street-Cardozo	8	Green Line - "E" route DC non-core
7334	Shaw-Howard Univ	9	Green Line - DC core
7335	Mt Vernon Square	9	Green Line - DC core
7336	Archives	9	Green Line - DC core
7337	L'Enfant Plaza	9	Green Line - DC core
7338	Waterfront	10	Green Line - "F" route DC non-core
7339	Navy Yard	10	Green Line - "F" route DC non-core
7340	Anacostia	10	Green Line - "F" route DC non-core
7341	Congress Heights	10	Green Line - "F" route DC non-core

Ref: M:\model_dev\Ver2.3_20080515_pceNo\2002\transum\mrBoardingSum2002.xls

Table 6-27 Equivalency table for Metrorail segments (i.e., station groups), Part 1 of 2

Sta. No.	Station Name	Seg. No.	Segment Name
7342	Southern Avenue	11	Green Line - "F" route MD
7343	Naylor Road	11	Green Line - "F" route MD
7344	Suitland	11	Green Line - "F" route MD
7345	Branch Avenue	11	Green Line - "F" route MD
7346	Van Dorn Street	12	Blue/Yellow Line - VA Fairfax
7347	Franconia-Springfield	12	Blue/Yellow Line - VA Fairfax
7348	Huntington	12	Blue/Yellow Line - VA Fairfax
7349	Eisenhower Avenue	13	Blue/Yellow Line - VA Alexandria
7350	King Street	13	Blue/Yellow Line - VA Alexandria
7351	Braddock Road	13	Blue/Yellow Line - VA Alexandria
7352	National Airport	14	Blue/Yellow Line - VA Core
7353	Crystal City	14	Blue/Yellow Line - VA Core
7354	Pentagon City	14	Blue/Yellow Line - VA Core
7355	Pentagon	14	Blue/Yellow Line - VA Core
7356	Arlington Cemetery	14	Blue/Yellow Line - VA Core
7357	Vienna	15	Orange Line - VA Fairfax
7358	Dunn Loring	15	Orange Line - VA Fairfax
7359	West Falls Church	15	Orange Line - VA Fairfax
7360	East Falls Church	16	Orange Line - VA Arlington non-core
7361	Ballston	16	Orange Line - VA Arlington non-core
7362	Virginia Square	16	Orange Line - VA Arlington non-core
7363	Clarendon	16	Orange Line - VA Arlington non-core
7364	Court House	16	Orange Line - VA Arlington non-core
7365	Rosslyn	17	Orange/Blue Line - VA/DC core
7366	Foggy Bottom-GWU	17	Orange/Blue Line - VA/DC core
7367	Farragut West	17	Orange/Blue Line - VA/DC core
7368	McPherson Square	17	Orange/Blue Line - VA/DC core
7369	Federal Triangle	17	Orange/Blue Line - VA/DC core
7370	Smithsonian	17	Orange/Blue Line - VA/DC core
7371	Federal Center SW	17	Orange/Blue Line - VA/DC core
7372	Capitol South	17	Orange/Blue Line - VA/DC core
7373	Eastern Market	18	Orange/Blue Line - DC non-core
7374	Potomac Avenue	18	Orange/Blue Line - DC non-core
7375	Stadium Armory	18	Orange/Blue Line - DC non-core
7376	Minnesota Avenue	19	Orange Line - DC/MD
7377	Deanwood	19	Orange Line - DC/MD
7378	Cheverly	19	Orange Line - DC/MD
7379	Landover	19	Orange Line - DC/MD
7380	New Carrollton	19	Orange Line - DC/MD
7381	Benning Road	20	Blue Line - DC/MD
7382	Capitol Heights	20	Blue Line - DC/MD
7383	Addison Road	20	Blue Line - DC/MD

Ref: M:\model_dev\Ver2.3_20080515_pceNo\2002\transum\mrBoardingSum2002.xls

Table 6-28 is also a transit assignment summary table, but this time it is for 2002 *total* (i.e., all four trip purposes) Metrorail. Just as was the case for Table 6-25, Table 6-28 reflects 2002 transit assignment results from a slightly earlier version of the travel model, though the modeled results of the two models should be very close. It is planned that these tables will be updated to reflect the latest model version in the next version of this report.

Table 6-28 Transit assignment: 2002 Total Metrorail

	Metrorail Segment	Observed 2002 Prods	Observed 2002 Attrs	Estimated 2002 Prods	Estimated 2002 Attrs
1	Red Line - "A" route MD outside Beltway	47,317	13,546	34,184	9,979
2	Red Line - "A" route MD inside Beltway	24,066	22,227	28,647	20,818
3	Red Line - "A" route DC non-core	28,912	18,748	34,964	8,990
4	Red Line - DC core	69,137	200,671	35,751	165,373
5	Red Line - "B" route DC non-core	32,637	12,768	39,254	6,239
6	Red Line - "B" route MD	39,335	11,116	49,594	8,605
7	Green Line - "E" route MD	27,853	8,419	19,118	4,273
8	Green Line - "E" route DC non-core	15,124	7,588	16,197	7,358
9	Green Line - DC core	17,580	53,480	17,374	64,008
10	Green Line - "F" route DC non-core	18,895	10,702	20,160	8,444
11	Green Line - "F" route MD	34,470	5,682	36,723	1,395
12	Blue/Yellow Line - VA Fairfax	34,832	4,944	42,807	1,901
13	Blue/Yellow Line - VA Alexandria	13,984	8,024	15,782	7,856
14	Blue/Yellow Line - VA Core	45,940	44,890	37,503	46,251
15	Orange Line - VA Fairfax	42,405	8,622	34,935	11,050
16	Orange Line - VA Arlington non-core	41,379	19,686	54,773	24,105
17	Orange/Blue Line - VA/DC core	49,483	181,024	40,071	232,500
18	Orange/Blue Line - DC non-core	16,142	5,927	18,522	3,746
19	Orange Line - DC/MD	29,547	6,059	33,107	3,293
20	Blue Line - DC/MD	18,395	3,308	27,427	959
	Total	647,431	647,431	636,893	637,143
	DC/VA Core Total	182,139	480,065	130,699	508,132
	Percent RMSE			56.2%	253.7%

Ref: M:\model_dev\Ver2.3_20080515_pceNo\2002\transum\mrBoardingSum2002.xls

6.5.2 Application of the model: 2005

2005 was considered a validation year for the nested-logit mode choice model, though the validation focused on the highway side, since there was observed 2005 highway data in the form of Highway Performance Monitoring System (HPMS) counts. Once again, model performance summaries for the year 2005 reflect a slightly earlier version of the travel model, though the two travel models should produce very similar results. Table 6-29 shows the estimated and observed VMT by state for the year 2005 for the Version 2.3 travel model. As a comparison, Table 6-30 shows the same information, but for the Version 2.2 travel model. Note that the Version 2.3 travel model generally has higher estimated-to-observed ratios, although still within a reasonable range.

Table 6-29 Estimated and observed VMT by state, 2005, Version 2.3 travel model

MSA	Est(000s)	Obs(000s)	E-O Ratio
DC	8,875	8,619	1.03
MD	57,814	56,806	1.02
VA	53,064	50,733	1.05
MSA Total	119,753	116,158	1.03
Modeled area Tot	159,124	N/A	N/A

Source: Observed data from HPMS
M:\model_dev\Ver2.3_20080515_pceNo\2005
Ref: I:\ateam\meetings_conf\tfs\2008\2008-05-23\HPMS_VMTpres3.xls

Table 6-30 Estimated and observed VMT by state, 2005, Version 2.2 travel model

MSA	Est(000s)	Obs(000s)	E-O Ratio
DC	8,999	8,619	1.04
MD	56,002	56,806	0.99
VA	51,031	50,733	1.01
MSA Total	116,032	116,158	1.00
Modeled area Tot	153,085	N/A	N/A

Source: Observed data from HPMS
M:\model_dev\Ver2.3_20080515_pceNo\2005
Ref: I:\ateam\meetings_conf\tfs\2008\2008-05-23\HPMS_VMTpres3.xls

Table 6-31 Regional traffic assignment performance, Version 2.3 vs. 2.2, based on the root mean squared error, grouped by facility type

	Ver. 2.2 MNL MC		**Ver. 2.3 NL MC**	
Facility Type	**Percent RMSE**	**Link Count**	**Percent RMSE**	**Link Count**
Freeway	21.05	539	20.84	539
Major Arterial	42.21	2,376	42.71	2,376
Minor Arterial	60.56	1,338	61.85	1,338
Collector	77.56	973	76.54	971
Expressway	34.48	136	34.20	136
Total	41.12	5,362	41.20	5,360

M:\model_dev\35_Ver2.2jan08_NL07\Summary\Summarize_Links_V2.2jan08_NL07_2005.s
Ref: I:\ateam\meetings_conf\tfs\2008\2008-05-23\trafficAssignRmse.xls
M:\model_dev\Version2.2_Jan08\Summary\Summarize_Links_V22_Jan08_2005.s and mse_vol_05_alt_All_Cnts_REG.txt
M:\model_dev\Ver2.3_20080515_pceNo\Summary\Summarize_Links_Ver2.3_20080515_pceNo_2005.s and rmse_vol_05_alt_All_Cnts_REG.txt

Thus, the estimated 2005 vehicle trips coming out of the Version 2.3 travel model is about 1.5% higher than that coming out of the Version 2.2 travel model (292,000 more trips). Similarly, the 2005 VMT is about 3.9% higher (6 million more) in Version 2.3 than was the case for the Version 2.2 travel model. Further investigation should be conducted to see whether updates to the model are warranted. This investigation is planned for the time period between July 2008 and January 2009, when the model will undergo a number of sensitivity tests and quality control checks.

6.5.3 Application of the model: 2030

Appendix D contains year-2030 summaries of mode choice output at the jurisdiction-to-jurisdiction level (known as 23-by-23's, due to the number of jurisdictions, including splits for core and non-core).

6.6 *References*

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Chapter 7 Time-of-Day Model

The Version 2.3 time-of-day model functions to apportion daily vehicle trips among three time modeled periods, prior to the traffic assignment step. Peak-hour factors corresponding to the three time periods are also required to support the traffic assignment process. This chapter presents the details of the model and the development of the peaking factors.

7.1 Model Structure

The Time-of-Day Model addresses the temporal dimension of travel subsequent to the mode choice step. The time of day model functions to convert daily trips by purpose and mode to specific time periods, in preparation for the traffic assignment step. The modeled time periods are defined as the AM peak period (6-9AM), PM peak period (4-7PM) and the off-peak period (all remaining hours).

The conversion of daily trips for the resident trip purposes (HBW, HBS, HBO, and NHB) are made with the application of temporal factors that have been developed directly from the HTS. The factors, shown as Table 7-2, have been developed from detailed trips-in-motion summaries. The factors are applied on the basis of purpose, mode, and direction of the trip, with respect to the home-end of the trip.

The truck and various non-modeled auto driver travel markets are also converted from daily trip tables to the three time periods using a system of temporal factors. The factors are summarized in Table 7-1.

Table 7-1 Version 2.2 Temporal Factors (Percentages) For Truck and Non-Modeled Travel Markets

Time Period	Travel Market							
	Comm. Vehicle	Medium Truck	Heavy Truck	X-X Auto Dr	Taxi Auto Dr	Tourist Auto Dr	School Auto Dr	Airport Auto Dr
AM	23.00	20.80	18.00	18.00	9.00	33.00	33.00	18.00
PM	27.00	15.80	14.70	22.00	27.00	33.00	33.00	29.00
Off-Peak	50.00	63.40	67.30	60.00	64.00	34.00	34.00	53.00

Note: Medium & Heavy truck factors were updated as part of the truck modeling update

The temporal factors shown for medium and heavy trucks were recently updated as part of the revised truck modeling effort (Allen, 2008). The remaining temporal factors were based on professional judgment. The directional splits for the above auto trips are 50/50 (all time periods). The directional X/I and IX split for external commercial and truck trips 70/30, 30/70, and 50/50, for the AM, PM, and off-peak periods, respectively.

In application these factors are assumed to remain *constant* over time. Although it is reasonable to expect, that congestion will encourage traffic spreading from the AM and PM periods to the off-peak, the peak spreading phenomenon is complex and not well understood in the profession. Instead of addressing this issue in the regional model, TPB accounts for peak spreading issues in its travel model post-processor (a.k.a. the mobile emissions post processor), where hourly volume and speed estimates are formulated.

Another important temporal parameter in the traffic assignment process is the peaking factor, which is the proportion of traffic in a given time period which occurs in the peak hour. Link speeds are a function of the volume-to-capacity (V/C) ratio. The peaking factor is necessary for converting hourly lane capacities into 'period lane capacities', from which V/C ratios are computed. The Version 2.2 model requires peaking factors for the AM, PM, and Off-peak time periods. To arrive at regionally appropriate peaking factors, an analysis of total auto driver trips from the HTS was summarized to the modeled time periods. The maximum hourly volume occurring within each time period was then determined. The resulting peaking factors are shown below.

Peak Hour Factors (Percentages)	
AM Period (6:00-9:00AM):	40%
PM Period (4:00-7:00PM):	37%
Off-Peak (All Other Hours):	12%

Table 7-2 Observed travel distributions during peak and non-peak time periods by purpose, mode, and direction

(Source: 1994 COG/TPB Household Travel Survey)

Purpose	Mode	Home to Non-Home Direction: AM Pk Prd. 6-9AM	PM Pk. Prd. 4-7PM	Non-Pk. Prd.	Total	Non-Home to Home Direction: AM Pk Prd. 6-9AM	PM Pk. Prd. 4-7PM	Non-Pk. Prd.	Total
HBW	Transit	71%	5%	25%	100%	1%	72%	27%	100%
	Auto Driver	68%	3%	30%	100%	1%	63%	35%	100%
	Auto Passenger	74%	4%	23%	100%	1%	69%	30%	100%
	Auto Person	69%	3%	29%	100%	1%	64%	35%	100%
	Drive Alone	66%	3%	31%	100%	2%	61%	37%	100%
	Carpool Person	75%	3%	22%	100%	1%	72%	27%	100%
	Motorized Person	69%	3%	28%	100%	1%	66%	33%	100%
HBS	Transit	24%	15%	62%	100%	2%	35%	64%	100%
	Auto Driver	11%	21%	69%	100%	2%	32%	67%	100%
	Auto Passenger	5%	28%	68%	100%	0%	32%	67%	100%
	Auto Person	9%	22%	69%	100%	2%	32%	67%	100%
	Drive Alone	13%	18%	69%	100%	2%	32%	66%	100%
	Carpool Person	6%	27%	68%	100%	1%	31%	68%	100%
	Motorized Person	10%	22%	69%	100%	2%	31%	67%	100%
HBO	Transit	38%	13%	49%	100%	2%	35%	63%	100%
	Auto Driver	24%	21%	54%	100%	5%	29%	67%	100%
	Auto Passenger	31%	28%	41%	100%	1%	30%	69%	100%
	Auto Person	27%	23%	50%	100%	4%	29%	67%	100%
	Drive Alone	23%	19%	58%	100%	7%	26%	68%	100%
	Carpool Person	29%	27%	45%	100%	2%	32%	67%	100%
	Motorized Person	34%	21%	46%	100%	3%	28%	69%	100%
NHB	Transit	14%	31%	55%	100%	14%	31%	55%	100%
	Auto Driver	9%	27%	65%	100%	9%	27%	65%	100%
	Auto Passenger	8%	27%	65%	100%	8%	27%	65%	100%
	Auto Person	8%	27%	65%	100%	8%	27%	65%	100%
	Drive Alone	9%	26%	65%	100%	9%	26%	65%	100%
	Carpool Person	7%	28%	65%	100%	7%	28%	65%	100%
	Motorized Person	9%	25%	66%	100%	9%	25%	66%	100%

Note: The distributions shown are based on time-in-motion summaries.

Ref: I:\ateam\docum\FY05\Model_Nov04\todpkftr.xls

Chapter 8 Traffic Assignment / Feedback

The traffic assignment step is used to load a trip table onto the highway network in order to producing network link flows and speeds. The process culminates in the estimation of network link volumes, which, in turn, enable the estimation of highway link speeds. The traffic assignment process of the Version 2.3 model is detailed in this chapter. The key refinement of the Version 2.3 assignment process is that it involves six trip table markets loadings, in contrast to five trip tables considered in Version 2.2 process. An added trip table is used because medium and heavy truck trips are assigned as separate markets. Previously, medium and heavy trucks were assigned as a single market.

8.1 *Model Application and Structure*

The traffic assignment step is executed seven times during a given model run. The first assignment is called the "pump prime" traffic assignment. The last six traffic assignments are called iteration 1, 2, 3, 4, 5, and 6. For each of the seven traffic assignments, there are actually three individual assignments, one for each of the three time-of-day periods: AM (6:00 to 9:00), PM (4:00 to 7:00), and off-peak (the remaining 18 hours of the day). The trips loaded in each time period are comprised of *all* purposes, as allocated by the time-of-day model. The loaded trips are segmented by six trip table markets:

1. SOVs and Commercial vehicles
2. 2-occupant HOVs
3. 3+ occupant HOVs
4. Medium Trucks
5. Airport passenger vehicles
6. Heavy Trucks

The primary reason for distinguishing truck markets is to allow for the option of using passenger car equivalents (PCEs) in the traffic assignment process. The use of PCE's has not yet been implemented, but they will be considered in future developmental work.

Each of the three time-of-day assignments utilize a user equilibrium algorithm that is applied using 60 fixed iterations. The algorithm used in the equilibrium approach attempts to increasingly minimize the delay of all trips in the system with each iteration pass. An important component of the equilibrium assignment process is the volume-delay function (VDF). VDFs are used to develop link speeds at the end of each loading pass. It represents the ratio of congested travel time to the free-flow time as a function of the volume-to-capacity (V/C) ratio. The function typically varies by facility type. Another important property of the function is the capacity definition: in this case, volume reaches capacity at a V/C ratio of 1.0, where the capacity is the level-of-service (LOS) 'E' capacity. The restrained speed calculation is also subject to the assumed free flow speeds and capacity assumptions, which vary by facility type and area type. The Version 2.3 capacities and free flow speeds are defined in Table 8-1 and Table 8-2.

Conical volume delay functions are a class of "well behaved" volume delay functions. Spiess (1989) lists a number of characteristics that define a set of "well behaved" functions, including:

1. Function is strictly increasing. This is a necessary condition for the assignment to converge to a unique solution.
2. Capacity is defined as the volume at which the congested speed is half the free-flow speed.
3. The derivative of the function exists and is strictly increasing.
4. The slope of the function at a V/C ratio of 1 is equal to α

In equation form, the conical VDF is:

Equation 8-1 Conical volume delay function (VDF)

$$t/t_0 = f^C(x) = 2 + \sqrt{\alpha^2(1-x)^2 + \beta^2} - \alpha(1-x) - \beta$$

where

$\alpha = \text{Slope of the function at V/C} = 1 \text{ (slope must be} > 1.0)$

$$\beta = \frac{2\alpha - 1}{2\alpha - 2}$$

$t/t_0 = \text{Ratio of congested travel time to free-flow travel time}$

Table 8-3 shows, in tabular form, the conical VDFs used in the Version 2.3 travel model. There is a separate curve for each facility type, although ramps and freeways are assumed to have the same VDF. The conical VDFs are shown in graphical form in Figure 8-1 (for V/C >1) and Figure 8-2 (for V/C ≤ 1). In reality, no link would ever have a V/C ratio above one. However, in a typical regional travel model, V/C ratios above 1 do occur, so the VDF needs to account for this domain. Figure 8-1 shows the behavior of the Version 2.3 conical VDFs for large V/C ratios (V/C >1). The curve for freeways is the steepest, followed by expressways, then major arterials, minor arterials, and collectors. A steeper cure means more sensitivity to high V/C ratios, forcing excess traffic off of these facilities. Figure 8-2 shows the behavior of the Version 2.3 conical VDFs for V/Cs less than or equal to one. In this area of V/C ratio, the freeways show the least sensitivity to V/C ratio, but, as the V/C ratio approaches 1, the freeway VDFs have the steepest slope (a slope of 15).

In Figure 8-3, Figure 8-4, Figure 8-5, Figure 8-6, and Figure 8-7, the vertical axis now shows congested speed (not ratio of congested to free-flow travel time). Table 8-4 show the same information as the aforementioned five figures, but in tabular form. One can see that, for freeways, the congested speed drops to about 2 mph at a V/C ratio of 2.00. For arterials, the congested speeds drops to about 2 or 3 mph at a V/C = 2.0. For collectors, speeds drop to about 2 to 4 mph when the V/C ratio hits 2.0.

The Version 2.3 model includes a queuing function, for ramps and freeways only, which was added to mimic the queuing that occurs in congested networks, but is difficult to represent in traditional, link-based static user equilibrium traffic models. One of the motivations behind including this queuing function was to reduce the number of hyper-congested links that occurred in the modeled network. According to this function, which is based on a sigmoid function, a queuing time is added to excessively congested freeway and ramp links. As shown in Figure 8-8, the queuing time ranges from 0 minutes, at low V/Cs (V/C ≤ 0.80) to a maximum of 14 minutes at high V/Cs (above V/C = 1.5).

Thus, previously, congested time was:

Equation 8-2 Congested time without queuing function

$$T_C = T_0 * \text{VDF } f(V/C)$$

Now, in the Version 2.2 travel model, for ramps and freeway links:

Equation 8-3 Congested time with queuing function (freeways and ramps only)

$$T_C = [\, T_0 * \text{VDF } f(V/C) \,] + \text{Queuing Time } f(V/C)$$

The main benefit of the new queuing function is that is prevents hyper-loading of links (i.e., cases where the estimated daily volume exceeds the daily capacity of the link). However, there are is a caveat to keep in mind: The link time is independent of link distance, which means the link speed can drop to extremely low levels. For example, a 14-minute delay is a much larger delay on a one-tenth-mile link than on a one-mile link. It should be added that the queuing function is applied to only to links that are associated with an interchange or to adjacent links that have capacity differences.

The time on the link with a large queuing time, realistically reflects queuing delay that occurs on 'upstream links'. Static assignments are limited in their ability to represent the operational details of traffic. One typically needs to move to dynamic assignments to accurately simulate freeway operations.

Table 8-1 LOS E Capacities

		Area Type						
Facility Type		**1**	**2**	**3**	**4**	**5**	**6**	**7**
Centroids	FT = 0	3,150	3,150	3,150	3,150	3,150	3,150	3,150
Freeways	FT = 1	1,500	1,600	1,800	1,800	2,000	2,000	2,100
Major Arterials	FT = 2	800	800	960	960	1,260	1,260	1,260
Minor Arterials	FT = 3	500	600	700	840	1,000	1,000	1,000
Collectors	FT = 4	300	400	500	700	700	700	800
Expressways	FT = 5	900	1,000	1,000	1,200	1,500	1,500	1,500
Ramps	FT = 6	1,500	1,600	1,800	1,800	2,000	2,000	2,100

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Table 8-2 Free-Flow Speeds

		Area Type						
Facility Type		**1**	**2**	**3**	**4**	**5**	**6**	**7**
Centroids	FT = 0	15	15	20	25	30	30	35
Freeways	FT = 1	55	55	60	60	67	67	67
Major Arterials	FT = 2	25	25	35	35	40	45	45
Minor Arterials	FT = 3	20	20	30	30	35	40	40
Collectors	FT = 4	15	15	20	20	25	30	30
Expressways	FT = 5	45	45	50	50	50	55	55
Ramps	FT = 6	55	55	60	60	67	67	67

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Table 8-3 Conical volume-delay functions used in the Version 2.2 travel model: Tabular format

	Centroid (FT=0)	Freeway (FT=1)	Maj Art (FT=2)	Min Art (FT=3)	Collector (FT=4)	Exprw (FT=5)	Ramps (FT=6)
a		15	7	5.5	3	8	15
b		1.035714	1.083333	1.111111	1.25	1.071429	1.035714
v/c	**t/t0**	**t/t0**	**t/t0**	**t/t0**	**t/t0**	**t/t0**	**t/t0**
0	1.000	1.000	1.000	1.000	1.000	1.000	1.000
0.1	1.000	1.004	1.009	1.012	1.025	1.008	1.004
0.2	1.000	1.009	1.020	1.027	1.056	1.018	1.009
0.3	1.000	1.015	1.035	1.046	1.094	1.030	1.015
0.4	1.000	1.024	1.054	1.071	1.141	1.047	1.024
0.5	1.000	1.035	1.080	1.105	1.203	1.070	1.035
0.6	1.000	1.053	1.119	1.154	1.283	1.103	1.053
0.7	1.000	1.082	1.180	1.228	1.390	1.157	1.082
0.8	1.000	1.138	1.287	1.352	1.537	1.254	1.138
0.9	1.000	1.287	1.506	1.579	1.735	1.466	1.287
1	1.000	2.000	2.000	2.000	2.000	2.000	2.000
1.1	1.000	4.287	2.906	2.679	2.335	3.066	4.287
1.2	1.000	7.138	4.087	3.552	2.737	4.454	7.138
1.3	1.000	10.082	5.380	4.528	3.190	5.957	10.082
1.4	1.000	13.053	6.719	5.554	3.683	7.503	13.053
1.5	1.000	16.035	8.080	6.605	4.203	9.070	16.035
1.6	1.000	19.024	9.454	7.671	4.741	10.647	19.024
1.7	1.000	22.015	10.835	8.746	5.294	12.230	22.015
1.8	1.000	25.009	12.220	9.827	5.856	13.818	25.009
1.9	1.000	28.004	13.609	10.912	6.425	15.408	28.004
2	1.000	31.000	15.000	12.000	7.000	17.000	31.000
2.1	1.000	33.997	16.393	13.090	7.579	18.594	33.997
2.2	1.000	36.994	17.786	14.182	8.161	20.188	36.994
2.3	1.000	39.992	19.181	15.275	8.745	21.784	39.992
2.4	1.000	42.990	20.576	16.369	9.332	23.380	42.990
2.5	1.000	45.988	21.972	17.463	9.920	24.976	45.988
2.6	1.000	48.987	23.369	18.559	10.510	26.573	48.987
2.7	1.000	51.985	24.766	19.655	11.101	28.171	51.985
2.8	1.000	54.984	26.163	20.751	11.693	29.768	54.984
2.9	1.000	57.983	27.561	21.848	12.285	31.366	57.983
3	1.000	60.982	28.959	22.945	12.879	32.964	60.982
999.9	1.000	60.982	28.959	22.945	12.879	32.964	60.982

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Figure 8-1 Conical volume-delay functions used in the Version 2.2 travel model: V/C > 1

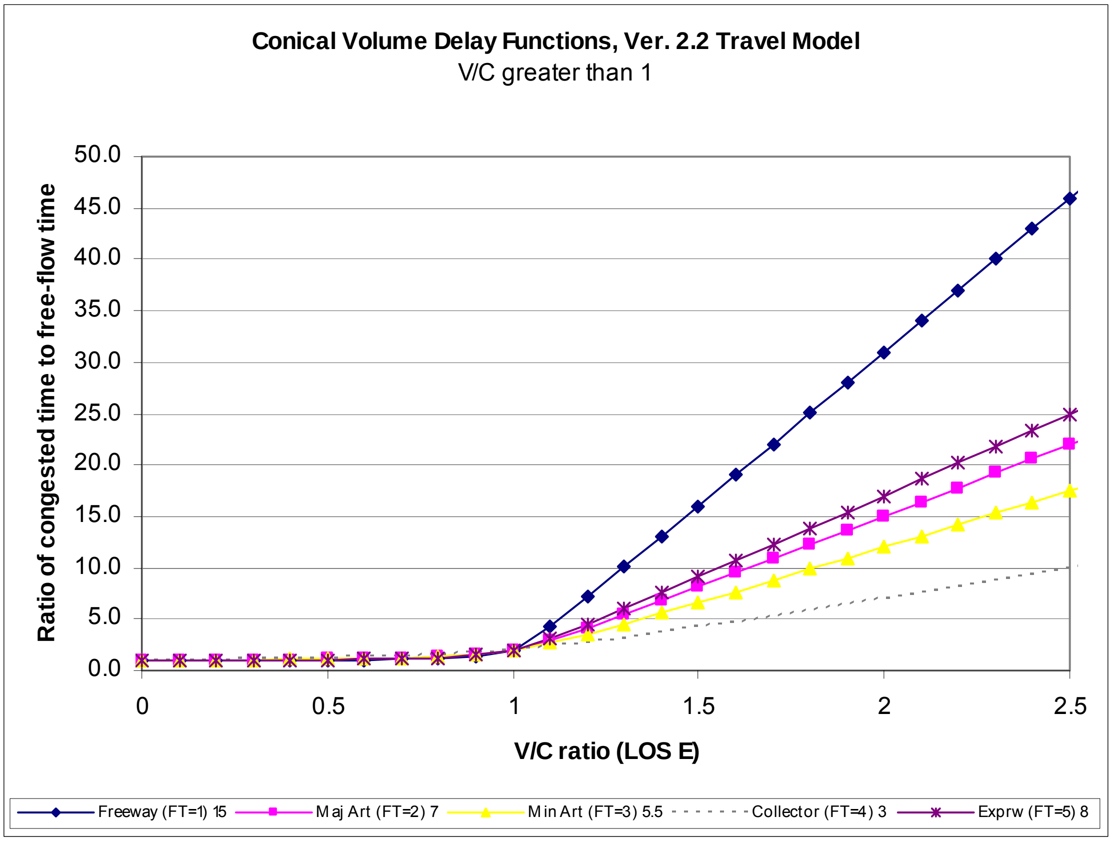

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Figure 8-2 Conical volume-delay functions used in the Version 2.2 travel model: V/C < 1

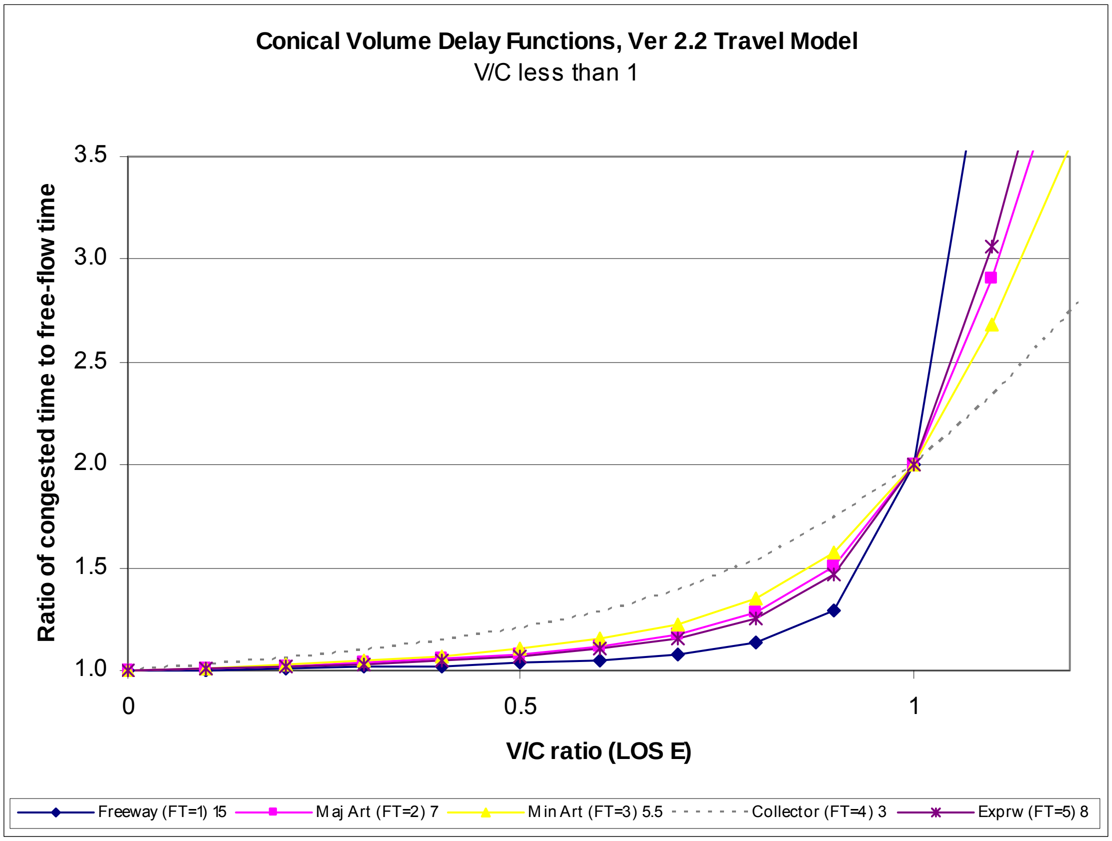

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Figure 8-3 Volume-delay functions used in the Version 2.2 travel model: Freeways

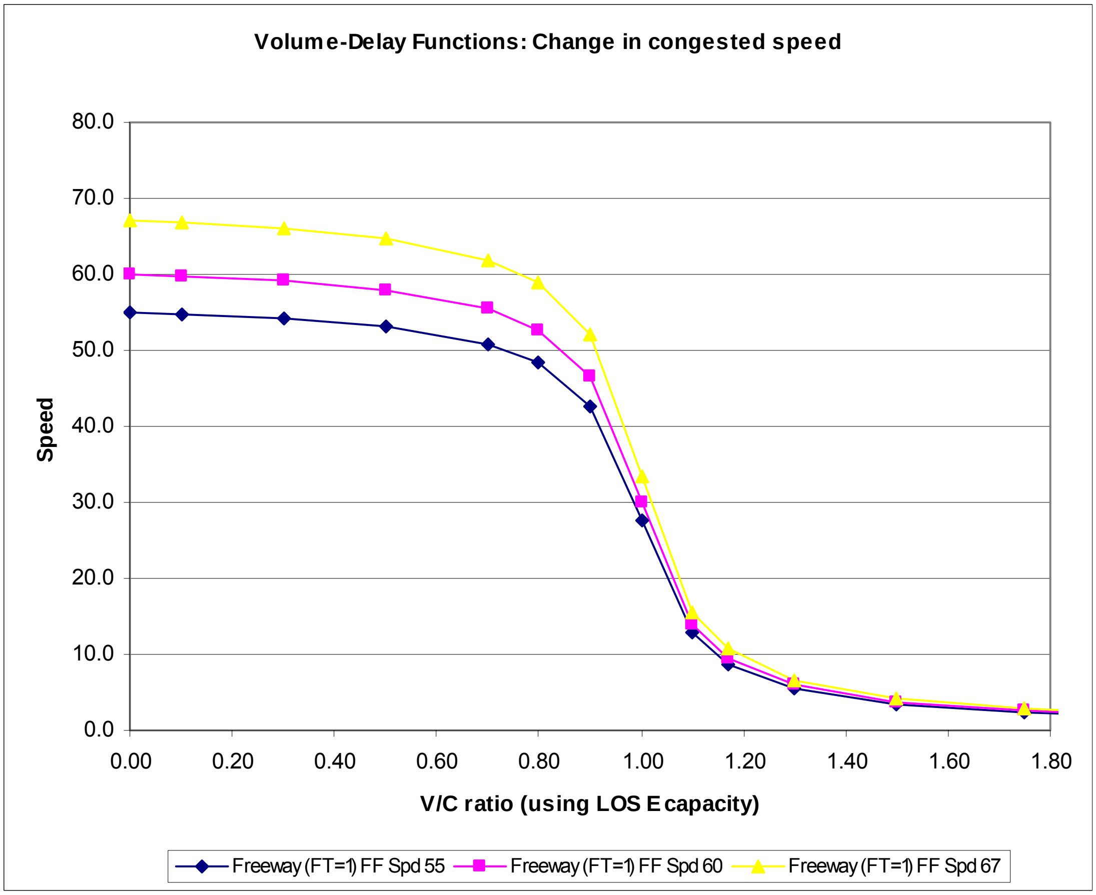

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Figure 8-4 Volume-delay functions used in the Version 2.2 travel model: Major Arterials

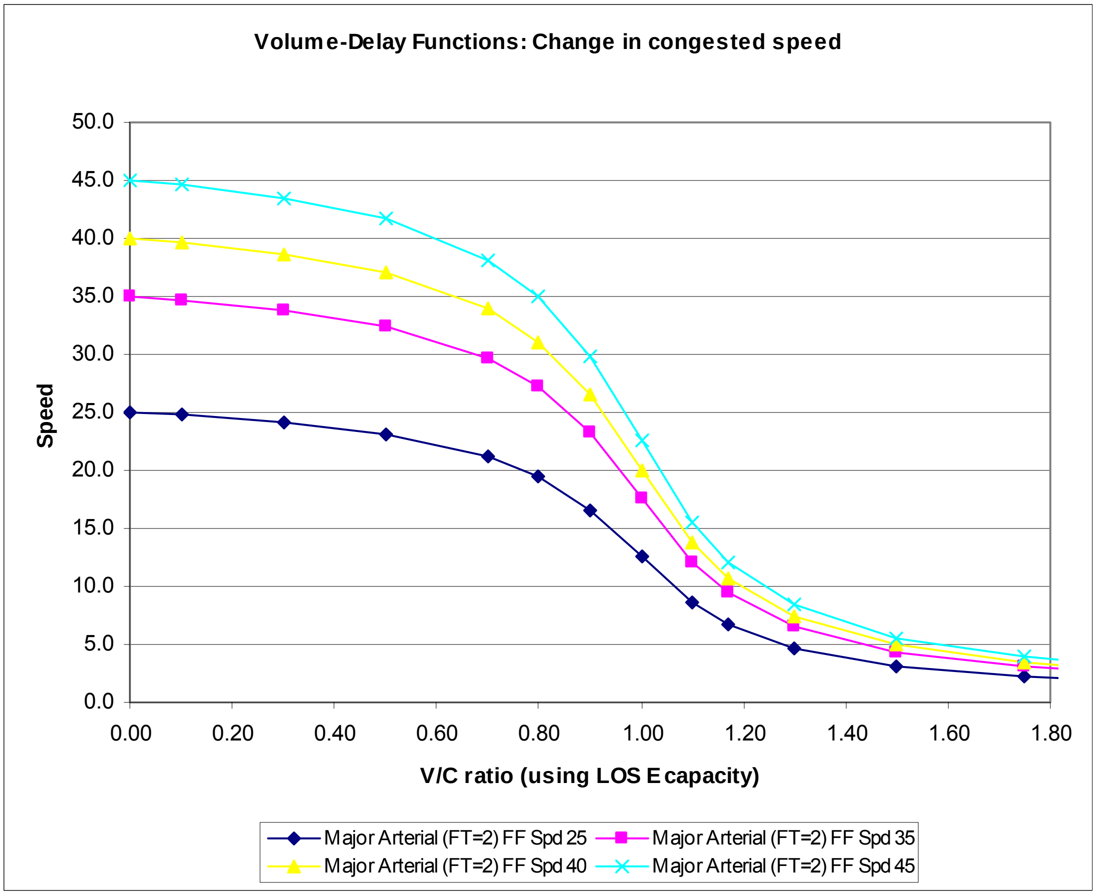

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Figure 8-5 Volume-delay functions used in the Version 2.2 travel model: Minor Arterials

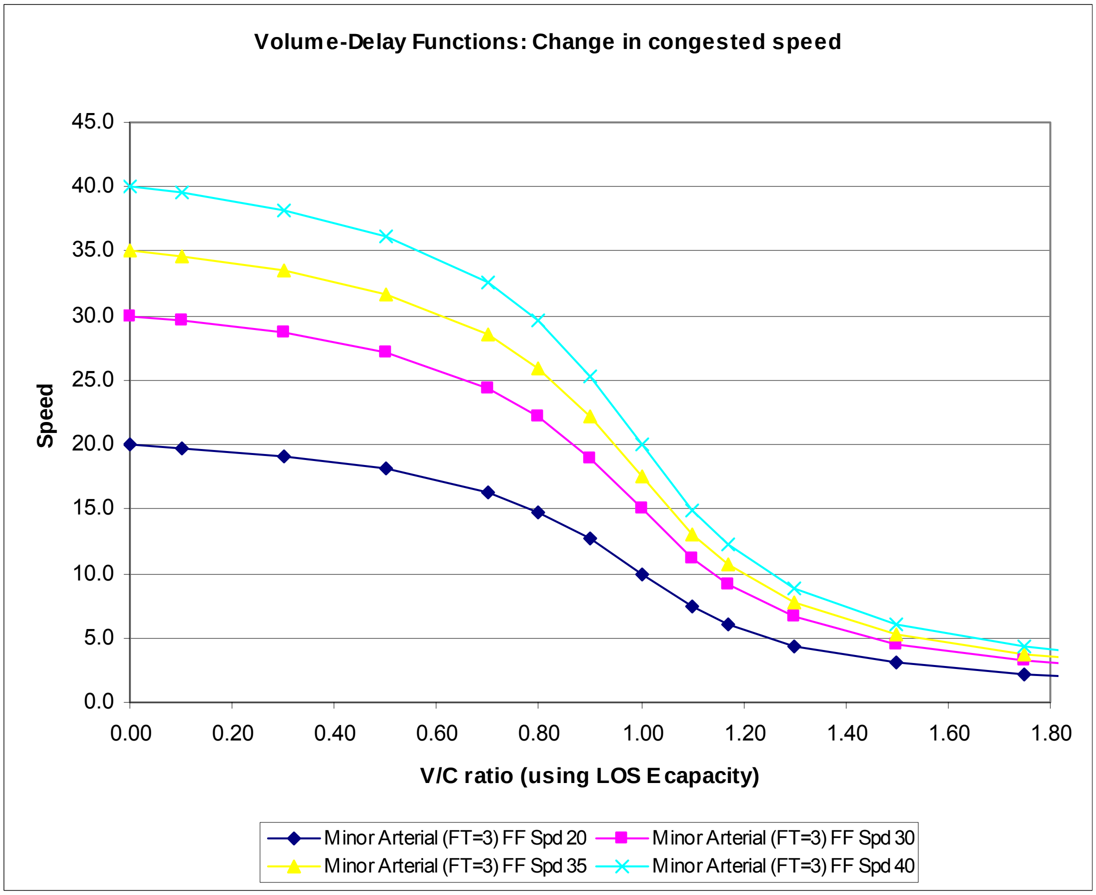

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Figure 8-6 Volume-delay functions used in the Version 2.2 travel model: Collectors

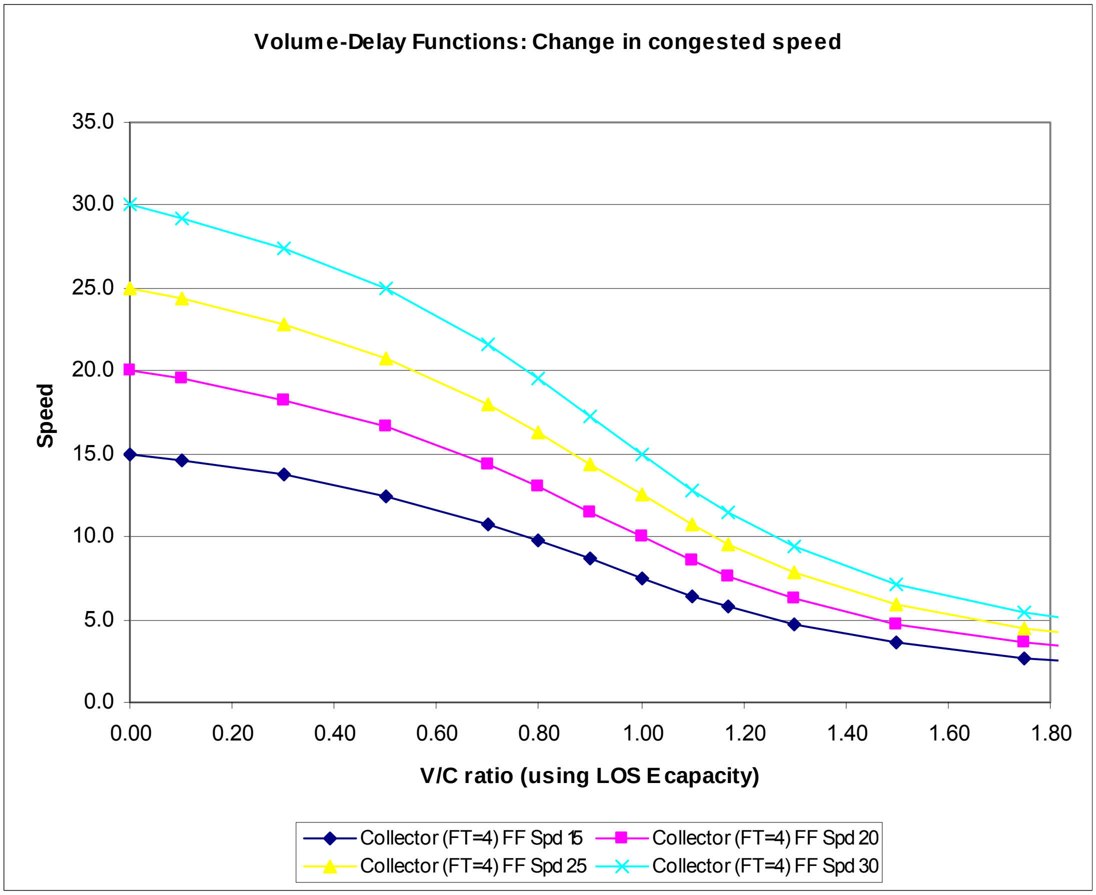

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Figure 8-7 Volume-delay functions used in the Version 2.2 travel model: Expressways

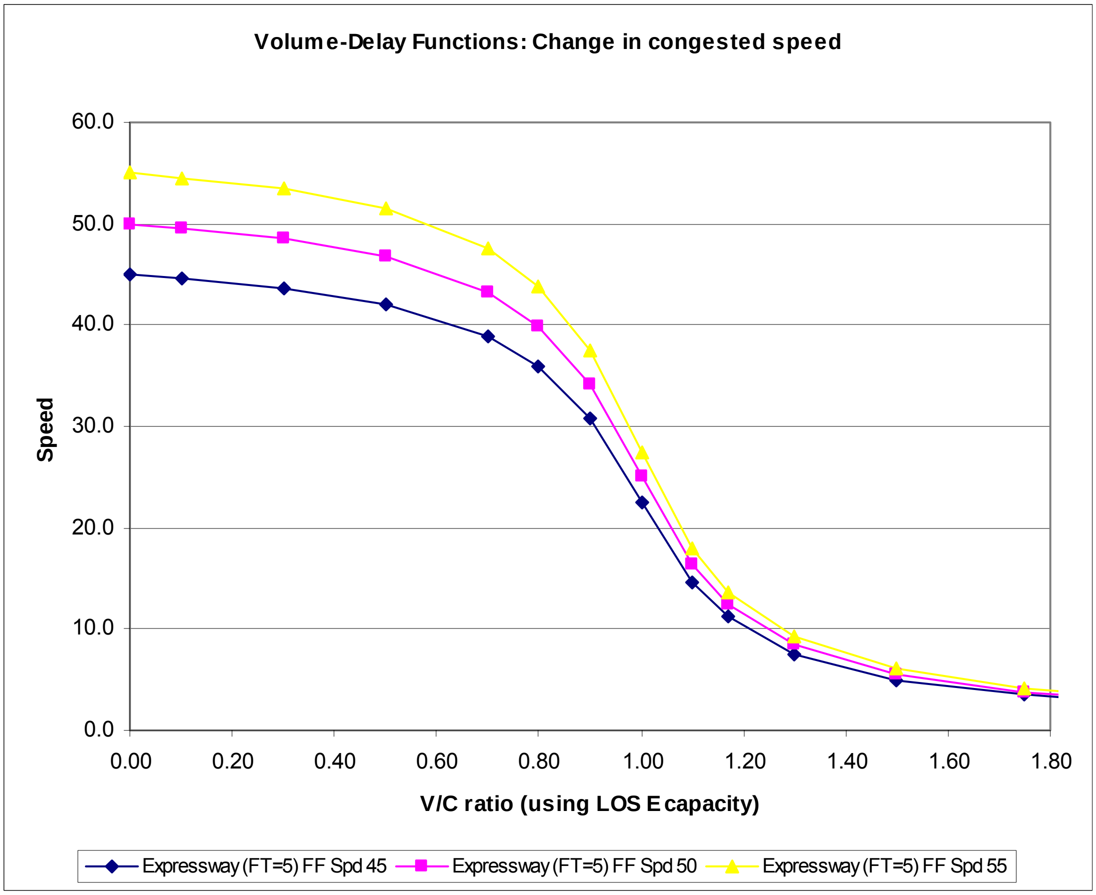

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Table 8-4 Volume-delay functions used in the Version 2.2, travel model: Speeds, Part 1 of 2

	Freeway (FT=1)			Major Arterial (FT=2)				Minor Arterial (FT=3)			
V/C	FF Spd 55 ConSpd	FF Spd 60 ConSpd	FF Spd 67 ConSpd	FF Spd 25 ConSpd	FF Spd 35 ConSpd	FF Spd 40 ConSpd	FF Spd 45 ConSpd	FF Spd 20 ConSpd	FF Spd 30 ConSpd	FF Spd 35 ConSpd	FF Spd 40 ConSpd
0.00	55.00	60.00	67.00	25.00	35.00	40.00	45.00	20.00	30.00	35.00	40.00
0.10	54.78	59.76	66.74	24.77	34.68	39.64	44.59	19.76	29.64	34.58	39.52
0.30	54.17	59.10	65.99	24.15	33.82	38.65	43.48	19.12	28.68	33.46	38.24
0.50	53.12	57.95	64.71	23.14	32.39	37.02	41.65	18.10	27.15	31.68	36.20
0.70	50.83	55.46	61.93	21.19	29.67	33.91	38.15	16.28	24.43	28.50	32.57
0.80	48.33	52.72	58.87	19.43	27.20	31.08	34.97	14.79	22.18	25.88	29.58
0.90	42.73	46.62	52.05	16.60	23.23	26.55	29.87	12.67	19.00	22.17	25.34
1.00	27.50	30.00	33.50	12.50	17.50	20.00	22.50	10.00	15.00	17.50	20.00
1.10	12.83	14.00	15.63	8.60	12.04	13.76	15.48	7.47	11.20	13.07	14.93
1.17	8.78	9.57	10.69	6.73	9.42	10.76	12.11	6.10	9.16	10.68	12.21
1.30	5.46	5.95	6.65	4.65	6.51	7.44	8.36	4.42	6.63	7.73	8.83
1.50	3.43	3.74	4.18	3.09	4.33	4.95	5.57	3.03	4.54	5.30	6.06
1.75	2.34	2.55	2.85	2.17	3.04	3.47	3.90	2.15	3.23	3.77	4.31
2.00	1.77	1.94	2.16	1.67	2.33	2.67	3.00	1.67	2.50	2.92	3.33

Ref: I:\ateam\docum\FY08\Version2.2_Final_Doc\conical_vdf_v22.xls

Table 8-5 Volume-delay functions used in the Version 2.2, travel model: Speeds, Part 1 of 2

Collector (FT=4)				Expressway (FT=5)		
FF Spd 15 ConSpd	FF Spd 20 ConSpd	FF Spd 25 ConSpd	FF Spd 30 ConSpd	FF Spd 45 ConSpd	FF Spd 50 ConSpd	FF Spd 55 ConSpd
15.00	20.00	25.00	30.00	45.00	50.00	55.00
14.63	19.51	24.38	29.26	44.65	49.61	54.57
13.71	18.28	22.85	27.43	43.68	48.54	53.39
12.47	16.63	20.79	24.95	42.07	46.75	51.42
10.79	14.39	17.98	21.58	38.90	43.22	47.54
9.76	13.02	16.27	19.52	35.88	39.87	43.85
8.64	11.52	14.41	17.29	30.70	34.11	37.52
7.50	10.00	12.50	15.00	22.50	25.00	27.50
6.42	8.56	10.70	12.85	14.68	16.31	17.94
5.75	7.66	9.58	11.49	11.19	12.44	13.68
4.70	6.27	7.84	9.40	7.55	8.39	9.23
3.57	4.76	5.95	7.14	4.96	5.51	6.06
2.69	3.59	4.49	5.38	3.46	3.84	4.22
2.14	2.86	3.57	4.29	2.65	2.94	3.24

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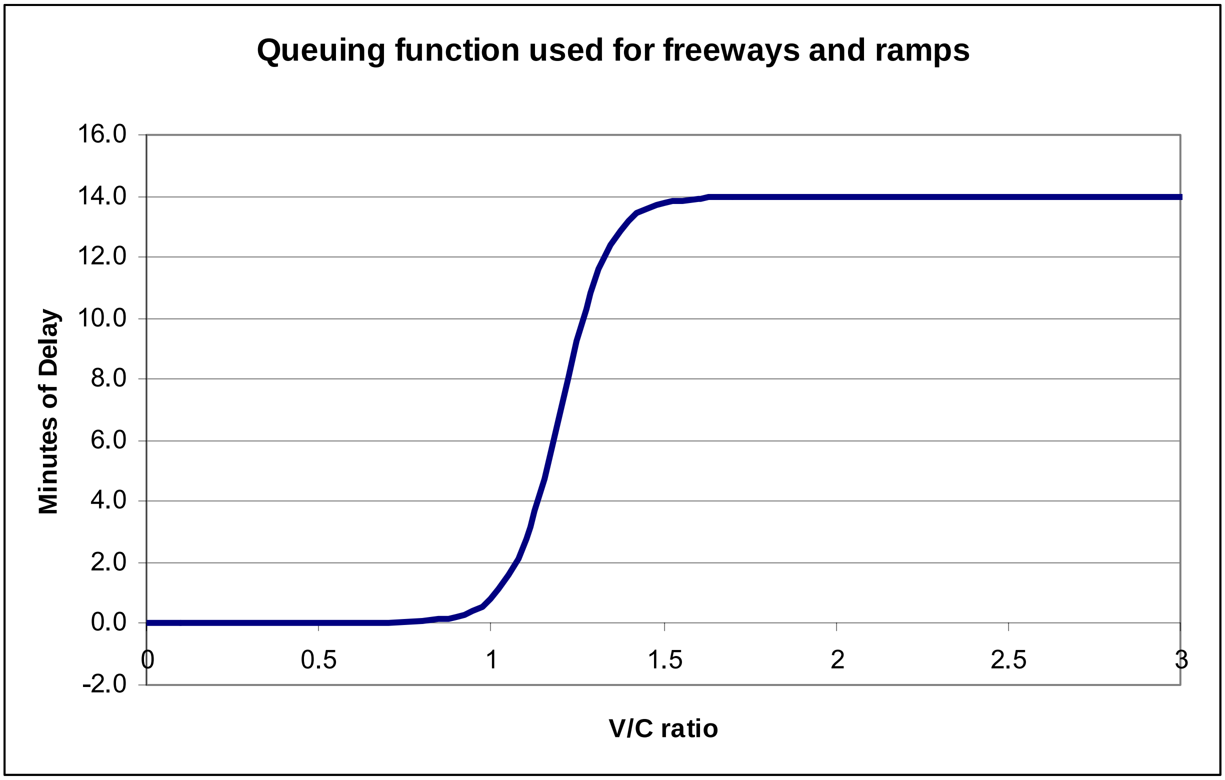
Figure 8-8 Queuing function used for freeways and ramps



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Chapter 9 Validation

This chapter briefly describes some performance results of the Version 2.3 model and also provides travel statistics from the most recent TPB forecasts.

9.1 *Validation Summaries*

A summary of state level estimated and observed vehicle-miles-of-travel (VMT) is shown in Table 9-1 . The table reflects the 12-county MSA area which is a subset of the modeled study area. The table indicates that the model presently over-estimates VMT in the MSA by 3 percent. The over-estimation appears consistent across the District of Columbia, Maryland, and Virginia. Jurisdiction-level VMT performance based on a *sample* of approximately 5,400 daily counts is shown in Table 9-2. The link-level performance on Table 9-2 indicates a 5% over-estimation of VMT overall. The performance at jurisdiction level is more volatile as would be expected with a sample of counts.

Screenline locations currently analyzed by TPB staff are provided on Figure 9-1 and Figure 9-2. 2005 Screenline level performance is shown on Table 9-3. The table also indicates the percentage of screenline links with observed counts is about 37%. Overall, estimated screenline counts are 4% higher than the observed counts.

A summary of global statistics over time (for 2002, 2005, and 2030) is shown on Table 9-4. The table displays available forecasts from both the Version 2.2 model and the Version 2.3. It should be noted that the Version 2.2 2030 forecast produces about 8% less VMT that that produced by the previous 2.1D model. Both the number of trips and VMT shown for Version 2.3 are consistently higher than that of Version 2.2 at the present time.

Table 9-1 2005 Estimated/Observed (HPMS) VMT for the Washington, DC MSA (VMT in thousands)

VMT - V2.3 Iterations			
MSA	Est(000s)	Obs(000s)	E-O Ratio
DC	8,875	8,619	1.03
MD	57,822	56,806	1.02
VA	53,072	50,733	1.05
MSA Total	119,769	116,158	1.03

Ref: I:\ateam\docum\FY09\Version2.3_modelDoc_2008-07\HPMS_VMT_V23.xls

Note: VMT shown excludes local traffic

Jurisdictions in the MSA are:
District of Columbia, Montgomery County, Prince George's County, Arlington County, City of Alexandria, Fairfax County, Loudoun County, Prince William County, Frederick County, Charles County, Calvert County, Stafford County.

Table 9-2 Year 2005 Estimated and Observed VMT Summary by Jurisdiction (VMT in thousands)

	Version 2.3			
Jurisdiction	**Est**	**Obs**	**Ratio Est / Obs**	**Number of Counts**
District of Columbia	3,141	2,670	1.18	578
Montgomery	9,218	8,437	1.09	594
Prince George's	9,382	10,162	0.92	520
Arlington	1,713	1,727	0.99	268
Alexandria	841	788	1.07	124
Fairfax	13,312	12,895	1.03	1,191
Loudoun	2,238	2,304	0.97	226
Prince William	4,262	4,472	0.95	358
Frederick	6,412	5,111	1.25	248
Howard	6,760	6,463	1.05	180
Anne Arundel	9,688	9,089	1.07	324
Charles	1,563	1,660	0.94	94
Carroll	2,236	2,000	1.12	130
Calvert	804	983	0.82	64
St. Mary's	1,016	1,005	1.01	86
King George	846	615	1.38	32
Fredericksburg	294	415	0.71	24
Stafford	2,516	2,184	1.15	112
Spotsylvania	1,460	1,712	0.85	82
Fauquier	2,619	2,244	1.17	89
Clarke	719	582	1.24	36
Jefferson	70	30	2.33	2
Total	**81,110**	**77,548**	**1.05**	**5,362**

Ref: I:\ateam\docum\FY09\Version2.3_modelDoc_2008-07\Sum_vmt_2005_V23.xls

Figure 9-1 Highway Network Screen lines Map 1 of 2

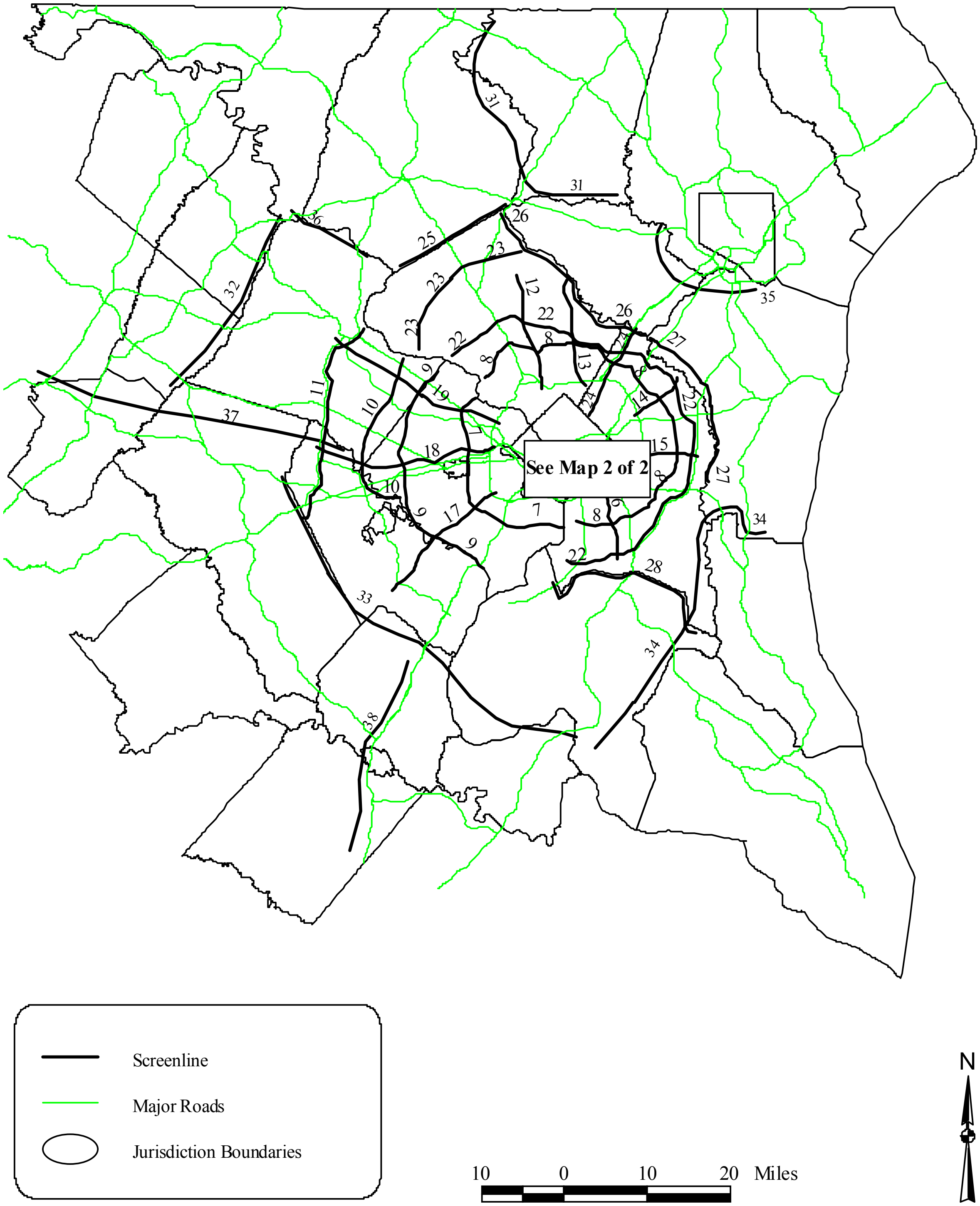

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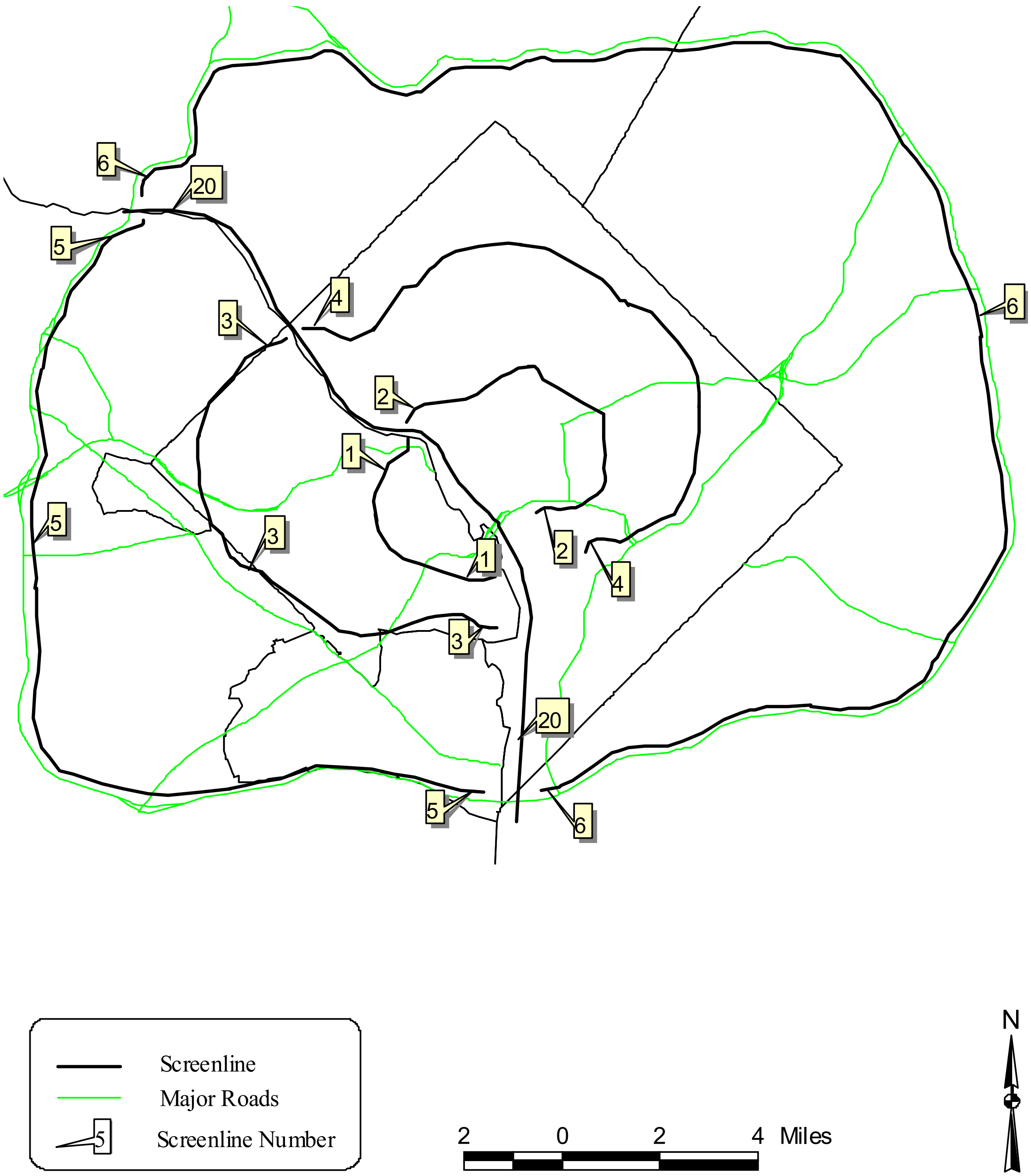
Figure 9-2 Highway Network Screen lines (Inside the Capital Beltway) Map 2 of 2



Ref: I:\ateam\docum\Fy03\Model\scrnlin2.wmf

Table 9-3 Year 2005 Estimated and Observed Daily Screenline Crossings (in thousands)

	Version 2.3					
Screenline No.	Est	Obs	Ratio Est / Obs	No. of links w/ Screenline Code	No. of links w/ Counts	% of links w/ Counts
1	330	304	1.09	40	18	45.0%
2	388	294	1.32	74	14	18.9%
3	393	356	1.10	56	22	39.3%
4	477	366	1.30	66	22	33.3%
5	400	378	1.06	52	14	26.9%
6	1,066	992	1.07	100	40	40.0%
7	685	720	0.95	66	30	45.5%
8	535	494	1.08	102	22	21.6%
9	709	664	1.07	46	26	56.5%
10	80	122	0.66	20	8	40.0%
11	8	12	0.67	18	4	22.2%
12	237	272	0.87	32	6	18.8%
13	238	240	0.99	18	4	22.2%
14	186	244	0.76	16	2	12.5%
15	176	216	0.81	12	2	16.7%
16	139	162	0.86	16	2	12.5%
17	87	92	0.95	30	10	33.3%
18	254	306	0.83	35	18	51.4%
19	400	442	0.90	42	20	47.6%
20	1,047	958	1.09	14	14	100.0%
22	576	558	1.03	118	26	22.0%
23	156	140	1.11	24	8	33.3%
24	252	296	0.85	28	4	14.3%
25	14	10	1.40	8	2	25.0%
26	387	318	1.22	20	12	60.0%
27	186	154	1.21	16	8	50.0%
28	32	28	1.14	10	2	20.0%
31	120	72	1.67	20	12	60.0%
32	78	40	1.95	8	4	50.0%
33	114	80	1.43	14	6	42.9%
34	77	84	0.92	14	10	71.4%
35	834	854	0.98	42	30	71.4%
36	50	24	2.08	6	4	66.7%
37	54	38	1.42	10	8	80.0%
38	159	168	0.95	18	14	77.8%
Total	**10,924**	**10,498**	**1.04**	**1,211**	**448**	**37.0%**

Ref: I:\ateam\docum\FY09\Version2.3_modelDoc_2008-07\Sum_links_2005_V23.xls

Table 9-4 Summary of Version 2.2 and Version 2.3 travel model output: Years 2002, 2005 and 2030

	Version 2.2			Version 2.3			Difference: V2.3 - V2.2		
	2002	2005	2030	2002	2005	2030	2002	2005	2030
Households	2,228,949	2,357,238	3,199,982	2,228,949	2,357,238	3,199,982	0	0	0
Employment	3,548,630	3,709,533	5,156,567	3,548,630	3,709,533	5,156,567	0	0	0
HH Population	5,843,440	6,160,526	8,133,627	5,843,440	6,160,526	8,133,627	0	0	0
HH & GQ Population	5,966,696	6,294,528	8,282,368	5,966,696	6,294,528	8,282,368	0	0	0
Extl. Productions/ HBW Auto Person	284,407	303,657	474,282	295,585	321,172	479,471	11,178	17,515	5,189
Extl. Productions/ HBS Auto Person	72,207	76,475	114,371	74,706	83,468	121,864	2,499	6,993	7,493
Extl. Productions/ HBO Auto Person	198,445	212,187	333,994	205,987	224,640	340,237	7,542	12,453	6,243
Extl. Productions/ NHB Auto Person	75,156	79,751	120,497	78,917	85,364	121,606	3,761	5,613	1,109
Extl. Productions/ Auto Person Subtotal	630,215	672,070	1,043,144	655,195	714,644	1,063,178	24,980	42,574	20,034
Extl. Productions/ Medium Truck	3,803	4,066	6,386	35,702	39,219	59,567	31,899	35,153	53,181
Extl. Productions/ Heavy Truck	24,605	26,292	41,246	8,622	9,361	14,017	-15,983	-16,931	-27,229
Extl. Productions/ Truck Subtotal	28,408	30,358	47,632	44,324	48,580	73,584	15,916	18,222	25,952
Extl. Attractions/ HBW Auto Person	175,558	186,443	282,929	183,731	200,848	291,203	8,173	14,405	8,274
Extl. Attractions/ HBS Auto Person	71,141	75,566	114,800	72,035	78,188	114,039	894	2,622	-761
Extl. Attractions/ HBO Auto Person	277,245	295,960	461,850	290,494	317,581	479,947	13,249	21,621	18,097
Extl. Attractions/ NHB Auto Person	75,146	79,741	120,480	78,906	85,352	121,589	3,760	5,611	1,109
Extl. Attractions/ Auto Person Subtotal	599,090	637,710	980,059	625,166	681,969	1,006,778	26,076	44,259	26,719
							0	0	0
Extl. Attractions/ Medium Truck	3,803	4,066	6,386	35,703	39,223	59,569	31,900	35,157	53,183
Extl. Attractions/ Heavy Truck	24,605	26,292	41,246	8,622	9,361	14,017	-15,983	-16,931	-27,229
Extl. Attractions/ Truck Subtotal	28,408	30,358	47,632	44,325	48,584	73,586	15,917	18,226	25,954
							0	0	0
Inc. Grp 1 HHs	527,594	552,147	756,667	527,594	552,147	756,667	0	0	0
Inc. Grp 2 HHs	510,062	538,139	732,621	510,063	538,139	732,622	1	0	1
Inc. Grp 3 HHs	615,948	653,833	888,293	615,948	653,834	888,293	0	1	0
Inc. Grp 4 HHs	575,311	613,033	821,137	575,312	613,032	821,137	1	-1	0
HHs Subtotal	2,228,916	2,357,152	3,198,717	2,228,915	2,357,152	3,198,719	-1	0	2
							0	0	0
1- person HHs	561,187	599,096	872,858	561,187	599,097	872,859	0	1	1
2- person HHs	685,312	723,030	985,693	685,312	723,030	985,694	0	0	1
3- person HHs	393,187	413,897	546,520	393,186	413,898	546,520	-1	1	0
4+ person HHs	589,229	621,128	793,646	589,230	621,127	793,646	1	-1	0
HHs Subtotal	2,228,916	2,357,152	3,198,717	2,228,915	2,357,152	3,198,719	-1	0	2

Table 9-4 Continued

	Version 2.2			Version 2.3			Difference: V2.3 - V2.2		
	2002	2005	2030	2002	2005	2030	2002	2005	2030
0 Vehicle HHs	212,773	223,840	344,095	212,681	225,310	338,935	-92	1,470	-5,160
1 Vehicle HHs	736,174	780,136	1,100,104	736,053	779,946	1,098,936	-121	-190	-1,168
2 Vehicle HHs	864,472	914,166	1,198,498	864,618	913,242	1,202,506	146	-924	4,008
3+ Vehicle HHs	415,496	439,009	556,021	415,563	438,654	558,342	67	-355	2,321
HHs Subtotal	2,228,916	2,357,152	3,198,717	2,228,915	2,357,152	3,198,719	-1	0	2
HBW Motorized Person Trips	4,206,863	4,452,589	5,998,223	4,217,571	4,477,016	6,007,364	10,708	24,427	9,141
HBS Motorized Person Trips	3,238,309	3,424,414	4,572,878	3,235,669	3,428,626	4,579,865	-2,640	4,212	6,987
HBO Motorized Person Trips	9,982,462	10,538,709	13,885,744	9,991,648	10,564,957	13,919,180	9,186	26,248	33,436
NHB Motorized Person Trips	5,500,460	5,821,285	7,732,312	5,503,203	5,827,804	7,744,464	2,743	6,519	12,152
Total Motorized Person Trips	22,928,094	24,236,997	32,189,157	22,948,090	24,298,403	32,250,872	19,996	61,406	61,715
Motorized Person Trips per HH	10.29	10.28	10.06	10.30	10.31	10.08	0	0	0
Motorized Person Trips per capita	3.84	3.85	3.89	3.85	3.86	3.89	0	0	0
							0	0	0
Non-Motorized HBW Trips	176,620	187,605	292,322	176,576	187,560	292,526	-44	-45	204
HBW Auto Driver Trips	3,222,166	3,435,096	4,560,854	3,146,466	3,359,134	4,546,271	-75,700	-75,962	-14,583
HBS Auto Driver Trips	2,558,806	2,707,208	3,657,434	2,591,013	2,742,638	3,649,541	32,207	35,430	-7,893
HBO Auto Driver Trips	7,279,400	7,730,049	10,195,673	7,417,608	7,850,230	10,320,629	138,208	120,181	124,956
NHB Auto Driver Trips	4,167,216	4,431,255	5,939,469	4,222,131	4,499,257	6,024,543	54,915	68,002	85,074
Total Auto Driver Trips	17,227,588	18,303,608	24,353,430	17,377,217	18,451,260	24,540,983	149,629	147,652	187,553
HBW Auto Passenger Trips	399,265	423,839	605,514	375,815	403,502	581,583	-23,450	-20,337	-23,931
HBS Auto Passenger Trips	624,315	661,837	827,011	610,680	650,312	885,971	-13,635	-11,525	58,960
HBO Auto Passenger Trips	2,455,135	2,570,070	3,312,917	2,399,784	2,543,057	3,370,954	-55,351	-27,013	58,037
NHB Auto Passenger Trips	1,172,964	1,231,776	1,557,665	1,120,248	1,172,550	1,498,834	-52,716	-59,226	-58,831
Total Auto Passenger Trips	4,651,679	4,887,522	6,303,106	4,506,526	4,769,421	6,337,343	-145,153	-118,101	34,237
HBW Auto Occupancies	1.12	1.12	1.13	1.12	1.12	1.13	0.00	0.00	0.00
HBS Auto Occupancies	1.24	1.24	1.23	1.24	1.24	1.24	0.00	0.00	0.01
HBO Auto Occupancies	1.34	1.33	1.32	1.32	1.32	1.33	-0.02	-0.01	0.01
NHB Auto Occupancies	1.28	1.28	1.26	1.27	1.26	1.25	-0.01	-0.02	-0.01
Total Auto Occupancies	1.27	1.27	1.26	1.26	1.26	1.26	-0.01	-0.01	0.00
HBW Transit Trips	585,432	593,654	831,855	695,290	714,380	879,510	109,858	120,726	47,655
HBS Transit Trips	55,188	55,369	88,433	33,976	35,676	44,353	-21,212	-19,693	-44,080
HBO Transit Trips	247,927	238,590	377,154	174,256	171,670	227,597	-73,671	-66,920	-149,557
NHB Transit Trips	160,280	158,254	235,179	160,824	155,997	221,086	544	-2,257	-14,093
Total Transit Trips	1,048,827	1,045,867	1,532,621	1,064,346	1,077,723	1,372,546	15,519	31,856	-160,075

Table 9-4 Continued

	Version 2.2			Version 2.3			Difference: V2.3 - V2.2		
	2002	2005	2030	2002	2005	2030	2002	2005	2030
HBW Transit Percentage	13.92	13.33	13.87	16.49	15.96	14.64	2.57	2.63	0.77
HBS Transit Percentage	1.70	1.62	1.93	1.05	1.04	0.97	-0.65	-0.58	-0.96
HBO Transit Percentage	2.48	2.26	2.72	1.74	1.62	1.64	-0.74	-0.64	-1.08
NHB Transit Percentage	2.91	2.72	3.04	2.92	2.68	2.85	0.01	-0.04	-0.19
Total Transit Percentage	4.57	4.32	4.76	4.64	4.44	4.26	0.07	0.12	-0.50
Medium Truck	311,681	327,698	445,597	451,021	474,462	636,537	139,340	146,764	190,940
Heavy Truck	161,137	169,148	241,350	151,366	159,755	213,207	-9,771	-9,393	-28,143
Misc. Auto Driver	605,990	639,093	847,389	605,990	639,093	847,389	0	0	0
Through (X-X) Auto&Comm.Veh	39,077	41,818	66,161	39,558	41,777	65,228	481	-41	-933
Through (X-X) Trucks	31,278	33,503	53,208	25,539	27,703	42,363	-5,739	-5,800	-10,845
Airport Passenger Auto Drivers	49,587	49,386	109,850	49,587	49,386	109,850	0	0	0
Commercial Vehicles (Int/&Extl)	1,138,667	1,192,674	1,588,697	1,151,265	1,204,426	1,597,737	12,598	11,752	9,040
							0	0	0
Total Vehicle Trips	19,565,006	20,756,928	27,705,682	19,851,545	21,047,862	28,053,295	286,539	290,934	347,613
Freeway VMT	56,786,378	58,335,530	79,474,462	54,352,392	59,425,630	80,831,573	-2,433,986	1,090,100	1,357,111
Major Art VMT	55,208,250	57,861,637	68,692,292	56,674,139	60,522,771	71,304,577	1,465,889	2,661,134	2,612,285
Minor Art VMT	18,306,610	19,425,613	28,771,123	18,890,223	20,693,697	30,488,330	583,613	1,268,084	1,717,207
Collector VMT	8,096,571	8,999,803	11,956,868	8,950,997	9,831,845	13,041,215	854,426	832,042	1,084,347
Express. VMT	6,996,197	7,197,834	9,415,956	10,366,643	7,392,717	9,662,601	3,370,446	194,883	246,645
Ramp VMT	1,209,478	1,264,393	1,573,213	1,230,172	1,286,675	1,602,758	20,694	22,282	29,545
Total VMT	146,603,484	153,084,810	199,883,914	150,464,566	159,153,334	206,931,054	3,861,082	6,068,524	7,047,140
VMT per Capita	24.57	24.32	24.13	25.22	25.28	24.98	0.65	0.96	0.85
VMT per HH	65.77	64.94	62.46	67.50	67.52	64.67	1.73	2.58	2.21
VMT per Vehicle Trip	7.49	7.38	7.21	7.58	7.56	7.38	0.09	0.18	0.17

Ref: I:\ateam\docum\FY09\Version2.3_modelDoc_2008-07\View_From_Space_V22_V23.xls,
M:\model_dev\Ver2.3_20080604_pceNo\Summary\View_From_Space_V23_V22.xls

Note:

Chapter 10 Model Application Overview

The Version 2.3 travel model is executed on microcomputer running Windows XP Professional (32-bit version), Windows XP Home (32-bit version), or Windows Server 2003 (32-bit version)[1]. The 64-bit version of Windows should not be used for executing the Version 2.3 model because several of the Fortran programs used in the Version 2.3 model are not compatible with that type of operating system. TPB staff has executed Version 2.3 using Intel-based computers, but alternative "clones" (e.g., AMD) should suffice as well.

The Version 2.3 travel model is executed with Cube Base and TP+ application software (version 4.1.1). This commercial software package is available from Citilabs[2] and must be installed on the microcomputer before the Version 2.3 model is applied. The use of earlier TP+ versions is not recommended[3].

Computers running the Version 2.3 model should be equipped with at least 2 GB RAM of memory and a minimum hard drive size of 100 GB. The microcomputer marketplace now offers machines with multiple central processing units (CPUs). A "Quad Core" CPU is currently recommended for minimizing model running times, as opposed to the Dual Core CPU or single-core CPU which are generally lower in price. Multiple CPU machines are preferred over single core computers because they enable one to more easily multitask as model is in execution. TPB's fastest computer is currently a single processor Quad Core Intel Xeon X5365, with a clock speed of 3.00 GHz, and bus speed of 1,333 MHz. This computer can complete a model run in half the time needed by a similar computer using two Dual Core CPUs.

Model run times are approximately 20-30 hours in duration, depending on hardware and modeled scenarios ("out" year model executions generally require longer running times than do "base" year executions). These run times do not reflect the incorporation of distributed processing (DP) which increases processing speed by enabling the use of multiple CPUs for a single modeling process. The DP capability has recently been made available, but has not yet been incorporated into the TPB travel model. Each scenario (e.g., 2002, 2020, etc.) results in approximately 1,000 output files, requiring 3.5 GB of hard disk space.

A powerful text editor is also strongly recommended to support modeling work. TPB staff uses both KEDIT, a commercial package (http://www.kedit.com/), and PSPad, a freeware text editor (http://www.pspad.com/). PSPad can be configured to highlight (color code) syntax for various languages (e.g., SAS, Fortran, and TP+). Color coding of syntax can help eliminate syntax errors. TPB also recommends using the following utility software:

[1] Other Windows operating systems such as Windows Vista have not been tested by TPB staff.
[2] The Citilabs website is: www.citilabs.com
[3] To determine which version of TP+ is installed in Windows, select Start => All Programs => Citilabs Licensed Software => TP+ Models and Utilities => TP+. Click the button "About TPPLUS". All of the modules listed (e.g., TPMAIN, HWYLOAD, HWYNET, MATRIX, TRNBUILD, LIBRARY) should explicitly indicate Version 4.1.1. COG/TPB staff currently uses Cube Base Version 4.1.1.

- Windows "Open Command Window Here" PowerToy (CmdHere.exe), which allows one to right-click a folder in Windows Explorer and open a command window at that folder/subdirectory location.
- TimeThis.exe: Allows one to time a command. This is a tool found in the "Windows 2000 Resource Kit." This software utility is used in the standard batch files used to apply the model, and is included is with TPB model transmittals.
- Tee.exe: Splits standard output (normally sent to either the screen or a file) to both the screen and a file at the same time. This is part of the Windows 2000 Resource Kit. This is also used in the standard application batch files and is included with TPB transmittals.

The application steps of the model are graphically outlined on Figure 10-1. The figure indicates that an initial (or pump-prime) iteration occurs where a first pass of the four-step process occurs using *initial* AM and off-peak highway speeds, and *initial* mode choice percentages (i.e., the mode choice model is not executed in the initial iteration). The 'skimmed' highway times are used to develop zone–to-PNR lot links as part of the transit network. After the transit network is built and skimmed, trip generation and trip distribution are executed. The resulting person trips are converted to vehicle trips on the basis of default zone-level mode choice and car occupancy percentages, and assigned to the highway network.

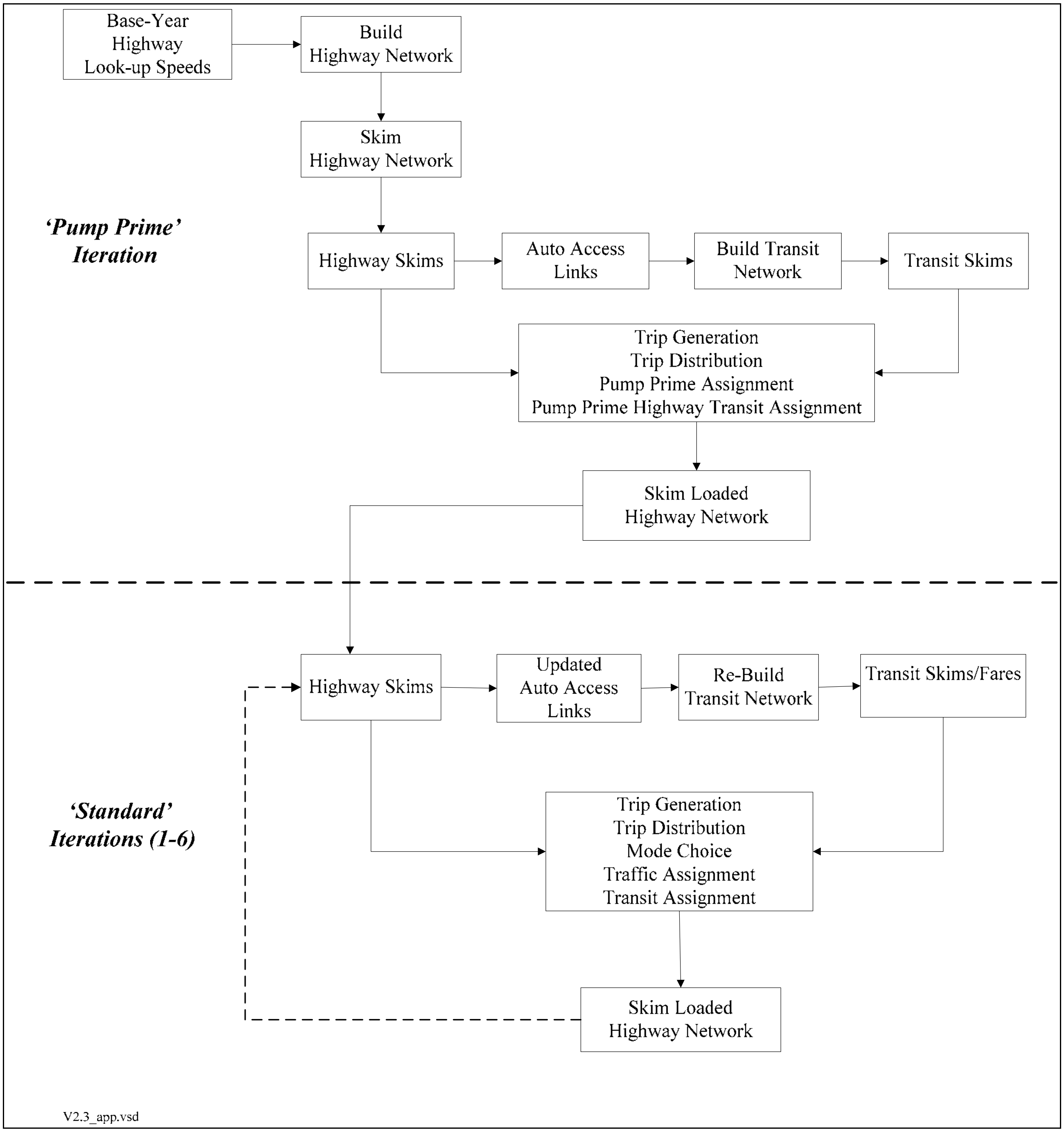
The next series of 'standard' iterations (1 through 6) involve the execution of the complete four step model which includes: 1) a mode choice model execution and 2) the use of recycled traffic assignment based speeds as input. The AM peak and off-peak restrained highway times are used to update the zone-to-PNR link speeds, and the transit network is re-built and skimmed. The highway and transit time skims are used as inputs to the mode choice model. The auto driver trips produced from the mode choice model are processed through the time-of-day model, which apportions the auto drivers among three time periods pertaining to the AM-peak period (6-9 AM), PM-peak period (4-7 PM), and off-peak period (all other hours of the day). The three time-of-day trip tables are subsequently loaded onto the highway network in separate traffic assignment procedures. The loaded link volumes are successively averaged using the method of successive averages, or MSA, to facilitate the convergence of the final link speeds. The averaging occurs individually for each of the three time periods at the link level, as follows:

- The 'final' first iteration link volumes are equal to the 'raw' assigned link volumes from the pump-prime iteration.
- The 'final' second iteration link volume equals one half of the first iteration link volume plus one half of the second iteration assigned link volume.
- The 'final' third iteration link volume equals 2/3 of the 'final' second iteration link volume plus 1/3 of the third iteration assigned volume.

  :

  :
- The 'final' sixth iteration link volume equals 5/6 of the 'final' fifth iteration link volume plus 1/6 of the sixth iteration assigned volume.

Figure 10-1 Application process of the Version 2.3 travel model



Typically, by the sixth iteration, over 99% of the highway links yield restrained speeds that are within +/-2 mph of the previous (fifth) iteration speed. Although a fixed number of speed feedback iterations (6) are used, the modeler should check the highway assignment report file (i6_Highway_Assignment.rpt) to make sure that key convergence metrics (e.g., relative gap or RELGAP) are within desired tolerances. Convergence metrics can vary depending on the type of study being conducted.

10.1 *Executing the Model*

A structured application procedure has been established for applying the Version 2.3 model from a command-prompt window. The procedure involves:

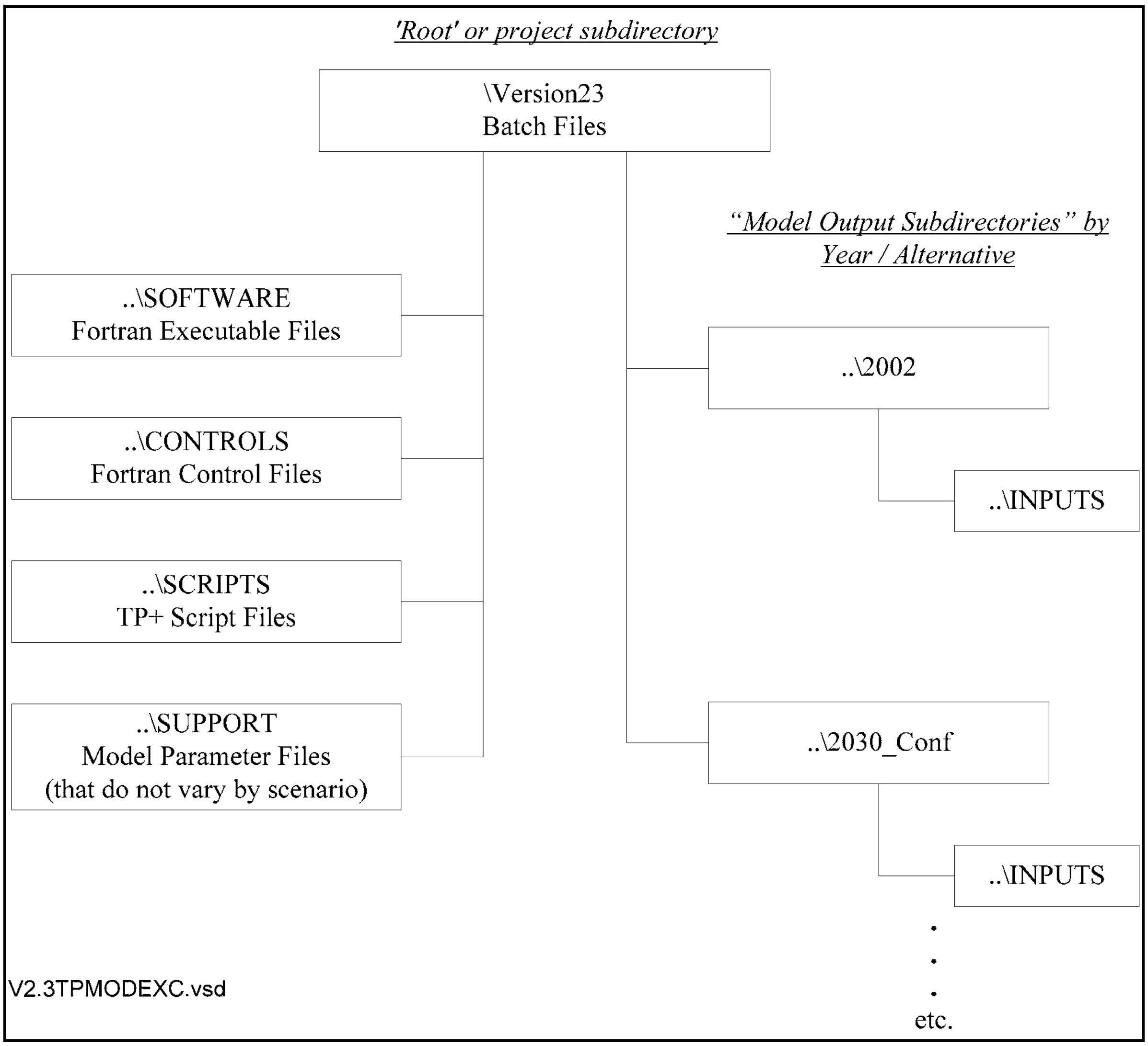
1. A series of pre-established batch files;
2. A standardized subdirectory system, in which input files, output files, TP+ scripts, etc. are rigidly organized; and
3. The use of generically named input and output files, which are stored in designated locations in the subdirectory system.

An example subdirectory structure for applying the Version 2.3 model is shown graphically on Figure 10-2. A 'root' subdirectory appears at the top of the structure. The root subdirectory may exist anywhere on the computer hard drive and may be arbitrarily named by the analyst (the name is typically related to a particular study or project). On the left side of the figure, there are four specially designated subdirectories under the root which are established specifically for Fortran executables (*\SOFTWARE*), control files that are required by some of the executables (*\CONTROLS*), TP+ scripts (*\SCRIPTS*), and general parameter files used by the scripts or executables (*\SUPPORT*). The *SUPPORT* subdirectory is reserved for parameter files that generally do not change by modeled scenario such as K-factors, F-factors, and the like. These four subdirectories must exist under the root, and must be named as shown. Furthermore, the files residing in these four subdirectories should not be altered or renamed.

The right side of Figure 10-2 shows subdirectories that are established for model inputs and outputs of one or more alternatives or scenarios. The figure indicates that each alternative subdirectory has its own *\INPUTS* subdirectory where all necessary model inputs are stored and generically named (e.g., land use data is stored in a file named *zone.asc*, network link data is stored in a file named *link.asc*, etc.). The scenario-specific subdirectory (e.g., ..\2000 on Figure 10-2) is arbitrarily named and typically has some relation to a scenario being modeled. The user may establish one or many such alternative subdirectories as long as a unique \INPUTS subdirectory exists under it. \INPUTS subdirectories can not be shared among more than one alternative.

Pre-established 'parent' and 'child' batch files for executing the model reside in the root subdirectory. Typically 'parent' batch files are prepared for each modeled scenario while 'child' batch files remain unaltered. The 'child' batch files function to execute individual modeling steps, such as the trip generation step or the traffic assignment step. 'Child' batch files generally call TP+ scripts and/or program executables. The 'child' batch files also assign names to report files that result from each model step. Listing files are typically assigned *.RPT or *.TAB naming extensions. The former refers to TP+ listings while the latter refers to a subset of the report file containing only trip table totals or jurisdictional summaries. 'Parent' batch files are used to string 'child' batch files together so that the entire model execution can be initiated with a single line command. The 'parent' batch file also establishes environment variables that are used in the child batch files and TP+ scripts, such as the iteration number, the model year, and the model description.

Figure 10-2 Subdirectory Structure for executing the Version 2.3 Model



All of the files in the *\INPUTS* subdirectory are assigned generic filenames as listed on Table 10-1. It is the user's responsibility to make sure that the generically named files are appropriate for the modeled scenario and are in the prescribed format (described later). Additionally, all of the files shown on Table 10-1 must exist unless they are listed as optional. The advantage of using generic names is that the input and output filenames referenced in each TP+ script and control file do not need to be updated. A list of the Fortran executables residing in the \SOFTWARE subdirectory is shown on Table 10-2. There are fewer executables used by the Versions 2.3 model than have been used in previous TPB models, since several Fortran routines have been converted to TP+ scripts.

A listing of 'child' batch files is provided on Table 10-3. The table also indicates the programs and/or TP+ scripts that are invoked and the purpose of each batch file. Given the iterative application process of the model, most of the batch files are called multiple times during a model run. The sequence of batch file applications, by iteration, is shown on Table 10-4. The table indicates that there are 72 batch steps called during a standard application of the model. Some of the batch files are called once, while others (e.g., trip_generation.bat) are called during the pump-prime and all 6 standard iterations. A 'parent' batch file is used to string each of the 72 'child' batch files together during a typical model execution. The 'parent' batch files, like 'child' batch files, reside in the root subdirectory. A 'parent' batch file is typically prepared for each individual model run. The process for executing a model is addressed in the next section. The remaining chapters address the specific details of each modeling step.

Table 10-1 Input Files Required for the Version 2.3 Model Execution

	Input Type	Filename	Description	Text or Binary
1	Land use	ZONE.ASC	Zonal Land Use	Text
2	Land use	AREAOVER.ASC	Zone Area Type Override File	Text
3	Network, highway	LINK.ASC	Highway Links	Text
4	Network, highway	NODE.ASC	Highway Node File	Text
5	Network, highway	TOLL.ESC	Highway Toll Value / Deflator File	Text
6	Network, highway	TOLL.INC	Highway Toll /Time Equivalent by Income Grp.	Text
7	Network, highway	TOLL.SKM	Highway Toll/Time Equivalent by Veh. Type	Text
8	Network, transit	MODE1AM.TB,… MODE10AM.TB	AM Transit Line Files, Mode 1 to 10	Text
9	Network, transit	MODE1OP.TB,… MODE10OP.TB	Off-peak Transit Line Files, Mode 1 to 10	Text
10	Network, transit	STA_TPP.BSE	Rail Station/PNR File	Text
11	Network, transit	RAIL_LNK.BSE	Rail Links	Text
12	Network, transit	TRNPEN.DAT	Metrorail Station Network Turn Penalty File	Text
13	Network, transit	LBUS_TIMFTRS.ASC	Local Bus Time Degradation Factors	Text
14	Network, transit	AREADEF.PRN	Input Zonal TAZ-Mode choice district equiv.	Text
15	Network, transit	NLWALKPCT.TXT	Input Zonal Transit Walk Percents	Text
16	Network, transit	TAZFRZN.ASC	TAZ/Bus Fare Zone Equivalency	Text
17	Network, transit	BUSFARAM.ASC	MFARE2 AM Bus Fare Zone Matrix	Text
18	Network, transit	BUSFAROP.ASC	MFARE2 Off-Peak Fare Zone Matrix	Text
19	Network, transit	I6_HBO_NL_MC.MTT	HBO Mode Choice file	Binary
20	Network, transit	I6_HBS_NL_MC.MTT	HBS Mode Choice file	Binary
21	Network, transit	I6_HBW_NL_MC.MTT	HBW Mode Choice file	Binary
22	Network, transit	I6_NHB_NL_MC.MTT	NHB Mode Choice file	Binary
23	Network, transit	mfare1_Sta_Disc.ASC	Metrorail Station Discount File	Text
24	Network, transit	Tariff.txt	WMATA Tariff policy control file	Text
25	Network, transit	CPI_FILE.txt	Historical CPI file	Text
26	Trip	AEXT.ASC	Zonal External Attractions	Text
27	Trip	PEXT.ASC	Zonal External Productions	Text
28	Trip	AIRPAX.ADR	Air Passenger Auto Dr. Trips	Binary
29	Trip	SCHL.ADR	School Auto Dr. Trips	Binary
30	Trip	TAXI.ADR	Taxi Auto Dr. Trips	Binary
31	Trip	VISI.ADR	Visitor/Tourist Auto Dr. Trips	Binary
32	Trip	XXAUT.VTT	Through Auto Drivers	Binary
33	Trip	XXCVT.VTT	Through Trucks and Commercial Vehicles trips	Binary

Ref: v23_inputs.xls

Table 10-2 Non-TP+ Software Required for Version 2.3 Model Execution

Executable Name	Size (bytes)	Date	Program Function	Requires a Control File?
AEMS.exe	163,536	9/3/2004	NL mode choice applicationj program	Yes
cw3240.dll	827,392	2/9/1998		No
DFORMD.dll	425,984	8/2/1999		No
Tppdlibx.dll	126,976	4/23/2002		No
Tputlib.dll	570,880	5/9/2002		No
AUTOACC4.exe	445,804	12/19/2007	Creates auto-access files for for transit network building.	Yes
walkacc.exe	522,552	11/17/2004	Creates walk-access files for for transit network building.	Yes
EXTRTAB.EXE	24,663	7/26/2001	Extracts sections from TP+ report files.	No
Linesum.exe	122,880	12/3/2007	Transit assignment summary programs	Yes
Linevol.exe	114,688	12/3/2007		Yes
staprotp_v1.exe	470,508	3/7/2005	Creates support files for transit network building from station file.	Yes
PARKER.EXE	382,720	10/22/2004	Generates PNR to station transfer links.	No

Ref: v23_software.xls

Table 10-3 'Child' Batch Files Used in the Version 2.3 Model Execution

Batch File	Scripts / Programs	Purpose
Set_Factors.bat	Set_Factors.s	Create K-factors and time penalties.
Set_CPI.bat	Set_CPI.s	Create highway and transit cost deflators.
PP_Highway_Build.bat	Staprotp.exe Highway_Build_Toll.s	Build highway networks.
PP_Highway_Skims.bat	Highway_Skims.s modnet.s Highway_Skims_mod.s joinskims.s	Create initial AM/ off-peak highway skims.
Transit_Skim_All_Modes.bat	prefarV23.s Highway_Unbuild.s STAPROTP_V1.EXE PARKER.EXE WALKACC.EXE AUTOACC4.EXE Transit_skims_CR.s Transit_skims_MR.s Transit_skims_AB.s Transit_skims_BM.s	Create transit networks.
Transit_Fare.bat	Metrorail_Skims.s Mfare1.s Mfare2.s Assemble_Skims_CR.s Assemble_Skims_MR.s Assemble_Skims_AB.s Assemble_Skims_BM.s	Create current iteration transit fares.
Trip_Generation.bat	Demo_models.s Trip_Generation.s	Execute daily trip generation.
Trip_Distribution.bat	Trip_Distribution.s	Execute daily trip distribution.
Mode_Choice.bat	AEMS.EXE mc_NL_summary.s	Execute daily mode choice model (optionally execute mode choice model with the Transit Constraint (TC) and/or with HOV Skim Replacement (HSR)).
Auto_Driver.bat	MC_Auto_Drivers.s	Generate initial auto drivers after mode choice model.
PP_Auto_Drivers.bat	PP_Auto_Drivers.s	Generate initial auto drivers (without mode choice model).
Time-of-Day.bat	Time-of-Day.s Misc_Time of-Day.s	Convert daily modeled trips to AM, PM, and Off-peak.
Highway_Assignment.bat	Highway_Assignment.s	Execute user equilibrium highway assignment for three time periods.
Highway_Skims.bat	Highway_Skims.s modnet.s Highway_Skims_mod.s joinskims.s	Create highway skims from assignment.
Transit_Assignment.bat	Combine_Tables_For_ TrAssign.s Transit_assignment_CR.s Transit_assignment_MR.s Transit_assignment_AB.s Transit_assignment_BM.s	Execute transit assignment for peak and off-peak periods.

Ref: V2.3_Flowchart_Table.xls

Table 10-4 Sequence of Version 2.3 model 'Child' Batch Files Executed by Iteration

		Initial (Pump Prime) Iteration	Standard Iterations →					
Batch File	**Scripts / Programs**	**PP**	**1**	**2**	**3**	**4**	**5**	**6**
Set_Factors.bat	Set_Factors.s	1						
Set_CPI.bat	Set_CPI.s	2						
PP_Highway_Build.bat	Staprotp.exe Highway_Build_Toll.s	3						
PP_Highway_Skims.bat	Highway_Skims.s modnet.s Highway_Skims_mod.s joinskims.s	4						
Transit_Skim_All_Modes.bat	prefarV23.s Highway_Unbuild.s STAPROTP_V1.EXE PARKER.EXE WALKACC.EXE AUTOACC4.EXE transit_skims_CR.s transit_skims_MR.s transit_skims_AB.s transit_skims_BM.s	5	13	23	33	43	53	63
Transit_Fare.bat	Metrorail_Skims.s Mfare1.s Mfare2.s Assemble_Skims_CR.s Assemble_Skims_MR.s Assemble_Skims_AB.s Assemble_Skims_BM.s		14	24	34	44	54	64
Trip_Generation.bat	Demo_models.s Trip_Generation.s	6	15	25	35	45	55	65
Trip_Distribution.bat	Trip_Distribution.s	7	16	26	36	46	56	66
Mode_Choice.bat	AEMS.EXE mc_NL_summary.s		17	27	37	47	57	67
Auto_Driver.bat	MC_Auto_Drivers.s		18	28	38	48	58	68
PP_Auto_Drivers.bat	PP_Auto_Drivers.s	8						
Time-of-Day.bat	Time-of-Day.s Misc_Time-of-Day.s	9	19	29	39	49	59	69
Highway_Assignment.bat	Highway_Assignment.s	10	20	30	40	50	60	70
Highway_Skims.bat	Highway_Skims.s modnet.s Highway_Skims_mod.s joinskims.s	11	21	31	41	51	61	71
Transit_Assignment.bat	Combine_Tables_For_ TrAssign.s Transit_assignment_CR.s Transit_assignment_MR.s Transit_assignment_AB.s Transit_assignment_BM.s	12	22	32	42	52	62	72

Ref: I:\ateam\docum\FY09\Version2.3_modelDoc_2008-07\V23_Flowchart_Table.xls

10.2 *Launching a Model Run*

The model is normally launched with a very small 'wrapper' batch file that executes the 'parent' batch file which, in turn, executes 'child' batch files (as described above). The model execution begins when the 'wrapper' file name is manually typed in a command window that is opened to the root subdirectory. This may be done expeditiously by opening Windows Explorer, navigating to the root directory, selecting the root subdirectory, and right-clicking the mouse, choosing "Open Command Window Here" in Windows XP.[4] The command prompt should show something like this:

```
C:\user\cgv23>
```

All 'wrapper', 'parent', and 'child' batch (*.bat) files normally exist in the root directory. An example 'wrapper' batch file for initiating a model run for the year 2000 (RUNALL2000.bat) is shown below.

```
:: runall_2002.bat, 2008-06-04  Wed  16:15:43

set root=E:\model_dev\Ver2.3_20080604_pceNo
set scenar=2002
set runbat=runall_NL_2002.bat
set fullpth=%root%\%scenar%
:: Std error redirected to a file; Std output split between file and screen
timethis "cmd /c %runbat%  %scenar%  2> %fullpth%\%scenar%_errs.txt" | tee
%fullpth%\%scenar%_output.txt

if exist %fullpth%\%scenar%_errs.txt   start %fullpth%\%scenar%_errs.txt
if exist %fullpth%\%scenar%_output.txt start %fullpth%\%scenar%_output.txt

if exist %fullpth%\%scenar%\i6_Highway_Assignment.rpt start
%fullpth%\%scenar%\i6_Highway_Assignment.rpt
if exist %fullpth%\%scenar%\i6_mc_NL_summary.txt      start
%fullpth%\%scenar%\i6_mc_NL_summary.txt

:: Cleanup
set root=
set scenar=
set fullpth=
set runbat=
```

The batch file first specifies the root subdirectory (set root=…), specifies the output subdirectory (set scenar=…), and specifies the 'parent' batch file (set runbat=…). The 'fullpth' variable specifies the full path of the output subdirectory. With these key parameters established, the batch file initiates the model run as a line command. The basic syntax of the execution command is:

<runall batch file name> <name of the scenario specific subdirectory>

[4] In Windows XP, the "Open Command Windows Here" option is not available, unless you install the Windows XP Power Toy, "Command Here" application (http://www.microsoft.com/windowsxp/downloads/powertoys/xppowertoys.mspx).

For example, the command:

```
runall_2002.bat 2002
```

will execute the "runall_2002.bat" batch file using the "2002" subdirectory as the scenario subdirectory. For example, here is the beginning of the information sent for a year-2002 model run:

```
E:\model_dev\Ver2.3_20080604_pceNo>set _year_=2002

E:\model_dev\Ver2.3_20080604_pceNo>set _alt_=Ver2.3_20080604_pceNo

E:\model_dev\Ver2.3_20080604_pceNo>cd 2002

E:\model_dev\Ver2.3_20080604_pceNo\2002>set _HOV3PATH_=

E:\model_dev\Ver2.3_20080604_pceNo\2002>cd..

E:\model_dev\Ver2.3_20080604_pceNo>rem ====== Pump Prime Iteration
==========================================

E:\model_dev\Ver2.3_20080604_pceNo>set _iter_=pp

E:\model_dev\Ver2.3_20080604_pceNo>set _prev_=pp

E:\model_dev\Ver2.3_20080604_pceNo>call Set_Factors.bat 2002

E:\model_dev\Ver2.3_20080604_pceNo>cd support

E:\model_dev\Ver2.3_20080604_pceNo\Support>del tppl*.*

E:\model_dev\Ver2.3_20080604_pceNo\Support>del set_factors.rpt

E:\model_dev\Ver2.3_20080604_pceNo\Support>start /w TPPLUS.EXE ..\scripts\Set_Factors.s /start -
Ptppl -S..\support

E:\model_dev\Ver2.3_20080604_pceNo\Support>if errorlevel 1 goto error

E:\model_dev\Ver2.3_20080604_pceNo\Support>copy tppl*.prn set_factors.rpt
tppl0001.PRN
        1 file(s) copied.
```

This information includes both "standard output" and "standard error." "Standard output" is the information that is normally written to the screen as a model run is in process. "Standard error" includes any error messages that may be generated during the running of a model. For example, if a batch file tries to delete a file that does not exist, it will generate the error message "File not found," and this is sent to the screen, since standard error is sent to the screen by default. Standard output includes any non-error messages, such as "1 file copied."

Typically, due to the long run times, a model run is launched in the evening and is ready the next morning (or later). When launching a model run, we typically re-direct the standard error to a file. This allows us to review the file the next morning to make sure that there were no error messages (or at least, no critical error messages). Otherwise, the error messages would be simply sent to the screen, which has a limited number of lines it will store (The screen buffer may be controlled by the user. It is typically around 300 to 700 lines). The following command will launch a model run and re-direct standard error to a file:

```
cmd /c runall_2002.bat 2002 2> errs2002.txt
```

The “cmd /c” starts a new instance of the Windows XP command interpreter in the current command window. The “2>” ensures that only standard error, not standard output, is sent to the file.

A further enhancement on the run command is to use the “timethis.exe” utility from the Windows 2000 Resource Kit. This file is freely available on the Web. This utility will report the run time for a given command. Thus,

```
C:\user\cgv23> timethis “cmd /c runall_2002.bat 2002 2> errs2002.txt”
```

will result in the following report on the screen at the end of the model run:

```
TimeThis :  Command Line :  cmd /c runall_NL_2002.bat  2002  2>
E:\model_dev\Ver2.3_20080604_pceNo\2002\2002_errs.txt
TimeThis :    Start Time :  Wed Jun 04 16:21:46 2008
TimeThis :      End Time :  Thu Jun 05 10:48:49 2008
TimeThis :  Elapsed Time :  18:27:02.770
```

The quotes around the command are necessary when re-direction is used.

The final enhancement is to re-direct the standard output to a file. In the past, if you redirected the standard output to a file, you would see nothing on the screen until the model run was done. Now, we use a free utility called “tee.exe” that splits the standard output into two copies, sending one to a file and one to the screen.[5] Thus, the final command is:

```
timethis "cmd /c runall_2002.bat    2002  2> errs2002.txt" | tee scr_outp2002.txt
```

Table 10-5 contains a listing of the key files resulting from the final iteration.

[5] http://www.csc.calpoly.edu/~bfriesen/software/console.shtml.

Table 10-5 Listing of Final Iteration (I6) Files Produced by the Version 2.3 Model

(This table is not yet completed)

Chapter 11 Set-Up Programs and Highway Network Building

User Provided Input(s):

CPI schedule and parameter file	\Inputs\CPI_File.txt	Text
Time penalty files (null)	\Support\???Pen.03	Text
Jurisdiction-to-TAZ equivalency	\Support\JURISV21.EQV	Text
Zonal Land Use File	\Inputs\ZONE.ASC	Text
Node Coordinate File	\Inputs\NODE.ASC	Text
Link File	\Inputs\LINK.ASC	Text
Station/PNR Lot File	\Inputs\STA_TPP.BSE	Text
Metrorail/Commuter Rail Link File	\Inputs\RAIL_LNK.BSE	Text
Initial Speed Lookup Files	\Inputs\TAZAMSPD.LKP, \Inputs\TAZOPSPD.LKP, \Inputs\AMSPD.LKP, \Inputs\OPSPD.LKP	Text
Area Type Override File	\Inputs\AREAOVER.ASC	Text
Toll Parameter File	\Inputs\TOLL.ESC	Text

Key Output(s):

Highway, Transit deflator files	Trn_Deflator.txt Hwy_Deflator.txt	Text
K-factor matrices	\Support\<???>K.dat	Binary
Time Penalty File (currently null)	\Support\<???>PEN.dat	Binary
Unloaded/Built Highway Network File	ZONEHWY.NET	Binary
Summary text file of Fare CPI assumptions used	MFARE2.CPI	Text
Zonal Highway Terminal Time File	ZTERMTM.ASC	Text
Zonal Area Type file	BASEZON.DAT	Text

Program File(s):

STAPROTP.EXE, TP+

Control/Support File(s):

STAPROTP.CTL (Control files for the STAPROTP Program)
SET_FACTORS.S, SET_CPI.S, HIGHWAY_BUILD_TOLL.S (TP+ scripts)

Application Details:

The Set_Factors.S script is used to establish K-factors and time penalty files (which are currently null values for the Version 2.3 model). The Set_CPI.S script is used to create highway and transit deflation factors in small text files that are used in subsequent modeling steps. Set_CPI.S reads a small file (CPI_File.txt) which contains a CPI schedule taken from the U.S. Bureau of Labor Statistics. The CPI schedule and also uses the environment variable _*year*_ from the RUNALL_????.bat file to calculate the deflation factors automatically. It should be noted that the CPI_File.txt includes a parameter named INFLATIONFTR that may be used to alter the CPI growth rate assumption in developing future deflation factors. The default value for this parameter is 1.0, which implies that the historical inflation rate is assumed. This value may be altered to reflect alternate growth assumptions if desired.

The purpose of the highway network building process is to establish a single binary highway network containing link attributes corresponding to AM peak, PM peak, and off-peak time periods. The process requires a highway link file and a nodes file and several supporting files. The nodes file contains the x/y coordinate units of each highway node, in Maryland State Plane coordinates, NAD83, in whole feet. HIGHWAY_BUILD_TOLL.S is the TP+ script that is used. The script first determines the nearest zone centroid associated with each link in the highway network.[6] It then determines the area type of each zone in the region based on land activity density. The density measure is defined jointly by population and employment densities for a one-mile 'floating' radius about each zone as shown on Table 11-1. Note that zonal area type override values may be specified in the AREAOVR.ASC file.

Table 11-1 Version 2 Highway Network Area Type Definitions

Relationship of Area Type Codes to Land Use Density

One-Mile 'Floating' Pop. Density (Pop/Sq mi.)	One-Mile 'Floating' Employment Density (Emp / Sq mi)						
	0-100	101-500	501-1,500	1,501-5,000	5,001-15,000	15,001-35,000	35,001+
0-100	7	7	5	5	2	2	2
101-350	7	5	5	5	2	2	2
351-1,500	6	6	5	5	2	2	2
1,501-3,500	6	6	4	3	2	2	2
3,501-6,500	4	4	3	3	2	2	1
6,501-10,000	4	3	3	3	2	2	1
10,001+	3	3	3	2	2	2	1

The highway network building process is used to convert text link records into a binary network file. The script also performs other functions. It creates transit walk-network links which are used in the transit network building process. The script also builds zonal highway terminal times. Highway terminal times vary from 2 to 8 minutes as a function of employment density.

[6] Each link is associated with one zone, but there is no guarantee that each zone is associated with a link.

Finally, procedures have been placed in the script to identify freeway links to be excused from queuing delay procedures (as described in Chapter 1). A variable named AllowQue variable is established for this purpose.

The STAPROTP program is used to create transit link and node files in TRNBUILD format, on the basis of two user-prepared files. Table 11-2 describes the control cards that are required for the program. One input file, called a 'station' file (sta_tpp.bse), contains attributes associated with all base and future transit stations and PNR lots. The second file is a "rail link" file, which contains distances and speeds of all fixed guideway links pertaining to Metrorail and commuter rail systems. The program also creates a TAZ-PNR equivalence file that is used in the building of drive access links. Finally, the program also creates three files that support the fare (MFARE) development process, a Metrorail link and node file, and the zonal data file (the "A1 deck") for the METRORAIL_SKIMS.S and MFARE1.S programs.

The input file format descriptions for the HIGHWAY_BUILD_TOLL.S and STAPROTP programs are shown at the end of this chapter.

Table 11-2 STAPROTP Control Parameters

Type	***Name***	***Description***
&files	Statf	Station file input
	Rlnkf	Rail link file input
	Metlnkm1	Metrorail Link file for MFARE1 process
	Metlnkf	Metrorail Link file in TRNBUILD format
	Comlnkf	Comm.Rail Link file in TRNBUILD format
	Metnodm1	Metrorail Node file for MFARE1 program
	Metnodf	Metrorail Node file in TRNBUILD format
	Comnodf	Comm. Rail Node file in TRNBUILD format
	Metpnrf	Metrorail PNR Node file in TRNBUILD format
	Compnrf	Comm. Rail PNR Node file in TRNBUILD format
	Buspnf	Bus PNR node file in TRNBUILD format
	Mpnlf	Metrorail/PNR Connect link file in TRNBUILD format
	Cpnrlf	Comm. Rail /PNR Connect link file in TRNBUILD format
	Bpnlf	Bus /PNR connect link file in TRNBUILD format
	Metblf	Metrorail/Bus connect link file in TRNBUILD format
	Comblf	Comm.Rail/Bus connect link file in TRNBUILD format
	Mf1a1	A1 deck for the MFARE1 program
	Tazpnrf	TAZ / PNR equivalience in MATRIX-ready format
	S_pxyf	Station/PNR XYS file

Highway Toll Modeling

Pathbuilding procedures in the Version 2.3 model are based on either highway time or a combination of highway time and transit time. The methodology for incorporating highway toll sensitivity into the model essentially involves converting link-coded highway *tolls* into *equivalent minutes.* The equivalent minutes are then added to the highway time during pathbuilding. This type of approach effectively reduces travel demand on tolled paths and increases demand on competing non-tolled paths for a given i/j. In developing highway toll-time equivalents, the nature of pathbuilding in trip distribution and highway assignment steps is considered. Trip distribution is applied using income stratification, while the traffic assignment distinguishes path by vehicle type. Therefore the toll modeling approach involves time-cost equivalent parameters that are provided on the basis of both income and vehicle types.
To apply the toll modeling procedure, the analyst: 1) codes highway tolls appropriately in the highway network, and 2) prepares three parameter files in the *INPUTS* subdirectory. The three files are relatively small text files generically named *TOLL.ESC*, *TOLL.INC*, and *TOLL.SKM*.

Toll coding in the highway network is reflected with two highway link attributes: *TOLL* and *TOLLGRP*. *TOLL* is the monetary value of the fee charged at the link location in current year cents. The current year should be consistent with the transit fare tariff year assumed in the MFARE2 program. *TOLLGRP* is a 4-digit facility type index. The *TOLLGRP* value should be coded with a non-zero value if the *TOLL* value is non-zero. (If the *TOLL* value of a given link is non-zero and the *TOLLGRP* value equals zero, the highway network building process automatically imposes a *TOLLGRP* override value of '1'). If the analyst wishes to reflect a per-mile *TOLL* value on a link, there is no need to code a manually calculated *TOLL* value on the link. In this instance, the *TOLL* value should not be coded, but a unique *TOLLGRP* code should be assigned to the link and an associated per-mile rate should be specified in the *TOLL.ESC* file (described below). The highway building process ultimately creates six period-specific toll attributes: *AMTOLL, PMTOLL, OPTOLL* (tolls by time-of-day on all toll facilities) and *AMTOLL_VP, PMTOLL_VP, OPTOLL_VP* (tolls by time-of-day on variable priced facilities only).

The TOLL.ESC file is a TP+ script section that is called into the highway network building process. It contains five 'look-up tables' named *ESCFAC*, *DSTFAC*, *TTFAC*, *TG_ATOVR*, and *TOLLTYPE* which contain user-specified parameters that vary by *TOLLGRP* codes. *ESCFAC* values are override deflation factors used to convert current year tolls into constant 1994 values. *ESCFAC* values are normally set to zero, in which case, the default deflation factor defined in the file Hwy_Deflator.txt is used. This parameter exists to provide flexibility in specifying toll deflation differences by between tolled facilities, if desired by the analyst. The most recent model runs have been executed with consistent deflation assumptions between tolls and transit fares. *DSTFAC* values are optional per-mile rates (current-year cents per mile) that may be specified at the user's option as a special network coding expedient. During highway building, the *DSTFAC* factor is applied to the coded distance and the *TOLL* value is automatically assigned the result. If this option is not exercised, all *DSTFAC* values must be set to zero. The *TTFAC* are optional factors that may be used to alter the *AMTOLL*, *PMTOLL, or OPTOLL* values described above on a facility basis. The default *TTFAC* values are '1.0'. If, for example, the analyst wishes to set the off-peak toll to one-half of the coded *TOLL* value, then the off-peak

TTFAC value would be set to ‘0.50’ instead of ‘1.0’. The *TG_ATOVR* lookup enables the option to change the area type designation on the tolled link. Because of the technique used to formulate area types, it is possible that adjacent links may have different area type codes, and hence, different capacities. Differences in capacities typically hamper the estimation of HOT lane toll rates. *TG_ATOVR* may be used to enforce area type homogeneity within a given toll segment ton ensure that the segment capacity is consistent. Finally, the *TOLLTYPE* lookup is used to distinguish fix-price type toll facilities (coded as ‘1’) from variably priced facilities (coded as ‘2’). All coded toll groups must be coded as either ‘1’ or ‘2’.

The time-cost equivalents by income level are specified in the *TOLL.INC* file. This is another TP+ script section that is called into the trip distribution process. The equivalent time values are reasonable average values, which should generally not be altered. The income-based time equivalents are shown on the table below. The hourly household wage rates were developed from the 2000 Census (Washington PMSA) income data, assuming 1,920 working hours per year and an average of 1.38 workers per household. The work equivalent values are based on a 50% average time valuation time while the non-work purpose is based on a 35% time valuation.

Work & Non-Work Time – Dollar Equivalents by Income Level

Annual Household Income Quartile	**(a)** **Hourly Wage Rate (2000 $)**	**(b)** **Work Equivalent** (minutes per 1994 $)	**(c)** **Non-Work Equivalent** (minutes per 1994$)
1	$6.60	21.1	30.2
2	$17.93	7.8	11.1
3	$30.19	4.6	6.6
4	$60.39	2.3	3.3

The assumed time-toll equivalents by vehicle type are shown on the table below. These equivalents are specified in the *TOLL.SKM* file (this file is called by the traffic assignment and highway skimming programs). The equivalent minutes are based on an average 1994 household income of $62,500. Airport vehicle time equivalents are based on the ‘full’ average value of time for all time periods. The SOV time equivalents are based on a 50% and 35% time valuation in the peak and off-peak periods. The HOV time equivalents are based on a 40% and 30% time valuation in the peak and off-peak periods. Truck time equivalents are set to 2.5 times the prevailing SOV values. These values should generally not be altered.

Peak/Off-Peak Time – Dollar Equivalents (Minutes/Dollar) by Vehicle Type

Vehicle Type	**Peak Period Equivalent** (minutes per 1994 $)	**Off-Peak Period Equivalent** (minutes per 1994 $)
Airport Auto	2.5	2.5
Single Occupant Auto	5.1	7.3
Multi-Occupant Auto	6.4	8.5
Truck	12.8	18.3

The *TOLL.SKM* files also enable the analyst to specify time period-specific toll factors by vehicle type and tolled facility using *AM_TFAC*, *PM_TFAC*, and *OP_TFAC* lookup tables. These lookup tables are provided as an optional coding expedient. Default values of ‘1.0’should be maintained if this option is not used. Example listings of the *TOLL.ESC*, *TOLL.INC*, and *TOLL.SKM* files follow below.

```
| ;|\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|
;|/////////////////////////////////////////////////////////////////////////|
;|//     TOLL.ESC  -- Version 2.3/TP+ Toll Escaltion - by toll group |
;|/////////////////////////////////////////////////////////////////////////|
;|\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|
;
;
;    ==========================================
;    = TOLL ESCALATION OVERRIDE FACTORS        =
;    = by TOLL GROUP                           =
;    = TABLE LOOKUP                            =
;    = For converting current year cents to    =
;    = 1994 cents                              =
;    = Note these are used to override the     =
;    = default deflation factor set in the file =
;    = named HWY_Deflator.txt                  =
;    ==========================================
;
; If the value is 0 below, default value will be taken
; from HWY_Deflator.txt
 LOOKUP NAME= ESCFAC,
        LOOKUP[1] = 1, RESULT=2,
        FAIL= 0,0,0,INTERPOLATE=F,
;   Toll  Escalation Toll Rate
;   Grp   Factor
;   ---   ------
 R=" 1    0.00000     ",  ;
   " 2    0.00000     ",  ;
   " 3    0.00000     "   ;
; end of toll escalation lookup
;
;    ================================================
;    = TOLL Distance Rates by TOLL GROUP (optional)   =
;    =                                                =
;    = Factor for computing tolls based on distance   =
;    =  in current year cents per mile                =
;    ================================================
 LOOKUP NAME= DSTFAC,
        LOOKUP[1] = 1, RESULT=2,
        FAIL= 0,0,0,INTERPOLATE=F,

;   Toll  Toll Rate
;   Grp   Cents/mi (in current yr$)
;   ---   ------
 R=" 1    0.0000    ",  ;
   " 2    0.0000    ",  ;
   " 3    0.0000    "   ;
; end of toll distance rate lookup
;
;    ================================================
;    = TOLL Time of Day Factors by Toll Group        =
;    =                                                =
;    = Factor for converting link-coded toll to      =
;    = specific time periods by link group           =
;    ================================================
 LOOKUP NAME= TTFAC,
        LOOKUP[1] = 1, RESULT=2,  ; AM       Toll factor
        LOOKUP[2] = 1, RESULT=3,  ; PM       Toll factor
        LOOKUP[3] = 1, RESULT=4,  ; Off-Peak Toll factor
        FAIL= 0,0,0,INTERPOLATE=F,
```

```
;   Toll  AM Toll PM Toll  Off-Peak
;   Grp   Factor  Factor   Toll Factor
;   ---   ------  ------   ------
 R=" 1    1.0000  1.0000   1.0000   ",  ;
   " 2    1.0000  1.0000   1.0000   ",  ;
   " 3    1.0000  1.0000   1.0000   ",  ;
   " 4    1.0000  1.0000   1.0000   "   ;
; end of toll time adjustment factor lookup
;
;    ==========================================
;    = Min. & Max                             =
;    = Area Type overide       by TOLL GROUP    =
;    =                                        =
;    =                                        =
;    ==========================================
;
; If the value is 0 below, default value will be
; based on the standard zonal density
; the override must be >= 1 and <=7
 LOOKUP NAME= TG_ATOVR,
        LOOKUP[1] = 1, RESULT=2,
        FAIL= 0,0,0,INTERPOLATE=F,
;   Toll  Area Type Override
;   Grp   Min  Max
;   ---   ---- ---
 R=" 1    0     0   ",  ;
   " 2    0     0   ",  ;
   " 9    0     0   ",  ;
   "10    0     0   "   ;
; end of Area type override
;    ==========================================
;    = Min. & Max                             =
;    = Area Type overide       by TOLL GROUP    =
;    =                                        =
;    =                                        =
;    ==========================================
;
; If the value is 0 below, default value will be
; based on the standard zonal density
; the override must be >= 1 and <=7

 LOOKUP NAME= TG_ATOVR,
        LOOKUP[1] = 1, RESULT=2,
        FAIL= 0,0,0,INTERPOLATE=F,

;   Toll  Area Type Override
;   Grp   Min  Max
;   ---   ---- ---
 R=" 1    0     0   ",  ;
   " 2    0     0   ",  ;
   " 3    5     7   ",  ;
   " 4    5     7   ",  ;
   " 5    5     7   ",  ;
   " 6    5     7   "   ;
; end of Area type override

; start of TOLL TYPE LOOKUP
;    ==========================================
;    = TOLL Type LOOKUP table for each toll group
;    =      1='Fixed Toll' facility (e.g., Dulles Toll Road)
;    =      2= variable or managed toll facility
;    =           (such as VA HOT lanes or ICC)
;    ==========================================
;
;
 LOOKUP NAME= TOLLTYPE,
        LOOKUP[1] = 1, RESULT=2,
        FAIL= 0,0,0,INTERPOLATE=F,
;
;   Toll  TOLL
```

```
;   Grp   TYPE 1/2
;   ---   ---- ---
 R=" 1    1      ",  ;
   " 2    2      ",  ;
   " 3    2      ",  ;
   " 4    2      ",  ;
   " 5    2      ",  ;
   " 6    2      "   ;
; end of Toll Type Lookup
```

```
;|//////////////////////////////////////////////////////////////////////|
;|// TOLL.INC  - Version 2.3     Toll Income Params   (Extl Ctl File)|
;|//////////////////////////////////////////////////////////////////////|
;|\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|
;
;
;     ================================================================
;     = Equivalent Toll Minutes by Time Prd & Income Group           =
;     = in minutes per 1994 dollars    6/08/04 rm =
;     ================================================================
;    AM Peak         Off Peak
;---------------   ----------------
 i1PKEQM = 21.1     I1OPEQM = 30.2                ; <--- INC 1
 i2PKEQM =  7.8     I2OPEQM = 11.1                ; <--- INC 2
 i3PKEQM =  4.6     I3OPEQM =  6.6                ; <--- INC 3
 i4PKEQM =  2.3     I4OPEQM =  3.3                ; <--- INC 4
;
; END
```

```
;|\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|
;|//////////////////////////////////////////////////////////////////////|
;|// TOLL.SKM  - Version 2.3     Toll Skim Params (TP+ Extl Ctl File)|
;|//////////////////////////////////////////////////////////////////////|
;|\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|

;     ================================================================
;     = Equivalent Toll Minutes by Time Prd & Vehicle Type           =
;     = in minutes per 1994 dollar - rm 6/8/04                       =
;     ================================================================
;    AM Peak          Off Peak           PM Peak
;---------------  ---------------      --------------
    SVAMEQM =  5.1     SVOPEQM =  7.3     SVPMEQM =  5.1 ; <--- SOVs
    H2AMEQM =  6.4     H2OPEQM =  8.5     H2PMEQM =  6.4 ; <--- HOVs-2 Occ
    H3AMEQM =  6.4     H3OPEQM =  8.5     H3PMEQM =  6.4 ; <--- HOVs-3+Occ
    TKAMEQM = 12.8     TKOPEQM = 18.3     TKPMEQM = 12.8 ; <--- Trucks
    APAMEQM =  2.5     APOPEQM =  2.5     APPMEQM =  2.5 ; <--- Apaxs

;     =================================================================
;     = AM Peak Toll Adjustment Factor(AM_TFAC)                       =
;     =    by Toll Group & Vehicle Type                               =
;     =================================================================
 LOOKUP NAME= AM_TFAC,
        LOOKUP[1]  = 1, RESULT=2,   ; sov toll factor as f(toll group#)
        LOOKUP[2]  = 1, RESULT=3,   ; hv2 toll factor as f(toll group#)
        LOOKUP[3]  = 1, RESULT=4,   ; hv3+toll factor as f(toll group#)
        LOOKUP[4]  = 1, RESULT=5,   ; Trk toll factor as f(toll group#)
        LOOKUP[5]  = 1, RESULT=6,   ; Apx toll factor as f(toll group#)
        FAIL= 0,0,0,INTERPOLATE=F,
;   Toll   SOV  HOV2  HOV3+ Trk   APAX
;   Grp   TFtr  TFtr  TFtr  TFtr  TFtr
;   ---   ----  ----  ----  ----  ----
 R=" 1    1.0   1.0   1.0   1.0   1.0  ",
   " 2    1.0   1.0   1.0   1.0   1.0  ",
   " 3    1.0   1.0   1.0   1.0   1.0  ",
   " 4    1.0   1.0   1.0   1.0   1.0  ",
   " 5    1.0   1.0   1.0   1.0   1.0  ",
   " 6    1.0   1.0   1.0   1.0   1.0  ",
   " 7    1.0   1.0   1.0   1.0   1.0  ",
   " 8    1.0   1.0   1.0   1.0   1.0  ",
   " 9    1.0   1.0   1.0   1.0   1.0  "
; (END of AM toll adjustment factor lookup)

;     =================================================================
;     = Off Peak Toll Adjustment Factor(OP_TFAC)                      =
;     =    by Toll Group & Vehicle Type                               =
;     =================================================================
 LOOKUP NAME= OP_TFAC,
        LOOKUP[1]  = 1, RESULT=2,   ; sov toll factor as f(toll group#)
        LOOKUP[2]  = 1, RESULT=3,   ; hv2 toll factor as f(toll group#)
        LOOKUP[3]  = 1, RESULT=4,   ; hv3+toll factor as f(toll group#)
        LOOKUP[4]  = 1, RESULT=5,   ; Trk toll factor as f(toll group#)
        LOOKUP[5]  = 1, RESULT=6,   ; Apx toll factor as f(toll group#)
        FAIL= 0,0,0,INTERPOLATE=F,
;
;   Toll   SOV  HOV2  HOV3+ Trk   APAX
;   Grp   TFtr  TFtr  TFtr  TFtr  TFtr
;   ---   ----  ----  ----  ----  ----
 R=" 1    1.0   1.0   1.0   1.0   1.0  ",
   " 2    1.0   1.0   1.0   1.0   1.0  ",
   " 3    1.0   1.0   1.0   1.0   1.0  ",
   " 4    1.0   1.0   1.0   1.0   1.0  ",
   " 5    1.0   1.0   1.0   1.0   1.0  ",
   " 6    1.0   1.0   1.0   1.0   1.0  ",
   " 7    1.0   1.0   1.0   1.0   1.0  ",
   " 8    1.0   1.0   1.0   1.0   1.0  ",
   " 9    1.0   1.0   1.0   1.0   1.0  "
; (END of Off peak toll adjustment factor lookup)
;
```

```
;      ==================================================================
;      =  PM Peak Toll Adjustment Factor(PM_TFAC)                         =
;      =    by Toll Group & Vehicle Type                                  =
;      ==================================================================
 LOOKUP NAME= PM_TFAC,
        LOOKUP[1]  = 1, RESULT=2,   ; sov toll factor as f(toll group#)
        LOOKUP[2]  = 1, RESULT=3,   ; hv2 toll factor as f(toll group#)
        LOOKUP[3]  = 1, RESULT=4,   ; hv3+toll factor as f(toll group#)
        LOOKUP[4]  = 1, RESULT=5,   ; Trk toll factor as f(toll group#)
        LOOKUP[5]  = 1, RESULT=6,   ; Apx toll factor as f(toll group#)
        FAIL= 0,0,0,INTERPOLATE=F,
;
;   Toll   SOV  HOV2  HOV3+ Trk   APAX
;   Grp   TFtr  TFtr  TFtr  TFtr  TFtr
;   ---   ----  ----  ----  ----  ----
 R=" 1    1.0   1.0   1.0   1.0   1.0  ",
   " 2    1.0   1.0   1.0   1.0   1.0  ",
   " 3    1.0   1.0   1.0   1.0   1.0  ",
   " 4    1.0   1.0   1.0   1.0   1.0  ",
   " 5    1.0   1.0   1.0   1.0   1.0  ",
   " 6    1.0   1.0   1.0   1.0   1.0  ",
   " 7    1.0   1.0   1.0   1.0   1.0  ",
   " 8    1.0   1.0   1.0   1.0   1.0  ",
   " 9    1.0   1.0   1.0   1.0   1.0  "
; (END of PM peak toll adjustment factor lookup)
```

Input File Descriptions and Formats:

1. Land Use File (zone.asc)

Table 11-3 Land Use File Format Description (zone.asc)

Columns	***Format***	***Field Description***
1- 4	I4	TAZ (1-2,191)
8- 15	I8	Households
16- 23	I8	Household Population
24- 31	I8	Group Quarters Population
32- 39	I8	Total Population
40- 47	I8	Total Employment
48- 55	I8	Industrial Employment
56- 63	I8	Retail Employment
64- 71	I8	Office Employment
72- 79	I8	Other Employment
80- 81	I2	Jurisdiction Code (0-23) *0/dc, 1/mtg, 2/pg, 3/alr/, 4/alx,5, ffx, 6/ldn, 7/ pw, 8/(unused), 9/ frd, 10/how, 11/aa, 12/chs, 13/(unused), 14/car, 15/cal, 16/stm, 17/ kg, 18/fbg, 19/stf, 20/spts, 21/fau, 22/clk, 23/jef*
83- 92	F10.4	Gross Land Area (in sq. miles)
94- 95	I2	Ratio of zonal HH median income to regional median HH income in tenths (i.e. 10 = 1.0), per 2000 CTPP.
97- 98	I2	Airline distance to the nearest external station in whole miles.

2. Node Coordinate File (node.asc)

Table 11-4 Node Coordinate File Format Description (node.asc)

Columns	***Format***	***Field Description***
1- 6	I6	Highway Node Number
7- 14	I8	X-Coordinate (NAD83-based in whole feet)
15- 22	I8	Y-Coordinate (NAD83-based in whole feet)

3. Base Highway Link File (link.asc)

Table 11-5 Base Highway Link File Format Description (link.asc)

Columns	Format	Field Description
1-5	I5	A node
6-10	I5	B node
13-17	F5.2	Link Distance (in whole miles with explicit decimal)
23-24	I2	Unused (place marker for Speed Class)*
26-27	I2	Unused (place marker for Capacity Class)*
30-33	I4	Daily Ground Count in thousands
35-36	I2	Daily Ground Count Quality Code
39-40	I2	Jurisdiction Code (0-23) *0/dc, 1/mtg, 2/pg, 3/alr/, 4/alx,5, ffx, 6/ldn, 7/ pw, 8/(unused), 9/ frd, 10/how, 11/aa, 12/chs, 13/(unused), 14/car, 15/cal, 16/stm, 17/ kg, 18/fbg, 19/stf, 20/spts, 21/fau, 22/clk, 23/jef*
51-52	I2	Screenline Code
54-55	I2	Link Facility Type Code (0-6) *0/centroids, 1/Freeways, 2/Major Art., 3/Minor Art, 4/ Collector, 5/ Expressway, 6/ Ramp (future use)*
61-64	I4	Toll Value in current year dollars
66-69	I4	Toll Group Code (1-9999)
81-82	I2	AM Peak No. of Lanes
84-85	I2	AM Peak Limit Code (0-9)
87-88	I2	PM Peak No. of Lanes
90-91	I2	PM Peak Limit Code (0-9)
93-94	I2	Off-Peak No. of Lanes
96-97	I2	Off-Peak Limit Code (0-9)
99-102	I4	Unused (place marker for TAZ)*
107-116	A/N	Project ID

Notes:
- *The mode choice model requires that all costs be in 1994 dollars.*
- *Limit Codes are 0,1 = General Use, 2 = HOV2,3+ only, 3 = HOV 3+ Only, 4 = Truck Prohibited, 5 = Non-Airport Vehicles Prohibited, 6-8 = (unused), 9 = 'Transit Only' link (links used to more accurately depict coded transit routes, but are below the grain of the zone system; these links are not included in the highway assignment process).*
- ** The speed class, capacity class, and TAZ are added to the highway network during the highway network building phase, so they are not used in the ASCII input file link.asc.*

4. Consolidated Station / PNR lot file (sta_tpp.bse)

Table 11-6 Consolidated Station / PNR Lot File Format Description (sta_tpp.bse)

Columns	***Format***	***Field Description***
1-5	I5	Sequence Number
10	A1	Mode Code (M=Metrorail, C=Commuter rail, B=Bus, L=Light rail, N= BRT/street car)
12	I1	Access distance code (1, 2, 3, 0, 9, 8) See Table 6-8.
15	A1	Parking Available? (Y/N)
18	A1	Station Active? (Y/N)
21-45	A25	Station Name/PNR lot name
46-50	I5	Network Centroid (2251-2500)
51-55	I5	TAZ location of Station/PNR lot (1-2191)
56-60	I5	Rail Station Node (7301-7399, 7600-7733)
61-65	I5	Parking lot node
66-70	I5	1st Bus Node
71-75	I5	2nd Bus Node
76-80	I5	3rd Bus Node
81-85	I5	4th Bus Node
86-90	I5	Parking capacity (number of spaces at the PNR lot)
91-100	I10	X coordinate of Station/PNR lot (MD State Plane, NAD83, feet)
101-110	I10	Y coordinate of Station/PNR lot (MD State Plane, NAD83, feet)
111-115	I5	Peak period parking cost (daily cost, cents)
116-120	I5	Off-peak parking cost (hourly cost, cents)
121-125	I5	Peak-period shadow price (currently not used)
126-130	I5	Off-peak-period shadow price (currently not used)
141-145	I5	Year of Station/PNR lot Opening (unused by scripts, but used as metadata)
147-166	A20	Project ID (Metadata)
168-187	A20	Scenario name, or left blank (Metadata)
189-210	A22	Comments, if any, regarding the file, since file cannot accept comment lines preceding the data lines

5. Rail Link File (rail_lnk.bse)

Table 11-7 Rail Link File Format Description (rail_lnk.bse)

Columns	***Format***	***Field Description***
1-5	I5	A Node
6-10	I5	B Node
15-19	I5	Distance in 1/100ths of miles
21-25	F5.2	Speed (mph)
37-37	I1	Rail Mode Number (3-5)

Chapter 12 Highway Skim File Development

Input(s):

Built Highway Network File	ZONEHWY.NET	Text
Time / Toll Value Equivalent File	TOLL.SKM	Text

Output(s): <ITER> =PP, i1…i6, PP= AM and OP

HIGHWAY_SKIMS.S	SKIMTOT<ITER>.DAT TRK<ITER>OP.SKM SOV<ITER>PP.SKM HOV2<ITER>PP.SKM HOV3<ITER>PP.SKM SOV<ITER>PP_MC.SKM HOV2<ITER>PP_MC.SKM HOV3<ITER>PP_MC.SKM	
JOINSKIMS.S	HWY<ITER>*PP*.SKM	
MODNET.S	<ITER>HWYMOD.NET	
Highway_Skims_mod.S	SOVM<ITER>*PP*.SKM HOV2M<ITER>PP.SKM HOV3M<ITER>PP.SKM	

Program File(s):

TP+

Control/Support File(s):

HIGHWAY_SKIMS.S, JOINSKIMS.S, MODNET.S, and Highway_Skims_mod.S

Application Details:

(Section to be added)

Chapter 13 Auto Driver Trip Development

Input(s): ??? = HBW, HBS, HBO, and NHB

Pre-existing final iteration AEMS mode choice model output modal trip tables	I6_???_NL_MC.MTT	Binary
Pump Prime iteration person trip tables	???ESTPP.PTT	Binary
Current iteration AEMS mode choice model output modal trip tables	???_NL_MC.MTT	Binary

Output(s): ??? = HBW, HBS, HBO, and NHB <ITER> =PP, i1…i6, PP= AM & OP

PP_AUTO_DRIVERS.S	???PP.ADR	
MC_AUTO_DRIVERS.S	???<ITER>.ADR	

Program File(s):

TP+

Control/Support File(s):

PP_AUTO_DRIVERS.S and MC_AUTO_DRIVERS.S

Chapter 14 Pre-Transit Network Processing

Input(s):

Built Highway Network File	ZONEHWY.NET	Binary
Station – PNR lot data file	Sta_tpp.bse	Text
Fixed guideway / rail link file	rail_lnk.bse	Text
Highway network link file	LINK.ASC	Text
Highway node file	NODE.ASC	Text
HBW zonal parking costs/terminal time file	HBWV2.A1F	Text
Supplemental walk link file	XTRAWALK.ASC	Text
Copy of Sta_tpp.bse file (see above)	STA_NEW.PRN	Text
List of zones connected to the Pentagon Metrorail station for the purpose of creating long-distance kiss-and-ride (KNR) links, which represent "slugging" or casual carpooling	PENTAGON.PRN	Text
SOV AM/Off-peak highway time skims file	SOVMAM.SKM, SOVMOP.SKM	Binary
Zonal walk shed file	NLwalkPct.txt	Text
Zonal TAZ-to-bus fare zone equivalence	TAZFRZN.ASC	Text
Zonal land use file	ZONE.ASC	Text
Equivalency file between TAZs and the seven superdistricts used in the nested-logit mode choice model	AREADEF.PRN	Text

Output(s):

HIGHWAY_UNBUILD.S	LINK.ASC, NODE.ASC	Text
STAPROTP_V1.EXE	MET_LINK.TB, MET_PNRL.TB, LRT_PNRN.TB, METLNKM1.TB, COM_PNRL.TB, LRT_PNRL.TB, COM_LINK.TB, BUS_PNRL.TB, LRT_BUS.TB, MET_NODE.TB, MET_BUS.TB, LRT_LINK.TB METNODEM1.TB, COM_BUS.TB, NEW_NODE.TB, COM_NODE.TB, TAZPNR.ASC, NEW_PNRN.TB, MET_PNRN.TB, MFARE1.A1, NEW_PNRL.TB COM_PNRN.TB, STAPNR.XYS,NEW_BUS.TB, BUS_PNRN.TB, LRT_NODE.TB, NEW_LINK.TB	Text
WALKACC.EXE	SIDEWALK.ASC WALKACC.ASC SUPPORT.ASC	
PARKER.EXE	METAMPNR.TB, METOPPNR.TB, COMAMPNR.TB, COMOPPNR.TB, BUSAMPNR.TB, BUSOPPNR.TB, LRTAMPNR.TB, LRTOPPNR.TB, NEWAMPNR.TB, NEWOPPNR.TB	
AUTOACC4.EXE	MRPRAM.ASC, NEWKROP.ASC, MRKRAM.ASC, BUSOP.ASC, CRAM.ASC, LRTOP.ASC, BUSAM.ASC, NEWOP.ASC,	Text

	LRTAM.ASC, AUTOALL.ASC, NEWAM.ASC, LRTKRAM.ASC, MRPROP.ASC, NEWKRAM.ASC, MRKROP.ASC, LRTKROP.ASC, CROP.ASC, NEWKROP.ASC	
PREFARV23.S	FARE_A2.ASC ZONEV2.A2F, HBWV2.A1F	Text

Program File(s):

STAPROTP_V1.EXE
WALKACC.EXE
PARKER.EXE
AUTOACC4.EXE
TP+

Control/Support File(s):

Staprotp_v1 Control (CTL) file, WALKACC Control Files, CROSS Control (CTL)file,andAUTOACC4 Control (CTL) file,
HIGHWAY_UNBUILD.S, PREFARV23.S (TP+ script)

Application Details:

(To be completed)

Table 14-1 TAZ / Bus Fare Zone Equivalency File Format Description (TAZFRZN.ASC)

Columns	*Format*	*Field Description*
Zonal data (All lines in the file)		
1-4	I4	TAZ Number (1-2141) and Metrorail Station No. (1-150)
9-16	I4	1st Bus fare zone 1 (currently numbered 1 to 21)
17-24	I4	2nd Bus fare zone 2 (currently numbered 1 to 21)
45-48	I4	Special transit service fare (cents)
49-50	I2	Jurisdiction code (0/DC, 1/MD, 2/VA Area 1 (Fairfax Co.), 3/VA Area 2 (non-Fairfax Co.)
Station data (first 150 lines of the file only)		
41-48	I4	1st Bus Fare Zone (currently numbered 1 to 21)
49-56	I4	2nd Bus Fare Zone (currently numbered 1 to 21)
57-64	I8	Jurisdiction code
65-72	I8	P discount
73-80	I8	A discount

Chapter 15 Transit Skim File Development

Input(s):

Local bus future time degradation factors	LBUSTIMFTRS.ASC	Text
Transit line files	MODE1,MODE2AM,...MODE10AM.TB MODE1,MODE2OP,...MODE10OP.TB	
Transit path tracing selection criteria	PATHTRACE.S	
Binary highway network	ZONEHWY.NET	Binary
Transit network support files- Transit nodes and links files	MET_LINK.TB, MET_PNRL.TB, LRT_PNRN.TB, METLNKM1.TB, COM_PNRL.TB, LRT_PNRL.TB, COM_LINK.TB, BUS_PNRL.TB, LRT_BUS.TB, MET_NODE.TB, MET_BUS.TB, LRT_LINK.TB METNODEM1.TB, COM_BUS.TB, NEW_NODE.TB, COM_NODE.TB, TAZPNR.ASC, NEW_PNRN.TB, MET_PNRN.TB, MFARE1.A1, NEW_PNRL.TB COM_PNRN.TB, STAPNR.XYS,NEW_BUS.TB, BUS_PNRN.TB, LRT_NODE.TB, NEW_LINK.TB	Text
Transit network Walk link files	SIDEWALK.ASC WALKACC.ASC SUPPORT.ASC	Text
PNR node files	METAMPNR.TB, METOPPNR.TB, COMAMPNR.TB, COMOPPNR.TB, BUSAMPNR.TB, BUSOPPNR.TB, LRTAMPNR.TB, LRTOPPNR.TB, NEWAMPNR.TB, NEWOPPNR.TB	Text
Transit access link files	MRPRAM.ASC, NEWKROP.ASC, MRKRAM.ASC, BUSOP.ASC, CRAM.ASC, LRTOP.ASC, BUSAM.ASC, NEWOP.ASC, LRTAM.ASC, AUTOALL.ASC, NEWAM.ASC, LRTKRAM.ASC, MRPROP.ASC, NEWKRAM.ASC, MRKROP.ASC, LRTKROP.ASC, CROP.ASC, NEWKROP.ASC	Text

Output(s): PP= AM and OP   AA= WK, DR, KR   <ITER> =PP, i1…i6, PP= AM & OP

TRANSIT_SKIMS_CR.S	SUPLCR*AAPP*.ASC SUPNCR*AAPP*.DBF TRNLCR*AAPP*.DBF <ITER>_*PPAA*_CR.STA <ITER>_*PPAA*_CR.SKM <ITER>_*PPAA*_CR.TTT	Text Text Text Binary Binary Binary
TRANSIT_SKIMS_MR.S	SUPLMR*AAPP*.ASC SUPNMR*AAPP*.DBF TRNLMR*AAPP*.DBF <ITER>_*PPAA*_MR.STA <ITER>_*PPAA*_MR.SKM <ITER>_*PPAA*_MR.TTT	Text Text Text Binary Binary Binary

TRANSIT_SKIMS_AB.S	SUPLAB*AAPP*.ASC SUPNAB*AAPP*.DBF TRNLAB*AAPP*.DBF <ITER>_*PPAA*_AB.STA <ITER>_*PPAA*_AB.SKM <ITER>_*PPAA*_AB.TTT	Text Text Text Binary Binary Binary
TRANSIT_SKIMS_BM.S	SUPLBM*AAPP*.ASC SUPNBM*AAPP*.DBF TRNLBM*AAPP*.DBF <ITER>_*PPAA*_BM.STA <ITER>_*PPAA*_BM.SKM <ITER>_*PPAA*_BM.TTT	Text Text Text Binary Binary Binary

Program File(s):

TP+

Control/Support File(s):

TRANSIT_SKIMS_CR.S, TRANSIT_SKIMS_MR.S, TRANSIT_SKIMS_AB.S, TRANSIT_SKIMS_BM.S

Application Details:

Chapter 16 Transit Fare Development

Input(s): PP= AM and OP AA= WK, DR, KR <ITER> =PP, i1…i6, PP= AM & OP

Metro Station Link File	METLNKM1.TB	Text
Metro Station XY File	METNODM1.TB	Text
Metrorail turn penalty file	INPUTS\TRNPEN.DAT	Text
MFARE1 A1 (Coordinate) File	MFARE1.A1	Text
Metrorail station discount file	Inputs\MFARE1_STA_DISC.ASC	Text
WMATA tariff parameters	Inputs\TARRIF.TXT	Text
Deflation factor file	Trn_deflator.txt	Text
	<ITER>_*PPAA*_CR.STA <ITER>_*PPAA*_CR.SKM <ITER>_*PPAA*_MR.STA <ITER>_*PPAA*_MR.SKM <ITER>_*PPAA*_AB.STA <ITER>_*PPAA*_AB.SKM <ITER>_*PPAA*_BM.STA <ITER>_*PPAA*_BM.SKM	Binary
	<ITER>_*PP_AA*_CR.FAR <ITER>_*PP_AA*_MR.FAR <ITER>_*PP_AA*_AB.FAR <ITER>_*PP_AA*_BM.FAR	
Peak / Off-Peak MFARE2 Bus Fare Matrix	Inputs\busfaram.asc Inputs\busfarop.asc	Text
Peak /Off-Peak MFARE2 A2 File	FARE_A2.ASC	Text

Output(s):

METRORAIL_SKIMS.S	RLDIST.SKM	Text
MFARE1.S	AM_Metrorail_Fares.TXT OP_Metrorail_Fares.TXT	Text
MFARE2.S	<ITER>_*PP_AA*_CR.FAR <ITER>_*PP_AA*_CR.FR5 <ITER>_*PP_AA*_CR.TXT <ITER>_*PP_AA*_MR.FAR <ITER>_*PP_AA*_MR.FR5 <ITER>_*PP_AA*_MR.TXT <ITER>_*PP_AA*_AB.FAR <ITER>_*PP_AA*_AB.FR5 <ITER>_*PP_AA*_AB.TXT <ITER>_*PP_AA*_BM.FAR <ITER>_*PP_AA*_BM.FR5 <ITER>_*PP_AA*_BM.TXT	
Assemble_Skims_CR.s	<ITER>_TRNAM_CR.SKM <ITER>_TRNOP_CR.SKM	Binary
Assemble_Skims_MR.s	<ITER>_TRNAM_MR.SKM <ITER>_TRNOP_MR.SKM	Binary

Assemble_Skims_AB.s	<ITER>_TRNAM_AB.SKM <ITER>_TRNOP_AB.SKM	Binary
Assemble_Skims_BM.s	<ITER>_TRNAM_BM.SKM <ITER>_TRNOP_BM.SKM	Binary

Control/Support File(s):

METRORAIL_SKIMS.S, MFARE1.S, MFARE2.S, Assemble_Skims_CR.s, Assemble_Skims_MR.s, Assemble_Skims_AB.s, Assemble_Skims_BM.s

Application Details:

(To be completed)

Chapter 17 Demographic Submodels

Input(s): <ITER> =PP, i1…i6, PP= AM & OP

Zonal Land Use File	`Inputs\ZONE.ASC`	Text
Zonal Area Type File	`BASEZON.DAT`	Text
Transit Accessibility File	`JOBACC.ASC`	Text

	`<ITER>_AM_WK_CR.TTT`
	`<ITER>_AM_DR_CR.TTT`
	`<ITER>_AM_WK_MR.TTT`
	`<ITER>_AM_DR_MR.TTT`
	`<ITER>_AM_WK_AB.TTT`
	`<ITER>_AM_DR_AB.TTT`
	`<ITER>_AM_WK_BM.TTT`
	`<ITER>_AM_DR_BM.TTT`
		Binary

Output(s):

Zonal HHs of Income Level 1, Stratified by Size and Vehicle Avail.	`HHI1_SV.DAT`	Text
Zonal HHs of Income Level 2, Stratified by Size and Vehicle Avail.	`HHI2_SV.DAT`	Text
Zonal HHs of Income Level 3, Stratified by Size and Vehicle Avail.	`HHI3_SV.DAT`	Text
Zonal HHs of Income Level 4, Stratified by Size and Vehicle Avail.	`HHI4_SV.DAT`	Text
Interim Output: Zonal Household Size, Income Level File	`HHSIZINC.DAT`	Text
Interim Output: Households by Number of Vehicles (0, 1, 2+)	`HH_VEH.DAT`	Text

Program File(s):

Control/Support File(s):

DEMO_MODELS.S

Application Details:

(To be completed)

Chapter 18 Trip Generation

Input(s):

Zonal Land Use File	ZONE.ASC	Text
Zonal HHs of Income Level 1, Stratified by Size and Vehicle Avail.	HHI1_SV.ASC	Text
Zonal HHs of Income Level 2, Stratified by Size and Vehicle Avail.	HHI2_SV.ASC	Text
Zonal HHs of Income Level 3, Stratified by Size and Vehicle Avail.	HHI3_SV.ASC	Text
Zonal HHs of Income Level 4, Stratified by Size and Vehicle Avail.	HHI4_SV.ASC	Text
Zonal Adjustment File, Purpose-Specific: HBW, HBS, HBO, NHB, TRK	ADJZPAF7.UPW, ADJZPAF7.UPS, ADJZPAF7.UPO, ADJZPAF7.UPN, TRUCKTAZ.ASC	Text
	SKIMTOT<ITER>.DAT	Text
External Production File	PEXT.ASC	Text
External Attraction File	AEXT.ASC	Text
Zonal Area Type File	BASEZON.DAT	Text

Output(s):

Trip End, Production-Attraction Files	HBWpros_ALL.TXT,HBWpros_INC.TXT, HBWattrs_ALL.TXT,HBWattrs_INC.TXT, HBSpros_ALL.TXT,HBSpros_INC.TXT, HBSattrs_ALL.TXT,HBSattrs_INC.TXT, HBOpros_ALL.TXT,HBOpros_INC.TXT, HBOattrs_ALL.TXT,HBOattrs_INC.TXT, NHBpros_ALL.TXT,NHBpros_INT.TXT, NHBattrs_ALL.TXT,NHBattrs_INT.TXT, MTKpros_ALL.TXT,MTKpros_INT.TXT, MTKattrs_ALL.TXT,MTKattrs_INT.TXT, HTKpros_ALL.TXT,HTKpros_INT.TXT, HTKattrs_ALL.TXT,HTKattrs_INT.TXT COMpros_int.txt, COMpros_all.txt, COMattrs_int.txt,COMattrs_all.txt	Text
HBW Non-Motorized Trip Ends	HBW_NM_PsAs.ASC	Text

Control/Support File(s):

TRIP_GENERATION.S

Application Details:

(To be completed)

Chapter 19 Trip Distribution

input(s):

Trip End, Production-Attraction Files	HBWpros_ALL.TXT,HBWpros_INC.TXT, HBWattrs_ALL.TXT,HBWattrs_INC.TXT, HBSpros_ALL.TXT,HBSpros_INC.TXT, HBSattrs_ALL.TXT,HBSattrs_INC.TXT, HBOpros_ALL.TXT,HBOpros_INC.TXT, HBOattrs_ALL.TXT,HBOattrs_INC.TXT, NHBpros_ALL.TXT,NHBpros_INT.TXT, NHBattrs_ALL.TXT,NHBattrs_INT.TXT, MTKpros_ALL.TXT,MTKpros_INT.TXT, HTKpros_ALL.TXT,HTKpros_INT.TXT, COMpros_int.txt, COMpros_all.txt	Text
SOV Peak, Off-Peak Highway Skims	SOV<ITER>AM.SKM, SOV<ITER>OP.SKM	Binary
	<ITER>_am_wk_BM.ttt <ITER>_am_dr_BM.ttt <ITER>_op_wk_BM.ttt <ITER>_op_dr_BM.ttt trk<ITER>op.skm	Binary
Land Use File	Inputs\ZONE.ASC	Text
Highway Terminal Time File	ZTERMTM.ASC	Text
F-Factor Files	HBWV2.FFS, HBSV2.FFS, HBOV2.FFS, NHBV2.FFS, CVTV2.FFS	Text
K-Factor Files	HBWK.DAT, HBSK.DAT, HBOK.DAT, NHBK.DAT	Binary
Time penalty Files	HBWPEN.DAT, HBSPEN.DAT, HBOPEN.DAT, NHBPEN.DAT	Binary
Income level Toll/Time Equivalent File	TOLL.INC	Text

Output(s): <ITER> =PP, i1…i6, PP= AM & OP

6 Trip Tables (HBW, HBS, HBO, NHB, Med Truck, Heavy Truck)	HBWEST<iter>.PTT, HBSEST<iter>.PTT, HBOEST<iter>.PTT, NHBEST<iter>.PTT, MTKEST<iter>.PTT, HTKEST<iter>.PTT mtkest<ITER>.vtt, htkest<ITER>.vtt, Comest<iter>.vtt SOVAMTT.SKF, SOVOPTT.SKF, TRKOPTT_<ITER>.SKF	Binary Binary Binary

Program File(s):

TP+, EXTRTAB.EXE

Control/Support File(s):

TRIP_DISTRIBUTION.S

Application Details:

(To be completed)

Chapter 20 Mode Choice

Input(s):

Daily person trips, stratified by income group (1, 2, 3, 4), in production/attraction format (INFILE 1)	`hbw_income.ptt, hbs_income.ptt, hbo_income.ptt, nhb_income.ptt` (person trip tables)	Binary
Highway skims, nine tables – SOV, HOV2, HOV3+ for time, distance, and tolls on non-variably-priced facilities (INFILE 2)	`hwyam.skm, hwyop.skm`	Binary
Commuter rail transit skims (INFILE 3)	`trnam_cr.skm, trnop_cr.skm`	Binary
All bus transit skims (INFILE 4)	`trnam_ab.skm, trnop_ab.skm`	Binary
Metrorail transit skims (INFILE 5)	`trnam_mr.skm, trnop_mr.skm`	Binary
Bus/Metrorail transit skims (INFILE 6)	`trnam_bm.skm, trnop_bm.skm`	Binary
Zonal data (INFILE 8)	zonev2.a2f	Text

Output(s):

Daily person trips, stratified by travel mode (14 tables): 1. DR ALONE 2. SR2 3. SR3+ 4. WK-CR 5. WK-BUS 6. WK-BU/MR 7. WK-MR 8. PNR-CR & KNR-CR 9. PNR-BUS 10. KNR-BUS 11. PNR-BU/MR 12. KNR-BU/MR 13. PNR-MR 14. KNR-MR	`hbw_nl_mc.mtt, hbs_nl_mc.mtt, hbs_nl_mc.mtt, nhb_nl_mc.mtt` (Modal trip tables)	(TP+) Binary
Print file	`hbw_nl_mc.prn, hbs_nl_mc.prn, hbs_nl_mc.prn, nhb_nl_mc.prn`	Text

Program File(s):

AEMS.EXE (AEMS.FOR), EXTRTAB.EXE

Control/Support File(s):

Control Files: HBW_NL_MC.CTL, HBS_NL_MC.CTL, HBS_NL_MC.CTL, and NHB_NL_MC.CTL

Scripts: MC_NL_Summary.s, MC_NL_St_Summary.s

Introduction

An overview of the nested-logit mode choice (NL MC) model used by the TPB Version 2.3 travel model is given in Chapter 6 (Mode Choice). This chapter of the user's guide will build on what was presented in Chapter 6 and will give details about using and running the NL MC model.

The mode choice model in the TPB Version 2.3 travel model is a 15-choice, NL MC model. The model includes three auto modes (drive alone, shared ride 2, and shared ride 3+) and four transit modes (commuter rail, all bus, all Metrorail, and combined bus/Metrorail) by three modes of access to transit (park and ride, kiss and ride, and walk), as shown in Figure 6-1. Although the model explicitly handles four transit sub-modes, it can also handle other transit sub-modes, such as light rail transit (LRT), bus rapid transit (BRT), and street car (Jain, 2008, p. 10). Table 20-1 lists the ten transit sub-modes that are handled by the Version 2.3 travel model and lists the mode code used in the consolidated station file. Note that the consolidated station file does not include bus stops, except for bus stops that have their own PNR lot (generally express bus service). Transit routes are represented in TP+ using the TRNBUILD LINE command, which is usually placed in a *.LIN file or, using COG/TPB convention, in a MODE*.TB file (a "mode" file).

Table 20-1 Transit sub-modes represented in the Version 2.3 travel model

Mode #	**Transit sub-mode**	**Mode code in consolidated station file**
1	Local Metrobus	(None, not represented)
2	Express Metrobus	B
3	Metrorail	M
4	Commuter rail	C
5	Light rail transit (LRT)	L
6	Other local bus in the WMATA service area	(None, not represented)
7	Other express bus in the WMATA service area	B
8	Other local bus beyond the WMATA service area	(None, not represented)
9	Other express bus beyond the WMATA service area	B
10	Bus rapid transit (BRT) and street car	N (for New mode)

Source: Metropolitan Washington Council of Governments, National Capital Region Transportation Planning Board. (2007, June 30). *FY–2007 Network Documentation: Highway and Transit Network Development*, DRAFT. June 30, 2007, p. 3-14.

Treatment of LRT, BRT, and streetcar

Since LRT, BRT, and street car are not explicitly represented in the 15-choice structure of the TPB NL MC model, it is useful to describe how these modes are handled by the model. As seen in Table 20-1, in terms of network coding, Mode 5 is reserved for LRT and Mode 10 is reserved for BRT and street car. The difference between these two sub-modes is that LRT (Mode 5) will generally run on a grade-separated right of way, whereas Mode 10 will run wholly, or at least partially, at-grade, on a facility that is shared with mixed traffic (e.g., cars and trucks) for at least part of the route. For transit skimming, mode choice, and transit assignment, LRT (Mode 5) is treated like Metrorail (Mode 3) and BRT/street car (Mode 10) is treated like local bus (Mode 1). In terms of fare development, Modes 5 and 10 are treated like Mode 1 (local bus).

So called "premium" modes (e.g., Metrorail, commuter rail, LRT, BRT, and streetcar) will typically travel faster than buses, since they have one or more of these characteristics: 1) A dedicated right-of-way, for all or a portion of the route; 2) Traffic signal priority; and/or 3) Superior acceleration/deceleration, compared to buses. In cases where "premium" modes have a dedicated ROW, one must add "transit-only" links to the rail link file (rail_link.bse). Thus, the rail link file will contain links for Metrorail (Mode 3), commuter rail (Mode 4), and potentially LRT (Mode 5) and BRT/streetcar (Mode 10). As has already been the case for Metrorail and commuter rail, when one is coding Mode 5 and 10 in the rail link file, one codes mode, distance, and speed values.

One codes Mode 5 and Mode 10 just like one would code local bus service. However, one must also make the following changes to the consolidated station file (which generally does not have information about local bus service). First, one must add Mode 5 and Mode 10 station nodes, using a mode code of "L" for LRT/Mode 5 and "N" for New/BRT/streetcar/Mode 10. Second, Mode 5 and Mode 10 stations do <u>not</u> require a station centroid number (23xx, 24xx, 25xx). Third, in cases where Mode 10 routes share a street segment with local bus and where one would like the mode 10 routes to be "combined" in terms of TP+/Voyager computing effective headways, the station node numbers of the mode 10 routes should be the same as those used for the bus stops on the link(s) of interest.

Revised transit access coding

The revised access coding used for the nested-logit mode choice model has been discussed in Chapter 6. Further detail is to be included in this section of the report, which is not yet complete. In the interim, one can consult the "MWCOG network coding guide for Nested Logit Model" (Jain, 2008).

Consolidated station file/database (sta_tpp.bse)

(Sections to be added)

Sidewalk links and zonal walk links

Zonal auto-access links

Station transfer links

Zonal percent walk to transit calculations

Application Details:

The mode choice model is run separately for each of the four trip purposes. The inputs are

- A control file (HBW_NL_MC.CTL, HBS_NL_MC.CTL, HBS_NL_MC.CTL, and NHB_NL_MC.CTL)
- Input 1: Motorized person trips, segmented by four income levels, in production/attraction format (hbw_income.ptt, hbs_income.ptt, hbo_income.ptt, nhb_income.ptt);
- Input 2: Highway “skims” (hwyam.skm, hwyop.skm);
- Input 3: Transit skims for the commuter rail mode (trnam_cr.skm, trnop_cr.skm);
- Input 4: Transit skims for the all bus mode (trnam_ab.skm, trnop_ab.skm);
- Input 5: Transit skims for the Metrorail mode (trnam_mr.skm, trnop_mr.skm);
- Input 6: Transit skims for the combined bus and Metrorail mode (trnam_bm.skm, trnop_bm.skm);
- Input 8: Zonal attributes, such as parking cost, terminal time (i.e., the time to park and “unpark” a car), and the percent of each zone that is within walking distance to transit. (zonev2.a2f).

The program writes out modal trip tables (in TP+ binary format). Note that, although there are 15 modes, PNR and KNR for commuter rail have been combined into one mode, so there are actually 14 tables on each binary file, not 15.

As mentioned in Chapter 6, the definition of high-occupancy vehicle (HOV) trips has changed, compared to the definition that was used in Version 2.2 and before. Previously, HOV trips coming out of the mode choice model referred to *only those that use HOV facilities for a substantial portion of their trip*. Similarly, in previous models, the definition of low-occupancy vehicle (LOV) included both drive-alone and carpools (provided the carpools did not use a preferential HOV facility). By contrast, in the Version 2.3 NL MC model, the term LOV refers to only the drive-alone trips. Similarly, HOV refers to all shared-ride 2 (2-person carpools) and shared-ride 3 (3+ person carpools), irrespective of whether they use an HOV facility or not.

The nested-logit mode choice model is applied using a Fortran program named AEMS (AECOM mode split modeling package). AEMS is completely parametric, i.e., all characteristics for any given mode choice model are specified in a control file. Characteristics represented in the control file include nesting structure, market segmentation, utility/disutility functions, and the values of coefficients and constants. These AEMS control files are described in the next section.

The zonal attributes file (zonev2.a2f) is created by prefarv23.s and is crated in the output subdirectory. Field definitions for the zonal attribute file can be found in Table 20-2.

Table 20-2 Zonal File, or "A1 Deck," Format Description (ZONEV2.A2F)

Columns	Format	Field Description
1-5	I5	TAZ number
6-10	I5	HBW parking cost (8-hour rate, 1994 cents)
11-15	I5	HBS parking cost (1994 cents)
16-20	I5	HBO parking cost (1994 cents)
21-25	I5	NHB parking cost (1994 cents)
26-30	I5	Terminal time for home-based purposes (minutes)
31-35	I5	Terminal time for non-home-based purposes (minutes)
36-40	I5	Percent walk to transit: Short walk to Metrorail (0 to <= 0.5 miles)
41-45	I5	Percent walk to transit: Long walk to Metrorail (>0.5 to <=1.0 miles)
46-50	I5	Percent walk to transit: Short walk to any transit, AM peak period
51-55	I5	Percent walk to transit: Long walk to any transit, AM peak period
56-60	I5	Percent walk to transit: Short walk to any transit, off-peak period
61-65	I5	Percent walk to transit: Long walk to any transit, off-peak period
66-70	I5	Mode choice superdistricts (1-7)

Nested-logit mode choice model control files

Appendix H (Fortran and other control files) contains listings showing the four nested-logit mode choice control files, which are read by AEMS.EXE for an execution of the NL MC model. This section will describe the contents of the HBW control file (HBW_NL_MC.CTL). The first 36 lines of this file can be found in Figure 20-1. Detailed information about the control files needed to run AEMS.EXE can be found in the AEMS documentation (AECOM, 2005). The first line of the HBW control file is

```
HBW OP NESTED LOGIT MC - #DATE:  5/08/2008 #VER:  21
```

This is an example of a "procedure title." It is used simply to identify the current procedure being processed. It gets used in report files (such as hbw_nl_mc.prn) and in the standard output that is sent to the screen during the running of AEMS. A procedure title should not begin with an asterisk ("*") in column 1, since an asterisk is used to turn a line into a comment. The procedure title must also not begin with any of the reserved key words used by AEMS (such as CHOICE, COEF, SKIM, COEF PURP, etc.).

The second line of the control file is

```
CHOICE          1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     (etc.)
```

Figure 20-1 The first 36 lines of the HBW mode choice control file (HBW_NL_MC.CTL)

```
HBW OP NESTED LOGIT MC - #DATE:  5/08/2008 #VER:  21
CHOICE            1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
*
*
*LOGIT COEFFICIENTS BY CHOICE FOR EACH SKIM (NO INPUT SKIM IS
*EQUIVALENT TO A CONSTANT)
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
COEF01:IVTT       1>-0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128
SKIM01:IVTT       1>DAIV      S2IV      S3IV      WCIV      WBIV      WTIV      WMIV      PCIV      KCIV      PBIV      KBIV      PTIV      KTIV      PMIV      KMIV
COEF02:AUTO ACC   1>                                                                      -0.03192  -0.03192  -0.03192  -0.03192  -0.03192  -0.03192  -0.03192  -0.03192
SKIM02:AUTO ACC   1>                                                                      PCAA      KCAA      PBAA      KBAA      PTAA      KTAA      PMAA      KMAA
COEF03:TERM/OVTT  1>-0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320
SKIM03:TERM/OVTT  1>DATE      S2TE      S3TE      WCOV      WBOV      WTOV      WMOV      PCOV      KCOV      PBOV      KBOV      PTOV      KTOV      PMOV      KMOV
* LIMIT COEF 04 TO PURPOSE 1
COEF PURP04        >1
COEF04:COST INC1  1>-0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185
SKIM04:COST INC1  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
* LIMIT COEF 05 TO PURPOSE 2
COEF PURP05        >2
COEF05:COST INC2  1>-0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093
SKIM05:COST INC2  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
* LIMIT COEF 06 TO PURPOSE 3
COEF PURP06        >3
COEF06:COST INC3  1>-0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062
SKIM06:COST INC3  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
COEF PURP07        >4
* LIMIT COEF 07 TO PURPOSE 4
COEF07:COST INC4  1>-0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046
SKIM07:COST INC4  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
COEF08:TRN XFERS  1>                              -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000
SKIM08:TRN XFERS  1>                              WCXF      WBXF      WTXF      WMXF      PCXF      KCXF      PBXF      KBXF      PTXF      KTXF      PMXF      KMXF
COEF09:TRN BRDPEN 1>                              -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320
SKIM09:TRN BRDPEN 1>                              WCXP      WBXP      WTXP      WMXP      PCXP      KCXP      PBXP      KBXP      PTXP      KTXP      PMXP      KMXP
*WALK WEIGHT
COEF10:TRN WLKWT  1>                              -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256
SKIM10:TRN WLKWT  1>                              WCWK      WBWK      WTWK      WMWK      PCWK      KCWK      PBWK      KBWK      PTWK      KTWK      PMWK      KMWK
```

Note: Lines in the control file can run 168 characters long. When describing lines in this chapter, due to formatting issues, we will normally show only the first 90 or so characters of the line, but the full line appears both in Figure 20-1 and Appendix H (Fortran and other control files). The CHOICE key word, which begins a CHOICE command, at the beginning of line 2 specifies the number and names of the modes (or “choices”) that are available for trip makers. The version of AEMS used by TPB supports up to 15 choices, which is sufficient for TPB’s current needs, but a newer version of AEMS supports up to 18 choices. The general syntax of a CHOICE line is as follows:

```
CHOICE              1> <choice 1><choice 2><choice 3>… <choice 15>
```

The names of each choice appear as 10-character labels beginning in column 21 (choice 1), column 31 (choice 2), column 41 (choice 3) and so on for up to 15 different choices. Choice names must be non-blank character strings and AEMS determines the number of available choices according to the last non-blank choice name defined with the choice command.

The next two lines, lines 3 and 4, contain only an asterisk in column 1, so these two lines are blank comment lines. Lines 5 and 6 are also comment lines, due to the asterisk in column 1:

```
*LOGIT COEFFICIENTS BY CHOICE FOR EACH SKIM (NO INPUT SKIM IS
*EQUIVALENT TO A CONSTANT)
```

Line 7 is shown below:

```
*CHOICE             1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR   (etc.)
```

Although it looks like the CHOICE command, it is actually a comment, due to the asterisk in column 1, and is used as a “ruler” to help line up the 29 lines of commands that follow it, the first two being (lines 8 & 9):

```
COEF01:IVTT         1>-0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  (etc.)
SKIM01:IVTT         1>DAIV      S2IV      S3IV      WCIV      WBIV      WTIV      WMIV      (etc.)
```

As stated in the AEMS user’s guide, the COEF command “specifies the disutility function to be used to represent the impedance associated with each travel mode. AEMS is dimensioned to allow up to 50 terms to be specified for the disutility function and the COEF command defines the coefficient values associated with each term in each mode’s disutility function. The coefficient values are multiplied by the contents of the SKIM variable and are separately accumulated for each mode.” The SKIM command “defines the file location or variable name containing the level-of-service information for each sequence element of each mode’s disutility equation. It works in conjunction with the COEF command.” (AECOM, 2005, p. 15). Thus, in our example, our first level-of-service, or skim, variable is in-vehicle travel time (IVTT), and the drive-alone IVTT (DAIV) is multiplied by the coefficient value of -0.02128. IVTT is used as a generic (i.e., not alternative-specific) variable, since the IVTT of all modes is treated the same, i.e., is multiplied by the same coefficient value: -0.02128. A listing of all of the time and cost variables used in the disutility equation of the TPB Ver. 2.3 NL MC model (and stored in the AEMS control file) can be found in Table 20-3. This table also shows the mapping between coefficient numbers and the level-of-service variable. A full list of the coefficient values in the four NL MC mode choice models can be found in Table 20-4, Table 20-5, and Table 20-6.

Table 20-3 Time and cost variables used in the disutility equation of the TPB Ver. 2.3 NL MC model (stored in the AEMS control file)

Variable name	Variable description	Coeff #	Skim #
IVTT	In-vehicle travel time (transit and auto)	COEF01	SKIM01
AUTO ACC	Auto-access time (transit)	COEF02	SKIM02
TERM/OVTT	Terminal time (auto) and other out-of-vehicle travel time (transit)	COEF03	SKIM03
COST INC1	Cost for income group 1	COEF04	SKIM04
COST INC2	Cost for income group 2	COEF05	SKIM05
COST INC3	Cost for income group 3	COEF06	SKIM06
COST INC4	Cost for income group 4	COEF07	SKIM07
TRN XFERS	Transit transfers	COEF08	SKIM08
TRN BRDPEN	Transit boarding penalty	COEF09	SKIM09
TRN WLKWT	Transit walking and waiting time	COEF10	SKIM10

Ref: M:\model_dev\nest_log\variableNamesAemsControFiles.xls

Table 20-4 Coefficient values stored in the control files of the NL mode choice model (Ver. 2.3): Part 1 of 3

Skim variable	Mode	Transit Access	Coeff. Name	Coeff. Value HBW	Coeff. Value HBS	Coeff. Value HBO	Coeff. Value NHB
IVTT	Drive alone		DAIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Shared ride 2		S2IV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Shared ride 3+		S3IV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Commuter rail	Walk	WCIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Bus	Walk	WBIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Transit (Bus/Metrorail)	Walk	WTIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Metrorail	Walk	WMIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Commuter rail	PNR	PCIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Commuter rail	KNR	KCIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Bus	PNR	PBIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Bus	KNR	KBIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Transit (Bus/Metrorail)	PNR	PTIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Transit (Bus/Metrorail)	KNR	KTIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Metrorail	PNR	PMIV	-0.02128	-0.02168	-0.02322	-0.0286
IVTT	Metrorail	KNR	KMIV	-0.02128	-0.02168	-0.02322	-0.0286
AUTO ACC	Commuter rail	PNR	PCAA	-0.03192	-0.03252	-0.03483	-0.0429
AUTO ACC	Commuter rail	KNR	KCAA	-0.03192	-0.03252	-0.03483	-0.0429
AUTO ACC	Bus	PNR	PBAA	-0.03192	-0.03252	-0.03483	-0.0429
AUTO ACC	Bus	KNR	KBAA	-0.03192	-0.03252	-0.03483	-0.0429
AUTO ACC	Transit (Bus/Metrorail)	PNR	PTAA	-0.03192	-0.03252	-0.03483	-0.0429
AUTO ACC	Transit (Bus/Metrorail)	KNR	KTAA	-0.03192	-0.03252	-0.03483	-0.0429
AUTO ACC	Metrorail	PNR	PMAA	-0.03192	-0.03252	-0.03483	-0.0429
AUTO ACC	Metrorail	KNR	KMAA	-0.03192	-0.03252	-0.03483	-0.0429
TERM/OVTT	Drive alone		DATE	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Shared ride 2		S2TE	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Shared ride 3+		S3TE	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Commuter rail	Walk	WCOV	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Bus	Walk	WBOV	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Transit (Bus/Metrorail)	Walk	WTOV	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Metrorail	Walk	WMOV	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Commuter rail	PNR	PCOV	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Commuter rail	KNR	KCOV	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Bus	PNR	PBOV	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Bus	KNR	KBOV	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Transit (Bus/Metrorail)	PNR	PTOV	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Transit (Bus/Metrorail)	KNR	KTOV	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Metrorail	PNR	PMOV	-0.0532	-0.0542	-0.05805	-0.0715
TERM/OVTT	Metrorail	KNR	KMOV	-0.0532	-0.0542	-0.05805	-0.0715
COST INC1	Drive alone		DACS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Shared ride 2		S2CS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Shared ride 3+		S3CS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Commuter rail	Walk	WCCS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Bus	Walk	WBCS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Transit (Bus/Metrorail)	Walk	WTCS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Metrorail	Walk	WMCS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Commuter rail	PNR	PCCS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Commuter rail	KNR	KCCS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Bus	PNR	PBCS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Bus	KNR	KBCS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Transit (Bus/Metrorail)	PNR	PTCS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Transit (Bus/Metrorail)	KNR	KTCS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Metrorail	PNR	PMCS	-0.00185	-0.00202	-0.00202	-0.00994
COST INC1	Metrorail	KNR	KMCS	-0.00185	-0.00202	-0.00202	-0.00994

Ref: M:\model_dev\nest_log\variableNamesAemsControFiles.xls

Table 20-5 Coefficient values stored in the control files of the NL mode choice model (Ver. 2.3): Part 2 of 3

Skim variable	Mode	Transit Access	Coeff. Name	Coeff. Value HBW	Coeff. Value HBS	Coeff. Value HBO	Coeff. Value NHB
COST INC2	Drive alone		DACS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Shared ride 2		S2CS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Shared ride 3+		S3CS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Commuter rail	Walk	WCCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Bus	Walk	WBCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Transit (Bus/Metrorail)	Walk	WTCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Metrorail	Walk	WMCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Commuter rail	PNR	PCCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Commuter rail	KNR	KCCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Bus	PNR	PBCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Bus	KNR	KBCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Transit (Bus/Metrorail)	PNR	PTCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Transit (Bus/Metrorail)	KNR	KTCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Metrorail	PNR	PMCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC2	Metrorail	KNR	KMCS	-0.00093	-0.00101	-0.00101	-0.00994
COST INC3	Drive alone		DACS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Shared ride 2		S2CS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Shared ride 3+		S3CS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Commuter rail	Walk	WCCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Bus	Walk	WBCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Transit (Bus/Metrorail)	Walk	WTCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Metrorail	Walk	WMCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Commuter rail	PNR	PCCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Commuter rail	KNR	KCCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Bus	PNR	PBCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Bus	KNR	KBCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Transit (Bus/Metrorail)	PNR	PTCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Transit (Bus/Metrorail)	KNR	KTCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Metrorail	PNR	PMCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC3	Metrorail	KNR	KMCS	-0.00062	-0.00067	-0.00067	-0.00994
COST INC4	Drive alone		DACS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Shared ride 2		S2CS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Shared ride 3+		S3CS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Commuter rail	Walk	WCCS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Bus	Walk	WBCS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Transit (Bus/Metrorail)	Walk	WTCS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Metrorail	Walk	WMCS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Commuter rail	PNR	PCCS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Commuter rail	KNR	KCCS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Bus	PNR	PBCS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Bus	KNR	KBCS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Transit (Bus/Metrorail)	PNR	PTCS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Transit (Bus/Metrorail)	KNR	KTCS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Metrorail	PNR	PMCS	-0.00046	-0.00051	-0.00051	-0.00994
COST INC4	Metrorail	KNR	KMCS	-0.00046	-0.00051	-0.00051	-0.00994

Ref: M:\model_dev\nest_log\variableNamesAemsControFiles.xls

Table 20-6 Coefficient values stored in the control files of the NL mode choice model (Ver. 2.3): Part 2 of 3

Skim variable	Mode	Transit Access	Coeff. Name	Coeff. Value HBW	Coeff. Value HBS	Coeff. Value HBO	Coeff. Value NHB
TRN XFERS	Commuter rail	Walk	WCXF	0	0	0	0
TRN XFERS	Bus	Walk	WBXF	0	0	0	0
TRN XFERS	Transit (Bus/Metrorail)	Walk	WTXF	0	0	0	0
TRN XFERS	Metrorail	Walk	WMXF	0	0	0	0
TRN XFERS	Commuter rail	PNR	PCXF	0	0	0	0
TRN XFERS	Commuter rail	KNR	KCXF	0	0	0	0
TRN XFERS	Bus	PNR	PBXF	0	0	0	0
TRN XFERS	Bus	KNR	KBXF	0	0	0	0
TRN XFERS	Transit (Bus/Metrorail)	PNR	PTXF	0	0	0	0
TRN XFERS	Transit (Bus/Metrorail)	KNR	KTXF	0	0	0	0
TRN XFERS	Metrorail	PNR	PMXF	0	0	0	0
TRN XFERS	Metrorail	KNR	KMXF	0	0	0	0
TRN BRDPEN	Commuter rail	Walk	WCXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN BRDPEN	Bus	Walk	WBXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN BRDPEN	Transit (Bus/Metrorail)	Walk	WTXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN BRDPEN	Metrorail	Walk	WMXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN BRDPEN	Commuter rail	PNR	PCXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN BRDPEN	Commuter rail	KNR	KCXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN BRDPEN	Bus	PNR	PBXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN BRDPEN	Bus	KNR	KBXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN BRDPEN	Transit (Bus/Metrorail)	PNR	PTXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN BRDPEN	Transit (Bus/Metrorail)	KNR	KTXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN BRDPEN	Metrorail	PNR	PMXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN BRDPEN	Metrorail	KNR	KMXP	-0.0532	-0.0542	-0.05805	-0.0715
TRN WLKWT	Commuter rail	Walk	WCWK	-0.04256	-0.04336	-0.04644	-0.0572
TRN WLKWT	Bus	Walk	WBWK	-0.04256	-0.04336	-0.04644	-0.0572
TRN WLKWT	Transit (Bus/Metrorail)	Walk	WTWK	-0.04256	-0.04336	-0.04644	-0.0572
TRN WLKWT	Metrorail	Walk	WMWK	-0.04256	-0.04336	-0.04644	-0.0572
TRN WLKWT	Commuter rail	PNR	PCWK	-0.04256	-0.04336	-0.04644	-0.0572
TRN WLKWT	Commuter rail	KNR	KCWK	-0.04256	-0.04336	-0.04644	-0.0572
TRN WLKWT	Bus	PNR	PBWK	-0.04256	-0.04336	-0.04644	-0.0572
TRN WLKWT	Bus	KNR	KBWK	-0.04256	-0.04336	-0.04644	-0.0572
TRN WLKWT	Transit (Bus/Metrorail)	PNR	PTWK	-0.04256	-0.04336	-0.04644	-0.0572
TRN WLKWT	Transit (Bus/Metrorail)	KNR	KTWK	-0.04256	-0.04336	-0.04644	-0.0572
TRN WLKWT	Metrorail	PNR	PMWK	-0.04256	-0.04336	-0.04644	-0.0572
TRN WLKWT	Metrorail	KNR	KMWK	-0.04256	-0.04336	-0.04644	-0.0572

Ref: M:\model_dev\nest_log\variableNamesAemsControFiles.xls

Lines 42 through 81 of the HBW NL MC model control file (shown in Figure 20-2) are all comment lines. These have been used to further describe the six first input files to the mode choice/AEMS process. Lines 82 through 103 (not shown in Figure 20-2) are also comment lines, in this case describing the zonal input file.

Figure 20-2 Lines 42 to 81of the HBW mode choice control file (HBW_NL_MC.CTL)

```
* ASSUMED MATRIX ORGANIZATION
* FILE 1 TRIP TABLE (SEPARATE FOR EACH PURPOSE)
* 1 INCOME 1 (HOME-BASED)/ALL NHB TRIPS
* 2 INCOME 2 (HOME-BASED)
* 3 INCOME 3 (HOME-BASED)
* 4 INCOME 4 (HOME-BASED)
*
* FILE 2 HIGHWAY SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* 1 SOV   TIME (MIN)
* 2 SOV   DIST (0.1 MILES)
* 3 SOV   TOLL (1994 CENTS)
* 4 HOV2  TIME (MIN)
* 5 HOV2  DIST (0.1 MILES)
* 6 HOV2  TOLL (1994 CENTS)
* 7 HOV3+ TIME (MIN)
* 8 HOV3+ DIST (0.1 MILES)
* 9 HOV3+ TOLL (1994 CENTS)
*
* FILE 3=COM. RAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 4=BUS SKIMS       (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 5=METRORAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 6=BUS+METRORAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
*  1 WLK ACC/EGR (.01 MIN)  15 PNR ACC/EGR (.01 MIN)  33 KNR ACC/EGR  (.01 MIN)
*  2 WLK OTHER   (.01 MIN)  16 PNR OTHER   (.01 MIN)  34 KNR OTHER   (.01 MIN)
*  3 WLK IWAIT   (.01 MIN)  17 PNR IWAIT   (.01 MIN)  35 KNR IWAIT   (.01 MIN)
*  4 WLK XWAIT   (.01 MIN)  18 PNR XWAIT   (.01 MIN)  36 KNR XWAIT   (.01 MIN)
*  5 WLK IVTT TOT(.01 MIN)  19 PNR IVTT TOT(.01 MIN)  37 KNR IVTT TOT(.01 MIN)
*  6 WLK IVTT CR (.01 MIN)  20 PNR IVTT CR (.01 MIN)  38 KNR IVTT CR (.01 MIN)
*  7 WLK IVTT XB (.01 MIN)  21 PNR IVTT XB (.01 MIN)  39 KNR IVTT XB (.01 MIN)
*  8 WLK IVTT MR (.01 MIN)  22 PNR IVTT MR (.01 MIN)  40 KNR IVTT MR (.01 MIN)
*  9 WLK IVTT NM (.01 MIN)  23 PNR IVTT NM (.01 MIN)  41 KNR IVTT NM (.01 MIN)
* 10 WLK IVTT NM2(.01 MIN)  24 PNR IVTT NM2(.01 MIN)  42 KNR IVTT NM2(.01 MIN)
* 11 WLK IVTT LB (.01 MIN)  25 PNR IVTT LB (.01 MIN)  43 KNR IVTT LB (.01 MIN)
* 12 WLK #XFERS  (NUMBER )  26 PNR #XFERS  (NUMBER )  44 KNR #XFERS  (NUMBER )
* 13 WLK COST    (94CENTS)  27 PNR COST    (94CENTS)  45 KNR COST    (94CENTS)
* 14 WLK XPEN    (.01 MIN)  28 PNR XPEN    (.01 MIN)  46 KNR XPEN    (.01 MIN)
*                           29 PNR ACC TIME(.01 MIN)  47 KNR ACC TIME(.01 MIN)
*                           30 PNR ACC DIST(.01 MIL)  48 KNR ACC DIST(.01 MIL)
*                           31 PNR ACC COST(94CENTS)
*                           32 PNR STA TERM(.01 MIN)
```

Auto operating cost is currently set in all four control files at 10 cents per mile (1994 cents). Auto operating cost includes expenditures directly associated with the requirements of an automobile trip, including fuel, oil, maintenance, tire wear, etc. Auto ownership costs including buying a vehicle, insurance, registration fees, are not included in the auto operating cost, since, it is assumed, that these latter costs are not part of the perceived out-of-pocket cost that one considers when trying to choose what mode to take for a given trip. The lines of the control file where auto operating cost are delineated are shown below:

```
* AUTO OPERATING COSTS IN CENTS/mile
COMPUTE AUOP       >10
```

As stated in Chapter 6, in the previous versions of the mode choice model, it was assumed that the long-term trend for auto operation costs was going down, but this assumption is not currently being applied for the NL MC model, so we use the value of 10 cents per mile for all analysis years. Given the recent sharp increase in the price gas, it may be necessary to revisit the 10-cents-per-mile value.

