# Mode Choice Calibration TCv7 – Calibrate E

# April 15, 2017

## Summary

In early 2016, the Metrolina Regional Model mode choice routine was replaced by AECOM Consult. The new model uses an open source C++ program developed for the TRANSIMS model (TRansportation ANalysis and SIMulation System) – an open source USDOT model that merges traditional travel demand modeling with traffic simulation. New on-board survey data was available from the LYNX Blue Line “After” study in 2013. New in-home survey data was available from the 2012 survey. Initial mode choice calibration was performed using TransCad version 5 with 2010 and 2013 highway and transit networks and land use data developed in 2009 (pre-Census).

The 2017 updates to the Metrolina model include updating TransCad software to version 7 (build 12300). TransCad updated the Pathfinder algorithms. As a result, the mode choice calibration needed updates as well. Calibration for this effort is for the year 2013 – the year of the on-board survey.

The TransCad version 5 mode choice updates were documented April, 2016. This memo documents the latest round of calibration using TC ver 7 and the latest model networks and land use data.

## Calibration runs

These are the major steps in the Feb, 2017 calibration. Each step has base bias constants and mode constants generated in the previous step.

1. Calibrate A – Adjust Mode Choice Mode Constants and Bias Constants from ver 5 model
2. Calibrate B – Path repair – Zero dwell time
3. Calibrate C – Add 2,000 Premium Walk trips to NHB
4. Calibrate D –Repair Fare, add iterations on constant calibration program
5. Calibrate E – Redefine linked trips in On-Board Survey

## Spreadsheets accompanying report

Tables in this report can be found on accompanying Excel spreadsheets. Three sets of spreadsheets are provided:

1. RunStats – the standard MRM model report for major steps in the model run.
2. MS Calibrate spreadsheets – Target estimation from surveys, mode choice results – constants and trips by mode. Comparison to targets.
   1. HBW – Peak and Offpeak, 4 income groups, two market segments
   2. HBO – Peak and Offpeak, 4 income groups, two market segments
   3. NHB – Peak and Offpeak, two market segments
   4. HBU – Peak and Offpeak, two market segments.
3. Boardings by Station spreadsheets. These include tables of modeled light-rail boardings to surveyed boardings.

RunStats\_2013\_1701v7\_Calibrate\_E\_170302\_RunComparison.xlsx

RunStats\_2013\_1701v5\_170203.xlsx

MS\_HBW\_PEAK\_Calibrate\_E\_170301.xlsx

MS\_HBW\_OFFPEAK\_Calibrate\_E\_Bias2\_170302.xlsx

MS\_HBO\_PEAK\_Calibrate\_E\_Bias2\_170302.xlsx

MS\_HBO\_OFFPEAK\_Calibrate\_E\_Bias2\_170302.xlsx

MS\_NHB\_Calibrate\_E\_Bias2\_170301.xlsx

MS\_HBU\_Calibrate\_E\_170301.xlsx

Boardings\_by\_Station\_2013\_1701v7\_Calibrate\_E\_170302.xlsx

Boardings\_by\_Station\_2013\_1701v5\_170221.xlxs

Summary statistics from Calibrate E are provided below. Complete tables are found in Appendix A.

##### Boardings by Station – TC v7 – calibrate E, Updated Mode Choice targets

##### Boardings by Station – TC v7 – calibrate D, Fare set to 2013 fares. Max iterations for mode choice calibration set to 30