Transit Constraint

Recent travel modeling at COG/TPB has added processing steps, generally referred to as the "transit constraint." The constraint was implemented to reflect the assumption that the core capacity of the transit system, particularly the Metrorail system, will not support expected passenger demand *beyond* certain levels (currently set as the unconstrained demand obtained in the year 2010). In the Version 2.2 regional travel model, the transit constraint imposed a transit trip maximum on forecasted transit trips, as established by 2010 transit trip flows, for those trips destined *to or through* the regional core. The transit constraint has not yet been implemented in the Version 2.3 model. It is hoped that this work can be undertaken in FY-09 so that the Version 2.3 travel model will be ready for use in the next air quality conformity assessment. Details of how the transit constraint was applied in the Version 2.2 travel model can be found in the documentation for that model (Milone, R., et. al., 2008).

Percent walk process

The zonal percent walk is the percent of a zone's area that lies within walking distance to transit service (i.e., a transit stop node, such as a bus stop or rail station). A short walk is defined as one that is less than or equal to 0.5 miles and a long walk is defined as one that is less than or equal to one mile. The following walk designations are used:

- Short walk to Metrorail (<= 0.5 miles);
- Long walk to Metrorail (>0.5 and <= 1.0 miles);
- Short walk to AM transit;
- Long walk to AM transit;
- Short walk to off-peak transit;
- Long walk to off-peak transit.

A GIS procedure is used to develop point buffers around transit stop nodes and then overlay these point buffers with zone (TAZ) boundaries. Finally, the six percent-walk metrics are calculated. Both AECOM and TPB staff have developed separate procedures for generating percent walk to transit values. We are currently using the TPB-developed procedure. The TPB procedure for generating transit walksheds and calculating zonal walk percents has been implemented as an ArcGIS procedure. The procedure was developed using ArcGIS version 9.0. The procedure will run under ArcGIS 9.1, but not as quickly, due to an ESRI software bug, that has been acknowledged by ESRI, but not yet fixed. The procedure takes about five minutes to run under ArcGIS 9.0 and about 40 minutes to run under ArcGIS 9.1. The ArcGIS procedure does not seem to run under ArcGIS 9.2 and has not been tested under later versions, such as 9.3. The next step is to produce a user's guide for the percent walk process.

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Chapter 21 Time-of-Day Processing

Input(s): <ITER> =PP, i1…i6, PP= AM & OP

Daily Auto Driver Trips, by Occupancy Levels	`HBW??.ADR, HBS??.ADR, HBO??.ADR, NHB??.ADR`	Binary
Daily Miscellaneous and Truck Trips (From the \Inputs subdirectory)	`VISI.ADR, TAXI.ADR, SCHL.ADR, AIRPAX.ADR, XXCVT.VTT, XXAUT.VTT,`	Binary
Truck and commercial vehicle trip tables	`MTKEST<ITER>.VTT, HTKEST<ITER>.VTT, COMEST<ITER>.VTT`	Binary
Adjustment or 'delta' trip tables used for commercial and trauck models	`CVDelta.trp` `TKDelta.trp`	
Time of Day Percent File by Purpose, Mode, and Direction	`V2TODTPP.PAR`	text / TP+ script

Output(s):

Trip Tables by Time Period	`AM<ITER>.ADR, PM<ITER>.ADR, OP<ITER>.ADR, ??TMCOM.TRP`	Binary
Miscellaneous Time-of-Day Files	`MISCAM<ITER>.TT, MISCPM<ITER>.TT, MISCOP<ITER>.TT`	Binary

Program File(s):

TP+, EXTRTAB.EXE

Control/Support File(s):

TIME-OF-DAY.S, MISC_TIME-OF-DAY.S, V2TODTPP.PAR

Application Details:

(To be completed)

Chapter 22 Traffic Assignment

Input(s): <ITER> =PP, i1…i6, PP= AM & OP

Volume delay and queuing parameters	..\support\Conical_VDF_22.txt ..\support\Queuing_time.txt	Text
Modeled vehicle trip tables by occupant level and time period	AM<ITER>.ADR, PM<ITER>.ADR, OP<ITER>.ADR, <ITER>TMCOM.TRP	Binary
Non-modeled vehicle and truck trip tables by time period	MISCAM<ITER>.TT, MISCPM<ITER>.TT, MISCOP<ITER>.TT	Binary
	Inputs\TOLL.SKM	
Network File	ZONEHWY.NET, PPHWY.NET, I1HWY.NET, ETC., I5HWY.NET	Binary

Output(s): <ITER> =PP, i1…i6, PP= AM & OP

Highway assignment output files		
Total Vehicle Trip by 6 Markets T1 – SOVs, Commercial vehicles T2 – HOV- 2 occ. vehicles T3 – HOV- 3+occ. Vehicles T4- Medium trucks T5- Airport passenger vehicles T6-Heavy trucks	<iter>AM.VTT, <iter>PM.VTT, <iter>OP.VTT	Binary
	<ITER>AMLLNK.ASC, ITER>PMLLNK.ASC, <ITER>OPLLNK.ASC	Text
Loaded Links Files by Time Period	<iter>HWY.NET	Binary

Program File(s):

TP+

Control/Support File(s):

HIGHWAY_ASSIGNMENT.S

Application Details:

(To be completed)

Chapter 23 Transit Assignment

Input(s): <ITER> =PP, i1…i6, PP= AM & OP

Combine_Tables_For_ TrAssign.s	Inputs\<iter>_HBW_NL_MC.MTT Inputs\<iter>_HBS_NL_MC.MTT Inputs\<iter>_HBO_NL_MC.MTT Inputs\<iter>_NHB_NL_MC.MTT	Binary
	Inputs\LBus_TimFTRS.ASC <iter>_PPMS.TRP ZONEHWY.NET	
transit_assignment_CR.s	Inputs\MODE1,3,4,5,6,8,10*PP*.TB met_node.tb, met_bus.tb met_link.tb, com_bus.tb com_node.tb, lrt_bus.tb com_link.tb, new_bus.tb lrt_node.tb, walkacc.asc lrt_link.tb, crPP.asc new_node.tb, sidewalk.asc new_link.tb, com_pnrn.tb comPPpnr.tb	
transit_assignment_MR.s	Inputs\MODE3,5*PP*.TB met_node.tb, lrt_bus.tb, met_link.tb, mrprPP.asc, lrt_node.tb, lrtPP.asc, lrt_link.tb, mrkrPP.asc, Met_pnrn.tb, lrtkrPP.asc, Lrt_pnrn.tb, sidewalk.asc, metPPpnr.tb, lrtPPpnr.tb, met_bus.tb	
transit_assignment_AB.s	Inputs\MODE1,2,6-10PP.TB new_node.tb, busPP.asc, new_link.tb, lrtPP.asc, bus_pnrn.tb, newPP.asc, met_pnrn.tb, mrkrPP.asc, lrt_pnrn.tb, busPP.asc, new_pnrn.tb, lrtkrPP.asc, busPPpnr.tb, newkrPP.asc, metPPpnr.tb, newPPpnr.tb, lrtPPpnr.tb, busPPpnr.tb, newPPpnr.tb, sidewalk.asc, new_bus.tb, walkacc.asc, mrprPP.asc	
Transit_assignment_BM.s	Inputs\MODE1-3,5-10*PP*.TB met_node.tb, walkacc.asc, met_link.tb, mrprpp.asc, lrt_node.tb, busPP.asc, lrt_link.tb, lrtPP.asc, new_node.tb, newPP.asc, new_link.tb, mrkrPP.asc, bus_pnrn.tb, lrtkrPP.asc, met_pnrn.tb, newkrPP.asc, lrt_pnrn.tb, lrtPPpnr.tb, new_pnrn.tb, newPPpnr.tb,	Binary

	busPPpnr.tb, busPPpnr.tb, metPPpnr.tb, sidewalk.asc, lrtPPpnr.tb, newPPpnr.tb, met_bus.tb, lrt_bus.tb, new_bus.tb	

Output(s): <ITER> =PP, i1…i6, AA= WK, DR, KR ??= CR, MR, AB, BM PP= AM, OP

	<iter>_PPMS.TRP	
	Node file <iter>_*AA??PP*node.dbf Link file <iter>_*AA??PP*link.dbf Supl??*AAPP*.asc	Text

Program File(s):

TP+

Control/Support File(s):

Combine_Tables_For_TrAssign.s, transit_assignment_CR.s, transit_assignment_MR.s, transit_assignment_AB.s, transit_assignment_BM.s,

Application Details:

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Appendix A. Model adjustment factors

Ref:

1 Trip Distribution Adjustments

1.1 Background

Historically, two sets of adjustment factors have been applied to the trip distribution model. The first set has been a series of time penalties applied sparingly to a matrix of twelve superdistricts to address physical barrier effects on trip patterns and to address jurisdictional effects (e.g., school trips and shopping trips tend to remain in a given traveler's residence jurisdiction). The time penalties were not developed in a mechanical process, but were developed after running and rerunning the calibration process with different time penalty sets. An analysis of the results was conducted between iterations.

A second set of adjustment factors was introduced during model application. Commonly referenced as K-factors, 52 individual values were applied in the Version 2.1 D #50 model. This is a reduction from the 68 K-factors that were employed in the Version 2.1C model, and reflects the improvements obtained with the introduction of other model and data input enhancements in the Version 2.1 D #50 model. Furthermore, of the remaining 52 K-factors in the Version 2.1 D #50 model, 32 were dampened (i.e., their values were made closer to 1.0). The breakdown, by trip purpose, of these factors were as follows:

HBW - 29 factors
HBS - 8 factors
HBO - 10 factors
NHB - 5 factors

K-factors were developed in the application of the model for the entire modeled area, after the F-factor calibration was completed. The K-factors were developed separately for each purpose, after several application iterations.

1.2 Version 2.2 and Version 2.3 Travel Models

The Version 2.2 model has a greatly reduced set of adjustment factors compared with the Version 2.1D #50 model. As for trip distribution, the Version 2.3 model has the same reduced set of K factors as was developed in the Version 2.2 model. Thus, any references in this section to the Version 2.2 model also apply to the Version 2.3 model. All time penalties have been removed, as have all non-work K-factors. HBW purpose K-factors have been further reduced to eleven, eight of which involve travel into or within the District of Columbia. The remaining three involve intra-jurisdiction movements within Montgomery County, Frederick County, and Fairfax County. These eleven K-factors are presented in Table 1-1, illustrating a substantial reduction in the number of such factors when compared with the Version 2.1D #50 model.

The eight remaining K-factors, involving the District of Columbia, reflect a continuing federal government presence, a larger "downtown" than one finds in many other cities of similar size, and the influence of a major heavy rail transit system in attracting trips to the central city. Simple time and cost variables in the impedance function of the travel demand model presently cannot explain these effects adequately.

Table 1-1 Trip distribution K-factors in the Version 2.1D #50 and Version 2.2 (and 2.3) travel models

Interchange	V2.1 D#50 HBW	V2.2 HBW	Change from 2.1D to V2.2
dc cr - dc cr	2.0		removed
dc cr - dc ncr	2.2		removed
dc ncr - dc cr	1.8	1.7	reduced magnitude
dc ncr - dc ncr			
dc ncr - mtg			
dc ncr - ffx			
dc ncr - extls			
mtg - dc cr	2.0	2.0	maintained
mtg - dc ncr	1.7		removed
mtg - mtg	2.0	1.6	reduced magnitude
mtg - how	0.5		removed
mtg - aa	0.2		removed
pg - dc cr	1.4		removed
pg - dc ncr	1.4		removed
pg - pg	1.5		removed
pg - how	0.5		removed
pg - aa	0.5		removed
pg - mtg			
pg - extls			
pw - dc cr	2.8	3.2	increased magnitude
arl cr - dc cr	2.5	2.5	maintained
arl cr - dc ncr	1.8		removed
arl ncr - arl ncr			
arl ncr - dc cr	2.4	1.7	reduced magnitude
alx - alx			
alx - dc cr	1.9	1.6	reduced magnitude
how - mtg			
how - pg	2.2		removed
how - extls/balt	2.5		removed
aa - aa	0.5		removed
aa - pg			
ffx - dc cr	2.2	2.0	reduced magnitude
ffx - dc ncr	1.3	1.4	increased magnitude
ffx - ffx	0.9	0.8	reduced magnitude
ffx - arl ncr	1.3		removed
frd - frd		0.9	added
frd - aa	0.2		removed
frd - how	0.2		removed
chs - chs			
chs - dc cr	2.2		removed
chs - pg	2.0		removed
car - car			

Ref: k_facs_v22_summary.xls

Fairfax County illustrates an additional behavioral pattern which simple time and cost variables in modeling cannot explain. The county has experienced substantial growth in employment during the past two decades, and is projected to continue this trend. However, there remains a significant amount of interaction with the District of Columbia, largely in terms of commutation to government employment and to other jobs related to government employment. Given the large growth in employment projected within Fairfax County in the future, a gravity model will likely understate this commutation into the central jurisdictions unless K-factors are applied. A K-factor less than 1.0 was therefore applied to intra-Fairfax County estimated trip patterns.

Montgomery County also is a major generator of employment. However, a K-factor greater than 1.0 for intra-county travel was retained, albeit reduced in magnitude from that employed in the Version 2.1D #50 model, to reflect the tendency of the model to otherwise send trips northward into Howard and Anne Arundel Counties with their growing concentrations of employment. Previous K-factors less than 1.0 for trips destined to these counties from TPB member jurisdictions have been removed in the Version 2.2 (and 2.3) model(s).

Finally, a K-factor less than 1.0 was added in the Version 2.2 (and 2.3) model(s) for intra-Frederick County travel (including City of Frederick). The size of TPB zones in that jurisdiction, coupled with the projected employment growth, tends to result in overestimation of intra-county travel unless a K-factor is applied. It is hoped that future zone refinement may reduce the need for this adjustment.

In conclusion, many of the K-factors employed in the Version 2.1D #50 model have been removed with the Version 2.2 (and 2.3) model(s), and the few that remain have largely been dampened as well. The result is a model which substantially moves toward the goal of eliminating adjustment factors. As noted earlier, the effect of this is to produce a model which will likely have a looser fit in the year 2000 validation year at finer levels of geography than previous COG/TPB travel demand models. As the region continues to grow, some of the time-honored adjustments may no longer apply as they have in the past.

2 Mode Choice Adjustments

Historically, the multinomial logit (MNL) mode choice model applied in the Version 2.2 (and earlier) travel model(s) have been applied using the Fortran program COGMC.EXE. This program allows for two sets of jurisdiction-level or superdistrict-level factors:

- Transit percent adjustment factors (TPAFs) and
- Car occupancy adjustment factors (COAFs)

The Version 2.3 travel model uses a nested-logit (NL) mode choice model that is applied with the Fortran program AEMS.EXE. This new NL mode choice model does not use any of the jurisdiction-level factors that were used in previous models. The NL MC model does, however, use a geographic market segmentation, that relies on seven superdistricts, which are used to create 20 geographic market segments. Each market segment (20) and travel mode (15) has a nesting constant. See Chapters 6 and 19 for more details.

Appendix B. Year 2002 mode choice summary (final, i6, iteration)

Ref: M:\model_dev\Ver2.3_20080604_pceNo\2002\i6_mc_NL_summary.tab

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Transit

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	11639	5872	1867	691	1067	1847	665	1138	2	0	0	0	9	3	0	0	0	0	0	0	0	0	0	24801
2 DC NC	109770	37292	15472	7471	4088	7378	2572	3859	4	1	0	0	61	22	0	0	0	0	0	0	0	0	0	187989
3 MTG	75230	6866	42896	2504	2914	2642	322	2516	1	0	0	0	48	5	0	0	0	0	0	0	0	0	0	135942
4 PG	81328	16855	7318	12977	5448	5731	1337	1473	0	0	0	0	239	88	0	0	0	0	0	0	0	0	0	132796
5 ARLCR	3174	220	104	18	129	347	76	169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4237
6 ARNCR	35193	2080	1007	162	3954	5555	1566	3330	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	52851
7 ALX	18013	1153	420	102	2390	4119	2873	1827	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	30898
8 FFX	56608	3223	1591	219	8399	10790	3922	9676	58	4	0	0	10	8	0	0	0	0	0	0	0	0	0	94508
9 LDN	716	39	35	0	213	162	9	277	119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1570
10 PW	6856	160	39	3	806	1116	488	859	0	738	0	0	0	0	0	0	0	0	0	0	0	0	0	11066
11 FRD	69	4	105	0	5	3	0	178	0	0	143	0	0	0	0	0	0	0	0	0	0	0	0	506
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	2782	318	528	242	118	95	6	69	0	0	0	0	484	31	0	0	0	0	0	0	0	0	0	4674
14 AAR	4539	310	126	249	195	172	12	832	0	0	0	0	33	35	0	0	0	0	0	0	0	0	0	6504
15 CAL	1423	191	17	55	69	63	8	50	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	1881
16 STM	112	12	1	2	5	4	1	17	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	153
17 CHS	3093	363	33	56	159	154	27	54	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	3945
18 FAU	1	0	0	0	1	1	0	62	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	66
19 STA	138	9	1	0	70	109	32	192	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	551
20 CL/JF	0	0	1	0	0	0	0	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119
21 SP/FB	18	1	0	0	10	14	5	159	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	211
22 KGEO	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	410700	74969	71561	24750	30038	40303	13922	26877	187	746	143	0	884	192	6	0	8	0	1	0	4	0	0	695290

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Auto Person

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	7307	1548	740	859	609	588	264	1610	62	6	1	0	50	79	1	0	8	0	0	0	0	0	0	13732
2 DC NC	23668	20376	11315	11609	4387	4462	1847	9260	259	22	36	0	692	1051	22	1	104	1	0	0	0	0	0	89113
3 MTG	32068	29832	294891	27591	3844	7482	2405	24336	717	25	6001	331	8151	2534	6	0	25	1	0	141	0	0	0	440381
4 PG	41381	70155	39134	173438	5746	12166	7807	16708	203	54	54	14	9530	21115	993	397	5343	0	0	0	1	127	0	404367
5 ARLCR	60	293	185	79	783	545	179	680	23	4	1	0	2	4	0	0	0	0	0	0	0	0	0	2837
6 ARNCR	5977	7085	4523	1565	6637	21236	6391	27330	646	149	12	0	41	52	0	0	11	8	5	0	4	0	0	81672
7 ALX	5966	4516	2049	1707	3420	9550	15810	22948	272	215	2	0	19	45	2	0	35	4	16	0	12	0	0	66588
8 FFX	45954	26664	18657	7961	12542	35427	35758	369687	28900	10706	113	0	125	146	10	1	136	754	311	62	306	5	0	594227
9 LDN	1369	879	3055	163	731	1646	628	61256	61612	1377	3912	38	104	5	0	0	0	505	2	2286	2	0	0	139569
10 PW	7198	1259	736	651	1371	3802	6242	81687	5600	100547	29	0	2	3	0	0	2	4352	4513	74	4186	120	0	222374
11 FRD	165	269	19248	412	38	78	12	739	2431	8	93525	4046	5730	526	0	0	0	5	0	2109	0	0	0	129341
12 CAR	33	52	4274	474	2	2	0	21	114	0	12566	56878	8211	809	0	0	0	0	0	166	0	0	0	83603
13 HOW	2186	3638	16792	14749	213	353	117	613	60	0	4100	1022	63419	16398	3	0	6	0	0	100	0	0	0	123768
14 AAR	6128	7454	4317	32004	526	918	403	635	3	0	69	30	17041	192198	1424	90	504	0	0	0	0	4	0	263751
15 CAL	1527	2082	366	7541	140	246	174	232	1	0	0	0	70	3150	21438	10022	1846	0	0	0	1	114	0	48950
16 STM	170	280	19	2030	15	26	27	36	0	1	0	0	2	99	2628	45381	4307	0	11	0	34	1129	0	56195
17 CHS	4291	5506	586	18485	409	749	757	1027	3	5	0	0	49	1037	1721	3250	38173	0	22	0	72	2081	0	78224
18 FAU	3	5	16	1	10	27	25	5594	1770	7349	19	0	0	0	0	0	1	16643	1698	189	1421	42	0	34813
19 STA	224	115	57	70	181	472	734	6449	43	9668	0	0	0	0	1	11	50	1424	24974	1	17483	1112	0	63069
20 CL/JF	0	8	673	4	1	4	1	1194	6001	238	5165	70	187	11	0	0	0	325	1	21660	0	0	0	35544
21 SP/FB	29	18	15	12	22	66	121	1487	8	2896	0	0	0	0	0	7	33	399	7634	0	45857	899	0	59503
22 KGEO	11	10	0	129	0	0	1	13	0	99	0	0	0	3	31	231	792	13	447	0	1011	8548	0	11340
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	185716	182044	421650	301533	41630	99845	79704	633544	108728	133368	125603	62428	113426	239265	28280	59390	51375	24435	39636	26789	70389	14184	0	3042962

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Motorized Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	18946	7420	2608	1549	1676	2436	929	2749	64	6	1	0	58	82	1	0	8	0	0	0	0	0	0	38532
2 DC NC	133438	57669	26787	19081	8475	11839	4419	13119	264	23	36	0	753	1073	22	1	104	1	0	0	0	0	0	277102
3 MTG	107297	36697	337787	30095	6758	10123	2727	26852	717	25	6001	331	8199	2539	6	0	25	1	0	141	0	0	0	576323
4 PG	122710	87010	46452	186415	11194	17896	9144	18181	203	54	54	14	9769	21203	993	397	5343	0	0	0	1	127	0	537162
5 ARLCR	3233	513	289	97	912	892	255	849	23	4	1	0	2	4	0	0	0	0	0	0	0	0	0	7074
6 ARNCR	41170	9166	5531	1727	10591	26792	7958	30660	647	149	12	0	41	52	0	0	11	8	5	0	4	0	0	134523
7 ALX	23979	5669	2469	1808	5810	13669	18682	24775	272	216	2	0	19	45	2	0	35	4	16	0	12	0	0	97486
8 FFX	102562	29887	20249	8180	20941	46217	39680	379363	28958	10711	113	0	135	154	10	1	136	754	311	62	307	5	0	688735
9 LDN	2085	918	3090	163	944	1808	637	61533	61732	1377	3912	38	104	5	0	0	0	505	2	2286	2	0	0	141140
10 PW	14054	1419	775	654	2177	4918	6730	82546	5601	101285	29	0	2	3	0	0	2	4352	4513	74	4186	120	0	233440
11 FRD	234	274	19353	413	43	82	13	916	2431	8	93667	4046	5730	526	0	0	0	5	0	2109	0	0	0	129847
12 CAR	33	52	4274	474	2	2	0	21	114	0	12566	56878	8211	809	0	0	0	0	0	166	0	0	0	83603
13 HOW	4968	3956	17320	14991	331	448	123	683	60	0	4100	1022	63903	16429	3	0	6	0	0	100	0	0	0	128442
14 AAR	10667	7764	4443	32253	721	1091	415	1467	3	0	69	30	17074	192233	1424	90	504	0	0	0	0	4	0	270255
15 CAL	2949	2274	383	7595	209	309	182	282	1	0	0	0	70	3150	21444	10022	1846	0	0	0	1	114	0	50831
16 STM	281	292	20	2032	20	31	28	53	0	1	0	0	2	99	2628	45381	4308	0	11	0	34	1129	0	56348
17 CHS	7385	5869	619	18541	567	903	784	1081	3	5	0	0	49	1037	1721	3250	38179	0	22	0	72	2081	0	82169
18 FAU	4	5	16	1	11	28	26	5657	1770	7350	19	0	0	0	0	0	1	16643	1698	189	1421	42	0	34879
19 STA	362	124	59	70	251	581	766	6641	43	9668	0	0	0	0	1	11	50	1424	24974	1	17483	1112	0	63620
20 CL/JF	0	8	674	4	1	4	1	1311	6001	238	5165	70	187	11	0	0	0	325	1	21660	0	0	0	35663
21 SP/FB	47	18	15	12	32	80	126	1646	8	2897	0	0	0	0	0	7	33	399	7634	0	45860	899	0	59714
22 KGEO	11	10	0	129	0	0	1	35	0	99	0	0	0	3	31	231	792	13	447	0	1011	8548	0	11362
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	596416	257013	493211	326283	71668	140149	93625	660421	108915	134115	125746	62428	114310	239457	28286	59390	51383	24435	39636	26789	70393	14184	0	3738252

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Commuter Rail

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0	0	0	15	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	21
2 DC NC	37	2	3	105	1	1	1	1	0	1	0	0	21	13	0	0	0	0	0	0	0	0	0	185
3 MTG	7491	157	391	30	127	85	9	16	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	8308
4 PG	3032	63	27	63	65	47	5	4	0	0	0	0	6	5	0	0	0	0	0	0	0	0	0	3318
5 ARLCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 ARNCR	17	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21
7 ALX	94	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103
8 FFX	2404	87	17	1	489	789	148	3	0	1	0	0	3	5	0	0	0	0	0	0	0	0	0	3949
9 LDN	2	0	1	0	1	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28
10 PW	2134	6	7	0	290	407	123	118	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	3092
11 FRD	51	2	36	0	3	2	0	172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	267
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	1193	39	33	62	28	21	2	24	0	0	0	0	6	2	0	0	0	0	0	0	0	0	0	1408
14 AAR	950	36	16	44	21	16	1	406	0	0	0	0	7	7	0	0	0	0	0	0	0	0	0	1505
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	1	0	0	0	1	1	0	62	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	66
19 STA	18	0	0	0	9	13	4	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90
20 CL/JF	0	0	1	0	0	0	0	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119
21 SP/FB	11	0	0	0	6	8	3	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114
22 KGEO	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	17437	402	533	325	1040	1390	295	1099	0	10	0	0	46	34	0	0	0	0	0	0	1	0	0	22614

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBW Trips   MODE: All Bus

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	4942	4436	636	281	78	522	196	608	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0	11706
2 DC NC	53342	30955	8761	5137	416	2097	600	1869	4	0	0	0	35	4	0	0	0	0	0	0	0	0	0	103219
3 MTG	5403	2988	31867	1969	115	82	8	1999	0	0	0	0	44	3	0	0	0	0	0	0	0	0	0	44479
4 PG	13057	9113	3715	11350	531	379	394	344	0	0	0	0	229	81	0	0	0	0	0	0	0	0	0	39193
5 ARLCR	209	91	13	1	23	63	12	121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	533
6 ARNCR	2719	682	78	3	1732	2526	1030	2629	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11401
7 ALX	3062	420	13	19	1198	2345	2444	1428	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10930
8 FFX	2050	420	257	8	1636	2507	1631	8359	50	1	0	0	2	0	0	0	0	0	0	0	0	0	0	16920
9 LDN	251	26	12	0	80	40	1	213	119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	743
10 PW	3763	142	6	0	411	568	209	538	0	732	0	0	0	0	0	0	0	0	0	0	0	0	0	6370
11 FRD	0	0	62	0	0	0	0	2	0	0	143	0	0	0	0	0	0	0	0	0	0	0	0	208
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	813	212	384	151	29	21	1	12	0	0	0	0	478	29	0	0	0	0	0	0	0	0	0	2130
14 AAR	1205	95	36	156	32	17	0	26	0	0	0	0	27	29	0	0	0	0	0	0	0	0	0	1622
15 CAL	1408	176	3	41	32	19	1	5	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	1691
16 STM	106	11	0	1	2	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	125
17 CHS	2028	287	4	29	52	34	6	6	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	2452
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	86	8	1	0	46	66	23	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	294
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	2	0	0	0	3	4	2	34	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	49
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	94445	50062	45849	19146	6417	11291	6559	18260	176	733	143	0	819	146	6	0	8	0	1	0	3	0	0	254063

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBW Trips   MODE: Bus & Metrorail

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	187	158	277	193	152	219	201	454	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1843
2 DC NC	13572	2230	2912	1231	1633	2534	1371	1837	1	0	0	0	5	5	0	0	0	0	0	0	0	0	0	27331
3 MTG	10582	1672	3051	305	551	727	186	478	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	17554
4 PG	15077	3915	1949	948	1695	2119	632	1100	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	27440
5 ARLCR	181	13	16	6	34	38	20	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	337
6 ARNCR	9405	526	366	87	426	755	166	482	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12214
7 ALX	8108	497	288	60	732	992	113	308	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	11099
8 FFX	11536	1311	527	133	1496	2306	644	781	8	2	0	0	6	3	0	0	0	0	0	0	0	0	0	18753
9 LDN	145	6	11	0	57	68	4	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	322
10 PW	503	12	20	2	66	101	108	168	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	980
11 FRD	17	1	6	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	145	24	25	16	25	26	3	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	296
14 AAR	468	71	31	28	40	49	6	399	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1092
15 CAL	15	15	13	14	37	44	7	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	190
16 STM	5	1	0	0	3	3	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
17 CHS	465	40	22	22	71	81	16	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	764
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	34	1	1	0	15	31	5	81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	5	0	0	0	1	2	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	70449	10493	9514	3046	7033	10097	3483	6332	11	3	0	0	18	12	0	0	0	0	0	0	0	0	0	120490

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Metrorail Only

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	6511	1278	955	201	837	1106	267	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11232
2 DC NC	42820	4105	3796	999	2038	2746	600	151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57255
3 MTG	51754	2049	7588	200	2121	1747	120	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65600
4 PG	50163	3764	1627	616	3158	3186	306	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62845
5 ARLCR	2783	115	75	10	72	246	45	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3366
6 ARNCR	23052	872	563	69	1796	2274	370	219	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29215
7 ALX	6748	230	119	22	461	782	316	91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8767
8 FFX	40618	1404	791	77	4778	5187	1499	534	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54887
9 LDN	318	6	11	0	76	54	3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	478
10 PW	456	1	5	1	40	40	47	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	624
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	631	44	86	14	37	28	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	840
14 AAR	1916	109	43	21	101	90	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2286
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	601	36	7	5	35	39	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	729
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	228369	14012	15665	2233	15549	17526	3585	1186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	298124

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Transit Percentage

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	61.4	79.1	71.6	44.6	63.6	75.8	71.6	41.4	2.8	7.1	0	0	14.7	3.3	0	0	0	0	0	0	0	0	0	64.4
2 DC NC	82.3	64.7	57.8	39.2	48.2	62.3	58.2	29.4	1.6	2.9	0	0	8.0	2.0	0	0	0.0	0	0	0	0	0	0	67.8
3 MTG	70.1	18.7	12.7	8.3	43.1	26.1	11.8	9.4	0.1	0	0	0	0.6	0.2	0	0	0	0	0	0	0	0	0	23.6
4 PG	66.3	19.4	15.8	7.0	48.7	32.0	14.6	8.1	0.2	0.1	0	0	2.4	0.4	0	0	0.0	0	0	0	0	0	0	24.7
5 ARLCR	98.2	42.8	35.9	18.3	14.2	38.9	29.9	19.9	0.9	0.3	0	0	1.8	0	0	0	0	0	0	0	0	0	0	59.9
6 ARNCR	85.5	22.7	18.2	9.4	37.3	20.7	19.7	10.9	0.2	0.4	0	0	1.1	0.1	0	0	0	0	0	0	0	0	0	39.3
7 ALX	75.1	20.3	17.0	5.6	41.1	30.1	15.4	7.4	0.1	0.5	0	0	0.2	0	0	0	0	0	0	0	0	0	0	31.7
8 FFX	55.2	10.8	7.9	2.7	40.1	23.3	9.9	2.6	0.2	0.0	0	0	7.7	5.2	0	0	0.0	0	0.0	0	0.1	0	0	13.7
9 LDN	34.3	4.2	1.1	0.3	22.5	9.0	1.4	0.5	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1
10 PW	48.8	11.3	5.1	0.5	37.0	22.7	7.3	1.0	0.0	0.7	0	0	0	0	0	0	0	0	0	0	0.0	0	0	4.7
11 FRD	29.4	1.5	0.5	0.1	10.9	4.2	0.3	19.4	0	0	0.2	0	0.0	0	0	0	0	0	0	0	0	0	0	0.4
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	56.0	8.0	3.0	1.6	35.6	21.2	5.1	10.2	0	0	0	0	0.8	0.2	0	0	0	0	0	0	0	0	0	3.6
14 AAR	42.6	4.0	2.8	0.8	27.0	15.8	3.0	56.7	0	0	0	0	0.2	0.0	0	0	0	0	0	0	0	0	0	2.4
15 CAL	48.2	8.4	4.3	0.7	32.9	20.4	4.2	17.8	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	3.7
16 STM	39.6	4.2	2.8	0.1	24.0	13.4	1.9	31.6	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.3
17 CHS	41.9	6.2	5.3	0.3	28.0	17.1	3.4	5.0	0	0	0	0	0.1	0	0	0	0.0	0	0	0	0	0	0	4.8
18 FAU	25.8	0.2	0.4	0	10.1	2.8	1.0	1.1	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
19 STA	38.2	7.0	2.5	0.1	27.7	18.8	4.1	2.9	0	0.0	0	0	0	0	0	0	0	0	0.0	0	0.0	0	0	0.9
20 CL/JF	12.5	2.6	0.1	0	0	0.8	0	9.0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
21 SP/FB	37.4	2.7	2.5	0	30.7	17.7	4.2	9.7	0	0.0	0	0	0	0	0	0	0	0	0.0	0	0.0	0	0	0.4
22 KGEO	0	0	0	0	0	0	0	62.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	68.9	29.2	14.5	7.6	41.9	28.8	14.9	4.1	0.2	0.6	0.1	0	0.8	0.1	0.0	0	0.0	0	0.0	0	0.0	0	0	18.6

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBS Trips MODE: Transit

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	270	611	49	23	189	808	67	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2026
2 DC NC	1800	6265	1428	1149	473	2516	270	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13930
3 MTG	53	442	8451	334	61	112	2	12	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	9476
4 PG	65	306	424	2455	43	154	40	8	0	0	0	0	19	39	0	0	0	0	0	0	0	0	0	3553
5 ARLCR	8	1	0	0	3	143	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	169
6 ARNCR	20	3	1	0	106	711	88	105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1033
7 ALX	2	0	0	0	30	442	399	133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1005
8 FFX	10	16	192	90	83	744	271	1069	5	21	3	0	15	12	0	0	3	0	1	0	17	0	0	2552
9 LDN	0	0	0	0	0	1	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
10 PW	0	0	0	0	0	3	0	4	0	117	0	0	0	0	0	0	0	0	0	0	0	0	0	124
11 FRD	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	19
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0	11	0	1	0	1	0	0	0	0	26	2	0	0	0	0	0	0	0	0	0	41
14 AAR	1	0	1	19	2	5	1	4	0	0	0	0	2	5	0	0	0	0	0	0	0	0	0	39
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2231	7644	10547	4080	988	5641	1146	1381	9	138	22	0	69	58	0	0	5	0	1	0	17	0	0	33976

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBS Trips MODE: Auto Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	4466	3440	594	845	517	5359	936	634	4	24	32	2	9	35	5	38	33	4	125	13	250	1	0	17366
2 DC NC	10925	82253	23642	29560	2064	21858	3723	2555	46	93	132	9	129	290	31	192	249	25	823	67	1241	6	0	179912
3 MTG	791	13436	480221	31298	266	3153	381	3181	88	202	1737	69	4120	779	58	336	262	41	1447	153	2551	13	0	544582
4 PG	1228	9505	15130	328589	156	2033	2118	1740	90	288	377	26	3743	15481	453	554	16973	58	1845	170	3234	17	0	403807
5 ARLCR	78	68	18	8	2244	2731	259	272	1	2	2	0	0	2	0	1	1	0	7	0	12	0	0	5707
6 ARNCR	323	328	168	49	1640	75978	6215	11254	14	40	15	1	3	15	2	18	14	2	63	5	123	0	0	96270
7 ALX	141	130	34	100	487	19675	47696	14776	4	137	15	1	3	16	2	22	15	2	83	7	142	1	0	83491
8 FFX	196	403	2456	773	1044	40479	23981	530702	27071	15396	650	70	131	798	153	1075	750	414	3552	491	6718	47	0	657350
9 LDN	10	23	621	255	18	378	104	8788	77705	384	1471	33	77	376	46	42	135	146	1696	3093	3145	10	0	98554
10 PW	7	21	521	241	16	323	242	8869	602	160133	316	25	72	387	68	169	262	4233	7858	221	5329	22	0	189936
11 FRD	35	54	4001	357	25	362	169	878	279	148	83946	715	296	278	18	2	79	57	653	412	501	0	0	93264
12 CAR	66	99	1316	666	39	527	251	1352	337	161	1496	41244	1395	440	29	3	85	68	22	62	0	0	0	49657
13 HOW	4	9	2532	7190	5	92	34	132	20	67	1407	366	76136	6450	23	95	66	13	401	70	425	5	0	95542
14 AAR	60	124	1151	7821	34	494	228	1253	291	342	334	19	5474	214785	969	277	486	38	1244	83	1548	10	0	237067
15 CAL	16	26	282	735	10	130	59	326	49	94	68	4	44	363	30890	2954	161	11	535	9	740	3	0	37508
16 STM	46	63	441	497	22	303	126	750	96	114	5	0	77	182	320	35742	925	9	1221	0	1035	5	0	41982
17 CHS	20	33	279	2062	10	143	60	400	99	88	58	1	45	103	778	829	54499	19	629	1	638	24	0	60819
18 FAU	10	15	246	123	8	104	50	349	337	839	89	4	36	94	6	4	43	20680	4041	49	1380	3	0	28511
19 STA	0	0	12	4	0	3	2	15	1	1089	5	0	2	6	1	5	5	10	38408	1	14302	0	0	53871
20 CL/JF	24	36	454	211	18	226	92	614	605	104	284	4	85	159	1	0	21	47	1064	22105	613	0	0	26765
21 SP/FB	0	0	3	1	0	1	0	3	1	4	0	0	0	1	0	1	1	0	2520	0	41985	0	0	44522
22 KGEO	19	26	155	172	11	162	75	408	65	78	0	0	23	101	18	27	125	25	1071	0	1775	4119	0	8456
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	18462	110094	534279	411555	8634	174516	86803	589249	107805	179829	92439	42592	91900	241138	33871	42385	75190	25902	69309	27014	87687	4286	0	3054937

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBS Trips MODE: Motorized Person

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	4736	4050	643	868	706	6167	1003	643	4	24	32	2	9	35	5	38	33	4	125	13	250	1	0	19392
2 DC NC	12725	88518	25071	30708	2536	24374	3994	2584	46	93	132	9	129	290	31	192	249	25	823	67	1241	6	0	193842
3 MTG	844	13878	488673	31632	327	3266	384	3193	88	202	1737	69	4127	779	58	336	262	41	1447	153	2551	13	0	554058
4 PG	1293	9811	15554	331044	199	2187	2158	1749	90	288	377	26	3761	15520	453	554	16973	58	1845	170	3234	17	0	407360
5 ARLCR	86	69	19	8	2247	2874	266	278	1	2	2	0	0	2	0	1	1	0	7	0	12	0	0	5876
6 ARNCR	343	331	168	49	1746	76688	6303	11359	14	40	15	1	3	15	2	18	14	2	63	5	123	0	0	97303
7 ALX	143	130	34	100	517	20118	48095	14909	4	137	15	1	3	16	2	22	15	2	83	7	142	1	0	84496
8 FFX	206	419	2648	862	1126	41223	24252	531770	27077	15417	652	70	146	810	153	1075	753	414	3553	491	6735	47	0	659902
9 LDN	10	23	621	255	18	379	104	8788	77708	384	1471	33	77	376	46	42	135	146	1696	3093	3145	10	0	98559
10 PW	7	21	521	241	17	327	242	8872	602	160250	316	25	72	387	68	169	262	4233	7858	221	5329	22	0	190060
11 FRD	35	54	4001	357	25	362	169	878	279	148	83965	715	296	278	18	2	79	57	653	412	501	0	0	93283
12 CAR	66	99	1316	666	39	527	251	1352	337	161	1496	41244	1395	440	29	3	85	68	22	62	0	0	0	49657
13 HOW	4	9	2533	7200	6	93	34	132	20	67	1407	366	76162	6452	23	95	66	13	401	70	425	5	0	95583
14 AAR	62	125	1152	7839	36	500	229	1257	291	342	334	19	5476	214790	969	277	486	38	1244	83	1548	10	0	237106
15 CAL	16	26	282	735	10	130	59	326	49	94	68	4	44	363	30890	2954	161	11	535	9	740	3	0	37508
16 STM	46	63	441	497	22	303	126	750	96	114	5	0	77	182	320	35742	925	9	1221	0	1035	5	0	41982
17 CHS	20	33	279	2062	10	144	60	400	99	88	58	1	45	103	778	829	54500	19	629	1	638	24	0	60820
18 FAU	10	15	246	123	8	104	50	349	337	839	89	4	36	94	6	4	43	20680	4041	49	1380	3	0	28511
19 STA	0	0	12	4	0	3	2	15	1	1089	5	0	2	6	1	5	5	10	38408	1	14302	0	0	53871
20 CL/JF	24	36	454	211	18	226	92	614	605	104	284	4	85	159	1	0	21	47	1064	22105	613	0	0	26765
21 SP/FB	0	0	3	1	0	1	0	3	1	4	0	0	0	1	0	1	1	0	2520	0	41985	0	0	44522
22 KGEO	19	26	155	172	11	162	76	409	65	78	0	0	23	101	18	27	125	25	1071	0	1775	4119	0	8457
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	20693	117737	544826	415635	9622	180157	87949	590629	107814	179968	92461	42592	91969	241196	33871	42385	75195	25902	69310	27014	87704	4286	0	3088914

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBS Trips MODE: Commuter Rail

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
2 DC NC	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
3 MTG	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
4 PG	1	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5 ARLCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 ARNCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 ALX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 FFX	0	0	0	0	1	30	4	3	0	0	0	0	0	1	0	0	0	0	1	0	17	0	0	57
9 LDN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 PW	0	0	0	0	0	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	7
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
14 AAR	1	0	1	1	1	4	1	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	14
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	0	12	5	2	37	28	9	0	3	0	0	1	2	0	0	0	0	1	0	17	0	0	120

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBS Trips MODE: All Bus

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	130	544	20	9	33	175	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	921
2 DC NC	930	5664	990	698	112	455	55	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8908
3 MTG	3	231	7376	285	3	1	0	2	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	7908
4 PG	4	178	348	2198	1	2	26	1	0	0	0	0	18	39	0	0	0	0	0	0	0	0	0	2814
5 ARLCR	0	0	0	0	0	18	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
6 ARNCR	1	0	0	0	8	344	63	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	508
7 ALX	0	0	0	0	5	193	365	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	681
8 FFX	1	2	51	13	14	303	133	1032	4	20	0	0	10	0	0	0	3	0	0	0	0	0	0	1588
9 LDN	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
10 PW	0	0	0	0	0	0	0	1	0	115	0	0	0	0	0	0	0	0	0	0	0	0	0	116
11 FRD	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	19
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0	11	0	0	0	0	0	0	0	0	26	2	0	0	0	0	0	0	0	0	0	39
14 AAR	0	0	0	18	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	23
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1070	6619	8786	3231	176	1491	650	1256	8	135	19	0	62	45	0	0	5	0	0	0	0	0	0	23554

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBS Trips MODE: Bus & Metrorail

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	8	5	4	6	17	126	29	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	203
2 DC NC	225	123	154	253	125	939	137	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1979
3 MTG	9	91	509	40	6	29	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	697
4 PG	10	82	43	182	9	61	12	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	407
5 ARLCR	0	0	0	0	0	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
6 ARNCR	3	1	0	0	8	84	11	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114
7 ALX	1	0	0	0	14	131	12	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	166
8 FFX	3	9	85	70	5	77	41	8	1	1	3	0	5	11	0	0	0	0	0	0	0	0	0	318
9 LDN	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10 PW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 AAR	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	259	312	794	551	186	1453	247	74	1	1	3	0	6	11	0	0	0	0	0	0	0	0	0	3897

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBS Trips   MODE: Metrorail Only

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	132	61	24	8	138	507	25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	897
2 DC NC	645	478	284	197	236	1122	60	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3024
3 MTG	41	120	556	10	51	82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	860
4 PG	50	45	33	72	32	91	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	326
5 ARLCR	8	1	0	0	3	118	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	135
6 ARNCR	17	2	1	0	89	284	14	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	410
7 ALX	1	0	0	0	10	118	22	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158
8 FFX	6	5	56	6	63	334	93	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	590
9 LDN	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10 PW	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
14 AAR	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	899	712	955	294	624	2660	220	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6405

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBS Trips   MODE: Transit Percentage

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	5.7	15.1	7.6	2.6	26.7	13.1	6.6	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	10.4
2 DC NC	14.1	7.1	5.7	3.7	18.6	10.3	6.8	1.1	0	0	0	0	0.1	0	0	0	0.0	0	0	0	0	0	0	7.2
3 MTG	6.3	3.2	1.7	1.1	18.6	3.4	0.6	0.4	0	0	0	0	0.2	0.0	0	0	0	0	0	0	0.0	0	0	1.7
4 PG	5.0	3.1	2.7	0.7	21.6	7.0	1.9	0.5	0	0	0	0	0.5	0.3	0	0	0.0	0	0	0	0	0	0	0.9
5 ARLCR	9.6	1.6	1.8	0.1	0.2	5.0	2.7	2.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.9
6 ARNCR	5.8	0.9	0.4	0.1	6.0	0.9	1.4	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1
7 ALX	1.7	0.1	0.1	0.1	5.7	2.2	0.8	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2
8 FFX	5.1	3.8	7.3	10.4	7.3	1.8	1.1	0.2	0.0	0.1	0.4	0	10.4	1.5	0.1	0.0	0.5	0	0.0	0	0.3	0	0	0.4
9 LDN	0	0	0	0	0.4	0.2	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
10 PW	0	0	0	0	0.8	1.0	0.0	0.0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
11 FRD	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0.0	0.1	3.2	1.1	0	0.4	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.0
14 AAR	1.8	0.2	0.1	0.2	4.5	1.1	0.4	0.3	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0.0
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0.0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0.0	0	0.0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0
18 FAU	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.0
22 KGEO	0.3	0	0	0	0.8	0.2	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	10.8	6.5	1.9	1.0	10.3	3.1	1.3	0.2	0.0	0.1	0.0	0	0.1	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0	0	1.1

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBO Trips   MODE: Transit

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	4644	4601	456	244	426	942	62	78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11452
2 DC NC	33313	26993	4527	3185	1455	2556	200	358	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	72590
3 MTG	6152	3129	17214	1621	573	462	7	938	0	0	1	0	18	1	0	0	0	0	0	0	0	0	0	30115
4 PG	10864	4611	1535	5880	687	699	76	659	0	0	0	0	33	51	0	0	0	0	0	0	0	0	0	25096
5 ARLCR	959	84	19	4	55	287	17	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1474
6 ARNCR	7081	576	122	31	1027	3318	428	1274	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13858
7 ALX	1956	152	19	8	366	1316	621	268	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4707
8 FFX	5269	406	709	332	692	2034	589	1584	9	71	9	0	79	53	5	0	7	0	1	0	6	0	0	11855
9 LDN	12	0	0	0	1	1	0	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67
10 PW	214	0	0	0	20	33	5	809	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1081
11 FRD	0	0	0	0	0	0	0	0	0	0	41	0	0	0	0	0	0	0	0	0	0	0	0	41
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	34	3	12	22	1	1	0	159	0	0	0	0	56	6	0	0	0	0	0	0	0	0	0	293
14 AAR	212	14	4	57	8	8	0	771	0	0	0	0	9	19	0	0	0	0	0	0	0	0	0	1102
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	33	2	0	0	1	1	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83
18 FAU	4	0	0	0	0	0	0	184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
19 STA	0	0	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	4	0	0	0	0	0	0	134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139
22 KGEO	2	0	0	0	0	0	0	81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	70753	40569	24617	11386	5314	11660	2004	7475	9	71	51	0	197	129	6	0	8	0	1	0	6	0	0	174256

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBO Trips   MODE: Auto Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	19290	11624	2086	2343	348	2368	713	1452	9	4	1	0	20	56	2	1	15	5	0	1	1	1	0	40341
2 DC NC	84261	348722	83391	70065	3820	20458	6790	15479	284	63	30	13	968	1791	118	28	446	30	11	28	35	31	0	636862
3 MTG	19094	73817	1407996	69878	1409	10778	2612	33526	1831	93	14771	1536	24582	4439	62	123	122	58	98	647	178	113	0	1667763
4 PG	35707	119927	70339	857558	1580	7861	8055	10234	84	132	72	50	15421	44135	2251	745	21247	61	83	69	104	142	0	1195857
5 ARLCR	1154	1457	462	202	3888	4025	827	1590	15	12	0	0	1	4	0	1	2	1	1	1	1	1	0	13644
6 ARNCR	19229	16629	7108	3169	9536	194473	28648	76752	824	455	9	8	25	89	8	18	33	26	23	19	22	17	0	357119
7 ALX	7678	6628	1653	2341	2728	26588	87153	43632	118	706	5	3	8	43	6	8	53	17	44	7	19	8	0	179446
8 FFX	17047	15801	18287	7105	5844	75114	65961	1478788	67392	31066	81	76	114	360	58	132	242	1875	1243	312	690	137	0	1787723
9 LDN	154	120	795	21	46	648	134	35007	268964	1285	2574	42	52	81	4	3	17	772	24	8134	46	20	0	318941
10 PW	1118	788	550	414	357	3348	4445	91706	6967	429458	72	66	95	331	50	78	91	4454	11272	338	6741	170	0	562909
11 FRD	106	163	20736	187	17	83	53	386	3475	58	296486	8133	5765	365	17	5	44	42	52	6894	43	0	0	343112
12 CAR	120	142	2204	208	22	102	76	331	110	61	8536	168585	6632	293	9	3	43	43	2	80	0	0	0	187601
13 HOW	240	1111	17372	13625	10	46	27	147	56	19	3024	3321	237157	21583	14	34	40	14	20	143	16	20	0	298037
14 AAR	1481	4756	4245	44462	75	344	276	794	170	187	173	101	28697	694999	3358	229	1014	75	99	65	73	63	0	785735
15 CAL	204	524	194	4632	14	59	67	191	34	37	26	10	41	4055	107543	10357	1755	10	32	5	34	26	0	129851
16 STM	42	44	94	458	6	31	11	77	10	20	4	1	29	69	2848	126023	4463	6	18	0	21	476	0	134751
17 CHS	583	1142	148	14491	25	114	216	337	35	24	26	11	36	472	1713	5655	172530	41	31	8	44	2616	0	200299
18 FAU	99	98	252	124	17	164	74	6486	1932	6953	51	30	54	135	11	19	71	54689	4035	644	1654	83	0	77675
19 STA	23	15	42	17	5	40	73	831	15	4427	10	0	11	36	7	21	18	956	107000	16	24731	506	0	138800
20 CL/JF	88	121	471	116	17	80	51	301	6784	175	6343	36	98	55	2	0	10	643	31	71452	11	1	0	86884
21 SP/FB	30	40	85	35	6	30	20	133	27	712	6	0	5	17	5	26	38	467	17243	2	130194	149	0	149269
22 KGEO	41	55	71	58	8	39	24	115	21	48	0	0	6	24	7	126	747	66	721	0	454	25665	0	28297
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	207787	603723	1638581	1091507	29776	346795	206307	1798296	359158	475994	332299	182023	319817	773430	118096	143636	203039	64350	142082	88865	165113	30245	0	9320919

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBO Trips   MODE: Motorized Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	23933	16225	2542	2587	774	3311	775	1530	9	4	1	0	20	56	2	1	15	5	0	1	1	1	0	51793
2 DC NC	117574	375715	87918	73250	5275	23014	6990	15836	284	63	30	13	970	1791	119	28	447	30	11	28	35	31	0	709452
3 MTG	25245	76946	1425210	71499	1983	11240	2619	34463	1831	93	14772	1536	24600	4440	62	123	122	58	98	647	178	113	0	1697878
4 PG	46571	124538	71874	863438	2267	8559	8131	10894	84	132	72	50	15454	44185	2251	745	21247	61	83	69	104	142	0	1220953
5 ARLCR	2114	1541	481	207	3943	4312	843	1639	15	12	0	0	1	4	0	1	2	1	1	1	1	1	0	15119
6 ARNCR	26310	17205	7230	3201	10563	197791	29076	78026	824	455	9	8	25	89	8	18	33	26	23	19	22	17	0	370978
7 ALX	9634	6780	1672	2349	3094	27904	87774	43900	118	706	5	3	8	43	6	8	53	17	44	7	19	8	0	184153
8 FFX	22315	16207	18997	7437	6536	77148	66550	1480372	67401	31136	90	76	194	413	62	132	249	1875	1244	312	696	137	0	1799579
9 LDN	165	120	795	21	47	649	134	35060	268964	1285	2574	42	52	81	4	3	17	772	24	8134	46	20	0	319008
10 PW	1332	788	550	414	376	3382	4450	92515	6967	429458	72	66	95	331	50	78	91	4454	11272	338	6741	170	0	563990
11 FRD	106	163	20736	187	17	83	53	386	3475	58	296527	8133	5765	365	17	5	44	42	52	6894	43	0	0	343152
12 CAR	120	142	2204	208	22	102	76	331	110	61	8536	168585	6632	293	9	3	43	43	2	80	0	0	0	187601
13 HOW	275	1113	17383	13647	10	47	27	305	56	19	3024	3321	237212	21589	14	34	40	14	20	143	16	20	0	298330
14 AAR	1693	4769	4249	44519	83	352	276	1564	170	187	173	101	28705	695017	3358	229	1014	75	99	65	73	63	0	786837
15 CAL	204	524	194	4632	14	59	67	191	34	37	26	10	41	4055	107544	10357	1755	10	32	5	34	26	0	129852
16 STM	42	44	94	458	6	31	11	77	10	20	4	1	29	69	2848	126023	4463	6	18	0	21	476	0	134751
17 CHS	616	1144	148	14491	26	116	217	383	35	24	26	11	36	472	1713	5655	172530	41	31	8	44	2616	0	200382
18 FAU	103	98	252	124	17	165	74	6670	1932	6953	51	30	54	135	11	19	71	54689	4035	644	1654	83	0	77863
19 STA	23	15	42	17	5	40	73	862	15	4427	10	0	11	36	7	21	18	956	107000	16	24731	506	0	138831
20 CL/JF	88	121	471	116	17	80	51	301	6784	175	6343	36	98	55	2	0	10	643	31	71452	11	1	0	86884
21 SP/FB	34	40	85	35	6	30	20	267	27	712	6	0	5	17	5	26	38	467	17243	2	130194	149	0	149408
22 KGEO	43	55	71	58	8	39	24	196	21	48	0	0	6	24	7	126	747	66	721	0	454	25665	0	28380
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	278540	644292	1663198	1102893	35090	358455	208312	1805770	359167	476065	332350	182023	320014	773560	118102	143636	203047	64350	142083	88865	165119	30245	0	9495175

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBO Trips   MODE: Commuter Rail

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
2 DC NC	0	0	0	2	0	0	14	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	18
3 MTG	94	0	9	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	105
4 PG	822	18	7	2	4	2	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	865
5 ARLCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 ARNCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 ALX	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8 FFX	334	0	0	0	29	95	11	0	0	1	3	0	10	30	0	0	0	0	1	0	6	0	0	522
9 LDN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 PW	27	0	0	0	3	6	0	353	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	389
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	6	0	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
14 AAR	137	7	2	1	4	4	0	506	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	661
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	4	0	0	0	0	0	0	184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
19 STA	0	0	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	4	0	0	0	0	0	0	134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139
22 KGEO	2	0	0	0	0	0	0	81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1430	25	20	7	40	109	29	1333	0	1	3	0	12	31	0	0	0	0	1	0	6	0	0	3045

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: All Bus

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	2032	3561	123	57	56	104	2	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5946
2 DC NC	17363	22235	2297	1682	262	246	8	40	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	44134
3 MTG	460	1812	15052	1484	43	12	0	121	0	0	1	0	17	1	0	0	0	0	0	0	0	0	0	19002
4 PG	900	2749	1201	5558	28	14	48	53	0	0	0	0	33	51	0	0	0	0	0	0	0	0	0	10635
5 ARLCR	19	21	1	0	1	65	4	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	147
6 ARNCR	191	118	4	0	90	1869	345	1074	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3690
7 ALX	31	7	0	2	54	752	565	195	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1606
8 FFX	40	59	385	139	110	960	349	1350	2	66	0	0	48	0	2	0	6	0	0	0	0	0	0	3515
9 LDN	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
10 PW	4	0	0	0	0	0	0	241	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	245
11 FRD	0	0	0	0	0	0	0	0	0	0	41	0	0	0	0	0	0	0	0	0	0	0	0	41
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	6	1	7	21	0	0	0	52	0	0	0	0	56	6	0	0	0	0	0	0	0	0	0	149
14 AAR	0	0	0	54	0	0	0	0	0	0	0	0	9	19	0	0	0	0	0	0	0	0	0	82
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	21045	30563	19070	8997	643	4022	1320	3183	2	67	42	0	163	76	3	0	7	0	0	0	0	0	0	89202

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: Bus & Metrorail

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	90	126	93	88	39	185	29	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	703
2 DC NC	4199	1614	1024	806	429	1156	122	292	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	9644
3 MTG	858	648	600	82	76	105	4	797	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3169
4 PG	1948	1045	166	150	153	247	17	587	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4313
5 ARLCR	20	6	4	1	6	11	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56
6 ARNCR	987	174	51	17	90	252	25	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1699
7 ALX	1015	102	13	4	175	249	13	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1614
8 FFX	772	192	189	184	74	206	44	199	8	4	7	0	21	22	3	0	1	0	0	0	0	0	0	1925
9 LDN	0	0	0	0	0	0	0	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42
10 PW	3	0	0	0	0	1	0	204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	208
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0	0	0	0	0	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73
14 AAR	6	1	0	0	0	0	0	260	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	268
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	1	0	0	0	0	0	0	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	9897	3908	2141	1333	1044	2411	258	2700	8	4	7	0	22	22	3	0	1	0	0	0	0	0	0	23759

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: Metrorail Only

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	2522	914	240	99	330	654	27	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4799
2 DC NC	11751	3144	1206	695	764	1153	57	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18794
3 MTG	4740	669	1553	55	454	346	3	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7838
4 PG	7195	799	161	170	502	435	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9283
5 ARLCR	921	57	14	3	48	212	9	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1272
6 ARNCR	5903	284	67	14	847	1197	58	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8469
7 ALX	910	43	5	2	137	315	43	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1486
8 FFX	4123	155	136	9	479	773	184	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5893
9 LDN	12	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
10 PW	180	0	0	0	17	26	5	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	239
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	22	2	4	1	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
14 AAR	70	6	2	2	4	4	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	92
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	32	1	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	38380	6074	3386	1049	3587	5117	397	260	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58250

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: Transit Percentage

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	19.4	28.4	17.9	9.4	55.0	28.5	7.9	5.1	0	0	0	0	0.4	0	0.4	0	0.1	0	0	0	0	0	0	22.1
2 DC NC	28.3	7.2	5.1	4.3	27.6	11.1	2.9	2.3	0	0	0	0	0.2	0.0	0.4	0	0.1	0	0	0	0	0	0	10.2
3 MTG	24.4	4.1	1.2	2.3	28.9	4.1	0.3	2.7	0	0	0.0	0	0.1	0.0	0	0	0	0	0	0	0	0	0	1.8
4 PG	23.3	3.7	2.1	0.7	30.3	8.2	0.9	6.1	0	0	0	0	0.2	0.1	0.0	0	0.0	0	0	0	0	0	0	2.1
5 ARLCR	45.4	5.4	4.0	2.1	1.4	6.7	2.0	3.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.8
6 ARNCR	26.9	3.3	1.7	1.0	9.7	1.7	1.5	1.6	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	3.7
7 ALX	20.3	2.2	1.1	0.4	11.8	4.7	0.7	0.6	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.6
8 FFX	23.6	2.5	3.7	4.5	10.6	2.6	0.9	0.1	0.0	0.2	10.4	0	41.0	12.7	7.2	0.1	2.8	0	0.1	0	0.9	0	0	0.7
9 LDN	7.1	0	0.0	0	2.4	0.2	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
10 PW	16.0	0.0	0.0	0	5.2	1.0	0.1	0.9	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
11 FRD	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	12.5	0.2	0.1	0.2	9.1	1.7	0	52.0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.1
14 AAR	12.5	0.3	0.1	0.1	9.9	2.2	0.1	49.3	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0.1
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0.0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	5.3	0.1	0.0	0	5.0	1.1	0.0	12.0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0
18 FAU	3.4	0	0	0	1.1	0.2	0	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
19 STA	1.3	0	0	0	0.2	0.1	0	3.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	12.5	0	0	0	4.1	1.2	0	50.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
22 KGEO	3.9	0	0	0	1.7	0.5	0	41.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	25.4	6.3	1.5	1.0	15.1	3.3	1.0	0.4	0.0	0.0	0.0	0	0.1	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0	0	1.8

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Transit

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	30042	6313	1532	448	2769	4393	457	644	0	6	0	0	2	0	1	0	2	0	0	0	0	0	0	46608
2 DC NC	25825	2735	1620	383	965	1434	85	264	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	33315
3 MTG	11480	1953	13895	489	702	852	62	548	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	29992
4 PG	10855	654	589	1281	333	527	70	317	0	0	0	0	6	7	0	0	0	0	0	0	0	0	0	14640
5 ARLCR	2471	58	51	12	268	703	63	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3721
6 ARNCR	9494	170	131	31	1880	2176	293	553	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	14728
7 ALX	2701	26	21	8	692	1502	384	189	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5523
8 FFX	4720	192	422	238	856	2417	367	1523	4	83	9	0	48	27	4	0	6	0	0	0	1	0	0	10918
9 LDN	5	0	0	0	1	1	0	54	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64
10 PW	67	0	0	0	6	16	2	165	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	271
11 FRD	0	0	0	0	0	0	0	0	0	0	44	0	0	0	0	0	0	0	0	0	0	0	0	44
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	108	2	9	7	2	1	0	119	0	0	0	0	14	1	0	0	0	0	0	0	0	0	0	263
14 AAR	198	4	4	13	3	4	0	276	0	0	0	0	1	5	0	0	0	0	0	0	0	0	0	507
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	29	0	0	0	1	1	0	26	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	59
18 FAU	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
19 STA	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102
22 KGEO	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	97996	12107	18273	2909	8476	14028	1785	4945	7	104	53	0	82	41	5	0	10	0	0	0	1	0	0	160824

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Auto Person

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	48095	45705	17258	30676	1991	19367	10602	20193	275	678	26	3	446	1372	129	6	636	5	12	1	3	1	0	197482
2 DC NC	25787	87872	45571	57257	2372	15210	8073	16975	284	486	109	8	1595	3276	261	13	1059	3	8	1	2	1	0	266221
3 MTG	7808	45935	649779	61300	1123	9302	3491	30346	1443	488	16695	2005	19883	5239	73	6	151	12	6	239	8	3	0	855336
4 PG	19736	56635	62274	378987	1299	7801	8301	13935	70	536	138	130	18539	41495	3520	566	14809	2	12	2	5	23	0	628812
5 ARLCR	2262	3271	1671	1595	2686	5870	2871	5809	82	219	5	0	15	54	6	0	32	3	5	0	1	0	0	26459
6 ARNCR	14045	16382	9537	8273	4617	66893	21429	57031	982	2026	33	2	81	270	31	2	166	39	49	1	12	1	0	201902
7 ALX	8950	8298	3366	7765	2218	20207	48615	50312	281	3104	7	1	38	200	45	3	328	14	121	1	35	1	0	153911
8 FFX	16906	17320	27680	14374	5069	55184	50841	702852	44369	51923	173	10	167	331	75	8	555	2210	1189	91	394	5	0	991724
9 LDN	302	280	1294	74	88	932	301	45372	112605	3787	2383	37	45	8	1	0	2	666	3	2751	2	0	0	170933
10 PW	817	616	494	551	256	2167	3052	53112	3552	192604	9	2	3	13	3	1	18	4780	5086	49	1877	15	0	269078
11 FRD	31	135	19269	167	7	44	10	223	2628	11	156853	5694	4112	179	2	0	4	3	2	2713	1	0	0	192090
12 CAR	3	11	2383	170	0	2	2	14	45	3	6377	92996	4671	293	1	0	2	1	0	51	0	0	0	107025
13 HOW	406	1727	21497	20235	18	96	45	198	45	4	3943	4317	132695	28697	16	3	22	2	2	49	1	1	0	214019
14 AAR	1273	3279	6164	40701	58	294	221	334	8	14	199	316	30975	324909	2271	28	793	3	4	5	4	3	0	411857
15 CAL	113	259	74	3840	5	27	46	62	1	3	2	1	18	2553	41760	4901	1838	1	1	0	2	7	0	55514
16 STM	7	16	8	679	1	2	4	10	0	2	0	0	4	38	5143	68393	3770	0	2	0	3	176	0	78258
17 CHS	629	1116	165	15472	34	177	364	493	2	17	4	2	22	843	1690	3253	80638	1	3	0	5	557	0	105488
18 FAU	6	4	12	2	3	43	17	2287	629	5065	3	1	2	3	0	0	1	18230	812	114	376	3	0	27613
19 STA	20	13	7	13	7	55	125	1332	3	5654	2	0	2	5	1	2	4	929	36882	1	14699	392	0	60146
20 CL/JF	1	1	303	3	0	1	1	113	3062	64	2854	48	58	6	0	0	0	145	1	36604	1	0	0	43266
21 SP/FB	4	3	10	6	2	14	36	459	3	2267	1	0	2	6	2	3	6	426	15135	1	94082	690	0	113159
22 KGEO	1	1	3	24	0	1	1	5	1	16	0	0	1	4	6	152	576	3	344	0	594	12653	0	14385
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	147204	288876	868818	642165	21855	203689	158449	1001469	170369	268972	189816	105573	213374	409793	55037	77339	105409	27479	59679	42674	112107	14532	0	5184679

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Motorized Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	78137	52017	18790	31124	4761	23760	11059	20837	275	684	26	3	448	1372	130	6	638	5	12	1	3	1	0	244089
2 DC NC	51612	90607	47191	57640	3337	16644	8159	17239	284	486	109	8	1597	3276	261	13	1059	3	8	1	2	1	0	299536
3 MTG	19289	47888	663674	61789	1825	10154	3553	30895	1443	488	16696	2005	19894	5239	73	6	151	12	6	239	8	3	0	885328
4 PG	30591	57288	62862	380267	1632	8329	8371	14252	70	536	138	130	18545	41502	3520	566	14809	2	12	2	5	23	0	643452
5 ARLCR	4733	3329	1721	1606	2954	6573	2934	5905	82	219	5	0	15	54	6	0	32	3	5	0	1	0	0	30181
6 ARNCR	23539	16552	9667	8304	6496	69069	21722	57584	982	2027	33	2	81	270	31	2	166	39	49	1	12	1	0	216630
7 ALX	11651	8324	3387	7773	2909	21709	49000	50502	281	3104	7	1	38	200	45	3	328	14	121	1	35	1	0	159434
8 FFX	21626	17512	28102	14612	5925	57601	51208	704375	44373	52006	182	10	215	358	79	8	561	2210	1189	91	396	5	0	1002643
9 LDN	308	280	1294	74	89	933	301	45426	112608	3787	2383	37	45	8	1	0	2	666	3	2751	2	0	0	170997
10 PW	883	616	494	551	262	2184	3055	53278	3552	192618	9	2	3	13	3	1	18	4780	5086	49	1877	15	0	269349
11 FRD	31	135	19269	167	7	44	10	223	2628	11	156896	5694	4112	179	2	0	4	3	2	2713	1	0	0	192134
12 CAR	3	11	2383	170	0	2	2	14	45	3	6377	92996	4671	293	1	0	2	1	0	51	0	0	0	107025
13 HOW	514	1728	21506	20242	20	97	45	318	45	4	3943	4317	132709	28698	16	3	22	2	2	49	1	1	0	214282
14 AAR	1471	3283	6168	40715	61	297	221	611	8	14	199	316	30975	324914	2271	28	793	3	4	5	4	3	0	412365
15 CAL	113	259	74	3840	5	27	46	62	1	3	2	1	18	2553	41760	4901	1838	1	1	0	2	7	0	55514
16 STM	7	16	8	679	1	2	4	10	0	2	0	0	4	38	5143	68393	3770	0	2	0	3	176	0	78258
17 CHS	658	1116	165	15472	35	178	365	519	2	17	4	2	22	843	1690	3253	80640	1	3	0	5	557	0	105547
18 FAU	6	4	12	2	3	43	17	2314	629	5065	3	1	2	3	0	0	1	18230	812	114	376	3	0	27641
19 STA	20	13	7	13	7	55	125	1360	3	5654	2	0	2	5	1	2	4	929	36882	1	14699	392	0	60175
20 CL/JF	1	1	303	3	0	1	1	113	3062	64	2854	48	58	6	0	0	0	145	1	36604	1	0	0	43266
21 SP/FB	4	3	10	6	2	14	36	561	3	2267	1	0	2	6	2	3	6	426	15135	1	94082	690	0	113260
22 KGEO	1	1	3	24	0	1	1	17	1	16	0	0	1	4	6	152	576	3	344	0	594	12653	0	14397
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	245200	300983	887091	645074	30331	217717	160234	1006414	170376	269076	189869	105573	213456	409834	55042	77339	105419	27479	59680	42674	112108	14532	0	5345502

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Commuter Rail

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0	0	0	3	0	0	64	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69
2 DC NC	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
3 MTG	0	0	13	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
4 PG	783	18	12	0	2	9	5	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	837
5 ARLCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 ARNCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7 ALX	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8 FFX	357	3	1	0	17	142	17	0	0	0	2	0	4	6	0	0	0	0	0	0	1	0	0	550
9 LDN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 PW	23	0	0	0	2	8	1	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	9	0	0	0	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46
14 AAR	168	4	3	0	1	2	0	175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	354
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
19 STA	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102
22 KGEO	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1340	25	29	4	22	162	98	449	0	1	2	0	4	7	0	0	0	0	0	0	1	0	0	2144

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: All Bus

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	4626	6021	839	232	100	959	100	505	0	5	0	0	2	0	1	0	2	0	0	0	0	0	0	13392
2 DC NC	8401	2552	985	236	41	176	12	134	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	12538
3 MTG	2610	877	11780	392	48	22	1	139	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	15880
4 PG	1840	406	429	1235	14	45	48	76	0	0	0	0	6	7	0	0	0	0	0	0	0	0	0	4105
5 ARLCR	38	10	1	0	2	57	18	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200
6 ARNCR	158	23	1	0	85	418	193	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1329
7 ALX	94	1	0	3	67	547	322	152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1186
8 FFX	991	72	172	87	295	1384	274	1425	1	78	0	0	28	0	2	0	6	0	0	0	0	0	0	4815
9 LDN	1	0	0	0	0	0	0	22	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
10 PW	26	0	0	0	0	0	0	101	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	142
11 FRD	0	0	0	0	0	0	0	0	0	0	44	0	0	0	0	0	0	0	0	0	0	0	0	44
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	92	1	7	6	1	1	0	62	0	0	0	0	14	1	0	0	0	0	0	0	0	0	0	186
14 AAR	3	0	0	12	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	0	21
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	18878	9965	14214	2203	654	3609	967	3139	4	99	44	0	62	14	3	0	10	0	0	0	0	0	0	53865

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Bus & Metrorail

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	367	125	244	84	216	631	158	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1921
2 DC NC	4142	90	327	87	366	593	46	125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5777
3 MTG	1445	573	603	46	162	284	39	389	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3540
4 PG	1775	146	63	17	97	183	12	226	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2518
5 ARLCR	138	18	5	2	40	64	14	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	284
6 ARNCR	831	65	15	4	109	216	19	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1281
7 ALX	835	16	7	0	257	211	11	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1346
8 FFX	588	84	152	131	83	280	34	87	3	5	7	0	16	20	2	0	0	0	0	0	0	0	0	1492
9 LDN	0	0	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
10 PW	0	0	0	0	0	1	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
14 AAR	6	0	0	0	0	0	0	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	10127	1117	1415	371	1329	2464	333	1144	3	5	7	0	16	20	2	0	0	0	0	0	0	0	0	18353

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Metrorail Only

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	25049	166	448	129	2453	2803	136	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31226
2 DC NC	13282	93	308	60	559	666	16	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14988
3 MTG	7426	502	1500	50	492	546	22	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10555
4 PG	6457	84	86	28	221	291	6	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7179
5 ARLCR	2295	30	45	10	226	582	31	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3238
6 ARNCR	8505	82	115	27	1686	1542	80	81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12117
7 ALX	1772	9	14	4	367	743	51	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2990
8 FFX	2785	33	97	21	463	610	42	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4061
9 LDN	5	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
10 PW	18	0	0	0	4	7	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	7	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
14 AAR	21	0	1	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	29	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	67651	1001	2615	330	6471	7793	387	214	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86462

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Transit Percentage

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	38.4	12.1	8.2	1.4	58.2	18.5	4.1	3.1	0	0.8	0	0	0.4	0.0	0.6	0	0.3	0	0	0	0	0	0	19.1
2 DC NC	50.0	3.0	3.4	0.7	28.9	8.6	1.0	1.5	0	0.0	0	0	0.1	0.0	0.0	0	0.0	0	0	0	0	0	0	11.1
3 MTG	59.5	4.1	2.1	0.8	38.5	8.4	1.7	1.8	0	0.0	0.0	0	0.1	0.0	0	0	0	0	0	0	0	0	0	3.4
4 PG	35.5	1.1	0.9	0.3	20.4	6.3	0.8	2.2	0	0	0	0	0.0	0.0	0	0	0.0	0	0	0	0	0	0	2.3
5 ARLCR	52.2	1.7	2.9	0.7	9.1	10.7	2.1	1.6	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	12.3
6 ARNCR	40.3	1.0	1.4	0.4	28.9	3.2	1.3	1.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.8
7 ALX	23.2	0.3	0.6	0.1	23.8	6.9	0.8	0.4	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.5
8 FFX	21.8	1.1	1.5	1.6	14.5	4.2	0.7	0.2	0.0	0.2	4.9	0	22.4	7.4	5.2	1.2	1.1	0	0.0	0	0.3	0	0	1.1
9 LDN	1.7	0	0.0	0	0.8	0.1	0	0.1	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
10 PW	7.6	0.0	0.0	0	2.2	0.7	0.1	0.3	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
11 FRD	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	21.0	0.1	0.0	0.0	8.7	1.3	0	37.6	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.1
14 AAR	13.4	0.1	0.1	0.0	4.2	1.2	0.2	45.2	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.1
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0.0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	4.4	0.0	0.1	0.0	1.9	0.6	0.0	5.0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.1
18 FAU	0	0	0	0	0	0	0	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
19 STA	0	0	0	0	0	0.0	0	2.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	2.6	0	0	0	1.7	0.6	0.0	18.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
22 KGEO	0	0	0	0	0	0	0	71.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	40.0	4.0	2.1	0.5	27.9	6.4	1.1	0.5	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0	0	3.0

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Transit

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	46595	17396	3905	1405	4450	7991	1251	1870	2	6	0	0	11	3	1	0	2	0	0	0	0	0	0	84886
2 DC NC	170708	73286	23047	12188	6981	13884	3128	4509	4	1	0	0	64	22	1	0	1	0	0	0	0	0	0	307824
3 MTG	92915	12390	82456	4948	4250	4068	393	4014	1	0	1	0	84	6	0	0	0	0	0	0	0	0	0	205525
4 PG	103112	22426	9866	22593	6511	7111	1523	2458	0	0	0	0	297	185	0	0	1	0	0	0	0	0	0	176084
5 ARLCR	6612	363	174	34	455	1481	163	320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9602
6 ARNCR	51788	2829	1260	225	6967	11761	2375	5262	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	82470
7 ALX	22673	1331	460	118	3478	7378	4277	2417	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	42133
8 FFX	66607	3837	2915	879	10030	15985	5149	13851	77	179	21	0	153	99	9	0	16	0	2	0	25	0	0	119834
9 LDN	733	39	35	0	215	165	9	385	126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1707
10 PW	7137	160	39	3	832	1169	496	1837	0	869	0	0	0	0	0	0	0	0	0	0	0	0	0	12542
11 FRD	69	4	105	0	5	3	0	178	0	0	246	0	0	0	0	0	0	0	0	0	0	0	0	610
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	2924	322	549	282	121	98	6	348	0	0	0	0	579	40	0	0	0	0	0	0	0	0	0	5271
14 AAR	4950	328	135	338	207	189	14	1883	0	0	0	0	44	64	0	0	0	0	0	0	0	0	0	8152
15 CAL	1423	191	17	55	69	63	8	50	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	1882
16 STM	112	12	1	2	5	4	1	17	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	153
17 CHS	3155	365	33	56	161	157	27	126	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	4089
18 FAU	5	0	0	0	1	1	0	274	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	282
19 STA	138	9	1	0	70	109	32	252	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	611
20 CL/JF	0	0	1	0	0	0	0	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119
21 SP/FB	22	1	0	0	10	15	5	394	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	452
22 KGEO	2	0	0	0	0	0	0	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	581679	135289	124998	43125	44816	71632	18856	40677	212	1060	269	0	1232	420	17	0	31	0	3	0	29	0	0	1064346

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Auto Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	79157	62316	20678	34723	3466	27683	12515	23890	351	712	60	5	524	1542	138	46	691	14	138	15	255	3	0	268920
2 DC NC	144641	539222	163920	168491	12643	61988	20433	44269	873	665	306	30	3385	6408	432	233	1858	59	842	96	1277	37	0	1172107
3 MTG	59761	163020	2832888	190067	6643	30715	8890	91389	4078	808	39204	3941	56736	12991	200	464	560	113	1551	1180	2736	129	0	3508063
4 PG	98052	256221	186877	1738571	8781	29860	26282	42617	447	1010	641	219	47233	122226	7216	2261	58372	121	1940	241	3345	309	0	2632842
5 ARLCR	3554	5090	2336	1884	9601	13171	4135	8351	120	237	8	1	19	62	7	3	36	4	13	1	14	1	0	48648
6 ARNCR	39574	40424	21336	13056	22430	358580	62684	172367	2466	2670	69	11	150	426	41	38	224	74	141	26	161	18	0	736964
7 ALX	22735	19571	7102	11912	8852	76021	199274	131669	676	4162	29	5	69	304	55	33	431	37	265	15	209	9	0	483436
8 FFX	80104	60188	67080	30212	24497	206205	176541	3082029	167732	109091	1017	156	537	1636	295	1216	1682	5253	6295	956	8109	193	0	4031024
9 LDN	1835	1302	5765	513	883	3604	1167	150423	520886	6833	10339	149	278	469	51	45	154	2088	1725	16264	3195	30	0	727997
10 PW	9140	2683	2301	1858	2001	9641	13981	235374	16721	882742	425	92	172	734	121	248	373	17819	28730	682	18132	327	0	1244296
11 FRD	338	621	63254	1124	87	568	244	2226	8813	225	630809	18588	15903	1347	38	7	127	107	707	12129	545	0	0	757807
12 CAR	222	304	10177	1517	64	634	328	1718	605	225	28975	359703	20910	1835	39	6	130	111	24	358	0	0	0	427886
13 HOW	2836	6485	58193	55798	246	587	222	1090	182	90	12474	9026	509407	73129	56	132	133	29	422	362	443	26	0	731367
14 AAR	8943	15614	15877	124988	695	2050	1127	3016	472	543	776	466	82187	1426890	8022	625	2797	116	1347	152	1625	82	0	1698410
15 CAL	1859	2891	916	16748	169	462	346	811	85	135	96	15	173	10121	201631	28234	5600	21	569	14	777	150	0	271823
16 STM	264	403	562	3665	43	363	168	873	108	136	9	1	112	388	10938	275539	13465	16	1252	0	1093	1787	0	311186
17 CHS	5524	7798	1178	50510	478	1184	1398	2257	139	134	87	14	152	2455	5902	12987	345839	61	684	10	757	5278	0	444830
18 FAU	118	121	525	250	37	338	168	14716	4667	20207	161	35	92	232	18	23	116	110243	10586	996	4831	132	0	168612
19 STA	267	143	118	104	194	569	934	8627	61	20838	17	0	15	46	9	38	77	3319	207264	19	71214	2011	0	315886
20 CL/JF	113	165	1901	333	36	311	145	2222	16452	580	14646	157	428	231	3	0	31	1161	1097	151821	626	1	0	192460
21 SP/FB	63	61	114	54	30	111	178	2082	39	5879	7	0	7	24	8	36	78	1292	42532	4	312118	1738	0	366454
22 KGEO	72	92	229	383	19	201	101	541	87	241	0	0	30	132	63	536	2239	108	2583	0	3834	50985	0	62478
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	559170	1184737	3463328	2446760	101895	824846	531263	4022558	746060	1058164	740158	392616	738517	1663627	235283	322749	435014	142166	310706	185341	435296	63248	0	20603497

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Motorized Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	125751	79713	24583	36128	7916	35673	13766	25759	352	718	60	5	535	1545	138	46	693	14	138	15	255	3	0	353807
2 DC NC	315349	612508	186967	180679	19624	75871	23562	48778	878	666	306	30	3448	6430	432	233	1859	59	842	96	1277	37	0	1479931
3 MTG	152676	175409	2915344	195015	10892	34783	9283	95403	4079	808	39205	3941	56820	12997	200	464	560	113	1551	1180	2736	129	0	3713588
4 PG	201164	278647	196743	1761164	15293	36971	27805	45076	447	1010	641	219	47529	122411	7217	2261	58373	121	1940	241	3345	309	0	2808927
5 ARLCR	10166	5452	2510	1918	10056	14652	4299	8671	121	237	8	1	19	62	7	3	36	4	13	1	14	1	0	58250
6 ARNCR	91362	43253	22596	13281	29396	370341	65059	177629	2468	2671	69	11	150	426	41	38	224	74	141	26	161	18	0	819434
7 ALX	45408	20903	7562	12029	12330	83400	203551	134085	676	4163	29	5	69	304	55	33	431	37	265	15	209	9	0	525569
8 FFX	146710	64025	69995	31091	34528	222189	181690	3095880	167809	109270	1038	156	690	1735	304	1216	1699	5253	6297	956	8134	193	0	4150858
9 LDN	2568	1340	5800	513	1098	3769	1176	150808	521012	6833	10339	149	278	469	51	45	154	2088	1725	16264	3195	30	0	729704
10 PW	16276	2844	2340	1861	2832	10810	14477	237211	16721	883611	425	92	172	734	121	248	373	17819	28730	682	18132	327	0	1256839
11 FRD	406	625	63359	1124	92	571	244	2403	8813	225	631055	18588	15903	1347	38	7	127	107	707	12129	545	0	0	758416
12 CAR	222	304	10177	1517	64	634	328	1718	605	225	28975	359703	20910	1835	39	6	130	111	24	358	0	0	0	427886
13 HOW	5760	6806	58742	56080	367	686	229	1438	182	90	12474	9026	509986	73169	56	132	133	29	422	362	443	26	0	736638
14 AAR	13893	15942	16012	125326	902	2239	1141	4899	472	543	776	466	82231	1426955	8022	625	2797	116	1347	152	1625	82	0	1706562
15 CAL	3282	3083	933	16802	238	525	354	861	85	135	96	15	173	10121	201637	28234	5600	21	569	14	777	150	0	273705
16 STM	376	415	563	3666	48	367	169	890	108	136	9	1	112	388	10938	275539	13466	16	1252	0	1093	1787	0	311339
17 CHS	8679	8163	1211	50566	639	1341	1425	2383	139	134	87	14	152	2455	5902	12987	345850	61	684	10	757	5278	0	448919
18 FAU	123	121	525	250	38	339	168	14990	4667	20208	161	35	92	232	18	23	116	110243	10586	996	4831	132	0	168894
19 STA	405	152	120	104	264	679	965	8879	61	20839	17	0	15	46	9	38	77	3319	207264	19	71214	2011	0	316497
20 CL/JF	113	166	1902	333	36	311	145	2340	16452	580	14646	157	428	231	3	0	31	1161	1097	151821	626	1	0	192579
21 SP/FB	85	61	114	54	40	125	184	2477	39	5880	7	0	7	24	8	36	78	1292	42532	4	312121	1738	0	366905
22 KGEO	74	92	229	383	19	202	101	657	87	241	0	0	30	132	63	536	2239	108	2583	0	3834	50985	0	62596
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1140849	1320026	3588326	2489885	146711	896478	550120	4063235	746272	1059224	740426	392616	739749	1664047	235300	322749	435045	142166	310709	185341	435324	63248	0	21667843

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Commuter Rail

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0	0	0	19	0	0	71	2	0	1	0	0	3	2	0	0	0	0	0	0	0	0	0	98
2 DC NC	37	2	4	108	1	1	44	1	0	1	0	0	21	13	0	0	0	0	0	0	0	0	0	233
3 MTG	7585	158	424	32	127	85	9	20	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	8442
4 PG	4638	99	47	69	71	59	11	21	0	0	0	0	6	5	0	0	0	0	0	0	0	0	0	5027
5 ARLCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 ARNCR	17	1	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
7 ALX	94	7	0	1	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	105
8 FFX	3096	91	18	1	536	1056	180	5	0	3	5	0	16	42	0	0	0	0	2	0	25	0	0	5077
9 LDN	2	0	1	0	1	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28
10 PW	2183	6	7	0	294	424	124	526	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	3574
11 FRD	51	2	36	0	3	2	0	172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	267
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	1208	39	33	62	28	21	2	93	0	0	0	0	6	2	0	0	0	0	0	0	0	0	0	1494
14 AAR	1257	47	22	46	27	26	2	1091	0	0	0	0	7	8	0	0	0	0	0	0	0	0	0	2533
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	5	0	0	0	1	1	0	274	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	282
19 STA	18	0	0	0	9	13	4	106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150
20 CL/JF	0	0	1	0	0	0	0	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119
21 SP/FB	16	0	0	0	6	8	3	321	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	354
22 KGEO	2	0	0	0	0	0	0	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	20209	453	594	341	1104	1698	450	2890	0	15	5	0	63	73	0	0	0	0	2	0	25	0	0	27923

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: All Bus

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	11730	14563	1618	578	268	1760	305	1125	1	5	0	0	7	0	1	0	2	0	0	0	0	0	0	31964
2 DC NC	80036	61406	13033	7752	830	2974	675	2048	4	0	0	0	37	4	0	0	0	0	0	0	0	0	0	168800
3 MTG	8476	5908	66075	4129	209	118	9	2261	0	0	1	0	78	4	0	0	0	0	0	0	0	0	0	87269
4 PG	15800	12446	5693	20341	574	440	516	474	0	0	0	0	287	178	0	0	1	0	0	0	0	0	0	56747
5 ARLCR	266	123	15	1	26	203	34	236	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	903
6 ARNCR	3069	824	83	4	1915	5156	1631	4245	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	16929
7 ALX	3188	428	13	24	1324	3838	3695	1893	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14403
8 FFX	3081	553	865	247	2054	5154	2387	12166	57	165	0	0	88	0	4	0	16	0	0	0	0	0	0	26838
9 LDN	252	26	12	0	80	40	1	245	126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	781
10 PW	3794	142	6	0	411	569	209	881	0	861	0	0	0	0	0	0	0	0	0	0	0	0	0	6873
11 FRD	0	0	62	0	0	0	0	2	0	0	246	0	0	0	0	0	0	0	0	0	0	0	0	311
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	912	214	399	190	30	22	1	125	0	0	0	0	573	38	0	0	0	0	0	0	0	0	0	2503
14 AAR	1207	95	36	240	32	17	0	26	0	0	0	0	37	57	0	0	0	0	0	0	0	0	0	1748
15 CAL	1408	176	3	41	32	19	1	5	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	1692
16 STM	106	11	0	1	2	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	125
17 CHS	2028	287	4	29	52	34	6	6	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	2456
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	86	8	1	0	46	66	23	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	294
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	2	0	0	0	3	4	2	34	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	49
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	135439	97209	87919	33577	7890	20413	9496	25837	190	1033	248	0	1107	281	12	0	30	0	1	0	3	0	0	420684

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Bus & Metrorail

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	651	415	618	371	425	1160	418	611	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4670
2 DC NC	22138	4057	4417	2378	2553	5221	1677	2278	1	0	0	0	6	5	0	0	0	0	0	0	0	0	0	44730
3 MTG	12893	2984	4762	472	795	1145	230	1674	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	24960
4 PG	18810	5188	2220	1297	1954	2610	672	1920	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	34678
5 ARLCR	339	37	25	9	80	120	40	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	688
6 ARNCR	11225	765	431	108	633	1307	221	615	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15308
7 ALX	9960	615	308	64	1178	1583	150	365	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	14225
8 FFX	12898	1595	952	518	1658	2870	763	1076	20	11	16	0	49	57	5	0	1	0	0	0	0	0	0	22488
9 LDN	145	6	11	0	57	68	4	104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	395
10 PW	507	12	20	2	66	102	109	383	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1201
11 FRD	17	1	6	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	145	24	26	16	25	26	3	126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	390
14 AAR	480	71	31	28	41	50	6	758	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1466
15 CAL	15	15	13	14	37	44	7	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	190
16 STM	5	1	0	0	3	3	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
17 CHS	466	40	22	22	71	81	16	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	834
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	34	1	1	0	15	31	5	81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	5	0	0	0	1	2	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	90732	15829	13865	5301	9592	16425	4321	10249	22	13	16	0	62	66	5	0	1	0	0	0	0	0	0	166498

Appendix B Year 2002 mode choice summary (final, i6, iteration)

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Metrorail Only

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	34214	2418	1668	438	3758	5070	456	132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48154
2 DC NC	68497	7820	5593	1951	3597	5688	732	183	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94061
3 MTG	63960	3340	11196	315	3118	2721	145	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84853
4 PG	63865	4693	1906	886	3913	4003	324	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79632
5 ARLCR	6007	203	134	23	348	1159	89	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8011
6 ARNCR	37477	1239	746	110	4419	5297	523	402	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50212
7 ALX	9431	282	139	28	975	1957	432	157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13401
8 FFX	47532	1598	1079	113	5782	6904	1818	604	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65431
9 LDN	334	6	11	0	77	57	3	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	502
10 PW	653	1	5	1	60	75	54	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	895
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	659	45	92	15	38	29	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	884
14 AAR	2007	115	46	23	107	95	5	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2406
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	662	38	7	5	37	42	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	800
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	335299	21798	22620	3906	26230	33096	4588	1702	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	449241

Simulation - Year: 2002 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Transit Percentage

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	37.1	21.8	15.9	3.9	56.2	22.4	9.1	7.3	0.5	0.8	0	0	2.0	0.2	0.6	0	0.3	0	0	0	0.0	0	0	24.0
2 DC NC	54.1	12.0	12.3	6.7	35.6	18.3	13.3	9.2	0.5	0.1	0	0	1.8	0.3	0.1	0	0.0	0	0	0	0	0	0	20.8
3 MTG	60.9	7.1	2.8	2.5	39.0	11.7	4.2	4.2	0.0	0.0	0.0	0	0.1	0.0	0	0	0	0	0	0	0.0	0	0	5.5
4 PG	51.3	8.0	5.0	1.3	42.6	19.2	5.5	5.5	0.1	0.0	0	0	0.6	0.2	0.0	0	0.0	0	0	0	0	0	0	6.3
5 ARLCR	65.0	6.7	6.9	1.8	4.5	10.1	3.8	3.7	0.2	0.1	0	0	0.2	0	0	0	0	0	0	0	0	0	0	16.5
6 ARNCR	56.7	6.5	5.6	1.7	23.7	3.2	3.7	3.0	0.1	0.1	0	0	0.3	0.0	0	0	0	0	0	0	0	0	0	10.1
7 ALX	49.9	6.4	6.1	1.0	28.2	8.8	2.1	1.8	0.0	0.0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	8.0
8 FFX	45.4	6.0	4.2	2.8	29.0	7.2	2.8	0.4	0.0	0.2	2.0	0	22.2	5.7	2.9	0.0	1.0	0	0.0	0	0.3	0	0	2.9
9 LDN	28.5	2.9	0.6	0.1	19.5	4.4	0.7	0.3	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
10 PW	43.8	5.6	1.7	0.2	29.4	10.8	3.4	0.8	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0.0	0	0	1.0
11 FRD	16.9	0.7	0.2	0.0	5.1	0.6	0.0	7.4	0	0	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0.1
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	50.8	4.7	0.9	0.5	32.9	14.3	2.8	24.2	0	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0.7
14 AAR	35.6	2.1	0.8	0.3	23.0	8.4	1.2	38.4	0	0	0	0	0.1	0.0	0.0	0	0	0	0	0	0	0	0	0.5
15 CAL	43.3	6.2	1.8	0.3	28.9	12.0	2.2	5.8	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0.7
16 STM	29.7	2.9	0.1	0.0	9.9	1.1	0.3	1.9	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0
17 CHS	36.4	4.5	2.7	0.1	25.2	11.7	1.9	5.3	0	0	0	0	0.0	0	0	0	0.0	0	0	0	0	0	0	0.9
18 FAU	3.7	0.0	0.0	0	3.4	0.4	0.2	1.8	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
19 STA	34.2	5.7	1.2	0.1	26.4	16.1	3.3	2.8	0	0.0	0	0	0	0	0	0	0	0	0.0	0	0.0	0	0	0.2
20 CL/JF	0.0	0.1	0.0	0	0	0.0	0	5.0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
21 SP/FB	25.8	0.8	0.3	0	25.2	11.6	2.9	15.9	0	0.0	0	0	0	0	0	0	0	0	0.0	0	0.0	0	0	0.1
22 KGEO	2.3	0	0	0	1.1	0.2	0.1	17.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	51.0	10.2	3.5	1.7	30.5	8.0	3.4	1.0	0.0	0.1	0.0	0	0.2	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0	0	4.9

Appendix C. Year 2002 mode choice output vs. targets

Ref: I:\ateam\docum\FY09\Version2.3_modelDoc_2008-07\newSegSumm4purps2002.xls

Trips by purpose and mode

Appendix C Year 2002 mode choice output vs. targets

		HBW		HBS		HBO		NHB	
Seg	Path #	Target	Model	Target	Model	Target	Model	Target	Model
(1) DC CORE / URBAN-DC CORE	DR ALONE	23,074	23,076	10,639	10,754	52,529	52,139	45,514	45,038
	SR2	5,498	5,496	2,901	2,857	29,850	29,633	17,028	16,885
	SR3+	2,408	2,406	1,861	1,783	21,930	21,774	12,035	11,959
	WK-CR	0	0	0	0	0	0	0	0
	WK-BUS	57,803	57,326	1,121	1,064	19,605	19,297	12,397	12,162
	WK-BU/MR	13,458	13,372	240	232	4,199	4,232	4,326	4,366
	WK-MR	39,020	39,091	690	661	12,071	11,961	36,336	35,850
	PNR-CR	0	36	0	0	0	0	0	0
	KNR-CR	0	1	0	0	0	0	0	0
	PNR-BUS	750	720	5	5	93	90	102	99
	KNR-BUS	263	243	0	1	0	11	800	774
	PNR-BU/MR	280	280	1	1	15	15	42	44
	KNR-BU/MR	107	113	3	3	50	49	106	106
	PNR-MR	7,476	7,439	101	99	1,766	1,752	1,666	1,659
	KNR-MR	2,769	2,801	33	32	580	569	836	832
(2) DC CORE / URBAN-VA CORE	DR ALONE	5,616	5,700	4,928	5,006	3,251	3,382	4,446	4,552
	SR2	1,320	1,339	1,719	1,734	1,785	1,855	1,905	1,942
	SR3+	566	574	903	905	1,342	1,393	1,316	1,329
	WK-CR	0	0	0	0	0	0	0	0
	WK-BUS	635	617	249	222	437	399	211	190
	WK-BU/MR	2,679	2,665	488	491	855	880	1,137	1,138
	WK-MR	3,592	3,604	933	930	1,636	1,676	5,423	5,466
	PNR-CR	0	1	0	0	0	0	0	0
	KNR-CR	0	0	0	0	0	0	0	0
	PNR-BUS	0	34	0	1	0	2	0	1
	KNR-BUS	0	1	0	0	0	0	0	0
	PNR-BU/MR	38	36	0	5	0	11	15	15
	KNR-BU/MR	53	52	0	0	0	1	162	162
	PNR-MR	584	544	81	76	143	134	158	159
	KNR-MR	305	313	10	11	18	20	99	101
(3) DC CORE / URBAN-URBAN	DR ALONE	24,567	24,703	88,324	88,552	247,292	246,911	129,102	129,181
	SR2	3,417	3,436	24,521	24,591	108,419	108,272	45,431	45,504
	SR3+	1,787	1,797	14,030	14,073	83,500	83,403	33,650	33,756
	WK-CR	0	0	0	22	0	15	0	67
	WK-BUS	46,080	46,216	8,131	8,043	28,331	28,385	11,617	11,272
	WK-BU/MR	7,341	7,332	1,058	1,094	3,686	3,761	1,264	1,286
	WK-MR	10,954	11,001	1,729	1,758	6,026	6,080	1,481	1,514
	PNR-CR	0	5	0	0	0	0	0	0
	KNR-CR	0	1	0	0	0	0	0	0
	PNR-BUS	111	111	39	40	134	137	0	5
	KNR-BUS	841	837	118	121	410	415	58	58
	PNR-BU/MR	74	72	19	18	66	63	18	17
	KNR-BU/MR	580	591	23	23	80	80	60	60
	PNR-MR	646	642	54	54	189	184	62	58
	KNR-MR	620	620	100	99	348	347	121	121
(4) DC CORE / URBAN-OTHER	DR ALONE	28,591	29,282	29,127	29,235	66,261	67,407	117,843	119,830
	SR2	3,036	3,108	10,493	10,517	32,665	33,205	29,576	29,672
	SR3+	2,172	2,223	7,377	7,380	27,381	27,815	24,520	24,142
	WK-CR	0	162	0	2	0	11	0	19
	WK-BUS	8,278	8,363	363	374	1,287	1,332	1,306	1,285
	WK-BU/MR	4,486	4,484	375	374	1,328	1,327	326	325
	WK-MR	2,572	2,340	264	262	937	937	424	423
	PNR-CR	0	4	0	0	0	0	0	0
	KNR-CR	0	0	0	0	0	0	0	0
	PNR-BUS	390	415	25	25	88	90	38	39
	KNR-BUS	168	180	4	4	16	17	203	207
	PNR-BU/MR	143	150	3	3	9	9	8	8
	KNR-BU/MR	220	233	20	20	69	69	339	340
	PNR-MR	69	71	7	7	26	26	58	58
	KNR-MR	108	112	4	4	16	16	72	72

Appendix C Year 2002 mode choice output vs. targets

		HBW		HBS		HBO		NHB	
Seg	**Path #**	**Target**	**Model**	**Target**	**Model**	**Target**	**Model**	**Target**	**Model**
(5) MD URBAN-DC CORE	DR ALONE	362	375	532	559	4,217	4,225	1,215	1,228
	SR2	87	90	85	87	2,377	2,381	407	409
	SR3+	40	41	71	71	1,944	1,947	335	336
	WK-CR	92	0	0	0	10	0	5	0
	WK-BUS	4,678	5,106	2	2	116	122	1,811	1,862
	WK-BU/MR	4,441	4,803	14	14	685	708	913	927
	WK-MR	11,848	10,603	45	45	2,171	2,125	5,188	5,144
	PNR-CR	1,139	1,186	2	0	91	87	94	0
	KNR-CR	82	83	0	0	7	7	7	0
	PNR-BUS	220	229	0	1	0	43	0	58
	KNR-BUS	196	188	0	0	0	4	24	23
	PNR-BU/MR	178	188	0	1	21	20	18	19
	KNR-BU/MR	0	74	0	0	0	6	20	20
	PNR-MR	4,601	4,841	17	17	818	779	709	737
	KNR-MR	1,696	1,728	5	5	225	217	406	413
(6) MD URBAN-VA CORE	DR ALONE	973	975	123	127	78	83	232	237
	SR2	227	227	20	21	30	32	71	73
	SR3+	116	116	18	18	27	29	56	57
	WK-CR	0	0	0	0	0	0	0	0
	WK-BUS	55	54	0	5	0	78	0	15
	WK-BU/MR	504	515	13	13	81	79	267	266
	WK-MR	748	719	60	55	384	295	511	504
	PNR-CR	0	3	0	0	0	0	0	0
	KNR-CR	0	4	0	0	0	0	0	0
	PNR-BUS	0	1	0	0	0	3	0	0
	KNR-BUS	0	0	0	0	0	0	0	0
	PNR-BU/MR	0	7	0	1	2	2	5	5
	KNR-BU/MR	47	45	0	0	0	5	0	0
	PNR-MR	209	201	26	25	164	174	27	27
	KNR-MR	129	128	16	16	102	104	16	16
(7) MD URBAN-URBAN	DR ALONE	22,426	22,390	44,052	43,888	93,888	93,344	50,605	50,293
	SR2	3,729	3,722	8,185	8,155	34,405	34,207	14,027	13,960
	SR3+	1,334	1,331	4,239	4,224	26,165	26,015	9,501	9,473
	WK-CR	6	0	0	0	0	0	0	0
	WK-BUS	4,900	5,013	709	715	2,375	2,402	1,201	1,211
	WK-BU/MR	1,658	1,630	120	120	400	397	547	540
	WK-MR	2,054	2,038	222	223	743	736	919	912
	PNR-CR	81	81	2	2	5	5	7	6
	KNR-CR	6	6	0	0	0	0	0	0
	PNR-BUS	29	28	0	3	0	12	76	71
	KNR-BUS	0	11	6	6	21	22	93	94
	PNR-BU/MR	46	46	18	17	61	57	0	9
	KNR-BU/MR	91	90	9	9	30	30	18	18
	PNR-MR	570	569	47	44	156	146	35	32
	KNR-MR	349	339	30	30	101	100	19	19
(8) MD URBAN-OTHER	DR ALONE	14,954	15,084	23,528	23,601	30,351	30,689	45,727	46,087
	SR2	2,135	2,154	10,440	10,469	19,688	19,903	18,672	18,776
	SR3+	1,148	1,158	6,176	6,191	15,617	15,784	13,193	13,214
	WK-CR	6	7	0	1	0	4	0	4
	WK-BUS	5,222	5,276	1,065	1,048	2,223	2,216	1,701	1,672
	WK-BU/MR	885	903	130	137	270	278	330	331
	WK-MR	500	509	115	118	241	245	387	393
	PNR-CR	81	81	2	2	5	5	7	6
	KNR-CR	6	6	0	1	0	1	0	0
	PNR-BUS	0	1	0	0	0	0	25	23
	KNR-BUS	316	327	37	37	76	78	32	30
	PNR-BU/MR	27	27	1	1	3	3	0	4
	KNR-BU/MR	125	127	23	23	47	47	0	4
	PNR-MR	21	21	2	2	4	4	13	12
	KNR-MR	131	132	6	6	12	12	15	14

Appendix C Year 2002 mode choice output vs. targets

		HBW		HBS		HBO		NHB	
Seg	Path #	Target	Model	Target	Model	Target	Model	Target	Model
(9) VA CORE / URBAN-DC CORE	DR ALONE	2,650	3,149	305	349	10,291	10,488	11,600	11,868
	SR2	533	631	39	43	6,064	6,176	5,050	5,144
	SR3+	435	515	28	30	4,607	4,690	3,587	3,638
	WK-CR	66	107	0	0	7	0	3	0
	WK-BUS	2,829	4,131	1	1	164	167	151	144
	WK-BU/MR	8,994	13,479	5	5	1,165	1,198	1,520	1,472
	WK-MR	29,004	20,724	22	25	5,404	5,485	9,232	9,416
	PNR-CR	815	0	0	0	67	0	67	0
	KNR-CR	58	0	0	0	5	0	5	0
	PNR-BUS	113	196	0	0	0	16	0	4
	KNR-BUS	0	3	0	0	0	0	0	0
	PNR-BU/MR	99	192	0	0	22	23	0	68
	KNR-BU/MR	0	180	0	0	56	58	13	13
	PNR-MR	1,984	3,673	3	3	641	717	1,283	1,329
	KNR-MR	2,165	2,813	1	1	231	237	899	924
(10) VA CORE / URBAN-VA CORE	DR ALONE	10,770	10,818	10,254	10,299	16,215	16,123	11,699	11,644
	SR2	2,328	2,340	1,776	1,763	5,595	5,563	3,632	3,614
	SR3+	944	937	770	756	3,774	3,752	2,154	2,142
	WK-CR	29	0	0	0	3	0	1	0
	WK-BUS	2,702	2,703	15	16	86	90	377	386
	WK-BU/MR	1,492	1,485	72	67	423	398	753	709
	WK-MR	2,208	2,221	236	234	1,392	1,369	3,744	3,701
	PNR-CR	356	0	4	0	25	0	29	0
	KNR-CR	26	0	0	0	2	0	2	0
	PNR-BUS	0	340	9	9	51	53	0	39
	KNR-BUS	0	5	0	0	0	0	0	0
	PNR-BU/MR	6	6	0	4	0	22	12	11
	KNR-BU/MR	25	29	0	0	0	3	0	4
	PNR-MR	274	283	10	10	60	61	376	365
	KNR-MR	132	151	13	13	80	79	324	321
(11) VA CORE / URBAN-URBAN	DR ALONE	29,279	29,485	69,465	69,345	140,673	140,368	82,820	82,749
	SR2	4,697	4,726	15,323	15,281	47,161	47,052	27,043	26,960
	SR3+	2,150	2,160	7,413	7,385	34,617	34,530	17,860	17,626
	WK-CR	7	8	0	0	0	0	0	0
	WK-BUS	4,797	4,811	507	506	2,427	2,420	640	630
	WK-BU/MR	1,315	1,304	83	77	396	393	188	181
	WK-MR	2,865	2,823	241	240	1,152	1,157	638	635
	PNR-CR	87	0	1	0	6	0	7	0
	KNR-CR	6	0	0	0	0	0	0	0
	PNR-BUS	0	82	0	2	0	11	27	27
	KNR-BUS	0	6	0	0	0	2	0	0
	PNR-BU/MR	6	6	2	2	7	6	0	7
	KNR-BU/MR	39	40	0	2	0	8	9	9
	PNR-MR	362	368	13	12	60	54	23	23
	KNR-MR	248	250	19	17	92	80	45	44
(12) VA CORE / URBAN-OTHER	DR ALONE	32,409	32,452	14,026	14,183	54,844	55,137	77,660	78,260
	SR2	4,943	4,945	5,250	5,309	34,161	34,318	29,237	29,219
	SR3+	2,380	2,379	2,975	3,008	26,238	26,340	20,625	20,136
	WK-CR	7	7	0	0	0	3	0	3
	WK-BUS	3,635	3,660	147	151	1,712	1,744	765	776
	WK-BU/MR	1,045	1,022	22	23	251	247	55	54
	WK-MR	697	610	19	19	216	212	341	332
	PNR-CR	87	0	1	0	6	0	7	0
	KNR-CR	6	0	0	0	0	0	0	0
	PNR-BUS	28	93	0	1	0	7	12	12
	KNR-BUS	28	31	0	1	0	4	0	0
	PNR-BU/MR	5	17	0	0	0	3	0	7
	KNR-BU/MR	36	39	1	1	11	10	0	2
	PNR-MR	6	20	3	3	40	35	7	7
	KNR-MR	53	57	3	3	29	25	22	19

Appendix C Year 2002 mode choice output vs. targets

		HBW		HBS		HBO		NHB	
Seg	Path #	Target	Model	Target	Model	Target	Model	Target	Model
(13) MD OTHER-DC CORE	DR ALONE	62,875	63,157	1,231	1,310	24,636	24,866	18,211	18,923
	SR2	16,449	16,535	137	142	12,960	13,092	4,607	4,839
	SR3+	7,710	7,756	115	115	10,947	11,068	4,051	4,301
	WK-CR	815	803	0	0	91	88	42	46
	WK-BUS	8,586	8,431	6	6	1,084	1,098	788	886
	WK-BU/MR	18,089	17,646	9	9	1,683	1,676	1,538	1,720
	WK-MR	8,357	7,562	7	7	1,237	1,231	5,820	4,511
	PNR-CR	10,106	9,941	4	4	827	820	833	856
	KNR-CR	721	706	0	0	60	60	60	62
	PNR-BUS	8,891	9,217	1	1	114	117	1,579	1,725
	KNR-BUS	838	872	0	0	8	8	14	16
	PNR-BU/MR	3,218	3,214	1	1	252	250	144	148
	KNR-BU/MR	861	868	1	1	197	195	413	431
	PNR-MR	68,860	68,232	34	35	6,340	6,375	2,247	2,361
	KNR-MR	12,230	12,098	7	7	1,348	1,343	766	803
(14) MD OTHER-VA CORE	DR ALONE	12,044	11,923	1,019	1,055	2,716	2,804	2,875	2,988
	SR2	3,125	3,095	273	278	1,194	1,232	708	727
	SR3+	1,406	1,393	219	219	984	1,014	604	616
	WK-CR	0	66	0	0	0	1	0	3
	WK-BUS	757	710	2	2	12	12	20	19
	WK-BU/MR	2,574	2,524	34	35	247	252	286	291
	WK-MR	625	605	25	26	184	184	482	450
	PNR-CR	0	227	0	3	0	6	0	4
	KNR-CR	0	80	0	2	0	8	0	2
	PNR-BUS	365	341	0	0	0	0	89	88
	KNR-BUS	18	17	0	0	0	0	0	0
	PNR-BU/MR	701	686	4	4	30	30	0	3
	KNR-BU/MR	151	146	8	8	58	57	11	11
	PNR-MR	6,260	6,022	75	74	546	554	200	200
	KNR-MR	1,437	1,354	41	41	295	296	142	141
(15) MD OTHER-URBAN	DR ALONE	164,903	165,110	27,678	28,256	138,640	139,910	109,978	110,795
	SR2	31,141	31,164	9,230	9,403	87,817	88,627	34,618	34,915
	SR3+	12,088	12,093	5,515	5,596	70,175	70,823	26,562	26,785
	WK-CR	58	55	1	1	6	6	3	3
	WK-BUS	20,285	20,232	889	898	7,494	7,533	3,630	3,589
	WK-BU/MR	7,590	7,608	220	224	1,854	1,848	781	787
	WK-MR	2,815	2,800	102	104	858	863	432	438
	PNR-CR	719	704	6	6	53	53	60	59
	KNR-CR	51	50	1	1	4	4	4	4
	PNR-BUS	1,393	1,397	47	47	395	395	92	92
	KNR-BUS	1,005	1,005	8	8	66	66	70	70
	PNR-BU/MR	760	762	15	15	122	123	39	39
	KNR-BU/MR	869	883	44	44	370	371	118	118
	PNR-MR	7,316	7,319	117	120	990	997	295	296
	KNR-MR	2,349	2,350	59	60	502	506	207	209
(16) MD OTHER-OTHER	DR ALONE	1,070,467	1,072,991	980,180	979,929	2,732,712	2,730,904	1,483,620	1,481,234
	SR2	168,872	169,202	276,873	276,782	908,376	907,899	474,499	474,885
	SR3+	26,891	26,933	164,104	164,009	722,619	722,333	332,463	333,406
	WK-CR	58	56	2	2	5	22	3	10
	WK-BUS	32,062	32,357	7,773	7,761	16,019	15,736	8,139	8,069
	WK-BU/MR	3,943	3,950	428	454	882	908	445	455
	WK-MR	610	610	73	74	151	148	246	246
	PNR-CR	719	728	19	19	40	424	60	198
	KNR-CR	51	52	2	2	3	102	4	15
	PNR-BUS	696	708	136	135	279	26	660	462
	KNR-BUS	707	719	211	209	434	129	533	426
	PNR-BU/MR	625	634	19	19	38	392	16	86
	KNR-BU/MR	650	667	69	69	142	451	57	161
	PNR-MR	1,087	1,087	78	78	161	28	50	36
	KNR-MR	659	662	61	61	125	25	60	50

Appendix C Year 2002 mode choice output vs. targets

Seg	Path #	HBW Target	HBW Model	HBS Target	HBS Model	HBO Target	HBO Model	NHB Target	NHB Model
(17) VA OTHER-DC CORE	DR ALONE	34,027	35,794	313	350	13,751	14,004	14,097	14,963
	SR2	8,460	8,778	24	26	6,007	6,105	3,967	4,171
	SR3+	17,313	17,945	20	20	5,139	5,209	3,386	3,554
	WK-CR	328	308	0	0	37	35	16	18
	WK-BUS	5,014	4,990	0	1	61	59	379	460
	WK-BU/MR	12,989	12,750	3	2	1,138	1,144	486	589
	WK-MR	6,868	5,467	2	2	755	728	2,755	1,719
	PNR-CR	4,071	3,993	1	1	334	326	336	345
	KNR-CR	290	282	0	0	24	24	24	25
	PNR-BUS	2,216	2,542	0	0	50	52	553	615
	KNR-BUS	261	309	0	0	1	1	92	102
	PNR-BU/MR	2,435	2,661	1	1	287	281	219	221
	KNR-BU/MR	622	678	0	1	125	125	50	51
	PNR-MR	30,879	31,317	9	9	3,797	3,823	1,332	1,380
	KNR-MR	9,848	9,983	2	2	1,052	1,067	611	635
(18) VA OTHER-VA CORE	DR ALONE	17,148	17,319	4,073	4,059	7,933	7,858	7,740	7,830
	SR2	4,769	4,783	1,344	1,328	4,697	4,648	3,180	3,183
	SR3+	6,481	6,409	771	755	3,475	3,434	2,165	2,151
	WK-CR	143	135	3	3	13	12	7	7
	WK-BUS	4,104	4,149	77	74	310	285	295	311
	WK-BU/MR	3,603	3,575	89	88	358	370	280	305
	WK-MR	1,078	1,024	88	84	356	332	997	745
	PNR-CR	1,776	1,720	29	28	117	115	146	149
	KNR-CR	127	123	2	2	8	7	11	11
	PNR-BUS	769	862	9	9	34	35	372	386
	KNR-BUS	52	60	0	2	0	9	0	9
	PNR-BU/MR	529	569	6	6	26	25	12	11
	KNR-BU/MR	74	79	0	2	0	5	65	62
	PNR-MR	6,737	6,729	163	161	654	649	337	341
	KNR-MR	1,532	1,537	61	57	243	227	169	164
(19) VA OTHER-URBAN	DR ALONE	74,086	74,640	39,818	39,687	76,989	77,413	74,017	74,466
	SR2	15,829	15,837	16,079	16,006	44,963	45,184	25,703	25,630
	SR3+	15,742	15,569	9,293	9,236	35,025	35,169	18,487	18,256
	WK-CR	35	32	1	1	3	3	2	2
	WK-BUS	4,898	4,984	613	618	1,903	1,910	1,766	1,786
	WK-BU/MR	3,607	3,546	144	147	446	463	303	347
	WK-MR	1,290	1,234	93	91	288	289	88	87
	PNR-CR	432	414	9	9	27	27	36	34
	KNR-CR	31	30	1	1	2	2	2	2
	PNR-BUS	1,002	1,074	3	3	8	8	0	15
	KNR-BUS	202	219	0	7	2	2	0	4
	PNR-BU/MR	427	431	15	15	46	45	21	16
	KNR-BU/MR	363	370	26	23	81	79	12	9
	PNR-MR	2,893	2,892	210	206	654	648	219	191
	KNR-MR	2,027	2,031	49	44	154	152	80	70
(20) VA OTHER-OTHER	DR ALONE	840,911	840,174	735,147	735,483	1,845,177	1,844,973	1,030,068	1,029,381
	SR2	138,271	138,059	226,321	226,444	709,907	709,844	350,013	350,243
	SR3+	42,487	42,076	132,419	132,482	562,821	562,826	245,520	245,889
	WK-CR	35	33	1	19	3	65	2	17
	WK-BUS	11,895	11,562	1,546	1,524	3,514	2,040	1,906	1,598
	WK-BU/MR	1,557	1,553	127	132	288	351	135	236
	WK-MR	289	262	45	44	103	25	14	12
	PNR-CR	432	445	11	10	25	605	36	166
	KNR-CR	31	34	1	1	2	165	2	54
	PNR-BUS	203	205	0	4	0	0	102	16
	KNR-BUS	498	509	35	34	80	350	537	488
	PNR-BU/MR	168	178	17	16	38	155	34	59
	KNR-BU/MR	99	100	30	31	67	274	12	97
	PNR-MR	667	646	38	34	85	16	37	9
	KNR-MR	406	402	31	30	71	22	46	67

Appendix C Year 2002 mode choice output vs. targets

		HBW		HBS		HBO		NHB		ALL	
Seg	Mode	Target	Model	Target	Model	Target	Model	Target	Model	Target	Model
All 20 Segments	DR ALONE	2,472,132	2,478,597	2,084,762	2,086,029	5,562,444	5,563,029	3,319,069	3,321,546	13,438,407	13,449,200
	SR2	418,866	419,667	611,033	611,236	2,098,121	2,099,227	1,089,374	1,090,753	4,217,394	4,220,883
	SR3+	145,598	145,810	358,317	358,256	1,658,327	1,659,350	772,070	772,765	2,934,312	2,936,181
	WK-CR	1,685	1,779	8	51	178	263	84	198	1,955	2,291
	WK-BUS	229,215	230,690	23,216	23,031	89,160	87,324	49,100	48,322	390,691	389,367
	WK-BU/MR	102,250	106,144	3,674	3,738	20,635	20,913	15,880	16,323	142,439	147,119
	WK-MR	127,994	115,846	5,011	5,003	36,305	36,078	75,458	72,499	244,768	229,426
	PNR-CR	20,901	19,569	91	83	1,628	2,473	1,725	1,824	24,345	23,949
	KNR-CR	1,492	1,459	7	9	117	378	121	175	1,737	2,021
	PNR-BUS	17,176	18,594	274	288	1,246	1,098	3,727	3,777	22,423	23,757
	KNR-BUS	5,393	5,540	419	430	1,114	1,119	2,456	2,301	9,382	9,390
	PNR-BU/MR	9,765	10,159	122	131	1,045	1,535	603	797	11,535	12,623
	KNR-BU/MR	5,012	5,403	257	260	1,383	1,921	1,465	1,680	8,117	9,265
	PNR-MR	141,501	142,917	1,088	1,069	17,294	17,157	9,134	9,281	169,017	170,424
	KNR-MR	39,193	39,862	551	535	5,624	5,446	4,955	5,036	50,323	50,879
	Total Person	3,738,173	3,742,037	3,088,830	3,090,150	9,494,621	9,497,310	5,345,221	5,347,277	21,666,845	21,676,773
	Total Transit	701,577	697,963	34,718	34,629	175,729	175,704	164,708	162,213	1,076,732	1,070,510
	Transit Pct	18.8%	18.7%	1.1%	1.1%	1.9%	1.9%	3.1%	3.0%	5.0%	4.9%

Market			HBW		HBS		HBO		NHB		ALL	
Seg.			Target	Model	Target	Model	Target	Model	Target	Model	Target	Model
1	DC	DC core	152,906	152,400	17,595	17,491	142,688	141,522	131,188	129,774	444,377	441,186
2	DC	VA core	15,388	15,482	9,311	9,380	9,467	9,752	14,872	15,056	49,038	49,670
3	DC	Urban DC, MD, VA	97,018	97,366	138,146	138,488	478,481	478,053	222,864	222,899	936,509	936,807
4	DC	Suburban MD, VA	50,233	51,125	48,062	48,208	130,083	132,261	174,713	176,420	403,091	408,015
5	MD urban	DC core	29,660	29,534	773	803	12,682	12,669	11,152	11,176	54,267	54,183
6	MD urban	VA core	3,008	2,996	276	281	868	885	1,185	1,200	5,337	5,362
7	MD urban	Urban DC, MD, VA	37,279	37,294	57,639	57,437	158,350	157,473	77,048	76,639	330,316	328,843
8	MD urban	Suburban MD, VA	25,557	25,813	41,525	41,636	68,537	69,268	80,102	80,571	215,721	217,288
9	VA core/urban	DC core	49,745	49,791	404	458	28,724	29,256	33,410	34,020	112,283	113,524
10	VA core/urban	VA core	21,292	21,317	13,159	13,170	27,706	27,514	23,103	22,937	85,260	84,938
11	VA core/urban	Urban DC, MD, VA	45,858	46,067	93,067	92,868	226,591	226,081	129,300	128,890	494,816	493,906
12	VA core/urban	Suburban MD, VA	45,365	45,330	22,447	22,702	117,508	118,086	128,731	128,826	314,051	314,943
13	MD suburban	DC core	228,606	227,038	1,553	1,638	61,784	62,288	41,113	41,628	333,056	332,592
14	MD suburban	VA core	29,463	29,190	1,700	1,747	6,266	6,449	5,417	5,544	42,846	42,930
15	MD suburban	Urban DC, MD, VA	253,342	253,533	43,932	44,784	309,346	312,125	176,889	178,200	783,509	788,642
16	MD suburban	Suburban MD, VA	1,308,097	1,311,354	1,430,028	1,429,603	4,381,986	4,379,528	2,300,855	2,299,739	9,420,966	9,420,225
17	VA suburban	DC core	135,621	137,795	375	415	32,558	32,983	28,303	28,848	196,857	200,041
18	VA suburban	VA core	48,922	49,072	6,715	6,658	18,224	18,012	15,776	15,665	89,637	89,406
19	VA suburban	Urban DC, MD, VA	122,864	123,301	66,354	66,095	160,591	161,394	120,736	120,914	470,545	471,705
20	VA suburban	Suburban MD, VA	1,037,949	1,036,238	1,095,769	1,096,287	3,122,181	3,121,711	1,628,464	1,628,331	6,884,363	6,882,568
			3,738,173	3,742,037	3,088,830	3,090,150	9,494,621	9,497,310	5,345,221	5,347,277	21,666,845	21,676,773
			701,577	697,963	34,718	34,629	175,729	175,704	164,708	162,213	1,076,732	1,070,510
			18.8%	18.7%	1.1%	1.1%	1.9%	1.9%	3.1%	3.0%	5.0%	4.9%

Appendix D. Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Ref: M:\model_dev\Ver2.3_20080604_pceNo\ 2030_final \i6_mc_NL_summary.tab

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Transit

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	16886	9469	2903	1363	1787	3210	1038	2217	24	0	0	0	20	7	0	0	0	0	0	0	0	0	0	38925
2 DC NC	123085	46464	18484	10496	5466	10483	3339	5423	42	0	1	0	119	38	0	0	0	0	0	0	0	0	0	223440
3 MTG	76938	8645	69012	4970	3735	3174	433	2747	18	0	67	0	325	21	0	0	0	0	0	0	0	0	0	170086
4 PG	86928	23756	8659	20379	6448	6758	2000	1947	8	0	0	0	449	185	0	0	1	0	0	0	0	0	0	157517
5 ARLCR	3816	309	149	29	176	586	100	421	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5589
6 ARNCR	38898	3065	1409	261	5537	8488	2261	6944	47	0	0	0	1	0	0	0	0	0	0	0	0	0	0	66912
7 ALX	22983	2052	629	204	3507	6411	4836	3287	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	43919
8 FFX	58036	4323	1908	223	10811	13841	6168	25987	1012	9	0	0	0	0	0	0	0	0	0	0	0	0	0	122318
9 LDN	513	33	53	1	245	184	11	2349	1586	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4974
10 PW	14472	378	47	7	2088	2163	839	1382	17	1521	0	0	0	0	0	0	0	0	0	0	0	0	0	22913
11 FRD	134	29	1373	27	14	12	1	14	1	0	999	0	34	1	0	0	0	0	0	0	0	0	0	2640
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	1391	196	508	356	71	48	4	8	0	0	1	0	442	50	0	0	0	0	0	0	0	0	0	3075
14 AAR	3657	372	111	336	158	130	12	7	0	0	0	0	61	95	0	0	0	0	0	0	0	0	0	4937
15 CAL	1563	408	25	179	87	84	20	6	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	2391
16 STM	159	38	3	9	21	18	4	1	0	0	0	0	0	0	0	15	6	0	0	0	0	0	0	274
17 CHS	4951	1342	54	289	260	266	141	46	0	0	0	0	0	0	0	0	123	0	0	0	0	0	0	7474
18 FAU	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
19 STA	1004	98	5	0	406	444	62	23	0	2	0	0	0	0	0	0	0	0	1	0	1	0	0	2048
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	23	1	0	0	15	16	4	2	0	1	0	0	0	0	0	0	0	0	3	0	14	0	0	78
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	455436	100978	105332	39129	40832	56315	21273	52811	2765	1535	1068	0	1453	398	19	15	130	0	3	0	15	0	0	879510

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Auto Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	9681	2016	916	1314	794	796	356	1832	77	2	1	0	86	160	0	0	1	0	0	0	0	0	0	18031
2 DC NC	24936	24945	12295	14857	5298	5381	2182	9811	277	10	17	0	973	1683	5	0	17	0	0	0	0	0	0	102688
3 MTG	25448	29530	398731	43340	3739	7978	2185	24086	716	8	5299	95	13201	4651	0	0	0	0	0	14	0	0	0	559023
4 PG	37316	83678	37767	253732	5475	13569	13538	19757	174	48	30	2	11962	31036	564	224	3936	0	0	0	0	44	0	512852
5 ARLCR	68	388	230	97	1365	855	218	779	36	1	0	0	3	4	0	0	0	0	0	0	0	0	0	4043
6 ARNCR	5043	8165	4614	1793	8111	30639	7547	32219	996	76	5	0	37	45	0	0	1	0	0	0	0	0	0	99292
7 ALX	4961	5636	1963	2646	3890	12353	24003	27085	329	143	1	0	18	35	0	0	12	0	2	0	1	0	0	83077
8 FFX	43184	28780	18055	9836	13811	42739	44811	515545	50712	11248	26	0	91	81	1	0	41	153	176	5	74	0	0	779369
9 LDN	634	495	2904	91	478	1176	375	90203	205362	4672	8373	15	136	0	0	0	0	882	9	3797	2	0	0	319604
10 PW	14429	2530	761	786	3248	6272	8864	118778	21056	181789	3	0	1	1	0	0	0	6144	5629	59	1906	17	0	372273
11 FRD	168	259	27219	791	39	72	11	315	1076	0	165807	3728	12392	548	0	0	0	0	0	1176	0	0	0	213601
12 CAR	0	11	3665	581	0	0	0	0	5	0	18553	85487	15615	591	0	0	0	0	0	20	0	0	0	124527
13 HOW	1049	1888	16161	15749	105	184	52	299	6	0	2501	363	100838	27650	0	0	0	0	0	8	0	0	0	166853
14 AAR	3826	5968	2705	38135	327	611	291	401	3	0	6	1	11491	248751	974	24	101	0	0	0	0	0	0	313617
15 CAL	778	1883	199	11906	82	186	183	199	0	0	0	0	33	4333	34053	10241	1711	0	0	0	0	51	0	65839
16 STM	79	225	24	2513	16	39	58	76	0	0	0	0	2	67	4048	68999	6342	0	2	0	5	1185	0	83681
17 CHS	3437	8306	389	36044	357	823	2230	2139	3	5	0	0	31	557	2882	5197	65635	0	6	0	14	2585	0	130639
18 FAU	0	0	0	0	0	1	3	1813	3138	16354	6	0	0	0	0	0	0	45978	7747	416	2128	13	0	77598
19 STA	1328	546	126	120	864	1480	1463	9907	107	16106	0	0	0	0	0	2	11	970	63289	0	32671	1503	0	130492
20 CL/JF	0	0	243	0	0	0	0	315	8574	64	5481	17	205	0	0	0	0	255	0	47547	0	0	0	62702
21 SP/FB	27	14	1	3	23	45	56	549	7	1608	0	0	0	0	0	0	3	73	10684	0	102720	635	0	116449
22 KGEO	0	0	0	13	0	0	0	2	0	59	0	0	0	0	8	74	297	2	788	0	1629	18065	0	20938
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	176392	205263	528968	434348	48021	125201	108427	856110	292652	232193	206110	89708	167113	320194	42536	84762	78108	54459	88333	53042	141150	24099	0	4357189

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Motorized Person

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	26567	11486	3819	2677	2581	4006	1393	4048	101	2	1	0	106	167	0	0	1	0	0	0	0	0	0	56956
2 DC NC	148020	71409	30779	25353	10764	15864	5521	15234	319	10	18	0	1092	1721	5	0	17	0	0	0	0	0	0	326128
3 MTG	102386	38175	467743	48311	7475	11153	2618	26833	734	8	5366	95	13526	4673	0	0	0	0	0	14	0	0	0	729109
4 PG	124245	107434	46426	274110	11923	20327	15538	21705	181	48	30	2	12411	31221	564	224	3937	0	0	0	0	44	0	670370
5 ARLCR	3884	697	379	125	1541	1440	318	1200	40	1	0	0	3	4	0	0	0	0	0	0	0	0	0	9632
6 ARNCR	43941	11230	6022	2054	13648	39128	9808	39163	1043	76	5	0	38	45	0	0	1	0	0	0	0	0	0	166204
7 ALX	27944	7688	2593	2849	7397	18764	28839	30372	336	144	1	0	19	35	0	0	12	0	2	0	1	0	0	126996
8 FFX	101220	33103	19963	10059	24622	56580	50979	541532	51724	11257	26	0	91	81	1	0	41	153	176	5	74	0	0	901688
9 LDN	1148	528	2957	92	722	1359	386	92552	206947	4672	8373	15	136	0	0	0	0	882	9	3797	2	0	0	324578
10 PW	28901	2908	807	794	5337	8434	9703	120160	21073	183310	3	0	1	1	0	0	0	6144	5629	59	1906	17	0	395187
11 FRD	302	288	28592	818	53	84	13	328	1077	0	166807	3728	12427	548	0	0	0	0	0	1176	0	0	0	216240
12 CAR	0	11	3665	581	0	0	0	0	5	0	18553	85487	15615	591	0	0	0	0	0	20	0	0	0	124527
13 HOW	2440	2085	16669	16105	176	233	56	306	6	0	2501	363	101280	27701	0	0	0	0	0	8	0	0	0	169928
14 AAR	7482	6340	2816	38471	485	741	304	408	3	0	6	1	11551	248845	974	24	101	0	0	0	0	0	0	318553
15 CAL	2340	2290	224	12085	169	270	203	205	0	0	0	0	33	4333	34072	10241	1711	0	0	0	0	51	0	68230
16 STM	237	262	27	2521	37	57	62	77	0	0	0	0	2	67	4048	69014	6349	0	2	0	5	1185	0	83955
17 CHS	8388	9647	443	36334	617	1089	2371	2185	3	5	0	0	31	557	2882	5197	65757	0	6	0	14	2585	0	138113
18 FAU	0	0	0	0	0	1	3	1813	3138	16355	6	0	0	0	0	0	0	45978	7747	416	2128	13	0	77599
19 STA	2333	644	131	120	1270	1925	1525	9930	107	16108	0	0	0	0	0	2	11	970	63290	0	32671	1503	0	132540
20 CL/JF	0	0	243	0	0	0	0	315	8574	64	5481	17	205	0	0	0	0	255	0	47547	0	0	0	62703
21 SP/FB	50	16	1	3	38	62	60	551	7	1608	0	0	0	0	0	0	3	73	10687	0	102734	635	0	116527
22 KGEO	0	0	0	13	0	0	0	2	0	59	0	0	0	0	8	74	297	2	788	0	1629	18065	0	20938
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	631828	306241	634300	473477	88853	181517	129700	908922	295417	233728	207178	89708	168566	320592	42555	84777	78238	54459	88336	53042	141166	24099	0	5236699

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Commuter Rail

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0	0	0	16	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	24
2 DC NC	18	2	3	61	0	1	1	3	0	0	0	0	22	20	0	0	0	0	0	0	0	0	0	131
3 MTG	5615	144	573	68	85	63	12	46	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	6610
4 PG	5012	162	59	67	116	90	12	9	0	0	0	0	8	14	0	0	0	0	0	0	0	0	0	5549
5 ARLCR	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6 ARNCR	13	2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
7 ALX	82	5	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89
8 FFX	9323	399	49	6	1839	1866	440	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13934
9 LDN	2	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
10 PW	6645	56	13	2	1001	930	270	60	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	9000
11 FRD	36	3	41	0	3	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	87
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	297	9	8	24	5	4	0	0	0	0	0	0	8	4	0	0	0	0	0	0	0	0	0	359
14 AAR	1106	60	18	45	25	20	2	0	0	0	0	0	3	19	0	0	0	0	0	0	0	0	0	1299
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
19 STA	98	1	0	0	51	49	12	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	217
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	19	0	0	0	10	8	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	40
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	28265	845	766	298	3136	3035	752	133	1	27	0	0	47	63	0	0	0	0	0	0	1	0	0	37368

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: All Bus

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	5681	6427	800	501	78	721	278	603	5	0	0	0	15	1	0	0	0	0	0	0	0	0	0	15110
2 DC NC	56191	36825	9804	6371	533	2872	660	1276	7	0	0	0	86	10	0	0	0	0	0	0	0	0	0	114635
3 MTG	6693	3139	48311	3897	157	116	23	1104	5	0	63	0	314	19	0	0	0	0	0	0	0	0	0	63843
4 PG	14614	11819	4346	17458	585	513	114	171	0	0	0	0	431	166	0	0	1	0	0	0	0	0	0	50218
5 ARLCR	222	101	13	1	69	126	16	99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	648
6 ARNCR	4437	881	101	8	2157	4170	1332	2589	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15678
7 ALX	2642	461	22	3	1349	3156	2925	1689	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12248
8 FFX	1820	385	339	3	1521	3141	2565	10902	593	9	0	0	0	0	0	0	0	0	0	0	0	0	0	21277
9 LDN	43	6	15	0	41	16	0	466	1445	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2032
10 PW	3666	276	5	0	611	780	130	852	1	1498	0	0	0	0	0	0	0	0	0	0	0	0	0	7819
11 FRD	0	1	1060	24	0	0	0	2	0	0	999	0	34	1	0	0	0	0	0	0	0	0	0	2122
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	464	127	358	300	15	10	0	1	0	0	1	0	434	46	0	0	0	0	0	0	0	0	0	1756
14 AAR	1332	135	37	230	26	18	0	0	0	0	0	0	57	76	0	0	0	0	0	0	0	0	0	1910
15 CAL	1448	373	4	136	36	27	1	1	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	2047
16 STM	135	33	0	6	11	6	0	0	0	0	0	0	0	0	0	15	6	0	0	0	0	0	0	212
17 CHS	4012	1202	10	193	116	100	15	8	0	0	0	0	0	0	0	0	123	0	0	0	0	0	0	5779
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	818	95	3	0	307	388	36	21	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1668
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	4	1	0	0	5	8	1	1	0	0	0	0	0	0	0	0	0	0	2	0	14	0	0	37
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	104222	62288	65229	29131	7618	16167	8097	19784	2060	1507	1064	0	1372	319	19	15	130	0	3	0	14	0	0	319039

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Bus & Metrorail

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	256	283	477	375	172	359	239	550	13	0	0	0	1	2	0	0	0	0	0	0	0	0	0	2728
2 DC NC	15248	3006	3702	2319	1922	3469	1703	2290	28	0	1	0	11	9	0	0	0	0	0	0	0	0	0	33706
3 MTG	10030	2023	6654	527	617	869	199	798	10	0	4	0	9	1	0	0	0	0	0	0	0	0	0	21739
4 PG	14841	5131	2185	1645	1823	2456	1218	1406	7	0	0	0	11	5	0	0	0	0	0	0	0	0	0	30727
5 ARLCR	216	19	29	10	26	30	19	58	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	410
6 ARNCR	7990	645	494	123	511	626	258	1141	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11820
7 ALX	6408	739	319	116	744	954	283	659	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10229
8 FFX	9531	1368	387	98	1514	2598	873	1388	178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17936
9 LDN	128	8	9	0	51	54	3	222	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	520
10 PW	636	12	10	2	70	146	157	155	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1201
11 FRD	98	24	271	3	11	10	1	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	431
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	136	21	49	16	20	17	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	268
14 AAR	152	61	31	36	35	36	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	361
15 CAL	114	35	21	43	50	56	19	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	344
16 STM	24	5	3	3	11	12	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61
17 CHS	878	124	44	95	141	161	122	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1604
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	89	2	2	0	49	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	163
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	66775	13506	14686	5412	7766	11863	5120	8733	332	1	5	0	34	17	0	0	0	0	0	0	0	0	0	134250

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Metrorail Only

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	10949	2760	1626	470	1537	2130	521	1064	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21063
2 DC NC	51627	6632	4975	1746	3010	4141	976	1855	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74968
3 MTG	54601	3338	13474	478	2876	2126	199	799	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77894
4 PG	52461	6643	2069	1209	3925	3698	655	362	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71024
5 ARLCR	3377	189	107	17	81	430	65	265	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4531
6 ARNCR	26458	1537	813	124	2869	3692	671	3214	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39394
7 ALX	13851	847	288	82	1414	2302	1628	938	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21352
8 FFX	37362	2171	1133	116	5936	6235	2290	13686	241	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69171
9 LDN	341	19	28	0	152	112	7	1660	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2415
10 PW	3525	34	18	3	406	307	283	315	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4893
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	493	39	93	15	31	17	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	692
14 AAR	1067	116	25	25	71	56	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1367
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	61	15	1	2	3	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	256174	24340	24651	4288	22312	25250	7305	24161	372	0	0	0	0	0	0	0	0	0	0	0	0	0	0	388853

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBW Trips MODE: Transit Percentage

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	63.6	82.4	76.0	50.9	69.2	80.1	74.5	54.8	23.7	4.5	9.7	0	19.2	4.3	0	0	0	0	0	0	0	0	0	68.3
2 DC NC	83.2	65.1	60.1	41.4	50.8	66.1	60.5	35.6	13.3	0.6	4.0	0	10.9	2.2	0	0	0	0	0	0	0	0	0	68.5
3 MTG	75.1	22.6	14.8	10.3	50.0	28.5	16.5	10.2	2.4	0.1	1.2	0	2.4	0.5	0	0	0	0	0	0	0	0	0	23.3
4 PG	70.0	22.1	18.7	7.4	54.1	33.2	12.9	9.0	4.2	0.1	1.4	0	3.6	0.6	0	0	0.0	0	0	0	0	0	0	23.5
5 ARLCR	98.2	44.4	39.3	22.9	11.4	40.7	31.5	35.1	10.0	0	2.8	0	4.0	0.5	0	0	0	0	0	0	0	0	0	58.0
6 ARNCR	88.5	27.3	23.4	12.7	40.6	21.7	23.1	17.7	4.5	0.3	0.4	0	2.0	0.4	0	0	0	0	0	0	0	0	0	40.3
7 ALX	82.2	26.7	24.3	7.1	47.4	34.2	16.8	10.8	2.2	0.6	0	0	1.5	0.2	0	0	0	0	0	0	0	0	0	34.6
8 FFX	57.3	13.1	9.6	2.2	43.9	24.5	12.1	4.8	2.0	0.1	0	0	0.1	0.0	0	0	0	0	0	0	0	0	0	13.6
9 LDN	44.7	6.3	1.8	0.8	33.9	13.5	2.8	2.5	0.8	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	1.5
10 PW	50.1	13.0	5.8	0.9	39.1	25.6	8.7	1.2	0.1	0.8	0	0	0	0	0	0	0	0	0	0	0.0	0	0	5.8
11 FRD	44.4	9.9	4.8	3.4	27.1	14.1	11.6	4.2	0.1	0	0.6	0	0.3	0.1	0	0	0	0	0	0	0	0	0	1.2
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	57.0	9.4	3.0	2.2	40.3	20.8	6.3	2.5	0	0	0.0	0	0.4	0.2	0	0	0	0	0	0	0	0	0	1.8
14 AAR	48.9	5.9	3.9	0.9	32.5	17.5	4.0	1.7	0.8	0	0.2	0	0.5	0.0	0	0	0	0	0	0	0	0	0	1.5
15 CAL	66.8	17.8	11.2	1.5	51.3	31.0	9.9	3.0	9.1	0	0	0	0.2	0.0	0.1	0.0	0	0	0	0	0	0	0	3.5
16 STM	66.8	14.4	11.6	0.3	57.3	31.7	6.2	1.6	0	0	0	0	0	0	0	0.0	0.1	0	0	0	0	0	0	0.3
17 CHS	59.0	13.9	12.3	0.8	42.2	24.4	6.0	2.1	0.9	0	0	0	0.9	0.0	0	0.0	0.2	0	0	0	0	0	0	5.4
18 FAU	0	0	0	0	0	1.1	0.3	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
19 STA	43.1	15.3	4.0	0.3	32.0	23.1	4.1	0.2	0.0	0.0	0	0	0	0	0	0	0	0	0.0	0	0.0	0	0	1.5
20 CL/JF	0	0	0.0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
21 SP/FB	45.6	9.4	2.2	0	39.1	26.5	6.2	0.3	0.1	0.0	0	0	0	0	0	0	0	0	0.0	0	0.0	0	0	0.1
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	72.1	33.0	16.6	8.3	46.0	31.0	16.4	5.8	0.9	0.7	0.5	0	0.9	0.1	0.0	0.0	0.2	0	0.0	0	0.0	0	0	16.8

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBS Trips MODE: Transit

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	411	899	41	76	163	1615	66	14	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3285
2 DC NC	1693	6839	1065	1770	300	3499	218	34	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	15421
3 MTG	68	676	11369	1041	41	212	12	30	1	1	0	0	17	1	0	0	0	0	0	0	5	0	0	13476
4 PG	30	223	231	3649	9	89	30	6	0	0	0	0	17	81	0	0	2	0	0	0	0	0	0	4368
5 ARLCR	13	2	1	0	7	422	7	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	460
6 ARNCR	20	3	1	0	67	1220	96	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1507
7 ALX	8	1	1	1	40	938	542	168	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1699
8 FFX	1	1	17	5	65	1259	251	1939	148	5	0	0	0	0	0	0	0	0	0	0	0	0	0	3691
9 LDN	0	0	0	0	0	5	0	1	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54
10 PW	0	0	0	0	0	8	0	1	0	171	0	0	0	0	0	0	0	0	0	0	0	0	0	181
11 FRD	0	0	1	0	0	0	0	0	0	0	56	0	0	0	0	0	0	0	0	0	0	0	0	57
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	2	38	1	5	0	0	0	0	0	0	40	6	0	0	0	0	0	0	0	0	0	92
14 AAR	0	0	0	15	1	6	0	0	0	0	0	0	2	5	0	0	0	0	0	0	0	0	0	31
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	25
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2244	8644	12729	6596	694	9280	1222	2303	198	177	56	0	76	94	1	3	27	0	0	0	9	0	0	44353

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBS Trips MODE: Auto Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	5774	4518	534	2203	497	8229	657	563	65	53	42	2	34	220	18	127	79	12	171	38	714	0	0	24549
2 DC NC	8442	96533	21762	44599	1557	25980	2313	1899	281	177	144	8	167	1025	77	560	335	57	1019	166	2596	0	0	209699
3 MTG	495	15224	595767	62387	163	3996	349	3117	1005	573	1504	47	4253	3640	149	351	449	138	1453	323	4162	0	0	699546
4 PG	416	6477	9634	438582	43	1364	2800	2119	295	285	248	16	2136	19113	512	1114	17202	85	1569	146	4581	1	0	508738
5 ARLCR	60	82	24	31	2300	5408	204	293	5	4	2	0	2	11	1	5	4	1	10	2	40	0	0	8489
6 ARNCR	202	279	105	216	1440	102444	5096	9875	30	41	15	0	12	71	5	35	25	4	74	11	265	0	0	120245
7 ALX	160	233	96	1530	640	25563	65517	16239	59	132	29	1	22	160	13	101	56	9	220	30	538	0	0	111349
8 FFX	137	479	4130	7908	907	60522	21489	682124	39942	30157	870	56	575	4896	412	1962	1451	387	5149	1209	16389	6	0	881157
9 LDN	19	86	2110	2189	38	1626	289	9374	187916	1697	1652	57	379	3210	69	40	382	354	3549	5735	7142	1	0	227913
10 PW	4	31	995	1128	18	795	199	6971	1856	287390	289	4	172	1574	103	207	322	6740	8568	520	6574	3	0	324465
11 FRD	68	199	6693	3844	53	2415	519	2245	2207	680	129238	1197	1063	2983	35	0	157	140	200	1330	39	0	0	155307
12 CAR	71	202	2033	3780	47	2019	368	1654	1465	79	1206	56228	1972	2541	39	0	113	1	0	214	0	0	0	74033
13 HOW	4	22	3405	12580	9	363	70	285	139	117	903	361	94348	15409	77	44	113	12	84	229	0	0	0	128573
14 AAR	34	114	942	13765	23	1048	221	1030	262	287	212	11	3000	259911	982	418	312	23	440	63	627	1	0	283727
15 CAL	10	31	298	1457	7	308	65	306	87	115	33	2	84	661	42747	3057	158	4	239	0	736	0	0	50405
16 STM	33	84	284	1792	17	775	143	669	79	137	0	0	100	639	451	53043	1198	0	1486	0	1742	0	0	62672
17 CHS	15	52	293	4915	8	408	79	423	305	157	3	0	90	418	1561	1330	90507	24	952	1	1266	1	0	102810
18 FAU	14	42	503	825	11	451	104	502	684	2573	62	2	38	49	1	1	103	44330	9405	109	3457	1	0	63265
19 STA	0	0	19	16	0	9	2	9	8	1816	0	0	1	8	1	5	10	15	82409	1	28176	0	0	112505
20 CL/JF	16	62	533	918	8	392	74	695	1985	331	112	4	215	747	0	0	5	99	876	39908	497	0	0	47477
21 SP/FB	0	0	0	4	0	10	2	10	12	6	0	0	0	0	0	1	4	1	1264	0	85763	0	0	87078
22 KGEO	27	63	64	1147	16	537	188	498	22	367	0	0	14	318	72	235	276	88	2929	0	4309	4439	0	15606
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	16004	124814	650225	605817	7803	244662	100749	740901	238710	327172	136565	57998	108679	317605	47324	62636	113259	52524	122064	50034	169611	4455	0	4299610

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBS Trips   MODE: Motorized Person

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	6185	5417	575	2278	659	9844	723	577	65	53	42	2	34	220	18	127	79	12	171	38	715	0	0	27835
2 DC NC	10135	103373	22826	46369	1857	29479	2531	1934	283	177	144	8	167	1025	77	560	335	57	1019	166	2598	0	0	225120
3 MTG	563	15900	607136	63428	204	4208	361	3147	1006	574	1504	47	4270	3641	149	351	449	138	1453	323	4167	0	0	713022
4 PG	446	6701	9865	442231	52	1453	2830	2125	296	285	248	16	2153	19195	512	1114	17203	85	1569	146	4581	1	0	513106
5 ARLCR	74	84	25	32	2307	5830	211	301	5	4	2	0	2	11	1	5	4	1	10	2	40	0	0	8949
6 ARNCR	222	283	106	216	1508	103664	5191	9975	30	41	15	0	12	71	5	35	25	4	74	11	266	0	0	121753
7 ALX	168	234	97	1532	679	26501	66059	16408	59	132	29	1	22	160	13	101	56	9	220	30	538	0	0	113048
8 FFX	138	480	4147	7913	973	61781	21740	684063	40090	30162	870	56	575	4896	412	1962	1451	387	5149	1209	16389	6	0	884848
9 LDN	19	86	2110	2189	38	1631	289	9375	187964	1697	1652	57	379	3210	69	40	382	354	3549	5735	7142	1	0	227967
10 PW	4	31	995	1128	19	803	199	6972	1856	287560	289	4	172	1574	103	207	322	6740	8568	520	6574	3	0	324646
11 FRD	68	199	6695	3844	53	2416	519	2245	2207	680	129293	1197	1063	2983	35	0	157	140	200	1330	39	0	0	155364
12 CAR	71	202	2033	3780	47	2019	368	1654	1465	79	1206	56228	1972	2541	39	0	113	1	0	214	0	0	0	74033
13 HOW	5	22	3406	12619	9	369	70	285	139	117	903	361	94387	15415	77	44	113	12	84	229	0	0	0	128664
14 AAR	35	114	943	13780	23	1055	221	1030	262	287	212	11	3002	259916	982	418	312	23	440	63	627	1	0	283758
15 CAL	10	31	298	1457	7	308	65	306	87	115	33	2	84	661	42748	3057	158	4	239	0	736	0	0	50406
16 STM	33	84	284	1792	17	775	143	669	79	137	0	0	100	639	451	53046	1198	0	1486	0	1742	0	0	62674
17 CHS	15	52	293	4915	8	409	79	423	305	157	3	0	90	418	1561	1330	90532	24	952	1	1266	1	0	102834
18 FAU	14	42	503	825	11	451	104	502	684	2573	62	2	38	49	1	1	103	44330	9405	109	3457	1	0	63266
19 STA	0	0	19	16	0	9	2	9	8	1816	0	0	1	8	1	5	10	15	82409	1	28177	0	0	112506
20 CL/JF	16	62	533	918	8	392	74	695	1985	331	112	4	215	747	0	0	5	99	876	39908	497	0	0	47477
21 SP/FB	0	0	0	4	0	10	2	10	12	6	0	0	0	0	0	1	4	1	1264	0	85763	0	0	87078
22 KGEO	27	63	64	1147	16	537	188	498	22	367	0	0	14	318	72	235	276	88	2929	0	4309	4439	0	15607
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	18248	133458	662953	612413	8497	253943	101970	743204	238908	327349	136621	57998	108755	317700	47325	62638	113286	52524	122064	50034	169620	4455	0	4343963

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBS Trips   MODE: Commuter Rail

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	9
2 DC NC	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	17
3 MTG	0	0	11	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	20
4 PG	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
5 ARLCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 ARNCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 ALX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 FFX	0	0	0	0	0	8	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	11
9 LDN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 PW	0	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	10
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
14 AAR	0	0	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	7
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	11	4	1	18	27	2	0	7	0	0	1	2	0	0	0	0	0	0	9	0	0	82

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBS Trips   MODE: All Bus

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	106	766	11	26	27	293	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1242
2 DC NC	629	6064	704	1022	53	591	38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9101
3 MTG	1	257	8995	885	2	4	0	6	0	0	0	0	17	1	0	0	0	0	0	0	0	0	0	10168
4 PG	0	121	190	3259	0	1	0	0	0	0	0	0	17	81	0	0	2	0	0	0	0	0	0	3671
5 ARLCR	0	0	0	0	0	52	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56
6 ARNCR	0	0	0	0	8	656	53	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	793
7 ALX	0	0	0	0	9	253	334	126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	723
8 FFX	0	0	1	0	11	456	113	952	48	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1584
9 LDN	0	0	0	0	0	0	0	1	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47
10 PW	0	0	0	0	0	0	0	1	0	166	0	0	0	0	0	0	0	0	0	0	0	0	0	167
11 FRD	0	0	1	0	0	0	0	0	0	0	56	0	0	0	0	0	0	0	0	0	0	0	0	57
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	1	38	0	0	0	0	0	0	0	0	39	6	0	0	0	0	0	0	0	0	0	85
14 AAR	0	0	0	15	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	0	21
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	24
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	736	7209	9904	5244	110	2306	551	1165	95	169	56	0	75	93	1	3	26	0	0	0	0	0	0	27742

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo   Iteration: i6
Purpose: Internal HBS Trips   MODE: Bus & Metrorail

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	9	13	4	19	13	235	13	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	314
2 DC NC	225	144	120	384	74	1120	99	21	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2188
3 MTG	6	127	1324	113	4	73	5	17	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1671
4 PG	4	61	25	234	2	31	25	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	386
5 ARLCR	0	0	0	0	0	7	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
6 ARNCR	2	1	0	0	4	77	16	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	109
7 ALX	1	0	0	0	9	188	55	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	258
8 FFX	0	0	0	0	3	119	31	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	154
9 LDN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 PW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 AAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	248	347	1474	750	109	1851	246	64	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5093

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBS Trips MODE: Metrorail Only

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	296	120	26	31	122	1087	33	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1721
2 DC NC	839	631	240	365	173	1788	66	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4115
3 MTG	61	291	1040	43	35	135	3	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1616
4 PG	25	41	15	153	7	58	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	306
5 ARLCR	13	2	1	0	7	364	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	394
6 ARNCR	17	2	1	0	55	486	27	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	606
7 ALX	7	1	1	1	21	496	152	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	718
8 FFX	1	1	16	5	51	676	107	985	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1941
9 LDN	0	0	0	0	0	5	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
10 PW	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
14 AAR	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1260	1088	1340	598	474	5105	398	1072	101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11436

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBS Trips MODE: Transit Percentage

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	6.6	16.6	7.1	3.3	24.6	16.4	9.1	2.5	0.3	0.3	0	0	0.2	0.0	0	0	0.0	0	0	0	0.1	0	0	11.8
2 DC NC	16.7	6.6	4.7	3.8	16.2	11.9	8.6	1.8	0.4	0.1	0	0	0.1	0	0	0	0.0	0	0	0	0.1	0	0	6.9
3 MTG	12.1	4.2	1.9	1.6	20.3	5.0	3.3	1.0	0.1	0.2	0.0	0	0.4	0.0	0	0	0.1	0	0.0	0	0.1	0	0	1.9
4 PG	6.7	3.3	2.3	0.8	17.6	6.1	1.1	0.3	0.1	0.0	0	0	0.8	0.4	0	0	0.0	0	0	0	0.0	0	0	0.9
5 ARLCR	18.0	2.1	2.9	0.6	0.3	7.2	3.4	2.6	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	5.1
6 ARNCR	8.9	1.1	1.1	0.2	4.5	1.2	1.8	1.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	1.2
7 ALX	4.7	0.4	1.3	0.1	5.8	3.5	0.8	1.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	1.5
8 FFX	0.6	0.2	0.4	0.1	6.7	2.0	1.2	0.3	0.4	0.0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.4
9 LDN	0	0	0.0	0	0.8	0.3	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
10 PW	0	0	0.0	0	1.2	1.0	0.0	0.0	0	0.1	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.1
11 FRD	0	0	0.0	0	0.0	0.0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0.4	0.1	0.0	0.3	5.5	1.4	0.1	0.0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.1
14 AAR	0.9	0.1	0.0	0.1	2.4	0.6	0.2	0.0	0	0	0	0	0.1	0.0	0.0	0	0	0	0	0	0.0	0	0	0.0
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0.0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0.0
17 CHS	0	0	0	0.0	0.1	0.0	0	0	0	0	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0.0
18 FAU	0	0	0	0	0.3	0.1	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0.0	0	0	0.0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.0
22 KGEO	0.1	0	0	0	0.3	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	12.3	6.5	1.9	1.1	8.2	3.7	1.2	0.3	0.1	0.1	0.0	0	0.1	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0	0	1.0

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: Transit

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	8050	7364	618	468	792	1818	90	113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19313
2 DC NC	41724	33544	5292	4077	2159	3893	296	215	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	91201
3 MTG	7567	4387	27608	2580	831	635	11	85	0	0	1	0	55	2	0	0	0	0	0	0	0	0	0	43761
4 PG	12615	5972	1784	8283	786	818	111	10	0	0	0	0	67	63	0	0	2	0	0	0	0	0	0	30512
5 ARLCR	1375	121	23	6	73	560	24	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2258
6 ARNCR	9165	773	133	38	2010	5292	570	1710	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19691
7 ALX	3635	287	25	21	706	2361	1046	316	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8397
8 FFX	5988	201	47	3	1025	2877	765	271	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11186
9 LDN	25	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33
10 PW	288	0	0	0	25	46	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	367
11 FRD	0	0	1	0	0	0	0	0	0	0	178	0	0	0	0	0	0	0	0	0	0	0	0	179
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	38	3	30	81	2	2	0	0	0	0	0	0	78	9	0	0	0	0	0	0	0	0	0	242
14 AAR	155	11	4	66	10	10	1	0	0	0	0	0	15	16	0	0	0	0	0	0	0	0	0	287
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	6
17 CHS	58	5	0	2	2	3	1	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	101
18 FAU	19	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
19 STA	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	20	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
22 KGEO	11	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	90734	52668	35566	15626	8428	18323	2923	2795	9	1	179	0	215	90	3	6	31	0	0	0	0	0	0	227597

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: Auto Person

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	28111	15645	2188	2647	493	3213	791	1553	11	4	1	0	11	26	0	0	4	8	1	0	2	0	0	54709
2 DC NC	102191	413543	91550	69294	4822	24381	7746	16852	427	61	10	5	535	919	29	4	184	35	20	25	45	9	0	732689
3 MTG	18071	80930	1796635	85969	1459	10831	2249	36533	2277	155	12277	746	26652	5044	18	13	70	94	137	271	165	15	0	2080612
4 PG	39591	136842	67720	1098148	1509	8142	17875	17373	355	133	67	27	15020	43136	1316	351	22462	71	137	54	149	39	0	1470518
5 ARLCR	1543	1837	490	182	7142	5886	935	1863	22	7	0	0	1	3	0	0	1	1	1	0	1	0	0	19917
6 ARNCR	22633	18251	5866	2700	12849	249307	31875	83866	1127	270	6	3	20	58	1	4	14	12	14	17	25	6	0	428924
7 ALX	9704	8574	1508	3906	3697	33077	117656	50249	138	377	6	1	13	39	2	2	69	21	14	7	16	3	0	229078
8 FFX	19210	18346	17609	12300	7425	93116	79245	1978704	115354	40708	75	24	179	457	16	31	268	871	586	165	242	46	0	2384974
9 LDN	289	269	1627	193	79	892	236	53110	661817	5763	3608	34	130	207	2	2	53	1249	65	10200	73	3	0	739902
10 PW	1562	990	938	611	438	3903	4771	143807	38416	739545	73	9	190	514	18	16	63	5390	11727	310	1795	93	0	955181
11 FRD	468	517	40935	831	78	438	289	1591	4586	242	491484	10647	11129	961	12	0	37	115	16	7563	1	0	0	571939
12 CAR	417	573	3717	727	84	450	232	890	388	26	11185	241378	11431	626	8	0	32	3	0	72	0	0	0	272238
13 HOW	232	865	23600	17486	17	109	72	364	148	41	2780	2336	302604	29731	10	9	35	2	4	75	0	2	0	380521
14 AAR	1540	4749	4019	56037	122	658	554	1592	364	233	194	62	33485	793347	2477	149	501	10	61	58	20	22	0	900254
15 CAL	426	1009	646	8533	46	254	237	775	180	105	29	13	145	5695	139355	11509	2844	3	63	0	72	28	0	171966
16 STM	355	456	480	1330	54	375	114	720	73	78	0	0	112	410	4298	179172	8622	1	59	0	95	457	0	197258
17 CHS	1592	3190	593	30276	71	487	1739	2472	293	120	20	9	136	556	2447	6456	275621	85	86	8	163	1996	0	328417
18 FAU	475	527	1248	603	77	487	330	11104	7164	19387	79	3	86	53	6	3	119	117317	10815	965	2456	106	0	173411
19 STA	84	78	180	97	15	111	101	1036	129	7637	2	0	12	45	4	13	28	1780	231629	13	44554	302	0	287850
20 CL/JF	388	658	1334	537	76	403	243	1167	13241	568	6493	39	247	231	0	0	2	1511	50	120861	12	0	0	148060
21 SP/FB	163	227	64	118	41	223	162	536	145	412	0	0	0	0	2	34	113	506	25052	1	263495	33	0	291328
22 KGEO	461	681	171	703	87	410	298	759	34	556	0	0	6	95	38	199	1185	906	2810	0	1135	41145	0	51679
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	249507	708758	2063118	1393228	40680	437151	267753	2406919	846689	816428	528388	255336	402143	882152	150060	197969	312324	129988	283346	140667	314517	44306	0	12871426

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: Motorized Person

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	36161	23009	2806	3115	1285	5031	881	1666	11	4	1	0	11	26	0	0	4	8	1	0	2	0	0	74022
2 DC NC	143915	447087	96841	73371	6982	28274	8042	17067	427	61	10	5	536	919	29	4	185	35	20	25	45	9	0	823890
3 MTG	25637	85317	1824243	88550	2290	11466	2260	36618	2277	155	12278	746	26706	5046	18	13	70	94	137	271	165	15	0	2124373
4 PG	52207	142815	69504	1106432	2295	8959	17986	17384	355	133	67	27	15087	43198	1316	351	22464	71	137	54	149	39	0	1501030
5 ARLCR	2918	1958	513	189	7214	6446	960	1939	22	7	0	0	1	3	0	0	1	1	1	0	1	0	0	22175
6 ARNCR	31797	19024	5999	2738	14859	254600	32445	85575	1128	270	6	3	20	58	1	4	14	12	14	17	25	6	0	448615
7 ALX	13339	8861	1533	3927	4403	35437	118702	50565	138	377	6	1	13	39	2	2	69	21	14	7	16	3	0	237475
8 FFX	25199	18547	17656	12303	8450	95993	80011	1978975	115362	40708	75	24	179	457	16	31	268	871	586	165	242	46	0	2396161
9 LDN	315	269	1627	193	82	896	236	53110	661818	5763	3608	34	130	207	2	2	53	1249	65	10200	73	3	0	739934
10 PW	1850	990	938	611	463	3949	4779	143807	38416	739545	73	9	190	514	18	16	63	5390	11727	310	1795	93	0	955548
11 FRD	468	517	40936	831	78	438	289	1591	4586	242	491662	10647	11129	961	12	0	37	115	16	7563	1	0	0	572118
12 CAR	417	573	3717	727	84	450	232	890	388	26	11185	241378	11431	626	8	0	32	3	0	72	0	0	0	272238
13 HOW	269	868	23630	17566	19	111	72	364	148	41	2780	2336	302682	29741	10	9	35	2	4	75	0	2	0	380764
14 AAR	1695	4760	4024	56103	131	668	555	1592	364	233	194	62	33500	793362	2477	149	501	10	61	58	20	22	0	900541
15 CAL	426	1009	646	8533	46	254	237	775	180	105	29	13	145	5695	139358	11509	2844	3	63	0	72	28	0	171969
16 STM	355	456	480	1330	54	375	114	720	73	78	0	0	112	410	4298	179178	8622	1	59	0	95	457	0	197264
17 CHS	1650	3195	593	30278	73	490	1740	2472	293	120	20	9	136	556	2447	6456	275649	85	86	8	163	1996	0	328517
18 FAU	494	527	1248	603	78	488	331	11104	7164	19387	79	3	86	53	6	3	119	117317	10815	965	2456	106	0	173433
19 STA	86	78	180	97	15	111	101	1036	129	7637	2	0	12	45	4	13	28	1780	231629	13	44554	302	0	287853
20 CL/JF	388	658	1334	537	76	403	243	1167	13241	568	6493	39	247	231	0	0	2	1511	50	120861	12	0	0	148060
21 SP/FB	183	227	64	118	43	226	162	536	145	412	0	0	0	0	2	34	113	506	25052	1	263495	33	0	291353
22 KGEO	472	681	171	703	88	411	298	759	34	556	0	0	6	95	38	199	1185	906	2810	0	1135	41145	0	51692
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	340241	761426	2098684	1408854	49108	455474	270676	2409714	846698	816429	528567	255336	402358	882242	150063	197974	312355	129988	283346	140667	314517	44306	0	13099023

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: Commuter Rail

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0	0	0	1	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
2 DC NC	0	0	0	2	0	1	26	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
3 MTG	182	1	18	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	204
4 PG	95	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	99
5 ARLCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 ARNCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 ALX	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8 FFX	93	0	0	0	10	22	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	127
9 LDN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 PW	34	0	0	0	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
14 AAR	54	2	1	0	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	19	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
19 STA	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	20	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
22 KGEO	11	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	511	3	19	5	21	40	40	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	642

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: All Bus

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	2893	5061	128	79	63	160	7	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8396
2 DC NC	18310	25850	2522	1700	257	382	11	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49037
3 MTG	377	2082	22677	2215	43	22	0	27	0	0	1	0	55	2	0	0	0	0	0	0	0	0	0	27501
4 PG	815	3000	1347	7551	23	21	1	1	0	0	0	0	67	63	0	0	2	0	0	0	0	0	0	12891
5 ARLCR	18	18	1	0	1	121	4	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	187
6 ARNCR	144	99	4	0	135	2746	373	958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4457
7 ALX	27	4	0	0	69	945	642	158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1845
8 FFX	10	7	5	0	123	1306	416	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1868
9 LDN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 PW	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11 FRD	0	0	1	0	0	0	0	0	0	0	178	0	0	0	0	0	0	0	0	0	0	0	0	178
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	4	0	22	80	0	0	0	0	0	0	0	0	78	9	0	0	0	0	0	0	0	0	0	192
14 AAR	0	0	2	63	0	0	0	0	0	0	0	0	15	16	0	0	0	0	0	0	0	0	0	96
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	6
17 CHS	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	31
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	22598	36121	26708	11690	713	5703	1453	1181	0	0	179	0	215	90	3	6	31	0	0	0	0	0	0	106691

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: Bus & Metrorail

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	142	267	134	151	58	312	24	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1130
2 DC NC	5887	2482	1162	1184	610	1566	145	101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13137
3 MTG	965	1005	1186	188	98	142	3	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3605
4 PG	2114	1509	199	286	159	275	50	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4600
5 ARLCR	27	10	5	2	4	11	4	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72
6 ARNCR	1099	220	49	17	191	230	45	186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2038
7 ALX	892	129	12	10	207	349	69	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1718
8 FFX	889	105	8	1	117	336	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1517
9 LDN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 PW	5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
14 AAR	7	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	12029	5728	2758	1840	1446	3224	402	411	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	27839

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: Metrorail Only

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	5015	2037	356	238	671	1345	52	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9779
2 DC NC	17527	5212	1608	1192	1293	1944	114	108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28997
3 MTG	6043	1299	3726	177	690	470	5	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12451
4 PG	9592	1462	237	445	603	521	59	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12921
5 ARLCR	1330	94	17	4	67	428	16	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2000
6 ARNCR	7922	454	80	21	1684	2317	152	566	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13196
7 ALX	2716	154	13	11	430	1066	335	106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4831
8 FFX	4997	89	34	2	776	1212	287	270	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7674
9 LDN	25	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
10 PW	248	0	0	0	22	40	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	318
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	31	2	7	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44
14 AAR	94	8	2	2	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	113
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	57	4	0	0	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	55595	10815	6081	2092	6248	9356	1028	1200	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	92424

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal HBO Trips MODE: Transit Percentage

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	22.3	32.0	22.0	15.0	61.6	36.1	10.2	6.8	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	26.1
2 DC NC	29.0	7.5	5.5	5.6	30.9	13.8	3.7	1.3	0	0	0	0	0.1	0.0	0.4	0	0.1	0	0	0	0	0	0	11.1
3 MTG	29.5	5.1	1.5	2.9	36.3	5.5	0.5	0.2	0	0	0.0	0	0.2	0.0	0	0	0	0	0	0	0	0	0	2.1
4 PG	24.2	4.2	2.6	0.7	34.2	9.1	0.6	0.1	0	0	0	0	0.4	0.1	0.0	0	0.0	0	0	0	0	0	0	2.0
5 ARLCR	47.1	6.2	4.5	3.3	1.0	8.7	2.5	3.9	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.2
6 ARNCR	28.8	4.1	2.2	1.4	13.5	2.1	1.8	2.0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	4.4
7 ALX	27.2	3.2	1.6	0.5	16.0	6.7	0.9	0.6	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	3.5
8 FFX	23.8	1.1	0.3	0.0	12.1	3.0	1.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5
9 LDN	8.0	0.0	0.0	0	3.7	0.4	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
10 PW	15.6	0.0	0.0	0	5.5	1.2	0.2	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
11 FRD	0.0	0	0.0	0	0.1	0.0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	14.0	0.3	0.1	0.5	10.5	1.7	0.0	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.1
14 AAR	9.1	0.2	0.1	0.1	7.3	1.5	0.1	0.0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0.0
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0.0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0.0
17 CHS	3.5	0.1	0.0	0.0	3.2	0.7	0.1	0	0	0	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0.0
18 FAU	3.8	0	0.0	0	1.1	0.3	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
19 STA	2.2	0	0	0	1.3	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	10.7	0.0	0	0	3.9	1.2	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
22 KGEO	2.3	0.0	0	0	0.9	0.2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	26.7	6.9	1.7	1.1	17.2	4.0	1.1	0.1	0.0	0.0	0.0	0	0.1	0.0	0.0	0.0	0.0	0	0	0	0	0	0	1.7

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Transit

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	37137	7655	2093	569	3581	6201	812	773	1	2	0	0	1	0	1	0	2	0	0	0	0	0	0	58829
2 DC NC	32528	3689	2689	599	1489	2104	217	231	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	43548
3 MTG	11758	2608	27225	920	884	1206	101	454	0	0	0	0	18	1	0	0	0	0	0	0	0	0	0	45176
4 PG	12662	1079	1380	2463	506	614	83	13	0	0	0	0	15	10	0	0	0	0	0	0	0	0	0	18825
5 ARLCR	2830	81	89	18	343	967	92	230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4650
6 ARNCR	13925	352	324	67	3910	4012	528	1779	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24901
7 ALX	4764	73	48	21	1287	2680	825	334	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10033
8 FFX	6011	158	238	4	1629	4104	507	1716	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	14378
9 LDN	42	0	1	0	11	17	0	12	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	116
10 PW	18	0	0	0	4	5	3	1	0	44	0	0	0	0	0	0	0	0	0	0	0	0	0	75
11 FRD	0	0	3	0	0	0	0	0	0	0	184	0	0	0	0	0	0	0	0	0	0	0	0	187
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	75	1	30	20	2	1	0	0	0	0	0	0	10	1	0	0	0	0	0	0	0	0	0	140
14 AAR	91	2	4	21	2	2	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	125
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	6
17 CHS	23	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	70	0	0	0	0	0	0	96
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	121865	15700	34125	4701	13648	21913	3169	5543	49	49	184	0	46	14	2	5	73	0	0	0	0	0	0	221086

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Auto Person

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	50585	52449	15285	31174	1559	22789	10828	18066	186	281	9	3	249	794	65	2	429	2	2	1	3	1	0	204762
2 DC NC	27144	110521	48080	68409	2190	18558	9289	16437	187	208	34	5	1107	2361	162	4	922	1	1	1	2	0	0	305624
3 MTG	5786	49127	878590	73061	845	9462	2799	25478	1050	142	17382	1554	22316	4878	27	3	60	11	7	73	3	0	0	1092652
4 PG	19715	68618	73279	576833	1063	8911	16723	20965	53	460	123	160	24220	49149	3310	352	17568	6	5	3	5	5	0	881523
5 ARLCR	2144	3525	1527	1498	3563	8030	3112	5587	67	105	2	0	8	25	3	0	21	0	0	0	0	0	0	29218
6 ARNCR	14860	20301	9467	9119	4964	108038	27187	70134	1046	1172	12	3	42	135	18	1	151	7	4	2	3	1	0	266667
7 ALX	8685	10096	2953	13684	2042	25763	73881	61284	215	2059	5	2	20	133	43	3	704	3	13	1	3	0	0	201591
8 FFX	13716	17036	23644	21235	4176	68920	63001	983854	71437	65949	57	11	78	221	64	8	1019	1304	473	48	49	2	0	1336303
9 LDN	143	176	1074	57	55	1030	259	77140	313757	14072	2543	22	36	21	2	0	7	1201	8	3526	7	0	0	415136
10 PW	380	282	164	509	130	1442	2474	70410	13844	367454	9	1	8	22	3	1	19	8901	7484	41	949	2	0	474527
11 FRD	14	57	24523	168	3	22	10	105	2805	20	248170	7304	5722	183	2	0	3	5	0	2167	0	0	0	291281
12 CAR	5	10	2322	226	1	6	4	22	25	1	7904	124857	6164	294	1	0	2	0	0	14	0	0	0	141856
13 HOW	258	1290	24603	26251	9	52	26	96	29	13	4728	5011	185338	41159	10	2	10	1	0	16	0	0	0	288901
14 AAR	917	2715	5309	51622	30	164	194	246	19	25	173	284	42803	428616	2088	15	307	1	2	5	0	1	0	535537
15 CAL	85	239	44	5076	3	20	70	82	3	7	2	1	15	2998	57022	5879	2719	0	1	0	2	3	0	74272
16 STM	9	17	13	776	1	8	15	35	1	6	0	0	5	43	6893	93671	6519	0	3	0	6	88	0	108108
17 CHS	668	1387	90	22434	32	252	1187	1256	9	24	3	2	12	378	2024	4040	124723	3	5	0	6	256	0	158789
18 FAU	2	1	11	6	1	14	5	1776	1274	10367	3	0	1	1	0	0	2	41148	1526	127	279	1	0	56545
19 STA	3	2	11	9	1	6	18	534	10	8265	0	0	0	2	1	2	5	1843	82291	1	20374	244	0	113621
20 CL/JF	4	2	180	9	1	4	3	95	5385	78	3052	23	35	10	0	0	0	201	1	63657	0	0	0	72740
21 SP/FB	6	5	4	10	1	7	6	70	11	1145	0	0	0	0	1	3	7	309	20540	1	186108	285	0	208519
22 KGEO	4	3	4	24	0	3	4	15	0	13	0	0	0	6	5	141	627	4	676	0	807	19792	0	22130
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	145131	337859	1111177	902189	20669	273502	211093	1353685	411412	471865	284210	139241	288181	531429	71745	104127	155825	54950	113041	69683	208607	20682	0	7280302

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Motorized Person

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	87722	60103	17378	31744	5140	28990	11640	18839	187	283	9	3	250	794	66	2	431	2	2	1	3	1	0	263591
2 DC NC	59672	114210	50769	69008	3679	20662	9507	16668	187	208	34	5	1108	2361	162	4	922	1	1	1	2	0	0	349172
3 MTG	17544	51735	905815	73980	1730	10668	2900	25932	1050	142	17382	1554	22335	4879	27	3	60	11	7	73	3	0	0	1137829
4 PG	32377	69697	74659	579296	1569	9525	16806	20978	53	460	123	160	24234	49159	3310	352	17569	6	5	3	5	5	0	900348
5 ARLCR	4974	3606	1616	1515	3906	8997	3204	5816	67	105	2	0	8	25	3	0	21	0	0	0	0	0	0	33868
6 ARNCR	28785	20653	9791	9185	8874	112050	27715	71913	1050	1172	12	3	42	135	18	1	151	7	4	2	3	1	0	291568
7 ALX	13449	10169	3001	13705	3329	28443	74705	61618	216	2059	5	2	20	133	43	3	704	3	13	1	3	0	0	211624
8 FFX	19728	17195	23882	21239	5804	73024	63508	985569	71446	65951	57	11	78	221	64	8	1019	1304	473	48	49	2	0	1350681
9 LDN	184	176	1075	57	66	1047	259	77152	313790	14072	2543	22	36	21	2	0	7	1201	8	3526	7	0	0	415252
10 PW	398	282	164	509	134	1447	2476	70411	13844	367499	9	1	8	22	3	1	19	8901	7484	41	949	2	0	474603
11 FRD	14	57	24526	168	3	22	10	105	2805	20	248353	7304	5722	183	2	0	3	5	0	2167	0	0	0	291467
12 CAR	5	10	2322	226	1	6	4	22	25	1	7904	124857	6164	294	1	0	2	0	0	14	0	0	0	141856
13 HOW	334	1291	24633	26271	10	53	26	96	29	13	4728	5011	185349	41160	10	2	10	1	0	16	0	0	0	289041
14 AAR	1008	2717	5314	51643	31	166	194	246	19	25	173	284	42804	428619	2088	15	307	1	2	5	0	1	0	535662
15 CAL	85	239	44	5076	3	20	70	82	3	7	2	1	15	2998	57023	5879	2719	0	1	0	2	3	0	74273
16 STM	9	17	13	776	1	8	15	35	1	6	0	0	5	43	6893	93675	6520	0	3	0	6	88	0	108114
17 CHS	691	1388	90	22434	33	253	1188	1256	9	24	3	2	12	378	2024	4040	124793	3	5	0	6	256	0	158885
18 FAU	2	1	11	6	1	14	5	1776	1274	10367	3	0	1	1	0	0	2	41148	1526	127	279	1	0	56545
19 STA	3	2	11	9	1	6	18	534	10	8265	0	0	0	2	1	2	5	1843	82291	1	20374	244	0	113621
20 CL/JF	4	2	180	9	1	4	3	95	5385	78	3052	23	35	10	0	0	0	201	1	63657	0	0	0	72740
21 SP/FB	6	5	4	10	1	7	6	70	11	1145	0	0	0	0	1	3	7	309	20540	1	186108	285	0	208519
22 KGEO	4	3	4	24	0	3	4	15	0	13	0	0	0	6	5	141	627	4	676	0	807	19792	0	22130
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	266996	353559	1145302	906891	34317	295415	214263	1359228	411461	471914	284394	139241	288227	531444	71746	104131	155898	54950	113041	69683	208607	20682	0	7501389

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Commuter Rail

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0	0	0	1	0	2	147	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	157
2 DC NC	0	0	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
3 MTG	0	1	34	1	0	1	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57
4 PG	108	1	1	0	0	1	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126
5 ARLCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 ARNCR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 ALX	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8 FFX	20	0	0	0	2	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
9 LDN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 PW	3	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
14 AAR	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	182	3	36	2	3	10	234	8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	479

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: All Bus

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	2800	7117	844	207	110	1093	260	180	0	2	0	0	1	0	1	0	2	0	0	0	0	0	0	12618
2 DC NC	8135	3281	1361	288	43	244	29	34	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	13415
3 MTG	2318	883	21030	698	60	43	2	297	0	0	0	0	18	1	0	0	0	0	0	0	0	0	0	25352
4 PG	1568	507	932	2323	10	13	1	1	0	0	0	0	15	10	0	0	0	0	0	0	0	0	0	5378
5 ARLCR	26	7	1	0	2	105	28	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	201
6 ARNCR	94	31	3	0	203	780	280	398	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1790
7 ALX	97	1	0	0	158	497	509	142	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1404
8 FFX	129	11	107	0	244	1786	299	841	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3420
9 LDN	0	0	0	0	0	0	0	1	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
10 PW	3	0	0	0	0	0	0	1	0	44	0	0	0	0	0	0	0	0	0	0	0	0	0	49
11 FRD	0	0	3	0	0	0	0	0	0	0	184	0	0	0	0	0	0	0	0	0	0	0	0	187
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	65	1	22	19	1	1	0	0	0	0	0	0	10	1	0	0	0	0	0	0	0	0	0	120
14 AAR	1	0	1	20	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	27
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	6
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	0	0	0	0	70
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	15237	11839	24303	3556	831	4562	1409	1927	34	48	184	0	46	14	2	5	73	0	0	0	0	0	0	64071

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Bus & Metrorail

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	691	204	390	122	224	960	150	131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2871
2 DC NC	5579	178	583	143	487	782	87	89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7928
3 MTG	1330	854	1315	88	201	318	34	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4178
4 PG	1940	316	149	57	127	177	27	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2798
5 ARLCR	104	22	7	2	26	49	10	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	225
6 ARNCR	1035	122	29	6	215	258	28	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1720
7 ALX	563	38	10	1	223	299	62	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1204
8 FFX	575	77	25	1	139	326	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1193
9 LDN	3	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
10 PW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
14 AAR	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	11828	1812	2509	420	1643	3170	448	303	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22133

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Metrorail Only

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	33646	333	859	239	3247	4147	255	456	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43183
2 DC NC	18815	230	745	168	959	1078	53	108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22155
3 MTG	8109	869	4846	132	623	844	45	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15590
4 PG	9045	255	298	83	370	424	41	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10523
5 ARLCR	2700	52	82	16	314	813	55	192	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4224
6 ARNCR	12796	199	293	61	3492	2973	220	1352	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21390
7 ALX	4104	34	38	19	906	1884	253	184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7423
8 FFX	5287	70	107	3	1244	1986	153	875	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9734
9 LDN	38	0	1	0	10	16	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77
10 PW	12	0	0	0	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	9	0	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
14 AAR	34	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	23	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	94619	2046	7277	723	11171	14171	1078	3304	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	134403

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Internal NHB Trips MODE: Transit Percentage

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	42.3	12.7	12.0	1.8	69.7	21.4	7.0	4.1	0.7	0.8	0	0	0.4	0.0	1.1	0	0.5	0	0	0	0	0	0	22.3
2 DC NC	54.5	3.2	5.3	0.9	40.5	10.2	2.3	1.4	0.1	0.0	0	0	0.1	0.0	0.1	0	0.0	0	0	0	0	0	0	12.5
3 MTG	67.0	5.0	3.0	1.2	51.1	11.3	3.5	1.8	0.0	0	0.0	0	0.1	0.0	0	0	0	0	0	0	0	0	0	4.0
4 PG	39.1	1.5	1.8	0.4	32.3	6.4	0.5	0.1	0	0	0	0	0.1	0.0	0.0	0	0.0	0	0	0	0	0	0	2.1
5 ARLCR	56.9	2.2	5.5	1.2	8.8	10.7	2.9	3.9	0.7	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	13.7
6 ARNCR	48.4	1.7	3.3	0.7	44.1	3.6	1.9	2.5	0.3	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.5
7 ALX	35.4	0.7	1.6	0.2	38.7	9.4	1.1	0.5	0.1	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.7
8 FFX	30.5	0.9	1.0	0.0	28.1	5.6	0.8	0.2	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1
9 LDN	22.7	0.1	0.1	0	16.7	1.6	0.1	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
10 PW	4.6	0	0	0	2.6	0.4	0.1	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
11 FRD	0	0	0.0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0.1
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	22.6	0.1	0.1	0.1	15.1	1.7	0	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.0
14 AAR	9.0	0.1	0.1	0.0	5.6	0.9	0.1	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.0
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0.0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0.0
17 CHS	3.3	0.1	0.1	0.0	2.3	0.3	0.0	0	0	0	0	0	0	0	0	0.0	0.1	0	0	0	0	0	0	0.1
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	45.6	4.4	3.0	0.5	39.8	7.4	1.5	0.4	0.0	0.0	0.1	0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	2.9

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Transit

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	62484	25387	5655	2476	6322	12844	2005	3117	26	2	0	0	21	7	1	0	2	0	0	0	1	0	0	120352
2 DC NC	199030	90537	27529	16942	9414	19979	4070	5903	44	0	1	0	121	39	0	0	0	0	0	0	2	0	0	373610
3 MTG	96330	16316	135214	9512	5493	5227	557	3316	19	1	68	0	415	25	0	0	0	0	0	0	5	0	0	272498
4 PG	112235	31030	12054	34774	7749	8279	2225	1977	8	0	0	0	548	338	0	0	5	0	0	0	0	0	0	211223
5 ARLCR	8034	513	262	53	598	2535	224	734	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12957
6 ARNCR	62008	4193	1867	366	11524	19013	3455	10533	51	1	0	0	1	0	0	0	0	0	0	0	0	0	0	113012
7 ALX	31390	2413	704	247	5540	12390	7248	4105	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	64047
8 FFX	70037	4683	2210	236	13530	22080	7691	29913	1178	15	0	0	0	0	0	0	0	0	0	0	0	0	0	151573
9 LDN	580	34	54	1	259	209	11	2362	1667	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5177
10 PW	14778	378	47	7	2117	2222	850	1384	17	1736	0	0	0	0	0	0	0	0	0	0	0	0	0	23537
11 FRD	134	29	1378	27	14	12	1	14	1	0	1416	0	34	1	0	0	0	0	0	0	0	0	0	3062
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	1504	201	569	495	75	56	4	8	0	0	1	0	570	67	0	0	0	0	0	0	0	0	0	3549
14 AAR	3903	384	120	437	170	148	13	7	0	0	0	0	79	119	0	0	0	0	0	0	0	0	0	5379
15 CAL	1563	408	25	179	87	84	20	6	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	2396
16 STM	159	38	3	9	21	18	4	1	0	0	0	0	0	0	0	28	7	0	0	0	0	0	0	288
17 CHS	5033	1347	55	291	263	270	143	46	0	0	0	0	0	0	0	1	246	0	0	0	0	0	0	7694
18 FAU	19	0	0	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	23
19 STA	1006	98	5	0	407	445	62	23	0	2	0	0	0	0	0	0	0	0	1	0	1	0	0	2051
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	42	2	0	0	16	19	4	2	0	1	0	0	0	0	0	0	0	0	3	0	15	0	0	103
22 KGEO	11	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	670279	177990	187752	66052	63602	105832	28587	63452	3021	1762	1487	0	1790	597	25	29	261	0	3	0	24	0	0	1372546

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Auto Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	94151	74627	18922	37338	3342	35028	12632	22014	339	340	53	4	380	1200	83	129	513	22	174	40	720	1	0	302052
2 DC NC	162713	645542	173686	197159	13868	74300	21532	45000	1172	456	205	19	2782	5987	273	568	1458	94	1041	192	2643	10	0	1350699
3 MTG	49800	174812	3669724	264757	6206	32267	7582	89215	5047	877	36462	2441	66422	18214	195	367	578	243	1597	681	4330	16	0	4431833
4 PG	97039	295616	188401	2367295	8090	31986	50936	60214	877	924	467	205	53337	142435	5702	2041	61168	162	1711	203	4735	89	0	3373632
5 ARLCR	3817	5831	2271	1808	14370	20179	4468	8522	130	117	5	1	14	43	4	6	26	2	11	2	41	0	0	61667
6 ARNCR	42738	46996	20052	13828	27365	490429	71705	196094	3199	1558	39	6	110	310	23	41	191	24	92	29	294	7	0	915128
7 ALX	23510	24539	6520	21766	10268	96755	281056	154857	741	2711	40	4	74	367	57	107	841	32	250	38	557	4	0	625096
8 FFX	76247	64642	63437	51279	26319	265298	208547	4160227	277444	148063	1028	90	923	5655	493	2000	2778	2715	6383	1427	16755	54	0	5381804
9 LDN	1085	1025	7715	2530	650	4724	1159	229827	1368852	26204	16177	127	682	3438	73	42	442	3685	3630	23258	7225	3	0	1702554
10 PW	16376	3833	2858	3034	3834	12411	16308	339966	75172	1576178	375	13	371	2110	124	224	404	27174	33408	931	11225	115	0	2126446
11 FRD	717	1031	99370	5634	172	2947	830	4256	10674	942	1034699	22876	30306	4674	49	0	197	260	217	12237	40	0	0	1232128
12 CAR	493	795	11737	5314	132	2474	604	2567	1883	106	38847	507949	35182	4052	48	0	146	4	0	320	0	0	0	612655
13 HOW	1543	4065	67769	72066	140	709	220	1043	322	171	10911	8071	683129	113950	96	55	158	14	88	327	0	2	0	964848
14 AAR	6318	13546	12977	159559	501	2481	1260	3270	648	546	586	358	90779	1730623	6522	607	1221	34	502	126	646	25	0	2033134
15 CAL	1298	3162	1186	26972	139	769	555	1362	270	228	64	17	276	13688	273178	30686	7432	7	303	0	809	82	0	362482
16 STM	475	781	801	6410	88	1197	329	1500	153	221	0	0	219	1159	15690	394885	22682	1	1550	0	1847	1731	0	451719
17 CHS	5711	12935	1365	93669	468	1970	5236	6289	610	306	26	11	269	1910	8914	17023	556485	111	1048	9	1450	4839	0	720655
18 FAU	492	571	1762	1434	89	952	442	15195	12260	48680	151	5	126	103	7	4	224	248773	29493	1617	8319	121	0	370819
19 STA	1415	627	335	242	880	1606	1584	11486	254	33824	2	0	13	55	6	21	53	4608	459617	15	125775	2049	0	644468
20 CL/JF	408	723	2291	1464	84	799	321	2273	29185	1041	15138	83	702	988	0	0	6	2066	927	271973	510	0	0	330981
21 SP/FB	197	247	70	136	65	285	226	1166	175	3171	0	0	0	0	3	39	127	889	57540	1	638085	953	0	703375
22 KGEO	492	747	239	1887	103	951	489	1275	56	995	0	0	20	419	123	649	2384	1000	7203	0	7879	83442	0	110353
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	587035	1376693	4353488	3335582	117173	1080517	688022	5357615	1789462	1847657	1155273	542283	966116	2051380	311665	449493	659516	291921	606784	313426	833885	93543	0	28808527

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Motorized Person

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	156636	100015	24578	39814	9665	47871	14637	25131	364	343	53	4	401	1207	84	129	515	22	174	40	721	1	0	422404
2 DC NC	361742	736079	201215	214101	23282	94279	25601	50903	1216	456	206	19	2903	6026	274	568	1459	94	1041	192	2645	10	0	1724309
3 MTG	146130	191127	3804938	274269	11698	37494	8139	92531	5066	878	36530	2441	66837	18239	195	367	579	243	1598	681	4334	16	0	4704332
4 PG	209274	326646	2004542	402069	15839	40265	53161	62191	884	925	467	205	53885	142773	5702	2041	61172	162	1711	203	4735	89	0	3584854
5 ARLCR	11850	6345	2533	1861	14968	22713	4692	9256	134	117	5	1	14	43	4	6	26	2	11	2	41	0	0	74624
6 ARNCR	104746	51190	21919	14194	38888	509442	75160	206627	3250	1559	39	6	111	310	23	41	191	24	92	29	294	7	0	1028140
7 ALX	54900	26952	7224	22013	15809	109145	288304	158962	749	2712	40	4	74	367	57	107	841	32	250	38	557	4	0	689143
8 FFX	146285	69325	65648	51515	39849	287378	2162384	190140	278622	148078	1028	90	923	5655	493	2000	2778	2715	6383	1427	16755	54	0	5533377
9 LDN	1665	1059	7769	2531	909	4933	1170	232189	1370519	26204	16177	127	682	3438	73	42	442	3685	3630	23258	7225	3	0	1707731
10 PW	31154	4211	2905	3042	5952	14633	17158	341351	75189	1577914	375	13	371	2110	124	224	404	27174	33408	931	11225	115	0	2149983
11 FRD	851	1060	100748	5662	187	2959	831	4270	10675	942	1036115	22876	30340	4675	49	0	197	260	217	12237	40	0	0	1235190
12 CAR	493	795	11737	5314	132	2474	604	2567	1883	106	38847	507949	35182	4052	48	0	146	4	0	320	0	0	0	612655
13 HOW	3047	4265	68338	72561	215	765	224	1050	322	171	10912	8071	683699	114017	96	55	158	14	88	327	0	2	0	968397
14 AAR	10220	13931	13096	159996	671	2629	1273	3277	648	546	586	358	90858	1730743	6522	607	1221	34	502	126	646	25	0	2038514
15 CAL	2861	3570	1211	27150	226	852	575	1368	270	228	64	17	276	13688	273202	30686	7432	7	303	0	809	82	0	364878
16 STM	634	818	804	6419	110	1215	333	1501	153	221	0	0	219	1159	15690	394913	22689	1	1550	0	1847	1731	0	452008
17 CHS	10744	14282	1420	93961	731	2241	5378	6335	610	306	26	11	269	1910	8914	17023	556731	111	1048	9	1450	4839	0	728349
18 FAU	510	571	1762	1434	90	954	443	15195	12260	48681	151	5	126	103	7	4	224	248773	29493	1617	8319	121	0	370843
19 STA	2422	725	340	243	1286	2051	1646	11510	254	33826	2	0	13	55	6	21	53	4608	459618	15	125776	2049	0	646520
20 CL/JF	408	723	2291	1464	84	799	321	2273	29185	1041	15138	83	702	988	0	0	6	2066	927	271973	510	0	0	330981
21 SP/FB	239	248	70	136	81	304	230	1168	176	3171	0	0	0	0	3	39	127	889	57542	1	638100	953	0	703477
22 KGEO	503	747	239	1887	104	952	490	1275	56	995	0	0	20	419	123	649	2384	1000	7203	0	7879	83442	0	110367
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1257313	1554683	4541239	3401634	180776	1186349	716609	5421067	1792483	1849419	1156760	542283	967906	2051977	311690	449521	659777	291921	606787	313426	833909	93543	0	30181073