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2013 On-Board Survey | | | | | TC v7 mrm1701- 2013, calib D | | | | |
| StaName | PNR | Non-PNR |  |  | Total | PNR | Direct Walk | Bus Access | Direct Dropoff | Total |
| 7th St Station |  | 592 | 248 | 49 | 889 | 0 | 186 | 15 | 3 | 204 |
| CTC |  | 1,539 | 2,226 | 22 | 3,787 | 0 | 1,217 | 1,943 | 37 | 3,196 |
| 3rd St Sta |  | 950 | 148 | 7 | 1,105 | 0 | 689 | 123 | 11 | 824 |
| Stonewall Sta |  | 305 | 26 | 20 | 351 | 0 | 438 | 57 | 6 | 501 |
| CBD Stations | 0 | 3,386 | 2,648 | 98 | 6,132 | 0 | 2,530 | 2,138 | 56 | 4,724 |
| Carson Sta |  | 236 | 59 | 0 | 295 | 0 | 210 | 6 | 4 | 220 |
| Bland |  | 334 | 25 | 5 | 364 | 0 | 354 | 119 | 7 | 480 |
| East-West Sta |  | 478 | 223 | 15 | 716 | 0 | 651 | 48 | 14 | 714 |
| New Bern Sta |  | 508 | 22 | 37 | 567 | 0 | 515 | 25 | 9 | 549 |
| Southend Stations | 0 | 1,556 | 329 | 57 | 1,942 | 0 | 1,730 | 199 | 34 | 1,963 |
| ScaleybarkSt | 257 | 402 | 186 | 92 | 937 | 201 | 289 | 82 | 38 | 609 |
| Woodlawn Sta | 178 | 339 | 139 | 61 | 717 | 172 | 443 | 89 | 37 | 741 |
| Tyvola Sta | 316 | 467 | 141 | 5 | 929 | 263 | 411 | 454 | 19 | 1,147 |
| Archdale Sta | 33 | 524 | 210 | 20 | 787 | 11 | 355 | 116 | 19 | 502 |
| Arrowood Sta | 273 | 377 | 689 | 4 | 1,343 | 253 | 276 | 538 | 13 | 1,081 |
| SharonWest | 368 | 374 | 397 | 49 | 1,188 | 606 | 316 | 508 | 23 | 1,453 |
| S I-485 | 1,112 | 343 | 602 | 52 | 2,109 | 426 | 157 | 426 | 15 | 1,024 |
| PNR Stations | 2,537 | 2,826 | 2,364 | 283 | 8,010 | 1,932 | 2,247 | 2,214 | 164 | 6,557 |
| Total | 2,537 | 7,768 | 5,341 | 438 | 16,084 | 1,932 | 6,508 | 4,550 | 254 | 13,244 |

##### Boardings by Station – TC v7 – calibrate C – add 2,000 NHB walk premium trips

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2013 On-Board Survey | | | | | TC v7 mrm1701- 2013, calib C | | | | |
| StaName | PNR | Non-PNR |  |  | Total | PNR | Direct Walk | Bus Access | Direct Dropoff | Total |
| 7th St Station |  | 592 | 248 | 49 | 889 | 0 | 229 | 15 | 3 | 247 |
| CTC |  | 1,539 | 2,226 | 22 | 3,787 | 0 | 1,300 | 2,156 | 40 | 3,495 |
| 3rd St Sta |  | 950 | 148 | 7 | 1,105 | 0 | 740 | 135 | 11 | 886 |
| Stonewall Sta |  | 305 | 26 | 20 | 351 | 0 | 471 | 76 | 7 | 554 |
| CBD Stations | 0 | 3,386 | 2,648 | 98 | 6,132 | 0 | 2,739 | 2,381 | 61 | 5,181 |
| Carson Sta |  | 236 | 59 | 0 | 295 | 0 | 216 | 7 | 5 | 227 |
| Bland |  | 334 | 25 | 5 | 364 | 0 | 368 | 131 | 8 | 507 |
| East-West Sta |  | 478 | 223 | 15 | 716 | 0 | 676 | 49 | 16 | 741 |
| New Bern Sta |  | 508 | 22 | 37 | 567 | 0 | 532 | 28 | 10 | 569 |
| Southend Stations | 0 | 1,556 | 329 | 57 | 1,942 | 0 | 1,792 | 215 | 38 | 2,045 |
| ScaleybarkSt | 257 | 402 | 186 | 92 | 937 | 231 | 303 | 78 | 40 | 652 |
| Woodlawn Sta | 178 | 339 | 139 | 61 | 717 | 194 | 464 | 92 | 42 | 792 |
| Tyvola Sta | 316 | 467 | 141 | 5 | 929 | 318 | 436 | 522 | 22 | 1,299 |
| Archdale Sta | 33 | 524 | 210 | 20 | 787 | 15 | 372 | 92 | 22 | 500 |
| Arrowood Sta | 273 | 377 | 689 | 4 | 1,343 | 296 | 292 | 581 | 13 | 1,183 |
| SharonWest | 368 | 374 | 397 | 49 | 1,188 | 517 | 335 | 543 | 25 | 1,421 |
| S I-485 | 1,112 | 343 | 602 | 52 | 2,109 | 656 | 164 | 498 | 19 | 1,337 |
| PNR Stations | 2,537 | 2,826 | 2,364 | 283 | 8,010 | 2,228 | 2,366 | 2,405 | 184 | 7,182 |
| Total | 2,537 | 7,768 | 5,341 | 438 | 16,084 | 2,228 | 6,897 | 5,001 | 283 | 14,408 |

##### Boardings by Station – TC v7 – calibrate B – Dwell Time repair

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2013 On-Board Survey | | | | | TC v7 mrm1701- 2013, calib B | | | | |
| StaName | PNR | Non-PNR |  |  | Total | PNR | Direct Walk | Bus Access | Direct Dropoff | Total |
| 7th St Station |  | 592 | 248 | 49 | 889 | 0 | 201 | 14 | 3 | 218 |
| CTC |  | 1,539 | 2,226 | 22 | 3,787 | 0 | 988 | 2,011 | 40 | 3,039 |
| 3rd St Sta |  | 950 | 148 | 7 | 1,105 | 0 | 561 | 133 | 11 | 705 |
| Stonewall Sta |  | 305 | 26 | 20 | 351 | 0 | 360 | 75 | 7 | 441 |
| CBD Stations | 0 | 3,386 | 2,648 | 98 | 6,132 | 0 | 2,109 | 2,233 | 60 | 4,402 |
| Carson Sta |  | 236 | 59 | 0 | 295 | 0 | 164 | 6 | 5 | 175 |
| Bland |  | 334 | 25 | 5 | 364 | 0 | 291 | 125 | 8 | 424 |
| East-West Sta |  | 478 | 223 | 15 | 716 | 0 | 535 | 42 | 16 | 593 |
| New Bern Sta |  | 508 | 22 | 37 | 567 | 0 | 448 | 26 | 10 | 484 |
| Southend Stations | 0 | 1,556 | 329 | 57 | 1,942 | 0 | 1,439 | 198 | 38 | 1,675 |
| ScaleybarkSt | 257 | 402 | 186 | 92 | 937 | 232 | 252 | 63 | 39 | 585 |
| Woodlawn Sta | 178 | 339 | 139 | 61 | 717 | 196 | 372 | 78 | 42 | 687 |
| Tyvola Sta | 316 | 467 | 141 | 5 | 929 | 322 | 359 | 434 | 23 | 1,137 |
| Archdale Sta | 33 | 524 | 210 | 20 | 787 | 15 | 329 | 84 | 22 | 450 |
| Arrowood Sta | 273 | 377 | 689 | 4 | 1,343 | 299 | 263 | 522 | 13 | 1,097 |
| SharonWest | 368 | 374 | 397 | 49 | 1,188 | 518 | 307 | 495 | 25 | 1,346 |
| S I-485 | 1,112 | 343 | 602 | 52 | 2,109 | 657 | 139 | 459 | 19 | 1,275 |
| PNR Stations | 2,537 | 2,826 | 2,364 | 283 | 8,010 | 2,239 | 2,021 | 2,135 | 183 | 6,577 |
| Total | 2,537 | 7,768 | 5,341 | 438 | 16,084 | 2,239 | 5,569 | 4,566 | 281 | 12,654 |