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Commuter Rail

ORIGIN | DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0	0	0	18	0	2	161	7	0	0	0	0	4	4	0	0	0	0	0	0	1	0	0	197
2 DC NC	18	2	3	63	0	3	90	4	0	0	0	0	22	20	0	0	0	0	0	0	2	0	0	227
3 MTG	5796	147	636	70	85	64	37	46	0	0	0	0	2	2	0	0	0	0	0	0	5	0	0	6890
4 PG	5215	164	61	72	116	91	28	9	0	0	0	0	8	14	0	0	0	0	0	0	0	0	0	5779
5 ARLCR	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6 ARNCR	13	2	0	5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21
7 ALX	82	5	0	2	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	93
8 FFX	9436	399	49	6	1850	1902	447	13	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	14104
9 LDN	2	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
10 PW	6682	56	13	2	1004	941	270	60	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	9057
11 FRD	36	3	41	0	3	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	87
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	301	9	8	24	5	4	0	0	0	0	0	0	8	5	0	0	0	0	0	0	0	0	0	365
14 AAR	1209	62	20	45	30	30	3	1	0	0	0	0	4	20	0	0	0	0	0	0	0	0	0	1423
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	19	0	0	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	23
19 STA	100	1	0	0	52	49	12	2	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	219
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	38	0	0	0	12	10	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	64
22 KGEO	11	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	28958	851	833	309	3161	3102	1053	146	1	34	0	0	48	65	0	0	0	0	0	0	10	0	0	38570

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: All Bus

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	11480	19371	1784	814	278	2267	558	788	5	2	0	0	16	1	1	0	2	0	0	0	0	0	0	37366
2 DC NC	83265	72020	14391	9379	886	4089	737	1316	7	0	0	0	88	10	0	0	0	0	0	0	0	0	0	186189
3 MTG	9389	6361	101013	7696	263	186	26	1435	5	0	65	0	403	23	0	0	0	0	0	0	0	0	0	126865
4 PG	16997	15447	6815	30591	618	548	116	173	0	0	0	0	529	320	0	0	5	0	0	0	0	0	0	72158
5 ARLCR	266	126	15	1	72	404	47	160	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1091
6 ARNCR	4675	1011	107	9	2503	8352	2038	4020	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	22718
7 ALX	2766	466	22	3	1585	4851	4411	2116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16220
8 FFX	1959	404	452	3	1898	6689	3393	12696	642	13	0	0	0	0	0	0	0	0	0	0	0	0	0	28149
9 LDN	43	6	15	0	41	16	0	467	1525	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2113
10 PW	3670	276	5	0	611	780	130	854	1	1708	0	0	0	0	0	0	0	0	0	0	0	0	0	8036
11 FRD	0	1	1065	24	0	0	0	2	0	0	1416	0	34	1	0	0	0	0	0	0	0	0	0	2544
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	533	128	403	437	16	10	0	1	0	0	1	0	561	62	0	0	0	0	0	0	0	0	0	2153
14 AAR	1333	135	40	328	26	18	0	0	0	0	0	0	75	99	0	0	0	0	0	0	0	0	0	2053
15 CAL	1448	373	4	136	36	27	1	1	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	2052
16 STM	135	33	0	6	11	6	0	0	0	0	0	0	0	0	0	28	7	0	0	0	0	0	0	227
17 CHS	4012	1202	10	195	116	100	15	8	0	0	0	0	0	0	0	1	246	0	0	0	0	0	0	5905
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	818	95	3	0	307	388	36	21	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1668
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	4	1	0	0	5	8	1	1	0	0	0	0	0	0	0	0	0	0	2	0	14	0	0	37
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	142793	117456	126144	49621	9272	28739	11509	24058	2188	1726	1482	0	1707	515	25	29	260	0	3	0	14	0	0	517544

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Bus & Metrorail

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1098	767	1005	667	467	1866	426	729	14	0	0	0	1	2	0	0	0	0	0	0	0	0	0	7044
2 DC NC	26939	5810	5567	4030	3092	6937	2034	2500	29	0	1	0	12	9	0	0	0	0	0	0	0	0	0	56959
3 MTG	12331	4009	10478	916	920	1402	241	871	11	0	4	0	9	1	0	0	0	0	0	0	0	0	0	31193
4 PG	18899	7018	2559	2221	2110	2939	1320	1422	7	0	0	0	11	5	0	0	0	0	0	0	0	0	0	38512
5 ARLCR	348	51	41	14	56	97	36	72	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	717
6 ARNCR	10127	988	572	147	921	1192	347	1363	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15687
7 ALX	7863	906	341	128	1184	1791	469	721	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	13409
8 FFX	10995	1551	420	100	1774	3379	1014	1389	179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20800
9 LDN	132	8	9	0	52	55	3	222	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	526
10 PW	641	12	10	2	70	146	158	155	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1208
11 FRD	98	24	271	3	12	11	1	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	432
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	138	22	51	17	20	18	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	273
14 AAR	166	62	31	37	36	38	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	381
15 CAL	114	35	21	43	50	56	19	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	344
16 STM	24	5	3	3	11	12	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61
17 CHS	879	125	44	95	141	161	123	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1605
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	89	2	2	0	49	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	163
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	90879	21393	21426	8423	10965	20107	6216	9511	336	2	5	0	35	17	0	0	0	0	0	0	0	0	0	189315

Appendix D Year 2030 mode choice summary (Unconstrained final, i6, iteration)

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Metrorail Only

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	49906	5250	2867	977	5577	8708	860	1593	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75745
2 DC NC	88807	12705	7568	3470	5435	8951	1208	2083	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	130236
3 MTG	68814	5798	23087	830	4225	3575	253	965	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	107550
4 PG	71123	8402	2620	1889	4905	4701	760	373	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94774
5 ARLCR	7420	336	206	38	469	2034	141	502	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11149
6 ARNCR	47193	2192	1188	206	8100	9469	1070	5150	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74586
7 ALX	20679	1036	341	114	2772	5748	2368	1266	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34325
8 FFX	47647	2330	1289	126	8007	10110	2837	15815	357	0	0	0	0	0	0	0	0	0	0	0	0	0	0	88520
9 LDN	404	20	29	0	166	136	7	1672	97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2531
10 PW	3784	34	18	3	432	355	292	315	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5236
11 FRD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	533	41	108	17	33	24	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	759
14 AAR	1195	125	29	28	77	63	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1523
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	142	20	1	2	7	9	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	185
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	407648	38290	39349	7700	40204	53883	9809	29737	496	0	0	0	0	0	0	0	0	0	0	0	0	0	0	627116

Simulation - Year: 2030 Alternative: Ver2.3_20080604_pceNo Iteration: i6
Purpose: Total Internal Trips MODE: Transit Percentage

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	39.9	25.4	23.0	6.2	65.4	26.8	13.7	12.4	7.0	0.7	0.2	0	5.4	0.6	0.9	0	0.4	0	0	0	0.1	0	0	28.5
2 DC NC	55.0	12.3	13.7	7.9	40.4	21.2	15.9	11.6	3.6	0.1	0.3	0	4.2	0.6	0.1	0	0.0	0	0	0	0.1	0	0	21.7
3 MTG	65.9	8.5	3.6	3.5	47.0	13.9	6.8	3.6	0.4	0.1	0.2	0	0.6	0.1	0	0	0.1	0	0.0	0	0.1	0	0	5.8
4 PG	53.6	9.5	6.0	1.4	48.9	20.6	4.2	3.2	0.9	0.0	0.1	0	1.0	0.2	0.0	0	0.0	0	0	0	0.0	0	0	5.9
5 ARLCR	67.8	8.1	10.3	2.8	4.0	11.2	4.8	7.9	3.3	0.1	0.2	0	0.8	0.0	0	0	0	0	0	0	0.1	0	0	17.4
6 ARNCR	59.2	8.2	8.5	2.6	29.6	3.7	4.6	5.1	1.6	0.1	0.1	0	0.7	0.1	0	0	0	0	0	0	0.0	0	0	11.0
7 ALX	57.2	9.0	9.7	1.1	35.0	11.4	2.5	2.6	1.0	0.1	0	0	0.4	0.0	0	0	0	0	0	0	0.0	0	0	9.3
8 FFX	47.9	6.8	3.4	0.5	34.0	7.7	3.6	0.7	0.4	0.0	0	0	0.0	0.0	0	0	0	0	0	0	0.0	0	0	2.7
9 LDN	34.8	3.2	0.7	0.0	28.5	4.2	0.9	1.0	0.1	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
10 PW	47.4	9.0	1.6	0.2	35.6	15.2	5.0	0.4	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0.0	0	0	1.1
11 FRD	15.8	2.7	1.4	0.5	7.7	0.4	0.2	0.3	0.0	0	0.1	0	0.1	0.0	0	0	0	0	0	0	0	0	0	0.2
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	49.4	4.7	0.8	0.7	35.0	7.4	1.6	0.7	0	0	0.0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0.4
14 AAR	38.2	2.8	0.9	0.3	25.3	5.6	1.0	0.2	0.0	0	0.0	0	0.1	0.0	0.0	0	0	0	0	0	0.0	0	0	0.3
15 CAL	54.6	11.4	2.1	0.7	38.4	9.8	3.5	0.5	0.0	0	0	0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0.7
16 STM	25.0	4.6	0.4	0.1	19.6	1.5	1.1	0.1	0	0	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0.1
17 CHS	46.8	9.4	3.9	0.3	36.0	12.1	2.7	0.7	0.0	0	0	0	0.1	0.0	0	0.0	0.0	0	0	0	0	0	0	1.1
18 FAU	3.7	0	0.0	0	1.0	0.2	0.1	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
19 STA	41.6	13.6	1.5	0.1	31.6	21.7	3.8	0.2	0.0	0.0	0	0	0	0	0	0	0	0	0.0	0	0.0	0	0	0.3
20 CL/JF	0	0	0.0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
21 SP/FB	17.7	0.6	0.0	0	20.1	6.3	1.7	0.1	0.0	0.0	0	0	0	0	0	0	0	0	0.0	0	0.0	0	0	0.0
22 KGEO	2.2	0.0	0	0	0.8	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	53.3	11.4	4.1	1.9	35.2	8.9	4.0	1.2	0.2	0.1	0.1	0	0.2	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0	0	4.5

Appendix E. TP+ Scripts

1 Assemble_Skims_AB.s

```
;--------------------------------------------------------------------------
;Assemble_Skims_AB.s
;MWCOG Version 2.2  Model
;Assemble Transit Skims by Time Period
; Input Files:
;   iteration (%_iter_%) = 'i1',..,'i6'
;   period    (@period@) = 'am'/'op'
;
;  Transit Skim Files           = <iteration>_<period>_AB.skm
;  Transit Fare Files           = <iteration>_<period>_AB.FAR
; Output File:
;  Combined Transit Skims       = <iteration>TRN<Period>_AB.SKM, MO = 1-48,
;--------------------------------------------------------------------------

;--------------------------------------------------------------------------
;Loop through each period
;--------------------------------------------------------------------------

; Read Deflation Factor
READ FILE=TRN_Deflator.txt

LOOP PERIOD=1,2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
 ELSE
  TIME_PERIOD = 'OP'
 ENDIF

;--------------------------------------------------------------------------
;Assemble Skims & Fares into Files for Mode Choice
;--------------------------------------------------------------------------
RUN PGM=MATRIX
 MATI[1]=%_iter_%_@TIME_PERIOD@_WK_AB.SKM
 MATI[2]=%_iter_%_@TIME_PERIOD@_WK_AB.FAR
 MATI[3]=%_iter_%_@TIME_PERIOD@_DR_AB.SKM
 MATI[4]=%_iter_%_@TIME_PERIOD@_DR_AB.FAR
 MATI[5]=%_iter_%_@TIME_PERIOD@_KR_AB.SKM
 MATI[6]=%_iter_%_@TIME_PERIOD@_KR_AB.FAR
 MATO[1]=%_iter_%_TRN@TIME_PERIOD@_AB.SKM, MO = 1-48,
  FORMAT = MINUTP,
  NAME = WWAET, WWLKT, WINIT, WXFRT, WIVTT, WIVCR, WIVXB, WIVMR, WIVN1,
  WIVN2, WIVLB, WNXFR, WFARE, WXPEN,
         DWAET, DWLKT, DINIT, DXFRT, DIVTT, DIVCR, DIVXB, DIVMR, DIVN1,
  DIVN2, DIVLB, DNXFR, DFARE, DXPEN, DACCT, DACCD, DPRKC, DPRKT,
         KWAET, KWLKT, KINIT, KXFRT, KIVTT, KIVCR, KIVXB, KIVMR, KIVN1,
  KIVN2, KIVLB, KNXFR, KFARE, KXPEN, KACCT, KACCD
MW[1] = MI.1.9    ;---- wlk walk acc time    (0.01 min)
MW[2] = MI.1.10   ;---- wlk other walk time  (0.01 min)
MW[3] = MI.1.7    ;---- wlk ini.wait time    (0.01 min)
MW[4] = MI.1.8    ;---- wlk xfr wait time    (0.01 min)
MW[5] = MI.1.3    ;---- wlk ivt-total        (0.01 min)
MW[6] = MI.1.4    ;---- wlk ivt-commuter rail(0.01 min)
MW[7] = MI.1.2    ;---- wlk ivt-exp bus      (0.01 min)
MW[8] = MI.1.3    ;---- wlk ivt-metrorail    (0.01 min)
MW[9] = MI.1.5    ;---- wlk ivt-new rail mode(0.01 min)
MW[10] = MI.1.6   ;---- wlk ivt-new bus mode (0.01 min)
MW[11] = MI.1.1   ;---- wlk ivt-local bus    (0.01 min)
MW[12] = MI.1.12  ;---- wlk transfers        (0+)
MW[13] = MI.2.1   ;---- wlk fare             (1994 cents)
MW[14] = MI.1.11  ;---- wlk added board time (0.01 min)
MW[15] = MI.3.9   ;---- drv walk acc time    (0.01 min)
MW[16] = MI.3.10  ;---- drv other walk time  (0.01 min)
MW[17] = MI.3.7   ;---- drv ini.wait time    (0.01 min)
MW[18] = MI.3.8   ;---- drv xfr wait time    (0.01 min)
MW[19] = MI.3.3   ;---- drv ivt-total        (0.01 min)
MW[20] = MI.3.4   ;---- drv ivt-commuter rail(0.01 min)
MW[21] = MI.3.2   ;---- drv ivt-exp bus      (0.01 min)
MW[22] = MI.3.3   ;---- drv ivt-metrorail    (0.01 min)
MW[23] = MI.3.5   ;---- drv ivt-new rail mode(0.01 min)
MW[24] = MI.3.6   ;---- drv ivt-new bus mode (0.01 min)
MW[25] = MI.3.1   ;---- drv ivt-local bus    (0.01 min)
MW[26] = MI.3.12  ;---- drv transfers        (0+)
MW[27] = MI.4.1   ;---- drv fare             (1994 cents)
MW[28] = MI.3.11  ;---- drv added board time (0.01 min)
MW[29] = MI.3.13  ;---- drv acc time         (0.01 min)
MW[30] = MI.3.14  ;---- drv acc distance     (0.01 mile)
MW[31] = MI.3.16  ;---- drv park cost        (1994 cents)
MW[32] = MI.3.15  ;---- drv park time        (0.01 min)
MW[33] = MI.5.9   ;---- knr walk acc time    (0.01 min)
MW[34] = MI.5.10  ;---- knr other walk time  (0.01 min)
MW[35] = MI.5.7   ;---- knr ini.wait time    (0.01 min)
MW[36] = MI.5.8   ;---- knr xfr wait time    (0.01 min)
MW[37] = MI.5.3   ;---- knr ivt-total        (0.01 min)
MW[38] = MI.5.4   ;---- knr ivt-commuter rail(0.01 min)
MW[39] = MI.5.2   ;---- knr ivt-exp bus      (0.01 min)
MW[40] = MI.5.3   ;---- knr ivt-metrorail    (0.01 min)
MW[41] = MI.5.5   ;---- knr ivt-new rail mode(0.01 min)
MW[42] = MI.5.6   ;---- knr ivt-new bus mode (0.01 min)
MW[43] = MI.5.1   ;---- knr ivt-local bus    (0.01 min)
MW[44] = MI.5.12  ;---- knr transfers        (0+)
MW[45] = MI.6.1   ;---- knr fare             (1994 cents)
MW[46] = MI.5.11  ;---- knr added board time (0.01 min)
MW[47] = MI.5.13  ;---- knr acc time         (0.01 min)
MW[48] = MI.5.14  ;---- knr acc distance     (0.01 mile)

JLOOP
; assemble total IVTT

  MW[05] = MW[06]+MW[07]+MW[08]+MW[09]+MW[10]+MW[11]
  MW[19] = MW[20]+MW[21]+MW[22]+MW[23]+MW[24]+MW[25]
  MW[37] = MW[38]+MW[39]+MW[40]+MW[41]+MW[42]+MW[43]

; zero-out fares for IVTT=0

  IF (MW[05]=0 ) MW[13]=0
  IF (MW[19]=0 ) MW[27]=0
  IF (MW[37]=0 ) MW[45]=0

; deflate parking costs to 1994

  MW[31] = @DEFLATIONFTR@*MW[31]

ENDJLOOP

ENDRUN

ENDLOOP ;---- PERIOD ----
```

2 Assemble_Skims_BM.s

```
;--------------------------------------------------------------------------
;Assemble_Skims_BM.s
;MWCOG Version 2.2  Model
;Assemble Transit Skims by Time Period
```

```
; Input Files:
;   iteration (%_iter_%) = 'i1',..,'i6'
;   period    (@period@) = 'am'/'op'
;
;  Transit Skim Files           = <iteration>_<period>_BM.skm
;  Transit Fare Files           = <iteration>_<period>_BM.FAR
; Output File:
;  Combined Transit Skims       = <iteration>TRN<Period>_BM.SKM, MO = 1-48,
;---------------------------------------------------------------------------


;---------------------------------------------------------------------------
;Loop through each period
;---------------------------------------------------------------------------
; Read Deflation Factor
READ FILE=TRN_Deflator.txt

LOOP PERIOD=1,2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
 ELSE
  TIME_PERIOD = 'OP'
 ENDIF

;---------------------------------------------------------------------------
;Assemble Skims & Fares into Files for Mode Choice
;---------------------------------------------------------------------------
RUN PGM=MATRIX
 MATI[1]=%_iter_%_@TIME_PERIOD@_WK_BM.SKM
 MATI[2]=%_iter_%_@TIME_PERIOD@_WK_BM.FAR
 MATI[3]=%_iter_%_@TIME_PERIOD@_DR_BM.SKM
 MATI[4]=%_iter_%_@TIME_PERIOD@_DR_BM.FAR
 MATI[5]=%_iter_%_@TIME_PERIOD@_KR_BM.SKM
 MATI[6]=%_iter_%_@TIME_PERIOD@_KR_BM.FAR
 MATO[1]=%_iter_%_TRN@TIME_PERIOD@_BM.SKM, MO = 1-48,
  FORMAT = MINUTP,
  NAME = WWAET, WWLKT, WINIT, WXFRT, WIVTT, WIVCR, WIVXB, WIVMR, WIVN1,
  WIVN2, WIVLB, WNXFR, WFARE, WXPEN,
         DWAET, DWLKT, DINIT, DXFRT, DIVTT, DIVCR, DIVXB, DIVMR, DIVN1,
  DIVN2, DIVLB, DNXFR, DFARE, DXPEN, DACCT, DACCD, DPRKC, DPRKT,
         KWAET, KWLKT, KINIT, KXFRT, KIVTT, KIVCR, KIVXB, KIVMR, KIVN1,
  KIVN2, KIVLB, KNXFR, KFARE, KXPEN, KACCT, KACCD
MW[1] = MI.1.9    ;---- wlk walk acc time    (0.01 min)
MW[2] = MI.1.10   ;---- wlk other walk time  (0.01 min)
MW[3] = MI.1.7    ;---- wlk ini.wait time    (0.01 min)
MW[4] = MI.1.8    ;---- wlk xfr wait time    (0.01 min)
MW[5] = MI.1.3    ;---- wlk ivt-total        (0.01 min)
MW[6] = MI.1.4    ;---- wlk ivt-commuter rail(0.01 min)
MW[7] = MI.1.2    ;---- wlk ivt-exp bus      (0.01 min)
MW[8] = MI.1.3    ;---- wlk ivt-metrorail    (0.01 min)
MW[9] = MI.1.5    ;---- wlk ivt-new rail mode(0.01 min)
MW[10] = MI.1.6   ;---- wlk ivt-new bus mode (0.01 min)
MW[11] = MI.1.1   ;---- wlk ivt-local bus    (0.01 min)
MW[12] = MI.1.12  ;---- wlk transfers        (0+)
MW[13] = MI.2.1   ;---- wlk fare             (1994 cents)
MW[14] = MI.1.11  ;---- wlk added board time (0.01 min)
MW[15] = MI.3.9   ;---- drv walk acc time    (0.01 min)
MW[16] = MI.3.10  ;---- drv other walk time  (0.01 min)
MW[17] = MI.3.7   ;---- drv ini.wait time    (0.01 min)
MW[18] = MI.3.8   ;---- drv xfr wait time    (0.01 min)
MW[19] = MI.3.3   ;---- drv ivt-total        (0.01 min)
MW[20] = MI.3.4   ;---- drv ivt-commuter rail(0.01 min)
MW[21] = MI.3.2   ;---- drv ivt-exp bus      (0.01 min)
MW[22] = MI.3.3   ;---- drv ivt-metrorail    (0.01 min)
MW[23] = MI.3.5   ;---- drv ivt-new rail mode(0.01 min)
MW[24] = MI.3.6   ;---- drv ivt-new bus mode (0.01 min)
MW[25] = MI.3.1   ;---- drv ivt-local bus    (0.01 min)
MW[26] = MI.3.12  ;---- drv transfers        (0+)
MW[27] = MI.4.1   ;---- drv fare             (1994 cents)
MW[28] = MI.3.11  ;---- drv added board time (0.01 min)
MW[29] = MI.3.13  ;---- drv acc time         (0.01 min)
MW[30] = MI.3.14  ;---- drv acc distance     (0.01 mile)
MW[31] = MI.3.16  ;---- drv park cost        (1994 cents)
MW[32] = MI.3.15  ;---- drv park time        (0.01 min)
MW[33] = MI.5.9   ;---- knr walk acc time    (0.01 min)
MW[34] = MI.5.10  ;---- knr other walk time  (0.01 min)
MW[35] = MI.5.7   ;---- knr ini.wait time    (0.01 min)
MW[36] = MI.5.8   ;---- knr xfr wait time    (0.01 min)
MW[37] = MI.5.3   ;---- knr ivt-total        (0.01 min)
MW[38] = MI.5.4   ;---- knr ivt-commuter rail(0.01 min)
MW[39] = MI.5.2   ;---- knr ivt-exp bus      (0.01 min)
MW[40] = MI.5.3   ;---- knr ivt-metrorail    (0.01 min)
MW[41] = MI.5.5   ;---- knr ivt-new rail mode(0.01 min)
MW[42] = MI.5.6   ;---- knr ivt-new bus mode (0.01 min)
MW[43] = MI.5.1   ;---- knr ivt-local bus    (0.01 min)
MW[44] = MI.5.12  ;---- knr transfers        (0+)
MW[45] = MI.6.1   ;---- knr fare             (1994 cents)
MW[46] = MI.5.11  ;---- knr added board time (0.01 min)
MW[47] = MI.5.13  ;---- knr acc time         (0.01 min)
MW[48] = MI.5.14  ;---- knr acc distance     (0.01 mile)

JLOOP

; assemble total IVTT

  MW[05] = MW[06]+MW[07]+MW[08]+MW[09]+MW[10]+MW[11]
  MW[19] = MW[20]+MW[21]+MW[22]+MW[23]+MW[24]+MW[25]
  MW[37] = MW[38]+MW[39]+MW[40]+MW[41]+MW[42]+MW[43]

; zero-out fares for IVTT=0

  IF (MW[05]=0 ) MW[13]=0
  IF (MW[19]=0 ) MW[27]=0
  IF (MW[37]=0 ) MW[45]=0

; deflate parking costs to 1994

  MW[31] = @DEFLATIONFTR@*MW[31]

ENDJLOOP

ENDRUN

ENDLOOP ;---- PERIOD ----
```

3 Assemble_Skims_CR.s

```
;---------------------------------------------------------------------------
;Assemble_Skims_CR.s
;MWCOG Version 2.2  Model
;Assemble Transit Skims by Time Period
; Input Files:
;   iteration (%_iter_%) = 'i1',..,'i6'
;   period    (@period@) = 'am'/'op'
;
;  Transit Skim Files           = <iteration>_<period>_CR.skm
;  Transit Fare Files           = <iteration>_<period>_CR.FAR
; Output File:
;  Combined Transit Skims       = <iteration>TRN<Period>_CR.SKM, MO = 1-32,
;---------------------------------------------------------------------------
```

```
;-------------------------------------------------------------------------
;Loop through each period
;-------------------------------------------------------------------------
; Read Deflation Factor
READ FILE=TRN_Deflator.txt

LOOP PERIOD=1,2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
 ELSE
  TIME_PERIOD = 'OP'
 ENDIF

;-------------------------------------------------------------------------
;Assemble Skims & Fares into Files for Mode Choice
;-------------------------------------------------------------------------
RUN PGM=MATRIX
 MATI[1]=%_iter_%_@TIME_PERIOD@_WK_CR.SKM
 MATI[2]=%_iter_%_@TIME_PERIOD@_WK_CR.FAR
 MATI[3]=%_iter_%_@TIME_PERIOD@_DR_CR.SKM
 MATI[4]=%_iter_%_@TIME_PERIOD@_DR_CR.FAR
 MATO[1]=%_iter_%_TRN@TIME_PERIOD@_CR.SKM, MO = 1-32,
  FORMAT = MINUTP,
  NAME = WWAET, WWLKT, WINIT, WXFRT, WIVTT, WIVCR, WIVXB, WIVMR, WIVN1,
  WIVN2, WIVLB, WNXFR, WFARE, WXPEN,
         DWAET, DWLKT, DINIT, DXFRT, DIVTT, DIVCR, DIVXB, DIVMR, DIVN1,
  DIVN2, DIVLB, DNXFR, DFARE, DXPEN, DACCT, DACCD, DPRKC, DPRKT

MW[1] = MI.1.9    ;---- wlk walk acc time    (0.01 min)
MW[2] = MI.1.10   ;---- wlk other walk time  (0.01 min)
MW[3] = MI.1.7    ;---- wlk ini.wait time    (0.01 min)
MW[4] = MI.1.8    ;---- wlk xfr wait time    (0.01 min)
MW[5] = MI.1.3    ;---- wlk ivt-total        (0.01 min)
MW[6] = MI.1.4    ;---- wlk ivt-commuter rail(0.01 min)
MW[7] = MI.1.2    ;---- wlk ivt-exp bus      (0.01 min)
MW[8] = MI.1.3    ;---- wlk ivt-metrorail    (0.01 min)
MW[9] = MI.1.5    ;---- wlk ivt-new rail mode(0.01 min)
MW[10] = MI.1.6   ;---- wlk ivt-new bus mode (0.01 min)
MW[11] = MI.1.1   ;---- wlk ivt-local bus    (0.01 min)
MW[12] = MI.1.12  ;---- wlk transfers        (0+)
MW[13] = MI.2.1   ;---- wlk fare             (1994 cents)
MW[14] = MI.1.11  ;---- wlk added board time (0.01 min)
MW[15] = MI.3.9   ;---- drv walk acc time    (0.01 min)
MW[16] = MI.3.10  ;---- drv other walk time  (0.01 min)
MW[17] = MI.3.7   ;---- drv ini.wait time    (0.01 min)
MW[18] = MI.3.8   ;---- drv xfr wait time    (0.01 min)
MW[19] = MI.3.3   ;---- drv ivt-total        (0.01 min)
MW[20] = MI.3.4   ;---- drv ivt-commuter rail(0.01 min)
MW[21] = MI.3.2   ;---- drv ivt-exp bus      (0.01 min)
MW[22] = MI.3.3   ;---- drv ivt-metrorail    (0.01 min)
MW[23] = MI.3.5   ;---- drv ivt-new rail mode(0.01 min)
MW[24] = MI.3.6   ;---- drv ivt-new bus mode (0.01 min)
MW[25] = MI.3.1   ;---- drv ivt-local bus    (0.01 min)
MW[26] = MI.3.12  ;---- drv transfers        (0+)
MW[27] = MI.4.1   ;---- drv fare             (1994 cents)
MW[28] = MI.3.11  ;---- drv added board time (0.01 min)
MW[29] = MI.3.13  ;---- drv acc time         (0.01 min)
MW[30] = MI.3.14  ;---- drv acc distance     (0.01 mile)
MW[31] = MI.3.16  ;---- drv park cost        (1980 cents)
MW[32] = MI.3.15  ;---- drv park time        (0.01 min)
JLOOP

; assemble total IVTT

  MW[05] = MW[06]+MW[07]+MW[08]+MW[09]+MW[10]+MW[11]
  MW[19] = MW[20]+MW[21]+MW[22]+MW[23]+MW[24]+MW[25]

; zero-out fares for IVTT=0

  IF (MW[05]=0 ) MW[13]=0
  IF (MW[19]=0 ) MW[27]=0

; deflate parking costs to 1994

  MW[31] = @DEFLATIONFTR@*MW[31]

ENDJLOOP

ENDRUN

ENDLOOP ;---- PERIOD ----
```

4 Assemble_Skims_MR.s

```
;-------------------------------------------------------------------------
;Assemble_Skims_MR.s
;MWCOG Version 2.2  Model
;Assemble Transit Skims by Time Period
; Input Files:
;   iteration (%_iter_%) = 'i1',..,'i6'
;   period    (@period@) = 'am'/'op'
;
;  Transit Skim Files           = <iteration>_<period>_MR.skm
;  Transit Fare Files           = <iteration>_<period>_MR.FAR
; Output File:
;  Combined Transit Skims       = <iteration>TRN<Period>_MR.SKM, MO = 1-48,
;-------------------------------------------------------------------------

;-------------------------------------------------------------------------
;Loop through each period
;-------------------------------------------------------------------------
; Read Deflation Factor
READ FILE=TRN_Deflator.txt

LOOP PERIOD=1,2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
 ELSE
  TIME_PERIOD = 'OP'
 ENDIF

;-------------------------------------------------------------------------
;Assemble Skims & Fares into Files for Mode Choice
;-------------------------------------------------------------------------
RUN PGM=MATRIX
 MATI[1]=%_iter_%_@TIME_PERIOD@_WK_MR.SKM
 MATI[2]=%_iter_%_@TIME_PERIOD@_WK_MR.FAR
 MATI[3]=%_iter_%_@TIME_PERIOD@_DR_MR.SKM
 MATI[4]=%_iter_%_@TIME_PERIOD@_DR_MR.FAR
 MATI[5]=%_iter_%_@TIME_PERIOD@_KR_MR.SKM
 MATI[6]=%_iter_%_@TIME_PERIOD@_KR_MR.FAR
 MATO[1]=%_iter_%_TRN@TIME_PERIOD@_MR.SKM, MO = 1-48,
  FORMAT = MINUTP,
  NAME = WWAET, WWLKT, WINIT, WXFRT, WIVTT, WIVCR, WIVXB, WIVMR, WIVN1,
  WIVN2, WIVLB, WNXFR, WFARE, WXPEN,
         DWAET, DWLKT, DINIT, DXFRT, DIVTT, DIVCR, DIVXB, DIVMR, DIVN1,
  DIVN2, DIVLB, DNXFR, DFARE, DXPEN, DACCT, DACCD, DPRKC, DPRKT,
         KWAET, KWLKT, KINIT, KXFRT, KIVTT, KIVCR, KIVXB, KIVMR, KIVN1,
  KIVN2, KIVLB, KNXFR, KFARE, KXPEN, KACCT, KACCD
MW[1] = MI.1.9    ;---- wlk walk acc time    (0.01 min)
```

```
MW[2] = MI.1.10   ;---- wlk other walk time  (0.01 min)
MW[3] = MI.1.7    ;---- wlk ini.wait time    (0.01 min)
MW[4] = MI.1.8    ;---- wlk xfr wait time    (0.01 min)
MW[5] = MI.1.3    ;---- wlk ivt-total        (0.01 min)
MW[6] = MI.1.4    ;---- wlk ivt-commuter rail(0.01 min)
MW[7] = MI.1.2    ;---- wlk ivt-exp bus      (0.01 min)
MW[8] = MI.1.3    ;---- wlk ivt-metrorail    (0.01 min)
MW[9] = MI.1.5    ;---- wlk ivt-new rail mode(0.01 min)
MW[10] = MI.1.6   ;---- wlk ivt-new bus mode (0.01 min)
MW[11] = MI.1.1   ;---- wlk ivt-local bus    (0.01 min)
MW[12] = MI.1.12  ;---- wlk transfers        (0+)
MW[13] = MI.2.1   ;---- wlk fare             (1994 cents)
MW[14] = MI.1.11  ;---- wlk added board time (0.01 min)
MW[15] = MI.3.9   ;---- drv walk acc time    (0.01 min)
MW[16] = MI.3.10  ;---- drv other walk time  (0.01 min)
MW[17] = MI.3.7   ;---- drv ini.wait time    (0.01 min)
MW[18] = MI.3.8   ;---- drv xfr wait time    (0.01 min)
MW[19] = MI.3.3   ;---- drv ivt-total        (0.01 min)
MW[20] = MI.3.4   ;---- drv ivt-commuter rail(0.01 min)
MW[21] = MI.3.2   ;---- drv ivt-exp bus      (0.01 min)
MW[22] = MI.3.3   ;---- drv ivt-metrorail    (0.01 min)
MW[23] = MI.3.5   ;---- drv ivt-new rail mode(0.01 min)
MW[24] = MI.3.6   ;---- drv ivt-new bus mode (0.01 min)
MW[25] = MI.3.1   ;---- drv ivt-local bus    (0.01 min)
MW[26] = MI.3.12  ;---- drv transfers        (0+)
MW[27] = MI.4.1   ;---- drv fare             (1994 cents)
MW[28] = MI.3.11  ;---- drv added board time (0.01 min)
MW[29] = MI.3.13  ;---- drv acc time         (0.01 min)
MW[30] = MI.3.14  ;---- drv acc distance     (0.01 mile)
MW[31] = MI.3.16  ;---- drv park cost        (cents)
MW[32] = MI.3.15  ;---- drv park time        (0.01 min)
MW[33] = MI.5.9   ;---- knr walk acc time    (0.01 min)
MW[34] = MI.5.10  ;---- knr other walk time  (0.01 min)
MW[35] = MI.5.7   ;---- knr ini.wait time    (0.01 min)
MW[36] = MI.5.8   ;---- knr xfr wait time    (0.01 min)
MW[37] = MI.5.3   ;---- knr ivt-total        (0.01 min)
MW[38] = MI.5.4   ;---- knr ivt-commuter rail(0.01 min)
MW[39] = MI.5.2   ;---- knr ivt-exp bus      (0.01 min)
MW[40] = MI.5.3   ;---- knr ivt-metrorail    (0.01 min)
MW[41] = MI.5.5   ;---- knr ivt-new rail mode(0.01 min)
MW[42] = MI.5.6   ;---- knr ivt-new bus mode (0.01 min)
MW[43] = MI.5.1   ;---- knr ivt-local bus    (0.01 min)
MW[44] = MI.5.12  ;---- knr transfers        (0+)
MW[45] = MI.6.1   ;---- knr fare             (1994 cents)
MW[46] = MI.5.11  ;---- knr added board time (0.01 min)
MW[47] = MI.5.13  ;---- knr acc time         (0.01 min)
MW[48] = MI.5.14  ;---- knr acc distance     (0.01 mile)

JLOOP

; assemble total IVTT

  MW[05] = MW[06]+MW[07]+MW[08]+MW[09]+MW[10]+MW[11]
  MW[19] = MW[20]+MW[21]+MW[22]+MW[23]+MW[24]+MW[25]
  MW[37] = MW[38]+MW[39]+MW[40]+MW[41]+MW[42]+MW[43]

; zero-out fares for IVTT=0

  IF (MW[05]=0 ) MW[13]=0
  IF (MW[19]=0 ) MW[27]=0
  IF (MW[37]=0 ) MW[45]=0

; deflate parking costs to 1994

  MW[31] = @DEFLATIONFTR@*MW[31]


ENDJLOOP

ENDRUN

ENDLOOP ;---- PERIOD ----
```

5 Auto_Access.s

```
;-----------------------------------------------------------------------
;Auto_Access.s
;MWCOG VERSION 2.2 MODEL
;
;
; Develop Auto Access Taz to PNR Links from the Prime Prime Auto Skims
;
; Environment variables:  _prev_  Previous iteration (PP,i1...i6)
;
;   Input files   -  SOVppam.skm (AM, SOV Skims from the Pump Prime Assignment)
;                    SOVppop.skm (AM, SOV Skims from the Pump Prime Assignment)
;                                   3 tables in each skim file:
;                                           1- time    (min),
;                                           2- distance(1/10th  mi)
;                                           3- tolls   (1980 cents)
;                    tazpnr.lkp          (TAZ pnr equivalency file)
;   Output files  -  pnr_am.tb , pnr_op.tb (will overwrite the files from the
;                    earlier Pump_Prime_skims file.
;
;
LOOP PERIOD=1,2       ;  loop through two time periods-- AM, Off-Peak

 IF (PERIOD=1)
   PRD =  'AM'
   IDS =  'AM Final Auto Access Skims'
  ELSE
   PRD =  'OP'
   IDS =  'OP Final Auto Access Skims'
 ENDIF

;-------------------------------------------------------------------------
;       Step 1: Park-&-Ride Access Data
;-------------------------------------------------------------------------
;
;  Next write out TAZ-to-PNR links based on skim times/distances
;  for each time period
;
RUN PGM=MATRIX
 MATI[1]=SOV%_prev_%@PRD@.SKM

        LOOKUP NAME=TAZPNRLK,
               LOOKUP[1] = 1, RESULT=2,; pnr node 1
               LOOKUP[2] = 1, RESULT=3,; pnr node 2 (if any)
               LOOKUP[3] = 1, RESULT=4,; pnr node 3 (if any)
               LOOKUP[4] = 1, RESULT=5,; pnr node 4 (if any)
               INTERPOLATE=N, FAIL=0,0,0, FILE=TAZPNR.LKP

        ZDATI[1]=BASEZON.DAT,Z=1-5,XCRD = 7-14,YCRD= 15-22

        MW[1] = mi.1.1     ;       Time     (min)
        MW[2] = mi.1.2*10  ;       Distance (1/100ths mi)

;  calculate the i/j airline distance in miles MW[3]  and
```

```
        JLOOP
           IF (XCRD[I] = 0 || XCRD[J] = 0)
              MW[3] = 0
           ELSE
              XCHGFT =   XCRD[I] - XCRD[J]
              YCHGFT =   YCRD[I] - YCRD[J]
              MW[3]  =   (SQRT((XCHGFT**2) + (YCHGFT**2)))/ 5280.0
           ENDIF
         ENDJLOOP
;  Insert 50% of lowest time/distance value into intrazonal cells
        JLOOP
          IF (J == I)
              MW[1]=(0.50 * LOWEST(1,1,0.0001,99999.9))
              MW[2]=(0.50 * LOWEST(2,1,0.0001,99999.9))
              MW[3]=(0.50 * LOWEST(3,1,0.0001,99999.9))
          ENDIF
        ENDJLOOP



 JLOOP
    pnr = tazpnrlk(1,j)
        IF (pnr          > 0   &               ;---- Park-&-Ride Station ----
               ((i = 1   -1229 & j = 1   -1229)| ;---- DC/Maryland Internals ----
                (i = 1230-2141 & j = 1230-2141)| ;---- Virginia Internals ----
                (i = 1780-1919 & j = 1   -1229)| ;---- Loudoun to DC/Maryland ----
                (i = 2135-2141 & j = 1   -1229))) ;---- Jefferson to DC/Maryland ---
-


             ; set default airline distance tolenances here:

              dtol= 8.0 ; default distance limit to pnr stations is  9mi
                        ; limit is shorter for more developed juris.
              if (I=1-319,1230-1329,1330-1399)  dtol=4.00; 4mi/dc,arl/alx
              if (I=320-639,640-1029,1400-1779) dtol=5.00; 7mi/mtg,pg,ffx

              IF (MW[1]  > 0  & MW[3]  > 0.0001 &  MW[3] <= dtol) ;
                     _SPEED = ROUND (MW[2] / MW[1] * 0.60)
                     _dis00 =        MW[2]
                     PRINT LIST='SUPPORT N=',i(4),'-',pnr(5),
                     ' DIST=',_dis00(5),' ONEWAY=Y MODES=11 SPEED=',
                      _SPEED(3),' ;  jtaz/pnr(1)=  ',j(5),
                      ' Airln Dist(mi): ',MW[3],
                     FILE=PNR_@PRD@.TB

                     if (tazpnrlk(2,j) > 0)
                        pnr2   = tazpnrlk(2,j)
                        PRINT LIST='SUPPORT N=',i(4),'-',pnr2(5),
                        ' DIST=',_dis00(5),' ONEWAY=Y MODES=11 SPEED=',
                         _SPEED(3),' ;  jtaz/pnr(2)=  ',j(5),
                      ' Airln Dist(mi): ',MW[3],
                         FILE=PNR_@PRD@.TB
                     endif
                     if (tazpnrlk(3,j) > 0)
                        pnr3    = tazpnrlk(3,j)
                        PRINT LIST='SUPPORT N=',i(4),'-',pnr3(5),
                        ' DIST=',_dis00(5),' ONEWAY=Y MODES=11 SPEED=',
                         _SPEED(3),' ;  jtaz/pnr(3)=  ',j(5),
                      ' Airln Dist(mi): ',MW[3],
                         FILE=PNR_@PRD@.TB
                     endif
                     if (tazpnrlk(4,j) > 0)
                        pnr4    = tazpnrlk(4,j)
                        PRINT LIST='SUPPORT N=',i(4),'-',pnr4(5),
                        ' DIST=',_dis00(5),' ONEWAY=Y MODES=11 SPEED=',
                         _SPEED(3),' ;   jtaz/pnr(4)=  ',j(5),
                      ' Airln Dist(mi): ',MW[3],
                         FILE=PNR_@PRD@.TB
                     endif

                ENDIF
        ENDIF

 ENDJLOOP

ENDRUN
ENDLOOP   ;
```

6 Combine_Tables_For_TrAssign.s

```
; COMBINE TRIPS FOR ALL PURPOSES INTO ONE FOR EACH SUB TRANSIT MODE
RUN PGM=MATRIX
MATI[1] = '%_iter_%_HBW_NL_MC.MTT' ;AECOM HBW Mode Choice file           (Input)
MATI[2] = '%_iter_%_HBS_NL_MC.MTT' ;AECOM HBS Mode Choice file           (Input)
MATI[3] = '%_iter_%_HBO_NL_MC.MTT' ;AECOM HBO Mode Choice file           (Input)
MATI[4] = '%_iter_%_NHB_NL_MC.MTT' ;AECOM NHB Mode Choice file           (Input)

MATO[1]='%_iter_%_AMMS.TRP',MO=04-14,
  NAME = WK_CR, WK_BUS, WK_BUS_MR, WK_MR, PNR_KNR_CR, PNR_BUS, KNR_BUS, PNR_BUS_MR,
KNR_BUS_MR, PNR_MR, KNR_MR
MATO[2]='%_iter_%_OPMS.TRP',MO=24-34,
  NAME = WK_CR, WK_BUS, WK_BUS_MR, WK_MR, PNR_KNR_CR, PNR_BUS, KNR_BUS, PNR_BUS_MR,
KNR_BUS_MR, PNR_MR, KNR_MR

;PK TRIP MATRICES
MW[1]=MI.1.1                          ; AM DR ALONE
MW[2]=MI.1.2                          ; AM SR2
MW[3]=MI.1.3                          ; AM SR3+
MW[4]=MI.1.4                          ; AM WK-CR
MW[5]=MI.1.5                          ; AM WK-BUS
MW[6]=MI.1.6                          ; AM WK-BU/MR
MW[7]=MI.1.7                          ; AM WK-MR
MW[8]=MI.1.8                          ; AM PNR-CR, KNR-CR
MW[9]=MI.1.9                          ; AM PNR-BUS
MW[10]=MI.1.10                        ; AM KNR-BUS
MW[11]=MI.1.11                        ; AM PNR-BU/MR
MW[12]=MI.1.12                        ; AM KNR-BU/MR
MW[13]=MI.1.13                        ; AM PNR-MR
MW[14]=MI.1.14                        ; AM KNR-MR


;OP TRIP MATRICES
MW[21]=MI.2.1+MI.3.1+MI.4.1          ; OP DR ALONE
MW[22]=MI.2.2+MI.3.2+MI.4.2          ; OP SR2
MW[23]=MI.2.3+MI.3.3+MI.4.3          ; OP SR3+
MW[24]=MI.2.4+MI.3.4+MI.4.4          ; OP WK-CR
MW[25]=MI.2.5+MI.3.5+MI.4.5          ; OP WK-BUS
MW[26]=MI.2.6+MI.3.6+MI.4.6          ; OP WK-BU/MR
MW[27]=MI.2.7+MI.3.7+MI.4.7          ; OP WK-MR
MW[28]=MI.2.8+MI.3.8+MI.4.8          ; OP PNR-CR, KNR-CR
MW[29]=MI.2.9+MI.3.9+MI.4.9          ; OP PNR-BUS
MW[30]=MI.2.10+MI.3.10+MI.4.10       ; OP KNR-BUS
MW[31]=MI.2.11+MI.3.11+MI.4.11       ; OP PNR-BU/MR
MW[32]=MI.2.12+MI.3.12+MI.4.12       ; OP KNR-BU/MR
MW[33]=MI.2.13+MI.3.13+MI.4.13       ; OP PNR-MR
```

```
MW[34]=MI.2.14+MI.3.14+MI.4.14       ; OP KNR-MR

ENDRUN
```

7 Demo_Models.s

```
;=================================================================
;  Demo_Models.S
;
;   Version 2.2  Demographic Model
;
;   The models have been updated using the 2000 CTPP
;   Program to Allocation Total Zonal Households among 64 Classes:
;   4 HH Size groups by 4 Income Groups by 4 Veh. Avail. groups
;
;   Programmer: Milone
;   Date:      01/11/07
;   refinements to income curves on 11/09/06 rm/ms
;   4/21/2008 VAve alt. specific constants updated
;=================================================================
;
;---------------------------------------------------------------------------
;         Develop transit accessibility files needed in the demographic modeling
; - the best AM transit accessibility to jobs w/in 40min
;---------------------------------------------------------------------------
;
ZONESIZE = 2191
RUN PGM=MATRIX
 MATI[1] =%_iter_%_AM_WK_AB.ttt
 MATI[2] =%_iter_%_AM_DR_AB.ttt

 MATI[3] =%_iter_%_AM_WK_BM.ttt
 MATI[4] =%_iter_%_AM_DR_BM.ttt

 MATI[5] =%_iter_%_AM_WK_CR.ttt
 MATI[6] =%_iter_%_AM_DR_CR.ttt

 MATI[7] =%_iter_%_AM_WK_MR.ttt
 MATI[8] =%_iter_%_AM_DR_MR.ttt

 ZDATI[1] = INPUTS\ZONE.ASC, Z=1-4, EMP=40-47

 _ACCESS = 0

MW[1] = Mi.1.1  MW[2] = Mi.2.1  MW[3] = Mi.3.1  MW[4] = Mi.4.1
MW[5] = Mi.5.1  MW[6] = Mi.6.1  MW[7] = Mi.7.1  MW[8] = Mi.8.1

JLOOP

IF (MW[1] =0) MW[1] =1000000
IF (MW[2] =0) MW[2] =1000000
IF (MW[3] =0) MW[3] =1000000
IF (MW[4] =0) MW[4] =1000000
IF (MW[5] =0) MW[5] =1000000
IF (MW[6] =0) MW[6] =1000000
IF (MW[7] =0) MW[7] =1000000
IF (MW[8] =0) MW[8] =1000000

MW[100]= MIN(mw[1],mw[2],mw[3],mw[4],mw[5],mw[6],mw[7],mw[8])

IF (I=1)
```

```
print form= 8,list=I(5), J(5),
            ' AMWKAB ',MI.1.1,
            ' AMDRAB ',MI.2.1,
            ' AMWKBM ',MI.3.1,
            ' AMDRBM ',MI.4.1,
            ' AMWKCR ',MI.5.1,
            ' AMDRCR ',MI.6.1,
            ' AMWKMR ',MI.7.1,
            ' AMDRMR ',MI.8.1,
            ' MINTIME',MW[98],
            ' MINNONZTM',MW[100],
FILE=MES.DAT
ENDIF


IF (MW[100] =1000000)
    NotConnected = NotConnected + 1
   ELSEIF (MW[1] = MW[100])
    AM_WK_AB    = AM_WK_AB + 1
    Connected   = Connected + 1
   ELSEIF (MW[2] = MW[100])
    AM_DR_AB    = AM_DR_AB + 1
    Connected   = Connected + 1
   ELSEIF (MW[3] = MW[100])
    AM_WK_BM    = AM_WK_BM + 1
    Connected   = Connected + 1
   ELSEIF (MW[4] = MW[100])
    AM_DR_BM    = AM_DR_BM + 1
    Connected   = Connected + 1
   ELSEIF (MW[5] = MW[100])
    AM_WK_CR    = AM_WK_CR + 1
    Connected   = Connected + 1
   ELSEIF (MW[6] = MW[100])
    AM_DR_CR    = AM_DR_CR + 1
    Connected   = Connected + 1
   ELSEIF (MW[7] = MW[100])
    AM_WK_MR    = AM_WK_MR + 1
    Connected   = Connected + 1
   ELSEIF (MW[8] = MW[100])
    AM_DR_MR    = AM_DR_MR + 1
    Connected   = Connected + 1
ENDIF


IF (MW[100] < 1000000 )
 _ACCESS = _ACCESS + MW[100]
ENDIF

 ENDJLOOP

 IF (_ACCESS > 0 )
  MW[100][I] = 1
 ENDIF

 _EMP30  = 0
 _EMP40  = 0
 _EMP50  = 0
 _EMP60  = 0
 _EMPTOT = 0

JLOOP
  IF (MW[100] = 1-30)
   _EMP30 = _EMP30  + ZI.1.EMP[J]
  ENDIF
  IF (MW[100] = 1-40)
   _EMP40 = _EMP40  + ZI.1.EMP[J]
  ENDIF
  IF (MW[100] = 1-50)
```

```
   _EMP50 = _EMP50  + ZI.1.EMP[J]
  ENDIF
  IF (MW[100] = 1-60)
   _EMP60 = _EMP60  + ZI.1.EMP[J]
  ENDIF
  _EMPTOT = _EMPTOT + ZI.1.EMP[J]

ENDJLOOP

;; Print Accessibility to jobs file
PRINT FILE=%_Iter_%_JOBACC.ASC FORM=10, LIST=I(5), '               ', _EMP30,
_EMP40, _EMP50, _EMP60, _EMPTOT

;; Print out text file containing best path stats
IF (I= @ZONESIZE@)
 PRINT FILE=%_Iter_%_JOBACC.txt, FORM=12csv, LIST= 'Accessibility Report: '
 PRINT FILE=%_Iter_%_JOBACC.txt, FORM=12csv, LIST= '# AM Connected IJs:
', Connected
 PRINT FILE=%_Iter_%_JOBACC.txt, FORM=12csv, LIST= '# AM Disconnected IJs:
', NotConnected

 PRINT FILE=%_Iter_%_JOBACC.txt, FORM=12csv, LIST= '#  Best AM Connected IJs that
are  AM_Walk_All_Bus:   ', AM_WK_AB
 PRINT FILE=%_Iter_%_JOBACC.txt, FORM=12csv, LIST= '#  Best AM Connected IJs that
are  AM_Driv_All_Bus:   ', AM_DR_AB
 PRINT FILE=%_Iter_%_JOBACC.txt, FORM=12csv, LIST= '#  Best AM Connected IJs that
are  AM_Walk_BusMetro   ', AM_WK_BM
 PRINT FILE=%_Iter_%_JOBACC.txt, FORM=12csv, LIST= '#  Best AM Connected IJs that
are  AM_Driv_BusMetro   ', AM_DR_BM
 PRINT FILE=%_Iter_%_JOBACC.txt, FORM=12csv, LIST= '#  Best AM Connected IJs that
are  AM_Walk_CommRail   ', AM_WK_CR
 PRINT FILE=%_Iter_%_JOBACC.txt, FORM=12csv, LIST= '#  Best AM Connected IJs that
are  AM_Driv_Commrail   ', AM_DR_CR
 PRINT FILE=%_Iter_%_JOBACC.txt, FORM=12csv, LIST= '#  Best AM Connected IJs that
are  AM_Walk_MetroOnly  ', AM_WK_MR
 PRINT FILE=%_Iter_%_JOBACC.txt, FORM=12csv, LIST= '#  Best AM Connected IJs that
are  AM_Driv_MetroOnly  ', AM_DR_MR
ENDIF


ENDRUN

;
ZONESIZE    =  2191                  ;  No. of TAZs
LastIZn     =  2144                  ;  Last Internal TAZ no.

JURSIZE     =  24                    ;  Transformed JURIS. Code  ( 0-23 becomes 1-
24)
Areasize    =   7                    ;  No. of Area Types
SzCl        =   4                    ;  No. of HH Size   Classes
InCl        =   4                    ;  No. of Income    Classes
VaCl        =   4                    ;  No. of Veh Avail Classes

SICells     =   SzCl*10    + InCl    ;  No. of Size by Inc matrix cells
SIVCells    =   SICells*10 + VaCl    ;  No. of Size by Inc. by Veh Avail. matrix
cells
VSCells     =   VaCl*10    + SzCl    ;  No. of VA   by Size matrix cells
VICells     =   VaCl*10    + InCl    ;  No. of VA   by Inc. matrix cells

JSCells     =   JURSIZE*10 + SzCl    ;  No. of Juris by Size matrix cells
JICells     =   JURSIZE*10 + InCl    ;  No. of Juris by Inc. matrix cells
JVCells     =   JURSIZE*10 + VaCl    ;  No. of Juris by Va. matrix cells

ASCells     =   Areasize  *10 + SzCl ;  No. of Area Types  by Size matrix cells
AICells     =   Areasize  *10 + InCl ;  No. of Area Types  by Inc. matrix cells
AVCells     =   Areasize  *10 + VaCl ;  No. of Area Types  by Va. matrix cells

ZNFILE_IN1  = 'INPUTS\ZONE.ASC'      ;  Input  Zonal Land Use File

ZNFILE_IN2  = 'BASEZON.DAT'          ;  Input  Zonal Area Type File from network
building

Rept        = 'Demo_Models.txt'      ;  Summary Reports

ZNFILE_IN3  = '%_Iter_%_JOBACC.ASC'  ;  Input  Zonal Transit Accessibility to Jobs

ZNFILE_OU1  = 'HHI1_SV.ASC'          ;  Output Zonal Income 1 HH by Size& VehAv
Classes: i1s1v1,i1s1v2,...,i1s4v4
ZNFILE_OU2  = 'HHI2_SV.ASC'          ;  Output Zonal Income 2 HH by Size& VehAv
Classes: i2s1v1,i2s1v2,...,i2s4v4
ZNFILE_OU3  = 'HHI3_SV.ASC'          ;  Output Zonal Income 3 HH by Size& VehAv
Classes: i3s1v1,i3s1v2,...,i3s4v4
ZNFILE_OU4  = 'HHI4_SV.ASC'          ;  Output Zonal Income 4 HH by Size& VehAv
Classes: i4s1v1,i4s1v2,...,i4s4v4

ZNFILE_OU5  = 'HH_Veh.Dat'           ;  Output zonal file for Mode Choice: HHs by
Veh. Av. groups (HHw/0, HHw/1, HHw/2+ Vehs)

Ofmt        = '(12.2)'               ;  Format of Output file data  Note:
Integer/real Spec. Here!


RUN PGM=MATRIX
ZONES=@ZONESIZE@


;
; Set up zone arrays for accumulating I/O variables
;
;


ARRAY ISZA     = @SzCl@,           ;  Initial  Marginal HH Totals by size levels
      IINA     = @InCl@,           ;  Initial  Marginal HH Totals by income levels
      CSZA     = @SzCl@,           ;  Computed Marginal HH Totals by size levels
      CINA     = @InCl@,           ;  Computed Marginal HH Totals by income levels
      CSZAdjA  = @Incl@,           ;  Marginal HH  adjustment ftr by Income class
      CINAdjA  = @SzCl@,           ;  Marginal Inc adjustment ftr by HH size class
      CSZINA   = @SICells@,        ;  HH Size by Income level Matrix,
11,12,13,...,44
      P_VA     = @VaCl@,           ;  Veh Avail  probabilities
      CVAA     = @VaCl@,           ;  Veh Avail  Totals
      CSZINVAA = @SIVCells@,       ;  Veh Avail by HH Size by Inc Matrix,
111,112,113,...,444

      JurA    = @Jursize@,         ;  Juris. HH Totals  array
      JurSzA  = @JSCells@,         ;  Juris. HH by size array
      JurInA  = @JICells@,         ;  Juris. HH by Inc  array
      JurVaA  = @JVCells@,         ;  Juris. HH by VeAv array

      RegSzA  = @SzCl@,            ;  Regional HH by Size array
      RegInA  = @InCl@,            ;  Regional HH by Inc  array
      RegVaA  = @VaCl@,            ;  Regional HH by VeAv array

      RegSzInA   = @SIcells@,      ;  Regional Size by Inc  array
      RegSzInVaA = @SIVcells@,     ;  Regional Size by Inc  by vehav array

      RegVaSzA   = @VScells@,      ;  Regional V    by S    matrix
      RegVaInA   = @VScells@,      ;  Regional V1   by S2   matrix


      HH_ArS1A = @AreaSize@, HH_ArS2A= @AreaSize@, HH_ArS3A= @AreaSize@,
HH_ArS4A=@AreaSize@, HH_ArSTA=@AreaSize@,
      HH_ArI1A = @AreaSize@, HH_ArI2A= @AreaSize@, HH_ArI3A= @AreaSize@,
HH_ArI4A=@AreaSize@, HH_ArITA=@AreaSize@,
      HH_ArV1A = @AreaSize@, HH_ArV2A= @AreaSize@, HH_ArV3A= @AreaSize@,
HH_ArV4A=@AreaSize@, HH_ArVTA=@AreaSize@,
```

```
     HH_ArCoopT =  @AreaSize@

;========================
; Define Loop-up Tables  =
;========================
;
;=============================================================
; HH Size Distribution from 2000 CTPP                         =
;=============================================================
;
     LOOKUP Name=SZPCTA,
            LOOKUP[1]   = 1,Result = 2,
            LOOKUP[2]   = 1,Result = 3,
            LOOKUP[3]   = 1,Result = 4,
            LOOKUP[4]   = 1,Result = 5,
            Interpolate = N, FAIL=0,0,0,
 ;     Avg HHSize   PctHH1psn PctHH2psn PctHH3Psn PctHH4+Psn

   R="   1.0,          100.0,     0.0,     0.0,     0.0",
     "   1.1,           86.7,    10.5,     1.0,     1.8",
     "   1.2,           78.2,    15.8,     4.1,     1.9",
     "   1.3,           72.7,    20.4,     4.9,     2.0",
     "   1.4,           67.1,    24.7,     5.8,     2.4",
     "   1.5,           63.0,    27.1,     6.7,     3.2",
     "   1.6,           59.0,    28.9,     7.9,     4.2",
     "   1.7,           55.2,    30.2,     8.7,     5.9",
     "   1.8,           50.9,    31.1,    10.1,     7.9",
     "   1.9,           46.7,    31.7,    11.5,    10.1",
     "   2.0,           42.8,    32.1,    12.7,    12.4",
     "   2.1,           39.0,    32.3,    14.0,    14.7",
     "   2.2,           35.5,    32.4,    15.0,    17.1",
     "   2.3,           32.2,    32.4,    16.0,    19.4",
     "   2.4,           29.1,    32.3,    16.9,    21.7",
     "   2.5,           26.3,    32.1,    17.6,    24.0",
     "   2.6,           23.8,    31.9,    18.2,    26.1",
     "   2.7,           21.5,    31.5,    18.7,    28.3",
     "   2.8,           19.4,    31.1,    19.2,    30.3",
     "   2.9,           17.4,    30.5,    19.8,    32.3",
     "   3.0,           15.6,    29.8,    20.3,    34.3",
     "   3.1,           14.0,    28.9,    20.7,    36.4",
     "   3.2,           12.6,    27.9,    20.8,    38.7",
     "   3.3,           11.3,    26.6,    20.9,    41.2",
     "   3.4,           10.2,    25.0,    20.8,    44.0",
     "   3.5,           09.2,    23.2,    20.4,    47.2",
     "   3.6,           08.3,    21.2,    19.6,    50.9",
     "   3.7,           07.5,    18.9,    18.4,    55.2",
     "   3.8,           06.7,    15.6,    17.4,    60.3",
     "   3.9,           05.9,    11.2,    16.5,    66.4"


;=============================================================
;    income level distribution from 2000 CTPP                 =
;=============================================================
;
     LOOKUP Name=INPCTA,
            LOOKUP[1]   = 1,Result = 2,
            LOOKUP[2]   = 1,Result = 3,
            LOOKUP[3]   = 1,Result = 4,                   ;
            LOOKUP[4]   = 1,Result = 5,                   ;  proportion of
            Interpolate = N, FAIL=0,0,0,                  ;  zonal median inc.
; inc level:   QRT1      QRT2     QRT3     QRT4           ; to regional median
income
  R="   0,    100.0,     0.0,      0.0,     0.0",     ; 0.0  inc ratio
    "   1,     87.9,     7.2,      3.9,     1.0",     ; 0.1  inc ratio
    "   2,     79.4,    12.9,      5.2,     2.5",     ; 0.2  inc ratio
    "   3,     72.1,    17.7,      7.0,     3.2",     ; 0.3  inc ratio
    "   4,     63.3,    21.9,     10.5,     4.3",     ; 0.4  inc ratio
    "   5,     54.1,    25.3,     14.9,     5.7",     ; 0.5  inc ratio
    "   6,     45.2,    27.5,     19.5,     7.8",     ; 0.6  inc ratio
    "   7,     37.2,    28.7,     23.8,    10.3",     ; 0.7  inc ratio
    "   8,     30.2,    28.7,     27.4,    13.7",     ; 0.8  inc ratio
    "   9,     24.4,    27.7,     30.2,    17.7",     ; 0.9  inc ratio
    "  10,     19.9,    26.0,     32.1,    22.0",     ; 1.0  inc ratio
    "  11,     16.4,    23.8,     33.1,    26.7",     ; 1.1  inc ratio
    "  12,     13.8,    21.2,     33.2,    31.8",     ; 1.2  inc ratio
    "  13,     12.0,    18.6,     32.6,    36.8",     ; 1.3  inc ratio
    "  14,     10.7,    16.1,     31.3,    41.9",     ; 1.4  inc ratio
    "  15,      9.8,    13.8,     29.7,    46.7",     ; 1.5  inc ratio
    "  16,      9.1,    11.9,     27.7,    51.3",     ; 1.6  inc ratio
    "  17,      8.4,    10.4,     25.6,    55.6",     ; 1.7  inc ratio
    "  18,      7.7,     9.4,     23.5,    59.4",     ; 1.8  inc ratio
    "  19,      7.0,     8.7,     21.5,    62.8",     ; 1.9  inc ratio
    "  20,      6.4,     8.4,     19.7,    65.5",     ; 2.0  inc ratio
    "  21,      5.7,     8.2,     18.2,    67.9",     ; 2.1  inc ratio
    "  22,      5.2,     8.1,     16.8,    69.9",     ; 2.2  inc ratio
    "  23,      5.0,     8.0,     15.7,    71.3",     ; 2.3  inc ratio
    "  24,      4.7,     7.8,     15.1,    72.4",     ; 2.4  inc ratio
    "  25,      4.6,     7.6,     14.5,    73.3",     ; 2.5  inc ratio
    "  26,      4.5,     7.0,     14.3,    74.2",     ; 2.6  inc ratio
    "  27,      4.3,     6.8,     14.0,    74.9",     ; 2.7  inc ratio
    "  28,      4.3,     6.6,     13.3,    75.8",     ; 2.8  inc ratio
    "  29,      4.0,     6.0,     13.3,    76.7",     ; 2.9  inc ratio
    "  30,      3.6,     5.4,     13.4,    77.6",     ; 3.0  inc ratio
    "  31,      3.1,     4.9,     13.5,    78.5",     ; 3.1  inc ratio
    "  32,      3.1,     4.6,     12.9,    79.4",     ; 3.2  inc ratio
    "  33,      2.9,     4.3,     12.5,    80.3",     ; 3.3  inc ratio
    "  34,      2.7,     3.9,     12.2,    81.2",     ; 3.4  inc ratio
    "  35,      2.5,     3.5,     11.9,    82.1",     ; 3.5  inc ratio
    "  36,      2.2,     3.1,     11.7,    83.0",     ; 3.6  inc ratio
    "  37,      2.0,     2.7,     11.4,    83.9"      ; 3.7  inc ratio

;=============================================================
; Initial Joint HH Size x Income Distribution from 2000 CTPP  =
;=============================================================

      LOOKUP Name=I_SPCTA, LOOKUP[1] = 1,Result = 2,
             Interpolate = N, FAIL=0,0,0,
;            Size_Inc Initial
;             Class   Pct
;             -----   ----
          R="  11,    45.51 ",  ;  Pct of Size 1 HHs in Inc 1 Group
            "  12,    29.18 ",  ;             1            2
            "  13,    18.47 ",  ;             1            3
            "  14,     6.84 ",  ;             .            .
            "  21,    18.77 ",  ;             .            .
            "  22,    22.26 ",  ;        .    .            .
            "  23,    29.81 ",  ;
            "  24,    29.16 ",  ;
            "  31,    16.61 ",  ;     .
            "  32,    20.66 ",  ;
            "  33,    31.27 ",  ;
            "  34,    31.46 ",  ;
            "  41,    13.32 ",  ;     .
            "  42,    19.65 ",  ;             4            2
            "  43,    32.53 ",  ;             4            3
            "  44,    34.50 "   ;             4            4


;=============================================================
; Final Size and Income factors based on area type            =
; Factors are Unused (set to 1.0) but available if needed     =
;=============================================================

      LOOKUP Name=AreaSizFtr,
       LOOKUP[1] = 1,Result = 2,
       LOOKUP[2] = 1,Result = 3,
```

```
       LOOKUP[3] = 1,Result = 4,
       LOOKUP[4] = 1,Result = 5,
             Interpolate = N, FAIL=0,0,0,
;             Area    Size1  Size2  Size3  Size4
;             Type    Factor Factor Factor Factor
;             -----   -----  -----  -----  -----
          R="  1,     1.00    1.00   1.00   1.00   ",
            "  2,     1.00    1.00   1.00   1.00   ",
            "  3,     1.00    1.00   1.00   1.00   ",
            "  4,     1.00    1.00   1.00   1.00   ",
            "  5,     1.00    1.00   1.00   1.00   ",
            "  6,     1.00    1.00   1.00   1.00   ",
            "  7,     1.00    1.00   1.00   1.00   "

      LOOKUP Name=AreaIncFtr,
       LOOKUP[1] = 1,Result = 2,
       LOOKUP[2] = 1,Result = 3,
       LOOKUP[3] = 1,Result = 4,
       LOOKUP[4] = 1,Result = 5,
             Interpolate = N, FAIL=0,0,0,
;             Area    Inc1   Inc2   Inc3   Inc4
;             Type    Factor Factor Factor Factor
;             -----  -----  -----  -----  -----
          R="  1,     1.00   1.00   1.00   1.00    ",
            "  2,     1.00   1.00   1.00   1.00    ",
            "  3,     1.00   1.00   1.00   1.00    ",
            "  4,     1.00   1.00   1.00   1.00    ",
            "  5,     1.00   1.00   1.00   1.00    ",
            "  6,     1.00   1.00   1.00   1.00    ",
            "  7,     1.00   1.00   1.00   1.00    "


;==================================================================================
==
;   Coefficients for the Veh Avail Model - provided as variables instead of lookups
=
;==================================================================================
==
; Original V2.1D#50 Alt-Specific Constants:
;v1_constant= 0.0  v2_constant= 1.598800000   v3_constant= -1.460800000
v4_constant= -4.302100000
; V2.2 /adjusted Coefficients to match 2000 CTPP values
;v1_constant= 0.0  v2_constant= 1.013800000   v3_constant= -2.338100000
v4_constant= -5.171000000

; Final/adjusted Alt-Specific Constants (to match 2002 V2.2 simulation distribution
RM/MS 4/21/2008)
 v1_constant= 0.0  v2_constant= 0.940200000   v3_constant= -2.455500000
v4_constant= -5.298900000
 v1_idum1   = 0.0  v2_idum1   =  .000000000   v3_idum1   =   .000000000   v4_idum1
=   .000000000
 v1_idum2   = 0.0  v2_idum2   = 1.237600000   v3_idum2   =  1.789200000   v4_idum2
=  1.822100000
 v1_idum3   = 0.0  v2_idum3   = 1.328500000   v3_idum3   =  2.483100000   v4_idum3
=  2.739500000
 v1_idum4   = 0.0  v2_idum4   = 1.999100000   v3_idum4   =  3.737200000   v4_idum4
=  4.198700000
 v1_hh      = 0.0  v2_hh      =  .000000000   v3_hh      =   .870000000   v4_hh
=  1.302600000
 v1_TrnAcc  = 0.0  v2_TrnAcc  = -.000001095   v3_TrnAcc  =  -.000001815   v4_TrnAcc
=  -.000002053
 v1_Atype   = 0.0  v2_Atype   =  .066800000   v3_Atype   =   .278300000   v4_Atype
=   .409300000
 v1_DcDum   = 0.0  v2_DcDum   = -.924600000   v3_DcDum   = -1.075100000   v4_DcDum
= -1.633400000
```

```
;==================================================================================
==================
;
=
; End of LookUps  Now read the input files
=
;==================================================================================
==================


;
; read Zonal land use files  into Z-File
;

ZDATI[1] = @ZNFILE_IN1@,Z       =  1- 4,
                        HH      =  8-15,
                        HHPOP   = 16-23,
                        JURCODE = 80-81,
                        INCRAT  = 93-95

; Zonal Area Type File
ZDATI[2] = @ZNFILE_IN2@,Z       =  1- 5,
                        ATYPE   = 58-59
                        Atype   = zi.2.ATYPE[I]



; Zonal Transit Acces. File
ZDATI[3] = @ZNFILE_IN3@,Z         =  1- 5,
                        TrnAcc    = 32-40



;
; establish variables
;
                       HH      =  zi.1.HH[I]
                       HHPOP   =  zi.1.HHPOP[I]
                       IncRat  =  zi.1.INCRAT[I]
                       Atype   =  zi.2.ATYPE[I]
                       TrnAcc  =  zi.3.TrnAcc[I]

                       IF( HH>HHPOP)
                           HH=HHPOP
                       ENDIF

                       HH_IP_Total = HH_IP_Total + HH  ; Input HH Total (to check
O/P Total)

; Compute HH Size rounded to nearest 1/10th (K.Vaughn fix)
                       If (HH == 0)
                              AvHHSz = 1.0
                          Else
                              AvHHsz10ths = Round(HHPOP/HH * 10.0)
; compute Avg HH Size in tenths
                              AvHHsztrue  = AvHHsz10ths/10.0
; compute Avg HH Size actual
                              AvHHSz      = MIN(AvHHsztrue,3.9)
;
                       Endif


; Compute Juris. index 1-24 / compute DC dummy code for VA model

                       Jdx = zi.1.JURCODE + 1

                       IF (zi.1.JURCODE  = 0)
                            DCDUM = 1
                          ELSE
```

```
                             DCDUM = 0
                        ENDIF

; Accumulate jurisdiction level & total land use values
;

;----------------------------------------------------------------------
;Begin Matrix Work Now ...
;----------------------------------------------------------------------


; Clear all initial/computed arrays, establish initial marginal controls

Loop sz = 1, @SzCl@
     Loop in = 1, @InCl@
          IDX = sz * 10.0 + in ; 2-digit index, 1st=HHsize& 2nd=Inc.level
          CSZINA[IDX] = 0      ; initial matrix cell value
     EndLoop
EndLoop

Loop IDX=1,@SzCl@
         ISZA[IDX] = 0
         CSZA[IDX] = 0
         ISZA[IDX] = HH * (SZPCTA(IDX,AvHHSz)/100.0)
EndLOOP

Loop IDX=1,@InCl@
         IInA[IDX] = 0
         CInA[IDX] = 0
         IInA[IDX] = HH * (INPCTA(IDX,IncRat)/100.0)
EndLOOP

;** Debug 1 On **
;* if (I==1)
;*     Print List = I(5),HHPOP(10),HH(10.0),Incrat(10.2),
AvHHSz(10.2),file=debug.txt
;*  loop idx = 1,4
;*      spct =SZPCTA(IDX,AvHHSz)
;*      ipct =INPCTA(IDX,IncRat)
;*      Print List = HH(10),
AvHHSz(10.2),Incrat(10.2),SPCT,IPCT,ISZA[IDX],IINA[IDX], file=debug.txt
;*  endloop
;* endif
;** Debug 1 Off**


;
; Setup Initial HH Size by Income Matrix with PUMS seed Pcts
;   and accumulate Size, Income marginals

Loop sz = 1, @SzCl@
     Loop in = 1, @InCl@
          IDX = sz * 10.0 + in ; 2-digit index, 1st=HHsize& 2nd=Inc.level
          CSZINA[IDX] = ISZA[sz] * (I_SPCTA(1,IDX)/100.00)  ; initial matrix cell
value
          CSZA[SZ]    = CSZA[sz] + CSZINA[IDX]    ; initial/'control' marginal size
total
          CINA[in]    = CINA[in] + CSZINA[IDX]    ; initial/'control' marginal Inc
total

;** Debug 2 On **
;* if (I==1)
;*      IF (sz <= 4 &&  in<=4)
;*         print list =' init matrix: inc: ', in(3),' hhs: ', sz(3),
cszina[idx](7.3) , file=debug.txt
;*      Endif
;* endif
;*
;*
;** Debug 2 Off**
     EndLoop
EndLoop


; Initial matrix now established, now
; begin fratar process
;
;

LOOP FRAT= 1,3
  OddEve   = FRAT%2  ; Modulo function to check Odd/Even
iteration:0=even/nonzero=odd
  IF (OddEve != 0) ; if an odd iteration then adjust cols ...
;
       Loop in=1,@InCl@
            IF  (CINA[in] == 0 )
                     CINADJA[in] = 0
               ELSE
                     CINADJA[in] = IINA[in] / CINA[in]
            ENDIF
       EndLoop


       Loop IDX=1,@SzCl@
                CSZA[IDX] = 0
       EndLOOP

       Loop IDX=1,@InCl@
                CINA[IDX] = 0
       EndLOOP

       Loop sz= 1,@SzCl@
         Loop in= 1,@InCl@
                 IDX = sz * 10.0 + in
                 CSZINA[IDX] = CSZINA[IDX] * CINADJA[in]
                 CSZA[sz]    = CSZA[sz]    + CSZINA[IDX]    ; computed/current
marginal size total
                 CINA[in]    = CINA[in]    + CSZINA[IDX]    ; computed/current
marginal Inc  total
         EndLoop
       EndLoop
       ;
    ELSE
       ; begin computing of row (size) adjustments
       ; and apply adjustments to the matrix...
       ;

       Loop sz=1,@SzCl@
            IF  (CSZA[sz] == 0 )
                     CSZADJA[sz] = 0
               ELSE
                     CSZADJA[sz] = ISZA[sz] / CSZA[sz]
            ENDIF
       EndLoop

       Loop IDX=1,@SzCl@
                CSZA[IDX] = 0
       EndLOOP

       Loop IDX=1,@InCl@
                CINA[IDX] = 0
       EndLOOP

       Loop sz= 1,@SzCl@
         Loop in= 1,@InCl@
                 IDX = sz * 10.0 + in
```

```
                CSZINA[IDX] = CSZINA[IDX] * CSZADJA[sz]
                CSZA[sz]    = CSZA[sz]    + CSZINA[IDX]    ; computed/current
marginal size total
                CINA[in]    = CINA[in]    + CSZINA[IDX]    ; computed/current
marginal Inc  total
         EndLoop
       EndLoop
  ENDIF
ENDLOOP

;
===================================================================================
========
; Apply final Size/Income adjustments (if desired) and then
; accumulate final Jurisdictional/ Regional marginals and totals
;
===================================================================================
========

       Loop sz= 1,@SzCl@
         Loop in= 1,@InCl@
                si  = sz  * 10.0 + in
                js  = jdx * 10.0 + sz
                ji  = jdx * 10.0 + in

                temp        =  CSZINA[si] * AreaSizFtr(Sz,Atype) *
AreaIncFtr(In,Atype) ; Apply Final Size/Income Adjustment
                CSZINA[si]   =  temp                      ; and store back in
CSZINA array
                RegSzInA[si] =  RegSzInA[si]  +  CSZINA[si]
                JurSzA[js]   =  JurSzA[js]    +  CSZINA[si]
                JurInA[ji]   =  JurInA[ji]    +  CSZINA[si]
                RegSzA[sz]   =  RegSzA[sz]    +  CSZINA[si]
                RegInA[in]   =  RegInA[in]    +  CSZINA[si]
                JurA[Jdx]    =  JurA[Jdx]     +  CSZINA[si]
                SITotal      =  SITotal       +  CSZINA[si]
         EndLoop
       EndLoop

;
===================================================================================
========
; Summarize/Print HHs by size groups and HHs by Income groups for zonal checking
;
;
===================================================================================
========
        HH_Sz1   =  CSZINA[11] + CSZINA[12] + CSZINA[13] + CSZINA[14]
        HH_Sz2   =  CSZINA[21] + CSZINA[22] + CSZINA[23] + CSZINA[24]
        HH_Sz3   =  CSZINA[31] + CSZINA[32] + CSZINA[33] + CSZINA[34]
        HH_Sz4   =  CSZINA[41] + CSZINA[42] + CSZINA[43] + CSZINA[44]
;
        HH_In1   =  CSZINA[11] + CSZINA[21] + CSZINA[31] + CSZINA[41]
        HH_In2   =  CSZINA[12] + CSZINA[22] + CSZINA[32] + CSZINA[42]
        HH_In3   =  CSZINA[13] + CSZINA[23] + CSZINA[33] + CSZINA[43]
        HH_In4   =  CSZINA[14] + CSZINA[24] + CSZINA[34] + CSZINA[44]
;
;
    Print List=
I(4),HH_Sz1@ofmt@,HH_Sz2@ofmt@,HH_Sz3@ofmt@,HH_Sz4@ofmt@,file=Est_Zonal_HH_Size.TXT
    Print List=
I(4),HH_In1@ofmt@,HH_In2@ofmt@,HH_In3@ofmt@,HH_In4@ofmt@,file=Est_Zonal_HH_Inc.TXT

;==================================================================================
==========
; All Done with Size and Income computations - Now apply Veh. Availability Model
; Loop through size and income cell and further disggregate among veh.av. groups
```

```
;==================================================================================
========

  Loop sz=1,@SzCl@
    Loop in=1,@InCl@

                  SI=  Sz * 10.0 + In               ;Size/Income index 11...44

                  P_VA[1] = 0
                  P_VA[2] = 0
                  P_VA[3] = 0
                  P_VA[4] = 0
                  IncDum1 = 0
                  IncDum2 = 0
                  IncDum3 = 0
                  IncDum4 = 0
                  If (in == 1)  IncDum1 = 1
                  If (in == 2)  IncDum2 = 1
                  If (in == 3)  IncDum3 = 1
                  If (in == 4)  IncDum4 = 1

                   u_1  = v1_constant                      +
                          v1_idum1     * IncDum1           +
                          v1_idum2     * IncDum2           +
                          v1_idum3     * IncDum3           +
                          v1_idum4     * IncDum4           +
                          v1_hh        * SZ                +
                          v1_TrnAcc    * TrnAcc            +
                          v1_Atype     * AType             +
                          v1_DcDum     * DCDUM

                   u_2  = v2_constant                      +
                          v2_idum1     * IncDum1           +
                          v2_idum2     * IncDum2           +
                          v2_idum3     * IncDum3           +
                          v2_idum4     * IncDum4           +
                          v2_hh        * SZ                +
                          v2_TrnAcc    * TrnAcc            +
                          v2_Atype     * AType             +
                          v2_DcDum     * DCDUM

                   u_3  = v3_constant                      +
                          v3_idum1     * IncDum1           +
                          v3_idum2     * IncDum2           +
                          v3_idum3     * IncDum3           +
                          v3_idum4     * IncDum4           +
                          v3_hh        * SZ                +
                          v3_TrnAcc    * TrnAcc            +
                          v3_Atype     * AType             +
                          v3_DcDum     * DCDUM

                   u_4  = v4_constant                      +
                          v4_idum1     * IncDum1           +
                          v4_idum2     * IncDum2           +
                          v4_idum3     * IncDum3           +
                          v4_idum4     * IncDum4           +
                          v4_hh        * SZ                +
                          v4_TrnAcc    * TrnAcc            +
                          v4_Atype     * AType             +
                          v4_DcDum     * DCDUM


                    P_VA[1] =  exp(u_1) / (exp(u_1) + exp(u_2) + exp(u_3) +
exp(u_4))
                    P_VA[2] =  exp(u_2) / (exp(u_1) + exp(u_2) + exp(u_3) +
exp(u_4))
                    P_VA[3] =  exp(u_3) / (exp(u_1) + exp(u_2) + exp(u_3) +
exp(u_4))
```

```
                    P_VA[4] =  exp(u_4) / (exp(u_1) + exp(u_2) + exp(u_3) +
exp(u_4))


                    SIV = SI*10.0                       + 1  ;  Create 3D index
SIV(Siz,Inc,Vav)
                    CSZINVAA[SIV]  =   CSZINA[SI]  *  P_VA[1] ;
from 111 to 444

                    SIV = SI*10.0                       + 2  ;
                    CSZINVAA[SIV]  =   CSZINA[SI]  *  P_VA[2] ;

                    SIV = SI*10.0                       + 3  ;
                    CSZINVAA[SIV]  =   CSZINA[SI]  *  P_VA[3] ;

                    SIV = SI*10.0                       + 4  ;
                    CSZINVAA[SIV]  =   CSZINA[SI]  *  P_VA[4] ;

         EndLoop
       EndLoop

      ; accumulate HHs in Vehicle Available groups (0,1,2+) for current TAZ
      ; also accumulate regional totals for checking

                    HHw0Vehs =  CSZINVAA[111] +  CSZINVAA[121] +  CSZINVAA[131] +
CSZINVAA[141] +
                                CSZINVAA[211] +  CSZINVAA[221] +  CSZINVAA[231] +
CSZINVAA[241] +
                                CSZINVAA[311] +  CSZINVAA[321] +  CSZINVAA[331] +
CSZINVAA[341] +
                                CSZINVAA[411] +  CSZINVAA[421] +  CSZINVAA[431] +
CSZINVAA[441]


                    HHw1Vehs =  CSZINVAA[112] +  CSZINVAA[122] +  CSZINVAA[132] +
CSZINVAA[142] +
                                CSZINVAA[212] +  CSZINVAA[222] +  CSZINVAA[232] +
CSZINVAA[242] +
                                CSZINVAA[312] +  CSZINVAA[322] +  CSZINVAA[332] +
CSZINVAA[342] +
                                CSZINVAA[412] +  CSZINVAA[422] +  CSZINVAA[432] +
CSZINVAA[442]


                    HHw2Vehs =  CSZINVAA[113] +  CSZINVAA[123] +  CSZINVAA[133] +
CSZINVAA[143] +
                                CSZINVAA[213] +  CSZINVAA[223] +  CSZINVAA[233] +
CSZINVAA[243] +
                                CSZINVAA[313] +  CSZINVAA[323] +  CSZINVAA[333] +
CSZINVAA[343] +
                                CSZINVAA[413] +  CSZINVAA[423] +  CSZINVAA[433] +
CSZINVAA[443]


                    HHw3Vehs =  CSZINVAA[114] +  CSZINVAA[124] +  CSZINVAA[134] +
CSZINVAA[144] +
                                CSZINVAA[214] +  CSZINVAA[224] +  CSZINVAA[234] +
CSZINVAA[244] +
                                CSZINVAA[314] +  CSZINVAA[324] +  CSZINVAA[334] +
CSZINVAA[344] +
                                CSZINVAA[414] +  CSZINVAA[424] +  CSZINVAA[434] +
CSZINVAA[444]

                    HHw2PVehs = HHw2Vehs + HHw3Vehs


                   Tot_HHw0Vehs =  Tot_HHw0Vehs +  HHw0Vehs
                    Tot_HHw1Vehs =  Tot_HHw1Vehs +  HHw1Vehs
                    Tot_HHw2Vehs =  Tot_HHw2Vehs +  HHw2Vehs
                    Tot_HHw3Vehs =  Tot_HHw3Vehs +  HHw3Vehs

                    Tot_HHw2PVehs =  Tot_HHw2PVehs +  HHw2PVehs

;==================================================================================
========
;  --Print out
;     zonal Household file for Mode Choice Model HHs by 0 , 1, 2+     Groups
;     and   Household file for Mode Choice Model HHs by 0 , 1, 2, 3+  Groups
;==================================================================================
========

    Print List=  I(5),
                 HHw0Vehs(6),HHw1Vehs(6),HHw2PVehs(6),file=@ZNFILE_OU5@

    Print List=  I(4), HHw0Vehs@ofmt@, HHw1Vehs@ofmt@, HHw2Vehs@ofmt@,
HHw3Vehs@ofmt@,file=Est_Zonal_HH_VehAv.TXT

;==================================================================================
========
; The Calculations are complete for the current zone
; and let's accumulate Veh Av. related Jurisdictional/ Regional marginals and totals
;==================================================================================
========


  Loop sz=1,@SzCl@
    Loop in=1,@InCl@
      Loop Va=1,@VaCl@
                    SIV = (SZ*10+IN)*10.0 + Va
                    VS  = Va*10 + sz
                    VI  = Va*10 + in
                    JV  = Jdx*10+ Va
                    RegSzInVaA[SIV] = RegSzInVaA[SIV] +  CSZINVAA[SIV]
                    JurVaA[JV]      = JurVaA[JV]      +  CSZINVAA[SIV]
                    RegVaA[VA]      = RegVaA[VA]      +  CSZINVAA[SIV]
                    RegVaSzA[vs]    = RegVaSzA[vs]    +  CSZINVAA[SIV]
                    RegVaInA[vi]    = RegVaInA[vi]    +  CSZINVAA[SIV]
                    SIVTotal        = SIVTotal        +  CSZINVAA[SIV]
       EndLoop
     EndLoop
   EndLoop




;==================================================================================
========
; Now We're at the end of the Iloop
;  --Print out input files to Trip Generation
;     4 income based files written in form TAZ, HH by size&VeAv s1v1,s1v2,...,s4v4
;==================================================================================
========

;Income 1 file with HHs by Size and VehAv:
    Print List=  I(4),
                 CSZINVAA[111]@ofmt@, CSZINVAA[112]@ofmt@, CSZINVAA[113]@ofmt@,
CSZINVAA[114]@ofmt@,
                 CSZINVAA[211]@ofmt@, CSZINVAA[212]@ofmt@, CSZINVAA[213]@ofmt@,
CSZINVAA[214]@ofmt@,
                 CSZINVAA[311]@ofmt@, CSZINVAA[312]@ofmt@, CSZINVAA[313]@ofmt@,
CSZINVAA[314]@ofmt@,
                 CSZINVAA[411]@ofmt@, CSZINVAA[412]@ofmt@, CSZINVAA[413]@ofmt@,
CSZINVAA[414]@ofmt@,file=@ZNFILE_OU1@

;Income 2 file with HHs by Size and VehAv:
```

```
    Print List=  I(4),
                 CSZINVAA[121]@ofmt@, CSZINVAA[122]@ofmt@, CSZINVAA[123]@ofmt@,
CSZINVAA[124]@ofmt@,
                 CSZINVAA[221]@ofmt@, CSZINVAA[222]@ofmt@, CSZINVAA[223]@ofmt@,
CSZINVAA[224]@ofmt@,
                 CSZINVAA[321]@ofmt@, CSZINVAA[322]@ofmt@, CSZINVAA[323]@ofmt@,
CSZINVAA[324]@ofmt@,
                 CSZINVAA[421]@ofmt@, CSZINVAA[422]@ofmt@, CSZINVAA[423]@ofmt@,
CSZINVAA[424]@ofmt@,file=@ZNFILE_OU2@

;Income 3 file with HHs by Size and VehAv:
    Print List=  I(4),
                 CSZINVAA[131]@ofmt@, CSZINVAA[132]@ofmt@, CSZINVAA[133]@ofmt@,
CSZINVAA[134]@ofmt@,
                 CSZINVAA[231]@ofmt@, CSZINVAA[232]@ofmt@, CSZINVAA[233]@ofmt@,
CSZINVAA[234]@ofmt@,
                 CSZINVAA[331]@ofmt@, CSZINVAA[332]@ofmt@, CSZINVAA[333]@ofmt@,
CSZINVAA[334]@ofmt@,
                 CSZINVAA[431]@ofmt@, CSZINVAA[432]@ofmt@, CSZINVAA[433]@ofmt@,
CSZINVAA[434]@ofmt@,file=@ZNFILE_OU3@

;Income 4 file with HHs by Size and VehAv:
    Print List=  I(4),
                 CSZINVAA[141]@ofmt@, CSZINVAA[142]@ofmt@, CSZINVAA[143]@ofmt@,
CSZINVAA[144]@ofmt@,
                 CSZINVAA[241]@ofmt@, CSZINVAA[242]@ofmt@, CSZINVAA[243]@ofmt@,
CSZINVAA[244]@ofmt@,
                 CSZINVAA[341]@ofmt@, CSZINVAA[342]@ofmt@, CSZINVAA[343]@ofmt@,
CSZINVAA[344]@ofmt@,
                 CSZINVAA[441]@ofmt@, CSZINVAA[442]@ofmt@, CSZINVAA[443]@ofmt@,
CSZINVAA[444]@ofmt@,file=@ZNFILE_OU4@


;==================================================================================
========
; Finally accumulate Size, Inc, Veh.Av variables by area type for reporting
;==================================================================================
========


If (ATYPE >=1 && Atype<=7 &&  I <= @LastIZN@)

   HH_ArS1A[ATYPE] = HH_ArS1A[ATYPE] + CSZINA[11] + CSZINA[12] + CSZINA[13] +
CSZINA[14]
   HH_ArS2A[ATYPE] = HH_ArS2A[ATYPE] + CSZINA[21] + CSZINA[22] + CSZINA[23] +
CSZINA[24]
   HH_ArS3A[ATYPE] = HH_ArS3A[ATYPE] + CSZINA[31] + CSZINA[32] + CSZINA[33] +
CSZINA[34]
   HH_ArS4A[ATYPE] = HH_ArS4A[ATYPE] + CSZINA[41] + CSZINA[42] + CSZINA[43] +
CSZINA[44]
   HH_ArSTA[ATYPE] = HH_ArSTA[ATYPE] + CSZINA[11] + CSZINA[12] + CSZINA[13] +
CSZINA[14] +
                                       CSZINA[21] + CSZINA[22] + CSZINA[23] +
CSZINA[24] +
                                       CSZINA[31] + CSZINA[32] + CSZINA[33] +
CSZINA[34] +
                                       CSZINA[41] + CSZINA[42] + CSZINA[43] +
CSZINA[44]

   HH_ArI1A[ATYPE] = HH_ArI1A[ATYPE] + CSZINA[11] + CSZINA[21] + CSZINA[31] +
CSZINA[41]
   HH_ArI2A[ATYPE] = HH_ArI2A[ATYPE] + CSZINA[12] + CSZINA[22] + CSZINA[32] +
CSZINA[42]
   HH_ArI3A[ATYPE] = HH_ArI3A[ATYPE] + CSZINA[13] + CSZINA[23] + CSZINA[33] +
CSZINA[43]
   HH_ArI4A[ATYPE] = HH_ArI4A[ATYPE] + CSZINA[14] + CSZINA[24] + CSZINA[34] +
CSZINA[44]
   HH_ArITA[ATYPE] = HH_ArITA[ATYPE] + CSZINA[11] + CSZINA[21] + CSZINA[31] +
CSZINA[41] +
                                       CSZINA[12] + CSZINA[22] + CSZINA[32] +
CSZINA[42] +
                                       CSZINA[13] + CSZINA[23] + CSZINA[33] +
CSZINA[43] +
                                       CSZINA[14] + CSZINA[24] + CSZINA[34] +
CSZINA[44]

   HH_ArV1A[ATYPE] = HH_ArV1A[ATYPE] + HHw0Vehs
   HH_ArV2A[ATYPE] = HH_ArV2A[ATYPE] + HHw1Vehs
   HH_ArV3A[ATYPE] = HH_ArV3A[ATYPE] + HHw2Vehs
   HH_ArV4A[ATYPE] = HH_ArV4A[ATYPE] + HHw3Vehs
   HH_ArVTA[ATYPE] = HH_ArVTA[ATYPE] + HHw0Vehs + HHw1Vehs + HHw2Vehs + HHw3Vehs


   HH_S1  = HH_S1     + CSZINA[11] + CSZINA[12] + CSZINA[13] + CSZINA[14]
   HH_S2  = HH_S2     + CSZINA[21] + CSZINA[22] + CSZINA[23] + CSZINA[24]
   HH_S3  = HH_S3     + CSZINA[31] + CSZINA[32] + CSZINA[33] + CSZINA[34]
   HH_S4  = HH_S4     + CSZINA[41] + CSZINA[42] + CSZINA[43] + CSZINA[44]

   HH_I1  = HH_I1     + CSZINA[11] + CSZINA[21] + CSZINA[31] + CSZINA[41]
   HH_I2  = HH_I2     + CSZINA[12] + CSZINA[22] + CSZINA[32] + CSZINA[42]
   HH_I3  = HH_I3     + CSZINA[13] + CSZINA[23] + CSZINA[33] + CSZINA[43]
   HH_I4  = HH_I4     + CSZINA[14] + CSZINA[24] + CSZINA[34] + CSZINA[44]

   HH_V1  = HH_V1     + HHw0Vehs
   HH_V2  = HH_V2     + HHw1Vehs
   HH_V3  = HH_V3     + HHw2Vehs
   HH_V4  = HH_V4     + HHw3Vehs

   HH_S   = HH_S      + CSZINA[11] + CSZINA[12] + CSZINA[13] + CSZINA[14] +
                        CSZINA[21] + CSZINA[22] + CSZINA[23] + CSZINA[24] +
                        CSZINA[31] + CSZINA[32] + CSZINA[33] + CSZINA[34] +
                        CSZINA[41] + CSZINA[42] + CSZINA[43] + CSZINA[44]

   HH_I   = HH_I      + CSZINA[11] + CSZINA[21] + CSZINA[31] + CSZINA[41] +
                        CSZINA[12] + CSZINA[22] + CSZINA[32] + CSZINA[42] +
                        CSZINA[13] + CSZINA[23] + CSZINA[33] + CSZINA[43] +
                        CSZINA[14] + CSZINA[24] + CSZINA[34] + CSZINA[44]



   HH_V   = HH_V      + HHw0Vehs +
                        HHw1Vehs +
                        HHw2Vehs +
                        HHw3Vehs



Endif

;==================================================================================
========
;  If we're at the last Zone, it's time to printout the listings and we're done.
;==================================================================================
========

IF (I=@ZONESIZE@)

   Print LIST= '  Demographic Model Report ', file=@Rept@ ;
   Print LIST= '   ',file=@Rept@
   Print LIST= '   ',file=@Rept@

   Print LIST= '   ',file=@Rept@
   Print LIST= '      Untransformed - Household Total from the Input File:',
HH_IP_Total(12.0),file=@Rept@ ;
   Print LIST= '   ',file=@Rept@
```

```
   Print LIST= '   ',file=@Rept@
   PRINT LIST =' Regional Households by Size and Income Summary ',file=@Rept@
   PRINT LIST ='   Size      Inc_1         Inc_2      Inc_3       Inc_4      Total
',file=@Rept@
   PRINT LIST ='          ------------ ----------- ----------- ----------- ---------
--   ',file=@Rept@

   Print form=12.csv LIST= '      1
',RegSzInA[11],RegSzInA[12],RegSzInA[13],RegSzInA[14],RegSzA[1],file=@Rept@ ;
   Print form=12.csv LIST= '      2
',RegSzInA[21],RegSzInA[22],RegSzInA[23],RegSzInA[24],RegSzA[2],file=@Rept@ ;
   Print form=12.csv LIST= '      3
',RegSzInA[31],RegSzInA[32],RegSzInA[33],RegSzInA[34],RegSzA[3],file=@Rept@ ;
   Print form=12.csv LIST= '      4+
',RegSzInA[41],RegSzInA[42],RegSzInA[43],RegSzInA[44],RegSzA[4],file=@Rept@ ;
   Print LIST= '   ',file=@Rept@
   Print form=12.csv LIST= ' Total    ',RegInA[1],   RegInA[2],   RegInA[3],
RegInA[4],   SITotal,file=@Rept@ ;
   Print LIST= '   ',file=@Rept@
   Print LIST= '   ',file=@Rept@

;================================================================================
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   PRINT LIST =' Jurisdictional Households by Size ',file=@Rept@
   PRINT LIST ='  Juris.    Size_1        Size_2     Size_3      Size_4      Total
',file=@Rept@
   PRINT LIST ='          ------------ ----------- ----------- ----------- ---------
--   ',file=@Rept@

   Print form=12.csv LIST= '    0_DC
',JurSzA[011],JurSzA[012],JurSzA[013],JurSzA[014],JurA[01],file=@Rept@ ;
   Print form=12.csv LIST= '    1_Mtg
',JurSzA[021],JurSzA[022],JurSzA[023],JurSzA[024],JurA[02],file=@Rept@ ;
   Print form=12.csv LIST= '    2_PG
',JurSzA[031],JurSzA[032],JurSzA[033],JurSzA[034],JurA[03],file=@Rept@ ;
   Print form=12.csv LIST= '    3_Arl
',JurSzA[041],JurSzA[042],JurSzA[043],JurSzA[044],JurA[04],file=@Rept@ ;
   Print form=12.csv LIST= '    4_Alx
',JurSzA[051],JurSzA[052],JurSzA[053],JurSzA[054],JurA[05],file=@Rept@ ;
   Print form=12.csv LIST= '    5_Ffx
',JurSzA[061],JurSzA[062],JurSzA[063],JurSzA[064],JurA[06],file=@Rept@ ;
   Print form=12.csv LIST= '    6_Ldn
',JurSzA[071],JurSzA[072],JurSzA[073],JurSzA[074],JurA[07],file=@Rept@ ;
   Print form=12.csv LIST= '    7_PW
',JurSzA[081],JurSzA[082],JurSzA[083],JurSzA[084],JurA[08],file=@Rept@ ;
   Print form=12.csv LIST= '    8_ -
',JurSzA[091],JurSzA[092],JurSzA[093],JurSzA[094],JurA[09],file=@Rept@ ;
   Print form=12.csv LIST= '    9_Frd
',JurSzA[101],JurSzA[102],JurSzA[103],JurSzA[104],JurA[10],file=@Rept@ ;
   Print form=12.csv LIST= '   10_How
',JurSzA[111],JurSzA[112],JurSzA[113],JurSzA[114],JurA[11],file=@Rept@ ;
   Print form=12.csv LIST= '   11_AA
',JurSzA[121],JurSzA[122],JurSzA[123],JurSzA[124],JurA[12],file=@Rept@ ;
   Print form=12.csv LIST= '   12_Chs
',JurSzA[131],JurSzA[132],JurSzA[133],JurSzA[134],JurA[13],file=@Rept@ ;
   Print form=12.csv LIST= '   13_ -
',JurSzA[141],JurSzA[142],JurSzA[143],JurSzA[144],JurA[14],file=@Rept@ ;
   Print form=12.csv LIST= '   14_Car
',JurSzA[151],JurSzA[152],JurSzA[153],JurSzA[154],JurA[15],file=@Rept@ ;
   Print form=12.csv LIST= '   15_Cal
',JurSzA[161],JurSzA[162],JurSzA[163],JurSzA[164],JurA[16],file=@Rept@ ;
   Print form=12.csv LIST= '   16_SM
',JurSzA[171],JurSzA[172],JurSzA[173],JurSzA[174],JurA[17],file=@Rept@ ;
   Print form=12.csv LIST= '
17_KGeo',JurSzA[181],JurSzA[182],JurSzA[183],JurSzA[184],JurA[18],file=@Rept@ ;
   Print form=12.csv LIST= '   18_Fbg
',JurSzA[191],JurSzA[192],JurSzA[193],JurSzA[194],JurA[19],file=@Rept@ ;
   Print form=12.csv LIST= '   19_Sta
',JurSzA[201],JurSzA[202],JurSzA[203],JurSzA[204],JurA[20],file=@Rept@ ;
   Print form=12.csv LIST= '   20_Spt
',JurSzA[211],JurSzA[212],JurSzA[213],JurSzA[214],JurA[21],file=@Rept@ ;
   Print form=12.csv LIST= '   21_Fau
',JurSzA[221],JurSzA[222],JurSzA[223],JurSzA[224],JurA[22],file=@Rept@ ;
   Print form=12.csv LIST= '   22_Clk
',JurSzA[231],JurSzA[232],JurSzA[233],JurSzA[234],JurA[23],file=@Rept@ ;
   Print form=12.csv LIST= '   23_Jef
',JurSzA[241],JurSzA[242],JurSzA[243],JurSzA[244],JurA[24],file=@Rept@ ;

   Print LIST= '   ',file=@Rept@
   Print form=12.csv LIST= ' Total    ',RegSzA[1],  RegSzA[2],  RegSzA[3],
RegSzA[4],  SITotal,file=@Rept@ ;
   Print LIST= '   ',file=@Rept@
   Print LIST= '   ',file=@Rept@
;================================================================================
=======================

   PRINT LIST =' Jurisdictional Households by Income ',file=@Rept@
   PRINT LIST ='  Juris.    Inc_1         Inc_2       Inc_3       Inc_4      Total
',file=@Rept@
   PRINT LIST ='          ------------ ----------- ----------- ----------- ---------
--   ',file=@Rept@

   Print form=12.csv LIST= '    0_DC
',JurInA[011],JurInA[012],JurInA[013],JurInA[014],JurA[01],file=@Rept@ ;
   Print form=12.csv LIST= '    1_Mtg
',JurInA[021],JurInA[022],JurInA[023],JurInA[024],JurA[02],file=@Rept@ ;
   Print form=12.csv LIST= '    2_PG
',JurInA[031],JurInA[032],JurInA[033],JurInA[034],JurA[03],file=@Rept@ ;
   Print form=12.csv LIST= '    3_Arl
',JurInA[041],JurInA[042],JurInA[043],JurInA[044],JurA[04],file=@Rept@ ;
   Print form=12.csv LIST= '    4_Alx
',JurInA[051],JurInA[052],JurInA[053],JurInA[054],JurA[05],file=@Rept@ ;
   Print form=12.csv LIST= '    5_Ffx
',JurInA[061],JurInA[062],JurInA[063],JurInA[064],JurA[06],file=@Rept@ ;
   Print form=12.csv LIST= '    6_Ldn
',JurInA[071],JurInA[072],JurInA[073],JurInA[074],JurA[07],file=@Rept@ ;
   Print form=12.csv LIST= '    7_PW
',JurInA[081],JurInA[082],JurInA[083],JurInA[084],JurA[08],file=@Rept@ ;
   Print form=12.csv LIST= '    8_ -
',JurInA[091],JurInA[092],JurInA[093],JurInA[094],JurA[09],file=@Rept@ ;
   Print form=12.csv LIST= '    9_Frd
',JurInA[101],JurInA[102],JurInA[103],JurInA[104],JurA[10],file=@Rept@ ;
   Print form=12.csv LIST= '   10_How
',JurInA[111],JurInA[112],JurInA[113],JurInA[114],JurA[11],file=@Rept@ ;
   Print form=12.csv LIST= '   11_AA
',JurInA[121],JurInA[122],JurInA[123],JurInA[124],JurA[12],file=@Rept@ ;
   Print form=12.csv LIST= '   12_Chs
',JurInA[131],JurInA[132],JurInA[133],JurInA[134],JurA[13],file=@Rept@ ;
   Print form=12.csv LIST= '   13_ -
',JurInA[141],JurInA[142],JurInA[143],JurInA[144],JurA[14],file=@Rept@ ;
   Print form=12.csv LIST= '   14_Car
',JurInA[151],JurInA[152],JurInA[153],JurInA[154],JurA[15],file=@Rept@ ;
   Print form=12.csv LIST= '   15_Cal
',JurInA[161],JurInA[162],JurInA[163],JurInA[164],JurA[16],file=@Rept@ ;
   Print form=12.csv LIST= '   16_SM
',JurInA[171],JurInA[172],JurInA[173],JurInA[174],JurA[17],file=@Rept@ ;
   Print form=12.csv LIST= '
17_KGeo',JurInA[181],JurInA[182],JurInA[183],JurInA[184],JurA[18],file=@Rept@ ;
   Print form=12.csv LIST= '   18_Fbg
',JurInA[191],JurInA[192],JurInA[193],JurInA[194],JurA[19],file=@Rept@ ;
   Print form=12.csv LIST= '   19_Sta
',JurInA[201],JurInA[202],JurInA[203],JurInA[204],JurA[20],file=@Rept@ ;
   Print form=12.csv LIST= '   20_Spt
',JurInA[211],JurInA[212],JurInA[213],JurInA[214],JurA[21],file=@Rept@ ;
```

```
   Print form=12.csv LIST= '   21_Fau
',JurInA[221],JurInA[222],JurInA[223],JurInA[224],JurA[22],file=@Rept@ ;
   Print form=12.csv LIST= '   22_Clk
',JurInA[231],JurInA[232],JurInA[233],JurInA[234],JurA[23],file=@Rept@ ;
   Print form=12.csv LIST= '   23_Jef
',JurInA[241],JurInA[242],JurInA[243],JurInA[244],JurA[24],file=@Rept@ ;

   Print LIST= '   ',file=@Rept@
   Print form=12.csv LIST= ' Total    ',RegInA[1],  RegInA[2],  RegInA[3],
RegInA[4],  SITotal,file=@Rept@ ;

   Print LIST= '   ',file=@Rept@
   Print LIST= '   ',file=@Rept@

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   Print LIST= '   ',file=@Rept@
   Print LIST= '   ',file=@Rept@
   PRINT LIST =' Regional Households by Vehicles Available and Size Summary
',file=@Rept@
   PRINT LIST ='   VeAv     Size_1        Size_2     Size_3      Size_4      Total
',file=@Rept@
   PRINT LIST ='          ------------ ----------- ----------- ----------- ---------
--   ',file=@Rept@

   Print form=12.csv LIST= '      1
',RegVaSzA[11],RegVaSzA[12],RegVaSzA[13],RegVaSzA[14],RegVaA[1],file=@Rept@ ;
   Print form=12.csv LIST= '      2
',RegVaSzA[21],RegVaSzA[22],RegVaSzA[23],RegVaSzA[24],RegVaA[2],file=@Rept@ ;
   Print form=12.csv LIST= '      3
',RegVaSzA[31],RegVaSzA[32],RegVaSzA[33],RegVaSzA[34],RegVaA[3],file=@Rept@ ;
   Print form=12.csv LIST= '      4+
',RegVaSzA[41],RegVaSzA[42],RegVaSzA[43],RegVaSzA[44],RegVaA[4],file=@Rept@ ;
   Print LIST= '   ',file=@Rept@
   Print form=12.csv LIST= ' Total    ',RegSzA[1],   RegSzA[2],   RegSzA[3],
RegSzA[4],   SITotal,file=@Rept@ ;

   Print LIST= '   ',file=@Rept@
   Print LIST= '   ',file=@Rept@

   Print LIST= '   ',file=@Rept@
   Print LIST= '   ',file=@Rept@
   PRINT LIST =' Regional Households by Vehicles Available Groups 1, 2, 3&4  ','\n',
               ' HHs w/ 0 Vehs:  ', Tot_HHw0Vehs(12.0),'\n',
               ' HHs w/ 1 Vehs:  ', Tot_HHw1Vehs(12.0),'\n',
               ' HHs w/ 2+Vehs:  ', Tot_HHw2PVehs(12.0),'\n', file=@Rept@
;==================================================================================
=======================

   Print LIST= '   ',file=@Rept@
   Print LIST= '   ',file=@Rept@
   PRINT LIST =' Regional Households by Vehicles Available and Income Summary
',file=@Rept@
   PRINT LIST ='   VeAv      Inc_1         Inc_2      Inc_3       Inc_4      Total
',file=@Rept@
   PRINT LIST ='          ------------ ----------- ----------- ----------- ---------
--   ',file=@Rept@

   Print form=12.csv LIST= '      1
',RegVaInA[11],RegVaInA[12],RegVaInA[13],RegVaInA[14],RegVaA[1],file=@Rept@ ;
   Print form=12.csv LIST= '      2
',RegVaInA[21],RegVaInA[22],RegVaInA[23],RegVaInA[24],RegVaA[2],file=@Rept@ ;
   Print form=12.csv LIST= '      3
',RegVaInA[31],RegVaInA[32],RegVaInA[33],RegVaInA[34],RegVaA[3],file=@Rept@ ;
   Print form=12.csv LIST= '      4+
',RegVaInA[41],RegVaInA[42],RegVaInA[43],RegVaInA[44],RegVaA[4],file=@Rept@ ;
   Print form=12.csv LIST= '   ',file=@Rept@
```

```
   Print form=12.csv LIST= ' Total    ',RegInA[1],   RegInA[2],   RegInA[3],
RegInA[4],   SITotal,file=@Rept@ ;

   Print LIST= '   ',file=@Rept@
   Print LIST= '   ',file=@Rept@

;==================================================================================
=======================

   PRINT LIST =' Jurisdictional Households by Vehicles Available ',file=@Rept@
   PRINT LIST ='  Juris.    Veh_0         Veh_1       Veh_2       Veh_3+     Total
',file=@Rept@
   PRINT LIST ='          ------------ ----------- ----------- ----------- ---------
--   ',file=@Rept@

   Print form=12.csv LIST= '    0_DC
',JurVaA[011],JurVaA[012],JurVaA[013],JurVaA[014],JurA[01],file=@Rept@ ;
   Print form=12.csv LIST= '    1_Mtg
',JurVaA[021],JurVaA[022],JurVaA[023],JurVaA[024],JurA[02],file=@Rept@ ;
   Print form=12.csv LIST= '    2_PG
',JurVaA[031],JurVaA[032],JurVaA[033],JurVaA[034],JurA[03],file=@Rept@ ;
   Print form=12.csv LIST= '    3_Arl
',JurVaA[041],JurVaA[042],JurVaA[043],JurVaA[044],JurA[04],file=@Rept@ ;
   Print form=12.csv LIST= '    4_Alx
',JurVaA[051],JurVaA[052],JurVaA[053],JurVaA[054],JurA[05],file=@Rept@ ;
   Print form=12.csv LIST= '    5_Ffx
',JurVaA[061],JurVaA[062],JurVaA[063],JurVaA[064],JurA[06],file=@Rept@ ;
   Print form=12.csv LIST= '    6_Ldn
',JurVaA[071],JurVaA[072],JurVaA[073],JurVaA[074],JurA[07],file=@Rept@ ;
   Print form=12.csv LIST= '    7_PW
',JurVaA[081],JurVaA[082],JurVaA[083],JurVaA[084],JurA[08],file=@Rept@ ;
   Print form=12.csv LIST= '    8_ -
',JurVaA[091],JurVaA[092],JurVaA[093],JurVaA[094],JurA[09],file=@Rept@ ;
   Print form=12.csv LIST= '    9_Frd
',JurVaA[101],JurVaA[102],JurVaA[103],JurVaA[104],JurA[10],file=@Rept@ ;
   Print form=12.csv LIST= '   10_How
',JurVaA[111],JurVaA[112],JurVaA[113],JurVaA[114],JurA[11],file=@Rept@ ;
   Print form=12.csv LIST= '   11_AA
',JurVaA[121],JurVaA[122],JurVaA[123],JurVaA[124],JurA[12],file=@Rept@ ;
   Print form=12.csv LIST= '   12_Chs
',JurVaA[131],JurVaA[132],JurVaA[133],JurVaA[134],JurA[13],file=@Rept@ ;
   Print form=12.csv LIST= '   13_ -
',JurVaA[141],JurVaA[142],JurVaA[143],JurVaA[144],JurA[14],file=@Rept@ ;
   Print form=12.csv LIST= '   14_Car
',JurVaA[151],JurVaA[152],JurVaA[153],JurVaA[154],JurA[15],file=@Rept@ ;
   Print form=12.csv LIST= '   15_Cal
',JurVaA[161],JurVaA[162],JurVaA[163],JurVaA[164],JurA[16],file=@Rept@ ;
   Print form=12.csv LIST= '   16_SM
',JurVaA[171],JurVaA[172],JurVaA[173],JurVaA[174],JurA[17],file=@Rept@ ;
   Print form=12.csv LIST= '
17_KGeo',JurVaA[181],JurVaA[182],JurVaA[183],JurVaA[184],JurA[18],file=@Rept@ ;
   Print form=12.csv LIST= '   18_Fbg
',JurVaA[191],JurVaA[192],JurVaA[193],JurVaA[194],JurA[19],file=@Rept@ ;
   Print form=12.csv LIST= '   19_Sta
',JurVaA[201],JurVaA[202],JurVaA[203],JurVaA[204],JurA[20],file=@Rept@ ;
   Print form=12.csv LIST= '   20_Spt
',JurVaA[211],JurVaA[212],JurVaA[213],JurVaA[214],JurA[21],file=@Rept@ ;
   Print form=12.csv LIST= '   21_Fau
',JurVaA[221],JurVaA[222],JurVaA[223],JurVaA[224],JurA[22],file=@Rept@ ;
   Print form=12.csv LIST= '   22_Clk
',JurVaA[231],JurVaA[232],JurVaA[233],JurVaA[234],JurA[23],file=@Rept@ ;
   Print form=12.csv LIST= '   23_Jef
',JurVaA[241],JurVaA[242],JurVaA[243],JurVaA[244],JurA[24],file=@Rept@ ;

   Print LIST= '   ',file=@Rept@
   Print form=12.csv LIST= ' Total    ',RegVaA[1],  RegVaA[2],  RegVaA[3],
RegVaA[4],  SITotal,file=@Rept@ ;
```

```
   Print LIST= '   ',file=@Rept@
   Print LIST= '   ',file=@Rept@


   PRINT LIST =' Estimated Households By Size Level by Area Type  ','\n',
file=@Rept@

   PRINT LIST =            '   Area_Tp  HHs_Size1    HHs_Size2   HHs_Size3
HHs_Size4    Total     ',file=@Rept@
   PRINT LIST =            '    ----   ----------- ------------ ---------- --------
--- ----------  ',file=@Rept@
   Print form=12.csv LIST= '      1   ',HH_ArS1A[1], HH_ArS2A[1] , HH_ArS3A[1],
HH_ArS4A[1] , HH_ArSTA[1],file =@Rept@ ;
   Print form=12.csv LIST= '      2   ',HH_ArS1A[2], HH_ArS2A[2] , HH_ArS3A[2],
HH_ArS4A[2] , HH_ArSTA[2],file =@Rept@ ;
   Print form=12.csv LIST= '      3   ',HH_ArS1A[3], HH_ArS2A[3] , HH_ArS3A[3],
HH_ArS4A[3] , HH_ArSTA[3],file =@Rept@ ;
   Print form=12.csv LIST= '      4   ',HH_ArS1A[4], HH_ArS2A[4] , HH_ArS3A[4],
HH_ArS4A[4] , HH_ArSTA[4],file =@Rept@ ;
   Print form=12.csv LIST= '      5   ',HH_ArS1A[5], HH_ArS2A[5] , HH_ArS3A[5],
HH_ArS4A[5] , HH_ArSTA[5],file =@Rept@ ;
   Print form=12.csv LIST= '      6   ',HH_ArS1A[6], HH_ArS2A[6] , HH_ArS3A[6],
HH_ArS4A[6] , HH_ArSTA[6],file =@Rept@ ;
   Print form=12.csv LIST= '      7   ',HH_ArS1A[7], HH_ArS2A[7] , HH_ArS3A[7],
HH_ArS4A[7] , HH_ArSTA[7],file =@Rept@ ;
   Print LIST= '    ',file=@Rept@
   Print form=12.csv LIST= '     Sum  ',HH_S1, HH_S2, HH_S3, HH_S4, HH_S,file
=@Rept@ ;
   Print LIST= '   ','\n',file=@Rept@



   PRINT LIST =' Estimated Households By Income Level by Area Type  ','\n',
file=@Rept@

   PRINT LIST =            '   Area_Tp  Income_1     Income_2    Income_3
Income_4     Total      ',file=@Rept@
   PRINT LIST =            '    ----   ----------- ------------ ---------- --------
--- -----------  ',file=@Rept@
   Print form=12.csv LIST= '      1   ',HH_ArI1A[1], HH_ArI2A[1] , HH_ArI3A[1],
HH_ArI4A[1] , HH_ArITA[1],file =@Rept@ ;
   Print form=12.csv LIST= '      2   ',HH_ArI1A[2], HH_ArI2A[2] , HH_ArI3A[2],
HH_ArI4A[2] , HH_ArITA[2],file =@Rept@ ;
   Print form=12.csv LIST= '      3   ',HH_ArI1A[3], HH_ArI2A[3] , HH_ArI3A[3],
HH_ArI4A[3] , HH_ArITA[3],file =@Rept@ ;
   Print form=12.csv LIST= '      4   ',HH_ArI1A[4], HH_ArI2A[4] , HH_ArI3A[4],
HH_ArI4A[4] , HH_ArITA[4],file =@Rept@ ;
   Print form=12.csv LIST= '      5   ',HH_ArI1A[5], HH_ArI2A[5] , HH_ArI3A[5],
HH_ArI4A[5] , HH_ArITA[5],file =@Rept@ ;
   Print form=12.csv LIST= '      6   ',HH_ArI1A[6], HH_ArI2A[6] , HH_ArI3A[6],
HH_ArI4A[6] , HH_ArITA[6],file =@Rept@ ;
   Print form=12.csv LIST= '      7   ',HH_ArI1A[7], HH_ArI2A[7] , HH_ArI3A[7],
HH_ArI4A[7] , HH_ArITA[7],file =@Rept@ ;
   Print LIST= '    ',file=@Rept@
   Print form=12.csv LIST= '     Sum  ',HH_I1, HH_I2, HH_I3, HH_I4, HH_I,file
=@Rept@ ;
   Print LIST= '   ','\n',file=@Rept@



   PRINT LIST =' Estimated Households By Vehicle Availability Level by Area Type
','\n', file=@Rept@

   PRINT LIST =            '   Area_Tp  0 Vehs.Av.   1 Veh.Av.   2 Vehs.Av.  3+
Vehs.Av.  Total      ',file=@Rept@
   PRINT LIST =            '    ----   ----------- ------------ ---------- --------
--- -----------  ',file=@Rept@
   Print form=12.csv LIST= '      1   ',HH_ArV1A[1], HH_ArV2A[1] , HH_ArV3A[1],
HH_ArV4A[1] , HH_ArVTA[1],file =@Rept@ ;
   Print form=12.csv LIST= '      2   ',HH_ArV1A[2], HH_ArV2A[2] , HH_ArV3A[2],
HH_ArV4A[2] , HH_ArVTA[2],file =@Rept@ ;
   Print form=12.csv LIST= '      3   ',HH_ArV1A[3], HH_ArV2A[3] , HH_ArV3A[3],
HH_ArV4A[3] , HH_ArVTA[3],file =@Rept@ ;
   Print form=12.csv LIST= '      4   ',HH_ArV1A[4], HH_ArV2A[4] , HH_ArV3A[4],
HH_ArV4A[4] , HH_ArVTA[4],file =@Rept@ ;
   Print form=12.csv LIST= '      5   ',HH_ArV1A[5], HH_ArV2A[5] , HH_ArV3A[5],
HH_ArV4A[5] , HH_ArVTA[5],file =@Rept@ ;
   Print form=12.csv LIST= '      6   ',HH_ArV1A[6], HH_ArV2A[6] , HH_ArV3A[6],
HH_ArV4A[6] , HH_ArVTA[6],file =@Rept@ ;
   Print form=12.csv LIST= '      7   ',HH_ArV1A[7], HH_ArV2A[7] , HH_ArV3A[7],
HH_ArV4A[7] , HH_ArVTA[7],file =@Rept@ ;
   Print LIST= '    ',file=@Rept@
   Print form=12.csv LIST= '     Sum  ',HH_V1, HH_V2, HH_V3, HH_V4, HH_V,file
=@Rept@ ;
   Print LIST= '   ','\n',file=@Rept@

ENDIF   ; -end of printing section


;
;
;
ENDRUN
```

8 Highway_Assignment.s

```
; ==================================================================
;
; Highway_Assignment.S  - VERSION 2.3
;  developed from the assignment process from 2.1D#50  with changes:
;  2/16/06  Formal Conical functions now called from an external file in the SUPPORT
;                 Subdir.  (filename: Conical_VDF_V22.txt)
;  3/ 8/06  reduced capacity and freeflow speed assumptions for ramps
;  4/14/06  Queuing time now added to freeways and ramps with high VCs
;           file in the \SUPPORT subdir. named 'QEUEING_Time.TXT' specifies
;            added times reflecting queuing. Times used in the speed flow
;            spec.in traffic assignment and in the volume averaging stage.
;   1/11/07  Now explicitly adding in Commercial Vehicle trips (<iter>tmcom.trp)
;            (NHB trip rates have been reduced)
;   6/14/07 > QEUEING_Time.TXT file in \Support renamed to QUEUING_Time.TXT
;           > New network link attribute named 'AllowQue' invoked in the queuing
;            delay calculation (0/disallow Que Delay, 1/Allow queuing delay
;           > corrected regional time of day vehicles (amvehs, pmvehs, opvehs)
;            calculation (Per JCP review)
;   7/26/07 > 20 iterations in equilib. assignment changed to 40 (RM for DV)
;   7/30/07 > 40 iterations changed to 60
;   10/1/07 > MISC??.TT updated to MISC??<iter>.TT  to reflect iterations for trucks
;   1/24/08 > AllowQue variable is replaced with time period specific variables:
;             AM_AllowQue, PM_Allow_Que, and OP_AllowQue; FTPlus1 var added to
exclude list
;   4/29/08   INPUT TRIP TABLES HAVE BEEN UPDATED AS PER v2.3 SCRIPTING
;             Note: PCEs removed
;-----------------------------------------------------------------------
;
;   3 Steps:
;     Step 1 - Consolidate current modeled and nonmodeled trip tables //
;              for the highway assignment process.
;     Step 2 - Execute traffic assignment and compute speed averaging
```

```
;             for three time periods.
;     Step 3 - Summarize daily VMT.
;
;   Environment Variables:
;    _iter_  (Iteration indicator = 'pp','i1' - 'i6')
;
;
;---------------------------------------------------------------
;   Step 1 - Modeled & Non-Modeled Trip Table Consolidation
;            for the Highway Assignment
;            - 3 Trip files built for AM,PM,Off-Peak Time Periods
;            - Each file has 5 Trip tables:
;                1) 1-occ adrs including commercial vehicles
;                2) 2-occ adrs
;                3) 3+ occ adrs
;                4) Trucks (Medium and Heavy)
;                5) Airport Pax Adrs
;---------------------------------------------------------------
;                                                                    //
; I/P Auto Dr. Pct. tables:                                          //
ADRAM  = 'AM%_iter_%.ADR' ; AM     Modeled Total Auto Drivers        //
ADRPM  = 'PM%_iter_%.ADR' ; PM     Modeled Total Auto Drivers        //
ADROP  = 'OP%_iter_%.ADR' ; Off-Pk Modeled Total Auto Drivers        //
;                                                                    //
; I/P MISC Auto Dr.Tables:                                           //
MISCAM  = 'MISCAM%_iter_%.TT'     ; AM Trk, CV, Non-Modeled Trips   //
MISCPM  = 'MISCPM%_iter_%.TT'     ; PM Trk, CV, Non-Modeled Trips   //
MISCOP  = 'MISCOP%_iter_%.TT'     ; OP Trk, CV, Non-Modeled Trips   //
;                                                                    //
;                                                                    //
;;                                                                   //
;                                                                    //
; O/P  Vehicle  Trips:                                               //
AM_VT   = '%_iter_%AM.VTT'    ; AM VEH TRIPS FOR ASSIGNMENT          //
PM_VT   = '%_iter_%PM.VTT'    ; PM VEH TRIPS FOR ASSIGNMENT          //
OP_VT   = '%_iter_%OP.VTT'    ; OP VEH TRIPS FOR ASSIGNMENT          //
;                         ;                                          //
;                         ; based on 1994 auto ext svy /             //
;                         ; avg xx auto occ. is 1.72 -basis for:     //
XXAD1OCC = 0.5021       ; ASSUMED SHARE OF THRU ADRS W/ 1-OCC      //
XXAD2OCC = 0.3426       ; ASSUMED SHARE OF THRU ADRS W/ 2-OCCS     //
XXAD3OCC = 0.1553       ; ASSUMED SHARE OF THRU ADRS W/ 3+OCCS     //
;/////////////////////////////////////////////////////////////////////


RUN PGM=MATRIX
    MATI[1]=@ADRAM@   ;
    MATI[2]=@ADRPM@   ;
    MATI[3]=@ADROP@   ;

    MATI[4]=@MISCAM@    ;
    MATI[5]=@MISCPM@    ;
    MATI[6]=@MISCOP@    ;

;
 MW[11]= MI.1.1          ; AM 1-Occ adrs
 MW[12]= MI.1.2          ; AM 2-Occ adrs
 MW[13]= MI.1.3          ; AM 3+Occ adrs
;
 MW[21]= MI.2.1          ; PM 1-Occ adrs
 MW[22]= MI.2.2          ; PM 2-Occ adrs
 MW[23]= MI.2.3          ; PM 3+Occ adrs
;
 MW[31]= MI.3.1          ; OP 1-Occ adrs
 MW[32]= MI.3.2          ; OP 2-Occ adrs
 MW[33]= MI.3.3          ; OP 3+Occ adrs
;
; AM Peak Period MISC Trips
 MW[100] = MI.4.1            ; AM Thru Med Truck
 MW[101] = MI.4.2            ; AM Thru Hvy Truck
 MW[102] = MI.4.3*@XXAD1OCC@ ; AM Thru     Auto Driver/CV-1 OCC
 MW[103] = MI.4.3*@XXAD2OCC@ ; AM Thru     Auto Driver/CV-2 OCC
 MW[104] = MI.4.3*@XXAD3OCC@ ; AM Thru     Auto Driver/CV-3+OCC
 MW[105] = MI.4.4            ; AM Taxi     Auto Driver
 MW[106] = MI.4.5            ; AM Visitor  Auto Driver
 MW[107] = MI.4.6            ; AM School   Auto Driver
 MW[108] = MI.4.7            ; AM I-I,I-E,E-I Medium Truck
 MW[109] = MI.4.8            ; AM I-I,I-E,E-I Heavy  Truck
 MW[110] = MI.4.9            ; AM Air Passenger Auto Driver
 MW[111] = MI.4.10           ; AM I-I,I-E,E-I Comm. Vehicle


; PM Peak Period MISC Trips
 MW[200] = MI.5.1            ; PM Thru Med Truck
 MW[201] = MI.5.2            ; PM Thru Hvy Truck
 MW[202] = MI.5.3*@XXAD1OCC@ ; PM Thru     Auto Driver/CV-1 OCC
 MW[203] = MI.5.3*@XXAD2OCC@ ; PM Thru     Auto Driver/CV-2 OCC
 MW[204] = MI.5.3*@XXAD3OCC@ ; PM Thru     Auto Driver/CV-3+OCC
 MW[205] = MI.5.4            ; PM Taxi     Auto Driver
 MW[206] = MI.5.5            ; PM Visitor  Auto Driver
 MW[207] = MI.5.6            ; PM School   Auto Driver
 MW[208] = MI.5.7            ; PM I-I,I-E,E-I Medium Truck
 MW[209] = MI.5.8            ; PM I-I,I-E,E-I Heavy  Truck
 MW[210] = MI.5.9            ; PM Air Passenger Auto Driver
 MW[211] = MI.5.10           ; PM I-I,I-E,E-I Comm. Vehicle
;


; OFF PK Peak Period MISC Trips
 MW[300] = MI.6.1            ; OP Thru Med Truck
 MW[301] = MI.6.2            ; OP Thru Hvy Truck
 MW[302] = MI.6.3*@XXAD1OCC@ ; OP Thru     Auto Driver/CV-1 OCC
 MW[303] = MI.6.3*@XXAD2OCC@ ; OP Thru     Auto Driver/CV-2 OCC
 MW[304] = MI.6.3*@XXAD3OCC@ ; OP Thru     Auto Driver/CV-3+OCC
 MW[305] = MI.6.4            ; OP Taxi     Auto Driver
 MW[306] = MI.6.5            ; OP Visitor  Auto Driver
 MW[307] = MI.6.6            ; OP School   Auto Driver
 MW[308] = MI.6.7            ; OP I-I,I-E,E-I Medium Truck
 MW[309] = MI.6.8            ; OP I-I,I-E,E-I Heavy  Truck
 MW[310] = MI.6.9            ; OP Air Passenger Auto Driver
 MW[311] = MI.6.10           ; OP I-I,I-E,E-I Comm. Vehicle

;  Add up vehicle tables into the appropriate categories
;  AM
 MW[40] =  MW[11]  + MW[102] + MW[107] + MW[111]  ; AM SOV   Vehicle Trips
w/CommVehs
 MW[41] =  MW[12]  + MW[103] + MW[105] + MW[106]  ; AM HOV2  Vehicle Trips
 MW[42] =  MW[13]  + MW[104]                      ; AM HOV3+ Vehicle Trips
 MW[43] =  MW[100] + MW[108]                      ; AM Med. Truck Trips
 MW[44] =  MW[110]                                ; AM Airport Pax Adr Trips
 MW[45] =  MW[101] + MW[109]                      ; AM Hvy. Truck Trips

;  PM
 MW[50] =  MW[21]  + MW[202] + MW[207] + MW[211]  ; PM SOV   Vehicle Trips
w/CommVehs
 MW[51] =  MW[22]  + MW[203] + MW[205] + MW[206]  ; PM HOV2  Vehicle Trips
 MW[52] =  MW[23]  + MW[204]                      ; PM HOV3+ Vehicle Trips
 MW[53] =  MW[200] + MW[208]                      ; PM Med. Truck Trips
 MW[54] =  MW[210]                                ; PM Airport Pax Adr Trips
 MW[55] =  MW[201] + MW[209]                      ; PM Hvy. Truck Trips

;  Off-Peak
 MW[60] =  MW[31]  + MW[302] + MW[307] + MW[311]  ; PM SOV   Vehicle Trips
w/CommVehs
 MW[61] =  MW[32]  + MW[303] + MW[305] + MW[306]  ; PM HOV2  Vehicle Trips
 MW[62] =  MW[33]  + MW[304]                      ; PM HOV3+ Vehicle Trips
```

```
 MW[63] =  MW[300] + MW[308]                      ; PM Med. Truck Trips
 MW[64] =  MW[310]                                ; PM Airport Pax Adr Trips
 MW[65] =  MW[301] + MW[309]                      ; PM Hvy. Truck Trips

;
;
; Now let's accumulate totals for neat regional summaries
jloop
     vehs =   vehs + (MW[40]+MW[41]+MW[42]+MW[43]+MW[44]+MW[45]) + ; daily vehs
                     (MW[50]+MW[51]+MW[52]+MW[53]+MW[54]+MW[55]) + ;
                     (MW[60]+MW[61]+MW[62]+MW[63]+MW[64]+MW[65])   ;

     comveh = comveh + MW[111] + MW[211] + MW[311]


;AM group
   amvehs   = amvehs   + MW[40]+MW[41]+MW[42]+MW[43]+MW[44]+MW[45] ; all am vehs
   am1occ   = am1occ   + MW[40]                        ; am 1-occveh's
   am2occ   = am2occ   + MW[41]                        ; am 2-occveh's
   am3occ   = am3occ   + MW[42]                        ; am 3-occveh's
   ammtrks  = ammtrks  + MW[43]                        ; am med trucks
   amapax   = amapax   + MW[44]                        ; am airpax adrs
   amhtrks  = amhtrks  + MW[45]                        ; am hvy trucks
   am1occad = am1occad + MW[11]                        ; am 1occ adr
   am2occad = am2occad + MW[12]                        ; am 2occ adr
   am3occad = am3occad + MW[13]                        ; am 3+occ adr
   amadr    = amadr    + MW[11] + MW[12] + MW[13]      ; am total adr(modeled)
   amxxmtrk = amxxmtrk + MW[100]                       ; am Thru med Truck
   amxxhtrk = amxxhtrk + MW[101]                       ; am Thru hvy Truck
   amxxad1  = amxxad1  + MW[102]                       ; am Thru 1occ Adr
   amxxad2  = amxxad2  + MW[103]                       ; am Thru 2occ Adr
   amxxad3  = amxxad3  + MW[104]                       ; am Thru 3+occAdr
   amxxadr  = amxxadr  + MW[102]+MW[103]+MW[104]       ; am total xx adr/cv
   amtaxi   = amtaxi   + MW[105]                       ; am Taxi     ADr
   amvisi   = amvisi   + MW[106]                       ; am visitor  ADr
   amscho   = amscho   + MW[107]                       ; am School   ADr
   ammtrk   = ammtrk   + MW[108]                       ; am int,ext MedTk
   amhtrk   = amhtrk   + MW[109]                       ; am int,ext HvyTk
   amcomveh = amcomveh + MW[111]                       ; am int,ext,xx ComVeh

;PM group
   pmvehs   = pmvehs   + MW[50]+MW[51]+MW[52]+MW[53]+MW[54] ; all pm vehs
   pm1occ   = pm1occ   + MW[50]                        ;  pm 1-occveh's
   pm2occ   = pm2occ   + MW[51]                        ;  pm 2-occveh's
   pm3occ   = pm3occ   + MW[52]                        ;  pm 3-occveh's
   pmmtrks  = pmmtrks  + MW[53]                        ;  pm med trucks
   pmapax   = pmapax   + MW[54]                        ;  pm airpax adrs
   pmhtrks  = pmhtrks  + MW[55]                        ;  pm hvy trucks
   pm1occad = pm1occad + MW[21]                        ;  pm 1occ adr
   pm2occad = pm2occad + MW[22]                        ;  pm 2occ adr
   pm3occad = pm3occad + MW[23]                        ;  pm 3+occ adr
   pmadr    = pmadr    + MW[21] + MW[22] + MW[23]      ;  pm total adr(modeled)
   pmxxmtrk = pmxxmtrk + MW[200]                       ;  pm Thru med Truck
   pmxxhtrk = pmxxhtrk + MW[201]                       ;  pm Thru hvy Truck
   pmxxad1  = pmxxad1  + MW[202]                       ;  pm Thru 1occ Adr
   pmxxad2  = pmxxad2  + MW[203]                       ;  pm Thru 2occ Adr
   pmxxad3  = pmxxad3  + MW[204]                       ;  pm Thru 3+occAdr
   pmxxadr  = pmxxadr  + MW[202]+MW[203]+MW[204]       ;  pm total xx adr/cv
   pmtaxi   = pmtaxi   + MW[205]                       ;  pm Taxi     ADr
   pmvisi   = pmvisi   + MW[206]                       ;  pm visitor  ADr
   pmscho   = pmscho   + MW[207]                       ;  pm School   ADr
   pmmtrk   = pmmtrk   + MW[208]                       ;  pm int,ext MedTk
   pmhtrk   = pmhtrk   + MW[209]                       ;  pm int,ext HvyTk
   pmcomveh = pmcomveh + MW[211]                       ;  pm int,ext,xx ComVeh

;Off-Peak group
   opvehs   = opvehs   + MW[60]+MW[61]+MW[62]+MW[63]+MW[64] ; all op vehs
   op1occ   = op1occ   + MW[60]                        ;  op 1-occveh's
   op2occ   = op2occ   + MW[61]                        ;  op 2-occveh's
   op3occ   = op3occ   + MW[62]                        ;  op 3-occveh's
   opmtrks  = opmtrks  + MW[63]                        ;  op med trucks
   opapax   = opapax   + MW[64]                        ;  op airpax adrs
   ophtrks  = ophtrks  + MW[65]                        ;  op hvy trucks
   op1occad = op1occad + MW[31]                        ;  op 1occ adr
   op2occad = op2occad + MW[32]                        ;  op 2occ adr
   op3occad = op3occad + MW[33]                        ;  op 3+occ adr
   opadr    = opadr    + MW[31] + MW[32] + MW[33]      ;  op total adr(modeled)
   opxxmtrk = opxxmtrk + MW[300]                       ;  op Thru med Truck
   opxxhtrk = opxxhtrk + MW[301]                       ;  op Thru hvy Truck
   opxxad1  = opxxad1  + MW[302]                       ;  op Thru 1occ Adr
   opxxad2  = opxxad2  + MW[303]                       ;  op Thru 2occ Adr
   opxxad3  = opxxad3  + MW[304]                       ;  op Thru 3+occAdr
   opxxadr  = opxxadr  + MW[302]+MW[303]+MW[304]       ;  op total xx adr/cv
   optaxi   = optaxi   + MW[305]                       ;  op Taxi     ADr
   opvisi   = opvisi   + MW[306]                       ;  op visitor  ADr
   opscho   = opscho   + MW[307]                       ;  op School   ADr
   opmtrk   = opmtrk   + MW[308]                       ;  op int,ext MedTk
   ophtrk   = ophtrk   + MW[309]                       ;  op int,ext HvyTk
   opcomveh = opcomveh + MW[311]                       ;  op int,ext,xx ComVeh
endjloop

if (i=zones)   ; print out results
list = '/bt      '
list = '%_iter_% Iter. Pre-Traffic Assignment Trip Table Preparation Report'
list = '  '
list = 'Total Vehs: ',vehs(9.0),'  AM,PM,OPk Vehs: ',
     amvehs(8.0),' ',pmvehs(8.0),' ',opvehs(8.0)
list = '  '
list = '                ',' AM 1,2,3+Occ Vehs, MedTrucks, Air Pax Adrs, Heavy
Trucks',
 am1occ(8.0),' ',am2occ(8.0),' ',am3occ(8.0),' ',ammtrks(8.0),' ',amapax(8.0),'
',amhtrks(8.0)
list = '                ',' PM 1,2,3+Occ Vehs, Trucks, Air Pax Adrs',
 pm1occ(8.0),' ',pm2occ(8.0),' ',pm3occ(8.0),' ',pmmtrks(8.0),' ',pmapax(8.0),'
',pmhtrks(8.0)
list = '                ',' OP 1,2,3+Occ Vehs, Trucks, Air Pax Adrs',
 op1occ(8.0),' ',op2occ(8.0),' ',op3occ(8.0),' ',opmtrks(8.0),' ',opapax(8.0),'
',ophtrks(8.0)
list = '      '
list = '                ',' AM,PM,OPk Auto Drivers (modeled) ',
     amadr(8.0),' ',pmadr(8.0),' ',opadr(8.0)
list = '                ',' AM  1,2,3+Occ Auto Drs ',
     am1occad(8.0),' ',am2occad(8.0),' ',am3occad(8.0)
list = '                ',' PM  1,2,3+Occ Auto Drs ',
     pm1occad(8.0),' ',pm2occad(8.0),' ',pm3occad(8.0)
list = '                ',' OP  1,2,3+Occ Auto Drs ',
     op1occad(8.0),' ',op2occad(8.0),' ',op3occad(8.0)
list = '          '
list = '                ',' AM MedTrk(IntlExtl),MedTrkXX,HvyTrk(IntlExtl),HvyTrkXX :
',
     ammtrk(8.0),' ',amxxmtrk(8.0),' ', amhtrk(8.0),' ',amxxhtrk(8.0)

list = '                ',' PM MedTrk(IntlExtl),MedTrkXX,HvyTrk(IntlExtl),HvyTrkXX :
',
     pmmtrk(8.0),' ',pmxxmtrk(8.0),' ', pmhtrk(8.0),' ',pmxxhtrk(8.0)

list = '                ',' OP MedTrk(IntlExtl),MedTrkXX,HvyTrk(IntlExtl),HvyTrkXX :
',
     opmtrk(8.0),' ',opxxmtrk(8.0),' ', ophtrk(8.0),' ',opxxhtrk(8.0)

list = '          '
list = '                ',' AM 1,2,3+Occ,TotlXX Adr',
     amxxad1(8.0),' ',amxxad2(8.0),' ',amxxad3(8.0),' ',amxxadr(9.0)
list = '                ',' PM 1,2,3+Occ,TotlXX Adr',
     pmxxad1(8.0),' ',pmxxad2(8.0),' ',pmxxad3(8.0),' ',pmxxadr(9.0)
list = '                ',' OP 1,2,3+Occ,TotlXX Adr',
```

```
     opxxad1(8.0),' ',opxxad2(8.0),' ',opxxad3(8.0),' ',opxxadr(9.0)
list = '           '
list = '                ',' AM Taxi,Visitr,Schl Adr, Air Pax Adr',
     amtaxi(8.0),' ',amvisi(8.0),' ',amscho(8.0),' ',amapax(8.0)
list = '                ',' PM Taxi,Visitr,Schl Adr, Air Pax Adr',
     pmtaxi(8.0),' ',pmvisi(8.0),' ',pmscho(8.0),' ',pmapax(8.0)
list = '                ',' OP Taxi,Visitr,Schl Adr, Air Pax Adr',
     optaxi(8.0),' ',opvisi(8.0),' ',opscho(8.0),' ',opapax(8.0)
list = '                ',' AM     ,PM     ,OP , Total Commercial Vehs. ',
     amcomveh(8.0),' ',pmcomveh(8.0),' ',opcomveh(8.0),' ',comveh(8.0)
list = '/et      '

 endif



;  Write out the auto driver tables by time period
 MATO[1] = @AM_VT@,  MO=40-45 ; AM Veh Trips 1,2,3+occ, med. trucks,Air Pax Vehs,
hvy. trucks
 MATO[2] = @PM_VT@,  MO=50-55 ; PM Veh Trips 1,2,3+occ, med. trucks,Air Pax Vehs,
hvy. trucks
 MATO[3] = @OP_VT@,  MO=60-65 ; OP Veh Trips 1,2,3+occ, med. trucks,Air Pax Vehs,
hvy. trucks

ENDRUN


;---------------------------------------------------------------
;   Step 2 - Highway Assignment
;
;
;
;---------------------------------------------------------------

itr = '%_iter_%'
; The Input Network Depends on the previous Iteration network

IF     (itr      = 'pp')
   INPNET = 'ZONEHWY.NET'
 ELSE
   INPNET = '%_prev_%HWY.NET'
ENDIF

LOOP Period=1,3;  Three assignment loops: 1/AM, 2/PM, 3/Off-Pk

IF     (Period==1)         ; AM Peak Period
    PRD    =  'AM'         ;
    PCTADT =   40  ; %_AMPF_%  AM Pk Ftr (% of traffic occurring in pk hr)

ELSEIF (Period==2)         ; PM Peak Period
    PRD    =  'PM'         ;
    PCTADT =   37  ; %_PMPF_%  PM Pk Ftr (% of traffic occurring in pk hr)

ELSE                       ;  Off-Peak Period
    PRD    =  'OP'         ;
    PCTADT =   12  ; %_OPPF_%  OP Pk Ftr (% of traffic occurring in pk hr)
ENDIF

CAPFAC=1/(PCTADT/100)      ; Capacity Factor = 1/(PCTADT/100)


;$
in_tskm  = 'inputs\toll.skm'                   ; toll param file
VDF_File = '..\support\Conical_VDF_V22.txt'   ; Volume Delay Functions file
Que_File = '..\support\Queuing_Time.TXT'       ; Queing Time  specification
;$

RUN PGM=HWYLOAD
```

```
  NETI     = @INPNET@                          ; TP+ Network
  ;
  ;  The input trip table has 5 Vehicle Tables:
  ;     1 - 1-Occ Auto Drivers
  ;     2 - 2-Occ Auto Drivers
  ;     3 - 3+Occ Auto Drivers
  ;     4 - Medium Trucks
  ;     5 - Airport Pass. Auto Driver Trips
  ;     6 - Heavy Trucks

  MATI=%_iter_%@prd@.VTT ;
  ;
  NETO=temp.net          ; Output loaded network of current iter/time prd.
  ;
  ;=================================================================
  ; CAP & SPEED CLASS 71 ADJUSTED FOR I-270 FROM I-370 & SPUR
  ; JCPARK 5/2/03
  ; CAP REVISED JCPARK 5/20/03 TO 1500
  ; CAPACITY & SPEED OF MAJOR & MINOR ARTERIAL REVISED
  ; SPEED OF COLLECTOR REVISED   JCPARK 6/17/03
  ; CAPACITY OF I-95 ADJUSTED: 1900 -> 1800 VPHPL
  ; I-270 & I-95 OVERRIDES REMOVED 6/23/03 JCPARK
  ; THE OVERRIDES ACTIVATED 6/25/03 JCPARK
  ; START ------>
  ;=================================================================
  ;*****************************************************************
  ;**  LOS'E' Capacities and Freeflow Speeds Assumptions:          **
  ;*****************************************************************
  ;
  ;            areatp > 1    2    3    4    5    6    7   fac type
  ;                    ---  ---  ---  ---  ---  ---  ---      V
  SPDCAP CAPACITY[01]=3150 3150 3150 3150 3150 3150 3150  ; cen
  SPDCAP CAPACITY[11]=1500 1600 1800 1800 2000 2000 2100  ; fwy REVISED 7/20/03
  SPDCAP CAPACITY[21]= 800  800  960  960 1260 1260 1260  ; maj REVISED 6/19/03
  SPDCAP CAPACITY[31]= 500  600  700  840 1000 1000 1000  ; min REVISED 6/30/03
  SPDCAP CAPACITY[41]= 300  400  500  700  700  700  800  ; col
  SPDCAP CAPACITY[51]= 900 1000 1000 1200 1500 1500 1500  ; xwy
  SPDCAP CAPACITY[61]=1000 1000 1000 1000 2000 2000 2000  ; rmp
  SPDCAP CAPACITY[71]=1600 1800 1800    ; JCPARK I-270 CAP 7/20/03 ICC CAP 11/18/03
  SPDCAP CAPACITY[91]=2400 2100         ; JCPARK 7/24/03 I-495 CAP
  ;
  ;  initial speed values :
  ;
  ;            areatp > 1    2    3    4    5    6    7   fac type
  ;                    ---  ---  ---  ---  ---  ---  ----    V
  SPDCAP    SPEED[01]= 15   15   20   25   30   30   35    ; cen
  SPDCAP    SPEED[11]= 55   55   60   60   67   67   67    ; fwy
  SPDCAP    SPEED[21]= 25   25   35   35   40   45   45    ; maj REVISED 6/18/03
  SPDCAP    SPEED[31]= 20   20   30   30   35   40   40    ; min REVISED 6/18/03
  SPDCAP    SPEED[41]= 15   15   20   20   25   30   30    ; col REVISED 6/18/03
  SPDCAP    SPEED[51]= 45   45   50   50   50   55   55    ; xwy
  SPDCAP    SPEED[61]= 20   20   30   30   35   40   50    ; rmp
  SPDCAP    SPEED[71]= 55   60   50 ; JCPARK I-270 SPD 7/20/03 ICC SPD 10/30/03

;$
  ;-----------------------------------------------------$
  ;    Read in Toll Parameters:                         $
  ;-----------------------------------------------------$
  READ FILE = @in_tskm@

;$  ;

  ;=================================================================
  ; CAP & SPEED CLASS 71 55mph ADJUSTED FOR I-270 FROM I-370 & SPUR
  ; JCPARK 5/5/03
  ; REMOVED 6/23/03 JCPARK
  ; ACTIVATED 6/25/03 JCPARK
  ; ALL THE OVERRIDES WERE REMOVED EXCEPT FOR I-495 7/20/03
```

```
  ; <------ END
  ;==================================================================
  ;
  ;----------------------------------------------------$
  ;   Queuing Penalty Function (qtime = f(V/C))          $
  ;----------------------------------------------------$
  ;   Time Penalty is a function of VC ratio
  ;
  LOOKUP NAME=QTIME,
         lookup[1] = 1,result = 2,  ;Centroids   Queuing Time (MIN)
         lookup[2] = 1,result = 3,  ;Fwys        Queuing Time (MIN)
         lookup[3] = 1,result = 4,  ;MajArts     Queuing Time (MIN)
         lookup[4] = 1,result = 5,  ;MinArts     Queuing Time (MIN)
         lookup[5] = 1,result = 6,  ;Colls       Queuing Time (MIN)
         lookup[6] = 1,result = 7,  ;Expways     Queuing Time (MIN)
         lookup[7] = 1,result = 8,  ;Ramps       Queuing Time (MIN)
         FAIL=0,0,0, INTERPOLATE=T, file= @Que_File@
  ;
  ;----------------------------------------------------$
  ;    VDF (Volume Delay Function) establishment:       $
  ;----------------------------------------------------$
  ; Note:  curves updated 2/16/06 rjm/msm
  ;
  LOOKUP NAME=VCRV,
         lookup[1] = 1,result = 2,  ;Centroids   old VCRV1
         lookup[2] = 1,result = 3,  ;Fwys        old VCRV2
         lookup[3] = 1,result = 4,  ;MajArts     old VCRV3
         lookup[4] = 1,result = 5,  ;MinArts     old VCRV4
         lookup[5] = 1,result = 6,  ;Colls       old VCRV5
         lookup[6] = 1,result = 7,  ;Expways     old VCRV6
         lookup[7] = 1,result = 8,  ;Ramps       old VCRV2
         FAIL=0.00,0.00,0.00, INTERPOLATE=T,file=@VDF_File@

 ; Congested Time (TC)specification:
 ; Note: PCEs used for medium, heavy truck trips (1.5 and 2.0 used, respectively)
  FUNCTION {
/*    V    = vol[1] + vol[2] + vol[3] + (1.0 * vol[4]) + vol[5] + (1.0 * vol[6])  */
    TC[1]= T0*VCRV(1,VC) + (QTIME(1,VC) * LI.@Prd@_AllowQue)  ; TC(LINKCLASS) =
    TC[2]= T0*VCRV(2,VC) + (QTIME(2,VC) * LI.@Prd@_AllowQue)  ;   Uncongested
Time(T0) *
    TC[3]= T0*VCRV(3,VC) + (QTIME(3,VC) * LI.@Prd@_AllowQue)  ;   Volume Delay
Funtion(VDF)Value
    TC[4]= T0*VCRV(4,VC) + (QTIME(4,VC) * LI.@Prd@_AllowQue)  ;   VDF function is
based on VC
    TC[5]= T0*VCRV(5,VC) + (QTIME(5,VC) * LI.@Prd@_AllowQue)  ; Note: the LINKCLASS
is defined
    TC[6]= T0*VCRV(6,VC) + (QTIME(6,VC) * LI.@Prd@_AllowQue)  ; during the LINKREAD
phase below.
    TC[7]= T0*VCRV(7,VC) + (QTIME(7,VC) * LI.@Prd@_AllowQue)  ; during the LINKREAD
phase below.
  }
  ;
  ;
  ;
  CAPFAC=@CAPFAC@  ;
  ; 10 iterations changed to 20 (RM) 3/09/04 / GAP,AAD, RMSE,&RAAD params set to
zero
  ; 20 iterations changed to 40 (RM) 7/26/07
  ; 40 iterations changed to 60 (DV) 7/30/07
  ;  to ensure 'maxiters' iterations are completely executed (RM) 6/15/04 .
  MAXITERS=60     ;
  GAP  = 0.0      ; ** To ensure Max iterations are fully executed **
  AAD  = 0.0      ; ** To ensure Max iterations are fully executed **
  RMSE = 0.0      ; ** To ensure Max iterations are fully executed **
  RAAD = 0.0      ; ** To ensure Max iterations are fully executed **


PHASE=LINKREAD
```

```
      C     = CAPACITYFOR(LI.@PRD@LANE,LI.CAPCLASS) * @CAPFAC@
      SPEED = SPEEDFOR(LI.@PRD@LANE,LI.SPDCLASS)
      T0    = (LI.DISTANCE/SPEED)*60.0


   IF (ITERATION = 0)
     ; Define AM /OP link level tolls by vehicle type here:
        LW.SOV@PRD@TOLL = LI.@PRD@TOLL * @PRD@_TFAC(1,LI.TOLLGRP) ; SOV       TOLLS
in 1994 cents
        LW.HV2@PRD@TOLL = LI.@PRD@TOLL * @PRD@_TFAC(2,LI.TOLLGRP) ; HOV 2 occ TOLLS
in 1994 cents
        LW.HV3@PRD@TOLL = LI.@PRD@TOLL * @PRD@_TFAC(3,LI.TOLLGRP) ; HOV 3+occ TOLLS
in 1994 cents
        LW.TRK@PRD@TOLL = LI.@PRD@TOLL * @PRD@_TFAC(4,LI.TOLLGRP) ; Truck     TOLLS
in 1994 cents
        LW.APX@PRD@TOLL = LI.@PRD@TOLL * @PRD@_TFAC(5,LI.TOLLGRP) ; AP Pax    TOLLS
in 1994 cents

     ; Initial Iteration LINK IMPEDANCE (HIGHWAY TIME + Equiv.Toll/Time) by vehicle
type here:
         LW.SOV@PRD@IMP = T0    + (LW.SOV@PRD@TOLL/100.0)* SV@PRD@EQM ;SOV   IMP
         LW.HV2@PRD@IMP = T0    + (LW.HV2@PRD@TOLL/100.0)* H2@PRD@EQM ;HOV 2 IMP
         LW.HV3@PRD@IMP = T0    + (LW.HV3@PRD@TOLL/100.0)* H3@PRD@EQM ;HOV 3+IMP
         LW.TRK@PRD@IMP = T0    + (LW.TRK@PRD@TOLL/100.0)* TK@PRD@EQM ;Truck IMP
         LW.APX@PRD@IMP = T0    + (LW.APX@PRD@TOLL/100.0)* AP@PRD@EQM ;APAX  IMP

         IF (LI.@PRD@TOLL > 0)
            PRINT LIST = 'iteration: ',iteration(3),' A: ',A(7),' B: ',B(7),
           ' DISTANCE: ',LI.DISTANCE(6.2),
           ' LI.@PRD@TOLL: ',                        LI.@PRD@TOLL(5.2),
           ' FFSPEED: ',                                    SPEED(5.2),
           ' @PRD@_TFAC(1,LI.TOLLGRP): ',@PRD@_TFAC(1,LI.TOLLGRP)(5.1),
           ' SV@PRD@EQM: ',                             SV@PRD@EQM(5.1),
           ' LW.SOV@PRD@TOLL: ',                  LW.SOV@PRD@TOLL(5.2),
           ' T0: ',                                            T0(5.2),
           ' LW.SOV@PRD@IMP',                      LW.SOV@PRD@IMP(5.2),
            file = @prd@CHK.LKREAD
         ENDIF

    ENDIF



;$
    ;
    ;   The highway network is coded with limit codes from 1 to 9
    ;     Limit Code  Definition
    ;     --------  ---------------------
    ;        1      All vehicles accepted
    ;        2      Only HOV2 (or greater) vehicles accepted only
    ;        3      Only HOV3 vehicles accepted only
    ;        4      Med,Hvy Trks not accepted, all other traffic is accepted
    ;        5      Airport Passenger Veh. Trips
    ;        6-8    (Unused)
    ;        9      No vehicles are accepted at all
    ;
    IF     (LI.@PRD@LIMIT==1)
      ADDTOGROUP=1
    ELSEIF (LI.@PRD@LIMIT==2)
      ADDTOGROUP=2
    ELSEIF (LI.@PRD@LIMIT==3)
      ADDTOGROUP=3
    ELSEIF (LI.@PRD@LIMIT==4)
      ADDTOGROUP=4
    ELSEIF (LI.@PRD@LIMIT==5)
      ADDTOGROUP=5
    ELSEIF (LI.@PRD@LIMIT==6-8)
      ADDTOGROUP=6
```

```
    ELSEIF (LI.@PRD@LIMIT==9)
      ADDTOGROUP=7
    ENDIF

    IF (LI.FTYPE = 0)      ;  LinkClass related to TC[?] above
       LINKCLASS = 1       ;
    ELSEIF (LI.FTYPE = 1)  ;
       LINKCLASS= 2        ;
    ELSEIF (LI.FTYPE = 2)  ;
       LINKCLASS= 3        ;
    ELSEIF (LI.FTYPE = 3)  ;
       LINKCLASS= 4        ;
    ELSEIF (LI.FTYPE = 4)  ;
       LINKCLASS= 5        ;
    ELSEIF (LI.FTYPE = 5)  ;
       LINKCLASS= 6        ;
    ELSEIF (LI.FTYPE = 6)  ;
       LINKCLASS= 7        ;
    ENDIF

ENDPHASE

PHASE=ILOOP

   IF (I=1)
     LINKLOOP
       ; Initial Iteration LINK IMPEDANCE (HIGHWAY TIME + Equiv.Toll/Time) by
vehicle type here:
         LW.SOV@PRD@IMP = TIME    + (LW.SOV@PRD@TOLL/100.0)* SV@PRD@EQM ;SOV   IMP
         LW.HV2@PRD@IMP = TIME    + (LW.HV2@PRD@TOLL/100.0)* H2@PRD@EQM ;HOV 2 IMP
         LW.HV3@PRD@IMP = TIME    + (LW.HV3@PRD@TOLL/100.0)* H3@PRD@EQM ;HOV 3+IMP
         LW.TRK@PRD@IMP = TIME    + (LW.TRK@PRD@TOLL/100.0)* TK@PRD@EQM ;Truck IMP
         LW.APX@PRD@IMP = TIME    + (LW.APX@PRD@TOLL/100.0)* AP@PRD@EQM ;APAX  IMP

          IF (LI.@PRD@TOLL > 0)
               PRINT LIST = 'iteration: ',iteration(3),' A: ',A(7),' B: ',B(7),
              ' DISTANCE: ',LI.DISTANCE(6.2),
              ' LI.@PRD@TOLL: ',                        LI.@PRD@TOLL(5.2),
              ' FFSPEED: ',                                    SPEED(5.2),
              ' @PRD@_TFAC(1,LI.TOLLGRP): ',@PRD@_TFAC(1,LI.TOLLGRP)(5.1),
              ' SV@PRD@EQM: ',                            SV@PRD@EQM(5.1),
              ' LW.SOV@PRD@TOLL: ',                  LW.SOV@PRD@TOLL(5.2),
              ' T0: ',                                            T0(5.2),
              ' TIME: ',                                        TIME(5.2),
              ' LW.SOV@PRD@IMP',                      LW.SOV@PRD@IMP(5.2),
               file = @prd@CHK.LKLOOP
          ENDIF
     ENDLINKLOOP

   ENDIF


    PATH=LW.SOV@PRD@IMP,
      EXCLUDEGRP=2,3,5,6,7,   ; prohibitions for free SOV veh
      VOL[1]=MI.1.1
    PATH=LW.HV2@PRD@IMP,
      EXCLUDEGRP=3,5,6,7,     ; prohibitions for HOV2 veh
      VOL[2]=MI.1.2
    PATH=LW.HV3@PRD@IMP,
      EXCLUDEGRP=5,6,7,       ; prohibitions for HOV3 veh
      VOL[3]=MI.1.3
    PATH=LW.TRK@PRD@IMP,
      EXCLUDEGRP=2,3,4,5,6,7, ; prohibitions for medium, heavy trucks
      VOL[4]=MI.1.4,VOL[6]=MI.1.6
    PATH=LW.APX@PRD@IMP,
      EXCLUDEGRP=6,7,         ; prohibitions for Airport pass.veh trips
      VOL[5]=MI.1.5
```

```
;$

ENDPHASE

PHASE = ADJUST

ENDPHASE

ENDRUN



;-----------------------------------------------------------------------
;Step 3
;Calculate Restrained Speed/Perform MSA Volume/Speed Averaging
;
;-----------------------------------------------------------------------
if      (itr = 'pp' )
            itrno  = 0
 elseif (itr = 'i1')
            itrno  = 1
 elseif (itr = 'i2')
            itrno  = 2
 elseif (itr = 'i3')
            itrno  = 3
 elseif (itr = 'i4')
            itrno  = 4
 elseif (itr = 'i5')
            itrno  = 5
 elseif (itr = 'i6')
            itrno  = 6
endif


RUN PGM=HWYNET
  NETI=temp.net             ; input network from highway assignment
  NETO=temp@prd@.net,       ; output/@PRD@ network with updated speeds
       EXCLUDE=V_1,TIME_1,VC_1,V1_1, V2_1, V3_1, V4_1,V5_1,V6_1,
                          VT_1,V1T_1,V2T_1,V3T_1,V4T_1,V5T_1,V6T_1,
       OLDSPD,NEWVOL,OLDVOL,FFSPD,HRLKCAP,HRLNCAP,DCD,NEWSPD,ATYPE,
       VMT,EVDF,WOSPD,WNSPD,WFSPD,SPDDIFF,COMP,%_iter_%@prd@VMT,
       cspd_1,vdt_1,vht_1,FTPlus1

  _CNT=1                      ; link counter      (temporary variable)

     OLDVOL  = V_1                                                     ;
     NEWVOL  = V_1                                                     ;
     OLDSPD  = 0
     %_iter_%@prd@VOL = NEWVOL
IF   (DISTANCE > 0)
     OLDSPD=DISTANCE/@Prd@HTIME*60.0                                   ;
ENDIF                                                                  ;

IF        (@itrno@  = 2  )                                             ;
              OLDSPD       = %_prev_%@prd@spd                          ;
              OLDVOL       = %_prev_%@prd@VOL                          ;
              @itr@@prd@VOL = ROUND((OLDVOL*1/2)+(NEWVOL*1/2))         ;
   ELSEIF (@itrno@  = 3  )                                             ;
              OLDSPD       = %_prev_%@prd@spd                          ;
              OLDVOL       = %_prev_%@prd@VOL                          ;
              @itr@@prd@VOL = ROUND((OLDVOL*2/3)+(NEWVOL*1/3))         ;
   ELSEIF (@itrno@  = 4  )                                             ;
              OLDSPD       = %_prev_%@prd@spd                          ;
              OLDVOL       = %_prev_%@prd@VOL                          ;
              @itr@@prd@VOL = ROUND((OLDVOL*3/4)+(NEWVOL*1/4))         ;
   ELSEIF (@itrno@  = 5  )                                             ;
              OLDSPD       = %_prev_%@prd@spd                          ;
```

```
              OLDVOL        = %_prev_%@prd@VOL                      ;
              @itr@@prd@VOL = ROUND((OLDVOL*4/5)+(NEWVOL*1/5))      ;
   ELSEIF (@itrno@  = 6  )                                          ;
              OLDSPD        = %_prev_%@prd@spd                      ;
              OLDVOL        = %_prev_%@prd@VOL                      ;
              @itr@@prd@VOL = ROUND((OLDVOL*5/6)+(NEWVOL*1/6))      ;
ENDIF

  _VMT=0                      ;

  IF (FTYPE=1-6)
     _VMT=(V_1*DISTANCE)
  ENDIF


  FFSPD  =SPEEDFOR(@prd@LANE,SPDCLASS)     ; freeflow speed
  HRLKCAP=CAPACITYFOR(@prd@LANE,CAPCLASS)  ; hrly LINK capacity
  HRLNCAP=CAPACITYFOR(1,CAPCLASS)          ; hrly LANE capacity
  DCD=1

 IF (TIME_1 =  0)                          ; current (not averaged)
  NEWSPD    =  0                           ; assignment speed.  Should be
 ELSE                                      ; same as pp@prd@spd & bs@prd@spd
  NEWSPD=(DISTANCE*60)/TIME_1              ;
 ENDIF                                     ;

  ; Tabulate VMT, _CNT by FTYPE and JUR
  CROSSTAB VAR=_VMT, FORM=12cs, ROW=FTYPE, RANGE=0-6-1,0-6
  CROSSTAB VAR=_VMT, FORM=12cs, ROW=JUR,   RANGE=0-23-1,0-23
  CROSSTAB VAR=_CNT, FORM=12cs, ROW=FTYPE, RANGE=0-6-1,0-6
  CROSSTAB VAR=_CNT, FORM=12cs, ROW=JUR,   RANGE=0-23-1,0-23


  ;
  ;-----------------------------------------------------$
  ;    VDF (Volume Delay Function) establishment:       $
  ;-----------------------------------------------------$
  ; Note:  curves updated 2/16/06 rjm/msm
  ;
  LOOKUP NAME=VCRV,
         lookup[1] = 1,result = 2,  ;Centroids   old VCRV1
         lookup[2] = 1,result = 3,  ;Fwys        old VCRV2
         lookup[3] = 1,result = 4,  ;MajArts     old VCRV3
         lookup[4] = 1,result = 5,  ;MinArts     old VCRV4
         lookup[5] = 1,result = 6,  ;Colls       old VCRV5
         lookup[6] = 1,result = 7,  ;Expways     old VCRV6
         lookup[7] = 1,result = 8,  ;Rmps
         FAIL=0.00,0.00,0.00, INTERPOLATE=T,file=@VDF_File@


  ;-----------------------------------------------------$
  ;   Queuing Penalty Function (qtime = f(V/C))         $
  ;-----------------------------------------------------$
  ;   Time Penalty is a function of VC ratio
  ;
  ;
  LOOKUP NAME=QTIME,
         lookup[1] = 1,result = 2,  ;Centroids   Queuing Time (MIN)
         lookup[2] = 1,result = 3,  ;Fwys        Queuing Time (MIN)
         lookup[3] = 1,result = 4,  ;MajArts     Queuing Time (MIN)
         lookup[4] = 1,result = 5,  ;MinArts     Queuing Time (MIN)
         lookup[5] = 1,result = 6,  ;Colls       Queuing Time (MIN)
         lookup[6] = 1,result = 7,  ;Expways     Queuing Time (MIN)
         lookup[7] = 1,result = 8,  ;Ramps       Queuing Time (MIN)
         FAIL=0,0,0, INTERPOLATE=T, file= @Que_File@
  ;
  ; Obtain Area Type from 1st digit of SPDCLASS
  ATYPE=SPDCLASS%10
```

```
; Compute the Final VMT based on final volume
;      variable name: '<iteration><period>VMT')
;
;  %_iter_%@prd@VMT=ROUND(%_iter_%@prd@VOL*DISTANCE) ; Final VMT
   VMT=ROUND(%_iter_%@prd@VOL*DISTANCE) ; Final VMT

; Compute the Final VC ratio based on final volume
;      variable name: '<iteration><period>VC')
;
      %_iter_%@prd@VC=(%_iter_%@prd@VOL*(@pctadt@/100.0)/HRLKCAP)

; Compute the Final Volume Delay Function based on final volume
;      variable name: '<iteration><period>VDF')
;
       FTPlus1 = Ftype + 1
       %_iter_%@prd@VDF = VCRV(FTPlus1, %_iter_%@prd@VC)


; Compute the Final Volume Delay Function based on final volume
;      variable name: '<iteration><period>SPD')
;
   IF (DISTANCE = 0)
     %_iter_%@prd@SPD   = 0
    ELSE
     %_iter_%@prd@SPD = FFSPD / %_iter_%@prd@VDF
   ENDIF

; -----------------------------------------------
;  Consider Queuing Time  if Appropriate
; -----------------------------------------------

      _BaseSpeed                  =  %_iter_%@prd@SPD
      _BaseTime                   =  Distance / _Basespeed  * 60.0
      %_iter_%@prd@QTimePen       =  QTIME(FTPlus1, %_iter_%@prd@VC) *
@Prd@_AllowQue
      _FinalTime                  =  _BaseTime +  %_iter_%@prd@QTimePen
      _FinalSpeed                 =  Distance / _FinalTime * 60.0
      %_iter_%@prd@SPD            = _FinalSpeed

      IF (%_iter_%@prd@QTimePen > 0.0)
         Print list = a(6),b(6), Distance(5.2),' ',_BaseSpeed(6.2),' ',
_BaseTime(6.2),' ', %_iter_%@prd@VC(6.3),' ',
                     %_iter_%@prd@QTimePen(6.2), _FinalTime(6.2),' ',
_FinalSpeed(5.1),' ',%_iter_%@prd@SPD(5.1),
                    ' ',@Prd@_AllowQue(2),
                    ' <-- a,b, Dst, base speed,time, BaseVCRatio, TimePen, final
time,speed(2x) AllowQue',
                    file = %_iter_%@prd@QTimePen.txt
      ENDIF
; End Time Penalty section

; compute WEIGHTED OLD and Final SPEEDS for Aggregate summaries
      WOSPD=ROUND(VMT * OLDSPD)
      WNSPD=ROUND(VMT * %_iter_%@prd@SPD)
      WFSPD=ROUND(VMT * FFSPD)

; Compute current/previous Speed Differences at link level
;     ADIFF  = ROUND(ABS(%_iter_%@prd@SPD - OLDSPD))
      SPDDIFF= ROUND(%_iter_%@prd@SPD     - OLDSPD)


; Crosstab VMT,WOSPD,WNSPD, by FTYPE and JUR
    CROSSTAB VAR=VMT,WOSPD,WNSPD,_CNT,FORM=12cs,
     ROW=JUR,   RANGE=0-23-1,,0-23,
     COL=FTYPE, RANGE=1-6-1,1-6,
     COMP=WOSPD/VMT, FORM=12.2cs,   ; AVG INITIAL SPD
```

```
     COMP=WNSPD/VMT, FORM=12.2cs,    ; AVG FINAL SPD
     COMP=((WNSPD/VMT)-(WOSPD/VMT)), FORM=12.2cs ; DIFF(NEW-OLD)

; Crosstab VMT,WOSPD,WNSPD,_CNT2 by ATYPE and FTYPE
    CROSSTAB VAR=VMT,WOSPD,WNSPD,_CNT, FORM=12cs,
     ROW=ATYPE, RANGE=1-7-1,,1-7,
     COL=FTYPE, RANGE=1-6-1,1-6,
     COMP=WOSPD/VMT, FORM=12.2cs,   ; AVG INITIAL SPD
     COMP=WNSPD/VMT, FORM=12.2cs,    ; AVG FINAL SPD
     COMP=((WNSPD/VMT)-(WOSPD/VMT)), FORM=12.2cs ; DIFF(NEW-OLD)


; Crosstab VMT,WOSPD,WNSPD,WFSPD,_CNT2 by EVC and FTYPE
    CROSSTAB VAR=VMT,WOSPD,WNSPD,WFSPD,_CNT, FORM=12cs,
     ROW=%_iter_%@prd@VC, RANGE=0-2-0.1,,1-99,
     COL=FTYPE, RANGE=1-6-1,1-6,
     COMP=WOSPD/VMT, FORM=12.2cs,   ;  AVG INITIAL SPD
     COMP=WNSPD/VMT, FORM=12.2cs,    ; AVG FINAL SPD
     COMP=WFSPD/VMT, FORM=12.2cs,    ; Freeflow Speed
     COMP=((WFSPD/VMT)/(WOSPD/VMT)), FORM=12.2cs, ; AVG FINAL SPD
     COMP=((WFSPD/VMT)/(WNSPD/VMT)), FORM=12.2cs, ; AVG FINAL SPD
     COMP=((WNSPD/VMT)-(WOSPD/VMT)), FORM=12.2cs ; DIFF(NEW-OLD)

; Tabulate _CNT by SPEED DIFF GROUP
   CROSSTAB VAR=_CNT, FORM=12cs,
;       ROW=ADIFF, RANGE=0-2,3-5,6-8,9-11,12-14,15-17,18-100,0-100
        ROW=SPDDIFF,
        RANGE=-100--18,-17--15,-14--12,-11--9,-8--6,-5--3,-2-2,
                3-5,6-8,9-11,12-14,15-17,18-100,,-100-100

;     Tabulate _CNT2_PCT by SPEED DIFF GROUP
;    CROSSTAB VAR=_CNT_PCT, FORM=12.1cs,
;      ROW=ADIFF, RANGE=0-2,3-5,6-8,9-11,12-14,15-17,18-100,0-100

    ; PRINT TO check
    PRINT,
     LIST=A(5),' ',B(5),DISTANCE(7.2),' ',@PCTADT@(4.3),' ',@prd@LANE(2.0),' ',
     HRLKCAP(5.0),' ',HRLNCAP(5.0),' ',
     oldvol(8.2),' ',newvol(8.2),' ',%_iter_%@prd@VOL(8.2),' ',
     ffspd(5.1),' ',%_iter_%@prd@VC(6.4),' ',%_iter_%@prd@VDF(6.4),
     ' ',ftype(3.0),' ',ATYPE(3.0),
     ' ',vc_1(6.4),' ',NEWSPD(5.1),%_iter_%@prd@SPD(5.1),
;
;
           FILE=%_iter_%@prd@LLNK.ASC

ENDRUN
ENDLOOP
;-------------------------------------------------------------------
; Step 4
;   Summarize 24 hour VMT  of current AM, PM, & Off-Peak Assignments
;-------------------------------------------------------------------
;
;
RUN PGM=HWYNET
  NETI[1]=tempam.net
  NETI[2]=temppm.net
  NETI[3]=tempop.net
  NETO   =%_iter_%HWY.NET
 ;
 ;
  _VOLAM =  LI.1.%_iter_%amVOL
  _VOLPM =  LI.2.%_iter_%pmVOL
  _VOLOP =  LI.3.%_iter_%opVOL

; COMPUTE FINAL DAILY VOLUME  ON ALL LINKS
 %_iter_%24VOL =  _VOLAM + _VOLOP + _VOLPM  ; Total Daily Volume

; COMPUTE FINAL DAILY VMT ON ALL NON-CENTROID LINKS
IF (FTYPE = 0)
 %_iter_%24VMT =  0
 ELSE
 %_iter_%24VMT =  %_iter_%24VOL * DISTANCE  ; Total Daily VMT
ENDIF

;
;
IF (FTYPE=1-6)
  TVOL00=ROUND((_VOLAM+_VOLPM+_VOLOP)/1000.0) ; total hwy vol in 000s
  TVMT00=TVOL00*DISTANCE                      ; total hwy VMT in 000s
  ELSE
  TVOL00=0
  TVMT00=0                                    ;
ENDIF
;
IF (FTYPE=1-6 && COUNT > 0 || (AMLIMIT = 2-3 || PMLIMIT=2-3 || OPLIMIT=2-3))
  TVolEST=TVol00           ; total hwy vol in 000s
  TVolobs=count            ; total hwy vol in 000s
  TVMTEST=TVMT00           ; total hwy vol in 000s
  TVMTOBS=count*DISTANCE   ; total hwy VMT in 000s
  ELSE
  Tvmtest=0
  TVMTobs=0                                  ; total hwy VMT in 000s
ENDIF
;

  comp atype=spdclass%10       ; area type code     1-7
                               ;  its the first digit of spdclass var
; Crosstab TVMTEST,TVMTOBS by ATYPE and FTYPE
    CROSSTAB VAR=TVMTEST,TVMTOBS, FORM=8cs,
             ROW=ATYPE, RANGE=1-7-1,,1-7,
             COL=FTYPE, RANGE=0-6-1,0-6,
             COMP=TVMTEST-TVMTOBS, FORM=8cs,   ; Difference  (est-obs)
             COMP=TVMTEST/TVMTOBS, FORM=8.2cs  ; Ratio       (est/obs)

; Crosstab TVMTEST,TVMTOBS by Jurisdiction and FTYPE
    CROSSTAB VAR=TVMTEST,TVMTOBS, FORM=8cs,
             ROW=JUR,   RANGE=0-23-1,,0-23,
             COL=FTYPE, RANGE=0-6-1,0-6,
             COMP=TVMTEST-TVMTOBS, FORM=8cs,   ; Difference  (est-obs)
             COMP=TVMTEST/TVMTOBS, FORM=8.2cs  ; Ratio       (est/obs)

; Crosstab TVMTEST,TVMTOBS by Screenline and FTYPE
    CROSSTAB VAR=TVolEST,TVolOBS, FORM=8cs,
             ROW=SCREEN, RANGE=1-38-1,,1-38,
             COL=FTYPE,  RANGE=0-6-1,0-6,
             COMP=TVolEST-TVolOBS, FORM=8cs,   ; Difference  (est-obs)
             COMP=TVolEST/TVolOBS, FORM=8.2cs  ; Ratio       (est/obs)
; ------------------------------------------------------------------
; ------------------------------------------------------------------
; Crosstab Total VMT by Jurisdiction and FTYPE
    CROSSTAB VAR=%_iter_%24VMT, FORM=12cs,
             ROW=JUR,   RANGE=0-23-1,,0-23,
             COL=FTYPE, RANGE=0-6-1,0-6


ENDRUN
```