##### Boardings by Station – TC v7 – calibrate A

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Metrolina 2013 South LRT Boardings by Mode of Access** | | | | |  |  |  |  |  |  |
|  | 2013 On-Board Survey | | | | | TC v7 mrm1701- 2013, calib A | | | | |
| StaName | PNR | Non-PNR |  |  | Total | PNR | Direct Walk | Bus Access | Direct Dropoff | Total |
| 7th St Station |  | 592 | 248 | 49 | 889 | 0 | 54 | 17 | 2 | 73 |
| CTC |  | 1,539 | 2,226 | 22 | 3,787 | 0 | 161 | 116 | 17 | 294 |
| 3rd St Sta |  | 950 | 148 | 7 | 1,105 | 0 | 1,656 | 64 | 67 | 1,787 |
| Stonewall Sta |  | 305 | 26 | 20 | 351 | 0 | 448 | 1 | 6 | 455 |
| CBD Stations | 0 | 3,386 | 2,648 | 98 | 6,132 | 0 | 2,319 | 198 | 92 | 2,609 |
| Carson Sta |  | 236 | 59 | 0 | 295 | 0 | 536 | 4 | 7 | 548 |
| Bland |  | 334 | 25 | 5 | 364 | 0 | 502 | 21 | 9 | 532 |
| East-West Sta |  | 478 | 223 | 15 | 716 | 0 | 831 | 39 | 20 | 890 |
| New Bern Sta |  | 508 | 22 | 37 | 567 | 0 | 702 | 18 | 11 | 731 |
| Southend Stations | 0 | 1,556 | 329 | 57 | 1,942 | 0 | 2,571 | 82 | 47 | 2,700 |
| ScaleybarkSt | 257 | 402 | 186 | 92 | 937 | 397 | 360 | 27 | 58 | 841 |
| Woodlawn Sta | 178 | 339 | 139 | 61 | 717 | 292 | 705 | 60 | 38 | 1,096 |
| Tyvola Sta | 316 | 467 | 141 | 5 | 929 | 230 | 497 | 288 | 26 | 1,041 |
| Archdale Sta | 33 | 524 | 210 | 20 | 787 | 13 | 455 | 120 | 15 | 603 |
| Arrowood Sta | 273 | 377 | 689 | 4 | 1,343 | 222 | 476 | 119 | 14 | 831 |
| SharonWest | 368 | 374 | 397 | 49 | 1,188 | 235 | 395 | 248 | 26 | 903 |
| S I-485 | 1,112 | 343 | 602 | 52 | 2,109 | 201 | 169 | 243 | 11 | 624 |
| PNR Stations | 2,537 | 2,826 | 2,364 | 283 | 8,010 | 1,591 | 3,058 | 1,105 | 186 | 5,939 |
| Total | 2,537 | 7,768 | 5,341 | 438 | 16,084 | 1,591 | 7,948 | 1,384 | 325 | 11,248 |

##### Boardings by Station – TC v5

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2013 On-Board Survey | | | | | mrm1602 - 2013, calib 4b | | | | |
| StaName | PNR | Non-PNR |  |  | Total | PNR | Direct Walk | Bus Access | Direct Dropoff | Total |
| 7th St Station |  | 592 | 248 | 49 | 889 | 0 | 177 | 15 | 3 | 194 |
| CTC |  | 1,539 | 2,226 | 22 | 3,787 | 0 | 1,374 | 2,319 | 45 | 3,738 |
| 3rd St Sta |  | 950 | 148 | 7 | 1,105 | 0 | 852 | 53 | 19 | 924 |
| Stonewall Sta |  | 305 | 26 | 20 | 351 | 0 | 437 | 45 | 9 | 491 |
| CBD Stations | 0 | 3,386 | 2,648 | 98 | 6,132 | 0 | 2,840 | 2,433 | 76 | 5,349 |
| Carson Sta |  | 236 | 59 | 0 | 295 | 0 | 104 | 25 | 2 | 130 |
| Bland |  | 334 | 25 | 5 | 364 | 0 | 328 | 161 | 7 | 495 |
| East-West Sta |  | 478 | 223 | 15 | 716 | 0 | 535 | 97 | 12 | 643 |
| New Bern Sta |  | 508 | 22 | 37 | 567 | 0 | 621 | 31 | 9 | 661 |
| Southend Stations | 0 | 1,556 | 329 | 57 | 1,942 | 0 | 1,587 | 313 | 30 | 1,930 |
| ScaleybarkSt | 257 | 402 | 186 | 92 | 937 | 178 | 328 | 68 | 52 | 625 |
| Woodlawn Sta | 178 | 339 | 139 | 61 | 717 | 190 | 461 | 162 | 44 | 857 |
| Tyvola Sta | 316 | 467 | 141 | 5 | 929 | 157 | 432 | 484 | 20 | 1,093 |
| Archdale Sta | 33 | 524 | 210 | 20 | 787 | 9 | 456 | 80 | 20 | 565 |
| Arrowood Sta | 273 | 377 | 689 | 4 | 1,343 | 140 | 350 | 831 | 13 | 1,333 |
| SharonWest | 368 | 374 | 397 | 49 | 1,188 | 310 | 409 | 687 | 25 | 1,431 |
| S I-485 | 1,112 | 343 | 602 | 52 | 2,109 | 1,104 | 175 | 415 | 19 | 1,713 |
| PNR Stations | 2,537 | 2,826 | 2,364 | 283 | 8,010 | 2,087 | 2,610 | 2,727 | 193 | 7,617 |
| Total | 2,537 | 7,768 | 5,341 | 438 | 16,084 | 2,087 | 7,038 | 5,472 | 298 | 14,896 |

## Model history

This document was written by Joseph McLelland, Charlotte Department of Transportation, April , 2017.

The Metrolina Regional Model (MRM) was developed in the late 1990s and early 2000s to serve as the source for future projections of travel in the greater Charlotte region. The household data were based on the 2000 Census. Trips were based on a 2002 in-home survey of regional households. Planners conducted additional studies and collected traffic count data to build and calibrate the model.

The transit side of the model was developed for the US Federal Transit Administration (FTA) New Starts program to estimate future ridership for the South Corridor light rail service between the Charlotte Central Business District and Pineville. The MRM team, Charlotte Area Transit System (CATS), AECOM Consult and FTA worked for several years to develop the model. The AECOM model introduced a nested logit structure using a Fortran mode choice model written by AECOM. With no existing premium transit service in Charlotte, parameters and constants for the model were based primarily on those from other cities.

New Starts analysis compares User Benefits between build and no-build models. FTA requires “before” and “after” on-board transit surveys to improve accuracy of local travel demand models. The “before” survey was conducted in 2007, a few months before the LYNX Blue Line opened for passenger service.

Major renovations to the transit model occurred 2009-2011 for an application to extend the Blue Line from the Charlotte CBD to UNCC in northeast Charlotte. Modifications were based on the Blue Line “after” survey conducted in 2009. These updates were completed in 2011 and the MPO adopted the model version: MRM11v1.0.

Since then, the MRM has undergone several major updates:

* 2010 Census data were released
* New socio-economic projections were developed
* The model boundaries were extended to include all of Iredell and Cleveland Counties,
* A new in-home survey was conducted in 2012
* A new external-station survey was also conducted in 2012
* The Blue Line Extension “before” on-board survey was conducted in 2013.
* The American Community Survey (ACS) has provided annual estimates of planning data.

MRM15v1.1 is the latest version of the model, but that model still uses the mode choice calibration from the 2009 survey. In updating the mode choice using the 2013 survey, the model team decided to update the mode choice platform as well. We opted to move to a C++ open source mode choice developed for the TRANSIMS model – a USDOT effort to combine standard travel demand models with traffic simulation models. AECOM Consult provided the base updates:

* Updated transit paths
* New C++ code to for data input and output and basic model operation
* Updated transit assignment

The transit updates were delivered to CATS and the MRM model team in September, 2015. That model produced reasonable light rail and system-wide ridership estimates, but had serious issues with the auto portion (trips driving-alone, by 2 person carpools and 3+ person carpools) and the non-motorized (walk and bike trips) of the mode choice model. Working with AECOM’s efforts to date, the MRM model team performed the latest calibration of the new model. These updates were completed on TransCad version 5 in April, 2016 and are documented in I:\Calibrate\ModeChoice\_TCv5\_2016\Mode Choice Recalibration\_160419.docx

## TransCad version 5 to version 7 updates

The model described in the April, 2016 memo is that used for the MRM1701\_TOUR model for TransCad version 5. Caliper made a number of updates to transit paths in versions 6 and 7 that resulted in significantly different transit usage in the MRM model. After examining the differences between transit skims and mode choice output trip tables, my opinion is that the AECOM algorithms for transit paths are working in version 7. I made a few adjustments to matrix core names to reflect differences in version 7, but the paths still seem accurate.