9 highway_build_toll.s

```
;=================================================================
;  HIGHWAY_BUILD_TOLL.S
;
;  MWCOG Version 2.2 Model  - Highway Network Building Program
;
;  This program includes the functions of the closestp, atypetp,
;  and arealktp programs in Version 2.1/TP+ Release C.
;  NOTE: Step 1.4 (Highway network build) updated on 3/28/04
;        to ensure TOLLGRP is coded with a value of '1' for
;        the condition: TOLL > 0 and TOLLGRP = 0.
;
;
;  STEP 1.1 - 1.5 BUILD BASE HIGHWAY NETWORK
;         INPUT:  node.asc, link.asc, zone.asc, areaover.asc,
;                 amspd.lkp, opspd.lkp, tazamspd.lkp,tazopspd.lkp,
;                 atype.asc
;
;        OUTPUTS:  zonehwy.net  --BUILT HIGHWAY NETWORK(AM,PM,Off-Pk)
;                  wlknet.tb    --(Walk links, transit netwk)
;                  trn_fwyn.asc --highway links,freeway nodes)
;
;  STEP 2 - DEVELOP ZONAL HIGHWAY TERMINAL TIMES
;               INPUT:    ZONE.ASC      --Zonal land use file
;               OUTPUT:   ZTERMTM.ASC   --Zonal Highway Terminal Time file
;
;========================================================================
;; Updates:
; modified by DV to allow for tollgrp=10; 8/16/2005
; tollgrp now takes up fields 66-67, not just 67; 8/16/2005
;
;; V2.2 Updates:
;  11/7/06/RM  - Steps 1.1 and 1.2 changed to read and process RECI
;                file inputs.
;              - Toll Group code field expanded from  66-67 to
;                66-69 to accommodate HOT lane Work (now is 4 digits)
;              - Cnt_Type link attribute added to further clarify COUNT;
;                The codes will be: 0/ no count or unknown count type
;                                   1/ Permanent Count, full year operation
;                                   2/ Permanent Count, part year operation
;                                   6/ Program count collected during current yr
;                                   7/ Program count collected previous year,
;                                          but adjusted to current year
;                HWY_Deflator.txt is now used - as a default deflation factor
;
;  6/14/07/RM  - Added script section to create ALLOWQUE link attribute.
;                (=1/ to allow queuing delay; 0/to disallow queuing)
;                The new section begins at ';; AllowQue Begin ;; '
;                and ends at:              ';; AllowQue End ;;  '
;
;                AREA TYPE OVERRIDE LOOKUP in the TOLL.ESC File (TG_ATOVR)
;                is now used to aover ride area types for any tolled facility.
;  1/24/08       Section added to develop AM_AllowQue, PM_AllowQue, &OP_AllowQue
;                variables.  Note: inactive HOV facilities in the Link.asc file
;                should have limit codes of '9' on mainline AND ramps!!
;  1/25/08       Toll.esc should have added lookup table named 'TOLLTYPE'
;                New variables are added: AMToll_VP,PMToll_VP,OPToll_VP,
;                which reflect Tolls on variabley priced/managed type facilities
;                ONLY.  These will be used to develop special highway time
;                toll skims used in the mode choice model
;  4/14/08       \Support\AMSPD.LKP and \Support\OPSPD.LKP is now used as basis for
initial
;                highway speeds(these files used to be in the inputs subdirectory).
;                TAZAMSPD.LKP and TAZOPSPD.LKP in the inputs subdirectory
;                no longer used.
;
; 5/15/08        Nullified the changes made on 4/14/08, due to excessive VMT.
;                 (All lookup files are now in the support subdir.)
;
```

```
;=======================================================================
;
; PARAMETERS / Files DEFINED in TP MAIN:
;


  ZONESIZE  =  2191                ; Max. TAZ No.            (Param)
  LSTITAZ   =  2144                ; Last Internal Zone No.  (Param)

  NODEFILE  = 'INPUTS\NODE.ASC'     ; Node X/Y File           (I/P file)
  LINKFILE  = 'INPUTS\LINK.ASC'     ; Node X/Y File           (I/P file)
  ZONEFILE  = 'INPUTS\ZONE.ASC'     ; Zonal Land Use File     (I/P file)

  AT_OVR    = 'INPUTS\AREAOVER.ASC' ; Area Type Override file (I/P file)

  ;FFSPDLKP  = '..\SUPPORT\FreeFlow_Speed_Lookup.txt'  ; Free-Flow Speed lookup
ATxFT   (I/P file)

  AMSPD      = '..\support\AMSPD.LKP'    ; AM Speed lookup ATxFT   (I/P file)
  OPSPD      = '..\support\OPSPD.LKP'    ; OP Speed lookup ATxFT   (I/P file)
  AMSPDTF    = '..\support\TAZAMSPD.LKP' ; AM Speed lookup TAZxFT  (I/P file)
  OPSPDTF    = '..\support\TAZOPSPD.LKP' ; OP Speed lookup TAZxFT  (I/P file)

  IN_TESC   = 'INPUTS\TOLL.ESC'     ; INPUT Toll Escalation Param file
  HWY_Defl  = 'HWY_Deflator.txt'    ; INPUT Default Highway Deflator not defined in
toll.esc file

  TCRDFILE  = 'TAZCRD.ASC'          ; TAZ X/Y File            Temp. File
  ATYPFILE  = 'ATYPE.ASC'           ; Zonal Area Type file    (O/P file)
  OU_BSNET  = 'ZONEHWY.NET'         ; OUTPUT BUILT network FILE

;--------------------------------------------------------------------
; STEP 1.1: Create TAZ Coordinate File from 'full' Network Node
;           Coordinate File.  Put results in TAZCRD.ASC file
;--------------------------------------------------------------------


RUN PGM=MATRIX

RECI=@NODEFILE@, Fields= 1-6, 7-14, 15-22  ; node/xCRD/yCRD
;
; If current node is within the TAZ number range, print out XY Coords.
;
   IF (RECI.NFIELD[1]  <=  @ZONESIZE@)

      PRINT
LIST=reci.nfield[1](5),reci.nfield[2](10),reci.nfield[3](10),FILE=TAZCRD.ASC

   ENDIF

ENDRUN


;--------------------------------------------------------------------
; STEP 1.2:  Find the Closest TAZ to each Highway node in the system.
;            Put results in NODCRDZN.ASC file
;--------------------------------------------------------------------

RUN PGM=MATRIX
RECI=@NODEFILE@, Fields= 1-6, 7-14, 15-22  ; node/xCRD/yCRD
;
; Read in TAZ XY file as a lookup...
;
LOOKUP NAME=TAZCRD,
       LOOKUP[1] = 1, RESULT=2,     ; X Crd of (TAZ)
       LOOKUP[2] = 1, RESULT=3,     ; Y Crd of (TAZ)
       INTERPOLATE=N, FAIL= 0,0,0, FILE=TAZCRD.ASC
```

```
;
; If current node is a TAZ and XYs are non-zero then
; the closest TAZ is itself.  Write it out.
;
;

IF     (reci.nfield[1] <= @ZONESIZE@ )
             NODE_TAZ = reci.nfield[1]
             NODEXCRD = reci.nfield[2]
             NODEYCRD = reci.nfield[3]
             MINDIST  = 0

          PRINT LIST=reci.nfield[1](6),reci.nfield[2](8) ,reci.nfield[3](8),
                     NODE_TAZ(8),MINDIST(8.2),FILE=NODCRDZN.ASC

;
; Else if current node is a non-TAZ and XYs are non-zero then
; loop through each TAZ, compute the node-TAZ distance and
; determine which TAZ is closest. Write it out.
;

ELSE

    MiNDIST =9999999.      ; initialize minimum distance to large no.

     LOOP IDX=1,@ZONESIZE@
                CURDIST=  SQRT((reci.nfield[2] - TAZCRD(1,IDX))**2 +
                               (reci.nfield[3] - TAZCRD(2,IDX))**2)/5280.

                IF (CURDIST    < MiNDIST)
                    NODEXCRD    = reci.nfield[2]
                    NODEYCRD    = reci.nfield[3]
                    MINDIST     = CURDIST
                    NODE_TAZ    = IDX

                ENDIF

     ENDLOOP

      PRINT LIST=reci.nfield[1](6),reci.nfield[2](8) ,reci.nfield[3](8),
                     NODE_TAZ(8),MINDIST(8.2),FILE=NODCRDZN.ASC
ENDIF



ENDRUN

;---------------------------------------------------------------------
; STEP 1.3:  Determine the Area Type of each TAZ based on the 1-mile
;      'floating' pop and emp density.  Put results in AREATP.ASC file.
;---------------------------------------------------------------------

RUN PGM=MATRIX
ZONES=@ZONESIZE@

; Keep zone arrays for the 'floating' pop, emp, area, pop. density,
; emp. density, pop den class, emp den class, 'standard' area type,
; & 'final' (override) areatype

ARRAY CUMPOP  = @ZONESIZE@, CUMEMP = @ZONESIZE@, CUMAREA  = @ZONESIZE@,
      POPDEN  = @ZONESIZE@, EMPDEN = @ZONESIZE@, POPDCL   = @ZONESIZE@,
      EMPDCL  = @ZONESIZE@, AREATP = @ZONESIZE@, F_AREATP = @ZONESIZE@

;
; read land use file into lookup table
;
ZDATI[1] = @ZONEFILE@ ,Z       =  1- 4,
                       HH      =  8-15,
                       HHPOP   = 16-23,
                       GQPOP   = 24-31,
                       TOTPOP  = 32-39,
                       TOTEMP  = 40-47,
                       INDEMP  = 48-55,
                       RETEMP  = 56-63,
                       OFFEMP  = 64-71,
                       OTHEMP  = 72-79,
                       JURCODE = 80-81,
                       AREA    = 83-92
;
; read TAZ XY file into lookup table
;

ZDATI[2] = @TCRDFILE@ ,Z       =  1- 5,
                       X       =  6-15,
                       Y       = 16-25



;
; Define Area Type codes based on pop/emp classes in lookup table
;

LOOKUP NAME=ATL,
       LOOKUP[1] = 1, RESULT=2,
       LOOKUP[2] = 1, RESULT=3,
       LOOKUP[3] = 1, RESULT=4,
       LOOKUP[4] = 1, RESULT=5,
       LOOKUP[5] = 1, RESULT=6,
       LOOKUP[6] = 1, RESULT=7,
       LOOKUP[7] = 1, RESULT=8,
       INTERPOLATE=N, FAIL= 0,0,0,
;
;    POP    Emp    Emp    Emp    Emp    Emp    Emp    Emp
;  Density  Den.   Den.   Den.   Den.   Den.   Den.   Den.
;   Class   Class1 Class2 Class3 Class4 Class5 Class6 Class7
;  ------   ------ ------ ------ ------ ------ ------ ------
     R=" 1,   7,     7,     5,     5,     2,     2,     2   ",
       " 2,   7,     5,     5,     5,     2,     2,     2   ",
       " 3,   6,     6,     5,     5,     2,     2,     2   ",
       " 4,   6,     6,     4,     3,     2,     2,     2   ",
       " 5,   4,     4,     3,     3,     2,     2,     1   ",
       " 6,   4,     3,     3,     3,     2,     2,     1   ",
       " 7,   3,     3,     3,     2,     2,     2,     1   "


;
; Zonal Area Type Overrides
;

LOOKUP NAME=ATOVR,
       LOOKUP[1] = 1, RESULT=2,    ;  AREA TYPE (1-7) Override
       INTERPOLATE=N, FAIL= 0,0,0,  FILE=@AT_OVR@
;
;

;
; Accumulate 1-mi 'floating' pop & emp & area here, for each TAZ
;
;
 LOOP IDX=1,@ZONESIZE@
  CURDIST=
   SQRT((X[I] - X[IDX])**2 + (Y[I]-Y[IDX])**2)/ 5280.
```

```
  IF (CURDIST < 1.00 && X[I] > 0 && X[IDX] > 0)
      CUMPOP[I]  = CUMPOP[I]  + TOTPOP[IDX]
      CUMEMP[I]  = CUMEMP[I]  + TOTEMP[IDX]
      CUMAREA[I] = CUMAREA[I] + AREA[IDX]
  ENDIF
 ENDLOOP

;
; Now that we have the floating pop & emp & area, compute the
; floating population / employment density
;

IF (CUMAREA[I]   = 0)
       POPDEN[I]    =  0
       EMPDEN[I]    =  0
ELSE
       POPDEN[I] =  CUMPOP[I] / CUMAREA[I]
       EMPDEN[I] =  CUMEMP[I] / CUMAREA[I]
ENDIF

;
; Use the floating pop & emp density to determine the
; population density class, employment density class
-
;


IF     (POPDEN[I]  <     100. )
        POPDCL[I]  =       1
ELSEIF (POPDEN[I]  <     350. )
        POPDCL[I]  =       2
ELSEIF (POPDEN[I]  <    1500. )
        POPDCL[I]  =       3
ELSEIF (POPDEN[I]  <    3500. )
        POPDCL[I]  =       4
ELSEIF (POPDEN[I]  <    6500. )
        POPDCL[I]  =       5
ELSEIF (POPDEN[I]  <   10000. )
        POPDCL[I]  =       6
ELSE
        POPDCL[I]  =       7
ENDIF



IF     (EMPDEN[I]  <     100. )
        EMPDCL[I]  =       1
ELSEIF (EMPDEN[I]  <     500. )
        EMPDCL[I]  =       2
ELSEIF (EMPDEN[I]  <    1500. )
        EMPDCL[I]  =       3
ELSEIF (EMPDEN[I]  <    5000. )
        EMPDCL[I]  =       4
ELSEIF (EMPDEN[I]  <   15000. )
        EMPDCL[I]  =       5
ELSEIF (EMPDEN[I]  <   35000. )
        EMPDCL[I]  =       6
ELSE
        EMPDCL[I]  =       7
ENDIF

;
; The pop den class, emp den class are then used to determine
; the area type
;

AREATP[I] = ATL(EMPDCL[I],POPDCL[I])
```

```
;
; Impose null overrides for external zones
;

IF    (I > @LSTITAZ@ )
      CUMPOP[I]  =  0
      CUMEMP[I]  =  0
      CUMAREA[I] =  0
      POPDEN[I]  =  0
      EMPDEN[I]  =  0
      POPDCL[I]  =  1
      EMPDCL[I]  =  1
      AREATP[I]  =  7
ENDIF



;
; The Final area-type equals standard area type...
;
        F_AREATP[I]   = AREATP[I]    ;  Final Area Type = 'Standard' AT

;
; ...unless a non-zero area-type override code exists
;
      IF (ATOVR(1,I)  >  0)          ;
        F_AREATP[I]   = ATOVR(1,I)
      ENDIF

; all done
; -------------------------------------------------------------------
; -------------------------------------------------------------------
;  If at the last zone, print out results and compute basic stats
;

LOOP IDX=1,@ZONESIZE@
  IF (I =  @ZONESIZE@)
;
;  Accumulate Final Area Type Frequencies for listing
;
   IF (F_AREATP[IDX] = 1)
    AT1_CNT = AT1_CNT + 1
    TPOP1=TPOP1+TOTPOP[IDX]
    TEMP1=TEMP1+TOTEMP[IDX]
   ENDIF
   IF (F_AREATP[IDX] = 2)
    AT2_CNT = AT2_CNT + 1
    TPOP2=TPOP2+TOTPOP[IDX]
    TEMP2=TEMP2+TOTEMP[IDX]
   ENDIF
   IF (F_AREATP[IDX] = 3)
    AT3_CNT = AT3_CNT + 1
    TPOP3=TPOP3+TOTPOP[IDX]
    TEMP3=TEMP3+TOTEMP[IDX]
   ENDIF
   IF (F_AREATP[IDX] = 4)
    AT4_CNT = AT4_CNT + 1
    TPOP4=TPOP4+TOTPOP[IDX]
    TEMP4=TEMP4+TOTEMP[IDX]
   ENDIF
   IF (F_AREATP[IDX] = 5)
    AT5_CNT = AT5_CNT + 1
    TPOP5=TPOP5+TOTPOP[IDX]
    TEMP5=TEMP5+TOTEMP[IDX]
   ENDIF
   IF (F_AREATP[IDX] = 6)
    AT6_CNT = AT6_CNT + 1
    TPOP6=TPOP6+TOTPOP[IDX]
```

```
     TEMP6=TEMP6+TOTEMP[IDX]
   ENDIF
   IF (F_AREATP[IDX] = 7)
    AT7_CNT = AT7_CNT + 1
    TPOP7=TPOP7+TOTPOP[IDX]
    TEMP7=TEMP7+TOTEMP[IDX]
   ENDIF

   IF (F_AREATP[IDX] < 1)   ERR_CNT = ERR_CNT+1
   IF (F_AREATP[IDX] > 7)   ERR_CNT = ERR_CNT+1

   TOT_CNT = TOT_CNT+1 TPOP =TPOP +TOTPOP[IDX]  TEMP =TEMP +TOTEMP[IDX]

   IF (ATOVR(1,IDX)  > 0 )
    PRINT LIST= IDX(5),TOTPOP[IDX](8),TOTEMP[IDX](8),AREA[IDX](8.2),
          CUMPOP[IDX](8),CUMEMP[IDX](8),CUMAREA[IDX](8.2),
          POPDCL[IDX](4),EMPDCL[IDX](4),AREATP[IDX](4),
          F_AREATP[IDX](4),'   ; * (Override) ',
          FILE=ATYPE.ASC
    ELSE
    PRINT LIST= IDX(5),TOTPOP[IDX](8),TOTEMP[IDX](8),AREA[IDX](8.2),
          CUMPOP[IDX](8),CUMEMP[IDX](8),CUMAREA[IDX](8.2),
          POPDCL[IDX](4),EMPDCL[IDX](4),AREATP[IDX](4),
          F_AREATP[IDX](4),'   ;             ',
          FILE=ATYPE.ASC
   ENDIF

;  PRINT VARIANT ZONAL FILE FOR PUMP_PRIME_SKIMS.S AND TRIP GEN PROGRAM
    PRINT LIST= IDX(5),' ',X[IDX](8),Y[IDX](8),
          TOTPOP[IDX](5),' ',TOTEMP[IDX](5),' ',AREA[IDX](8.4),
          CUMPOP[IDX](6),' ',CUMEMP[IDX](6),'   ',
          F_AREATP[IDX](1),
          FILE = BASEZON.DAT



  ENDIF



ENDLOOP

;
;  Compute Final Area Type Percentages for listing
;


 IF (I = @ZONESIZE@)
  AT1_PCT= AT1_CNT / TOT_CNT * 100.
  AT2_PCT= AT2_CNT / TOT_CNT * 100.
  AT3_PCT= AT3_CNT / TOT_CNT * 100.
  AT4_PCT= AT4_CNT / TOT_CNT * 100.
  AT5_PCT= AT5_CNT / TOT_CNT * 100.
  AT6_PCT= AT6_CNT / TOT_CNT * 100.
  AT7_PCT= AT7_CNT / TOT_CNT * 100.
  TOT_PCT= TOT_CNT / TOT_CNT * 100.
  ERR_PCT= ERR_CNT / TOT_CNT * 100.

  TPOP1PT= TPOP1 / TPOP * 100.
  TPOP2PT= TPOP2 / TPOP * 100.
  TPOP3PT= TPOP3 / TPOP * 100.
  TPOP4PT= TPOP4 / TPOP * 100.
  TPOP5PT= TPOP5 / TPOP * 100.
  TPOP6PT= TPOP6 / TPOP * 100.
  TPOP7PT= TPOP7 / TPOP * 100.
  TPOP_PT= TPOP  / TPOP * 100.
```

```
  TEMP1PT= TEMP1 / TEMP * 100.
  TEMP2PT= TEMP2 / TEMP * 100.
  TEMP3PT= TEMP3 / TEMP * 100.
  TEMP4PT= TEMP4 / TEMP * 100.
  TEMP5PT= TEMP5 / TEMP * 100.
  TEMP6PT= TEMP6 / TEMP * 100.
  TEMP7PT= TEMP7 / TEMP * 100.
  TEMP_PT= TEMP  / TEMP * 100.


    PRINT LIST= ' Area Type Statistics '
    PRINT LIST= '---------------------'
    PRINT LIST= '               '
    PRINT LIST= '              TAZ Count '  ,'    ',' TAZ Pct.   ','    ','
POPULATION ','    ',' POP Pct.   ','    ',' EMPLOYMENT ','    ',' EMP Pct.   '
    PRINT LIST= '             -----------'  ,'    ','-----------','    ','---------
---','    ','-----------','    ','-----------','    ','------------'
    PRINT LIST= 'Area Type 1: ', AT1_CNT(11),'    ',AT1_PCT(11.2) ,'    ',
TPOP1(11)   ,'    ',TPOP1PT(11.2) ,'    ',  TEMP1(11)   ,'    ',TEMP1PT(11.2)
    PRINT LIST= 'Area Type 2: ', AT2_CNT(11),'    ',AT2_PCT(11.2) ,'    ',
TPOP2(11)   ,'    ',TPOP2PT(11.2) ,'    ',  TEMP2(11)   ,'    ',TEMP2PT(11.2)
    PRINT LIST= 'Area Type 3: ', AT3_CNT(11),'    ',AT3_PCT(11.2) ,'    ',
TPOP3(11)   ,'    ',TPOP3PT(11.2) ,'    ',  TEMP3(11)   ,'    ',TEMP3PT(11.2)
    PRINT LIST= 'Area Type 4: ', AT4_CNT(11),'    ',AT4_PCT(11.2) ,'    ',
TPOP4(11)   ,'    ',TPOP4PT(11.2) ,'    ',  TEMP4(11)   ,'    ',TEMP4PT(11.2)
    PRINT LIST= 'Area Type 5: ', AT5_CNT(11),'    ',AT5_PCT(11.2) ,'    ',
TPOP5(11)   ,'    ',TPOP5PT(11.2) ,'    ',  TEMP5(11)   ,'    ',TEMP5PT(11.2)
    PRINT LIST= 'Area Type 6: ', AT6_CNT(11),'    ',AT6_PCT(11.2) ,'    ',
TPOP6(11)   ,'    ',TPOP6PT(11.2) ,'    ',  TEMP6(11)   ,'    ',TEMP6PT(11.2)
    PRINT LIST= 'Area Type 7: ', AT7_CNT(11),'    ',AT7_PCT(11.2) ,'    ',
TPOP7(11)   ,'    ',TPOP7PT(11.2) ,'    ',  TEMP7(11)   ,'    ',TEMP7PT(11.2)
    PRINT LIST= '  '
    PRINT LIST= '- Total ---- ', TOT_CNT(11),'    ',TOT_PCT(11.2) ,'    ',
TPOP(11)   ,'    ',TPOP_PT(11.2) ,'    ',  TEMP(11)   ,'    ',TEMP_PT(11.2)
    PRINT LIST= '  '
    PRINT LIST= '  '
    PRINT LIST= '  '
    PRINT LIST= 'Error Count  ', Err_CNT(11),'    ',Err_PCT(11.2)
  ENDIF

ENDRUN


;==================================================================
;  Step 1.4.
;  Highway Building  - Part 1,
;                    Develop Area type, Spdclass/CapClass Vars
;
;==================================================================
;
;
;


RUN PGM = HWYNET
ZONES=@ZONESIZE@

READ FILE=@IN_TESC@

; Node Coordinate File
; XY Units are NAD83 (in whole feet)
FILEI NODEI=NODCRDZN.ASC,
        VAR=N,01-06,   ; Node
        VAR=X,07-14,   ; X Crd
        VAR=Y,15-22,   ; Y Crd
        VAR=TZ,27-30,  ; Nearest TAZ associated with node
        VAR=DS,33-38   ; Distance from node to nearest taz

; Highway Links
```

```
FILEI LINKI=@LINKFILE@,
        VAR=A,01-05,         ; A-Node Number
        VAR=B,06-10,         ; B-Node Number
        VAR=DISTANCE,13-17,  ; Distance in whole miles (xx.xx)
        VAR=SPDCLASS,23-24,  ; Speed Class(optional)
        VAR=CAPCLASS,26-27,  ; Capacity Class(optional)
        VAR=COUNT,30-33,     ; Observed AAWDT in 1000's
        VAR=CNT_TYPE,35-36,  ; Count Type 0,1,2,6,7
        VAR=JUR,39-40,       ; Jurisdiction Code (0-23)
        VAR=SCREEN,51-52,    ; Screenline Code   (1-36)
        VAR=FTYPE,54-55,     ; Facility Type Code (0-6)
        VAR=TOLL,61-64,      ; Current year Toll Value in cents
        VAR=TOLLGRP,66-69,   ; Toll Group code (1-10)
        VAR=AMLANE,81-82,    ; AM Peak Prd. No. of Lanes
        VAR=AMLIMIT,84-85,   ; AM Peak Period Operation Code (0-9)
        VAR=PMLANE,87-88,    ; PM Peak Prd. No. of Lanes
        VAR=PMLIMIT,90-91,   ; PM Peak Period Operation Code (0-9)
        VAR=OPLANE,93-94,    ; Off-Peak Prd. No. of Lanes
        VAR=OPLIMIT,96-97,   ; Off-Peak Period Operation Code (0-9)
        VAR=PROJ_ID,TYP=A,BEG=107,LEN=10; Project ID String

;   Note:
;   The Standard SPDCLASS(1-67), CAPCLASS(1-67),& TAZ defined below
;

; WRITE TEMPORARY NETWORK TO BE PASSED ONTO NEXT STEP
NETO=TEMP.NET


;-------------------------------------------------------------
; Develop Link Area type/ Spdclass/ Capclass Attributes      -
;-------------------------------------------------------------

;
; Zonal Area Type Lookup (produced above)
;

LOOKUP NAME=ZNAT,
       LOOKUP[1] = 1, RESULT=11,   ; ZONAL AREA TYPE (1-7)
       INTERPOLATE=N, FAIL= 0,0,0, LIST=N, FILE=@ATYPFILE@


;
; The TAZ designated for the link is that with the minimum distance
; to either the A-node or the B-node
;

            TAZ=A.TZ
            IF (B.DS < A.DS)
               TAZ=B.TZ
            ENDIF
           AREATP   =  ZNAT(1,TAZ)            ;  Area Type
;
;
;  Here we will over ride the standard default Area Type code
;  if the user specifies an area type override range (Min, Max)
;  (via TG_ATOVR lookup table in the TOLL.ESC file)

           _TG_ATMin  =    TG_ATOVR(1,TOLLGRP)
           _TG_ATMax  =    TG_ATOVR(2,TOLLGRP)
           _DefaultAT =    AREATP

           IF (_TG_ATMin > 0 && _DefaultAT < _TG_ATMin) AREATP = _TG_ATMin
           IF (_TG_ATMax > 0 && _DefaultAT > _TG_ATMax) AREATP = _TG_ATMax


           IF (AREATP < 1 || AREATP > 7)  ABORT
;
;
; With the TAZ designated, now the speed/capacity class is defined as
; a two-digit code-- facility type & areatype
;
           SPDCLASS =  FTYPE*10 + AREATP      ;  Speed Class
           CAPCLASS =  FTYPE*10 + AREATP      ;  Capacity Class


;
;
; Check that TOLLGRP is coded for any link coded with a TOLL value-
;  IF TOLLGRP is not coded with non-zero value, then give it a default
;  value of '1.0'
;
          IF (TOLL > 0.0 && TOLLGRP = 0.0)
              TOLLGRP = 1.0
          ENDIF
;
ENDRUN


;=================================================================
; Step 1.5:
;  Highway Building  - Part 2, compute initial highway speed,
;                              write out support files
;=================================================================
;
;

RUN PGM = HWYNET

ZONES=@ZONESIZE@

NETI=TEMP.NET
; output network in TP+ format
NETO=ZONEHWY.tem

READ FILE=@IN_TESC@
READ FILE=@HWY_Defl@
;
; Compute AM, PM, Off-Peak Tolls
; The tolls are read in as undeflated, based on the coded TOLL value on the
;  link and/or as a function of a distance based rate;
;  The defaltion is handled below.  If the 'escfac' lookup (in the TOLL.ESC file)
;  is non-zero, then it is used to deflate.  If it is zero, then the the default
;  highway deflator 'DEFLATION' (calculated in the SET_Factors.s script) is used.
;  The recommended appraoch is to set the 'escfac' lookup array to zero and use
;  HWY_Deflator
;

; deflated toll based on escfac:
AMTOLL=(TOLL+(DSTFAC(1,tollgrp)*DISTANCE))*TTFAC(1,tollgrp)*escfac(1,tollgrp)
PMTOLL=(TOLL+(DSTFAC(1,tollgrp)*DISTANCE))*TTFAC(2,tollgrp)*escfac(1,tollgrp)
OPTOLL=(TOLL+(DSTFAC(1,tollgrp)*DISTANCE))*TTFAC(3,tollgrp)*escfac(1,tollgrp)


; if escfac set to zero then deflate based on HWY_Deflator:
  IF (AMTOLL = 0)
      AMTOLL=(TOLL+(DSTFAC(1,tollgrp)*DISTANCE))*TTFAC(1,tollgrp)*DEFLATIONFTR
  ENDIF
  IF (PMTOLL = 0)
      PMTOLL=(TOLL+(DSTFAC(1,tollgrp)*DISTANCE))*TTFAC(2,tollgrp)*DEFLATIONFTR
  ENDIF
  IF (OPTOLL = 0)
      OPTOLL=(TOLL+(DSTFAC(1,tollgrp)*DISTANCE))*TTFAC(3,tollgrp)*DEFLATIONFTR
  ENDIF
; -------------------------------------------------------------------------
; 1/25/08/ rm  Changes made to develop special travel times/tolls for the MC
;              program regarding variably priced facilities
```

```
   AMTOLL_VP = 0
   PMTOLL_VP = 0
   OPTOLL_VP = 0



; Check that coded tolls have a TOLLTYPE designation
;  then define tolls on variably priced facilities ONLY
  _TOLLTP   =  TOLLTYPE(1,tollgrp)       ;
  IF ((AMTOLL > 0 || PMTOLL > 0 || OPTOLL>0) && _TOLLTP = 0)
      LIST=' non-zero TOLL exists on a link has a zero TOLLTYPE code'
      abort
   ELSEIF (_TOLLTP = 2)
      AMTOLL_VP = (TOLL+(DSTFAC(1,tollgrp)*DISTANCE))*TTFAC(1,tollgrp)*DEFLATIONFTR
      PMTOLL_VP = (TOLL+(DSTFAC(1,tollgrp)*DISTANCE))*TTFAC(2,tollgrp)*DEFLATIONFTR
      OPTOLL_VP = (TOLL+(DSTFAC(1,tollgrp)*DISTANCE))*TTFAC(3,tollgrp)*DEFLATIONFTR
  ENDIF
; ---------------------------------------------------------------------------

;-------------------------------------------------------------
;  ICC freeflow speed/capacity override 11/21/07 jcpark
;  1800 vphpl and 50 mph code=73
;  (Not good form but preserved for now), RM
;-------------------------------------------------------------

IF(TOLLGRP=2 && FTYPE=1) SPDCLASS=73 CAPCLASS=73

IF (SPDClass < 1 || SPDClass > 73)
  list= 'Speed Class Code out of expected range'
  abort
ENDIF

;
;
; AM and Off-peak Initial Speed Lookup Tables...
;
; Two sets of initial AM/Opk speeds are used, one by TAZ and Fac. Type,
;     and one by Facility type and Area type.  The more detailed TAZ
;     fac. type table will be used unless it returns a value of zero.
;     In that case, the less detailed atype/ftype value will be used.
;
lookup name = tazamspd,         ; AM Initial Speeds TAZ x Fac.Type
       lookup[1] = 1,result=2,  ; AM CentConn Speeds (mph)
       lookup[2] = 1,result=3,  ; AM Freeway  Speeds (mph)
       lookup[3] = 1,result=4,  ; AM Maj Art  Speeds (mph)
       lookup[4] = 1,result=5,  ; AM Min Art  Speeds (mph)
       lookup[5] = 1,result=6,  ; AM Collect  Speeds (mph)
       lookup[6] = 1,result=7,  ; AM Exprway  Speeds (mph)
       lookup[7] = 1,result=8,  ; AM Ramp     Speeds (mph)
       interpolate=N,fail=0,0,0,file=@AMSPDTF@

lookup name = tazopspd,         ; Off-pk Initial Speeds TAZ x Fac.Type
       lookup[1] = 1,result=2,  ; Off-pk CentConn Speeds (mph)
       lookup[2] = 1,result=3,  ; Off-pk Freeway  Speeds (mph)
       lookup[3] = 1,result=4,  ; Off-pk Maj Art  Speeds (mph)
       lookup[4] = 1,result=5,  ; Off-pk Min Art  Speeds (mph)
       lookup[5] = 1,result=6,  ; Off-pk Collect  Speeds (mph)
       lookup[6] = 1,result=7,  ; Off-pk Exprway  Speeds (mph)
       lookup[7] = 1,result=8,  ; Off-pk Ramp     Speeds (mph)
       interpolate=N,fail=0,0,0,file=@OPSPDTF@

lookup name = amspd,            ;   AM Initial Speeds Atype x Ftype
       lookup[1] = 1,result=2,  ; AM CentConn Speeds (mph)
       lookup[2] = 1,result=3,  ; AM Freeway  Speeds (mph)
       lookup[3] = 1,result=4,  ; AM Maj Art  Speeds (mph)
       lookup[4] = 1,result=5,  ; AM Min Art  Speeds (mph)
       lookup[5] = 1,result=6,  ; AM Collect  Speeds (mph)
       lookup[6] = 1,result=7,  ; AM Exprway  Speeds (mph)
       lookup[7] = 1,result=8,  ; AM Ramp     Speeds (mph)
       interpolate=N,fail=0,0,0,file=@AMSPD@

lookup name = opspd,            ; Off-Pk Initial Speeds Atype x Ftype
       lookup[1] = 1,result=2,  ; Off-pk CentConn Speeds (mph)
       lookup[2] = 1,result=3,  ; Off-pk Freeway  Speeds (mph)
       lookup[3] = 1,result=4,  ; Off-pk Maj Art  Speeds (mph)
       lookup[4] = 1,result=5,  ; Off-pk Min Art  Speeds (mph)
       lookup[5] = 1,result=6,  ; Off-pk Collect  Speeds (mph)
       lookup[6] = 1,result=7,  ; Off-pk Exprway  Speeds (mph)
       lookup[7] = 1,result=8,  ; Off-pk Ramp     Speeds (mph)
       interpolate=N,fail=0,0,0,file=@OPSPD@

_IDX    =  FTYPE + 1
PPAMSPD =  TAZAMSPD(_IDX,TAZ)
PPOPSPD =  TAZOPSPD(_IDX,TAZ)

IF (PPAMSPD = 0)
        PPAMSPD= AMSPD(_IDX,AREATP)
ENDIF
IF (PPOPSPD = 0)
        PPOPSPD= OPSPD(_IDX,AREATP)
ENDIF

;
;
; ESTABLISH  AM/PM/OFF-PEAK Highway Times (for the transit Network)
;
PPPMSPD =  PPAMSPD                  ; assume PM spd is equal to AM
IF (PPAMSPD != 0 )
  AMHTIME    =  (DISTANCE/PPAMSPD)*60.00
  PMHTIME    =  (DISTANCE/PPPMSPD)*60.00
  OPHTIME    =  (DISTANCE/PPOPSPD)*60.00
 ELSE
  AMHTIME    =  0
  PMHTIME    =  0
  OPHTIME    =  0
ENDIF

;-------------------------------------------------------------
; Generate list of walk links for transit path building    -
;-------------------------------------------------------------
;  Critrerea for a Walk Link:
; 1)The links are non-centroids and non-freeways (spdclass > 19)
; 2)The X coordinate range OR Y coordinate range of the A/B nodes are within
;   the following pre-designated 'downtown-like' areas as defined by
;   XY coordinate ranges:
;   X range: 1304529- 1313238 Y range: 442628- 450578  DC Downtown Area 1
;   X range: 1294904- 1306426 Y range: 443406- 453764  DC Downtown Area 2
;   X range: 1301347- 1304777 Y range: 481102- 484409  Silver Spring
;   X range: 1297245- 1297442 Y range: 437527- 437730  Pentagon
;

if (spdclass>19)           ; if link is non-centroid & non-freeway type

if      (((a.x= 1304529- 1313238 || b.x= 1304529- 1313238 ) &&
          (a.y=  442628-  450578 || b.y=  442628-  450578 )))
           _walkflg =1
elseif  (((a.x= 1294904- 1306426 || b.x= 1294904- 1306426 ) &&
          (a.y=  443406-  453764 || b.y=  443406-  453764 )))
           _walkflg =2
elseif  (((a.x= 1301347- 1304777 || b.x= 1301347- 1304777 ) &&
          (a.y=  481102-  484409 || b.y=  481102-  484409 )))
           _walkflg =3
elseif  (((a.x= 1297245- 1297442 || b.x= 1297245- 1297442 ) &&
          (a.y=  437527-  437730 || b.y=  437527- 437730  )))
           _walkflg=4
```

```
else
           _walkflg=0
endif
if (_walkflg > 0)   ; if anode or bnode of link is within predefined areas

  print list='SUPPORT N=',a(5),'-',b(5),' MODES=13 SPEED=3 ONEWAY=Y',
              '   ;',_walkflg(3),file=wlknet.tb
endif
endif

;
;-------------------------------------------------------------
; Generate list of Freeway Nodes for cntconn2 program        -
;-------------------------------------------------------------
;
;print list=a(5),b(5),'                                   ',FTYPE(2),
;file=LINKBSE.DAT
;------------------------------------------
if (spdclass==10-19)
print list=a(6),file=trn_fwyn.asc
endif


;  CREATE SOME FREQUENCY-CROSSTABS FOR CHECKING
_CNT= 1

CROSSTAB VAR=_CNT,ROW=FTYPE, RANGE=1-7-1, COL=AMLANE,    RANGE=1-7-1
CROSSTAB VAR=_CNT,ROW=FTYPE, RANGE=1-7-1, COL=OPLANE,    RANGE=1-7-1
CROSSTAB VAR=_CNT,ROW=FTYPE, RANGE=1-7-1, COL=PMLANE,    RANGE=1-7-1

CROSSTAB VAR=_CNT,ROW=FTYPE, RANGE=1-7-1, COL=AMLIMIT,   RANGE=0-9-1
CROSSTAB VAR=_CNT,ROW=FTYPE, RANGE=1-7-1, COL=OPLIMIT,   RANGE=0-9-1
CROSSTAB VAR=_CNT,ROW=FTYPE, RANGE=1-7-1, COL=PMLIMIT,   RANGE=0-9-1

;
;
ENDRUN


;; AllowQue Begin ;;


;;-;;*del   ZONEHWY.tem
;;-;;*copy  ZONEHWY.upt  ZONEHWY.tem
;;-;;
;;-;;OU_BSNET  = 'ZONEHWY.NET'         ; OUTPUT BUILT network FILE

;; Beginning of AllowQue (AQ) section
; ---------------------------------------------------------------------------
;  Script section identifies links to be excluded from queuing delay.
;  The defines/adds 3 new variables to the highway network:
;    1)  AM_AllowQue
;    2)  PM_AllowQue
;    3)  OP_AllowQue
;  The variable values are binary -  1/Allows 0/disallows queuing delay time.
;  Links disallowed from queing are one-way links that don't connect with
;  intersections.  They are directional links with one adjacent one-way link
;  entering the Anode and one adjacent one-way link leaving the Bnode.
;  Additionally, the laneage of the link both adjacent links must be uniform.
;
; ---------------------------------------------------------------------------

FstHwyNode = 3000
;-------------------------------------------------------
; Step 1 - write out node list and AB list from network
;-------------------------------------------------------
LOOP PRD = 1,3              ; Begin Period (PRD) LOOP
     IF       (PRD= 1)
```

```
           PER     = 'AM'
       ELSEIF (PRD = 2)
           PER     = 'PM'
       ELSEIF (PRD = 3)
           PER     = 'OP'
     ENDIF

RUN PGM=HWYNET
  NETI  = zonehwy.tem            ;  input network from previous step
  NETO  = zonehwy@per@.tem       ;  period network with 'active' links
  IF (@PER@Limit = 9 ) delete    ;  delete unused links from the
ENDRUN


RUN PGM=HWYNET
  NETI  = zonehwy@per@.tem            ;  output network from previous step

  NODEO = @PER@NODE.txt, FORMAT=TXT,
                  varform=n(8.0),
                  include = n
  LINKO = @PER@LINK.txt, FORMAT=TXT,
                  varform =a(8.0),b(8.0),@PER@lane(8.0),
                  include=a,b, @PER@lane
ENDRUN


;-------------------------------------------------------
; Step 2 - write out indexed highway node list
;-------------------------------------------------------
RUN PGM=MATRIX
    RECI=@PER@NODE.TXT, Fields= 1-8  ; List of Nodes

       IF (RECI.NFIELD[1] >= @FstHwyNode@)
         _NDX= _NDX + 1
         Print LIST=_ndx(8.0),            ; Seq. no.
                 RECI.NFIELD[1](8.0),  ; hwy node
                 file=@PER@NodeIDX.txt

    ENDIF
    LOG PREFIX=MATRIX, VAR= _NDX  ;  save max hwy node seq. no. for reference later
ENDRUN


;-------------------------------------------------------
; Step 3 - write out indexed (total) link list
;-------------------------------------------------------
RUN PGM=MATRIX
    RECI=@PER@LINK.TXT, Fields= 1-8,9-16,17-24,25-32,33-40 ; a,b,ln

      _LDX= _LDX + 1
      Print LIST=_LDX(8.0),            ; Seq. No.
                 RECI.NFIELD[1](8.0),  ; Anode
                 RECI.NFIELD[2](8.0),  ; Bnode
                 RECI.NFIELD[3](8.0),  ; lanes for current time period
                 file=@PER@LinkIDX.txt

    LOG PREFIX=MATRIX, VAR= _LDX   ;  save max hwy link no. for reference later
ENDRUN

    MAXNODE=MATRIX._NDX  ;  define max node no. from hwy node list (used in loops
later)
    MAXLINK=MATRIX._LDX  ;  define max link no. from hwy link list (used in loops
later)

;-------------------------------------------------------
; Step 4 - evaluate each highway node against the hwy link list
;  accum. the no. of times each node appears as an anode (forematch) & save the
;  last bnode (forenode)  accum. the no. of times each node appears as a  bnode
```

```
;  (backmatch) & save the last anode (backnode) write out the node list with its
;  foremetch, forenode, backmatch, backnode for all nodes with forematch
;  values of 1 or backmatch values of 1 (BNF.txt).  This is a list of nodes having
;  either 1 directional entry link and/or 1 directional exit link.
;  We don't care about nodes with multiple entry and exit links.
;-------------------------------------------------------
;
 run pgm=MATRIX

 lookup name=NodeList,
 lookup[1] = 1, result = 2, ; Node No.
 interpolate=N, Fail=0,0,0, File= @PER@NodeIDX.txt

 lookup name=LinkList,
 lookup[1] = 1, result = 2, ; A_Node
 lookup[2] = 1, result = 3, ; B_Node
 lookup[3] = 1, result = 4, ; Lane of current time period
 interpolate=N, Fail=0,0,0, File= @PER@LinkIDX.txt

  zones=1


  loop  NDX=@FstHwyNode@,@MAXNODE@   ; evaluate each and every node

    BACKMATCH = 0  BACKNODE = 0 BACKLN  = 0
    FOREMATCH = 0  FORENODE = 0 FORELN  = 0

    CURR_NODE = NodeList(1,NDX)


        loop LDX=1,@MAXLINK@

            IF (FOREMATCH > 1 && BACKMATCH > 1)  goto NextLink

             CURR_A = LinkList(1,LDX)
             CURR_B = LinkList(2,LDX)
             CURR_LN= LinkList(3,LDX)



             IF (CURR_A = Curr_Node)
                    FOREMATCH =  FOREMATCH + 1
                    FORENODE  =  CURR_B
                    FORELN    =  CURR_LN
             ENDIF

             IF (CURR_B = Curr_Node)
                    BACKMATCH =  BACKMATCH + 1
                    BACKNODE  =  CURR_A
                    BACKLN    =  CURR_LN
             ENDIF

        :NextLink
        endloop

      ; At the end of current node- write out all nodes that have a single
      ; entry (back-) node connecion OR a single exit (fore-) node connection
      ; A unique link list will be established from this list in the following
      ; program

      IF ((FOREMATCH = 1 ||  BACKMATCH = 1) && (BACKNODE != FORENODE))
          _Seq = _Seq + 1   ;     sequence no.
          print form =8.0
               list  =  _Seq, BACKMATCH, BACKNODE, BACKLN,
                              CURR_Node,
                              FOREMATCH, FORENODE, FORELN,
                              file =  @PER@BNF.txt
      ENDIF

  endloop   ; end of NODE loop

    LOG PREFIX=MATRIX, VAR= _Seq
 endrun
;
    MAXBNF = MATRIX._SEQ



;-------------------------------------------------------
;  Step 5. Evalute each hwy link list against the BNF.txt list.
;    If the current Anode (Cur_A) has a single entry and a single exit node AND
;    the Current Bnode (Cur_B) has a single entry and a single exit node THEN
;    the link is considered to be exempt from queuing, and is printed out to a file
;    to be later merged back to the network (NoQLink.txt)
;-------------------------------------------------------
RUN PGM=MATRIX
ZONES = 1
LOOKUP NAME= BNFList, ; List of all nodes with 1 entry link (where
                      ; BackMatch=1) OR with 1 exit link (where ForeMatch=1)
       LOOKUP[01] = 1, Result = 2,    ; BackMatch 1,2
       LOOKUP[02] = 1, Result = 3,    ; BackNode
       LOOKUP[03] = 1, Result = 4,    ; BackLN
       LOOKUP[04] = 1, Result = 5,    ; Reference Node
       LOOKUP[05] = 1, Result = 6,    ; ForeMatch
       LOOKUP[06] = 1, Result = 7,    ; Forenode
       LOOKUP[07] = 1, Result = 8,    ; ForeAMLN
       Interpolate = N, Fail= 0,0,0, File=@PER@BNF.txt

LOOKUP NAME= LinkList,  ; List of all non-centroid links
       LOOKUP[1] = 1, Result = 2, ; Anode
       LOOKUP[2] = 1, Result = 3, ; Bnode
       Interpolate = N, Fail= 0,0,0, File=@PER@LINKIDX.Txt


LOOP LDX=1,@MaxLink@

     Cur_A        = LinkList(1,LDX)
     Cur_B        = LinkList(2,LDX)
     AQtest       = 0
     BQtest       = 0
     @PER@_XQflag = 0


     LOOP NDX = 1, @MAXBNF@
          BackMatch = BNFList(1,NDX)
          BackNode  = BNFList(2,NDX)
          BackLN    = BNFList(3,NDX)
          Node      = BNFList(4,NDX)
          ForeMatch = BNFList(5,NDX)
          ForeNode  = BNFList(6,NDX)
          ForeLN    = BNFList(7,NDX)

          IF (Cur_A  = Node && BackMatch = 1 && ForeMatch = 1  &&  BACKLN = ForeLN)
                 AQtest = 1
          ENDIF

          IF (Cur_B  = Node && BackMatch = 1 && ForeMatch = 1  &&  BACKLN = ForeLN)
                 BQtest = 1
          ENDIF

          ; If BOTH the Anode and Bnode of the current link have:
          ;  1) ONE directional entry link
          ;  2) ONE directional exit  link
          ;  3) No capacity differential between adjacent links
          ;     for all time periods
```

```
         ;  Then queuing delay is disallowed

         IF (AQtest = 1 && BQtest = 1)
             @PER@_XQflag = 1
             Print form= 8.0 List= Cur_A Cur_B @PER@_XQFlag, File =
@PER@_NoQLink.txt
             goto NextLink     ; current link passes test, go on to next link
         ENDIF

     ENDLOOP

    :NextLink

 ENDLOOP
 ENDRUN

ENDLOOP  ;; -  END OF Period (PRD) LOOP
;-------------------------------------------------------
;  Step 6. Merge 'No queuing' link list to network and define
;  AllowQue variable
;  (=1/allow queuing, =0/disallow queuing)
;-------------------------------------------------------
 RUN PGM=HWYNET
 ZONES = 2191
 NETI[1]  = zonehwy.tem
 LINKI[2] = AM_NoQLink.txt,var  = A, 1-8, var = B, 9-16, var  = AM_XQFLAG,17-24
 LINKI[3] = PM_NoQLink.txt,var  = A, 1-8, var = B, 9-16, var  = PM_XQFLAG,17-24
 LINKI[4] = OP_NoQLink.txt,var  = A, 1-8, var = B, 9-16, var  = OP_XQFLAG,17-24
 merge record = T
 NETO     = @OU_BSNET@, EXCLUDE = AM_XQFLAG, PM_XQFLAG, OP_XQFLAG, AllowQue

;; Default- Allow queuing to occur on all links           (??_AllowQue = 1)
  AM_AllowQue = 1
  PM_AllowQue = 1
  OP_AllowQue = 1

;; If exclude queuing flags are '1', then disallow queuing (??_AllowQue = 0)
  IF (AM_XQFlag= 1 )  AM_AllowQue = 0
  IF (PM_XQFlag= 1 )  PM_AllowQue = 0
  IF (OP_XQFlag= 1 )  OP_AllowQue = 0

ENDRUN

*del zonehwy.tem

;; END of AllowQue (AQ) section




;-----------------------------------------------------------------------
; STEP 2:
; HIGHWAY TERMINAL TIME DEVELOPMENT
; Input File:  ZONE.ASC (Standard Land Use File)
;
; Output File: ZTERMTM.ASC   ZONAL TERMINAL TIME FILE
;
;
;------------------------------------------------------------------

RUN PGM=MATRIX
zones=@ZONESIZE@
;  READ ZONAL EMPLOYMENT AND AREA FROM 'STANDARD' V2 LAND USE FILE

ZDATI[1]= @ZONEFILE@, Z=1-4,EMP=40-47,SQMI=83-92
```

```
; CREATE ZONAL ARRAY FOR EMPLOYMENT DENSITY

  ARRAY,                     ;  CREATE ZONAL ARRAYS
        EDENSITY = @ZONESIZE@, ;  ARRAY FOR EMPLOYMENT DENSITY
        TERMTM   = @ZONESIZE@  ;  ARRAY FOR TERMINAL TIME


IF (I=1)                     ;  COMPUTE EMPLOYMENT DENSITY --
      LOOP INDEX=1,@ZONESIZE@  ;     ONCE AT THE 1ST I ZONE 'PASS'
        IF (SQMI[INDEX]    = 0)
           EDENSITY[INDEX] = 0
        ELSE
           EDENSITY[INDEX]=EMP[INDEX]/SQMI[INDEX]
        ENDIF

           IF (INDEX>@LSTITAZ@)
                      TERMTM[INDEX]  = 0.0
              ELSEIF (EDENSITY[INDEX] <   4618)
                      TERMTM[INDEX]  = 1.0
              ELSEIF (EDENSITY[INDEX] <   6632)
                      TERMTM[INDEX]  = 2.0
              ELSEIF (EDENSITY[INDEX] <  11563)
                      TERMTM[INDEX]  = 4.0
              ELSEIF (EDENSITY[INDEX] <  32986)
                      TERMTM[INDEX]  = 6.0
              ELSE
                      TERMTM[INDEX]  = 8.0
           ENDIF

        TOTEMP = TOTEMP+ EMP[INDEX] ; ACCUMULATE TOTAL EMP. FOR CHECKING
        TOTSQM = TOTSQM+SQMI[INDEX] ; ACCUMULATE TOTAL SQMI.FOR CHECKING

;  WRITE OUT  ZONAL TERMINAL TIME FILE

        LIST = INDEX(4),' ',EMP[INDEX](6),' ',SQMI[INDEX](10.2),' ',
             TERMTM[INDEX](5),' ; <-- TAZ, Empl, SqMi, HwyTermTime (min)',
             FILE=ZTERMTM.ASC

      ENDLOOP
ENDIF

;  NOW PRINT OUT THE REGIONAL EMPLOYMENT, SQ MILEAGE TOTALS FOR CHECKING

IF (I=@ZONESIZE@)
   LIST =' ** THE TOTAL EMPLOYMENT INPUT IS: ',TOTEMP(12.0C)
   LIST =' ** THE TOTAL SQ MILEAGE INPUT IS: ',TOTSQM(12.2C)
ENDIF


ENDRUN
```

10 Highway_Skims.s

```
;///////////////////////////////////////////////////////////;
;  Highway_Skims.S                                        //;
;  MWCOG Version 2.3 Model                                //;
;                                                         //;
;  Build AM Peak/Off-Peak Highway Skims                   //;
;  the Current Iteration Asssignment                      //;
;  AM and Off-Pk Skims are built in 2 separate HWYLOAD    //;
;  programs.                                              //;
;  Three files are created, per SOV, HOV2, and HOV3 paths.//;
;  Each file will contain 3 Tables (in MINUTP format)     //;
;          1) Time     (whole minutes)                    //;
```

```
;          2) Distance (implied tenths of mi.)            //;
;          3) Toll     (in 1994 cents)                    //;
;
; 6/30/03 MODIFICATIONS FOR IMPROVED TOLL MODELING MADE  rjm
;
; 1/25/08 Changes made to create special changes to mode choice skims
; 1/31/08 generalized toll used in pathtracing changed to be mode-specific
;         e.g.       MW[3] =PATHTRACE(LI.@PRD@TOLL),       NOACCESS=0,
; ..was changed to>  MW[3] =PATHTRACE(LW.SOV@PRD@TOLL),    NOACCESS=0,
;
;                    MW[6] =PATHTRACE(LI.@PRD@TOLL),       NOACCESS=0, ;
; ..was changed to>  MW[6] =PATHTRACE(LW.HV2@PRD@TOLL),    NOACCESS=0, ;
;
;                    MW[9] =PATHTRACE(LI.@PRD@TOLL),       NOACCESS=0, ;
; ..was changed to>  MW[9] =PATHTRACE(LW.HV3@PRD@TOLL),    NOACCESS=0, ;
;
;  4/25/08  Modifications for Truck model wga/rm
;           Note Time is not rounded (to whole mintes) any more
;
;///////////////////////////////////////////////////////////;
;
;
;   Environment Variables:
;     _iter_  (Iteration indicator = 'pp','i1'-'i6')
;
;

NETIN    = '%_iter_%hwy.net'


; Output special truck skim only for off-peak conditions

LOOP Period=1,2         ;  We are looping through the skimming process
                        ;  twice: (1) for the AM Peak & (2) the Off-Peak

in_tskm = 'inputs\toll.skm'  ; read in toll param file

  IF (Period=1)          ; AM Highway Skim tokens
    PRD       = 'AM'
    MATOUT1   = 'sov%_iter_%am.skm '
    MATOUT2   = 'hov2%_iter_%am.skm'
    MATOUT3   = 'hov3%_iter_%am.skm'

    MATOUTMC1 = 'sov%_iter_%am_MC.skm '
    MATOUTMC2 = 'hov2%_iter_%am_MC.skm'
    MATOUTMC3 = 'hov3%_iter_%am_MC.skm'

    MYID      = '%_iter_% AM skims'

    TT        = ';'
    MATOUT4   = ' '
    SKMTOT    = ' '

  ELSE                  ; OP Highway Skim tokens
    PRD       = 'OP'
    MATOUT1   = 'sov%_iter_%op.skm '
    MATOUT2   = 'hov2%_iter_%op.skm'
    MATOUT3   = 'hov3%_iter_%op.skm'

    MATOUTMC1 = 'sov%_iter_%op_MC.skm '
    MATOUTMC2 = 'hov2%_iter_%op_MC.skm'
    MATOUTMC3 = 'hov3%_iter_%op_MC.skm'

    TT        = ' '
    MATOUT4   = 'trk%_iter_%op.skm'
    SKMTOT    = 'skimtot%_iter_%.dat'

    MYID    = '%_iter_% OP skims'
```

```
  ENDIF


RUN PGM=HWYLOAD
;
;
  NETI   =@NETIN@                           ; Pk Prd TP+ network
  MATO[1]=@MATOUT1@, MO=1,2,3,13, FORMAT=MINUTP  ; LOV   skims: time, dist, total
tolls, VP tolls
  MATO[2]=@MATOUT2@, MO=4,5,6,16, FORMAT=MINUTP  ; HOV2  skims: time, dist, total
tolls, VP tolls
  MATO[3]=@MATOUT3@, MO=7,8,9,19, FORMAT=MINUTP  ; HOV3+ skims: time, dist, total
tolls, VP tolls
  @TT@ MATO[4]=@MATOUT4@, MO=10  ; Truck skims

  ID=@MYID@
;-
  READ FILE = @in_tskm@
;-

  PHASE=LINKREAD
       SPEED        =  LI.%_iter_%@PRD@SPD ;Restrained speed (min)
       IF (SPEED = 0)
          T1 = 0
       ELSE
          T1 = LI.DISTANCE / SPEED * 60.0
       ENDIF
;-
   ; Define AM /OP link level TOTAL tolls by vehicle type here:
       LW.SOV@PRD@TOLL    = LI.@PRD@TOLL    * @PRD@_TFAC(1,LI.TOLLGRP)           ;
SOV       TOTAL TOLLS in 1994 cents
       LW.HV2@PRD@TOLL    = LI.@PRD@TOLL    * @PRD@_TFAC(2,LI.TOLLGRP)           ;
HOV 2 occ TOTAL TOLLS in 1994 cents
       LW.HV3@PRD@TOLL    = LI.@PRD@TOLL    * @PRD@_TFAC(3,LI.TOLLGRP)           ;
HOV 3+occ TOTAL TOLLS in 1994 cents
       LW.TRK@PRD@TOLL    = LI.@PRD@TOLL    * @PRD@_TFAC(4,LI.TOLLGRP)           ;
Truck     TOTAL TOLLS in 1994 cents
       LW.APX@PRD@TOLL    = LI.@PRD@TOLL    * @PRD@_TFAC(5,LI.TOLLGRP)           ;
AP Pax    TOTAL TOLLS in 1994 cents

       LW.SOV@PRD@TOLL_VP = LI.@PRD@TOLL_VP * @PRD@_TFAC(1,LI.TOLLGRP)           ;
SOV       VarPr TOLLS in 1994 cents
       LW.HV2@PRD@TOLL_VP = LI.@PRD@TOLL_VP * @PRD@_TFAC(2,LI.TOLLGRP)           ;
HOV 2 occ VarPr TOLLS in 1994 cents
       LW.HV3@PRD@TOLL_VP = LI.@PRD@TOLL_VP * @PRD@_TFAC(3,LI.TOLLGRP)           ;
HOV 3+occ VarPr TOLLS in 1994 cents
       LW.TRK@PRD@TOLL_VP = LI.@PRD@TOLL_VP * @PRD@_TFAC(4,LI.TOLLGRP)           ;
Truck     VarPr TOLLS in 1994 cents
       LW.APX@PRD@TOLL_VP = LI.@PRD@TOLL_VP * @PRD@_TFAC(5,LI.TOLLGRP)           ;
AP Pax    VarPr TOLLS in 1994 cents

   ; Define AM /OP IMPEDANCE by vehicle type here:
      LW.SOV@PRD@IMP= T1 + ((LW.SOV@PRD@TOLL/100.0)*   SV@PRD@EQM);SOV   IMP
      LW.HV2@PRD@IMP= T1 + ((LW.HV2@PRD@TOLL/100.0)*   H2@PRD@EQM);HOV 2 IMP
      LW.HV3@PRD@IMP= T1 + ((LW.HV3@PRD@TOLL/100.0)*   H3@PRD@EQM);HOV 3+IMP
      LW.TRK@PRD@IMP= T1 + ((LW.TRK@PRD@TOLL/100.0)*   TK@PRD@EQM);Truck IMP
      LW.APX@PRD@IMP= T1 + ((LW.APX@PRD@TOLL/100.0)*   AP@PRD@EQM);APAX  IMP

;
;  Define the three path types here:
;
;
; limit codes used:
;  1=no prohibitions
;  2=prohibit  1/occ autos,trucks
;  3=prohibit  1&2occ autos,trucks
;  4=prohibit  trucks
;  5=prohibit non-airport access trips
```

```
;  6-8=unused
;  9=prohibit all traffic use

    IF (LI.@PRD@LIMIT = 2,3,5-9) ADDTOGROUP=1 ; SOV   prohibited links
    IF (LI.@PRD@LIMIT = 3,5-9)   ADDTOGROUP=2 ; HOV2  prohibited links
    IF (LI.@PRD@LIMIT = 5-9)     ADDTOGROUP=3 ; HOV3+ prohibited links
    IF (LI.@PRD@LIMIT = 4)       ADDTOGROUP=4 ; Truck prohibited links

;
  ENDPHASE
;
; Now do the path skimming, per the three path types.  Time, distance,
; and Toll skims created.  Scaling to the desired specified below.
; All skims are based on minimum time paths.
;
; Note that override values of 0 will be inserted for disconnected ijs
; (i.e. cells associated with 'unused' zones and intrazonal cells).
; I don't like the TP+ default value of 1,000,000 for these situations
;
; 1/25/08 added skim tabs created:
;        (t13,t16,t19) tolls on variably priced facilities only

  PHASE=ILOOP



     PATHLOAD PATH=LW.SOV@PRD@IMP, EXCLUDEGRP=1,                ; SOV   paths
              MW[1] =PATHTRACE(TIME),              NOACCESS=0, ; -excluding links
              MW[2] =PATHTRACE(DIST),              NOACCESS=0, ; w/LIMIT=2,3,5-9
              MW[3] =PATHTRACE(LW.SOV@PRD@TOLL),    NOACCESS=0, ;
              MW[13]=PATHTRACE(LW.SOV@PRD@TOLL_VP), NOACCESS=0 ;

     PATHLOAD PATH=LW.HV2@PRD@IMP, EXCLUDEGRP=2,                ; HOV2  paths
              MW[4] =PATHTRACE(TIME),              NOACCESS=0, ; -excluding links
              MW[5] =PATHTRACE(DIST),              NOACCESS=0, ; w/LIMIT=3,5-9
              MW[6] =PATHTRACE(LW.HV2@PRD@TOLL),    NOACCESS=0, ;
              MW[16]=PATHTRACE(LW.HV2@PRD@TOLL_VP), NOACCESS=0  ;

     PATHLOAD PATH=LW.HV3@PRD@IMP, EXCLUDEGRP=3,                ; HOV3+ paths
              MW[7] =PATHTRACE(TIME),              NOACCESS=0, ; -excluding links
              MW[8] =PATHTRACE(DIST),              NOACCESS=0, ; w/LIMIT=5-9
              MW[9] =PATHTRACE(LW.HV3@PRD@TOLL),    NOACCESS=0, ;
              MW[19]=PATHTRACE(LW.HV3@PRD@TOLL_VP), NOACCESS=0  ;

@TT@ PATHLOAD PATH=LW.TRK@PRD@IMP, EXCLUDEGRP=1,4,           ; Truck paths
@TT@          MW[10]=PATHTRACE(TIME),   NOACCESS=0


;---------------------------------------------------------------------
; scaling, rounding of skim tables done here!!
;---------------------------------------------------------------------

     mw[2] = ROUND(MW[2]*10)                  ; FACTOR/ROUND DIST.
     mw[5] = ROUND(MW[5]*10)                  ; SKIMS TO IMPLICIT
     mw[8] = ROUND(MW[8]*10)                  ; 1/10THS OF MILES

     mw[3] = ROUND(MW[3])                     ; ROUND Total TOLL
     mw[6] = ROUND(MW[6])                     ; SKIMS TO 1994
     mw[9] = ROUND(MW[9])                     ; WHOLE CENTS

     mw[13] = ROUND(MW[13])                   ; ROUND Variable priced TOLL
     mw[16] = ROUND(MW[16])                   ; SKIMS TO 1994
     mw[19] = ROUND(MW[19])                   ; WHOLE CENTS

;;
;---------------------------------------------------------------------
; Print selected rows of skim files
; for checking.
;--------------------------------------------------------------------


     IF (i = 1-2)                        ;  for select rows (Is)
        printrow MW=1-3, j=1-2191        ;  print work matrices 1-3
     ENDIF                               ;  row value to all Js.
  ENDPHASE
ENDRUN

;--------------------------------------------------------------------
; Finally create special Mode Choice skims here
; The mode choice skims will be the same as the above skims unless VP toll lanes
;  are used; in that case time will include the VP toll time equivalent
;  and the toll value will be the toll on non-VP toll lanes ONLY
;
; Also create zonal truck access file per the @TT@ statements for the OP per. only
;--------------------------------------------------------------------

RUN PGM=MATRIX

    READ FILE = @in_tskm@     ; read toll time eqv param file
                                                       ; -- INPUT SKIMS --
      MATI[1] = @MATOUT1@                                ; SOV  skims (tm,dst,total
toll, VP toll)
      MATI[2] = @MATOUT2@                                ; HOV2 skims (tm,dst,total
toll, VP toll)
      MATI[3] = @MATOUT3@                                ; HOV3+skims (tm,dst,total
toll, VP toll)

 @TT@ MATI[4] = @MATOUT4@                                ; read in trk skim (op per
only)
 @TT@  MW[99] = MI.4.1
 ; For the skim total, put a large value in unconnected O/D pairs
 @TT@  JLOOP
 @TT@     IF (MW[99] = 0) MW[99] = 100000
 @TT@  ENDJLOOP
 @TT@  REPORT MARGINREC = Y, FILE = @SKMTOT@, FORM=15, LIST=J(5),R99,C99

                                                       ; -- OUTPUT SKIMS --
    MATO[1] = @MATOUTMC1@,MO=101,12,103, FORMAT=MINUTP  ; SOV  skims (tm&toll tm
eqv,dst,non-VP toll component)
    MATO[2] = @MATOUTMC2@,MO=201,22,203, FORMAT=MINUTP  ; HOV2 skims (tm&toll tm
eqv,dst,non-VP toll component)
    MATO[3] = @MATOUTMC3@,MO=301,32,303, FORMAT=MINUTP  ; HOV3+skims (tm&toll tm
eqv,dst,non-VP toll component)


 ;; read in input skims from above
    MW[11] = MI.1.1  ; SOV   time
    MW[12] = MI.1.2  ; SOV   distance
    MW[13] = MI.1.3  ; SOV   total toll
    MW[14] = MI.1.4  ; SOV   Var.priced toll component (if VP toll facility used)

    MW[21] = MI.2.1  ; HOV2  time
    MW[22] = MI.2.2  ; HOV2  distance
    MW[23] = MI.2.3  ; HOV2  total toll
    MW[24] = MI.2.4  ; HOV2  Var.priced toll component (if VP toll facility used)

    MW[31] = MI.3.1  ; HOV3+ time
    MW[32] = MI.3.2  ; HOV3+ distance
    MW[33] = MI.3.3  ; HOV3+ total toll
    MW[34] = MI.3.4  ; HOV3+ Var.priced toll component (if VP toll facility used)

 ;; now compute special time and toll values to be used in the mode choice process
 ;; which are normally 1/time, 2/distance, and 3/tolls; the new skims will be:
 ;; 1/ time + the toll time_equivalent on VP facilities only
 ;; 2/ distance (as before)
 ;; 3/ tolls on non-VP tolled facilities ONLY
```

```
 ;Mode Choice model Hwy time:
      MW[101] = MW[11] + ((MW[14]/100.0) * SV@PRD@EQM);
      MW[201] = MW[21] + ((MW[24]/100.0) * H2@PRD@EQM);
      MW[301] = MW[31] + ((MW[34]/100.0) * H3@PRD@EQM);

 ;Mode Choice model Hwy TOLL:
      MW[103] = MW[13] - MW[14]
      MW[203] = MW[23] - MW[24]
      MW[303] = MW[33] - MW[34]

      MW[103] = MAX(0,MW[103])
      MW[203] = MAX(0,MW[203])
      MW[303] = MAX(0,MW[303])
 ENDRUN



; end of truck access section
ENDLOOP
```

11 Highway_Skims_mod.s

```
;/////////////////////////////////////////////////////////////;
;  Highway_SkimsMod.S                                        //;
;  MWCOG Version 2 Model                                     //;
;                                                            //;
;  Build AM Peak/Off-Peak Highway Skims                      //;
;  the Current Iteration Asssignment                         //;
;  AM and Off-Pk Skims are built in 2 separate HWYLOAD       //;
;  programs.                                                 //;
;  Three files are created, per SOV, HOV2, and HOV3 paths.//;
;  Each file will contain 3 Tables (in MINUTP format)        //;
;          1) Time     (whole minutes)                       //;
;          2) Distance (implied tenths of mi.)               //;
;          3) Toll     (in 1994 cents)                       //;
;
; 6/30/03 MODIFICATIONS FOR IMPROVED TOLL MODELING MADE  rjm
; 2/14/08 generalized toll skimming changed to mode specific  skimming
;         (See  HIGHWAY_SKIMS.S change made on 1/31/08)
;/////////////////////////////////////////////////////////////;
;
;
;   Environment Variables:
;     _iter_  (Iteration indicator = 'pp','i1'-'i6')
;
;

NETIN    = '%_iter_%hwymod.net'

LOOP Period=1,2        ;  We are looping through the skimming process
                       ;  twice: (1) for the AM Peak & (2) the Off-Peak

in_tskm = 'inputs\toll.skm'  ; read in toll param file

  IF (Period=1)         ; AM Highway Skim tokens
    PRD     = 'AM'
    MATOUT1 = 'sovm%_iter_%am.skm '
    MATOUT2 = 'hov2m%_iter_%am.skm'
    MATOUT3 = 'hov3m%_iter_%am.skm'
    MYID    = '%_iter_% AM skims'
  ELSE                 ; OP Highway Skim tokens
    PRD     = 'OP'
    MATOUT1 = 'sovm%_iter_%op.skm '
    MATOUT2 = 'hov2m%_iter_%op.skm'
    MATOUT3 = 'hov3m%_iter_%op.skm'
    MYID    = '%_iter_% OP skims'
  ENDIF

RUN PGM=HWYLOAD
zones=3000
;
;
  NETI   =@NETIN@                           ; Pk Prd TP+ network
  MATO[1]=@MATOUT1@, MO=1-3, FORMAT=MINUTP ; LOV   skims
  MATO[2]=@MATOUT2@, MO=4-6, FORMAT=MINUTP ; HOV2  skims
  MATO[3]=@MATOUT3@, MO=7-9, FORMAT=MINUTP ; HOV3+ skims
  ID=@MYID@
;-
  READ FILE = @in_tskm@
;-

  PHASE=LINKREAD
       SPEED        =  LI.%_iter_%@PRD@SPD ;Restrained speed (min)
       IF (SPEED = 0)
          T1 = 0
       ELSE
          T1 = LI.DISTANCE / SPEED * 60.0
       ENDIF
;-
   ; Define AM /OP link level tolls by vehicle type here:
       LW.SOV@PRD@TOLL = LI.@PRD@TOLL * @PRD@_TFAC(1,LI.TOLLGRP)           ;  SOV
TOLLS in 1994 cents
       LW.HV2@PRD@TOLL = LI.@PRD@TOLL * @PRD@_TFAC(2,LI.TOLLGRP)           ;  HOV 2
occ TOLLS in 1994 cents
       LW.HV3@PRD@TOLL = LI.@PRD@TOLL * @PRD@_TFAC(3,LI.TOLLGRP)           ;  HOV
3+occ TOLLS in 1994 cents
       LW.TRK@PRD@TOLL = LI.@PRD@TOLL * @PRD@_TFAC(4,LI.TOLLGRP)           ;  Truck
TOLLS in 1994 cents
       LW.APX@PRD@TOLL = LI.@PRD@TOLL * @PRD@_TFAC(5,LI.TOLLGRP)           ;  AP Pax
TOLLS in 1994 cents

   ; Define AM /OP IMPEDANCE by vehicle type here:
      LW.SOV@PRD@IMP= T1 + ((LW.SOV@PRD@TOLL/100.0)*   SV@PRD@EQM);SOV   IMP
      LW.HV2@PRD@IMP= T1 + ((LW.HV2@PRD@TOLL/100.0)*   H2@PRD@EQM);HOV 2 IMP
      LW.HV3@PRD@IMP= T1 + ((LW.HV3@PRD@TOLL/100.0)*   H3@PRD@EQM);HOV 3+IMP
      LW.TRK@PRD@IMP= T1 + ((LW.TRK@PRD@TOLL/100.0)*   TK@PRD@EQM);Truck IMP
      LW.APX@PRD@IMP= T1 + ((LW.APX@PRD@TOLL/100.0)*   AP@PRD@EQM);APAX  IMP


;
;  Define the three path types here:
;
;
; limit codes used:
;  1=no prohibitions
;  2=prohibit  1/occ autos,trucks
;  3=prohibit  1&2occ autos,trucks
;  4=prohibit  trucks
;  5=prohibit non-airport access trips
;  6-8=unused
;  9=prohibit all traffic use

    IF (LI.@PRD@LIMIT = 2,3,5-9) ADDTOGROUP=1 ; SOV   prohibited links
    IF (LI.@PRD@LIMIT = 3,5-9)   ADDTOGROUP=2 ; HOV2  prohibited links
    IF (LI.@PRD@LIMIT = 5-9)     ADDTOGROUP=3 ; HOV3+ prohibited links
;
  ENDPHASE
;
; Now do the path skimming, per the three path types.  Time, distance,
; and Toll skims created.  Scaling to the desired specified below.
; All skims are based on minimum time paths.
;
```

```
; Note that override values of 0 will be inserted for disconnected ijs
; (i.e. cells associated with 'unused' zones and intrazonal cells).
; I don't like the TP+ default value of 1,000,000 for these situations
;
  PHASE=ILOOP

    PATHLOAD PATH=LW.SOV@PRD@IMP, EXCLUDEGRP=1,              ; SOV   paths
             MW[1]=PATHTRACE(TIME),    NOACCESS=0, ; -excluding links
             MW[2]=PATHTRACE(DIST),    NOACCESS=0, ;   w/ LIMIT=2,3,5-9
             MW[3]=PATHTRACE(LW.SOV@PRD@TOLL),    NOACCESS=0 ;
    PATHLOAD PATH=LW.HV2@PRD@IMP, EXCLUDEGRP=2,              ; HOV2  paths
             MW[4]=PATHTRACE(TIME),    NOACCESS=0, ; -excluding links
             MW[5]=PATHTRACE(DIST),    NOACCESS=0, ;   w/ LIMIT=3,5-9
             MW[6]=PATHTRACE(LW.HV2@PRD@TOLL),    NOACCESS=0 ;
    PATHLOAD PATH=LW.HV3@PRD@IMP, EXCLUDEGRP=3,              ; HOV3+ paths
             MW[7]=PATHTRACE(TIME),    NOACCESS=0, ; -excluding links
             MW[8]=PATHTRACE(DIST),    NOACCESS=0, ;   w/ LIMIT=5-9
             MW[9]=PATHTRACE(LW.HV3@PRD@TOLL),    NOACCESS=0 ;

;----------------------------------------------------------------------
; scaling, rounding of skim tables done here!!
;----------------------------------------------------------------------

     mw[1] = ROUND(MW[1])                       ; ROUND TIME SKIMS
     mw[4] = ROUND(MW[4])                       ; TO WHOLE MINUTES
     mw[7] = ROUND(MW[7])                       ;
     mw[1] = MIN(MW[1],326.0)  ; Impose Max TIME / MC Model Maximum
     mw[4] = MIN(MW[4],326.0)  ; Impose Max TIME / MC Model Maximum
     mw[7] = MIN(MW[7],326.0)  ; Impose Max TIME / MC Model Maximum
                               ;  ...just in case
     mw[2] = ROUND(MW[2]*10)                    ; FACTOR/ROUND DIST.
     mw[5] = ROUND(MW[5]*10)                    ; SKIMS TO IMPLICIT
     mw[8] = ROUND(MW[8]*10)                    ; 1/10THS OF MILES

     mw[3] = ROUND(MW[3])                       ; ROUND TOLL
     mw[6] = ROUND(MW[6])                       ; SKIMS TO 1994
     mw[9] = ROUND(MW[9])                       ; WHOLE CENTS

;----------------------------------------------------------------------
; Print selected rows of skim files
; for checking.
;----------------------------------------------------------------------


     IF (i = 1-2)                         ;  for select rows (Is)
         printrow MW=1-3, j=1-2191        ;  print work matrices 1-3
     ENDIF                                ;  row value to all Js.
  ENDPHASE
ENDRUN
ENDLOOP
```

12 highway_unbuild.s

```
;---------------------------------------------------------------------------
;       Highway_UnBuild.s
;         MWCOG Version 2.1D Model
;
;         Convert Highway Network to Link and Node Card Images.
;         Input Files:
;               TP+ Highway Network = ZONEHWY.NET
;         Output Files:
;               ASCII Links = LINK.ASC
;               ASCII Nodes = NODE.ASC
;
;         Step 1: UnBuild Highway Network
;               Input Files: ZONEHWY.NET
;               Output Files: LINK.ASC, NODE.ASC
;
;---------------------------------------------------------------------------
;
;         Global Variables
;
          COMP ID = 'MWCOG Version 2.1D Model -- Highway UnBuild'
;
;---------------------------------------------------------------------------
;         Step 1 Un-Build Highway Network
;---------------------------------------------------------------------------
;
RUN PGM = HWYNET
        NETI = ZONEHWY.NET                       ;---- input highway network ----

          PHASE = LINKMERGE
                    DISTANCE = LI.1.DISTANCE

                PRINT FILE = LINK.ASC, LIST = A(5), B(5), DISTANCE(7.2),
                        SPDCLASS(7), CAPCLASS(3), COUNT(6), JUR(7), TAZ(5),
                        SCREEN(7), FTYPE(3), TOLL(9), TOLLGRP(3), AREATP(2),
                        AMLANE(13), AMLIMIT(3), PMLANE(3),
                        PMLIMIT(3), OPLANE(3), OPLIMIT(3)

          ENDPHASE

          PHASE = NODEMERGE
                PRINT FILE = NODE.ASC, LIST = N(6.0), X(8.0), Y(8.0)
          ENDPHASE
ENDRUN
```

13 joinskims.s

```
; JoinSkims.S - Consolidate highway skims used in Mode Choice Model
; 2/14/08  Input skims:  ???%_iter_%@PRD@.skm
;           Changed to:   ???%_iter_%@PRD@_MC.skm
;  The revised skim reflect
;       time (min) + time (min) equivalent of any Variably Priced facility toll such
as ICC/VA Hot lanes
;       distance (1/10s of mi),
;       tolls (1994 cts) of any FIXED price facility, such as Dulles toll road.
;
; _HOV3Path_  environment variable is used to override HOV3 Skims from another
Subdirectory
;
HOV3PATH = '%_HOV3PATH_%'
LOOP PERIOD=1,2

IF (PERIOD=1)
  PRD='am'
ELSE
  PRD='op'
ENDIF

RUN PGM=MATRIX
    MATI[1]=          sov%_iter_%@PRD@_MC.skm
    MATI[2]=          hov2%_iter_%@PRD@_MC.skm
    MATI[3]=@HOV3PATH@hov3%_iter_%@PRD@_MC.skm
```

```
    FILLMW  MW[1]  = MI.1.1,2,3
    FILLMW  MW[4]  = MI.2.1,2,3
    FILLMW  MW[7]  = MI.3.1,2,3

   MATO[1] = hwy%_iter_%@PRD@.skm, MO=1-9
ENDRUN
ENDLOOP ; PERIOD
```

14 MC_Auto_Drivers.s

```
; ==================================================================
;  MC_Auto_Drivers.s
;  This program is used to develop 1-occ, 2-occ, and 3+occ auto driver
;  trip tables, by purpose (HBW, HBS, HBO, and NHB).  The script reads two files:
;  1) Internal Auto Person Trips - The AECOM NL Mode choice output, each file
;     contains auto person trips by occupancy group (1,2,and 3+ Occupant Vehicles).
;  2) External Auto Person trips - the trip distibution output containing
;     total auto person trips.
; ==================================================================
;
;
;//////////////////////////////////////////////////////////////////
;
; First, establish Input/Output filenames:
LOOP PURP=1,4   ;  We'll Loop 4 times, for each purpose
                ;

IF (PURP=1)    ; HBW Loop
 MCFILE   = '%_iter_%_HBW_NL_MC.MTT' ;AECOM Mode Choice file           (Input)
 TDFILE   = 'HBWEST%_iter_%.PTT'     ;Trip distibution output          (Input)
 MC123OCC = 'HBW%_iter_%.ADR'        ;HBW Auto Drv trips- 1,2,3+ Occ.  (Output)
 PURPOSE  = 'HBW'                    ;
 Avg3P_Occ=  3.50                    ; Avg Auto Occupancy for autos w/ 3+ person
 ExtCarOcc=  1.15                    ; Avg External Auto Occ.
 TDTab    =  '7'                     ; Total Psn Trip tab no. in Trip Dist. output
file

ELSEIF (PURP=2) ; HBS Loop
 MCFILE   = '%_iter_%_HBS_NL_MC.MTT' ;AECOM Mode Choice file           (Input)
 TDFILE   = 'HBSEST%_iter_%.PTT'     ;Trip distibution output          (Input)
 MC123OCC = 'HBS%_iter_%.ADR'        ;HBW Auto Drv trips- 1,2,3+ Occ.  (Output)
 PURPOSE  = 'HBS'                    ;
 Avg3P_Occ=  3.25                    ; Avg Auto Occupancy for autos w/ 3+ person
 ExtCarOcc=  1.64                    ; Avg External Auto Occ.
 TDTab    =  '7'                     ; Total Psn Trip tab no. in Trip Dist. output
file

ELSEIF (PURP=3) ; HBO Loop
 MCFILE   = '%_iter_%_HBO_NL_MC.MTT' ;AECOM Mode Choice file           (Input)
 TDFILE   = 'HBOEST%_iter_%.PTT'     ;Trip distibution output          (Input)
 MC123OCC = 'HBO%_iter_%.ADR'        ;HBW Auto Drv trips- 1,2,3+ Occ.  (Output)
 PURPOSE  = 'HBO'                    ;
 Avg3P_Occ=  3.35                    ; Avg Auto Occupancy for autos w/ 3+ person
 ExtCarOcc=  1.61                    ; Avg External Auto Occ.
 TDTab    =  '7'                     ; Total Psn Trip tab no. in Trip Dist. output
file

ELSEIF (PURP=4) ; NHB Loop
 MCFILE   = '%_iter_%_NHB_NL_MC.MTT' ;AECOM Mode Choice file           (Input)
 TDFILE   = 'NHBEST%_iter_%.PTT'     ;Trip distibution output          (Input)
 MC123OCC = 'NHB%_iter_%.ADR'        ;HBW Auto Drv trips- 1,2,3+ Occ.  (Output)
 PURPOSE  = 'NHB'                    ;
 Avg3P_Occ=  3.35                    ; Avg Auto Occupancy for autos w/ 3+ person
 ExtCarOcc=  1.28                    ; Avg External Auto Occ.
 TDTab    =  '4'                     ; Total Psn Trip tab no. in Trip Dist. output
file

ENDIF
;
;//////////////////////////////////////////////////////////////////

RUN PGM=MATRIX
  PAGEHEIGHT= 32767

    MATI[1]=@MCFILE@          ;  MODE CHOICE MODEL OUTPUT FILE (for INTL TRIPS)
    MATI[2]=@TDfILE@          ;  TRIP DISTRIBUTION OUTPUT FILE (for EXTL TRIPS)

    ; put INTERNAL 1,2,3+ OCC AUTO PERSON TRIPS IN MTX 1,2,3
        FILLMW MW[1]  = MI.1.1,2,3

    ; compute internal auto driver trips, by occ group in mtx 11,12,13
        MW[11]  = MW[1] / 1.0              ;;  intl 1-occ. auto drivers
        MW[12]  = MW[2] / 2.0              ;;  intl 2-occ. auto drivers
        MW[13]  = MW[3] / @Avg3P_Occ@      ;;  intl 3+occ. auto drivers

    ; put TOTAL motorized person trips in mtx 20.
        MW[20] = MI.2.@TDtab@

    ; the external portion(auto person trips) will be extracted from mtx 20, and put
into 30
    ; .
        IF (I <  2145) MW[22]  = 1.0, include = 2145-2191;
        IF (I >= 2145) MW[22]  = 1.0, exclude = 2145-2191;

        MW[30] = MW[20] * MW[22]        ;; Extl auto person trips

    ; compute external auto driver trips in mtx 40, and apportion among occ groups
    ; using standard occ. curves

        MW[40] = MW[30] / @ExtCarOcc@    ;; Extl Auto driver trips

JLOOP
  XCarOcc =@ExtCarOcc@
; Determine LOV Vehicles in 1,2,3&4+ occupant groups using model
; COG's disaggrgegation model.

        IF     (XCarOcc  < 1.0050) ;  Make sure the computed Car Occ.
                XCarOcc  = 1.0050  ;  is between 1.005 and 2.500
        ELSEIF (XCarOcc  > 2.5000) ;  -- if not establish boundary
                XCarOcc  = 2.5000  ;      conditions
        ENDIF
;
; Apply Car Occ. Pct Model-Computes Pct Vehs.in Occ groups as function
; of avg auto occ.  The function is continuous  but piecewise.
;
        IF     (XCarOcc = 1.0050 - 1.1199999)
         MW[21] =  2.00264 - (0.9989 * XCarOcc) ; Shr of 1-Occ Vehs
         MW[22] = -1.00050 + (0.9952 * XCarOcc) ; Shr of 2-Occ Vehs
         MW[23] = -0.00158 + (0.0029 * XCarOcc) ; Shr of 3-Occ Vehs
         MW[24] = -0.00056 + (0.0008 * XCarOcc) ; Shr of 4-Occ Vehs
        ELSEIF (XCarOcc = 1.1200 - 2.5000)
         MW[21] =  1.59600 - (0.6357 * XCarOcc) ; Shr of 1-Occ Vehs
         MW[22] = -0.31143 + (0.3800 * XCarOcc) ; Shr of 2-Occ Vehs
         MW[23] = -0.17082 + (0.1540 * XCarOcc) ; Shr of 3-Occ Vehs
         MW[24] = -0.11375 + (0.1017 * XCarOcc) ; Shr of 4-Occ Vehs
        ENDIF

        ;
        ;   Apply Modeled Shares to the Extl Auto Drivers in mtx 51-54
```

```
        MW[51] =(MW[21] * MW[40]) ; Estimated Extl 1 occ vehicles
        MW[52] =(MW[22] * MW[40]) ; Estimated Extl 2 occ vehicles
        MW[53] =(MW[23] * MW[40]) ; Estimated Extl 3 occ vehicles
        MW[54] =(MW[24] * MW[40]) ; Estimated Extl 4+occ vehicles


; compute add intl and extl auto drivers by occ. groups together
; in mtx 61,62,63.  Total adrs will be in mtx 70

        MW[61] = MW[51] + MW[11]          ; Total 1-Occ Total Auto Drivers
        MW[62] = MW[52] + MW[12]          ;       2-occ
        MW[63] = MW[53] + MW[54] + MW[13]  ;       3+occ

        MW[70] = mw[61] + MW[62] + MW[63]
;
endjloop



JLOOP

; Lets sum up the above to get neat total summaries
     Int1_OccAPsn  =   Int1_OccAPsn + MW[1]                          ;
     Int2_OccAPsn  =   Int2_OccAPsn + MW[2]                          ;
     Int3POccAPsn  =   Int3POccAPsn + MW[3]                          ;
     IntAutoPsn    =   IntAutoPsn   + MW[1] + MW[2]+ MW[3]
;

     Int1_OccADrv  =   Int1_OccADrv + MW[11]                         ;
     Int2_OccADrv  =   Int2_OccADrv + MW[12]                         ;
     Int3POccADrv  =   Int3POccADrv + MW[13]                         ;
     IntAutoDrv    =   IntAutoDrv   + MW[11] + MW[12]+ MW[13]
;

     TotalMotorPsn =   TotalMotorPsn + MW[20]                         ;

     ExtAutoPsn    =   ExtAutoPsn   + MW[30]                         ;

     ExtAutoDrv    =   ExtAutoDrv   + MW[40]                         ;

     Ext1_OccADrv  =   Ext1_OccADrv + MW[51]                         ;
     Ext2_OccADrv  =   Ext2_OccADrv + MW[52]                         ;
     Ext3_OccADrv  =   Ext3_OccADrv + MW[53]                         ;
     Ext4POccADrv  =   Ext4POccADrv + MW[54]                         ;
     ExtchkAdrv    =   ExtchkADrv   + MW[51]+ MW[52]+ MW[53]+ MW[54]      ;

     Tot1_OccADrv  =   Tot1_OccADrv + MW[61]                         ;
     Tot2_OccADrv  =   Tot2_OccADrv + MW[62]                         ;
     Tot3POccADrv  =   Tot3POccADrv + MW[63]                         ;

     TotalAutoDrv  =   TotalAutoDrv + MW[70]                         ;
endjloop

IF (I == ZONES)
;


 Print LIST='/bt     '
 LIST='SUMMARY OF ','@PURPOSE@',' ITERATION: ','%_iter_%','  AUTO DRIVER TRIP
RESULTS'
 LIST='   '
 Print form = 12.2  LIST='    Assumed Avg  3+Veh. Occ.:  ',@Avg3P_Occ@
 Print form = 12.2  LIST='    Assumed Extl Veh Occ.   :  ',@ExtCarOcc@
 LIST='   '
 List=' Input Internal Auto Persons   '
 Print form = 12.0csv List='       1-Occ.: ',   Int1_OccAPsn
 Print form = 12.0csv List='       2-Occ.: ',   Int2_OccAPsn
 Print form = 12.0csv List='       3+Occ.: ',   Int3POccAPsn
 List=' ------------------------------- '
 List='      Total   ',    IntAutoPsn
 List='                                 '
 List=' Input / Derived Internal Auto Drivers  '
 Print form = 12.0csv List='       1-Occ.: '    Int1_OccADrv
 Print form = 12.0csv List='       2-Occ.: '    Int2_OccADrv
 Print form = 12.0csv List='       3+Occ.: '    Int3POccADrv
 List=' ------------------------------ '
 Print form = 12.0csv List='       Total   ',   IntAutoDrv
 List='                 '                   '
 Print form = 12.0csv List='  Input Total Motorized Person   ',  TotalMotorPsn
 List='                            '
 Print form = 12.0csv List='  Input Total External Auto Psn  ',  ExtAutoPsn
 List='                           '
 Print form = 12.0csv List=' Input/Derived External Auto Drv ',  ExtAutoDrv
 List='             '
 List=' Estimated External Auto Drivers  '
 Print form = 12.0csv List='       1-Occ.: ',   Ext1_OccADrv
 Print form = 12.0csv List='       2-Occ.: ',   Ext2_OccADrv
 Print form = 12.0csv List='       3-Occ.: ',   Ext3_OccADrv
 Print form = 12.0csv List='       4+Occ.: ',   Ext4POccADrv
 List=' ------------------------------- '
 Print form = 12.0csv List='       Total   ',   ExtchkADrv
 List='       '
 List=' Output / Combined Internal/External Auto Drivers  '
 Print form = 12.0csv List='       1-Occ.: '    Tot1_OccADrv
 Print form = 12.0csv List='       2-Occ.: '    Tot2_OccADrv
 Print form = 12.0csv List='       3+Occ.: '    Tot3POccADrv
 List=' ------------------------------ '
 Print form = 12.0csv LIST='       Total   ',   TotalAutoDrv
 LIST='       '
 LIST='===  END OF ','@PURPOSE@',' ITERATION: ','%_iter_%',' AUTO DRV RESULTS ==='
 LIST='/et     '
ENDIF

MATO=@MC123OCC@,MO=61,62,63 ; output file designation

ENDRUN
ENDLOOP
```

15 MC_NL_Summary.s

```
;-------------------------------------------------------------------
; Program Name: MC__NL_Summary.s
; MWCOG Version 2.2 Model w/ Nested Logit MC model
;
;  Summarize final table by purpose & Mode & Submode
;
; Environment Variables Used:
;              %_iter_%
;              %_year_%
;              %_alt_%
;
;
;-------------------------------------------------------------------
;   Modes in AECOM MC model    Summary modes
;     1 DR ALONE                  1 All transit         4-14
;     2 SR2                       2 Metrorail only      7,13,14
;     3 SR3+                      3 Metrorail related   7,13,14,6,11,12
;     4 WK-CR                     4 Auto person         1-3
;     5 WK-BUS                    5 Total motorized psn 1-14
;     6 WK-BU/MR                  6 Commuter rail       4,8 (may incl bus/Mrail)
```

```
;     7 WK-MR                   7 Bus only            5,9,10
;     8 PNR-CR                  8 Bus only, WMATA Compact area
;     8 KNR-CR
;     9 PNR-BUS
;    10 KNR-BUS
;    11 PNR-BU/MR
;    12 KNR-BU/MR
;    13 PNR-MR
;    14 KNR-MR
;--------------------------------------------------------------------

; --------------------------------------------------------------
; Now summarize total purpose trip tables, by mode
; --------------------------------------------------------------

 HBW3PlOCC = 3.50  ; Assumed Occupancy of 3+ Vehicles (derived from 2000 Census)
 HBS3PlOCC = 3.25  ; Assumed Occupancy of 3+ Vehicles (derived from 1994HTS)
 HBO3PlOCC = 3.35  ; Assumed Occupancy of 3+ Vehicles (derived from 1994HTS)
 NHB3PlOCC = 3.35  ; Assumed Occupancy of 3+ Vehicles (derived from 1994HTS)

RUN PGM=MATRIX

  ZONES=2191

    MATI[1]= %_iter_%_HBW_NL_MC.MTT
    MATI[2]= %_iter_%_HBS_NL_MC.MTT
    MATI[3]= %_iter_%_HBO_NL_MC.MTT
    MATI[4]= %_iter_%_NHB_NL_MC.MTT

    FILLMW MW[101] = mi.1.1,2,3,4,5,6,7,8,9,10,11,12,13,14   ; HBW modal trip tabs
101..114
    FILLMW MW[201] = mi.2.1,2,3,4,5,6,7,8,9,10,11,12,13,14   ; HBS modal trip tabs
201..214
    FILLMW MW[301] = mi.3.1,2,3,4,5,6,7,8,9,10,11,12,13,14   ; HBO modal trip tabs
301..314
    FILLMW MW[401] = mi.4.1,2,3,4,5,6,7,8,9,10,11,12,13,14   ; NHB modal trip tabs
401..414

   MW[501]= MW[101]+MW[201]+MW[301]+MW[401]   MW[502]=
MW[102]+MW[202]+MW[302]+MW[402]  ; sum
   MW[503]= MW[103]+MW[203]+MW[303]+MW[403]   MW[504]=
MW[104]+MW[204]+MW[304]+MW[404]  ; total purpose
   MW[505]= MW[105]+MW[205]+MW[305]+MW[405]   MW[506]=
MW[106]+MW[206]+MW[306]+MW[406]  ; trips in tabs
   MW[507]= MW[107]+MW[207]+MW[307]+MW[407]   MW[508]=
MW[108]+MW[208]+MW[308]+MW[408]  ; 501..514
   MW[509]= MW[109]+MW[209]+MW[309]+MW[409]   MW[510]=
MW[110]+MW[210]+MW[310]+MW[410]  ;
   MW[511]= MW[111]+MW[211]+MW[311]+MW[411]   MW[512]=
MW[112]+MW[212]+MW[312]+MW[412]  ;
   MW[513]= MW[113]+MW[213]+MW[313]+MW[413]   MW[514]=
MW[114]+MW[214]+MW[314]+MW[414]  ;

   MATO[1] = %_iter_%_ALL_NL_MC.MTT, MO=501-514 ; Total Purpose Mode Choice Trips
ENDRUN


;--------------------------------------------------------------
; Summarize the Mode Choice Model Output to Juris. Level
;--------------------------------------------------------------


DESCRIPT='Simulation - Year: %_year_% Alternative: %_alt_%   Iteration: %_iter_% '


LOOP PURP=1,5  ; Outer Loop for Each Purpose (HBW,HBS,HBO,NHB,Total)
IF (PURP=1)
    pur = 'HBW'
    purfile = 'A_HBW.tb1'
    MCOUTTAB='%_iter_%_HBW_NL_MC.MTT'
    PURPOSE ='Internal HBW Trips'
ELSEIF (PURP=2)
    pur = 'HBS'
    purfile = 'B_HBS.tb1'
    MCOUTTAB='%_iter_%_HBS_NL_MC.MTT'
    PURPOSE ='Internal HBS Trips'
ELSEIF (PURP=3)
    pur = 'HBO'
    purfile = 'C_HBO.tb1'
    MCOUTTAB='%_iter_%_HBO_NL_MC.MTT'
    PURPOSE ='Internal HBO Trips'
ELSEIF (PURP=4)
    pur = 'NHB'
    purfile = 'D_NHB.tb1'
    MCOUTTAB='%_iter_%_NHB_NL_MC.MTT'
    PURPOSE ='Internal NHB Trips'
ELSEIF (PURP=5)
    pur = 'ALL'
    purfile = 'E_ALL.tb1'
    MCOUTTAB='%_iter_%_ALL_NL_MC.MTT'
    PURPOSE ='Total Internal Trips '
ENDIF

;
COPY FILE=DJ.EQV
;   -- Start of Jurisiction-to-TAZ equivalency --
D 1=1-88                          ; DC cr
D 2=89-319                        ; DC ncr
D 3=320-639,648,650               ; MTG MD
D 4=640-647,649,651-1029          ; PG  MD
D 5=1230-1238                     ; ARL core
D 6=1239-1329                     ; ARLcnore
D 7=1330-1399                     ; ALX VA
D 8=1400-1779                     ; FFX VA
D 9=1780-1919                     ; LDN VA
D 10=1920-2069                    ; PW  VA
D 11=1030-1059                    ; FRD MD
D 12=1060-1079                    ; CAR MD
D 13=1080-1109                    ; HOW MD
D 14=1110-1149                    ; AAR MD
D 15=1150-1169                    ; CAL
D 16=1170-1199                    ; STM
D 17=1200-1229                    ; CHS MD
D 18=2115-2129                    ; FAU VA
D 19=2080-2099                    ; STA VA
D 20=2130-2134,2135-2144          ; CLK/JEF
D 21=2100-2104,2105-2114          ; FBG/SPTS
D 22=2070-2079                    ; KGEOVA
D 23=2145-2191                    ; EXTRNLS
;   -- end of Jurisiction-to-TAZ equivalency --
ENDCOPY

RUN PGM=MATRIX
  PAGEHEIGHT= 32767
  ZONES=2191
  MATI[1]= @MCOUTTAB@


  MW[01]  = MI.1.4  + MI.1.5  + MI.1.6  + MI.1.7  + MI.1.8  +   ; 1/Transit
            MI.1.9  + MI.1.10 + MI.1.11 + MI.1.12 + MI.1.13 +
            MI.1.14

  MW[02]  = MI.1.1  + MI.1.2  + MI.1.3                          ; 2/Auto_Psn


  MW[04]  = MW[1] + MW[2]                                       ; 4/Person
```

```
  MW[05]  = MI.1.4  + MI.1.5  + MI.1.6  + MI.1.7                ; 5/TRN_Wlk
  MW[06]  = MI.1.8  + MI.1.9  + MI.1.11 + MI.1.13               ; 6/TRN_PNR
  MW[07]  = MI.1.10 + MI.1.12 + MI.1.14                         ; 7/TRN_KNR

  MW[08] = MI.1.1      ; DR ALONE                               ; 8/SOV_Psn
  MW[09] = MI.1.2      ; SR2                                    ; 9/HOV2_Psn
  MW[10] = MI.1.3      ; SR3+                                   ;10/HOV3_Psn

  MW[11] = MI.1.4      ; WK-CR                                  ;11/WLK_CR
  MW[12] = MI.1.5      ; WK-AB                                  ;12/WLK_AB
  MW[13] = MI.1.6      ; WK-BM                                  ;13/WLK_BM
  MW[14] = MI.1.7      ; WK-MR                                  ;14/WLK_MR

  MW[15] = MI.1.8      ; PNR-CR                                 ;15/PNR_CR
  MW[16] = MI.1.9      ; PNR-AB                                 ;16/PNR_AB
  MW[17] = MI.1.10     ; KNR-AB                                 ;17/KNR_AB
  MW[18] = MI.1.11     ; PNR-BM                                 ;18/PNR_BM
  MW[19] = MI.1.12     ; KNR-BM                                 ;19/KNR_BM
  MW[20] = MI.1.13     ; PNR-MR                                 ;20/PNR_MR
  MW[21] = MI.1.14     ; KNR-MR                                 ;21/KNR_MR

  MW[22] = MW[11] + MW[15]                                     ;22/cr
  MW[23] = MW[12] + MW[16] + MW[17]                            ;23/ab
  MW[24] = MW[13] + MW[18] + MW[19]                            ;24/bm
  MW[25] = MW[14] + MW[20] + MW[21]                            ;25/mr

  MW[30]= 0            ; dummy/placemarker table

;; ACCUMULATE MODAL TOTALS
    Transit          =  Transit   + ROWSUM(01)

    Auto_Psn         =  Auto_Psn  + ROWSUM(02)


    Person           =  Person    + ROWSUM(01) + ROWSUM(02)
    SOV_Psn          =  SOV_Psn   + ROWSUM(08)
    HOV2_Psn         =  HOV2_Psn  + ROWSUM(09)
    HOV3_Psn         =  HOV3_Psn  + ROWSUM(10)

    Trn_WLK          =  Trn_WLK   + ROWSUM(11) + ROWSUM(12) + ROWSUM(13) +
ROWSUM(14)
    Trn_PNR          =  Trn_PNR   + ROWSUM(15) + ROWSUM(16) + ROWSUM(18) +
ROWSUM(20)
    Trn_KNR          =  Trn_KNR   + ROWSUM(17) + ROWSUM(19) + ROWSUM(21)

    CR               =  CR        + ROWSUM(11) + ROWSUM(15)
    AB               =  AB        + ROWSUM(12) + ROWSUM(16) + ROWSUM(17)
    BM               =  BM        + ROWSUM(13) + ROWSUM(18) + ROWSUM(19)
    MR               =  MR        + ROWSUM(14) + ROWSUM(20) + ROWSUM(21)

    WLK_CR           =  WLK_CR    + ROWSUM(11)
    WLK_AB           =  WLK_AB    + ROWSUM(12)
    WLK_BM           =  WLK_BM    + ROWSUM(13)
    WLK_MR           =  WLK_MR    + ROWSUM(14)

    PNR_CR           =  PNR_CR    + ROWSUM(15)
    PNR_AB           =  PNR_AB    + ROWSUM(16)
    PNR_BM           =  PNR_BM    + ROWSUM(18)
    PNR_MR           =  PNR_MR    + ROWSUM(20)

    KNR_AB           =  KNR_AB    + ROWSUM(17)
    KNR_BM           =  KNR_BM    + ROWSUM(19)
    KNR_MR           =  KNR_MR    + ROWSUM(21)

    IF (I=ZONES)
       ;;
```

```
       ;; compute regional rates
       ;;
        Transit_Pct  =  Transit/Person * 100.00


       ;; print global totals:
         PRINT              LIST=' Purpose: ','@pur@', '  Regional Totals Summary',
file= @purfile@
         PRINT              LIST='      '
         PRINT FORM=12.0csv List= '      ','      Transit:            ', Transit
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      Auto_Person:        ', Auto_Psn
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','     --------------------------------
',file= @purfile@;
         PRINT FORM=12.0csv List= '      ','        Total_Person:     ', Person
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','                                    '
,file= @purfile@;
         PRINT FORM=12.2csv List= '      ','      Transit Pct.:       ',
Transit_Pct  ,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','                                    '
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','                                    '
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      SOV_Auto_Person:    ', SOV_Psn
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      HOV2_Auto_Person:   ', HOV2_Psn
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      HOV3+Auto_Person    ', HOV3_Psn
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','     --------------------------------'
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','        Auto_Person:      ', Auto_Psn
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','                                    '
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      Commuter_Rail:      ', CR
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      All_Bus:            ', AB
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      Bus&Metrorail:      ', BM
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      Metrorail_Only:     ', MR
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','     -------------------------------- '
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','         Transit:         ', Transit
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','                                    '
,file= @purfile@;
                                                                              ;
         PRINT FORM=12.0csv List= '      ','      Walk_Commuter_Rail:  ', WLK_CR
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      Walk_All_Bus         ', WLK_AB
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      Walk_Bus_&_Metrorail:', WLK_BM
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      Walk_Metrorail_Only: ', WLK_MR
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','     -------------------------------- '
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','        Total WLK Acc:     ', Trn_WLK
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','                                    '
,file= @purfile@;
         PRINT FORM=12.0csv List= '      ','      PNR__Commuter_Rail:  ', PNR_CR
,file= @purfile@;
```

```
        PRINT FORM=12.0csv List= '      ','       PNR__All_Bus         ', PNR_AB
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','       PNR__Bus_&_Metrorail:', PNR_BM
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','       PNR__Metrorail_Only: ', PNR_MR
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','      ------------------------------- '
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','         Total PNR Acc:     ', Trn_PNR
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','                            '
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','       KNR__ALL_Bus:        ', KNR_AB
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','       KNR__Bus_&_Metrorail:', KNR_BM
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','       KNR__Metrorail_Only: ', KNR_MR
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','      ------------------------------- '
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','         Total KNR Acc:     ', Trn_KNR
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','                            '
,file= @purfile@;
        PRINT              LIST=' ====== End ','@pur@',' Purpose ============== '
,file= @purfile@;
        PRINT FORM=12.0csv List= '      ','     ','                             '
,file= @purfile@;
        PRINT LIST='/et            '

    ENDIF

       ;;
  FILEO MATO[01]  = TEMP.trn MO= 1,30
        MATO[02]  = TEMP.apn MO= 2,30
        MATO[04]  = TEMP.psn MO= 4,30
        MATO[05]  = TEMP.cr  MO=22,30
        MATO[06]  = TEMP.ab  MO=23,30
        MATO[07]  = TEMP.bm  MO=24,30
        MATO[08]  = TEMP.mr  MO=25,30
        MATO[09]  = TEMP.trp MO=1,4

  ; renumber OUT.MAT according to DJ.EQV
  RENUMBER FILE=DJ.EQV, MISSINGZI=M, MISSINGZO=W
ENDRUN

;
LOOP INDEX2=1,8   ; Inner Loop for Each Summary Type:
;                   1/LOV Adrs,2/LOV APpsns,3/Transit,4/HOV Psns,5/HOV Adrs
;                   6/Adrs    ,7/Apsns     ,8/Persons,9/Pct Trn ,10/Auto Occ
;
IF (INDEX2=1)                     ; Parameters for each table:
       SQFNAME='temp.trn'         ; - name of squeezed modal trip table(s)
       MODE ='Transit        '    ; - mode label od trip table
       DCML=0                     ; - decimal specification
       TABTYPE=1                  ; - table type(1/2)-involves 1 or 2 trip tables
       SCALE=1                    ; - scale factor to be applied (if desired)
       OPER='+'                   ; - operation(if tabtype=2) Tab1(?)Tab2=Result
     ELSEIF (INDEX2=2)
       SQFNAME='temp.apn'         ;
       MODE ='Auto Person    '
       DCML=0
       TABTYPE=1
       SCALE=1                    ;
       OPER='+'                   ;
     ELSEIF (INDEX2=3)
       SQFNAME='temp.psn'         ;
       MODE ='Motorized Person'
       DCML=0
       TABTYPE=1
       SCALE=1                    ;
       OPER='+'                   ;
     ELSEIF (INDEX2=4)
       SQFNAME='temp.cr '         ;
       MODE ='Commuter Rail  '
       DCML=0
       TABTYPE=1
       SCALE=1                    ;
       OPER='+'                   ;
     ELSEIF (INDEX2=5)
       SQFNAME='temp.ab '         ;
       MODE ='All Bus    '
       DCML=0
       TABTYPE=1
       SCALE=1                    ;
       OPER='+'                   ;
     ELSEIF (INDEX2=6)
       SQFNAME='temp.bm'          ;
       MODE ='Bus & Metrorail  '
       DCML=0
       TABTYPE=1
       SCALE=1                    ;
       OPER='+'                   ;
     ELSEIF (INDEX2=7)
       SQFNAME='temp.mr'          ;
       MODE ='Metrorail Only '
       DCML=0
       TABTYPE=1
       SCALE=1                    ;
       OPER='+'                   ;
     ELSEIF (INDEX2=8)
       SQFNAME='temp.trp'         ;
       MODE ='Transit Percentage'
       DCML=1
       TABTYPE=2
       SCALE=100                  ;
       OPER='/'
     ENDIF
;
RUN PGM=MATRIX
  PAGEHEIGHT= 32767
  ZONES=23
  FILEI MATI=@SQFNAME@
  ARRAY CSUM=23,CSUM1=23,CSUM2=23
; --------------------------------------------------------------
; --  Table Cell Value decalaration or computation (in MW[1])
; --------------------------------------------------------------

  FILLMW MW[1]=MI.1.1,2     ;    read input tables in MW 2,3

 IF (@TABTYPE@ = 2)
  FILLMW MW[2]=MI.1.1,2     ;    read input tables in MW 2,3
 ENDIF

  IF (@TABTYPE@=2)                                ; Cell Value
     JLOOP                                        ; computed for
      IF (MW[3][J]>0) MW[1]=MW[2]*@SCALE@@OPER@MW[3]; special summaries-
     ENDJLOOP                                     ; calculation in MW[1]
  ENDIF

; ----------------------------------------------------
; ---- ROW Marginal declaration or computation --------
; ----------------------------------------------------
  RSUM   =     ROWSUM(1)           ; 'normal' table- row summary value
  denom  =     ROWSUM(3)
  IF (@TABTYPE@=2)
```

```
       if (denom>0)  RSUM = @SCALE@*ROWSUM(2)@OPER@ROWSUM(3)  ; non-'normal' table
  ENDIF                                     ; compute the row marginal(%)

; -------------------------------------------------------
; ---- COLUMN/Total Marginal Accumulation            ----
; ---- The computation (if necessary) is done below  ----
; -------------------------------------------------------

  JLOOP                           ; COL/Total Accumulation
    CSUM[J] = CSUM[J] +  MW[1][J]  ; for 'normal' table
    TOTAL   = TOTAL   +  MW[1]     ;
  ENDJLOOP

IF (@TABTYPE@=2)
  JLOOP                             ; COL/Total Accumulation
    CSUM1[J] = CSUM1[J] +  MW[2][J]  ; for non-'normal' Table
    TOTAL1   = TOTAL1   +  MW[2]     ;
    CSUM2[J] = CSUM2[J] +  MW[3][J]  ;
    TOTAL2   = TOTAL2   +  MW[3]     ;
  ENDJLOOP
ENDIF

  IF (I==1)      ; print header

  PRINT LIST='/bt   ','@DESCRIPT@'
  PRINT LIST='      ','Purpose: ','@PURPOSE@','   MODE: ','@MODE@'
  PRINT LIST='      '

   PRINT LIST='           DESTINATION'
   PRINT LIST=' ORIGIN |',
              '      1','      2','      3','      4',
              '      5','      6','      7','      8','      9',
              '     10','     11','     12','     13','     14',
              '     15','     16','     17','     18','     19',
              '     20','     21','     22','     23',' |  TOTAL'



   PRINT LIST='==============',
              '==========================================',
              '==========================================',
              '==========================================',
              '======================================='


  ENDIF

  IF (I=1)
   CURDIST=STR(I,2,1)+' DC CR'+ '|' ; Make row header
  ELSEIF (I=2)
   CURDIST=STR(I,2,1)+' DC NC'+ '|' ; Make row header
  ELSEIF (I=3)
   CURDIST=STR(I,2,1)+' MTG  '+ '|' ; Make row header
  ELSEIF (I=4)
   CURDIST=STR(I,2,1)+' PG   '+ '|' ; Make row header
  ELSEIF (I=5)
   CURDIST=STR(I,2,1)+' ARLCR'+ '|' ; Make row header
  ELSEIF (I=6)
   CURDIST=STR(I,2,1)+' ARNCR'+ '|' ; Make row header
  ELSEIF (I=7)
   CURDIST=STR(I,2,1)+' ALX  '+ '|'; Make row header
  ELSEIF (I=8)
   CURDIST=STR(I,2,1)+' FFX  '+ '|' ; Make row header
  ELSEIF (I=9)
   CURDIST=STR(I,2,1)+' LDN  '+ '|' ; Make row header
  ELSEIF (I=10)
   CURDIST=STR(I,2,1)+' PW   '+ '|' ; Make row header
  ELSEIF (I=11)
   CURDIST=STR(I,2,1)+' FRD  '+ '|' ; Make row header
  ELSEIF (I=12)
   CURDIST=STR(I,2,1)+' CAR  '+ '|' ; Make row header
  ELSEIF (I=13)
   CURDIST=STR(I,2,1)+' HOW  '+ '|' ; Make row header
  ELSEIF (I=14)
   CURDIST=STR(I,2,1)+' AAR  '+ '|' ; Make row header
  ELSEIF (I=15)
   CURDIST=STR(I,2,1)+' CAL  '+ '|' ; Make row header
  ELSEIF (I=16)
   CURDIST=STR(I,2,1)+' STM  '+ '|' ; Make row header
  ELSEIF (I=17)
   CURDIST=STR(I,2,1)+' CHS  '+ '|' ; Make row header
  ELSEIF (I=18)
   CURDIST=STR(I,2,1)+' FAU  '+ '|' ; Make row header
  ELSEIF (I=19)
   CURDIST=STR(I,2,1)+' STA  '+ '|' ; Make row header
  ELSEIF (I=20)
   CURDIST=STR(I,2,1)+' CL/JF'+ '|' ; Make row header
  ELSEIF (I=21)
   CURDIST=STR(I,2,1)+' SP/FB'+ '|' ; Make row header
  ELSEIF (I=22)
   CURDIST=STR(I,2,1)+' KGEO '+ '|' ; Make row header
  ELSEIF (I=23)
   CURDIST=STR(I,2,1)+' EXTL '+ '|' ; Make row header
  ELSE ;  (I=24)
   CURDIST=STR(I,2,1)+' TOTAL'+ '|' ; Make row header
  ENDIF

  PRINT FORM=7.@DCML@ LIST=CURDIST, MW[1][1],MW[1][2],MW[1][3],MW[1][4],MW[1][5],
                  MW[1][6],MW[1][7],MW[1][8],MW[1][9],MW[1][10],
                  MW[1][11],MW[1][12],MW[1][13],MW[1][14],MW[1][15],
                  MW[1][16],MW[1][17],MW[1][18],MW[1][19],MW[1][20],
                  MW[1][21],MW[1][22],MW[1][23],' |',RSUM

  IF (I==ZONES)
; Now at the end of Processed zone matrix
;  Do final Column/Grand Total Computations
     IF (@TABTYPE@=2)
       LOOP IDX = 1,ZONES
            IF (CSUM2[IDX] = 0)
                 CSUM[IDX] = 0
            ELSE
                 CSUM[IDX] = @SCALE@* CSUM1[IDX] @OPER@ CSUM2[IDX]
            ENDIF
       ENDLOOP
     ENDIF
     IF (@TABTYPE@=2 )
            IF (TOTAL2 = 0)
                TOTAL  = 0
            ELSE
                TOTAL  = @SCALE@ *TOTAL1 @OPER@ TOTAL2
            ENDIF
     ENDIF

;  End of final Column/Grand Total Computations

   PRINT LIST='==============',
              '==========================================',
              '==========================================',
              '==========================================',
              '======================================='


    PRINT FORM=8.@DCML@,
    LIST=' TOTAL ',' ',CSUM[1],'      ' ,CSUM[3],
    '      ',CSUM[5],'      ',CSUM[7],'      ',CSUM[9],
    '      ',CSUM[11],'      ',CSUM[13],'      ',CSUM[15],
```

```
    '      ',CSUM[17],'      ',CSUM[19],'      ',CSUM[21],
    '      ',CSUM[23],' |'
    PRINT FORM=8.@DCML@,
    LIST='/et            ',CSUM[2],
    '      ' ,CSUM[4],'      ',CSUM[6],'      ',CSUM[8],
    '      ',CSUM[10],'      ',CSUM[12],'      ',CSUM[14],
    '      ',CSUM[16],'      ',CSUM[18],'      ',CSUM[20],
    '      ',CSUM[22],'       ',TOTAL(9.@DCML@)


 ENDIF
ENDRUN

ENDLOOP ; End 'Inner' Loop
ENDLOOP ; End 'Outer' Loop
```

16 Metrorail_skims.s

```
;=================================================================
;  Metrorail_skims.S
;  MWCOG Version 2.2 Model
;
;  Step 1: Build Metrorail Staion to Station Network
;  Step 2: Build Distance skims (in 1/100s mi) to be used in the
;  MFARE1 process
;  set metrorail link file to new input name
;=================================================================
; max 'zones' (stations changed from 116 to 150)

;  Global variables:

NZONES = 150           ; Max. no. of Stations

NODIN='METNODM1.TB'    ; Input Station Nodes
LNKIN='METLNKM1.TB'   ; Input Station Links
DSKMO='rldist.skm'     ; Output Distance Skim File
TPENS='inputs\trnpen.dat'     ; Turn Penalty file


;=================================================================
; Step 1: Build Metrorail Network
;=================================================================


RUN PGM=HWYNET
;
ZONES=@NZONES@

; Node Coordinate File
; XY Units are NAD83 (in whole feet)
FILEI NODEI=@NODIN@,
        VAR=N,09-13,
        VAR=X,19-26,
        VAR=Y,32-39

; Metrorail Links
FILEI LINKI=@LNKIN@,
        VAR=A,12-16,         ; A-Node Number
        VAR=B,18-22,         ; B-Node Number
        VAR=REV,30-31,       ; Reverse Code
        VAR=DISTANCE,38-42,  ; Distance in 1/100ths of Miles
        VAR=SPEED,59-63      ; Speed Value (mph)

; output network in TP+ format
NETO=metrail.TPN
;

;=================================================================
; Step 2: Build Station Level Distance Skims
;=================================================================

RUN PGM=HWYLOAD
  NETI   =metrail.tpn        ; Metrorail Network
  MATO[1]=@DSKMO@,MO=1,
          FORMAT=MINUTP
  TURNPENI=@TPENS@


  PHASE=LINKREAD
       SPEED   = LI.SPEED            ; Use Link Coded Speed
       DISTANCE= LI.DISTANCE / 100   ; Set Distance in 1/100ths of mi to true mi
  ENDPHASE
;
; Now create station-to-station distance skims over minimum time
; paths.  The distance skims are in 100ths of miles
; (e.g. a skim value of '145' indicates 1.45 miles)
;
;
  PHASE=ILOOP

   PATHLOAD PATH=TIME, PENI=1,  TRACE=(I=64 && J=37),

              MW[1]=PATHTRACE(LI.DISTANCE), noaccess = 0
;---------------------------------------------------------------------
; I will print selected rows of skim files
;---------------------------------------------------------------------
     IF (i = 1-2)                       ;  for select rows (Is)
         printrow MW=1, j=1-@NZONES@   ;  print work matrices 1-3
     ENDIF                              ;  row value to all Js.
   ENDPHASE
ENDRUN
```

17 MFARE1.S

```
;=================================================================
;  MFARE1.S
;   V2.2 Model
;   TP+ Script Version of MFARE1 script
;   Walk and Drive Access Metrorail Sta. to Sta. fares developed
;    for AM Peak and off-peak periods
;
;   Programmer: Milone
;   Date:      1/11/07
;   Metro station XY file name corrected (12/13/2006)
;=================================================================
;


STATSIZE        =   150               ;  No. of Metrorail Stations (Note: Max is
999)
MR_DST_FTR      =  0.01               ;  Factor to convert input skimmed Metrorail
distance units to whole miles

;---------------------------------------------------------------------
;  Filenames:
```

```
MSTA_XYs        = 'MFARE1.A1'                 ;  Metrorail Sta XYs coords scaled
so computed units are in 1/100ths of miles
MSTA_Dst_Skims  = 'RLDIST.SKM'                ;  Metrorail Sta/Sta Distance Skims
(Distance units:        1/100ths of miles
MSTA_Discount   = 'INPUTS\mfare1_Sta_Disc.ASC'  ;  Metrorail Sta fare discount array
in cents
MSTA_Tariff     = 'INPUTS\tariff.txt'         ;  WMATA tariff policy

AM_Sta_Fares    = 'AM_Metrorail_Fares.TXT'    ;  Output AM Statio-to-Station Fares
-text file
OP_Sta_Fares    = 'OP_Metrorail_Fares.TXT'    ;  Output OP Statio-to-Station Fares
-text file


RUN PGM=MATRIX
ZONES=@STATSIZE@
read FILE=@MSTA_Tariff@

;
; Set up zone arrays for accumulating I/O variables
;
;
;
;==============================================================
; Read Station Coordinate file                                =
;==============================================================
;
      LOOKUP Name=StaXYS,
             LOOKUP[1]   = 1,Result = 2, ; Xcrds
             LOOKUP[2]   = 1,Result = 3, ; YCrds
             Interpolate = N, FAIL=0,0,0,list=Y,file=@MSTA_XYS@

;
;==============================================================
; Read Station Fare Discount Lookup                           =
;   - The station-specific discount values are in cents.      =
;     The discounts are subtracted from the final             =
;     computed fares to/from the station                      =
;==============================================================
;
      LOOKUP Name=StaDSC,
             LOOKUP[1]   = 1,Result = 2,   ;  AM Fare Discount in cents
             LOOKUP[2]   = 1,Result = 3,   ;  OP Fare Discount in cents
             Interpolate = N, FAIL=0,0,0,list=Y,file=@MSTA_Discount@


;==============================================================
; Over-the Rail Distance Skims                                =
;==============================================================

     FILEI MATI = RLDIST.SKM
           MW[1]= MI.1.1     ;   (Over-the-rail distance in 1/100s mi)

           ROWSUM1 = ROWSUM(1)
;==============================================================
; Now, loop through each station i/j, compute composite distance,
;      and compute AM and Off peak fares.  Use generalized cost
;      calculation:
;
; FARE = (incremental cost + Rate*Distance) <-Per short  Distance  +
;        (incremental cost + Rate*Distance) <-Per medium Distance  +
;        (incremental cost + Rate*Distance) <-Per long   Distance
;
;==============================================================
  IF (rowsum1 > 0)      ; exclude unused stations
    JLOOP
```

```
     IF (MW[1] !=0 || I=J )   ; exclude station i/js that are 'unused

;     Calculate airline distance (MW[2]) in 100s of miles
      IxCrd  = StaXYS(1,I)
      JxCrd  = StaXYS(1,J)
      IyCrd  = StaXYS(2,I)
      JyCrd  = StaXYS(2,J)
      MW[2]  = ((IxCrd-JxCrd)^2 + (IyCrd-JyCrd)^2 )^ 0.5

;     Calculate Composite (airline/over-the rail) distance MW[3] in whole miles
      MW[3]  =          ((MW[1]  + MW[2]) / 2.0) * @MR_Dst_Ftr@

;     Calculate peak (MW[10]) and off-peak fares (MW[20]) based on comp distance
;     Fares computed units in non-defalted cents


;   Peak Fare Calculation:  ------------------------------------------------------
----------------

      PkDist1 = Pk_Fare_Dist1
      PkDist2 = Pk_Fare_Dist1 + Pk_Fare_Dist2


      IF       (MW[3] <= PkDist1)

                 MW[10] = Pk_Fare_Incr1 + (Pk_Fare_Rate1 * MW[3])

        ELSEIF (MW[3] >  PkDist1 && MW[3] <= PkDist2)

                 MW[10] = Pk_Fare_Incr1 + (Pk_Fare_Rate1 *  Pk_Fare_Dist1)   +
                          Pk_Fare_Incr2 + (Pk_Fare_Rate2 * (MW[3] - PkDist1))

        ELSEIF (MW[3] >  PkDist2)

                 MW[10] = Pk_Fare_Incr1 + (Pk_Fare_Rate1 *  Pk_Fare_Dist1)   +
                          Pk_Fare_Incr2 + (Pk_Fare_Rate2 *  Pk_Fare_Dist2)   +
                          Pk_Fare_Incr3 + (Pk_Fare_Rate3 * (MW[3] - PkDist2))
      ENDIF

;     Round computed AM fare MW[10] to nearest nickle as in original program Final
Fare
;     is 'FinAMFare'
                    FARE       = MW[10]
                    temp1      = INT(Fare/10.0)
                    temp2      = temp1  * 10.0
                    DiffCheck  = Fare - temp2
                    IF       (DiffCheck < 2.5)
                         FinAMFare = temp2
                      ELSEIF  (DiffCheck > 7.5)
                         FinAMFare = temp2 + 10.0
                      ElSE
                         FinAMFare = temp2 +  5.0
                    ENDIF

;     Impose Max Fare rule
                 If (FinAMFare > Pk_Fare_Max)  FinAMFare = Pk_Fare_Max

;     Apply AM station discounts if used
                    FinAMFare = FinAMFare - StaDSC(1,I) - StaDsc(1,J)

;     Compute IJ Index so station-to-station fares can be read in as a lookup
;     Index merges separate I/J numbers into one number (index for  station 1 to
station 1 is '1001')
                    IJindex = (I * 1000.0)  + J

;    Write out the AM Fares:
      Print List =  I(5),J(5), FinAMFare(6),IJindex(7),' ; ', MW[10](6),
MW[1](10.0),MW[2](10.0),MW[3](10.2),
```

```
                    IxCrd(7), JxCrd(7), IyCrd(7), JyCrd(7),
                    PkDist1(10.2),PkDist2(10.2),
               ';<
I/J/AM_Fare_n5/AM_Fare/R_Dst100s/A_Dst100s/CmpDstMi/iXcrd/jXcrd/iYcrd/jYcrdI/Dist1/D
ist2',
                File=@AM_Sta_Fares@



;     END of Peak Fare Calculation -----------------------------------------------
--------------

;    Off-Peak Calculation:  -----------------------------------------------------
----------------

      OpDist1 = Op_Fare_Dist1
      OpDist2 = Op_Fare_Dist1 + Op_Fare_Dist2


      IF       (MW[3] <= OpDist1)

                 MW[20] = Op_Fare_Incr1 + (Op_Fare_Rate1 * MW[3])

        ELSEIF (MW[3] >  OpDist1 && MW[3] <= OpDist2)

                 MW[20] = Op_Fare_Incr1 + (Op_Fare_Rate1 *  Op_Fare_Dist1)   +
                          Op_Fare_Incr2 + (Op_Fare_Rate2 * (MW[3] - OpDist1))

        ELSEIF (MW[3] >  OpDist2)

                 MW[20] = Op_Fare_Incr1 + (Op_Fare_Rate1 *  Op_Fare_Dist1)   +
                          Op_Fare_Incr2 + (Op_Fare_Rate2 *  Op_Fare_Dist2)   +
                          Op_Fare_Incr3 + (Op_Fare_Rate3 * (MW[3] - OpDist2))
      ENDIF

;     Round computed Off-peak fare MW[20] to nearest nickle as in original program
Final Fare
;     is 'FinOPFare'
                    FARE        = MW[20]
                    temp1       = INT(Fare/10.0)
                    temp2       = temp1  * 10.0
                    DiffCheck   = Fare - temp2
                    IF        (DiffCheck < 2.5)
                         FinOPFare = temp2
                      ELSEIF  (DiffCheck > 7.5)
                         FinOPFare = temp2 + 10.0
                      ElSE
                         FinOPFare = temp2 +  5.0
                    ENDIF



;     Impose Max Fare rule
                 If (FinOPFare > Op_Fare_Max)  FinOPFare = Op_Fare_Max

;     Apply Off-pk station discounts if used
                    FinOPFare = FinOPFare - StaDSC(2,I) - StaDsc(2,J)

;     Compute IJ Index so station-to-station fares can be read in as a lookup
;     Index merges separate I/J numbers into one number (index for  station 1 to
station 1 is '1001')
                    IJjindex = (I * 1000.0)  + J

;     Write out the Off-Pk Fares:
      Print List =  I(5),J(5),FinOPFare(6),IJindex(7),' ; ', MW[20](6),
MW[1](10.0),MW[2](10.0),MW[3](10.2),
                    IxCrd(7), JxCrd(7), IyCrd(7), JyCrd(7),
                    OpDist1(10.2),OpDist2(10.2),
                ';<
I/J/OP_Fare/R_Dst100s/A_Dst100s/CmpDstMi/iXcrd/jXcrd/iYcrd/jYcrdI/Dist1/Dist2',
                File=@OP_Sta_Fares@



;     END of Off Peak Fare Calculation --------------------------------------------
----------------



     ENDIF
    ENDJLOOP
   endif
ENDRUN
```

18 MFARE2.S

```
;================================================================
;  MFARE2.S
;   Version 2.2 Model
;   TP+ Script Version of MFARE2 Program
;   Walk and Drive Access Zonal Fares Developed for AM Peak and Off-Peak Periods
;
;   Programmer: Milone
;   Date:      1/11/07
;
;
; Update 2/21/07 to support nested logit work
; 01/03/08 JainM
; Update for including LRT in MR path. Use BUSFARAM.ASC and BUSFAROP.ASC in MR
paths.
; Condition the fares for Metrorail only path. Zero out fare for i/j with no transit
path.
;================================================================
;
ZONESIZE        =  2191               ;  No. of TAZs
LastIZn         =  2144               ;  Last Internal TAZ No.
STATSIZE        =   150               ;  Max No. of Metrorail Stations
BFZ_Size        =    21               ;  No. of Bus Fare Zones
; ------------------------------------------------------------------

MSTA_Tariff     = 'INPUTS\tariff.txt'
TRN_Defl        = 'TRN_Deflator.txt'
; LOOP Through the Time Period/Access Mode combinations
;      - define I/P & O/P files:
;
LOOP PRDACC = 1,22
                                                     ;; COMMUTER RAIL FARES
================================================
    IF (PRDACC = 1)                                  ;  ------ AM Walk Access cycle:
------
       USTOSFile       = '%_iter_%_AM_WK_CR.STA '    ;   Input:  Walk Acc. Station
to Station Matrix (Brd Sta/T1, Ali Stat/T2)
       TRSkimFile      = '%_iter_%_AM_WK_CR.SKM '    ;           Walk Acc. CR
Transit Skims
       MR_FareFile     = 'AM_Metrorail_Fares.TXT '   ;           Metrorail Fares in
Current Year Cents
       BusFareMTX      = 'INPUTS\BUSFARAM.ASC'       ;           Bus Fare matrix
21x21 (Bus fares zones '1' to '21')
```

```
      MF2ZonalDeck    = 'FARE_A2.ASC'              ;           Zonal A2 Deck
(Bus fares zones referenced as '1' to '21')
      OutputMatrix    = '%_iter_%_AM_WK_CR.FAR '    ;   Output: Total Fare Matrix
      OutputMatrix5   = '%_iter_%_AM_WK_CR.FR5 '    ;           Fare Matrix (T1-5
Total,bus onlr, rail, acc, egr fare file)
      OutputText      = '%_iter_%_AM_WK_CR.TXT '    ;           Fare text file for
checking fare components / selected ijs
   ELSEIF (PRDACC = 2)                              ;  ------ AM Drive Access
cycle: ------
      USTOSFile       = '%_iter_%_AM_DR_CR.STA '    ;
      TRSkimFile      = '%_iter_%_AM_DR_CR.SKM '    ;
      MR_FareFile     = 'AM_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFARAM.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_AM_DR_CR.FAR '    ;
      OutputMatrix5   = '%_iter_%_AM_DR_CR.FR5 '    ;
      OutputText      = '%_iter_%_AM_DR_CR.TXT '    ;
   ELSEIF (PRDACC = 3)                              ;  ------ Off-Pk Walk  Access
cycle: ------
      USTOSFile       = '%_iter_%_OP_WK_CR.STA '    ;
      TRSkimFile      = '%_iter_%_OP_WK_CR.SKM '    ;
      MR_FareFile     = 'OP_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFAROP.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_OP_WK_CR.FAR '    ;
      OutputMatrix5   = '%_iter_%_OP_WK_CR.FR5 '    ;
      OutputText      = '%_iter_%_OP_WK_CR.TXT '    ;
   ELSEIF (PRDACC = 4)                              ;  ------ Off-Pk Drive  Access
cycle: ------
      USTOSFile       = '%_iter_%_OP_DR_CR.STA '    ;
      TRSkimFile      = '%_iter_%_OP_DR_CR.SKM '    ;
      MR_FareFile     = 'OP_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFAROP.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_OP_DR_CR.FAR '    ;
      OutputMatrix5   = '%_iter_%_OP_DR_CR.FR5 '    ;
      OutputText      = '%_iter_%_OP_DR_CR.TXT '    ;

                                                    ;; METRORAIL ONLY FARES
==============
   ELSEIF (PRDACC = 5)                              ;  ------ AM Walk Access cycle:
------
      USTOSFile       = '%_iter_%_AM_WK_MR.STA '    ;
      TRSkimFile      = '%_iter_%_AM_WK_MR.SKM '    ;
      MR_FareFile     = 'AM_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFARAM.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_AM_WK_MR.FAR '    ;
      OutputMatrix5   = '%_iter_%_AM_WK_MR.FR5 '    ;
      OutputText      = '%_iter_%_AM_WK_MR.TXT '    ;
   ELSEIF (PRDACC = 6)                              ;  ------ AM Drive Access
cycle: ------
      USTOSFile       = '%_iter_%_AM_DR_MR.STA '    ;
      TRSkimFile      = '%_iter_%_AM_DR_MR.SKM '    ;
      MR_FareFile     = 'AM_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFARAM.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_AM_DR_MR.FAR '    ;
      OutputMatrix5   = '%_iter_%_AM_DR_MR.FR5 '    ;
      OutputText      = '%_iter_%_AM_DR_MR.TXT '    ;
   ELSEIF (PRDACC = 7)                              ;  ------ AM KNR   Access
cycle: ------
      USTOSFile       = '%_iter_%_AM_KR_MR.STA '    ;
      TRSkimFile      = '%_iter_%_AM_KR_MR.SKM '    ;
      MR_FareFile     = 'AM_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFARAM.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_AM_KR_MR.FAR '    ;
      OutputMatrix5   = '%_iter_%_AM_KR_MR.FR5 '    ;
      OutputText      = '%_iter_%_AM_KR_MR.TXT '    ;
   ELSEIF (PRDACC = 8)                              ;  ------ Off-Pk Walk  Access
cycle: ------
      USTOSFile       = '%_iter_%_OP_WK_MR.STA '    ;
      TRSkimFile      = '%_iter_%_OP_WK_MR.SKM '    ;
      MR_FareFile     = 'OP_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFAROP.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_OP_WK_MR.FAR '    ;
      OutputMatrix5   = '%_iter_%_OP_WK_MR.FR5 '    ;
      OutputText      = '%_iter_%_OP_WK_MR.TXT '    ;
   ELSEIF (PRDACC = 9)                              ;  ------ Off-Pk Drive Access
cycle: ------
      USTOSFile       = '%_iter_%_OP_DR_MR.STA '    ;
      TRSkimFile      = '%_iter_%_OP_DR_MR.SKM '    ;
      MR_FareFile     = 'OP_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFAROP.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_OP_DR_MR.FAR '    ;
      OutputMatrix5   = '%_iter_%_OP_DR_MR.FR5 '    ;
      OutputText      = '%_iter_%_OP_DR_MR.TXT '    ;
   ELSEIF (PRDACC =10)                              ;  ------ Off-Pk KNR   Access
cycle: ------
      USTOSFile       = '%_iter_%_OP_KR_MR.STA '    ;
      TRSkimFile      = '%_iter_%_OP_KR_MR.SKM '    ;
      MR_FareFile     = 'OP_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFAROP.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_OP_KR_MR.FAR '    ;
      OutputMatrix5   = '%_iter_%_OP_KR_MR.FR5 '    ;
      OutputText      = '%_iter_%_OP_KR_MR.TXT '    ;

                                                    ;; ALL BUS FARES
========================================================
   ELSEIF (PRDACC =11)                              ;  ------ AM Walk Access cycle:
------
      USTOSFile       = '%_iter_%_AM_WK_AB.STA '    ;
      TRSkimFile      = '%_iter_%_AM_WK_AB.SKM '    ;
      MR_FareFile     = 'AM_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFARAM.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_AM_WK_AB.FAR '    ;
      OutputMatrix5   = '%_iter_%_AM_WK_AB.FR5 '    ;
      OutputText      = '%_iter_%_AM_WK_AB.TXT '    ;
   ELSEIF (PRDACC =12)                              ;  ------ AM Drive Access
cycle: ------
      USTOSFile       = '%_iter_%_AM_DR_AB.STA '    ;
      TRSkimFile      = '%_iter_%_AM_DR_AB.SKM '    ;
      MR_FareFile     = 'AM_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFARAM.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_AM_DR_AB.FAR '    ;
      OutputMatrix5   = '%_iter_%_AM_DR_AB.FR5 '    ;
      OutputText      = '%_iter_%_AM_DR_AB.TXT '    ;
   ELSEIF (PRDACC =13)                              ;  ------ AM KNR   Access
cycle: ------
      USTOSFile       = '%_iter_%_AM_KR_AB.STA '    ;
      TRSkimFile      = '%_iter_%_AM_KR_AB.SKM '    ;
      MR_FareFile     = 'AM_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFARAM.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_AM_KR_AB.FAR '    ;
      OutputMatrix5   = '%_iter_%_AM_KR_AB.FR5 '    ;
      OutputText      = '%_iter_%_AM_KR_AB.TXT '    ;
   ELSEIF (PRDACC =14)                              ;  ------ Off-Pk Walk  Access
cycle: ------
      USTOSFile       = '%_iter_%_OP_WK_AB.STA '    ;
```

```
      TRSkimFile      = '%_iter_%_OP_WK_AB.SKM '    ;
      MR_FareFile     = 'OP_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFAROP.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_OP_WK_AB.FAR '    ;
      OutputMatrix5   = '%_iter_%_OP_WK_AB.FR5 '    ;
      OutputText      = '%_iter_%_OP_WK_AB.TXT '    ;
   ELSEIF (PRDACC =15)                              ;  ------ Off-Pk Drive Access
cycle: ------
      USTOSFile       = '%_iter_%_OP_DR_AB.STA '    ;
      TRSkimFile      = '%_iter_%_OP_DR_AB.SKM '    ;
      MR_FareFile     = 'OP_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFAROP.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_OP_DR_AB.FAR '    ;
      OutputMatrix5   = '%_iter_%_OP_DR_AB.FR5 '    ;
      OutputText      = '%_iter_%_OP_DR_AB.TXT '    ;
   ELSEIF (PRDACC =16)                              ;  ------ Off-Pk KNR   Access
cycle: ------
      USTOSFile       = '%_iter_%_OP_KR_AB.STA '    ;
      TRSkimFile      = '%_iter_%_OP_KR_AB.SKM '    ;
      MR_FareFile     = 'OP_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFAROP.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_OP_KR_AB.FAR '    ;
      OutputMatrix5   = '%_iter_%_OP_KR_AB.FR5 '    ;
      OutputText      = '%_iter_%_OP_KR_AB.TXT '    ;

                                                    ;; ALL BUS/METRORAIL FARES
=============================================
   ELSEIF (PRDACC =17)                              ;  ------ AM Walk Access cycle:
------
      USTOSFile       = '%_iter_%_AM_WK_BM.STA '    ;
      TRSkimFile      = '%_iter_%_AM_WK_BM.SKM '    ;
      MR_FareFile     = 'AM_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFARAM.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_AM_WK_BM.FAR '    ;
      OutputMatrix5   = '%_iter_%_AM_WK_BM.FR5 '    ;
      OutputText      = '%_iter_%_AM_WK_BM.TXT '    ;
   ELSEIF (PRDACC =18)                              ;  ------ AM Drive Access
cycle: ------
      USTOSFile       = '%_iter_%_AM_DR_BM.STA '    ;
      TRSkimFile      = '%_iter_%_AM_DR_BM.SKM '    ;
      MR_FareFile     = 'AM_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFARAM.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_AM_DR_BM.FAR '    ;
      OutputMatrix5   = '%_iter_%_AM_DR_BM.FR5 '    ;
      OutputText      = '%_iter_%_AM_DR_BM.TXT '    ;
   ELSEIF (PRDACC =19)                              ;  ------ AM KNR   Access
cycle: ------
      USTOSFile       = '%_iter_%_AM_KR_BM.STA '    ;
      TRSkimFile      = '%_iter_%_AM_KR_BM.SKM '    ;
      MR_FareFile     = 'AM_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFARAM.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_AM_KR_BM.FAR '    ;
      OutputMatrix5   = '%_iter_%_AM_KR_BM.FR5 '    ;
      OutputText      = '%_iter_%_AM_KR_BM.TXT '    ;
   ELSEIF (PRDACC =20)                              ;  ------ Off-Pk Walk  Access
cycle: ------
      USTOSFile       = '%_iter_%_OP_WK_BM.STA '    ;
      TRSkimFile      = '%_iter_%_OP_WK_BM.SKM '    ;
      MR_FareFile     = 'OP_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFAROP.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_OP_WK_BM.FAR '    ;
      OutputMatrix5   = '%_iter_%_OP_WK_BM.FR5 '    ;
      OutputText      = '%_iter_%_OP_WK_BM.TXT '    ;
   ELSEIF (PRDACC =21)                              ;  ------ Off-Pk Drive Access
cycle: ------
      USTOSFile       = '%_iter_%_OP_DR_BM.STA '    ;
      TRSkimFile      = '%_iter_%_OP_DR_BM.SKM '    ;
      MR_FareFile     = 'OP_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFAROP.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_OP_DR_BM.FAR '    ;
      OutputMatrix5   = '%_iter_%_OP_DR_BM.FR5 '    ;
      OutputText      = '%_iter_%_OP_DR_BM.TXT '    ;
   ELSEIF (PRDACC =22)                              ;  ------ Off-Pk KR    Access
cycle: ------
      USTOSFile       = '%_iter_%_OP_KR_BM.STA '    ;
      TRSkimFile      = '%_iter_%_OP_KR_BM.SKM '    ;
      MR_FareFile     = 'OP_Metrorail_Fares.TXT '   ;
      BusFareMTX      = 'INPUTS\BUSFAROP.ASC'       ;
      MF2ZonalDeck    = 'FARE_A2.ASC'               ;
      OutputMatrix    = '%_iter_%_OP_KR_BM.FAR '    ;
      OutputMatrix5   = '%_iter_%_OP_KR_BM.FR5 '    ;
      OutputText      = '%_iter_%_OP_KR_BM.TXT '    ;

   ENDIF


RUN PGM=MATRIX
ZONES=@ZONESIZE@
;
read FILE=@MSTA_Tariff@
read FILE=@TRN_Defl@
;============================================================
; Read Station-to-Station Metrorail Fares as lookups         =
; Fares read in based on IJ index                            =
;    e.g., '1001' means 1 to 1 and '150150' means 150 to 150  =
;                                                            =
;============================================================
;
      LOOKUP Name=STA_Fares,
             LOOKUP[1]   = 4,Result = 3,   ;  station to station fares
             Interpolate = N, FAIL=0,0,0,list=N,file=@MR_FareFile@
;
;============================================================
; Read Bus Fare zone to Bus fare zone matrix                 =
; Fares are indexed to origin-end bus fare zone 'row';lookup  =
; no. corresponds to a destin-end bus fare zone 'column'      =
;============================================================
;
      LOOKUP Name=BusFrMTX,
             LOOKUP[01]   = 1,Result = 2,   ;
             LOOKUP[02]   = 1,Result = 3,   ;
             LOOKUP[03]   = 1,Result = 4,   ;
             LOOKUP[04]   = 1,Result = 5,   ;
             LOOKUP[05]   = 1,Result = 6,   ;
             LOOKUP[06]   = 1,Result = 7,   ;
             LOOKUP[07]   = 1,Result = 8,   ;
             LOOKUP[08]   = 1,Result = 9,   ;
             LOOKUP[09]   = 1,Result =10,   ;
             LOOKUP[10]   = 1,Result =11,   ;
             LOOKUP[11]   = 1,Result =12,   ;
             LOOKUP[12]   = 1,Result =13,   ;
             LOOKUP[13]   = 1,Result =14,   ;
             LOOKUP[14]   = 1,Result =15,   ;
             LOOKUP[15]   = 1,Result =16,   ;
             LOOKUP[16]   = 1,Result =17,   ;
             LOOKUP[17]   = 1,Result =18,   ;
             LOOKUP[18]   = 1,Result =19,   ;
             LOOKUP[19]   = 1,Result =20,   ;
```

```
            LOOKUP[20]   = 1,Result =21,   ;
            LOOKUP[21]   = 1,Result =22,   ;
            Interpolate  = N, FAIL=0,0,0,list=N,file=@BusFareMTX@


;;   read Zone data file
      LOOKUP Name=TAZLook,
            LOOKUP[01]   = 1,Result = 2,   ;  BusFare Zn 1 (1-21)
            LOOKUP[02]   = 1,Result = 3,   ;  BusFare Zn 2 (1-21)
            LOOKUP[03]   = 1,Result = 4,   ;  Orig Walk Pct in 10ths of pcts
('1000'=100%)
            LOOKUP[04]   = 1,Result = 5,   ;  Dest Walk Pct in 10ths of pcts
('1000'=100%)
            LOOKUP[05]   = 1,Result = 6,   ;  BusFare Zn 1 associated w/ Metro
station  (1-21)
            LOOKUP[06]   = 1,Result = 7,   ;  BusFare Zn 2 associated w/ Metro
station  (1-21)
            LOOKUP[07]   = 1,Result = 8,   ;  Jurcode: 0/DC, 1/MD, 2/VA Area1, 3/VA
Area2
            LOOKUP[08]   = 1,Result = 9,   ;  Origin-end Bus Fare Override value
(in current yr cents)
            LOOKUP[09]   = 1,Result =10,   ;  Destin-end Bus Fare Override value
(in current yr cents
            Interpolate  = N, FAIL=0,0,0,list=N,file=@MF2ZonalDeck@

          ;
          ; Establish Discount Array
          ;
            ARRAY RB_Disc = 4

                  RB_Disc[1] = DC_RailBus_Disc
                  RB_Disc[2] = MD_RailBus_Disc
                  RB_Disc[3] = VA1_RailBusDisc
                  RB_Disc[4] = VA2_RailBusDisc

            IF (TAZLook(7,I) > 3 || TAZLook(7,I) < 0)
               LIST = 'Jurisdiction Code NOT within convention values; I Quit'
               ABORT
            ENDIF

            IF (TAZLook(3,I) < 0  || TAZLook(3,I) > 1000.0  )
               LIST = 'Orig. Walk Pcts NOT within tolerances(0.0 to 1000.0) ; I
Quit'
               ABORT
            ENDIF

            IF (TAZLook(4,I) < 0  || TAZLook(4,I) > 1000.0  )
               LIST = 'Destin. Walk Pcts NOT within tolerances(0.0 to 1000.0) ; I
Quit'
               ABORT
            ENDIF


            IF (TAZLook(1,I) > @BFZ_SIZE@ || TAZLook(2,I) > @BFZ_SIZE@ ||
                TAZLook(5,I) > @BFZ_SIZE@ || TAZLook(6,I) > @BFZ_SIZE@)
               LIST = 'Zonal / Metrorail Bus Fare Zn No. equivalence exceeds:
','@BFZ_SIZE@',': I Quit'
               ABORT
            ENDIF

;==============================================================
; Read in the USTOS files here & Declare output matrix       =
;==============================================================

          MATI[01] = @USTOSFile@
            MW[11] = MI.1.1    ;  On-Station
            MW[12] = MI.1.2    ;  Off-Station

          MATI[02] = @TRSkimFile@
            MW[13] = MI.2.1    ;---- ivt-local bus    (0.01 min)
            MW[14] = MI.2.2    ;---- ivt-exp bus      (0.01 min)
            MW[15] = MI.2.3    ;---- ivt-metrorail    (0.01 min)
            MW[16] = MI.2.4    ;---- ivt-commuter rail(0.01 min)
            MW[17] = MI.2.5    ;---- ivt-light rail   (0.01 min)
            MW[18] = MI.2.6    ;---- ivt-new mode     (0.01 min)



            MATO[1]= @OutputMatrix@,MO=21,FORMAT=MINUTP; total deflated fare/t1)

            MATO[2]= @OutputMatrix5@,MO=41-45    ; total deflated fare/t1,
                                                 ; busonly(undefl)    /t2,
                                                 ; rail(undef)        /t3,
                                                 ; acc(undef)         /t4,
                                                 ; egr(undef)         /t5

;==============================================================
;==============================================================
; Now begin  i/j level fare calculation process              =
;==============================================================
;==============================================================


  JLOOP

    MW[19] = MW[13]+MW[14]+MW[15]+MW[16]+MW[17]+MW[18]   ; total transit in-vehicle
time
    MW[20] = MW[13]+MW[14]+MW[16]+MW[17]+MW[18]          ; Non-Metrorail in-vehicle
time

    IF (I > @LastIZN@ || J > @LastIZN@)  Continue                  ; Skip current
i/j if either is external
     ; Start afresh all fare related variables at the current i/j

          BusFare        = 0.0
          RailFare       = 0.0
          RailAccFare    = 0.0
          RailEgrFare    = 0.0
          TotalFare      = 0.0
          TotalFareDef   = 0.0
          IBFZ1          = 0.0
          IBFZ2          = 0.0
          JBFZ1          = 0.0
          JBFZ2          = 0.0
          Acc_NoWlk_Prop = 0.0
          Egr_NoWlk_Prop = 0.0
          ISTA           = 0.0
          JSTA           = 0.0
          IJIDX          = 0.0
          RailFare       = 0.0
          RIBFZ1         = 0.0
          RIBFZ2         = 0.0
          RJBFZ1         = 0.0
          RJBFZ2         = 0.0
          _AccFare1      = 0.0
          _AccFare2      = 0.0
          _AccFare12     = 0.0
          _EgrFare1      = 0.0
          _EgrFare2      = 0.0
          _EgrFare12     = 0.0
          RailAccFare    = 0.0
          RailEgrFare    = 0.0
          Acc_Discount   = 0.0
          Egr_Discount   = 0.0
          I_FareOvr      = 0.0
          J_FareOvr      = 0.0
```

```
     ; Make sure station numbers are appropriate:
          IF (MW[11] > @STATSIZE@ ||  MW[12] > @STATSIZE@ )
                LIST = 'USTOS Station number(s) are out of range; I Quit'
              ABORT
          ENDIF

      ;
      ; Define Rail-to-bus fare discount.  The discount will be applied
      ; at the acces end and egress - end on a 50/50 basis (per MFARE2)
      ;
        AccRBDx     =  TAZLook(7,I) + 1         ; convert JurCode 0-3 to Rail/Bus
discount array index 1-4
        EgrRBDx     =  TAZLook(7,J) + 1         ;
        Acc_Discount  =  RB_Disc[AccRBDx] * 0.50
        Egr_Discount  =  RB_Disc[EgrRBDx] * 0.50


     ; Lookup Bus Fares
     ;
     IBFZ1 = TAZLOOK(1,I)
     IBFZ2 = TAZLOOK(2,I)
     IF (IBFZ2 = 0) IBFZ2 = IBFZ1


     JBFZ1 = TAZLOOK(1,J)
     JBFZ2 = TAZLOOK(2,J)
     IF (JBFZ2 = 0) JBFZ2 = JBFZ1

     ;
     ;  Define Zonal Non-walk area percentages at
     ;  Access end and egress end:
     Acc_NoWlk_Prop = 1.0 - (TAZLOOK(3,I)/1000.0)    ; Zonal non-walk proportion to
station (Access-end)
     Egr_NoWlk_Prop = 1.0 - (TAZLOOK(4,J)/1000.0)    ; Zonal non-walk proportion to
station (Egress-end)


    ;-------------------------------------------------------------------
    ; If no transit path exists for i/j then zero-out fares
    ;-------------------------------------------------------------------
    IF (MW[19][j] = 0 )

         TotalFare      = 0.0
         TotalFareDef   = 0.0
         BusFare        = 0.0
         RailFare       = 0.0
         _AccFare12     = 0.0
         _EgrFare12     = 0.0

          MW[21][j]     = TotalFareDef

          MW[41][j]     = TotalFareDef
          MW[42][j]     = BusFare
          MW[43][j]     = RailFare
          MW[44][j]     = _AccFare12
          MW[45][j]     = _EgrFare12


    ELSEIF (MW[11][j] = 0  && MW[12][j] = 0)  ;
    ;-------------------------------------------------------------------
    ; ..ElseIf no rail stations used, compute Bus fare (BUSFARE)
    ;-------------------------------------------------------------------
          BusFare = (BusFrMTX(JBFZ1,IBFZ1)  +
                     BusFrMTX(JBFZ2,IBFZ1)  +
                     BusFrMTX(JBFZ1,IBFZ2)  +
                     BusFrMTX(JBFZ2,IBFZ2))   * 0.250
```

```
         TotalFare     =  BusFare + RailFare + RailAccFare + RailEgrFare  ;
undeflated transit fare, Bus-Only paths
         TotalFareDef  =  Round(TotalFare * DeflationFTR)
         MW[21][j]     =  TotalFareDef

         MW[41][j]     = TotalFareDef
         MW[42][j]     = BusFare
         MW[43][j]     = RailFare
         MW[44][j]     = _AccFare12
         MW[45][j]     = _EgrFare12

    ELSE
    ;-----------------------------------------------------------------
    ; ... Else compute rail related fares                           -
    ; if USTOS stations exist for current I/J                       -
    ;-----------------------------------------------------------------

       ISTA     =  MW[11][J]                              ; Origin Metrorail
Station No.
       JSTA     =  MW[12][J]                              ; Destin Metrorail
Station No.
       IJIDX    =  ISTA*1000.0 + JSTA                     ; Sta I/J index,
('0001001' means from sta# 1 to sta#1)
       RailFare =  Sta_Fares(1,IJIDX)                     ; Fare from current Sta.I
to Sta.J

      ;
      ;  Define Station-related Bus Fare Zones
      ;  Access-End:

      RIBFZ1 = TAZLOOK(5,ISTA)
      RIBFZ2 = TAZLOOK(6,ISTA)
      IF (RIBFZ2 = 0) RIBFZ2 = RIBFZ1

      ;  Egress-End:

      RJBFZ1 = TAZLOOK(5,JSTA)
      RJBFZ2 = TAZLOOK(6,JSTA)
      IF (RJBFZ2 = 0) RJBFZ2 = RJBFZ1

       _AccFare1 = MIN(BusFrMTX(RIBFZ1,IBFZ1),BusFrMTX(RIBFZ2,IBFZ1))
       _AccFare2 = MIN(BusFrMTX(RIBFZ1,IBFZ2),BusFrMTX(RIBFZ2,IBFZ2))
       _AccFare12= ((_AccFare1 + _AccFare2) * 0.50) - Acc_Discount

       _EgrFare1 = MIN(BusFrMTX(JBFZ1,RJBFZ1),BusFrMTX(JBFZ1,RJBFZ2))
       _EgrFare2 = MIN(BusFrMTX(JBFZ2,RJBFZ1),BusFrMTX(JBFZ2,RJBFZ2))
       _EgrFare12= ((_EgrFare1 + _EgrFare2) * 0.50) - Egr_Discount

        RailAccFare = _AccFare12 *  Acc_NoWlk_Prop
        RailEgrFare = _EgrFare12 *  Egr_NoWlk_Prop


    ; If Only Metrorail is used then TotalFare equals RailFare

         IF (MW[20][j] = 0)

            TotalFare  = RailFare                                      ; undeflated
transit fare, Metrorail Only-Related paths

            BusFare    = 0.0
            _AccFare12 = 0.0
            _EgrFare12 = 0.0
           RailAccFare = 0.0
           RailEgrFare = 0.0

         ELSE
```

```
          TotalFare = BusFare + RailFare + RailAccFare + RailEgrFare ; undeflated
transit fare, Metrorail-Related paths

         ENDIF

    ; If an I/J override value exists use it instead of the total computed fare
value

         IF ( TAZLOOK(8,I) > 0.0 )
              I_FareOvr = TAZLOOK(8,I)
              TotalFare = I_FareOvr
         ENDIF
         IF ( TAZLOOK(9,J) > 0.0 )
             J_FareOvr = TAZLOOK(9,J)
             TotalFare = J_FareOvr
         ENDIF

    ; Apply Deflator to Total fare to write out constant dollars

        TotalFareDef   =  Round(TotalFare * DeflationFTR)
         MW[21][j]     =  TotalFareDef

         MW[41][j]     =  TotalFareDef
         MW[42][j]     =  BusFare
         MW[43][j]     =  RailFare
         MW[44][j]     =  _AccFare12
         MW[45][j]     =  _EgrFare12

    ENDIF


    ; write out the results of sample IJs here:
    IF (i = 8, 64, 345, 362, 464, 578, 829, 927, 1043, 1231, 1236, 1337,
         1537, 1554, 1619, 1698, 1716, 1842, 1942, 1967 &
         j = 8, 64, 345, 362, 1231, 1236, 1337, 1537)

         print Form=7.1 list= i(6),j(6),TotalFareDef(6), TotalFare, BusFare,
RailFare, _AccFare12,_EgrFare12,
                              I_FareOvr,J_FareOvr,
            ' <<-
I/J/DefFare/UnDefFare/BusFare/RailFare/AccFare/EgrFare/IOvrFare/JOvrFare/',
file=@Outputtext@
    ENDIF

  ENDJLOOP


ENDRUN

ENDLOOP
```

19 Misc_Time-of-Day.S

```
; ===================================================================
;  Misc_Time-of-Day.s
;  MWCOG Version 2.3 Model
;
;            Distribute Truck and
;            miscellaneous (non-modeled) trips among
;             among three time periods:
;             -  AM peak  (6:00 - 9:00 AM)
;             -  PM peak  (4:00 - 7:00 PM)
;             -  Off-peak (All Other Hrs)
;            The Time-of-Day factors are taken from a card image
;            file named: 'V2TODTPP.PAR'.
; Buck rounding is removed per version 2.2
; Sept. 2007: Iteration spec. now used for internal trucks
; 4/29/2008 new process added for COM/MTK/HTK trips, for new model (wga)
; 5/ 2/2008 - in this test script External Com, Mtk, and Htk trips are
; multiplied by 2.0 because the original models (delta tabs) were developed
; that way.  This will be addressed by WGA later on(denoted below with '**SEE
NOTE**').
; ===================================================================
;
; Environment Variable:
;               _iter_  (Iteration indicator = 'pp','i1'-'i6'
;
;///////////////////////////////////////////////////////////////////
; Parameters:
;                                                                  //
ZONESIZE    =       2191              ;  No. of TAZs               //
LastIZN     =       2144              ;  Last Internal TAZ no.     //
FExt        =       LastIZN + 1       ;  First External TAZ no.    //

; Input/Output filenames:                                          //
;                                                                  //
READ FILE=..\support\V2TODTPP.PAR  ; Time of Day Factor File       //
;                                                                  //
; COM/TRK Calibration Adjustment Tables                            //
TKDELTA  = '..\support\tkdelta.trp'   ; MTK/HTK delta              //
CVDELTA  = '..\support\cvdelta.trp'   ; COM delta      ;
//
; I/P Truck & Exogenous trip Tables:                               //
XXCVTRK  = 'inputs\XXCVT.vtt'       ;  Com/Mtk/Htk XX Trips (t1-3) //
XXAUTDR  = 'inputs\xxaut.vtt'       ;  Auto Dr XX Trips (t1)    //
;                                                                  //
TAXIADR  = 'inputs\taxi.adr'        ;  TAXI Auto Dr Trips       //
VISIADR  = 'inputs\visi.adr'        ;  Visitor A.Dr Trips       //
SCHLADR  = 'inputs\schl.adr'        ;  School  A.Dr Trips       //
;
COMTDOUT = 'COMEST%_iter_%.VTT'        ;  Comm Vehs t1-Intl, t2-Extl
MTKTDOUT = 'MTKEST%_iter_%.VTT'        ;  Med  Trks t1-Intl, t2-Extl
HTKTDOUT = 'HTKEST%_iter_%.VTT'        ;  Hvy  Trks t1-Intl, t2-Extl  /
;
APXADR   = 'inputs\airpax.adr'         ;  Air Passenger Auto Dr.   //
;
; O/P Truck and Exogenous Tabs by time of day                      //
MISCAM  = 'MISCAM%_iter_%.TT'          ; AM     Non-Modeled Trips  //
MISCPM  = 'MISCPM%_iter_%.TT'          ; PM     Non-Modeled Trips  //
MISCOP  = 'MISCOP%_iter_%.TT'          ; Off-Pk Non-Modeled Trips  //
;
; Each output file contains 9 tables -                             //
; 1/xx truck,2/xx autodr,3/taxi adr,4/visitor adr,5/school adr,
; 6/med. truck, 7/hvy truck, 8/air passenger adr, 9/comm veh
;///////////////////////////////////////////////////////////////////
;------------------------------------------------------------------
;;=====================================================
;;  Begin com veh, med, hvy truck time of day processing
;;=====================================================
run pgm=matrix
  pageheight=32767  ; Preclude header breaks
  id = "Commercial time of day + delta

  mati[1] = @COMTDOUT@
  mati[2] = @XXCVTRK@
  mati[3] = @CVDELTA@

  mato    = tempcom.trp, mo=5-10


 ; set up mtx 100, 200 to identify I-X, and X-I ijs respectively
```

```
  MW[100] = 0
  MW[200] = 0
  if (I=1-@LastIzn@)
      MW[100] = 1, include= 2145-2191
     else
      MW[200] = 1, include= 1-@LastIzn@
  endif

; I/I trips are already balanced, so we can apply a single factor
;  to all trips.  Apply separate P/A and A/P factors to externals.
;  Assume externals are 70/30 inbound (X/I, or A/P) in the morning,
;  70/30 outbound (I/X, P/A) in the evening.  Off-peak is 50/50.
;
; Note: the External(I-X,X-I) trips are multiplied by 2.0 as the CV model
; (i.e., delta table) was developed this way - rm 4/30/08

  mw[1] = mi.1.1                   ; I/I CV trips
  mw[2] = mi.1.2   * mw[100] * 2.0 ; Int P/ Ext A (outbound)        **SEE NOTE**
  mw[3] = mi.1.2   * mw[200] * 2.0 ; Ext A/ Int P (inbound)         **SEE NOTE**

; Also add in the X/X's.
  mw[4] = mi.2.1

; Read and transpose the external delta
  mw[11] = mi.3.1 ; I/I
  mw[12] = mi.3.2 ; Int P/ Ext A (outbound)
  mw[13] = mi.3.2.t ; Ext A/ Int P (inbound)

; Add in the deltas.  First, for I/I and I/X.
  if (i = 1-@LastIZN@)
    jloop
      mw[21] = max(mw[1] + mw[11],0)
      mw[22] = max(mw[2] + mw[12],0)
    endjloop
  endif

  if (i > @LastIZN@)
; Now for Ext transposed (X/I).
    mw[23] = max(mw[3] + mw[13],0), include = 1-@LastIZN@

; Now for X/X.
    mw[24] = max(mw[4] + mw[12],0), include = @FExt@-@ZONESIZE@
  endif

; Sum I/I and External here
  mw[5] = @AMIICOMP@ * 0.01 * (mw[21] + 0.7 * mw[23] + 0.3 * mw[22])  ; AM
  mw[6] = @PMIICOMP@ * 0.01 * (mw[21] + 0.3 * mw[23] + 0.7 * mw[22])  ; PM
  mw[7] = @OPIICOMP@ * 0.01 * (mw[21] + 0.5 * mw[23] + 0.5 * mw[22])  ; OP

; Keep X/X separate
  mw[8] = @AMIICOMP@ * 0.01 * mw[24]
  mw[9] = @PMIICOMP@ * 0.01 * mw[24]
  mw[10]= @OPIICOMP@ * 0.01 * mw[24]

endrun

;--------------------------------------------------------------------
run pgm=matrix

  id = "Truck time of day + delta

  mati[1] = @MTKTDOUT@
  mati[4] = @HTKTDOUT@
  mati[2] = @XXCVTRK@
  mati[3] = @TKDELTA@

  mato    = temptrk.trp, mo=9-20

 ; set up mtx 100, 200 to identify I-X, and X-I ijs respectively
  MW[100] = 0
  MW[200] = 0
  if (I=1-@LastIzn@)
      MW[100] = 1, include= 2145-2191
     else
      MW[200] = 1, include= 1-@LastIzn@
  endif

; I/I trips are already balanced, so we can apply a single factor
;  to all trips.  Apply separate P/A and A/P factors to externals.
;  Assume externals are 70/30 inbound (X/I, or A/P) in the morning,
;  70/30 outbound (I/X, P/A) in the evening.  Off-peak is 50/50.
  mw[1] = mi.1.1                   ; MTK I/I
  mw[2] = mi.1.2    * mw[100] * 2.0; MTK Int P/ Ext A (outbound)  **SEE NOTE**
  mw[3] = mi.1.2    * mw[200] * 2.0; MTK Ext A/ Int P (inbound)   **SEE NOTE**

  mw[4] = mi.4.1                   ; HTK I/I
  mw[5] = mi.4.2    * mw[100] * 2.0; HTK Int P/ Ext A (outbound)  **SEE NOTE**
  mw[6] = mi.4.2    * mw[200] * 2.0; HTK Ext A/ Int P (inbound)   **SEE NOTE**

; Also add in the X/X's.
  mw[7] = mi.2.2 ; MTK
  mw[8] = mi.2.3 ; HTK

; Read and transpose the external delta.
  mw[21] = mi.3.mtkii
  mw[22] = mi.3.mtkext
  mw[23] = mi.3.mtkext.t
  mw[24] = mi.3.mtkxx

  mw[25] = mi.3.htkii
  mw[26] = mi.3.htkext
  mw[27] = mi.3.htkext.t
  mw[28] = mi.3.htkxx

; Add in the deltas.  First, for I/I and I/X.
  if (i = 1-@LastIZN@)
    jloop
      mw[31] = max(mw[1] + mw[21],0)
      mw[32] = max(mw[2] + mw[22],0)

      mw[35] = max(mw[4] + mw[25],0)
      mw[36] = max(mw[5] + mw[26],0)
    endjloop
  endif

  if (i > @LastIZN@)

; Now for X/I.
    mw[33] = max(mw[3] + mw[23],0), include = 1-@LastIZN@
    mw[37] = max(mw[6] + mw[27],0), include = 1-@LastIZN@

; Now for X/X.
    mw[34] = max(mw[7] + mw[24],0), include = @FExt@-@ZONESIZE@
    mw[38] = max(mw[8] + mw[28],0), include = @FExt@-@ZONESIZE@
  endif

; Sum I/I and External here
;  MTK
  mw[9]  = @AMIIMTKP@ * 0.01 * (mw[31] + 0.7 * mw[33] + 0.3 * mw[32])  ; AM
  mw[10] = @PMIIMTKP@ * 0.01 * (mw[31] + 0.3 * mw[33] + 0.7 * mw[32])  ; PM
  mw[11] = @OPIIMTKP@ * 0.01 * (mw[31] + 0.5 * mw[33] + 0.5 * mw[32])  ; OP

;  HTK
  mw[12] = @AMIIHTKP@ * 0.01 * (mw[35] + 0.7 * mw[37] + 0.3 * mw[36])  ; AM
  mw[13] = @PMIIHTKP@ * 0.01 * (mw[35] + 0.3 * mw[37] + 0.7 * mw[36])  ; PM
```

```
  mw[14] = @OPIIHTKP@ * 0.01 * (mw[35] + 0.5 * mw[37] + 0.5 * mw[36])  ; OP

; Keep X/X separate
;  MTK
  mw[15] = @AMIIMTKP@ * 0.01 * mw[34]
  mw[16] = @PMIIMTKP@ * 0.01 * mw[34]
  mw[17] = @OPIIMTKP@ * 0.01 * mw[34]

;  HTK
  mw[18] = @AMIIHTKP@ * 0.01 * mw[38]
  mw[19] = @PMIIHTKP@ * 0.01 * mw[38]
  mw[20] = @OPIIHTKP@ * 0.01 * mw[38]
endrun
;;=========================================================
;;  end of com veh, med, hvy truck time of day processing
;;=========================================================
RUN PGM=MATRIX                   ; Read in Daily Miscellaneous Trips
    MATI[1]=@XXAUTDR@            ; Thru            Auto Driver Trips
    MATI[2]=@TAXIADR@            ; Taxi            Auto Driver Trips
    MATI[3]=@VISIADR@            ; Visitor/Tourist Auto Driver Trips
    MATI[4]=@SCHLADR@            ; School          Auto Driver Trips
    MATI[5]=@APXADR@             ; Air Passenger auto driver   Trips

; Read in COM/TRK trips, already split by time period above.
    MATI[6]=tempcom.trp
    MATI[7]=temptrk.trp

; Put Misc Trips in Work Mats 2-8 (it simplifies the
;  numbering of the other tables, below).
  MW[2]  = MI.1.1
  MW[3]  = MI.2.1
  MW[4]  = MI.3.1
  MW[5]  = MI.4.1
  MW[8]  = MI.5.1

; Put COM/TRK trips by TOD in their proper work matrices.  We're just
;  passing them through from the steps above.

  MW[10] = MI.7.7           ; AM X/X MTK
  MW[11] = MI.7.10          ; AM X/X HTK
  MW[16] = MI.7.1           ; AM I/I + EXT MTK
  MW[17] = MI.7.4           ; AM I/I + EXT HTK
  MW[19] = MI.6.1           ; AM I/I + EXT COM

  MW[20] = MI.7.8           ; PM X/X MTK
  MW[21] = MI.7.11          ; PM X/X HTK
  MW[26] = MI.7.2           ; PM I/I + EXT MTK
  MW[27] = MI.7.5           ; PM I/I + EXT HTK
  MW[29] = MI.6.2           ; PM I/I + EXT COM

  MW[30] = MI.7.9           ; OP X/X MTK
  MW[31] = MI.7.12          ; OP X/X HTK
  MW[36] = MI.7.3           ; OP I/I + EXT MTK
  MW[37] = MI.7.6           ; OP I/I + EXT HTK
  MW[39] = MI.6.3           ; OP I/I + EXT COM

; Apply TOD Factors
; put AM       trips in work mats 10-19
; put PM       trips in work mats 20-29
; put Off-Peak trips in work mats 30-39
;
 JLOOP
   ; AM Peak Period Trips
    MW[12] = @AMXXADRP@ * MW[2] / 100.0 + MI.6.4[J] ; AM Thru     Auto Driver + COM
    MW[13] = @AMTAXISP@ * MW[3] / 100.0   ; AM Taxi     Auto Driver
    MW[14] = @AMVISITP@ * MW[4] / 100.0   ; AM Visitor  Auto Driver
    MW[15] = @AMSCHOOP@ * MW[5] / 100.0   ; AM School   Auto Driver
    MW[18] = @AMAIRPXP@ * MW[8] / 100.0   ; AM Air Pax  Auto Driver

   ; PM Peak Period Trips
    MW[22] = @PMXXADRP@ * MW[2] / 100.0 + MI.6.5[J] ; PM Thru     Auto Driver + COM
    MW[23] = @PMTAXISP@ * MW[3] / 100.0 ; PM Taxi     Auto Driver
    MW[24] = @PMVISITP@ * MW[4] / 100.0 ; PM Visitor  Auto Driver
    MW[25] = @PMSCHOOP@ * MW[5] / 100.0 ; PM School   Auto Driver
    MW[28] = @PMAIRPXP@ * MW[8] / 100.0 ; PM Air Pax  Auto Driver

   ; Off-Peak Period Trips
    MW[32] = MW[2] - (MW[12] + MW[22]) + MI.6.6[J] ; Off-Pk Thru     Auto Driver +
COM
    MW[33] = MW[3] - (MW[13] + MW[23])  ; Off-Pk Taxi     Auto Driver
    MW[34] = MW[4] - (MW[14] + MW[24])  ; Off-Pk Visitor  Auto Driver
    MW[35] = MW[5] - (MW[15] + MW[25])  ; Off-Pk School   Auto Driver
    MW[38] = MW[8] - (MW[18] + MW[28])  ; Off-Pk Air Pax  Auto Driver
 ENDJLOOP

; LET'S SUMMARIZE NEATLY
 jloop
    DAYXXMTK = DAYXXMTK + MW[10] + MW[20] + MW[30] ; ACCUMULATE TOTAL DAILY Medium
THRU TRUCKS
    DAYXXHTK = DAYXXHTK + MW[11] + MW[21] + MW[31] ; ACCUMULATE TOTAL DAILY Heavy
THRU TRUCKS
    DAYXXAD = DAYXXAD + MW[2] + MI.6.4[J] + MI.6.5[J] + MI.6.6[J] ; ACCUMULATE TOTAL
DAILY THRU AUTO DRV + COM
    DAYTXAD = DAYTXAD + MW[3]      ; ACCUMULATE TOTAL DAILY TAXI    ADR TRIPS
    DAYVSAD = DAYVSAD + MW[4]      ; ACCUMULATE TOTAL DAILY VISITOR ADR TRIPS
    DAYSCAD = DAYSCAD + MW[5]      ; ACCUMULATE TOTAL DAILY SCHOOL  ADR TRIPS
    DAYMTRK = DAYMTRK + MW[16] + MW[26] + MW[36] ; ACCUMULATE TOTAL DAILY MED. TRUCK
TRIPS
    DAYHTRK = DAYHTRK + MW[17] + MW[27] + MW[37] ; ACCUMULATE TOTAL DAILY HVY. TRUCK
TRIPS
    DAYAPAX = DAYAPAX + MW[8]      ; ACCUMULATE TOTAL DAILY AIR PAX ADR TRIPS
    DAYCOM  = DAYCOM  + MW[19] + MW[29] + MW[39] ; ACCUMULATE TOTAL DAILY COMMERCIAL
TRIPS

    AMXXMTK = AMXXMTK + MW[10]  ; ACCUMULATE TOTAL AM XX Medium TRUCKS
    AMXXHTK = AMXXHTK + MW[11]  ; ACCUMULATE TOTAL AM XX Heavy  TRUCKS
    AMXXAD  = AMXXAD  + MW[12]  ; ACCUMULATE TOTAL AM XX ADR + XX COM  TRIPS
    AMTXAD  = AMTXAD  + MW[13]  ; ACCUMULATE TOTAL AM TAXI  ADR  TRIPS
    AMVSAD  = AMVSAD  + MW[14]  ; ACCUMULATE TOTAL AM VISIT ADR  TRIPS
    AMSCAD  = AMSCAD  + MW[15]  ; ACCUMULATE TOTAL AM SCHL  ADR  TRIPS
    AMMTRK  = AMMTRK  + MW[16]  ; ACCUMULATE TOTAL AM MED TRUCK  TRIPS
    AMHTRK  = AMHTRK  + MW[17]  ; ACCUMULATE TOTAL AM HVY TRUCK  TRIPS
    AMAPAX  = AMAPAX  + MW[18]  ; ACCUMULATE TOTAL AIR PAX ADR   TRIPS
    AMCOM   = AMCOM   + MW[19]  ; ACCUMULATE TOTAL AM COMMERCIAL TRIPS

    PMXXMTK = PMXXMTK + MW[20]  ; ACCUMULATE TOTAL PM XX Medium TRUCKS
    PMXXHTK = PMXXHTK + MW[21]  ; ACCUMULATE TOTAL PM XX Heavy  TRUCKS
    PMXXAD  = PMXXAD  + MW[22]  ; ACCUMULATE TOTAL PM XX ADR + XX COM  TRIPS
    PMTXAD  = PMTXAD  + MW[23]  ; ACCUMULATE TOTAL PM TAXI  ADR  TRIPS
    PMVSAD  = PMVSAD  + MW[24]  ; ACCUMULATE TOTAL PM VISIT ADR  TRIPS
    PMSCAD  = PMSCAD  + MW[25]  ; ACCUMULATE TOTAL PM SCHL  ADR  TRIPS
    PMMTRK  = PMMTRK  + MW[26]  ; ACCUMULATE TOTAL PM MED TRUCK  TRIPS
    PMHTRK  = PMHTRK  + MW[27]  ; ACCUMULATE TOTAL PM HVY TRUCK  TRIPS
    PMAPAX  = PMAPAX  + MW[28]  ; ACCUMULATE TOTAL AIR PAX ADR   TRIPS
    PMCOM   = PMCOM   + MW[29]  ; ACCUMULATE TOTAL PM COMMERCIAL TRIPS

    OPXXMTK = OPXXMTK + MW[30]  ; ACCUMULATE TOTAL OP XX Medium TRUCKS
    OPXXHTK = OPXXHTK + MW[31]  ; ACCUMULATE TOTAL OP XX Heavy  TRUCKS
    OPXXAD  = OPXXAD  + MW[32]  ; ACCUMULATE TOTAL OP XX ADR + XX COM  TRIPS
    OPTXAD  = OPTXAD  + MW[33]  ; ACCUMULATE TOTAL OP TAXI  ADR  TRIPS
    OPVSAD  = OPVSAD  + MW[34]  ; ACCUMULATE TOTAL OP VISIT ADR  TRIPS
    OPSCAD  = OPSCAD  + MW[35]  ; ACCUMULATE TOTAL OP SCHL ADR   TRIPS
    OPMTRK  = OPMTRK  + MW[36]  ; ACCUMULATE TOTAL OP MED TRUCK  TRIPS
    OPHTRK  = OPHTRK  + MW[37]  ; ACCUMULATE TOTAL OP HVY TRUCK  TRIPS
    OPAPAX  = OPAPAX  + MW[38]  ; ACCUMULATE TOTAL AIR PAX ADR   TRIPS
    OPCOM   = OPCOM   + MW[39]  ; ACCUMULATE TOTAL OP COMMERCIAL TRIPS
```

```
; total input misc trips
  ipmisc  = ipmisc + MW[02]+MW[03]+MW[04]+MW[05]+MW[08]+
                     MW[10]+MW[11]+MW[16]+MW[17]+MW[19]+
                     MW[20]+MW[21]+MW[26]+MW[27]+MW[29]+
                     MW[30]+MW[31]+MW[36]+MW[37]+MW[39]+
                     MI.6.4[J] + MI.6.5[J] + MI.6.6[J]

; total output misc trips
  opmisc  = opmisc +
   MW[10]+MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+MW[17]+MW[18]+MW[19]+
   MW[20]+MW[21]+MW[22]+MW[23]+MW[24]+MW[25]+MW[26]+MW[27]+MW[28]+MW[29]+
   MW[30]+MW[31]+MW[32]+MW[33]+MW[34]+MW[35]+MW[36]+MW[37]+MW[38]+MW[39]

 ENDJLOOP

IF (I=ZONES)  ;  LIST OUT THE TOTALS IF AT THE END OF THE I-LOOP
; get regional I/O differences
diff = opmisc-ipmisc ;

LIST = '/bt          '
LIST = '  MISCELLANEOUS/TRUCK TIME-OF-DAY TOTALS ','\n',
list = ' '

list = 'Input  Misc/Truck Total: ',ipmisc(10.0c)
list = 'Output Misc/Truck Total: ',opmisc(10.0c)
list = 'Diff.  (Output-Input):   ',diff(10.0)
list = ' '

LIST = 'DAILY XX MedTrk:',dayxxmtk(9.0c),' AM,PM, Off-Pk totals: ',
          AMXXmTK(9.0c),',',PMXXmTK(9.0c),',',OPXXmTK(9.0c)
LIST = 'DAILY XX HvyTrk:',dayxxhtk(9.0c),' AM,PM, Off-Pk totals: ',
          AMXXhTK(9.0c),',',PMXXhTK(9.0c),',',OPXXhTK(9.0c)
LIST = 'DAILY XX ADR/CV:',dayxxAD(9.0c),' AM,PM, Off-Pk totals: ',
          AMXXAD(9.0c),',',PMXXAD(9.0c),',',OPXXAD(9.0c)
LIST = 'DAILY TAXI ADRS:',dayTxAD(9.0c),' AM,PM, Off-Pk totals: ',
          AMTXAD(9.0c),',',PMTXAD(9.0c),',',OPTXAD(9.0c)
LIST = 'DAILY VISI ADRS:',dayVSAD(9.0c),' AM,PM, Off-Pk totals: ',
          AMVSAD(9.0c),',',PMVSAD(9.0c),',',OPVSAD(9.0c)
LIST = 'DAILY SCHL ADRS:',daySCAD(9.0c),' AM,PM, Off-Pk totals: ',
          AMSCAD(9.0c),',',PMSCAD(9.0c),',',OPSCAD(9.0c)
LIST = 'DAILY COM VEHS: ',dayCOM(9.0c), ' AM,PM, Off-Pk totals: ',
          AMCOM(9.0c),',',PMCOM(9.0c),',',OPCOM(9.0c)
LIST = 'DAILY MED TRKS: ',dayMTRK(9.0c),' AM,PM, Off-Pk totals: ',
          AMMTRK(9.0c),',',PMMTRK(9.0c),',',OPMTRK(9.0c)
LIST = 'DAILY HVY TRKS: ',dayHTRK(9.0c),' AM,PM, Off-Pk totals: ',
          AMHTRK(9.0c),',',PMHTRK(9.0c),',',OPHTRK(9.0c)
LIST = 'DAILY APX ADRS: ',dayAPAX(9.0c),' AM,PM, Off-Pk totals: ',
          AMAPAX(9.0c),',',PMAPAX(9.0c),',',OPAPAX(9.0c)

LIST = '/et          '
endif
;  Write out the Miscellaneous Trips in time period-specific files

   MATO[1] = @MISCAM@, MO=10-19  ; AM MISC Trips
   MATO[2] = @MISCPM@, MO=20-29  ; PM MISC Trips
   MATO[3] = @MISCOP@, MO=30-39  ; OP MISC Trips
ENDRUN
;
*del tempcom.trp
*del temptrk.trp
```

20 modnet.s

```
RUN PGM=HWYNET
NETI = '%_iter_%hwy.net'

NETO = '%_iter_%HWYMOD.NET'

PARAMETERS ZONES=3000

IF (A=2250-3000 || B=2250-3000)
  AMLIMIT = 0
  PMLIMIT = 0
  OPLIMIT = 0
ENDIF
ENDRUN
```

21 pathTrace.s

```
/* pathTrace.s
   This file will get inserted into Transit_Skims*.s to perform path traces
   for select i/j's (origins and destinations)

   Date        Person  Comment
   2008-04-28  msm     Script created

   Consider these origins:

     TAZ Jur  Description
       8 dc   Downtown, Farragut West
      64 dc   Union Station
     344 mtg  Bethesda Metro station
     362 mtg  Silver Spring, to the south of the Metro station
     464 mtg  N. Silver Spr, Featherwood St & Old Columbia Pike
     578 mtg  Shady Gr Rd  (North of Montgomery Co. Airpark)
     677 pg   College Park, west & south of the Metro station
     829 pg   Andrews AFB
     927 pg   New Carrltn (Bowie, near Mitchellville Road)
     972 pg   Bristol (Upper Marlboro)
    1043 frd  Frederick, Clover Hill
    1080 hwd  Savage, Jessup
    1091 hwd  Scaggsville (North Laurel)
    1216 chs  Waldorf, Mattawoman Beantown Road
    1230 arl  Pentagon Metro station
    1236 arl  Rosslyn Metro station
    1242 arl  Crystal City Metro station
    1337 alx  Alexandria, Madison St & N. Columbus St
    1537 ffx  Tysons Corner, International Dr & Jones Branch Dr
    1554 ffx  Mount Vernon
    1619 ffx  Vienna
    1698 ffx  Dulles Airport (VDOT Chantilly)
    1716 ffx  Reston (South Lakes Dr & Olde Crafts Dr)
    1842 ldn  Leesburg
    1863 ldn  Lovettsville
    1942 pwc  Dale City
    1967 pwc  Manassas
    1982 pwc  Quantico VRE station
    2110 spt  Spotsylvania

   To these destinations:

     TAZ Jur  Description
```

```
      8 dc   Downtown, Farragut West
     64 dc   Union Station
    344 mtg  Bethesda Metro station
    362 mtg  Silver Spring, to the south of the Metro station
    478 mtg  Rockville Metro/MARC stations
    686 pg   Greenbelt Metro/MARC station
   1230 arl  Pentagon Metro station
   1236 arl  Rosslyn Metro station
   1337 alx  Alexandria, Madison St & N. Columbus St
   1487 ffx  Franconia-Springfield Metro/VRE station
   1505 ffx  Rolling Road VRE station
   1537 ffx  Tysons Corner, International Dr & Jones Branch Dr

*/

trace = (i =
8,  64,  344,  362,  464,  578,  677,  829,  927,  972, 1043, 1080, 1091,
1216, 1230, 1236, 1242, 1337, 1537, 1554, 1619, 1698, 1716, 1842, 1863,
1942, 1967, 1982, 2110 &
j =
8,  64,  344,  362,  478, 686, 1230, 1236, 1337, 1487, 1505, 1537)
```

22 PP_Auto_Drivers.s

```
; ===================================================================
;  PP_Auto_Drivers.s
;  MWCOG Version 2.3  Model
;
;
;  This program used to develop 1-occ, 2-occ, and 3+occ auto driver
;  trip tables directly from the a pump-prime total person trip table.
;  The trips are developed using auto driver percentages
;  from a pre-existing (or seed) NL mode choice output file.
; ===================================================================
;
;
;//////////////////////////////////////////////////////////////////
;
; First, establish Input/Output filenames:
LOOP PURP=1,4  ;  We'll Loop 4 times, for each purpose
               ;  Note default auto driver shares and occupant
               ;  shares to be used in case no seed shares exist

IF (PURP=1)     ; HBW Loop
 PPPERSON = 'HBWESTPP.PTT'               ; HBW Pump Prime Person Trips
(Input)
 PPPTABs  = 'Mi.1.1+Mi.1.2+Mi.1.3+Mi.1.4'; Tables. for Intl PP Person trip file
 SEED_MCH = 'INPUTS\I6_HBW_NL_MC.MTT'  ; HBW Mode Choice file         (Input)

 PP123OCC = 'HBWPP.tem'                ; HBW auto driver trips- 1,2,3+ Occ.
(Output)
 DOCC1PCT =  0.9100                    ; DFLT Share of HBW persons that are 1  occ
Adrs
 DOCC2PCT =  0.0800                    ; DFLT Share of HBW persons that are 2  occ
Adrs
 DOCC3PCT =  0.0100                    ; DFLT Share of HBW persons that are 3+ occ
Adrs
 OCC3Pl   =  3.50                      ; Assumed Occupancy of 3+ Vehicles (derived
from 2000 Census)
 PURPOSE  = 'HBW'                      ;

ELSEIF (PURP=2) ; HBS Loop

 PPPERSON = 'HBSESTPP.PTT'              ; HBS Pump Prime Person Trips       (Input)
 PPPTABs  = 'Mi.1.1+Mi.1.2+Mi.1.3+Mi.1.4'; Tables. for Intl PP Person trip file
 SEED_MCH = 'INPUTS\I6_HBS_NL_MC.MTT'   ; HBS Mode Choice file       (Input)

 PP123OCC = 'HBSPP.tem'                 ; HBS auto driver trips- 1,2,3+ Occ.
(Output)
 DOCC1PCT =  0.8400                     ; DFLT Share of HBS persons that are 1  occ
Adrs
 DOCC2PCT =  0.1200                     ; DFLT Share of HBS persons that are 2  occ
Adrs
 DOCC3PCT =  0.0400                     ; DFLT Share of HBS persons that are 3+ occ
Adrs
 OCC3Pl   =  3.25                       ; Assumed Occupancy of 3+ Vehicles (derived
from 1994HTS)
 PURPOSE  = 'HBS'                       ;

ELSEIF (PURP=3) ; HBO Loop

 PPPERSON = 'HBOESTPP.PTT'               ; HBO Pump Prime Person Trips
(Input)
 PPPTABs  = 'Mi.1.1+Mi.1.2+Mi.1.3+Mi.1.4'; Tables. for Intl PP Person trip file
 SEED_MCH = 'INPUTS\I6_HBO_NL_MC.MTT'    ; HBO Mode Choice file       (Input)

 PP123OCC = 'HBOPP.tem'                  ; HBO auto driver trips- 1,2,3+ Occ.
(Output)
 DOCC1PCT =  0.7900                      ; DFLT Share of HBO persons that are 1  occ
Adrs
 DOCC2PCT =  0.1500                      ; DFLT Share of HBO persons that are 2  occ
Adrs
 DOCC3PCT =  0.0600                      ; DFLT Share of HBO persons that are 3+ occ
Adrs
 OCC3Pl   =  3.35                        ; Assumed Occupancy of 3+ Vehicles (derived
from 1994HTS)
 PURPOSE  = 'HBO'                        ;

ELSEIF (PURP=4) ; NHB Loop

 PPPERSON = 'NHBESTPP.PTT'              ; NHB Pump Prime Person Trips       (Input)
 PPPTABs  = 'Mi.1.1 '                   ; Tables. for Intl PP Person trip file
 SEED_MCH = 'INPUTS\I6_NHB_NL_MC.MTT'   ; NHB Mode Choice file       (Input)

 PP123OCC = 'NHBPP.tem'                 ; NHB auto driver trips- 1,2,3+ Occ.
(Output)
 DOCC1PCT =  0.8100                     ; DFLT Share of NHB persons that are 1  occ
Adrs
 DOCC2PCT =  0.1400                     ; DFLT Share of NHB persons that are 2  occ
Adrs
 DOCC3PCT =  0.0500                     ; DFLT Share of NHB persons that are 3+ occ
Adrs
 OCC3Pl   =  3.35                       ; Assumed Occupancy of 3+ Vehicles (derived
from 1994HTS)
 PURPOSE  = 'NHB'                       ;

ENDIF
;
;//////////////////////////////////////////////////////////////////

;-------------------------------------------------------------------
;   Modes in AECOM MC model    Summary modes
;     1 DR ALONE                 1 All transit         4-14
;     2 SR2                      2 Metrorail only      7,13,14
;     3 SR3+                     3 Metrorail related   7,13,14,6,11,12
;     4 WK-CR                    4 Auto person         1-3
;     5 WK-BUS                   5 Total motorized psn 1-14
;     6 WK-BU/MR                 6 Commuter rail       4,8 (may incl bus/Mrail)
;     7 WK-MR                    7 Bus only            5,9,10
```

```
;     8 PNR-CR                   8 Bus only, WMATA Compact area
;     8 KNR-CR
;     9 PNR-BUS
;    10 KNR-BUS
;    11 PNR-BU/MR
;    12 KNR-BU/MR
;    13 PNR-MR
;    14 KNR-MR
;---------------------------------------------------------------------
RUN PGM=MATRIX

    MATI[1]=@PPPERSON@           ;  PP Person trips
    MATI[2]=@SEED_MCH@           ;  MC model ouput
 ;
 ; First, put 'pump prime' person trips in mtx 100
 ;        put 'seed' MC trips in mtx 1-14.
 ;        put Auto person, auto driver total transit in tabs 20, 30, and 40
 ;

MW[101] = @PPPTABs@                                               ;  Pump Prime
Person trips in 101  screen to intl trips

FILLMW MW[201]  = MI.2.1,2,3,4,5,6,7,8,9,10,11,12,13,14              ; 'seed' NL MC
trips in mats 201-214

       MW[301] = MW[201] + MW[202] + MW[203] + MW[204] + MW[205] + MW[206] +
                 MW[207] + MW[208] + MW[209] + MW[210] + MW[211] + MW[212] +
                 MW[213] + MW[214]                                    ; 'seed'
Person  total in 301

       MW[302] = MW[201] + MW[202] + MW[203]                          ; 'seed' auto
person total in 302

       MW[303] =(MW[201]/1.00) + (MW[202]/2.00) + (MW[203]/@Occ3pl@)  ; 'seed' auto
driver total in 303
       MW[314] = MW[201]/1.00                                         ; 'seed' 1-occ
auto drvs          in 314
       MW[315] = MW[202]/2.00                                         ; 'seed' 2-occ
auto drvs          in 315
       MW[316] = MW[203]/@Occ3pl@                                     ; 'seed' 3+occ
auto drvs          in 316

       MW[307] = MW[204] + MW[205] + MW[206] + MW[207] +
                 MW[208] + MW[209] + MW[210] + MW[211] +
                 MW[212] + MW[213]+ MW[214]                           ; 'seed'
Transit total in 307


;  Process cell by cell ..

JLOOP


       IF (MW[303] = 0 )
         MW[304] =0                                                     ; 'seed'
share of 1-occ auto drvs in 304
         MW[305] =0                                                     ; 'seed'
share of 1-occ auto drvs in 304
         MW[306] =0                                                     ; 'seed'
share of 1-occ auto drvs in 304

        ELSE
         MW[304] =(MW[201]/1.00)     / MW[301]                          ; 'seed'
share of psns that are 1-occ auto drvs in 304

         MW[305] =(MW[202]/2.00)     / MW[301]                          ; 'seed'
share of psns that are 2-occ auto drvs in 305

         MW[306] =(MW[203]/@Occ3pl@) / MW[301]                          ; 'seed'
share of psns that are 3+occ auto drvs in 306
      ENDIF

  ;  If pump prime person trips exist but 'seed' person trips do not
  ;  Then apply default auto driver/occupant level share defaults

  IF (MW[101] > 0 && MW[301] = 0) ;

     NOSEEDCNT  = 1.0   ; counter for the no. of cases (i/js)

     MW[501]  = MW[101] *   @DOCC1PCT@  ; 1-0cc adrs ;; Apply default
     MW[502]  = MW[101] *   @DOCC2PCT@  ; 2-occ adrs ;; auto drv / occupant
     MW[503]  = MW[101] *   @DOCC3PCT@  ; 3+occ adrs ;; shares

     IF (MW[501] > MW[101])
         MW[501] = MW[101]
         MW[502] = 0
         MW[503] = 0
     ENDIF
     MW[504] = MW[501] + MW[502] + MW[503] ; total output auto drivers

  ; Otherwise estimate auto driver/occupant level shares from mode
  ; choice output

  ELSEIF ((MW[101] > 0 & MW[301]> 0) || (MW[101] = 0 & MW[301] > 0))

     MW[501]  = MW[101] * MW[304]  ; 1-0cc adrs ;; Based on seed MC table
     MW[502]  = MW[101] * MW[305]  ; 2-occ adrs ;;
     MW[503]  = MW[101] * MW[306]  ; 3+occ adrs ;;


     MW[504] = MW[501] + MW[502] + MW[503] ; total output auto drivers
  ENDIF

  ;; Lets sum up the above to get neat total summaries

   seedpsn  = seedpsn  + MW[301]                      ;  Mode choice(seed) person
trips
   seedapsn = seedapsn + MW[302]                      ;  Mode choice(seed) auto
person trips
   seedadri = seedadri + MW[303]                      ;  Mode choice(seed) auto dr
trips
   seedadr1 = seedadr1 + MW[314]                      ;  Estim. seed 1-occ auto dr
trips
   seedadr2 = seedadr2 + MW[315]                      ;  Estim. seed 2-occ auto dr
trips
   seedadr3 = seedadr3 + MW[316]                      ;  Estim. seed 3+occ auto dr
trips
   seedadro = seedadro + MW[314] + MW[315] + MW[316]  ; Sum of est. 1,2,3+occ adrs

   pppsn    = pppsn    + MW[101]                      ;  Pump Prime person trips -
intl only
   ppadr1   = ppadr1   + MW[501]                      ;  Est. Pump Prime 1-occ auto
dr trips
   ppadr2   = ppadr2   + MW[502]                      ;  Est. Pump Prime 2-occ auto
dr trips
   ppadr3   = ppadr3   + MW[503]                      ;  Est. Pump Prime 3+occ auto
dr trips
   ppadr    = ppadr    + MW[504]                      ;  Est. Pump Prime total auto
dr trips

ENDJLOOP

 IF (I == ZONES)
;
; Compute Regional Seed/Pump Prime Auto Dr Shares/Occ. distributions
```

```
;
   IF (seedpsn = 0)
        sadrpct = 0
     ELSE
        sadrpct = seedadri/seedpsn  ; seed auto driver pct
   ENDIF

   IF (seedadro = 0)
       s1adpt   = 0
       s2adpt   = 0
       s3adpt   = 0
   ELSE
       s1adpt  = seedadr1/seedadro ; seed 1-occ adr pct
       s2adpt  = seedadr2/seedadro ; seed 2-occ adr pct
       s3adpt  = seedadr3/seedadro ; seed 3+occ adr pct
   ENDIF

   IF (pppsn    = 0)
       padrpct  = 0
   ELSE
       padrpct = ppadr/pppsn       ; Pump Prime auto driver pct
   ENDIF

   IF (ppadr    = 0)
       p1adpt   = 0
       p2adpt   = 0
       p3adpt   = 0
   ELSE
       p1adpt  = ppadr1/ppadr      ; Pump Prime 1-occ adr pct
       p2adpt  = ppadr2/ppadr      ; Pump Prime 2-occ adr pct
       p3adpt  = ppadr3/ppadr      ; Pump Prime 3+occ adr pct
   ENDIF


   LIST='/bt   '
   LIST='Summary of ','@PURPOSE@',' Pump-Prime Auto Driver Trip Results'
   LIST='   '
   LIST='Total Mode Choice Model (seed) Person Trips: ', seedpsn(10csv)
   LIST='Total Mode Choice Model (seed) AutoPsnTrips: ', seedapsn(10csv)
   LIST='Total Mode CHoice Model (seed) AutoDr Trips: ', seedadri(10csv)
   LIST='Total seed 1-Occ Auto Dr. Trips:             ', seedadr1(10csv)
   LIST='Total seed 2-Occ Auto Dr. Trips:             ', seedadr2(10csv)
   LIST='Total seed 3+Occ Auto Dr. Trips:             ', seedadr3(10csv)
   LIST='Sum of seed 1,2,3+ Auto Dr. Trips:           ', seedadro(10csv)

   LIST='Total Pump Prime Person Trips-Intl ONLY:     ', pppsn(10csv)
   LIST='Total PP 1-Occ. Auto Driver Trips:           ', ppadr1(10csv)
   LIST='Total PP 2-Occ. Auto Driver Trips:           ', ppadr2(10csv)
   LIST='Total PP 3+Occ. Auto Driver Trips:           ', ppadr3(10csv)
   LIST='Sum of PP 1,2,3+ Auto Driver Trips:          ', ppadr(10csv)
   LIST='   '
   List=' Summary of Input/Output Shares'
   List='Input AutoDr Share: ', sadrpct(6.2),
   '    1,2,3+Occ.AutoDr.Shares: ',s1adpt(6.2),s2adpt(6.2),s3adpt(6.2)
   List='Output AutoDr.Share:', padrpct(6.2),
   '    1,2,3+Occ.AutoDr.Shares: ',p1adpt(6.2),p2adpt(6.2),p3adpt(6.2)
   LIST='/et   '
 ENDIF

MATO=@PP123OCC@,MO=501,502,503 ; output file designation

ENDRUN
ENDLOOP

; ======================================================================
;
;  This program is used to develop 1-occ, 2-occ, and 3+occ auto driver
;  trip tables, by purpose (HBW, HBS, HBO, and NHB).  The script reads two files:
;  1) Internal Auto Person Trips - The AECOM NL Mode choice output, each file
;     contains auto person trips by occupancy group (1,2,and 3+ Occupant Vehicles).
;  2) External Auto Person trips - the trip distibution output containing
;     total auto person trips.
; ====================================================================
;
;
;///////////////////////////////////////////////////////////////////
;
; First, establish Input/Output filenames:
LOOP PURP=1,4   ;  We'll Loop 4 times, for each purpose
                ;

IF (PURP=1)    ; HBW Loop
 MCFILE   = 'HBWPP.tem'              ;PP Mode Choice file             (Input)
 TDFILE   = 'HBWESTPP.PTT'           ;Trip distibution output         (Input)
 MC123OCC = 'HBW%_iter_%.ADR'        ;HBW Auto Drv trips- 1,2,3+ Occ.  (Output)
 PURPOSE  = 'HBW'                    ;
 Avg3P_Occ=  3.50                    ; Avg Auto Occupancy for autos w/ 3+ person
 ExtCarOcc=  1.15                    ; Avg External Auto Occ.
 TDTab    =  '7'                     ; Total Psn Trip tab no. in Trip Dist. output
file

ELSEIF (PURP=2) ; HBS Loop
 MCFILE   = 'HBSPP.tem'              ;PP Mode Choice file          (Input)
 TDFILE   = 'HBSESTPP.PTT'           ;Trip distibution output         (Input)
 MC123OCC = 'HBS%_iter_%.ADR'        ;HBW Auto Drv trips- 1,2,3+ Occ.  (Output)
 PURPOSE  = 'HBS'                    ;
 Avg3P_Occ=  3.25                    ; Avg Auto Occupancy for autos w/ 3+ person
 ExtCarOcc=  1.64                    ; Avg External Auto Occ.
 TDTab    =  '7'                     ; Total Psn Trip tab no. in Trip Dist. output
file

ELSEIF (PURP=3) ; HBO Loop
 MCFILE   = 'HBOPP.tem'              ;PP Mode Choice file             (Input)
 TDFILE   = 'HBOESTPP.PTT'           ;Trip distibution output         (Input)
 MC123OCC = 'HBO%_iter_%.ADR'        ;HBW Auto Drv trips- 1,2,3+ Occ.  (Output)
 PURPOSE  = 'HBO'                    ;
 Avg3P_Occ=  3.35                    ; Avg Auto Occupancy for autos w/ 3+ person
 ExtCarOcc=  1.61                    ; Avg External Auto Occ.
 TDTab    =  '7'                     ; Total Psn Trip tab no. in Trip Dist. output
file

ELSEIF (PURP=4) ; NHB Loop
 MCFILE   = 'NHBPP.tem'              ;PP Mode Choice file             (Input)
 TDFILE   = 'NHBESTPP.PTT'           ;Trip distibution output         (Input)
 MC123OCC = 'NHB%_iter_%.ADR'        ;HBW Auto Drv trips- 1,2,3+ Occ.  (Output)
 PURPOSE  = 'NHB'                    ;
 Avg3P_Occ=  3.35                    ; Avg Auto Occupancy for autos w/ 3+ person
 ExtCarOcc=  1.28                    ; Avg External Auto Occ.
 TDTab    =  '4'                     ; Total Psn Trip tab no. in Trip Dist. output
file

ENDIF
;
;///////////////////////////////////////////////////////////////////

RUN PGM=MATRIX
  PAGEHEIGHT= 32767

    MATI[1]=@MCFILE@           ;  MODE CHOICE MODEL OUTPUT FILE (for INTL TRIPS)
    MATI[2]=@TDfILE@           ;  TRIP DISTRIBUTION OUTPUT FILE (for EXTL TRIPS)

    ; put INTERNAL 1,2,3+ OCC AUTO PERSON TRIPS IN MTX 1,2,3
        FILLMW MW[1]  = MI.1.1,2,3

    ; compute internal auto driver trips, by occ group in mtx 11,12,13
        MW[11]  = MW[1] / 1.0              ;;  intl 1-occ. auto drivers
```

```
        MW[12]  = MW[2] / 2.0              ;;  intl 2-occ. auto drivers
        MW[13]  = MW[3] / @Avg3P_Occ@      ;;  intl 3+occ. auto drivers

    ; put TOTAL motorized person trips in mtx 20.
        MW[20] = MI.2.@TDtab@

    ; the external portion(auto person trips) will be extracted from mtx 20, and put
into 30
    ; .
        IF (I <  2145) MW[22]  = 1.0, include = 2145-2191;
        IF (I >= 2145) MW[22]  = 1.0, exclude = 2145-2191;

        MW[30] = MW[20] * MW[22]        ;; Extl auto person trips

    ; compute external auto driver trips in mtx 40, and apportion among occ groups
    ; using standard occ. curves

        MW[40] = MW[30] / @ExtCarOcc@    ;; Extl Auto driver trips

JLOOP
  XCarOcc =@ExtCarOcc@
; Determine LOV Vehicles in 1,2,3&4+ occupant groups using model
; COG's disaggrgegation model.

        IF     (XCarOcc  < 1.0050) ;  Make sure the computed Car Occ.
                XCarOcc  = 1.0050  ;  is between 1.005 and 2.500
        ELSEIF (XCarOcc  > 2.5000) ;  -- if not establish boundary
                XCarOcc  = 2.5000  ;      conditions
        ENDIF
;
; Apply Car Occ. Pct Model-Computes Pct Vehs.in Occ groups as function
; of avg auto occ.  The function is continuous  but piecewise.
;
        IF     (XCarOcc = 1.0050 - 1.1199999)
         MW[21] =  2.00264 - (0.9989 * XCarOcc) ; Shr of 1-Occ Vehs
         MW[22] = -1.00050 + (0.9952 * XCarOcc) ; Shr of 2-Occ Vehs
         MW[23] = -0.00158 + (0.0029 * XCarOcc) ; Shr of 3-Occ Vehs
         MW[24] = -0.00056 + (0.0008 * XCarOcc) ; Shr of 4-Occ Vehs
        ELSEIF (XCarOcc = 1.1200 - 2.5000)
         MW[21] =  1.59600 - (0.6357 * XCarOcc) ; Shr of 1-Occ Vehs
         MW[22] = -0.31143 + (0.3800 * XCarOcc) ; Shr of 2-Occ Vehs
         MW[23] = -0.17082 + (0.1540 * XCarOcc) ; Shr of 3-Occ Vehs
         MW[24] = -0.11375 + (0.1017 * XCarOcc) ; Shr of 4-Occ Vehs
        ENDIF

        ;
        ;   Apply Modeled Shares to the Extl Auto Drivers in mtx 51-54

         MW[51] =(MW[21] * MW[40]) ; Estimated Extl 1 occ vehicles
         MW[52] =(MW[22] * MW[40]) ; Estimated Extl 2 occ vehicles
         MW[53] =(MW[23] * MW[40]) ; Estimated Extl 3 occ vehicles
         MW[54] =(MW[24] * MW[40]) ; Estimated Extl 4+occ vehicles


; compute add intl and extl auto drivers by occ. groups together
; in mtx 61,62,63.  Total adrs will be in mtx 70

         MW[61] = MW[51] + MW[11]          ; Total 1-Occ Total Auto Drivers
         MW[62] = MW[52] + MW[12]          ;       2-occ
         MW[63] = MW[53] + MW[54] + MW[13]  ;       3+occ

         MW[70] = mw[61] + MW[62] + MW[63]
;
endjloop



JLOOP
```

```
; Lets sum up the above to get neat total summaries
     Int1_OccAPsn  =   Int1_OccAPsn + MW[1]                              ;
     Int2_OccAPsn  =   Int2_OccAPsn + MW[2]                              ;
     Int3POccAPsn  =   Int3POccAPsn + MW[3]                              ;
     IntAutoPsn    =   IntAutoPsn   + MW[1] + MW[2]+ MW[3]
;

     Int1_OccADrv  =   Int1_OccADrv + MW[11]                             ;
     Int2_OccADrv  =   Int2_OccADrv + MW[12]                             ;
     Int3POccADrv  =   Int3POccADrv + MW[13]                             ;
     IntAutoDrv    =   IntAutoDrv   + MW[11] + MW[12]+ MW[13]
;

     TotalMotorPsn =   TotalMotorPsn + MW[20]                             ;

     ExtAutoPsn    =   ExtAutoPsn   + MW[30]                             ;

     ExtAutoDrv    =   ExtAutoDrv   + MW[40]                             ;

     Ext1_OccADrv  =   Ext1_OccADrv + MW[51]                             ;
     Ext2_OccADrv  =   Ext2_OccADrv + MW[52]                             ;
     Ext3_OccADrv  =   Ext3_OccADrv + MW[53]                             ;
     Ext4POccADrv  =   Ext4POccADrv + MW[54]                             ;
     ExtchkAdrv    =   ExtchkADrv   + MW[51]+ MW[52]+ MW[53]+ MW[54]     ;

     Tot1_OccADrv  =   Tot1_OccADrv + MW[61]                             ;
     Tot2_OccADrv  =   Tot2_OccADrv + MW[62]                             ;
     Tot3POccADrv  =   Tot3POccADrv + MW[63]                             ;

     TotalAutoDrv  =   TotalAutoDrv + MW[70]                             ;
endjloop

IF (I == ZONES)
;


 Print LIST='/bt     '
 LIST='SUMMARY OF ','@PURPOSE@',' ITERATION: ','%_iter_%',' Pump Prime AUTO DRIVER
TRIP RESULTS'
 LIST='   '
 Print form = 12.2  LIST='    Assumed Avg  3+Veh. Occ.:  ',@Avg3P_Occ@
 Print form = 12.2  LIST='    Assumed Extl Veh Occ.   :  ',@ExtCarOcc@
 LIST='   '
 List=' Input Internal Auto Persons   '
 Print form = 12.0csv List='       1-Occ.: ',   Int1_OccAPsn
 Print form = 12.0csv List='       2-Occ.: ',   Int2_OccAPsn
 Print form = 12.0csv List='       3+Occ.: ',   Int3POccAPsn
 List=' ------------------------------- '
 Print form = 12.0csv List='       Total:  ',    IntAutoPsn
 List='                               '
 List=' Input / Derived Internal Auto Drivers  '
 Print form = 12.0csv List='       1-Occ.: '    Int1_OccADrv
 Print form = 12.0csv List='       2-Occ.: '    Int2_OccADrv
 Print form = 12.0csv List='       3+Occ.: '    Int3POccADrv
 List=' ------------------------------- '
 Print form = 12.0csv List='       Total:  ',   IntAutoDrv
 List='                 '                   '
 Print form = 12.0csv List='  Input Total Motorized Person   ',  TotalMotorPsn
 List='                          '
 Print form = 12.0csv List='  Input Total External Auto Psn  ',  ExtAutoPsn
 List='                         '
 Print form = 12.0csv List=' Input/Derived External Auto Drv ',  ExtAutoDrv
 List='              '
 List=' Estimated External Auto Drivers  '
 Print form = 12.0csv List='       1-Occ.: ',   Ext1_OccADrv
 Print form = 12.0csv List='       2-Occ.: ',   Ext2_OccADrv
 Print form = 12.0csv List='       3-Occ.: ',   Ext3_OccADrv
```

```
 Print form = 12.0csv List='       4+Occ.: ',   Ext4POccADrv
 List=' ------------------------------- '
 Print form = 12.0csv List='       Total:  ',   ExtchkADrv
 List='       '
 List=' Output / Combined Internal/External Auto Drivers  '
 Print form = 12.0csv List='       1-Occ.: '    Tot1_OccADrv
 Print form = 12.0csv List='       2-Occ.: '    Tot2_OccADrv
 Print form = 12.0csv List='       3+Occ.: '    Tot3POccADrv
 List=' ------------------------------- '
 Print form = 12.0csv LIST='       Total:  ',   TotalAutoDrv
 LIST='        '
 LIST='===  END OF ','@PURPOSE@',' ITERATION: ','%_iter_%',' AUTO DRV RESULTS ==='
 LIST='/et     '
ENDIF

MATO=@MC123OCC@,MO=61,62,63 ; output file designation

ENDRUN
ENDLOOP
;
```

23 prefarV23.s

```
;=================================================================
;  PREFAREV23.S
;   Program to read Zone File Used for MFARE2 Program (without walk pcts)
;       and to merge in walk pct. information
;      (Conversion of FORTRAN program Prefaretp.FOR)
;       Program also prepares the Z-file for the NL Mode Choice model (File 8)
;
;   Programmer: Milone
;   Date:        11/08/06
;
;    The program reads 3 files:
;               - a GIS-based walk area file containing short and
;                 long walk areas to all rail stations
;                 (rail includes metro & commuter rail).  The file also
;                 contains the sht,lng distances to the nearest metrorail
;                 station.  Note: the walk distance is based on 1.0 mile
;                 radius per the V2 models (NOT 7/10 mile per V1 models)
;               - a zone file containing bus fare zone/station equivs and
;                 jurisdiction code information.  This is essentially
;                 an A2 deck without walk percentages
;               - the 'final' zonal walk percentage file written
;                 by the wlklnktp.exe program.  This will suppress
;                 metrorail walk percentages to be consistent with
;                 the walk access links built previously
;    It writes out:
;               - A 'complete' A2 file for the MFARE2.S
;                  process
;    1/31/08 rm / a quality control check section added at the bottom
;    4/10/08 rm / added procedure to prepare the A1 file for the NL Mode choice
;                 application (Note: must use updated Ctl files)

;
ZONESIZE        =  2144                ; internal zones
ZNFILE_TrPcts   = 'inputs\NLwalkPct.txt' ;  Input Zonal Transit Walk Pcts
Fare_Zone_File  = 'INPUTS\tazfrzn.asc'  ; from \INPUTS SD

out_file        = 'fare_a2.asc'

RUN PGM=MATRIX
ZONES=@ZONESIZE@

;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
; Initialize current metrorail walk pct and final pct walk
;;====================================================
ZDATI[1] = @ZNFILE_TrPcts@ , Z            =  #1,
                             MetroShort   =  #2,
                             MetroLong    =  #3,
                             AMShort      =  #4,
                             AMLong       =  #5,
                             OPShort      =  #6,
                             OPLong       =  #7
                   ;; Convert Metrorail Long walk proportion to 1/10s of pcts (i.e.,
1.00 will be 1000.)
                   ;; as expected in the MFARE process

                            Metwkpct     =  Round(zi.1.MetroLong[I]   * 1000.0)


;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

;  Lets double check that the computed metrorail walk pct (in tenths)
;  is within the expected range, if not then abort and write msg.

      if ((metwkpct <  0) || (metwkpct  > 1000.0)) ABORT

;;  print list = I(5),' ', larea(10.7),' ',swrarea(10.7),' ',lwrarea(10.7),' ',
;;                   smetdst(10.3),' ',lmetdst(10.3),
;;                         ' ',metwkpct(6.2)

ZDATI[3] = @Fare_Zone_File@,
           Z        =   4- 8,
           bfz1     =   9-16,
           bfz2     =  17-24,
           rfz1     =  41-48,
           rfz2     =  49-56,
           jur      =  57-64,
           pdsc     =  65-72,
           adsc     =  73-80


;
;  Print Out zonal data
;  -- Only if input bus fare zone 1 is nonzero
;     -this ensures that a consistent record count will be maintained w/ I&O
  IF (zi.3.bfz1 > 0)


       Print list = i(8), zi.3.bfz1(8),zi.3.bfz2(8),
                          metwkpct(8),metwkpct(8),
                          zi.3.rfz1(8),zi.3.rfz2(8),
                          zi.3.JUR(8),zi.3.pdsc(8),zi.3.adsc(8),file=@out_file@

  ENDIF

ENDRUN
;------------------------------------------------------------------------------
; 1/31/08 rm - add checking routine to make sure the BUS fare zone coding is OK
;------------------------------------------------------------------------------
;  Let's double check that the 'A1' deck read into MFARE2 is intact
;  We'll read
;        1) the active Metrorail list (Met_Node.TB) from Staprotp
;        2) the land use file (ZONE.ASC) to determine active TAZ (Area > 0)
;        3) The Mfare2 A1 deck which has BF zone eqvs with TAZs and Stations
;  We'll abort miserably if:
;        1) A TAZ's BFZ is not within max/mins for an Active TAZ
;        2) A MetroStation's BFZ is not within max/mins for an active station
;        3) If no BFZ eqv. exists for an active station
```

```
;
;
;-------------------------------------------------------------------

MinBFZ   =   1
MaxBFZ   =  21
MinStaNo =   1
MaxStaNo = 150
NZNS     =2191
;
; Read in the 'active' Metrorail Nodes (73??) normally produced by StaproTP
; write out the list with an sequence no. 1 - ?)
;
RUN PGM=MATRIX
ZONES= 1
    RECI=MET_NODE.TB, Fields= 10-13  ; read list of Metrorail Nodes (cols 10-13)
         _IDX= _IDX + 1                    ; add sequence variable
         Print LIST=_Idx(8.0),             ; write this back out
                 RECI.NFIELD[1](8.0),      ;
                 file=MET_NODE_LKP.txt


    LOG PREFIX=MATRIX, VAR= _IDX           ; save last (max) seq no. for later
ENDRUN

Max_MN_No  = MATRIX._IDX

;-----------------------------------------------------------------------
;  Read in land use and zonal bus fare zone file
;-----------------------------------------------------------------------

RUN PGM=MATRIX
ZONES= @NZNS@

 array nodematch= @Max_MN_No@,
       MBF1     = @Max_MN_No@,
       MBF2     = @Max_MN_No@


 ZDATI[1] = inputs\zone.asc,    Z= 1-4, Area=83-92

 ZDATI[2] = inputs\tazfrzn.asc, Z= 1-8, TazBF1=  9-16,  ;BF1 zone eqv w/ Taz
                                        TazBF2= 17-24,  ;BF2 zone eqv w/ Taz
                                        MetBF1= 41-48,  ;BF1 zone eqv w/ MetSta
                                        MetBF2= 49-56   ;BF2 zone eqv w/ Metsta



;-----------------------------------------------------------------------
;  Abort if zonal bus fare zonea look funny, else print out zonal data
;-----------------------------------------------------------------------
 if (zi.1.area > 0 && (zi.2.TazBF1 < @MinBFZ@ || zi.2.TAZBF1 > @MaxBFZ@))
        List=' Active TAZ: ',I(8),'  has invalid bus fare zone: ',zi.2.TazBF1(8),
             '  -- Fix TAZFRZN.asc file in inthe INPUTS subdir.'
        ABORT
 endif

 if (zi.1.area > 0 )
      Print list =  'TAZ: ',I(8),' Bus Fare Zone Eqvs: ', TazBF1(8), TazBF2(8),
                    '  Area: ',zi.1.area(10.2), file = MfareTAZCheck.txt
 endif


;-----------------------------------------------------------------------
;  read in Metro node list lookup with seq. no here
;-----------------------------------------------------------------------
;
 lookup name = MetNodeList,
 lookup[1]   = 1, result = 2, ; Metro Node
 interpolate =N, Fail=0,0,0, File= Met_Node_LKP.txt


;-----------------------------------------------------------------------
; If at the first 150 records, check Metrorail station bus fare zones
;-----------------------------------------------------------------------
IF (I<=@MaxStaNo@)

   loop idx = 1,@Max_MN_No@

        CurrNode = MetNodeList(1,idx) - 7300. ; convert 7301,7302,.. to 1,2,3...
        if (CurrNode = i )

                nodematch[idx] = 1
                MBF1[idx]      = zi.2.MetBF1
                MBF2[idx]      = zi.2.MetBF2

                if (zi.2.MetBF1 < @MinBFZ@ || zi.2.MetBF1 > @MaxBFZ@)
                    LIST= '  Invalid Bus fare zone equivalent: ', zi.2.MetBF1(8),
                          ' for Metro station', CurrNode(8),
             ' -- Fix TAZFRZN.asc file in inthe INPUTS subdir.'
                    ABORT
                endif
        endif

   endloop
ENDIF

;-----------------------------------------------------------------------
; If Station bus fare zones check out ok, print out the data
;-----------------------------------------------------------------------
IF (I= 151)

        loop idx = 1, @Max_MN_No@
               MetNode = MetNodeList(1,idx)


               print list = 'MetroNode: ',MetNode(8),' Bus Fare Zn 1/2: ',
                             MBF1[idx](8), MBF2[idx](8), File = MfareSTACheck.txt

               if ( nodematch[idx] = 0)
                    LIST= '  Bus fare zone equivalent for Metro Station: 'idx(8),
                          '  is missing in the A1 deck ',
             ' -- Fix TAZFRZN.asc file in inthe INPUTS subdir.'

                    ABORT
               endif
       endloop
endif
ENDRUN

;-----------------------------------------------------------------------
; END
;-----------------------------------------------------------------------


;===============================================================
;  Prepare_MC_Zfile.S
;
;   Version 2.3 Create Zonal file for the NL Mode Choice model
;
;
;   Programmer: Milone
;   Date:       4/08/08
;
;===============================================================
;
```

```
;==================================================================
; Set Parameters:
;==================================================================

ZONESIZE    =       2191                 ;  No. of TAZs
LastIZN     =       2144                 ;  Last Internal TAZ no.
PCostRng    =       51                   ;  No. of ranges in the parking cost Model
TTimeRng    =       5                    ;  No. of ranges in the terminal time
Model


Rept         = 'Prepare_MC_Zfile.txt'  ; Summary Reports
OFilem       = ' ZONEV2.A2F  '         ; Output ZFile for the NL Mode Choice Model
OFilew       = ' HBWV2.A1F  '          ; Output ZFile for the WalkACC program

;==================================================================
; Set Input Files:
;==================================================================

ZNFILE_LU      = 'inputs\zone.asc'      ;  Input Zonal Land Use File
ZNFILE_TrPcts  = 'inputs\NLwalkPct.txt' ;  Input Zonal Transit Walk Pcts
ZNFILE_MCMrkts = 'inputs\areadef.prn'   ;  Input Zonal TAZ-Mode choice district
equiv.

;===================================================================
;//////////////////////////////////////////////////////////////////=
;===================================================================
;          Begin TP+ Matrix Routine :                              =
;===================================================================
;\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\=
;===================================================================

RUN PGM=MATRIX
ZONES=@ZONESIZE@
ARRAY MetroShortA=101,   ;; Arrays for counting TAZs in pct walk bins of 0-100
      MetroLongA=101,
      AMShortA=101,
      AMLongA=101,
      OPShortA=101,
      OPLongA=101,

      MetroShortj=24,    ;; Arrays for counting TAZs in juris bins
      MetroLongj=24,
      AMShortj=24,
      AMLongj=24,
      OPShortj=24,
      OPLongj=24,
      Total_Area=24



;=========================
; Define Loop-ups        =
;=========================
;
;==================================================================
; Parking Cost Lookup
;==================================================================
;
      LOOKUP Name=ParkingCost,
             LOOKUP[1] = 1, Result = 2, ;Emp Density,low value
             LOOKUP[2] = 1, Result = 3, ;Emp Density,hi value
             LOOKUP[3] = 1, Result = 4, ;HBW Parking Cost 8-Hr rate  (>=low & <hi)
94cents
             LOOKUP[4] = 1, Result = 5, ;Non-work Pk Cost Hourly rate (>=low & <hi)
94cents
             Interpolate = N, FAIL=0,0,0,
;      Empdenlo    EmpdenHi   HBWParkingCost   Non-WorkParkCost
;      --------    --------  ---------------  ---------------
  R=" 1,      0,       7000,         0,            0",
    " 2,   7000,      14000,        59,            0",
    " 3,  14000,      21000,        77,            0",
    " 4,  21000,      28000,        94,            0",
    " 5,  28000,      35000,       110,            0",
    " 6,  35000,      42000,       126,            0",
    " 7,  42000,      49000,       142,            0",
    " 8,  49000,      56000,       153,            0",
    " 9,  56000,      63000,       165,            0",
    "10,  63000,      69000,       180,            0",
    "11,  69000,      76000,       194,            0",
    "12,  76000,      83000,       205,            0",
    "13,  83000,      90000,       214,           70",
    "14,  90000,      97000,       223,           74",
    "15,  97000,     104000,       232,           77",
    "16, 104000,     111000,       241,           79",
    "17, 111000,     118000,       250,           83",
    "18, 118000,     125000,       259,           86",
    "19, 125000,     132000,       270,           90",
    "20, 132000,     139000,       279,           92",
    "21, 139000,     146000,       288,           95",
    "22, 146000,     153000,       297,           97",
    "23, 153000,     160000,       306,          101",
    "24, 160000,     167000,       315,          104",
    "25, 167000,     174000,       324,          106",
    "26, 174000,     181000,       333,          110",
    "27, 181000,     188000,       342,          113",
    "28, 188000,     194000,       351,          115",
    "29, 194000,     201000,       360,          119",
    "30, 201000,     208000,       369,          122",
    "31, 208000,     215000,       378,          124",
    "32, 215000,     222000,       388,          128",
    "33, 222000,     229000,       399,          131",
    "34, 229000,     236000,       410,          135",
    "35, 236000,     243000,       421,          138",
    "36, 243000,     250000,       433,          142",
    "37, 250000,     257000,       444,          147",
    "38, 257000,     264000,       457,          151",
    "39, 264000,     271000,       468,          155",
    "40, 271000,     278000,       478,          158",
    "41, 278000,     285000,       489,          162",
    "42, 285000,     292000,       496,          164",
    "43, 292000,     299000,       502,          165",
    "44, 299000,     306000,       507,          167",
    "45, 306000,     313000,       513,          169",
    "46, 313000,     319000,       518,          171",
    "47, 319000,     326000,       523,          173",
    "48, 326000,     333000,       531,          174",
    "49, 333000,     340000,       536,          176",
    "50, 340000,     347000,       541,          178",
    "51, 347000,   99999999,       547,          180"

;==================================================================
; Terminal Time Lookup
;==================================================================
      LOOKUP Name=TermTime,
             LOOKUP[1] = 1, Result = 2, ;Emp Density,low value
             LOOKUP[2] = 1, Result = 3, ;Emp Density,hi value
             LOOKUP[3] = 1, Result = 4, ;HB  Terminal Time in min.(>=low & <=hi)
             LOOKUP[4] = 1, Result = 5, ;NHB Terminal Time in min.(>=low & <=hi)
             Interpolate = N,  FAIL=0,0,0,
;       Empdenlo    EmpdenHi   HBWParkingCost   Non-WorkParkCost
;       --------    --------  ---------------  ---------------
  R=" 1,      0,       4617,       1,                  3    ",
    " 2,   4618,       6631,       2,                  5    ",
    " 3,   6632,      11562,       4,                 10    ",
    " 4,  11563,      32985,       6,                 15    ",
```

```
    " 5,  32986,   99999999,       8,                  20    "


;=================================================================================
=================
; End of LookUps  Now read the input files
=
;=================================================================================
=================

;; First initialize all current values to zero:

         HBWParkCost = 0
         HBSParkCost = 0
         HBOParkCost = 0
         NHBParkCost = 0
         HB_TermTime = 0
         NHB_TermTime= 0
         MetroShort  = 0
         MetroLong   = 0
         AMShort     = 0
         AMLong      = 0
         OPShort     = 0
         OPLong      = 0
         EMP         = 0
         jur         = 0
         area        = 0
         AMMELONG    = 0

; read Zonal land use files  into Z-File
ZDATI[1] = @ZNFILE_LU@,Z                  =  1- 4,
                       EMP                = 40-47,
                       jur                = 80-81,
                       Area               = 83-92

      ; Current Zonal Totals:
                             EMP          = zi.1.EMP[I]
                             jur          = zi.1.jur[I] + 1 ; convert 0-23 jur codes
to 1 to 24 for indexing
                             Area         = zi.1.Area[I]
                             IF (Area > 0)
                                 EMPDENSITY = ROUND(EMP/AREA)
                               ELSE
                                 EMPDENSITY = 0
                             ENDIF

      ; Accumulate Regional Totals:
                             TOTEMP       = TOTEMP  +  zi.1.EMP[I]
                             TOTArea      = TOTArea +  zi.1.Area[I]


; Zonal MC TAZ -District Equiv. File
ZDATI[2] = @ZNFILE_MCMrkts@, Z            =  #1,
                             MCDistrict   =  #2
                             MCDistrict   =  zi.2.MCDistrict[I]

; Zonal Transit Walk Shares
ZDATI[3] = @ZNFILE_TrPcts@ , Z            =  #1,  ; TAZ
                             MetroShort   =  #2,  ; % of TAZ that is w/in short walk
distance (0.5mi) to Metrorail
                             MetroLong    =  #3,  ; % of TAZ that is w/in long  walk
distance (1.0mi) to Metrorail
                             AMShort      =  #4,  ; % of TAZ that is w/in short walk
distance (0.5mi) to AM Transit
                             AMLong       =  #5,  ; % of TAZ that is w/in long  walk
distance (1.0mi) to AM Transit
                             OPShort      =  #6,  ; % of TAZ that is w/in short walk
distance (0.5mi) to OP Transit
                             OPLong       =  #7   ; % of TAZ that is w/in long  walk
distance (1.0mi) to OP Transit
                   ;; Convert walk shares to percents (i.e., 1.00 will be 100)
                             MetroShort   =  Round(zi.3.MetroShort[I]  * 100.0)
                             MetroLong    =  Round(zi.3.MetroLong[I]   * 100.0)
                             AMShort      =  Round(zi.3.AMShort[I]     * 100.0)
                             AMLong       =  Round(zi.3.AMLong[I]      * 100.0)
                             OPShort      =  Round(zi.3.OPShort[I]     * 100.0)
                             OPLong       =  Round(zi.3.OPLong[I]      * 100.0)

                             AMMELON = 0.0 ; AM Long-mutually exclusive of AM Short
area
                             IF (AMSHORT = 100.0 )
AMMELONG = 0.0
                             IF (AMSHORT >   0.0 && AMSHORT < 100.0  &&  AMLONG > 0)
AMMELONG = AMLONG - AMShort
                             IF (AMSHORT =   0.0 && AMLONG  >   0.0)
AMMELONG = AMLONG


 ;; Do some QC checks on the Percent walk data
  IF (MetroShort < 0 || MetroShort > 100)
                List =' MetroShort  value: ', Metroshort,' out of expected range at
TAZ:',I
                Abort
  ENDIF
  IF (MetroLong  < 0 || MetroLong  > 100)
                List =' MetroLong   value: ', MetroLong ,' out of expected range at
TAZ:',I
                Abort
  ENDIF
  IF (AMShort    < 0 || AMShort    > 100)
                List =' AMShort     value: ', AMShort   ,' out of expected range at
TAZ:',I
                Abort
  ENDIF
  IF (AMLong     < 0 || AMLong     > 100)
                List =' AMLong      value: ', AMLong    ,' out of expected range at
TAZ:',I
                Abort
  ENDIF
  IF (OPShort    < 0 || OPShort    > 100)
                List =' OPShort     value: ', OPShort   ,' out of expected range at
TAZ:',I
                Abort
  ENDIF
  IF (OPLong     < 0 || OPLong     > 100)
                List =' OPLong      value: ', OPLong    ,' out of expected range at
TAZ:',I
                Abort
  ENDIF

; Accumulate the count of TAZs in pct walk bins (0 to 100) for reporting
 IF (Area > 0)
  LOOP Idx  = 1, 101  ;; indexs 1-101 refer to  values 0 to 100
```

```
      IF (MetroShort = (idx-1)) MetroShortA[idx] = MetroShortA[idx] + 1
      IF (MetroLong  = (idx-1)) MetroLongA[idx]  = MetroLongA[idx]  + 1
      IF (AMShort    = (idx-1)) AMShortA[idx]    = AMShortA[idx]    + 1
      IF (AMLong     = (idx-1)) AMLongA[idx]     = AMLongA[idx]     + 1
      IF (OPShort    = (idx-1)) OPShortA[idx]    = OPShortA[idx]    + 1
      IF (OPLong     = (idx-1)) OPLongA[idx]     = OPLongA[idx]     + 1
  ENDLOOP
      ActiveTAZCnt = ActiveTAZCnt + 1
 ENDIF
; Accumulate the Area of each walk shed for reporting
          MetroShortArea = MetroShortArea + (MetroShort/100.00 * Area)
          MetroLongArea  = MetroLongArea  + (MetroLong /100.00 * Area)
          AMShortArea    = AMShortArea    + (AMShort   /100.00 * Area)
          AMLongArea     = AMLongArea     + (AMLong    /100.00 * Area)
          OPShortArea    = OPShortArea    + (OPShort   /100.00 * Area)
          OPLongArea     = OPLongArea     + (OPLong    /100.00 * Area)


; Accumulate the area of TAZs in juris. bins for reporting
 IF (Area > 0)
  LOOP Idx  = 1, 24   ;; indexs 1-101 refer to  values 0 to 100

      IF (jur =  idx ) MetroShortj[idx] = MetroShortj[idx] + (MetroShort/100.00 *
Area)
      IF (jur =  idx ) MetroLongj[idx]  = MetroLongj[idx]  + (MetroLong /100.00 *
Area)
      IF (jur =  idx ) AMShortj[idx]    = AMShortj[idx]    + (AMShort   /100.00 *
Area)
      IF (jur =  idx ) AMLongj[idx]     = AMLongj[idx]     + (AMLong    /100.00 *
Area)
      IF (jur =  idx ) OPShortj[idx]    = OPShortj[idx]    + (OPShort   /100.00 *
Area)
      IF (jur =  idx ) OPLongj[idx]     = OPLongj[idx]     + (OPLong    /100.00 *
Area)
      IF (jur =  idx ) Total_Area[idx]  = Total_Area[idx]  +  Area
  ENDLOOP
ENDIF
;---------------------------------------------------------------------
;Begin Matrix Work Now ...
;---------------------------------------------------------------------

LOOP Idx = 1, @PCostRng@

     IF (EMPDensity >=  ParkingCost(1,idx) && EMPDensity <  ParkingCost(2,idx))

           HBWParkCost   =  ParkingCost(3,idx)
           HrNonWkPkCost =  ParkingCost(4,idx)
           Break
     ENDIF
ENDLOOP

          HBSParkCost = HrNonWkPkCost
          HBOParkCost = HrNonWkPkCost * 2.0
          NHBParkCost = HrNonWkPkCost * 2.0


LOOP Idx = 1, @TTimeRng@

     IF (EMPDensity >=  TermTime(1,idx) && EMPDensity <=  TermTime(2,idx) && I <=
@LastIzn@)

           HB_TermTime   =  TermTime(3,idx)
           NHB_TermTime  =  TermTime(4,idx)
           Break
     ENDIF
ENDLOOP
```

```
;---------------------------------------------------------------------
;Write out zonal files here  ...
;---------------------------------------------------------------------

 Print file=@ofilem@, form = 5 List=  I,
                                    HBWParkCost,
                                    HBSParkCost,
                                    HBOParkCost,
                                    NHBParkCost,
                                    HB_TermTime,
                                    NHB_TermTime,
                                    MetroShort,
                                    MetroLong,
                                    AMShort,
                                    AMLong,
                                    OPShort,
                                    OPLong,
                                    MCDistrict


 Print file=@ofilew@,               List=  I(5),
                                    '                  ', ;18x
                                    AMShort(4),
                                    AMMELong(4),
                                    '        ',           ;7x
                                    Area(8.4)



IF (I=@Zonesize@)
     Print form=10.5csv file=@Rept@ list = '    Total Employment:  ',
totemp(10.0csv) ,'\n','\n'







;;---------------------------------------------------------------------------------
---------------------------
     Print file=@Rept@ list = ' Jurisdictional Summary of Walk Shed Area (sq mi) by
Shed Type ','\n','\n',
                              '  Walk_Pct  MetroSh   MetroLg   AMShort   AMLong
OPShort   OPLong     TOTAL  ','\n',
                              ' --------- --------- --------- --------- --------- --
------- --------- ---------','\n'
 LOOP Idx   = 1, 24
  IF (Idx=1)
   CURDIST=STR(Idx,2,1)+' DC   '+ '|' ; Make row header
  ELSEIF (Idx=2)
   CURDIST=STR(Idx,2,1)+' MTG  '+ '|' ; Make row header
  ELSEIF (Idx=3)
   CURDIST=STR(Idx,2,1)+' PG   '+ '|' ; Make row header
  ELSEIF (Idx=4)
   CURDIST=STR(Idx,2,1)+' ARL  '+ '|' ; Make row header
  ELSEIF (Idx=5)
   CURDIST=STR(Idx,2,1)+' ALX  '+ '|' ; Make row header
  ELSEIF (Idx=6)
   CURDIST=STR(Idx,2,1)+' FFX  '+ '|' ; Make row header
  ELSEIF (Idx=7)
   CURDIST=STR(Idx,2,1)+' LDN  '+ '|'; Make row header
  ELSEIF (Idx=8)
   CURDIST=STR(Idx,2,1)+' PW   '+ '|' ; Make row header
  ELSEIF (Idx=9)
   CURDIST=STR(Idx,2,1)+' --   '+ '|' ; Make row header
  ELSEIF (Idx=10)
```

```
   CURDIST=STR(Idx,2,1)+' FRD  '+ '|' ; Make row header
  ELSEIF (Idx=11)
   CURDIST=STR(Idx,2,1)+' HOW  '+ '|' ; Make row header
  ELSEIF (Idx=12)
   CURDIST=STR(Idx,2,1)+' AAR  '+ '|' ; Make row header
  ELSEIF (Idx=13)
   CURDIST=STR(Idx,2,1)+' CHS  '+ '|' ; Make row header
  ELSEIF (Idx=14)
   CURDIST=STR(Idx,2,1)+' --   '+ '|' ; Make row header
  ELSEIF (Idx=15)
   CURDIST=STR(Idx,2,1)+' CAR  '+ '|' ; Make row header
  ELSEIF (Idx=16)
   CURDIST=STR(Idx,2,1)+' CAL  '+ '|' ; Make row header
  ELSEIF (Idx=17)
   CURDIST=STR(Idx,2,1)+' STM  '+ '|' ; Make row header
  ELSEIF (Idx=18)
   CURDIST=STR(Idx,2,1)+' KG   '+ '|' ; Make row header
  ELSEIF (Idx=19)
   CURDIST=STR(Idx,2,1)+' FBG  '+ '|' ; Make row header
  ELSEIF (Idx=20)
   CURDIST=STR(Idx,2,1)+' STF  '+ '|' ; Make row header
  ELSEIF (Idx=21)
   CURDIST=STR(Idx,2,1)+' SPTS '+ '|' ; Make row header
  ELSEIF (Idx=22)
   CURDIST=STR(Idx,2,1)+' FAUQ '+ '|' ; Make row header
  ELSEIF (Idx=23)
   CURDIST=STR(Idx,2,1)+' CLK  '+ '|' ; Make row header
  ELSE
   CURDIST=STR(Idx,2,1)+' JEFF '+ '|' ; Make row header
  ENDIF
     Print form=10.2csv, file=@Rept@,  list = CURDIST,
       MetroShortj[idx],
       MetroLongj[idx],
       AMShortj[idx],
       AMLongj[idx],
       OPShortj[idx],
       OPLongj[idx],
       TOTAL_Area[idx]
 ENDLOOP
     Print form=10.2csv, file=@Rept@ list = '\n', '\n',
                              ' --------- --------- --------- --------- --------- --
-------  --------- ---------','\n',
                              '     Total',MetroShortArea,MetroLongArea, AMShortArea
, AMLongArea,
                                          OPShortArea, OPLongArea,
totarea,'\n','\n','\n'
;;------------------------------------------------------------------------------------
----------------------------


;;------------------------------------------------------------------------------------
----------------------------
     Print file=@Rept@ list = ' # of "Active"  TAZs by Shed Type and Walk Percentage
(0% to 100%) ','\n','\n',
                              '  Walk_Pct  MetroSh   MetroLg   AMShort   AMLong
OPShort   OPLong  ','\n',
                              ' --------- --------- --------- --------- --------- --
------- ---------','\n'
 LOOP Idx  = 1, 101
     value = idx - 1
     Print form=10, file=@Rept@,  list = value,
       MetroShortA[idx],
       MetroLongA[idx],
       AMShortA[idx],
       AMLongA[idx],
       OPShortA[idx],
       OPLongA[idx]
 ENDLOOP
```

```
     Print form=10, file=@Rept@ list = '\n', '\n',
                              ' --------- --------- --------- --------- --------- --
------- ---------','\n',
                              '     Total', ActiveTAZCnt,
ActiveTAZCnt,ActiveTAZCnt,ActiveTAZCnt,
                                            ActiveTAZCnt, ActiveTAZCnt
;;------------------------------------------------------------------------------------
----------------------------
ENDIF

ENDRUN

*copy TPPL*.prn Prepare_MC_ZFile.RPT
```

24 Set_CPI.S

```
;---------------------------------------------------------------------
; SET_CPI.S   Version 2.2 Model
;   Used to   define Transit and Highway Deflators consistently
;
;---------------------------------------------------------------------
CPI_File        =  'INPUTS\CPI_File.TXT'   ;  Input parameters from the \INPUTS
subdir.
ModeledYear     =  '%_year_%'              ;  Simulation Year (Defined in
RUNALL_????.bat file)
;------------------------------------------------------------------------

CPI_Rept        = 'MFARE2_CPI.TXT'                 ; Output Reporting file

;
RUN PGM=MATRIX
ZONES=1
READ file=@CPI_File@

IF (Defl_OverRide != 0 )               ; if explicit deflation factor is provided by
user
     DEFLATIONFTR  = Defl_OverRide     ; then use it, otherwise compute it using the
most recent CPI table
     Print List='Deflation Factor is based on Override (Defl_OverRide)  in the
CPI_File.txt file: ', DEFLATIONFTR(8.5), file=@CPI_rept@
   ELSE                                ;
;
;;
;;  Now establish the Deflation factor depending on the modeled year
;;  and available historic US BLS data
;;
       _BseCPI      = CPI_Table(1,BaseCPIYear)
       _CurCPI      = CPI_Table(1,CurrCPIYear)
       _CurCPIdefl  = CPI_Table(1,BaseCPIYear) / CPI_Table(1,CurrCPIYear)

       IF (@ModeledYear@ < BaseCPIYear)             ; Deflation ftr can't be
developed if yr < 1994
           LIST = 'Modeled Year is earlier than Base Year in CPI Lookup; I Quit'
           ABORT

         ELSEIF (@ModeledYear@ = BaseCPIYear)      ; If Modeled year is Base CPI
year
           _BseGrowRate = CPI_Table(2,@ModeledYear@) ;    then use the defaltion
rate from table
```

```
          _AltGrowRate = CPI_Table(2,@ModeledYear@)

          _FutBseCPI   = CPI_Table(1,@ModeledYear@)
          _FutAltCPI   = CPI_Table(1,@ModeledYear@)

          DEFLATIONFTR = CPI_Table(3,@ModeledYear@)


        ELSEIF (@ModeledYear@ > BaseCPIYear && @ModeledYear@ <= CurrCPIYear)   ; If
Modeled year is Base CPI year
          _BseGrowRate = CPI_Table(2,@ModeledYear@)                           ;
then use the defaltion rate from table
          _AltGrowRate = CPI_Table(2,@ModeledYear@) * INFLATIONFTR

          _FutBseCPI   = CPI_Table(1,BaseCPIYear) * ((1.0 +
_BseGrowRate)^(@ModeledYear@ - BaseCPIYear))
          _FutAltCPI   = CPI_Table(1,BaseCPIYear) * ((1.0 +
_AltGrowRate)^(@ModeledYear@ - BaseCPIYear))

          DEFLATIONFTR = (_FutAltCPI / _FutBseCPI)  *  CPI_Table(3,@ModeledYear@)


        ELSE
          _BseGrowRate = ( (CPI_Table(1,CurrCPIYear) / CPI_Table(1,BaseCPIYear)) ^
(1.0/ (CurrCPIYear - BaseCPIYear)) ) - 1.0
          _AltGrowRate = _BseGrowRate * INFLATIONFTR

          _FutBseCPI   = CPI_Table(1,BaseCPIYear) * ((1.0 +
_BseGrowRate)^(@ModeledYear@ - BaseCPIYear))
          _FutAltCPI   = CPI_Table(1,BaseCPIYear) * ((1.0 +
_AltGrowRate)^(@ModeledYear@ - BaseCPIYear))

          DEFLATIONFTR =  (_FutAltCPI / _FutBseCPI)  *  CPI_Table(3,CurrCPIYear)
        ENDIF

              ;  print out small text file containing deflation factor deriviation:
          Print List='Modeled Year:                                       ',
@ModeledYear@(8.0) ,'\n',                            file=@CPI_rept@
          Print List='Base    Year & CPI:                                 ',
BaseCPIYear(8.0) , _BseCPI(8.1),'\n',                file=@CPI_rept@
          Print List='Current Year & CPI & deflator (Base CPI/Curr CPI):  ',
CurrCPIYear(8.0) , _CurCPI(8.1),_CurCPIdefl(8.5),'\n',file=@CPI_rept@
          Print List='Inflation Factor Assumption (1.00 = direct CPI):    ',
INFLATIONFTR(8.5),'\n',                              file=@CPI_rept@
          Print List='Modeled Year Growth rate & CPI w/  Full  CPI:    (A)',
_BseGrowRate(8.5)  , _FutBseCPI(8.1),'(forecasts years only)','\n',file=@CPI_rept@
          Print List='Modeled Year growth rate & CPI w/ Infla. Factor: (B)',
_AltGrowRate(8.5)  , _FutAltCPI(8.1),'(forecasts years only)','\n',file=@CPI_rept@
          Print List='Deflation Factor ((B)/(A) * Current Deflator :      ',
DEFLATIONFTR(8.5)  ,                                   file=@CPI_rept@

ENDIF
         Print List = 'DEFLATIONFTR  = ', DEFLATIONFTR(8.5),'  ;; Transit Deflation
Factor ',  File = TRN_Deflator.txt
         Print List = 'DEFLATIONFTR  = ', DEFLATIONFTR(8.5),'  ;; Highway Deflation
Factor ',  File = HWY_Deflator.txt




ENDRUN
;===============================================================
; End of CPI/Deflation section                                 =
;===============================================================
```

25 Set_Factors.s

```
;---------------------------------------------------------------------
; SET_FACTORS.S   Version 2.3 Model
;---------------------------------------------------------------------

; MWCOG Version 2.2  Model
;  Set up time penalty & K-factor files used in Trip Distribution
; Income-based Time Penalty Files & Superzone-to-TAZ Equivalency File
;  have now been removed.  Null placemarker files are now used.
;
; K-Factors for HBW purpose have been modifed
;    HBS, HBO, NHB Ks are now removed
; 4/24/08 Truck K factors no longer written (per new truck models)
; Input Files:
;
;  HBWPEN.03=      HBW TIME PENALITES (Inc 1-4)  12x12 (ASCII)
;  HBSPEN.03=      HBS TIME PENALITES (Inc 1-4)  12x12 (ASCII)
;  HBOPEN.03=      HBO TIME PENALITES (Inc 1-4)  12x12 (ASCII)
;  NHBPEN.03=      NHB TIME PENALITES            12x12 (ASCII)
;
;  PENEXPND =      JURISV21.EQV'  TIME PENALTY ZONE-TO-TAZ
;                                 EQUIVALENCE FILE
; Output Files:
;  HBWPEN.DAT=     HBW Time Penalties at 2191 zone level (Inc 1-4)
;  HBSPEN.DAT=     HBS Time Penalties at 2191 zone level (Inc 1-4)
;  HBOPEN.DAT=     HBO Time Penalties at 2191 zone level (Inc 1-4)
;  NHBPEN.DAT=     NHB Time Penalties at 2191 zone level
;
;  HBWK.DAT  =     HBW          K-Factor Matrix 2191 zone level
;  HBSK.DAT  =     HBS          K-Factor Matrix 2191 zone leve
;  HBOK.DAT  =     HBO          K-Factor Matrix 2191 zone leve
;  NHBK.DAT  =     NHB          K-Factor Matrix 2191 zone leve
;
;---------------------------------------------------------------------


; ---------------------------------------------------------------------
; Time Penalty Files & Superzone-to-TAZ Equivalency File
;   Non-work penalties were updated by JC
;
  HBWPEN   = '..\support\HBWPEN.03'    ;  HBW TIME PENALITES (Inc 1-4)
  HBSPEN   = '..\support\HBSPEN.03'    ;  HBS TIME PENALITES (Inc 1-4)
  HBOPEN   = '..\support\HBOPEN.03'    ;  HBO TIME PENALITES (Inc 1-4)
  NHBPEN   = '..\support\NHBPEN.03'    ;  NHB TIME PENALITES

  PENEXPND = '..\support\JURISV21.EQV' ;  TIME PENALTY ZONE-TO-TAZ
;                                         ;  EQUIVALENCE FILE
;

RUN PGM=MATRIX
ZONES=12

;  Build Income stratified time penalties (min)
;  at 12x12 superdistrict level.

MATI[1] = @HBWPEN@, PATTERN=IJM:V, FIELDS=1-5,6-10,0,11-15-4
MATI[2] = @HBSPEN@, PATTERN=IJM:V, FIELDS=1-5,6-10,0,11-15-4
MATI[3] = @HBOPEN@, PATTERN=IJM:V, FIELDS=1-5,6-10,0,11-15-4
MATI[4] = @NHBPEN@, PATTERN=IJM:V, FIELDS=1-5,6-10,0,11-15-1

; ESTABLISH WORK FILES FOR TIME PENALTIES
; HBW/INC 1-4      HBS/INC 1-4      HBO/INC 1-4       NHB
; -------------    --------------   ---------------  ----------------
 MW[1]  = MI.1.1,  MW[5]  = MI.2.1,  MW[9]  = MI.3.1,  MW[13] = MI.4.1
 MW[2]  = MI.1.2,  MW[6]  = MI.2.2,  MW[10] = MI.3.2
```

```
 MW[3]  = MI.1.3,  MW[7]  = MI.2.3,  MW[11] = MI.3.3
 MW[4]  = MI.1.4,  MW[8]  = MI.2.4,  MW[12] = MI.3.4

; NOW, WRITE OUT THE 12X12 TIME PENATLY MATRICES

MATO[1] = PENALTY.TEM, MO= 1- 13;
ENDRUN

; --------------------------------------------------------------------
; NEXT, EXPAND TIME PENALTY MATRICES AT SUPERZONE LEVEL TO 2191 TAZ LEVEL

RUN PGM=MATRIX
ZONES=12
MATI[1] = PENALTY.TEM

; ESTABLISH WORK FILES FOR TIME PENALTIES
;    HBW/INC 1-4      HBS/INC 1-4      HBO/INC 1-4         NHB
; --------------   ---------------  ----------------  ----------------
 MW[1] = MI.1.1,  MW[5] = MI.1.5,  MW[9]  = MI.1.9,  MW[13] = MI.1.13
 MW[2] = MI.1.2,  MW[6] = MI.1.6,  MW[10] = MI.1.10
 MW[3] = MI.1.3,  MW[7] = MI.1.7,  MW[11] = MI.1.11
 MW[4] = MI.1.4,  MW[8] = MI.1.8,  MW[12] = MI.1.12

RENUMBER FILE=@PENEXPND@, ZONES=2191, MISSINGZI=M, MISSINGZO=M

MATO[1] = HBWPEN.DAT, MO= 1- 4 ;
MATO[2] = HBSPEN.DAT, MO= 5- 8 ;
MATO[3] = HBOPEN.DAT, MO= 9-12 ;
MATO[4] = NHBPEN.DAT, MO=   13 ;

;
; ////////////////////////////////////////////////////////////////////////
; \\\\\\\\\    5) Begin K-Factor building, by trip purpose.          \\
; \\\\\\\\\       K-Factors values below are scaled by 1000.         \\
; \\\\\\\\\       (i.e., a value of 1000 below means K-Ftr of 1)     \\
; \\\\\\\\\       The will be applied across income strata in trip   \\
; \\\\\\\\\       distribution.                                      \\
; ////////////////////////////////////////////////////////////////////////

RUN PGM=MATRIX
ZONES=2191
; Now Begin the K-Factor Establishment
; Initialize K-factor matrices for each purpose:

MW[1] = 1000.0 ;  HBW       K-factor matrix
MW[2] = 1000.0 ;  HBS       K-factor matrix
MW[3] = 1000.0 ;  HBO       K-factor matrix
MW[4] = 1000.0 ;  NHB       K-factor matrix

; Establish Output Files for each purpose:

MATO[1] = HBWK.DAT ,MO=1
MATO[2] = HBSK.DAT ,MO=2
MATO[3] = HBOK.DAT ,MO=3
MATO[4] = NHBK.DAT ,MO=4

;-----------------------------------------

; |----------------------------------------------------------------|
; |------ Start of K-Factor Specifications for All Purposes  -----|
; |----------------------------------------------------------------|
;; Note updated TAZ ranges for mtg/pg (Sept 2006)
;;   MTG MD    320-639,648,650
;;   PG  MD    640-647,649,651-1029

;; K-Factors per Ver 2.2I
IF      (I =   89-  319)
       MW[1] = 1700,  INCLUDE=            1-   88 ; dcncr - dc cr
  ELSEIF (I =    320-639,648,650)
       MW[1] = 1600,  INCLUDE=     320-639,648,650 ; Mtg - Mtg
       MW[1] = 2000,  INCLUDE=             1-   88 ; Mtg - Dc core

  ELSEIF (I = 1920- 2069)
       MW[1] = 3200,  INCLUDE=             1-   88 ; pw - dccr

  ELSEIF (I  = 1230- 1238)
       MW[1] = 2500,  INCLUDE=             1-   88 ; arl core - dccr

  ELSEIF (I  = 1239- 1329)
       MW[1] = 1700,  INCLUDE=             1-   88 ; arl non core - dccr

 ELSEIF  (I = 1330- 1399)
       MW[1] = 1600,  INCLUDE=             1-   88 ; alx   - dc cr

  ELSEIF (I = 1400- 1779)
       MW[1] = 2000,  INCLUDE=             1-   88 ; ffx- dccr
       MW[1] = 1400,  INCLUDE=            89-  319 ; ffx- dcncr
       MW[1] =  800,  INCLUDE=          1400- 1779 ; ffx- ffx

  ELSEIF  (I = 1030- 1059)
       MW[1] =  900,  INCLUDE=  1030- 1059 ; frd- frd

ENDIF



; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|
; |//////   End of K-Factor Specifications for All Purposes  /////|
; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|

endrun
```

26 Time-of-Day.s

```
; ====================================================================
; Time-of-Day.s
; MWCOG Version 2.2 Model
;
;
;             Distribute Modeled Pump Prime Auto Driver Trips, i.e,
;             4 Purposes (HBW,HBS,HBO,NHB), 3 Modes (1,2,3+Occ Adrs)
;             among three time periods:
;             -  AM peak  (6:00 - 9:00 AM)
;             -  PM peak  (4:00 - 7:00 PM)
;             -  Off-peak (All Other hrs )
;             A card image file named: 'V2TODTPP.PAR' is used.
;             It contains trip percentages
;             for each time period by purpose, mode, and direction.
;
;   Note: Bucket Rounding is now removed per V 2.2 (1/11/07)
;
;
;
;
;   Environment Variable:
;             _iter_  (Iteration indicator = 'pp','i1'-'i6'
; ====================================================================
;
;
;//////////////////////////////////////////////////////////////////////
```

```
;                                                                  //
; Input/Output filenames:                                          //
;                                                                  //
READ FILE=..\support\V2TODTPP.PAR  ; Time of Day Factor File  //
;                                                                  //
; I/P PP Auto Driver Trip Tables:                                  //
 HBWADR = 'HBW%_iter_%.ADR' ; HBW  1,2,3+ Occ Adr Trips (t1-3)  //
 HBSADR = 'HBS%_iter_%.ADR' ; HBS  1,2,3+ Occ Adr Trips (t1-3)  //
 HBOADR = 'HBO%_iter_%.ADR' ; HBO  1,2,3+ Occ Adr Trips (t1-3)  //
 NHBADR = 'NHB%_iter_%.ADR' ; NHB  1,2,3+ Occ Adr Trips (t1-3)  //
;                                                                  //
; O/P Auto Dr. Pct. tables:                                        //
 ADRAM  = 'AM%_iter_%.ADR'  ; AM     Modeled Total Auto Drivers //
 ADRPM  = 'PM%_iter_%.ADR'  ; PM     Modeled Total Auto Drivers //
 ADROP  = 'OP%_iter_%.ADR'  ; Off-Pk Modeled Total Auto Drivers //
;                                                                  //
;//////////////////////////////////////////////////////////////////

RUN PGM=MATRIX
    MATI[1]=@HBWADR@    ; HBW 1,2,3+-Occ. Auto Drv. Trips(T1-3)
    MATI[2]=@HBSADR@    ; HBS 1,2,3+-Occ. Auto Drv. Trips(T1-3)
    MATI[3]=@HBOADR@    ; HBO 1,2,3+-Occ. Auto Drv. Trips(T1-3)
    MATI[4]=@NHBADR@    ; NHB 1,2,3+-Occ. Auto Drv. Trips(T1-3)


; Put HBW 1-Occ,2-Occ, 3+ Occ Adrs in tabs  1- 3, respectively
; Put HBS 1-Occ,2-Occ, 3+ Occ Adrs in tabs  4- 6, respectively
; Put HBO 1-Occ,2-Occ, 3+ Occ Adrs in tabs  7- 9, respectively
; Put NHB 1-Occ,2-Occ, 3+ Occ Adrs in tabs 10-12, respectively
;  These are in P/A format and represent the Home-to-NonHome direction

    FILLMW  MW[1]  = MI.1.1,  MI.1.2,  MI.1.3 ; Work 1,2,3+ Occ Adrs P/A
    FILLMW  MW[4]  = MI.2.1,  MI.2.2,  MI.2.3 ; Shop 1,2,3+ Occ Adrs P/A
    FILLMW  MW[7]  = MI.3.1,  MI.3.2,  MI.3.3 ; Othr 1,2,3+ Occ Adrs P/A
    FILLMW MW[10]  = MI.4.1,  MI.4.2,  MI.4.3 ; NHB  1,2,3+ Occ Adrs P/A

; Put Transpose of the above
; HBW, HBS, HBO, and NHB trip tables in Work Mats 21-32
; The transpose represents the NonHome-to-Home direction

MW[21]=MI.1.1.T, MW[22]=MI.1.2.T, MW[23]=MI.1.3.T; HBW 1,2,3+ Occ Adrs A/P
MW[24]=MI.2.1.T, MW[25]=MI.2.2.T, MW[26]=MI.2.3.T; HBS 1,2,3+ Occ Adrs A/P
MW[27]=MI.3.1.T, MW[28]=MI.3.2.T, MW[29]=MI.3.3.T; HBO 1,2,3+ Occ Adrs A/P
MW[30]=MI.4.1.T, MW[31]=MI.4.2.T, MW[32]=MI.4.3.T; NHB 1,2,3+ Occ Adrs A/P

; Now we're ready to apply apply TOD factors
;
;
 JLOOP

;\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
;//////////////// AM Trip Calculations          ////////////////////
;\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\

; AM Peak Period Auto Driver Trips
;    HBW:
MW[40]=(( MW[1]*(@AMWDAHNP@/100.0))+(MW[21]*(@AMWDANHP@/100.0)))/2.0;1occ
MW[41]=(( MW[2]*(@AMWCPHNP@/100.0))+(MW[22]*(@AMWCPNHP@/100.0)))/2.0;2occ
MW[42]=(( MW[3]*(@AMWCPHNP@/100.0))+(MW[23]*(@AMWCPNHP@/100.0)))/2.0;3+oc
;    HBS:
MW[45]=(( MW[4]*(@AMSDAHNP@/100.0))+(MW[24]*(@AMSDANHP@/100.0)))/2.0;1occ
MW[46]=(( MW[5]*(@AMSCPHNP@/100.0))+(MW[25]*(@AMSCPNHP@/100.0)))/2.0;2occ
MW[47]=(( MW[6]*(@AMSCPHNP@/100.0))+(MW[26]*(@AMSCPNHP@/100.0)))/2.0;3+oc
;    HBO:
MW[50]=(( MW[7]*(@AMODAHNP@/100.0))+(MW[27]*(@AMODANHP@/100.0)))/2.0;1occ
MW[51]=(( MW[8]*(@AMOCPHNP@/100.0))+(MW[28]*(@AMOCPNHP@/100.0)))/2.0;2occ
MW[52]=(( MW[9]*(@AMOCPHNP@/100.0))+(MW[29]*(@AMOCPNHP@/100.0)))/2.0;3+oc
;    NHB:
MW[55]=((MW[10]*(@AMNDAHNP@/100.0))+(MW[30]*(@AMNDANHP@/100.0)))/2.0;1occ
MW[56]=((MW[11]*(@AMNCPHNP@/100.0))+(MW[31]*(@AMNCPNHP@/100.0)))/2.0;2occ
MW[57]=((MW[12]*(@AMNCPHNP@/100.0))+(MW[32]*(@AMNCPNHP@/100.0)))/2.0;3+oc
;

;\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
;//////////////// PM Trip Calculations          ////////////////////
;\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\

; PM Peak Period Auto Driver Trips
;    HBW:
MW[60]=(( MW[1]*(@PMWDAHNP@/100.0))+(MW[21]*(@PMWDANHP@/100.0)))/2.0;1occ
MW[61]=(( MW[2]*(@PMWCPHNP@/100.0))+(MW[22]*(@PMWCPNHP@/100.0)))/2.0;2occ
MW[62]=(( MW[3]*(@PMWCPHNP@/100.0))+(MW[23]*(@PMWCPNHP@/100.0)))/2.0;3+oc
;    HBS:
MW[65]=(( MW[4]*(@PMSDAHNP@/100.0))+(MW[24]*(@PMSDANHP@/100.0)))/2.0;1occ
MW[66]=(( MW[5]*(@PMSCPHNP@/100.0))+(MW[25]*(@PMSCPNHP@/100.0)))/2.0;2occ
MW[67]=(( MW[6]*(@PMSCPHNP@/100.0))+(MW[26]*(@PMSCPNHP@/100.0)))/2.0;3+oc
;    HBO:
MW[70]=(( MW[7]*(@PMODAHNP@/100.0))+(MW[27]*(@PMODANHP@/100.0)))/2.0;1occ
MW[71]=(( MW[8]*(@PMOCPHNP@/100.0))+(MW[28]*(@PMOCPNHP@/100.0)))/2.0;2occ
MW[72]=(( MW[9]*(@PMOCPHNP@/100.0))+(MW[29]*(@PMOCPNHP@/100.0)))/2.0;3+oc
;    NHB:
MW[75]=((MW[10]*(@PMNDAHNP@/100.0))+(MW[30]*(@PMNDANHP@/100.0)))/2.0;1occ
MW[76]=((MW[11]*(@PMNCPHNP@/100.0))+(MW[31]*(@PMNCPNHP@/100.0)))/2.0;2occ
MW[77]=((MW[12]*(@PMNCPHNP@/100.0))+(MW[32]*(@PMNCPNHP@/100.0)))/2.0;3+oc
;

;\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
;//////////////// Off-Pk Trip Calculations      ////////////////////
;\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\

; Off-Peak Period Auto Driver Trips
;    HBW:
MW[80]=(( MW[1]*(@OPWDAHNP@/100.0))+(MW[21]*(@OPWDANHP@/100.0)))/2.0;1occ
MW[81]=(( MW[2]*(@OPWCPHNP@/100.0))+(MW[22]*(@OPWCPNHP@/100.0)))/2.0;2occ
MW[82]=(( MW[3]*(@OPWCPHNP@/100.0))+(MW[23]*(@OPWCPNHP@/100.0)))/2.0;3+oc
;    HBS:
MW[85]=(( MW[4]*(@OPSDAHNP@/100.0))+(MW[24]*(@OPSDANHP@/100.0)))/2.0;1occ
MW[86]=(( MW[5]*(@OPSCPHNP@/100.0))+(MW[25]*(@OPSCPNHP@/100.0)))/2.0;2occ
MW[87]=(( MW[6]*(@OPSCPHNP@/100.0))+(MW[26]*(@OPSCPNHP@/100.0)))/2.0;3+oc
;    HBO:
MW[90]=(( MW[7]*(@OPODAHNP@/100.0))+(MW[27]*(@OPODANHP@/100.0)))/2.0;1occ
MW[91]=(( MW[8]*(@OPOCPHNP@/100.0))+(MW[28]*(@OPOCPNHP@/100.0)))/2.0;2occ
MW[92]=(( MW[9]*(@OPOCPHNP@/100.0))+(MW[29]*(@OPOCPNHP@/100.0)))/2.0;3+oc
;    NHB:
MW[95]=((MW[10]*(@OPNDAHNP@/100.0))+(MW[30]*(@OPNDANHP@/100.0)))/2.0;1occ
MW[96]=((MW[11]*(@OPNCPHNP@/100.0))+(MW[31]*(@OPNCPNHP@/100.0)))/2.0;2occ
MW[97]=((MW[12]*(@OPNCPHNP@/100.0))+(MW[32]*(@OPNCPNHP@/100.0)))/2.0;3+oc
;
ENDJLOOP

;--------------------------------------------------------------------
; Summarize by purpose for checking;
; Total HBW:
 MW[100]= MW[40]+MW[41]+MW[42]+MW[60]+MW[61]+MW[62]+MW[80]+MW[81]+MW[82]
; Total HBS:
 MW[101]= MW[45]+MW[46]+MW[47]+MW[65]+MW[66]+MW[67]+MW[85]+MW[86]+MW[87]
; Total HBW:
 MW[102]= MW[50]+MW[51]+MW[52]+MW[70]+MW[71]+MW[72]+MW[90]+MW[91]+MW[92]
; Total HBS:
 MW[103]= MW[55]+MW[56]+MW[57]+MW[75]+MW[76]+MW[77]+MW[95]+MW[96]+MW[97]

;--------------------------------------------------------------------
; Summarize by Time period, Occ Group for Assignment
;
 MW[110]= MW[40]+MW[45]+MW[50]+MW[55] ; AM 1-Occ adrs
 MW[111]= MW[41]+MW[46]+MW[51]+MW[56] ; AM 2-Occ adrs
```

```
 MW[112]= MW[42]+MW[47]+MW[52]+MW[57] ; AM 3+Occ adrs
;
 MW[113]= MW[60]+MW[65]+MW[70]+MW[75] ; PM 1-Occ adrs
 MW[114]= MW[61]+MW[66]+MW[71]+MW[76] ; PM 2-Occ adrs
 MW[115]= MW[62]+MW[67]+MW[72]+MW[77] ; PM 3+Occ adrs
;
 MW[116]= MW[80]+MW[85]+MW[90]+MW[95] ; OP 1-Occ adrs
 MW[117]= MW[81]+MW[86]+MW[91]+MW[96] ; OP 2-Occ adrs
 MW[118]= MW[82]+MW[87]+MW[92]+MW[97] ; OP 3+Occ adrs

; Now summarize regional totals to summarize neatly
Jloop
; am hbw, hbs, hbo, nhb by occupant totals:
amhbw1=amhbw1+MW[40], amhbw2=amhbw2+MW[41], amhbw3=amhbw3+MW[42]
amhbs1=amhbs1+MW[45], amhbs2=amhbs2+MW[46], amhbs3=amhbs3+MW[47]
amhbo1=amhbo1+MW[50], amhbo2=amhbo2+MW[51], amhbo3=amhbo3+MW[52]
amnhb1=amnhb1+MW[55], amnhb2=amnhb2+MW[56], amnhb3=amnhb3+MW[57]
; am hbw, hbs, hbo, nhb totals:
amhbw =amhbw + MW[40] + MW[41] + MW[42]
amhbs =amhbs + MW[45] + MW[46] + MW[47]
amhbo =amhbo + MW[50] + MW[51] + MW[52]
amnhb =amnhb + MW[55] + MW[56] + MW[57]
; am occupant level totals:
am1   =am1   +MW[110],am2   =am2   +MW[111],am3   =am3   +MW[112]
; am totals:
am    =am    +MW[110]              +MW[111]              +MW[112]

; pm hbw, hbs, hbo, nhb by occupant totals:
pmhbw1=pmhbw1+MW[60], pmhbw2=pmhbw2+MW[61], pmhbw3=pmhbw3+MW[62]
pmhbs1=pmhbs1+MW[65], pmhbs2=pmhbs2+MW[66], pmhbs3=pmhbs3+MW[67]
pmhbo1=pmhbo1+MW[70], pmhbo2=pmhbo2+MW[71], pmhbo3=pmhbo3+MW[72]
pmnhb1=pmnhb1+MW[75], pmnhb2=pmnhb2+MW[76], pmnhb3=pmnhb3+MW[77]
; pm hbw, hbs, hbo, nhb totals:
pmhbw =pmhbw + MW[60] + MW[61] + MW[62]
pmhbs =pmhbs + MW[65] + MW[66] + MW[67]
pmhbo =pmhbo + MW[70] + MW[71] + MW[72]
pmnhb =pmnhb + MW[75] + MW[76] + MW[77]
; pm occupant level totals:
pm1   =pm1   +MW[113],pm2   =pm2   +MW[114],pm3   =pm3   +MW[115]
; pm totals:
pm    =pm    +MW[113]              +MW[114]              +MW[115]

; op hbw, hbs, hbo, nhb by occupant totals:
ophbw1=ophbw1+MW[80], ophbw2=ophbw2+MW[81], ophbw3=ophbw3+MW[82]
ophbs1=ophbs1+MW[85], ophbs2=ophbs2+MW[86], ophbs3=ophbs3+MW[87]
ophbo1=ophbo1+MW[90], ophbo2=ophbo2+MW[91], ophbo3=ophbo3+MW[92]
opnhb1=opnhb1+MW[95], opnhb2=opnhb2+MW[96], opnhb3=opnhb3+MW[97]
; op hbw, hbs, hbo, nhb totals:
ophbw =ophbw + MW[80]  + MW[81] + MW[82]
ophbs =ophbs + MW[85]  + MW[86] + MW[87]
ophbo =ophbo + MW[90]  + MW[91] + MW[92]
opnhb =opnhb + MW[95]  + MW[96] + MW[97]
; op occupant level totals:
op1   =op1   +MW[116],op2   =op2   +MW[117],op3   =op3   +MW[118]
; op totals:
op    =op    +MW[116]              +MW[117]              +MW[118]

; total output trips by purpose--output total:
 ohbw=ohbw+MW[100], ohbs=ohbs+MW[101], ohbo=ohbo+MW[102], onhb=onhb+MW[103]

; total grand Total of output auto driver trips:
 adr = adr + MW[100] + MW[101] + MW[102] + MW[103]

; total input trips by purpose
 ihbw=ihbw + MW[1]  + MW[2]  + MW[3]
 ihbs=ihbs + MW[4]  + MW[5]  + MW[6]
 ihbo=ihbo + MW[7]  + MW[8]  + MW[9]
 inhb=inhb + MW[10] + MW[11] + MW[12]
```

```
endjloop

; now write out the totals neatly:
if (i=zones)
; get differences by purpose (output - Input)
dfhbw = ohbw - ihbw;
dfhbs = ohbs - ihbs;
dfhbo = ohbo - ihbo;
dfnhb = onhb - inhb;

LIST = '/bt     '
LIST = ' Modeled Pump Prime Time-of-Day Results','\n'
list = 'AM Period:  1-Occ.  2-Occ.  3+Occ.      Total'
list = 'HBW       ',amhbw1(8.0),amhbw2(8.0),amhbw3(8.0),'    ',amhbw(8.0)
list = 'HBS       ',amhbs1(8.0),amhbs2(8.0),amhbs3(8.0),'    ',amhbs(8.0)
list = 'HBO       ',amhbo1(8.0),amhbo2(8.0),amhbo3(8.0),'    ',amhbo(8.0)
list = 'NHB       ',amnhb1(8.0),amnhb2(8.0),amnhb3(8.0),'    ',amnhb(8.0)
list = '---------------------------------------------'
list = 'Subtotal: ',am1(8.0),am2(8.0),am3(8.0),'    ',am(8.0)
list = '  '
list = '  '
list = 'PM Period:  1-Occ.  2-Occ.  3+Occ.      Total'
list = 'HBW       ',pmhbw1(8.0),pmhbw2(8.0),pmhbw3(8.0),'    ',pmhbw(8.0)
list = 'HBS       ',pmhbs1(8.0),pmhbs2(8.0),pmhbs3(8.0),'    ',pmhbs(8.0)
list = 'HBO       ',pmhbo1(8.0),pmhbo2(8.0),pmhbo3(8.0),'    ',pmhbo(8.0)
list = 'NHB       ',pmnhb1(8.0),pmnhb2(8.0),pmnhb3(8.0),'    ',pmnhb(8.0)
list = '---------------------------------------------'
list = 'Subtotal: ',pm1(8.0),pm2(8.0),pm3(8.0),'    ',pm(8.0)
list = '  '
list = '  '
list = 'Off-Peak:   1-Occ.  2-Occ.  3+Occ.      Total'
list = 'HBW       ',ophbw1(8.0),ophbw2(8.0),ophbw3(8.0),'    ',ophbw(8.0)
list = 'HBS       ',ophbs1(8.0),ophbs2(8.0),ophbs3(8.0),'    ',ophbs(8.0)
list = 'HBO       ',ophbo1(8.0),ophbo2(8.0),ophbo3(8.0),'    ',ophbo(8.0)
list = 'NHB       ',opnhb1(8.0),opnhb2(8.0),opnhb3(8.0),'    ',opnhb(8.0)
list = '---------------------------------------------'
list = 'Subtotal: ',op1(8.0),op2(8.0),op3(8.0),'    ',op(8.0)
list = '  '
list = '  '
list = ' Input / Output Totals by Purpose:
list = '                           Diff.      '
list = '        Input    Output    (O-I)      '
list = 'HBW  ',ihbw(8.0),'  ',ohbw(8.0),'  ',dfhbw(8.0)
list = 'HBS  ',ihbs(8.0),'  ',ohbs(8.0),'  ',dfhbs(8.0)
list = 'HBO  ',ihbo(8.0),'  ',ohbo(8.0),'  ',dfhbo(8.0)
list = 'NHB  ',inhb(8.0),'  ',onhb(8.0),'  ',dfnhb(8.0)
list = '  '
list = 'Total Auto Drv:',adr(8.0)

list = '/et       '
endif


;  Write out the auto driver tables by time period

   MATO[1] = @ADRAM@, MO=110-112 ; AM Auto Drv Trips 1,2,3+occ tabs 1-3
   MATO[2] = @ADRPM@, MO=113-115 ; PM Auto Drv Trips 1,2,3+occ tabs 1-3
   MATO[3] = @ADROP@, MO=116-118 ; OP Auto Drv Trips 1,2,3+occ tabs 1-3
ENDRUN
;
```

27 Transit_Assignment_AB.s

```
;-------------------------------------------------------------------------
;Transit_Assignment_AB.s
;MWCOG Version 2.2 Model
;                        - PATHSTYLE changed from 1 to 0 on 3.9.04 (RM)
;                        - iteration (_iter_) global variables used
;Assign Transit Trips by Time Period and Access Mode
; Input Files:
;  TP+ Highway Network          = ZONEHWY.NET
;  Transit Line Files           = MODE?_pp.TB
;  Transit Network Data         = MET_*.TB, COM_*.TB, BUS_*.TB
;  Walk and Drive Access        = WALKACC.TB, *_PNR_pp.TB
;  Walk Sidewalk Network        = SIDEWALK.ASC
;  Transit Trip Tables          = '%_iter_%_AMMS.TRP', '%_iter_%_OPMS.TRP'
; Output Files:
;  Transit Assignment Link and Node Files
;
; Step 1: AM Peak Walk Assignment
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB, '%_iter_%_AMMS.TRP'
;  Output Files: WKABAMnode.dbf; WKABAMlink.dbf
; Step 2: AM Peak Drive Assignment
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB, '%_iter_%_AMMS.TRP'
;  Output Files: DRABAMnode.dbf; DRABAMlink.dbf
; Step 3: AM Peak K/R Assignment
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB, '%_iter_%_AMMS.TRP'
;  Output Files: KRABAMnode.dbf; KRABAMlink.dbf
; Step 4: Off Peak Walk Assignment
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB, '%_iter_%_OPMS.TRP'
;  Output Files: WKABOPnode.dbf; WKABOPlink.dbf
; Step 5: Off Peak Drive Assignment
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB, '%_iter_%_OPMS.TRP'
;  Output Files: DRABOPnode.dbf; DRABOPlink.dbf
; Step 6: Off Peak K/R Assignment
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB, '%_iter_%_OPMS.TRP'
;  Output Files: KRABOPnode.dbf; KRABOPlink.dbf
;


;-------------------------------------------------------------------------
;         Loop through each period and access mode
;-------------------------------------------------------------------------

;
;  Read in time factors to increase local bus times
;  based on increasing arterial hwy congestion

READ FILE=INPUTS\LBus_TimFTRS.ASC   ; Local Bus Time Factors
;

LOOP PERIOD = 1, 2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
  COMBINE = 5.0
  _IBFTR=AMIBFTR
  _OBFTR=AMOBFTR

  MATIN='%_iter_%_AMMS.TRP'
  AM=' '
  OP=';'

 ELSE
  TIME_PERIOD = 'OP'
  COMBINE = 10.0
  _IBFTR=OPIBFTR
  _OBFTR=OPOBFTR

  MATIN='%_iter_%_OPMS.TRP'
  AM=';'
  OP=' '

 ENDIF



;---- start the access mode loop ----

LOOP ACCESS = 1,3

  IF (ACCESS = 1)
   ACCESS_MODE = 'WK'
   WALK_MODEL = ' '
   DRIVE_MODEL = ';'
   KR_MODEL = ';'
   TABIN = 'MI.1.2'
  ELSEIF (ACCESS = 2)
   ACCESS_MODE = 'DR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ' '
   KR_MODEL = ';'
   TABIN = 'MI.1.6'
  ELSE
   ACCESS_MODE = 'KR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ';'
   KR_MODEL = ' '
   TABIN = 'MI.1.7'
  ENDIF


;-------------------------------------------------------------------------
; Step 1, 2, 3 , 4, 5 & 6 Assign All Bus Transit Trips
;-------------------------------------------------------------------------

RUN PGM=TRNBUILD
 NETI = ZONEHWY.NET
 MATI = @MATIN@

 HWYTIME = @TIME_PERIOD@HTIME

;--- set default zone access and line parameters ----

ZONEACCESS  GENERATE=N

@WALK_MODEL@ACCESSMODES = 14,16
@DRIVE_MODEL@ACCESSMODES = 11
@KR_MODEL@ACCESSMODES = 11

@WALK_MODEL@SKIPMODES = 11,15

PATHSTYLE  = 0
USERUNTIME = Y

;---- rules for combining multiple line and headways ----

COMBINE MAXDIFF[1] = 0.0, IF[1] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[2] = 0.0, IF[2] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[3] = 0.0, IF[3] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[4] = 0.0, IF[4] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[5] = 0.0, IF[5] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[6] = 0.0, IF[6] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[7] = 0.0, IF[7] = ((RUN - MINRUN) < @COMBINE@)
```

```
COMBINE MAXDIFF[8] = 0.0, IF[8] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[9] = 0.0, IF[9] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[10] = 0.0, IF[10] = ((RUN - MINRUN) < @COMBINE@)

;---- factors to convert actual time to perceived time ----

MODEFAC[1]  = 10*1.0  ;---- in-vehicle time
MODEFAC[11] = 1.50    ;---- drive access time
MODEFAC[12] = 2.00    ;---- transit transfer time
MODEFAC[13] = 2.00    ;---- walk network time
MODEFAC[14] = 2.00    ;---- unused (used to be dummy link to station)
MODEFAC[15] = 2.50    ;---- park-&-ride transfer time
MODEFAC[16] = 2.00    ;---- walk access time

;---- initial and transfer wait factors ----

IWAITFAC[1] = 10*2.50
XWAITFAC[1] = 10*2.50
IWAITMAX[1] = 10*60.0
XWAITMIN[1] = 2*4.0,0.0,4.0,0.0,3*4.0,10.0,4.0

;---- boarding and transfer penalties ----

XPEN[1]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[2]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[3]= 2*5.0, 0.0, 2*2.0,5*5.0, 6*0.0
XPEN[4]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[5]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[6]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[7]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[8]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[9]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[10]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[11]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[12]= 2*8.0,3*2.0,4*8.0,5.0, 6*0.0
XPEN[13]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[14]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[15]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[16]= 2*5.0,3*2.0,5*5.0, 6*0.0

XPENFAC[1]= 16*2.50
XPENFAC[2]= 16*2.50
XPENFAC[3]= 16*2.50
XPENFAC[4]= 16*2.50
XPENFAC[5]= 16*2.50
XPENFAC[6]= 16*2.50
XPENFAC[7]= 16*2.50
XPENFAC[8]= 16*2.50
XPENFAC[9]= 16*2.50
XPENFAC[10]= 16*2.50
XPENFAC[11]= 16*2.50
XPENFAC[12]= 16*2.50
XPENFAC[13]= 16*2.50
XPENFAC[14]= 16*2.50
XPENFAC[15]= 16*2.50
XPENFAC[16]= 16*2.50

;---- transfer prohibitions ----

;--- mode  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16
NOX[1]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[2]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[3]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[4]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[5]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[6]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[7]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[8]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[9]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[10] =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[11] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n
NOX[12] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  n,  Y,  n
NOX[13] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[14] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[15] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  Y,  Y,  Y,  Y
NOX[16] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  Y

;---- Parameters ----

LISTINPUT = N         ;--- echo input files

MAXPATHTIME = 360.0   ;--- Kill any path with preceived time > 240 min.
FREQPERIOD = 1        ;--- Use the First Headway value
USERUNTIME = Y        ;--- Ignore any RUNTIME or RT parameters on lines.
MAXRUNTIME = 240.0    ;--- Report lines with run times > 240 min.
;ONLINE = 100          ;--- Display every 100 lines

;WALKSPEED = 3.0       ;--- Set default walk speed to 3.0 mph
;XYFACTOR = 0.84401    ;--- Replicate MINUTP value
;WALKSPEED = 2.0       ;--- Added on 09/25
;XYFACTOR = 1.97       ;--- Added on 09/25
;-------------------------
;  write out support links for later viewing in VIPER
fileo supporto = suplAB@access_mode@@time_period@.asc modes=11-16 oneway=t fixed=y



;---- Rail Stations & Links (modes 3 & 4) ----

;READ FILE = met_node.tb   ;---- Metrorail stations
;READ FILE = met_link.tb   ;---- Metrorail links
;READ FILE = com_node.tb   ;---- Commuter Rail stations
;READ FILE = com_link.tb   ;---- Commuter Rail links
;READ FILE = lrt_node.tb   ;---- LRT stations
;READ FILE = lrt_link.tb   ;---- LRT links
READ FILE = new_node.tb   ;---- Mode10 Stations
READ FILE = new_link.tb   ;---- Mode10 links
;---- Park and Ride Lots (mode 15) ----

@DRIVE_MODEL@ READ FILE = bus_pnrn.tb  ;---- Bus PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = met_pnrn.tb  ;---- Metro PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = com_pnrn.tb  ;---- Commuter Rail PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = lrt_pnrn.tb  ;---- LRT PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = new_pnrn.tb  ;---- Mode10 PNR lots (nodes)

@DRIVE_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = met@TIME_PERIOD@pnr.tb  ;---- Metro-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = com@TIME_PERIOD@pnr.tb  ;---- Commuter Rail-PNR
connectors (links)
@DRIVE_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors
(links)

;---- Access Links (modes 11, 12 and 16) ----

;READ FILE = met_bus.tb   ;--- bus-metro links&xfer cards
;READ FILE = com_bus.tb   ;--- bus-commuter rail links&xfer car
;READ FILE = lrt_bus.tb   ;--- bus-LRT links&xfer car
READ FILE = new_bus.tb   ;--- Mode10 bus-LRT links&xfer car

READ FILE = walkacc.asc ;--- walk to local transit

@DRIVE_MODEL@READ FILE = mrpr@TIME_PERIOD@.asc;--- drive to metrorail
;@DRIVE_MODEL@READ FILE = cr@TIME_PERIOD@.asc;--- drive to Commuter rail
@DRIVE_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- drive to bus
@DRIVE_MODEL@READ FILE = lrt@TIME_PERIOD@.asc;--- drive to LRT
```

```
@DRIVE_MODEL@READ FILE = new@TIME_PERIOD@.asc;--- drive to Mode10

@KR_MODEL@READ FILE = mrkr@TIME_PERIOD@.asc;--- k/r to metrorail
@KR_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- k/r to bus
@KR_MODEL@READ FILE = lrtkr@TIME_PERIOD@.asc;--- k/r to LRT
@KR_MODEL@READ FILE = newkr@TIME_PERIOD@.asc;--- k/r to Mode10

;@KR_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
@KR_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors (links)
@KR_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)

;---- Dummy Centroid Access Links (mode 14) ----

;---- Sidewalk Network (mode 13) ----

READ FILE = sidewalk.asc;--- walk network for transfers

;---- Transit Line Cards (modes 1-10) ----

READ FILE = MODE1@TIME_PERIOD@.TB  ;---- M1- metrobus local
READ FILE = MODE2@TIME_PERIOD@.TB  ;---- M2- metrobus express
;READ FILE = MODE3@TIME_PERIOD@.TB  ;---- M3- metrorail
;READ FILE = MODE4@TIME_PERIOD@.TB  ;---- M4- commuter rail
;READ FILE = MODE5@TIME_PERIOD@.TB  ;---- M5- other rail (future)
READ FILE = MODE6@TIME_PERIOD@.TB  ;---- M6- other local bus
READ FILE = MODE7@TIME_PERIOD@.TB  ;---- M7- other express bus
READ FILE = MODE8@TIME_PERIOD@.TB  ;---- M8- other local bus
READ FILE = MODE9@TIME_PERIOD@.TB  ;---- M9- other express bus
READ FILE = MODE10@TIME_PERIOD@.TB  ;---- M10- other bus (future)

; output files
@WALK_MODEL@@AM@FILEO NODEO  = %_iter_%_WKABAMnode.dbf ; output node file
@WALK_MODEL@@OP@FILEO NODEO  = %_iter_%_WKABOPnode.dbf ; output node file
@DRIVE_MODEL@@AM@FILEO NODEO = %_iter_%_DRABAMnode.dbf ; output node file
@DRIVE_MODEL@@OP@FILEO NODEO = %_iter_%_DRABOPnode.dbf ; output node file
@KR_MODEL@@AM@FILEO NODEO    = %_iter_%_KRABAMnode.dbf ; output node file
@KR_MODEL@@OP@FILEO NODEO    = %_iter_%_KRABOPnode.dbf ; output node file

@WALK_MODEL@@AM@FILEO LINKO  = %_iter_%_WKABAMlink.dbf ; output link file
@WALK_MODEL@@OP@FILEO LINKO  = %_iter_%_WKABOPlink.dbf ; output link file
@DRIVE_MODEL@@AM@FILEO LINKO = %_iter_%_DRABAMlink.dbf ; output link file
@DRIVE_MODEL@@OP@FILEO LINKO = %_iter_%_DRABOPlink.dbf ; output link file
@KR_MODEL@@AM@FILEO LINKO    = %_iter_%_KRABAMlink.dbf ; output link file
@KR_MODEL@@OP@FILEO LINKO    = %_iter_%_KRABOPlink.dbf ; output link file

TRIPS MATRIX=@TABIN@, ASSIGN=Y, VOLUMES=Y, BOARDS=Y, EXITS=Y
REPORT LINKVOL=Y,LINEVOL=Y

ENDRUN

ENDLOOP ;---- ACCESS ----
ENDLOOP ;---- PERIOD ----
```

28 Transit_Assignment_BM.s

```
;-------------------------------------------------------------------------
;Transit_Assignment_BM.s
;MWCOG Version 2.2 Model
;                        - PATHSTYLE changed from 1 to 0 on 3.9.04 (RM)
;                        - iteration (_iter_) global variables used
;Assign Transit Trips by Time Period and Access Mode
; Input Files:
;  TP+ Highway Network         = ZONEHWY.NET
;  Transit Line Files          = MODE?_pp.TB
;  Transit Network Data        = MET_*.TB, COM_*.TB, BUS_*.TB
;  Walk and Drive Access       = WALKACC.TB, *_PNR_pp.TB
;  Walk Sidewalk Network       = SIDEWALK.ASC
;  Transit Trip Tables         = '%_iter_%_AMMS.TRP', '%_iter_%_OPMS.TRP'
; Output Files:
;  Transit Assignment Link and Node Files
;
; Step 1: AM Peak Walk Assignment
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB, '%_iter_%_AMMS.TRP'
;  Output Files: WKBMAMnode.dbf; WKBMAMlink.dbf
; Step 2: AM Peak Drive Assignment
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB, '%_iter_%_AMMS.TRP'
;  Output Files: DRBMAMnode.dbf; DRBMAMlink.dbf
; Step 3: AM Peak K/R Assignment
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB, '%_iter_%_AMMS.TRP'
;  Output Files: KRBMAMnode.dbf; KRBMAMlink.dbf
; Step 4: Off Peak Walk Assignment
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB, '%_iter_%_OPMS.TRP'
;  Output Files: WKBMOPnode.dbf; WKBMOPlink.dbf
; Step 5: Off Peak Drive Assignment
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB, '%_iter_%_OPMS.TRP'
;  Output Files: DRBMOPnode.dbf; DRBMOPlink.dbf
; Step 6: Off Peak K/R Assignment
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB, '%_iter_%_OPMS.TRP'
;  Output Files: KRBMOPnode.dbf; KRBMOPlink.dbf
;
;
;  Read in time factors to increase local bus times
;  based on increasing arterial hwy congestion

READ FILE=INPUTS\LBus_TimFTRS.ASC   ; Local Bus Time Factors
;

;-------------------------------------------------------------------------
;         Loop through each period and access mode
;-------------------------------------------------------------------------

LOOP PERIOD = 1, 2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
  COMBINE = 5.0
  _IBFTR=AMIBFTR
  _OBFTR=AMOBFTR
  MATIN='%_iter_%_AMMS.TRP'
  AM=' '
  OP=';'
 ELSE
  TIME_PERIOD = 'OP'
  COMBINE = 10.0
  _IBFTR=OPIBFTR
  _OBFTR=OPOBFTR
  MATIN='%_iter_%_OPMS.TRP'
  AM=';'
  OP=' '
 ENDIF

;---- start the access mode loop ----

LOOP ACCESS = 1,3

  IF (ACCESS = 1)
   ACCESS_MODE = 'WK'
   WALK_MODEL = ' '
   DRIVE_MODEL = ';'
   KR_MODEL = ';'
   TABIN = 'MI.1.3'
```

```
  ELSEIF (ACCESS = 2)
   ACCESS_MODE = 'DR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ' '
   KR_MODEL = ';'
   TABIN = 'MI.1.8'
  ELSE
   ACCESS_MODE = 'KR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ';'
   KR_MODEL = ' '
   TABIN = 'MI.1.9'
  ENDIF

;---------------------------------------------------------------------------
; Step 1, 2, 3 , 4, 5 & 6 Assign Bus/MR Transit Trips
;---------------------------------------------------------------------------

RUN PGM=TRNBUILD
 NETI = ZONEHWY.NET
 MATI = @MATIN@

 HWYTIME = @TIME_PERIOD@HTIME

;--- set default zone access and line parameters ----

ZONEACCESS  GENERATE=N

@WALK_MODEL@ACCESSMODES = 14,16
@DRIVE_MODEL@ACCESSMODES = 11
@KR_MODEL@ACCESSMODES = 11

@WALK_MODEL@SKIPMODES = 11,15

PATHSTYLE  = 0
USERUNTIME = Y

;---- rules for combining multiple line and headways ----

COMBINE MAXDIFF[1] = 0.0, IF[1] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[2] = 0.0, IF[2] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[3] = 0.0, IF[3] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[4] = 0.0, IF[4] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[5] = 0.0, IF[5] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[6] = 0.0, IF[6] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[7] = 0.0, IF[7] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[8] = 0.0, IF[8] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[9] = 0.0, IF[9] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[10] = 0.0, IF[10] = ((RUN - MINRUN) < @COMBINE@)

;---- factors to convert actual time to perceived time ----

MODEFAC[1]  = 10*1.0  ;---- in-vehicle time
MODEFAC[11] = 1.50    ;---- drive access time
MODEFAC[12] = 2.00    ;---- transit transfer time
MODEFAC[13] = 2.00    ;---- walk network time
MODEFAC[14] = 2.00    ;---- unused (used to be dummy link to station)
MODEFAC[15] = 2.50    ;---- park-&-ride transfer time
MODEFAC[16] = 2.00    ;---- walk access time

;---- initial and transfer wait factors ----

IWAITFAC[1] = 10*2.50
XWAITFAC[1] = 10*2.50
IWAITMAX[1] = 10*60.0
XWAITMIN[1] = 2*4.0,0.0,4.0,0.0,3*4.0,10.0,4.0

;---- boarding and transfer penalties ----

XPEN[1]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[2]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[3]= 2*5.0, 0.0, 2*2.0,5*5.0, 6*0.0
XPEN[4]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[5]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[6]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[7]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[8]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[9]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[10]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[11]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[12]= 2*8.0,3*2.0,4*8.0,5.0, 6*0.0
XPEN[13]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[14]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[15]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[16]= 2*5.0,3*2.0,5*5.0, 6*0.0

XPENFAC[1]= 16*2.50
XPENFAC[2]= 16*2.50
XPENFAC[3]= 16*2.50
XPENFAC[4]= 16*2.50
XPENFAC[5]= 16*2.50
XPENFAC[6]= 16*2.50
XPENFAC[7]= 16*2.50
XPENFAC[8]= 16*2.50
XPENFAC[9]= 16*2.50
XPENFAC[10]= 16*2.50
XPENFAC[11]= 16*2.50
XPENFAC[12]= 16*2.50
XPENFAC[13]= 16*2.50
XPENFAC[14]= 16*2.50
XPENFAC[15]= 16*2.50
XPENFAC[16]= 16*2.50

;---- transfer prohibitions ----

;--- mode  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16
NOX[1]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[2]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[3]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[4]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[5]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[6]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[7]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[8]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[9]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[10] =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[11] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n
NOX[12] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  Y,  n,  Y,  n
NOX[13] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  n,  Y,  n
NOX[14] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[15] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  Y,  Y,  Y,  Y
NOX[16] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  Y

;---- Parameters ----

LISTINPUT = N         ;--- echo input files

MAXPATHTIME = 360.0   ;--- Kill any path with preceived time > 240 min.
FREQPERIOD = 1        ;--- Use the First Headway value
USERUNTIME = Y        ;--- Ignore any RUNTIME or RT parameters on lines.
MAXRUNTIME = 240.0    ;--- Report lines with run times > 240 min.
;ONLINE = 100          ;--- Display every 100 lines

;WALKSPEED = 3.0       ;--- Set default walk speed to 3.0 mph
;XYFACTOR = 0.84401    ;--- Replicate MINUTP value
;WALKSPEED = 2.0       ;--- Added on 09/25
```

```
;XYFACTOR = 1.97       ;--- Added on 09/25

;--------------------------
;  write out support links for later viewing in VIPER
fileo supporto = suplBM@access_mode@@time_period@.asc modes=11-16 oneway=t fixed=y
;

;---- Rail Stations & Links (modes 3 & 4) ----

READ FILE = met_node.tb   ;---- Metrorail stations
READ FILE = met_link.tb   ;---- Metrorail links
;READ FILE = com_node.tb   ;---- Commuter Rail stations
;READ FILE = com_link.tb   ;---- Commuter Rail links
READ FILE = lrt_node.tb   ;---- LRT stations
READ FILE = lrt_link.tb   ;---- LRT links
READ FILE = new_node.tb   ;---- Mode10 Stations
READ FILE = new_link.tb   ;---- Mode10 links

;---- Park and Ride Lots (mode 15) ----

@DRIVE_MODEL@ READ FILE = bus_pnrn.tb  ;---- Bus PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = met_pnrn.tb  ;---- Metro PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = com_pnrn.tb  ;---- Commuter Rail PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = lrt_pnrn.tb  ;---- LRT PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = new_pnrn.tb  ;---- Mode10 PNR lots (nodes)

@DRIVE_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = met@TIME_PERIOD@pnr.tb  ;---- Metro-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = com@TIME_PERIOD@pnr.tb  ;---- Commuter Rail-PNR
connectors (links)
@DRIVE_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors
(links)

;---- Access Links (modes 11, 12 and 16) ----

READ FILE = met_bus.tb   ;--- bus-metro links&xfer cards
;READ FILE = com_bus.tb   ;--- bus-commuter rail links&xfer car
READ FILE = lrt_bus.tb   ;--- bus-LRT links&xfer car
READ FILE = new_bus.tb   ;--- Mode10 bus-LRT links&xfer car

READ FILE = walkacc.asc ;--- walk to local transit

@DRIVE_MODEL@READ FILE = mrpr@TIME_PERIOD@.asc;--- drive to metrorail
;@DRIVE_MODEL@READ FILE = cr@TIME_PERIOD@.asc;--- drive to Commuter rail
@DRIVE_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- drive to bus
@DRIVE_MODEL@READ FILE = lrt@TIME_PERIOD@.asc;--- drive to LRT
@DRIVE_MODEL@READ FILE = new@TIME_PERIOD@.asc;--- drive to Mode10

@KR_MODEL@READ FILE = mrkr@TIME_PERIOD@.asc;--- k/r to metrorail
@KR_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- k/r to bus
@KR_MODEL@READ FILE = lrtkr@TIME_PERIOD@.asc;--- k/r to LRT
@KR_MODEL@READ FILE = newkr@TIME_PERIOD@.asc;--- k/r to Mode10

@KR_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
@KR_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors (links)
@KR_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)

;---- Dummy Centroid Access Links (mode 14) ----

;---- Sidewalk Network (mode 13) ----

READ FILE = sidewalk.asc;--- walk network for transfers

;---- Transit Line Cards (modes 1-10) ----

READ FILE = MODE1@TIME_PERIOD@.TB  ;---- M1- metrobus local
READ FILE = MODE2@TIME_PERIOD@.TB  ;---- M2- metrobus express
READ FILE = MODE3@TIME_PERIOD@.TB  ;---- M3- metrorail
;READ FILE = MODE4@TIME_PERIOD@.TB  ;---- M4- commuter rail
READ FILE = MODE5@TIME_PERIOD@.TB  ;---- M5- other rail (future)
READ FILE = MODE6@TIME_PERIOD@.TB  ;---- M6- other local bus
READ FILE = MODE7@TIME_PERIOD@.TB  ;---- M7- other express bus
READ FILE = MODE8@TIME_PERIOD@.TB  ;---- M8- other local bus
READ FILE = MODE9@TIME_PERIOD@.TB  ;---- M9- other express bus
READ FILE = MODE10@TIME_PERIOD@.TB  ;---- M10- other bus (future)

; output files
@WALK_MODEL@@AM@FILEO NODEO  = %_iter_%_WKBMAMnode.dbf ; output node file
@WALK_MODEL@@OP@FILEO NODEO  = %_iter_%_WKBMOPnode.dbf ; output node file
@DRIVE_MODEL@@AM@FILEO NODEO = %_iter_%_DRBMAMnode.dbf ; output node file
@DRIVE_MODEL@@OP@FILEO NODEO = %_iter_%_DRBMOPnode.dbf ; output node file
@KR_MODEL@@AM@FILEO NODEO    = %_iter_%_KRBMAMnode.dbf ; output node file
@KR_MODEL@@OP@FILEO NODEO    = %_iter_%_KRBMOPnode.dbf ; output node file ; Added
"O" to filename

@WALK_MODEL@@AM@FILEO LINKO  = %_iter_%_WKBMAMlink.dbf ; output link file
@WALK_MODEL@@OP@FILEO LINKO  = %_iter_%_WKBMOPlink.dbf ; output link file
@DRIVE_MODEL@@AM@FILEO LINKO = %_iter_%_DRBMAMlink.dbf ; output link file
@DRIVE_MODEL@@OP@FILEO LINKO = %_iter_%_DRBMOPlink.dbf ; output link file
@KR_MODEL@@AM@FILEO LINKO    = %_iter_%_KRBMAMlink.dbf ; output link file
@KR_MODEL@@OP@FILEO LINKO    = %_iter_%_KRBMOPlink.dbf ; output link file

TRIPS MATRIX=@TABIN@, ASSIGN=Y, VOLUMES=Y, BOARDS=Y, EXITS=Y
REPORT LINKVOL=Y,LINEVOL=Y

ENDRUN

ENDLOOP ;---- ACCESS ----
ENDLOOP ;---- PERIOD ----
```

29 Transit_Assignment_CR.s

```
;--------------------------------------------------------------------------
;Transit_Assignment_CR.s
;MWCOG Version 2.2 Model
;                        - PATHSTYLE changed from 1 to 0 on 3.9.04 (RM)
;                        - iteration (_iter_) global variables used
;Assign Transit Trips by Time Period and Access Mode
; Input Files:
;  TP+ Highway Network          = ZONEHWY.NET
;  Transit Line Files           = MODE?_pp.TB
;  Transit Network Data         = MET_*.TB, COM_*.TB, BUS_*.TB
;  Walk and Drive Access        = WALKACC.TB, *_PNR_pp.TB
;  Walk Sidewalk Network        = SIDEWALK.ASC
;  Transit Trip Tables          = '%_iter_%_AMMS.TRP', '%_iter_%_OPMS.TRP'
; Output Files:
;  Transit Assignment Link and Node Files
;
; Step 1: AM Peak Walk Assignment
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB, '%_iter_%_AMMS.TRP'
;  Output Files: WKCRAMnode.dbf; WKCRAMlink.dbf
; Step 2: AM Peak Drive, K/R Assignment
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB, '%_iter_%_AMMS.TRP'
;  Output Files: DRCRAMnode.dbf; DRCRAMlink.dbf
; Step 3: Off Peak Walk Assignment
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB, '%_iter_%_OPMS.TRP'
;  Output Files: WKCROPnode.dbf; WKCROPlink.dbf
; Step 4: Off Peak Drive, K/R Assignment
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB, '%_iter_%_OPMS.TRP'
```

```
;  Output Files: DRCROPnode.dbf; DRCROPlink.dbf
;
;---------------------------------------------------------------------------

;
;  Read in time factors to increase local bus times
;  based on increasing arterial hwy congestion

READ FILE=INPUTS\LBus_TimFTRS.ASC   ; Local Bus Time Factors
;

;---------------------------------------------------------------------------
;         Loop through each period and access mode
;---------------------------------------------------------------------------

LOOP PERIOD = 1, 2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
  COMBINE = 5.0
  _IBFTR=AMIBFTR
  _OBFTR=AMOBFTR
   MATIN='%_iter_%_AMMS.TRP'
  AM=' '
  OP=';'
ELSE
  TIME_PERIOD = 'OP'
  COMBINE = 10.0
  _IBFTR=OPIBFTR
  _OBFTR=OPOBFTR
   MATIN='%_iter_%_OPMS.TRP'
  AM=';'
  OP=' '
ENDIF

;---- start the access mode loop ----

LOOP ACCESS = 1, 2

  IF (ACCESS = 1)
   ACCESS_MODE = 'WK'
   WALK_MODEL = ' '
   DRIVE_MODEL = ';'
    TABIN = 'MI.1.1'
 ELSE
   ACCESS_MODE = 'DR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ' '
   TABIN = 'MI.1.5'
  ENDIF

;---------------------------------------------------------------------------
; Step 1, 2, 3 & 4 Assign CR Transit Trips
;---------------------------------------------------------------------------

RUN PGM=TRNBUILD
 NETI = ZONEHWY.NET
 MATI = @MATIN@

 HWYTIME = @TIME_PERIOD@HTIME

;--- set default zone access and line parameters ----

ZONEACCESS  GENERATE=N

@WALK_MODEL@ACCESSMODES = 14,16
@DRIVE_MODEL@ACCESSMODES = 11

@WALK_MODEL@SKIPMODES = 11,15

PATHSTYLE  = 0
USERUNTIME = Y

;---- rules for combining multiple line and headways ----

COMBINE MAXDIFF[1] = 0.0, IF[1] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[2] = 0.0, IF[2] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[3] = 0.0, IF[3] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[4] = 0.0, IF[4] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[5] = 0.0, IF[5] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[6] = 0.0, IF[6] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[7] = 0.0, IF[7] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[8] = 0.0, IF[8] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[9] = 0.0, IF[9] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[10] = 0.0, IF[10] = ((RUN - MINRUN) < @COMBINE@)

;---- factors to convert actual time to perceived time ----

MODEFAC[1]  = 10*1.0  ;---- in-vehicle time
MODEFAC[11] = 1.50    ;---- drive access time
MODEFAC[12] = 2.00    ;---- transit transfer time
MODEFAC[13] = 2.00    ;---- walk network time
MODEFAC[14] = 2.00    ;---- unused (used to be dummy link to station)
MODEFAC[15] = 2.50    ;---- park-&-ride transfer time
MODEFAC[16] = 2.00    ;---- walk access time

;---- initial and transfer wait factors ----

IWAITFAC[1] = 10*2.50
XWAITFAC[1] = 10*2.50
IWAITMAX[1] = 10*60.0
XWAITMIN[1] = 2*4.0,0.0,4.0,0.0,3*4.0,10.0,4.0

;---- boarding and transfer penalties ----

XPEN[1]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[2]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[3]= 2*5.0, 0.0, 2*2.0,5*5.0, 6*0.0
XPEN[4]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[5]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[6]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[7]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[8]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[9]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[10]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[11]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[12]= 2*8.0,3*2.0,4*8.0,5.0, 6*0.0
XPEN[13]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[14]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[15]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[16]= 2*5.0,3*2.0,5*5.0, 6*0.0

XPENFAC[1]= 16*2.50
XPENFAC[2]= 16*2.50
XPENFAC[3]= 16*2.50
XPENFAC[4]= 16*2.50
XPENFAC[5]= 16*2.50
XPENFAC[6]= 16*2.50
XPENFAC[7]= 16*2.50
XPENFAC[8]= 16*2.50
XPENFAC[9]= 16*2.50
XPENFAC[10]= 16*2.50
XPENFAC[11]= 16*2.50
XPENFAC[12]= 16*2.50
XPENFAC[13]= 16*2.50
XPENFAC[14]= 16*2.50
```

```
XPENFAC[15]= 16*2.50
XPENFAC[16]= 16*2.50

;---- transfer prohibitions ----

;--- mode  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16
NOX[1]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[2]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[3]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[4]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[5]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[6]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[7]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[8]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[9]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[10] =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[11] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n
NOX[12] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  n,  Y,  n
NOX[13] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[14] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[15] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  Y,  Y,  Y,  Y
NOX[16] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  Y

;---- Parameters ----

LISTINPUT = N         ;--- echo input files

MAXPATHTIME = 360.0   ;--- Kill any path with preceived time > 240 min.
FREQPERIOD = 1        ;--- Use the First Headway value
USERUNTIME = Y        ;--- Ignore any RUNTIME or RT parameters on lines.
MAXRUNTIME = 240.0    ;--- Report lines with run times > 240 min.
;ONLINE = 100          ;--- Display every 100 lines

;WALKSPEED = 3.0       ;--- Set default walk speed to 3.0 mph
;XYFACTOR = 0.84401    ;--- Replicate MINUTP value
;WALKSPEED = 2.0       ;--- Added on 09/25
;XYFACTOR = 1.97       ;--- Added on 09/25

;-------------------------
;  write out support links for later viewing in VIPER
fileo supporto = suplCR@access_mode@@time_period@.asc modes=11-16 oneway=t fixed=y
;

;---- Rail Stations & Links (modes 3 & 4) ----

READ FILE = met_node.tb   ;---- Metrorail stations
READ FILE = met_link.tb   ;---- Metrorail links
READ FILE = com_node.tb   ;---- Commuter Rail stations
READ FILE = com_link.tb   ;---- Commuter Rail links
READ FILE = lrt_node.tb   ;---- LRT stations
READ FILE = lrt_link.tb   ;---- LRT links
READ FILE = new_node.tb   ;---- Mode10 Stations
READ FILE = new_link.tb   ;---- Mode10 links
;---- Park and Ride Lots (mode 15) ----

;@DRIVE_MODEL@ READ FILE = bus_pnrn.tb  ;---- Bus PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = met_pnrn.tb  ;---- Metro PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = com_pnrn.tb  ;---- Commuter Rail PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = lrt_pnrn.tb  ;---- LRT PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = new_pnrn.tb  ;---- Mode10 PNR lots (nodes)

;@DRIVE_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = met@TIME_PERIOD@pnr.tb  ;---- Metro-PNR connectors
(links)
@DRIVE_MODEL@ READ FILE = com@TIME_PERIOD@pnr.tb  ;---- Commuter Rail-PNR connectors
(links)
;@DRIVE_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors
(links)

;---- Access Links (modes 11, 12 and 16) ----

READ FILE = met_bus.tb   ;--- bus-metro links&xfer cards
READ FILE = com_bus.tb   ;--- bus-commuter rail links&xfer car
READ FILE = lrt_bus.tb   ;--- bus-LRT links&xfer car
READ FILE = new_bus.tb   ;--- Mode10 bus-LRT links&xfer car

READ FILE = walkacc.asc ;--- walk to local transit

;@DRIVE_MODEL@READ FILE = mrpr@TIME_PERIOD@.asc;--- drive to metrorail
@DRIVE_MODEL@READ FILE = cr@TIME_PERIOD@.asc;--- drive to Commuter rail
;@DRIVE_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- drive to bus
;@DRIVE_MODEL@READ FILE = lrt@TIME_PERIOD@.asc;--- drive to LRT
;@DRIVE_MODEL@READ FILE = new@TIME_PERIOD@.asc;--- drive to Mode10

;---- Dummy Centroid Access Links (mode 14) ----

;---- Sidewalk Network (mode 13) ----

READ FILE = sidewalk.asc;--- walk network for transfers

;---- Transit Line Cards (modes 1-10) ----

READ FILE = MODE1@TIME_PERIOD@.TB  ;---- M1- metrobus local
;READ FILE = MODE2@TIME_PERIOD@.TB  ;---- M2- metrobus express
READ FILE = MODE3@TIME_PERIOD@.TB  ;---- M3- metrorail
READ FILE = MODE4@TIME_PERIOD@.TB  ;---- M4- commuter rail
READ FILE = MODE5@TIME_PERIOD@.TB  ;---- M5- other rail (future)
READ FILE = MODE6@TIME_PERIOD@.TB  ;---- M6- other local bus
;READ FILE = MODE7@TIME_PERIOD@.TB  ;---- M7- other express bus
READ FILE = MODE8@TIME_PERIOD@.TB  ;---- M8- other local bus
;READ FILE = MODE9@TIME_PERIOD@.TB  ;---- M9- other express bus
READ FILE = MODE10@TIME_PERIOD@.TB  ;---- M10- other bus (future)

; output files
@WALK_MODEL@@AM@FILEO NODEO  = %_iter_%_WKCRAMnode.dbf ; output node file
@WALK_MODEL@@OP@FILEO NODEO  = %_iter_%_WKCROPnode.dbf ; output node file
@DRIVE_MODEL@@AM@FILEO NODEO = %_iter_%_DRCRAMnode.dbf ; output node file
@DRIVE_MODEL@@OP@FILEO NODEO = %_iter_%_DRCROPnode.dbf ; output node file

@WALK_MODEL@@AM@FILEO LINKO  = %_iter_%_WKCRAMlink.dbf ; output link file
@WALK_MODEL@@OP@FILEO LINKO  = %_iter_%_WKCROPlink.dbf ; output link file
@DRIVE_MODEL@@AM@FILEO LINKO = %_iter_%_DRCRAMlink.dbf ; output link file
@DRIVE_MODEL@@OP@FILEO LINKO = %_iter_%_DRCROPlink.dbf ; output link file

TRIPS MATRIX=@TABIN@, ASSIGN=Y, VOLUMES=Y, BOARDS=Y, EXITS=Y
REPORT LINKVOL=Y,LINEVOL=Y

ENDRUN

ENDLOOP ;---- ACCESS ----
ENDLOOP ;---- PERIOD ----
```

30 Transit_Assignment_MR.s

```
;---------------------------------------------------------------------------
;Transit_Assignment_MR.s
;MWCOG Version 2.2 Model
;                         - PATHSTYLE changed from 1 to 0 on 3.9.04 (RM)
;                         - iteration (_iter_) global variables used
;Assign Transit Trips by Time Period and Access Mode
```

```
; Input Files:
;  TP+ Highway Network          = ZONEHWY.NET
;  Transit Line Files           = MODE?_pp.TB
;  Transit Network Data         = MET_*.TB, COM_*.TB, BUS_*.TB
;  Walk and Drive Access        = WALKACC.TB, *_PNR_pp.TB
;  Walk Sidewalk Network        = SIDEWALK.ASC
;  Transit Trip Tables          = '%_iter_%_AMMS.TRP', '%_iter_%_OPMS.TRP'
; Output Files:
;  Transit Assignment Link and Node Files
;
; Step 1: AM Peak Walk Assignment
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB, '%_iter_%_AMMS.TRP'
;  Output Files: WKMRAMnode.dbf; WKMRAMlink.dbf
; Step 2: AM Peak Drive Assignment
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB, '%_iter_%_AMMS.TRP'
;  Output Files: DRMRAMnode.dbf; DRMRAMlink.dbf
; Step 3: AM Peak K/R Assignment
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB, '%_iter_%_AMMS.TRP'
;  Output Files: KRMRAMnode.dbf; KRMRAMlink.dbf
; Step 4: Off Peak Walk Assignment
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB, '%_iter_%_OPMS.TRP'
;  Output Files: WKMROPnode.dbf; WKMROPlink.dbf
; Step 5: Off Peak Drive Assignment
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB, '%_iter_%_OPMS.TRP'
;  Output Files: DRMROPnode.dbf; DRMROPlink.dbf
; Step 6: Off Peak K/R Assignment
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB, '%_iter_%_OPMS.TRP'
;  Output Files: KRMROPnode.dbf; KRMROPlink.dbf
;
;--------------------------------------------------------------------------

;
;  Read in time factors to increase local bus times
;  based on increasing arterial hwy congestion

READ FILE=INPUTS\LBus_TimFTRS.ASC   ; Local Bus Time Factors
;

;--------------------------------------------------------------------------
;         Loop through each period and access mode
;--------------------------------------------------------------------------

LOOP PERIOD=1,2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
  COMBINE = 5.0
  _IBFTR=AMIBFTR
  _OBFTR=AMOBFTR
  MATIN='%_iter_%_AMMS.TRP'
  AM=' '
  OP=';'
 ELSE
  TIME_PERIOD = 'OP'
  COMBINE = 10.0
  _IBFTR=OPIBFTR
  _OBFTR=OPOBFTR
  MATIN='%_iter_%_OPMS.TRP'
  AM=';'
  OP=' '
 ENDIF

;---- start the access mode loop ----

LOOP ACCESS=1,3

  IF (ACCESS = 1)
   ACCESS_MODE = 'WK'
```

```
   WALK_MODEL = ' '
   DRIVE_MODEL = ';'
   KR_MODEL = ';'
   TABIN = 'MI.1.4'
  ELSEIF (ACCESS = 2)
   ACCESS_MODE = 'DR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ' '
   KR_MODEL = ';'
   TABIN = 'MI.1.10'
  ELSE
   ACCESS_MODE = 'KR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ';'
   KR_MODEL = ' '
   TABIN = 'MI.1.11'
  ENDIF

;--------------------------------------------------------------------------
; Step 1, 2, 3, 4, 5 & 6 Assign MR Transit Trips
;--------------------------------------------------------------------------

RUN PGM=TRNBUILD
 NETI = ZONEHWY.NET
 MATI = @MATIN@

 HWYTIME = @TIME_PERIOD@HTIME

;--- set default zone access and line parameters ----

ZONEACCESS  GENERATE=N

@WALK_MODEL@ACCESSMODES = 14,16
@DRIVE_MODEL@ACCESSMODES = 11
@KR_MODEL@ACCESSMODES = 11

@WALK_MODEL@SKIPMODES = 11,15

PATHSTYLE  = 0
USERUNTIME = Y

;---- rules for combining multiple line and headways ----

COMBINE MAXDIFF[1] = 0.0, IF[1] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[2] = 0.0, IF[2] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[3] = 0.0, IF[3] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[4] = 0.0, IF[4] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[5] = 0.0, IF[5] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[6] = 0.0, IF[6] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[7] = 0.0, IF[7] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[8] = 0.0, IF[8] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[9] = 0.0, IF[9] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[10] = 0.0, IF[10] = ((RUN - MINRUN) < @COMBINE@)

;---- factors to convert actual time to perceived time ----

MODEFAC[1]  = 10*1.0  ;---- in-vehicle time
MODEFAC[11] = 1.50    ;---- drive access time
MODEFAC[12] = 2.00    ;---- transit transfer time
MODEFAC[13] = 2.00    ;---- walk network time
MODEFAC[14] = 2.00    ;---- unused (used to be dummy link to station)
MODEFAC[15] = 2.50    ;---- park-&-ride transfer time
MODEFAC[16] = 2.00    ;---- walk access time

;---- initial and transfer wait factors ----

IWAITFAC[1] = 10*2.50
XWAITFAC[1] = 10*2.50
```

```
IWAITMAX[1] = 10*60.0
XWAITMIN[1] = 2*4.0,0.0,4.0,0.0,3*4.0,10.0,4.0

;---- boarding and transfer penalties ----

XPEN[1]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[2]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[3]= 2*5.0, 0.0, 2*2.0,5*5.0, 6*0.0
XPEN[4]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[5]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[6]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[7]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[8]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[9]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[10]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[11]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[12]= 2*8.0,3*2.0,4*8.0,5.0, 6*0.0
XPEN[13]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[14]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[15]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[16]= 2*5.0,3*2.0,5*5.0, 6*0.0

XPENFAC[1]= 16*2.50
XPENFAC[2]= 16*2.50
XPENFAC[3]= 16*2.50
XPENFAC[4]= 16*2.50
XPENFAC[5]= 16*2.50
XPENFAC[6]= 16*2.50
XPENFAC[7]= 16*2.50
XPENFAC[8]= 16*2.50
XPENFAC[9]= 16*2.50
XPENFAC[10]= 16*2.50
XPENFAC[11]= 16*2.50
XPENFAC[12]= 16*2.50
XPENFAC[13]= 16*2.50
XPENFAC[14]= 16*2.50
XPENFAC[15]= 16*2.50
XPENFAC[16]= 16*2.50


;---- transfer prohibitions ----

;--- mode  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16
NOX[1]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[2]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[3]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[4]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[5]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[6]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[7]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[8]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[9]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[10] =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[11] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n
NOX[12] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  n,  Y,  n
NOX[13] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[14] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[15] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  Y,  Y,  Y,  Y
NOX[16] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  Y

;---- Parameters ----

LISTINPUT = N         ;--- echo input files

MAXPATHTIME = 360.0   ;--- Kill any path with preceived time > 240 min.
FREQPERIOD = 1        ;--- Use the First Headway value
USERUNTIME = Y        ;--- Ignore any RUNTIME or RT parameters on lines.
MAXRUNTIME = 240.0    ;--- Report lines with run times > 240 min.
```

```
;ONLINE = 100         ;--- Display every 100 lines

;WALKSPEED = 3.0      ;--- Set default walk speed to 3.0 mph
;XYFACTOR = 0.84401   ;--- Replicate MINUTP value
;WALKSPEED = 2.0      ;--- Added on 09/25
;XYFACTOR = 1.97      ;--- Added on 09/25

;--------------------------
;  write out support links for later viewing in VIPER
fileo supporto = suplMR@access_mode@@time_period@.asc modes=11-16 oneway=t fixed=y
;

;---- Rail Stations & Links (modes 3 & 4) ----

READ FILE = met_node.tb   ;---- Metrorail stations
READ FILE = met_link.tb   ;---- Metrorail links
;READ FILE = com_node.tb   ;---- Commuter Rail stations
;READ FILE = com_link.tb   ;---- Commuter Rail links
READ FILE = lrt_node.tb   ;---- LRT stations
READ FILE = lrt_link.tb   ;---- LRT links
;READ FILE = new_node.tb   ;---- Mode10 Stations
;READ FILE = new_link.tb   ;---- Mode10 links
;---- Park and Ride Lots (mode 15) ----

;@DRIVE_MODEL@ READ FILE = bus_pnrn.tb  ;---- Bus PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = met_pnrn.tb  ;---- Metro PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = com_pnrn.tb  ;---- Commuter Rail PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = lrt_pnrn.tb  ;---- LRT PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = new_pnrn.tb  ;---- Mode10 PNR lots (nodes)

;@DRIVE_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = met@TIME_PERIOD@pnr.tb  ;---- Metro-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = com@TIME_PERIOD@pnr.tb  ;---- Commuter Rail-PNR
connectors (links)
@DRIVE_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors
(links)

;---- Access Links (modes 11, 12 and 16) ----

READ FILE = met_bus.tb   ;--- bus-metro links&xfer cards
;READ FILE = com_bus.tb   ;--- bus-commuter rail links&xfer car
READ FILE = lrt_bus.tb   ;--- bus-LRT links&xfer car
;READ FILE = new_bus.tb   ;--- Mode10 bus-LRT links&xfer car

READ FILE = walkacc.asc ;--- walk to local transit

@DRIVE_MODEL@READ FILE = mrpr@TIME_PERIOD@.asc;--- drive to metrorail
;@DRIVE_MODEL@READ FILE = cr@TIME_PERIOD@.asc;--- drive to Commuter rail
;@DRIVE_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- drive to bus
@DRIVE_MODEL@READ FILE = lrt@TIME_PERIOD@.asc;--- drive to LRT
;@DRIVE_MODEL@READ FILE = new@TIME_PERIOD@.asc;--- drive to Mode10

@KR_MODEL@READ FILE = mrkr@TIME_PERIOD@.asc;--- k/r to metrorail
;KR_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- k/r to bus
@KR_MODEL@READ FILE = lrtkr@TIME_PERIOD@.asc;--- k/r to LRT
;@KR_MODEL@READ FILE = newkr@TIME_PERIOD@.asc;--- k/r to Mode10

@KR_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)

;---- Dummy Centroid Access Links (mode 14) ----

;---- Sidewalk Network (mode 13) ----

READ FILE = sidewalk.asc;--- walk network for transfers

;---- Transit Line Cards (modes 1-10) ----
```

```
;READ FILE = MODE1@TIME_PERIOD@.TB  ;---- M1- metrobus local
;READ FILE = MODE2@TIME_PERIOD@.TB  ;---- M2- metrobus express
READ FILE = MODE3@TIME_PERIOD@.TB  ;---- M3- metrorail
;READ FILE = MODE4@TIME_PERIOD@.TB  ;---- M4- commuter rail
READ FILE = MODE5@TIME_PERIOD@.TB  ;---- M5- other rail (future)
;READ FILE = MODE6@TIME_PERIOD@.TB  ;---- M6- other local bus
;READ FILE = MODE7@TIME_PERIOD@.TB  ;---- M7- other express bus
;READ FILE = MODE8@TIME_PERIOD@.TB  ;---- M8- other local bus
;READ FILE = MODE9@TIME_PERIOD@.TB  ;---- M9- other express bus
;READ FILE = MODE10@TIME_PERIOD@.TB  ;---- M10- other bus (future)

; output files
@WALK_MODEL@@AM@FILEO NODEO  = %_iter_%_WKMRAMnode.dbf ; output node file
@WALK_MODEL@@OP@FILEO NODEO  = %_iter_%_WKMROPnode.dbf ; output node file
@DRIVE_MODEL@@AM@FILEO NODEO = %_iter_%_DRMRAMnode.dbf ; output node file
@DRIVE_MODEL@@OP@FILEO NODEO = %_iter_%_DRMROPnode.dbf ; output node file
@KR_MODEL@@AM@FILEO NODEO    = %_iter_%_KRMRAMnode.dbf ; output node file
@KR_MODEL@@OP@FILEO NODEO    = %_iter_%_KRMROPnode.dbf ; output node file

@WALK_MODEL@@AM@FILEO LINKO  = %_iter_%_WKMRAMlink.dbf ; output link file
@WALK_MODEL@@OP@FILEO LINKO  = %_iter_%_WKMROPlink.dbf ; output link file
@DRIVE_MODEL@@AM@FILEO LINKO = %_iter_%_DRMRAMlink.dbf ; output link file
@DRIVE_MODEL@@OP@FILEO LINKO = %_iter_%_DRMROPlink.dbf ; output link file
@KR_MODEL@@AM@FILEO LINKO    = %_iter_%_KRMRAMlink.dbf ; output link file
@KR_MODEL@@OP@FILEO LINKO    = %_iter_%_KRMROPlink.dbf ; output link file

TRIPS MATRIX=@TABIN@, ASSIGN=Y, VOLUMES=Y, BOARDS=Y, EXITS=Y
REPORT LINKVOL=Y,LINEVOL=Y


ENDRUN

ENDLOOP ;---- ACCESS ----
ENDLOOP ;---- PERIOD ----
```

31 Transit_Skims_AB.s

```
;---------------------------------------------------------------------------
;Transit_Skims_AB.s
;MWCOG Version 2.2 Model
;                        - PATHSTYLE changed from 1 to 0 on 3.9.04 (RM)
;                        - iteration (_iter_) global variables used
;Build Transit Skims by Time Period and Access Mode
; Input Files:
;  TP+ Highway Network          = ZONEHWY.NET
;  Transit Line Files           = MODE?_pp.TB
;  Transit Network Data         = MET_*.TB, COM_*.TB, BUS_*.TB
;  Walk and Drive Access        = WALKACC.TB, *_PNR_pp.TB
;  Walk Sidewalk Network        = SIDEWALK.ASC
; Output Files:
;  Walk and Drive Access Skims  = pp_aa_mo.SKM
;  Walk and Drive Station Data  = pp_aa_mo.STA
;
; Step 1: AM Peak Walk Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 2: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_WK_AB.SKM, %_iter_%_AM_WK_AB.STA,
; Step 3: AM Peak Drive Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 4: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_DR_AB.SKM, %_iter_%_AM_DR_AB.STA,
; Step 5: AM Peak K/R Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 6: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_KR_AB.SKM, %_iter_%_AM_KR_AB.STA,
; Step 7: Off Peak Walk Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 8: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_WK_AB.SKM, %_iter_%_OP_WK_AB.STA,
; Step 9: Off Peak Drive Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 10: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_DR_AB.SKM, %_iter_%_OP_DR_AB.STA
; Step 11: Off Peak K/R Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 12: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_KR_AB.SKM, %_iter_%_OP_KR_AB.STA,
;
;---------------------------------------------------------------------------
; Added Mode 15 access links for KNR to Bus path, JainM 09.19.06
; @KR_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)

; rm  4/7/08                        ;
; Added  table #19 (Total Transit time in min.) to output transit.skm file     ;
; create total transit time skims named:                                       ;
;         %_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_AB.ttt                          ;
;---------------------------------------------------------------------------


;---------------------------------------------------------------------------
;         Loop through each period and access mode
;---------------------------------------------------------------------------
pageheight=32767  ; Preclude header breaks
;
;  Read in time factors to increase local bus times
;  based on increasing arterial hwy congestion

READ FILE=INPUTS\LBus_TimFTRS.ASC   ; Local Bus Time Factors
;

LOOP PERIOD = 1, 2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
  COMBINE = 5.0
  _IBFTR=AMIBFTR
  _OBFTR=AMOBFTR
 ELSE
  TIME_PERIOD = 'OP'
  COMBINE = 10.0
  _IBFTR=OPIBFTR
  _OBFTR=OPOBFTR
 ENDIF
```

```
;---- start the access mode loop ----

LOOP ACCESS = 1,3

  IF (ACCESS = 1)
   ACCESS_MODE = 'WK'
   WALK_MODEL = ' '
   DRIVE_MODEL = ';'
   KR_MODEL = ';'
  ELSEIF (ACCESS = 2)
   ACCESS_MODE = 'DR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ' '
   KR_MODEL = ';'
  ELSE
   ACCESS_MODE = 'KR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ';'
   KR_MODEL = ' '
  ENDIF


;----------------------------------------------------------------------------
; Step 1, 3, 5 , 7, 9 & 11 Build Transit Path
;----------------------------------------------------------------------------

RUN PGM=TRNBUILD
 NETI = ZONEHWY.NET
 MATO = TRANSIT.SKM

 HWYTIME = @TIME_PERIOD@HTIME

;--- set default zone access and line parameters ----

ZONEACCESS  GENERATE=N

@WALK_MODEL@ACCESSMODES = 14,16
@DRIVE_MODEL@ACCESSMODES = 11
@KR_MODEL@ACCESSMODES = 11

@WALK_MODEL@SKIPMODES = 11,15

PATHSTYLE  = 0
USERUNTIME = Y

;---- rules for combining multiple line and headways ----

COMBINE MAXDIFF[1] = 0.0, IF[1] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[2] = 0.0, IF[2] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[3] = 0.0, IF[3] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[4] = 0.0, IF[4] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[5] = 0.0, IF[5] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[6] = 0.0, IF[6] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[7] = 0.0, IF[7] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[8] = 0.0, IF[8] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[9] = 0.0, IF[9] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[10] = 0.0, IF[10] = ((RUN - MINRUN) < @COMBINE@)

;---- factors to convert actual time to perceived time ----

MODEFAC[1]  = 10*1.0  ;---- in-vehicle time
MODEFAC[11] = 1.50    ;---- drive access time
MODEFAC[12] = 2.00    ;---- transit transfer time
MODEFAC[13] = 2.00    ;---- walk network time
MODEFAC[14] = 2.00    ;---- unused (used to be dummy link to station)
MODEFAC[15] = 2.50    ;---- park-&-ride transfer time
MODEFAC[16] = 2.00    ;---- walk access time

;---- initial and transfer wait factors ----

IWAITFAC[1] = 10*2.50
XWAITFAC[1] = 10*2.50
IWAITMAX[1] = 10*60.0
XWAITMIN[1] = 2*4.0,0.0,4.0,0.0,3*4.0,10.0,4.0

;---- boarding and transfer penalties ----

XPEN[1]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[2]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[3]= 2*5.0, 0.0, 2*2.0,5*5.0, 6*0.0
XPEN[4]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[5]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[6]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[7]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[8]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[9]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[10]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[11]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[12]= 2*8.0,3*2.0,4*8.0,5.0, 6*0.0
XPEN[13]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[14]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[15]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[16]= 2*5.0,3*2.0,5*5.0, 6*0.0

XPENFAC[1]= 16*2.50
XPENFAC[2]= 16*2.50
XPENFAC[3]= 16*2.50
XPENFAC[4]= 16*2.50
XPENFAC[5]= 16*2.50
XPENFAC[6]= 16*2.50
XPENFAC[7]= 16*2.50
XPENFAC[8]= 16*2.50
XPENFAC[9]= 16*2.50
XPENFAC[10]= 16*2.50
XPENFAC[11]= 16*2.50
XPENFAC[12]= 16*2.50
XPENFAC[13]= 16*2.50
XPENFAC[14]= 16*2.50
XPENFAC[15]= 16*2.50
XPENFAC[16]= 16*2.50

;---- transfer prohibitions ----

;--- mode  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16
NOX[1]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[2]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[3]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[4]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[5]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[6]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[7]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[8]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[9]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[10] =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[11] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n
NOX[12] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  n,  Y,  n
NOX[13] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[14] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[15] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  Y,  Y,  Y,  Y
NOX[16] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  Y

;---- Parameters ----

LISTINPUT = N         ;--- echo input files
```

```
MAXPATHTIME = 360.0   ;--- Kill any path with preceived time > 240 min.
FREQPERIOD = 1        ;--- Use the First Headway value
USERUNTIME = Y        ;--- Ignore any RUNTIME or RT parameters on lines.
MAXRUNTIME = 240.0    ;--- Report lines with run times > 240 min.
;ONLINE = 100          ;--- Display every 100 lines

;WALKSPEED = 3.0       ;--- Set default walk speed to 3.0 mph
;XYFACTOR = 0.84401    ;--- Replicate MINUTP value
;WALKSPEED = 2.0       ;--- Added on 09/25
;XYFACTOR = 1.97       ;--- Added on 09/25
;-------------------------
;  write out support links for later viewing in VIPER
fileo supporto = suplAB@access_mode@@time_period@.asc modes=11-16 oneway=t fixed=y
fileo nodeo    = supnAB@access_mode@@time_period@.dbf
fileo linko    = trnlAB@access_mode@@time_period@.dbf   ; Can be used to create
transit shapefile


;---- specify output skims ----


MATRICES NAME = IVLB, IVXB, IVMT, IVCR, IVNRM, IVNBM, IWAIT, XWAIT, WACCT, WLKT,
 XADD, BRDS, DACCT, DACCD, PRKI, PRKC, ISTOS, JSTOS,
; MW[1] = TIME(1,6,8),
 MW[1] = TIME(1) * @_IBFTR@ +
         TIME(6) * @_IBFTR@ +
         TIME(8) * @_OBFTR@ ,                ;---- ivt-local bus    (0.01 min)
 MW[2] = TIME(2,7,9),                        ;---- ivt-exp bus      (0.01 min)
 MW[3] = TIME(3),                            ;---- ivt-metrorail    (0.01 min)
 MW[4] = TIME(4),                            ;---- ivt-commuter rail(0.01 min)
 MW[5] = TIME(5),                            ;---- ivt-new rail mode(0.01 min)
 MW[6] = TIME(10),                           ;---- ivt-new bus mode (0.01 min)
 MW[7] = IWAIT,                              ;---- ini.wait time    (0.01 min)
 MW[8] = XWAIT(1,2,3,4,5,6,7,8,9,10),        ;---- xfr wait time    (0.01 min)
 MW[9] = TIME(14,16),                        ;---- walk acc time    (0.01 min)
 MW[10] = TIME(12,13),                       ;---- other walk time  (0.01 min)
 MW[11] = XPEN,                              ;---- added xfer time  (0.01 min)
 MW[12] = BOARDS,                            ;---- boardings        (1+)
 MW[13] = TIME(11),                          ;---- drv acc time     (0.01 min)
 MW[14] = DIST(11),                          ;---- drv acc distance (0.01 mile)
 MW[15] = TIME(15),                          ;---- pnr impedance    (0.01 min)
 MW[16] = DIST(15),                          ;---- pnr cost         (cents)
 MW[17] = NODE0(3) - 7300.0,                 ;---- metro board  sta (1-150)
 MW[18] = NODEL(3) - 7300.0,                 ;---- metro alight sta (1-150)

 MW[19] = (IWAIT + TIME (0) + XWAIT (0))*0.01 ;---- total time       (min)     ;2

;---- Rail Stations & Links (modes 3 & 4) ----

;READ FILE = met_node.tb   ;---- Metrorail stations
;READ FILE = met_link.tb   ;---- Metrorail links
;READ FILE = com_node.tb   ;---- Commuter Rail stations
;READ FILE = com_link.tb   ;---- Commuter Rail links
;READ FILE = lrt_node.tb   ;---- LRT stations
;READ FILE = lrt_link.tb   ;---- LRT links
READ FILE = new_node.tb   ;---- Mode10 Stations
READ FILE = new_link.tb   ;---- Mode10 links
;---- Park and Ride Lots (mode 15) ----

@DRIVE_MODEL@ READ FILE = bus_pnrn.tb  ;---- Bus PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = met_pnrn.tb  ;---- Metro PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = com_pnrn.tb  ;---- Commuter Rail PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = lrt_pnrn.tb  ;---- LRT PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = new_pnrn.tb  ;---- Mode10 PNR lots (nodes)

@DRIVE_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = met@TIME_PERIOD@pnr.tb  ;---- Metro-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = com@TIME_PERIOD@pnr.tb  ;---- Commuter Rail-PNR
connectors (links)
@DRIVE_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors
(links)

;---- Access Links (modes 11, 12 and 16) ----

;READ FILE = met_bus.tb   ;--- bus-metro links&xfer cards
;READ FILE = com_bus.tb   ;--- bus-commuter rail links&xfer car
;READ FILE = lrt_bus.tb   ;--- bus-LRT links&xfer car
READ FILE = new_bus.tb   ;--- Mode10 bus-LRT links&xfer car

READ FILE = walkacc.asc ;--- walk to local transit

@DRIVE_MODEL@READ FILE = mrpr@TIME_PERIOD@.asc;--- drive to metrorail
;@DRIVE_MODEL@READ FILE = cr@TIME_PERIOD@.asc;--- drive to Commuter rail
@DRIVE_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- drive to bus
@DRIVE_MODEL@READ FILE = lrt@TIME_PERIOD@.asc;--- drive to LRT
@DRIVE_MODEL@READ FILE = new@TIME_PERIOD@.asc;--- drive to Mode10

@KR_MODEL@READ FILE = mrkr@TIME_PERIOD@.asc;--- k/r to metrorail
@KR_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- k/r to bus
@KR_MODEL@READ FILE = lrtkr@TIME_PERIOD@.asc;--- k/r to LRT
@KR_MODEL@READ FILE = newkr@TIME_PERIOD@.asc;--- k/r to Mode10

;@KR_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
@KR_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors (links)
@KR_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)

;---- Dummy Centroid Access Links (mode 14) ----

;---- Sidewalk Network (mode 13) ----

READ FILE = sidewalk.asc;--- walk network for transfers

;---- Transit Line Cards (modes 1-10) ----

READ FILE = MODE1@TIME_PERIOD@.TB  ;---- M1- metrobus local
READ FILE = MODE2@TIME_PERIOD@.TB  ;---- M2- metrobus express
;READ FILE = MODE3@TIME_PERIOD@.TB  ;---- M3- metrorail
;READ FILE = MODE4@TIME_PERIOD@.TB  ;---- M4- commuter rail
;READ FILE = MODE5@TIME_PERIOD@.TB  ;---- M5- other rail (future)
READ FILE = MODE6@TIME_PERIOD@.TB  ;---- M6- other local bus
READ FILE = MODE7@TIME_PERIOD@.TB  ;---- M7- other express bus
READ FILE = MODE8@TIME_PERIOD@.TB  ;---- M8- other local bus
READ FILE = MODE9@TIME_PERIOD@.TB  ;---- M9- other express bus
READ FILE = MODE10@TIME_PERIOD@.TB  ;---- M10- other bus (future)

/* Transit path traces for select i/j pairs */
read file = ..\scripts\pathTrace.s

ENDRUN
;---------------------------------------------------------------------------
;Step 2, 4, 6 & 8 Condition & Split Skims into Multiple Files
;---------------------------------------------------------------------------
RUN PGM=MATRIX
 MATI[1]=TRANSIT.SKM
 MATO[1]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_AB.SKM, MO = 1-16,
  FORMAT = MINUTP,
  NAME = IVLB, IVXB, IVMT, IVCR, IVNM, INIT, XFERT, WACCT, WLKT, BRDS,
  DACCT, DACCD, PRKT, PRKC
 MATO[2]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_AB.STA, MO = 17-18,
  FORMAT = MINUTP,
 NAME = ISTOS, JSTOS
                                                                              ;3
 MATO[3]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_AB.ttt, MO = 19,                ;
  FORMAT = MINUTP,                                                            ;
```

```
 NAME = sumtrntm

MW[1] = MI.1.1    ;---- ivt-local bus    (0.01 min)
MW[2] = MI.1.2    ;---- ivt-exp bus      (0.01 min)
MW[3] = MI.1.3    ;---- ivt-metrorail    (0.01 min)
MW[4] = MI.1.4    ;---- ivt-commuter rail(0.01 min)
MW[5] = MI.1.5    ;---- ivt-new rail mode(0.01 min)
MW[6] = MI.1.6    ;---- ivt-new bus mode (0.01 min)
MW[7] = MI.1.7    ;---- ini.wait time    (0.01 min)
MW[8] = MI.1.8    ;---- xfr wait time    (0.01 min)
MW[9] = MI.1.9    ;---- walk acc time    (0.01 min)
MW[10] = MI.1.10  ;---- other walk time  (0.01 min)
MW[11] = MI.1.11  ;---- added xfer time  (0.01 min)
MW[12] = MI.1.12  ;---- transfers        (0+)
MW[13] = MI.1.13  ;---- drv acc time     (0.01 min)
MW[14] = MI.1.14  ;---- drv acc distance (0.01 mile)
MW[15] = MI.1.15  ;---- pnr time         (0.01 min)
MW[16] = MI.1.16  ;---- pnr cost         (cents)

MW[17] = MI.1.17  ;---- metro board  sta (1-150)
MW[18] = MI.1.18  ;---- metro alight sta (1-150)
                                                                              ;4
MW[19] = MI.1.19  ;---- total transit time (whole min)                        ;
                                                                              ;
JLOOP
  MW[12] = MW[12] - 1
  IF (MW[16] = 1 ) MW[16] = 0
  MW[15] = MW[15] - MW[16] * 6.0
  IF (MW[17] < 0 || MW[17] > 150 ) MW[17] = 0
  IF (MW[18] < 0 || MW[18] > 150 ) MW[18] = 0
ENDJLOOP

ENDRUN

ENDLOOP ;---- ACCESS ----
ENDLOOP ;---- PERIOD ----
```

32 Transit_Skims_BM.s

```
;---------------------------------------------------------------------------
;Transit_Skims_BM.s
;MWCOG Version 2.2 Model
;                        - PATHSTYLE changed from 1 to 0 on 3.9.04 (RM)
;                        - iteration (_iter_) global variables used
;Build Transit Skims by Time Period and Access Mode
; Input Files:
;  TP+ Highway Network          = ZONEHWY.NET
;  Transit Line Files           = MODE?_pp.TB
;  Transit Network Data         = MET_*.TB, COM_*.TB, BUS_*.TB
;  Walk and Drive Access        = WALKACC.TB, *_PNR_pp.TB
;  Walk Sidewalk Network        = SIDEWALK.ASC
; Output Files:
;  Walk and Drive Access Skims  = pp_aa_mo.SKM
;  Walk and Drive Station Data  = pp_aa_mo.STA
;
; Step 1: AM Peak Walk Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 2: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_WK_BM.SKM, %_iter_%_AM_WK_BM.STA,
; Step 3: AM Peak Drive Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 4: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_DR_BM.SKM, %_iter_%_AM_DR_BM.STA,
; Step 5: AM Peak K/R Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 6: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_KR_BM.SKM, %_iter_%_AM_KR_BM.STA,
; Step 7: Off Peak Walk Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 8: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_WK_BM.SKM, %_iter_%_OP_WK_BM.STA,
; Step 9: Off Peak Drive Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 10: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_DR_BM.SKM, %_iter_%_OP_DR_BM.STA
; Step 11: Off Peak K/R Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 12: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_KR_BM.SKM, %_iter_%_OP_KR_BM.STA,
;
;---------------------------------------------------------------------------
; Added Mode 15 access links for KNR to Bus path, JainM 09.19.06
; @KR_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)

; rm  4/7/08                     ;
; Added  table #19 (Total Transit time in min.) to output transit.skm file     ;
; create total transit time skims named:                                       ;
;         %_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_BM.ttt                          ;
;---------------------------------------------------------------------------

;
;  Read in time factors to increase local bus times
;  based on increasing arterial hwy congestion

READ FILE=INPUTS\LBus_TimFTRS.ASC   ; Local Bus Time Factors
;

;---------------------------------------------------------------------------
;         Loop through each period and access mode
;---------------------------------------------------------------------------
pageheight=32767  ; Preclude header breaks
LOOP PERIOD = 1, 2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
  COMBINE = 5.0
  _IBFTR=AMIBFTR
  _OBFTR=AMOBFTR
 ELSE
  TIME_PERIOD = 'OP'
  COMBINE = 10.0
  _IBFTR=OPIBFTR
  _OBFTR=OPOBFTR
 ENDIF

;---- start the access mode loop ----

LOOP ACCESS = 1,3
```

```
  IF (ACCESS = 1)
   ACCESS_MODE = 'WK'
   WALK_MODEL = ' '
   DRIVE_MODEL = ';'
   KR_MODEL = ';'
  ELSEIF (ACCESS = 2)
   ACCESS_MODE = 'DR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ' '
   KR_MODEL = ';'
  ELSE
   ACCESS_MODE = 'KR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ';'
   KR_MODEL = ' '
  ENDIF

;---------------------------------------------------------------------------
; Step 1, 3, 5 , 7, 9 & 11 Build Transit Path
;---------------------------------------------------------------------------

RUN PGM=TRNBUILD
 NETI = ZONEHWY.NET
 MATO = TRANSIT.SKM

 HWYTIME = @TIME_PERIOD@HTIME

;--- set default zone access and line parameters ----

ZONEACCESS  GENERATE=N

@WALK_MODEL@ACCESSMODES = 14,16
@DRIVE_MODEL@ACCESSMODES = 11
@KR_MODEL@ACCESSMODES = 11

@WALK_MODEL@SKIPMODES = 11,15

PATHSTYLE  = 0
USERUNTIME = Y

;---- rules for combining multiple line and headways ----

COMBINE MAXDIFF[1] = 0.0, IF[1] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[2] = 0.0, IF[2] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[3] = 0.0, IF[3] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[4] = 0.0, IF[4] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[5] = 0.0, IF[5] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[6] = 0.0, IF[6] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[7] = 0.0, IF[7] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[8] = 0.0, IF[8] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[9] = 0.0, IF[9] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[10] = 0.0, IF[10] = ((RUN - MINRUN) < @COMBINE@)

;---- factors to convert actual time to perceived time ----

MODEFAC[1]  = 10*1.0  ;---- in-vehicle time
MODEFAC[11] = 1.50    ;---- drive access time
MODEFAC[12] = 2.00    ;---- transit transfer time
MODEFAC[13] = 2.00    ;---- walk network time
MODEFAC[14] = 2.00    ;---- unused (used to be dummy link to station)
MODEFAC[15] = 2.50    ;---- park-&-ride transfer time
MODEFAC[16] = 2.00    ;---- walk access time

;---- initial and transfer wait factors ----

IWAITFAC[1] = 10*2.50
XWAITFAC[1] = 10*2.50
```

```
IWAITMAX[1] = 10*60.0
XWAITMIN[1] = 2*4.0,0.0,4.0,0.0,3*4.0,10.0,4.0

;---- boarding and transfer penalties ----

XPEN[1]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[2]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[3]= 2*5.0, 0.0, 2*2.0,5*5.0, 6*0.0
XPEN[4]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[5]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[6]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[7]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[8]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[9]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[10]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[11]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[12]= 2*8.0,3*2.0,4*8.0,5.0, 6*0.0
XPEN[13]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[14]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[15]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[16]= 2*5.0,3*2.0,5*5.0, 6*0.0

XPENFAC[1]= 16*2.50
XPENFAC[2]= 16*2.50
XPENFAC[3]= 16*2.50
XPENFAC[4]= 16*2.50
XPENFAC[5]= 16*2.50
XPENFAC[6]= 16*2.50
XPENFAC[7]= 16*2.50
XPENFAC[8]= 16*2.50
XPENFAC[9]= 16*2.50
XPENFAC[10]= 16*2.50
XPENFAC[11]= 16*2.50
XPENFAC[12]= 16*2.50
XPENFAC[13]= 16*2.50
XPENFAC[14]= 16*2.50
XPENFAC[15]= 16*2.50
XPENFAC[16]= 16*2.50

;---- transfer prohibitions ----

;--- mode  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16
NOX[1]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[2]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[3]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[4]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[5]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[6]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[7]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[8]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[9]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[10] =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[11] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n
NOX[12] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  Y,  n,  Y,  n
NOX[13] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  n,  Y,  n
NOX[14] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[15] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  Y,  Y,  Y,  Y
NOX[16] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  Y

;---- Parameters ----

LISTINPUT = N         ;--- echo input files

MAXPATHTIME = 360.0   ;--- Kill any path with preceived time > 240 min.
FREQPERIOD = 1        ;--- Use the First Headway value
USERUNTIME = Y        ;--- Ignore any RUNTIME or RT parameters on lines.
MAXRUNTIME = 240.0    ;--- Report lines with run times > 240 min.
;ONLINE = 100          ;--- Display every 100 lines
```

```
;WALKSPEED = 3.0       ;--- Set default walk speed to 3.0 mph
;XYFACTOR = 0.84401    ;--- Replicate MINUTP value
;WALKSPEED = 2.0       ;--- Added on 09/25
;XYFACTOR = 1.97       ;--- Added on 09/25

;--------------------------
;  write out support links for later viewing in VIPER
fileo supporto = suplBM@access_mode@@time_period@.asc modes=11-16 oneway=t fixed=y
fileo nodeo    = supnBM@access_mode@@time_period@.dbf
fileo linko    = trnlBM@access_mode@@time_period@.dbf   ; Can be used to create
transit shapefile
;

;---- specify output skims ----

MATRICES NAME = IVLB, IVXB, IVMT, IVCR, IVNRM, IVNBM, IWAIT, XWAIT, WACCT, WLKT,
 XADD, BRDS, DACCT, DACCD, PRKI, PRKC, ISTOS, JSTOS,
; MW[1] = TIME(1,6,8),
 MW[1] = TIME(1) * @_IBFTR@ +
         TIME(6) * @_IBFTR@ +
         TIME(8) * @_OBFTR@ ,               ;---- ivt-local bus    (0.01 min)
 MW[2] = TIME(2,7,9),                       ;---- ivt-exp bus      (0.01 min)
 MW[3] = TIME(3),                           ;---- ivt-metrorail    (0.01 min)
 MW[4] = TIME(4),                           ;---- ivt-commuter rail(0.01 min)
 MW[5] = TIME(5),                           ;---- ivt-new rail mode(0.01 min)
 MW[6] = TIME(10),                          ;---- ivt-new bus mode (0.01 min)
 MW[7] = IWAIT,                             ;---- ini.wait time    (0.01 min)
 MW[8] = XWAIT(1,2,3,4,5,6,7,8,9,10),       ;---- xfr wait time    (0.01 min)
 MW[9] = TIME(14,16),                       ;---- walk acc time    (0.01 min)
 MW[10] = TIME(12,13),                      ;---- other walk time  (0.01 min)
 MW[11] = XPEN,                             ;---- added xfer time  (0.01 min)
 MW[12] = BOARDS,                           ;---- boardings        (1+)
 MW[13] = TIME(11),                         ;---- drv acc time     (0.01 min)
 MW[14] = DIST(11),                         ;---- drv acc distance (0.01 mile)
 MW[15] = TIME(15),                         ;---- pnr impedance    (0.01 min)
 MW[16] = DIST(15),                         ;---- pnr cost         (cents)
 MW[17] = NODE0(3) - 7300.0,                ;---- metro board  sta (1-150)
 MW[18] = NODEL(3) - 7300.0,                ;---- metro alight sta (1-150)

 MW[19] = (IWAIT + TIME (0) + XWAIT (0))*0.01 ;---- total time       (min)     ;2


;---- Rail Stations & Links (modes 3 & 4) ----

READ FILE = met_node.tb   ;---- Metrorail stations
READ FILE = met_link.tb   ;---- Metrorail links
;READ FILE = com_node.tb   ;---- Commuter Rail stations
;READ FILE = com_link.tb   ;---- Commuter Rail links
READ FILE = lrt_node.tb   ;---- LRT stations
READ FILE = lrt_link.tb   ;---- LRT links
READ FILE = new_node.tb   ;---- Mode10 Stations
READ FILE = new_link.tb   ;---- Mode10 links

;---- Park and Ride Lots (mode 15) ----

@DRIVE_MODEL@ READ FILE = bus_pnrn.tb  ;---- Bus PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = met_pnrn.tb  ;---- Metro PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = com_pnrn.tb  ;---- Commuter Rail PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = lrt_pnrn.tb  ;---- LRT PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = new_pnrn.tb  ;---- Mode10 PNR lots (nodes)

@DRIVE_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = met@TIME_PERIOD@pnr.tb  ;---- Metro-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = com@TIME_PERIOD@pnr.tb  ;---- Commuter Rail-PNR
connectors (links)
@DRIVE_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors
(links)

;---- Access Links (modes 11, 12 and 16) ----

READ FILE = met_bus.tb   ;--- bus-metro links&xfer cards
;READ FILE = com_bus.tb   ;--- bus-commuter rail links&xfer car
READ FILE = lrt_bus.tb   ;--- bus-LRT links&xfer car
READ FILE = new_bus.tb   ;--- Mode10 bus-LRT links&xfer car

READ FILE = walkacc.asc ;--- walk to local transit

@DRIVE_MODEL@READ FILE = mrpr@TIME_PERIOD@.asc;--- drive to metrorail
;@DRIVE_MODEL@READ FILE = cr@TIME_PERIOD@.asc;--- drive to Commuter rail
@DRIVE_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- drive to bus
@DRIVE_MODEL@READ FILE = lrt@TIME_PERIOD@.asc;--- drive to LRT
@DRIVE_MODEL@READ FILE = new@TIME_PERIOD@.asc;--- drive to Mode10

@KR_MODEL@READ FILE = mrkr@TIME_PERIOD@.asc;--- k/r to metrorail
@KR_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- k/r to bus
@KR_MODEL@READ FILE = lrtkr@TIME_PERIOD@.asc;--- k/r to LRT
@KR_MODEL@READ FILE = newkr@TIME_PERIOD@.asc;--- k/r to Mode10

@KR_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
@KR_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors (links)
@KR_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)

;---- Dummy Centroid Access Links (mode 14) ----

;---- Sidewalk Network (mode 13) ----

READ FILE = sidewalk.asc;--- walk network for transfers

;---- Transit Line Cards (modes 1-10) ----

READ FILE = MODE1@TIME_PERIOD@.TB  ;---- M1- metrobus local
READ FILE = MODE2@TIME_PERIOD@.TB  ;---- M2- metrobus express
READ FILE = MODE3@TIME_PERIOD@.TB  ;---- M3- metrorail
;READ FILE = MODE4@TIME_PERIOD@.TB  ;---- M4- commuter rail
READ FILE = MODE5@TIME_PERIOD@.TB  ;---- M5- other rail (future)
READ FILE = MODE6@TIME_PERIOD@.TB  ;---- M6- other local bus
READ FILE = MODE7@TIME_PERIOD@.TB  ;---- M7- other express bus
READ FILE = MODE8@TIME_PERIOD@.TB  ;---- M8- other local bus
READ FILE = MODE9@TIME_PERIOD@.TB  ;---- M9- other express bus
READ FILE = MODE10@TIME_PERIOD@.TB  ;---- M10- other bus (future)

/* Transit path traces for select i/j pairs */
read file = ..\scripts\pathTrace.s

ENDRUN
;---------------------------------------------------------------------------
;Step 2, 4, 6 & 8 Condition & Split Skims into Multiple Files
;---------------------------------------------------------------------------
RUN PGM=MATRIX
 MATI[1]=TRANSIT.SKM
 MATO[1]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_BM.SKM, MO = 1-16,
  FORMAT = MINUTP,
  NAME = IVLB, IVXB, IVMT, IVCR, IVNM, INIT, XFERT, WACCT, WLKT, BRDS,
  DACCT, DACCD, PRKT, PRKC
 MATO[2]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_BM.STA, MO = 17-18,
  FORMAT = MINUTP,
 NAME = ISTOS, JSTOS

 MATO[3]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_BM.ttt, MO = 19,                 ;
  FORMAT = MINUTP,                                                             ;
 NAME = sumtrntm
```

```
MW[1] = MI.1.1    ;---- ivt-local bus    (0.01 min)
MW[2] = MI.1.2    ;---- ivt-exp bus      (0.01 min)
MW[3] = MI.1.3    ;---- ivt-metrorail    (0.01 min)
MW[4] = MI.1.4    ;---- ivt-commuter rail(0.01 min)
MW[5] = MI.1.5    ;---- ivt-new rail mode(0.01 min)
MW[6] = MI.1.6    ;---- ivt-new bus mode (0.01 min)
MW[7] = MI.1.7    ;---- ini.wait time    (0.01 min)
MW[8] = MI.1.8    ;---- xfr wait time    (0.01 min)
MW[9] = MI.1.9    ;---- walk acc time    (0.01 min)
MW[10] = MI.1.10  ;---- other walk time  (0.01 min)
MW[11] = MI.1.11  ;---- added xfer time  (0.01 min)
MW[12] = MI.1.12  ;---- transfers        (0+)
MW[13] = MI.1.13  ;---- drv acc time     (0.01 min)
MW[14] = MI.1.14  ;---- drv acc distance (0.01 mile)
MW[15] = MI.1.15  ;---- pnr time         (0.01 min)
MW[16] = MI.1.16  ;---- pnr cost         (cents)

MW[17] = MI.1.17  ;---- metro board  sta (1-150)
MW[18] = MI.1.18  ;---- metro alight sta (1-150)
                                                                                  ;4
MW[19] = MI.1.19  ;---- total transit time (whole min)                            ;
                                                                                  ;



JLOOP
 IF ((MW[1] + MW[2] + MW[6] = 0 ) || (MW[3]+MW[5]=0))
  MW[1] = 0
  MW[2] = 0
  MW[3] = 0
  MW[4] = 0
  MW[5] = 0
  MW[6] = 0
  MW[7] = 0
  MW[8] = 0
  MW[9] = 0
  MW[10] = 0
  MW[11] = 0
  MW[12] = 0
  MW[13] = 0
  MW[14] = 0
  MW[15] = 0
  MW[16] = 0
  MW[17] = 0
  MW[18] = 0
 ELSE
  MW[12] = MW[12] - 1
  IF (MW[16] = 1 ) MW[16] = 0
  MW[15] = MW[15] - MW[16] * 6.0
  IF (MW[17] < 0 || MW[17] > 150 ) MW[17] = 0
  IF (MW[18] < 0 || MW[18] > 150 ) MW[18] = 0
 ENDIF
ENDJLOOP

ENDRUN

ENDLOOP ;---- ACCESS ----
ENDLOOP ;---- PERIOD ----
```

33 Transit_Skims_CR.s

```
;-----------------------------------------------------------------------------
;Transit_Skims_CR.s
;MWCOG Version 2.2 Model
;                        - PATHSTYLE changed from 1 to 0 on 3.9.04 (RM)
;                        - iteration (_iter_) global variables used
;Build Transit Skims by Time Period and Access Mode
; Input Files:
;  TP+ Highway Network          = ZONEHWY.NET
;  Transit Line Files           = MODE?_pp.TB
;  Transit Network Data         = MET_*.TB, COM_*.TB, BUS_*.TB
;  Walk and Drive Access        = WALKACC.TB, *_PNR_pp.TB
;  Walk Sidewalk Network        = SIDEWALK.ASC
; Output Files:
;  Walk and Drive Access Skims  = pp_aa_mo.SKM
;  Walk and Drive Station Data  = pp_aa_mo.STA
;
; Step 1: AM Peak Walk Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 2: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_WK_CR.SKM, %_iter_%_AM_WK_CR.STA,
; Step 3: AM Peak Drive Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 4: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_DR_CR.SKM, %_iter_%_AM_DR_CR.STA,
; Step 5: Off Peak Walk Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 6: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_WK_CR.SKM, %_iter_%_OP_WK_CR.STA,
; Step 7: Off Peak Drive Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 8: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_DR_CR.SKM, %_iter_%_OP_DR_CR.STA
;
;-----------------------------------------------------------------------------
; rm  4/7/08                        ;
; Added  table #19 (Total Transit time in min.) to output transit.skm file     ;
; create total transit time skims named:                                       ;
;         %_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_CR.ttt                          ;
;
;  Read in time factors to increase local bus times
;  based on increasing arterial hwy congestion

READ FILE=INPUTS\LBus_TimFTRS.ASC   ; Local Bus Time Factors
;

;-----------------------------------------------------------------------------
;         Loop through each period and access mode
;-----------------------------------------------------------------------------
pageheight=32767  ; Preclude header breaks
LOOP PERIOD = 1, 2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
  COMBINE = 5.0
```

```
  _IBFTR=AMIBFTR
  _OBFTR=AMOBFTR
 ELSE
  TIME_PERIOD = 'OP'
  COMBINE = 10.0
  _IBFTR=OPIBFTR
  _OBFTR=OPOBFTR
 ENDIF

;---- start the access mode loop ----

LOOP ACCESS = 1, 2

  IF (ACCESS = 1)
   ACCESS_MODE = 'WK'
   WALK_MODEL = ' '
   DRIVE_MODEL = ';'
  ELSE
   ACCESS_MODE = 'DR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ' '
  ENDIF

;---------------------------------------------------------------------------
; Step 1, 3, 5 & 7 Build Transit Path
;---------------------------------------------------------------------------

RUN PGM=TRNBUILD
 NETI = ZONEHWY.NET
 MATO = TRANSIT.SKM

 HWYTIME = @TIME_PERIOD@HTIME

;--- set default zone access and line parameters ----

ZONEACCESS  GENERATE=N

@WALK_MODEL@ACCESSMODES = 14,16
@DRIVE_MODEL@ACCESSMODES = 11

@WALK_MODEL@SKIPMODES = 11,15

PATHSTYLE  = 0
USERUNTIME = Y

;---- rules for combining multiple line and headways ----

COMBINE MAXDIFF[1] = 0.0, IF[1] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[2] = 0.0, IF[2] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[3] = 0.0, IF[3] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[4] = 0.0, IF[4] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[5] = 0.0, IF[5] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[6] = 0.0, IF[6] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[7] = 0.0, IF[7] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[8] = 0.0, IF[8] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[9] = 0.0, IF[9] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[10] = 0.0, IF[10] = ((RUN - MINRUN) < @COMBINE@)

;---- factors to convert actual time to perceived time ----

MODEFAC[1]  = 10*1.0  ;---- in-vehicle time
MODEFAC[11] = 1.50    ;---- drive access time
MODEFAC[12] = 2.00    ;---- transit transfer time
MODEFAC[13] = 2.00    ;---- walk network time
MODEFAC[14] = 2.00    ;---- unused (used to be dummy link to station)
MODEFAC[15] = 2.50    ;---- park-&-ride transfer time
MODEFAC[16] = 2.00    ;---- walk access time

;---- initial and transfer wait factors ----

IWAITFAC[1] = 10*2.50
XWAITFAC[1] = 10*2.50
IWAITMAX[1] = 10*60.0
XWAITMIN[1] = 2*4.0,0.0,4.0,0.0,3*4.0,10.0,4.0

;---- boarding and transfer penalties ----

XPEN[1]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[2]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[3]= 2*5.0, 0.0, 2*2.0,5*5.0, 6*0.0
XPEN[4]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[5]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[6]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[7]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[8]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[9]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[10]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[11]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[12]= 2*8.0,3*2.0,4*8.0,5.0, 6*0.0
XPEN[13]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[14]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[15]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[16]= 2*5.0,3*2.0,5*5.0, 6*0.0

XPENFAC[1]= 16*2.50
XPENFAC[2]= 16*2.50
XPENFAC[3]= 16*2.50
XPENFAC[4]= 16*2.50
XPENFAC[5]= 16*2.50
XPENFAC[6]= 16*2.50
XPENFAC[7]= 16*2.50
XPENFAC[8]= 16*2.50
XPENFAC[9]= 16*2.50
XPENFAC[10]= 16*2.50
XPENFAC[11]= 16*2.50
XPENFAC[12]= 16*2.50
XPENFAC[13]= 16*2.50
XPENFAC[14]= 16*2.50
XPENFAC[15]= 16*2.50
XPENFAC[16]= 16*2.50

;---- transfer prohibitions ----

;--- mode  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16
NOX[1]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[2]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[3]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[4]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[5]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[6]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[7]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[8]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[9]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[10] =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[11] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n
NOX[12] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  n,  Y,  n
NOX[13] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[14] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[15] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  Y,  Y,  Y,  Y
NOX[16] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  Y

;---- Parameters ----

LISTINPUT = N         ;--- echo input files

MAXPATHTIME = 360.0   ;--- Kill any path with preceived time > 240 min.
```

```
FREQPERIOD = 1        ;--- Use the First Headway value
USERUNTIME = Y        ;--- Ignore any RUNTIME or RT parameters on lines.
MAXRUNTIME = 240.0    ;--- Report lines with run times > 240 min.
;ONLINE = 100          ;--- Display every 100 lines

;WALKSPEED = 3.0       ;--- Set default walk speed to 3.0 mph
;XYFACTOR = 0.84401    ;--- Replicate MINUTP value
;WALKSPEED = 2.0       ;--- Added on 09/25
;XYFACTOR = 1.97       ;--- Added on 09/25

;-------------------------
;  write out support links for later viewing in VIPER
fileo supporto = suplCR@access_mode@@time_period@.asc modes=11-16 oneway=t fixed=y
fileo nodeo    = supnCR@access_mode@@time_period@.dbf
fileo linko    = trnlCR@access_mode@@time_period@.dbf   ; Can be used to create
transit shapefile
;

;---- specify output skims ----

MATRICES NAME = IVLB, IVXB, IVMT, IVCR, IVNRM, IVNBM, IWAIT, XWAIT, WACCT, WLKT,
 XADD, BRDS, DACCT, DACCD, PRKI, PRKC, ISTOS, JSTOS,
; MW[1] = TIME(1,6,8),
 MW[1] = TIME(1) * @_IBFTR@ +
         TIME(6) * @_IBFTR@ +
         TIME(8) * @_OBFTR@ ,                ;---- ivt-local bus    (0.01 min)
 MW[2] = TIME(2,7,9),                        ;---- ivt-exp bus      (0.01 min)
 MW[3] = TIME(3),                            ;---- ivt-metrorail    (0.01 min)
 MW[4] = TIME(4),                            ;---- ivt-commuter rail(0.01 min)
 MW[5] = TIME(5),                            ;---- ivt-new rail mode(0.01 min)
 MW[6] = TIME(10),                           ;---- ivt-new bus mode (0.01 min)
 MW[7] = IWAIT,                              ;---- ini.wait time    (0.01 min)
 MW[8] = XWAIT(1,2,3,4,5,6,7,8,9,10),        ;---- xfr wait time    (0.01 min)
 MW[9] = TIME(14,16),                        ;---- walk acc time    (0.01 min)
 MW[10] = TIME(12,13),                       ;---- other walk time  (0.01 min)
 MW[11] = XPEN,                              ;---- added xfer time  (0.01 min)
 MW[12] = BOARDS,                            ;---- boardings        (1+)
 MW[13] = TIME(11),                          ;---- drv acc time     (0.01 min)
 MW[14] = DIST(11),                          ;---- drv acc distance (0.01 mile)
 MW[15] = TIME(15),                          ;---- pnr impedance    (0.01 min)
 MW[16] = DIST(15),                          ;---- pnr cost         (cents)
 MW[17] = NODE0(3) - 7300.0,                 ;---- metro board  sta (1-150)
 MW[18] = NODEL(3) - 7300.0,                 ;---- metro alight sta (1-150)

 MW[19] = (IWAIT + TIME (0) + XWAIT (0))*0.01 ;---- total time       (min)     ;2

;---- Rail Stations & Links (modes 3 & 4) ----

READ FILE = met_node.tb   ;---- Metrorail stations
READ FILE = met_link.tb   ;---- Metrorail links
READ FILE = com_node.tb   ;---- Commuter Rail stations
READ FILE = com_link.tb   ;---- Commuter Rail links
READ FILE = lrt_node.tb   ;---- LRT stations
READ FILE = lrt_link.tb   ;---- LRT links
READ FILE = new_node.tb   ;---- Mode10 Stations
READ FILE = new_link.tb   ;---- Mode10 links
;---- Park and Ride Lots (mode 15) ----

;@DRIVE_MODEL@ READ FILE = bus_pnrn.tb  ;---- Bus PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = met_pnrn.tb  ;---- Metro PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = com_pnrn.tb  ;---- Commuter Rail PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = lrt_pnrn.tb  ;---- LRT PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = new_pnrn.tb  ;---- Mode10 PNR lots (nodes)

;@DRIVE_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = met@TIME_PERIOD@pnr.tb  ;---- Metro-PNR connectors
(links)
@DRIVE_MODEL@ READ FILE = com@TIME_PERIOD@pnr.tb  ;---- Commuter Rail-PNR connectors
(links)
;@DRIVE_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors
(links)

;---- Access Links (modes 11, 12 and 16) ----

READ FILE = met_bus.tb   ;--- bus-metro links&xfer cards
READ FILE = com_bus.tb   ;--- bus-commuter rail links&xfer car
READ FILE = lrt_bus.tb   ;--- bus-LRT links&xfer car
READ FILE = new_bus.tb   ;--- Mode10 bus-LRT links&xfer car

READ FILE = walkacc.asc ;--- walk to local transit

;@DRIVE_MODEL@READ FILE = mrpr@TIME_PERIOD@.asc;--- drive to metrorail
@DRIVE_MODEL@READ FILE = cr@TIME_PERIOD@.asc;--- drive to Commuter rail
;@DRIVE_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- drive to bus
;@DRIVE_MODEL@READ FILE = lrt@TIME_PERIOD@.asc;--- drive to LRT
;@DRIVE_MODEL@READ FILE = new@TIME_PERIOD@.asc;--- drive to Mode10

;---- Dummy Centroid Access Links (mode 14) ----

;---- Sidewalk Network (mode 13) ----

READ FILE = sidewalk.asc;--- walk network for transfers

;---- Transit Line Cards (modes 1-10) ----

READ FILE = MODE1@TIME_PERIOD@.TB  ;---- M1- metrobus local
;READ FILE = MODE2@TIME_PERIOD@.TB  ;---- M2- metrobus express
READ FILE = MODE3@TIME_PERIOD@.TB  ;---- M3- metrorail
READ FILE = MODE4@TIME_PERIOD@.TB  ;---- M4- commuter rail
READ FILE = MODE5@TIME_PERIOD@.TB  ;---- M5- other rail (future)
READ FILE = MODE6@TIME_PERIOD@.TB  ;---- M6- other local bus
;READ FILE = MODE7@TIME_PERIOD@.TB  ;---- M7- other express bus
READ FILE = MODE8@TIME_PERIOD@.TB  ;---- M8- other local bus
;READ FILE = MODE9@TIME_PERIOD@.TB  ;---- M9- other express bus
READ FILE = MODE10@TIME_PERIOD@.TB  ;---- M10- other bus (future)

/* Transit path traces for select i/j pairs */
read file = ..\scripts\pathTrace.s

ENDRUN
;-----------------------------------------------------------------------
;Step 2, 4, 6 & 8 Condition & Split Skims into Multiple Files
;-----------------------------------------------------------------------
RUN PGM=MATRIX
 MATI[1]=TRANSIT.SKM
 MATO[1]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_CR.SKM, MO = 1-16,
  FORMAT = MINUTP,
  NAME = IVLB, IVXB, IVMT, IVCR, IVNM, INIT, XFERT, WACCT, WLKT, BRDS,
  DACCT, DACCD, PRKT, PRKC
 MATO[2]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_CR.STA, MO = 17-18,
  FORMAT = MINUTP,
 NAME = ISTOS, JSTOS
                                                                         ;3
 MATO[3]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_CR.ttt, MO = 19,          ;
  FORMAT = MINUTP,                                                       ;
 NAME = sumtrntm


MW[1] = MI.1.1    ;---- ivt-local bus    (0.01 min)
MW[2] = MI.1.2    ;---- ivt-exp bus      (0.01 min)
MW[3] = MI.1.3    ;---- ivt-metrorail    (0.01 min)
MW[4] = MI.1.4    ;---- ivt-commuter rail(0.01 min)
MW[5] = MI.1.5    ;---- ivt-new rail mode(0.01 min)
MW[6] = MI.1.6    ;---- ivt-new bus mode (0.01 min)
```

```
MW[7] = MI.1.7    ;---- ini.wait time    (0.01 min)
MW[8] = MI.1.8    ;---- xfr wait time    (0.01 min)
MW[9] = MI.1.9    ;---- walk acc time    (0.01 min)
MW[10] = MI.1.10  ;---- other walk time  (0.01 min)
MW[11] = MI.1.11  ;---- added xfer time  (0.01 min)
MW[12] = MI.1.12  ;---- transfers        (0+)
MW[13] = MI.1.13  ;---- drv acc time     (0.01 min)
MW[14] = MI.1.14  ;---- drv acc distance (0.01 mile)
MW[15] = MI.1.15  ;---- pnr time         (0.01 min)
MW[16] = MI.1.16  ;---- pnr cost         (cents)

MW[17] = MI.1.17  ;---- metro board  sta (1-150)
MW[18] = MI.1.18  ;---- metro alight sta (1-150)

                                                                              ;4
MW[19] = MI.1.19  ;---- total transit time (whole min)                        ;
                                                                              ;

JLOOP
 IF (MW[4] = 0 )
  MW[1] = 0
  MW[2] = 0
  MW[3] = 0
  MW[4] = 0
  MW[5] = 0
  MW[6] = 0
  MW[7] = 0
  MW[8] = 0
  MW[9] = 0
  MW[10] = 0
  MW[11] = 0
  MW[12] = 0
  MW[13] = 0
  MW[14] = 0
  MW[15] = 0
  MW[16] = 0
  MW[17] = 0
  MW[18] = 0
 ELSE
  MW[12] = MW[12] - 1
  IF (MW[16] = 1 ) MW[16] = 0
  MW[15] = MW[15] - MW[16] * 6.0
  IF (MW[17] < 0 || MW[17] > 150 ) MW[17] = 0
  IF (MW[18] < 0 || MW[18] > 150 ) MW[18] = 0
 ENDIF
ENDJLOOP

ENDRUN

ENDLOOP ;---- ACCESS ----
ENDLOOP ;---- PERIOD ----
```

34 Transit_Skims_MR.s

```
;---------------------------------------------------------------------------
;Transit_Skims_MR.s
;MWCOG Version 2.2 Model
;                        - PATHSTYLE changed from 1 to 0 on 3.9.04 (RM)
;                        - iteration (_iter_) global variables used
;Build Transit Skims by Time Period and Access Mode
; Input Files:
;  TP+ Highway Network          = ZONEHWY.NET
;  Transit Line Files           = MODE?_pp.TB
;  Transit Network Data         = MET_*.TB, COM_*.TB, BUS_*.TB
;  Walk and Drive Access        = WALKACC.TB, *_PNR_pp.TB
;  Walk Sidewalk Network        = SIDEWALK.ASC
; Output Files:
;  Walk and Drive Access Skims  = pp_aa_mo.SKM
;  Walk and Drive Station Data  = pp_aa_mo.STA
;
; Step 1: AM Peak Walk Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 2: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_WK_MR.SKM, %_iter_%_AM_WK_MR.STA,
; Step 3: AM Peak Drive Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 4: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_DR_MR.SKM, %_iter_%_AM_DR_MR.STA,
; Step 5: AM Peak K/R Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 6: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_KR_MR.SKM, %_iter_%_AM_KR_MR.STA,
; Step 7: Off Peak Walk Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 8: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_WK_MR.SKM, %_iter_%_OP_WK_MR.STA,
; Step 9: Off Peak Drive Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 10: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_DR_MR.SKM, %_iter_%_OP_DR_MR.STA
; Step 11: Off Peak K/R Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 12: Condition & Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_KR_MR.SKM, %_iter_%_OP_KR_MR.STA,
;
;---------------------------------------------------------------------------
; rm  4/7/08                      ;
; Added  table #19 (Total Transit time in min.) to output transit.skm file     ;
; create total transit time skims named:                                       ;
;         %_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_MR.ttt                          ;

;
;  Read in time factors to increase local bus times
;  based on increasing arterial hwy congestion

READ FILE=INPUTS\LBus_TimFTRS.ASC   ; Local Bus Time Factors
;

;---------------------------------------------------------------------------
;         Loop through each period and access mode
;---------------------------------------------------------------------------
pageheight=32767  ; Preclude header breaks
LOOP PERIOD=1,2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
  COMBINE = 5.0
  _IBFTR=AMIBFTR
  _OBFTR=AMOBFTR
 ELSE
```

```
  TIME_PERIOD = 'OP'
  COMBINE = 10.0
  _IBFTR=OPIBFTR
  _OBFTR=OPOBFTR
 ENDIF

;---- start the access mode loop ----

LOOP ACCESS=1,3

  IF (ACCESS = 1)
   ACCESS_MODE = 'WK'
   WALK_MODEL = ' '
   DRIVE_MODEL = ';'
   KR_MODEL = ';'
  ELSEIF (ACCESS = 2)
   ACCESS_MODE = 'DR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ' '
   KR_MODEL = ';'
  ELSE
   ACCESS_MODE = 'KR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ';'
   KR_MODEL = ' '
  ENDIF

;---------------------------------------------------------------------------
; Step 1, 3, 5 & 7 Build Transit Path
;---------------------------------------------------------------------------

RUN PGM=TRNBUILD
 NETI = ZONEHWY.NET
 MATO = TRANSIT.SKM

 HWYTIME = @TIME_PERIOD@HTIME

;--- set default zone access and line parameters ----

ZONEACCESS  GENERATE=N

@WALK_MODEL@ACCESSMODES = 14,16
@DRIVE_MODEL@ACCESSMODES = 11
@KR_MODEL@ACCESSMODES = 11

@WALK_MODEL@SKIPMODES = 11,15

PATHSTYLE  = 0
USERUNTIME = Y

;---- rules for combining multiple line and headways ----

COMBINE MAXDIFF[1] = 0.0, IF[1] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[2] = 0.0, IF[2] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[3] = 0.0, IF[3] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[4] = 0.0, IF[4] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[5] = 0.0, IF[5] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[6] = 0.0, IF[6] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[7] = 0.0, IF[7] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[8] = 0.0, IF[8] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[9] = 0.0, IF[9] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[10] = 0.0, IF[10] = ((RUN - MINRUN) < @COMBINE@)

;---- factors to convert actual time to perceived time ----

MODEFAC[1]  = 10*1.0  ;---- in-vehicle time
MODEFAC[11] = 1.50    ;---- drive access time
MODEFAC[12] = 2.00    ;---- transit transfer time
MODEFAC[13] = 2.00    ;---- walk network time
MODEFAC[14] = 2.00    ;---- unused (used to be dummy link to station)
MODEFAC[15] = 2.50    ;---- park-&-ride transfer time
MODEFAC[16] = 2.00    ;---- walk access time

;---- initial and transfer wait factors ----

IWAITFAC[1] = 10*2.50
XWAITFAC[1] = 10*2.50
IWAITMAX[1] = 10*60.0
XWAITMIN[1] = 2*4.0,0.0,4.0,0.0,3*4.0,10.0,4.0

;---- boarding and transfer penalties ----

XPEN[1]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[2]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[3]= 2*5.0, 0.0, 2*2.0,5*5.0, 6*0.0
XPEN[4]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[5]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[6]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[7]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[8]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[9]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[10]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[11]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[12]= 2*8.0,3*2.0,4*8.0,5.0, 6*0.0
XPEN[13]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[14]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[15]= 2*5.0,3*2.0,5*5.0, 6*0.0
XPEN[16]= 2*5.0,3*2.0,5*5.0, 6*0.0

XPENFAC[1]= 16*2.50
XPENFAC[2]= 16*2.50
XPENFAC[3]= 16*2.50
XPENFAC[4]= 16*2.50
XPENFAC[5]= 16*2.50
XPENFAC[6]= 16*2.50
XPENFAC[7]= 16*2.50
XPENFAC[8]= 16*2.50
XPENFAC[9]= 16*2.50
XPENFAC[10]= 16*2.50
XPENFAC[11]= 16*2.50
XPENFAC[12]= 16*2.50
XPENFAC[13]= 16*2.50
XPENFAC[14]= 16*2.50
XPENFAC[15]= 16*2.50
XPENFAC[16]= 16*2.50


;---- transfer prohibitions ----

;--- mode  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16
NOX[1]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[2]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[3]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[4]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[5]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[6]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[7]  =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[8]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[9]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[10] =  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n,  n,  Y,  n
NOX[11] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n
NOX[12] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  n,  Y,  n
NOX[13] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[14] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[15] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  Y,  Y,  Y,  Y
NOX[16] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  Y
```

```
;---- Parameters ----

LISTINPUT = N        ;--- echo input files

MAXPATHTIME = 360.0   ;--- Kill any path with preceived time > 240 min.
FREQPERIOD = 1        ;--- Use the First Headway value
USERUNTIME = Y        ;--- Ignore any RUNTIME or RT parameters on lines.
MAXRUNTIME = 240.0    ;--- Report lines with run times > 240 min.
;ONLINE = 100          ;--- Display every 100 lines

;WALKSPEED = 3.0       ;--- Set default walk speed to 3.0 mph
;XYFACTOR = 0.84401    ;--- Replicate MINUTP value
;WALKSPEED = 2.0       ;--- Added on 09/25
;XYFACTOR = 1.97       ;--- Added on 09/25

;-------------------------
;  write out support links for later viewing in VIPER
fileo supporto = suplMR@access_mode@@time_period@.asc modes=11-16 oneway=t fixed=y
fileo nodeo    = supnMR@access_mode@@time_period@.dbf
fileo linko    = trnlMR@access_mode@@time_period@.dbf   ; Can be used to create
transit shapefile
;

;---- specify output skims ----

MATRICES NAME = IVLB, IVXB, IVMT, IVCR, IVNRM, IVNBM, IWAIT, XWAIT, WACCT, WLKT,
 XADD, BRDS, DACCT, DACCD, PRKI, PRKC, ISTOS, JSTOS,
; MW[1] = TIME(1,6,8),
 MW[1] = TIME(1) * @_IBFTR@ +
        TIME(6) * @_IBFTR@ +
        TIME(8) * @_OBFTR@ ,                ;---- ivt-local bus    (0.01 min)
 MW[2] = TIME(2,7,9),                       ;---- ivt-exp bus      (0.01 min)
 MW[3] = TIME(3),                           ;---- ivt-metrorail    (0.01 min)
 MW[4] = TIME(4),                           ;---- ivt-commuter rail(0.01 min)
 MW[5] = TIME(5),                           ;---- ivt-new rail mode(0.01 min)
 MW[6] = TIME(10),                          ;---- ivt-new bus mode (0.01 min)
 MW[7] = IWAIT,                             ;---- ini.wait time    (0.01 min)
 MW[8] = XWAIT(1,2,3,4,5,6,7,8,9,10),       ;---- xfr wait time    (0.01 min)
 MW[9] = TIME(14,16),                       ;---- walk acc time    (0.01 min)
 MW[10] = TIME(12,13),                      ;---- other walk time  (0.01 min)
 MW[11] = XPEN,                             ;---- added xfer time  (0.01 min)
 MW[12] = BOARDS,                           ;---- boardings        (1+)
 MW[13] = TIME(11),                         ;---- drv acc time     (0.01 min)
 MW[14] = DIST(11),                         ;---- drv acc distance (0.01 mile)
 MW[15] = TIME(15),                         ;---- pnr impedance    (0.01 min)
 MW[16] = DIST(15),                         ;---- pnr cost         (cents)
 MW[17] = NODE0(3) - 7300.0,                ;---- metro board  sta (1-150)
 MW[18] = NODEL(3) - 7300.0,                ;---- metro alight sta (1-150)

 MW[19] = (IWAIT + TIME (0) + XWAIT (0))*0.01 ;---- total time       (min)     ;2


;---- Rail Stations & Links (modes 3 & 4) ----

READ FILE = met_node.tb   ;---- Metrorail stations
READ FILE = met_link.tb   ;---- Metrorail links
;READ FILE = com_node.tb   ;---- Commuter Rail stations
;READ FILE = com_link.tb   ;---- Commuter Rail links
READ FILE = lrt_node.tb   ;---- LRT stations
READ FILE = lrt_link.tb   ;---- LRT links
;READ FILE = new_node.tb   ;---- Mode10 Stations
;READ FILE = new_link.tb   ;---- Mode10 links
;---- Park and Ride Lots (mode 15) ----

;@DRIVE_MODEL@ READ FILE = bus_pnrn.tb  ;---- Bus PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = met_pnrn.tb  ;---- Metro PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = com_pnrn.tb  ;---- Commuter Rail PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = lrt_pnrn.tb  ;---- LRT PNR lots (nodes)
;@DRIVE_MODEL@ READ FILE = new_pnrn.tb  ;---- Mode10 PNR lots (nodes)

;@DRIVE_MODEL@ READ FILE = bus@TIME_PERIOD@pnr.tb  ;---- Bus-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = met@TIME_PERIOD@pnr.tb  ;---- Metro-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = com@TIME_PERIOD@pnr.tb  ;---- Commuter Rail-PNR
connectors (links)
@DRIVE_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)
;@DRIVE_MODEL@ READ FILE = new@TIME_PERIOD@pnr.tb  ;---- Mode10-PNR connectors
(links)

;---- Access Links (modes 11, 12 and 16) ----

READ FILE = met_bus.tb   ;--- bus-metro links&xfer cards
;READ FILE = com_bus.tb   ;--- bus-commuter rail links&xfer car
READ FILE = lrt_bus.tb   ;--- bus-LRT links&xfer car
;READ FILE = new_bus.tb   ;--- Mode10 bus-LRT links&xfer car

READ FILE = walkacc.asc ;--- walk to local transit

@DRIVE_MODEL@READ FILE = mrpr@TIME_PERIOD@.asc;--- drive to metrorail
;@DRIVE_MODEL@READ FILE = cr@TIME_PERIOD@.asc;--- drive to Commuter rail
;@DRIVE_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- drive to bus
@DRIVE_MODEL@READ FILE = lrt@TIME_PERIOD@.asc;--- drive to LRT
;@DRIVE_MODEL@READ FILE = new@TIME_PERIOD@.asc;--- drive to Mode10

@KR_MODEL@READ FILE = mrkr@TIME_PERIOD@.asc;--- k/r to metrorail
;KR_MODEL@READ FILE = bus@TIME_PERIOD@.asc;--- k/r to bus
@KR_MODEL@READ FILE = lrtkr@TIME_PERIOD@.asc;--- k/r to LRT
;@KR_MODEL@READ FILE = newkr@TIME_PERIOD@.asc;--- k/r to Mode10

@KR_MODEL@ READ FILE = lrt@TIME_PERIOD@pnr.tb  ;---- LRT-PNR connectors (links)

;---- Dummy Centroid Access Links (mode 14) ----

;---- Sidewalk Network (mode 13) ----

READ FILE = sidewalk.asc;--- walk network for transfers

;---- Transit Line Cards (modes 1-10) ----

;READ FILE = MODE1@TIME_PERIOD@.TB  ;---- M1- metrobus local
;READ FILE = MODE2@TIME_PERIOD@.TB  ;---- M2- metrobus express
READ FILE = MODE3@TIME_PERIOD@.TB  ;---- M3- metrorail
;READ FILE = MODE4@TIME_PERIOD@.TB  ;---- M4- commuter rail
READ FILE = MODE5@TIME_PERIOD@.TB  ;---- M5- other rail (future)
;READ FILE = MODE6@TIME_PERIOD@.TB  ;---- M6- other local bus
;READ FILE = MODE7@TIME_PERIOD@.TB  ;---- M7- other express bus
;READ FILE = MODE8@TIME_PERIOD@.TB  ;---- M8- other local bus
;READ FILE = MODE9@TIME_PERIOD@.TB  ;---- M9- other express bus
;READ FILE = MODE10@TIME_PERIOD@.TB  ;---- M10- other bus (future)

/* Transit path traces for select i/j pairs */
read file = ..\scripts\pathTrace.s

ENDRUN
;---------------------------------------------------------------------------
;Step 2, 4, 6 & 8 Condition & Split Skims into Multiple Files
;---------------------------------------------------------------------------
RUN PGM=MATRIX
 MATI[1]=TRANSIT.SKM
 MATO[1]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_MR.SKM, MO = 1-16,
  FORMAT = MINUTP,
  NAME = IVLB, IVXB, IVMT, IVCR, IVNM, INIT, XFERT, WACCT, WLKT, BRDS,
  DACCT, DACCD, PRKT, PRKC
 MATO[2]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_MR.STA, MO = 17-18,
  FORMAT = MINUTP,
 NAME = ISTOS, JSTOS
```

```
 MATO[3]=%_iter_%_@TIME_PERIOD@_@ACCESS_MODE@_MR.ttt, MO = 19,                 ;
  FORMAT = MINUTP,                                                              ;
 NAME = sumtrntm


MW[1] = MI.1.1    ;---- ivt-local bus    (0.01 min)
MW[2] = MI.1.2    ;---- ivt-exp bus      (0.01 min)
MW[3] = MI.1.3    ;---- ivt-metrorail    (0.01 min)
MW[4] = MI.1.4    ;---- ivt-commuter rail(0.01 min)
MW[5] = MI.1.5    ;---- ivt-new rail mode(0.01 min)
MW[6] = MI.1.6    ;---- ivt-new bus mode (0.01 min)
MW[7] = MI.1.7    ;---- ini.wait time    (0.01 min)
MW[8] = MI.1.8    ;---- xfr wait time    (0.01 min)
MW[9] = MI.1.9    ;---- walk acc time    (0.01 min)
MW[10] = MI.1.10  ;---- other walk time  (0.01 min)
MW[11] = MI.1.11  ;---- added xfer time  (0.01 min)
MW[12] = MI.1.12  ;---- transfers        (0+)
MW[13] = MI.1.13  ;---- drv acc time     (0.01 min)
MW[14] = MI.1.14  ;---- drv acc distance (0.01 mile)
MW[15] = MI.1.15  ;---- pnr time         (0.01 min)
MW[16] = MI.1.16  ;---- pnr cost         (cents)

MW[17] = MI.1.17  ;---- metro board  sta (1-150)
MW[18] = MI.1.18  ;---- metro alight sta (1-150)
                                                                                ;4
MW[19] = MI.1.19  ;---- total transit time (whole min)                          ;
                                                                                ;

JLOOP
 IF ((MW[3]+MW[5] = 0) || (MW[1]+MW[2]+MW[6] > 0))
  MW[1] = 0
  MW[2] = 0
  MW[3] = 0
  MW[4] = 0
  MW[5] = 0
  MW[6] = 0
  MW[7] = 0
  MW[8] = 0
  MW[9] = 0
  MW[10] = 0
  MW[11] = 0
  MW[12] = 0
  MW[13] = 0
  MW[14] = 0
  MW[15] = 0
  MW[16] = 0
  MW[17] = 0
  MW[18] = 0
 ELSE
  MW[12] = MW[12] - 1
  IF (MW[16] = 1 ) MW[16] = 0
  MW[15] = MW[15] - MW[16] * 6.0
  IF (MW[17] < 0 || MW[17] > 150 ) MW[17] = 0
  IF (MW[18] < 0 || MW[18] > 150 ) MW[18] = 0
 ENDIF
ENDJLOOP

ENDRUN

ENDLOOP ;---- ACCESS ----
ENDLOOP ;---- PERIOD ----
```

35 Transit_Skims_Select_Paths.s

```
;---------------------------------------------------------------------------
;Transit_Skims_Select_Paths.s
;MWCOG Version 2.1D Model
;                         - PATHSTYLE changed from 1 to 0 on 3.9.04 (RM)
;                         - iteration (_iter_) global variables used
;Build Transit Skims by Time Period and Access Mode
; Input Files:
;  TP+ Highway Network          = ZONEHWY.NET
;  Transit Line Files           = MODE?_pp.TB
;  Transit Network Data         = MET_*.TB, COM_*.TB, BUS_*.TB
;  Walk and Drive Access        = WALK_pp.TB, PNR_pp.TB
;  Walk Sidewalk Network        = WLKNET.TB
;  Zone Employment              = ZONE.ASC
; Output Files:
;  Walk and Drive Access Skims  = %_iter_%_pp_aa.SKM
;  Walk and Drive Station Data  = %_iter_%_pp_aa.STA
;  Walk and Drive Travel Time   = %_iter_%_pp_aa.TTT
;  Transit Access to Employment = JOBACC.ASC
;
; Step 1: AM Peak Walk Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 2: Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_WK.SKM, %_iter_%_AM_WK.STA, %_iter_%_AM_WK.TTT
; Step 3: AM Peak Drive Skims
;  Input Files: ZONEHWY.NET, MODE?_AM.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 4: Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_AM_DR.SKM, %_iter_%_AM_DR.STA, %_iter_%_AM_DR.TTT
; Step 5: Off Peak Walk Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 6: Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_WK.SKM, %_iter_%_OP_WK.STA, %_iter_%_OP_WK.TTT
; Step 7: Off Peak Drive Skims
;  Input Files: ZONEHWY.NET, MODE?_OP.TB, *.TB
;  Output Files: TRANSIT.SKM
; Step 8: Split Skims into Multiple Files
;  Input Files: TRANSIT.SKM
;  Output Files: %_iter_%_OP_DR.SKM, %_iter_%_OP_DR.STA, %_iter_%_OP_DR.TTT
; Step 9: Sum the Jobs by Transit Travel Time
;  Input Files: %_iter_%_AM_WK.TTT, %_iter_%_AM_DR.TTT
;  Output Files: JOBACC.ASC
;
;---------------------------------------------------------------------------
;
; Global Variables
;
;        _iter_ (= PP,i1-i6)
;
;---------------------------------------------------------------------------
;         Loop through each period and access mode
;---------------------------------------------------------------------------

LOOP PERIOD = 1, 2

 IF (PERIOD = 1)
  TIME_PERIOD = 'AM'
  COMBINE = 5.0
 ELSE
```

```
  TIME_PERIOD = 'OP'
  COMBINE = 10.0
 ENDIF

;---- start the access mode loop ----

LOOP ACCESS = 1, 2

  IF (ACCESS = 1)
   ACCESS_MODE = 'WK'
   WALK_MODEL = ' '
   DRIVE_MODEL = ';'
  ELSE
   ACCESS_MODE = 'DR'
   WALK_MODEL = ';'
   DRIVE_MODEL = ' '
  ENDIF

;---------------------------------------------------------------------------
; Steps 1, 3, and 5: Build Transit Paths
;---------------------------------------------------------------------------

RUN PGM = TRNBUILD
 NETI = ZONEHWY.NET
;; MATO = TRANSIT.SKM

 HWYTIME = @TIME_PERIOD@HTIME

;--- set default zone access and line parameters ----

ZONEACCESS  GENERATE=N

@WALK_MODEL@ACCESSMODES = 14,16
@DRIVE_MODEL@ACCESSMODES = 11

@WALK_MODEL@SKIPMODES = 11,15

PATHSTYLE  = 0
USERUNTIME = Y

;---- rules for combining multiple line and headways ----

COMBINE MAXDIFF[1] = 0.0, IF[1] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[2] = 0.0, IF[2] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[3] = 0.0, IF[3] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[4] = 0.0, IF[4] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[5] = 0.0, IF[5] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[6] = 0.0, IF[6] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[7] = 0.0, IF[7] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[8] = 0.0, IF[8] = ((RUN - MINRUN) < @COMBINE@)
COMBINE MAXDIFF[9] = 0.0, IF[9] = ((RUN - MINRUN) < @COMBINE@)

;---- factors to convert actual time to perceived time ----

MODEFAC[1]  = 10*1.00 ;---- in-vehicle time
MODEFAC[11] = 1.00    ;---- drive access time
MODEFAC[12] = 2.50    ;---- transit transfer time
MODEFAC[13] = 2.50    ;---- walk network time
MODEFAC[14] = 2.50    ;---- unused (used to be dummy link to station)
MODEFAC[15] = 2.50    ;---- park-&-ride transfer time
MODEFAC[16] = 2.50    ;---- walk access time

;---- initial and transfer wait factors ----

IWAITFAC[1] = 10*2.50
XWAITFAC[1] = 10*2.50
IWAITMAX[1] = 10*60.0
```

```
;---- boarding penalty - limit to three transfers ----

BOARDPEN[1] = 0.0, 6.0, 6.0, 60.0

;---- transfer prohibitions ----

;--- mode  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16
NOX[1]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[2]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[3]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[4]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[5]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[6]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[7]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[8]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[9]  =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[10] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[11] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  Y,  n,  n
NOX[12] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  n,  n,  Y,  n
NOX[13] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[14] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  n,  n,  Y,  n
NOX[15] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  Y,  Y,  Y,  Y,  Y
NOX[16] =  n,  n,  n,  n,  n,  n,  n,  n,  n,  n,  Y,  n,  Y,  n,  Y,  Y

;---- Parameters ----

LISTINPUT = N         ;--- echo input files

MAXPATHTIME = 240.0   ;--- Kill any path with preceived time > 240 min.
FREQPERIOD = 1        ;--- Use the First Headway value
USERUNTIME = Y        ;--- Ignore any RUNTIME or RT parameters on lines.
MAXRUNTIME = 240.0    ;--- Report lines with run times > 240 min.
;ONLINE = 100          ;--- Display every 100 lines

;WALKSPEED = 3.0       ;--- Set default walk speed to 3.0 mph
;XYFACTOR = 0.84401    ;--- Replicate MINUTP value
;WALKSPEED = 2.0       ;--- Added on 09/25
;XYFACTOR = 1.97       ;--- Added on 09/25

;--------------------------
;  write out support links for later viewing in VIPER
fileo supporto = supl@access_mode@@time_period@.asc modes=11-16 oneway=t fixed=y
fileo nodeo    = supn@access_mode@@time_period@.dbf
;


;---- specify output skims ----

;;MATRICES NAME = WLKT, DACCT, INIT, XFERT, IVNMT, IVMT, TOTT, ISTOS, JSTOS,
;; MW[1] = TIME(12,13,14,15)*0.01,             ;---- xfer walk time   (min)
;; MW[2] = TIME(11)*0.01,                      ;---- drv acc time     (min)
;; MW[3] = IWAIT*0.01,                         ;---- ini.wait time    (min)
;; MW[4] = XWAIT(1,2,3,4,5,6,7,8,9,10)*0.01,   ;---- xfr wait time    (min)
;; MW[5] = TIME(1,2,4,5,6,7,8,9,10)*0.01,      ;---- ivt-nonmetrorail (min)
;; MW[6] = TIME(3)*0.01,                       ;---- ivt-metrorail    (min)
;; MW[7] = (IWAIT + TIME (0) + XWAIT (0))*0.01,;---- total time       (min)
;; MW[8] = NODE0(3) - 7300.0,                  ;---- metro board  sta (1-116)
;; MW[9] = NODEL(3) - 7300.0                   ;---- metro alight sta (1-116)

;---- Rail Stations & Links (modes 3 & 4) ----

READ FILE = met_node.tb   ;---- Metrorail stations
READ FILE = met_link.tb   ;---- Metrorail links
READ FILE = com_node.tb   ;---- Commuter Rail stations
READ FILE = com_link.tb   ;---- Commuter Rail links

;---- Park and Ride Lots (mode 15) ----
```

```
@DRIVE_MODEL@ READ FILE = bus_pnrn.tb  ;---- Bus PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = met_pnrn.tb  ;---- Metro PNR lots (nodes)
@DRIVE_MODEL@ READ FILE = com_pnrn.tb  ;---- Commuter Rail PNR lots (nodes)

@DRIVE_MODEL@ READ FILE = bus_pnrl.tb  ;---- Bus-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = met_pnrl.tb  ;---- Metro-PNR connectors (links)
@DRIVE_MODEL@ READ FILE = com_pnrl.tb  ;---- Commuter Rail-PNR connectors (links)

;---- Access Links (modes 11, 12 and 16) ----

READ FILE = met_bus.tb   ;--- bus-metro links&xfer cards
READ FILE = com_bus.tb   ;--- bus-commuter rail links&xfer car

READ FILE = walk_@TIME_PERIOD@.tb ;--- walk to local transit

@DRIVE_MODEL@READ FILE = pnr_@TIME_PERIOD@.tb;--- drive to transit

;---- Dummy Centroid Access Links (mode 14) ----

;---- Sidewalk Network (mode 13) ----

READ FILE = wlknet.tb;--- walk network for transfers

;---- Transit Line Cards (modes 1-9) ----

READ FILE = MODE1@TIME_PERIOD@.TB  ;---- M1- metrobus local
READ FILE = MODE2@TIME_PERIOD@.TB  ;---- M2- metrobus express
READ FILE = MODE3@TIME_PERIOD@.TB  ;---- M3- metrorail
READ FILE = MODE4@TIME_PERIOD@.TB  ;---- M4- commuter rail
READ FILE = MODE5@TIME_PERIOD@.TB  ;---- M5- other rail (future)
READ FILE = MODE6@TIME_PERIOD@.TB  ;---- M6- other local bus
READ FILE = MODE7@TIME_PERIOD@.TB  ;---- M7- other express bus
READ FILE = MODE8@TIME_PERIOD@.TB  ;---- M8- other local bus
READ FILE = MODE9@TIME_PERIOD@.TB  ;---- M9- other express bus

;---- Reports -----
; Path Tracing
; Consider these "i"s           to      these "j"s
; -----------------------------         ---------
;   8 Downtwn      1236 Rosslyn               8  Downtwn
;  64 Union Sta    1337 Alexandria           64  Union Sta
; 345 Bethesda     1537 Tysons Crnr         345  Bethesda
; 362 Silver Spr   1554 Ft Belvoir          362  Silver Spr
; 464 N.SilverSpr  1619 Vienna             1231  Pentagon
; 578 Shady Gr Rd  1698 Dulles AP          1236  Rosslyn
; 829 Andrews AFB  1716 Reston             1337  Alexandria
; 927 New Carrltn  1842 Leesburg           1537  Tysons
;1043 Frederick    1942 Dale City
;1231 Pentagon     1967 Manassas


Select   i = 451, 692
trace = (i = 451, 692  &
         j = 8, 64)
;; REPORT LINES = NAME, MODE  ; added by rm 4/09/04 to ensure line listings
                           ; with or without 'RT=' commands in transit line files
ENDRUN

ENDLOOP

ENDLOOP
```