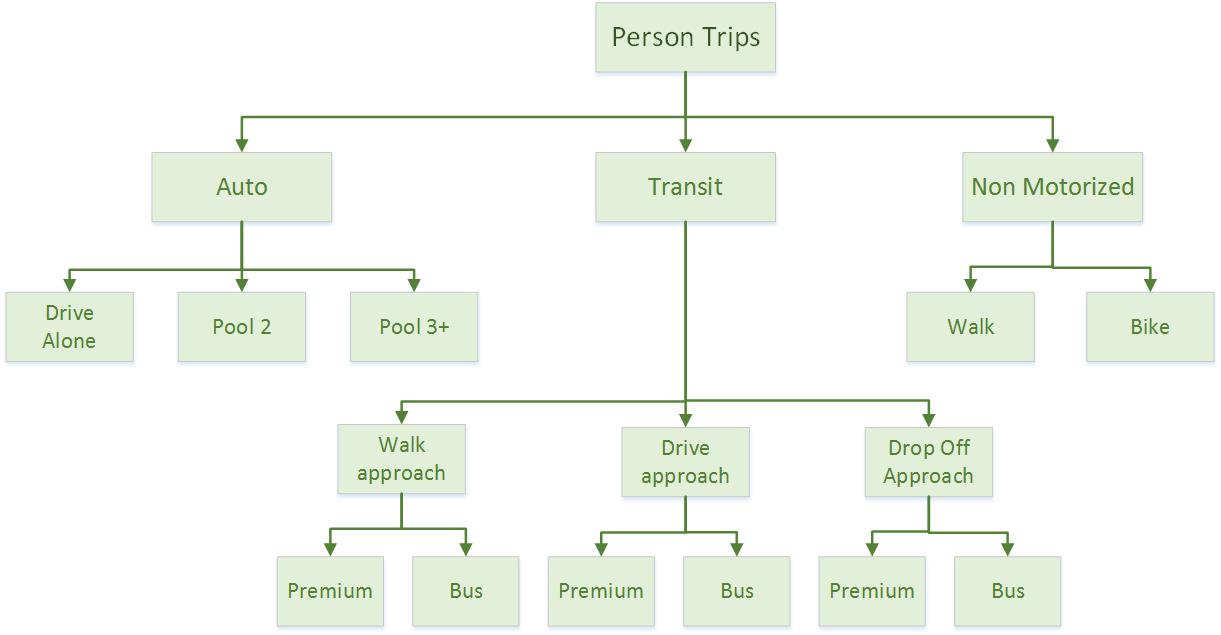
The MRM1701 model uses an expanded model area to include all of Iredell and Cleveland counties. The MRM model was initially calibrated using 2010 data expanded to the new TAZ structure and then repeated using new 2015 land use data. 2015 is the base year for the MRM1701 model. The model was updated using TransCad version 5 (build 1590), the same TC version for the adopted MRM15v1.1. Given that the expansion was at the edges of the model in primarily rural areas, the transit portion of the model produced very similar results as MRM15v1.1.

## Travel Demand Model

MRM1701\_TOUR is the model version used for calibration. The calibration is based on a standard 4-step trips-based model. Although “TOUR” is included in the name of the model, it indicates only that routines for the tour model are included in the compile. For this document, the model is referenced as MRM1701.

Mode choice allocates trips by a nested logit model. Trips are first allocated to three primary modes, then sub-allocated in a nested structure shown below :

* Auto
  + Single Occupant Vehicle (SOV) – drive alone
  + High-Occupancy Vehicle (HOV)
    - 2 person carpools
    - 3+ person carpools
* Transit
  + Walk to transit
    - Walk to premium service (light rail)
    - Walk to bus-only service
  + Drive to transit
    - Drive to premium service
    - Drive to bus-only service
  + Drop-off to transit
    - Drop-off to premium service
    - Drop-off to bus-only service
* WalkBike (non-motorized)
  + Walk trips
  + Bike trips



For the two primary trip purposes, HBW and HBO, trips are allocated by four household income groups . NHB trips and HBU trips are not allocated by income

* the lowest 10% of households,
* the next income group 10% - 25%
* incomes 25% to 50%
* incomes > 50%

### Calibration Model Year

The transit survey was conducted in 2013, so 2013 was the chosen calibration year.

The MRM15v1.0 model was calibrated to 2010 using the 2010 Census, the 2012 Home-survey – expanded to 2010 household data, 2010 employment data, and 2010 traffic counts. 2015 was the first projection year for the MRM15v1.0 model. To obtain 2013 land use data; population, household and employment was interpolated between 2010 and 2015.

MRM staff ran a full version of the 2013 model with peak highway speed feedback (and the 2009 transit model). This provided the 2013 TAZ to TAZ person trip tables used to develop mode choice targets.

### CBD Definition

The mode choice model includes two transit “markets” –

2 trips to the Charlotte central business district (CBD) and

1 trips everywhere else

Mode targets are separately calculated for the two markets.

In developing the 2011 mode choice model, we used a much smaller CBD than used in trip generation and distribution. The mode choice CBD was designed to include only the office core. For future year projections, the size of the CBD increased as projections of high density employment filled more of the center city.

We encountered a serious issue in recalibrating using the 2013 On-board survey. Only 3,380 transit trips were attracted to the CBD. On closer examination we found 4,393 transit trips (572 sample records) attracted to TAZ 10011. TAZ 10011 lies on the south west side of the transit tracks and has 970 employees in 2013. My guess is that we have issues in the survey geocoding. TAZ designations for on’s and off’s indicate CBD trips, but it seems unlikely such a large number of trips are destined for 10011.