36 Trip_Distribution.s

```
;------------------------------------------------------------------
; TRIP_DISTRIBUTION.S
;
; Version 2.3  Model
;  Note: Bucket rounding is maintained as MC model (COGMC) works with integer
;        trips.  Bucket rounding in the future (when a new MC model is used)
;$
; Trip_Distribution.s - V2.1C Model with ICC changes (JPark) and
;    improved toll modeling changes (RMilone) - Toll changes in ';$' Blocks
;$
; MWCOG  Version 2 Trip Distribution
; Update 8/28/02 rjm
; Note:  Corrected misspecified MAXITERS (was MAXITRS) key word  11/05/02
;        9/8/04 Updated Post-Distribution External adjustments for all purposes
;        to handle 6-figure external Ps/As. rm
;$ 12/23/05 Updated input Z-filenames to read TRIP_GENERATIONR.S outputs
;           (which are now decimal).  Bucket rounding of Trip Dist. output tabs.
;                                     maintained.
;$ 11/07/06 Jurisdiction-to TAZ equivalency file updated to reflect
;  change in Montgomery / prince Georges zone ranges (2-zone annexation)
;
;$ 02/22/07  Bucket Rounding Removed per the Nested Logit Implementation
;            Note: Output tables used for inputs to the ML mode choice model
;             are still created, but are not written in MINUTP format
;            %_iter_%_hbwmu.ptt,MO=1;  ,FORMAT=MINUTP
;            %_iter_%_hbsmu.ptt,MO=2;  ,FORMAT=MINUTP
;            %_iter_%_hbomu.ptt,MO=3;  ,FORMAT=MINUTP
;            %_iter_%_nhbmu.ptt,MO=4;  ,FORMAT=MINUTP
;
;$ 02/23/07  Trip tables produced for the nested logit model
;
;            %_iter_%_hbw_NL.ptt
;            %_iter_%_hbs_NL.ptt
;            %_iter_%_hbo_NL.ptt
;            %_iter_%_nhb_NL.ptt
;$ 04/15/08  Trip tables produced for the nested logit model
;            Total transit skims used in Composite time calulation
;             are based on Bus/Metrorail paths
;             as these are most closely resemble the V2.2 Trip dist. calibration
;             work
;
;04/28/08  Commercial model added & Truck models updated by bill allen
;
;------------------------------------------------------------------
;
;
;
;Environment Variables:
;            %_iter_%  ;---- Run Interation (pp, bs, i1, i2)
;            %_year_%  ;
;            %_alt_%   ;
;
;Global Variables:
ZONESIZE = 2191 ; No. of TAZs, both Internal & External
; //////////////////////////////////////////////////////////////////////
; \\\\\\\\\    INPUT/OUTPUT FILENAMES HERE:                  \\\\\\\\\\
; \\\\\\\\\    In TP Main                                    \\\\\\\\\\
; //////////////////////////////////////////////////////////////////////
;
;
; ===================================================================
; == The Output Trip Distribution Filenames of this Program are:   ==
; ===================================================================
```

```
;
HBWTDOUT = 'hbwest%_iter_%.ptt'  ; HBW Person   Trips-7TABS
(INC1..INC4,EXT_INTRST,EXT_ART,TOTAL)
HBSTDOUT = 'hbsest%_iter_%.ptt'  ; HBS Person   Trips-7TABS
HBOTDOUT = 'hboest%_iter_%.ptt'  ; HBO Person   Trips-7TABS
NHBTDOUT = 'nhbest%_iter_%.ptt'  ; NHB Person   Trips-4TABS (INTL
,EXT_INTRST,EXT_ART,TOTAL)
COMTDOUT = 'comest%_iter_%.vtt'  ; Commercial   Trips-2 TABS (INTL, EXTL)
MTKTDOUT = 'mtkest%_iter_%.vtt'  ; Medium Truck Trips-2 TABS
HTKTDOUT = 'htkest%_iter_%.vtt'  ; Heavy Truck  Trips-2 TABS
;
; ==================================================================
; == Trip table Files Created for the Nested Logit MC Model will be ==
; ==================================================================
;
;
;   %_iter_%_hbw_NL.ptt ; HBW Person Trips, by income level(4tabs, Inc1..Inc4)
;   %_iter_%_hbs_NL.ptt ; HBS Person Trips, by income level(4tabs, Inc1..Inc4)
;   %_iter_%_hbo_NL.ptt ; HBO Person Trips, by income level(4tabs, Inc1..Inc4)
;   %_iter_%_nhb_NL.ptt ; NHB Person Trips, interal trips  (1tab)
;
;
; =================================================================
; == The Input Filenames of this Program are:                    ==
; =================================================================
; -----------------------------------------------------------------
; Land Use and Network Files:
;
itr = '%_iter_%'
LUFILE  = 'inputs\zone.asc'                      ;  LAND USE FILE
HWYTERM = 'ztermtm.asc'                          ;  Zonal HWY TERMINAL TIME


 AMSOVSKM = 'SOV%_prev_%am.skm'                   ;  AM  HWY TIME SKIMS
 OPSOVSKM = 'SOV%_prev_%op.skm'                   ;  OP  HWY TIME SKIMS
 AWTRNSKM = '%_prev_%_am_wk_BM.ttt'               ;  AM WK ACC TRN TIME SKIMS -
Bus/Metrorail
 ADTRNSKM = '%_prev_%_am_dr_BM.ttt'               ;  AM DR ACC TRN TIME SKIMS - Bus
Metrorail
 OWTRNSKM = '%_prev_%_op_wk_BM.ttt'               ;  OP WK ACC TRN TIME SKIMS - Bus
Metrorail
 ODTRNSKM = '%_prev_%_op_dr_BM.ttt'               ;  OP DR ACC TRN TIME SKIMS - Bus
Metrorail

 OPTRKSKM = 'trk%_prev_%op.skm'                   ;  OP Truck TIME SKIMS - Bus
Metrorail

; -----------------------------------------------------------------
; Trip-End (P/A) Input Files:
;
HBWPROINC= 'hbwpros_inc.txt'; HBW Productions - for four income levels (Intl only)
HBWPROALL= 'hbwpros_all.txt'; HBW Productions - Total/NonStratified    (Intl&Extl)

HBWATTINC= 'hbwattrs_inc.txt'; HBW Attractions - for four income levels (Intl only)
HBWATTALL= 'hbwattrs_all.txt'; HBW Attractions - Total/NonStratified    (Intl&Extl)

HBSPROINC= 'hbspros_inc.txt'; HBS Productions - for four income levels (Intl only)
HBSPROALL= 'hbspros_all.txt'; HBS Productions - Total/NonStratified    (Intl&Extl)

HBSATTINC= 'hbsattrs_inc.txt'; HBS Attractions - for four income levels (Intl only)
HBSATTALL= 'hbsattrs_all.txt'; HBS Attractions - Total/NonStratified    (Intl&Extl)

HBOPROINC= 'hbopros_inc.txt'; HBO Productions - for four income levels (Intl only)
HBOPROALL= 'hbopros_all.txt'; HBO Productions - Total/NonStratified    (Intl&Extl)

HBOATTINC= 'hboattrs_inc.txt'; HBO Attractions - for four income levels (Intl only)
HBOATTALL= 'hboattrs_all.txt'; HBO Attractions - Total/NonStratified    (Intl&Extl)
```

```
NHBPROINT= 'nhbattrs_int.txt'; NHB Productions (Same as final/scaled attractions)
- (Intl only)
NHBPROALL= 'nhbattrs_all.txt'; NHB Productions (Same as final/scaled attractions)
- (Intl&Extl)

NHBATTINT= 'nhbattrs_int.txt'; NHB Attractions     - (Intl only)
NHBATTALL= 'nhbattrs_all.txt'; NHB Attractions     - (Intl&Extl)

COMPROINT= 'compros_int.txt'; Com Veh Productions - (Intl only)
COMPROALL= 'compros_all.txt'; Com Veh Productions - (Intl&Extl)

MTKPROINT= 'mtkpros_int.txt'; Med Trk Productions - (Intl only)
MTKPROALL= 'mtkpros_all.txt'; Med Trk Productions - (Intl&Extl)

HTKPROINT= 'htkpros_int.txt'; Hvy Trk Productions - (Intl only)
HTKPROALL= 'htkpros_all.txt'; Hvy Trk Productions - (Intl&Extl)


;$
; -----------------------------------------------------------------
; Equivalent minutes (min/'80$) by income level (for toll modeling)
;
toll_inc   = 'inputs\toll.inc'    ;
;
; -----------------------------------------------------------------
;$
; -----------------------------------------------------------------
; Zonal-to-Zone Time Penalty Tables
;
HBWPEN   = '..\support\hbwpen.dat'    ;  HBW TIME PENALITES
HBSPEN   = '..\support\hbspen.dat'    ;  HBS TIME PENALITES
HBOPEN   = '..\support\hbopen.dat'    ;  HBO TIME PENALITES
NHBPEN   = '..\support\nhbpen.dat'    ;  NHB TIME PENALITES

; -----------------------------------------------------------------
; Zonal K-factor Files
;
HBWK     = '..\support\hbwk.dat'    ;
HBSK     = '..\support\hbsk.dat'    ;
HBOK     = '..\support\hbok.dat'    ;
NHBK     = '..\support\nhbk.dat'    ;

; -----------------------------------------------------------------
; Friction Factor Files:
;
IHBWFFS   = '..\support\HBWV2.FFS' ; HBW       6 Curves
IHBSFFS   = '..\support\HBSV2.FFS' ; HBS       6 Curves
IHBOFFS   = '..\support\HBOV2.FFS' ; HBO       6 Curves
INHBFFS   = '..\support\NHBV2.FFS' ; NHB       3 Curves
ICVTFFS   = '..\support\CVTV2.FFS' ; NHB       6 Curves
;
; Note:  Sequence of F-Factor Curves:
;           | File:
;           | IHBWFFS      IHBSFFS       IHBOFFS      INHBFFS            ICVTFFS
;  Curve #  | (work)       (shop)        (other)      (NHB)
(COM/TRK)
; --------- |---------------------------------------------------------------------
--
;    1      | intl/inc 1    intl/inc 1    intl/inc 1    intl NHB           intl COM
;    2      | intl/inc 2    intl/inc 2    intl/inc 2    extl/interst/NHB    intl MTK
;    3      | intl/inc 3    intl/inc 3    intl/inc 3    extl/arter./NHB     intl HTK
;    4      | intl/inc 4    intl/inc 4    intl/inc 4                       extl COM
;    5      | extl/interst. extl/interst. extl/interst.                    extl MTK
;    6      | extl/arter.   extl/arter.   extl/arter.                      extl HTK
;
; -----------------------------------------------------------------
; ////////////////////////////////////////////////////////////////////
; \\\\\\\\\   End of Input/Output File Section                  \\\\\\
```

```
; //////////////////////////////////////////////////////////////////////
;
;
; //////////////////////////////////////////////////////////////////////
; \\\\\\\\\    BEGIN TP+                                          \\\\\\
; //////////////////////////////////////////////////////////////////////
;
; //////////////////////////////////////////////////////////////////////
; \\\\\\\\\    1) Add Highway Terminal Times to AM, Off-peak     \\\\\\
; \\\\\\\\\       SOV and Truck Skims                             \\\\\\
; //////////////////////////////////////////////////////////////////////

RUN PGM=MATRIX
zones=@ZONESIZE@
;  READ ZONAL EMPLOYMENT AND AREA FROM 'STANDARD' V2 LAND USE FILE

ZDATI[1]= @hwyterm@, Z=1-4,hterm=27-28

;  READ AM PEAK & OFF-PEAK SOV TIME SKIM FILE (IN WHOLE MIN)

  MATI[1] = @AMSOVSKM@   ;  INPUT AM PK  SKIM FILE
  MATI[2] = @OPSOVSKM@   ;  INPUT OFF-PK SKIM FILE
  MATI[3] = @OPTRKSKM@   ;  INPUT OFF-PK TRUCK SKIM FILE

  MW[1]   = MI.1.1       ;  INPUT AM PK  SKIM FILE
  MW[2]   = MI.2.1       ;  INPUT OFF-PK SKIM FILE
  MW[5]   = MI.3.1       ;  INPUT OFF-PK TRUCK SKIM FILE

;
; Now add the terminal times to the AM/OP travel times below
; (terminal times added only to connected interchanges)
;
; For the truck skims, put a big number in unconnected
;  interchanges, to prevent gravity model from estimating
;  trips for them.  This includes truck-inaccessible zones
;  and intrazonal interchanges for external stations.
;
JLOOP
    IF  (MW[1] > 0)
         MW[3] = MW[1] + zi.1.hterm[I] + zi.1.hterm[J]
         ELSE
         MW[3] = MW[1]
    ENDIF

    IF  (MW[2] > 0)
         MW[4] = MW[2] + zi.1.hterm[I] + zi.1.hterm[J]
         ELSE
         MW[4] = MW[2]
    ENDIF

    IF  (MW[5] > 0)
         MW[6] = MW[5] + zi.1.hterm[I] + zi.1.hterm[J]
    ELSE
         MW[6] = 100000
    ENDIF

ENDJLOOP

;
; Establish Intrazonal Values for Network Time Skims
; --  Values equal to 50% of single lowest nonzero interzonal value
; IMPOSE MAX INTRAZONAL TRAVEL TIME JCPARK 6/18/03
; NO INTRAZONAL TT OVERRIDES FOR RUN 12B2 JCPARK 6/24/03

JLOOP
 IF (I=J)
      MW[3]=ROUND(0.50 * LOWEST(3,1,0.0001,99999.9))
      MW[4]=ROUND(0.50 * LOWEST(4,1,0.0001,99999.9))
      MW[6]=ROUND(0.50 * LOWEST(6,1,0.0001,99999.9))

 ENDIF
ENDJLOOP

; WRITE OUT FINAL TIME SKIMS

 MATO[1] = SOVAMTT.SKF, MO=3; output am sov time(min) w/ o&d term&intra times
 MATO[2] = SOVOPTT.SKF, MO=4; output op sov time(min) w/ o&d term&intra times
 MATO[3] = TRKOPTT_%_iter_%.SKF, MO=6; output op trk time(min) w/ o&d term&intra
times

; print a row 1 of I/O matrices for checking

   IF  (I =92)
     PRINTROW MW=1-10
   ENDIF

ENDRUN

; //////////////////////////////////////////////////////////////////////
; \\\\\\\\\    2) Compute Composite Impedances to by used in       \\\
; \\\\\\\\\       Trip Distribution for HBW, HBS, HBO, NHB Purposes \\\
; //////////////////////////////////////////////////////////////////////


RUN PGM=MATRIX
ZONES=@ZONESIZE@

; COMPUTATION OF COMPOSITE IMPEDANCES
;  READ AM PEAK & OFF-PEAK SOV TIME SKIM FILE (IN WHOLE MIN)

MATI[1] = SOVAMTT.SKF  ;  AM  PK HWY TIME FILE W/ TERM&INTRAZNL VALUES
MATI[2] = SOVOPTT.SKF  ;  OFF-PK HWY TIME FILE W/ TERM&INTRAZNL VALUES

MATI[3] = @AWTRNSKM@   ;  AM  PK WALK ACC TRN SKIM FILE
MATI[4] = @ADTRNSKM@   ;  AM  PK AUTO ACC TRN SKIM FILE
MATI[5] = @OWTRNSKM@   ;  OFF-PK WALK ACC TRN SKIM FILE
MATI[6] = @ODTRNSKM@   ;  OFF-PK AUTO ACC TRN SKIM FILE

;$
MATI[7] = @AMSOVSKM@   ;  INPUT AM PK  tolls in 80 cents (on table 3)
MATI[8] = @OPSOVSKM@   ;  INPUT OFF-PK tolls in 80 cents (on table 3)
;
 READ FILE =@TOLL_INC@  ;  READ in equivalent min/80$ by income group
;
;$

; ESTABLISH WORK MATRICES:

MW[1]=MI.1.1            ; AM  PK HWY TIME FILE W/ TERM&INTRAZNL VALUES
MW[2]=MI.2.1            ; OFF-PK HWY TIME FILE W/ TERM&INTRAZNL VALUES
;
;-----------------------; Make Sure interzonal (conn.or disconn.)
JLOOP                   ; have a minimum of 1 minute
  IF (MW[1] = 0.0)      ;
      MW[1] = 1.0       ;
  ENDIF                 ;
  IF (MW[2] = 0.0)      ;
      MW[2] = 1.0       ;
  ENDIF                 ;
ENDJLOOP                ;
;-----------------------;
;

;$
;-
; add equivalent 'tolled' AM/OP highway time to normal times by income level
```

```
; AM pk normal + equivalent hwy time in work tables 61-64
; Offpk normal + equivalent hwy time in work tables 71-74

      MW[61] = Round(MW[1] + ((MI.7.3/100.0) * i1PKEQM)) ;i1 AM hwy time w/eqv
      MW[62] = Round(MW[1] + ((MI.7.3/100.0) * i2PKEQM)) ;i2 AM hwy time w/eqv
      MW[63] = Round(MW[1] + ((MI.7.3/100.0) * i3PKEQM)) ;i3 AM hwy time w/eqv
      MW[64] = Round(MW[1] + ((MI.7.3/100.0) * i4PKEQM)) ;i4 AM hwy time w/eqv

      MW[71] = Round(MW[2] + ((MI.8.3/100.0) * i1OPEQM)) ;i1 OP hwy time w/eqv
      MW[72] = Round(MW[2] + ((MI.8.3/100.0) * i2OPEQM)) ;i2 OP hwy time w/eqv
      MW[73] = Round(MW[2] + ((MI.8.3/100.0) * i3OPEQM)) ;i3 OP hwy time w/eqv
      MW[74] = Round(MW[2] + ((MI.8.3/100.0) * i4OPEQM)) ;i4 OP hwy time w/eqv
;
;
;
;
;
MW[3]=MI.3.1            ; AM  PK WALK ACC TOTAL TRN TIME FILE
MW[4]=MI.4.1            ; AM  PK AUTO ACC TOTAL TRN TIME FILE

MW[5]=MI.5.1            ; OFF-PK WALK ACC TOTAL TRN TIME FILE
MW[6]=MI.6.1            ; OFF-PK AUTO ACC TOTAL TRN TIME FILE

;FIRST, FIND 'BEST' WALK/AUTO TRANSIT TIME BOTH AM AND OFF-PK CONDITIONS
; BEST AM TRN TIME STORED IN MW11, BEST OP TRN TIME STORED IN MW12

  JLOOP
     IF (MW[3] > 0 && MW[4] > 0)      ; 'BEST' AM PK TRN TIME
        MW[11] = MIN(MW[3],MW[4])     ; WILL BE THE MINIMUM OF
     ELSE                             ; NON-ZERO WALK/AUTO TIMES OR
        MW[11] = MAX(MW[3],MW[4])     ; THE ONE THAT'S CONNECTED
     ENDIF

     IF (MW[5] > 0 && MW[6] > 0)      ;  SAME FOR OFF PEAK
        MW[12] = MIN(MW[5],MW[6])     ;
     ELSE                             ;
        MW[12] = MAX(MW[5],MW[6])     ;
     ENDIF
  ENDJLOOP

; NOW COMPUTE HBW,HBS,HBO,NHB COMPOSITE IMPEDANCES
;
JLOOP
 IF (MW[11] = 0 || I = J)
   MW[15] = MW[61]
   MW[16] = MW[62]
   MW[17] = MW[63]
   MW[18] = MW[64]
 ELSE
   MW[15] = ROUND (1.0/((1.0/MW[61])+(0.2572/MW[11]))) ; HBW -INC 1 CI MTX
   MW[16] = ROUND (1.0/((1.0/MW[62])+(0.1484/MW[11]))) ; HBW -INC 2 CI MTX
   MW[17] = ROUND (1.0/((1.0/MW[63])+(0.1365/MW[11]))) ; HBW -INC 3 CI MTX
   MW[18] = ROUND (1.0/((1.0/MW[64])+(0.1402/MW[11]))) ; HBW -INC 4 CI MTX
 ENDIF

 IF (MW[12] = 0 || I = J)
   MW[20] =  MW[71]
   MW[21] =  MW[72]
   MW[22] =  MW[73]
   MW[23] =  MW[74]

   MW[25] =  MW[71]
   MW[26] =  MW[72]
   MW[27] =  MW[73]
   MW[28] =  MW[74]

   MW[30] =  MW[72]
 ELSE
   MW[20] = ROUND (1.0/((1.0/MW[71])+(0.0518/MW[12]))) ; HBS -INC 1 CI MTX
   MW[21] = ROUND (1.0/((1.0/MW[72])+(0.0235/MW[12]))) ; HBS -INC 2 CI MTX
   MW[22] = ROUND (1.0/((1.0/MW[73])+(0.0093/MW[12]))) ; HBS -INC 3 CI MTX
   MW[23] = ROUND (1.0/((1.0/MW[74])+(0.0075/MW[12]))) ; HBS -INC 4 CI MTX

   MW[25] = ROUND (1.0/((1.0/MW[71])+(0.0755/MW[12]))) ; HBO -INC 1 CI MTX
   MW[26] = ROUND (1.0/((1.0/MW[72])+(0.0311/MW[12]))) ; HBO -INC 2 CI MTX
   MW[27] = ROUND (1.0/((1.0/MW[73])+(0.0186/MW[12]))) ; HBO -INC 3 CI MTX
   MW[28] = ROUND (1.0/((1.0/MW[74])+(0.0244/MW[12]))) ; HBO -INC 4 CI MTX

   MW[30] = ROUND (1.0/((1.0/MW[72])+(0.0483/MW[12]))) ; NHB
 ENDIF

ENDJLOOP

MATO[1] = HBWTDIMP.MAT, MO=15,16,17,18 ;HBW COMP.IMPEDANCES-INC.LEVELS 1-4
MATO[2] = HBSTDIMP.MAT, MO=20,21,22,23 ;HBS COMP.IMPEDANCES-INC.LEVELS 1-4
MATO[3] = HBOTDIMP.MAT, MO=25,26,27,28 ;HBO COMP.IMPEDANCES-INC.LEVELS 1-4
MATO[4] = NHBTDIMP.MAT, MO=30          ;NHB COMP.IMPEDANCE
;
;$
;
; NOW, WRITE OUT THE RESULTS OF SELECTED INTERCHANGES FOR CHECKING
;     AND COMPARING WITH MINUTP
JLOOP INCLUDE=1 ; WILL PROCESS ONLY FOR J=1
  PRINT LIST = I(4),' ',J(4),' ',mw[15](5),mw[16](5),mw[17](5),mw[18](5),
        FILE =ci_hbw.chk
  PRINT LIST = I(4),' ',J(4),' ',mw[20](5),mw[21](5),mw[22](5),mw[23](5),
        FILE =ci_hbs.chk
  PRINT LIST = I(4),' ',J(4),' ',mw[25](5),mw[26](5),mw[27](5),mw[28](5),
        FILE =ci_hbo.chk
  PRINT LIST = I(4),' ',J(4),' ',mw[30](5),
        FILE =ci_nhb.chk
ENDJLOOP
ENDRUN

; //////////////////////////////////////////////////////////////////////
; \\\\\\\\\    3) Compute Impedance files to be used in the External \\
; \\\\\\\\\       Trip Distribution processing                       \\
; //////////////////////////////////////////////////////////////////////


RUN PGM=MATRIX
ZONES  =@ZONESIZE@

MATI[1] = SOVAMTT.SKF  ;  AM  PK HWY TIME FILE W/ TERM&INTRAZNL VALUES
MATI[2] = SOVOPTT.SKF  ;  OFF-PK HWY TIME FILE W/ TERM&INTRAZNL VALUES

MW[1]=MI.1.1           ;  AM  PK HWY TIME FILE W/ TERM&INTRAZNL VALUES
MW[2]=MI.2.1           ;  OFF-PK HWY TIME FILE W/ TERM&INTRAZNL VALUES

;  Development of Peak, Off-Peak SOV Travel times to be used
;  for External Trip distribution of Interstate and Arterial Trip Dist.
;
;  2 skim files will be written:
;  MW[11] - AM Time Period, External ij's
;  MW[12] - OffPeak Period, External ij's
;
;   First, set work matrices equal to 'Full' AM, Off-peak time skims
;
 MW[11] = MW[1]    ; AM
 MW[12] = MW[2]    ; Off-Pk

; next, put very large time value into all
; i-i and x-x ijs

 IF  (I =    1-2144)
    MW[11] =   200, INCLUDE=    1-2144 ; i-i ijs
```

```
   MW[12] =   200, INCLUDE=    1-2144 ; i-i ijs
 ELSE
   MW[11] =   200, INCLUDE= 2145-2191 ; x-x ijs
   MW[12] =   200, INCLUDE= 2145-2191 ; x-x ijs
 ENDIF

; WRITE OUT EXTERNAL TRIP DISTRIBUTION IMPEDANCE TABLES

MATO[1] = SOVAMTTE.skf, MO=11 ;  AM -PK Time skims for Extl trip dist.
MATO[2] = SOVOPTTE.skf, MO=12 ;  Off-PK Time skims for Extl trip dist.
ENDRUN
;
; ////////////////////////////////////////////////////////////////////////
; \\\\\\\\\    4) Add time penalty files to composite impedance      \\
; \\\\\\\\\       skims.                                             \\
; ////////////////////////////////////////////////////////////////////////


RUN PGM=MATRIX
ZONES=@ZONESIZE@

; ADD TIME PENALTIES TO COMPOSITE TIME MATRICES
;  READ AM PEAK & OFF-PEAK SOV TIME SKIM FILE (IN WHOLE MIN)

MATI[1] = @HBWPEN@       ;  2191 TAZ LEVEL HBW TIME PENS. INC 1-4
MATI[2] = @HBSPEN@       ;                 HBS TIME PENS. INC 1-4
MATI[3] = @HBOPEN@       ;                 HBO TIME PENS. INC 1-4
MATI[4] = @NHBPEN@       ;                 NHB TIME PENS.

MATI[11] = HBWTDIMP.MAT ; HBW COMP.IMPEDANCES - INC.LEVELS 1-4
MATI[12] = HBSTDIMP.MAT ; HBS COMP.IMPEDANCES - INC.LEVELS 1-4
MATI[13] = HBOTDIMP.MAT ; HBO COMP.IMPEDANCES - INC.LEVELS 1-4
MATI[14] = NHBTDIMP.MAT ; NHB COMP.IMPEDANCE


; ESTABLISH WORK FILES FOR TIME PENALTIES
;    HBW/INC 1-4      HBS/INC 1-4      HBO/INC 1-4         NHB
; --------------   ---------------  ----------------  ----------------
MW[1] = MI.1.1, MW[5] = MI.2.1, MW[9]  = MI.3.1,  MW[13] = MI.4.1
MW[2] = MI.1.2, MW[6] = MI.2.2, MW[10] = MI.3.2
MW[3] = MI.1.3, MW[7] = MI.2.3, MW[11] = MI.3.3
MW[4] = MI.1.4, MW[8] = MI.2.4, MW[12] = MI.3.4


; ESTABLISH WORK FILES FOR COMPOSITE TIMES
;    HBW/INC 1-4      HBS/INC 1-4      HBO/INC 1-4         NHB
; --------------   ---------------  ----------------  ----------------
MW[21] = MI.11.1, MW[25] = MI.12.1, MW[29] = MI.13.1, MW[33] = MI.14.1
MW[22] = MI.11.2, MW[26] = MI.12.2, MW[30] = MI.13.2
MW[23] = MI.11.3, MW[27] = MI.12.3, MW[31] = MI.13.3
MW[24] = MI.11.4, MW[28] = MI.12.4, MW[32] = MI.13.4

;
; NOW, MERGE THE TIME PENALTIES IN WITH THE COMPOSITE TIMES
;
MW[40] = MW[1]  +  MW[21] ; FINAL HBW INC 1 COMPOSITE TIMES
MW[41] = MW[2]  +  MW[22] ; FINAL HBW INC 2 COMPOSITE TIMES
MW[42] = MW[3]  +  MW[23] ; FINAL HBW INC 3 COMPOSITE TIMES
MW[43] = MW[4]  +  MW[24] ; FINAL HBW INC 4 COMPOSITE TIMES

MW[44] = MW[5]  +  MW[25] ; FINAL HBS INC 1 COMPOSITE TIMES
MW[45] = MW[6]  +  MW[26] ; FINAL HBS INC 2 COMPOSITE TIMES
MW[46] = MW[7]  +  MW[27] ; FINAL HBS INC 3 COMPOSITE TIMES
MW[47] = MW[8]  +  MW[28] ; FINAL HBS INC 4 COMPOSITE TIMES

MW[48] = MW[9]  +  MW[29] ; FINAL HBO INC 1 COMPOSITE TIMES
MW[49] = MW[10] +  MW[30] ; FINAL HBO INC 2 COMPOSITE TIMES
MW[50] = MW[11] +  MW[31] ; FINAL HBO INC 3 COMPOSITE TIMES
```

```
MW[51] = MW[12] +  MW[32] ; FINAL HBO INC 4 COMPOSITE TIMES

MW[52] = MW[13] +  MW[33] ; FINAL NHB       COMPOSITE TIME
;
; Write out composite Impedance Tables
; The files are purpose-specific, HB purpose files have 4 tables
;   corresponding to income levels

MATO[1] = HBWCI1_4.DAT, MO=40-43 ;  HBW Composite Impedances/Incomes 1-4
MATO[2] = HBSCI1_4.DAT, MO=44-47 ;  HBS Composite Impedances/Incomes 1-4
MATO[3] = HBOCI1_4.DAT, MO=48-51 ;  HBO Composite Impedances/Incomes 1-4
MATO[4] = NHBCI.DAT   , MO=52    ;  NHB Composite Impedance

; End of Composite Impedance Development
ENDRUN
;---------------------------------------------------------------------


; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|
; |//////   5) Start HBW Trip Distribution Here:             /////|
; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|

RUN PGM=TRIPDIST
  MATI= HBWCI1_4.DAT,   ; Composite Time Impedances HBW Inc.Levels 1-4
        SOVAMTTE.skf,   ; AM Travel Time Imped. for Extl/Int. Trip Dist.
        @HBWK@          ; HBW Kfactors (Scaled by 1000.0)

; Put impedance matrices in work tables 11-16
; tabs 11-14 are comp.time for inc.levels 1,2,3,4, tabs 15,16 are
; both AM pk SOV time. All impedance and time values are in whole minutes.

  FILLMW MW[11]  = MI.1.1,2,3,4,MI.2.1,MI.2.1

; Put K-factor matrix in work table 20
; The k-factor values are scaled by 1000s (eg, a mtx value of '1000'=1.0)
; the K-factors are appiled across all HBW distributions

  FILLMW MW[20] = MI.3.1
  DUMMY = ROWFAC(20,0.001) ; scale k-factor's to 'true' units

ZDATI[1]  = @HBWPROINC@, Z=#1,P1=#2,    ; HBW Inc. 1    productions
                              P2=#3,    ; HBW Inc. 2    productions
                              P3=#4,    ; HBW Inc. 3    productions
                              P4=#5     ; HBW Inc. 4    productions
ZDATI[2]  = @HBWPROALL@, Z=#1,P5=#2     ; HBW Totl      productions

ZDATI[3]  = @HBWATTINC@, Z=#1,A1=#2,    ; HBW Inc. 1    attractions
                              A2=#3,    ; HBW Inc. 2    attractions
                              A3=#4,    ; HBW Inc. 3    attractions
                              A4=#5     ; HBW Inc. 4    attractions
ZDATI[4]  = @HBWATTALL@, Z=#1,A5=#2     ; HBW Totl      attractions

LOOKUP FILE = @IHBWFFS@,INTERPOLATE=N,SETUPPER=T,FAIL=,0,,NAME = FF,
       LOOKUP[1] = 1, RESULT = 2,  ; HBW INC 1           F-FACTORS
       LOOKUP[2] = 1, RESULT = 3,  ; HBW INC 2           F-FACTORS
       LOOKUP[3] = 1, RESULT = 4,  ; HBW INC 3           F-FACTORS
       LOOKUP[4] = 1, RESULT = 5,  ; HBW INC 4           F-FACTORS
       LOOKUP[5] = 1, RESULT = 6,  ; HBW Extl-Interstate F-FACTORS
       LOOKUP[6] = 1, RESULT = 7   ; HBW Extl-Arterial   F-FACTORS

;  Establish production and attraction vectors here:

SETPA P[1] = P1, P[2] = P2, P[3] = P3, P[4] = P4, P[5] = P5, P[6] = P5
SETPA A[1] = A1, A[2] = A2, A[3] = A3, A[4] = A4, A[5] = A5, A[6] = A5

MAXITERS = 7    ; specify GM iterations to be 7
```

```
;  Establish gravity model run files & parameters
GRAVITY  PURPOSE  = 1, LOS=MW[11], FFACTORS= FF, KFACTORS = MW[20]
GRAVITY  PURPOSE  = 2, LOS=MW[12], FFACTORS= FF, KFACTORS = MW[20]
GRAVITY  PURPOSE  = 3, LOS=MW[13], FFACTORS= FF, KFACTORS = MW[20]
GRAVITY  PURPOSE  = 4, LOS=MW[14], FFACTORS= FF, KFACTORS = MW[20]
GRAVITY  PURPOSE  = 5, LOS=MW[15], FFACTORS= FF, KFACTORS = MW[20]
GRAVITY  PURPOSE  = 6, LOS=MW[16], FFACTORS= FF, KFACTORS = MW[20]


MATO = EST.TEM,MO=1-6 ;   Final HBW  trip table(s)
                         ;       T1 - HBW Inc. Level 1 (i-i)
                         ;       T2 - HBW Inc. Level 2 (i-i)
                         ;       T3 - HBW Inc. Level 3 (i-i)
                         ;       T4 - HBW Inc. Level 4 (i-i)
                         ;       T5 - HBW ALL (Extl/Interst. FFs)
                         ;       T6 - HBW ALL (Extle/Arter.  FFs)
; Note: The External Interstate and Arterial trips (t5 & t6) will be
; refined in the next two matrix runs

ENDRUN
;
;
;--------------------------------------------------------------------
; Refinement of External Trip Distribution Trip Tables
; (External Interstate and External Arterial Trips)
; There are two MATRIX steps
;    1) This program reads the external interstate and external arterial
;    tables produced from the external trip dist. process above. The
;    program wipes out trips in internal or through trip interchanges
;    if any exist (there may be a small chance that some trips exist).
;    It also makes sure that no extl/art. trips exist in the
;    extl/interstate interchanges and vise-versa. Finally it writes out
;    an array containing the column totals of the total external trips.
;    to be used in the following program.
;
;    2) This program is used to make sure the row & column totals
;    of the external trip files match those of P/A files produced in
;    the trip generation process. the adjustment will affect the As
;    much more than the P's.
;--------------------------------------------------------------------


RUN PGM=MATRIX
  MATI= EST.TEM       ; read in initial ext trips from trip dist.
  ARRAY COLTOTX=2191  ; set up an array for init.col totals for ext trips

  MW[5]  = MI.1.5 ; Get Initial Extl Interstate table
  MW[6]  = MI.1.6 ; Get Initial Extl Arterial   table

  MW[15] = MW[5]  ; Store HBW trips with Extl/Interst.  FFs in MW15
  MW[16] = MW[6]  ; Store HBW trips with Extl/Arterial  FFs in MW16
;
; Now, strip away or zero out unwanted interchanges
; interstate-type external stations  MW[15]
;-
IF  (I =    1-2144)
  MW[15] =     0, INCLUDE=    1-2144 ; i-i ijs
ELSE
  MW[15] =     0, INCLUDE= 2145-2191 ; x-x ijs
ENDIF

IF  (I =      2145,2147-2148,2150-2153,2155,2157-2165,
              2167-2170,2172-2179,2181,2185-2186,2188-2190)
  MW[15] =     0 ; ext art. ijs
ENDIF

MW[15] =     0, INCLUDE=2145,2147-2148,2150-2153,2155,2157-2165,
              2167-2170,2172-2179,2181,2185-2186,2188-2190 ; ext art. ijs
```

```
;
; Now, strip away or zero out unwanted interchanges
; arterial-type external stations  MW[16]
;
IF  (I =    1-2144)
  MW[16] =     0, INCLUDE=    1-2144 ; i-i ijs
ELSE
  MW[16] =     0, INCLUDE= 2145-2191 ; x-x ijs
ENDIF

IF  (I =      2146,2149,2154,2156,2166,2171,2180,
              2182,2183,2184,2187,2191)
  MW[16] =     0 ; ext int.ijs
ENDIF

MW[16] =     0, INCLUDE=2146,2149,2154,2156,2166,2171,2180,
              2182,2183,2184,2187,2191 ; ext int.ijs
;
; -------------------------------------------------------------------
;  ACCUMULATE COLUMN TOTALS of ALL INITIAL EXTERNAL TRIPS
JLOOP
  COLTOTX[J]=COLTOTX[J] + MW[15][J] + MW[16][J]
ENDJLOOP

;
; NOW, WRITE OUT THE INITIAL COLUMN TOTALS FOR Later Use
IF (I=2191)
   LOOP K=2145,2191
        PRINT FORM=8,LIST=K, COLTOTX[K], FILE=IXCOLTOT.DAT
   ENDLOOP
ENDIF
MATO = EXT.TEM,MO=15,16 ;   Final HBW  trip table(s)

; --------------------------------------------------------------

RUN PGM=MATRIX
  MATI[1]= EXT.TEM
  MATI[2]= EST.TEM
  ZDATI[1]=@HBWPROALL@, Z=#1,RCNTL=#2     ; total trip gen. prod.totals
  ZDATI[2]=@HBWATTALL@, Z=#1,CCNTL=#2     ; total trip gen. attr.totals
  ZDATI[3]=IXCOLTOT.DAT, Z=#1,ICOLTOT=2

  FILLMW MW[1]  = MI.2.1,2,3,4
  FILLMW MW[5]  = MI.1.1,2

  ARRAY IROWTOTA= @ZONESIZE@

  ARRAY FROWTOT = @ZONESIZE@
  ARRAY FCOLTOT = @ZONESIZE@

  ARRAY ROWADJ  = @ZONESIZE@
  ARRAY COLADJ  = @ZONESIZE@

  MW[15] = MW[5]  ; Store HBW trips with Extl/Interst.  FFs in MW15
  MW[16] = MW[6]  ; Store HBW trips with Extl/Arterial  FFs in MW16

; --------------
IF (i=1-2144)
 JLOOP
    IF  (ICOLTOT[j]   = 0)
         COLADJ[J]    = 1.0
    ELSE
         COLADJ[J]    = CCNTL[j]/ICOLTOT[j]
    ENDIF
      MW[25] = MW[15][J]*COLADJ[J]
      MW[26] = MW[16][J]*COLADJ[J]
      FCOLTOT[J] = FCOLTOT[J]+ MW[25][J] + MW[26][J]
```

```
 endjloop
ELSE
 irowtota[i] = ROWSUM(15) + rowsum(16)

 JLOOP
    IF  (IrowTOTa[i]   = 0)
         rowADJ[i]    = 1.0
    ELSE
         rowADJ[i]    = RCNTL[i]/IROWTOTa[i]
    ENDIF
    MW[25] =  MW[15][J]*ROWADJ[i]
    MW[26] =  MW[16][J]*ROWADJ[i]
    FROWTOT[i]  = FROWTOT[i]  + MW[25][j] + MW[26][j]
 endjloop
endif

 ;
 ; Now replace full external trip tables with 'trimmed' tables
 ; and compute Final Total Trip Table


 MW[5] = MW[25]
 MW[6] = MW[26]
 DUMMY=ROWADD(7,1,2,3,4,5,6)


MATO = @HBWTDOUT@,MO=1-7 ;   Final HBW  trip table(s)

IF (I=2191) ; if at the last zone
   LIST = ' TAZ  inital  contrl   final  adjftr ',FILE=xcolHBW.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',ICOLTOT[INDEX](8),' ',CCNTL[INDEX](8),
                            FCOLTOT[INDEX](8),' ',coladj[INDEX](8.3),
             FILE=xcolHBW.asc
   ENDLOOP



   LIST = ' TAZ   inital  contrl   final  adjftr ',FILE=xrowHBW.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',IROWTOTA[INDEX](8),RCNTL[INDEX](8),
                            FROWTOT[INDEX](8),rowadj[INDEX](8.3),
             FILE=xROWHBW.asc
   ENDLOOP
ENDIF
;-------------------------------------------------------------------
; END of HBW Trip Distribution
;-------------------------------------------------------------------


; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|
; |//////   6) Start HBS Trip Distribution Here:             /////|
; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|

RUN PGM=TRIPDIST
  MATI= HBSCI1_4.DAT,   ; Composite Time Impedances HBS Inc.Levels 1-4
        SOVOPTTE.skf,   ; Off Pk    Time Imped. for Extl/Int. Trip Dist.
        @HBSK@          ; HBW Kfactors (Scaled by 1000.0)

; Put impedance matrices in work tables 11-16
; tabs 11-14 are comp.time for inc.levels 1,2,3,4, tabs 15,16 are
; both Offpk SOV time. All impedance and time values are in whole minutes.

  FILLMW MW[11]  = MI.1.1,2,3,4,MI.2.1,MI.2.1

; Put K-factor matrix in work table 20
; The k-factor values are scaled by 1000s (eg, a mtx value of '1000'=1.0)
; the K-factors are appiled across all HBS distributions

    FILLMW MW[20] = MI.3.1
    DUMMY = ROWFAC(20,0.001) ; scale k-factor's to 'true' units


  ZDATI[1]  = @HBSPROINC@, Z=#1,P1=#2,    ; HBS Inc. 1    productions
                               P2=#3,    ; HBS Inc. 2    productions
                               P3=#4,    ; HBS Inc. 3    productions
                               P4=#5     ; HBS Inc. 4    productions
  ZDATI[2]  = @HBSPROALL@, Z=#1,P5=#2     ; HBS Totl      productions

  ZDATI[3]  = @HBSATTINC@, Z=#1,A1=#2,    ; HBS Inc. 1    attractions
                               A2=#3,    ; HBS Inc. 2    attractions
                               A3=#4,    ; HBS Inc. 3    attractions
                               A4=#5     ; HBS Inc. 4    attractions
  ZDATI[4]  = @HBSATTALL@, Z=#1,A5=#2     ; HBS Totl      attractions


  LOOKUP FILE = @IHBSFFS@,INTERPOLATE=N,SETUPPER=T,FAIL=,0,,NAME = FF,
         LOOKUP[1] = 1, RESULT = 2,  ; HBS INC 1           F-FACTORS
         LOOKUP[2] = 1, RESULT = 3,  ; HBS INC 2           F-FACTORS
         LOOKUP[3] = 1, RESULT = 4,  ; HBS INC 3           F-FACTORS
         LOOKUP[4] = 1, RESULT = 5,  ; HBS INC 4           F-FACTORS
         LOOKUP[5] = 1, RESULT = 6,  ; HBS Extl-Interstate F-FACTORS
         LOOKUP[6] = 1, RESULT = 7   ; HBS Extl-Arterial   F-FACTORS

  ;  Establish production and attraction vectors here:

  SETPA P[1] = P1, P[2] = P2, P[3] = P3, P[4] = P4, P[5] = P5, P[6] = P5
  SETPA A[1] = A1, A[2] = A2, A[3] = A3, A[4] = A4, A[5] = A5, A[6] = A5

  MAXITERS = 7    ; specify GM iterations to be 7


  ;  Establish gravity model run files & parameters
  GRAVITY  PURPOSE  = 1, LOS=MW[11], FFACTORS= FF, KFACTORS = MW[20]
  GRAVITY  PURPOSE  = 2, LOS=MW[12], FFACTORS= FF, KFACTORS = MW[20]
  GRAVITY  PURPOSE  = 3, LOS=MW[13], FFACTORS= FF, KFACTORS = MW[20]
  GRAVITY  PURPOSE  = 4, LOS=MW[14], FFACTORS= FF, KFACTORS = MW[20]
  GRAVITY  PURPOSE  = 5, LOS=MW[15], FFACTORS= FF, KFACTORS = MW[20]
  GRAVITY  PURPOSE  = 6, LOS=MW[16], FFACTORS= FF, KFACTORS = MW[20]

  ; Write out trips as integers to be consistent with MINUTP


  MATO = EST.TEM,MO=1-6 ;   Final HBS  trip table(s)
                         ;       T1 - HBS Inc. Level 1 (i-i)
                         ;       T2 - HBS Inc. Level 2 (i-i)
                         ;       T3 - HBS Inc. Level 3 (i-i)
                         ;       T4 - HBS Inc. Level 4 (i-i)
                         ;       T5 - HBS ALL (Extl/Interst. FFs)
                         ;       T6 - HBS ALL (Extle/Arter.  FFs)
  ; Note: The External Interstate and Arterial trips (t5 & t6) will be
  ; refined in the next two matrix runs

  ENDRUN
  ;
  ;
  ;-------------------------------------------------------------------
  ; Refinement of External Trip Distribution Trip Tables
  ; (External Interstate and External Arterial Trips)
  ; There are two MATRIX steps
  ;    1) This program reads the external interstate and external arterial
  ;    tables produced from the external trip dist. process above. The
  ;    program wipes out trips in internal or through trip interchanges
  ;    if any exist (there may be a small chance that some trips exist).
  ;    It also makes sure that no extl/art. trips exist in the
  ;    extl/interstate interchanges and vice-versa. Finally it writes out
```

```
;    an array containing the column totals of the total external trips.
;    to be used in the following program.
;
;    2) This program is used to make sure the row & column totals
;    of the external trip files match those of P/A files produced in
;    the trip generation process. The adjustment will affect the As
;    much more than the P's.
;-------------------------------------------------------------------


RUN PGM=MATRIX
  MATI= EST.TEM            ; read in initial ext trips from trip dist.
  ARRAY COLTOTX=@ZONESIZE@ ; set up an array for init.col totals for ext trips

  MW[5]  = MI.1.5 ; Get Initial Extl Interstate table
  MW[6]  = MI.1.6 ; Get Initial Extl Arterial   table

  MW[15] = MW[5]  ; Store HBS trips with Extl/Interst.  FFs in MW15
  MW[16] = MW[6]  ; Store HBS trips with Extl/Arterial  FFs in MW16
;
; Now, strip away or zero out unwanted interchanges
; interstate-type external stations  MW[15]
;-
IF  (I =    1-2144)
  MW[15] =     0, INCLUDE=    1-2144 ; i-i ijs
ELSE
  MW[15] =     0, INCLUDE= 2145-2191 ; x-x ijs
ENDIF

IF  (I =      2145,2147-2148,2150-2153,2155,2157-2165,2167-2170,
              2172-2179,2181,2185-2186,2188-2190)  MW[15] =     0 ; ext art. ijs

MW[15] =     0, INCLUDE=2145,2147-2148,2150-2153,2155,2157-2165,2167-2170,
                        2172-2179,2181,2185-2186,2188-2190 ; ext art. ijs

;
; Now, strip away or zero out unwanted interchanges
; arterial-type external stations  MW[16]
;
IF  (I =    1-2144)
  MW[16] =     0, INCLUDE=    1-2144 ; i-i ijs
ELSE
  MW[16] =     0, INCLUDE= 2145-2191 ; x-x ijs
ENDIF

IF  (I =      2146,2149,2154,2156,2166,2171,2180,2182,2183,2184,
              2187,2191)  MW[16] =     0 ; ext int.ijs

MW[16] =     0, INCLUDE=2146,2149,2154,2156,2166,2171,2180,2182,2183,2184,
                        2187,2191 ; ext int.ijs
;
; ---------------------------------------------------------------------
;  ACCUMULATE COLUMN TOTALS of ALL INITIAL EXTERNAL TRIPS
JLOOP
  COLTOTX[J]=COLTOTX[J] + MW[15][J] + MW[16][J]
ENDJLOOP

;
; NOW, WRITE OUT THE INITIAL COLUMN TOTALS FOR Later Use
IF (I=2191)
   LOOP K=2145,2191
        PRINT FORM=8,LIST=K, COLTOTX[K], FILE=IXCOLTOT.DAT
   ENDLOOP
ENDIF
MATO = EXT.TEM,MO=15,16 ;   Final HBS  trip table(s)

; --------------------------------------------------------------

RUN PGM=MATRIX
  MATI[1]= EXT.TEM
  MATI[2]= EST.TEM
  ZDATI[1]=@HBSPROALL@, Z=#1,RCNTL=#2       ; total trip gen. prod.totals
  ZDATI[2]=@HBSATTALL@, Z=#1,CCNTL=#2       ; total trip gen. attr.totals
  ZDATI[3]=IXCOLTOT.DAT, Z=#1,ICOLTOT=2

  FILLMW MW[1]  = MI.2.1,2,3,4
  FILLMW MW[5]  = MI.1.1,2

  ARRAY IROWTOTA= @ZONESIZE@

  ARRAY FROWTOT = @ZONESIZE@
  ARRAY FCOLTOT = @ZONESIZE@

  ARRAY ROWADJ  = @ZONESIZE@
  ARRAY COLADJ  = @ZONESIZE@

  MW[15] = MW[5]  ; Store HBS trips with Extl/Interst.  FFs in MW15
  MW[16] = MW[6]  ; Store HBS trips with Extl/Arterial  FFs in MW16

; --------------
IF (i=1-2144)
 JLOOP
    IF  (ICOLTOT[j]   = 0)
         COLADJ[J]    = 1.0
    ELSE
         COLADJ[J]    = CCNTL[j]/ICOLTOT[j]
    ENDIF
      MW[25] = MW[15][J]*COLADJ[J]
      MW[26] = MW[16][J]*COLADJ[J]
      FCOLTOT[J] = FCOLTOT[J]+ MW[25][J] + MW[26][J]
 endjloop
ELSE
    irowtota[i] = ROWSUM(15) + rowsum(16)


 JLOOP
    IF  (IrowTOTa[i]   = 0)
         rowADJ[i]    = 1.0
    ELSE
         rowADJ[i]    = RCNTL[i]/IROWTOTa[i]
    ENDIF
    MW[25] =  MW[15][J]*ROWADJ[i]
    MW[26] =  MW[16][J]*ROWADJ[i]
    FROWTOT[i]  = FROWTOT[i]  + MW[25][j] + MW[26][j]
 endjloop
endif

 ;
 ; Now replace full external trip tables with 'trimmed' tables
 ; and compute Final Total Trip Table

 MW[5] = MW[25]
 MW[6] = MW[26]
 DUMMY=ROWADD(7,1,2,3,4,5,6)


MATO = @HBSTDOUT@,MO=1-7 ;   Final HBS  trip table(s)

IF (I=2191) ; if at the last zone
   LIST = ' TAZ  inital  contrl   final  adjftr ',FILE=xcolHBS.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',ICOLTOT[INDEX](8),' ',CCNTL[INDEX](8),
                            FCOLTOT[INDEX](8),' ',coladj[INDEX](8.3),
             FILE=xcolHBS.asc
   ENDLOOP
```

```
   LIST = ' TAZ  inital  contrl   final  adjftr ',FILE=xrowHBS.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',IROWTOTA[INDEX](8),RCNTL[INDEX](8),
                            FROWTOT[INDEX](8),rowadj[INDEX](8.3),
             FILE=xROWHBS.asc
   ENDLOOP
ENDIF
;--------------------------------------------------------------------
; END of HBS Trip Distribution
;--------------------------------------------------------------------


; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|
; |//////   7) Start HBO Trip Distribution Here:             /////|
; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|

RUN PGM=TRIPDIST
  MATI= HBOCI1_4.DAT,   ; Composite Time Impedances HBO Inc.Levels 1-4
        SOVOPTTE.skf,   ; Off Pk    Time Imped. for Extl/Int. Trip Dist.
        @HBOK@          ; HBW Kfactors (Scaled by 1000.0)

; Put impedance matrices in work tables 11-16
; tabs 11-14 are comp.time for inc.levels 1,2,3,4, tabs 15,16 are
; both Offpk SOV time. All impedance and time values are in whole minutes.

  FILLMW MW[11]  = MI.1.1,2,3,4,MI.2.1,MI.2.1

; Put K-factor matrix in work table 20
; The k-factor values are scaled by 1000s (eg, a mtx value of '1000'=1.0)
; the K-factors are appiled across all HBO distributions

  FILLMW MW[20] = MI.3.1
  DUMMY = ROWFAC(20,0.001) ; scale k-factor's to 'true' units


ZDATI[1]  = @HBOPROINC@, Z=#1,P1=#2,    ; HBO Inc. 1    productions
                              P2=#3,    ; HBO Inc. 2    productions
                              P3=#4,    ; HBO Inc. 3    productions
                              P4=#5     ; HBO Inc. 4    productions
ZDATI[2]  = @HBOPROALL@, Z=#1,P5=#2     ; HBO Totl      productions

ZDATI[3]  = @HBOATTINC@, Z=#1,A1=#2,    ; HBO Inc. 1    attractions
                              A2=#3,    ; HBO Inc. 2    attractions
                              A3=#4,    ; HBO Inc. 3    attractions
                              A4=#5     ; HBO Inc. 4    attractions
ZDATI[4]  = @HBOATTALL@, Z=#1,A5=#2     ; HBO Totl      attractions


LOOKUP FILE = @IHBOFFS@,INTERPOLATE=N,SETUPPER=T,FAIL=,0,,NAME = FF,
       LOOKUP[1] = 1, RESULT = 2,  ; HBO INC 1           F-FACTORS
       LOOKUP[2] = 1, RESULT = 3,  ; HBO INC 2           F-FACTORS
       LOOKUP[3] = 1, RESULT = 4,  ; HBO INC 3           F-FACTORS
       LOOKUP[4] = 1, RESULT = 5,  ; HBO INC 4           F-FACTORS
       LOOKUP[5] = 1, RESULT = 6,  ; HBO Extl-Interstate F-FACTORS
       LOOKUP[6] = 1, RESULT = 7   ; HBO Extl-Arterial   F-FACTORS

;  Establish production and attraction vectors here:

SETPA P[1] = P1, P[2] = P2, P[3] = P3, P[4] = P4, P[5] = P5, P[6] = P5
SETPA A[1] = A1, A[2] = A2, A[3] = A3, A[4] = A4, A[5] = A5, A[6] = A5

MAXITERS = 7    ; specify GM iterations to be 7


;  Establish gravity model run files & parameters
GRAVITY  PURPOSE  = 1, LOS=MW[11], FFACTORS= FF, KFACTORS = MW[20]
GRAVITY  PURPOSE  = 2, LOS=MW[12], FFACTORS= FF, KFACTORS = MW[20]
GRAVITY  PURPOSE  = 3, LOS=MW[13], FFACTORS= FF, KFACTORS = MW[20]
GRAVITY  PURPOSE  = 4, LOS=MW[14], FFACTORS= FF, KFACTORS = MW[20]
GRAVITY  PURPOSE  = 5, LOS=MW[15], FFACTORS= FF, KFACTORS = MW[20]
GRAVITY  PURPOSE  = 6, LOS=MW[16], FFACTORS= FF, KFACTORS = MW[20]

 ; Write out trips as integers to be consistent with MINUTP


MATO = EST.TEM,MO=1-6 ;   Final HBO  trip table(s)
                         ;       T1 - HBO Inc. Level 1 (i-i)
                         ;       T2 - HBO Inc. Level 2 (i-i)
                         ;       T3 - HBO Inc. Level 3 (i-i)
                         ;       T4 - HBO Inc. Level 4 (i-i)
                         ;       T5 - HBO ALL (Extl/Interst. FFs)
                         ;       T6 - HBO ALL (Extle/Arter.  FFs)
; Note: The External Interstate and Arterial trips (t5 & t6) will be
; refined in the next two matrix runs

ENDRUN
;
;
;--------------------------------------------------------------------
; Refinement of External Trip Distribution Trip Tables
; (External Interstate and External Arterial Trips)
; There are two MATRIX steps
;    1) This program reads the external interstate and external arterial
;    tables produced from the external trip dist. process above. The
;    program wipes out trips in internal or through trip interchanges
;    if any exist (there may be a small chance that some trips exist).
;    It also makes sure that no extl/art. trips exist in the
;    extl/interstate interchanges and vise-versa. Finally it writes out
;    an array containing the column totals of the total external trips.
;    to be used in the following program.
;
;    2) This program is used to make sure the row & column totals
;    of the external trip files match those of P/A files produced in
;    the trip generation process. the adjustment will affect the As
;    much more than the P's.
;--------------------------------------------------------------------


RUN PGM=MATRIX
  MATI= EST.TEM       ; read in initial ext trips from trip dist.
  ARRAY COLTOTX=@ZONESIZE@  ; set up an array for init.col totals for ext trips

  MW[5]  = MI.1.5 ; Get Initial Extl Interstate table
  MW[6]  = MI.1.6 ; Get Initial Extl Arterial   table

  MW[15] = MW[5]  ; Store HBO trips with Extl/Interst.  FFs in MW15
  MW[16] = MW[6]  ; Store HBO trips with Extl/Arterial  FFs in MW16
;
; Now, strip away or zero out unwanted interchanges
; interstate-type external stations  MW[15]
;-
IF  (I =    1-2144)
  MW[15] =     0, INCLUDE=    1-2144 ; i-i ijs
ELSE
  MW[15] =     0, INCLUDE= 2145-2191 ; x-x ijs
ENDIF

IF  (I =      2145,2147-2148,2150-2153,2155,2157-2165,2167-2170,
              2172-2179,2181,2185-2186,2188-2190)  MW[15] =     0 ; ext art. ijs

MW[15] =     0, INCLUDE=2145,2147-2148,2150-2153,2155,2157-2165,2167-2170,
                        2172-2179,2181,2185-2186,2188-2190; ext art. ijs

;
```

```
; Now, strip away or zero out unwanted interchanges
; arterial-type external stations  MW[16]
;
IF  (I =    1-2144)
  MW[16] =     0, INCLUDE=    1-2144 ; i-i ijs
ELSE
  MW[16] =     0, INCLUDE= 2145-2191 ; x-x ijs
ENDIF

IF  (I =      2146,2149,2154,2156,2166,2171,2180,2182,2183,
              2184,2187,2191)  MW[16] =     0 ; ext int.ijs

MW[16] =     0, INCLUDE=2146,2149,2154,2156,2166,2171,2180,2182,2183,
                        2184,2187,2191 ; ext int.ijs
;
; -------------------------------------------------------------------
;  ACCUMULATE COLUMN TOTALS of ALL INITIAL EXTERNAL TRIPS
JLOOP
  COLTOTX[J]=COLTOTX[J] + MW[15][J] + MW[16][J]
ENDJLOOP

;
; NOW, WRITE OUT THE INITIAL COLUMN TOTALS FOR Later Use
IF (I=2191)
   LOOP K=2145,2191
        PRINT FORM=8,LIST=K, COLTOTX[K], FILE=IXCOLTOT.DAT
   ENDLOOP
ENDIF
MATO = EXT.TEM,MO=15,16 ;   Final HBO  trip table(s)

; -------------------------------------------------------------

RUN PGM=MATRIX
  MATI[1]= EXT.TEM
  MATI[2]= EST.TEM
  ZDATI[1]=@HBOPROALL@, Z=#1,RCNTL=#2       ; total trip gen. prod.totals
  ZDATI[2]=@HBOATTALL@, Z=#1,CCNTL=#2       ; total trip gen. attr.totals
  ZDATI[3]=IXCOLTOT.DAT, Z=#1,ICOLTOT=2

  FILLMW MW[1]  = MI.2.1,2,3,4
  FILLMW MW[5]  = MI.1.1,2

  ARRAY IROWTOTA= @ZONESIZE@

  ARRAY FROWTOT = @ZONESIZE@
  ARRAY FCOLTOT = @ZONESIZE@

  ARRAY ROWADJ  = @ZONESIZE@
  ARRAY COLADJ  = @ZONESIZE@

  MW[15] = MW[5]  ; Store HBO trips with Extl/Interst.  FFs in MW15
  MW[16] = MW[6]  ; Store HBO trips with Extl/Arterial  FFs in MW16

; --------------
IF (i=1-2144)
 JLOOP
    IF  (ICOLTOT[j]   = 0)
         COLADJ[J]    = 1.0
    ELSE
         COLADJ[J]    = CCNTL[j]/ICOLTOT[j]
    ENDIF
      MW[25] =  MW[15][J]*COLADJ[J]
      MW[26] =  MW[16][J]*COLADJ[J]
      FCOLTOT[J] = FCOLTOT[J]+ MW[25][J] + MW[26][J]
 endjloop
ELSE
    irowtota[i] = ROWSUM(15) + rowsum(16)
```

```
 JLOOP
    IF  (IrowTOTa[i]   = 0)
         rowADJ[i]    = 1.0
    ELSE
         rowADJ[i]    = RCNTL[i]/IROWTOTa[i]
    ENDIF
    MW[25] =  MW[15][J]*ROWADJ[i]
    MW[26] =  MW[16][J]*ROWADJ[i]
    FROWTOT[i]  = FROWTOT[i]  + MW[25][j] + MW[26][j]
 endjloop
endif

 ;
 ; Now replace full external trip tables with 'trimmed' tables
 ; and compute Final Total Trip Table


 MW[5] = MW[25]
 MW[6] = MW[26]
 DUMMY=ROWADD(7,1,2,3,4,5,6)


MATO = @HBOTDOUT@,MO=1-7 ;   Final HBO  trip table(s)

IF (I=2191) ; if at the last zone
   LIST = ' TAZ  inital  contrl   final  adjftr ',FILE=xcolHBO.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',ICOLTOT[INDEX](8),' ',CCNTL[INDEX](8),
                            FCOLTOT[INDEX](8),' ',coladj[INDEX](8.3),
             FILE=xcolHBO.asc
   ENDLOOP



   LIST = ' TAZ inital contrl  final adjftr ',FILE=xrowHBO.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',IROWTOTA[INDEX](8),RCNTL[INDEX](8),
                            FROWTOT[INDEX](8),rowadj[INDEX](8.3),
             FILE=xROWHBO.asc
   ENDLOOP
ENDIF
;-------------------------------------------------------------------
; END of HBO Trip Distribution
;-------------------------------------------------------------------



; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|
; |//////   8) Start NHB  Here:                                    /////|
; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|

RUN PGM=TRIPDIST
  MATI= NHBCI.DAT,      ; Composite Time Impedances NHB All Inc. Levels 1-4
        SOVOPTT.SKF,    ; Off-Pk    Time Imped. for Intl      Trip Dist.
        SOVOPTTE.SKF,   ; Off Pk    Time Imped. for Extl/Int. Trip Dist.
        @NHBK@          ; NHB        Kfactors (Scaled by 1000.0)


; Put impedance matrices in work tables 11-13
; tab  11 is comp.time for Intl NHB Trips                   Purp 1


; Offpk SOV time. All impedance and time values are in whole minutes.

  FILLMW MW[11]  = MI.1.1

; Put K-factor matrices in work table 20
```

```
; The k-factor values are scaled by 1000s (eg, a mtx value of '1000'=1.0)
; the NHB K-factors are appiled across all Intl&Extl distributions

         MW[20] = MI.4.1   ; NHB Kfactors

  DUMMY = ROWFAC(20,0.001) ; scale NHB k-factor's to 'true' units

ZDATI[1]  = @NHBPROINT@, Z=#1,P1=#2  ; Intl NHB      productions

ZDATI[2]  = @NHBPROALL@, Z=#1,P2=#2  ; Intl/Extl NHB productions


LOOKUP FILE = @INHBFFS@,INTERPOLATE=N,SETUPPER=T,FAIL=,0,,NAME = FF,
       LOOKUP[1] = 1, RESULT = 2,  ; NHB Internal        F-FACTORS
       LOOKUP[2] = 1, RESULT = 3,  ; NHB Extl/Interst    F-FACTORS
       LOOKUP[3] = 1, RESULT = 4   ; NHB Extl/Arterial   F-FACTORS

;  Establish production and attraction vectors here:
;  Note here that I am reading in production z-files for BOTH
;  Production and Attraction Vectors.
;
;
;
;
SETPA P[1]=P1,P[2]=P2,P[3]=P2
SETPA A[1]=P1,A[2]=P2,A[3]=P2

MAXITERS = 7    ; specify GM iterations to be 7


;  Establish gravity model run files & parameters
GRAVITY  PURPOSE  = 1, LOS=MW[11], FFACTORS= FF, KFACTORS = MW[20] ;nhbin
GRAVITY  PURPOSE  = 2, LOS=MW[13], FFACTORS= FF, KFACTORS = MW[20] ;nhbxi
GRAVITY  PURPOSE  = 3, LOS=MW[13], FFACTORS= FF, KFACTORS = MW[20] ;nhbxa



MATO = EST.TEM,MO=1-3    ;   Final NHB Truck  trip tables:
                         ;       T1 - NHB (i-i)
                         ;       T2 - NHB (Extl/Interst)
                         ;       T3 - NHB (Extl/Arterial)
; Note: The External Interstate and Arterial trips (t4 - t7) will be
; refined in the next two matrix runs

ENDRUN
;
;
;-------------------------------------------------------------------
; Refinement of External Trip Distribution Trip Tables
; (External Interstate and External Arterial Trips)
; There are two MATRIX steps
;    1) This program reads the external interstate and external arterial
;    tables produced from the external trip dist. process above. The
;    program wipes out trips in internal or through trip interchanges
;    if any exist (there may be a small chance that some trips exist).
;    It also makes sure that no extl/art. trips exist in the
;    extl/interstate interchanges and vise-versa. Finally it writes out
;    an array containing the column totals of the total external trips.
;
;-------------------------------------------------------------------


RUN PGM=MATRIX
  MATI= EST.TEM       ; read in initial ext trips from trip dist.
  ARRAY COLTOTN=@ZONESIZE@   ; set up array for init.col totals for NHB ext

  MW[5]  = MI.1.2 ; Get Initial NHB Extl Interstate table
  MW[6]  = MI.1.3 ; Get Initial NHB Extl Arterial   table
```

```
  MW[15] = MW[5]  ; Store NHB Extl/Interst. Trips  in MW15
  MW[16] = MW[6]  ; Store NHB Extl/Arterial Trips  in MW16
;
; Now, strip away or zero out unwanted interchanges
; interstate-type external stations  MW[15]
;-
IF  (I =    1-2144)
  MW[15] =     0, INCLUDE=    1-2144 ; i-i ijs
ELSE
  MW[15] =     0, INCLUDE= 2145-2191 ; x-x ijs
ENDIF

IF  (I =      2145,2147-2148,2150-2153,2155,2157-2165,2167-2170,
              2172-2179,2181,2185-2186,2188-2190)  MW[15] =     0 ; ext art. ijs

MW[15] =     0, INCLUDE=2145,2147-2148,2150-2153,2155,2157-2165,2167-2170,
              2172-2179,2181,2185-2186,2188-2190; ext art. ijs

;
; Now, strip away or zero out unwanted interchanges
; arterial-type external stations  MW[16]
;
IF  (I =    1-2144)
  MW[16] =     0, INCLUDE=    1-2144 ; i-i ijs
ELSE
  MW[16] =     0, INCLUDE= 2145-2191 ; x-x ijs
ENDIF

IF  (I =      2146,2149,2154,2156,2166,2171,2180,2182,2183,
              2184,2187,2191)  MW[16] =     0 ; ext int.ijs

MW[16] =     0, INCLUDE=2146,2149,2154,2156,2166,2171,2180,2182,2183,
                        2184,2187,2191 ; ext int.ijs
;
; -----------------------------------------------------------------
;  ACCUMULATE COLUMN TOTALS of ALL INITIAL EXTERNAL TRIPS
JLOOP
  COLTOTN[J]=COLTOTN[J] + MW[15][J] + MW[16][J]  ;Col. Total NHB Extl
ENDJLOOP

;
; NOW, WRITE OUT THE INITIAL COLUMN TOTALS FOR Later Use
IF (I=2191)
   LOOP K=2145,2191
        PRINT FORM=8,LIST=K, COLTOTN[K],
                     FILE=IXCOLTOT.DAT
   ENDLOOP
ENDIF
MATO = EXT.TEM,MO=15,16 ; Final Extl NHB, Mtk, HTK  trip table(s)

; ------------------------------------------------------------

RUN PGM=MATRIX    ; Adjust NHB Externals
  MATI[1]= EXT.TEM
  MATI[2]= EST.TEM
  ZDATI[1] = @NHBPROALL@, Z=#1,RCNTL=#2    ; NHB Trip Production Controls
  ZDATI[2] = @NHBATTALL@, Z=#1,CCNTL=#2    ; NHB Trip Attraction Controls
  ZDATI[3] = IXCOLTOT.DAT, Z=#1,ICOLTOT=2

  FILLMW MW[1]  = MI.2.1      ; mw 1   i-i nhb
  FILLMW MW[4]  = MI.1.1,2    ; mw 4-5 ext nhb(intst,art)

  ARRAY IROWTOTA = @ZONESIZE@
  ARRAY FROWTOT  = @ZONESIZE@
  ARRAY FCOLTOT  = @ZONESIZE@
  ARRAY ROWADJ   = @ZONESIZE@
  ARRAY COLADJ   = @ZONESIZE@
```

```
  MW[14] = MW[4]  ; Extr/Int. trips to be adj. --Start w/ initial trips
  MW[15] = MW[5]  ; Extr/Art. trips to be adj. --Start w/ initial trips

 IF (I=1-2144)
    JLOOP
     IF (ICOLTOT[J] = 0)
        COLADJ[J] = 1.0
     ELSE
        COLADJ[J] = CCNTL[J] / ICOLTOT[J]
     ENDIF

     MW[24] =  MW[14] * COLADJ[J]
     MW[25] =  MW[15] * COLADJ[J]
     FCOLTOT[J] = FCOLTOT[J] + MW[24] + MW[25]
    ENDJLOOP
ELSE
   IROWTOTA[I] = ROWSUM(14) + ROWSUM(15)

    JLOOP
     IF (IROWTOTA[I] = 0)
        ROWADJ[I] = 1.0
     ELSE
        ROWADJ[I] = RCNTL[I] / IROWTOTA[I]
     ENDIF

     MW[24] =  MW[14][J] * ROWADJ[I]
     MW[25] =  MW[15][J] * ROWADJ[I]
     FROWTOT[I] = FROWTOT[I] + MW[24][J] + MW[25][J]
    ENDJLOOP
ENDIF



  MW[4] = MW[24]  ;  Replace initial nhb ext/int trips w/ adj trips
  MW[5] = MW[25]  ;  Replace initial nhb ext/art trips w/ adj trips

  DUMMY=ROWADD(10,1,4,5)  ; total NHB trips

MATO[1] = @NHBTDOUT@,MO=1,4,5,10 ;   Final NHB  trip table(s)  1-4
                                 ;   intl,ext/int,ext/art,total


IF (I=2191) ; if at the last zone
   LIST = ' TAZ  inital  contrl   final  adjftr ',FILE=xcolNHB.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',ICOLTOT[INDEX](8),' ',CCNTL[INDEX](8),
                            FCOLTOT[INDEX](8),' ',coladj[INDEX](8.3),
             FILE=xcolNHB.asc
   ENDLOOP



   LIST = ' TAZ  inital  contrl   final  adjftr ',FILE=xrowNHB.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',IROWTOTA[INDEX](8),RCNTL[INDEX](8),
                            FROWTOT[INDEX](8),rowadj[INDEX](8.3),
             FILE=xROWNHB.asc
   ENDLOOP
ENDIF


;-------------------------------------------------------------------
; END of NHB Trip Distribution
;-------------------------------------------------------------------
; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|
; |//////   9) Start COM/TRK Trip Distribution Here:               /////|
; |\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\|
```

```
RUN PGM=TRIPDIST
  MATI[1] = SOVOPTT.SKF  ; Off-Pk Time Imped. for COM
  MATI[2] = TRKOPTT_%_iter_%.SKF  ; Off-Pk Truck Time for MTK/HTK

; Put impedance matrices in work tables 11-12.  Tab 11 is for COM
; trips; tab 12 is for MTK and HTK trips.  All time values are in minutes.

  FILLMW MW[11]  = MI.1.1,MI.2.1

ZDATI[1]  = @COMPROINT@, Z=#1,P1=#2  ; Intl COM      productions
ZDATI[2]  = @MTKPROINT@, Z=#1,P2=#2  ; Intl MTK      productions
ZDATI[3]  = @HTKPROINT@, Z=#1,P3=#2  ; Intl HTK      productions
ZDATI[4]  = @COMPROALL@, Z=#1,P4=#2  ; Intl/Extl COM productions
ZDATI[5]  = @MTKPROALL@, Z=#1,P5=#2  ; Intl/Extl MTK productions
ZDATI[6]  = @HTKPROALL@, Z=#1,P6=#2  ; Intl/Extl HTK productions

; Use slightly different lookup parameters, to match those used in
;  COM/TRK model development.
LOOKUP FILE = @ICVTFFS@, INTERPOLATE=Y, FAIL=4000000,0,0, NAME = FF,
       LOOKUP[1] = 1, RESULT = 2,  ; COM Internal  F-FACTORS
       LOOKUP[2] = 1, RESULT = 3,  ; MTK Internal  F-FACTORS
       LOOKUP[3] = 1, RESULT = 4,  ; HTK Internal  F-FACTORS
       LOOKUP[4] = 1, RESULT = 5,  ; COM Intl/Extl F-FACTORS
       LOOKUP[5] = 1, RESULT = 6,  ; MTK Intl/Extl F-FACTORS
       LOOKUP[6] = 1, RESULT = 7   ; HTK Intl/Extl F-FACTORS

;  Establish production and attraction vectors here:
;  Note here that I am reading in production z-files for BOTH
;  Production and Attraction Vectors.
;
SETPA P[1]=P1,P[2]=P2,P[3]=P3,P[4]=P4,P[5]=P5,P[6]=P6
SETPA A[1]=P1,A[2]=P2,A[3]=P3,A[4]=P4,A[5]=P5,A[6]=P6

; Set maximum iterations, unless RMSE for all purposes is met.
MAXITERS = 20, MAXRMSE = 10

;  Establish gravity model run files & parameters
GRAVITY  PURPOSE  = 1, LOS=MW[11], FFACTORS= FF                     ; COM I/I
GRAVITY  PURPOSE  = 2, LOS=MW[12], FFACTORS= FF,losrange=0-250     ; MTK I/I
GRAVITY  PURPOSE  = 3, LOS=MW[12], FFACTORS= FF,losrange=0-250     ; HTK I/I
GRAVITY  PURPOSE  = 4, LOS=MW[11], FFACTORS= FF                     ; COM External
GRAVITY  PURPOSE  = 5, LOS=MW[12], FFACTORS= FF,losrange=0-250     ; MTK External
GRAVITY  PURPOSE  = 6, LOS=MW[12], FFACTORS= FF,losrange=0-250     ; HTK External


MATO[1] = COMTD.TEM,MO=1,4 ; Final COM trip tables: 1 = I/I, 2 = Extl
MATO[2] = MTKTD.TEM,MO=2,5 ; Final MTK trip tables: 1 = I/I, 2 = Extl
MATO[3] = HTKTD.TEM,MO=3,6 ; Final HTK trip tables: 1 = I/I, 2 = Extl

; Note: The External COM, MTK, and HTK trips (t2) are refined below


ENDRUN

;-------------------------------------------------------------------
;-------------------------------------------------------------------
; Refinement of External Trip Distribution Trip Tables
; (External Interstate and External Arterial Trips)
; There are two MATRIX steps
;    1) This program reads the external tables produced from the Trip Dist.
;    program wipes out trips in internal or through trip interchanges
;    if any exist (there may be a small chance that some trips exist).
;    Finally it writes out
;    an array containing the column totals of the total external trips.
;    to be used in the following program.
;
;    2) This program is used to make sure the row & column totals
```

```
;    of the external trip files match those of P/A files produced in
;    the trip generation process. the adjustment will affect the As
;    much more than the P's.
;-------------------------------------------------------------------

RUN PGM=MATRIX
 MATI[1]= COMTD.TEM
 MATI[2]= MTKTD.TEM
 MATI[3]= HTKTD.TEM

  ARRAY COLTOTcvX=@ZONESIZE@,  ; set up an array for init.col totals for comveh ext
trips
        COLTOTmtX=@ZONESIZE@,  ; set up an array for init.col totals for medtrk ext
trips
        COLTOThtX=@ZONESIZE@   ; set up an array for init.col totals for hvytrk ext
trips


; Create 0/1 matrix flaging IX,XI cells only (as '1')
;
  IF (I=1-2144)
      MW[1] = 1, include = 2145-2191
    ELSE
      MW[1] = 1, exclude = 2145-2191
  ENDIF

 MW[11] = MI.1.1       ;  com veh ii
 MW[12] = MI.1.2       ;  com veh ii/extl (initial)
 MW[13] = MI.1.2*mw[1] ;  com veh ii/extl (initial) -pure extls


 MW[21] = MI.2.1       ;  MTK veh ii
 MW[22] = MI.2.2       ;  MTK veh ii/extl (initial)
 MW[23] = MI.2.2*mw[1] ;  MTK veh extl    (initial) -pure extls

 MW[31] = MI.3.1       ;  HTK veh ii
 MW[32] = MI.3.2       ;  HTK veh ii/extl (initial)
 MW[33] = MI.3.2*mw[1] ;  HTK veh extl    (initial) -pure extls

;
;
;  ACCUMULATE COLUMN TOTALS of ALL INITIAL EXTERNAL TRIPS
JLOOP
  COLTOTcvX[J]=COLTOTcvX[J] + MW[13][J]
  COLTOTmtX[J]=COLTOTmtX[J] + MW[23][J]
  COLTOThtX[J]=COLTOThtX[J] + MW[33][J]
ENDJLOOP

;
; NOW, WRITE OUT THE INITIAL COLUMN TOTALS FOR Later Use
IF (I=2191)
   LOOP K=2145,2191
        PRINT FORM=8,LIST=K, COLTOTcvX[K], COLTOTmtX[K], COLTOThtX[K],
FILE=IXCOLTOT.DAT
   ENDLOOP
ENDIF
MATO = EXT.TEM,MO=13,23,33 ;   initial external trip tables - Comm, Mtk, Htk
endrun
; -------------------------------------------------------------

RUN PGM=MATRIX
 MATI[1]= COMTD.TEM
 MATI[2]= MTKTD.TEM
 MATI[3]= HTKTD.TEM
 MATI[4]= EXT.TEM

 MW[11] = MI.1.1       ;  com veh ii
 MW[13] = MI.4.1       ;  com veh init.ext trips
```

```
 MW[21] = MI.2.1       ;  MTK veh ii
 MW[23] = MI.4.2       ;  Mtk veh init.ext trips

 MW[31] = MI.3.1       ;  HTK veh ii
 MW[33] = MI.4.3       ;  Htk veh init.ext trips

 ZDATI[1]=@comPROALL@, Z=#1,RCNTLcv=#2       ; total trip gen. prod.totals
 ZDATI[2]=@comPROALL@, Z=#1,CCNTLcv=#2       ; total trip gen. attr.totals

 ZDATI[3]=@mtkPROALL@, Z=#1,RCNTLmt=#2       ; total trip gen. prod.totals
 ZDATI[4]=@mtkPROALL@, Z=#1,CCNTLmt=#2       ; total trip gen. attr.totals

 ZDATI[5]=@htkPROALL@, Z=#1,RCNTLht=#2       ; total trip gen. prod.totals
 ZDATI[6]=@htkPROALL@, Z=#1,CCNTLht=#2       ; total trip gen. attr.totals

 ZDATI[7]=IXCOLTOT.DAT, Z=#1,ICOLTOTcv=#2 ,ICOLTOTmt=#3 ,ICOLTOTht=#4



  ARRAY IROWTOTAcv=@ZONESIZE@, IROWTOTAmt=@ZONESIZE@,  IROWTOTAht=@ZONESIZE@

  ARRAY FROWTOTcv = @ZONESIZE@ FROWTOTmt = @ZONESIZE@  FROWTOTht = @ZONESIZE@
  ARRAY FCOLTOTcv = @ZONESIZE@ FCOLTOTmt = @ZONESIZE@  FCOLTOTht = @ZONESIZE@

  ARRAY ROWADJcv  = @ZONESIZE@ ROWADJmt  = @ZONESIZE@  ROWADJht  = @ZONESIZE@
  ARRAY COLADJcv  = @ZONESIZE@ COLADJmt  = @ZONESIZE@  COLADJht  = @ZONESIZE@


; ---------beg cv
IF (i=1-2144)
 JLOOP
    IF  (ICOLTOTcv[j]   = 0)
         COLADJcv[J]    = 1.0
    ELSE
         COLADJcv[J]    = CCNTLcv[j]/ICOLTOTcv[j]
    ENDIF
      MW[113] =  MW[13][J]*COLADJcv[J]

      FCOLTOTcv[J] = FCOLTOTcv[J]+ MW[113][J]
 endjloop
ELSE
    irowtotacv[i] = ROWSUM(13)


 JLOOP
    IF  (IrowTOTacv[i]   = 0)
         rowADJcv[i]    = 1.0
    ELSE
         rowADJcv[i]    = RCNTLcv[i]/IROWTOTacv[i]
    ENDIF
    MW[113] =  MW[13][J]*ROWADJcv[i]
    FROWTOTcv[i]  = FROWTOTcv[i]  + MW[113][j]
 endjloop
endif

; ---------beg mt
IF (i=1-2144)
 JLOOP
    IF  (ICOLTOTmt[j]   = 0)
         COLADJmt[J]    = 1.0
    ELSE
         COLADJmt[J]    = CCNTLmt[j]/ICOLTOTmt[j]
    ENDIF
      MW[123] =  MW[23][J]*COLADJmt[J]

      FCOLTOTmt[J] = FCOLTOTmt[J]+ MW[123][J]
 endjloop
```

```
ELSE
    irowtotamt[i] = ROWSUM(23)


 JLOOP
    IF  (IrowTOTamt[i]   = 0)
         rowADJmt[i]    = 1.0
    ELSE
         rowADJmt[i]    = RCNTLmt[i]/IROWTOTamt[i]
    ENDIF
    MW[123] =  MW[23][J]*ROWADJmt[i]
    FROWTOTmt[i]  = FROWTOTmt[i]  + MW[123][j]
 endjloop
endif
; ----- end mt

; ---------beg ht
IF (i=1-2144)
 JLOOP
    IF  (ICOLTOTht[j]   = 0)
         COLADJht[J]    = 1.0
    ELSE
         COLADJht[J]    = CCNTLht[j]/ICOLTOTht[j]
    ENDIF
      MW[133] =  MW[33][J]*COLADJht[J]

      FCOLTOTht[J] = FCOLTOTht[J]+ MW[133][J]
 endjloop
ELSE
    irowtotaht[i] = ROWSUM(33)


 JLOOP
    IF  (IrowTOTaht[i]   = 0)
         rowADJht[i]    = 1.0
    ELSE
         rowADJht[i]    = RCNTLht[i]/IROWTOTaht[i]
    ENDIF
    MW[133] =  MW[33][J]*ROWADJht[i]
    FROWTOTht[i]  = FROWTOTht[i]  + MW[133][j]
 endjloop
endif
; ----- end ht


IF (I=2191) ; if at the last zone  print out
;--- cv summary
   LIST = ' TAZ  inital  contrl   final  adjftr ',FILE=xcolcom.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',ICOLTOTcv[INDEX](8),' ',CCNTLcv[INDEX](8),
                            FCOLTOTcv[INDEX](8),' ',coladjcv[INDEX](8.3),
             FILE=xcolcom.asc
   ENDLOOP



   LIST = ' TAZ inital contrl  final adjftr ',FILE=xrowcom.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',IROWTOTAcv[INDEX](8),RCNTLcv[INDEX](8),
                            FROWTOTcv[INDEX](8),rowadjcv[INDEX](8.3),
             FILE=xROWcom.asc
   ENDLOOP
;--- end cv summary

;--- mt summary
   LIST = ' TAZ  inital  contrl   final  adjftr ',FILE=xcolmtk.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',ICOLTOTmt[INDEX](8),' ',CCNTLmt[INDEX](8),
                            FCOLTOTmt[INDEX](8),' ',coladjmt[INDEX](8.3),
             FILE=xcolmtk.asc
   ENDLOOP



   LIST = ' TAZ inital contrl  final adjftr ',FILE=xrowmtk.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',IROWTOTAmt[INDEX](8),RCNTLmt[INDEX](8),
                            FROWTOTmt[INDEX](8),rowadjmt[INDEX](8.3),
             FILE=xROWmtk.asc
   ENDLOOP
;--- end mt summary


;--- ht summary
   LIST = ' TAZ  inital  contrl   final  adjftr ',FILE=xcolhtk.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',ICOLTOTht[INDEX](8),' ',CCNTLht[INDEX](8),
                            FCOLTOTht[INDEX](8),' ',coladjht[INDEX](8.3),
             FILE=xcolhtk.asc
   ENDLOOP



   LIST = ' TAZ inital contrl  final adjftr ',FILE=xrowhtk.asc
   LOOP INDEX = 2145,2191
        LIST = INDEX(4),' ',IROWTOTAht[INDEX](8),RCNTLht[INDEX](8),
                            FROWTOTht[INDEX](8),rowadjht[INDEX](8.3),
             FILE=xROWhtk.asc
   ENDLOOP
;--- end ht summary
ENDIF
;------------------------------------------------------------------
; END of CV, Med Trk, Hvy Trk Trip Distribution
;------------------------------------------------------------------

 MATO[1] = @COMTDOUT@,MO=11,113 ; Final COM trip tables: 1 = I/I, 2 = Extl
 MATO[2] = @MTKTDOUT@,MO=21,123 ; Final MTK trip tables: 1 = I/I, 2 = Extl
 MATO[3] = @HTKTDOUT@,MO=31,133 ; Final HTK trip tables: 1 = I/I, 2 = Extl
 endrun
;
; ///////////////////////////////////////////////////////////////////////
; \\\\\\\\\   10) Get final trip distribution totals                 \\\
; \\\\\\\\\       and prepare input trips for the mode choice model \\\
; ///////////////////////////////////////////////////////////////////////

RUN PGM=MATRIX
ZONES = @ZONESIZE@

  MATI[1]=   @HBWTDOUT@
  MATI[2]=   @HBSTDOUT@
  MATI[3]=   @HBOTDOUT@
  MATI[4]=   @NHBTDOUT@
  MATI[5]=   @COMTDOUT@
  MATI[6]=   @MTKTDOUT@
  MATI[7]=   @HTKTDOUT@

  MW[1]  = MI.1.7          ; Total HBW Trips
  MW[2]  = MI.2.7          ; Total HBS Trips
  MW[3]  = MI.3.7          ; Total HBO Trips
  MW[4]  = MI.4.4          ; Total NHB Trips
  MW[5]  = MI.5.1 + MI.5.2 ; Total COM Trips
  MW[6]  = MI.6.1 + MI.6.2 ; Total MTK Trips
  MW[7]  = MI.7.1 + MI.7.2 ; Total HTK Trips

  FILLMW MW[11]  = MI.1.1,2,3,4       ;  hbw person trips, inc 1-4 in  mw11-14
  FILLMW MW[21]  = MI.2.1,2,3,4       ;  hbs person trips, inc 1-4 in  mw21-24
```

```
  FILLMW MW[31]  = MI.3.1,2,3,4       ;  hbo person trips, inc 1-4 in  mw31-34
  FILLMW MW[41]  = MI.4.1             ;  nhb person trips, internal in mw41

  MATO[1]= %_iter_%_hbwmu.ptt,MO=1;
  MATO[2]= %_iter_%_hbsmu.ptt,MO=2;
  MATO[3]= %_iter_%_hbomu.ptt,MO=3;
  MATO[4]= %_iter_%_nhbmu.ptt,MO=4;

  MATO[5]= %_iter_%_hbw_NL.ptt,MO=11,12,13,14  ; HBW Person   Trips-4TABS
(INC1..INC4)
  MATO[6]= %_iter_%_hbs_NL.ptt,MO=21,22,23,24  ; HBS Person   Trips-4TABS
(INC1..INC4)
  MATO[7]= %_iter_%_hbo_NL.ptt,MO=31,32,33,34  ; HBO Person   Trips-4TABS
(INC1..INC4)
  MATO[8]= %_iter_%_nhb_NL.ptt,MO=41           ; NHB Person   Trips-1TAB  (INTERNAL)

ENDRUN
;
;===================================================================
;
;--------------------------------------------------------
; Step 11.
; Standard 23x23 Summaries
; Trip Distribution (HBW,HBS,HBO,NHB,COM,MTK,HTK) and formats
; them in neat jurisdictional summaries (23x23)
;
;
;--------------------------------------------------------

COPY FILE=DJ.EQV
;   -- Start of Jurisdiction-to-TAZ equivalency --
; Updated RM/MS 8/10/2006 (Mtg and PG Zones)
D 1=1-88                         ; DC cr
D 2=89-319                       ; DC ncr
D 3=320-639,648,650              ; MTG MD
D 4=640-647,649,651-1029         ; PG  MD
D 5=1230-1238                    ; ARL core
D 6=1239-1329                    ; ARLncore
D 7=1330-1399                    ; ALX VA
D 8=1400-1779                    ; FFX VA
D 9=1780-1919                    ; LDN VA
D 10=1920-2069                   ; PW  VA
D 11=1030-1059                   ; FRD MD
D 12=1060-1079                   ; CAR MD
D 13=1080-1109                   ; HOW MD
D 14=1110-1149                   ; AAR MD
D 15=1150-1169                   ; CAL
D 16=1170-1199                   ; STM
D 17=1200-1229                   ; CHS MD
D 18=2115-2129                   ; FAU VA
D 19=2080-2099                   ; STA VA
D 20=2130-2134,2135-2144         ; CLK/JEF
D 21=2100-2104,2105-2114         ; FBG/SPTS
D 22=2070-2079                   ; KGEOVA
D 23=2145-2191                   ; EXTRNLS
;   -- end of Jurisdiction-to-TAZ equivalency --
ENDCOPY

RUN PGM=MATRIX
  ZONES=@ZONESIZE@
  MATI[1]= @HBWTDOUT@
  MATI[2]= @HBSTDOUT@
  MATI[3]= @HBOTDOUT@
  MATI[4]= @NHBTDOUT@
  MATI[5]= @COMTDOUT@
  MATI[6]= @MTKTDOUT@
  MATI[7]= @HTKTDOUT@
```

```
  MW[1] = MI.1.7          ; HBW TRIP TABLE/TAZ-LEVEL
  MW[2] = MI.2.7          ; HBS TRIP TABLE/TAZ-LEVEL
  MW[3] = MI.3.7          ; HBO TRIP TABLE/TAZ-LEVEL
  MW[4] = MI.4.4          ; NHB TRIP TABLE/TAZ-LEVEL
  MW[5] = MI.5.1 + MI.5.2 ; COM TRIP TABLE/TAZ-LEVEL
  MW[6] = MI.6.1 + MI.6.2 ; MTK TRIP TABLE/TAZ-LEVEL
  MW[7] = MI.7.1 + MI.7.2 ; HTK TRIP TABLE/TAZ-LEVEL

 ; -- PLACEMARKER TABLES - FUTURE WORK
  MW[11] = 0 ;MI.11.@TABNO1@   HBW TRIP TABLE/TAZ-LEVEL
  MW[12] = 0 ;MI.12.@TABNO2@   HBS TRIP TABLE/TAZ-LEVEL
  MW[13] = 0 ;MI.13.@TABNO3@   HBO TRIP TABLE/TAZ-LEVEL
  MW[14] = 0 ;MI.14.@TABNO4@   NHB TRIP TABLE/TAZ-LEVEL
  MW[15] = 0 ;MI.15.@TABNO5@   COM TRIP TABLE/TAZ-LEVEL
  MW[16] = 0 ;MI.16.@TABNO6@   MTK TRIP TABLE/TAZ-LEVEL
  MW[17] = 0 ;MI.17.@TABNO7@   HTK TRIP TABLE/TAZ-LEVEL

  FILEO MATO[1]  = HBW.SQZ MO=1,11 ; OUTPUT HBW TABLE(S), SQUEEZED
        MATO[2]  = HBS.SQZ MO=2,12 ; OUTPUT HBS TABLE(S), SQUEEZED
        MATO[3]  = HBO.SQZ MO=3,13 ; OUTPUT HBO TABLE(S), SQUEEZED
        MATO[4]  = NHB.SQZ MO=4,14 ; OUTPUT NHB TABLE(S), SQUEEZED
        MATO[5]  = COM.SQZ MO=5,15 ; OUTPUT COM TABLE(S), SQUEEZED
        MATO[6]  = MTK.SQZ MO=6,16 ; OUTPUT MTK TABLE(S), SQUEEZED
        MATO[7]  = HTK.SQZ MO=7,17 ; OUTPUT HTK TABLE(S), SQUEEZED

  ; renumber OUT.MAT according to DJ.EQV
  RENUMBER FILE=DJ.EQV, MISSINGZI=M, MISSINGZO=W
ENDRUN

;
LOOP PURP=1,7 ; Loop for Each Purpose
;
; Global Variables:
;   SQFNAME    Name of squeezed modal trip table(s)
;   DESCRIPT   Description
;   PURPOSE    Purpose
;   MODE       Mode
;   DCML       Decimal specification
;   TABTYPE    Table type(1/2), i.e.,-involves 1 or 2 trip tables
;   SCALE=1    Scale factor to be applied (if desired)
;   OPER='+'   Operation(if tabtype=2) Tab1(?)Tab2=Result
;
;
DESCRIPT    = 'SIMULATION-%_iter_% Itr Year: %_year_% Alt: %_alt_%'
IF (PURP=1)
  SQFNAME     = 'HBW.SQZ'
  PURPOSE     = 'HBW'
  MODE        = 'MOTORIZED PERSON'
  DCML        = 0
  TABTYPE     = 1
  SCALE       = 1
  OPER        = '+'
ELSEIF (PURP=2)
  SQFNAME     = 'HBS.SQZ'
  PURPOSE     = 'HBS'
  MODE        = 'MOTORIZED PERSON'
  DCML        = 0
  TABTYPE     = 1
  SCALE       = 1
  OPER        = '+'
ELSEIF (PURP=3)
  SQFNAME     = 'HBO.SQZ'
  PURPOSE     = 'HBO'
  MODE        = 'MOTORIZED PERSON'
  DCML        = 0
  TABTYPE     = 1
  SCALE       = 1
  OPER        = '+'
```

```
ELSEIF (PURP=4)
  SQFNAME     = 'NHB.SQZ'
  PURPOSE     = 'NHB'
  MODE        = 'MOTORIZED PERSON'
  DCML        = 0
  TABTYPE     = 1
  SCALE       = 1
  OPER        = '+'
ELSEIF (PURP=5)
  SQFNAME     = 'COM.SQZ'
  PURPOSE     = 'COM'
  MODE        = 'COMMERCIAL VEH'
  DCML        = 0
  TABTYPE     = 1
  SCALE       = 1
  OPER        = '+'
ELSEIF (PURP=6)
  SQFNAME     = 'MTK.SQZ'
  PURPOSE     = 'MTK'
  MODE        = 'TRUCKS'
  DCML        = 0
  TABTYPE     = 1
  SCALE       = 1
  OPER        = '+'
ELSEIF (PURP=7)
  SQFNAME     = 'HTK.SQZ'
  PURPOSE     = 'HTK'
  MODE        = 'TRUCKS'
  DCML        = 0
  TABTYPE     = 1
  SCALE       = 1
  OPER        = '+'
ENDIF
;
RUN PGM=MATRIX
  ZONES=23
  FILEI MATI=@SQFNAME@
  ARRAY CSUM=23,CSUM1=23,CSUM2=23
; ---------------------------------------------------------------
; --  Table Cell Value decalaration or computation (in MW[1])
; ---------------------------------------------------------------

  FILLMW MW[1]=MI.1.1,2     ;    read input tables in MW 2,3

 IF (@TABTYPE@ = 2)
  FILLMW MW[2]=MI.1.1,2     ;    read input tables in MW 2,3
 ENDIF

  IF (@TABTYPE@=2)                                ; Cell Value
     JLOOP                                        ; computed for
       IF (MW[3][J]>0) MW[1]=MW[2]*@SCALE@@OPER@MW[3]; special summaries-
     ENDJLOOP                                     ; calculation in MW[1]
  ENDIF

; -----------------------------------------------------
; ---- ROW Marginal declaration or computation --------
; -----------------------------------------------------
  RSUM   =     ROWSUM(1)           ; 'normal' table- row summary value

  IF (@TABTYPE@=2)
         RSUM = @SCALE@*ROWSUM(2)@OPER@ROWSUM(3)  ; non-'normal' table
  ENDIF                                    ; compute the row marginal(%)

; -------------------------------------------------------
; ---- COLUMN/Total Marginal Accumulation            ----
; ---- The computation (if necessary) is done below  ----
; -------------------------------------------------------
```

```
    JLOOP                           ; COL/Total Accumulation
      CSUM[J] = CSUM[J] +  MW[1][J]  ; for 'normal' table
      TOTAL   = TOTAL   +  MW[1]     ;
    ENDJLOOP

  IF (@TABTYPE@=2)
    JLOOP                             ; COL/Total Accumulation
      CSUM1[J] = CSUM1[J] +  MW[2][J]  ; for non-'normal' Table
      TOTAL1   = TOTAL1   +  MW[2]     ;
      CSUM2[J] = CSUM2[J] +  MW[3][J]  ;
      TOTAL2   = TOTAL2   +  MW[3]     ;
    ENDJLOOP
  ENDIF

    IF (I==1)      ; print header

    PRINT LIST='/bt   ','@DESCRIPT@'
    PRINT LIST='      ','Purpose: ','@PURPOSE@','   MODE: ','@MODE@'
    PRINT LIST='      '

     PRINT LIST='           DESTINATION'
     PRINT LIST=' ORIGIN |',
                '      1','      2','      3','      4',
                '      5','      6','      7','      8','      9',
                '     10','     11','     12','     13','     14',
                '     15','     16','     17','     18','     19',
                '     20','     21','     22','     23',' |  TOTAL'



     PRINT LIST='==============',
                '========================================',
                '========================================',
                '========================================',
                '======================================'



    ENDIF

    IF (I=1)
     CURDIST=STR(I,2,1)+' DC CR'+ '|' ; Make row header
    ELSEIF (I=2)
     CURDIST=STR(I,2,1)+' DC NC'+ '|' ; Make row header
    ELSEIF (I=3)
     CURDIST=STR(I,2,1)+' MTG  '+ '|' ; Make row header
    ELSEIF (I=4)
     CURDIST=STR(I,2,1)+' PG   '+ '|' ; Make row header
    ELSEIF (I=5)
     CURDIST=STR(I,2,1)+' ARLCR'+ '|' ; Make row header
    ELSEIF (I=6)
     CURDIST=STR(I,2,1)+' ARNCR'+ '|' ; Make row header
    ELSEIF (I=7)
     CURDIST=STR(I,2,1)+' ALX  '+ '|'; Make row header
    ELSEIF (I=8)
     CURDIST=STR(I,2,1)+' FFX  '+ '|' ; Make row header
    ELSEIF (I=9)
     CURDIST=STR(I,2,1)+' LDN  '+ '|' ; Make row header
    ELSEIF (I=10)
     CURDIST=STR(I,2,1)+' PW   '+ '|' ; Make row header
    ELSEIF (I=11)
     CURDIST=STR(I,2,1)+' FRD  '+ '|' ; Make row header
    ELSEIF (I=12)
     CURDIST=STR(I,2,1)+' CAR  '+ '|' ; Make row header
    ELSEIF (I=13)
     CURDIST=STR(I,2,1)+' HOW  '+ '|' ; Make row header
    ELSEIF (I=14)
     CURDIST=STR(I,2,1)+' AAR  '+ '|' ; Make row header
    ELSEIF (I=15)
```

```
  CURDIST=STR(I,2,1)+' CAL  '+ '|' ; Make row header
 ELSEIF (I=16)
  CURDIST=STR(I,2,1)+' STM  '+ '|' ; Make row header
 ELSEIF (I=17)
  CURDIST=STR(I,2,1)+' CHS  '+ '|' ; Make row header
 ELSEIF (I=18)
  CURDIST=STR(I,2,1)+' FAU  '+ '|' ; Make row header
 ELSEIF (I=19)
  CURDIST=STR(I,2,1)+' STA  '+ '|' ; Make row header
 ELSEIF (I=20)
  CURDIST=STR(I,2,1)+' CL/JF'+ '|' ; Make row header
 ELSEIF (I=21)
  CURDIST=STR(I,2,1)+' SP/FB'+ '|' ; Make row header
 ELSEIF (I=22)
  CURDIST=STR(I,2,1)+' KGEO '+ '|' ; Make row header
 ELSEIF (I=23)
  CURDIST=STR(I,2,1)+' EXTL '+ '|' ; Make row header
 ELSE  ; (I=24)
  CURDIST=STR(I,2,1)+' TOTAL'+ '|' ; Make row header
 ENDIF

 PRINT FORM=7.@DCML@ LIST=CURDIST, MW[1][1],MW[1][2],MW[1][3],MW[1][4],MW[1][5],
                   MW[1][6],MW[1][7],MW[1][8],MW[1][9],MW[1][10],
                   MW[1][11],MW[1][12],MW[1][13],MW[1][14],MW[1][15],
                   MW[1][16],MW[1][17],MW[1][18],MW[1][19],MW[1][20],
                   MW[1][21],MW[1][22],MW[1][23],' |',RSUM

 IF (I==ZONES)
; Now at the end of Processed zone matrix
;  Do final Column/Grand Total Computations
    IF (@TABTYPE@=2)
      LOOP IDX = 1,ZONES
           IF (CSUM2[IDX] = 0)
                CSUM[IDX] = 0
           ELSE
                CSUM[IDX] = @SCALE@* CSUM1[IDX] @OPER@ CSUM2[IDX]
           ENDIF
      ENDLOOP
    ENDIF
    IF (@TABTYPE@=2 )
           IF (TOTAL2 = 0)
               TOTAL  = 0
           ELSE
               TOTAL  = @SCALE@ *TOTAL1 @OPER@ TOTAL2
           ENDIF
    ENDIF

;  End of final Column/Grand Total Computations

  PRINT LIST='==============',
             '=========================================',
             '=========================================',
             '=========================================',
             '======================================='


   PRINT FORM=8.@DCML@,
   LIST=' TOTAL ',' ',CSUM[1],'      ' ,CSUM[3],
   '      ',CSUM[5],'      ',CSUM[7],'      ',CSUM[9],
   '      ',CSUM[11],'      ',CSUM[13],'      ',CSUM[15],
   '      ',CSUM[17],'      ',CSUM[19],'      ',CSUM[21],
   '      ',CSUM[23],' |'
   PRINT FORM=8.@DCML@,
   LIST='/et           ',CSUM[2],
   '      ' ,CSUM[4],'      ',CSUM[6],'      ',CSUM[8],
   '      ',CSUM[10],'      ',CSUM[12],'      ',CSUM[14],
   '      ',CSUM[16],'      ',CSUM[18],'      ',CSUM[20],
   '      ',CSUM[22],'       ',TOTAL(9.@DCML@)

 ENDIF
ENDRUN

ENDLOOP ; End Loop
```

37 Trip_Generation.s

```
*del tppl*.prn
;=================================================================
;  Trip_Generation.s
;
;   Version 2.2  Trip Generation Script
;
;     Note: NHB trips do not include Commercial Vehicle - they are modeled
;           separately.
;
;   Programmer: Milone
;   Date:       1/11/07
;   6/15/07 The NHB P/A mod file has been updated (..\support\adjzpaf7.upn)
;           The factor columns normally used as pmods by income level
;           are set to '1.00' (they are now unused) and amods updated.
;           The fifth column will be used to modify the final zonal
;           NHB P's and A's.   NHB trip production equation is updated
;          (P-Mod term is removed)
;   4/25/08 Commercial and Truck models added by bill allen/rm
;=================================================================
;
;=================================================================
; Set Parameters:
;=================================================================

ZONESIZE    =       2191                 ;  No. of TAZs
LastIZN     =       2144                 ;  Last Internal TAZ no.

HBW_GlobalAdj  = 1.00                    ;  Global Trips Production Adjustments
HBS_GlobalAdj  = 1.50                    ;  by Purpose
HBO_GlobalAdj  = 1.50                    ;
NHB_GlobalAdj  = 1.16806  ;was 1.17      ;  Reduction from 1.5    **CV mod**
COM_GlobalAdj  = 1.00                    ;
MTK_GlobalAdj  = 1.00                    ;
HTK_GlobalAdj  = 1.00                    ;

DCCoreRng   = '     1-88'                ;  TAZ Range/DC Core
DCNCorRng   = '   89-319'                ;  TAZ Range/DC NonCore
VACoreRng   = '1230-1238'                ;  TAZ Range/VA NonCore
VA10MSRng   = '1239-1360'                ;  TAZ Range/VA 10miSq

JURSIZE     =  24                  ;  No. of Juris. Codes
SzCl        =   4                  ;  No. of HH Size   Classes
InCl        =   4                  ;  No. of Income    Classes
VaCl        =   4                  ;  No. of Veh Avail Classes

ISCells     =   InCl*10    + SzCl   ;  No. of Size by Inc matrix cells
ISVCells    =   ISCells*10 + VaCl   ;  No. of Size by Inc. by Veh Avail. matrix
cells
JSCells     =   JURSIZE*10 + SzCl   ;  No. of Juris by Inc. matrix cells
JICells     =   JURSIZE*10 + InCl   ;  No. of Juris by Inc. matrix cells
```

```
JVCells     =   JURSIZE*10 + VaCl   ;  No. of Juris by Va. matrix cells

Ofmt        = '(12.2)'             ;  Format of Output P/A files data

Rept         = 'Trip_Generation.txt' ;  Summary Reports

;=================================================================
; Set Input Files:
;=================================================================

ZNFILE_LU    = 'inputs\zone.asc'     ;  Input  Zonal Land Use File
ZNFILE_AT    = 'BASEZON.DAT'         ;  Input  Zonal Area Type File from network
building
ZNFILE_PEX   = 'inputs\pext.asc'     ;  Input ExtStation Trip-Productions, by
Purpose
ZNFILE_AEX   = 'inputs\aext.asc'     ;  Input ExtStation Trip-Attractions, by
Purpose
ZNFILE_TZone = '..\support\trucktaz.asc' ;  lookup table defining truck zones
ZNFILE_TSkim = 'skimtot%_prev_%.dat'        ;  computed sum of truck travel times
to all zones


ZNFILE_I1SV  = 'HHI1_SV.ASC'         ;  Input  Zonal Income 1 HH by Size& VehAv
Classes: i1s1v1,i1s1v2,...,i1s4v4
ZNFILE_I2SV  = 'HHI2_SV.ASC'         ;  Input  Zonal Income 2 HH by Size& VehAv
Classes: i2s1v1,i2s1v2,...,i2s4v4
ZNFILE_I3SV  = 'HHI3_SV.ASC'         ;  Input  Zonal Income 3 HH by Size& VehAv
Classes: i3s1v1,i3s1v2,...,i3s4v4
ZNFILE_I4SV  = 'HHI4_SV.ASC'         ;  Input  Zonal Income 4 HH by Size& VehAv
Classes: i4s1v1,i4s1v2,...,i4s4v4

ZNFILE_ZModW = '..\support\adjzpaf7.upw'
ZNFILE_ZModS = '..\support\adjzpaf7.ups'
ZNFILE_ZModO = '..\support\adjzpaf7.upo'
ZNFILE_ZModN = '..\support\adjzpaf7.upn'

;=================================================================
; Set Output Files:
;=================================================================

 hbwnmpa    = 'hbw_NM_PsAs.ASC'

 hbwps_all  ='hbwpros_all.txt'    hbwas_all  ='hbwattrs_all.txt'
 hbwps_inc  ='hbwpros_inc.txt'    hbwas_inc  ='hbwattrs_inc.txt'

 hbsps_all  ='hbspros_all.txt'    hbsas_all  ='hbsattrs_all.txt'
 hbsps_inc  ='hbspros_inc.txt'    hbsas_inc  ='hbsattrs_inc.txt'

 hbops_all  ='hbopros_all.txt'    hboas_all  ='hboattrs_all.txt'
 hbops_inc  ='hbopros_inc.txt'    hboas_inc  ='hboattrs_inc.txt'

 nhbps_int  ='nhbpros_int.txt'    nhbas_int  ='nhbattrs_int.txt'
 nhbps_all  ='nhbpros_all.txt'    nhbas_all  ='nhbattrs_all.txt'

 comps_int  ='compros_int.txt'    comas_int  ='comattrs_int.txt'
 comps_all  ='compros_all.txt'    comas_all  ='comattrs_all.txt'

 mtkps_int  ='mtkpros_int.txt'    mtkas_int  ='mtkattrs_int.txt'
 mtkps_all  ='mtkpros_all.txt'    mtkas_all  ='mtkattrs_all.txt'

 htkps_int  ='htkpros_int.txt'    htkas_int  ='htkattrs_int.txt'
 htkps_all  ='htkpros_all.txt'    htkas_all  ='htkattrs_all.txt'


;==================================================================
;//////////////////////////////////////////////////////////////////=
;==================================================================
;          Begin TP+ Matrix Routine :                             =
;==================================================================
;\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\=
;==================================================================

RUN PGM=MATRIX
ZONES=@ZONESIZE@

;
; Set up zone arrays for accumulating I/O variables
;
;

ARRAY CHHA   = @ISVCells@,         ;  HH ARRAY at Inc/Size/VehAv Crossclass

 ; Current Trip P's/A's by isv Cells

      Prodw= @ISVCells@, Prods= @ISVCells@, Prodo= @ISVCells@, Prodn=
@ISVCells@,ProdwNM=@ISVCells@,
      Attrw= @ISVCells@, Attrs= @ISVCells@, Attro= @ISVCells@, Attrn=
@ISVCells@,AttrwNM=@ISVCells@,


 ;  ZONAL Trip Arrays

      ZoneJurA  =@LastIZN@,; Zonal Jurisdiction Array

      PHBW_NMTZA=@ZoneSize@,
      PHBWTZA = @ZoneSize@, PHBW1ZA = @ZoneSize@, PHBW2ZA = @ZoneSize@, PHBW3ZA =
@ZoneSize@, PHBW4ZA = @ZoneSize@,
      PHBSTZA = @ZoneSize@, PHBS1ZA = @ZoneSize@, PHBS2ZA = @ZoneSize@, PHBS3ZA =
@ZoneSize@, PHBS4ZA = @ZoneSize@,
      PHBOTZA = @ZoneSize@, PHBO1ZA = @ZoneSize@, PHBO2ZA = @ZoneSize@, PHBO3ZA =
@ZoneSize@, PHBO4ZA = @ZoneSize@,
      PNHBTZA = @ZoneSize@, PNHB1ZA = @ZoneSize@, PNHB2ZA = @ZoneSize@, PNHB3ZA =
@ZoneSize@, PNHB4ZA = @ZoneSize@,
      PCOMTZA = @ZoneSize@,
      PMTKTZA = @ZoneSize@,
      PHTKTZA = @ZoneSize@,

      AHBW_NMTZA=@ZoneSize@,
      AHBWTZA = @ZoneSize@, AHBW1ZA = @ZoneSize@, AHBW2ZA = @ZoneSize@, AHBW3ZA =
@ZoneSize@, AHBW4ZA = @ZoneSize@,
   adjAHBWTZA = @ZoneSize@,
   adjAHBW1ZA = @ZoneSize@,
   adjAHBW2ZA = @ZoneSize@,
   adjAHBW3ZA = @ZoneSize@,
   adjAHBW4ZA = @ZoneSize@,
      AHBSTZA = @ZoneSize@, AHBS1ZA = @ZoneSize@, AHBS2ZA = @ZoneSize@, AHBS3ZA =
@ZoneSize@, AHBS4ZA = @ZoneSize@,
      AHBOTZA = @ZoneSize@, AHBO1ZA = @ZoneSize@, AHBO2ZA = @ZoneSize@, AHBO3ZA =
@ZoneSize@, AHBO4ZA = @ZoneSize@,
      ANHBTZA = @ZoneSize@,
      ACOMTZA = @ZoneSize@,
      AMTKTZA = @ZoneSize@,
      AHTKTZA = @ZoneSize@,

     FAHBWTZA = @ZoneSize@,FAHBW1ZA = @ZoneSize@,FAHBW2ZA = @ZoneSize@,FAHBW3ZA =
@ZoneSize@,FAHBW4ZA = @ZoneSize@,
     FAHBSTZA = @ZoneSize@,FAHBS1ZA = @ZoneSize@,FAHBS2ZA = @ZoneSize@,FAHBS3ZA =
@ZoneSize@,FAHBS4ZA = @ZoneSize@,
     FAHBOTZA = @ZoneSize@,FAHBO1ZA = @ZoneSize@,FAHBO2ZA = @ZoneSize@,FAHBO3ZA =
@ZoneSize@,FAHBO4ZA = @ZoneSize@,
     FANHBTZA = @ZoneSize@,
     FACOMTZA = @ZoneSize@,
     FAMTKTZA = @ZoneSize@,
     FAHTKTZA = @ZoneSize@,
```

```
      JurHHA     = @Jursize@,      ; Juris. HH  Trips array
      JurHBWA    = @Jursize@, JurHBWrA    = @Jursize@,     ;  Juris. HBW Trips &
Rates array
      JurHBSA    = @Jursize@, JurHBSrA    = @Jursize@,     ;  Juris. HBS Trips &
Rates array
      JurHBOA    = @Jursize@, JurHBOrA    = @Jursize@,     ;  Juris. HBO Trips &
Rates array
      JurNHBA    = @Jursize@, JurNHBrA    = @Jursize@,     ;  Juris. NHB Trips &
Rates array
      JurCOMA    = @Jursize@, JurCOMrA    = @Jursize@,     ;  Juris. MTK Trips &
Rates array
      JurMTKA    = @Jursize@, JurMTKrA    = @Jursize@,     ;  Juris. MTK Trips &
Rates array
      JurHTKA    = @Jursize@, JurHTKrA    = @Jursize@,     ;  Juris. HTK Trips &
Rates array

      RegHHSzA   = @SzCl@,          ;  Regional HH by Size array
      RegHBWSzA  = @SzCl@, RegHBWrSzA   = @SzCl@,     ;  Regional HBW Trips & Rates
by Size array
      RegHBSSzA  = @SzCl@, RegHBSrSzA   = @SzCl@,     ;  Regional HBS Trips & Rates
by Size array
      RegHBOSzA  = @SzCl@, RegHBOrSzA   = @SzCl@,     ;  Regional HBO Trips & Rates
by Size array
      RegNHBSzA  = @SzCl@, RegNHBrSzA   = @SzCl@,     ;  Regional NHB Trips & Rates
by Size array

      RegHHInA   = @InCl@,          ;  Regional HH by Inc array
      RegHBWInA  = @InCl@, RegHBWrInA   = @InCl@,     ;  Regional HBW Trips & Rates
by Inc. array
      RegHBSInA  = @InCl@, RegHBSrInA   = @InCl@,     ;  Regional HBS Trips & Rates
by Inc. array
      RegHBOInA  = @InCl@, RegHBOrInA   = @InCl@,     ;  Regional HBO Trips & Rates
by Inc. array
      RegNHBInA  = @InCl@, RegNHBrInA   = @InCl@,     ;  Regional NHB Trips & Rates
by Inc. array


      RegHHVaA   = @VaCl@,          ;  Regional HH by VeAv array
      RegHBWVaA  = @VaCl@, RegHBWrVaA   = @VaCl@,     ;  Regional HBW Trips & Rates
by Vehs Av. array
      RegHBSVaA  = @VaCl@, RegHBSrVaA   = @VaCl@,     ;  Regional HBS Trips & Rates
by Vehs Av. array
      RegHBOVaA  = @VaCl@, RegHBOrVaA   = @VaCl@,     ;  Regional HBO Trips & Rates
by Vehs Av. array
      RegNHBVaA  = @VaCl@, RegNHBrVaA   = @VaCl@,     ;  Regional NHB Trips & Rates
by Vehs Av. array

      JurInHHA     = @JICells@,      ; Juris. HH  Trips array
      JurInHBWA    = @JICells@, JurInHBWrA    = @JICells@,     ;  Juris. HBW Trips &
Rates array
      JurInHBSA    = @JICells@, JurInHBSrA    = @JICells@,     ;  Juris. HBS Trips &
Rates array
      JurInHBOA    = @JICells@, JurInHBOrA    = @JICells@,     ;  Juris. HBO Trips &
Rates array
      JurInNHBA    = @JICells@, JurInNHBrA    = @JICells@      ;  Juris. NHB Trips &
Rates array

;========================
; Define Loop-up Tables  =
;========================
;
;================================================================
; Trip Production Rates, based on Inc/Size/VeAv Index 111 to 444 =
;================================================================
;
      LOOKUP Name=PRATE,
             LOOKUP[1]   = 1,Result = 2,  ; HBW rate
             LOOKUP[2]   = 1,Result = 3,  ; HBS rate
             LOOKUP[3]   = 1,Result = 4,  ; HBO rate
             LOOKUP[4]   = 1,Result = 5,  ; NHB rate
             Interpolate = N, FAIL=0,0,0,
; Trip production rates: isv
;      isv     HBW    HBS    HBO    NHB
;     -----   -----  -----  -----  -----
  R="  111,   0.686, 0.215, 0.415, 0.200",
    "  112,   0.851, 0.599, 1.121, 1.258",
    "  113,   0.750, 0.599, 1.435, 1.258",
    "  114,   0.957, 0.631, 1.435, 1.258",
    "  121,   1.082, 0.215, 0.540, 0.300",
    "  122,   1.082, 0.680, 1.700, 1.258",
    "  123,   1.412, 0.680, 1.770, 1.430",
    "  124,   1.412, 0.680, 1.800, 1.430",
    "  131,   1.096, 0.215, 1.284, 0.400",
    "  132,   1.517, 0.680, 2.400, 1.430",
    "  133,   1.936, 0.838, 2.614, 1.430",
    "  134,   1.936, 0.838, 2.391, 1.430",
    "  141,   1.664, 0.215, 1.364, 0.500",
    "  142,   1.664, 0.680, 2.900, 1.500",
    "  143,   1.936, 0.960, 4.266, 1.600",
    "  144,   1.936, 1.000, 3.819, 1.700",
    "  211,   1.017, 0.215, 0.685, 0.300",
    "  212,   1.182, 0.599, 1.158, 1.258",
    "  213,   1.301, 0.599, 1.474, 1.400",
    "  214,   1.527, 0.631, 1.474, 1.490",
    "  221,   1.352, 0.294, 0.889, 0.400",
    "  222,   1.352, 0.680, 1.892, 1.258",
    "  223,   1.531, 0.680, 1.968, 2.197",
    "  224,   2.122, 0.840, 2.041, 2.197",
    "  231,   1.662, 0.400, 1.349, 0.500",
    "  232,   1.662, 0.965, 2.500, 1.762",
    "  233,   1.790, 0.965, 3.190, 2.600",
    "  234,   2.122, 1.043, 3.472, 2.800",
    "  241,   1.849, 0.450, 0.750, 0.600",
    "  242,   1.849, 0.965, 3.486, 1.983",
    "  243,   2.049, 1.000, 4.266, 2.800",
    "  244,   2.426, 1.100, 5.674, 2.967",
    "  311,   1.017, 0.294, 0.708, 0.400",
    "  312,   1.223, 0.666, 1.035, 1.524",
    "  313,   1.223, 0.666, 1.474, 1.565",
    "  314,   1.223, 0.666, 1.474, 1.565",
    "  321,   1.464, 0.429, 0.889, 0.500",
    "  322,   1.464, 0.680, 2.161, 1.625",
    "  323,   1.841, 0.900, 2.460, 2.330",
    "  324,   2.152, 0.965, 2.659, 2.536",
    "  331,   1.662, 0.500, 1.548, 0.600",
    "  332,   1.662, 0.965, 2.843, 2.479",
    "  333,   2.016, 1.000, 3.190, 2.892",
    "  334,   3.024, 1.141, 3.559, 2.891",
    "  341,   2.295, 0.600, 3.446, 0.609",
    "  342,   2.295, 0.956, 4.653, 2.188",
    "  343,   2.295, 1.141, 5.395, 2.925",
    "  344,   3.076, 1.400, 6.501, 4.202",
    "  411,   1.335, 0.429, 0.708, 0.600",
    "  412,   1.335, 0.860, 1.087  1.760",
    "  413,   1.335, 0.860, 1.083, 1.760",
    "  414,   2.000, 0.860, 2.000, 2.405",
    "  421,   1.451, 0.886, 1.567, 0.700",
    "  422,   1.451, 0.886, 1.810, 1.760",
    "  423,   1.841, 0.965, 2.460, 2.405",
    "  424,   2.152, 0.980, 2.460, 2.691",
    "  431,   1.672, 0.900, 3.446, 0.800",
    "  432,   1.672, 1.039, 3.446, 2.720",
    "  433,   2.017, 1.150, 3.937, 2.812",
    "  434,   3.024, 1.200, 3.940, 3.100",
    "  441,   3.333, 1.092, 4.146, 0.900",
    "  442,   3.333, 1.278, 4.839, 1.536",
```

```
    "  443,   3.333, 1.333, 5.921, 3.348",
    "  444,   3.365  1.659  6.738  4.376"


;==============================================================
;    Attraction Rate Lookups  :                               =
;==============================================================
;==================================================
;  HBW Trip Attraction Rates by Area Type        .
;==================================================
      LOOKUP Name=HBWARate,
             LOOKUP[1]   = 1,Result = 2, ;  hh
             LOOKUP[2]   = 1,Result = 3, ;  hhpop
             LOOKUP[3]   = 1,Result = 4, ;  totemp
             LOOKUP[4]   = 1,Result = 5, ;  indemp
             LOOKUP[5]   = 1,Result = 6, ;  retemp
             LOOKUP[6]   = 1,Result = 7, ;  offemp
             LOOKUP[7]   = 1,Result = 8, ;  othemp
             LOOKUP[8]   = 1,Result = 9, ;  nonretailemp
             Interpolate = N, FAIL=0,0,0,
;                 HH    Tot Ind  Ret  Off  Oth NonRet
; AType     HHs  Pop   Emp Emp  Emp  Emp  Emp  Emp
R="1        0.00,0.00,1.11,0.00,0.00,0.00,0.00,0.00",
  "2        0.00,0.00,1.11,0.00,0.00,0.00,0.00,0.00",
  "3        0.00,0.00,1.11,0.00,0.00,0.00,0.00,0.00",
  "4        0.00,0.00,1.11,0.00,0.00,0.00,0.00,0.00",
  "5        0.00,0.00,1.11,0.00,0.00,0.00,0.00,0.00",
  "6        0.00,0.00,1.11,0.00,0.00,0.00,0.00,0.00",
  "7        0.00,0.00,1.11,0.00,0.00,0.00,0.00,0.00"

;==================================================
;  HBS Trip Attraction Rates by Area Type        .
;==================================================
      LOOKUP Name=HBSARate,
             LOOKUP[1]   = 1,Result = 2, ;  hh
             LOOKUP[2]   = 1,Result = 3, ;  hhpop
             LOOKUP[3]   = 1,Result = 4, ;  totemp
             LOOKUP[4]   = 1,Result = 5, ;  indemp
             LOOKUP[5]   = 1,Result = 6, ;  retemp
             LOOKUP[6]   = 1,Result = 7, ;  offemp
             LOOKUP[7]   = 1,Result = 8, ;  othemp
             LOOKUP[8]   = 1,Result = 9, ;  nonretailemp
             Interpolate = N, FAIL=0,0,0,
;                 HH    Tot Ind  Ret  Off  Oth NonRet
; AType     HHs  Pop   Emp Emp  Emp  Emp  Emp  Emp
R="1        0.00,0.00,0.00,0.00,0.29,0.00,0.00,0.00",
  "2        0.00,0.00,0.00,0.00,2.44,0.00,0.00,0.00",
  "3        0.00,0.00,0.00,0.00,3.35,0.00,0.00,0.00",
  "4        0.00,0.00,0.00,0.00,3.35,0.00,0.00,0.00",
  "5        0.00,0.00,0.00,0.00,3.35,0.00,0.00,0.00",
  "6        0.00,0.00,0.00,0.00,3.35,0.00,0.00,0.00",
  "7        0.00,0.00,0.00,0.00,3.35,0.00,0.00,0.00"

;==================================================
;  HBO Trip Attraction Rates by Area Type        .
;==================================================
      LOOKUP Name=HBOARate,
             LOOKUP[1]   = 1,Result = 2, ;  hh
             LOOKUP[2]   = 1,Result = 3, ;  hhpop
             LOOKUP[3]   = 1,Result = 4, ;  totemp
             LOOKUP[4]   = 1,Result = 5, ;  indemp
             LOOKUP[5]   = 1,Result = 6, ;  retemp
             LOOKUP[6]   = 1,Result = 7, ;  offemp
             LOOKUP[7]   = 1,Result = 8, ;  othemp
             LOOKUP[8]   = 1,Result = 9, ;  nonretailemp
             Interpolate = N, FAIL=0,0,0,
;                 HH    Tot Ind  Ret  Off  Oth NonRet
; AType     HHs  Pop   Emp Emp  Emp  Emp  Emp  Emp
R="1        0.00,0.77,0.00,0.00,1.30,0.00,0.00,0.30",
  "2        0.00,0.77,0.00,0.00,1.30,0.00,0.00,0.30",
  "3        0.00,0.77,0.00,0.00,1.30,0.00,0.00,0.30",
  "4        0.00,0.77,0.00,0.00,1.30,0.00,0.00,0.30",
  "5        0.00,0.77,0.00,0.00,1.30,0.00,0.00,0.30",
  "6        0.00,0.77,0.00,0.00,1.30,0.00,0.00,0.30",
  "7        0.00,0.77,0.00,0.00,1.30,0.00,0.00,0.30"


;==================================================
;  NHB Trip Attraction Rates by Area Type        .
;==================================================
      LOOKUP Name=NHBARate,
             LOOKUP[1]   = 1,Result = 2, ;  hh
             LOOKUP[2]   = 1,Result = 3, ;  hhpop
             LOOKUP[3]   = 1,Result = 4, ;  totemp
             LOOKUP[4]   = 1,Result = 5, ;  indemp
             LOOKUP[5]   = 1,Result = 6, ;  retemp
             LOOKUP[6]   = 1,Result = 7, ;  offemp
             LOOKUP[7]   = 1,Result = 8, ;  othemp
             LOOKUP[8]   = 1,Result = 9, ;  nonretailemp
             Interpolate = N, FAIL=0,0,0,
;                 HH    Tot Ind  Ret  Off  Oth NonRet
; AType     HHs  Pop   Emp Emp  Emp  Emp  Emp  Emp
R="1        0.00,0.00,0.00,0.00,0.00,0.00,0.00,0.42",
  "2        0.00,0.28,0.00,0.00,2.77,0.00,0.00,0.49",
  "3        0.00,0.28,0.00,0.00,2.77,0.00,0.00,0.49",
  "4        0.00,0.28,0.00,0.00,2.77,0.00,0.00,0.49",
  "5        0.00,0.28,0.00,0.00,2.77,0.00,0.00,0.49",
  "6        0.00,0.28,0.00,0.00,2.77,0.00,0.00,0.49",
  "7        0.00,0.28,0.00,0.00,2.77,0.00,0.00,0.49"

;==================================================
;  Commercial Trip Attraction Rates by Area Type        .
;==================================================
      LOOKUP Name=COMARate,
             LOOKUP[1]   = 1,Result = 2, ;  hh
             LOOKUP[2]   = 1,Result = 3, ;  hhpop
             LOOKUP[3]   = 1,Result = 4, ;  totemp
             LOOKUP[4]   = 1,Result = 5, ;  indemp
             LOOKUP[5]   = 1,Result = 6, ;  retemp
             LOOKUP[6]   = 1,Result = 7, ;  offemp
             LOOKUP[7]   = 1,Result = 8, ;  othemp
             LOOKUP[8]   = 1,Result = 9, ;  nonretailemp
             Interpolate = N, FAIL=0,0,0,
;                  HH    Tot   Ind   Ret   Off   Oth   NonRet
; AType     HHs   Pop   Emp   Emp   Emp   Emp   Emp   Emp
R="1        0.137,0.000,0.000,0.059,0.519,0.176,0.086,0.000 ",
  "2        0.117,0.000,0.000,0.050,0.445,0.151,0.074,0.000 ",
  "3        0.130,0.000,0.000,0.056,0.494,0.168,0.082,0.000 ",
  "4        0.130,0.000,0.000,0.056,0.494,0.168,0.082,0.000 ",
  "5        0.130,0.000,0.000,0.056,0.494,0.168,0.082,0.000 ",
  "6        0.156,0.000,0.000,0.067,0.593,0.202,0.098,0.000 ",
  "7        0.150,0.000,0.000,0.064,0.568,0.193,0.094,0.000 "

;==================================================
;  Medium Truck Trip Attraction Rates by Area Type        .
;==================================================
      LOOKUP Name=MTKARate,
             LOOKUP[1]   = 1,Result = 2, ;  hh
             LOOKUP[2]   = 1,Result = 3, ;  hhpop
             LOOKUP[3]   = 1,Result = 4, ;  totemp
             LOOKUP[4]   = 1,Result = 5, ;  indemp
             LOOKUP[5]   = 1,Result = 6, ;  retemp
             LOOKUP[6]   = 1,Result = 7, ;  offemp
             LOOKUP[7]   = 1,Result = 8, ;  othemp
             LOOKUP[8]   = 1,Result = 9, ;  nonretailemp
             Interpolate = N, FAIL=0,0,0,
```

```
;                HH    Tot   Ind   Ret   Off   Oth   NonRet
; AType     HHs   Pop   Emp   Emp   Emp   Emp   Emp   Emp
R="1        0.070,0.000,0.000,0.088,0.088,0.004,0.014,0.000",
  "2        0.100,0.000,0.000,0.125,0.125,0.005,0.020,0.000",
  "3        0.100,0.000,0.000,0.125,0.125,0.005,0.020,0.000",
  "4        0.100,0.000,0.000,0.125,0.125,0.005,0.020,0.000",
  "5        0.120,0.000,0.000,0.150,0.150,0.006,0.024,0.000",
  "6        0.120,0.000,0.000,0.150,0.150,0.006,0.024,0.000",
  "7        0.120,0.000,0.000,0.150,0.150,0.006,0.024,0.000"

;==================================================
;  Heavy Truck Trip Attraction Rates by Area Type       .
;==================================================
      LOOKUP Name=HTKARate,
             LOOKUP[1]   = 1,Result = 2, ;  hh
             LOOKUP[2]   = 1,Result = 3, ;  hhpop
             LOOKUP[3]   = 1,Result = 4, ;  totemp
             LOOKUP[4]   = 1,Result = 5, ;  indemp
             LOOKUP[5]   = 1,Result = 6, ;  retemp
             LOOKUP[6]   = 1,Result = 7, ;  offemp
             LOOKUP[7]   = 1,Result = 8, ;  othemp
             LOOKUP[8]   = 1,Result = 9, ;  nonretailemp
             Interpolate = N, FAIL=0,0,0,
;                HH    Tot   Ind   Ret   Off   Oth   NonRet
; AType     HHs   Pop   Emp   Emp   Emp   Emp   Emp   Emp
R="1        0.011,0.000,0.000,0.055,0.027,0.001,0.002,0.000",
  "2        0.015,0.000,0.000,0.078,0.039,0.002,0.003,0.000",
  "3        0.015,0.000,0.000,0.078,0.039,0.002,0.003,0.000",
  "4        0.015,0.000,0.000,0.078,0.039,0.002,0.003,0.000",
  "5        0.017,0.000,0.000,0.086,0.043,0.002,0.003,0.000",
  "6        0.017,0.000,0.000,0.086,0.043,0.002,0.003,0.000",
  "7        0.017,0.000,0.000,0.086,0.043,0.002,0.003,0.000"


;==========================================
;  Production Adjustment Rates by Purpose
;==========================================
      LOOKUP Name=JurPmod,
             LOOKUP[1]   = 1,Result = 2, ;  HBW
             LOOKUP[2]   = 1,Result = 3, ;  HBS
             LOOKUP[3]   = 1,Result = 4, ;  HBO
             LOOKUP[4]   = 1,Result = 5, ;  NHB
             LOOKUP[5]   = 1,Result = 6, ;  COM
             LOOKUP[6]   = 1,Result = 7, ;  Mtk
             LOOKUP[7]   = 1,Result = 8, ;  Htk
             Interpolate = N, FAIL=0,0,0,List=Y,
; Jur   HBW   HBS   HBO   NHB   COM   Mtk   Htk
R=" 0  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; dc  1
  " 1  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; mtg 2
  " 2  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; pg  3
  " 3  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; arl 4
  " 4  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; alx 5
  " 5  0.90, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; ffx 6  HBW changed from 1.0>0.90
  " 6  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; ldn 7              v2.2D
  " 7  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; pw  8
  " 8  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; -   9
  " 9  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; frd 10
  "10  0.75, 0.75, 0.70, 1.00, 1.00, 1.00, 1.00", ; how 11
  "11  0.85, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; aa  12
  "12  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; chs 13
  "13  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; -   14
  "14  0.85, 0.68, 0.75, 1.00, 1.00, 1.00, 1.00", ; car 15
  "15  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; cal 16
  "16  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; stm 17
  "17  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; kge 18
  "18  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; fbg 19
  "19  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; stf 20
  "20  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; spt 21
```

```
  "21  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; fau 22
  "22  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; clk 23
  "23  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00"  ; jef 24

;==========================================
;  Attraction Adjustment Rates by Purpose
;==========================================
      LOOKUP Name=JurAmod,
             LOOKUP[1]   = 1,Result = 2, ;  HBW
             LOOKUP[2]   = 1,Result = 3, ;  HBS
             LOOKUP[3]   = 1,Result = 4, ;  HBO
             LOOKUP[4]   = 1,Result = 5, ;  NHB
             LOOKUP[5]   = 1,Result = 6, ;  COM
             LOOKUP[6]   = 1,Result = 7, ;  Mtk
             LOOKUP[7]   = 1,Result = 8, ;  Htk
             Interpolate = N, FAIL=0,0,0,List=Y,
; Jur   HBW   HBS   HBO   NHB   COM   Mtk   Htk
R=" 0  1.07, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; dc  1
  " 1  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; mtg 2
  " 2  1.10, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; pg  3
  " 3  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; arl 4
  " 4  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; alx 5
  " 5  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; ffx 6
  " 6  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; ldn 7
  " 7  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; pw  8
  " 8  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; -   9
  " 9  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; frd 10
  "10  0.75  0.80, 0.80, 1.00, 1.00, 1.00, 1.00", ; how 11
  "11  0.85, 1.03, 1.00, 1.00, 1.00, 1.00, 1.00", ; aa  12
  "12  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; chs 13
  "13  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; -   14
  "14  0.85, 0.70, 0.75, 1.00, 1.00, 1.00, 1.00", ; car 15
  "15  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; cal 16
  "16  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; stm 17
  "17  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; kge 18
  "18  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; fbg 19
  "19  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; stf 20
  "20  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; spt 21
  "21  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; fau 22
  "22  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00", ; clk 23
  "23  1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00"  ; jef 24

;========================================================
;  HBW Zonal Production / Attraction Modification Factors  =
;========================================================
      LOOKUP Name=HBWZmod,
             LOOKUP[1]   = 1,Result = 2, ;  Prod Factor/Inc. 1
             LOOKUP[2]   = 1,Result = 3, ;             /Inc. 2
             LOOKUP[3]   = 1,Result = 4, ;             /Inc. 3
             LOOKUP[4]   = 1,Result = 5, ;             /Inc. 4
             LOOKUP[5]   = 1,Result = 6, ;  Attr Factor/Inc. 1
             LOOKUP[6]   = 1,Result = 7, ;             /Inc. 2
             LOOKUP[7]   = 1,Result = 8, ;             /Inc. 3
             LOOKUP[8]   = 1,Result = 9, ;             /Inc. 4
             Interpolate = N, FAIL=0,0,0,File=@ZNFILE_ZModW@


;========================================================
;  HBS Zonal Production / Attraction Modification Factors  =
;========================================================
      LOOKUP Name=HBSZmod,
             LOOKUP[1]   = 1,Result = 2, ;  Prod Factor/Inc. 1
             LOOKUP[2]   = 1,Result = 3, ;             /Inc. 2
             LOOKUP[3]   = 1,Result = 4, ;             /Inc. 3
             LOOKUP[4]   = 1,Result = 5, ;             /Inc. 4
             LOOKUP[5]   = 1,Result = 6, ;  Attr Factor/Inc. 1
             LOOKUP[6]   = 1,Result = 7, ;             /Inc. 2
             LOOKUP[7]   = 1,Result = 8, ;             /Inc. 3
```

```
            LOOKUP[8]   = 1,Result = 9, ;             /Inc. 4
            Interpolate = N, FAIL=0,0,0,File=@ZNFILE_ZModS@
;==========================================================
;  HBO Zonal Production / Attraction Modification Factors  =
;==========================================================
      LOOKUP Name=HBOZmod,
            LOOKUP[1]   = 1,Result = 2, ;  Prod Factor/Inc. 1
            LOOKUP[2]   = 1,Result = 3, ;             /Inc. 2
            LOOKUP[3]   = 1,Result = 4, ;             /Inc. 3
            LOOKUP[4]   = 1,Result = 5, ;             /Inc. 4
            LOOKUP[5]   = 1,Result = 6, ;  Attr Factor/Inc. 1
            LOOKUP[6]   = 1,Result = 7, ;             /Inc. 2
            LOOKUP[7]   = 1,Result = 8, ;             /Inc. 3
            LOOKUP[8]   = 1,Result = 9, ;             /Inc. 4
            Interpolate = N, FAIL=0,0,0,File=@ZNFILE_ZModO@
;

;==========================================================
;  NHB Zonal Production / Attraction Modification Factors  =
;==========================================================
      LOOKUP Name=NHBZmod,
            LOOKUP[1]   = 1,Result = 2, ;  Prod Factor/Inc. 1
            LOOKUP[2]   = 1,Result = 3, ;             /Inc. 2
            LOOKUP[3]   = 1,Result = 4, ;             /Inc. 3
            LOOKUP[4]   = 1,Result = 5, ;             /Inc. 4
            LOOKUP[5]   = 1,Result = 6, ;  Attr Factor/Inc. 1
            LOOKUP[6]   = 1,Result = 7, ;             /Inc. 2
            LOOKUP[7]   = 1,Result = 8, ;             /Inc. 3
            LOOKUP[8]   = 1,Result = 9, ;             /Inc. 4
            Interpolate = N, FAIL=0,0,0,File=@ZNFILE_ZModN@

; Truck zone lookup
read file = @ZNFILE_TZone@

;===================================================================================
==================
;
=
; End of LookUps  Now read the input files
=
;===================================================================================
==================

;
; read Zonal land use files  into Z-File
ZDATI[1] = @ZNFILE_LU@,Z       =  1- 4,
                       HH      =  8-15,
                       HHPOP   = 16-23,
                       GQPOP   = 24-31,
                       TOTPOP  = 32-39,
                       TOTEMP  = 40-47,
                       INDEMP  = 48-55,
                       RETEMP  = 56-63,
                       OFFEMP  = 64-71,
                       OTHEMP  = 72-79,
                       JURCODE = 80-81,
                       DistnEX = 96-98

    ; Current Zonal Totals:
                 HH      = zi.1.HH[I]
                 HHPOP   = zi.1.HHPOP[I]
                 TOTPOP  = zi.1.TOTPOP[I]
                 TOTEMP  = zi.1.TOTEMP[I]
                 INDEMP  = zi.1.INDEMP[I]
                 RETEMP  = zi.1.RETEMP[I]
                 OFFEMP  = zi.1.OFFEMP[I]
                 OTHEMP  = zi.1.OTHEMP[I]
                 NRETEMP = zi.1.OTHEMP[I] + zi.1.OFFEMP[I] + zi.1.INDEMP[I]
                 JURCODE = zi.1.JURCODE[I]
                 DistnEX = zi.1.DistnEX[I]

      ; Accumulate Regional Totals:
                 HH_Tot       = HH_Tot      +  zi.1.HH[I]
                 HHPOP_Tot    = HHPOP_Tot   +  zi.1.HHPOP[I]
                 TOTPOP_Tot   = TOTPOP_Tot  +  zi.1.TOTPOP[I]
                 TOTEMP_Tot   = TOTEMP_Tot  +  zi.1.TOTEMP[I]
                 INDEMP_Tot   = INDEMP_Tot  +  zi.1.INDEMP[I]
                 RETEMP_Tot   = RETEMP_Tot  +  zi.1.RETEMP[I]
                 OFFEMP_Tot   = OFFEMP_Tot  +  zi.1.OFFEMP[I]
                 OTHEMP_Tot   = OTHEMP_Tot  +  zi.1.OTHEMP[I]
                 NRETEMP_Tot  = NRETEMP_Tot +  zi.1.OTHEMP[I] + zi.1.OFFEMP[I] +
zi.1.INDEMP[I]

                  IF  (I <= @LASTIZN@)
                       ZoneJURA[I]  = JurCode + 1
                  ENDIF
;
;  Define location variables for truck models
                   Loc  = 4                                   ; default
                   IF (I=@DCCoreRng@ || I=@VACoreRNG@)  Loc = 1  ; regional core
                   IF (I=@DCNCorRng@                 )  Loc = 2  ; DC non-Core
                   IF (I=@VA10MSRng@                 )  Loc = 3  ; VA 10miSquare

; Zonal Area Type File
ZDATI[2] = @ZNFILE_AT@, Z       =  1- 5,
                        ATYPE   = 58-59
                        ATYPE   = zi.2.Atype[I]

ZDATI[3] = @ZNFILE_PEX@ , Z= #1,  hbwxp=#2,  hbsxp=#3,  hboxp=#4,  nhbxp=#5,
                                  comxp=#6,  mtkxp=#7,  htkxp=#8

ZDATI[4] = @ZNFILE_AEX@ , Z= #1,  hbwxa=#2,  hbsxa=#3,  hboxa=#4,  nhbxa=#5,
                                  comxa=#6,  mtkxa=#7,  htkxa=#8

; read HH files by ISV
ZDATI[5]  = @ZNFILE_I1SV@, Z= #1, hh111=#2 , hh112=#3 , hh113=#4 , hh114=#5 ,
                                  hh121=#6 , hh122=#7 , hh123=#8 , hh124=#9 ,
                                  hh131=#10, hh132=#11, hh133=#12, hh134=#13,
                                  hh141=#14, hh142=#15, hh143=#16, hh144=#17

ZDATI[6]  = @ZNFILE_I2SV@, Z= #1, hh211=#2 , hh212=#3 , hh213=#4 , hh214=#5 ,
                                  hh221=#6 , hh222=#7 , hh223=#8 , hh224=#9 ,
                                  hh231=#10, hh232=#11, hh233=#12, hh234=#13,
                                  hh241=#14, hh242=#15, hh243=#16, hh244=#17

ZDATI[7]  = @ZNFILE_I3SV@, Z= #1, hh311=#2 , hh312=#3 , hh313=#4 , hh314=#5 ,
                                  hh321=#6 , hh322=#7 , hh323=#8 , hh324=#9 ,
                                  hh331=#10, hh332=#11, hh333=#12, hh334=#13,
                                  hh341=#14, hh342=#15, hh343=#16, hh344=#17

ZDATI[8]  = @ZNFILE_I4SV@, Z= #1, hh411=#2 , hh412=#3 , hh413=#4 , hh414=#5 ,
                                  hh421=#6 , hh422=#7 , hh423=#8 , hh424=#9 ,
                                  hh431=#10, hh432=#11, hh433=#12, hh434=#13,
                                  hh441=#14, hh442=#15, hh443=#16, hh444=#17


; Zonal sum of truck skims.  Used to determine whether or not the zone is
;  accessible by trucks.
ZDATI[9]  = @ZNFILE_TSkim@, Z= #1, skimout=#2, skimin=#3



;----------------------------------------------------------------------
;Begin Matrix Work Now ...
;----------------------------------------------------------------------
```

```
; Put HH variables into arrays
  CHHA[111]=zi.5.hh111[I]  CHHA[112]=zi.5.hh112[I]  CHHA[113]=zi.5.hh113[I]
CHHA[114]=zi.5.hh114[I]
  CHHA[121]=zi.5.hh121[I]  CHHA[122]=zi.5.hh122[I]  CHHA[123]=zi.5.hh123[I]
CHHA[124]=zi.5.hh124[I]
  CHHA[131]=zi.5.hh131[I]  CHHA[132]=zi.5.hh132[I]  CHHA[133]=zi.5.hh133[I]
CHHA[134]=zi.5.hh134[I]
  CHHA[141]=zi.5.hh141[I]  CHHA[142]=zi.5.hh142[I]  CHHA[143]=zi.5.hh143[I]
CHHA[144]=zi.5.hh144[I]

  CHHA[211]=zi.6.hh211[I]  CHHA[212]=zi.6.hh212[I]  CHHA[213]=zi.6.hh213[I]
CHHA[214]=zi.6.hh214[I]
  CHHA[221]=zi.6.hh221[I]  CHHA[222]=zi.6.hh222[I]  CHHA[223]=zi.6.hh223[I]
CHHA[224]=zi.6.hh224[I]
  CHHA[231]=zi.6.hh231[I]  CHHA[232]=zi.6.hh232[I]  CHHA[233]=zi.6.hh233[I]
CHHA[234]=zi.6.hh234[I]
  CHHA[241]=zi.6.hh241[I]  CHHA[242]=zi.6.hh242[I]  CHHA[243]=zi.6.hh243[I]
CHHA[244]=zi.6.hh244[I]

  CHHA[311]=zi.7.hh311[I]  CHHA[312]=zi.7.hh312[I]  CHHA[313]=zi.7.hh313[I]
CHHA[314]=zi.7.hh314[I]
  CHHA[321]=zi.7.hh321[I]  CHHA[322]=zi.7.hh322[I]  CHHA[323]=zi.7.hh323[I]
CHHA[324]=zi.7.hh324[I]
  CHHA[331]=zi.7.hh331[I]  CHHA[332]=zi.7.hh332[I]  CHHA[333]=zi.7.hh333[I]
CHHA[334]=zi.7.hh334[I]
  CHHA[341]=zi.7.hh341[I]  CHHA[342]=zi.7.hh342[I]  CHHA[343]=zi.7.hh343[I]
CHHA[344]=zi.7.hh344[I]

  CHHA[411]=zi.8.hh411[I]  CHHA[412]=zi.8.hh412[I]  CHHA[413]=zi.8.hh413[I]
CHHA[414]=zi.8.hh414[I]
  CHHA[421]=zi.8.hh421[I]  CHHA[422]=zi.8.hh422[I]  CHHA[423]=zi.8.hh423[I]
CHHA[424]=zi.8.hh424[I]
  CHHA[431]=zi.8.hh431[I]  CHHA[432]=zi.8.hh432[I]  CHHA[433]=zi.8.hh433[I]
CHHA[434]=zi.8.hh434[I]
  CHHA[441]=zi.8.hh441[I]  CHHA[442]=zi.8.hh442[I]  CHHA[443]=zi.8.hh443[I]
CHHA[444]=zi.8.hh444[I]

;
;==================================================================================
==============
; Compute Current Internal trip productions of current TAZ (I) for HBW, HBS, HBO,&
NHB purposes  =
;==================================================================================
==============

    EXTsh     = 0.0791 * EXP(-0.0882 * DISTnEX)     ; share of hb/nhb trips that are
External
    nonEXTsh  = 1.00 - EXTsh                        ; share of hb/nhb trips that are
Internal

    IF (Atype = 1)  HBWNMPsh = 0.40334
    IF (Atype = 2)  HBWNMPsh = 0.11155
    IF (Atype = 3)  HBWNMPsh = 0.03201
    IF (Atype >=4)  HBWNMPsh = 0.02346              ; with fix

Loop in = 1, @InCl@
   Loop sz = 1, @SzCl@
      Loop va = 1,@VaCl@

            isv =  in*100.0 + sz*10.0 + va    ; 3-digit index, Income/Size/Va
            extsh    = 0.0791 * EXP(-0.0882 * DISTnEX)     ; share of hb/nhb trips
to externals
            nonextsh = 1.00 - extsh                        ; share of hb/nhb trips
to externals
      ; Compute rates by purpose:
      ; HBW Motorized& NonMotorized INTERNAL Trips:
         tem_M_N_II   = CHHA[isv] * Prate(1,isv) * HBWZmod(in,I) *
JurPmod(1,JurCode) * @HBW_GlobalAdj@ * nonExtSH
      ; HBW Motorized/NonMotorized INTERNAL to EXTERNAL Trips:
         tem_M_N_IX   = CHHA[isv] * Prate(1,isv) * HBWZmod(in,I) *
JurPmod(1,JurCode) * @HBW_GlobalAdj@ * ExtSH
      ; HBW Non-Motorized Trips:
         tem_NMtr_II  = tem_M_N_II * HBWNMPsh    ; nonmotorized trips
      ; HBW Motorized INTERNAL to INTERNAL Trips:
         tem_Mtr_II   = tem_M_N_II * (1.00 - HBWNMPsh)

         ; compute non-motorized HBW Trips, store in isv array
         prodwNM[isv] = tem_NMtr_II

         ; compute internal motorized trips here, store in zonal arrays:
         prodw[isv]   = tem_Mtr_II
         prods[isv]   = CHHA[isv] * Prate(2,isv) * HBSZmod(in,I) *
JurPmod(2,JurCode) * @HBS_GlobalAdj@ * nonExtSH
         prodo[isv]   = CHHA[isv] * Prate(3,isv) * HBOZmod(in,I) *
JurPmod(3,JurCode) * @HBO_GlobalAdj@ * nonExtSH
         prodn[isv]   = CHHA[isv] * Prate(4,isv) *
JurPmod(4,JurCode) * @NHB_GlobalAdj@ * nonExtSH

;        #Note:#        Zonal production factor for NHB productions is removed
;                       A-mod factors is NHBZmod(5,I) used as a NHB special
generator adjustment

      ; Accumulate Trips by purpose at the TAZ level
         PHBW_NMTZA[I]= PHBW_NMTZA[I] + prodwNM[isv]
         PHBWTZA[I]   = PHBWTZA[I]    + prodw[isv]
         PHBSTZA[I]   = PHBSTZA[I]    + prods[isv]
         PHBOTZA[I]   = PHBOTZA[I]    + prodo[isv]
         PNHBTZA[I]   = PNHBTZA[I]    + prodn[isv]

      ; Accumulate Trips by purpose and Income at the TAZ level
             if (in=1)
                        PHBW1ZA[I]   = PHBW1ZA[I] + prodw[isv]
                        PHBS1ZA[I]   = PHBS1ZA[I] + prods[isv]
                        PHBO1ZA[I]   = PHBO1ZA[I] + prodo[isv]
                        PNHB1ZA[I]   = PNHB1ZA[I] + prodn[isv]
              endif
              if (in=2)
                        PHBW2ZA[I]   = PHBW2ZA[I] + prodw[isv]
                        PHBS2ZA[I]   = PHBS2ZA[I] + prods[isv]
                        PHBO2ZA[I]   = PHBO2ZA[I] + prodo[isv]
                        PNHB2ZA[I]   = PNHB2ZA[I] + prodn[isv]
              endif
              if (in=3)
                        PHBW3ZA[I]   = PHBW3ZA[I] + prodw[isv]
                        PHBS3ZA[I]   = PHBS3ZA[I] + prods[isv]
                        PHBO3ZA[I]   = PHBO3ZA[I] + prodo[isv]
                        PNHB3ZA[I]   = PNHB3ZA[I] + prodn[isv]
              endif
              if (in=4)
                        PHBW4ZA[I]   = PHBW4ZA[I] + prodw[isv]
                        PHBS4ZA[I]   = PHBS4ZA[I] + prods[isv]
                        PHBO4ZA[I]   = PHBO4ZA[I] + prodo[isv]
                        PNHB4ZA[I]   = PNHB4ZA[I] + prodn[isv]
              endif


      ; Accumulate Internal HHs, Trip Productions by purpose by Size  Levels

               RegHHSzA[sz]   =  RegHHSzA[sz]  + CHHA[isv]
              RegHBWSzA[sz]   = RegHBWSzA[sz]  + prodw[isv]
              RegHBSSzA[sz]   = RegHBSSzA[sz]  + prods[isv]
              RegHBOSzA[sz]   = RegHBOSzA[sz]  + prodo[isv]
              RegNHBSzA[sz]   = RegNHBSzA[sz]  + prodn[isv]
```

```
      ; Accumulate Internal HHs, Trip Productions by purpose by Income Levels
               RegHHInA[in]   =  RegHHInA[in]  + CHHA[isv]
              RegHBWInA[in]   = RegHBWInA[in]  + prodw[isv]
              RegHBSInA[in]   = RegHBSInA[in]  + prods[isv]
              RegHBOInA[in]   = RegHBOInA[in]  + prodo[isv]
              RegNHBInA[in]   = RegNHBInA[in]  + prodn[isv]


      ; Accumulate Internal HHs, Trip Productions by purpose by Veh. Av. Levels
               RegHHVaA[va]   =  RegHHVaA[va]  + CHHA[isv]
              RegHBWVaA[va]   = RegHBWVaA[va]  + prodw[isv]
              RegHBSVaA[va]   = RegHBSVaA[va]  + prods[isv]
              RegHBOVaA[va]   = RegHBOVaA[va]  + prodo[isv]
              RegNHBVaA[va]   = RegNHBVaA[va]  + prodn[isv]

      ; Accumulate Internal HHs, Trip Productions by purpose at Juris Level
              If (I<= @LastIZN@)
                 Jr = ZoneJURA[I]
                 JurHHA[Jr]  = JurHHA[Jr]  + CHHA[isv]
                 JurHBWA[Jr] = JurHBWA[Jr] + prodw[isv]
                 JurHBSA[Jr] = JurHBSA[Jr] + prods[isv]
                 JurHBOA[Jr] = JurHBOA[Jr] + prodo[isv]


                 JI = Jr*10 + in
                       JurInHHA[JI]   =   JurInHHA[JI] + CHHA[isv]    ; Juris. HHs/
Inc1
                       JurInHBWA[JI]  =  JurInHBWA[JI] + prodw[isv]
                       JurInHBSA[JI]  =  JurInHBSA[JI] + prods[isv]
                       JurInHBOA[JI]  =  JurInHBOA[JI] + prodo[isv]
                       JurInNHBA[JI]  =  JurInNHBA[JI] + prodn[isv]

              ENDIF

      ; Accumulate Internal Trip Productions by purpose for the system
            HH_TotSIV    = HH_TotSIV    + CHHA[isv]
            IntlNMHBWPs  = IntlNMHBWPs  + prodwNM[isv]

            IntlHBWPs    = IntlHBWPs    + prodw[isv]
            IntlHBSPs    = IntlHBSPs    + prods[isv]
            IntlHBOPs    = IntlHBOPs    + prodo[isv]
            IntlNHBPs    = IntlNHBPs    + prodn[isv]
      EndLoop
   EndLoop
EndLoop
;
;==================================================================================
===========
; Read in External trip prods of current TAZ (I) for HBW, HBS, HBO, NHB, CV, Mtk,
Htk purposes =
;==================================================================================
===========
;
IF (I > @LastIZN@)
            PHBWTZA[I]   = zi.3.hbwxp[I]
            PHBSTZA[I]   = zi.3.hbsxp[I]
            PHBOTZA[I]   = zi.3.hboxp[I]
            PNHBTZA[I]   = zi.3.nhbxp[I]

      ; Accumulate External Trip Productions by purpose for the system
            ExtlHBWPs    = ExtlHBWPs  +  zi.3.hbwxp[I]
            ExtlHBSPs    = ExtlHBSPs  +  zi.3.hbsxp[I]
            ExtlHBOPs    = ExtlHBOPs  +  zi.3.hboxp[I]
            ExtlNHBPs    = ExtlNHBPs  +  zi.3.nhbxp[I]
            ExtlCOMPs    = ExtlCOMPs  +  zi.3.comxp[I]
            ExtlMTKPs    = ExtlMTKPs  +  zi.3.mtkxp[I]
            ExtlHTKPs    = ExtlHTKPs  +  zi.3.htkxp[I]
ENDIF
```

```
;
;==================================================================================
===========
; Compute Internal trip Attractions  for HBW, HBS, HBO, NHB purposes
=
;==================================================================================
===========
; calculate totals to allocate among income groups

            AHBWtem      = HBWArate(1,Atype) * HH      +
                           HBWArate(2,Atype) * HHpop   +
                           HBWArate(3,Atype) * TOTEMP  +
                           HBWArate(4,Atype) * INDEMP  +
                           HBWArate(5,Atype) * RETEMP  +
                           HBWArate(6,Atype) * OFFEMP  +
                           HBWArate(7,Atype) * OTHEMP  +
                           HBWArate(8,Atype) * NRETEMP

            AHBStem      = HBSArate(1,Atype) * HH      +
                           HBSArate(2,Atype) * HHpop   +
                           HBSArate(3,Atype) * TOTEMP  +
                           HBSArate(4,Atype) * INDEMP  +
                           HBSArate(5,Atype) * RETEMP  +
                           HBSArate(6,Atype) * OFFEMP  +
                           HBSArate(7,Atype) * OTHEMP  +
                           HBSArate(8,Atype) * NRETEMP

            AHBOtem      = HBOArate(1,Atype) * HH      +
                           HBOArate(2,Atype) * HHpop   +
                           HBOArate(3,Atype) * TOTEMP  +
                           HBOArate(4,Atype) * INDEMP  +
                           HBOArate(5,Atype) * RETEMP  +
                           HBOArate(6,Atype) * OFFEMP  +
                           HBOArate(7,Atype) * OTHEMP  +
                           HBOArate(8,Atype) * NRETEMP

            ANHBtem      = NHBArate(1,Atype) * HH      +
                           NHBArate(2,Atype) * HHpop   +
                           NHBArate(3,Atype) * TOTEMP  +
                           NHBArate(4,Atype) * INDEMP  +
                           NHBArate(5,Atype) * RETEMP  +
                           NHBArate(6,Atype) * OFFEMP  +
                           NHBArate(7,Atype) * OTHEMP  +
                           NHBArate(8,Atype) * NRETEMP

;==================================================================================
==============
; Compute internal trip Attractions for COM, MTK, HTK
=
;==================================================================================
==============

            EXTshCOM     = 0.0
            EXTshMTK     = 0.0
            EXTshHTK     = 0.0
            if (DISTnEX > 0)
              EXTshCOM   = min(1.73 * (DISTnEX^-1.2), 1.0)
              EXTshMTK   = min(0.44 * (DISTnEX^-0.9), 0.6)
              EXTshHTK   = min(0.72 * (DISTnEX^-0.5), 0.9)
            endif
            nonEXTshCOM  = 1.00 - EXTshCOM
            nonEXTshMTK  = 1.00 - EXTshMTK
            nonEXTshHTK  = 1.00 - EXTshHTK

            ACOMtem     = (COMArate(1,Atype) * HH      +
                           COMArate(2,Atype) * HHpop   +
                           COMArate(3,Atype) * TOTEMP  +
```

```
                           COMArate(4,Atype) * INDEMP  +
                           COMArate(5,Atype) * RETEMP  +
                           COMArate(6,Atype) * OFFEMP  +
                           COMArate(7,Atype) * OTHEMP  +
                           COMArate(8,Atype) * NRETEMP)  * nonEXTshCOM

            AMTKtem      =(MTKArate(1,Atype) * HH      +
                           MTKArate(2,Atype) * HHpop   +
                           MTKArate(3,Atype) * TOTEMP  +
                           MTKArate(4,Atype) * INDEMP  +
                           MTKArate(5,Atype) * RETEMP  +
                           MTKArate(6,Atype) * OFFEMP  +
                           MTKArate(7,Atype) * OTHEMP  +
                           MTKArate(8,Atype) * NRETEMP) * nonEXTshMTK

            AHTKtem      =(HTKArate(1,Atype) * HH      +
                           HTKArate(2,Atype) * HHpop   +
                           HTKArate(3,Atype) * TOTEMP  +
                           HTKArate(4,Atype) * INDEMP  +
                           HTKArate(5,Atype) * RETEMP  +
                           HTKArate(6,Atype) * OFFEMP  +
                           HTKArate(7,Atype) * OTHEMP  +
                           HTKArate(8,Atype) * NRETEMP) * nonEXTshHTK

; If zone is not truck-accessible, zero out the truck trips.

          IF (SKIMOUT/@ZONESIZE@ > 90000 || SKIMIN/@ZONESIZE@ > 90000)
            AMTKtem = 0
            AHTKtem = 0
          ENDIF


; Allocate HB-Attractions among income groups:
; HBW
          IF (ATYPE = 1)
              AHBW1ZA[I] = AHBWtem * 0.1220 * JurAmod(1,JurCode) * HBWZmod(5,I)
              AHBW2ZA[I] = AHBWtem * 0.1782 * JurAmod(1,JurCode) * HBWZmod(6,I)
              AHBW3ZA[I] = AHBWtem * 0.2897 * JurAmod(1,JurCode) * HBWZmod(7,I)
              AHBW4ZA[I] = AHBWtem * 0.4101 * JurAmod(1,JurCode) * HBWZmod(8,I)
           ENDIF
          IF (ATYPE = 2)
              AHBW1ZA[I] = AHBWtem * 0.1559 * JurAmod(1,JurCode) * HBWZmod(5,I)
              AHBW2ZA[I] = AHBWtem * 0.1714 * JurAmod(1,JurCode) * HBWZmod(6,I)
              AHBW3ZA[I] = AHBWtem * 0.3006 * JurAmod(1,JurCode) * HBWZmod(7,I)
              AHBW4ZA[I] = AHBWtem * 0.3721 * JurAmod(1,JurCode) * HBWZmod(8,I)
           ENDIF
          IF (ATYPE = 3)
              AHBW1ZA[I] = AHBWtem * 0.1523 * JurAmod(1,JurCode) * HBWZmod(5,I)
              AHBW2ZA[I] = AHBWtem * 0.2153 * JurAmod(1,JurCode) * HBWZmod(6,I)
              AHBW3ZA[I] = AHBWtem * 0.3330 * JurAmod(1,JurCode) * HBWZmod(7,I)
              AHBW4ZA[I] = AHBWtem * 0.2994 * JurAmod(1,JurCode) * HBWZmod(8,I)
           ENDIF
          IF (ATYPE > 3)
              AHBW1ZA[I] = AHBWtem * 0.2062 * JurAmod(1,JurCode) * HBWZmod(5,I)
              AHBW2ZA[I] = AHBWtem * 0.2501 * JurAmod(1,JurCode) * HBWZmod(6,I)
              AHBW3ZA[I] = AHBWtem * 0.3236 * JurAmod(1,JurCode) * HBWZmod(7,I)
              AHBW4ZA[I] = AHBWtem * 0.2201 * JurAmod(1,JurCode) * HBWZmod(8,I)
           ENDIF

       AHBWTZA[I]  = AHBW1ZA[I] + AHBW2ZA[I] + AHBW3ZA[I] + AHBW4ZA[I]


; HBS
          IF (ATYPE < 3)
              AHBS1ZA[I] = AHBStem * 0.1765 * JurAmod(2,JurCode) * HBSZmod(5,I)
              AHBS2ZA[I] = AHBStem * 0.1790 * JurAmod(2,JurCode) * HBSZmod(6,I)
              AHBS3ZA[I] = AHBStem * 0.3066 * JurAmod(2,JurCode) * HBSZmod(7,I)
              AHBS4ZA[I] = AHBStem * 0.3379 * JurAmod(2,JurCode) * HBSZmod(8,I)
           ENDIF
          IF (ATYPE = 3)
              AHBS1ZA[I] = AHBStem * 0.1501 * JurAmod(2,JurCode) * HBSZmod(5,I)
              AHBS2ZA[I] = AHBStem * 0.2010 * JurAmod(2,JurCode) * HBSZmod(6,I)
              AHBS3ZA[I] = AHBStem * 0.3732 * JurAmod(2,JurCode) * HBSZmod(7,I)
              AHBS4ZA[I] = AHBStem * 0.2757 * JurAmod(2,JurCode) * HBSZmod(8,I)
           ENDIF
          IF (ATYPE > 3)
              AHBS1ZA[I] = AHBStem * 0.1446 * JurAmod(2,JurCode) * HBSZmod(5,I)
              AHBS2ZA[I] = AHBStem * 0.2055 * JurAmod(2,JurCode) * HBSZmod(6,I)
              AHBS3ZA[I] = AHBStem * 0.3051 * JurAmod(2,JurCode) * HBSZmod(7,I)
              AHBS4ZA[I] = AHBStem * 0.3448 * JurAmod(2,JurCode) * HBSZmod(8,I)
           ENDIF

       AHBSTZA[I]  = AHBS1ZA[I] + AHBS2ZA[I] + AHBS3ZA[I] + AHBS4ZA[I]


; HBO
          IF (ATYPE < 3)
              AHBO1ZA[I] = AHBOtem * 0.1588 * JurAmod(3,JurCode) * HBOZmod(5,I)
              AHBO2ZA[I] = AHBOtem * 0.1665 * JurAmod(3,JurCode) * HBOZmod(6,I)
              AHBO3ZA[I] = AHBOtem * 0.3039 * JurAmod(3,JurCode) * HBOZmod(7,I)
              AHBO4ZA[I] = AHBOtem * 0.3708 * JurAmod(3,JurCode) * HBOZmod(8,I)
           ENDIF
          IF (ATYPE = 3)
              AHBO1ZA[I] = AHBOtem * 0.0971 * JurAmod(3,JurCode) * HBOZmod(5,I)
              AHBO2ZA[I] = AHBOtem * 0.1626 * JurAmod(3,JurCode) * HBOZmod(6,I)
              AHBO3ZA[I] = AHBOtem * 0.3842 * JurAmod(3,JurCode) * HBOZmod(7,I)
              AHBO4ZA[I] = AHBOtem * 0.3561 * JurAmod(3,JurCode) * HBOZmod(8,I)
           ENDIF
          IF (ATYPE > 3)
              AHBO1ZA[I] = AHBOtem * 0.1309 * JurAmod(3,JurCode) * HBOZmod(5,I)
              AHBO2ZA[I] = AHBOtem * 0.2119 * JurAmod(3,JurCode) * HBOZmod(6,I)
              AHBO3ZA[I] = AHBOtem * 0.3456 * JurAmod(3,JurCode) * HBOZmod(7,I)
              AHBO4ZA[I] = AHBOtem * 0.3116 * JurAmod(3,JurCode) * HBOZmod(8,I)
           ENDIF


       AHBOTZA[I]  = AHBO1ZA[I] + AHBO2ZA[I] + AHBO3ZA[I] + AHBO4ZA[I]

; NHB
       ANHBTZA[I]  = ANHBtem          * JurAmod(4,JurCode) * NHBZmod(5,I) ;  see
#Note# above

; COM
       ACOMTZA[I]  = ACOMtem          * JurAmod(5,JurCode) * @COM_GlobalAdj@
       PCOMTZA[I]  = ACOMtem          * JurAmod(5,JurCode) * @COM_GlobalAdj@

; Incorporate truck zone adjustment factors

       TZFACTM     = 1.0
       TZFACTH     = 1.0
       IF (TZONE(I) > 0)
         TZFACTM = 2.7
         TZFACTH = 5.3
       ENDIF

; MTK
       AMTKTZA[I]  = AMTKtem          * JurAmod(6,JurCode) * @MTK_GlobalAdj@ *
TZFACTM
       PMTKTZA[I]  = AMTKtem          * JurAmod(6,JurCode) * @MTK_GlobalAdj@ *
TZFACTM

; HTK
       AHTKTZA[I]  = AHTKtem          * JurAmod(7,JurCode) * @HTK_GlobalAdj@ *
TZFACTH
       PHTKTZA[I]  = AHTKtem          * JurAmod(7,JurCode) * @HTK_GlobalAdj@ *
TZFACTH
```

```
 ; Accumulate Internal Trip Attractions by purpose for the system
  IF (I <=  @LastIZN@)
            IntlHBWAs    = IntlHBWAs  + AHBWTZA[I]
            IntlHBSAs    = IntlHBSAs  + AHBSTZA[I]
            IntlHBOAs    = IntlHBOAs  + AHBOTZA[I]
            IntlNHBAs    = IntlNHBAs  + ANHBTZA[I]
            IntlCOMAs    = IntlCOMAs  + ACOMTZA[I]  IntlCOMPs    = IntlCOMPs  +
PCOMTZA[I]
            IntlMTKAs    = IntlMTKAs  + AMTKTZA[I]  IntlMTKPs    = IntlMTKPs  +
PMTKTZA[I]
            IntlHTKAs    = IntlHTKAs  + AHTKTZA[I]  IntlHTKPs    = IntlHTKPs  +
PHTKTZA[I]
  ENDIF

 IF(I > @LastIZN@)
            AHBWTZA[I]   = zi.4.hbwxa[I]
            AHBSTZA[I]   = zi.4.hbsxa[I]
            AHBOTZA[I]   = zi.4.hboxa[I]
            ANHBTZA[I]   = zi.4.nhbxa[I]
            AMTKTZA[I]   = zi.4.mtkxa[I]
            AHTKTZA[I]   = zi.4.htkxa[I]
            PCOMTZA[I]   = zi.3.comxp[I]
            PMTKTZA[I]   = zi.3.mtkxp[I]
            PHTKTZA[I]   = zi.3.htkxp[I]

      ; Accumulate External Trip Attractions by purpose for the system
            ExtlHBWAs    = ExtlHBWAs  +  zi.4.hbwxa[I]
            ExtlHBSAs    = ExtlHBSAs  +  zi.4.hbsxa[I]
            ExtlHBOAs    = ExtlHBOAs  +  zi.4.hboxa[I]
            ExtlNHBAs    = ExtlNHBAs  +  zi.4.nhbxa[I]
            ExtlCOMAs    = ExtlCOMAs  +  zi.4.comxa[I]
            ExtlMTKAs    = ExtlMTKAs  +  zi.4.mtkxa[I]
            ExtlHTKAs    = ExtlHTKAs  +  zi.4.htkxa[I]
ENDIF

;==================================================================================
======
;  Scale Attractions to Productions
;==================================================================================
======


IF (I = @ZONESIZE@)
;######################################################################

  ;  Before scaling, compute HBW nonMotorized attractions as per CGTGV2TP.FOR
     LOOP IDX=1,@LastIZN@

         AHBW_NMTZA[IDX]  =  PHBW_NMTZA[IDX] * 0.8982

              IF (AHBW_NMTZA[IDX]    >   AHBWTZA[IDX] )
                     AHBW_NMTZA[IDX]  =  AHBWTZA[IDX] * 0.1870
              ENDIF

               IntlHBWNMAs  = IntlHBWNMAs  +  AHBW_NMTZA[IDX]

     ENDLOOP

     NMScale     = IntlNMHBWPs /IntlHBWNMAs

 ;
 ;  Now, allocate HBW attractions among motorized/non-motorized groups
 ;

      LOOP IDX=1,@ZONESIZE@
           TEM            =  AHBW_NMTZA[IDX]
           AHBW_NMTZA[IDX]=  TEM   * NMScale             ;<-- Final Scaled HBW
Non_Motorized Attractions

           AdjAHBWTZA[IDX]   =  AHBWTZA[IDX] -  AHBW_NMTZA[IDX]      ; <-- Final HBW
Mototized Attractions
              IF  (AdjAHBWTZA[IDX] <=  0.0)
                   AdjAHBWTZA[IDX]  =  0.0
                   AdjAHBW1ZA[IDX]  =  0.0
                   AdjAHBW2ZA[IDX]  =  0.0
                   AdjAHBW3ZA[IDX]  =  0.0
                   AdjAHBW4ZA[IDX]  =  0.0
                ELSE
                AdjAHBW1ZA[IDX] = AdjAHBWTZA[IDX] *  AHBW1ZA[IDX]/AHBWTZA[IDX]
                AdjAHBW2ZA[IDX] = AdjAHBWTZA[IDX] *  AHBW2ZA[IDX]/AHBWTZA[IDX]
                AdjAHBW3ZA[IDX] = AdjAHBWTZA[IDX] *  AHBW3ZA[IDX]/AHBWTZA[IDX]
                AdjAHBW4ZA[IDX] = AdjAHBWTZA[IDX] *  AHBW4ZA[IDX]/AHBWTZA[IDX]
              ENDIF

       IF(IDX <= @LastIZN@)
               IntlADJHBWAs   = IntlADJHBWAs  +  AdjAHBWTZA[IDX]
               IntlNMHBWAs   = IntlNMHBWAs    +  AHBW_NMTZA[IDX]
       ENDIF

       IF(IDX > @LastIZN@)
           ADJAHBWTZA[I]   = zi.4.hbwxa[I]
           ADJAHBW1ZA[I]   = 0
           ADJAHBW2ZA[I]   = 0
           ADJAHBW3ZA[I]   = 0
           ADJAHBW4ZA[I]   = 0

       ENDIF

      ENDLOOP

   ;---------------------------------------------------------
   ;  Now compute Global Scaling Factors by Purpose here:
   ;---------------------------------------------------------

     IF (IntlAdjHBWAs == 0)
         SF_HBW =  0
       ELSE
         SF_HBW =  ((IntlHBWPs  + ExtlHBWPs) - ExtlHBWAs) / IntlAdjHBWAs
     ENDIF

     IF (IntlHBSAs == 0)
         SF_HBS =  0
       ELSE
         SF_HBS =  ((IntlHBSPs  + ExtlHBSPs) - ExtlHBSAs) / IntlHBSAs
     ENDIF

     IF (IntlHBOAs == 0)
         SF_HBO =  0
       ELSE
         SF_HBO =  ((IntlHBOPs  + ExtlHBOPs) - ExtlHBOAs) / IntlHBOAs
     ENDIF

     IF (IntlNHBAs == 0)
         SF_NHB =  0
       ELSE
         SF_NHB =  ((IntlNHBPs  + ExtlNHBPs) - ExtlNHBAs) / IntlNHBAs
     ENDIF

     IF (IntlCOMAs == 0)
         SF_COM =  0
       ELSE
```

```
        SF_COM =  ((IntlCOMPs  + ExtlCOMPs) - ExtlCOMAs) / IntlCOMAs
    ENDIF

    IF (IntlMTKAs == 0)
        SF_MTK =  0
      ELSE
        SF_MTK =  ((IntlMTKPs  + ExtlMTKPs) - ExtlMTKAs) / IntlMTKAs
    ENDIF

    IF (IntlHTKAs == 0)
        SF_HTK =  0
      ELSE
        SF_HTK =  ((IntlHTKPs  + ExtlHTKPs) - ExtlHTKAs) / IntlHTKAs
    ENDIF

  ;------------------------------------------------------------
  ; Now apply attraction scaling factors to Internal TAZs Only
  ;------------------------------------------------------------

LOOP IDX = 1,@LastIZN@

      FAHBW1ZA[IDX] = AdjAHBW1ZA[IDX] * SF_HBW      FAHBW2ZA[IDX] = AdjAHBW2ZA[IDX]
* SF_HBW
      FAHBW3ZA[IDX] = AdjAHBW3ZA[IDX] * SF_HBW      FAHBW4ZA[IDX] = AdjAHBW4ZA[IDX]
* SF_HBW
      FAHBWTZA[IDX] = AdjAHBWTZA[IDX] * SF_HBW

      FAHBS1ZA[IDX] = AHBS1ZA[IDX]    * SF_HBS      FAHBS2ZA[IDX] = AHBS2ZA[IDX]
* SF_HBS
      FAHBS3ZA[IDX] = AHBS3ZA[IDX]    * SF_HBS      FAHBS4ZA[IDX] = AHBS4ZA[IDX]
* SF_HBS
      FAHBSTZA[IDX] = AHBSTZA[IDX]    * SF_HBS

      FAHBO1ZA[IDX] = AHBO1ZA[IDX]    * SF_HBO      FAHBO2ZA[IDX] = AHBO2ZA[IDX]
* SF_HBO
      FAHBO3ZA[IDX] = AHBO3ZA[IDX]    * SF_HBO      FAHBO4ZA[IDX] = AHBO4ZA[IDX]
* SF_HBO
      FAHBOTZA[IDX] = AHBOTZA[IDX]    * SF_HBO

      FANHBTZA[IDX] = ANHBTZA[IDX]    * SF_NHB   ; Final NHB A's  (Also used as
final P's too)

      FACOMTZA[IDX] = ACOMTZA[IDX]    * SF_COM   ; Final COM A's  (Also used as
final P's too)

      FAMTKTZA[IDX] = AMTKTZA[IDX]    * SF_MTK   ; Final MTK A's  (Also used as
final P's too)

      FAHTKTZA[IDX] = AHTKTZA[IDX]    * SF_HTK   ; Final HTK A's  (Also used as
final P's too)

;
; Accumulate the Total Internal Final/Scaled Attractions Here:
;
          IntlFinHBWAs   = IntlFinHBWAs  +  FAHBWTZA[IDX]
          IntlFinHBSAs   = IntlFinHBSAs  +  FAHBSTZA[IDX]
          IntlFinHBOAs   = IntlFinHBOAs  +  FAHBOTZA[IDX]
          IntlFinNHBAs   = IntlFinNHBAs  +  FANHBTZA[IDX]
          IntlFinCOMAs   = IntlFinCOMAs  +  FACOMTZA[IDX]
          IntlFinMTKAs   = IntlFinMTKAs  +  FAMTKTZA[IDX]
          IntlFinHTKAs   = IntlFinHTKAs  +  FAHTKTZA[IDX]
;
; Accumulate Internal NHB, COM, Mtk, Htk final/scaled trip attractions at Juris
Level
;
      IF(IDX <= @LastIZN@)
      Jr  = ZoneJURA[IDX]
              JurNHBA[jr] = JurNHBA[jr]  + FANHBTZA[IDX]
              JurCOMA[jr] = JurCOMA[jr]  + FACOMTZA[IDX]
              JurMTKA[jr] = JurMTKA[jr]  + FAMTKTZA[IDX]
              JurHTKA[jr] = JurHTKA[jr]  + FAHTKTZA[IDX]
      EndIF

ENDLOOP


;
; Now just set final/scaled attractions equal to initial attractions which are
; really just the input external attractions.  These are maintained as is
;

FrstExZN = @LastIZN@ + 1
LOOP  IDX= FrstExZN,@ZONESIZE@

          FAHBWTZA[IDX] = AHBWTZA[IDX]              ; Final HBW As
          FAHBSTZA[IDX] = AHBSTZA[IDX]              ; Final HBS As
          FAHBOTZA[IDX] = AHBOTZA[IDX]              ; Final HBO A's
          FANHBTZA[IDX] = ANHBTZA[IDX]              ; Final NHB A's
          FACOMTZA[IDX] = ACOMTZA[IDX]              ; Final COM A's
          FAMTKTZA[IDX] = AMTKTZA[IDX]              ; Final MTK A's
          FAHTKTZA[IDX] = AHTKTZA[IDX]              ; Final HTK A's

 ENDLOOP

;
;=================================================================================
========
;  Now Write the Zonal P/A Files for Trip Distribution
;=================================================================================
========
;

 LOOP Idx= 1,@ZoneSize@
   Print Form=@Ofmt@ List =IDX(5),PHBW_NMTZA[IDX],AHBW_NMTZA[IDX],
file=@hbwnmpa@

   Print Form=@Ofmt@ List =IDX(5),PHBWTZA[IDX],
file=@hbwps_all@
   Print Form=@Ofmt@ List =IDX(5),PHBSTZA[IDX],
file=@hbsps_all@
   Print Form=@Ofmt@ List =IDX(5),PHBOTZA[IDX],
file=@hbops_all@
   Print Form=@Ofmt@ List =IDX(5),PNHBTZA[IDX],
file=@nhbps_all@

   Print Form=@Ofmt@ List =IDX(5),PCOMTZA[IDX],
file=@comps_all@
   Print Form=@Ofmt@ List =IDX(5),PMTKTZA[IDX],
file=@mtkps_all@
   Print Form=@Ofmt@ List =IDX(5),PHTKTZA[IDX],
file=@htkps_all@

   Print Form=@Ofmt@ List
=IDX(5),PHBW1ZA[IDX],PHBW2ZA[IDX],PHBW3ZA[IDX],PHBW4ZA[IDX], file=@hbwps_inc@
   Print Form=@Ofmt@ List
=IDX(5),PHBS1ZA[IDX],PHBS2ZA[IDX],PHBS3ZA[IDX],PHBS4ZA[IDX], file=@hbsps_inc@
   Print Form=@Ofmt@ List
=IDX(5),PHBO1ZA[IDX],PHBO2ZA[IDX],PHBO3ZA[IDX],PHBO4ZA[IDX], file=@hbops_inc@

   Print Form=@Ofmt@ List =IDX(5),FAHBWTZA[IDX],
file=@hbwas_all@
   Print Form=@Ofmt@ List =IDX(5),FAHBSTZA[IDX],
file=@hbsas_all@
   Print Form=@Ofmt@ List =IDX(5),FAHBOTZA[IDX],
file=@hboas_all@
```

```
   Print Form=@Ofmt@ List =IDX(5),FANHBTZA[IDX],
file=@nhbas_all@

   Print Form=@Ofmt@ List =IDX(5),FAMTKTZA[IDX],
file=@mtkas_all@
   Print Form=@Ofmt@ List =IDX(5),FAHTKTZA[IDX],
file=@htkas_all@
   Print Form=@Ofmt@ List =IDX(5),FACOMTZA[IDX],
file=@comas_all@

   Print Form=@Ofmt@ List
=IDX(5),FAHBW1ZA[IDX],FAHBW2ZA[IDX],FAHBW3ZA[IDX],FAHBW4ZA[IDX], file=@hbwas_inc@
   Print Form=@Ofmt@ List
=IDX(5),FAHBS1ZA[IDX],FAHBS2ZA[IDX],FAHBS3ZA[IDX],FAHBS4ZA[IDX], file=@hbsas_inc@
   Print Form=@Ofmt@ List
=IDX(5),FAHBO1ZA[IDX],FAHBO2ZA[IDX],FAHBO3ZA[IDX],FAHBO4ZA[IDX], file=@hboas_inc@

  IF (IDX  <= @LastIZN@) ; Internal Com/Med/Hvy Truck and NHB Trips Only

     Print Form=@Ofmt@ List =IDX(5),PNHBTZA[IDX],
file=@nhbps_int@
     Print Form=@Ofmt@ List =IDX(5),PCOMTZA[IDX],
file=@comps_int@
     Print Form=@Ofmt@ List =IDX(5),PMTKTZA[IDX],
file=@mtkps_int@
     Print Form=@Ofmt@ List =IDX(5),PHTKTZA[IDX],
file=@htkps_int@

     Print Form=@Ofmt@ List =IDX(5),FANHBTZA[IDX],
file=@nhbas_int@
     Print Form=@Ofmt@ List =IDX(5),FACOMTZA[IDX],
file=@comas_int@
     Print Form=@Ofmt@ List =IDX(5),FAMTKTZA[IDX],
file=@mtkas_int@
     Print Form=@Ofmt@ List =IDX(5),FAHTKTZA[IDX],
file=@htkas_int@

    ELSE

     Print Form=@Ofmt@ List =IDX(5),'        0.00',
file=@nhbps_int@
     Print Form=@Ofmt@ List =IDX(5),'        0.00',
file=@comps_int@
     Print Form=@Ofmt@ List =IDX(5),'        0.00',
file=@mtkps_int@
     Print Form=@Ofmt@ List =IDX(5),'        0.00',
file=@htkps_int@

     Print Form=@Ofmt@ List =IDX(5),'        0.00',
file=@nhbas_int@
     Print Form=@Ofmt@ List =IDX(5),'        0.00',
file=@comas_int@
     Print Form=@Ofmt@ List =IDX(5),'        0.00',
file=@mtkas_int@
     Print Form=@Ofmt@ List =IDX(5),'        0.00',
file=@htkas_int@

  ENDIF


ENDLOOP

;
;==================================================================================
========
;  Write the Report Files
;==================================================================================
========

;
; compute total motorized Ps/As for summary:
  TOTHBWPs = IntlHBWPs       + ExtlHBWPs
  TOTHBWAs = IntlAdjHBWAs    + ExtlHBWAs
  DiffHBW  =  TOTHBWAs - TOTHBWPs
  PctDHBW  =  DiffHBW/TOTHBWPs * 100.00

  TOTHBSPs = IntlHBSPs   + ExtlHBSPs
  TOTHBSAs = IntlHBSAs   + ExtlHBSAs
  DiffHBS  =  TOTHBSAs - TOTHBSPs
  PctDHBS  =  DiffHBS/TOTHBSPs * 100.00

  TOTHBOPs = IntlHBOPs    + ExtlHBOPs
  TOTHBOAs = IntlHBOAs + ExtlHBOAs
  DiffHBO  =  TOTHBOAs - TOTHBOPs
  PctDHBO  =  DiffHBO/TOTHBOPs * 100.00

  TOTNHBPs = IntlNHBPs    + ExtlNHBPs
  TOTNHBAs = IntlNHBAs + ExtlNHBAs
  DiffNHB  =  TOTNHBAs - TOTNHBPs
  PctDNHB  =  DiffNHB/TOTNHBPs * 100.00

  TOTCOMPs = IntlCOMPs + ExtlCOMPs
  TOTCOMAs = IntlCOMAs + ExtlCOMAs
  DiffCOM  =  TOTCOMAs - TOTCOMPs
  PctDCOM  =  DiffCOM/TOTCOMPs * 100.00

  TOTMTKPs = IntlMTKPs + ExtlMTKPs
  TOTMTKAs = IntlMTKAs + ExtlMTKAs
  DiffMTK  =  TOTMTKAs - TOTMTKPs
  PctDMTK  =  DiffMTK/TOTMTKPs * 100.00

  TOTHTKPs = IntlHTKPs + ExtlHTKPs
  TOTHTKAs = IntlHTKAs + ExtlHTKAs
  DiffHTK  = TOTHTKAs - TOTHTKPs
  PctDHTK  = DiffHTK/TOTHTKPs * 100.00

;
; Calculate 'person' subtotals for summary:
  IntlPSNPs = IntlHBWPs    + IntlHBSPs + IntlHBOPs + IntlNHBPs
  IntlPSNAs = IntlAdjHBWAs + IntlHBSAs + IntlHBOAs + IntlNHBAs
  ExtlPSNPs = ExtlHBWPs    + ExtlHBSPs + ExtlHBOPs + ExtlNHBPs
  ExtlPSNAs = ExtlHBWAs    + ExtlHBSAs + ExtlHBOAs + ExtlNHBAs
  TOTPSNPs  = IntlPSNPs    + ExtlPSNPs
  TOTPSNAs  = IntlPSNAs    + ExtlPSNAs
  DiffPSN   =  TOTPSNAs - TOTPSNPs
  PctDPSN   =  DiffPSN/TOTPSNPs * 100.00
  IntlFinPSNAs = IntlFinHBWAs + IntlFinHBSAs + IntlFinHBOAs + IntlFinNHBAs

;
; Calculate Commercial + Truck subtotals for summary:
  IntlTrkPs = IntlMTKPs  + IntlHTKPs + IntlCOMPs
  IntlTrkAs = IntlMTKAs  + IntlHTKAs + IntlCOMAs
  ExtlTrkPs = ExtlMtkPs  + ExtlHtkPs + ExtlCOMPs
  ExtlTrkAs = ExtlMtkAs  + ExtlHtkAs + ExtlCOMAs
  TOTTrkPs  = IntlTrkPs  + ExtlTrkPs
  TOTTrkAs  = IntlTrkAs  + ExtlTrkAs
  DiffTrk   =  TOTTrkAs - TOTTrkPs
  PctDTrk   =  DiffTrk/TOTTrkPs * 100.00
  IntlFinTrkAs = IntlFinMTKAs + IntlFinHTKAs + IntlFinCOMAs



 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '     TRIP_GENERATION.S  -  P r o g r a m   O u t p u t   S u m m a r y
- ',file=@Rept@
 Print LIST= '   ',file=@Rept@
```

```
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '                                   Initial
Final/Scaled  Scaling    '
 Print LIST= ' Trip        Internal   External   Internal   External   Total
Total      Diff.      % Diff.    Internal    Factor     ' ,file=@Rept@
 Print LIST= ' Purpose      Prods.     Prods.     Attrs.     Attrs.    Prods.
Attrs.    (As - Ps)              Attrs.               ' ,file=@Rept@
 Print LIST= '----------- ---------- ---------- ---------- ---------- ---------- ---
------- ---------- ---------- ----------  ----------  ' ,file=@Rept@
 Print form=11csv list='HB Work    ',IntlHBWPs,ExtlHBWPs,IntlHBWAs,
ExtlHBWAs,TOTHBWPs,TOTHBWAs,DiffHBW,PctDHBW(11.2),IntlFinHBWAs, SF_HBW(11.3)
,file=@Rept@
 Print form=11csv list='HB Shop    ',IntlHBSPs,ExtlHBSPs,IntlHBSAs,
ExtlHBSAs,TOTHBSPs,TOTHBSAs,DiffHBS,PctDHBS(11.2),IntlFinHBSAs, SF_HBS(11.3)
,file=@Rept@
 Print form=11csv list='HB Other   ',IntlHBOPs,ExtlHBOPs,IntlHBOAs,
ExtlHBOAs,TOTHBOPs,TOTHBOAs,DiffHBO,PctDHBO(11.2),IntlFinHBOAs, SF_HBO(11.3)
,file=@Rept@
 Print form=11csv list='NonHB      ',IntlNHBPs,ExtlNHBPs,IntlNHBAs,
ExtlNHBAs,TOTNHBPs,TOTNHBAs,DiffNHB,PctDNHB(11.2),IntlFinNHBAs, SF_NHB(11.3)
,file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print form=11csv list='Persn Total',IntlPsnPs,ExtlPsnPs,IntlPsnAs,
ExtlPsnAs,TOTPsnPs,TOTPsnAs,DiffPsn,PctDPsn(11.2),IntlFinPsnAs,'          -'
,file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@

 Print form=11csv list='Commercial ',IntlCOMPs,ExtlCOMPs,IntlCOMAs,
ExtlCOMAs,TOTCOMPs,TOTCOMAs,DiffCOM,PctDCOM(11.2),IntlFinCOMAs, SF_COM(11.3)
,file=@Rept@
 Print form=11csv list='Med. Truck ',IntlMTKPs,ExtlMTKPs,IntlMTKAs,
ExtlMTKAs,TOTMTKPs,TOTMTKAs,DiffMTK,PctDMTK(11.2),IntlFinMTKAs, SF_MTK(11.3)
,file=@Rept@
 Print form=11csv list='Hvy. Truck ',IntlHTKPs,ExtlHTKPs,IntlHTKAs,
ExtlHTKAs,TOTHTKPs,TOTHTKAs,DiffHTK,PctDHTK(11.2),IntlFinHTKAs, SF_HTK(11.3)
,file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print form=11csv list='CVTrkTotal ',IntlTrkPs,ExtlTrkPs,IntlTrkAs,
ExtlTrkAs,TOTTrkPs,TOTTrkAs,DiffTrk,PctDTrk(11.2),IntlFinTrkAs,'          -'
,file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@


 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
   Print Form=12.csv  List='Non-Motorized HBW Production  Total: ', IntlNMHBWPs,
file=@rept@
   Print Form=12.csv  List='Non-Motorized HBW Attractions Total: ', IntlNMHBWAs,
file=@rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
;
; Compute Trip Rate Totals, marginals for reporting
;
  IntlHBWPr  = IntlHBWPs/HH_TotSIV, IntlHBSPr  = IntlHBSPs/HH_TotSIV, IntlHBOPr  =
IntlHBOPs/HH_TotSIV
  IntlNHBPr  = IntlNHBPs/HH_TotSIV, IntlMTKPr  = IntlMTKPs/HH_TotSIV, IntlHTKPr  =
IntlHTKPs/HH_TotSIV
  IntlCOMPr  = IntlCOMPs/HH_TotSIV
  DFIOHH     = HH_TotSIV - HH_Tot

 Loop IDX=1,@SzCL@
  RegHBWrSzA[IDX] = RegHBWSzA[IDX]/RegHHSzA[IDX]
  RegHBSrSzA[IDX] = RegHBSSzA[IDX]/RegHHSzA[IDX]
  RegHBOrSzA[IDX] = RegHBOSzA[IDX]/RegHHSzA[IDX]
  RegNHBrSzA[IDX] = RegNHBSzA[IDX]/RegHHSzA[IDX]
 ENDLOOP

 Loop IDX=1,@InCL@
  RegHBWrInA[IDX] = RegHBWInA[IDX]/RegHHInA[IDX]
  RegHBSrInA[IDX] = RegHBSInA[IDX]/RegHHInA[IDX]
  RegHBOrInA[IDX] = RegHBOInA[IDX]/RegHHInA[IDX]
  RegNHBrInA[IDX] = RegNHBInA[IDX]/RegHHInA[IDX]
 ENDLOOP

 Loop IDX=1,@VaCL@
  RegHBWrVaA[IDX] = RegHBWVaA[IDX]/RegHHVaA[IDX]
  RegHBSrVaA[IDX] = RegHBSVaA[IDX]/RegHHVaA[IDX]
  RegHBOrVaA[IDX] = RegHBOVaA[IDX]/RegHHVaA[IDX]
  RegNHBrVaA[IDX] = RegNHBVaA[IDX]/RegHHVaA[IDX]
 ENDLOOP
;
 Loop IDX=1,@JurSize@
  IF (  JurHHa[IDX]  = 0)
      JurHBWrA[IDX] = 0
      JurHBSrA[IDX] = 0
      JurHBOrA[IDX] = 0
      JurNHBrA[IDX] = 0
      JurCOMrA[IDX] = 0
      JurMTKrA[IDX] = 0
      JurHTKrA[IDX] = 0
   ELSE
      JurHBWrA[IDX] = JurHBWA[IDX]/JurHHa[IDX]
      JurHBSrA[IDX] = JurHBSA[IDX]/JurHHa[IDX]
      JurHBOrA[IDX] = JurHBOA[IDX]/JurHHa[IDX]
      JurNHBrA[IDX] = JurNHBA[IDX]/JurHHa[IDX]
      JurCOMrA[IDX] = JurCOMA[IDX]/JurHHa[IDX]
      JurMTKrA[IDX] = JurMTKA[IDX]/JurHHa[IDX]
      JurHTKrA[IDX] = JurHTKA[IDX]/JurHHa[IDX]
  ENDIF


 ENDLOOP
;
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 PRINT LIST =' Regional Households and Motorized Person Trips By Size Level
',file=@Rept@
 PRINT LIST =            '                             HBW         HBW         HBS
HBS         HBO         HBO          NHB        NHB          ',file=@Rept@
 PRINT LIST =            '   Size        HHs        Trips        Rate       Trips
Rate       Trips        Rate        Trips       Rate         ',file=@Rept@
 PRINT LIST =            '           ----------- ----------- ----------- ----------
- ----------- ----------- ----------- ----------- -----------    ',file=@Rept@
 Print form=12.csv LIST= '      1
',RegHHSzA[1],RegHBWSzA[1],RegHBWrSzA[1](12.3),RegHBSSzA[1],RegHBSrSzA[1](12.3),RegH
BOSzA[1],RegHBOrSzA[1](12.3),RegNHBSzA[1],RegNHBrSzA[1](12.3),file=@Rept@ ;
 Print form=12.csv LIST= '      2
',RegHHSzA[2],RegHBWSzA[2],RegHBWrSzA[2](12.3),RegHBSSzA[2],RegHBSrSzA[2](12.3),RegH
BOSzA[2],RegHBOrSzA[2](12.3),RegNHBSzA[2],RegNHBrSzA[2](12.3),file=@Rept@ ;
 Print form=12.csv LIST= '      3
',RegHHSzA[3],RegHBWSzA[3],RegHBWrSzA[3](12.3),RegHBSSzA[3],RegHBSrSzA[3](12.3),RegH
BOSzA[3],RegHBOrSzA[3](12.3),RegNHBSzA[3],RegNHBrSzA[3](12.3),file=@Rept@ ;
 Print form=12.csv LIST= '      4+
',RegHHSzA[4],RegHBWSzA[4],RegHBWrSzA[4](12.3),RegHBSSzA[4],RegHBSrSzA[4](12.3),RegH
BOSzA[4],RegHBOrSzA[4](12.3),RegNHBSzA[4],RegNHBrSzA[4](12.3),file=@Rept@ ;
 Print LIST= '    ',file=@Rept@
 Print form=12.csv LIST= ' Total     ',HH_TotSIV,
IntlHBWPs,IntlHBWPr(12.3),IntlHBSPs, IntlHBSPr(12.3), IntlHBOPs,IntlHBOPr(12.3),
IntlNHBPs,IntlNHBPr(12.3),  ,file=@Rept@ ;
 Print LIST= '   ',file=@Rept@
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 Print LIST= '   ',file=@Rept@
 Print form=12.csv LIST= 'I/P HHs:  ',HH_Tot, ' (Regional HH Total from ZONE.ASC
file) '     ,file=@Rept@ ;
 Print form=12.csv LIST= 'HH Diff.  ',DFIOHH,
,file=@Rept@ ;

 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 PRINT LIST =' Regional Households and Motorized Person Trips By Income Level
',file=@Rept@
 PRINT LIST =            '                           HBW         HBW         HBS
HBS         HBO         HBO          NHB        NHB          ',file=@Rept@
 PRINT LIST =            'Inc.Level      HHs        Trips        Rate       Trips
Rate       Trips        Rate        Trips       Rate         ',file=@Rept@
 PRINT LIST =            '           ----------- ------------ ----------- ----------
- ----------- ----------- ----------- ------------ -----------    ',file=@Rept@
 Print form=12.csv LIST= '      1
',RegHHInA[1],RegHBWInA[1],RegHBWrInA[1](12.3),RegHBSInA[1],RegHBSrInA[1](12.3),RegH
BOInA[1],RegHBOrInA[1](12.3),RegNHBInA[1],RegNHBrInA[1](12.3),file=@Rept@ ;
 Print form=12.csv LIST= '      2
',RegHHInA[2],RegHBWInA[2],RegHBWrInA[2](12.3),RegHBSInA[2],RegHBSrInA[2](12.3),RegH
BOInA[2],RegHBOrInA[2](12.3),RegNHBInA[2],RegNHBrInA[2](12.3),file=@Rept@ ;
 Print form=12.csv LIST= '      3
',RegHHInA[3],RegHBWInA[3],RegHBWrInA[3](12.3),RegHBSInA[3],RegHBSrInA[3](12.3),RegH
BOInA[3],RegHBOrInA[3](12.3),RegNHBInA[3],RegNHBrInA[3](12.3),file=@Rept@ ;
 Print form=12.csv LIST= '      4
',RegHHInA[4],RegHBWInA[4],RegHBWrInA[4](12.3),RegHBSInA[4],RegHBSrInA[4](12.3),RegH
BOInA[4],RegHBOrInA[4](12.3),RegNHBInA[4],RegNHBrInA[4](12.3),file=@Rept@ ;
 Print LIST= '    ',file=@Rept@
 Print form=12.csv LIST= ' Total    ',HH_TotSIV,
IntlHBWPs,IntlHBWPr(12.3),IntlHBSPs, IntlHBSPr(12.3), IntlHBOPs,IntlHBOPr(12.3),
IntlNHBPs,IntlNHBPr(12.3),  ,file=@Rept@ ;
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
;
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 PRINT LIST =' Regional Households and Motorized Person Trips By Vehicle Availablity
Level     ',file=@Rept@
 PRINT LIST =            '                           HBW         HBW         HBS
HBS         HBO         HBO          NHB        NHB          ',file=@Rept@
 PRINT LIST =            'Vehs.Avail.    HHs        Trips        Rate       Trips
Rate       Trips        Rate        Trips       Rate         ',file=@Rept@
 PRINT LIST =            '           ----------- ------------ ----------- ----------
- ----------- ----------- ----------- ------------ -----------    ',file=@Rept@
 Print form=12.csv LIST= '      0
',RegHHVaA[1],RegHBWVaA[1],RegHBWrVaA[1](12.3),RegHBSVaA[1],RegHBSrVaA[1](12.3),RegH
BOVaA[1],RegHBOrVaA[1](12.3),RegNHBVaA[1],RegNHBrVaA[1](12.3),file=@Rept@ ;
 Print form=12.csv LIST= '      1
',RegHHVaA[2],RegHBWVaA[2],RegHBWrVaA[2](12.3),RegHBSVaA[2],RegHBSrVaA[2](12.3),RegH
BOVaA[2],RegHBOrVaA[2](12.3),RegNHBVaA[2],RegNHBrVaA[2](12.3),file=@Rept@ ;
 Print form=12.csv LIST= '      2
',RegHHVaA[3],RegHBWVaA[3],RegHBWrVaA[3](12.3),RegHBSVaA[3],RegHBSrVaA[3](12.3),RegH
BOVaA[3],RegHBOrVaA[3](12.3),RegNHBVaA[3],RegNHBrVaA[3](12.3),file=@Rept@ ;
 Print form=12.csv LIST= '      3+
',RegHHVaA[4],RegHBWVaA[4],RegHBWrVaA[4](12.3),RegHBSVaA[4],RegHBSrVaA[4](12.3),RegH
BOVaA[4],RegHBOrVaA[4](12.3),RegNHBVaA[4],RegNHBrVaA[4](12.3),file=@Rept@ ;
 Print LIST= '    ',file=@Rept@
 Print form=12.csv LIST= ' Total    ',HH_TotSIV,
IntlHBWPs,IntlHBWPr(12.3),IntlHBSPs, IntlHBSPr(12.3), IntlHBOPs,IntlHBOPr(12.3),
IntlNHBPs,IntlNHBPr(12.3),  ,file=@Rept@ ;
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@
```

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;;=================================================================================
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  PRINT LIST =            ' Jurisdictional Households and Motorized Person Trips by
Purpose ',file=@Rept@
 PRINT LIST =            '                          HBW         HBW         HBS
HBS         HBO         HBO          NHB        NHB          ',file=@Rept@
 PRINT LIST =            '  Juris.       HHs        Trips        Rate       Trips
Rate       Trips        Rate        Trips       Rate         ',file=@Rept@
 PRINT LIST =            '           ----------- ------------ ----------- ----------
- ----------- ----------- ----------- ------------ -----------    ',file=@Rept@

  Print form=12.csv LIST= '    0_DC
',JurHHA[01],JurHBWA[01],JurHBWrA[01](12.3),JurHBSA[01],JurHBSrA[01](12.3),JurHBOA[0
1],JurHBOrA[01](12.3),JurNHBA[01],JurNHBrA[01](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    1_Mtg
',JurHHA[02],JurHBWA[02],JurHBWrA[02](12.3),JurHBSA[02],JurHBSrA[02](12.3),JurHBOA[0
2],JurHBOrA[02](12.3),JurNHBA[02],JurNHBrA[02](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    2_PG
',JurHHA[03],JurHBWA[03],JurHBWrA[03](12.3),JurHBSA[03],JurHBSrA[03](12.3),JurHBOA[0
3],JurHBOrA[03](12.3),JurNHBA[03],JurNHBrA[03](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    3_Arl
',JurHHA[04],JurHBWA[04],JurHBWrA[04](12.3),JurHBSA[04],JurHBSrA[04](12.3),JurHBOA[0
4],JurHBOrA[04](12.3),JurNHBA[04],JurNHBrA[04](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    4_Alx
',JurHHA[05],JurHBWA[05],JurHBWrA[05](12.3),JurHBSA[05],JurHBSrA[05](12.3),JurHBOA[0
5],JurHBOrA[05](12.3),JurNHBA[05],JurNHBrA[05](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    5_Ffx
',JurHHA[06],JurHBWA[06],JurHBWrA[06](12.3),JurHBSA[06],JurHBSrA[06](12.3),JurHBOA[0
6],JurHBOrA[06](12.3),JurNHBA[06],JurNHBrA[06](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    6_Ldn
',JurHHA[07],JurHBWA[07],JurHBWrA[07](12.3),JurHBSA[07],JurHBSrA[07](12.3),JurHBOA[0
7],JurHBOrA[07](12.3),JurNHBA[07],JurNHBrA[07](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    7_PW
',JurHHA[08],JurHBWA[08],JurHBWrA[08](12.3),JurHBSA[08],JurHBSrA[08](12.3),JurHBOA[0
8],JurHBOrA[08](12.3),JurNHBA[08],JurNHBrA[08](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    8_ -
',JurHHA[09],JurHBWA[09],JurHBWrA[09](12.3),JurHBSA[09],JurHBSrA[09](12.3),JurHBOA[0
9],JurHBOrA[09](12.3),JurNHBA[09],JurNHBrA[09](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    9_Frd
',JurHHA[10],JurHBWA[10],JurHBWrA[10](12.3),JurHBSA[10],JurHBSrA[10](12.3),JurHBOA[1
0],JurHBOrA[10](12.3),JurNHBA[10],JurNHBrA[10](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   10_How
',JurHHA[11],JurHBWA[11],JurHBWrA[11](12.3),JurHBSA[11],JurHBSrA[11](12.3),JurHBOA[1
1],JurHBOrA[11](12.3),JurNHBA[11],JurNHBrA[11](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   11_AA
',JurHHA[12],JurHBWA[12],JurHBWrA[12](12.3),JurHBSA[12],JurHBSrA[12](12.3),JurHBOA[1
2],JurHBOrA[12](12.3),JurNHBA[12],JurNHBrA[12](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   12_Chs
',JurHHA[13],JurHBWA[13],JurHBWrA[13](12.3),JurHBSA[13],JurHBSrA[13](12.3),JurHBOA[1
3],JurHBOrA[13](12.3),JurNHBA[13],JurNHBrA[13](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   13_ -
',JurHHA[14],JurHBWA[14],JurHBWrA[14](12.3),JurHBSA[14],JurHBSrA[14](12.3),JurHBOA[1
4],JurHBOrA[14](12.3),JurNHBA[14],JurNHBrA[14](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   14_Car
',JurHHA[15],JurHBWA[15],JurHBWrA[15](12.3),JurHBSA[15],JurHBSrA[15](12.3),JurHBOA[1
5],JurHBOrA[15](12.3),JurNHBA[15],JurNHBrA[15](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   15_Cal
',JurHHA[16],JurHBWA[16],JurHBWrA[16](12.3),JurHBSA[16],JurHBSrA[16](12.3),JurHBOA[1
6],JurHBOrA[16](12.3),JurNHBA[16],JurNHBrA[16](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   16_SM
',JurHHA[17],JurHBWA[17],JurHBWrA[17](12.3),JurHBSA[17],JurHBSrA[17](12.3),JurHBOA[1
7],JurHBOrA[17](12.3),JurNHBA[17],JurNHBrA[17](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '
17_KGeo',JurHHA[18],JurHBWA[18],JurHBWrA[18](12.3),JurHBSA[18],JurHBSrA[18](12.3),Ju
rHBOA[18],JurHBOrA[18](12.3),JurNHBA[18],JurNHBrA[18](12.3),file=@Rept@ ;
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```
  Print form=12.csv LIST= '   18_Fbg
',JurHHA[19],JurHBWA[19],JurHBWrA[19](12.3),JurHBSA[19],JurHBSrA[19](12.3),JurHBOA[1
9],JurHBOrA[19](12.3),JurNHBA[19],JurNHBrA[19](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   19_Sta
',JurHHA[20],JurHBWA[20],JurHBWrA[20](12.3),JurHBSA[20],JurHBSrA[20](12.3),JurHBOA[2
0],JurHBOrA[20](12.3),JurNHBA[20],JurNHBrA[20](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   20_Spt
',JurHHA[21],JurHBWA[21],JurHBWrA[21](12.3),JurHBSA[21],JurHBSrA[21](12.3),JurHBOA[2
1],JurHBOrA[21](12.3),JurNHBA[21],JurNHBrA[21](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   21_Fau
',JurHHA[22],JurHBWA[22],JurHBWrA[22](12.3),JurHBSA[22],JurHBSrA[22](12.3),JurHBOA[2
2],JurHBOrA[22](12.3),JurNHBA[22],JurNHBrA[22](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   22_Clk
',JurHHA[23],JurHBWA[23],JurHBWrA[23](12.3),JurHBSA[23],JurHBSrA[23](12.3),JurHBOA[2
3],JurHBOrA[23](12.3),JurNHBA[23],JurNHBrA[23](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   23_Jef
',JurHHA[24],JurHBWA[24],JurHBWrA[24](12.3),JurHBSA[24],JurHBSrA[24](12.3),JurHBOA[2
4],JurHBOrA[24](12.3),JurNHBA[24],JurNHBrA[24](12.3),file=@Rept@ ;

  Print LIST= '           ',file=@Rept@
 Print form=12.csv LIST=  ' Total    ',HH_TotSIV,
IntlHBWPs,IntlHBWPr(12.3),IntlHBSPs, IntlHBSPr(12.3), IntlHBOPs,IntlHBOPr(12.3),
IntlNHBPs,IntlNHBPr(12.3),  ,file=@Rept@ ;
 Print LIST= '   ',file=@Rept@
 Print LIST= '   ',file=@Rept@

PRINT LIST =           ' Jurisdictional Households and CV/Truck Trips by Vehicle
Type  ',file=@Rept@
 PRINT LIST =           '                         Commercial   Commercial  Medium
Trk  Medium Trk  Heavy Trk   Heavy Trk  ',file=@Rept@
 PRINT LIST =           '  Juris.       HHs        Trips        Rate        Trips
Rate       Trips        Rate    ',file=@Rept@
 PRINT LIST =           '           ----------- ------------ ----------- ----------
- ----------- ----------- ----------- ',file=@Rept@

  Print form=12.csv LIST= '    0_DC
',JurHHA[01],JurCOMA[01],JurCOMrA[01](12.3),JurMTKA[01],JurMTKrA[01](12.3),JurHTKA[0
1],JurHTKrA[01](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    1_Mtg
',JurHHA[02],JurCOMA[02],JurCOMrA[02](12.3),JurMTKA[02],JurMTKrA[02](12.3),JurHTKA[0
2],JurHTKrA[02](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    2_PG
',JurHHA[03],JurCOMA[03],JurCOMrA[03](12.3),JurMTKA[03],JurMTKrA[03](12.3),JurHTKA[0
3],JurHTKrA[03](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    3_Arl
',JurHHA[04],JurCOMA[04],JurCOMrA[04](12.3),JurMTKA[04],JurMTKrA[04](12.3),JurHTKA[0
4],JurHTKrA[04](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    4_Alx
',JurHHA[05],JurCOMA[05],JurCOMrA[05](12.3),JurMTKA[05],JurMTKrA[05](12.3),JurHTKA[0
5],JurHTKrA[05](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    5_Ffx
',JurHHA[06],JurCOMA[06],JurCOMrA[06](12.3),JurMTKA[06],JurMTKrA[06](12.3),JurHTKA[0
6],JurHTKrA[06](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    6_Ldn
',JurHHA[07],JurCOMA[07],JurCOMrA[07](12.3),JurMTKA[07],JurMTKrA[07](12.3),JurHTKA[0
7],JurHTKrA[07](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    7_PW
',JurHHA[08],JurCOMA[08],JurCOMrA[08](12.3),JurMTKA[08],JurMTKrA[08](12.3),JurHTKA[0
8],JurHTKrA[08](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    8_ -
',JurHHA[09],JurCOMA[09],JurCOMrA[09](12.3),JurMTKA[09],JurMTKrA[09](12.3),JurHTKA[0
9],JurHTKrA[09](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '    9_Frd
',JurHHA[10],JurCOMA[10],JurCOMrA[10](12.3),JurMTKA[10],JurMTKrA[10](12.3),JurHTKA[1
0],JurHTKrA[10](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   10_How
',JurHHA[11],JurCOMA[11],JurCOMrA[11](12.3),JurMTKA[11],JurMTKrA[11](12.3),JurHTKA[1
1],JurHTKrA[11](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   11_AA
',JurHHA[12],JurCOMA[12],JurCOMrA[12](12.3),JurMTKA[12],JurMTKrA[12](12.3),JurHTKA[1
2],JurHTKrA[12](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   12_Chs
',JurHHA[13],JurCOMA[13],JurCOMrA[13](12.3),JurMTKA[13],JurMTKrA[13](12.3),JurHTKA[1
3],JurHTKrA[13](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   13_ -
',JurHHA[14],JurCOMA[14],JurCOMrA[14](12.3),JurMTKA[14],JurMTKrA[14](12.3),JurHTKA[1
4],JurHTKrA[14](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   14_Car
',JurHHA[15],JurCOMA[15],JurCOMrA[15](12.3),JurMTKA[15],JurMTKrA[15](12.3),JurHTKA[1
5],JurHTKrA[15](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   15_Cal
',JurHHA[16],JurCOMA[16],JurCOMrA[16](12.3),JurMTKA[16],JurMTKrA[16](12.3),JurHTKA[1
6],JurHTKrA[16](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   16_SM
',JurHHA[17],JurCOMA[17],JurCOMrA[17](12.3),JurMTKA[17],JurMTKrA[17](12.3),JurHTKA[1
7],JurHTKrA[17](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '
17_KGeo',JurHHA[18],JurCOMA[18],JurCOMrA[18](12.3),JurMTKA[18],JurMTKrA[18](12.3),Ju
rHTKA[18],JurHTKrA[18](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   18_Fbg
',JurHHA[19],JurCOMA[19],JurCOMrA[19](12.3),JurMTKA[19],JurMTKrA[19](12.3),JurHTKA[1
9],JurHTKrA[19](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   19_Sta
',JurHHA[20],JurCOMA[20],JurCOMrA[20](12.3),JurMTKA[20],JurMTKrA[20](12.3),JurHTKA[2
0],JurHTKrA[20](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   20_Spt
',JurHHA[21],JurCOMA[21],JurCOMrA[21](12.3),JurMTKA[21],JurMTKrA[21](12.3),JurHTKA[2
1],JurHTKrA[21](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   21_Fau
',JurHHA[22],JurCOMA[22],JurCOMrA[22](12.3),JurMTKA[22],JurMTKrA[22](12.3),JurHTKA[2
2],JurHTKrA[22](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   22_Clk
',JurHHA[23],JurCOMA[23],JurCOMrA[23](12.3),JurMTKA[23],JurMTKrA[23](12.3),JurHTKA[2
3],JurHTKrA[23](12.3),file=@Rept@ ;
  Print form=12.csv LIST= '   23_Jef
',JurHHA[24],JurCOMA[24],JurCOMrA[24](12.3),JurMTKA[24],JurMTKrA[24](12.3),JurHTKA[2
4],JurHTKrA[24](12.3),file=@Rept@ ;

  Print LIST= '           ',file=@Rept@
 Print form=12.csv LIST=  ' Total    ',HH_TotSIV,
IntlCOMPs,IntlCOMPr(12.3),IntlMTKPs,IntlMTKPr(12.3),IntlHTKPs,
IntlHTKPr(12.3),file=@Rept@ ;
;=====================================================================================
========================

  ENDIF   ;
#####################################################################################
##################


ENDRUN

*copy TPPL*.prn Trip_Generation.RPT
```

Appendix F. Batch files

Ref:

1 Runall

1.1 runall_NL_2002.bat

```
:: runall_NL_2002_pceNo_Update.bat

:: TPB Travel Model, Version 2.2 with Nested-Logit mode choice in speed feedback
loop

set _year_=2002
set _alt_=Ver2.3_20080604_pceNo

:: Location of substitute HOV 3+ skims/ null location for this year
cd %1
set _HOV3PATH_=
cd..

rem ====== Pump Prime Iteration ==========================================

set _iter_=pp
set _prev_=pp

call Set_Factors.bat %1

call Set_CPI.bat %1

call PP_Highway_Build.bat %1

call PP_Highway_Skims.bat %1

call Transit_Skim_All_Modes.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call PP_Auto_Drivers.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

rem ====== Iteration 1 ===================================================

set _iter_=i1
set _prev_=pp

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 2 ===================================================

set _iter_=i2
set _prev_=i1

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 3 ===================================================

set _iter_=i3
set _prev_=i2

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1


:: rem ====== Iteration 4 ===================================================

set _iter_=i4
set _prev_=i3

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1
```

```
call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 5 ===================================================

set _iter_=i5
set _prev_=i4

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 6 ===================================================

set _iter_=i6
set _prev_=i5

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Transit assignment ============================================

call Transit_Assignment.bat %1

:: rem ====== End of batch file =============================================

set _year_=
set _alt_=
set _iter_=
set _prev_=
```

1.2 runall_2002.bat

```
:: runall_2002.bat, 2008-06-04  Wed  16:15:43

set root=E:\model_dev\Ver2.3_20080604_pceNo
set scenar=2002
set runbat=runall_NL_2002.bat
set fullpth=%root%\%scenar%
:: Std error redirected to a file; Std output split between file and screen
timethis "cmd /c %runbat%  %scenar%  2> %fullpth%\%scenar%_errs.txt" | tee
%fullpth%\%scenar%_output.txt

if exist %fullpth%\%scenar%_errs.txt   start %fullpth%\%scenar%_errs.txt
if exist %fullpth%\%scenar%_output.txt start %fullpth%\%scenar%_output.txt

if exist %fullpth%\%scenar%\i6_Highway_Assignment.rpt start
%fullpth%\%scenar%\i6_Highway_Assignment.rpt
if exist %fullpth%\%scenar%\i6_mc_NL_summary.txt      start
%fullpth%\%scenar%\i6_mc_NL_summary.txt

:: Cleanup
set root=
set scenar=
set fullpth=
set runbat=
```

1.3 runall_NL_2005.bat

```
:: runall_NL_2005.bat

:: TPB Travel Model, Version 2.2 with Nested-Logit mode choice in speed feedback
loop

set _year_=2005
set _alt_=Ver2.3_20080604_pceNo

:: Location of substitute HOV 3+ skims/ null location for this year
cd %1
set _HOV3PATH_=
cd..

rem ====== Pump Prime Iteration ==========================================

set _iter_=pp
set _prev_=pp

call Set_Factors.bat %1

call Set_CPI.bat %1

call PP_Highway_Build.bat %1

call PP_Highway_Skims.bat %1

call Transit_Skim_All_Modes.bat %1

call Trip_Generation.bat %1
```

```
call Trip_Distribution.bat %1

call PP_Auto_Drivers.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

rem ====== Iteration 1 ==================================================

set _iter_=i1
set _prev_=pp

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 2 ==================================================

set _iter_=i2
set _prev_=i1

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 3 ==================================================

set _iter_=i3
set _prev_=i2

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 4 ==================================================

set _iter_=i4
set _prev_=i3

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 5 ==================================================

set _iter_=i5
set _prev_=i4

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 6 ==================================================

set _iter_=i6
set _prev_=i5

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1
```

```
call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Transit assignment ============================================

call Transit_Assignment.bat %1

:: rem ====== End of batch file =============================================

set _year_=
set _alt_=
set _iter_=
set _prev_=
```

1.4 runall_2005.bat

```
:: runall_2005.bat, 2008-06-04  Wed  16:17:50

set root=E:\model_dev\Ver2.3_20080604_pceNo
set scenar=2005
set runbat=runall_NL_2005.bat
set fullpth=%root%\%scenar%
:: Std error redirected to a file; Std output split between file and screen
timethis "cmd /c %runbat%  %scenar%  2> %fullpth%\%scenar%_errs.txt" | tee
%fullpth%\%scenar%_output.txt

if exist %fullpth%\%scenar%_errs.txt   start %fullpth%\%scenar%_errs.txt
if exist %fullpth%\%scenar%_output.txt start %fullpth%\%scenar%_output.txt

if exist %fullpth%\%scenar%\i6_Highway_Assignment.rpt start
%fullpth%\%scenar%\i6_Highway_Assignment.rpt
if exist %fullpth%\%scenar%\i6_mc_NL_summary.txt      start
%fullpth%\%scenar%\i6_mc_NL_summary.txt

:: Cleanup
set root=
set scenar=
set fullpth=
set runbat=
```

1.5 runall_NL_2030_Base.bat

```
:: runall_NL_2030_Base.bat

:: TPB Travel Model, Ver. 2.2 with nested-logit mode choice in speed feedback loop

set _year_=2030
set _alt_=Ver2.3_20080604_pceNo

:: Location of substitute HOV 3+ skims/ nul for this run
cd %1
set _HOV3PATH_=
cd..

rem ====== Pump Prime Iteration ==========================================

set _iter_=pp
set _prev_=pp

call Set_Factors.bat %1

call Set_CPI.bat %1

call PP_Highway_Build.bat %1

call PP_Highway_Skims.bat %1

call Transit_Skim_All_Modes.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call PP_Auto_Drivers.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

rem ====== Iteration 1 ===================================================

set _iter_=i1
set _prev_=pp

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 2 ===================================================

set _iter_=i2
set _prev_=i1
```

```
call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 3 ===================================================

set _iter_=i3
set _prev_=i2

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1


:: rem ====== Iteration 4 ===================================================

set _iter_=i4
set _prev_=i3

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 5 ===================================================

set _iter_=i5
set _prev_=i4

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 6 ===================================================

set _iter_=i6
set _prev_=i5

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Transit assignment ============================================

call Transit_Assignment.bat %1

:: rem ====== End of batch file ============================================

set _year_=
set _alt_=
set _iter_=
set _prev_=
```

1.6 runall_2030Base.bat

```
:: runall_2030base.bat, 2008-06-23  Mon  1:50:00

set root=E:\model_dev\Ver2.3_20080604_pceNo
set scenar=2030_base
set runbat=runall_NL_2030_base.bat
set fullpth=%root%\%scenar%
:: Std error redirected to a file; Std output split between file and screen
```

```
timethis "cmd /c %runbat%  %scenar%  2> %fullpth%\%scenar%_errs.txt" | tee
%fullpth%\%scenar%_output.txt

if exist %fullpth%\%scenar%_errs.txt   start %fullpth%\%scenar%_errs.txt
if exist %fullpth%\%scenar%_output.txt start %fullpth%\%scenar%_output.txt

if exist %fullpth%\%scenar%\i6_Highway_Assignment.rpt start
%fullpth%\%scenar%\i6_Highway_Assignment.rpt
if exist %fullpth%\%scenar%\i6_mc_NL_summary.txt      start
%fullpth%\%scenar%\i6_mc_NL_summary.txt

:: Cleanup
set root=
set scenar=
set fullpth=
set runbat=
```

1.7 runall_NL_2030_Final.bat

```
:: runall_NL_2030_Final.bat

:: TPB Travel Model, Ver. 2.3 with nested-logit mode choice in speed feedback loop

set _year_=2030
set _alt_=Ver2.3_20080604_pceNo

:: Location of substitute HOV 3+ skims/ check that files exist
cd %1
set _HOV3PATH_=..\2030_Base\
if not exist %_HOV3PATH_%hov3i1am_MC.skm goto error
if not exist %_HOV3PATH_%hov3i2am_MC.skm goto error
if not exist %_HOV3PATH_%hov3i3am_MC.skm goto error
if not exist %_HOV3PATH_%hov3i4am_MC.skm goto error
if not exist %_HOV3PATH_%hov3i5am_MC.skm goto error
if not exist %_HOV3PATH_%hov3i6am_MC.skm goto error

if not exist %_HOV3PATH_%hov3i1op_MC.skm goto error
if not exist %_HOV3PATH_%hov3i2op_MC.skm goto error
if not exist %_HOV3PATH_%hov3i3op_MC.skm goto error
if not exist %_HOV3PATH_%hov3i4op_MC.skm goto error
if not exist %_HOV3PATH_%hov3i5op_MC.skm goto error
if not exist %_HOV3PATH_%hov3i6op_MC.skm goto error
cd..

rem ====== Pump Prime Iteration ==========================================

set _iter_=pp
set _prev_=pp

call Set_Factors.bat %1

call Set_CPI.bat %1

call PP_Highway_Build.bat %1

call PP_Highway_Skims.bat %1

call Transit_Skim_All_Modes.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call PP_Auto_Drivers.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

rem ====== Iteration 1 ===================================================

set _iter_=i1
set _prev_=pp

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 2 ===================================================

set _iter_=i2
set _prev_=i1

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 3 ===================================================

set _iter_=i3
set _prev_=i2

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1
```

```
call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1


:: rem ====== Iteration 4 ===================================================

set _iter_=i4
set _prev_=i3

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 5 ===================================================

set _iter_=i5
set _prev_=i4

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Iteration 6 ===================================================

set _iter_=i6
set _prev_=i5

call Transit_Skim_All_Modes.bat %1

call Transit_Fare.bat %1

call Trip_Generation.bat %1

call Trip_Distribution.bat %1

call Mode_Choice.bat %1

call Auto_Driver.bat %1

call Time-of-Day.bat %1

call Highway_Assignment.bat %1

call Highway_Skims.bat %1

:: rem ====== Transit assignment ============================================

call Transit_Assignment.bat %1

:: rem ====== End of batch file =============================================

set _year_=
set _alt_=
set _iter_=
set _prev_=
```

1.8 *runall_2030Final.bat*

```
:: runall_2030final.bat, 2008-06-24  Tue  10:25:00

set root=E:\model_dev\Ver2.3_20080604_pceNo
set scenar=2030_final
set runbat=runall_NL_2030_final.bat
set fullpth=%root%\%scenar%
:: Std error redirected to a file; Std output split between file and screen
timethis "cmd /c %runbat%  %scenar%  2> %fullpth%\%scenar%_errs.txt" | tee
%fullpth%\%scenar%_output.txt

if exist %fullpth%\%scenar%_errs.txt   start %fullpth%\%scenar%_errs.txt
if exist %fullpth%\%scenar%_output.txt start %fullpth%\%scenar%_output.txt

if exist %fullpth%\%scenar%\i6_Highway_Assignment.rpt start
%fullpth%\%scenar%\i6_Highway_Assignment.rpt
if exist %fullpth%\%scenar%\i6_mc_NL_summary.txt      start
%fullpth%\%scenar%\i6_mc_NL_summary.txt

:: Cleanup
set root=
set scenar=
set fullpth=
set runbat=
```

2 ‘Pump-Prime’ Iterations

2.1 *SetFactors.bat*

```
cd support

del tppl*.*
del set_factors.rpt

start /w TPPLUS.EXE ..\scripts\Set_Factors.s /start -Ptppl -S..\support
```

```
if errorlevel 1 goto error
        copy tppl*.prn set_factors.rpt
        copy TRN_deflator.txt ..\%1
        copy Hwy_Deflator.txt ..\%1
        copy MFARE2_CPI.TXT   ..\%1
        del  TRN_deflator.txt
        del  Hwy_Deflator.txt
        del  MFARE2_CPI.TXT

goto end
:error
REM Processing Error
PAUSE
:end
cd..
```

2.2 set_CPI.bat

```
cd %1

REM  CPI Establishment

del tppl*.*
        del set_CPI.rpt
start /w TPPLUS.EXE  ..\scripts\set_CPI.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
        copy tppl*.prn set_CPI.rpt
goto end

:error
REM  Processing Error.....
PAUSE
:end
cd..
```

2.3 PP_Highway_Build.bat

```
cd %1

REM  Highway Network Building

del tppl*.*
        del highway_build.rpt
start /w TPPLUS.EXE  ..\scripts\highway_build_toll.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
        copy tppl*.prn %_iter_%_highway_build.rpt
goto end

:error
REM  Processing Error.....
PAUSE
:end
cd..
```

2.4 PP_Highway_Skims.bat

```
CD %1

REM  Highway Skims

:: cOPY ZONEHWY.NET TEMPORARILY TO pphWY.NET

COPY ZONEHWY.NET PPHWY.NET

         del tppl*.*
         del            %_iter_%_Highway_Skims.rpt
start /w TPPLUS.EXE  ..\scripts\Highway_Skims.s /start -Ptppl -S..\%1
         if errorlevel 2 goto error
         copy tppl*.prn %_iter_%_Highway_Skims.rpt


:: Additional Steps per the Nested Logit
:: modnet.bat / Highway_Skims_Mod.bat / JoinSkims.bat ===

REM  Utility - Convert dummy centroid connectors

           del tppl*.*
         del %_iter_%ModNet.rpt
start /w TPPLUS.EXE  ..\scripts\modnet.s /start -Ptppl -S..\%1
           if errorlevel 1 goto error
           copy tppl*.prn %_iter_%ModNet.rpt

         del tppl*.*
         del            %_iter_%_Highway_Skims_mod.rpt
start /w TPPLUS.EXE  ..\scripts\Highway_Skims_mod.s /start -Ptppl -S..\%1
         if errorlevel 1 goto error
         copy tppl*.prn %_iter_%_Highway_Skims_Mod.rpt

:: ----- Save initial highway skims to special names for later checking

copy SOVPP??.SKM     SOVPP??_Initial.SKM
copy HOV2PP??.SKM    HOV2PP??_Initial.SKM
copy HOV3PP??.SKM    HOV3PP??_Initial.SKM

copy SOVMPP??.SKM     SOVMPP??_Initial.SKM
copy HOV2MPP??.SKM    HOV2MPP??_Initial.SKM
copy HOV3MPP??.SKM    HOV3MPP??_Initial.SKM

::  ----- the PP??.SKM files will be overwritten after the skimming
::  ----- of the PP Highway assignment network

REM  Utility - Join Highway Skims

           del tppl*.*
         del            %_iter_%_JoinSkims.rpt
start /w TPPLUS.EXE  ..\scripts\joinskims.s /start -Ptppl -S..\%1
           if errorlevel 1 goto error
           copy tppl*.prn %_iter_%_JoinSkims.rpt

:: DELETE TEMPORARY ppHWY.NET, THIS WILL BE CREATED AFTER the PP HIGHWAY ASSIGNMENT

del pphWY.NET

goto end
:error
REM  Processing Error....
PAUSE
:end
CD..
```

2.5 PP_Auto_Drivers.bat

```
CD %1

REM  Pump Prime Auto Driver Trips

del tppl*.*
del            %_iter_%_Auto_Drivers.rpt
start /w TPPLUS.EXE  ..\scripts\PP_Auto_Drivers.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
copy tppl*.prn %_iter_%_Auto_Drivers.rpt
copy           %_iter_%_Auto_Drivers.rpt temp.dat
..\software\extrtab    temp.dat
copy extrtab.out       %_iter_%_Auto_Drivers.tab
del  extrtab.out
del  temp.out

goto end
:error
REM  Processing Error....
PAUSE
:end
CD..
```

3 ‘Standard’ Iterations (1-6)

3.1 Transit_Skim_All_Modes.bat

```
::  Transit Skimming for All Submodes
::  updated 4/27/07  copy sta_tpp.bse from inputs to output subdir.

CD %1

copy inputs\MODE*.TB

..\software\STAPROTP_v1  ..\controls\staprotp_v1.ctl
if errorlevel 1 goto error
        del temp.dat
        del staprotp.tem
        del trn_node.asc
copy node.asc + stapnr.xys  TRN_NODE.ASC

del tppl*.*
        del prefarV23.rpt
start /w TPPLUS.EXE  ..\scripts\prefarV23.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
        copy tppl*.prn prefarV23.rpt

:: Create Support Files for Transit Skimming

copy /Y  sovm%_prev_%am.skm  sovmam.skm
copy /Y  sovm%_prev_%op.skm  sovmop.skm

REM Unbuild ZONEHWY.NET to NODE.ASC and LINK.ASC
        del tppl*.*
         del            %_iter_%_Highway_Unbuild.rpt
start /w TPPLUS.EXE  ..\scripts\Highway_Unbuild.s /start -Ptppl -S..\%1
         if errorlevel 1 goto error
         copy tppl*.prn %_iter_%_Highway_Unbuild.rpt


copy /Y ..\controls\walkacc.ctl
copy /Y ..\controls\autoacc4.ctl
copy /Y ..\controls\cross.ctl
copy /y ..\support\xtrawalk.asc
copy /y ..\support\pentagon.prn

copy /Y   inputs\STA_TPP.BSE  STA_NEW.PRN
copy /Y   inputs\STA_TPP.BSE
copy /Y   inputs\ZONE.ASC
copy /y   inputs\RAIL_LNK.BSE
copy /y   inputs\TAZFRZN.ASC

..\software\parker
        if errorlevel 1 goto error

..\software\walkacc
        if errorlevel 1 goto error

..\software\autoacc4
        if errorlevel 1 goto error

rem ---------- Do some cleaning up ----------
:: del /F STA_NEW.PRN
:: del /F walkacc.ctl
:: del /F autoacc4.ctl
:: del /F cross.ctl
:: del /F xtrawalk.asc
:: del /F pentagon.prn
:: del /F ..\%1\hov2m%_prev_%am.skm
:: del /F ..\%1\hov2m%_prev_%op.skm
:: del /F ..\%1\hov3m%_prev_%am.skm
:: del /F ..\%1\hov3m%_prev_%op.skm
:: del /F ..\%1\tppl*.*

CD..

:: ======================================
:: = Transit Skimming Section           =
:: ======================================

::  Transit Network Building (Final) Commuter Rail

CD %1

del tppl*.*
del             %_iter_%_TRANSIT_SKIMS_CR.RPT
start /w TPPLUS.EXE  ..\scripts\transit_skims_CR.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn  %_iter_%_TRANSIT_SKIMS_CR.RPT
goto end
error
REM  Processing Error......
PAUSE
:end
CD..



CD %1

REM  Transit Network Building (Final) Metro Rail
```

```
del tppl*.*
del             %_iter_%_TRANSIT_SKIMS_MR.RPT
start /w TPPLUS.EXE  ..\scripts\transit_skims_MR.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn   %_iter_%_TRANSIT_SKIMS_MR.RPT
goto end
:error
REM  Processing Error......
PAUSE
:end
CD..



CD %1

REM  Transit Network Building (Final) All Bus


del tppl*.*
del            %_iter_%_TRANSIT_SKIMS_AB.RPT
start /w TPPLUS.EXE  ..\scripts\transit_skims_AB.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn  %_iter_%_TRANSIT_SKIMS_AB.RPT
goto end
:error
REM  Processing Error......
PAUSE
:end
CD..


CD %1

REM  Transit Network Building (Final) Bus+Rail


del tppl*.*
del            %_iter_%_TRANSIT_SKIMS_BM.RPT
start /w TPPLUS.EXE  ..\scripts\transit_skims_BM.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn  %_iter_%_TRANSIT_SKIMS_BM.RPT
goto end
:error
REM  Processing Error......
PAUSE
:end

CD..
```

3.2 Transit_Fare.bat

```
CD %1

REM  Transit Fares

del tppl*.*
del metrorail_skims.rpt
start /w TPPLUS.EXE  ..\scripts\metrorail_skims.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
copy tppl*.prn    %_iter_%_metrorail_skims.rpt

del tppl*.*
del %_iter_%_mfare1.rpt
start /w TPPLUS.EXE  ..\scripts\mfare1.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
copy tppl*.prn    %_iter_%_mfare1.rpt


del tppl*.*
del %_iter_%_mfare2.rpt
start /w TPPLUS.EXE  ..\scripts\mfare2.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
copy tppl*.prn    %_iter_%_mfare2.rpt

::
:: Now Assemble the transit skim fare files for the Nested Logit MC model
::

del tppl*.*
del             %_iter_%_Assemble_Skims_CR.rpt
start /w TPPLUS.EXE  ..\scripts\Assemble_Skims_CR.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn  %_iter_%_Assemble_Skims_CR.rpt

del tppl*.*
del             %_iter_%_Assemble_Skims_MR.rpt
start /w TPPLUS.EXE  ..\scripts\Assemble_Skims_MR.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn  %_iter_%_Assemble_Skims_MR.rpt
del tppl*.*

del             %_iter_%_Assemble_Skims_AB.rpt
start /w TPPLUS.EXE  ..\scripts\Assemble_Skims_AB.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn  %_iter_%_Assemble_Skims_AB.rpt

del tppl*.*
del             %_iter_%_Assemble_Skims_BM.rpt
start /w TPPLUS.EXE  ..\scripts\Assemble_Skims_BM.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn  %_iter_%_Assemble_Skims_BM.rpt

goto end
:error
REM  Processing Error....
PAUSE
:end
CD..
```

3.3 Trip_Generation.bat

```
CD %1


REM  Trip Generation
del tppl*.*
del                 %_iter_%_Demo_Models.rpt
start /w TPPLUS.EXE  ..\scripts\Demo_Models.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
copy tppl*.prn        %_iter_%_Demo_Models.rpt
copy Demo_Models.txt  %_iter_%_Demo_Models.txt


copy HHI1_SV.ASC    %_iter_%HHI1_SV.ASC
copy HHI2_SV.ASC    %_iter_%HHI2_SV.ASC
copy HHI3_SV.ASC    %_iter_%HHI3_SV.ASC
```

```
copy HHI4_SV.ASC    %_iter_%HHI4_SV.ASC

copy HH_Veh.dat     %_iter_%HH_Veh.dat

del tppl*.*
del                 %_iter_%_Trip_Generation.rpt
start /w TPPLUS.EXE  ..\scripts\trip_generation.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
copy tppl*.prn      %_iter_%_Trip_Generation.rpt
copy trip_Generation.txt   %_iter_%_Trip_Generation.txt


goto end
:error
REM  Processing Error....
PAUSE
:end
CD..
```

3.4 Trip_Distribution.bat

```
REM Trip Distribution

CD %1


del tppl*.*
del                 %_iter_%_TrpDst.rpt
start /w TPPLUS.EXE  ..\scripts\trip_distribution.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
copy tppl*.prn      %_iter_%_TrpDst.rpt
copy                %_iter_%_TrpDst.rpt temp.rpt
..\software\extrtab                     temp.rpt
copy extrtab.out    %_iter_%_TrpDst.tab
del  extrtab.out
del  temp.rpt


goto end
:error
REM  Processing Error....
PAUSE
:end
CD..
```

3.5 Mode_Choice.bat

```
::  Nested Logit Mode Choice Model Application

CD %1

::
:: Copy iteration-specific inputs to generic names
::

copy  %_iter_%_hbw_NL.ptt     HBW_INCOME.PTT
copy  %_iter_%_hbs_NL.ptt     HBS_INCOME.PTT
copy  %_iter_%_hbo_NL.ptt     HBO_INCOME.PTT
copy  %_iter_%_nhb_NL.ptt     NHB_INCOME.PTT

copy Hwy%_prev_%AM.SKM                  HWYAM.SKM
copy Hwy%_prev_%OP.SKM                  HWYOP.SKM

copy %_iter_%_TRNAM_CR.SKM    TRNAM_CR.SKM
copy %_iter_%_TRNAM_AB.SKM    TRNAM_AB.SKM
copy %_iter_%_TRNAM_MR.SKM    TRNAM_MR.SKM
copy %_iter_%_TRNAM_BM.SKM    TRNAM_BM.SKM

copy %_iter_%_TRNOP_CR.SKM    TRNOP_CR.SKM
copy %_iter_%_TRNOP_AB.SKM    TRNOP_AB.SKM
copy %_iter_%_TRNOP_MR.SKM    TRNOP_MR.SKM
copy %_iter_%_TRNOP_BM.SKM    TRNOP_BM.SKM



del hbw_NL_MC.*
..\software\AEMS   ..\controls\HBW_NL_MC.ctl
if errorlevel 1 goto error

del hbs_NL_MC.*
..\software\AEMS   ..\controls\HBS_NL_MC.ctl
if errorlevel 1 goto error

del hbo_NL_MC.*
..\software\AEMS   ..\controls\hbo_NL_MC.ctl
if errorlevel 1 goto error

del nhb_NL_MC.*
..\software\AEMS   ..\controls\nhb_NL_MC.ctl
if errorlevel 1 goto error

::
::  COPY GENERIC MODE CHOICE OUTPUT FILES
::  TO INTERATION-SPECIFIC NAMES

copy  HBW_NL_MC.MTT  %_iter_%_HBW_NL_MC.MTT /y
copy  HBS_NL_MC.MTT  %_iter_%_HBS_NL_MC.MTT /y
copy  HBO_NL_MC.MTT  %_iter_%_HBO_NL_MC.MTT /y
copy  NHB_NL_MC.MTT  %_iter_%_NHB_NL_MC.MTT /y


del tppl*.prn
del                 %_iter_%_MC_NL_SUMMARY.rpt
start /w TPPLUS.EXE  ..\scripts\mc_NL_summary.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
copy tppl*.prn      %_iter_%_mc_NL_summary.rpt
copy tppl*.prn      temp.rpt
..\software\extrtab temp.rpt
copy extrtab.out    %_iter_%_mc_NL_summary.tab
del  extrtab.out
del  temp.rpt
copy *.tb1          %_iter_%_mc_NL_summary.txt
del  *.tb1


goto end


:error
REM  Processing Error....
PAUSE
:end
CD..
```

3.6 Auto_Driver.bat

```
CD %1

REM  Auto Driver Trips

del tppl*.*
        del            %_iter_%_mc_Auto_Drivers.rpt
start /w TPPLUS.EXE  ..\scripts\mc_Auto_Drivers.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
        copy tppl*.prn %_iter_%_mc_Auto_Drivers.rpt
copy                   %_iter_%_mc_Auto_Drivers.rpt temp.dat
..\software\extrtab    temp.dat
copy extrtab.out       %_iter_%_mc_Auto_Drivers.tab
del  extrtab.out
del  temp.out

goto end
:error
REM  Processing Error....
PAUSE
:end
CD..
```

3.7 Time-of-Day.bat

```
CD %1
REM --  Time of Day Process ---

REM ----------------------------------------
REM  Auto Driver Time-of-Day Trips
REM ----------------------------------------

del tppl*.*
del                     %_iter_%_Time-of-Day.rpt
start /w TPPLUS.EXE  ..\scripts\Time-of-Day.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
copy tppl*.prn          %_iter_%_Time-of-Day.rpt
        copy            %_iter_%_Time-of-Day.rpt temp.dat
        ..\software\extrtab     temp.dat
        copy    extrtab.out     %_iter_%_Time-of-Day.tab
        del     temp.dat


REM ----------------------------------------
REM  Truck and Exogenous Time-of-Day Trips
REM ----------------------------------------

del tppl*.*
del                       %_iter_%_Misc_Time-of-Day.rpt
start /w TPPLUS.EXE  ..\scripts\Misc_Time-of-Day.s /start -Ptppl -S..\%1
if errorlevel 1 goto error
copy tppl*.prn            %_iter_%_Misc_Time-of-Day.rpt
copy                      %_iter_%_Misc_Time-of-Day.rpt temp.dat
..\software\extrtab       temp.dat
copy extrtab.out          %_iter_%_Misc_Time-of-Day.tab
del  extrtab.out
del  temp.dat

goto end
:error
REM  Processing Error....
PAUSE
:end
CD..
```

3.8 Highway_Assignment.bat

```
CD %1

REM  Highway Assignment

del tppl*.*
del            %_iter_%_Highway_Assignment.rpt
start /w TPPLUS.EXE  ..\scripts\Highway_Assignment.s /start -Ptppl -S..\%1
if errorlevel 1 goto error

copy tppl*.prn       %_iter_%_Highway_Assignment.rpt
copy                 %_iter_%_Highway_Assignment.rpt  temp.dat
..\software\extrtab  temp.dat
copy    extrtab.out  %_iter_%_Highway_Assignment.tab

goto end
:error
REM  Processing Error....
PAUSE
:end
CD..
```

3.9 Highway_Skims.bat

```
CD %1

REM  Highway Skims

         del tppl*.*
         del           %_iter_%_Highway_Skims.rpt
start /w TPPLUS.EXE  ..\scripts\Highway_Skims.s /start -Ptppl -S..\%1
         if errorlevel 2 goto error
         copy tppl*.prn %_iter_%_Highway_Skims.rpt


:: Additional Steps per the Nested Logit
:: modnet.bat / Highway_Skims_Mod.bat / JoinSkims.bat ===

REM  Utility - Convert dummy centroid connectors

           del tppl*.*
         del %_iter_%ModNet.rpt
start /w TPPLUS.EXE  ..\scripts\modnet.s /start -Ptppl -S..\%1
           if errorlevel 1 goto error
           copy tppl*.prn %_iter_%ModNet.rpt

         del tppl*.*
         del           %_iter_%_Highway_Skims_mod.rpt
start /w TPPLUS.EXE  ..\scripts\Highway_Skims_mod.s /start -Ptppl -S..\%1
```

```
        if errorlevel 1 goto error
        copy tppl*.prn %_iter_%_Highway_Skims_Mod.rpt

REM  Utility - Join Highway Skims

          del tppl*.*
        del            %_iter_%_JoinSkims.rpt
start /w TPPLUS.EXE  ..\scripts\joinskims.s /start -Ptppl -S..\%1
          if errorlevel 1 goto error
          copy tppl*.prn %_iter_%_JoinSkims.rpt


goto end
:error
REM  Processing Error....
PAUSE
:end
CD..
```

3.10 Transit_Assignment.bat

```
CD %1

:: Combine Mode Choice Output for Transit Assignment

del tppl*.*
del %_iter_%_Combine_Tables_For_TrAssign.RPT
start /w TPPLUS.EXE  ..\Scripts\Combine_Tables_For_TrAssign.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn %_iter_%_Combine_Tables_For_TrAssign.RPT

:: =======================================
:: = Transit Assignment Section          =
:: =======================================

::  Transit Assignment Commuter Rail

del tppl*.*
del %_iter_%_Transit_Assgn_CR.RPT
start /w TPPLUS.EXE  ..\scripts\transit_assignment_CR.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn %_iter_%_Transit_Assgn_CR.RPT


::  Transit Assignment Metro Rail

del tppl*.*
del %_iter_%_Transit_Assgn_MR.RPT
start /w TPPLUS.EXE  ..\scripts\transit_assignment_MR.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn %_iter_%_Transit_Assgn_MR.RPT


::  Transit Assignment All Bus

del tppl*.*
del %_iter_%_Transit_Assgn_AB.RPT
start /w TPPLUS.EXE  ..\scripts\transit_assignment_AB.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn %_iter_%_Transit_Assgn_AB.RPT


::  Transit Assignment Bus+Metro Rail

del tppl*.*
del %_iter_%_Transit_Assgn_BM.RPT
start /w TPPLUS.EXE  ..\scripts\transit_assignment_BM.s /start -Ptppl -S..\%1
if errorlevel 2 goto error
copy tppl*.prn %_iter_%_Transit_Assgn_BM.RPT

goto end
:error
REM  Processing Error.....
PAUSE
:end
cd..
```

Appendix G. Flowcharts

Ref: v2.2_MODAPP_Final.vsd

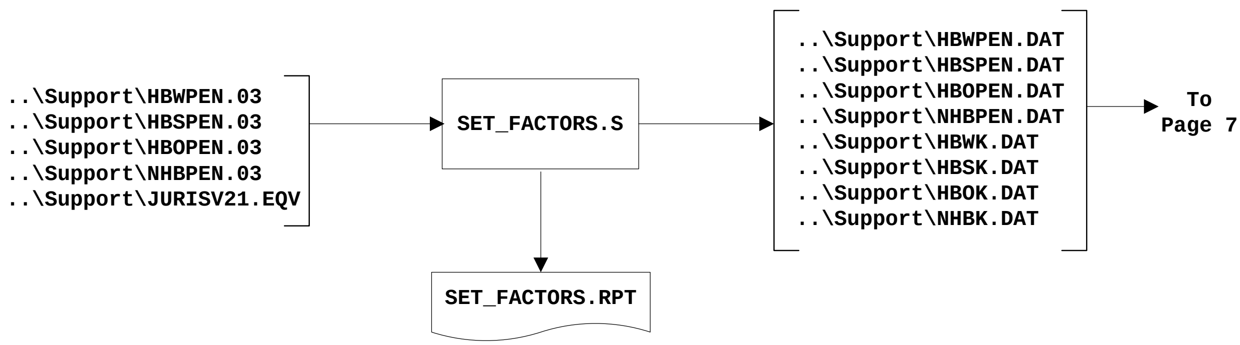
Flowchart Numbers associated with Flowchart Steps

This Appendix contains detailed data processing flow charts showing the relationship of input and output files to the processing steps comprising the Version 2.2 travel model. The flowcharts are arranged on the basis of the 17 batch files used in the model application. Many of the batch files are reused during the application of the model. The table below describes the sequence of each batch file used by iteration. The flowcharts are numbered in accordance with the numbering system (1-17), shown in the table below.

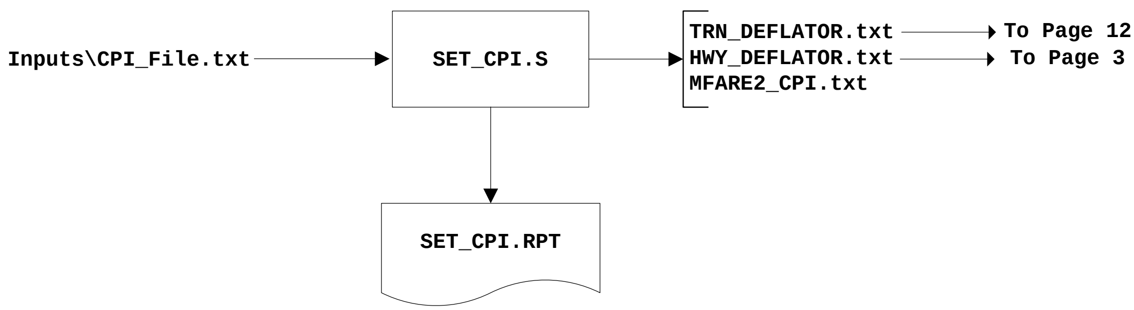
	Initial (Pump Prime) Iteration	Standard Iterations					
Batch File	PP	1	2	3	4	5	6
Set_Factors.bat	1						
Set_CPI.bat	2						
PP_Highway_Build.bat	3						
PP_Highway_Skims.bat	4						
Transit_Skim_All_Modes.bat				5			
Transit_Fare.bat				12			
Trip_Generation.bat				6			
Trip_Distribution.bat				7			
Mode_Choice.bat				13			
Auto_Driver.bat				14			
PP_Auto_Drivers.bat	8						
Time-of-Day.bat				9			
Highway_Assignment.bat				10			
Highway_Skims.bat				11			
Transit_Assignment.bat				15			

Ref: V2.3_Flowchart_Table.xls

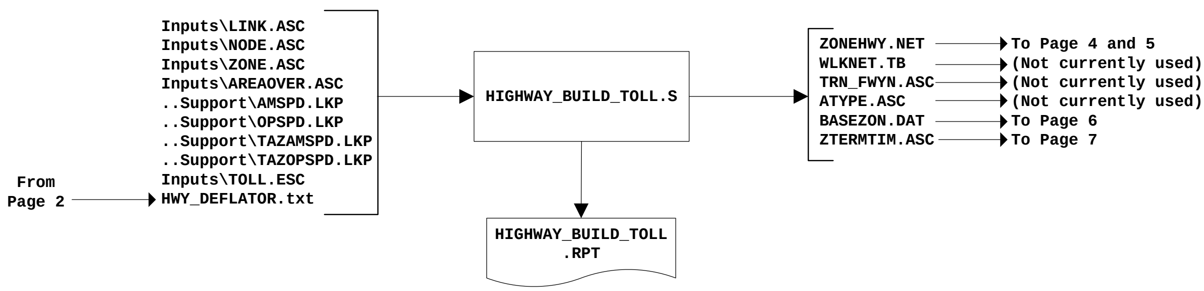
Set_Factors.bat



Set_CPI.bat


Inputs\CPI_File.txt
SET_CPI.S
TRN_DEFLATOR.txt
HWY_DEFLATOR.txt
MFARE2_CPI.txt
To Page 12
To Page 3
SET_CPI.RPT

PP_Highway_Build.bat: Highway Network Preparation



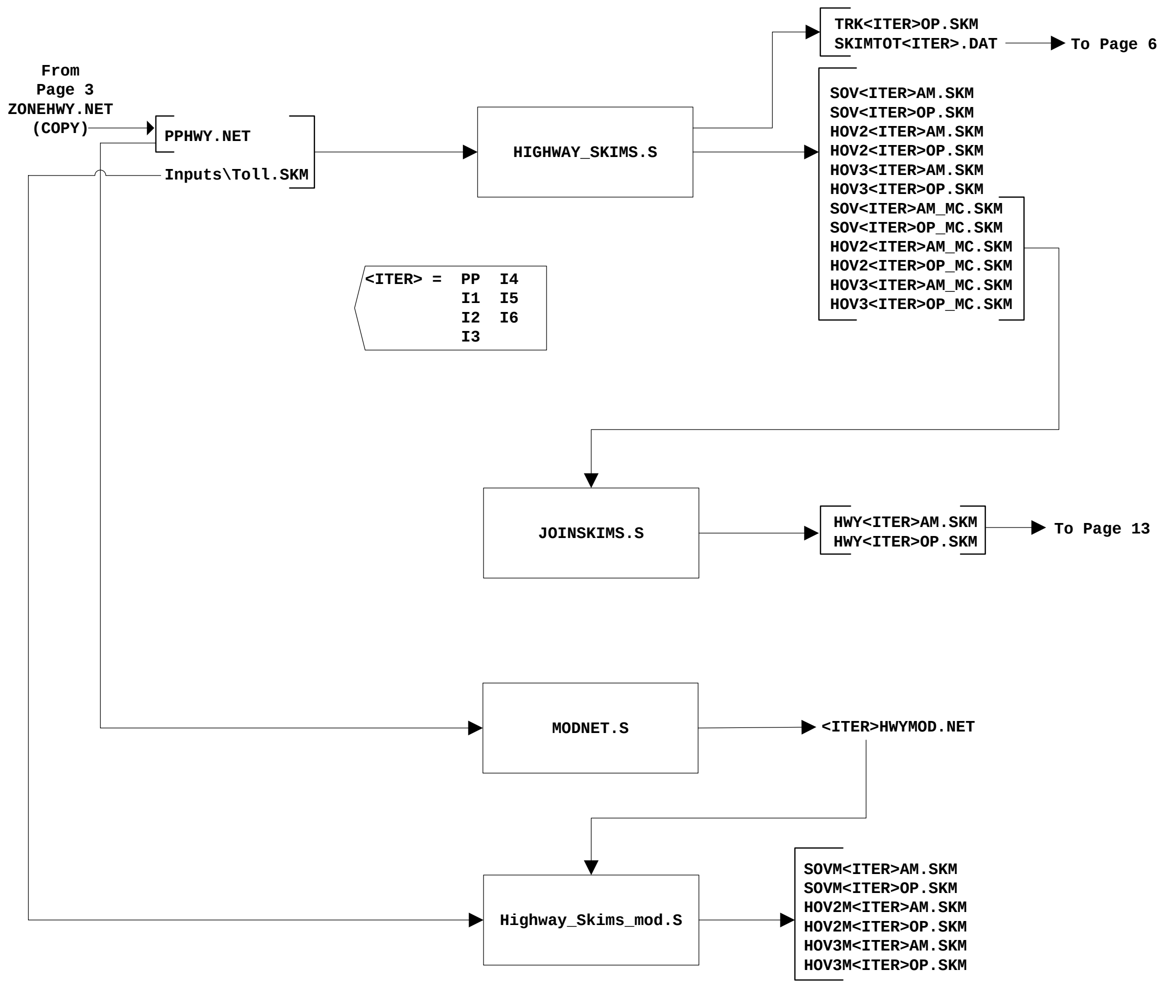
TITLE: Version 2.3 Model Application

COMPANY: COG/TPB **CREATOR: RM/MS**

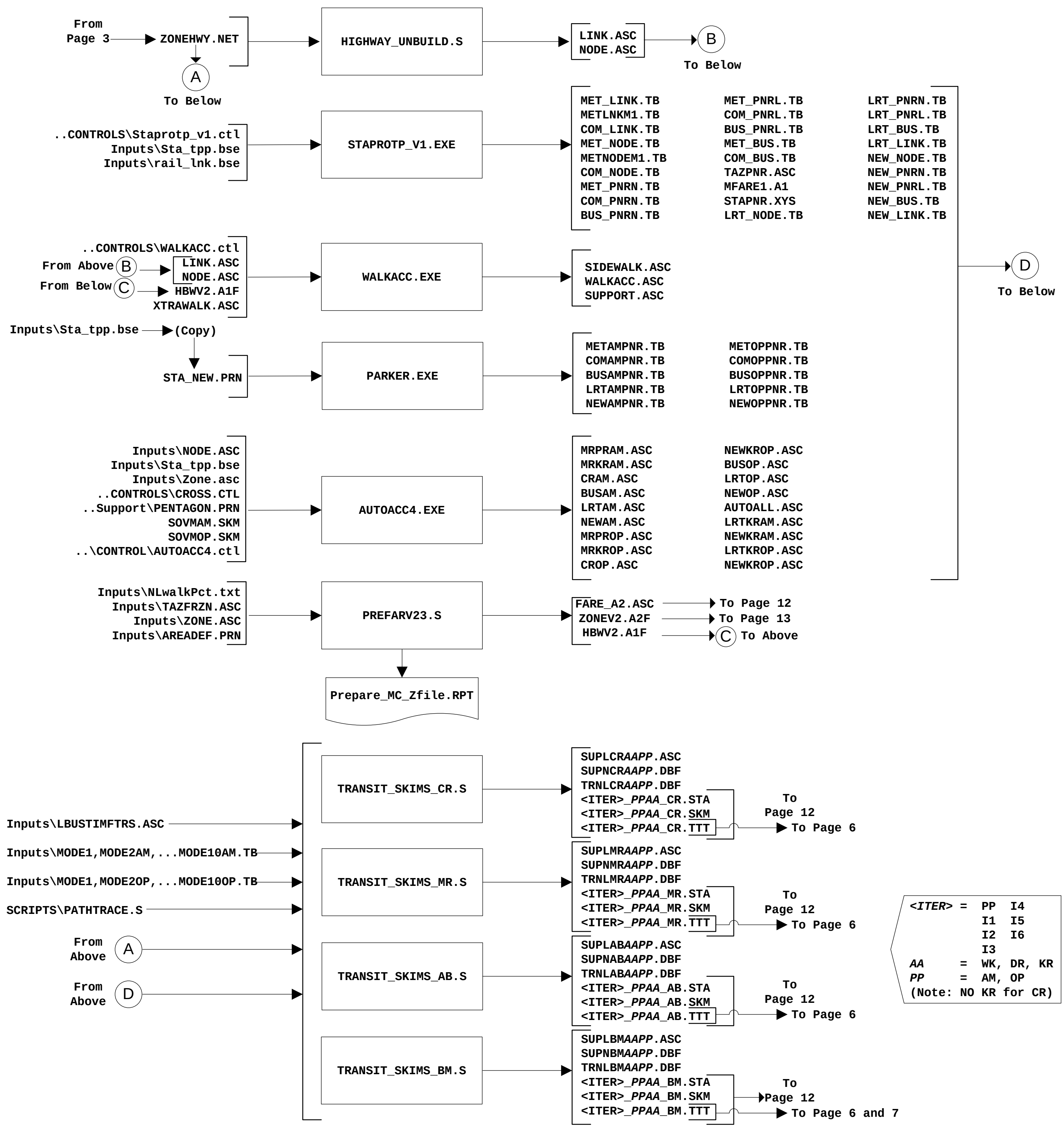
DATE: June 2008 PG: 4 OF 15

FILENAME: Interrrim_V2.3.VSD

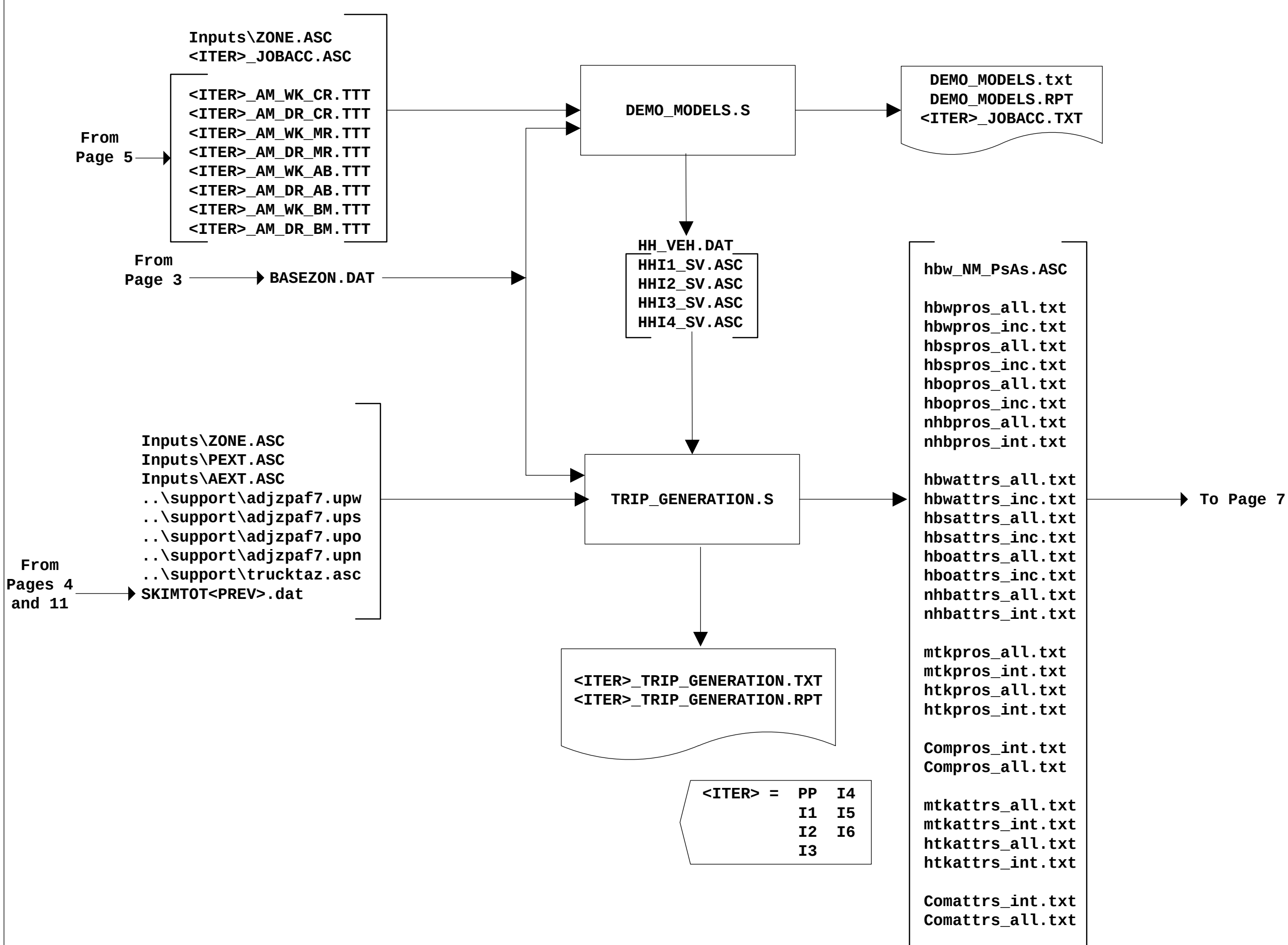
PP_Highway_Skims.bat



TRANSIT_Skim_All_Modes.bat

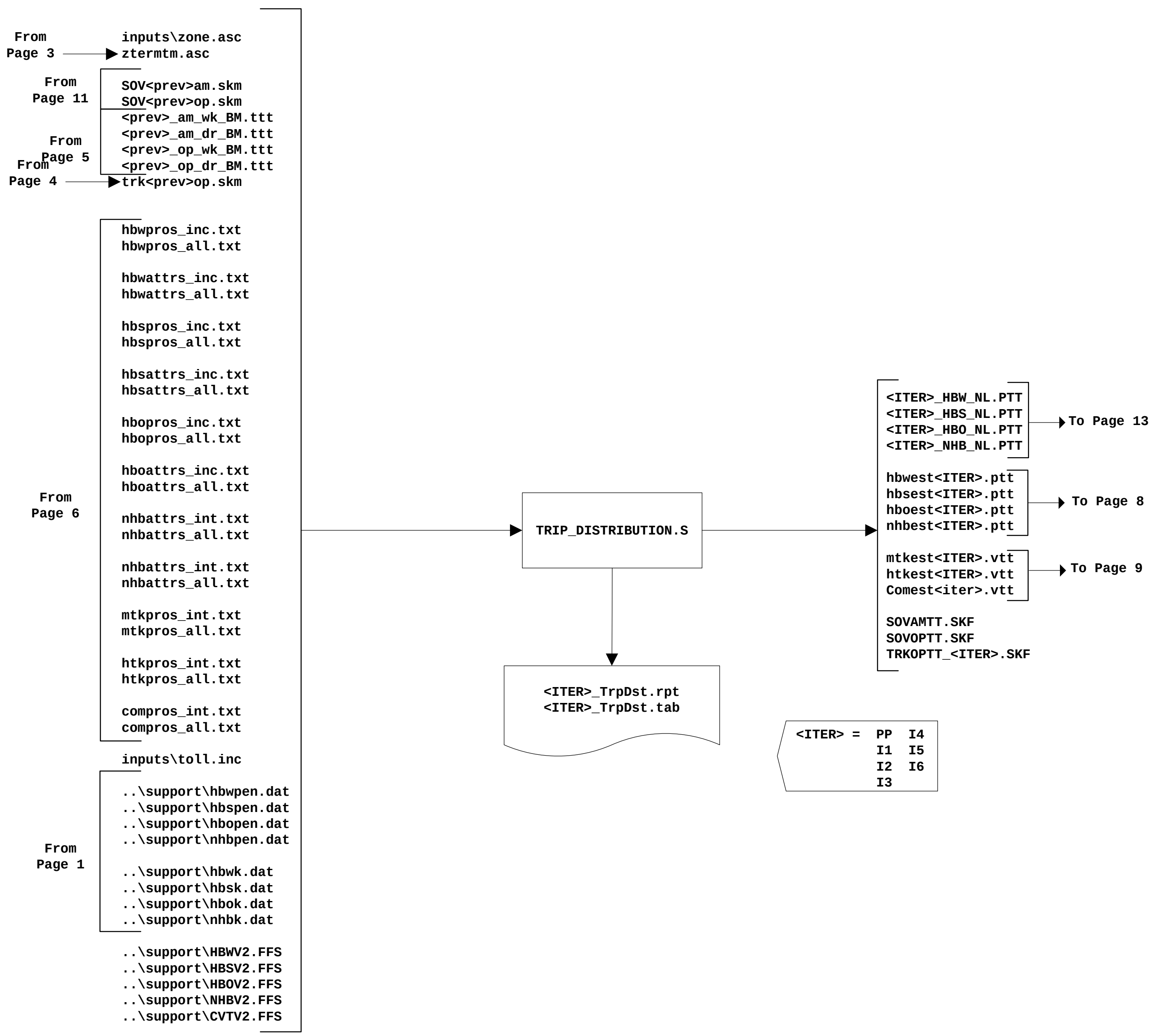


Trip Generation.bat: Trip Generation

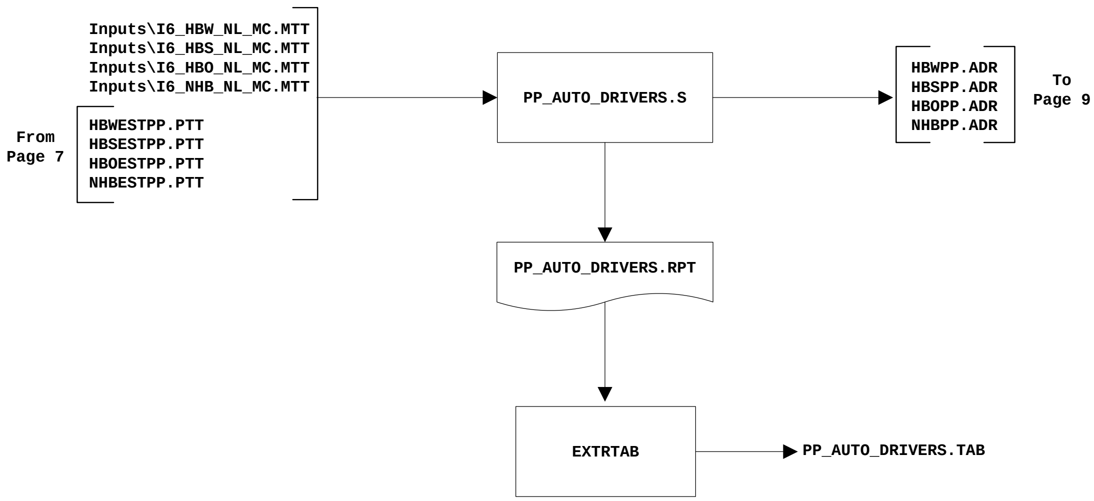


TITLE:	Version 2.3 Model Application
COMPANY: COG/TPB	CREATOR: RM/MS
DATE: June 2008	PG: 7 OF 15
FILENAME: Interrrim_V2.3.VSD	

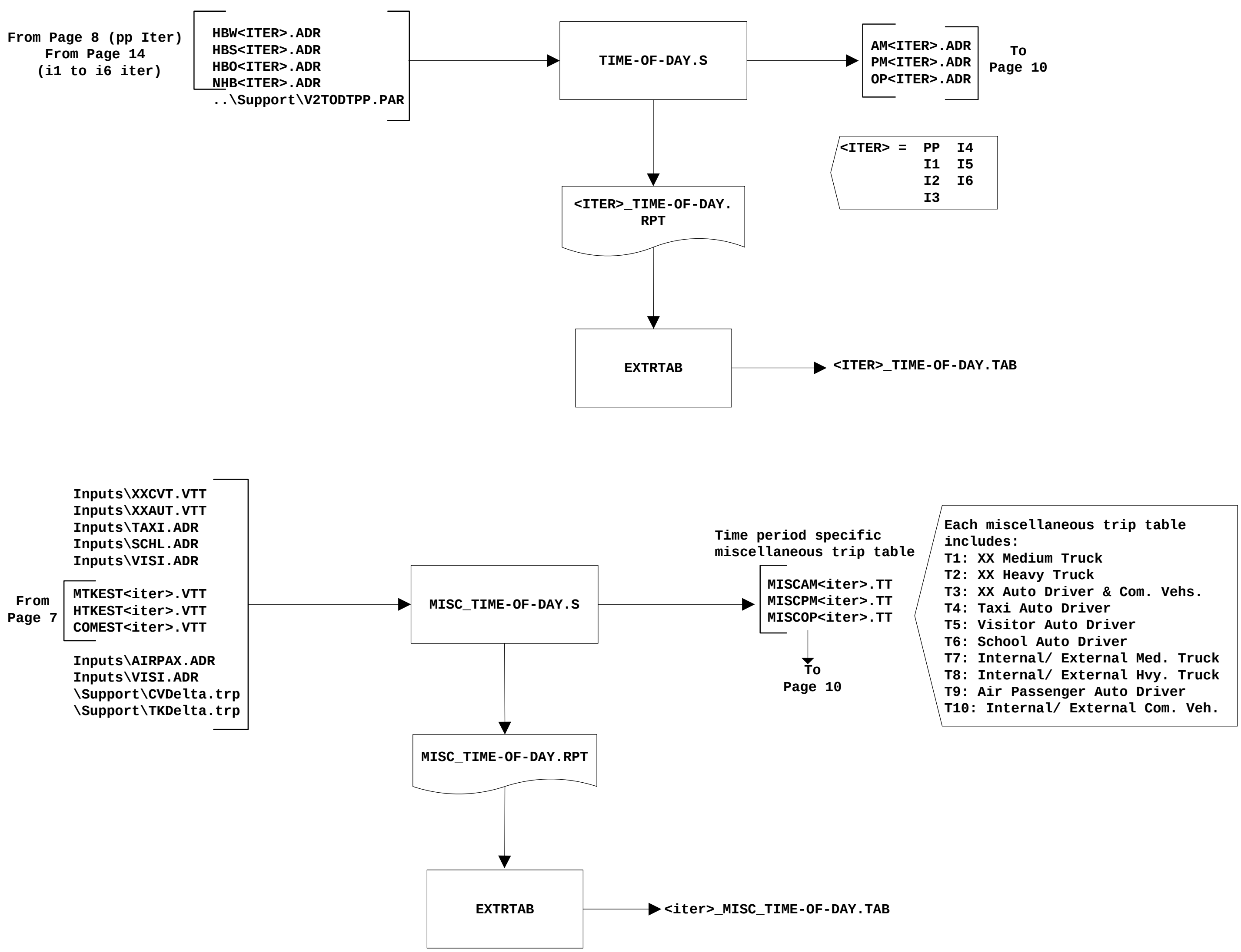
Trip_Distribution.bat: Trip Distribution



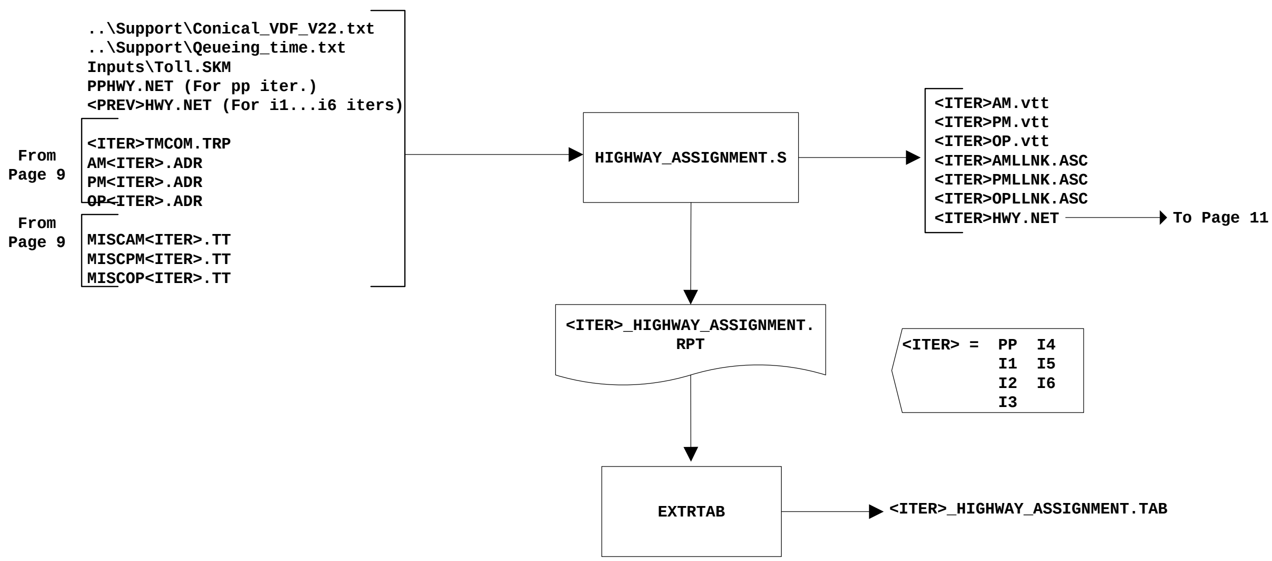
PP_Auto_Drivers.bat: Pump Prime Auto Driver Trips



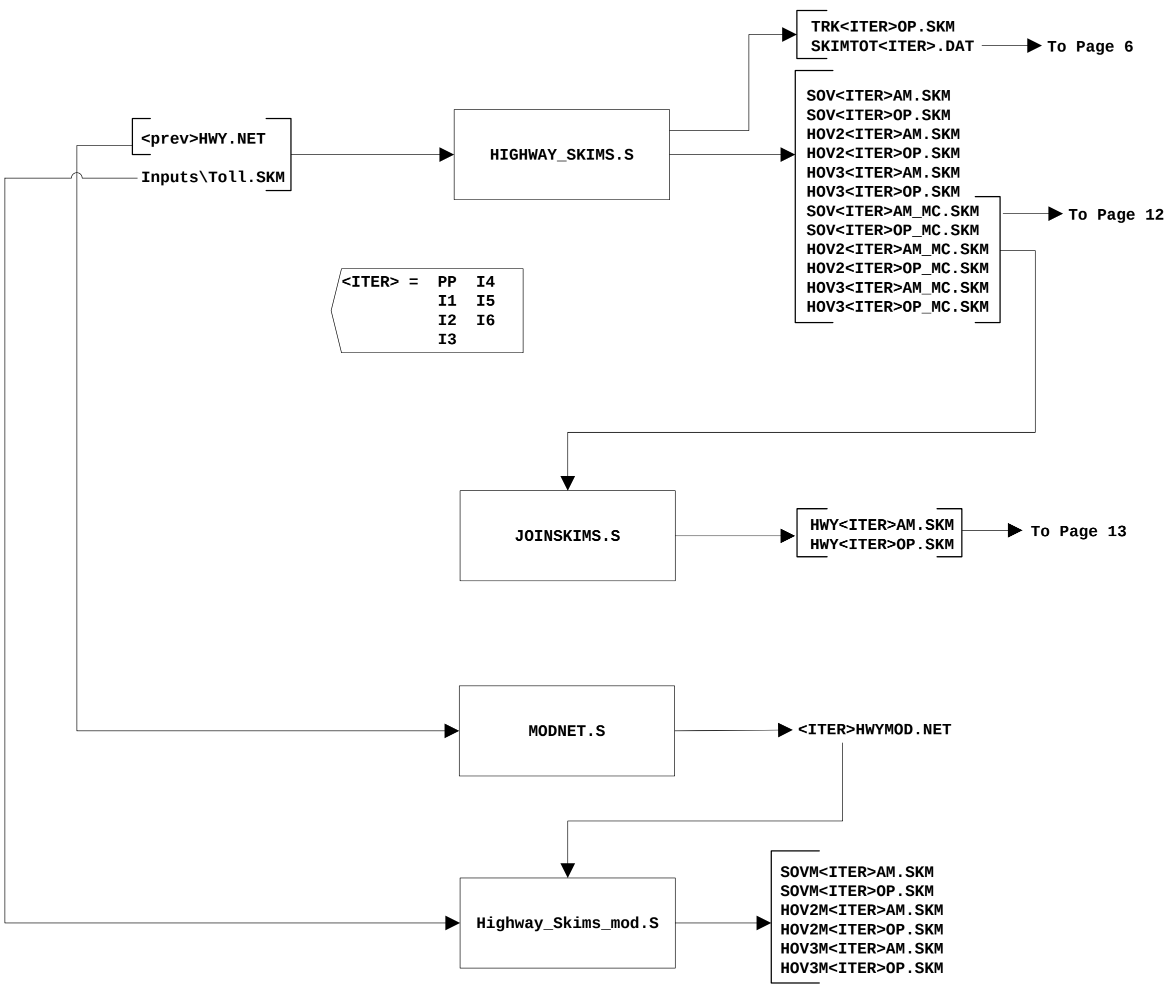
Time-of-Day.bat



Highway_Assignment.bat



Highway_Skims.bat



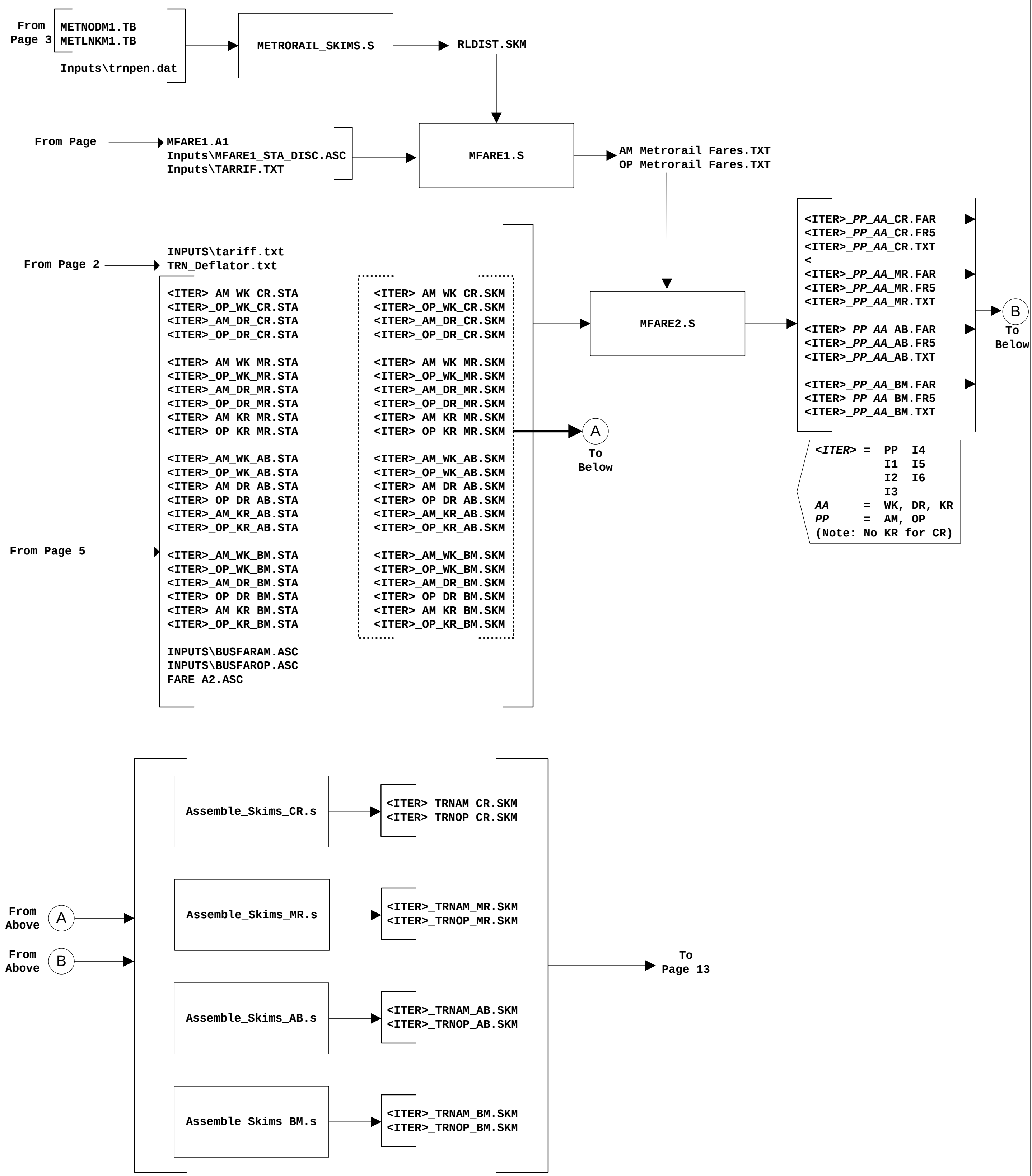
TITLE: Version 2.3 Model Application

COMPANY: COG/TPB **CREATOR: RM/MS**

DATE: June 2008 PG: 12 OF 15

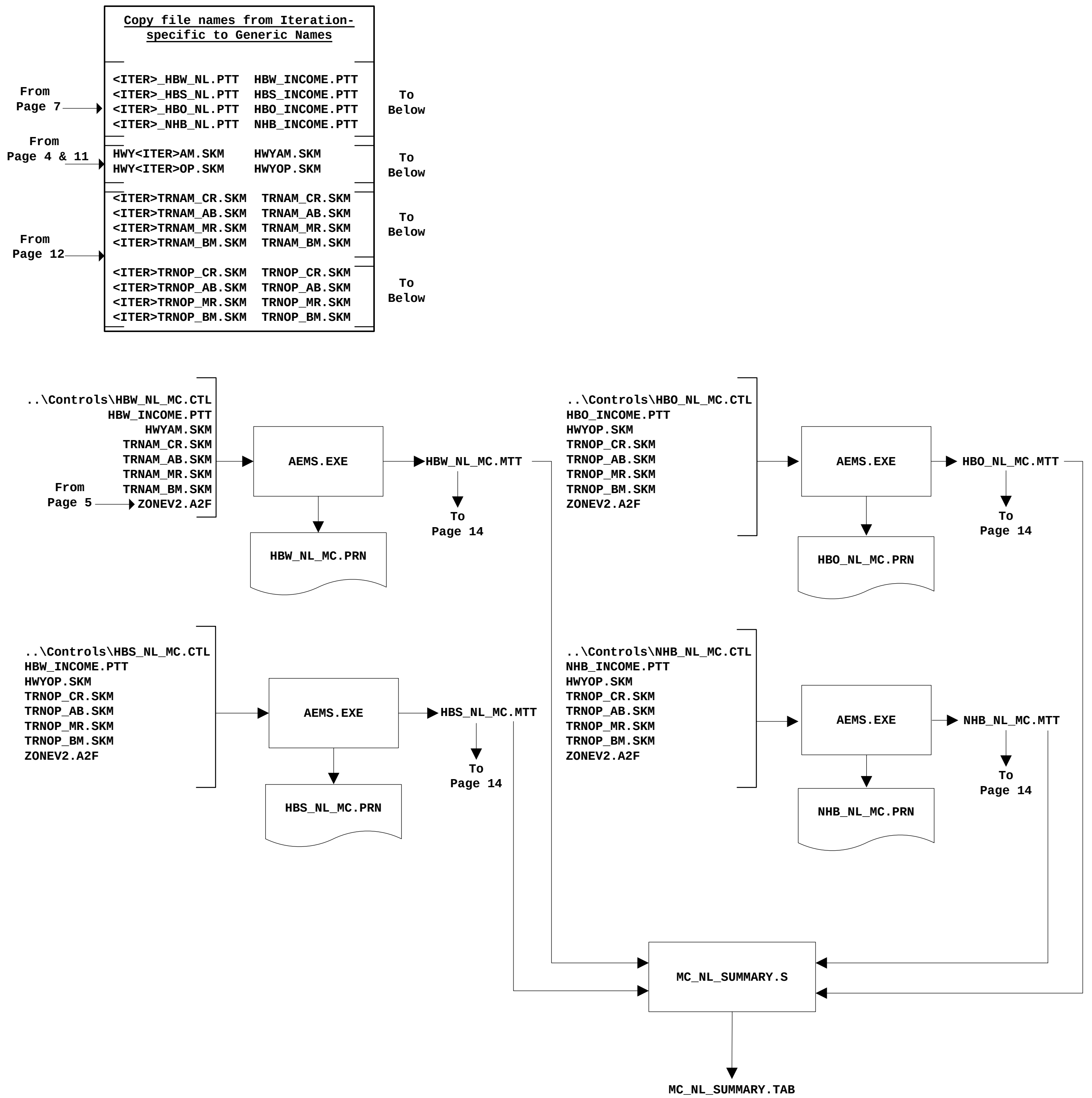
FILENAME: Interrrim_V2.3.VSD

Transit_Fare.bat

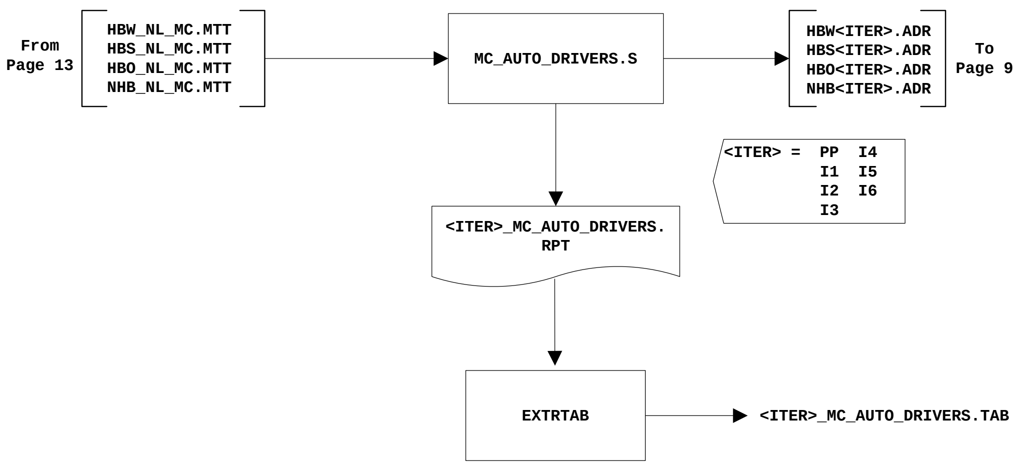


TITLE:	**Version 2.3 Model Application**
COMPANY: COG/TPB	**CREATOR:** RM/MS
DATE: June 2008	PG: 13 OF 15
FILENAME: Interrrim_V2.3.VSD	

Mode Choice.bat

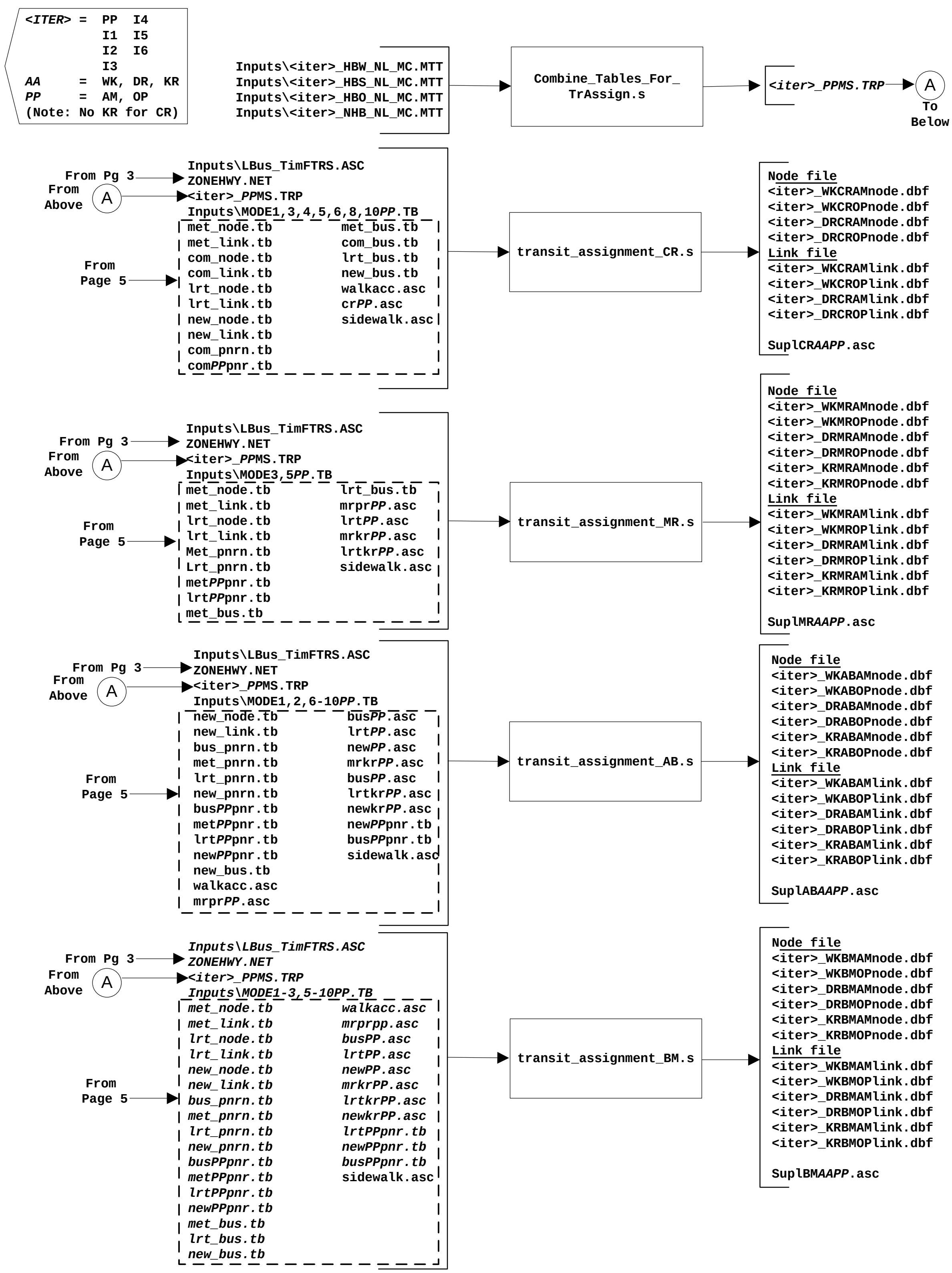


Auto_Driver.bat



TITLE:	Version 2.3 Model Application
COMPANY: COG/TPB	CREATOR: RM/MS
DATE: June 2008	PG: 15 OF 15
FILENAME: Interrrim_V2.3.VSD	

Transit_Assignment.bat



Appendix H. Fortran and other control files

Ref:

1 Access.ctl

```
  Station Access Summary
PK_VOL.DBF                              //---- peak transit network ----
OP_VOL.DBF                              //---- offpeak transit network ----

ACCESS
      7301, 7302, 7303, 7304, 7305, 7306, 7307, 7308, 7309, 7310, 7311, 7312, 7313,
      7314, 7315, 7316, 7317, 7318, 7319, 7320, 7321, 7322, 7323, 7324, 7325, 7326,
      7327, 7328, 7329, 7330, 7331, 7332, 7333, 7334, 7335, 7336, 7337, 7338, 7339,
      7340, 7341, 7342, 7343, 7344, 7345, 7346, 7347, 7348, 7349, 7350, 7351, 7352,
      7353, 7354, 7355, 7356, 7357, 7358, 7359, 7360, 7361, 7362, 7363, 7364, 7365,
      7366, 7367, 7368, 7369, 7370, 7371, 7372, 7373, 7374, 7375, 7376, 7377, 7378,
      7379, 7380, 7381, 7382, 7383

MODES=11-16, DETAIL=YES, NAME="Station Access", FILE=BOARDING.ASC
```

2 AccessPkHbw.ctl

```
Station Access Summary
PK_VOL.DBF                              //---- peak transit network ----

ACCESS
      7301, 7302, 7303, 7304, 7305, 7306, 7307, 7308, 7309, 7310, 7311, 7312, 7313,
      7314, 7315, 7316, 7317, 7318, 7319, 7320, 7321, 7322, 7323, 7324, 7325, 7326,
      7327, 7328, 7329, 7330, 7331, 7332, 7333, 7334, 7335, 7336, 7337, 7338, 7339,
      7340, 7341, 7342, 7343, 7344, 7345, 7346, 7347, 7348, 7349, 7350, 7351, 7352,
      7353, 7354, 7355, 7356, 7357, 7358, 7359, 7360, 7361, 7362, 7363, 7364, 7365,
      7366, 7367, 7368, 7369, 7370, 7371, 7372, 7373, 7374, 7375, 7376, 7377, 7378,
      7379, 7380, 7381, 7382, 7383

MODES=11-16, DETAIL=YES, NAME="Station Access", FILE=BOARDINGPKHBW.ASC
```

3 autoacc4.ctl

```
 node.asc
sta_tpp.bse
zone.asc
cross.ctl
pentagon.prn
sovmam.skm
sovmop.skm
mrpram.asc
mrkram.asc
cram.asc
busam.asc
lrtam.asc
newam.asc
mrprop.asc
mrkrop.asc
crop.asc
busop.asc
lrtop.asc
newop.asc
autoall.asc
lrtkram.asc
newkram.asc
lrtkrop.asc
newkrop.asc
M  1 1500
M  2  500
M  3  300
M  0  300
C  1 1500
C  2 1000
C  0  500
B  1  500
B  0  300
N  1  500
N  0  300
L  1  500
L  0  300
```

4 cross.ctl

```
  24
 0 1
 1 3
 2 1
 3 2
 4 2
 5 2
 6 4
 7 2
 8 0
 9 3
10 1
11 1
12 1
13 0
14 1
15 1
16 1
17 2
18 2
19 2
20 2
21 2
22 2
23 4
 4
 1 1 0 1 0
 2 0 1 0 1
 3 1 0 1 0
 4 0 1 1 1
```

5 hbo_nl_mc.ctl

```
HBO OP NESTED LOGIT MC - #DATE:  5/08/2008 #VER:  21
CHOICE            1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
*
*
*LOGIT COEFFICIENTS BY CHOICE FOR EACH SKIM (NO INPUT SKIM IS
*EQUIVALENT TO A CONSTANT)
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
COEF01:IVTT       1>-0.02322  -0.02322  -0.02322  -0.02322  -0.02322  -0.02322  -0.02322  -0.02322  -0.02322  -0.02322  -0.02322  -0.02322  -0.02322  -0.02322  -0.02322
SKIM01:IVTT       1>DAIV      S2IV      S3IV      WCIV      WBIV      WTIV      WMIV      PCIV      KCIV      PBIV      KBIV      PTIV      KTIV      PMIV      KMIV
COEF02:AUTO ACC   1>                                                                      -0.03483  -0.03483  -0.03483  -0.03483  -0.03483  -0.03483  -0.03483  -0.03483
SKIM02:AUTO ACC   1>                                                                      PCAA      KCAA      PBAA      KBAA      PTAA      KTAA      PMAA      KMAA
COEF03:TERM/OVTT  1>-0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805
SKIM03:TERM/OVTT  1>DATE      S2TE      S3TE      WCOV      WBOV      WTOV      WMOV      PCOV      KCOV      PBOV      KBOV      PTOV      KTOV      PMOV      KMOV
* LIMIT COEF 04 TO PURPOSE 1
COEF PURP04        >1
COEF04:COST INC1  1>-0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202
SKIM04:COST INC1  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
* LIMIT COEF 05 TO PURPOSE 2
COEF PURP05        >2
COEF05:COST INC2  1>-0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101
SKIM05:COST INC2  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
* LIMIT COEF 06 TO PURPOSE 3
COEF PURP06        >3
COEF06:COST INC3  1>-0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067
SKIM06:COST INC3  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
COEF PURP07        >4
* LIMIT COEF 07 TO PURPOSE 4
COEF07:COST INC4  1>-0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051
SKIM07:COST INC4  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
COEF08:TRN XFERS  1>                              -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000
SKIM08:TRN XFERS  1>                              WCXF      WBXF      WTXF      WMXF      PCXF      KCXF      PBXF      KBXF      PTXF      KTXF      PMXF      KMXF
COEF09:TRN BRDPEN 1>                              -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805  -0.05805
SKIM09:TRN BRDPEN 1>                              WCXP      WBXP      WTXP      WMXP      PCXP      KCXP      PBXP      KBXP      PTXP      KTXP      PMXP      KMXP
*WALK WEIGHT
COEF10:TRN WLKWT  1>                              -0.04644  -0.04644  -0.04644  -0.04644  -0.04644  -0.04644  -0.04644  -0.04644  -0.04644  -0.04644  -0.04644  -0.04644
SKIM10:TRN WLKWT  1>                              WCWK      WBWK      WTWK      WMWK      PCWK      KCWK      PBWK      KBWK      PTWK      KTWK      PMWK      KMWK

*SYNTAX TO LIMIT UTILITY ELEMENT TO A PARTICULAR WALK SEGMENT IN THIS EXAMPLE
*    COEF 18 APPLIES ONLY TO WALK SEGMENT 1
*COEF WLKSEG18      >1

* ASSUMED MATRIX ORGANIZATION
* FILE 1 TRIP TABLE (SEPARATE FOR EACH PURPOSE)
* 1 INCOME 1 (HOME-BASED)/ALL NHB TRIPS
* 2 INCOME 2 (HOME-BASED)
* 3 INCOME 3 (HOME-BASED)
* 4 INCOME 4 (HOME-BASED)
*
* FILE 2 HIGHWAY SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* 1 SOV   TIME (MIN)
* 2 SOV   DIST (0.1 MILES)
* 3 SOV   TOLL (1994 CENTS)
* 4 HOV2  TIME (MIN)
* 5 HOV2  DIST (0.1 MILES)
* 6 HOV2  TOLL (1994 CENTS)
* 7 HOV3+ TIME (MIN)
* 8 HOV3+ DIST (0.1 MILES)
* 9 HOV3+ TOLL (1994 CENTS)
*
* FILE 3=COM. RAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 4=BUS SKIMS       (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 5=METRORAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 6=BUS+METRORAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
```

```
*  1 WLK ACC/EGR (.01 MIN)  15 PNR ACC/EGR (.01 MIN)  33 KNR ACC/EGR  (.01 MIN)
*  2 WLK OTHER   (.01 MIN)  16 PNR OTHER   (.01 MIN)  34 KNR OTHER   (.01 MIN)
*  3 WLK IWAIT   (.01 MIN)  17 PNR IWAIT   (.01 MIN)  35 KNR IWAIT   (.01 MIN)
*  4 WLK XWAIT   (.01 MIN)  18 PNR XWAIT   (.01 MIN)  36 KNR XWAIT   (.01 MIN)
*  5 WLK IVTT TOT(.01 MIN)  19 PNR IVTT TOT(.01 MIN)  37 KNR IVTT TOT(.01 MIN)
*  6 WLK IVTT CR (.01 MIN)  20 PNR IVTT CR (.01 MIN)  38 KNR IVTT CR (.01 MIN)
*  7 WLK IVTT XB (.01 MIN)  21 PNR IVTT XB (.01 MIN)  39 KNR IVTT XB (.01 MIN)
*  8 WLK IVTT MR (.01 MIN)  22 PNR IVTT MR (.01 MIN)  40 KNR IVTT MR (.01 MIN)
*  9 WLK IVTT NM (.01 MIN)  23 PNR IVTT NM (.01 MIN)  41 KNR IVTT NM (.01 MIN)
* 10 WLK IVTT NM2(.01 MIN)  24 PNR IVTT NM2(.01 MIN)  42 KNR IVTT NM2(.01 MIN)
* 11 WLK IVTT LB (.01 MIN)  25 PNR IVTT LB (.01 MIN)  43 KNR IVTT LB (.01 MIN)
* 12 WLK #XFERS  (NUMBER )  26 PNR #XFERS  (NUMBER )  44 KNR #XFERS  (NUMBER )
* 13 WLK COST    (94CENTS)  27 PNR COST    (94CENTS)  45 KNR COST    (94CENTS)
* 14 WLK XPEN    (.01 MIN)  28 PNR XPEN    (.01 MIN)  46 KNR XPEN    (.01 MIN)
*                           29 PNR ACC TIME(.01 MIN)  47 KNR ACC TIME(.01 MIN)
*                           30 PNR ACC DIST(.01 MIL)  48 KNR ACC DIST(.01 MIL)
*                           31 PNR ACC COST(94CENTS)
*                           32 PNR STA TERM(.01 MIN)
*
* FILE 8=ZDATA
*  1 HBW PARK COST (1994 CENTS)
*  2 HBS PARK COST (1994 CENTS)
*  3 HBO PARK COST (1994 CENTS)
*  4 NHB PARK COST (1994 CENTS)
*  5 TERMINAL TIME (HOME BASED) (MINUTES)
*  6 TERMINAL TIME (NON HOME BASED) (MINUTES)
*  7 ARC VIEW SHORT WALK PERCENT TO METRO
*  8 ARC VIEW LONG WALK PERCENT TO METRO
*  9 ARC VIEW SHORT WALK PERCENT TO ALL AM PK TRANSIT
* 10 ARC VIEW LONG WALK PERCENT TO ALL AM PK TRANSIT
* 11 ARC VIEW SHORT WALK PERCENT TO ALL OP TRANSIT
* 12 ARC VIEW LONG WALK PERCENT TO ALL OP TRANSIT
* 13 AREA TYPE
*    1=DC CORE
*    2=VA CORE
*    3=DC URBAN
*    4=MD URBAN
*    5=VA URBAN
*    6=MD OTHER
*    7=VA OTHER

* PARAMETERS
*=======================================================
* AUTO OPERATING COSTS IN CENTS/mile
COMPUTE AUOP       >10
* AUTO OCCUPANCY FOR 3+   Reduced from 3.5 to 3.35 on 3/1/07 rm
COMPUTE OCC3       >3.35

* TERMINAL TIMES, USE i/j805 FOR HBW, HBS, AND HBO. USE i/j806 FOR NHB
* HBW/HBS/HBO
COMPUTE TERI       >i805
COMPUTE TERJ       >j805
* NHB
*COMPUTE TERI       >i806
*COMPUTE TERJ       >j806

* PARK COSTS, USE i/j801 802 803 804 FOR HBW, HBS, HBO, NHB RESPECTIVELY
* HBW
*COMPUTE PRKC       >j801/2.
* HBS
* COMPUTE PRKC       >j802/2.
* HBO
COMPUTE PRKC       >j803/2.
* NHB
* COMPUTE PRKC       >j804

* Percent of productions in long-walk area that are assumed to walk = 25% (i.e., 75% drive)
COMPUTE PCLM       >0.25
```

```
COMPUTE PCLT       >0.25
* PERCENT WALKS-METRORAIL ONLY
COMPUTE PCMI       >(i807+PCLM*(i808-i807))/100.
COMPUTE PCMJ       >(j807+PCLM*(j808-j807))/100.
* PERCENT WALKS-PEAK
*COMPUTE PCTI       >(i809+PCLT*(i810-i809))/100.
*COMPUTE PCTJ       >(j809+PCLT*(j810-j809))/100.
* PERCENT WALKS-OFFPEAK
COMPUTE PCTI       >(i811+PCLT*(i812-i811))/100.
COMPUTE PCTJ       >(j811+PCLT*(j812-j811))/100.
COMPUTE PCMI       >MAX(PCMI,0)
COMPUTE PCMI       >MIN(PCMI,1)
COMPUTE PCMJ       >MAX(PCMJ,0)
COMPUTE PCMJ       >MIN(PCMJ,1)
COMPUTE PCTI       >MAX(PCTI,PCMI)
COMPUTE PCTI       >MIN(PCTI,1)
COMPUTE PCTJ       >MAX(PCTJ,PCMJ)
COMPUTE PCTJ       >MIN(PCTJ,1)
*
* DO TRIP SUBDIVISIONS
*
*  HOME BASED ALTERNATIVES
COMPUTE TRP1       >m101
COMPUTE TRP2       >m102
COMPUTE TRP3       >m103
COMPUTE TRP4       >m104
* NON-HOME BASED
*COMPUTE TRP1       >0.25*m101
*COMPUTE TRP2       >0.25*m101
*COMPUTE TRP3       >0.25*m101
*COMPUTE TRP4       >0.25*m101
*
* BE SURE TO UPDATE THE IVTT COEFFICIENT IN FTA SECTION FOR EACH PURPOSE
*
*=======================================================
*INITIALIZING ALL VARIABLES WITHIN IF STATEMENTS TO ZERO
COMPUTE DAIV       >0
COMPUTE DACS       >0
COMPUTE DATE       >0
COMPUTE S2IV       >0
COMPUTE S2CS       >0
COMPUTE S2TE       >0
COMPUTE S3IV       >0
COMPUTE S3CS       >0
COMPUTE S3TE       >0
COMPUTE WKIV       >0
COMPUTE WKOV       >0
COMPUTE WKXF       >0
COMPUTE WKCS       >0
COMPUTE WKXP       >0
COMPUTE WBIV       >0
COMPUTE WBOV       >0
COMPUTE WBXF       >0
COMPUTE WBCS       >0
COMPUTE WBXP       >0
COMPUTE WTIV       >0
COMPUTE WTOV       >0
COMPUTE WTXF       >0
COMPUTE WTCS       >0
COMPUTE WTXP       >0
COMPUTE WMIV       >0
COMPUTE WMOV       >0
COMPUTE WMXF       >0
COMPUTE WMCS       >0
COMPUTE WMXP       >0
COMPUTE PCIV       >0
COMPUTE PCAA       >0
COMPUTE PCOV       >0
```

```
COMPUTE PCXF       >0
COMPUTE PCCS       >0
COMPUTE PCXP       >0
COMPUTE PBIV       >0
COMPUTE PBAA       >0
COMPUTE PBOV       >0
COMPUTE PBXF       >0
COMPUTE PBCS       >0
COMPUTE PBXP       >0
COMPUTE PTIV       >0
COMPUTE PTAA       >0
COMPUTE PTOV       >0
COMPUTE PTXF       >0
COMPUTE PTCS       >0
COMPUTE PTXP       >0
COMPUTE PMIV       >0
COMPUTE PMAA       >0
COMPUTE PMOV       >0
COMPUTE PMXF       >0
COMPUTE PMCS       >0
COMPUTE PMXP       >0
COMPUTE KCIV       >0
COMPUTE KCAA       >0
COMPUTE KCOV       >0
COMPUTE KCXF       >0
COMPUTE KCCS       >0
COMPUTE KCXP       >0
COMPUTE KBIV       >0
COMPUTE KBAA       >0
COMPUTE KBOV       >0
COMPUTE KBXF       >0
COMPUTE KBCS       >0
COMPUTE KBXP       >0
COMPUTE KTIV       >0
COMPUTE KTAA       >0
COMPUTE KTOV       >0
COMPUTE KTXF       >0
COMPUTE KTCS       >0
COMPUTE KTXP       >0
COMPUTE KMIV       >0
COMPUTE KMAA       >0
COMPUTE KMOV       >0
COMPUTE KMXF       >0
COMPUTE KMCS       >0
COMPUTE KMXP       >0

COMPUTE WCWK       >0
COMPUTE WBWK       >0
COMPUTE WTWK       >0
COMPUTE WMWK       >0
COMPUTE PCWK       >0
COMPUTE KCWK       >0
COMPUTE PBWK       >0
COMPUTE KBWK       >0
COMPUTE PTWK       >0
COMPUTE KTWK       >0
COMPUTE PMWK       >0
COMPUTE KMWK       >0

* SKIM VALUES, Divide distances by 10 to convert tenths of miles to whole miles
* DRIVE ALONE
COMPUTE            >IF(m201>0)
COMPUTE DAIV       >m201
COMPUTE DACS       >m202/10*AUOP+m203+PRKC
COMPUTE DATE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 2
```

```
COMPUTE            >IF(m204>0)
COMPUTE S2IV       >m204
COMPUTE S2CS       >(m205/10*AUOP+m206+PRKC)/2.0
COMPUTE S2TE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 3
COMPUTE            >IF(m207>0)
COMPUTE S3IV       >m207
COMPUTE S3CS       >(m208/10*AUOP+m209+PRKC)/OCC3
COMPUTE S3TE       >TERI+TERJ
COMPUTE            >ENDIF

* Assign Intrazonal trips to Autos (mj11/04/05)
COMPUTE            >IF(P()=Q())
COMPUTE DAIV       >1
COMPUTE DACS       >m202/10*AUOP+m203+PRKC
COMPUTE DATE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 2
COMPUTE            >IF(P()=Q())
COMPUTE S2IV       >1
COMPUTE S2CS       >(m205/10*AUOP+m206+PRKC)/2.0
COMPUTE S2TE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 3
COMPUTE            >IF(P()=Q())
COMPUTE S3IV       >1
COMPUTE S3CS       >(m208/10*AUOP+m209+PRKC)/OCC3
COMPUTE S3TE       >TERI+TERJ
COMPUTE            >ENDIF

*End of Intrazonal trips

* WALK COMMUTER RAIL
COMPUTE            >IF(m305>0)
COMPUTE WCIV       >m305/100.
COMPUTE WCOV       >(m303+m304)/100.
COMPUTE WCXF       >m312
COMPUTE WCCS       >m313
COMPUTE WCXP       >m314/100.
COMPUTE WCWK       >(m301+m302)/100.
COMPUTE            >ENDIF

* WALK BUS
COMPUTE            >IF(m405>0)
COMPUTE WBIV       >m405/100.
COMPUTE WBOV       >(m403+m404)/100.
COMPUTE WBXF       >m412
COMPUTE WBCS       >m413
COMPUTE WBXP       >m414/100.
COMPUTE WBWK       >(m401+m402)/100.
COMPUTE            >ENDIF

* WALK BUS/METRORAIL (TRANSIT)
COMPUTE            >IF(m605>0)
COMPUTE WTIV       >m605/100.
COMPUTE WTOV       >(m603+m604)/100.
COMPUTE WTXF       >m612
COMPUTE WTCS       >m613
COMPUTE WTXP       >m614/100.
COMPUTE WTWK       >(m601+m602)/100.
COMPUTE            >ENDIF


* WALK METRORAIL
```

```
COMPUTE            >IF(m505>0)
COMPUTE WMIV       >m505/100.
COMPUTE WMOV       >(m503+m504)/100.
COMPUTE WMXF       >m512
COMPUTE WMCS       >m513
COMPUTE WMXP       >m514/100.
COMPUTE WMWK       >(m501+m502)/100.
COMPUTE            >ENDIF

* PNR COMMUTER RAIL
COMPUTE            >IF(m319>0)
COMPUTE PCIV       >m319/100.
COMPUTE PCAA       >m329/100.
COMPUTE PCOV       >(m317+m318+m332)/100.
COMPUTE PCXF       >m326
COMPUTE PCCS       >m327+m331+m330/100*AUOP
COMPUTE PCXP       >m328/100.
COMPUTE PCWK       >(m315+m316)/100.
COMPUTE            >ENDIF

* PNR BUS
COMPUTE            >IF(m419>0)
COMPUTE PBIV       >m419/100.
COMPUTE PBAA       >m429/100.
COMPUTE PBOV       >(m417+m418+m432)/100.
COMPUTE PBXF       >m426
COMPUTE PBCS       >m427+m431+m430/100*AUOP
COMPUTE PBXP       >m428/100.
COMPUTE PBWK       >(m415+m416)/100.
COMPUTE            >ENDIF

* PNR BUS/METRORAIL (TRANSIT)
COMPUTE            >IF(m619>0)
COMPUTE PTIV       >m619/100.
COMPUTE PTAA       >m629/100.
COMPUTE PTOV       >(m617+m618+m632)/100.
COMPUTE PTXF       >m626
COMPUTE PTCS       >m627+m631+m630/100*AUOP
COMPUTE PTXP       >m628/100.
COMPUTE PTWK       >(m615+m616)/100.
COMPUTE            >ENDIF


* PNR METRORAIL
COMPUTE            >IF(m519>0)
COMPUTE PMIV       >m519/100.
COMPUTE PMAA       >m529/100.
COMPUTE PMOV       >(m517+m518+m532)/100.
COMPUTE PMXF       >m526
COMPUTE PMCS       >m527+m531+m530/100*AUOP
COMPUTE PMXP       >m528/100.
COMPUTE PMWK       >(m515+m516)/100.
COMPUTE            >ENDIF


* KNR COMMUTER RAIL
COMPUTE            >IF(m319>0)
COMPUTE KCIV       >m319/100.
COMPUTE KCAA       >m329/100.
COMPUTE KCOV       >(m317+m318)/100.
COMPUTE KCXF       >m326
COMPUTE KCCS       >m327+m330/100*AUOP
COMPUTE KCXP       >m328/100.
COMPUTE KCWK       >(m315+m316)/100.
COMPUTE            >ENDIF


* KNR BUS
```

```
COMPUTE              >IF(m437>0)
COMPUTE KBIV         >m437/100.
COMPUTE KBAA         >m447/100.
COMPUTE KBOV         >(m435+m436)/100.
COMPUTE KBXF         >m444
COMPUTE KBCS         >m445+m448/100*AUOP
COMPUTE KBXP         >m446/100.
COMPUTE KBWK         >(m433+m434)/100.
COMPUTE              >ENDIF

* KNR BUS/METRORAIL (TRANSIT)
COMPUTE              >IF(m637>0)
COMPUTE KTIV         >m637/100.
COMPUTE KTAA         >m647/100.
COMPUTE KTOV         >(m635+m636)/100.
COMPUTE KTXF         >m644
COMPUTE KTCS         >m645+m648/100*AUOP
COMPUTE KTXP         >m646/100.
COMPUTE KTWK         >(m633+m634)/100.
COMPUTE              >ENDIF


* KNR METRORAIL
COMPUTE              >IF(m537>0)
COMPUTE KMIV         >m537/100.
COMPUTE KMAA         >m547/100.
COMPUTE KMOV         >(m535+m536)/100.
COMPUTE KMXF         >m544
COMPUTE KMCS         >m545+m548/100*AUOP
COMPUTE KMXP         >m546/100.
COMPUTE KMWK         >(m533+m534)/100.
COMPUTE              >ENDIF

*CONSTANTS BY CHOICE FOR EACH PURPOSE
*CHOICE             1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
PURP01 1INC 1       1>                              2.000000  2.000000  2.000000  2.000000
PURP02 1INC 2       1>
PURP03 1INC 3       1>
PURP04 1INC 4       1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 2INC 1       1>                              2.000000  2.000000  2.000000  2.000000
PURP02 2INC 2       1>
PURP03 2INC 3       1>
PURP04 2INC 4       1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 3INC 1       1>                              2.000000  2.000000  2.000000  2.000000
PURP02 3INC 2       1>
PURP03 3INC 3       1>
PURP04 3INC 4       1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 4INC 1       1>                              2.000000  2.000000  2.000000  2.000000
PURP02 4INC 2       1>
PURP03 4INC 3       1>
PURP04 4INC 4       1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 5INC 1       1>                              2.000000  2.000000  2.000000  2.000000
PURP02 5INC 2       1>
PURP03 5INC 3       1>
PURP04 5INC 4       1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 6INC 1       1>                              2.000000  2.000000  2.000000  2.000000
PURP02 6INC 2       1>
PURP03 6INC 3       1>
PURP04 6INC 4       1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 7INC 1       1>                              2.000000  2.000000  2.000000  2.000000
PURP02 7INC 2       1>
PURP03 7INC 3       1>
PURP04 7INC 4       1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 8INC 1       1>                              2.000000  2.000000  2.000000  2.000000
PURP02 8INC 2       1>
PURP03 8INC 3       1>
PURP04 8INC 4       1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 9INC 1       1>                              2.000000  2.000000  2.000000  2.000000
```

```
PURP02 9INC 2     1>
PURP03 9INC 3     1>
PURP04 9INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000
PURP0110INC 1     1>                             2.000000  2.000000  2.000000  2.000000
PURP0210INC 2     1>
PURP0310INC 3     1>
PURP0410INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000
PURP0111INC 1     1>                             2.000000  2.000000  2.000000  2.000000
PURP0211INC 2     1>
PURP0311INC 3     1>
PURP0411INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000
PURP0112INC 1     1>                             2.000000  2.000000  2.000000  2.000000
PURP0212INC 2     1>
PURP0312INC 3     1>
PURP0412INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000
PURP0113INC 1     1>                             2.000000  2.000000  2.000000  2.000000
PURP0213INC 2     1>
PURP0313INC 3     1>
PURP0413INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000
PURP0114INC 1     1>                             2.000000  2.000000  2.000000  2.000000
PURP0214INC 2     1>
PURP0314INC 3     1>
PURP0414INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000
PURP0115INC 1     1>                             2.000000  2.000000  2.000000  2.000000
PURP0215INC 2     1>
PURP0315INC 3     1>
PURP0415INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000
PURP0116INC 1     1>                             2.000000  2.000000  2.000000  2.000000
PURP0216INC 2     1>
PURP0316INC 3     1>
PURP0416INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000
PURP0117INC 1     1>                             2.000000  2.000000  2.000000  2.000000
PURP0217INC 2     1>
PURP0317INC 3     1>
PURP0417INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000
PURP0118INC 1     1>                             2.000000  2.000000  2.000000  2.000000
PURP0218INC 2     1>
PURP0318INC 3     1>
PURP0418INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000
PURP0119INC 1     1>                             2.000000  2.000000  2.000000  2.000000
PURP0219INC 2     1>
PURP0319INC 3     1>
PURP0419INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000
PURP0120INC 1     1>                             2.000000  2.000000  2.000000  2.000000
PURP0220INC 2     1>
PURP0320INC 3     1>
PURP0420INC 4     1>                             -2.00000  -2.00000  -2.00000  -2.00000

TRIPIN01           >TRP1
TRIPIN02           >TRP2
TRIPIN03           >TRP3
TRIPIN04           >TRP4
TRIPIFACT01        >tfi1
TRIPIFACT02        >tfi2
TRIPIFACT03        >tfi3
TRIPIFACT04        >tfi4
COMPUTE tfi1       >1.0
COMPUTE tfi2       >1.0
COMPUTE tfi3       >1.0
COMPUTE tfi4       >1.0

*
*OUTPUT MATRICES AND OUTPUT FACTORS BY CHOICE FOR EACH PURPOSE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
TRIPOUT01         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT01        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
TRIPOUT02         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT02        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
```

```
TRIPOUT03         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT03        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
TRIPOUT04         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT04        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
**
**P AND A WALK PERCENTS BY CHOICE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
WALK SEG CW 1 PCT 1>WSWM
WALK SEG CW 1 MODE1>Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG CW 2 PCT 1>WSW1
WALK SEG CW 2 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG CW 3 PCT 1>WSW2
WALK SEG CW 3 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y
WALK SEG CW 4 PCT 1>WSW3
WALK SEG CW 4 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y
WALK SEG MD 5 PCT 1>WSM1
WALK SEG MD 5 MODE1>Y         Y         Y                                                 Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG MD 6 PCT 1>WSM2
WALK SEG MD 6 MODE1>Y         Y         Y                                                 Y         Y         Y         Y         Y         Y
WALK SEG NT 7 PCT 1>WSNT
WALK SEG NT 7 MODE1>Y         Y         Y
*SYNTAX OF COMMAND TO ADD A COMPONENT TO A SPECIFIC WALK SEGMENT IF DESIRED
*WALK SEG CW 1 COEF1>                                -0.04747  -0.04747  -0.04747  -0.04747  -0.04747  -0.04747
*WALK SEG CW 1 VAR 1>                                 WTSS      DTSS      DISS      WRSS      DRSS      DJSS
COMPUTE WSWM       >PCMI*PCMJ
COMPUTE WSW1       >(PCTI-PCMI)*PCMJ
COMPUTE WSW2       >(PCTI-PCMI)*(PCTJ-PCMJ)
COMPUTE WSW3       >PCMI*(PCTJ-PCMJ)
COMPUTE WSM1       >(1-PCTI)*PCMJ
COMPUTE WSM2       >(1-PCTI)*(PCTJ-PCMJ)
COMPUTE WSNT       >1-WSWM-WSW1-WSW2-WSW3-WSM1-WSM2

*NEST DEFINITIONS BY CHOICE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
NEST 1,1=         1>Y         Y         Y
NEST 1,2=         1>                              Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
NEST 2,1=         1>                              Y         Y         Y         Y
NEST 2,2=         1>                                                                      Y                   Y                   Y                   Y
NEST 2,3=         1>                                                                                Y                   Y                   Y                   Y
NEST 3,1=         1>                              Y
NEST 3,2=         1>                                        Y
NEST 3,3=         1>                                                  Y
NEST 3,4=         1>                                                            Y
NEST 4,1          1>                                                                      Y
NEST 4,2          1>                                                                                          Y
NEST 4,3          1>                                                                                                              Y
NEST 4,4          1>                                                                                                                                  Y
NEST 5,1          1>                                                                                Y
NEST 5,2          1>                                                                                                    Y
NEST 5,3          1>                                                                                                                        Y
NEST 5,4          1>                                                                                                                                            Y
NEST 6,1          1>Y
NEST 6,2          1>          Y         Y
NEST 7,1          1>          Y
NEST 7,2          1>                    Y

IGRP DEFINITION    >i813
JGRP DEFINITION    >j813
* 1 DC CORE/URBAN-DC CORE
SEGMENT  1         >    1    1
SEGMENT  1         >    3    1
* 2 DC CORE/URBAN-VA CORE
SEGMENT  2         >    1    2
SEGMENT  2         >    3    2
* 3 DC CORE/URBAN-URBAN
SEGMENT  3         >    1    3
SEGMENT  3         >    3    3
SEGMENT  3         >    1    4
```

```
SEGMENT  3         >    3    4
SEGMENT  3         >    1    5
SEGMENT  3         >    3    5
* 4 DC CORE/URBAN-OTHER
SEGMENT  4         >    1    6
SEGMENT  4         >    3    6
SEGMENT  4         >    1    7
SEGMENT  4         >    3    7
* 5 MD URBAN-DC CORE
SEGMENT  5         >    4    1
* 6 MD URBAN-VA CORE
SEGMENT  6         >    4    2
* 7 MD URBAN-URBAN
SEGMENT  7         >    4    3
SEGMENT  7         >    4    4
SEGMENT  7         >    4    5
* 8 MD URBAN-OTHER
SEGMENT  8         >    4    6
SEGMENT  8         >    4    7
* 9 VA CORE/URBAN-DC CORE
SEGMENT  9         >    2    1
SEGMENT  9         >    5    1
*10 VA CORE/URBAN-VA CORE
SEGMENT 10         >    2    2
SEGMENT 10         >    5    2
*11 VA CORE/URBAN-URBAN
SEGMENT 11         >    2    3
SEGMENT 11         >    5    3
SEGMENT 11         >    2    4
SEGMENT 11         >    5    4
SEGMENT 11         >    2    5
SEGMENT 11         >    5    5
*12 VA CORE/URBAN-OTHER
SEGMENT 12         >    2    6
SEGMENT 12         >    5    6
SEGMENT 12         >    2    7
SEGMENT 12         >    5    7
*13 MD OTHER-DC CORE
SEGMENT 13         >    6    1
*14 MD OTHER-VA CORE
SEGMENT 14         >    6    2
*15 MD OTHER-URBAN
SEGMENT 15         >    6    3
SEGMENT 15         >    6    4
SEGMENT 15         >    6    5
*16 MD OTHER-OTHER
SEGMENT 16         >    6    6
SEGMENT 16         >    6    7
*17 VA OTHER-DC CORE
SEGMENT 17         >    7    1
*18 VA OTHER-VA CORE
SEGMENT 18         >    7    2
*19 VA OTHER-URBAN
SEGMENT 19         >    7    3
SEGMENT 19         >    7    4
SEGMENT 19         >    7    5
*20 VA OTHER-OTHER
SEGMENT 20         >    7    6
SEGMENT 20         >    7    7

* SEGMENT  1
NSTC 10 1GRND TOTAL>
NSTC 11 1AUTO      >      0.5    0.00000
NSTC 12 1TRANSIT   >      0.5    0.24734
NSTC 20 1TOTAL TRN >
NSTC 21 1WALK ACC  >      0.5    0.00000
NSTC 22 1PNR ACC   >      0.5   -2.05668
NSTC 23 1KNR ACC   >      0.5   -6.31838
```

```
NSTC 30 1WLK TRN
NSTC 31 1WLK CR    >      1.0    0.12192
NSTC 32 1WLK BUS   >      1.0    0.18563
NSTC 33 1WLK BU/MR >      1.0    0.19678
NSTC 34 1WLK METRO >      1.0    0.00000
NSTC 40 1PNR TRN
NSTC 41 1PNR CR    >      1.0   -0.63046
NSTC 42 1PNR BUS   >      1.0   -5.98920
NSTC 43 1PNR BU/MR >      1.0   -5.27658
NSTC 44 1PNR METRO >      1.0    0.00000
NSTC 50 1KNR TRN
NSTC 51 1KNR CR    >      1.0   -0.40003
NSTC 52 1KNR BUS   >      1.0   -0.40003
NSTC 53 1KNR BU/MR >      1.0    0.50122
NSTC 54 1KNR METRO >      1.0    0.00000
NSTC 60 1AUTO
NSTC 61 1LOV       >      1.0    0.00000
NSTC 62 1HOV       >      0.5   -0.37211
NSTC 70 1HOV
NSTC 71 1HOV2      >      1.0    0.00000
NSTC 72 1HOV3+     >      1.0   -0.37904
* SEGMENT  2
NSTC 10 2GRND TOTAL>
NSTC 11 2AUTO      >      0.5    0.00000
NSTC 12 2TRANSIT   >      0.5    0.77237
NSTC 20 2TOTAL TRN >
NSTC 21 2WALK ACC  >      0.5    0.00000
NSTC 22 2PNR ACC   >      0.5   -2.56336
NSTC 23 2KNR ACC   >      0.5   -7.38113
NSTC 30 2WLK TRN
NSTC 31 2WLK CR    >      1.0   -0.04073
NSTC 32 2WLK BUS   >      1.0    0.75201
NSTC 33 2WLK BU/MR >      1.0   -0.40521
NSTC 34 2WLK METRO >      1.0    0.00000
NSTC 40 2PNR TRN
NSTC 41 2PNR CR    >      1.0   -2.94114
NSTC 42 2PNR BUS   >      1.0   -2.94114
NSTC 43 2PNR BU/MR >      1.0   -2.94114
NSTC 44 2PNR METRO >      1.0    0.00000
NSTC 50 2KNR TRN
NSTC 51 2KNR CR    >      1.0   -0.73863
NSTC 52 2KNR BUS   >      1.0   -0.73863
NSTC 53 2KNR BU/MR >      1.0   -0.73863
NSTC 54 2KNR METRO >      1.0    0.00000
NSTC 60 2AUTO
NSTC 61 2LOV       >      1.0    0.00000
NSTC 62 2HOV       >      0.5   -0.38749
NSTC 70 2HOV
NSTC 71 2HOV2      >      1.0    0.00000
NSTC 72 2HOV3+     >      1.0   -0.34208
* SEGMENT  3
NSTC 10 3GRND TOTAL>
NSTC 11 3AUTO      >      0.5    0.00000
NSTC 12 3TRANSIT   >      0.5   -0.77290
NSTC 20 3TOTAL TRN >
NSTC 21 3WALK ACC  >      0.5    0.00000
NSTC 22 3PNR ACC   >      0.5   -4.44306
NSTC 23 3KNR ACC   >      0.5   -6.60727
NSTC 30 3WLK TRN
NSTC 31 3WLK CR    >      1.0    0.90263
NSTC 32 3WLK BUS   >      1.0    1.30004
NSTC 33 3WLK BU/MR >      1.0   -0.16755
NSTC 34 3WLK METRO >      1.0    0.00000
NSTC 40 3PNR TRN
NSTC 41 3PNR CR    >      1.0   -0.60657
NSTC 42 3PNR BUS   >      1.0   -0.99101
NSTC 43 3PNR BU/MR >      1.0   -1.29883
NSTC 44 3PNR METRO >      1.0    0.00000
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NSTC 50 3KNR TRN
NSTC 51 3KNR CR    >      1.0    1.46327
NSTC 52 3KNR BUS   >      1.0    4.91237
NSTC 53 3KNR BU/MR >      1.0   -1.15265
NSTC 54 3KNR METRO >      1.0    0.00000
NSTC 60 3AUTO
NSTC 61 3LOV       >      1.0    0.00000
NSTC 62 3HOV       >      0.5   -0.56352
NSTC 70 3HOV
NSTC 71 3HOV2      >      1.0    0.00000
NSTC 72 3HOV3+     >      1.0   -0.28164
* SEGMENT  4
NSTC 10 4GRND TOTAL>
NSTC 11 4AUTO      >      0.5    0.00000
NSTC 12 4TRANSIT   >      0.5   -0.49879
NSTC 20 4TOTAL TRN >
NSTC 21 4WALK ACC  >      0.5    0.00000
NSTC 22 4PNR ACC   >      0.5   -5.12527
NSTC 23 4KNR ACC   >      0.5   -7.33072
NSTC 30 4WLK TRN
NSTC 31 4WLK CR    >      1.0   -3.11094
NSTC 32 4WLK BUS   >      1.0   -3.76621
NSTC 33 4WLK BU/MR >      1.0   -4.03529
NSTC 34 4WLK METRO >      1.0    0.00000
NSTC 40 4PNR TRN
NSTC 41 4PNR CR    >      1.0    1.18677
NSTC 42 4PNR BUS   >      1.0    3.97877
NSTC 43 4PNR BU/MR >      1.0   -4.46862
NSTC 44 4PNR METRO >      1.0    0.00000
NSTC 50 4KNR TRN
NSTC 51 4KNR CR    >      1.0    0.24789
NSTC 52 4KNR BUS   >      1.0    4.91450
NSTC 53 4KNR BU/MR >      1.0   -0.28098
NSTC 54 4KNR METRO >      1.0    0.00000
NSTC 60 4AUTO
NSTC 61 4LOV       >      1.0    0.00000
NSTC 62 4HOV       >      0.5   -0.49789
NSTC 70 4HOV
NSTC 71 4HOV2      >      1.0    0.00000
NSTC 72 4HOV3+     >      1.0   -0.25804
* SEGMENT  5
NSTC 10 5GRND TOTAL>
NSTC 11 5AUTO      >      0.5    0.00000
NSTC 12 5TRANSIT   >      0.5    1.33551
NSTC 20 5TOTAL TRN >
NSTC 21 5WALK ACC  >      0.5    0.00000
NSTC 22 5PNR ACC   >      0.5   -4.75625
NSTC 23 5KNR ACC   >      0.5   -6.60905
NSTC 30 5WLK TRN
NSTC 31 5WLK CR    >      1.0   -2.28925
NSTC 32 5WLK BUS   >      1.0   -8.88443
NSTC 33 5WLK BU/MR >      1.0   -6.60923
NSTC 34 5WLK METRO >      1.0    0.00000
NSTC 40 5PNR TRN
NSTC 41 5PNR CR    >      1.0    9.87202
NSTC 42 5PNR BUS   >      1.0   -1.34106
NSTC 43 5PNR BU/MR >      1.0   -1.32538
NSTC 44 5PNR METRO >      1.0    0.00000
NSTC 50 5KNR TRN
NSTC 51 5KNR CR    >      1.0    8.85153
NSTC 52 5KNR BUS   >      1.0   -1.32123
NSTC 53 5KNR BU/MR >      1.0   -1.32123
NSTC 54 5KNR METRO >      1.0    0.00000
NSTC 60 5AUTO
NSTC 61 5LOV       >      1.0    0.00000
NSTC 62 5HOV       >      0.5   -0.39416
NSTC 70 5HOV
NSTC 71 5HOV2      >      1.0    0.00000
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NSTC 72 5HOV3+     >      1.0   -0.30288
* SEGMENT  6
NSTC 10 6GRND TOTAL>
NSTC 11 6AUTO      >      0.5    0.00000
NSTC 12 6TRANSIT   >      0.5    5.44132
NSTC 20 6TOTAL TRN >
NSTC 21 6WALK ACC  >      0.5    0.00000
NSTC 22 6PNR ACC   >      0.5   -7.06091
NSTC 23 6KNR ACC   >      0.5   -8.13492
NSTC 30 6WLK TRN
NSTC 31 6WLK CR    >      1.0   -6.12311
NSTC 32 6WLK BUS   >      1.0   -6.12311
NSTC 33 6WLK BU/MR >      1.0  -11.68372
NSTC 34 6WLK METRO >      1.0    0.00000
NSTC 40 6PNR TRN
NSTC 41 6PNR CR    >      1.0   -0.43718
NSTC 42 6PNR BUS   >      1.0   -0.43718
NSTC 43 6PNR BU/MR >      1.0   -4.53572
NSTC 44 6PNR METRO >      1.0    0.00000
NSTC 50 6KNR TRN
NSTC 51 6KNR CR    >      1.0   -1.34446
NSTC 52 6KNR BUS   >      1.0   -1.34446
NSTC 53 6KNR BU/MR >      1.0   -1.34446
NSTC 54 6KNR METRO >      1.0    0.00000
NSTC 60 6AUTO
NSTC 61 6LOV       >      1.0    0.00000
NSTC 62 6HOV       >      0.5   -0.73428
NSTC 70 6HOV
NSTC 71 6HOV2      >      1.0    0.00000
NSTC 72 6HOV3+     >      1.0   -0.18723
* SEGMENT  7
NSTC 10 7GRND TOTAL>
NSTC 11 7AUTO      >      0.5    0.00000
NSTC 12 7TRANSIT   >      0.5   -1.76084
NSTC 20 7TOTAL TRN >
NSTC 21 7WALK ACC  >      0.5    0.00000
NSTC 22 7PNR ACC   >      0.5   -3.88464
NSTC 23 7KNR ACC   >      0.5   -5.11664
NSTC 30 7WLK TRN
NSTC 31 7WLK CR    >      1.0   -0.03172
NSTC 32 7WLK BUS   >      1.0    0.17155
NSTC 33 7WLK BU/MR >      1.0   -1.05050
NSTC 34 7WLK METRO >      1.0    0.00000
NSTC 40 7PNR TRN
NSTC 41 7PNR CR    >      1.0    5.88879
NSTC 42 7PNR BUS   >      1.0   -1.84942
NSTC 43 7PNR BU/MR >      1.0   -0.74501
NSTC 44 7PNR METRO >      1.0    0.00000
NSTC 50 7KNR TRN
NSTC 51 7KNR CR    >      1.0   -0.00433
NSTC 52 7KNR BUS   >      1.0    1.20014
NSTC 53 7KNR BU/MR >      1.0   -0.52264
NSTC 54 7KNR METRO >      1.0    0.00000
NSTC 60 7AUTO
NSTC 61 7LOV       >      1.0    0.00000
NSTC 62 7HOV       >      0.5   -0.74647
NSTC 70 7HOV
NSTC 71 7HOV2      >      1.0    0.00000
NSTC 72 7HOV3+     >      1.0   -0.29492
* SEGMENT  8
NSTC 10 8GRND TOTAL>
NSTC 11 8AUTO      >      0.5    0.00000
NSTC 12 8TRANSIT   >      0.5   -0.74187
NSTC 20 8TOTAL TRN >
NSTC 21 8WALK ACC  >      0.5    0.00000
NSTC 22 8PNR ACC   >      0.5   -6.94450
NSTC 23 8KNR ACC   >      0.5   -6.22825
NSTC 30 8WLK TRN
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NSTC 31 8WLK CR    >      1.0   -0.55355
NSTC 32 8WLK BUS   >      1.0   -0.39967
NSTC 33 8WLK BU/MR >      1.0   -1.74767
NSTC 34 8WLK METRO >      1.0    0.00000
NSTC 40 8PNR TRN
NSTC 41 8PNR CR    >      1.0    7.86359
NSTC 42 8PNR BUS   >      1.0    0.35570
NSTC 43 8PNR BU/MR >      1.0   -2.24548
NSTC 44 8PNR METRO >      1.0    0.00000
NSTC 50 8KNR TRN
NSTC 51 8KNR CR    >      1.0    3.49928
NSTC 52 8KNR BUS   >      1.0   10.00876
NSTC 53 8KNR BU/MR >      1.0    1.14870
NSTC 54 8KNR METRO >      1.0    0.00000
NSTC 60 8AUTO
NSTC 61 8LOV       >      1.0    0.00000
NSTC 62 8HOV       >      0.5   -0.20953
NSTC 70 8HOV
NSTC 71 8HOV2      >      1.0    0.00000
NSTC 72 8HOV3+     >      1.0   -0.29012
* SEGMENT  9
NSTC 10 9GRND TOTAL>
NSTC 11 9AUTO      >      0.5    0.00000
NSTC 12 9TRANSIT   >      0.5    0.95940
NSTC 20 9TOTAL TRN >
NSTC 21 9WALK ACC  >      0.5    0.00000
NSTC 22 9PNR ACC   >      0.5   -3.89509
NSTC 23 9KNR ACC   >      0.5   -7.58989
NSTC 30 9WLK TRN
NSTC 31 9WLK CR    >      1.0   -1.75324
NSTC 32 9WLK BUS   >      1.0   -8.05930
NSTC 33 9WLK BU/MR >      1.0   -6.93612
NSTC 34 9WLK METRO >      1.0    0.00000
NSTC 40 9PNR TRN
NSTC 41 9PNR CR    >      1.0    1.62724
NSTC 42 9PNR BUS   >      1.0    1.62724
NSTC 43 9PNR BU/MR >      1.0   -2.50349
NSTC 44 9PNR METRO >      1.0    0.00000
NSTC 50 9KNR TRN
NSTC 51 9KNR CR    >      1.0    0.58150
NSTC 52 9KNR BUS   >      1.0    0.58150
NSTC 53 9KNR BU/MR >      1.0    1.68799
NSTC 54 9KNR METRO >      1.0    0.00000
NSTC 60 9AUTO
NSTC 61 9LOV       >      1.0    0.00000
NSTC 62 9HOV       >      0.5   -0.36013
NSTC 70 9HOV
NSTC 71 9HOV2      >      1.0    0.00000
NSTC 72 9HOV3+     >      1.0   -0.37227
* SEGMENT 10
NSTC 1010GRND TOTAL>
NSTC 1110AUTO      >      0.5    0.00000
NSTC 1210TRANSIT   >      0.5   -0.23216
NSTC 2010TOTAL TRN >
NSTC 2110WALK ACC  >      0.5    0.00000
NSTC 2210PNR ACC   >      0.5   -4.51637
NSTC 2310KNR ACC   >      0.5   -7.91743
NSTC 3010WLK TRN
NSTC 3110WLK CR    >      1.0   -1.84875
NSTC 3210WLK BUS   >      1.0  -12.57786
NSTC 3310WLK BU/MR >      1.0   -2.11553
NSTC 3410WLK METRO >      1.0    0.00000
NSTC 4010PNR TRN
NSTC 4110PNR CR    >      1.0    2.38740
NSTC 4210PNR BUS   >      1.0    2.44461
NSTC 4310PNR BU/MR >      1.0    2.38740
NSTC 4410PNR METRO >      1.0    0.00000
NSTC 5010KNR TRN
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NSTC 5110KNR CR    >      1.0   -0.34905
NSTC 5210KNR BUS   >      1.0   -0.34905
NSTC 5310KNR BU/MR >      1.0   -0.34905
NSTC 5410KNR METRO >      1.0    0.00000
NSTC 6010AUTO
NSTC 6110LOV       >      1.0    0.00000
NSTC 6210HOV       >      0.5   -0.85738
NSTC 7010HOV
NSTC 7110HOV2      >      1.0    0.00000
NSTC 7210HOV3+     >      1.0   -0.43679
* SEGMENT 11
NSTC 1011GRND TOTAL>
NSTC 1111AUTO      >      0.5    0.00000
NSTC 1211TRANSIT   >      0.5   -1.76847
NSTC 2011TOTAL TRN >
NSTC 2111WALK ACC  >      0.5    0.00000
NSTC 2211PNR ACC   >      0.5   -5.54658
NSTC 2311KNR ACC   >      0.5   -6.78955
NSTC 3011WLK TRN
NSTC 3111WLK CR    >      1.0   -0.01859
NSTC 3211WLK BUS   >      1.0    0.30518
NSTC 3311WLK BU/MR >      1.0   -1.54357
NSTC 3411WLK METRO >      1.0    0.00000
NSTC 4011PNR TRN
NSTC 4111PNR CR    >      1.0   -3.22593
NSTC 4211PNR BUS   >      1.0   -3.22593
NSTC 4311PNR BU/MR >      1.0   -1.07299
NSTC 4411PNR METRO >      1.0    0.00000
NSTC 5011KNR TRN
NSTC 5111KNR CR    >      1.0   -4.53601
NSTC 5211KNR BUS   >      1.0   -4.53601
NSTC 5311KNR BU/MR >      1.0   -4.53601
NSTC 5411KNR METRO >      1.0    0.00000
NSTC 6011AUTO
NSTC 6111LOV       >      1.0    0.00000
NSTC 6211HOV       >      0.5   -0.84133
NSTC 7011HOV
NSTC 7111HOV2      >      1.0    0.00000
NSTC 7211HOV3+     >      1.0   -0.32930
* SEGMENT 12
NSTC 1012GRND TOTAL>
NSTC 1112AUTO      >      0.5    0.00000
NSTC 1212TRANSIT   >      0.5   -0.79806
NSTC 2012TOTAL TRN >
NSTC 2112WALK ACC  >      0.5    0.00000
NSTC 2212PNR ACC   >      0.5   -3.53072
NSTC 2312KNR ACC   >      0.5   -5.88824
NSTC 3012WLK TRN
NSTC 3112WLK CR    >      1.0   -3.07597
NSTC 3212WLK BUS   >      1.0   -3.29824
NSTC 3312WLK BU/MR >      1.0   -3.46676
NSTC 3412WLK METRO >      1.0    0.00000
NSTC 4012PNR TRN
NSTC 4112PNR CR    >      1.0  -10.46738
NSTC 4212PNR BUS   >      1.0  -10.46738
NSTC 4312PNR BU/MR >      1.0  -10.46738
NSTC 4412PNR METRO >      1.0    0.00000
NSTC 5012KNR TRN
NSTC 5112KNR CR    >      1.0   -7.01316
NSTC 5212KNR BUS   >      1.0   -7.01316
NSTC 5312KNR BU/MR >      1.0   -6.85275
NSTC 5412KNR METRO >      1.0    0.00000
NSTC 6012AUTO
NSTC 6112LOV       >      1.0    0.00000
NSTC 6212HOV       >      0.5   -0.24683
NSTC 7012HOV
NSTC 7112HOV2      >      1.0    0.00000
NSTC 7212HOV3+     >      1.0   -0.31408
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* SEGMENT 13
NSTC 1013GRND TOTAL>
NSTC 1113AUTO      >      0.5    0.00000
NSTC 1213TRANSIT   >      0.5   -0.00988
NSTC 2013TOTAL TRN >
NSTC 2113WALK ACC  >      0.5    0.00000
NSTC 2213PNR ACC   >      0.5   -1.24898
NSTC 2313KNR ACC   >      0.5   -2.81950
NSTC 3013WLK TRN
NSTC 3113WLK CR    >      1.0    7.49850
NSTC 3213WLK BUS   >      1.0   -0.15809
NSTC 3313WLK BU/MR >      1.0   -1.87253
NSTC 3413WLK METRO >      1.0    0.00000
NSTC 4013PNR TRN
NSTC 4113PNR CR    >      1.0    3.29096
NSTC 4213PNR BUS   >      1.0    4.45289
NSTC 4313PNR BU/MR >      1.0   -0.69470
NSTC 4413PNR METRO >      1.0    0.00000
NSTC 5013KNR TRN
NSTC 5113KNR CR    >      1.0    0.93318
NSTC 5213KNR BUS   >      1.0    1.77211
NSTC 5313KNR BU/MR >      1.0    0.72311
NSTC 5413KNR METRO >      1.0    0.00000
NSTC 6013AUTO
NSTC 6113LOV       >      1.0    0.00000
NSTC 6213HOV       >      0.5   -0.50813
NSTC 7013HOV
NSTC 7113HOV2      >      1.0    0.00000
NSTC 7213HOV3+     >      1.0   -0.31744
* SEGMENT 14
NSTC 1014GRND TOTAL>
NSTC 1114AUTO      >      0.5    0.00000
NSTC 1214TRANSIT   >      0.5    1.13846
NSTC 2014TOTAL TRN >
NSTC 2114WALK ACC  >      0.5    0.00000
NSTC 2214PNR ACC   >      0.5   -3.11797
NSTC 2314KNR ACC   >      0.5   -3.51495
NSTC 3014WLK TRN
NSTC 3114WLK CR    >      1.0   -2.18843
NSTC 3214WLK BUS   >      1.0   -2.10675
NSTC 3314WLK BU/MR >      1.0   -3.52860
NSTC 3414WLK METRO >      1.0    0.00000
NSTC 4014PNR TRN
NSTC 4114PNR CR    >      1.0   -0.22368
NSTC 4214PNR BUS   >      1.0   -0.22368
NSTC 4314PNR BU/MR >      1.0    0.05057
NSTC 4414PNR METRO >      1.0    0.00000
NSTC 5014KNR TRN
NSTC 5114KNR CR    >      1.0   -0.35500
NSTC 5214KNR BUS   >      1.0   -0.35500
NSTC 5314KNR BU/MR >      1.0    1.12854
NSTC 5414KNR METRO >      1.0    0.00000
NSTC 6014AUTO
NSTC 6114LOV       >      1.0    0.00000
NSTC 6214HOV       >      0.5   -0.68048
NSTC 7014HOV
NSTC 7114HOV2      >      1.0    0.00000
NSTC 7214HOV3+     >      1.0   -0.33082
* SEGMENT 15
NSTC 1015GRND TOTAL>
NSTC 1115AUTO      >      0.5    0.00000
NSTC 1215TRANSIT   >      0.5   -1.26964
NSTC 2015TOTAL TRN >
NSTC 2115WALK ACC  >      0.5    0.00000
NSTC 2215PNR ACC   >      0.5   -3.22463
NSTC 2315KNR ACC   >      0.5   -3.81022
NSTC 3015WLK TRN
NSTC 3115WLK CR    >      1.0   -1.93619
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NSTC 3215WLK BUS   >      1.0    1.56180
NSTC 3315WLK BU/MR >      1.0   -0.29936
NSTC 3415WLK METRO >      1.0    0.00000
NSTC 4015PNR TRN
NSTC 4115PNR CR    >      1.0    1.55563
NSTC 4215PNR BUS   >      1.0    4.22018
NSTC 4315PNR BU/MR >      1.0   -1.85991
NSTC 4415PNR METRO >      1.0    0.00000
NSTC 5015KNR TRN
NSTC 5115KNR CR    >      1.0   -2.65062
NSTC 5215KNR BUS   >      1.0    1.57763
NSTC 5315KNR BU/MR >      1.0    1.17444
NSTC 5415KNR METRO >      1.0    0.00000
NSTC 6015AUTO
NSTC 6115LOV       >      1.0    0.00000
NSTC 6215HOV       >      0.5   -0.25108
NSTC 7015HOV
NSTC 7115HOV2      >      1.0    0.00000
NSTC 7215HOV3+     >      1.0   -0.29928
* SEGMENT 16
NSTC 1016GRND TOTAL>
NSTC 1116AUTO      >      0.5    0.00000
NSTC 1216TRANSIT   >      0.5   -1.93594
NSTC 2016TOTAL TRN >
NSTC 2116WALK ACC  >      0.5    0.00000
NSTC 2216PNR ACC   >      0.5  -17.75603
NSTC 2316KNR ACC   >      0.5   -8.70739
NSTC 3016WLK TRN
NSTC 3116WLK CR    >      1.0  -31.03921
NSTC 3216WLK BUS   >      1.0    2.82237
NSTC 3316WLK BU/MR >      1.0   -3.27216
NSTC 3416WLK METRO >      1.0    0.00000
NSTC 4016PNR TRN
NSTC 4116PNR CR    >      1.0  -73.22476
NSTC 4216PNR BUS   >      1.0   10.21793
NSTC 4316PNR BU/MR >      1.0  -76.57317
NSTC 4416PNR METRO >      1.0    0.00000
NSTC 5016KNR TRN
NSTC 5116KNR CR    >      1.0  -94.75598
NSTC 5216KNR BUS   >      1.0   -5.15726
NSTC 5316KNR BU/MR >      1.0  -45.52928
NSTC 5416KNR METRO >      1.0    0.00000
NSTC 6016AUTO
NSTC 6116LOV       >      1.0    0.00000
NSTC 6216HOV       >      0.5   -0.85396
NSTC 7016HOV
NSTC 7116HOV2      >      1.0    0.00000
NSTC 7216HOV3+     >      1.0   -0.26874
* SEGMENT 17
NSTC 1017GRND TOTAL>
NSTC 1117AUTO      >      0.5    0.00000
NSTC 1217TRANSIT   >      0.5    0.61961
NSTC 2017TOTAL TRN >
NSTC 2117WALK ACC  >      0.5    0.00000
NSTC 2217PNR ACC   >      0.5   -2.15019
NSTC 2317KNR ACC   >      0.5   -3.68103
NSTC 3017WLK TRN
NSTC 3117WLK CR    >      1.0    2.90493
NSTC 3217WLK BUS   >      1.0   -5.67278
NSTC 3317WLK BU/MR >      1.0   -4.33947
NSTC 3417WLK METRO >      1.0    0.00000
NSTC 4017PNR TRN
NSTC 4117PNR CR    >      1.0    5.23842
NSTC 4217PNR BUS   >      1.0    1.17273
NSTC 4317PNR BU/MR >      1.0   -0.50595
NSTC 4417PNR METRO >      1.0    0.00000
NSTC 5017KNR TRN
NSTC 5117KNR CR    >      1.0    2.39692
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NSTC 5217KNR BUS   >      1.0   -2.83697
NSTC 5317KNR BU/MR >      1.0   -0.06014
NSTC 5417KNR METRO >      1.0    0.00000
NSTC 6017AUTO
NSTC 6117LOV       >      1.0    0.00000
NSTC 6217HOV       >      0.5   -0.69809
NSTC 7017HOV
NSTC 7117HOV2      >      1.0    0.00000
NSTC 7217HOV3+     >      1.0   -0.31454
* SEGMENT 18
NSTC 1018GRND TOTAL>
NSTC 1118AUTO      >      0.5    0.00000
NSTC 1218TRANSIT   >      0.5    0.51823
NSTC 2018TOTAL TRN >
NSTC 2118WALK ACC  >      0.5    0.00000
NSTC 2218PNR ACC   >      0.5   -3.93004
NSTC 2318KNR ACC   >      0.5   -5.26911
NSTC 3018WLK TRN
NSTC 3118WLK CR    >      1.0    1.18372
NSTC 3218WLK BUS   >      1.0   -5.17858
NSTC 3318WLK BU/MR >      1.0   -5.69283
NSTC 3418WLK METRO >      1.0    0.00000
NSTC 4018PNR TRN
NSTC 4118PNR CR    >      1.0    6.30064
NSTC 4218PNR BUS   >      1.0   -1.36529
NSTC 4318PNR BU/MR >      1.0   -0.95378
NSTC 4418PNR METRO >      1.0    0.00000
NSTC 5018KNR TRN
NSTC 5118KNR CR    >      1.0    3.15224
NSTC 5218KNR BUS   >      1.0   -1.88804
NSTC 5318KNR BU/MR >      1.0   -1.88804
NSTC 5418KNR METRO >      1.0    0.00000
NSTC 6018AUTO
NSTC 6118LOV       >      1.0    0.00000
NSTC 6218HOV       >      0.5   -0.36537
NSTC 7018HOV
NSTC 7118HOV2      >      1.0    0.00000
NSTC 7218HOV3+     >      1.0   -0.40377
* SEGMENT 19
NSTC 1019GRND TOTAL>
NSTC 1119AUTO      >      0.5    0.00000
NSTC 1219TRANSIT   >      0.5   -1.61704
NSTC 2019TOTAL TRN >
NSTC 2119WALK ACC  >      0.5    0.00000
NSTC 2219PNR ACC   >      0.5   -3.37083
NSTC 2319KNR ACC   >      0.5   -5.08594
NSTC 3019WLK TRN
NSTC 3119WLK CR    >      1.0   -1.24602
NSTC 3219WLK BUS   >      1.0    0.06936
NSTC 3319WLK BU/MR >      1.0   -2.35899
NSTC 3419WLK METRO >      1.0    0.00000
NSTC 4019PNR TRN
NSTC 4119PNR CR    >      1.0    3.32749
NSTC 4219PNR BUS   >      1.0   -7.79552
NSTC 4319PNR BU/MR >      1.0   -6.48023
NSTC 4419PNR METRO >      1.0    0.00000
NSTC 5019KNR TRN
NSTC 5119KNR CR    >      1.0    0.99560
NSTC 5219KNR BUS   >      1.0   -7.58583
NSTC 5319KNR BU/MR >      1.0   -2.44835
NSTC 5419KNR METRO >      1.0    0.00000
NSTC 6019AUTO
NSTC 6119LOV       >      1.0    0.00000
NSTC 6219HOV       >      0.5   -0.32995
NSTC 7019HOV
NSTC 7119HOV2      >      1.0    0.00000
NSTC 7219HOV3+     >      1.0   -0.31944
* SEGMENT 20
```

```
NSTC 1020GRND TOTAL>
NSTC 1120AUTO      >      0.5    0.00000
NSTC 1220TRANSIT   >      0.5   -2.75465
NSTC 2020TOTAL TRN >
NSTC 2120WALK ACC  >      0.5    0.00000
NSTC 2220PNR ACC   >      0.5  -47.94681
NSTC 2320KNR ACC   >      0.5  -40.81674
NSTC 3020WLK TRN
NSTC 3120WLK CR    >      1.0  -96.85074
NSTC 3220WLK BUS   >      1.0  -23.15593
NSTC 3320WLK BU/MR >      1.0  -45.62245
NSTC 3420WLK METRO >      1.0    0.00000
NSTC 4020PNR TRN
NSTC 4120PNR CR    >      1.0  -90.96449
NSTC 4220PNR BUS   >      1.0  -63.88709
NSTC 4320PNR BU/MR >      1.0  -62.75750
NSTC 4420PNR METRO >      1.0    0.00000
NSTC 5020KNR TRN
NSTC 5120KNR CR    >      1.0 -108.30590
NSTC 5220KNR BUS   >      1.0  -41.21114
NSTC 5320KNR BU/MR >      1.0  -47.86386
NSTC 5420KNR METRO >      1.0    0.00000
NSTC 6020AUTO
NSTC 6120LOV       >      1.0    0.00000
NSTC 6220HOV       >      0.5   -0.70356
NSTC 7020HOV
NSTC 7120HOV2      >      1.0    0.00000
NSTC 7220HOV3+     >      1.0   -0.26848

*DOWNTOWN=8
*SELI               >         8

*UNION STATION=64
*SELI               >        64

* =122
*SELI               >       122

*BETHESDA=345
*SELI               >       345

*SILVER SPRING=362
*SELI               >       362

*N.SILVER SPRING=464
*SELI               >       464

* =475
*SELI               >       475

*SHADY GROVE RD=578
*SELI               >       578

* =787
*SELI               >       787

*ANDREWS AFB=829
*SELI               >       829

*NEW CARROLTON=927
*SELI               >       927

*BRISTOL=972
*SELI               >       972

*FREDERICK=1043
*SELI               >      1043
```

```
*JESSUP=1080
*SELI               >      1080

*SCAGGSVILLE=1091
*SELI               >      1091

*WALDORF=1216
*SELI               >      1216

*PENTAGON=1231
*SELI               >      1231

*ROSSLYN=1236
*SELI               >      1236

*ALEXANDRIA=1337
*SELI               >      1337

* =1455
*SELI               >      1455

*SPRINGFIELD=1502
*SELI               >      1502

*  =1511
*SELI               >      1511

*TYSONS CRNR=1537
*SELI               >      1537

*FT BELVOIR=1554
*SELI               >      1554

*VIENNA=1619
*SELI               >      1619

*DULES AP=1698
*SELI               >      1698

*RESTON=1716
*SELI               >      1716

*LEESBURG=1842
*SELI               >      1842

*BRUNSWICK=1863
*SELI               >      1863

*DALE CITY=1942
*SELI               >      1942

*MANASSAS=1967
*SELI               >      1967

*SPOTSYLVANIA=2110
*SELI               >      2110

* =2055
*SELI               >      2055

*SELJ               >         8
*SELJ               >        63
*SELJ               >        64
*SELJ               >        77
*SELJ               >       100
*SELJ               >       344
*SELJ               >       345
*SELJ               >       362
```

```
*SELJ               >      1231
*SELJ               >      1236
*SELJ               >      1265
*SELJ               >      1337
*SELJ               >      1537
*SELI               >  523
*SELJ               >    9

TRACE              >         0
* OUTPUT %           >
*PROCSEL            >
PRINT MS           >HBO_NL_MC.PRN
INPUT PRINT FILE   >HBO_NL_MC.PRN
INPUT GOALS        >HBO_NL_MC.GOL
INFILE 1           >HBO_INCOME.PTT
INFILE 2           >HWYOP.SKM
INFILE 3           >TRNOP_CR.SKM
INFILE 4           >TRNOP_AB.SKM
INFILE 5           >TRNOP_MR.SKM
INFILE 6           >TRNOP_BM.SKM
ZINFILE 8          >ZONEV2.A2F
OUTFILE 9          >HBO_NL_MC.MTT

* FTA USER BENEFITS SPECIFICATIONS
*FTA RESULTS FILE   >HBO_NL_MC.BEN
FTA TRANSIT COEFF  >-0.02322
FTA AUTO COEFF     >-0.02322
FTA PURPOSE NAME   >HBO
FTA PERIOD NAME    >ALLDAY
FTA ALTER. NAME    >CALIB
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
FTA AUTO NEST      >         1         1
FTA MOTORIZED?    1>Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
FTA TRANSIT?      1>                              Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
```

6 hbs_nl_mc.ctl

```
HBS OP NESTED LOGIT MC - #DATE:  5/08/2008 #VER:  21
CHOICE            1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
*
*
*LOGIT COEFFICIENTS BY CHOICE FOR EACH SKIM (NO INPUT SKIM IS
*EQUIVALENT TO A CONSTANT)
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
COEF01:IVTT       1>-0.02168  -0.02168  -0.02168  -0.02168  -0.02168  -0.02168  -0.02168  -0.02168  -0.02168  -0.02168  -0.02168  -0.02168  -0.02168  -0.02168  -0.02168
SKIM01:IVTT       1>DAIV      S2IV      S3IV      WCIV      WBIV      WTIV      WMIV      PCIV      KCIV      PBIV      KBIV      PTIV      KTIV      PMIV      KMIV
COEF02:AUTO ACC   1>                                                                      -0.03252  -0.03252  -0.03252  -0.03252  -0.03252  -0.03252  -0.03252  -0.03252
SKIM02:AUTO ACC   1>                                                                      PCAA      KCAA      PBAA      KBAA      PTAA      KTAA      PMAA      KMAA
COEF03:TERM/OVTT  1>-0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420
SKIM03:TERM/OVTT  1>DATE      S2TE      S3TE      WCOV      WBOV      WTOV      WMOV      PCOV      KCOV      PBOV      KBOV      PTOV      KTOV      PMOV      KMOV
* LIMIT COEF 04 TO PURPOSE 1
COEF PURP04        >1
COEF04:COST INC1  1>-0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202  -0.00202
SKIM04:COST INC1  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
* LIMIT COEF 05 TO PURPOSE 2
COEF PURP05        >2
COEF05:COST INC2  1>-0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101  -0.00101
SKIM05:COST INC2  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
* LIMIT COEF 06 TO PURPOSE 3
COEF PURP06        >3
COEF06:COST INC3  1>-0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067  -0.00067
SKIM06:COST INC3  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
COEF PURP07        >4
* LIMIT COEF 07 TO PURPOSE 4
COEF07:COST INC4  1>-0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051  -0.00051
```

```
SKIM07:COST INC4  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
COEF08:TRN XFERS  1>                              -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000
SKIM08:TRN XFERS  1>                              WCXF      WBXF      WTXF      WMXF      PCXF      KCXF      PBXF      KBXF      PTXF      KTXF      PMXF      KMXF
COEF09:TRN BRDPEN 1>                              -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420  -0.05420
SKIM09:TRN BRDPEN 1>                              WCXP      WBXP      WTXP      WMXP      PCXP      KCXP      PBXP      KBXP      PTXP      KTXP      PMXP      KMXP
*WALK WEIGHT
COEF10:TRN WLKWT  1>                              -0.04336  -0.04336  -0.04336  -0.04336  -0.04336  -0.04336  -0.04336  -0.04336  -0.04336  -0.04336  -0.04336  -0.04336
SKIM10:TRN WLKWT  1>                              WCWK      WBWK      WTWK      WMWK      PCWK      KCWK      PBWK      KBWK      PTWK      KTWK      PMWK      KMWK

*SYNTAX TO LIMIT UTILITY ELEMENT TO A PARTICULAR WALK SEGMENT IN THIS EXAMPLE
*    COEF 18 APPLIES ONLY TO WALK SEGMENT 1
*COEF WLKSEG18      >1

* ASSUMED MATRIX ORGANIZATION
* FILE 1 TRIP TABLE (SEPARATE FOR EACH PURPOSE)
* 1 INCOME 1 (HOME-BASED)/ALL NHB TRIPS
* 2 INCOME 2 (HOME-BASED)
* 3 INCOME 3 (HOME-BASED)
* 4 INCOME 4 (HOME-BASED)
*
* FILE 2 HIGHWAY SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* 1 SOV   TIME (MIN)
* 2 SOV   DIST (0.1 MILES)
* 3 SOV   TOLL (1994 CENTS)
* 4 HOV2  TIME (MIN)
* 5 HOV2  DIST (0.1 MILES)
* 6 HOV2  TOLL (1994 CENTS)
* 7 HOV3+ TIME (MIN)
* 8 HOV3+ DIST (0.1 MILES)
* 9 HOV3+ TOLL (1994 CENTS)
*
* FILE 3=COM. RAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 4=BUS SKIMS       (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 5=METRORAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 6=BUS+METRORAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
*  1 WLK ACC/EGR (.01 MIN)  15 PNR ACC/EGR (.01 MIN)  33 KNR ACC/EGR  (.01 MIN)
*  2 WLK OTHER   (.01 MIN)  16 PNR OTHER   (.01 MIN)  34 KNR OTHER   (.01 MIN)
*  3 WLK IWAIT   (.01 MIN)  17 PNR IWAIT   (.01 MIN)  35 KNR IWAIT   (.01 MIN)
*  4 WLK XWAIT   (.01 MIN)  18 PNR XWAIT   (.01 MIN)  36 KNR XWAIT   (.01 MIN)
*  5 WLK IVTT TOT(.01 MIN)  19 PNR IVTT TOT(.01 MIN)  37 KNR IVTT TOT(.01 MIN)
*  6 WLK IVTT CR (.01 MIN)  20 PNR IVTT CR (.01 MIN)  38 KNR IVTT CR (.01 MIN)
*  7 WLK IVTT XB (.01 MIN)  21 PNR IVTT XB (.01 MIN)  39 KNR IVTT XB (.01 MIN)
*  8 WLK IVTT MR (.01 MIN)  22 PNR IVTT MR (.01 MIN)  40 KNR IVTT MR (.01 MIN)
*  9 WLK IVTT NM (.01 MIN)  23 PNR IVTT NM (.01 MIN)  41 KNR IVTT NM (.01 MIN)
* 10 WLK IVTT NM2(.01 MIN)  24 PNR IVTT NM2(.01 MIN)  42 KNR IVTT NM2(.01 MIN)
* 11 WLK IVTT LB (.01 MIN)  25 PNR IVTT LB (.01 MIN)  43 KNR IVTT LB (.01 MIN)
* 12 WLK #XFERS  (NUMBER )  26 PNR #XFERS  (NUMBER )  44 KNR #XFERS  (NUMBER )
* 13 WLK COST    (94CENTS)  27 PNR COST    (94CENTS)  45 KNR COST    (94CENTS)
* 14 WLK XPEN    (.01 MIN)  28 PNR XPEN    (.01 MIN)  46 KNR XPEN    (.01 MIN)
*                           29 PNR ACC TIME(.01 MIN)  47 KNR ACC TIME(.01 MIN)
*                           30 PNR ACC DIST(.01 MIL)  48 KNR ACC DIST(.01 MIL)
*                           31 PNR ACC COST(94CENTS)
*                           32 PNR STA TERM(.01 MIN)
*
* FILE 8=ZDATA
*  1 HBW PARK COST (1994 CENTS)
*  2 HBS PARK COST (1994 CENTS)
*  3 HBO PARK COST (1994 CENTS)
*  4 NHB PARK COST (1994 CENTS)
*  5 TERMINAL TIME (HOME BASED) (MINUTES)
*  6 TERMINAL TIME (NON HOME BASED) (MINUTES)
*  7 ARC VIEW SHORT WALK PERCENT TO METRO
*  8 ARC VIEW LONG WALK PERCENT TO METRO
*  9 ARC VIEW SHORT WALK PERCENT TO ALL AM PK TRANSIT
* 10 ARC VIEW LONG WALK PERCENT TO ALL AM PK TRANSIT
* 11 ARC VIEW SHORT WALK PERCENT TO ALL OP TRANSIT
* 12 ARC VIEW LONG WALK PERCENT TO ALL OP TRANSIT
* 13 AREA TYPE
```

```
*    1=DC CORE
*    2=VA CORE
*    3=DC URBAN
*    4=MD URBAN
*    5=VA URBAN
*    6=MD OTHER
*    7=VA OTHER


* PARAMETERS
*=======================================================
* AUTO OPERATING COSTS IN CENTS/mile
COMPUTE AUOP       >10
* AUTO OCCUPANCY FOR 3+  Reduced from 3.5 to 3.25 on 3/1/07 rm
COMPUTE OCC3       >3.25

* TERMINAL TIMES, USE i/j805 FOR HBW, HBS, AND HBO. USE i/j806 FOR NHB
* HBW/HBS/HBO
COMPUTE TERI       >i805
COMPUTE TERJ       >j805
* NHB
*COMPUTE TERI       >i806
*COMPUTE TERJ       >j806

* PARK COSTS, USE i/j801 802 803 804 FOR HBW, HBS, HBO, NHB RESPECTIVELY
* HBW
*COMPUTE PRKC       >j801/2.
* HBS
COMPUTE PRKC       >j802/2.
* HBO
* COMPUTE PRKC       >j803/2.
* NHB
* COMPUTE PRKC       >j804

* Percent of productions in long-walk area that are assumed to walk = 25% (i.e., 75% drive)
COMPUTE PCLM       >0.25
COMPUTE PCLT       >0.25
* PERCENT WALKS-METRORAIL ONLY
COMPUTE PCMI       >(i807+PCLM*(i808-i807))/100.
COMPUTE PCMJ       >(j807+PCLM*(j808-j807))/100.
* PERCENT WALKS-PEAK
*COMPUTE PCTI       >(i809+PCLT*(i810-i809))/100.
*COMPUTE PCTJ       >(j809+PCLT*(j810-j809))/100.
* PERCENT WALKS-OFFPEAK
COMPUTE PCTI       >(i811+PCLT*(i812-i811))/100.
COMPUTE PCTJ       >(j811+PCLT*(j812-j811))/100.
COMPUTE PCMI       >MAX(PCMI,0)
COMPUTE PCMI       >MIN(PCMI,1)
COMPUTE PCMJ       >MAX(PCMJ,0)
COMPUTE PCMJ       >MIN(PCMJ,1)
COMPUTE PCTI       >MAX(PCTI,PCMI)
COMPUTE PCTI       >MIN(PCTI,1)
COMPUTE PCTJ       >MAX(PCTJ,PCMJ)
COMPUTE PCTJ       >MIN(PCTJ,1)
*
* DO TRIP SUBDIVISIONS
*
*  HOME BASED ALTERNATIVES
COMPUTE TRP1       >m101
COMPUTE TRP2       >m102
COMPUTE TRP3       >m103
COMPUTE TRP4       >m104
* NON-HOME BASED
*COMPUTE TRP1       >0.25*m101
*COMPUTE TRP2       >0.25*m101
*COMPUTE TRP3       >0.25*m101
*COMPUTE TRP4       >0.25*m101
*
```

```
* BE SURE TO UPDATE THE IVTT COEFFICIENT IN FTA SECTION FOR EACH PURPOSE
*
*=======================================================
*INITIALIZING ALL VARIABLES WITHIN IF STATEMENTS TO ZERO
COMPUTE DAIV       >0
COMPUTE DACS       >0
COMPUTE DATE       >0
COMPUTE S2IV       >0
COMPUTE S2CS       >0
COMPUTE S2TE       >0
COMPUTE S3IV       >0
COMPUTE S3CS       >0
COMPUTE S3TE       >0
COMPUTE WKIV       >0
COMPUTE WKOV       >0
COMPUTE WKXF       >0
COMPUTE WKCS       >0
COMPUTE WKXP       >0
COMPUTE WBIV       >0
COMPUTE WBOV       >0
COMPUTE WBXF       >0
COMPUTE WBCS       >0
COMPUTE WBXP       >0
COMPUTE WTIV       >0
COMPUTE WTOV       >0
COMPUTE WTXF       >0
COMPUTE WTCS       >0
COMPUTE WTXP       >0
COMPUTE WMIV       >0
COMPUTE WMOV       >0
COMPUTE WMXF       >0
COMPUTE WMCS       >0
COMPUTE WMXP       >0
COMPUTE PCIV       >0
COMPUTE PCAA       >0
COMPUTE PCOV       >0
COMPUTE PCXF       >0
COMPUTE PCCS       >0
COMPUTE PCXP       >0
COMPUTE PBIV       >0
COMPUTE PBAA       >0
COMPUTE PBOV       >0
COMPUTE PBXF       >0
COMPUTE PBCS       >0
COMPUTE PBXP       >0
COMPUTE PTIV       >0
COMPUTE PTAA       >0
COMPUTE PTOV       >0
COMPUTE PTXF       >0
COMPUTE PTCS       >0
COMPUTE PTXP       >0
COMPUTE PMIV       >0
COMPUTE PMAA       >0
COMPUTE PMOV       >0
COMPUTE PMXF       >0
COMPUTE PMCS       >0
COMPUTE PMXP       >0
COMPUTE KCIV       >0
COMPUTE KCAA       >0
COMPUTE KCOV       >0
COMPUTE KCXF       >0
COMPUTE KCCS       >0
COMPUTE KCXP       >0
COMPUTE KBIV       >0
COMPUTE KBAA       >0
COMPUTE KBOV       >0
COMPUTE KBXF       >0
COMPUTE KBCS       >0
```

```
COMPUTE KBXP       >0
COMPUTE KTIV       >0
COMPUTE KTAA       >0
COMPUTE KTOV       >0
COMPUTE KTXF       >0
COMPUTE KTCS       >0
COMPUTE KTXP       >0
COMPUTE KMIV       >0
COMPUTE KMAA       >0
COMPUTE KMOV       >0
COMPUTE KMXF       >0
COMPUTE KMCS       >0
COMPUTE KMXP       >0

COMPUTE WCWK       >0
COMPUTE WBWK       >0
COMPUTE WTWK       >0
COMPUTE WMWK       >0
COMPUTE PCWK       >0
COMPUTE KCWK       >0
COMPUTE PBWK       >0
COMPUTE KBWK       >0
COMPUTE PTWK       >0
COMPUTE KTWK       >0
COMPUTE PMWK       >0
COMPUTE KMWK       >0

* SKIM VALUES, Divide distances by 10 to convert tenths of miles to whole miles
* DRIVE ALONE
COMPUTE            >IF(m201>0)
COMPUTE DAIV       >m201
COMPUTE DACS       >m202/10*AUOP+m203+PRKC
COMPUTE DATE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 2
COMPUTE            >IF(m204>0)
COMPUTE S2IV       >m204
COMPUTE S2CS       >(m205/10*AUOP+m206+PRKC)/2.0
COMPUTE S2TE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 3
COMPUTE            >IF(m207>0)
COMPUTE S3IV       >m207
COMPUTE S3CS       >(m208/10*AUOP+m209+PRKC)/OCC3
COMPUTE S3TE       >TERI+TERJ
COMPUTE            >ENDIF

* Assign Intrazonal trips to Autos (mj11/04/05)
COMPUTE            >IF(P()=Q())
COMPUTE DAIV       >1
COMPUTE DACS       >m202/10*AUOP+m203+PRKC
COMPUTE DATE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 2
COMPUTE            >IF(P()=Q())
COMPUTE S2IV       >1
COMPUTE S2CS       >(m205/10*AUOP+m206+PRKC)/2.0
COMPUTE S2TE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 3
COMPUTE            >IF(P()=Q())
COMPUTE S3IV       >1
COMPUTE S3CS       >(m208/10*AUOP+m209+PRKC)/OCC3
COMPUTE S3TE       >TERI+TERJ
```

```
COMPUTE            >ENDIF

*End of Intrazonal trips

* WALK COMMUTER RAIL
COMPUTE            >IF(m305>0)
COMPUTE WCIV       >m305/100.
COMPUTE WCOV       >(m303+m304)/100.
COMPUTE WCXF       >m312
COMPUTE WCCS       >m313
COMPUTE WCXP       >m314/100.
COMPUTE WCWK       >(m301+m302)/100.
COMPUTE            >ENDIF

* WALK BUS
COMPUTE            >IF(m405>0)
COMPUTE WBIV       >m405/100.
COMPUTE WBOV       >(m403+m404)/100.
COMPUTE WBXF       >m412
COMPUTE WBCS       >m413
COMPUTE WBXP       >m414/100.
COMPUTE WBWK       >(m401+m402)/100.
COMPUTE            >ENDIF

* WALK BUS/METRORAIL (TRANSIT)
COMPUTE            >IF(m605>0)
COMPUTE WTIV       >m605/100.
COMPUTE WTOV       >(m603+m604)/100.
COMPUTE WTXF       >m612
COMPUTE WTCS       >m613
COMPUTE WTXP       >m614/100.
COMPUTE WTWK       >(m601+m602)/100.
COMPUTE            >ENDIF


* WALK METRORAIL
COMPUTE            >IF(m505>0)
COMPUTE WMIV       >m505/100.
COMPUTE WMOV       >(m503+m504)/100.
COMPUTE WMXF       >m512
COMPUTE WMCS       >m513
COMPUTE WMXP       >m514/100.
COMPUTE WMWK       >(m501+m502)/100.
COMPUTE            >ENDIF

* PNR COMMUTER RAIL
COMPUTE            >IF(m319>0)
COMPUTE PCIV       >m319/100.
COMPUTE PCAA       >m329/100.
COMPUTE PCOV       >(m317+m318+m332)/100.
COMPUTE PCXF       >m326
COMPUTE PCCS       >m327+m331+m330/100*AUOP
COMPUTE PCXP       >m328/100.
COMPUTE PCWK       >(m315+m316)/100.
COMPUTE            >ENDIF

* PNR BUS
COMPUTE            >IF(m419>0)
COMPUTE PBIV       >m419/100.
COMPUTE PBAA       >m429/100.
COMPUTE PBOV       >(m417+m418+m432)/100.
COMPUTE PBXF       >m426
COMPUTE PBCS       >m427+m431+m430/100*AUOP
COMPUTE PBXP       >m428/100.
COMPUTE PBWK       >(m415+m416)/100.
COMPUTE            >ENDIF

* PNR BUS/METRORAIL (TRANSIT)
```

```
COMPUTE            >IF(m619>0)
COMPUTE PTIV       >m619/100.
COMPUTE PTAA       >m629/100.
COMPUTE PTOV       >(m617+m618+m632)/100.
COMPUTE PTXF       >m626
COMPUTE PTCS       >m627+m631+m630/100*AUOP
COMPUTE PTXP       >m628/100.
COMPUTE PTWK       >(m615+m616)/100.
COMPUTE            >ENDIF


* PNR METRORAIL
COMPUTE            >IF(m519>0)
COMPUTE PMIV       >m519/100.
COMPUTE PMAA       >m529/100.
COMPUTE PMOV       >(m517+m518+m532)/100.
COMPUTE PMXF       >m526
COMPUTE PMCS       >m527+m531+m530/100*AUOP
COMPUTE PMXP       >m528/100.
COMPUTE PMWK       >(m515+m516)/100.
COMPUTE            >ENDIF


* KNR COMMUTER RAIL
COMPUTE            >IF(m319>0)
COMPUTE KCIV       >m319/100.
COMPUTE KCAA       >m329/100.
COMPUTE KCOV       >(m317+m318)/100.
COMPUTE KCXF       >m326
COMPUTE KCCS       >m327+m330/100*AUOP
COMPUTE KCXP       >m328/100.
COMPUTE KCWK       >(m315+m316)/100.
COMPUTE            >ENDIF


* KNR BUS
COMPUTE            >IF(m437>0)
COMPUTE KBIV       >m437/100.
COMPUTE KBAA       >m447/100.
COMPUTE KBOV       >(m435+m436)/100.
COMPUTE KBXF       >m444
COMPUTE KBCS       >m445+m448/100*AUOP
COMPUTE KBXP       >m446/100.
COMPUTE KBWK       >(m433+m434)/100.
COMPUTE            >ENDIF

* KNR BUS/METRORAIL (TRANSIT)
COMPUTE            >IF(m637>0)
COMPUTE KTIV       >m637/100.
COMPUTE KTAA       >m647/100.
COMPUTE KTOV       >(m635+m636)/100.
COMPUTE KTXF       >m644
COMPUTE KTCS       >m645+m648/100*AUOP
COMPUTE KTXP       >m646/100.
COMPUTE KTWK       >(m633+m634)/100.
COMPUTE            >ENDIF


* KNR METRORAIL
COMPUTE            >IF(m537>0)
COMPUTE KMIV       >m537/100.
COMPUTE KMAA       >m547/100.
COMPUTE KMOV       >(m535+m536)/100.
COMPUTE KMXF       >m544
COMPUTE KMCS       >m545+m548/100*AUOP
COMPUTE KMXP       >m546/100.
COMPUTE KMWK       >(m533+m534)/100.
COMPUTE            >ENDIF
```