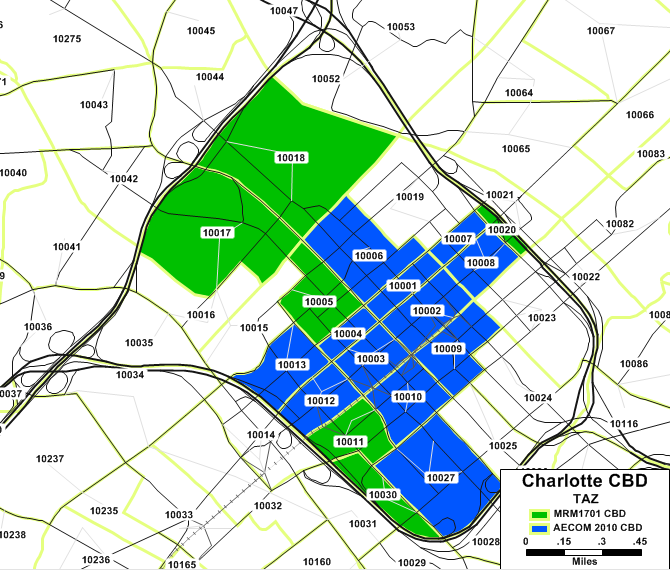
A second problem was the lack of Home-based University attractions to the CBD. TAZ 10017 and 10018 are home to Johnson and Wales University. UNC Charlotte has a building in TAZ 10023 and we expect more university trips when the line extends to UNCC.

Going back to the AECOM definition of the CBD, the 2030 CBD includes an additional six TAZ including 10011, 10017 and 10118. Local staff opted to use this broader definition of the CBD for recalibration. On the map below, the original 2010 AECOM CBD is shown in blue. The additional TAZ added for calibration are shown in green. A few statistics are provided in the table below.

AECOM 2010 CBD: TAZ 10001 – 10013, 10017, 10018, 10020, 10027, 10030

MRM1701 CBD: Add TAZ 10005, 10011, 10017, 10018, 10020, 10030

|  |  |  |  |
| --- | --- | --- | --- |
| 2013 | AECOM 2010 | Added (MRM1701) | MRM1701\_CBD |
| Households | 2,290 | 1,592 | 3,882 |
| Employment | 73,382 | 5,845 | 79,277 |
| Students – Col/Univ | 985 | 2,495 | 3,480 |
| On-board Survey Attractions | 3,380 | 5,907 | 9,287 |
| On-board Survey sample | 474 | 743 | 1,217 |
|  |  |  |  |



### 2013 Land Use

To obtain a 2013 land use file compatible to the 2013 transit survey, the 2010 and 2015 were interpolated to produce a 2013 dataset ((2015-2010)\*0.6)+2010.

### External station volumes

In deference to schedule, we used the 2015 external station volumes renamed to ExtSta13. No trips to or from external stations are used in mode choice calibration.

### 2013 Highway Network

The most recent highway network has a base year of 2015. This includes several roadway improvements at the Charlotte – Douglas International Airport that opened after 2013. To maintain integrity with the transit system, we used an older master highway network:

L:\MRM1701\_TOUR\MasterNet\tcv7\mrm17v1.1\_10BY\_15yrlyUpdate\_rev160829

with a base year of 2010 and build year of 2013.

### 2013 Route System

The 2013 vehicle routes and routes.dbf include **CATS routes ONLY**. All other companies have been deleted from this route system. The calibration dataset is from the CATS on-board survey and contains only CATS routes.

## Surveys

### Home Survey - 2012

File: I:\Calibrate\ModeChoice\_TCv7\

Metrolina 2012 HHSurvey\_TripFile\_170204.bin

MSAGGCODE\_HHTS\_Trips.xlsx

The most recent survey of household travel patterns was conducted by ETC Institute. Their final report and data were provided in July 2012. 4,232 households reported 34,208 trips region-wide. The trip file in the calibrate folder has a few updates from that in the I:\Surveys\HHTS2012 table. I started with the \_130108 version, but made a few changes.