```
*CONSTANTS BY CHOICE FOR EACH PURPOSE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
PURP01 1INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 1INC 2     1>
PURP03 1INC 3     1>
PURP04 1INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 2INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 2INC 2     1>
PURP03 2INC 3     1>
PURP04 2INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 3INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 3INC 2     1>
PURP03 3INC 3     1>
PURP04 3INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 4INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 4INC 2     1>
PURP03 4INC 3     1>
PURP04 4INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 5INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 5INC 2     1>
PURP03 5INC 3     1>
PURP04 5INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 6INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 6INC 2     1>
PURP03 6INC 3     1>
PURP04 6INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 7INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 7INC 2     1>
PURP03 7INC 3     1>
PURP04 7INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 8INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 8INC 2     1>
PURP03 8INC 3     1>
PURP04 8INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 9INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 9INC 2     1>
PURP03 9INC 3     1>
PURP04 9INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0110INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0210INC 2     1>
PURP0310INC 3     1>
PURP0410INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0111INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0211INC 2     1>
PURP0311INC 3     1>
PURP0411INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0112INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0212INC 2     1>
PURP0312INC 3     1>
PURP0412INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0113INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0213INC 2     1>
PURP0313INC 3     1>
PURP0413INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0114INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0214INC 2     1>
PURP0314INC 3     1>
PURP0414INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0115INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0215INC 2     1>
PURP0315INC 3     1>
PURP0415INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0116INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0216INC 2     1>
PURP0316INC 3     1>
PURP0416INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0117INC 1     1>                              2.000000  2.000000  2.000000  2.000000
```

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PURP0217INC 2     1>
PURP0317INC 3     1>
PURP0417INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0118INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0218INC 2     1>
PURP0318INC 3     1>
PURP0418INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0119INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0219INC 2     1>
PURP0319INC 3     1>
PURP0419INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0120INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0220INC 2     1>
PURP0320INC 3     1>
PURP0420INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000

TRIPIN01           >TRP1
TRIPIN02           >TRP2
TRIPIN03           >TRP3
TRIPIN04           >TRP4
TRIPIFACT01        >tfi1
TRIPIFACT02        >tfi2
TRIPIFACT03        >tfi3
TRIPIFACT04        >tfi4
COMPUTE tfi1       >1.0
COMPUTE tfi2       >1.0
COMPUTE tfi3       >1.0
COMPUTE tfi4       >1.0

*
*OUTPUT MATRICES AND OUTPUT FACTORS BY CHOICE FOR EACH PURPOSE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
TRIPOUT01         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT01        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
TRIPOUT02         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT02        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
TRIPOUT03         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT03        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
TRIPOUT04         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT04        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
**
**P AND A WALK PERCENTS BY CHOICE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
WALK SEG CW 1 PCT 1>WSWM
WALK SEG CW 1 MODE1>Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG CW 2 PCT 1>WSW1
WALK SEG CW 2 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG CW 3 PCT 1>WSW2
WALK SEG CW 3 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y
WALK SEG CW 4 PCT 1>WSW3
WALK SEG CW 4 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y
WALK SEG MD 5 PCT 1>WSM1
WALK SEG MD 5 MODE1>Y         Y         Y                                                 Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG MD 6 PCT 1>WSM2
WALK SEG MD 6 MODE1>Y         Y         Y                                                 Y         Y         Y         Y         Y         Y
WALK SEG NT 7 PCT 1>WSNT
WALK SEG NT 7 MODE1>Y         Y         Y
*SYNTAX OF COMMAND TO ADD A COMPONENT TO A SPECIFIC WALK SEGMENT IF DESIRED
*WALK SEG CW 1 COEF1>                              -0.04747  -0.04747  -0.04747  -0.04747  -0.04747  -0.04747
*WALK SEG CW 1 VAR 1>                              WTSS      DTSS      DISS      WRSS      DRSS      DJSS
COMPUTE WSWM       >PCMI*PCMJ
COMPUTE WSW1       >(PCTI-PCMI)*PCMJ
COMPUTE WSW2       >(PCTI-PCMI)*(PCTJ-PCMJ)
COMPUTE WSW3       >PCMI*(PCTJ-PCMJ)
COMPUTE WSM1       >(1-PCTI)*PCMJ
COMPUTE WSM2       >(1-PCTI)*(PCTJ-PCMJ)
COMPUTE WSNT       >1-WSWM-WSW1-WSW2-WSW3-WSM1-WSM2
```

```
*NEST DEFINITIONS BY CHOICE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
NEST 1,1=         1>Y         Y         Y
NEST 1,2=         1>                              Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
NEST 2,1=         1>                              Y         Y         Y         Y
NEST 2,2=         1>                                                                      Y                   Y                   Y                   Y
NEST 2,3=         1>                                                                                Y                   Y                   Y                   Y
NEST 3,1=         1>                              Y
NEST 3,2=         1>                                        Y
NEST 3,3=         1>                                                  Y
NEST 3,4=         1>                                                            Y
NEST 4,1          1>                                                                      Y
NEST 4,2          1>                                                                                          Y
NEST 4,3          1>                                                                                                              Y
NEST 4,4          1>                                                                                                                                  Y
NEST 5,1          1>                                                                                Y
NEST 5,2          1>                                                                                                    Y
NEST 5,3          1>                                                                                                                        Y
NEST 5,4          1>                                                                                                                                            Y
NEST 6,1          1>Y
NEST 6,2          1>          Y         Y
NEST 7,1          1>          Y
NEST 7,2          1>                    Y

IGRP DEFINITION    >i813
JGRP DEFINITION    >j813
* 1 DC CORE/URBAN-DC CORE
SEGMENT  1         >    1    1
SEGMENT  1         >    3    1
* 2 DC CORE/URBAN-VA CORE
SEGMENT  2         >    1    2
SEGMENT  2         >    3    2
* 3 DC CORE/URBAN-URBAN
SEGMENT  3         >    1    3
SEGMENT  3         >    3    3
SEGMENT  3         >    1    4
SEGMENT  3         >    3    4
SEGMENT  3         >    1    5
SEGMENT  3         >    3    5
* 4 DC CORE/URBAN-OTHER
SEGMENT  4         >    1    6
SEGMENT  4         >    3    6
SEGMENT  4         >    1    7
SEGMENT  4         >    3    7
* 5 MD URBAN-DC CORE
SEGMENT  5         >    4    1
* 6 MD URBAN-VA CORE
SEGMENT  6         >    4    2
* 7 MD URBAN-URBAN
SEGMENT  7         >    4    3
SEGMENT  7         >    4    4
SEGMENT  7         >    4    5
* 8 MD URBAN-OTHER
SEGMENT  8         >    4    6
SEGMENT  8         >    4    7
* 9 VA CORE/URBAN-DC CORE
SEGMENT  9         >    2    1
SEGMENT  9         >    5    1
*10 VA CORE/URBAN-VA CORE
SEGMENT 10         >    2    2
SEGMENT 10         >    5    2
*11 VA CORE/URBAN-URBAN
SEGMENT 11         >    2    3
SEGMENT 11         >    5    3
SEGMENT 11         >    2    4
SEGMENT 11         >    5    4
SEGMENT 11         >    2    5
SEGMENT 11         >    5    5
```

```
*12 VA CORE/URBAN-OTHER
SEGMENT 12         >    2    6
SEGMENT 12         >    5    6
SEGMENT 12         >    2    7
SEGMENT 12         >    5    7
*13 MD OTHER-DC CORE
SEGMENT 13         >    6    1
*14 MD OTHER-VA CORE
SEGMENT 14         >    6    2
*15 MD OTHER-URBAN
SEGMENT 15         >    6    3
SEGMENT 15         >    6    4
SEGMENT 15         >    6    5
*16 MD OTHER-OTHER
SEGMENT 16         >    6    6
SEGMENT 16         >    6    7
*17 VA OTHER-DC CORE
SEGMENT 17         >    7    1
*18 VA OTHER-VA CORE
SEGMENT 18         >    7    2
*19 VA OTHER-URBAN
SEGMENT 19         >    7    3
SEGMENT 19         >    7    4
SEGMENT 19         >    7    5
*20 VA OTHER-OTHER
SEGMENT 20         >    7    6
SEGMENT 20         >    7    7

* SEGMENT  1
NSTC 10 1GRND TOTAL>
NSTC 11 1AUTO      >      0.5    0.00000
NSTC 12 1TRANSIT   >      0.5   -1.45318
NSTC 20 1TOTAL TRN >
NSTC 21 1WALK ACC  >      0.5    0.00000
NSTC 22 1PNR ACC   >      0.5   -0.30553
NSTC 23 1KNR ACC   >      0.5   -4.26889
NSTC 30 1WLK TRN
NSTC 31 1WLK CR    >      1.0   -0.40393
NSTC 32 1WLK BUS   >      1.0   -0.81945
NSTC 33 1WLK BU/MR >      1.0    0.73670
NSTC 34 1WLK METRO >      1.0    0.00000
NSTC 40 1PNR TRN
NSTC 41 1PNR CR    >      1.0   -0.63216
NSTC 42 1PNR BUS   >      1.0   -5.23704
NSTC 43 1PNR BU/MR >      1.0   -5.52772
NSTC 44 1PNR METRO >      1.0    0.00000
NSTC 50 1KNR TRN
NSTC 51 1KNR CR    >      1.0   -0.66919
NSTC 52 1KNR BUS   >      1.0   -0.66919
NSTC 53 1KNR BU/MR >      1.0   -1.12384
NSTC 54 1KNR METRO >      1.0    0.00000
NSTC 60 1AUTO
NSTC 61 1LOV       >      1.0    0.00000
NSTC 62 1HOV       >      0.5   -1.14387
NSTC 70 1HOV
NSTC 71 1HOV2      >      1.0    0.00000
NSTC 72 1HOV3+     >      1.0   -0.52029
* SEGMENT  2
NSTC 10 2GRND TOTAL>
NSTC 11 2AUTO      >      0.5    0.00000
NSTC 12 2TRANSIT   >      0.5   -0.35924
NSTC 20 2TOTAL TRN >
NSTC 21 2WALK ACC  >      0.5    0.00000
NSTC 22 2PNR ACC   >      0.5   -1.61750
NSTC 23 2KNR ACC   >      0.5   -6.86701
NSTC 30 2WLK TRN
NSTC 31 2WLK CR    >      1.0    0.18218
NSTC 32 2WLK BUS   >      1.0    1.29203
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NSTC 33 2WLK BU/MR >      1.0    0.09693
NSTC 34 2WLK METRO >      1.0    0.00000
NSTC 40 2PNR TRN
NSTC 41 2PNR CR    >      1.0   -2.36690
NSTC 42 2PNR BUS   >      1.0   -2.36690
NSTC 43 2PNR BU/MR >      1.0   -2.36690
NSTC 44 2PNR METRO >      1.0    0.00000
NSTC 50 2KNR TRN
NSTC 51 2KNR CR    >      1.0   -0.66789
NSTC 52 2KNR BUS   >      1.0   -0.66789
NSTC 53 2KNR BU/MR >      1.0   -0.66789
NSTC 54 2KNR METRO >      1.0    0.00000
NSTC 60 2AUTO
NSTC 61 2LOV       >      1.0    0.00000
NSTC 62 2HOV       >      0.5   -0.90161
NSTC 70 2HOV
NSTC 71 2HOV2      >      1.0    0.00000
NSTC 72 2HOV3+     >      1.0   -0.69117
* SEGMENT  3
NSTC 10 3GRND TOTAL>
NSTC 11 3AUTO      >      0.5    0.00000
NSTC 12 3TRANSIT   >      0.5   -1.22838
NSTC 20 3TOTAL TRN >
NSTC 21 3WALK ACC  >      0.5    0.00000
NSTC 22 3PNR ACC   >      0.5   -3.96715
NSTC 23 3KNR ACC   >      0.5   -6.34802
NSTC 30 3WLK TRN
NSTC 31 3WLK CR    >      1.0    1.77100
NSTC 32 3WLK BUS   >      1.0    2.73344
NSTC 33 3WLK BU/MR >      1.0   -0.27884
NSTC 34 3WLK METRO >      1.0    0.00000
NSTC 40 3PNR TRN
NSTC 41 3PNR CR    >      1.0   -0.25204
NSTC 42 3PNR BUS   >      1.0   -0.11602
NSTC 43 3PNR BU/MR >      1.0   -1.09722
NSTC 44 3PNR METRO >      1.0    0.00000
NSTC 50 3KNR TRN
NSTC 51 3KNR CR    >      1.0    1.75759
NSTC 52 3KNR BUS   >      1.0    6.19487
NSTC 53 3KNR BU/MR >      1.0   -0.61568
NSTC 54 3KNR METRO >      1.0    0.00000
NSTC 60 3AUTO
NSTC 61 3LOV       >      1.0    0.00000
NSTC 62 3HOV       >      0.5   -1.08247
NSTC 70 3HOV
NSTC 71 3HOV2      >      1.0    0.00000
NSTC 72 3HOV3+     >      1.0   -0.58010
* SEGMENT  4
NSTC 10 4GRND TOTAL>
NSTC 11 4AUTO      >      0.5    0.00000
NSTC 12 4TRANSIT   >      0.5   -1.82492
NSTC 20 4TOTAL TRN >
NSTC 21 4WALK ACC  >      0.5    0.00000
NSTC 22 4PNR ACC   >      0.5   -4.20435
NSTC 23 4KNR ACC   >      0.5   -5.99785
NSTC 30 4WLK TRN
NSTC 31 4WLK CR    >      1.0   -1.29556
NSTC 32 4WLK BUS   >      1.0   -1.59475
NSTC 33 4WLK BU/MR >      1.0   -1.64198
NSTC 34 4WLK METRO >      1.0    0.00000
NSTC 40 4PNR TRN
NSTC 41 4PNR CR    >      1.0    2.45655
NSTC 42 4PNR BUS   >      1.0    5.61133
NSTC 43 4PNR BU/MR >      1.0   -0.88145
NSTC 44 4PNR METRO >      1.0    0.00000
NSTC 50 4KNR TRN
NSTC 51 4KNR CR    >      1.0    2.91612
NSTC 52 4KNR BUS   >      1.0    5.60377
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NSTC 53 4KNR BU/MR >      1.0    3.62966
NSTC 54 4KNR METRO >      1.0    0.00000
NSTC 60 4AUTO
NSTC 61 4LOV       >      1.0    0.00000
NSTC 62 4HOV       >      0.5   -0.87127
NSTC 70 4HOV
NSTC 71 4HOV2      >      1.0    0.00000
NSTC 72 4HOV3+     >      1.0   -0.45483
* SEGMENT  5
NSTC 10 5GRND TOTAL>
NSTC 11 5AUTO      >      0.5    0.00000
NSTC 12 5TRANSIT   >      0.5   -0.80502
NSTC 20 5TOTAL TRN >
NSTC 21 5WALK ACC  >      0.5    0.00000
NSTC 22 5PNR ACC   >      0.5   -3.19739
NSTC 23 5KNR ACC   >      0.5   -4.89229
NSTC 30 5WLK TRN
NSTC 31 5WLK CR    >      1.0   -2.20383
NSTC 32 5WLK BUS   >      1.0  -10.25734
NSTC 33 5WLK BU/MR >      1.0   -4.82491
NSTC 34 5WLK METRO >      1.0    0.00000
NSTC 40 5PNR TRN
NSTC 41 5PNR CR    >      1.0   -1.70709
NSTC 42 5PNR BUS   >      1.0   -1.70709
NSTC 43 5PNR BU/MR >      1.0   -1.70709
NSTC 44 5PNR METRO >      1.0    0.00000
NSTC 50 5KNR TRN
NSTC 51 5KNR CR    >      1.0   -2.89753
NSTC 52 5KNR BUS   >      1.0   -2.89753
NSTC 53 5KNR BU/MR >      1.0   -2.89753
NSTC 54 5KNR METRO >      1.0    0.00000
NSTC 60 5AUTO
NSTC 61 5LOV       >      1.0    0.00000
NSTC 62 5HOV       >      0.5   -1.65476
NSTC 70 5HOV
NSTC 71 5HOV2      >      1.0    0.00000
NSTC 72 5HOV3+     >      1.0   -0.28028
* SEGMENT  6
NSTC 10 6GRND TOTAL>
NSTC 11 6AUTO      >      0.5    0.00000
NSTC 12 6TRANSIT   >      0.5    1.67836
NSTC 20 6TOTAL TRN >
NSTC 21 6WALK ACC  >      0.5    0.00000
NSTC 22 6PNR ACC   >      0.5   -4.31195
NSTC 23 6KNR ACC   >      0.5   -5.30414
NSTC 30 6WLK TRN
NSTC 31 6WLK CR    >      1.0   -3.05098
NSTC 32 6WLK BUS   >      1.0   -3.05098
NSTC 33 6WLK BU/MR >      1.0   -6.53329
NSTC 34 6WLK METRO >      1.0    0.00000
NSTC 40 6PNR TRN
NSTC 41 6PNR CR    >      1.0   -1.28454
NSTC 42 6PNR BUS   >      1.0   -1.28454
NSTC 43 6PNR BU/MR >      1.0   -1.28454
NSTC 44 6PNR METRO >      1.0    0.00000
NSTC 50 6KNR TRN
NSTC 51 6KNR CR    >      1.0   -0.81437
NSTC 52 6KNR BUS   >      1.0   -0.81437
NSTC 53 6KNR BU/MR >      1.0   -0.81437
NSTC 54 6KNR METRO >      1.0    0.00000
NSTC 60 6AUTO
NSTC 61 6LOV       >      1.0    0.00000
NSTC 62 6HOV       >      0.5   -1.58827
NSTC 70 6HOV
NSTC 71 6HOV2      >      1.0    0.00000
NSTC 72 6HOV3+     >      1.0   -0.17845
* SEGMENT  7
NSTC 10 7GRND TOTAL>
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NSTC 11 7AUTO      >      0.5    0.00000
NSTC 12 7TRANSIT   >      0.5   -1.96642
NSTC 20 7TOTAL TRN >
NSTC 21 7WALK ACC  >      0.5    0.00000
NSTC 22 7PNR ACC   >      0.5   -4.45167
NSTC 23 7KNR ACC   >      0.5   -5.94777
NSTC 30 7WLK TRN
NSTC 31 7WLK CR    >      1.0   -0.46159
NSTC 32 7WLK BUS   >      1.0   -0.62503
NSTC 33 7WLK BU/MR >      1.0   -0.21922
NSTC 34 7WLK METRO >      1.0    0.00000
NSTC 40 7PNR TRN
NSTC 41 7PNR CR    >      1.0    5.75934
NSTC 42 7PNR BUS   >      1.0   -1.27352
NSTC 43 7PNR BU/MR >      1.0    0.01603
NSTC 44 7PNR METRO >      1.0    0.00000
NSTC 50 7KNR TRN
NSTC 51 7KNR CR    >      1.0    0.33413
NSTC 52 7KNR BUS   >      1.0    2.49527
NSTC 53 7KNR BU/MR >      1.0    0.62194
NSTC 54 7KNR METRO >      1.0    0.00000
NSTC 60 7AUTO
NSTC 61 7LOV       >      1.0    0.00000
NSTC 62 7HOV       >      0.5   -1.49107
NSTC 70 7HOV
NSTC 71 7HOV2      >      1.0    0.00000
NSTC 72 7HOV3+     >      1.0   -0.67120
* SEGMENT  8
NSTC 10 8GRND TOTAL>
NSTC 11 8AUTO      >      0.5    0.00000
NSTC 12 8TRANSIT   >      0.5   -2.00940
NSTC 20 8TOTAL TRN >
NSTC 21 8WALK ACC  >      0.5    0.00000
NSTC 22 8PNR ACC   >      0.5   -6.12809
NSTC 23 8KNR ACC   >      0.5   -5.23872
NSTC 30 8WLK TRN
NSTC 31 8WLK CR    >      1.0    1.37531
NSTC 32 8WLK BUS   >      1.0    1.83088
NSTC 33 8WLK BU/MR >      1.0   -0.06600
NSTC 34 8WLK METRO >      1.0    0.00000
NSTC 40 8PNR TRN
NSTC 41 8PNR CR    >      1.0    7.54895
NSTC 42 8PNR BUS   >      1.0    1.39829
NSTC 43 8PNR BU/MR >      1.0    0.48061
NSTC 44 8PNR METRO >      1.0    0.00000
NSTC 50 8KNR TRN
NSTC 51 8KNR CR    >      1.0    4.74813
NSTC 52 8KNR BUS   >      1.0   11.04860
NSTC 53 8KNR BU/MR >      1.0    4.19709
NSTC 54 8KNR METRO >      1.0    0.00000
NSTC 60 8AUTO
NSTC 61 8LOV       >      1.0    0.00000
NSTC 62 8HOV       >      0.5   -0.65126
NSTC 70 8HOV
NSTC 71 8HOV2      >      1.0    0.00000
NSTC 72 8HOV3+     >      1.0   -0.58472
* SEGMENT  9
NSTC 10 9GRND TOTAL>
NSTC 11 9AUTO      >      0.5    0.00000
NSTC 12 9TRANSIT   >      0.5   -1.19856
NSTC 20 9TOTAL TRN >
NSTC 21 9WALK ACC  >      0.5    0.00000
NSTC 22 9PNR ACC   >      0.5   -1.57194
NSTC 23 9KNR ACC   >      0.5   -5.88062
NSTC 30 9WLK TRN
NSTC 31 9WLK CR    >      1.0   -1.29102
NSTC 32 9WLK BUS   >      1.0   -8.58837
NSTC 33 9WLK BU/MR >      1.0   -2.99454
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NSTC 34 9WLK METRO >      1.0    0.00000
NSTC 40 9PNR TRN
NSTC 41 9PNR CR    >      1.0   -4.06254
NSTC 42 9PNR BUS   >      1.0   -4.06254
NSTC 43 9PNR BU/MR >      1.0   -4.06254
NSTC 44 9PNR METRO >      1.0    0.00000
NSTC 50 9KNR TRN
NSTC 51 9KNR CR    >      1.0   -3.63747
NSTC 52 9KNR BUS   >      1.0   -3.63747
NSTC 53 9KNR BU/MR >      1.0   -3.63747
NSTC 54 9KNR METRO >      1.0    0.00000
NSTC 60 9AUTO
NSTC 61 9LOV       >      1.0    0.00000
NSTC 62 9HOV       >      0.5   -1.90213
NSTC 70 9HOV
NSTC 71 9HOV2      >      1.0    0.00000
NSTC 72 9HOV3+     >      1.0   -0.42376
* SEGMENT 10
NSTC 1010GRND TOTAL>
NSTC 1110AUTO      >      0.5    0.00000
NSTC 1210TRANSIT   >      0.5   -0.89203
NSTC 2010TOTAL TRN >
NSTC 2110WALK ACC  >      0.5    0.00000
NSTC 2210PNR ACC   >      0.5   -4.47191
NSTC 2310KNR ACC   >      0.5   -8.81825
NSTC 3010WLK TRN
NSTC 3110WLK CR    >      1.0   -2.22155
NSTC 3210WLK BUS   >      1.0  -12.39806
NSTC 3310WLK BU/MR >      1.0   -2.98957
NSTC 3410WLK METRO >      1.0    0.00000
NSTC 4010PNR TRN
NSTC 4110PNR CR    >      1.0    1.93260
NSTC 4210PNR BUS   >      1.0    2.31495
NSTC 4310PNR BU/MR >      1.0    1.93260
NSTC 4410PNR METRO >      1.0    0.00000
NSTC 5010KNR TRN
NSTC 5110KNR CR    >      1.0   -0.58522
NSTC 5210KNR BUS   >      1.0   -0.58522
NSTC 5310KNR BU/MR >      1.0   -0.58522
NSTC 5410KNR METRO >      1.0    0.00000
NSTC 6010AUTO
NSTC 6110LOV       >      1.0    0.00000
NSTC 6210HOV       >      0.5   -1.61406
NSTC 7010HOV
NSTC 7110HOV2      >      1.0    0.00000
NSTC 7210HOV3+     >      1.0   -0.86861
* SEGMENT 11
NSTC 1011GRND TOTAL>
NSTC 1111AUTO      >      0.5    0.00000
NSTC 1211TRANSIT   >      0.5   -2.10741
NSTC 2011TOTAL TRN >
NSTC 2111WALK ACC  >      0.5    0.00000
NSTC 2211PNR ACC   >      0.5   -6.14146
NSTC 2311KNR ACC   >      0.5   -7.86210
NSTC 3011WLK TRN
NSTC 3111WLK CR    >      1.0   -1.44493
NSTC 3211WLK BUS   >      1.0   -2.12978
NSTC 3311WLK BU/MR >      1.0   -0.46662
NSTC 3411WLK METRO >      1.0    0.00000
NSTC 4011PNR TRN
NSTC 4111PNR CR    >      1.0   -3.73065
NSTC 4211PNR BUS   >      1.0   -3.73065
NSTC 4311PNR BU/MR >      1.0   -0.50547
NSTC 4411PNR METRO >      1.0    0.00000
NSTC 5011KNR TRN
NSTC 5111KNR CR    >      1.0   -4.63724
NSTC 5211KNR BUS   >      1.0   -4.63724
NSTC 5311KNR BU/MR >      1.0   -4.63724
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NSTC 5411KNR METRO >      1.0    0.00000
NSTC 6011AUTO
NSTC 6111LOV       >      1.0    0.00000
NSTC 6211HOV       >      0.5   -1.33003
NSTC 7011HOV
NSTC 7111HOV2      >      1.0    0.00000
NSTC 7211HOV3+     >      1.0   -0.73871
* SEGMENT 12
NSTC 1012GRND TOTAL>
NSTC 1112AUTO      >      0.5    0.00000
NSTC 1212TRANSIT   >      0.5   -1.49917
NSTC 2012TOTAL TRN >
NSTC 2112WALK ACC  >      0.5    0.00000
NSTC 2212PNR ACC   >      0.5   -3.66485
NSTC 2312KNR ACC   >      0.5   -5.98411
NSTC 3012WLK TRN
NSTC 3112WLK CR    >      1.0   -4.75738
NSTC 3212WLK BUS   >      1.0   -5.32651
NSTC 3312WLK BU/MR >      1.0   -3.44565
NSTC 3412WLK METRO >      1.0    0.00000
NSTC 4012PNR TRN
NSTC 4112PNR CR    >      1.0  -11.43110
NSTC 4212PNR BUS   >      1.0  -11.43110
NSTC 4312PNR BU/MR >      1.0  -11.43110
NSTC 4412PNR METRO >      1.0    0.00000
NSTC 5012KNR TRN
NSTC 5112KNR CR    >      1.0   -8.56065
NSTC 5212KNR BUS   >      1.0   -8.56065
NSTC 5312KNR BU/MR >      1.0   -7.38608
NSTC 5412KNR METRO >      1.0    0.00000
NSTC 6012AUTO
NSTC 6112LOV       >      1.0    0.00000
NSTC 6212HOV       >      0.5   -0.80207
NSTC 7012HOV
NSTC 7112HOV2      >      1.0    0.00000
NSTC 7212HOV3+     >      1.0   -0.60387
* SEGMENT 13
NSTC 1013GRND TOTAL>
NSTC 1113AUTO      >      0.5    0.00000
NSTC 1213TRANSIT   >      0.5   -2.51625
NSTC 2013TOTAL TRN >
NSTC 2113WALK ACC  >      0.5    0.00000
NSTC 2213PNR ACC   >      0.5    0.51336
NSTC 2313KNR ACC   >      0.5   -1.55986
NSTC 3013WLK TRN
NSTC 3113WLK CR    >      1.0   -0.96471
NSTC 3213WLK BUS   >      1.0   -1.09262
NSTC 3313WLK BU/MR >      1.0   -1.34648
NSTC 3413WLK METRO >      1.0    0.00000
NSTC 4013PNR TRN
NSTC 4113PNR CR    >      1.0    2.15962
NSTC 4213PNR BUS   >      1.0    3.68134
NSTC 4313PNR BU/MR >      1.0   -4.26587
NSTC 4413PNR METRO >      1.0    0.00000
NSTC 5013KNR TRN
NSTC 5113KNR CR    >      1.0   -0.75137
NSTC 5213KNR BUS   >      1.0   -0.75137
NSTC 5313KNR BU/MR >      1.0   -1.85182
NSTC 5413KNR METRO >      1.0    0.00000
NSTC 6013AUTO
NSTC 6113LOV       >      1.0    0.00000
NSTC 6213HOV       >      0.5   -2.15137
NSTC 7013HOV
NSTC 7113HOV2      >      1.0    0.00000
NSTC 7213HOV3+     >      1.0   -0.42640
* SEGMENT 14
NSTC 1014GRND TOTAL>
NSTC 1114AUTO      >      0.5    0.00000
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NSTC 1214TRANSIT   >      0.5    0.31695
NSTC 2014TOTAL TRN >
NSTC 2114WALK ACC  >      0.5    0.00000
NSTC 2214PNR ACC   >      0.5   -2.76031
NSTC 2314KNR ACC   >      0.5   -3.58813
NSTC 3014WLK TRN
NSTC 3114WLK CR    >      1.0   -2.34830
NSTC 3214WLK BUS   >      1.0   -2.80133
NSTC 3314WLK BU/MR >      1.0   -3.63061
NSTC 3414WLK METRO >      1.0    0.00000
NSTC 4014PNR TRN
NSTC 4114PNR CR    >      1.0   -0.84978
NSTC 4214PNR BUS   >      1.0   -0.84978
NSTC 4314PNR BU/MR >      1.0   -0.32939
NSTC 4414PNR METRO >      1.0    0.00000
NSTC 5014KNR TRN
NSTC 5114KNR CR    >      1.0   -0.76474
NSTC 5214KNR BUS   >      1.0   -0.76474
NSTC 5314KNR BU/MR >      1.0    1.08438
NSTC 5414KNR METRO >      1.0    0.00000
NSTC 6014AUTO
NSTC 6114LOV       >      1.0    0.00000
NSTC 6214HOV       >      0.5   -1.31294
NSTC 7014HOV
NSTC 7114HOV2      >      1.0    0.00000
NSTC 7214HOV3+     >      1.0   -0.52345
* SEGMENT 15
NSTC 1015GRND TOTAL>
NSTC 1115AUTO      >      0.5    0.00000
NSTC 1215TRANSIT   >      0.5   -1.70764
NSTC 2015TOTAL TRN >
NSTC 2115WALK ACC  >      0.5    0.00000
NSTC 2215PNR ACC   >      0.5   -3.46799
NSTC 2315KNR ACC   >      0.5   -4.73110
NSTC 3015WLK TRN
NSTC 3115WLK CR    >      1.0    0.73292
NSTC 3215WLK BUS   >      1.0   -0.50243
NSTC 3315WLK BU/MR >      1.0   -0.08845
NSTC 3415WLK METRO >      1.0    0.00000
NSTC 4015PNR TRN
NSTC 4115PNR CR    >      1.0    2.24726
NSTC 4215PNR BUS   >      1.0    4.45130
NSTC 4315PNR BU/MR >      1.0   -1.23928
NSTC 4415PNR METRO >      1.0    0.00000
NSTC 5015KNR TRN
NSTC 5115KNR CR    >      1.0    0.72811
NSTC 5215KNR BUS   >      1.0    3.11056
NSTC 5315KNR BU/MR >      1.0    1.72111
NSTC 5415KNR METRO >      1.0    0.00000
NSTC 6015AUTO
NSTC 6115LOV       >      1.0    0.00000
NSTC 6215HOV       >      0.5   -0.96675
NSTC 7015HOV
NSTC 7115HOV2      >      1.0    0.00000
NSTC 7215HOV3+     >      1.0   -0.62518
* SEGMENT 16
NSTC 1016GRND TOTAL>
NSTC 1116AUTO      >      0.5    0.00000
NSTC 1216TRANSIT   >      0.5   -2.56933
NSTC 2016TOTAL TRN >
NSTC 2116WALK ACC  >      0.5    0.00000
NSTC 2216PNR ACC   >      0.5   -5.03594
NSTC 2316KNR ACC   >      0.5   -5.09165
NSTC 3016WLK TRN
NSTC 3116WLK CR    >      1.0   -0.56293
NSTC 3216WLK BUS   >      1.0    3.44175
NSTC 3316WLK BU/MR >      1.0    2.30151
NSTC 3416WLK METRO >      1.0    0.00000
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NSTC 4016PNR TRN
NSTC 4116PNR CR    >      1.0    3.49856
NSTC 4216PNR BUS   >      1.0    1.26888
NSTC 4316PNR BU/MR >      1.0   -1.20125
NSTC 4416PNR METRO >      1.0    0.00000
NSTC 5016KNR TRN
NSTC 5116KNR CR    >      1.0   -0.77407
NSTC 5216KNR BUS   >      1.0    1.77429
NSTC 5316KNR BU/MR >      1.0    2.32854
NSTC 5416KNR METRO >      1.0    0.00000
NSTC 6016AUTO
NSTC 6116LOV       >      1.0    0.00000
NSTC 6216HOV       >      0.5   -1.08882
NSTC 7016HOV
NSTC 7116HOV2      >      1.0    0.00000
NSTC 7216HOV3+     >      1.0   -0.57909
* SEGMENT 17
NSTC 1017GRND TOTAL>
NSTC 1117AUTO      >      0.5    0.00000
NSTC 1217TRANSIT   >      0.5   -1.69081
NSTC 2017TOTAL TRN >
NSTC 2117WALK ACC  >      0.5    0.00000
NSTC 2217PNR ACC   >      0.5   -1.90852
NSTC 2317KNR ACC   >      0.5   -4.07985
NSTC 3017WLK TRN
NSTC 3117WLK CR    >      1.0  -10.52712
NSTC 3217WLK BUS   >      1.0  -10.52712
NSTC 3317WLK BU/MR >      1.0   -2.84777
NSTC 3417WLK METRO >      1.0    0.00000
NSTC 4017PNR TRN
NSTC 4117PNR CR    >      1.0    6.70865
NSTC 4217PNR BUS   >      1.0   -1.41417
NSTC 4317PNR BU/MR >      1.0   -9.41840
NSTC 4417PNR METRO >      1.0    0.00000
NSTC 5017KNR TRN
NSTC 5117KNR CR    >      1.0   -7.42723
NSTC 5217KNR BUS   >      1.0   -7.42723
NSTC 5317KNR BU/MR >      1.0   -7.42723
NSTC 5417KNR METRO >      1.0    0.00000
NSTC 6017AUTO
NSTC 6117LOV       >      1.0    0.00000
NSTC 6217HOV       >      0.5   -2.59282
NSTC 7017HOV
NSTC 7117HOV2      >      1.0    0.00000
NSTC 7217HOV3+     >      1.0   -0.54773
* SEGMENT 18
NSTC 1018GRND TOTAL>
NSTC 1118AUTO      >      0.5    0.00000
NSTC 1218TRANSIT   >      0.5    0.73353
NSTC 2018TOTAL TRN >
NSTC 2118WALK ACC  >      0.5    0.00000
NSTC 2218PNR ACC   >      0.5   -5.33262
NSTC 2318KNR ACC   >      0.5   -6.72288
NSTC 3018WLK TRN
NSTC 3118WLK CR    >      1.0   -0.47189
NSTC 3218WLK BUS   >      1.0   -5.57558
NSTC 3318WLK BU/MR >      1.0   -5.97593
NSTC 3418WLK METRO >      1.0    0.00000
NSTC 4018PNR TRN
NSTC 4118PNR CR    >      1.0    5.35455
NSTC 4218PNR BUS   >      1.0   -2.12790
NSTC 4318PNR BU/MR >      1.0   -2.18495
NSTC 4418PNR METRO >      1.0    0.00000
NSTC 5018KNR TRN
NSTC 5118KNR CR    >      1.0    2.23146
NSTC 5218KNR BUS   >      1.0   -2.39503
NSTC 5318KNR BU/MR >      1.0   -2.39503
NSTC 5418KNR METRO >      1.0    0.00000
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NSTC 6018AUTO
NSTC 6118LOV       >      1.0    0.00000
NSTC 6218HOV       >      0.5   -0.97890
NSTC 7018HOV
NSTC 7118HOV2      >      1.0    0.00000
NSTC 7218HOV3+     >      1.0   -0.64793
* SEGMENT 19
NSTC 1019GRND TOTAL>
NSTC 1119AUTO      >      0.5    0.00000
NSTC 1219TRANSIT   >      0.5   -1.51853
NSTC 2019TOTAL TRN >
NSTC 2119WALK ACC  >      0.5    0.00000
NSTC 2219PNR ACC   >      0.5   -3.78905
NSTC 2319KNR ACC   >      0.5   -5.62461
NSTC 3019WLK TRN
NSTC 3119WLK CR    >      1.0   -0.78128
NSTC 3219WLK BUS   >      1.0   -2.07505
NSTC 3319WLK BU/MR >      1.0   -1.68636
NSTC 3419WLK METRO >      1.0    0.00000
NSTC 4019PNR TRN
NSTC 4119PNR CR    >      1.0    2.91265
NSTC 4219PNR BUS   >      1.0   -8.35731
NSTC 4319PNR BU/MR >      1.0   -4.72173
NSTC 4419PNR METRO >      1.0    0.00000
NSTC 5019KNR TRN
NSTC 5119KNR CR    >      1.0    1.35884
NSTC 5219KNR BUS   >      1.0   -3.50387
NSTC 5319KNR BU/MR >      1.0   -0.58298
NSTC 5419KNR METRO >      1.0    0.00000
NSTC 6019AUTO
NSTC 6119LOV       >      1.0    0.00000
NSTC 6219HOV       >      0.5   -0.74208
NSTC 7019HOV
NSTC 7119HOV2      >      1.0    0.00000
NSTC 7219HOV3+     >      1.0   -0.60781
* SEGMENT 20
NSTC 1020GRND TOTAL>
NSTC 1120AUTO      >      0.5    0.00000
NSTC 1220TRANSIT   >      0.5   -0.72027
NSTC 2020TOTAL TRN >
NSTC 2120WALK ACC  >      0.5    0.00000
NSTC 2220PNR ACC   >      0.5   -9.33558
NSTC 2320KNR ACC   >      0.5   -9.69080
NSTC 3020WLK TRN
NSTC 3120WLK CR    >      1.0  -73.29762
NSTC 3220WLK BUS   >      1.0   -6.68011
NSTC 3320WLK BU/MR >      1.0  -16.64803
NSTC 3420WLK METRO >      1.0    0.00000
NSTC 4020PNR TRN
NSTC 4120PNR CR    >      1.0   -1.21293
NSTC 4220PNR BUS   >      1.0   -9.04425
NSTC 4320PNR BU/MR >      1.0  -11.65205
NSTC 4420PNR METRO >      1.0    0.00000
NSTC 5020KNR TRN
NSTC 5120KNR CR    >      1.0   -5.15897
NSTC 5220KNR BUS   >      1.0   -4.77054
NSTC 5320KNR BU/MR >      1.0   -9.86725
NSTC 5420KNR METRO >      1.0    0.00000
NSTC 6020AUTO
NSTC 6120LOV       >      1.0    0.00000
NSTC 6220HOV       >      0.5   -0.99372
NSTC 7020HOV
NSTC 7120HOV2      >      1.0    0.00000
NSTC 7220HOV3+     >      1.0   -0.58034

*DOWNTOWN=8
*SELI               >         8
```

```
*UNION STATION=64
*SELI              >        64

* =122
*SELI              >       122

*BETHESDA=345
*SELI              >       345

*SILVER SPRING=362
*SELI              >       362

*N.SILVER SPRING=464
*SELI              >       464

* =475
*SELI              >       475

*SHADY GROVE RD=578
*SELI              >       578

* =787
*SELI              >       787

*ANDREWS AFB=829
*SELI              >       829

*NEW CARROLTON=927
*SELI              >       927

*BRISTOL=972
*SELI              >       972

*FREDERICK=1043
*SELI              >      1043

*JESSUP=1080
*SELI              >      1080

*SCAGGSVILLE=1091
*SELI              >      1091

*WALDORF=1216
*SELI              >      1216

*PENTAGON=1231
*SELI              >      1231

*ROSSLYN=1236
*SELI              >      1236

*ALEXANDRIA=1337
*SELI              >      1337

* =1455
*SELI              >      1455

*SPRINGFIELD=1502
*SELI              >      1502

*  =1511
*SELI              >      1511

*TYSONS CRNR=1537
*SELI              >      1537

*FT BELVOIR=1554
*SELI              >      1554
```

```
*VIENNA=1619
*SELI              >      1619

*DULES AP=1698
*SELI              >      1698

*RESTON=1716
*SELI              >      1716

*LEESBURG=1842
*SELI              >      1842

*BRUNSWICK=1863
*SELI              >      1863

*DALE CITY=1942
*SELI              >      1942

*MANASSAS=1967
*SELI              >      1967

*SPOTSYLVANIA=2110
*SELI              >      2110

* =2055
*SELI              >      2055

*SELJ              >         8
*SELJ              >        63
*SELJ              >        64
*SELJ              >        77
*SELJ              >       100
*SELJ              >       344
*SELJ              >       345
*SELJ              >       362
*SELJ              >      1231
*SELJ              >      1236
*SELJ              >      1265
*SELJ              >      1337
*SELJ              >      1537
*SELI              >  523
*SELJ              >    9

TRACE             >         0
* OUTPUT %         >
*PROCSEL           >
PRINT MS          >HBS_NL_MC.PRN
INPUT PRINT FILE  >HBS_NL_MC.PRN
INPUT GOALS       >HBS_NL_MC.GOL
INFILE 1          >HBS_INCOME.PTT
INFILE 2          >HWYOP.SKM
INFILE 3          >TRNOP_CR.SKM
INFILE 4          >TRNOP_AB.SKM
INFILE 5          >TRNOP_MR.SKM
INFILE 6          >TRNOP_BM.SKM
ZINFILE 8         >ZONEV2.A2F
OUTFILE 9         >HBS_NL_MC.MTT

* FTA USER BENEFITS SPECIFICATIONS
*FTA RESULTS FILE  >HBS_NL_MC.BEN
FTA TRANSIT COEFF >-0.02168
FTA AUTO COEFF    >-0.02168
FTA PURPOSE NAME  >HBO
FTA PERIOD NAME   >ALLDAY
FTA ALTER. NAME   >CALIB
*CHOICE          1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
FTA AUTO NEST     >         1         1
```

```
FTA MOTORIZED?    1>Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
FTA TRANSIT?      1>                              Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
```

7 hbw_nl_mc.ctl

```
HBW OP NESTED LOGIT MC - #DATE:  5/08/2008 #VER:  21
CHOICE            1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
*
*
*LOGIT COEFFICIENTS BY CHOICE FOR EACH SKIM (NO INPUT SKIM IS
*EQUIVALENT TO A CONSTANT)
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
COEF01:IVTT       1>-0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128
SKIM01:IVTT       1>DAIV      S2IV      S3IV      WCIV      WBIV      WTIV      WMIV      PCIV      KCIV      PBIV      KBIV      PTIV      KTIV      PMIV      KMIV
COEF02:AUTO ACC   1>                                                                      -0.03192  -0.03192  -0.03192  -0.03192  -0.03192  -0.03192  -0.03192  -0.03192
SKIM02:AUTO ACC   1>                                                                      PCAA      KCAA      PBAA      KBAA      PTAA      KTAA      PMAA      KMAA
COEF03:TERM/OVTT  1>-0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320
SKIM03:TERM/OVTT  1>DATE      S2TE      S3TE      WCOV      WBOV      WTOV      WMOV      PCOV      KCOV      PBOV      KBOV      PTOV      KTOV      PMOV      KMOV
* LIMIT COEF 04 TO PURPOSE 1
COEF PURP04        >1
COEF04:COST INC1  1>-0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185  -0.00185
SKIM04:COST INC1  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
* LIMIT COEF 05 TO PURPOSE 2
COEF PURP05        >2
COEF05:COST INC2  1>-0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093  -0.00093
SKIM05:COST INC2  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
* LIMIT COEF 06 TO PURPOSE 3
COEF PURP06        >3
COEF06:COST INC3  1>-0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062  -0.00062
SKIM06:COST INC3  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
COEF PURP07        >4
* LIMIT COEF 07 TO PURPOSE 4
COEF07:COST INC4  1>-0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046  -0.00046
SKIM07:COST INC4  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
COEF08:TRN XFERS  1>                              -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000
SKIM08:TRN XFERS  1>                              WCXF      WBXF      WTXF      WMXF      PCXF      KCXF      PBXF      KBXF      PTXF      KTXF      PMXF      KMXF
COEF09:TRN BRDPEN 1>                              -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320  -0.05320
SKIM09:TRN BRDPEN 1>                              WCXP      WBXP      WTXP      WMXP      PCXP      KCXP      PBXP      KBXP      PTXP      KTXP      PMXP      KMXP
*WALK WEIGHT
COEF10:TRN WLKWT  1>                              -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256  -0.04256
SKIM10:TRN WLKWT  1>                              WCWK      WBWK      WTWK      WMWK      PCWK      KCWK      PBWK      KBWK      PTWK      KTWK      PMWK      KMWK

*SYNTAX TO LIMIT UTILITY ELEMENT TO A PARTICULAR WALK SEGMENT IN THIS EXAMPLE
*    COEF 18 APPLIES ONLY TO WALK SEGMENT 1
*COEF WLKSEG18      >1

* ASSUMED MATRIX ORGANIZATION
* FILE 1 TRIP TABLE (SEPARATE FOR EACH PURPOSE)
* 1 INCOME 1 (HOME-BASED)/ALL NHB TRIPS
* 2 INCOME 2 (HOME-BASED)
* 3 INCOME 3 (HOME-BASED)
* 4 INCOME 4 (HOME-BASED)
*
* FILE 2 HIGHWAY SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* 1 SOV   TIME (MIN)
* 2 SOV   DIST (0.1 MILES)
* 3 SOV   TOLL (1994 CENTS)
* 4 HOV2  TIME (MIN)
* 5 HOV2  DIST (0.1 MILES)
* 6 HOV2  TOLL (1994 CENTS)
* 7 HOV3+ TIME (MIN)
* 8 HOV3+ DIST (0.1 MILES)
```

```
* 9 HOV3+ TOLL (1994 CENTS)
*
* FILE 3=COM. RAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 4=BUS SKIMS       (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 5=METRORAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 6=BUS+METRORAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
*  1 WLK ACC/EGR (.01 MIN)  15 PNR ACC/EGR (.01 MIN)  33 KNR ACC/EGR  (.01 MIN)
*  2 WLK OTHER   (.01 MIN)  16 PNR OTHER   (.01 MIN)  34 KNR OTHER   (.01 MIN)
*  3 WLK IWAIT   (.01 MIN)  17 PNR IWAIT   (.01 MIN)  35 KNR IWAIT   (.01 MIN)
*  4 WLK XWAIT   (.01 MIN)  18 PNR XWAIT   (.01 MIN)  36 KNR XWAIT   (.01 MIN)
*  5 WLK IVTT TOT(.01 MIN)  19 PNR IVTT TOT(.01 MIN)  37 KNR IVTT TOT(.01 MIN)
*  6 WLK IVTT CR (.01 MIN)  20 PNR IVTT CR (.01 MIN)  38 KNR IVTT CR (.01 MIN)
*  7 WLK IVTT XB (.01 MIN)  21 PNR IVTT XB (.01 MIN)  39 KNR IVTT XB (.01 MIN)
*  8 WLK IVTT MR (.01 MIN)  22 PNR IVTT MR (.01 MIN)  40 KNR IVTT MR (.01 MIN)
*  9 WLK IVTT NM (.01 MIN)  23 PNR IVTT NM (.01 MIN)  41 KNR IVTT NM (.01 MIN)
* 10 WLK IVTT NM2(.01 MIN)  24 PNR IVTT NM2(.01 MIN)  42 KNR IVTT NM2(.01 MIN)
* 11 WLK IVTT LB (.01 MIN)  25 PNR IVTT LB (.01 MIN)  43 KNR IVTT LB (.01 MIN)
* 12 WLK #XFERS  (NUMBER )  26 PNR #XFERS  (NUMBER )  44 KNR #XFERS  (NUMBER )
* 13 WLK COST    (94CENTS)  27 PNR COST    (94CENTS)  45 KNR COST    (94CENTS)
* 14 WLK XPEN    (.01 MIN)  28 PNR XPEN    (.01 MIN)  46 KNR XPEN    (.01 MIN)
*                           29 PNR ACC TIME(.01 MIN)  47 KNR ACC TIME(.01 MIN)
*                           30 PNR ACC DIST(.01 MIL)  48 KNR ACC DIST(.01 MIL)
*                           31 PNR ACC COST(94CENTS)
*                           32 PNR STA TERM(.01 MIN)
*
* FILE 8=ZDATA
*  1 HBW PARK COST (1994 CENTS)
*  2 HBS PARK COST (1994 CENTS)
*  3 HBO PARK COST (1994 CENTS)
*  4 NHB PARK COST (1994 CENTS)
*  5 TERMINAL TIME (HOME BASED) (MINUTES)
*  6 TERMINAL TIME (NON HOME BASED) (MINUTES)
*  7 ARC VIEW SHORT WALK PERCENT TO METRO
*  8 ARC VIEW LONG WALK PERCENT TO METRO
*  9 ARC VIEW SHORT WALK PERCENT TO ALL AM PK TRANSIT
* 10 ARC VIEW LONG WALK PERCENT TO ALL AM PK TRANSIT
* 11 ARC VIEW SHORT WALK PERCENT TO ALL OP TRANSIT
* 12 ARC VIEW LONG WALK PERCENT TO ALL OP TRANSIT
* 13 AREA TYPE
*    1=DC CORE
*    2=VA CORE
*    3=DC URBAN
*    4=MD URBAN
*    5=VA URBAN
*    6=MD OTHER
*    7=VA OTHER


* PARAMETERS
*=======================================================
* AUTO OPERATING COSTS IN CENTS/mile
COMPUTE AUOP       >10
* AUTO OCCUPANCY FOR 3+
COMPUTE OCC3       >3.5

* TERMINAL TIMES, USE i/j805 FOR HBW, HBS, AND HBO. USE i/j806 FOR NHB
* HBW/HBS/HBO
COMPUTE TERI       >i805
COMPUTE TERJ       >j805
* NHB
*COMPUTE TERI       >i806
*COMPUTE TERJ       >j806

* PARK COSTS, USE i/j801 802 803 804 FOR HBW, HBS, HBO, NHB RESPECTIVELY
* HBW
COMPUTE PRKC       >j801/2.
* HBS
* COMPUTE PRKC       >j802/2.
```

```
* HBO
* COMPUTE PRKC       >j803/2.
* NHB
* COMPUTE PRKC       >j804

* Percent of productions in long-walk area that are assumed to walk = 25% (i.e., 75% drive)
COMPUTE PCLM       >0.25
COMPUTE PCLT       >0.25
* PERCENT WALKS-METRORAIL ONLY
COMPUTE PCMI       >(i807+PCLM*(i808-i807))/100.
COMPUTE PCMJ       >(j807+PCLM*(j808-j807))/100.
* PERCENT WALKS-PEAK
COMPUTE PCTI       >(i809+PCLT*(i810-i809))/100.
COMPUTE PCTJ       >(j809+PCLT*(j810-j809))/100.
* PERCENT WALKS-OFFPEAK
*COMPUTE PCTI       >(i811+PCLT*(i812-i811))/100.
*COMPUTE PCTJ       >(j811+PCLT*(j812-j811))/100.
COMPUTE PCMI       >MAX(PCMI,0)
COMPUTE PCMI       >MIN(PCMI,1)
COMPUTE PCMJ       >MAX(PCMJ,0)
COMPUTE PCMJ       >MIN(PCMJ,1)
COMPUTE PCTI       >MAX(PCTI,PCMI)
COMPUTE PCTI       >MIN(PCTI,1)
COMPUTE PCTJ       >MAX(PCTJ,PCMJ)
COMPUTE PCTJ       >MIN(PCTJ,1)
*
* DO TRIP SUBDIVISIONS
*
*  HOME BASED ALTERNATIVES
COMPUTE TRP1       >m101
COMPUTE TRP2       >m102
COMPUTE TRP3       >m103
COMPUTE TRP4       >m104
* NON-HOME BASED
*COMPUTE TRP1       >0.25*m101
*COMPUTE TRP2       >0.25*m101
*COMPUTE TRP3       >0.25*m101
*COMPUTE TRP4       >0.25*m101
*
* BE SURE TO UPDATE THE IVTT COEFFICIENT IN FTA SECTION FOR EACH PURPOSE
*
*=======================================================


*INITIALIZING ALL VARIABLES WITHIN IF STATEMENTS TO ZERO
COMPUTE DAIV       >0
COMPUTE DACS       >0
COMPUTE DATE       >0
COMPUTE S2IV       >0
COMPUTE S2CS       >0
COMPUTE S2TE       >0
COMPUTE S3IV       >0
COMPUTE S3CS       >0
COMPUTE S3TE       >0
COMPUTE WKIV       >0
COMPUTE WKOV       >0
COMPUTE WKXF       >0
COMPUTE WKCS       >0
COMPUTE WKXP       >0
COMPUTE WBIV       >0
COMPUTE WBOV       >0
COMPUTE WBXF       >0
COMPUTE WBCS       >0
COMPUTE WBXP       >0
COMPUTE WTIV       >0
COMPUTE WTOV       >0
COMPUTE WTXF       >0
COMPUTE WTCS       >0
```

```
COMPUTE WTXP      >0
COMPUTE WMIV      >0
COMPUTE WMOV      >0
COMPUTE WMXF      >0
COMPUTE WMCS      >0
COMPUTE WMXP      >0
COMPUTE PCIV      >0
COMPUTE PCAA      >0
COMPUTE PCOV      >0
COMPUTE PCXF      >0
COMPUTE PCCS      >0
COMPUTE PCXP      >0
COMPUTE PBIV      >0
COMPUTE PBAA      >0
COMPUTE PBOV      >0
COMPUTE PBXF      >0
COMPUTE PBCS      >0
COMPUTE PBXP      >0
COMPUTE PTIV      >0
COMPUTE PTAA      >0
COMPUTE PTOV      >0
COMPUTE PTXF      >0
COMPUTE PTCS      >0
COMPUTE PTXP      >0
COMPUTE PMIV      >0
COMPUTE PMAA      >0
COMPUTE PMOV      >0
COMPUTE PMXF      >0
COMPUTE PMCS      >0
COMPUTE PMXP      >0
COMPUTE KCIV      >0
COMPUTE KCAA      >0
COMPUTE KCOV      >0
COMPUTE KCXF      >0
COMPUTE KCCS      >0
COMPUTE KCXP      >0
COMPUTE KBIV      >0
COMPUTE KBAA      >0
COMPUTE KBOV      >0
COMPUTE KBXF      >0
COMPUTE KBCS      >0
COMPUTE KBXP      >0
COMPUTE KTIV      >0
COMPUTE KTAA      >0
COMPUTE KTOV      >0
COMPUTE KTXF      >0
COMPUTE KTCS      >0
COMPUTE KTXP      >0
COMPUTE KMIV      >0
COMPUTE KMAA      >0
COMPUTE KMOV      >0
COMPUTE KMXF      >0
COMPUTE KMCS      >0
COMPUTE KMXP      >0

COMPUTE WCWK      >0
COMPUTE WBWK      >0
COMPUTE WTWK      >0
COMPUTE WMWK      >0
COMPUTE PCWK      >0
COMPUTE KCWK      >0
COMPUTE PBWK      >0
COMPUTE KBWK      >0
COMPUTE PTWK      >0
COMPUTE KTWK      >0
COMPUTE PMWK      >0
COMPUTE KMWK      >0
```

```
* SKIM VALUES, Divide distances by 10 to convert tenths of miles to whole miles
* DRIVE ALONE
COMPUTE            >IF(m201>0)
COMPUTE DAIV       >m201
COMPUTE DACS       >m202/10*AUOP+m203+PRKC
COMPUTE DATE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 2
COMPUTE            >IF(m204>0)
COMPUTE S2IV       >m204
COMPUTE S2CS       >(m205/10*AUOP+m206+PRKC)/2.0
COMPUTE S2TE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 3
COMPUTE            >IF(m207>0)
COMPUTE S3IV       >m207
COMPUTE S3CS       >(m208/10*AUOP+m209+PRKC)/OCC3
COMPUTE S3TE       >TERI+TERJ
COMPUTE            >ENDIF

* Assign Intrazonal trips to Autos (mj11/04/05)
COMPUTE            >IF(P()=Q())
COMPUTE DAIV       >1
COMPUTE DACS       >m202/10*AUOP+m203+PRKC
COMPUTE DATE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 2
COMPUTE            >IF(P()=Q())
COMPUTE S2IV       >1
COMPUTE S2CS       >(m205/10*AUOP+m206+PRKC)/2.0
COMPUTE S2TE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 3
COMPUTE            >IF(P()=Q())
COMPUTE S3IV       >1
COMPUTE S3CS       >(m208/10*AUOP+m209+PRKC)/OCC3
COMPUTE S3TE       >TERI+TERJ
COMPUTE            >ENDIF

*End of Intrazonal trips

* WALK COMMUTER RAIL
COMPUTE            >IF(m305>0)
COMPUTE WCIV       >m305/100.
COMPUTE WCOV       >(m303+m304)/100.
COMPUTE WCXF       >m312
COMPUTE WCCS       >m313
COMPUTE WCXP       >m314/100.
COMPUTE WCWK       >(m301+m302)/100.
COMPUTE            >ENDIF

* WALK BUS
COMPUTE            >IF(m405>0)
COMPUTE WBIV       >m405/100.
COMPUTE WBOV       >(m403+m404)/100.
COMPUTE WBXF       >m412
COMPUTE WBCS       >m413
COMPUTE WBXP       >m414/100.
COMPUTE WBWK       >(m401+m402)/100.
COMPUTE            >ENDIF

* WALK BUS/METRORAIL (TRANSIT)
COMPUTE            >IF(m605>0)
COMPUTE WTIV       >m605/100.
```

```
COMPUTE WTOV       >(m603+m604)/100.
COMPUTE WTXF       >m612
COMPUTE WTCS       >m613
COMPUTE WTXP       >m614/100.
COMPUTE WTWK       >(m601+m602)/100.
COMPUTE            >ENDIF


* WALK METRORAIL
COMPUTE            >IF(m505>0)
COMPUTE WMIV       >m505/100.
COMPUTE WMOV       >(m503+m504)/100.
COMPUTE WMXF       >m512
COMPUTE WMCS       >m513
COMPUTE WMXP       >m514/100.
COMPUTE WMWK       >(m501+m502)/100.
COMPUTE            >ENDIF

* PNR COMMUTER RAIL
COMPUTE            >IF(m319>0)
COMPUTE PCIV       >m319/100.
COMPUTE PCAA       >m329/100.
COMPUTE PCOV       >(m317+m318+m332)/100.
COMPUTE PCXF       >m326
COMPUTE PCCS       >m327+m331+m330/100*AUOP
COMPUTE PCXP       >m328/100.
COMPUTE PCWK       >(m315+m316)/100.
COMPUTE            >ENDIF

* PNR BUS
COMPUTE            >IF(m419>0)
COMPUTE PBIV       >m419/100.
COMPUTE PBAA       >m429/100.
COMPUTE PBOV       >(m417+m418+m432)/100.
COMPUTE PBXF       >m426
COMPUTE PBCS       >m427+m431+m430/100*AUOP
COMPUTE PBXP       >m428/100.
COMPUTE PBWK       >(m415+m416)/100.
COMPUTE            >ENDIF

* PNR BUS/METRORAIL (TRANSIT)
COMPUTE            >IF(m619>0)
COMPUTE PTIV       >m619/100.
COMPUTE PTAA       >m629/100.
COMPUTE PTOV       >(m617+m618+m632)/100.
COMPUTE PTXF       >m626
COMPUTE PTCS       >m627+m631+m630/100*AUOP
COMPUTE PTXP       >m628/100.
COMPUTE PTWK       >(m615+m616)/100.
COMPUTE            >ENDIF


* PNR METRORAIL
COMPUTE            >IF(m519>0)
COMPUTE PMIV       >m519/100.
COMPUTE PMAA       >m529/100.
COMPUTE PMOV       >(m517+m518+m532)/100.
COMPUTE PMXF       >m526
COMPUTE PMCS       >m527+m531+m530/100*AUOP
COMPUTE PMXP       >m528/100.
COMPUTE PMWK       >(m515+m516)/100.
COMPUTE            >ENDIF


* KNR COMMUTER RAIL
COMPUTE            >IF(m319>0)
COMPUTE KCIV       >m319/100.
COMPUTE KCAA       >m329/100.
```

```
COMPUTE KCOV       >(m317+m318)/100.
COMPUTE KCXF       >m326
COMPUTE KCCS       >m327+m330/100*AUOP
COMPUTE KCXP       >m328/100.
COMPUTE KCWK       >(m315+m316)/100.
COMPUTE            >ENDIF


* KNR BUS
COMPUTE            >IF(m437>0)
COMPUTE KBIV       >m437/100.
COMPUTE KBAA       >m447/100.
COMPUTE KBOV       >(m435+m436)/100.
COMPUTE KBXF       >m444
COMPUTE KBCS       >m445+m448/100*AUOP
COMPUTE KBXP       >m446/100.
COMPUTE KBWK       >(m433+m434)/100.
COMPUTE            >ENDIF

* KNR BUS/METRORAIL (TRANSIT)
COMPUTE            >IF(m637>0)
COMPUTE KTIV       >m637/100.
COMPUTE KTAA       >m647/100.
COMPUTE KTOV       >(m635+m636)/100.
COMPUTE KTXF       >m644
COMPUTE KTCS       >m645+m648/100*AUOP
COMPUTE KTXP       >m646/100.
COMPUTE KTWK       >(m633+m634)/100.
COMPUTE            >ENDIF


* KNR METRORAIL
COMPUTE            >IF(m537>0)
COMPUTE KMIV       >m537/100.
COMPUTE KMAA       >m547/100.
COMPUTE KMOV       >(m535+m536)/100.
COMPUTE KMXF       >m544
COMPUTE KMCS       >m545+m548/100*AUOP
COMPUTE KMXP       >m546/100.
COMPUTE KMWK       >(m533+m534)/100.
COMPUTE            >ENDIF

*CONSTANTS BY CHOICE FOR EACH PURPOSE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
PURP01 1INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 1INC 2     1>
PURP03 1INC 3     1>
PURP04 1INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 2INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 2INC 2     1>
PURP03 2INC 3     1>
PURP04 2INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 3INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 3INC 2     1>
PURP03 3INC 3     1>
PURP04 3INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 4INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 4INC 2     1>
PURP03 4INC 3     1>
PURP04 4INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 5INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 5INC 2     1>
PURP03 5INC 3     1>
PURP04 5INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 6INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 6INC 2     1>
PURP03 6INC 3     1>
PURP04 6INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
```

```
PURP01 7INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 7INC 2     1>
PURP03 7INC 3     1>
PURP04 7INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 8INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 8INC 2     1>
PURP03 8INC 3     1>
PURP04 8INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP01 9INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP02 9INC 2     1>
PURP03 9INC 3     1>
PURP04 9INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0110INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0210INC 2     1>
PURP0310INC 3     1>
PURP0410INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0111INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0211INC 2     1>
PURP0311INC 3     1>
PURP0411INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0112INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0212INC 2     1>
PURP0312INC 3     1>
PURP0412INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0113INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0213INC 2     1>
PURP0313INC 3     1>
PURP0413INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0114INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0214INC 2     1>
PURP0314INC 3     1>
PURP0414INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0115INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0215INC 2     1>
PURP0315INC 3     1>
PURP0415INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0116INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0216INC 2     1>
PURP0316INC 3     1>
PURP0416INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0117INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0217INC 2     1>
PURP0317INC 3     1>
PURP0417INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0118INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0218INC 2     1>
PURP0318INC 3     1>
PURP0418INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0119INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0219INC 2     1>
PURP0319INC 3     1>
PURP0419INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000
PURP0120INC 1     1>                              2.000000  2.000000  2.000000  2.000000
PURP0220INC 2     1>
PURP0320INC 3     1>
PURP0420INC 4     1>                              -2.00000  -2.00000  -2.00000  -2.00000

TRIPIN01           >TRP1
TRIPIN02           >TRP2
TRIPIN03           >TRP3
TRIPIN04           >TRP4
TRIPIFACT01        >tfi1
TRIPIFACT02        >tfi2
TRIPIFACT03        >tfi3
TRIPIFACT04        >tfi4
COMPUTE tfi1       >1.0
COMPUTE tfi2       >1.0
COMPUTE tfi3       >1.0
```

```
COMPUTE tfi4       >1.0

*
*OUTPUT MATRICES AND OUTPUT FACTORS BY CHOICE FOR EACH PURPOSE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
TRIPOUT01         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT01        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
TRIPOUT02         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT02        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
TRIPOUT03         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT03        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
TRIPOUT04         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT04        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
**
**P AND A WALK PERCENTS BY CHOICE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
WALK SEG CW 1 PCT 1>WSWM
WALK SEG CW 1 MODE1>Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG CW 2 PCT 1>WSW1
WALK SEG CW 2 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG CW 3 PCT 1>WSW2
WALK SEG CW 3 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y
WALK SEG CW 4 PCT 1>WSW3
WALK SEG CW 4 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y
WALK SEG MD 5 PCT 1>WSM1
WALK SEG MD 5 MODE1>Y         Y         Y                                                 Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG MD 6 PCT 1>WSM2
WALK SEG MD 6 MODE1>Y         Y         Y                                                 Y         Y         Y         Y         Y         Y
WALK SEG NT 7 PCT 1>WSNT
WALK SEG NT 7 MODE1>Y         Y         Y
*SYNTAX OF COMMAND TO ADD A COMPONENT TO A SPECIFIC WALK SEGMENT IF DESIRED
*WALK SEG CW 1 COEF1>                              -0.04747  -0.04747  -0.04747  -0.04747  -0.04747  -0.04747
*WALK SEG CW 1 VAR 1>                              WTSS      DTSS      DISS      WRSS      DRSS      DJSS
COMPUTE WSWM       >PCMI*PCMJ
COMPUTE WSW1       >(PCTI-PCMI)*PCMJ
COMPUTE WSW2       >(PCTI-PCMI)*(PCTJ-PCMJ)
COMPUTE WSW3       >PCMI*(PCTJ-PCMJ)
COMPUTE WSM1       >(1-PCTI)*PCMJ
COMPUTE WSM2       >(1-PCTI)*(PCTJ-PCMJ)
COMPUTE WSNT       >1-WSWM-WSW1-WSW2-WSW3-WSM1-WSM2

*NEST DEFINITIONS BY CHOICE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
NEST 1,1=         1>Y         Y         Y
NEST 1,2=         1>                              Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
NEST 2,1=         1>                              Y         Y         Y         Y
NEST 2,2=         1>                                                                      Y                   Y                   Y                   Y
NEST 2,3=         1>                                                                                Y                   Y                   Y                   Y
NEST 3,1=         1>                              Y
NEST 3,2=         1>                                        Y
NEST 3,3=         1>                                                  Y
NEST 3,4=         1>                                                            Y
NEST 4,1          1>                                                                      Y
NEST 4,2          1>                                                                                          Y
NEST 4,3          1>                                                                                                              Y
NEST 4,4          1>                                                                                                                                  Y
NEST 5,1          1>                                                                                Y
NEST 5,2          1>                                                                                                    Y
NEST 5,3          1>                                                                                                                        Y
NEST 5,4          1>                                                                                                                                            Y
NEST 6,1          1>Y
NEST 6,2          1>          Y         Y
NEST 7,1          1>          Y
NEST 7,2          1>                    Y

IGRP DEFINITION    >i813
JGRP DEFINITION    >j813
* 1 DC CORE/URBAN-DC CORE
```

```
SEGMENT  1         >    1    1
SEGMENT  1         >    3    1
* 2 DC CORE/URBAN-VA CORE
SEGMENT  2         >    1    2
SEGMENT  2         >    3    2
* 3 DC CORE/URBAN-URBAN
SEGMENT  3         >    1    3
SEGMENT  3         >    3    3
SEGMENT  3         >    1    4
SEGMENT  3         >    3    4
SEGMENT  3         >    1    5
SEGMENT  3         >    3    5
* 4 DC CORE/URBAN-OTHER
SEGMENT  4         >    1    6
SEGMENT  4         >    3    6
SEGMENT  4         >    1    7
SEGMENT  4         >    3    7
* 5 MD URBAN-DC CORE
SEGMENT  5         >    4    1
* 6 MD URBAN-VA CORE
SEGMENT  6         >    4    2
* 7 MD URBAN-URBAN
SEGMENT  7         >    4    3
SEGMENT  7         >    4    4
SEGMENT  7         >    4    5
* 8 MD URBAN-OTHER
SEGMENT  8         >    4    6
SEGMENT  8         >    4    7
* 9 VA CORE/URBAN-DC CORE
SEGMENT  9         >    2    1
SEGMENT  9         >    5    1
*10 VA CORE/URBAN-VA CORE
SEGMENT 10         >    2    2
SEGMENT 10         >    5    2
*11 VA CORE/URBAN-URBAN
SEGMENT 11         >    2    3
SEGMENT 11         >    5    3
SEGMENT 11         >    2    4
SEGMENT 11         >    5    4
SEGMENT 11         >    2    5
SEGMENT 11         >    5    5
*12 VA CORE/URBAN-OTHER
SEGMENT 12         >    2    6
SEGMENT 12         >    5    6
SEGMENT 12         >    2    7
SEGMENT 12         >    5    7
*13 MD OTHER-DC CORE
SEGMENT 13         >    6    1
*14 MD OTHER-VA CORE
SEGMENT 14         >    6    2
*15 MD OTHER-URBAN
SEGMENT 15         >    6    3
SEGMENT 15         >    6    4
SEGMENT 15         >    6    5
*16 MD OTHER-OTHER
SEGMENT 16         >    6    6
SEGMENT 16         >    6    7
*17 VA OTHER-DC CORE
SEGMENT 17         >    7    1
*18 VA OTHER-VA CORE
SEGMENT 18         >    7    2
*19 VA OTHER-URBAN
SEGMENT 19         >    7    3
SEGMENT 19         >    7    4
SEGMENT 19         >    7    5
*20 VA OTHER-OTHER
SEGMENT 20         >    7    6
SEGMENT 20         >    7    7
```

```
* SEGMENT  1
NSTC 10 1GRND TOTAL>
NSTC 11 1AUTO      >      0.5    0.00000
NSTC 12 1TRANSIT   >      0.5    3.20679
NSTC 20 1TOTAL TRN >
NSTC 21 1WALK ACC  >      0.5    0.00000
NSTC 22 1PNR ACC   >      0.5   -3.57004
NSTC 23 1KNR ACC   >      0.5   -7.44000
NSTC 30 1WLK TRN
NSTC 31 1WLK CR    >      1.0   -0.38669
NSTC 32 1WLK BUS   >      1.0   -0.48356
NSTC 33 1WLK BU/MR >      1.0   -1.03223
NSTC 34 1WLK METRO >      1.0    0.00000
NSTC 40 1PNR TRN
NSTC 41 1PNR CR    >      1.0   -0.92540
NSTC 42 1PNR BUS   >      1.0   -5.17098
NSTC 43 1PNR BU/MR >      1.0   -3.16686
NSTC 44 1PNR METRO >      1.0    0.00000
NSTC 50 1KNR TRN
NSTC 51 1KNR CR    >      1.0   -0.00779
NSTC 52 1KNR BUS   >      1.0    0.84330
NSTC 53 1KNR BU/MR >      1.0   -0.69698
NSTC 54 1KNR METRO >      1.0    0.00000
NSTC 60 1AUTO
NSTC 61 1LOV       >      1.0    0.00000
NSTC 62 1HOV       >      0.5   -1.37976
NSTC 70 1HOV
NSTC 71 1HOV2      >      1.0    0.00000
NSTC 72 1HOV3+     >      1.0   -0.94074
* SEGMENT  2
NSTC 10 2GRND TOTAL>
NSTC 11 2AUTO      >      0.5    0.00000
NSTC 12 2TRANSIT   >      0.5    1.40110
NSTC 20 2TOTAL TRN >
NSTC 21 2WALK ACC  >      0.5    0.00000
NSTC 22 2PNR ACC   >      0.5   -2.68669
NSTC 23 2KNR ACC   >      0.5   -5.89183
NSTC 30 2WLK TRN
NSTC 31 2WLK CR    >      1.0   -0.49402
NSTC 32 2WLK BUS   >      1.0   -1.96568
NSTC 33 2WLK BU/MR >      1.0   -0.74113
NSTC 34 2WLK METRO >      1.0    0.00000
NSTC 40 2PNR TRN
NSTC 41 2PNR CR    >      1.0   -2.31326
NSTC 42 2PNR BUS   >      1.0   -2.31326
NSTC 43 2PNR BU/MR >      1.0   -3.77408
NSTC 44 2PNR METRO >      1.0    0.00000
NSTC 50 2KNR TRN
NSTC 51 2KNR CR    >      1.0   -0.00492
NSTC 52 2KNR BUS   >      1.0   -0.00492
NSTC 53 2KNR BU/MR >      1.0    0.84223
NSTC 54 2KNR METRO >      1.0    0.00000
NSTC 60 2AUTO
NSTC 61 2LOV       >      1.0    0.00000
NSTC 62 2HOV       >      0.5   -1.35698
NSTC 70 2HOV
NSTC 71 2HOV2      >      1.0    0.00000
NSTC 72 2HOV3+     >      1.0   -0.92354
* SEGMENT  3
NSTC 10 3GRND TOTAL>
NSTC 11 3AUTO      >      0.5    0.00000
NSTC 12 3TRANSIT   >      0.5    2.94637
NSTC 20 3TOTAL TRN >
NSTC 21 3WALK ACC  >      0.5    0.00000
NSTC 22 3PNR ACC   >      0.5   -5.62233
NSTC 23 3KNR ACC   >      0.5   -8.12342
NSTC 30 3WLK TRN
```

```
NSTC 31 3WLK CR    >      1.0    0.80918
NSTC 32 3WLK BUS   >      1.0    1.55298
NSTC 33 3WLK BU/MR >      1.0   -1.39492
NSTC 34 3WLK METRO >      1.0    0.00000
NSTC 40 3PNR TRN
NSTC 41 3PNR CR    >      1.0   -1.21580
NSTC 42 3PNR BUS   >      1.0   -3.55556
NSTC 43 3PNR BU/MR >      1.0   -3.30731
NSTC 44 3PNR METRO >      1.0    0.00000
NSTC 50 3KNR TRN
NSTC 51 3KNR CR    >      1.0    1.58718
NSTC 52 3KNR BUS   >      1.0    4.62183
NSTC 53 3KNR BU/MR >      1.0    1.31714
NSTC 54 3KNR METRO >      1.0    0.00000
NSTC 60 3AUTO
NSTC 61 3LOV       >      1.0    0.00000
NSTC 62 3HOV       >      0.5   -1.81079
NSTC 70 3HOV
NSTC 71 3HOV2      >      1.0    0.00000
NSTC 72 3HOV3+     >      1.0   -0.69100
* SEGMENT  4
NSTC 10 4GRND TOTAL>
NSTC 11 4AUTO      >      0.5    0.00000
NSTC 12 4TRANSIT   >      0.5    2.11087
NSTC 20 4TOTAL TRN >
NSTC 21 4WALK ACC  >      0.5    0.00000
NSTC 22 4PNR ACC   >      0.5   -5.63053
NSTC 23 4KNR ACC   >      0.5   -7.20037
NSTC 30 4WLK TRN
NSTC 31 4WLK CR    >      1.0   -4.84762
NSTC 32 4WLK BUS   >      1.0   -3.85339
NSTC 33 4WLK BU/MR >      1.0   -7.10107
NSTC 34 4WLK METRO >      1.0    0.00000
NSTC 40 4PNR TRN
NSTC 41 4PNR CR    >      1.0    1.69232
NSTC 42 4PNR BUS   >      1.0    4.91697
NSTC 43 4PNR BU/MR >      1.0   -0.43845
NSTC 44 4PNR METRO >      1.0    0.00000
NSTC 50 4KNR TRN
NSTC 51 4KNR CR    >      1.0    0.44883
NSTC 52 4KNR BUS   >      1.0    5.99601
NSTC 53 4KNR BU/MR >      1.0   -0.82729
NSTC 54 4KNR METRO >      1.0    0.00000
NSTC 60 4AUTO
NSTC 61 4LOV       >      1.0    0.00000
NSTC 62 4HOV       >      0.5   -2.12557
NSTC 70 4HOV
NSTC 71 4HOV2      >      1.0    0.00000
NSTC 72 4HOV3+     >      1.0   -0.47697
* SEGMENT  5
NSTC 10 5GRND TOTAL>
NSTC 11 5AUTO      >      0.5    0.00000
NSTC 12 5TRANSIT   >      0.5    6.77185
NSTC 20 5TOTAL TRN >
NSTC 21 5WALK ACC  >      0.5    0.00000
NSTC 22 5PNR ACC   >      0.5   -6.90269
NSTC 23 5KNR ACC   >      0.5   -8.74261
NSTC 30 5WLK TRN
NSTC 31 5WLK CR    >      1.0   -3.41785
NSTC 32 5WLK BUS   >      1.0   -5.83593
NSTC 33 5WLK BU/MR >      1.0   -8.15510
NSTC 34 5WLK METRO >      1.0    0.00000
NSTC 40 5PNR TRN
NSTC 41 5PNR CR    >      1.0    1.79448
NSTC 42 5PNR BUS   >      1.0   -2.85880
NSTC 43 5PNR BU/MR >      1.0   -1.40350
NSTC 44 5PNR METRO >      1.0    0.00000
NSTC 50 5KNR TRN
```

```
NSTC 51 5KNR CR    >      1.0    0.78003
NSTC 52 5KNR BUS   >      1.0    0.72675
NSTC 53 5KNR BU/MR >      1.0   -1.01143
NSTC 54 5KNR METRO >      1.0    0.00000
NSTC 60 5AUTO
NSTC 61 5LOV       >      1.0    0.00000
NSTC 62 5HOV       >      0.5   -1.36896
NSTC 70 5HOV
NSTC 71 5HOV2      >      1.0    0.00000
NSTC 72 5HOV3+     >      1.0   -0.89350
* SEGMENT  6
NSTC 10 6GRND TOTAL>
NSTC 11 6AUTO      >      0.5    0.00000
NSTC 12 6TRANSIT   >      0.5    2.29600
NSTC 20 6TOTAL TRN >
NSTC 21 6WALK ACC  >      0.5    0.00000
NSTC 22 6PNR ACC   >      0.5   -5.84010
NSTC 23 6KNR ACC   >      0.5   -6.73363
NSTC 30 6WLK TRN
NSTC 31 6WLK CR    >      1.0   -2.50838
NSTC 32 6WLK BUS   >      1.0   -3.75477
NSTC 33 6WLK BU/MR >      1.0   -5.41698
NSTC 34 6WLK METRO >      1.0    0.00000
NSTC 40 6PNR TRN
NSTC 41 6PNR CR    >      1.0   -1.87150
NSTC 42 6PNR BUS   >      1.0   -1.87150
NSTC 43 6PNR BU/MR >      1.0   -1.87150
NSTC 44 6PNR METRO >      1.0    0.00000
NSTC 50 6KNR TRN
NSTC 51 6KNR CR    >      1.0   -0.28853
NSTC 52 6KNR BUS   >      1.0   -0.28853
NSTC 53 6KNR BU/MR >      1.0    1.81078
NSTC 54 6KNR METRO >      1.0    0.00000
NSTC 60 6AUTO
NSTC 61 6LOV       >      1.0    0.00000
NSTC 62 6HOV       >      0.5   -1.36868
NSTC 70 6HOV
NSTC 71 6HOV2      >      1.0    0.00000
NSTC 72 6HOV3+     >      1.0   -0.77620
* SEGMENT  7
NSTC 10 7GRND TOTAL>
NSTC 11 7AUTO      >      0.5    0.00000
NSTC 12 7TRANSIT   >      0.5    0.44574
NSTC 20 7TOTAL TRN >
NSTC 21 7WALK ACC  >      0.5    0.00000
NSTC 22 7PNR ACC   >      0.5   -4.18683
NSTC 23 7KNR ACC   >      0.5   -5.57617
NSTC 30 7WLK TRN
NSTC 31 7WLK CR    >      1.0   -1.24914
NSTC 32 7WLK BUS   >      1.0   -1.28982
NSTC 33 7WLK BU/MR >      1.0   -2.45266
NSTC 34 7WLK METRO >      1.0    0.00000
NSTC 40 7PNR TRN
NSTC 41 7PNR CR    >      1.0    0.85910
NSTC 42 7PNR BUS   >      1.0   -1.84668
NSTC 43 7PNR BU/MR >      1.0   -2.68461
NSTC 44 7PNR METRO >      1.0    0.00000
NSTC 50 7KNR TRN
NSTC 51 7KNR CR    >      1.0   -0.36583
NSTC 52 7KNR BUS   >      1.0   -0.73477
NSTC 53 7KNR BU/MR >      1.0   -0.19630
NSTC 54 7KNR METRO >      1.0    0.00000
NSTC 60 7AUTO
NSTC 61 7LOV       >      1.0    0.00000
NSTC 62 7HOV       >      0.5   -1.71168
NSTC 70 7HOV
NSTC 71 7HOV2      >      1.0    0.00000
NSTC 72 7HOV3+     >      1.0   -1.09063
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* SEGMENT  8
NSTC 10 8GRND TOTAL>
NSTC 11 8AUTO      >      0.5    0.00000
NSTC 12 8TRANSIT   >      0.5    0.65716
NSTC 20 8TOTAL TRN >
NSTC 21 8WALK ACC  >      0.5    0.00000
NSTC 22 8PNR ACC   >      0.5   -5.23944
NSTC 23 8KNR ACC   >      0.5   -4.09943
NSTC 30 8WLK TRN
NSTC 31 8WLK CR    >      1.0   -4.49090
NSTC 32 8WLK BUS   >      1.0    0.74038
NSTC 33 8WLK BU/MR >      1.0   -1.90376
NSTC 34 8WLK METRO >      1.0    0.00000
NSTC 40 8PNR TRN
NSTC 41 8PNR CR    >      1.0    5.34853
NSTC 42 8PNR BUS   >      1.0    1.47372
NSTC 43 8PNR BU/MR >      1.0   -0.21362
NSTC 44 8PNR METRO >      1.0    0.00000
NSTC 50 8KNR TRN
NSTC 51 8KNR CR    >      1.0   -0.16088
NSTC 52 8KNR BUS   >      1.0    8.07255
NSTC 53 8KNR BU/MR >      1.0   -0.72757
NSTC 54 8KNR METRO >      1.0    0.00000
NSTC 60 8AUTO
NSTC 61 8LOV       >      1.0    0.00000
NSTC 62 8HOV       >      0.5   -1.84899
NSTC 70 8HOV
NSTC 71 8HOV2      >      1.0    0.00000
NSTC 72 8HOV3+     >      1.0   -0.72882
* SEGMENT  9
NSTC 10 9GRND TOTAL>
NSTC 11 9AUTO      >      0.5    0.00000
NSTC 12 9TRANSIT   >      0.5    7.71237
NSTC 20 9TOTAL TRN >
NSTC 21 9WALK ACC  >      0.5    0.00000
NSTC 22 9PNR ACC   >      0.5  -11.34025
NSTC 23 9KNR ACC   >      0.5  -14.45396
NSTC 30 9WLK TRN
NSTC 31 9WLK CR    >      1.0  -16.15065
NSTC 32 9WLK BUS   >      1.0  -19.50202
NSTC 33 9WLK BU/MR >      1.0  -16.38152
NSTC 34 9WLK METRO >      1.0    0.00000
NSTC 40 9PNR TRN
NSTC 41 9PNR CR    >      1.0    6.34374
NSTC 42 9PNR BUS   >      1.0   -1.51162
NSTC 43 9PNR BU/MR >      1.0   -3.20131
NSTC 44 9PNR METRO >      1.0    0.00000
NSTC 50 9KNR TRN
NSTC 51 9KNR CR    >      1.0   -1.15140
NSTC 52 9KNR BUS   >      1.0   -1.15140
NSTC 53 9KNR BU/MR >      1.0   -1.15140
NSTC 54 9KNR METRO >      1.0    0.00000
NSTC 60 9AUTO
NSTC 61 9LOV       >      1.0    0.00000
NSTC 62 9HOV       >      0.5   -1.46375
NSTC 70 9HOV
NSTC 71 9HOV2      >      1.0    0.00000
NSTC 72 9HOV3+     >      1.0   -0.61134
* SEGMENT 10
NSTC 1010GRND TOTAL>
NSTC 1110AUTO      >      0.5    0.00000
NSTC 1210TRANSIT   >      0.5    0.81029
NSTC 2010TOTAL TRN >
NSTC 2110WALK ACC  >      0.5    0.00000
NSTC 2210PNR ACC   >      0.5   -3.95681
NSTC 2310KNR ACC   >      0.5   -7.53617
NSTC 3010WLK TRN
NSTC 3110WLK CR    >      1.0   -0.26430
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NSTC 3210WLK BUS   >      1.0   -0.63244
NSTC 3310WLK BU/MR >      1.0   -0.34735
NSTC 3410WLK METRO >      1.0    0.00000
NSTC 4010PNR TRN
NSTC 4110PNR CR    >      1.0    4.28604
NSTC 4210PNR BUS   >      1.0    4.28604
NSTC 4310PNR BU/MR >      1.0   -1.77455
NSTC 4410PNR METRO >      1.0    0.00000
NSTC 5010KNR TRN
NSTC 5110KNR CR    >      1.0    2.99622
NSTC 5210KNR BUS   >      1.0    2.99622
NSTC 5310KNR BU/MR >      1.0    1.06067
NSTC 5410KNR METRO >      1.0    0.00000
NSTC 6010AUTO
NSTC 6110LOV       >      1.0    0.00000
NSTC 6210HOV       >      0.5   -1.45978
NSTC 7010HOV
NSTC 7110HOV2      >      1.0    0.00000
NSTC 7210HOV3+     >      1.0   -1.11399
* SEGMENT 11
NSTC 1011GRND TOTAL>
NSTC 1111AUTO      >      0.5    0.00000
NSTC 1211TRANSIT   >      0.5    0.73682
NSTC 2011TOTAL TRN >
NSTC 2111WALK ACC  >      0.5    0.00000
NSTC 2211PNR ACC   >      0.5   -4.83449
NSTC 2311KNR ACC   >      0.5   -7.35390
NSTC 3011WLK TRN
NSTC 3111WLK CR    >      1.0   -0.88574
NSTC 3211WLK BUS   >      1.0   -2.16872
NSTC 3311WLK BU/MR >      1.0   -4.45996
NSTC 3411WLK METRO >      1.0    0.00000
NSTC 4011PNR TRN
NSTC 4111PNR CR    >      1.0    0.00289
NSTC 4211PNR BUS   >      1.0    0.00289
NSTC 4311PNR BU/MR >      1.0   -6.04591
NSTC 4411PNR METRO >      1.0    0.00000
NSTC 5011KNR TRN
NSTC 5111KNR CR    >      1.0   -0.38376
NSTC 5211KNR BUS   >      1.0   -0.38376
NSTC 5311KNR BU/MR >      1.0   -2.23803
NSTC 5411KNR METRO >      1.0    0.00000
NSTC 6011AUTO
NSTC 6111LOV       >      1.0    0.00000
NSTC 6211HOV       >      0.5   -1.71315
NSTC 7011HOV
NSTC 7111HOV2      >      1.0    0.00000
NSTC 7211HOV3+     >      1.0   -0.90731
* SEGMENT 12
NSTC 1012GRND TOTAL>
NSTC 1112AUTO      >      0.5    0.00000
NSTC 1212TRANSIT   >      0.5    1.51998
NSTC 2012TOTAL TRN >
NSTC 2112WALK ACC  >      0.5    0.00000
NSTC 2212PNR ACC   >      0.5   -6.72140
NSTC 2312KNR ACC   >      0.5   -7.28585
NSTC 3012WLK TRN
NSTC 3112WLK CR    >      1.0   -7.09220
NSTC 3212WLK BUS   >      1.0   -8.21416
NSTC 3312WLK BU/MR >      1.0   -9.69802
NSTC 3412WLK METRO >      1.0    0.00000
NSTC 4012PNR TRN
NSTC 4112PNR CR    >      1.0   22.97230
NSTC 4212PNR BUS   >      1.0   -0.50997
NSTC 4312PNR BU/MR >      1.0   -5.42257
NSTC 4412PNR METRO >      1.0    0.00000
NSTC 5012KNR TRN
NSTC 5112KNR CR    >      1.0   -1.87574
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NSTC 5212KNR BUS   >      1.0   -1.99009
NSTC 5312KNR BU/MR >      1.0   -5.68197
NSTC 5412KNR METRO >      1.0    0.00000
NSTC 6012AUTO
NSTC 6112LOV       >      1.0    0.00000
NSTC 6212HOV       >      0.5   -1.80201
NSTC 7012HOV
NSTC 7112HOV2      >      1.0    0.00000
NSTC 7212HOV3+     >      1.0   -0.86657
* SEGMENT 13
NSTC 1013GRND TOTAL>
NSTC 1113AUTO      >      0.5    0.00000
NSTC 1213TRANSIT   >      0.5    2.30336
NSTC 2013TOTAL TRN >
NSTC 2113WALK ACC  >      0.5    0.00000
NSTC 2213PNR ACC   >      0.5   -3.31689
NSTC 2313KNR ACC   >      0.5   -4.98725
NSTC 3013WLK TRN
NSTC 3113WLK CR    >      1.0   -3.23673
NSTC 3213WLK BUS   >      1.0   -4.35370
NSTC 3313WLK BU/MR >      1.0   -4.93525
NSTC 3413WLK METRO >      1.0    0.00000
NSTC 4013PNR TRN
NSTC 4113PNR CR    >      1.0    0.89716
NSTC 4213PNR BUS   >      1.0   -1.78058
NSTC 4313PNR BU/MR >      1.0   -1.26448
NSTC 4413PNR METRO >      1.0    0.00000
NSTC 5013KNR TRN
NSTC 5113KNR CR    >      1.0   -1.61880
NSTC 5213KNR BUS   >      1.0   -3.84956
NSTC 5313KNR BU/MR >      1.0   -2.06913
NSTC 5413KNR METRO >      1.0    0.00000
NSTC 6013AUTO
NSTC 6113LOV       >      1.0    0.00000
NSTC 6213HOV       >      0.5   -1.37038
NSTC 7013HOV
NSTC 7113HOV2      >      1.0    0.00000
NSTC 7213HOV3+     >      1.0   -0.94917
* SEGMENT 14
NSTC 1014GRND TOTAL>
NSTC 1114AUTO      >      0.5    0.00000
NSTC 1214TRANSIT   >      0.5    1.04658
NSTC 2014TOTAL TRN >
NSTC 2114WALK ACC  >      0.5    0.00000
NSTC 2214PNR ACC   >      0.5   -2.00707
NSTC 2314KNR ACC   >      0.5   -3.35764
NSTC 3014WLK TRN
NSTC 3114WLK CR    >      1.0   -1.34012
NSTC 3214WLK BUS   >      1.0    1.15736
NSTC 3314WLK BU/MR >      1.0   -1.55015
NSTC 3414WLK METRO >      1.0    0.00000
NSTC 4014PNR TRN
NSTC 4114PNR CR    >      1.0   -1.04654
NSTC 4214PNR BUS   >      1.0   -0.13883
NSTC 4314PNR BU/MR >      1.0   -1.36822
NSTC 4414PNR METRO >      1.0    0.00000
NSTC 5014KNR TRN
NSTC 5114KNR CR    >      1.0   -2.01377
NSTC 5214KNR BUS   >      1.0   -3.64401
NSTC 5314KNR BU/MR >      1.0   -2.96550
NSTC 5414KNR METRO >      1.0    0.00000
NSTC 6014AUTO
NSTC 6114LOV       >      1.0    0.00000
NSTC 6214HOV       >      0.5   -1.35115
NSTC 7014HOV
NSTC 7114HOV2      >      1.0    0.00000
NSTC 7214HOV3+     >      1.0   -0.95807
* SEGMENT 15
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NSTC 1015GRND TOTAL>
NSTC 1115AUTO      >      0.5    0.00000
NSTC 1215TRANSIT   >      0.5    0.41246
NSTC 2015TOTAL TRN >
NSTC 2115WALK ACC  >      0.5    0.00000
NSTC 2215PNR ACC   >      0.5   -3.61550
NSTC 2315KNR ACC   >      0.5   -4.51235
NSTC 3015WLK TRN
NSTC 3115WLK CR    >      1.0   -6.52171
NSTC 3215WLK BUS   >      1.0   -0.30612
NSTC 3315WLK BU/MR >      1.0   -3.00585
NSTC 3415WLK METRO >      1.0    0.00000
NSTC 4015PNR TRN
NSTC 4115PNR CR    >      1.0   -1.12725
NSTC 4215PNR BUS   >      1.0   -0.45572
NSTC 4315PNR BU/MR >      1.0   -2.47410
NSTC 4415PNR METRO >      1.0    0.00000
NSTC 5015KNR TRN
NSTC 5115KNR CR    >      1.0   -4.66422
NSTC 5215KNR BUS   >      1.0   -0.09427
NSTC 5315KNR BU/MR >      1.0   -1.17254
NSTC 5415KNR METRO >      1.0    0.00000
NSTC 6015AUTO
NSTC 6115LOV       >      1.0    0.00000
NSTC 6215HOV       >      0.5   -1.65225
NSTC 7015HOV
NSTC 7115HOV2      >      1.0    0.00000
NSTC 7215HOV3+     >      1.0   -1.06990
* SEGMENT 16
NSTC 1016GRND TOTAL>
NSTC 1116AUTO      >      0.5    0.00000
NSTC 1216TRANSIT   >      0.5   -0.29286
NSTC 2016TOTAL TRN >
NSTC 2116WALK ACC  >      0.5    0.00000
NSTC 2216PNR ACC   >      0.5   -4.46101
NSTC 2316KNR ACC   >      0.5   -4.42540
NSTC 3016WLK TRN
NSTC 3116WLK CR    >      1.0   -6.19744
NSTC 3216WLK BUS   >      1.0    0.51942
NSTC 3316WLK BU/MR >      1.0   -1.96788
NSTC 3416WLK METRO >      1.0    0.00000
NSTC 4016PNR TRN
NSTC 4116PNR CR    >      1.0   -3.20367
NSTC 4216PNR BUS   >      1.0   -2.01180
NSTC 4316PNR BU/MR >      1.0   -2.58387
NSTC 4416PNR METRO >      1.0    0.00000
NSTC 5016KNR TRN
NSTC 5116KNR CR    >      1.0   -9.32123
NSTC 5216KNR BUS   >      1.0   -2.57598
NSTC 5316KNR BU/MR >      1.0   -2.63584
NSTC 5416KNR METRO >      1.0    0.00000
NSTC 6016AUTO
NSTC 6116LOV       >      1.0    0.00000
NSTC 6216HOV       >      0.5   -1.88046
NSTC 7016HOV
NSTC 7116HOV2      >      1.0    0.00000
NSTC 7216HOV3+     >      1.0   -1.93428
* SEGMENT 17
NSTC 1017GRND TOTAL>
NSTC 1117AUTO      >      0.5    0.00000
NSTC 1217TRANSIT   >      0.5    3.42690
NSTC 2017TOTAL TRN >
NSTC 2117WALK ACC  >      0.5    0.00000
NSTC 2217PNR ACC   >      0.5   -6.38962
NSTC 2317KNR ACC   >      0.5   -7.39126
NSTC 3017WLK TRN
NSTC 3117WLK CR    >      1.0  -11.69046
NSTC 3217WLK BUS   >      1.0   -9.90154
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NSTC 3317WLK BU/MR >      1.0   -9.49376
NSTC 3417WLK METRO >      1.0    0.00000
NSTC 4017PNR TRN
NSTC 4117PNR CR    >      1.0   -0.43676
NSTC 4217PNR BUS   >      1.0   -2.06328
NSTC 4317PNR BU/MR >      1.0   -1.79244
NSTC 4417PNR METRO >      1.0    0.00000
NSTC 5017KNR TRN
NSTC 5117KNR CR    >      1.0   -4.49535
NSTC 5217KNR BUS   >      1.0   -5.13483
NSTC 5317KNR BU/MR >      1.0   -3.93126
NSTC 5417KNR METRO >      1.0    0.00000
NSTC 6017AUTO
NSTC 6117LOV       >      1.0    0.00000
NSTC 6217HOV       >      0.5   -1.54949
NSTC 7017HOV
NSTC 7117HOV2      >      1.0    0.00000
NSTC 7217HOV3+     >      1.0   -0.63130
* SEGMENT 18
NSTC 1018GRND TOTAL>
NSTC 1118AUTO      >      0.5    0.00000
NSTC 1218TRANSIT   >      0.5    1.91147
NSTC 2018TOTAL TRN >
NSTC 2118WALK ACC  >      0.5    0.00000
NSTC 2218PNR ACC   >      0.5   -4.17479
NSTC 2318KNR ACC   >      0.5   -5.64305
NSTC 3018WLK TRN
NSTC 3118WLK CR    >      1.0   -4.65060
NSTC 3218WLK BUS   >      1.0   -2.71283
NSTC 3318WLK BU/MR >      1.0   -3.73051
NSTC 3418WLK METRO >      1.0    0.00000
NSTC 4018PNR TRN
NSTC 4118PNR CR    >      1.0    0.89007
NSTC 4218PNR BUS   >      1.0   -1.23406
NSTC 4318PNR BU/MR >      1.0   -1.32168
NSTC 4418PNR METRO >      1.0    0.00000
NSTC 5018KNR TRN
NSTC 5118KNR CR    >      1.0   -2.30967
NSTC 5218KNR BUS   >      1.0   -4.29997
NSTC 5318KNR BU/MR >      1.0   -3.55731
NSTC 5418KNR METRO >      1.0    0.00000
NSTC 6018AUTO
NSTC 6118LOV       >      1.0    0.00000
NSTC 6218HOV       >      0.5   -1.42265
NSTC 7018HOV
NSTC 7118HOV2      >      1.0    0.00000
NSTC 7218HOV3+     >      1.0   -1.11008
* SEGMENT 19
NSTC 1019GRND TOTAL>
NSTC 1119AUTO      >      0.5    0.00000
NSTC 1219TRANSIT   >      0.5    0.72002
NSTC 2019TOTAL TRN >
NSTC 2119WALK ACC  >      0.5    0.00000
NSTC 2219PNR ACC   >      0.5   -4.69840
NSTC 2319KNR ACC   >      0.5   -4.82984
NSTC 3019WLK TRN
NSTC 3119WLK CR    >      1.0   -9.25989
NSTC 3219WLK BUS   >      1.0   -3.60069
NSTC 3319WLK BU/MR >      1.0   -5.12770
NSTC 3419WLK METRO >      1.0    0.00000
NSTC 4019PNR TRN
NSTC 4119PNR CR    >      1.0   -0.96742
NSTC 4219PNR BUS   >      1.0    2.14280
NSTC 4319PNR BU/MR >      1.0   -2.35168
NSTC 4419PNR METRO >      1.0    0.00000
NSTC 5019KNR TRN
NSTC 5119KNR CR    >      1.0   -6.14707
NSTC 5219KNR BUS   >      1.0   -1.26182
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NSTC 5319KNR BU/MR >      1.0   -3.61830
NSTC 5419KNR METRO >      1.0    0.00000
NSTC 6019AUTO
NSTC 6119LOV       >      1.0    0.00000
NSTC 6219HOV       >      0.5   -1.58771
NSTC 7019HOV
NSTC 7119HOV2      >      1.0    0.00000
NSTC 7219HOV3+     >      1.0   -1.04022
* SEGMENT 20
NSTC 1020GRND TOTAL>
NSTC 1120AUTO      >      0.5    0.00000
NSTC 1220TRANSIT   >      0.5    0.88941
NSTC 2020TOTAL TRN >
NSTC 2120WALK ACC  >      0.5    0.00000
NSTC 2220PNR ACC   >      0.5   -5.41034
NSTC 2320KNR ACC   >      0.5   -5.37385
NSTC 3020WLK TRN
NSTC 3120WLK CR    >      1.0  -14.21692
NSTC 3220WLK BUS   >      1.0   -8.29971
NSTC 3320WLK BU/MR >      1.0   -9.88311
NSTC 3420WLK METRO >      1.0    0.00000
NSTC 4020PNR TRN
NSTC 4120PNR CR    >      1.0  -13.05760
NSTC 4220PNR BUS   >      1.0  -11.27065
NSTC 4320PNR BU/MR >      1.0  -13.52812
NSTC 4420PNR METRO >      1.0    0.00000
NSTC 5020KNR TRN
NSTC 5120KNR CR    >      1.0  -18.57485
NSTC 5220KNR BUS   >      1.0  -10.37418
NSTC 5320KNR BU/MR >      1.0  -14.42615
NSTC 5420KNR METRO >      1.0    0.00000
NSTC 6020AUTO
NSTC 6120LOV       >      1.0    0.00000
NSTC 6220HOV       >      0.5   -1.80418
NSTC 7020HOV
NSTC 7120HOV2      >      1.0    0.00000
NSTC 7220HOV3+     >      1.0   -1.59241

*DOWNTOWN=8
*SELI               >        8

*UNION STATION=64
*SELI               >       64

* =122
*SELI               >      122

*BETHESDA=345
*SELI               >      345

*SILVER SPRING=362
*SELI               >      362

*N.SILVER SPRING=464
*SELI               >      464

* =475
*SELI               >      475

*SHADY GROVE RD=578
*SELI               >      578

* =787
*SELI               >      787

*ANDREWS AFB=829
*SELI               >      829
```

```
*NEW CARROLTON=927
*SELI               >       927

*BRISTOL=972
*SELI               >       972

*FREDERICK=1043
*SELI               >      1043

*JESSUP=1080
*SELI               >      1080

*SCAGGSVILLE=1091
*SELI               >      1091

*WALDORF=1216
*SELI               >      1216

*PENTAGON=1231
*SELI               >      1231

*ROSSLYN=1236
*SELI               >      1236

*ALEXANDRIA=1337
*SELI               >      1337

* =1455
*SELI               >      1455

*SPRINGFIELD=1502
*SELI               >      1502

*  =1511
*SELI               >      1511

*TYSONS CRNR=1537
*SELI               >      1537

*FT BELVOIR=1554
*SELI               >      1554

*VIENNA=1619
*SELI               >      1619

*DULES AP=1698
*SELI               >      1698

*RESTON=1716
*SELI               >      1716

*LEESBURG=1842
*SELI               >      1842

*BRUNSWICK=1863
*SELI               >      1863

*DALE CITY=1942
*SELI               >      1942

*MANASSAS=1967
*SELI               >      1967

*SPOTSYLVANIA=2110
*SELI               >      2110

* =2055
*SELI               >      2055
```

```
*SELJ               >         8
*SELJ               >        63
*SELJ               >        64
*SELJ               >        77
*SELJ               >       100
*SELJ               >       344
*SELJ               >       345
*SELJ               >       362
*SELJ               >      1231
*SELJ               >      1236
*SELJ               >      1265
*SELJ               >      1337
*SELJ               >      1537

*SELI               >  523
*SELJ               >    9

TRACE              >         0
* OUTPUT %           >
*PROCSEL            >
PRINT MS           >HBW_NL_MC.PRN
INPUT PRINT FILE   >HBW_NL_MC.PRN
INPUT GOALS        >HBW_NL_MC.GOL
INFILE 1           >HBW_INCOME.PTT
INFILE 2           >HWYAM.SKM
INFILE 3           >TRNAM_CR.SKM
INFILE 4           >TRNAM_AB.SKM
INFILE 5           >TRNAM_MR.SKM
INFILE 6           >TRNAM_BM.SKM
ZINFILE 8          >ZONEV2.A2F
OUTFILE 9          >HBW_NL_MC.MTT

* FTA USER BENEFITS SPECIFICATIONS
*FTA RESULTS FILE   >HBW_NL_MC.BEN
FTA TRANSIT COEFF  >-0.02128
FTA AUTO COEFF     >-0.02128
FTA PURPOSE NAME   >HBW
FTA PERIOD NAME    >ALLDAY
FTA ALTER. NAME    >CALIB
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
FTA AUTO NEST      >         1         1
FTA MOTORIZED?    1>Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
FTA TRANSIT?      1>                              Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
```

8 nhb_nl_mc.ctl

```
NHB OP NESTED LOGIT MC - #DATE:  5/08/2008 #VER:  21
CHOICE            1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
*
*
*LOGIT COEFFICIENTS BY CHOICE FOR EACH SKIM (NO INPUT SKIM IS
*EQUIVALENT TO A CONSTANT)
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
COEF01:IVTT       1>-0.02860  -0.02860  -0.02860  -0.02860  -0.02860  -0.02860  -0.02860  -0.02860  -0.02860  -0.02860  -0.02860  -0.02860  -0.02860  -0.02860  -0.02860
SKIM01:IVTT       1>DAIV      S2IV      S3IV      WCIV      WBIV      WTIV      WMIV      PCIV      KCIV      PBIV      KBIV      PTIV      KTIV      PMIV      KMIV
COEF02:AUTO ACC   1>                                                                      -0.04290  -0.04290  -0.04290  -0.04290  -0.04290  -0.04290  -0.04290  -0.04290
SKIM02:AUTO ACC   1>                                                                      PCAA      KCAA      PBAA      KBAA      PTAA      KTAA      PMAA      KMAA
COEF03:TERM/OVTT  1>-0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150
SKIM03:TERM/OVTT  1>DATE      S2TE      S3TE      WCOV      WBOV      WTOV      WMOV      PCOV      KCOV      PBOV      KBOV      PTOV      KTOV      PMOV      KMOV
```

```
* LIMIT COEF 04 TO PURPOSE 1
COEF PURP04        >1
COEF04:COST INC1  1>-0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994
SKIM04:COST INC1  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
* LIMIT COEF 05 TO PURPOSE 2
COEF PURP05        >2
COEF05:COST INC2  1>-0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994
SKIM05:COST INC2  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
* LIMIT COEF 06 TO PURPOSE 3
COEF PURP06        >3
COEF06:COST INC3  1>-0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994
SKIM06:COST INC3  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
COEF PURP07        >4
* LIMIT COEF 07 TO PURPOSE 4
COEF07:COST INC4  1>-0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994  -0.00994
SKIM07:COST INC4  1>DACS      S2CS      S3CS      WCCS      WBCS      WTCS      WMCS      PCCS      KCCS      PBCS      KBCS      PTCS      KTCS      PMCS      KMCS
COEF08:TRN XFERS  1>                            -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000  -0.00000
SKIM08:TRN XFERS  1>                            WCXF      WBXF      WTXF      WMXF      PCXF      KCXF      PBXF      KBXF      PTXF      KTXF      PMXF      KMXF
COEF09:TRN BRDPEN 1>                            -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150  -0.07150
SKIM09:TRN BRDPEN 1>                            WCXP      WBXP      WTXP      WMXP      PCXP      KCXP      PBXP      KBXP      PTXP      KTXP      PMXP      KMXP
*WALK WEIGHT
COEF10:TRN WLKWT  1>                            -0.05720  -0.05720  -0.05720  -0.05720  -0.05720  -0.05720  -0.05720  -0.05720  -0.05720  -0.05720  -0.05720  -0.05720
SKIM10:TRN WLKWT  1>                            WCWK      WBWK      WTWK      WMWK      PCWK      KCWK      PBWK      KBWK      PTWK      KTWK      PMWK      KMWK

*SYNTAX TO LIMIT UTILITY ELEMENT TO A PARTICULAR WALK SEGMENT IN THIS EXAMPLE
*    COEF 18 APPLIES ONLY TO WALK SEGMENT 1
*COEF WLKSEG18      >1

* ASSUMED MATRIX ORGANIZATION
* FILE 1 TRIP TABLE (SEPARATE FOR EACH PURPOSE)
* 1 INCOME 1 (HOME-BASED)/ALL NHB TRIPS
* 2 INCOME 2 (HOME-BASED)
* 3 INCOME 3 (HOME-BASED)
* 4 INCOME 4 (HOME-BASED)
*
* FILE 2 HIGHWAY SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* 1 SOV   TIME (MIN)
* 2 SOV   DIST (0.1 MILES)
* 3 SOV   TOLL (1994 CENTS)
* 4 HOV2  TIME (MIN)
* 5 HOV2  DIST (0.1 MILES)
* 6 HOV2  TOLL (1994 CENTS)
* 7 HOV3+ TIME (MIN)
* 8 HOV3+ DIST (0.1 MILES)
* 9 HOV3+ TOLL (1994 CENTS)
*
* FILE 3=COM. RAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 4=BUS SKIMS       (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 5=METRORAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
* FILE 6=BUS+METRORAIL SKIMS (SEPARATE FOR PEAK AND OFFPEAK)
*  1 WLK ACC/EGR (.01 MIN)  15 PNR ACC/EGR (.01 MIN)  33 KNR ACC/EGR  (.01 MIN)
*  2 WLK OTHER   (.01 MIN)  16 PNR OTHER   (.01 MIN)  34 KNR OTHER   (.01 MIN)
*  3 WLK IWAIT   (.01 MIN)  17 PNR IWAIT   (.01 MIN)  35 KNR IWAIT   (.01 MIN)
*  4 WLK XWAIT   (.01 MIN)  18 PNR XWAIT   (.01 MIN)  36 KNR XWAIT   (.01 MIN)
*  5 WLK IVTT TOT(.01 MIN)  19 PNR IVTT TOT(.01 MIN)  37 KNR IVTT TOT(.01 MIN)
*  6 WLK IVTT CR (.01 MIN)  20 PNR IVTT CR (.01 MIN)  38 KNR IVTT CR (.01 MIN)
*  7 WLK IVTT XB (.01 MIN)  21 PNR IVTT XB (.01 MIN)  39 KNR IVTT XB (.01 MIN)
*  8 WLK IVTT MR (.01 MIN)  22 PNR IVTT MR (.01 MIN)  40 KNR IVTT MR (.01 MIN)
*  9 WLK IVTT NM (.01 MIN)  23 PNR IVTT NM (.01 MIN)  41 KNR IVTT NM (.01 MIN)
* 10 WLK IVTT NM2(.01 MIN)  24 PNR IVTT NM2(.01 MIN)  42 KNR IVTT NM2(.01 MIN)
* 11 WLK IVTT LB (.01 MIN)  25 PNR IVTT LB (.01 MIN)  43 KNR IVTT LB (.01 MIN)
* 12 WLK #XFERS  (NUMBER )  26 PNR #XFERS  (NUMBER )  44 KNR #XFERS  (NUMBER )
* 13 WLK COST    (94CENTS)  27 PNR COST    (94CENTS)  45 KNR COST    (94CENTS)
* 14 WLK XPEN    (.01 MIN)  28 PNR XPEN    (.01 MIN)  46 KNR XPEN    (.01 MIN)
*                           29 PNR ACC TIME(.01 MIN)  47 KNR ACC TIME(.01 MIN)
*                           30 PNR ACC DIST(.01 MIL)  48 KNR ACC DIST(.01 MIL)
*                           31 PNR ACC COST(94CENTS)
*                           32 PNR STA TERM(.01 MIN)
```

```
*
* FILE 8=ZDATA
*  1 HBW PARK COST (1994 CENTS)
*  2 HBS PARK COST (1994 CENTS)
*  3 HBO PARK COST (1994 CENTS)
*  4 NHB PARK COST (1994 CENTS)
*  5 TERMINAL TIME (HOME BASED) (MINUTES)
*  6 TERMINAL TIME (NON HOME BASED) (MINUTES)
*  7 ARC VIEW SHORT WALK PERCENT TO METRO
*  8 ARC VIEW LONG WALK PERCENT TO METRO
*  9 ARC VIEW SHORT WALK PERCENT TO ALL AM PK TRANSIT
* 10 ARC VIEW LONG WALK PERCENT TO ALL AM PK TRANSIT
* 11 ARC VIEW SHORT WALK PERCENT TO ALL OP TRANSIT
* 12 ARC VIEW LONG WALK PERCENT TO ALL OP TRANSIT
* 13 AREA TYPE
*    1=DC CORE
*    2=VA CORE
*    3=DC URBAN
*    4=MD URBAN
*    5=VA URBAN
*    6=MD OTHER
*    7=VA OTHER

* PARAMETERS
*=======================================================
* AUTO OPERATING COSTS IN CENTS/mile
COMPUTE AUOP       >10
* AUTO OCCUPANCY FOR 3+   Reduced from 3.5 to 3.35 on 3/1/07 rm
COMPUTE OCC3       >3.35

* TERMINAL TIMES, USE i/j805 FOR HBW, HBS, AND HBO. USE i/j806 FOR NHB
* HBW/HBS/HBO
*COMPUTE TERI       >i805
*COMPUTE TERJ       >j805
* NHB
COMPUTE TERI       >i806
COMPUTE TERJ       >j806

* PARK COSTS, USE i/j801 802 803 804 FOR HBW, HBS, HBO, NHB RESPECTIVELY
* HBW
*COMPUTE PRKC       >j801/2.
* HBS
* COMPUTE PRKC       >j802/2.
* HBO
* COMPUTE PRKC       >j803/2.
* NHB
COMPUTE PRKC       >j804

* Percent of productions in long-walk area that are assumed to walk = 25% (i.e., 75% drive)
COMPUTE PCLM       >0.25
COMPUTE PCLT       >0.25
* PERCENT WALKS-METRORAIL ONLY
COMPUTE PCMI       >(i807+PCLM*(i808-i807))/100.
COMPUTE PCMJ       >(j807+PCLM*(j808-j807))/100.
* PERCENT WALKS-PEAK
*COMPUTE PCTI       >(i809+PCLT*(i810-i809))/100.
*COMPUTE PCTJ       >(j809+PCLT*(j810-j809))/100.
* PERCENT WALKS-OFFPEAK
COMPUTE PCTI       >(i811+PCLT*(i812-i811))/100.
COMPUTE PCTJ       >(j811+PCLT*(j812-j811))/100.
COMPUTE PCMI       >MAX(PCMI,0)
COMPUTE PCMI       >MIN(PCMI,1)
COMPUTE PCMJ       >MAX(PCMJ,0)
COMPUTE PCMJ       >MIN(PCMJ,1)
COMPUTE PCTI       >MAX(PCTI,PCMI)
COMPUTE PCTI       >MIN(PCTI,1)
COMPUTE PCTJ       >MAX(PCTJ,PCMJ)
COMPUTE PCTJ       >MIN(PCTJ,1)
```

```
*
* DO TRIP SUBDIVISIONS
*
*  HOME BASED ALTERNATIVES
*COMPUTE TRP1       >m101
*COMPUTE TRP2       >m102
*COMPUTE TRP3       >m103
*COMPUTE TRP4       >m104
* NON-HOME BASED
COMPUTE TRP1       >0.25*m101
COMPUTE TRP2       >0.25*m101
COMPUTE TRP3       >0.25*m101
COMPUTE TRP4       >0.25*m101
*
* BE SURE TO UPDATE THE IVTT COEFFICIENT IN FTA SECTION FOR EACH PURPOSE
*
*=======================================================
*INITIALIZING ALL VARIABLES WITHIN IF STATEMENTS TO ZERO
COMPUTE DAIV       >0
COMPUTE DACS       >0
COMPUTE DATE       >0
COMPUTE S2IV       >0
COMPUTE S2CS       >0
COMPUTE S2TE       >0
COMPUTE S3IV       >0
COMPUTE S3CS       >0
COMPUTE S3TE       >0
COMPUTE WKIV       >0
COMPUTE WKOV       >0
COMPUTE WKXF       >0
COMPUTE WKCS       >0
COMPUTE WKXP       >0
COMPUTE WBIV       >0
COMPUTE WBOV       >0
COMPUTE WBXF       >0
COMPUTE WBCS       >0
COMPUTE WBXP       >0
COMPUTE WTIV       >0
COMPUTE WTOV       >0
COMPUTE WTXF       >0
COMPUTE WTCS       >0
COMPUTE WTXP       >0
COMPUTE WMIV       >0
COMPUTE WMOV       >0
COMPUTE WMXF       >0
COMPUTE WMCS       >0
COMPUTE WMXP       >0
COMPUTE PCIV       >0
COMPUTE PCAA       >0
COMPUTE PCOV       >0
COMPUTE PCXF       >0
COMPUTE PCCS       >0
COMPUTE PCXP       >0
COMPUTE PBIV       >0
COMPUTE PBAA       >0
COMPUTE PBOV       >0
COMPUTE PBXF       >0
COMPUTE PBCS       >0
COMPUTE PBXP       >0
COMPUTE PTIV       >0
COMPUTE PTAA       >0
COMPUTE PTOV       >0
COMPUTE PTXF       >0
COMPUTE PTCS       >0
COMPUTE PTXP       >0
COMPUTE PMIV       >0
COMPUTE PMAA       >0
COMPUTE PMOV       >0
```

```
COMPUTE PMXF       >0
COMPUTE PMCS       >0
COMPUTE PMXP       >0
COMPUTE KCIV       >0
COMPUTE KCAA       >0
COMPUTE KCOV       >0
COMPUTE KCXF       >0
COMPUTE KCCS       >0
COMPUTE KCXP       >0
COMPUTE KBIV       >0
COMPUTE KBAA       >0
COMPUTE KBOV       >0
COMPUTE KBXF       >0
COMPUTE KBCS       >0
COMPUTE KBXP       >0
COMPUTE KTIV       >0
COMPUTE KTAA       >0
COMPUTE KTOV       >0
COMPUTE KTXF       >0
COMPUTE KTCS       >0
COMPUTE KTXP       >0
COMPUTE KMIV       >0
COMPUTE KMAA       >0
COMPUTE KMOV       >0
COMPUTE KMXF       >0
COMPUTE KMCS       >0
COMPUTE KMXP       >0

COMPUTE WCWK       >0
COMPUTE WBWK       >0
COMPUTE WTWK       >0
COMPUTE WMWK       >0
COMPUTE PCWK       >0
COMPUTE KCWK       >0
COMPUTE PBWK       >0
COMPUTE KBWK       >0
COMPUTE PTWK       >0
COMPUTE KTWK       >0
COMPUTE PMWK       >0
COMPUTE KMWK       >0

* SKIM VALUES, Divide distances by 10 to convert tenths of miles to whole miles
* DRIVE ALONE
COMPUTE            >IF(m201>0)
COMPUTE DAIV       >m201
COMPUTE DACS       >m202/10*AUOP+m203+PRKC
COMPUTE DATE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 2
COMPUTE            >IF(m204>0)
COMPUTE S2IV       >m204
COMPUTE S2CS       >(m205/10*AUOP+m206+PRKC)/2.0
COMPUTE S2TE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 3
COMPUTE            >IF(m207>0)
COMPUTE S3IV       >m207
COMPUTE S3CS       >(m208/10*AUOP+m209+PRKC)/OCC3
COMPUTE S3TE       >TERI+TERJ
COMPUTE            >ENDIF

* Assign Intrazonal trips to Autos (mj11/04/05)
COMPUTE            >IF(P()=Q())
COMPUTE DAIV       >1
COMPUTE DACS       >m202/10*AUOP+m203+PRKC
COMPUTE DATE       >TERI+TERJ
```

```
COMPUTE            >ENDIF

* SHARED RIDE 2
COMPUTE            >IF(P()=Q())
COMPUTE S2IV       >1
COMPUTE S2CS       >(m205/10*AUOP+m206+PRKC)/2.0
COMPUTE S2TE       >TERI+TERJ
COMPUTE            >ENDIF

* SHARED RIDE 3
COMPUTE            >IF(P()=Q())
COMPUTE S3IV       >1
COMPUTE S3CS       >(m208/10*AUOP+m209+PRKC)/OCC3
COMPUTE S3TE       >TERI+TERJ
COMPUTE            >ENDIF

*End of Intrazonal trips

* WALK COMMUTER RAIL
COMPUTE            >IF(m305>0)
COMPUTE WCIV       >m305/100.
COMPUTE WCOV       >(m303+m304)/100.
COMPUTE WCXF       >m312
COMPUTE WCCS       >m313
COMPUTE WCXP       >m314/100.
COMPUTE WCWK       >(m301+m302)/100.
COMPUTE            >ENDIF

* WALK BUS
COMPUTE            >IF(m405>0)
COMPUTE WBIV       >m405/100.
COMPUTE WBOV       >(m403+m404)/100.
COMPUTE WBXF       >m412
COMPUTE WBCS       >m413
COMPUTE WBXP       >m414/100.
COMPUTE WBWK       >(m401+m402)/100.
COMPUTE            >ENDIF

* WALK BUS/METRORAIL (TRANSIT)
COMPUTE            >IF(m605>0)
COMPUTE WTIV       >m605/100.
COMPUTE WTOV       >(m603+m604)/100.
COMPUTE WTXF       >m612
COMPUTE WTCS       >m613
COMPUTE WTXP       >m614/100.
COMPUTE WTWK       >(m601+m602)/100.
COMPUTE            >ENDIF


* WALK METRORAIL
COMPUTE            >IF(m505>0)
COMPUTE WMIV       >m505/100.
COMPUTE WMOV       >(m503+m504)/100.
COMPUTE WMXF       >m512
COMPUTE WMCS       >m513
COMPUTE WMXP       >m514/100.
COMPUTE WMWK       >(m501+m502)/100.
COMPUTE            >ENDIF

* PNR COMMUTER RAIL
COMPUTE            >IF(m319>0)
COMPUTE PCIV       >m319/100.
COMPUTE PCAA       >m329/100.
COMPUTE PCOV       >(m317+m318+m332)/100.
COMPUTE PCXF       >m326
COMPUTE PCCS       >m327+m331+m330/100*AUOP
COMPUTE PCXP       >m328/100.
COMPUTE PCWK       >(m315+m316)/100.
```

```
COMPUTE            >ENDIF

* PNR BUS
COMPUTE            >IF(m419>0)
COMPUTE PBIV       >m419/100.
COMPUTE PBAA       >m429/100.
COMPUTE PBOV       >(m417+m418+m432)/100.
COMPUTE PBXF       >m426
COMPUTE PBCS       >m427+m431+m430/100*AUOP
COMPUTE PBXP       >m428/100.
COMPUTE PBWK       >(m415+m416)/100.
COMPUTE            >ENDIF

* PNR BUS/METRORAIL (TRANSIT)
COMPUTE            >IF(m619>0)
COMPUTE PTIV       >m619/100.
COMPUTE PTAA       >m629/100.
COMPUTE PTOV       >(m617+m618+m632)/100.
COMPUTE PTXF       >m626
COMPUTE PTCS       >m627+m631+m630/100*AUOP
COMPUTE PTXP       >m628/100.
COMPUTE PTWK       >(m615+m616)/100.
COMPUTE            >ENDIF


* PNR METRORAIL
COMPUTE            >IF(m519>0)
COMPUTE PMIV       >m519/100.
COMPUTE PMAA       >m529/100.
COMPUTE PMOV       >(m517+m518+m532)/100.
COMPUTE PMXF       >m526
COMPUTE PMCS       >m527+m531+m530/100*AUOP
COMPUTE PMXP       >m528/100.
COMPUTE PMWK       >(m515+m516)/100.
COMPUTE            >ENDIF


* KNR COMMUTER RAIL
COMPUTE            >IF(m319>0)
COMPUTE KCIV       >m319/100.
COMPUTE KCAA       >m329/100.
COMPUTE KCOV       >(m317+m318)/100.
COMPUTE KCXF       >m326
COMPUTE KCCS       >m327+m330/100*AUOP
COMPUTE KCXP       >m328/100.
COMPUTE KCWK       >(m315+m316)/100.
COMPUTE            >ENDIF


* KNR BUS
COMPUTE            >IF(m437>0)
COMPUTE KBIV       >m437/100.
COMPUTE KBAA       >m447/100.
COMPUTE KBOV       >(m435+m436)/100.
COMPUTE KBXF       >m444
COMPUTE KBCS       >m445+m448/100*AUOP
COMPUTE KBXP       >m446/100.
COMPUTE KBWK       >(m433+m434)/100.
COMPUTE            >ENDIF

* KNR BUS/METRORAIL (TRANSIT)
COMPUTE            >IF(m637>0)
COMPUTE KTIV       >m637/100.
COMPUTE KTAA       >m647/100.
COMPUTE KTOV       >(m635+m636)/100.
COMPUTE KTXF       >m644
COMPUTE KTCS       >m645+m648/100*AUOP
COMPUTE KTXP       >m646/100.
```

```
COMPUTE KTWK       >(m633+m634)/100.
COMPUTE            >ENDIF


* KNR METRORAIL
COMPUTE            >IF(m537>0)
COMPUTE KMIV       >m537/100.
COMPUTE KMAA       >m547/100.
COMPUTE KMOV       >(m535+m536)/100.
COMPUTE KMXF       >m544
COMPUTE KMCS       >m545+m548/100*AUOP
COMPUTE KMXP       >m546/100.
COMPUTE KMWK       >(m533+m534)/100.
COMPUTE            >ENDIF


*CONSTANTS BY CHOICE FOR EACH PURPOSE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
PURP01 1INC 1     1>
PURP02 1INC 2     1>
PURP03 1INC 3     1>
PURP04 1INC 4     1>

TRIPIN01           >TRP1
TRIPIN02           >TRP2
TRIPIN03           >TRP3
TRIPIN04           >TRP4
TRIPIFACT01        >tfi1
TRIPIFACT02        >tfi2
TRIPIFACT03        >tfi3
TRIPIFACT04        >tfi4
COMPUTE tfi1       >1.0
COMPUTE tfi2       >1.0
COMPUTE tfi3       >1.0
COMPUTE tfi4       >1.0

*
*OUTPUT MATRICES AND OUTPUT FACTORS BY CHOICE FOR EACH PURPOSE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
TRIPOUT01         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT01        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
TRIPOUT02         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT02        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
TRIPOUT03         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT03        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
TRIPOUT04         1>m901      m902      m903      m904      m905      m906      m907      m908      m908      m909      m910      m911      m912      m913      m914
TRIPFACT04        1>1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
**
**P AND A WALK PERCENTS BY CHOICE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
WALK SEG CW 1 PCT 1>WSWM
WALK SEG CW 1 MODE1>Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG CW 2 PCT 1>WSW1
WALK SEG CW 2 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG CW 3 PCT 1>WSW2
WALK SEG CW 3 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y
WALK SEG CW 4 PCT 1>WSW3
WALK SEG CW 4 MODE1>Y         Y         Y         Y         Y         Y                   Y         Y         Y         Y         Y         Y
WALK SEG MD 5 PCT 1>WSM1
WALK SEG MD 5 MODE1>Y         Y         Y                                                 Y         Y         Y         Y         Y         Y         Y         Y
WALK SEG MD 6 PCT 1>WSM2
WALK SEG MD 6 MODE1>Y         Y         Y                                                 Y         Y         Y         Y         Y         Y
WALK SEG NT 7 PCT 1>WSNT
WALK SEG NT 7 MODE1>Y         Y         Y
*SYNTAX OF COMMAND TO ADD A COMPONENT TO A SPECIFIC WALK SEGMENT IF DESIRED
*WALK SEG CW 1 COEF1>                              -0.04747  -0.04747  -0.04747  -0.04747  -0.04747  -0.04747
*WALK SEG CW 1 VAR 1>                              WTSS      DTSS      DISS      WRSS      DRSS      DJSS
COMPUTE WSWM       >PCMI*PCMJ
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COMPUTE WSW1       >(PCTI-PCMI)*PCMJ
COMPUTE WSW2       >(PCTI-PCMI)*(PCTJ-PCMJ)
COMPUTE WSW3       >PCMI*(PCTJ-PCMJ)
COMPUTE WSM1       >(1-PCTI)*PCMJ
COMPUTE WSM2       >(1-PCTI)*(PCTJ-PCMJ)
COMPUTE WSNT       >1-WSWM-WSW1-WSW2-WSW3-WSM1-WSM2

*NEST DEFINITIONS BY CHOICE
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
NEST 1,1=         1>Y         Y         Y
NEST 1,2=         1>                              Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
NEST 2,1=         1>                              Y         Y         Y         Y
NEST 2,2=         1>                                                                      Y                   Y                   Y                   Y
NEST 2,3=         1>                                                                                Y                   Y                   Y                   Y
NEST 3,1=         1>                              Y
NEST 3,2=         1>                                        Y
NEST 3,3=         1>                                                  Y
NEST 3,4=         1>                                                            Y
NEST 4,1          1>                                                                      Y
NEST 4,2          1>                                                                                          Y
NEST 4,3          1>                                                                                                              Y
NEST 4,4          1>                                                                                                                                  Y
NEST 5,1          1>                                                                                Y
NEST 5,2          1>                                                                                                    Y
NEST 5,3          1>                                                                                                                        Y
NEST 5,4          1>                                                                                                                                            Y
NEST 6,1          1>Y
NEST 6,2          1>          Y         Y
NEST 7,1          1>          Y
NEST 7,2          1>                    Y

IGRP DEFINITION    >i813
JGRP DEFINITION    >j813
* 1 DC CORE/URBAN-DC CORE
SEGMENT  1         >    1    1
SEGMENT  1         >    3    1
* 2 DC CORE/URBAN-VA CORE
SEGMENT  2         >    1    2
SEGMENT  2         >    3    2
* 3 DC CORE/URBAN-URBAN
SEGMENT  3         >    1    3
SEGMENT  3         >    3    3
SEGMENT  3         >    1    4
SEGMENT  3         >    3    4
SEGMENT  3         >    1    5
SEGMENT  3         >    3    5
* 4 DC CORE/URBAN-OTHER
SEGMENT  4         >    1    6
SEGMENT  4         >    3    6
SEGMENT  4         >    1    7
SEGMENT  4         >    3    7
* 5 MD URBAN-DC CORE
SEGMENT  5         >    4    1
* 6 MD URBAN-VA CORE
SEGMENT  6         >    4    2
* 7 MD URBAN-URBAN
SEGMENT  7         >    4    3
SEGMENT  7         >    4    4
SEGMENT  7         >    4    5
* 8 MD URBAN-OTHER
SEGMENT  8         >    4    6
SEGMENT  8         >    4    7
* 9 VA CORE/URBAN-DC CORE
SEGMENT  9         >    2    1
SEGMENT  9         >    5    1
*10 VA CORE/URBAN-VA CORE
SEGMENT 10         >    2    2
SEGMENT 10         >    5    2
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*11 VA CORE/URBAN-URBAN
SEGMENT 11         >    2    3
SEGMENT 11         >    5    3
SEGMENT 11         >    2    4
SEGMENT 11         >    5    4
SEGMENT 11         >    2    5
SEGMENT 11         >    5    5
*12 VA CORE/URBAN-OTHER
SEGMENT 12         >    2    6
SEGMENT 12         >    5    6
SEGMENT 12         >    2    7
SEGMENT 12         >    5    7
*13 MD OTHER-DC CORE
SEGMENT 13         >    6    1
*14 MD OTHER-VA CORE
SEGMENT 14         >    6    2
*15 MD OTHER-URBAN
SEGMENT 15         >    6    3
SEGMENT 15         >    6    4
SEGMENT 15         >    6    5
*16 MD OTHER-OTHER
SEGMENT 16         >    6    6
SEGMENT 16         >    6    7
*17 VA OTHER-DC CORE
SEGMENT 17         >    7    1
*18 VA OTHER-VA CORE
SEGMENT 18         >    7    2
*19 VA OTHER-URBAN
SEGMENT 19         >    7    3
SEGMENT 19         >    7    4
SEGMENT 19         >    7    5
*20 VA OTHER-OTHER
SEGMENT 20         >    7    6
SEGMENT 20         >    7    7

* SEGMENT  1
NSTC 10 1GRND TOTAL>
NSTC 11 1AUTO      >      0.5    0.00000
NSTC 12 1TRANSIT   >      0.5   -1.05930
NSTC 20 1TOTAL TRN >
NSTC 21 1WALK ACC  >      0.5    0.00000
NSTC 22 1PNR ACC   >      0.5   -2.29136
NSTC 23 1KNR ACC   >      0.5   -4.89047
NSTC 30 1WLK TRN
NSTC 31 1WLK CR    >      1.0   -0.75267
NSTC 32 1WLK BUS   >      1.0   -2.68770
NSTC 33 1WLK BU/MR >      1.0    0.71254
NSTC 34 1WLK METRO >      1.0    0.00000
NSTC 40 1PNR TRN
NSTC 41 1PNR CR    >      1.0   -0.17140
NSTC 42 1PNR BUS   >      1.0   -1.67326
NSTC 43 1PNR BU/MR >      1.0   -0.70786
NSTC 44 1PNR METRO >      1.0    0.00000
NSTC 50 1KNR TRN
NSTC 51 1KNR CR    >      1.0    1.50048
NSTC 52 1KNR BUS   >      1.0    6.10649
NSTC 53 1KNR BU/MR >      1.0    1.70154
NSTC 54 1KNR METRO >      1.0    0.00000
NSTC 60 1AUTO
NSTC 61 1LOV       >      1.0    0.00000
NSTC 62 1HOV       >      0.5   -2.75201
NSTC 70 1HOV
NSTC 71 1HOV2      >      1.0    0.00000
NSTC 72 1HOV3+     >      1.0   -2.68924
* SEGMENT  2
NSTC 10 2GRND TOTAL>
NSTC 11 2AUTO      >      0.5    0.00000
NSTC 12 2TRANSIT   >      0.5   -0.52567
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NSTC 20 2TOTAL TRN >
NSTC 21 2WALK ACC  >      0.5    0.00000
NSTC 22 2PNR ACC   >      0.5   -1.59305
NSTC 23 2KNR ACC   >      0.5   -3.70982
NSTC 30 2WLK TRN
NSTC 31 2WLK CR    >      1.0    0.00612
NSTC 32 2WLK BUS   >      1.0   -1.14631
NSTC 33 2WLK BU/MR >      1.0    0.35725
NSTC 34 2WLK METRO >      1.0    0.00000
NSTC 40 2PNR TRN
NSTC 41 2PNR CR    >      1.0   -0.10092
NSTC 42 2PNR BUS   >      1.0   -0.10092
NSTC 43 2PNR BU/MR >      1.0    0.65330
NSTC 44 2PNR METRO >      1.0    0.00000
NSTC 50 2KNR TRN
NSTC 51 2KNR CR    >      1.0    1.82503
NSTC 52 2KNR BUS   >      1.0    1.82503
NSTC 53 2KNR BU/MR >      1.0    5.85453
NSTC 54 2KNR METRO >      1.0    0.00000
NSTC 60 2AUTO
NSTC 61 2LOV       >      1.0    0.00000
NSTC 62 2HOV       >      0.5   -1.42596
NSTC 70 2HOV
NSTC 71 2HOV2      >      1.0    0.00000
NSTC 72 2HOV3+     >      1.0   -1.40325
* SEGMENT  3
NSTC 10 3GRND TOTAL>
NSTC 11 3AUTO      >      0.5    0.00000
NSTC 12 3TRANSIT   >      0.5   -2.81308
NSTC 20 3TOTAL TRN >
NSTC 21 3WALK ACC  >      0.5    0.00000
NSTC 22 3PNR ACC   >      0.5   -1.33208
NSTC 23 3KNR ACC   >      0.5   -2.94496
NSTC 30 3WLK TRN
NSTC 31 3WLK CR    >      1.0    4.13045
NSTC 32 3WLK BUS   >      1.0    5.73742
NSTC 33 3WLK BU/MR >      1.0    2.31645
NSTC 34 3WLK METRO >      1.0    0.00000
NSTC 40 3PNR TRN
NSTC 41 3PNR CR    >      1.0   -2.31886
NSTC 42 3PNR BUS   >      1.0   -2.31886
NSTC 43 3PNR BU/MR >      1.0    0.78312
NSTC 44 3PNR METRO >      1.0    0.00000
NSTC 50 3KNR TRN
NSTC 51 3KNR CR    >      1.0    1.34319
NSTC 52 3KNR BUS   >      1.0    4.94507
NSTC 53 3KNR BU/MR >      1.0    2.31146
NSTC 54 3KNR METRO >      1.0    0.00000
NSTC 60 3AUTO
NSTC 61 3LOV       >      1.0    0.00000
NSTC 62 3HOV       >      0.5   -1.23262
NSTC 70 3HOV
NSTC 71 3HOV2      >      1.0    0.00000
NSTC 72 3HOV3+     >      1.0   -0.73944
* SEGMENT  4
NSTC 10 4GRND TOTAL>
NSTC 11 4AUTO      >      0.5    0.00000
NSTC 12 4TRANSIT   >      0.5   -2.79614
NSTC 20 4TOTAL TRN >
NSTC 21 4WALK ACC  >      0.5    0.00000
NSTC 22 4PNR ACC   >      0.5    0.45369
NSTC 23 4KNR ACC   >      0.5   -1.55653
NSTC 30 4WLK TRN
NSTC 31 4WLK CR    >      1.0    1.68042
NSTC 32 4WLK BUS   >      1.0    3.59487
NSTC 33 4WLK BU/MR >      1.0   -0.05914
NSTC 34 4WLK METRO >      1.0    0.00000
NSTC 40 4PNR TRN
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NSTC 41 4PNR CR    >      1.0    0.54651
NSTC 42 4PNR BUS   >      1.0    3.83161
NSTC 43 4PNR BU/MR >      1.0   -2.79606
NSTC 44 4PNR METRO >      1.0    0.00000
NSTC 50 4KNR TRN
NSTC 51 4KNR CR    >      1.0    4.71238
NSTC 52 4KNR BUS   >      1.0   10.62377
NSTC 53 4KNR BU/MR >      1.0    4.66500
NSTC 54 4KNR METRO >      1.0    0.00000
NSTC 60 4AUTO
NSTC 61 4LOV       >      1.0    0.00000
NSTC 62 4HOV       >      0.5   -2.41066
NSTC 70 4HOV
NSTC 71 4HOV2      >      1.0    0.00000
NSTC 72 4HOV3+     >      1.0   -1.52097
* SEGMENT  5
NSTC 10 5GRND TOTAL>
NSTC 11 5AUTO      >      0.5    0.00000
NSTC 12 5TRANSIT   >      0.5    1.29817
NSTC 20 5TOTAL TRN >
NSTC 21 5WALK ACC  >      0.5    0.00000
NSTC 22 5PNR ACC   >      0.5   -4.64540
NSTC 23 5KNR ACC   >      0.5   -6.02280
NSTC 30 5WLK TRN
NSTC 31 5WLK CR    >      1.0   -0.60888
NSTC 32 5WLK BUS   >      1.0   -0.53937
NSTC 33 5WLK BU/MR >      1.0   -2.94178
NSTC 34 5WLK METRO >      1.0    0.00000
NSTC 40 5PNR TRN
NSTC 41 5PNR CR    >      1.0    1.48340
NSTC 42 5PNR BUS   >      1.0    1.48340
NSTC 43 5PNR BU/MR >      1.0   -0.27462
NSTC 44 5PNR METRO >      1.0    0.00000
NSTC 50 5KNR TRN
NSTC 51 5KNR CR    >      1.0    0.43021
NSTC 52 5KNR BUS   >      1.0    2.23834
NSTC 53 5KNR BU/MR >      1.0    0.66497
NSTC 54 5KNR METRO >      1.0    0.00000
NSTC 60 5AUTO
NSTC 61 5LOV       >      1.0    0.00000
NSTC 62 5HOV       >      0.5   -2.44875
NSTC 70 5HOV
NSTC 71 5HOV2      >      1.0    0.00000
NSTC 72 5HOV3+     >      1.0   -2.32090
* SEGMENT  6
NSTC 10 6GRND TOTAL>
NSTC 11 6AUTO      >      0.5    0.00000
NSTC 12 6TRANSIT   >      0.5    1.37725
NSTC 20 6TOTAL TRN >
NSTC 21 6WALK ACC  >      0.5    0.00000
NSTC 22 6PNR ACC   >      0.5   -5.15227
NSTC 23 6KNR ACC   >      0.5   -6.53296
NSTC 30 6WLK TRN
NSTC 31 6WLK CR    >      1.0   -0.51432
NSTC 32 6WLK BUS   >      1.0   -0.51432
NSTC 33 6WLK BU/MR >      1.0    0.32231
NSTC 34 6WLK METRO >      1.0    0.00000
NSTC 40 6PNR TRN
NSTC 41 6PNR CR    >      1.0    0.27325
NSTC 42 6PNR BUS   >      1.0    0.27325
NSTC 43 6PNR BU/MR >      1.0    2.89896
NSTC 44 6PNR METRO >      1.0    0.00000
NSTC 50 6KNR TRN
NSTC 51 6KNR CR    >      1.0   -0.30752
NSTC 52 6KNR BUS   >      1.0   -0.30752
NSTC 53 6KNR BU/MR >      1.0   -0.30752
NSTC 54 6KNR METRO >      1.0    0.00000
NSTC 60 6AUTO
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NSTC 61 6LOV       >      1.0    0.00000
NSTC 62 6HOV       >      0.5   -2.25283
NSTC 70 6HOV
NSTC 71 6HOV2      >      1.0    0.00000
NSTC 72 6HOV3+     >      1.0   -1.63198
* SEGMENT  7
NSTC 10 7GRND TOTAL>
NSTC 11 7AUTO      >      0.5    0.00000
NSTC 12 7TRANSIT   >      0.5   -2.21796
NSTC 20 7TOTAL TRN >
NSTC 21 7WALK ACC  >      0.5    0.00000
NSTC 22 7PNR ACC   >      0.5   -4.37155
NSTC 23 7KNR ACC   >      0.5   -6.25881
NSTC 30 7WLK TRN
NSTC 31 7WLK CR    >      1.0    0.88900
NSTC 32 7WLK BUS   >      1.0    1.42362
NSTC 33 7WLK BU/MR >      1.0    1.61478
NSTC 34 7WLK METRO >      1.0    0.00000
NSTC 40 7PNR TRN
NSTC 41 7PNR CR    >      1.0   11.51508
NSTC 42 7PNR BUS   >      1.0    7.93132
NSTC 43 7PNR BU/MR >      1.0    0.18154
NSTC 44 7PNR METRO >      1.0    0.00000
NSTC 50 7KNR TRN
NSTC 51 7KNR CR    >      1.0    5.78128
NSTC 52 7KNR BUS   >      1.0   11.67379
NSTC 53 7KNR BU/MR >      1.0    3.51383
NSTC 54 7KNR METRO >      1.0    0.00000
NSTC 60 7AUTO
NSTC 61 7LOV       >      1.0    0.00000
NSTC 62 7HOV       >      0.5   -1.40925
NSTC 70 7HOV
NSTC 71 7HOV2      >      1.0    0.00000
NSTC 72 7HOV3+     >      1.0   -0.78899
* SEGMENT  8
NSTC 10 8GRND TOTAL>
NSTC 11 8AUTO      >      0.5    0.00000
NSTC 12 8TRANSIT   >      0.5   -2.31760
NSTC 20 8TOTAL TRN >
NSTC 21 8WALK ACC  >      0.5    0.00000
NSTC 22 8PNR ACC   >      0.5   -3.71925
NSTC 23 8KNR ACC   >      0.5   -4.48790
NSTC 30 8WLK TRN
NSTC 31 8WLK CR    >      1.0    2.58691
NSTC 32 8WLK BUS   >      1.0    3.77557
NSTC 33 8WLK BU/MR >      1.0    1.26092
NSTC 34 8WLK METRO >      1.0    0.00000
NSTC 40 8PNR TRN
NSTC 41 8PNR CR    >      1.0    7.26557
NSTC 42 8PNR BUS   >      1.0   10.24818
NSTC 43 8PNR BU/MR >      1.0   -0.34419
NSTC 44 8PNR METRO >      1.0    0.00000
NSTC 50 8KNR TRN
NSTC 51 8KNR CR    >      1.0   -0.44082
NSTC 52 8KNR BUS   >      1.0   11.65529
NSTC 53 8KNR BU/MR >      1.0   -0.44082
NSTC 54 8KNR METRO >      1.0    0.00000
NSTC 60 8AUTO
NSTC 61 8LOV       >      1.0    0.00000
NSTC 62 8HOV       >      0.5   -1.71713
NSTC 70 8HOV
NSTC 71 8HOV2      >      1.0    0.00000
NSTC 72 8HOV3+     >      1.0   -1.50144
* SEGMENT  9
NSTC 10 9GRND TOTAL>
NSTC 11 9AUTO      >      0.5    0.00000
NSTC 12 9TRANSIT   >      0.5   -2.31625
NSTC 20 9TOTAL TRN >
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NSTC 21 9WALK ACC  >      0.5    0.00000
NSTC 22 9PNR ACC   >      0.5   -0.79962
NSTC 23 9KNR ACC   >      0.5   -4.09280
NSTC 30 9WLK TRN
NSTC 31 9WLK CR    >      1.0   -0.06872
NSTC 32 9WLK BUS   >      1.0   -1.40406
NSTC 33 9WLK BU/MR >      1.0   -0.20296
NSTC 34 9WLK METRO >      1.0    0.00000
NSTC 40 9PNR TRN
NSTC 41 9PNR CR    >      1.0   -0.14351
NSTC 42 9PNR BUS   >      1.0   -0.14351
NSTC 43 9PNR BU/MR >      1.0   -0.14351
NSTC 44 9PNR METRO >      1.0    0.00000
NSTC 50 9KNR TRN
NSTC 51 9KNR CR    >      1.0    0.07141
NSTC 52 9KNR BUS   >      1.0    0.07141
NSTC 53 9KNR BU/MR >      1.0   -1.34702
NSTC 54 9KNR METRO >      1.0    0.00000
NSTC 60 9AUTO
NSTC 61 9LOV       >      1.0    0.00000
NSTC 62 9HOV       >      0.5   -2.79037
NSTC 70 9HOV
NSTC 71 9HOV2      >      1.0    0.00000
NSTC 72 9HOV3+     >      1.0   -2.83878
* SEGMENT 10
NSTC 1010GRND TOTAL>
NSTC 1110AUTO      >      0.5    0.00000
NSTC 1210TRANSIT   >      0.5   -0.62286
NSTC 2010TOTAL TRN >
NSTC 2110WALK ACC  >      0.5    0.00000
NSTC 2210PNR ACC   >      0.5   -1.78699
NSTC 2310KNR ACC   >      0.5   -6.37205
NSTC 3010WLK TRN
NSTC 3110WLK CR    >      1.0   -0.47241
NSTC 3210WLK BUS   >      1.0   -5.18367
NSTC 3310WLK BU/MR >      1.0    0.85422
NSTC 3410WLK METRO >      1.0    0.00000
NSTC 4010PNR TRN
NSTC 4110PNR CR    >      1.0   -0.58071
NSTC 4210PNR BUS   >      1.0   -0.58071
NSTC 4310PNR BU/MR >      1.0   -0.23370
NSTC 4410PNR METRO >      1.0    0.00000
NSTC 5010KNR TRN
NSTC 5110KNR CR    >      1.0   -0.21603
NSTC 5210KNR BUS   >      1.0   -0.21603
NSTC 5310KNR BU/MR >      1.0   -0.21603
NSTC 5410KNR METRO >      1.0    0.00000
NSTC 6010AUTO
NSTC 6110LOV       >      1.0    0.00000
NSTC 6210HOV       >      0.5   -1.84804
NSTC 7010HOV
NSTC 7110HOV2      >      1.0    0.00000
NSTC 7210HOV3+     >      1.0   -1.70378
* SEGMENT 11
NSTC 1011GRND TOTAL>
NSTC 1111AUTO      >      0.5    0.00000
NSTC 1211TRANSIT   >      0.5   -3.46401
NSTC 2011TOTAL TRN >
NSTC 2111WALK ACC  >      0.5    0.00000
NSTC 2211PNR ACC   >      0.5   -3.63128
NSTC 2311KNR ACC   >      0.5   -5.21339
NSTC 3011WLK TRN
NSTC 3111WLK CR    >      1.0    1.05054
NSTC 3211WLK BUS   >      1.0    2.38555
NSTC 3311WLK BU/MR >      1.0    1.15243
NSTC 3411WLK METRO >      1.0    0.00000
NSTC 4011PNR TRN
NSTC 4111PNR CR    >      1.0    3.31299
```

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NSTC 4211PNR BUS   >      1.0    7.21397
NSTC 4311PNR BU/MR >      1.0    3.31299
NSTC 4411PNR METRO >      1.0    0.00000
NSTC 5011KNR TRN
NSTC 5111KNR CR    >      1.0    0.05802
NSTC 5211KNR BUS   >      1.0    0.05802
NSTC 5311KNR BU/MR >      1.0    0.97925
NSTC 5411KNR METRO >      1.0    0.00000
NSTC 6011AUTO
NSTC 6111LOV       >      1.0    0.00000
NSTC 6211HOV       >      0.5   -1.32897
NSTC 7011HOV
NSTC 7111HOV2      >      1.0    0.00000
NSTC 7211HOV3+     >      1.0   -0.94920
* SEGMENT 12
NSTC 1012GRND TOTAL>
NSTC 1112AUTO      >      0.5    0.00000
NSTC 1212TRANSIT   >      0.5   -2.10084
NSTC 2012TOTAL TRN >
NSTC 2112WALK ACC  >      0.5    0.00000
NSTC 2212PNR ACC   >      0.5   -3.36319
NSTC 2312KNR ACC   >      0.5   -4.72528
NSTC 3012WLK TRN
NSTC 3112WLK CR    >      1.0   -3.21335
NSTC 3212WLK BUS   >      1.0   -3.84302
NSTC 3312WLK BU/MR >      1.0   -6.52009
NSTC 3412WLK METRO >      1.0    0.00000
NSTC 4012PNR TRN
NSTC 4112PNR CR    >      1.0   -2.12360
NSTC 4212PNR BUS   >      1.0   -0.14253
NSTC 4312PNR BU/MR >      1.0   -2.12360
NSTC 4412PNR METRO >      1.0    0.00000
NSTC 5012KNR TRN
NSTC 5112KNR CR    >      1.0   -6.78521
NSTC 5212KNR BUS   >      1.0   -6.78521
NSTC 5312KNR BU/MR >      1.0   -6.78521
NSTC 5412KNR METRO >      1.0    0.00000
NSTC 6012AUTO
NSTC 6112LOV       >      1.0    0.00000
NSTC 6212HOV       >      0.5   -1.81732
NSTC 7012HOV
NSTC 7112HOV2      >      1.0    0.00000
NSTC 7212HOV3+     >      1.0   -1.55870
* SEGMENT 13
NSTC 1013GRND TOTAL>
NSTC 1113AUTO      >      0.5    0.00000
NSTC 1213TRANSIT   >      0.5    1.47457
NSTC 2013TOTAL TRN >
NSTC 2113WALK ACC  >      0.5    0.00000
NSTC 2213PNR ACC   >      0.5   -9.27833
NSTC 2313KNR ACC   >      0.5  -10.87957
NSTC 3013WLK TRN
NSTC 3113WLK CR    >      1.0   -9.12221
NSTC 3213WLK BUS   >      1.0  -12.38800
NSTC 3313WLK BU/MR >      1.0  -12.71827
NSTC 3413WLK METRO >      1.0    0.00000
NSTC 4013PNR TRN
NSTC 4113PNR CR    >      1.0    6.22864
NSTC 4213PNR BUS   >      1.0   10.29612
NSTC 4313PNR BU/MR >      1.0    2.37350
NSTC 4413PNR METRO >      1.0    0.00000
NSTC 5013KNR TRN
NSTC 5113KNR CR    >      1.0    3.23643
NSTC 5213KNR BUS   >      1.0    4.59776
NSTC 5313KNR BU/MR >      1.0    4.93966
NSTC 5413KNR METRO >      1.0    0.00000
NSTC 6013AUTO
NSTC 6113LOV       >      1.0    0.00000
```

```
NSTC 6213HOV       >      0.5   -4.24286
NSTC 7013HOV
NSTC 7113HOV2      >      1.0    0.00000
NSTC 7213HOV3+     >      1.0   -3.52721
* SEGMENT 14
NSTC 1014GRND TOTAL>
NSTC 1114AUTO      >      0.5    0.00000
NSTC 1214TRANSIT   >      0.5    0.68387
NSTC 2014TOTAL TRN >
NSTC 2114WALK ACC  >      0.5    0.00000
NSTC 2214PNR ACC   >      0.5   -6.03048
NSTC 2314KNR ACC   >      0.5   -6.73774
NSTC 3014WLK TRN
NSTC 3114WLK CR    >      1.0   -2.06676
NSTC 3214WLK BUS   >      1.0   -3.82314
NSTC 3314WLK BU/MR >      1.0   -4.63761
NSTC 3414WLK METRO >      1.0    0.00000
NSTC 4014PNR TRN
NSTC 4114PNR CR    >      1.0    0.96460
NSTC 4214PNR BUS   >      1.0   12.12233
NSTC 4314PNR BU/MR >      1.0    0.96460
NSTC 4414PNR METRO >      1.0    0.00000
NSTC 5014KNR TRN
NSTC 5114KNR CR    >      1.0   -0.20991
NSTC 5214KNR BUS   >      1.0   -0.20991
NSTC 5314KNR BU/MR >      1.0    2.37732
NSTC 5414KNR METRO >      1.0    0.00000
NSTC 6014AUTO
NSTC 6114LOV       >      1.0    0.00000
NSTC 6214HOV       >      0.5   -3.38037
NSTC 7014HOV
NSTC 7114HOV2      >      1.0    0.00000
NSTC 7214HOV3+     >      1.0   -2.59016
* SEGMENT 15
NSTC 1015GRND TOTAL>
NSTC 1115AUTO      >      0.5    0.00000
NSTC 1215TRANSIT   >      0.5   -2.32756
NSTC 2015TOTAL TRN >
NSTC 2115WALK ACC  >      0.5    0.00000
NSTC 2215PNR ACC   >      0.5   -2.41433
NSTC 2315KNR ACC   >      0.5   -3.08166
NSTC 3015WLK TRN
NSTC 3115WLK CR    >      1.0    1.73502
NSTC 3215WLK BUS   >      1.0    5.84550
NSTC 3315WLK BU/MR >      1.0    2.91176
NSTC 3415WLK METRO >      1.0    0.00000
NSTC 4015PNR TRN
NSTC 4115PNR CR    >      1.0    5.20003
NSTC 4215PNR BUS   >      1.0    4.61013
NSTC 4315PNR BU/MR >      1.0    1.34056
NSTC 4415PNR METRO >      1.0    0.00000
NSTC 5015KNR TRN
NSTC 5115KNR CR    >      1.0    0.46730
NSTC 5215KNR BUS   >      1.0    4.74646
NSTC 5315KNR BU/MR >      1.0    3.28505
NSTC 5415KNR METRO >      1.0    0.00000
NSTC 6015AUTO
NSTC 6115LOV       >      1.0    0.00000
NSTC 6215HOV       >      0.5   -2.08502
NSTC 7015HOV
NSTC 7115HOV2      >      1.0    0.00000
NSTC 7215HOV3+     >      1.0   -1.53593
* SEGMENT 16
NSTC 1016GRND TOTAL>
NSTC 1116AUTO      >      0.5    0.00000
NSTC 1216TRANSIT   >      0.5   -2.53908
NSTC 2016TOTAL TRN >
NSTC 2116WALK ACC  >      0.5    0.00000
```

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NSTC 2216PNR ACC   >      0.5   -5.85854
NSTC 2316KNR ACC   >      0.5   -5.65918
NSTC 3016WLK TRN
NSTC 3116WLK CR    >      1.0  -17.03125
NSTC 3216WLK BUS   >      1.0    6.03115
NSTC 3316WLK BU/MR >      1.0   -0.57063
NSTC 3416WLK METRO >      1.0    0.00000
NSTC 4016PNR TRN
NSTC 4116PNR CR    >      1.0  -18.44712
NSTC 4216PNR BUS   >      1.0   11.11345
NSTC 4316PNR BU/MR >      1.0  -35.40670
NSTC 4416PNR METRO >      1.0    0.00000
NSTC 5016KNR TRN
NSTC 5116KNR CR    >      1.0  -24.94977
NSTC 5216KNR BUS   >      1.0    9.97220
NSTC 5316KNR BU/MR >      1.0  -15.87923
NSTC 5416KNR METRO >      1.0    0.00000
NSTC 6016AUTO
NSTC 6116LOV       >      1.0    0.00000
NSTC 6216HOV       >      0.5   -1.71929
NSTC 7016HOV
NSTC 7116HOV2      >      1.0    0.00000
NSTC 7216HOV3+     >      1.0   -1.46052
* SEGMENT 17
NSTC 1017GRND TOTAL>
NSTC 1117AUTO      >      0.5    0.00000
NSTC 1217TRANSIT   >      0.5    2.52066
NSTC 2017TOTAL TRN >
NSTC 2117WALK ACC  >      0.5    0.00000
NSTC 2217PNR ACC   >      0.5  -13.09587
NSTC 2317KNR ACC   >      0.5  -14.55587
NSTC 3017WLK TRN
NSTC 3117WLK CR    >      1.0  -16.24298
NSTC 3217WLK BUS   >      1.0  -20.35664
NSTC 3317WLK BU/MR >      1.0  -22.27666
NSTC 3417WLK METRO >      1.0    0.00000
NSTC 4017PNR TRN
NSTC 4117PNR CR    >      1.0    8.38072
NSTC 4217PNR BUS   >      1.0    5.19607
NSTC 4317PNR BU/MR >      1.0    2.76315
NSTC 4417PNR METRO >      1.0    0.00000
NSTC 5017KNR TRN
NSTC 5117KNR CR    >      1.0    5.78575
NSTC 5217KNR BUS   >      1.0    4.17932
NSTC 5317KNR BU/MR >      1.0    1.74533
NSTC 5417KNR METRO >      1.0    0.00000
NSTC 6017AUTO
NSTC 6117LOV       >      1.0    0.00000
NSTC 6217HOV       >      0.5   -4.36600
NSTC 7017HOV
NSTC 7117HOV2      >      1.0    0.00000
NSTC 7217HOV3+     >      1.0   -3.63276
* SEGMENT 18
NSTC 1018GRND TOTAL>
NSTC 1118AUTO      >      0.5    0.00000
NSTC 1218TRANSIT   >      0.5    2.42060
NSTC 2018TOTAL TRN >
NSTC 2118WALK ACC  >      0.5    0.00000
NSTC 2218PNR ACC   >      0.5  -10.44836
NSTC 2318KNR ACC   >      0.5  -11.79616
NSTC 3018WLK TRN
NSTC 3118WLK CR    >      1.0   -9.82785
NSTC 3218WLK BUS   >      1.0  -16.69404
NSTC 3318WLK BU/MR >      1.0  -15.16498
NSTC 3418WLK METRO >      1.0    0.00000
NSTC 4018PNR TRN
NSTC 4118PNR CR    >      1.0    8.64814
NSTC 4218PNR BUS   >      1.0    4.19506
```

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NSTC 4318PNR BU/MR >      1.0    1.69885
NSTC 4418PNR METRO >      1.0    0.00000
NSTC 5018KNR TRN
NSTC 5118KNR CR    >      1.0    5.97158
NSTC 5218KNR BUS   >      1.0   -0.19069
NSTC 5318KNR BU/MR >      1.0    4.69491
NSTC 5418KNR METRO >      1.0    0.00000
NSTC 6018AUTO
NSTC 6118LOV       >      1.0    0.00000
NSTC 6218HOV       >      0.5   -2.30923
NSTC 7018HOV
NSTC 7118HOV2      >      1.0    0.00000
NSTC 7218HOV3+     >      1.0   -2.33187
* SEGMENT 19
NSTC 1019GRND TOTAL>
NSTC 1119AUTO      >      0.5    0.00000
NSTC 1219TRANSIT   >      0.5   -2.68205
NSTC 2019TOTAL TRN >
NSTC 2119WALK ACC  >      0.5    0.00000
NSTC 2219PNR ACC   >      0.5   -3.19765
NSTC 2319KNR ACC   >      0.5   -4.78554
NSTC 3019WLK TRN
NSTC 3119WLK CR    >      1.0    2.83935
NSTC 3219WLK BUS   >      1.0    2.71693
NSTC 3319WLK BU/MR >      1.0    1.23204
NSTC 3419WLK METRO >      1.0    0.00000
NSTC 4019PNR TRN
NSTC 4119PNR CR    >      1.0    8.01811
NSTC 4219PNR BUS   >      1.0   -1.32598
NSTC 4319PNR BU/MR >      1.0   -0.66621
NSTC 4419PNR METRO >      1.0    0.00000
NSTC 5019KNR TRN
NSTC 5119KNR CR    >      1.0    5.13376
NSTC 5219KNR BUS   >      1.0   -1.24714
NSTC 5319KNR BU/MR >      1.0   -0.09580
NSTC 5419KNR METRO >      1.0    0.00000
NSTC 6019AUTO
NSTC 6119LOV       >      1.0    0.00000
NSTC 6219HOV       >      0.5   -1.94688
NSTC 7019HOV
NSTC 7119HOV2      >      1.0    0.00000
NSTC 7219HOV3+     >      1.0   -1.61102
* SEGMENT 20
NSTC 1020GRND TOTAL>
NSTC 1120AUTO      >      0.5    0.00000
NSTC 1220TRANSIT   >      0.5   -3.16727
NSTC 2020TOTAL TRN >
NSTC 2120WALK ACC  >      0.5    0.00000
NSTC 2220PNR ACC   >      0.5  -12.12576
NSTC 2320KNR ACC   >      0.5  -10.43416
NSTC 3020WLK TRN
NSTC 3120WLK CR    >      1.0  -54.16714
NSTC 3220WLK BUS   >      1.0   -3.29808
NSTC 3320WLK BU/MR >      1.0  -22.17546
NSTC 3420WLK METRO >      1.0    0.00000
NSTC 4020PNR TRN
NSTC 4120PNR CR    >      1.0  -47.17738
NSTC 4220PNR BUS   >      1.0   10.82848
NSTC 4320PNR BU/MR >      1.0  -36.16396
NSTC 4420PNR METRO >      1.0    0.00000
NSTC 5020KNR TRN
NSTC 5120KNR CR    >      1.0  -53.40786
NSTC 5220KNR BUS   >      1.0   13.69220
NSTC 5320KNR BU/MR >      1.0  -32.96349
NSTC 5420KNR METRO >      1.0    0.00000
NSTC 6020AUTO
NSTC 6120LOV       >      1.0    0.00000
NSTC 6220HOV       >      0.5   -1.58678
```

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NSTC 7020HOV
NSTC 7120HOV2      >      1.0    0.00000
NSTC 7220HOV3+     >      1.0   -1.32196

*DOWNTOWN=8
*SELI               >         8

*UNION STATION=64
*SELI               >        64

* =122
*SELI               >       122

*BETHESDA=345
*SELI               >       345

*SILVER SPRING=362
*SELI               >       362

*N.SILVER SPRING=464
*SELI               >       464

* =475
*SELI               >       475

*SHADY GROVE RD=578
*SELI               >       578

* =787
*SELI               >       787

*ANDREWS AFB=829
*SELI               >       829

*NEW CARROLTON=927
*SELI               >       927

*BRISTOL=972
*SELI               >       972

*FREDERICK=1043
*SELI               >      1043

*JESSUP=1080
*SELI               >      1080

*SCAGGSVILLE=1091
*SELI               >      1091

*WALDORF=1216
*SELI               >      1216

*PENTAGON=1231
*SELI               >      1231

*ROSSLYN=1236
*SELI               >      1236

*ALEXANDRIA=1337
*SELI               >      1337

* =1455
*SELI               >      1455

*SPRINGFIELD=1502
*SELI               >      1502

*  =1511
```

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*SELI              >      1511

*TYSONS CRNR=1537
*SELI              >      1537

*FT BELVOIR=1554
*SELI              >      1554

*VIENNA=1619
*SELI              >      1619

*DULES AP=1698
*SELI              >      1698

*RESTON=1716
*SELI              >      1716

*LEESBURG=1842
*SELI              >      1842

*BRUNSWICK=1863
*SELI              >      1863

*DALE CITY=1942
*SELI              >      1942

*MANASSAS=1967
*SELI              >      1967

*SPOTSYLVANIA=2110
*SELI              >      2110

* =2055
*SELI              >      2055


*SELJ              >         8
*SELJ              >        63
*SELJ              >        64
*SELJ              >        77
*SELJ              >       100
*SELJ              >       344
*SELJ              >       345
*SELJ              >       362
*SELJ              >      1231
*SELJ              >      1236
*SELJ              >      1265
*SELJ              >      1337
*SELJ              >      1537

*SELI              >  523
*SELJ              >    9

TRACE             >         0
* OUTPUT %          >
*PROCSEL           >
PRINT MS          >NHB_NL_MC.PRN
INPUT PRINT FILE  >NHB_NL_MC.PRN
INPUT GOALS       >NHB_NL_MC.GOL
INFILE 1          >NHB_INCOME.PTT
INFILE 2          >HWYOP.SKM
INFILE 3          >TRNOP_CR.SKM
INFILE 4          >TRNOP_AB.SKM
INFILE 5          >TRNOP_MR.SKM
INFILE 6          >TRNOP_BM.SKM
ZINFILE 8         >ZONEV2.A2F
OUTFILE 9         >NHB_NL_MC.MTT
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* FTA USER BENEFITS SPECIFICATIONS
*FTA RESULTS FILE   >NHB_NL_MC.BEN
FTA TRANSIT COEFF  >-0.02860
FTA AUTO COEFF     >-0.02860
FTA PURPOSE NAME   >NHB
FTA PERIOD NAME    >ALLDAY
FTA ALTER. NAME    >CALIB
*CHOICE           1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR     PNR-CR    KNR-CR    PNR-BUS   KNR-BUS   PNR-BU/MR KNR-BU/MR PNR-MR    KNR-MR
FTA AUTO NEST      >         1         1
FTA MOTORIZED?    1>Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
FTA TRANSIT?      1>                              Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y         Y
```

9 linesumMB.ctl

```
Transit Summary Reports
PK_VOL.DBF                              //---- peak transit network ----
OP_VOL.DBF                              //---- offpeak transit network ----

LINE M08L,M09L, NAME="CONGRESS HEIGHTS SHUTTLE"
LINE 05BO,05B#1I, NAME="D.C.TYSONS CORNER"
LINE K02I,K02#1O, NAME="TAKOMA FORT TOTTEN"
LINE H06LO,H06LI, NAME="BROOKLAND-FORT LINCOLN LOOP"
LINE H05L,H07L, NAME="COLUMBIA HTS-MT PLEASANT LOOP"
LINE E06O,E06I, NAME="CHEVY CHASE"
LINE D04I,D04O, NAME="IVY CITY-UNION STATION"
LINE D02LO,D02LI,D02#1I, NAME="GLOVER PARK-DUPONT CIRCLE"
LINE B08I,B08O,B08#1O, NAME="FORT LINCOLN SHUTTLE, NO B9"
LINE U04L, NAME="SHERIFF RD-RIVER TERRACE"
LINE W02I,W02O,W02%I, NAME="S.E.COMMUNITY HOSPITAL-ANACOSTIA,NO W3"
LINE D08O,D08I, NAME="HOSPITAL CENTER"
LINE W06L,W08L, NAME="GARFIELD-ANACOSTIA LOOP"
LINE P01I,P06O,P06I, NAME="ANACOSTIA-ECKINGTON,NO P2"
LINE M06O,M06I, NAME="FAIRFAX VILLAGE"
LINE U08L,U08#1I, NAME="CAPITOL HTS-BENNING HTS"
LINE U06L,U06%4O, NAME="MAYFAIR-MARSHALL HTS, NO U5"
LINE M04NI,M04SO,M04SI,M04%I,M04%1O,M04%1I, NAME="NEBRASKA AVE"
LINE M02LO,M02LI, NAME="FAIRFAX VILLAGE-NAYLOR ROAD"
LINE H08O,H08I,H09O, NAME="PARK RD-BROOKLAND"
LINE X08I,X08O, NAME="MARYLAND AVE"
LINE N08LO,N08LI, NAME="VAN NESS-WESLEY HTS LOOP"
LINE A04O,A04#2I,A05O, NAME="ANACOSTIA-FORT DRUM"
LINE H02I,H02O,H03I,H03O,H04I,H04O,H04SI, NAME="CROSSTOWN"
LINE X01I,X03I, NAME="BENNING RD"
LINE W04I,W04#1I,W04#1O,W04#2I,W04#3O, NAME="DEANWOOD-ALABAMA AVE"
LINE V07I,V07O,V07%O,V09I, NAME="MINNESOTA AVE-M ST, NO V8"
LINE 94LO,94LI, NAME="STANTON RD"
LINE 80I,80O,80#2O, NAME="NORTH CAPITOL ST"
LINE X02I,X02O,X02S2O, NAME="BENNING RD-H ST"
LINE U02O,U02I, NAME="MINNESOTA AVE-ANACOSTIA"
LINE 90I,90O,90%I,90%1I,92I,92#1O,92%I, NAME="U ST-GARFIELD, NO 93"
LINE E02O,E02I,E02#1I,E04O,E04I,E04#3O, NAME="MILITART RD-CROSSTOWN, NO E3"
LINE B02I,B02O,B02%O, NAME="BLADENSBURG RD-ANACOSTIA"
LINE D05I, NAME="MCARTHUR BLVD-GEORGETOWN"
LINE 70#4O,70%2I,71O,71I, NAME="GEORGIA AVE-7 TH ST"
LINE G02O,G02I, NAME="P ST-LEDROIT PARK"
LINE A02O,A02I,A06O,A06I,A06#2I,A07I,A08O,A08I, NAME="ANACOSTIA-CONGRESS HTS, NO
42,46,48"
LINE 96#1I,96%O,97I,97O, NAME="EAST CAPITOL ST-CARDOZO LINE"
LINE W09L, NAME="DEFENSE FACILITIES SHUTTLE"
LINE 30I,30%1I,30%4I,32O,32I,32#5O,32%4I,34O,34I,34%4I,35O,35#1O,36I,36%4I,
NAME="PENNSYLVANIA AVE LINE"
LINE D01I,D03I,D03%I,D03%1I,D06I,D06O,D06#2I,D06%I,D06%2O, NAME="SIBLEY HOSITAL-
STADIUM/ARMORY"
LINE 66O,66I,68O,68I, NAME="PETWORTH-11 ST"
LINE V05I, NAME="FAIRFAX VILLAGE-L'ENFANT PLAZA"
LINE 60I,60O,64I,64O, NAME="FORT TOTTEN-PETWORTH"
LINE A09I, NAME="SOUTH CAPITOL ST"
LINE 62O,62I, NAME="TAKOMA-PETWORTH"
LINE 52O,52#1I,52%#1O,53I,53#1I,54I,54#1I,54%O, NAME="14 ST"
LINE 42O,42I,42%I, NAME="MT PLEASANT"
LINE G08I,G08O, NAME="RHODE ISLAND AVE"
LINE 05AI,05AO, NAME="DISTRICT-DULLES AIRPORT"
LINE L01I,L02I,L02O, NAME="CONNECTICUT AVE"
LINE N02I,N02O,N03I,N04I,N04O, NAME="MASSACHUSETS AVE"
LINE N22O,N22I, NAME="NAVY YARD SHUTTLE"
LINE S01#1I, NAME="16 TH ST-POTOMAC PARK"
LINE S02O,S02I,S02#1I,S02#5I,S02%5I,S04O,S04I,S04%I, NAME="16 TH ST"
LINE H01I, NAME="BROOKLAND-POTOMAC PARK"
LINE F12O,F12I, NAME="ARDWICK INDST PARK SHUTTLE"
LINE C28O,C28I, NAME="POINTER RIDGE"
LINE F13I,F13O, NAME="CHEVERLY-WASH BUSSINESS PARK"
LINE F14I,F14O, NAME="SHERIFF RD-CAPITOL HTS"
LINE 87I,87#1O,88I, NAME="LAUREL EXP"
LINE C21O,C22I,C25O,C26I, NAME="CENTRAL AVE"
LINE B21O,B22I, NAME="BOWIE STATE UNIV"
LINE L07O,L07I,L08O,L08I, NAME="CONNECTICUT AVE-MARYLAND"
LINE B27I,B27O, NAME="BOWIE-NEW CARROLTON"
LINE J08O,J09I, NAME="I-270 EXP"
LINE R03O,R03I, NAME="GREENBELT-FORT TOTTEN"
LINE V14O,V14I, NAME="DISTRICT HTS-SEAT PLEASANT, NO 15"
LINE B24I,B25O, NAME="BOWIE-BELAIR"
LINE J11O,J12I,J15O,J15I, NAME="MARLBORO PIKE"
LINE T02O,T02I, NAME="RIVER RD"
LINE Z11I,Z13O, NAME="GREENCASTLE-BRIGGS CHANEY EXP"
LINE Z09#1I,Z29I, NAME="LAUREL-BURTONSVILLE EXP"
LINE J05O,J05I, NAME="TWINBROOK-SILVER SPRING"
LINE Z01O,Z04I, NAME="GLENMONT-SILVER SPRING"
LINE F08O,F08I, NAME="PG'S-LANGLEY"
LINE 89I,89#1O, NAME="LAUREL"
LINE Z07I,Z17O, NAME="CALVERTON EXP"
LINE R04O,R04I, NAME="QUEENS CHAPEL RD"
LINE T17I,T17O, NAME="GREENBELT"
LINE Z02#4I,Z02#5O, NAME="COLESVILLE RD"
LINE R12O,R12I, NAME="KENILWORHT AVE-NEW CARROLTON"
LINE Z05O,Z03I, NAME="COLESVILLE-FAIRLAND EXP"
LINE B11O, NAME="BETHESDA REVERSE COMMUTE"
LINE 14AO,14BI,14CI,14C#1I,14C%,14C%1I,14DO, NAME="MONTGOMERY TYSONS-BELTWAY EXP"
LINE N11I,N13O, NAME="BRANCH AVE-KING ST. EXP"
LINE 84I,84O, NAME="RHODE ISLAND AVE-NEW CARROLTON"
LINE F04I,F04O,F06I,F06O, NAME="PG'S-SILVER SPRING"
LINE T18I,T18O, NAME="ANNAPOLIS"
LINE 83I,83O,86I,86O, NAME="COLLEGE PARK"
LINE C12I,C14O, NAME="HILCREST HTS"
LINE C11I,C13O, NAME="CLINTON"
LINE W13I, NAME="BOCK RD"
LINE J01I,J01#2O,J02I,J02#2O,J02%O,J03#2O, NAME="BETHESDA-SILVER SPRING"
LINE F01I,F01O, NAME="CHILLUM RD"
LINE P12O,P12I, NAME="EASTOVER-ADDISON RD"
LINE D12I,D12O,D13I,D14I,D14O,D14#1I, NAME="OXON HILL-SUITLAND"
LINE C08I,C08O, NAME="COLLEGE PARK-SOUTH FLINT"
LINE C07I,C09O, NAME="GREENBELT-GLENMONT"
LINE V12O,V12I, NAME="DISTRICT HTS-SUITLAND"
LINE K12I,K12O,K13I, NAME="FORESTVILLE"
LINE H11I,H12O,H13O, NAME="MARLOW HTS-TEMPLE HILLS"
LINE C02I,C02O,C02#II,C04I,C04O, NAME="GREENBELT-TWINBROOK"
LINE P17I,P19I, NAME="OXON HILL-FORT WASHINGTON"
LINE A12I,A15O, NAME="M L KING JR HWY"
LINE K06O,K06I, NAME="NEW HAMPSHIRE-MARYLAND"
LINE Y07O,Y07I,Y07#1I,Y07%O,Y08O,Y08#2I,Y08#3I,Y09O,Y09#1I, NAME="GEORGIA AVE-
MARYLAND"
LINE Z08#1I,Z08#2O,Z08#4I,Z08#5O, NAME="FAIRLAND"
LINE W15I,W17I, NAME="INDIAN HEAD HWY"
LINE R01I,R02I,R02O,R05I, NAME="RIGGS RD"
LINE Q02I,Q02O, NAME="VEIRS MILL RD"
LINE B29I,B29#2O, NAME="CROFTON-NEW CARROLTON"
LINE W19I,W19#1O, NAME="INDIAN HEAD EXPRESS"
LINE J04O,J04I, NAME="COLLEGE PARK-BETHESDA"
LINE B30I,B30O, NAME="GREENBELT-BWI EXP"
LINE N07I, NAME="MONTGOMERY MALL-FEDERAL TRIANGLE EXP"
LINE 02WL, NAME="VIENNA-OAKTON"
LINE 24TI,24TO, NAME="MCLEAN HAMLET-EAST FALLS CHURCH"
LINE 12CI,12DO, NAME="CENTERVILLE NORTH"
LINE 17GI,17HI,17KI,17LI, NAME="KINGS PARK EXPRESS"
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LINE 12LI,12MO, NAME="LITTLE ROCKY RUN-VIENNA"
LINE 18EI,18FO, NAME="SPRINGFIELD"
LINE 18GI,18HI,18JO, NAME="ORANGE HUNT"
LINE 12EI,12FO, NAME="CENTERVILLE SOUTH"
LINE 20FI,20WO,20XI,20YO, NAME="CHANTILLY-GREENBRIAR"
LINE 12RO,12SI, NAME="SULLY STATION-VIENNA"
LINE 17AO,17FO,17MI, NAME="KINGS PARK"
LINE 18PI,18RI,18SI,18S%O, NAME="BURKE CENTER"
LINE 11YI, NAME="MT VERNON EXP"
LINE 03AI,03AO,03BO,03BI,03EI, NAME="LEE HWY"
LINE 28TI,28TO, NAME="TYSONS CORNER-WEST FALLS CHURCH"
LINE 08SO,08WI,08XI,08ZI, NAME="FOXCHASE-SEMINARY VALLEY"
LINE 38BI,38BO, NAME="BALLSTON-FARRAGUT SQ"
LINE 10BO,10BI, NAME="HUNTING TOWERS-BALLSTON"
LINE 16AI,16AO,16BO,16C%O,16DI,16DO,16FI,16GI,16JI,16J%O, NAME="COLUMBIA PIKE"
LINE 09AI,09A%O,09A#3I,09A#3O,09EO, NAME="RICMOND HWY"
LINE 10PI,10PO, NAME="MT VERNON AVE-POTOMAC YARD-CRYSTAL CITY"
LINE 22AO,22BI,22B%O,22FO, NAME="WALKER CHAPEL-PENTAGON"
LINE 23AO,23A#1I,23CO,23C%3I, NAME="MCLEAN-CRYSTAL CITY"
LINE 16SO,16UI,16WI,16XI, NAME="SIRLINGTON-PENTAGON"
LINE 28AO,28AI,28BO,28BI,28B#2O, NAME="ALEXANDRIA-TYSONS CORNER"
LINE 29KI,29KO,29K#1I,29N#3O, NAME="ALEXANDRIA-FAIRFAX"
LINE 02TO,02TI, NAME="TYSONS CORNER-DUNNLORING"
LINE 16YI, NAME="COLUMBIA PIKE-FARRAGUT SQ"
LINE 25AO,25FI,25F#1I,25GI, NAME="BALLSTON-BRADLEE-PENTAGON"
LINE 01BO,01BI,01CO,01CI,01DO,01EI,01ZI,01Z#1I, NAME="WILSON BLVD-FAIRFAX"
LINE 03TO,03T#1I, NAME="PIMMIT HILLS"
LINE 13AL,13BL, NAME="NAT AIRPORT-PENTAGON-WASHINGTON"
LINE 28FO,28GI, NAME="SKYLINE CITY"
LINE 07AO,07BI,07CI,07DO,07EI,07FO,07HO,07PO,07WI,07XI, NAME="LINCOLNIA-NORTH
FAIRLINGTON"
LINE 04AO,04AI,04BO,04EI,04SI, NAME="PERSHING DR-ARLINGTON BLVD"
LINE 24PI,24PO, NAME="BALLSTON-PENTAGON"
LINE 21AI,21BI,21CO,21FO, NAME="LANDMARK-PENTAGON"
LINE 29CO,29GI,29HI,29XI, NAME="ANNANDALE"
LINE 10AI,10AO,10EI, NAME="HUNTING TOWERS-PENTAGON"
LINE 11PI,11PO, NAME="HUNTING TOWERS-POTOMAC YARD-CRYSTAL CITY"
LINE 25BO,25BI,25B#1I, NAME="LANDMARK-BALLSTON"
LINE 16LI, NAME="ANNANDALE-SKYLINE CITY-PENTAGON"
LINE 15K#2O,15LI, NAME="CHAIN BRIDGE RD"
LINE 02BI,02CO,02CI,02GO, NAME="WASHINTON BLVD"
LINE S91L, NAME="SPRINGFIELD MALL PARKING LOT SHUTTLE"
LINE S82L, NAME="METRO PARK SHUTTLE"
LINE S80L,S81L, NAME="SPRINGFIELD CIRCULATOR"
LINE 14TI,14TL,14WO,14WI,14WL, NAME="LINES NOT FOUND IN SURVEY"
```

10 linesumMR.ctl

```
Transit Summary Reports
PK_VOL.DBF                               //---- peak transit network ----
OP_VOL.DBF                               //---- offpeak transit network ----
NODE_NAME=STANAME.prn

LINE MBLUA, NAME="BLUE-LINE"
LINE MAQUA, NAME="Blue-AQUA LINE"
LINE MGRNA, NAME="GREEN-LINE"
LINE GREN2, NAME="GREEN-LINE (Greenbelt Branch Ave)"
LINE MORNA, NAME="ORANGE-LINE"
LINE MORNB, NAME="ORANGE-LINE (Vienna Largo)"
LINE MREDA, NAME="RED LINE SG/WHT"
LINE MYELA, NAME="YELLOW-LINE"
LINE MDULL, NAME="ORANGE-LINE Dulles"
LINE MBLUA,MAQUA,MGRNA,GREN2,MORNA,MORNB,MREDA,MYELA,MDULL, NAME="ALL METRO-RAIL"
```

11 linesumOB.ctl

```
Transit Summary Reports
PK_VOL.DBF                               //---- peak transit network ----
OP_VOL.DBF                               //---- offpeak transit network ----

LINE ART51O,ART51I,ART52,ART90L, NAME="ARLINGTON TRANSIT"
LINE DAT2WO,DAT2%W,DAT2EI,DAT3I,DAT3O,DAT4I,DAT4O,DAT4%I,DAT5O,DAT5I,
     DAT6I,DAT6O,DAT7I,DAT7O,DAT8I,DAT8%I,DAT8O, NAME="ALEXANDRIA DASH"
LINE F101I,F101O,F102I,F103LI,F103LO,F105%I,F105%O,F106I,F106O,F107%I,
     F107O,F108I,F108O,F109O,F109I,F110I,F110O,F112L,F202I,F202O,F203I,
     F203O,F204I,F204O,F301I,F301O,F303I,F303O,F304I,F304O,F305I,F401I,
     F401O,F402I,F403O,F504I,F504O,F556L,F574I,F574O,F605O,F605I,F922L,
     F924I,F926O,F927L,F929L,F383I,F384I,F384O,F385I,F425LI,F425LO,F427LO,
     F427LI,F505I,F505O,F551I,F551O,F552I,F553AI,F554I,F557I,F585I,F622L,
     F623LO,F623LI,F950I,F950O,F951O,F952O,F980I,F984I,F984O,
     F989I, NAME="FAIRFAX CONNECTOR"
LINE RIBS1L,RIBS2L,RIBS3L,RIBS4L, NAME="RIBS"
LINE GO11L,GO12L,GO13L,GO14E,GO14W,GO15W,GO15E,GO15X,GO16N,GO16S,GO17N,
     GO17S,GO18S,GO18N,GO20,GO21,GO21S,GO22,GO23,GO24,GO25L,GO30,GO32N,
     GO32S,GO33,GO34,GO51L,GO53L, NAME="THE BUS"
LINE RO01I,RO01BO,RO02I,RO02AO,RO03O,RO04,RO05O,RO05I,RO06AI,RO06DO,RO07O,
     RO07I,RO07AI,RO08,RO09,RO10,RO11I,RO12I,RO13I,RO13O,RO14,RO15I,RO15O,
     RO16AI,RO16AO,RO17I,RO17O,RO18I,RO18O,RO18AI,RO19I,RO20I,RO20O,RO22I,
     RO22O,RO23I,RO23O,RO24I,RO25O,RO25I,RO26I,RO26O,RO27O,RO27I,RO28I,
     RO28AI,RO29,RO30,RO31,RO32O,RO32BI,RO33,RO34I,RO34BO,RO34BI,RO35,RO36I,
     RO36O,RO37O,RO37AI,RO38,RO39I,RO39AO,RO41,RO42O,RO42I,RO43,RO44,RO45,
     RO45CI,RO46I,RO46O,RO47,RO48,RO49O,RO49I,RO51,RO52I,RO52AO,RO53,RO54I,
     RO54BO,RO55I,RO55O,RO56I,RO56AO,RO57,RO58I,RO58O,RO59I,RO59AO,RO60I,
     RO61BI,RO61BO,RO62,RO63I,RO63AO,RO64,RO65I,RO66I,RO67O,RO68I,RO69I,
     RO69CI,RO70BO,RO70CI,RO71I,RO72I,RO73O,RO74,RO75I,RO76I,RO76O,RO76%O,
     RO77I,RO78I,RO79I,RO90I,RO90AO,RO92I,RO93I,RO96AI,RO96%I,RO96AO,
     RO124, NAME="RIDE-ON"
LINE SGOLD1,SGOLD2,SGRN1,SGRN2, NAME="FFX CUE"
LINE CCLS1,CCLS2,CCLS3,CCS1,CCPFL,CCPF2O,CCPF2I, NAME="CALVERT COUNTY TRANSIT"
LINE FTCC10,FTFM20,FTF20I,FTMC30,FTR40O,FTR40I,FTWE50,FTCC60,FTCC70,FTBS02,
     FTEBRG,FT801,FT802,FT803,FTMARC,FTRT85,FTWALK, NAME="FREDERICK COUNTY TRANSIT"
LINE HTBLUI,HTBLUO,HTBRN,HTBRNO,HTGRNL,HTORGL,HTREDI,HTREDO,HTRED2,HTYELO,
     HTYELI,HTYE2O,HTYE2I,HTUS1L,HTUS1N, NAME="HOWARD AREA TRANSIT SERVICES"
LINE LA00AI,LA00AO,LB00AI,LB00AO,LC00AI,LC00AO,LD00AI,LD00AO,LE00AI,LE00AO,
     LF00AO,LG00AI,LG00AO,LJ00AI,LK00AO,LL00AL,LM00AL, NAME="LAUREL BUS"
LINE LT01L,LT02L,LT03L,LT04L,LT05L,LT06L,LT07O,LT07I,LT08I, NAME="LOUDOUN TRANSIT"
LINE OLCC1,OLDLEI,OLDLEO,OLDMFI,OWDMFO,OLBRA,OLBRA%,OLBRB,OLBRB%,OLMNO,
     OLMNI,OLMPKA,OLMPKB, NAME="OMNI LINK SERVICE"
LINE LC01I,LC04I,LCSDNI,LCSGWI, NAME="LEE COACHES"
LINE MT01AI,MT01BI,MT02AI,MT02BI,MT03AI,MT04AI,MT04BI,MT05AI,MT07AI,MT09AI,
     MT15AI,MT15BI,MT15CI,MT21AI,MT21BI,MT21AO,MT22AI,MT22BI,MT29AI,MT29BI,
     MT29BO,MT50AI,MT50BI,MT91AI,MT91BI,MT95AI,MT95BI,MT95CI, NAME="MTA COMMUTER"
LINE ORDS1I,ORDC2I,ORDP3I,ORDN3I,ORFSDI,ORFSDO,ORC1I,ORL4I,ORL5I,ORL6I,ORL203,
     ORL204,ORM3I,ORM3RI,ORWFCI,ORVS2I,ORM4I,ORMC4I,ORMC5I,ORRT1I,ORRSI,
     NAME="OMNI RIDE"
LINE PQ01I,PQ03I,PQ05I,PQ07I,PQ09I,PQ12I,PQ13I,PQ14I,PQ15I,PQ17I, NAME="QUICK'S"
LINE SDC6I,SDC7I,SDC8I,SDC9I,SDC10I,SDC14I, NAME="NATIONAL COACH INC"
```

12 Linksum.ctl

```
Transit Summary Reports
PK_VOL.DBF                               #---- peak transit network ----
```

```
OP_VOL.DBF                              #---- offpeak transit network ----
NODE_NAME=STANAME.prn

LINK 7301-7306,7308-7309,7311-7316, NAME="RED LINE"
```

13 op_vol.ctl

```
Merge the Transit Volumes
OP_VOL.DBF                                                  //---- output file ----
..\i6_DRABOPlink.dbf   //--- drive-access
..\i6_DRBMOPlink.dbf
..\i6_DRCROPlink.dbf
..\i6_DRMROPlink.dbf
..\i6_KRABOPlink.dbf   //--- kiss-and-ride access
..\i6_KRBMOPlink.dbf
..\i6_KRMROPlink.dbf
..\i6_WKABOPlink.dbf   //--- walk-access
..\i6_WKBMOPlink.dbf
..\i6_WKCROPlink.dbf
..\i6_WKMROPlink.dbf
```

14 pk_vol.ctl

```
Merge the Transit Volumes
PK_VOL.DBF                                                  //---- output file ----
..\i6_DRABAMlink.dbf   //--- drive-access
..\i6_DRBMAMlink.dbf
..\i6_DRCRAMlink.dbf
..\i6_DRMRAMlink.dbf
..\i6_KRABAMlink.dbf   //--- kiss-and-ride access
..\i6_KRBMAMlink.dbf
..\i6_KRMRAMlink.dbf
..\i6_WKABAMlink.dbf   //--- walk-access
..\i6_WKBMAMlink.dbf
..\i6_WKCRAMlink.dbf
..\i6_WKMRAMlink.dbf
```

15 staprotp_v1.ctl

```
staprotp_v1.ctl
  Control File for STAPROTP_V1.EXE Program

  The 2 INPUT files are:
  unit  7  statf - the consolidated station file
  unit  8  rlnkf - the metrorail/commuter rail link file

  The 14 OUTPUT files are:

  unit 11  metlnkf - metrorail     link file
  unit 28  metlnkm1- metrorail     link file for metro sta. net building
  unit 12  comlnkf - commuter rail link file

  unit 13  metnodf - metrorail station nodes
  unit 29  metnodm1- metrorail station nodes for metro sta. net. building
  unit 14  comnodf - commuter rail     nodes

  unit 15  metpnrf - metrorail     PNR nodes
  unit 16  compnrf - commuter rail PNR nodes
  unit 17  buspnrf - bus           PNR Nodes

  unit 18  mpnrlf  - metrorail      PNR Connector Links
  unit 19  cpnrlf  - commuter rail  PNR Connector Links
  unit 20  bpnrlf  - bus            PNR Connector Links

  unit 21  metblf  - metrorail/bus connector Links
  unit 22  comblf  - comm.rail/bus connector Links

  unit 23  tazpnrf - TAZ-PNR Node equiv file (for MATRIX Run)
  unit 24  mf1a1   - A1 Deck Input file to MFARE1 program
  unit 25  s_pxyf  - station and pnr lot xys (unformated)

&files

   statf   = 'inputs\sta_tpp.bse'
   rlnkf   = 'inputs\rail_lnk.bse'
   metlnkf = 'MET_LINK.TB'
   metlnkm1= 'METLNKM1.TB'
   comlnkf = 'COM_LINK.TB'
   metnodf = 'MET_NODE.TB'
   metnodm1= 'METNODM1.TB'
   comnodf = 'COM_NODE.TB'
   metpnrf = 'MET_PNRN.TB'
   compnrf = 'COM_PNRN.TB'
   buspnrf = 'BUS_PNRN.TB'
   mpnrlf  = 'MET_PNRL.TB'
   cpnrlf  = 'COM_PNRL.TB'
   bpnrlf  = 'BUS_PNRL.TB'
   metblf  = 'MET_BUS.TB'
   comblf  = 'COM_BUS.TB'
   tazpnrf = 'TAZPNR.asc'
   mf1a1   = 'mfare1.a1'
   s_pxyf  = 'stapnr.xys'
   lrtnodf = 'LRT_NODE.TB'
   lrtpnrf = 'LRT_PNRN.TB'
   lpnrlf  = 'LRT_PNRL.TB'
   lrtblf  = 'LRT_BUS.TB'
   lrtlnkf = 'LRT_LINK.TB'
   newnodf = 'NEW_NODE.TB'
   newpnrf = 'NEW_PNRN.TB'
   npnrlf  = 'NEW_PNRL.TB'
   newblf  = 'NEW_BUS.TB'
   newlnkf = 'NEW_LINK.TB'
   /
```

16 total.ctl

```
Transit Line Summary
PK_VOL.DBF                              //---- peak transit network ----
OP_VOL.DBF                              //---- offpeak transit network ----

TOTAL NAME="Transit Line Summary"
```

17 WALKACC.CTL

```
node.asc
HBWV2.a1f
xtrawalk.asc
link.asc
sidewalk.asc
walkacc.asc
support.asc
```