Retagged TAZ based on trip end (O & D) coordinates. Nearly half of the trips had different TAZ. I am using the 3490 TAZ with all of Cleveland and Iredell Counties, but most of the TAZ differences seemed to be “off”. I found it because the version on drive I\Surveys\HHTS2012 had almost no trips destined to Charlotte CBD TAZ. To do this, I added columns labeled “Longitude” and “Latitude” and copied in the Start Long and Lat, then opened as a geographic point file in TransCad, then tagged start\_TAZ2 with TAZ from TAZ coverage. I repeated with destination long/lat and tagged using dest\_TAZ2. **THIS NEEDS ADDITIONAL FOLLOW UP INCLUDING CHECKS OF THE HOUSEHOLD AND PERSON TAZ.**

Added production and attraction TAZ. For Home based trips (HBW, HBO, HBU, HBSchool) – if the destination purpose was 1 (Home), then Production = Destination and Attraction = Start, otherwise Production = Start and Attraction = Destination

Added income classification from Household record. Income group 2 in the home survey was $15K-$30K rather than $15K-$35K in the On-board survey. I did not adjust for the discrepancy.

Auto Occupancy –

Drive Alone – Survey Drive Personal and Vehicle Occupancy = 1

Pool 2 Home Survey Drive or Passenger and Vehicle Occupancy = 2

Pool 3+ Home Survey Drive or Passenger and Vehicle Occupancy > 2 (< 99)

Mode other than Auto (above), Walk, Bike, Transit (e.g. Taxi, School Bus, Other) all summed to Other

Added expansion weights from a file on Joe’s computer \HHTS2012\ C\_Weight and D\_Weight . Trips = C\_Weight \* D\_Weight. I am pretty sure C\_Weight is county and D\_Weight is trip distribution adjustment.

Added

MSAggCode\_HHTS

X0000 Trip Purp (HBW, HBO, NHB, HBU) 90000 for others – mostly HBSchool

0X000 Peak / Off Peak

00X00 Market Segment Non CBD – CBD – (MRM1701\_CBD definition, see above)

000X0 Income

0000X Mode

### On Board Survey -2013

File: I:\Calibrate\ModeChoice\_TCv7\

CATS\_2013\_OD\_Survey.bin

MSAggCodeID.bin

MSAggCode+CATS\_2013\_OD\_Survey\_LinkTripRail.csv

As part of the “before” study for the LYNX Blue Line Extension, an on-board survey of passengers was conducted in 2013.

MSAggCode

X00000 Trip Purp (HBW, HBO, NHB, HBU)

0X0000 Peak / Offpeak

00X000 Market Segment Non CBD – CBD – (MRM1701\_CBD definition, see above)

000X00 Income

0000X0 Access (Walk, Drive, Drop)

00000X Premium / Bus

#### Calibrate E update

In calibration efforts A-D, modeled light rail boardings were well below surveyed counts even though the mode choice calibration results looked good. The problem was the method used to estimate linked trips in the survey.

On-board surveys are conducted by route. The expansion factor is calculated by dividing total ridership on that route by the number of completed surveys. If the survey is good, this provides an accurate profile of system boardings. But, surveyed transit riders may have transferred from another route or will transfer after the surveyed route, so one person-trip may involve two, three, or more boardings. Mode choice allocates person trips, so an additional factor – the linked trip factor – is applied to reduce the number of boardings to person trips. Survey respondents are asked about transfers and the data-cleaning process attempts to address unreported transfers based on location of origin and destination. Person trips (or linked trips) are estimated by dividing the expanded boardings by the number of routes used on the trip. The survey was expanded to 77,000 boardings representing about 49,200 linked person trips. The initial AECOM on-board expansion factors were calculated using this process, so rail riders that transferred were counted as a portion of a person trip.

However, in the model, any trip that includes rail is a “Premium” trip. These premium trips may use bus routes to access rail, but are a separate category of transit users. A new field was added to the survey named LinkTripRail. Rail trips (premium) were not factored for transfers resulting in 53,747 linked transit trips.

This fixed the problem with low boardings.

**On-Board Survey Trips**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | Records | Linked Trips | |
|  |  |  |  |  |  |  |
| X00000 | Purpose | 100000 | HBW | 4,014 | 25,717 |  |
|  |  | 200000 | HBO | 3,043 | 18,952 |  |
|  |  | 300000 | NHB | 891 | 5,869 |  |
|  |  | 400000 | HBU | 546 | 3,209 |  |
|  |  |  |  | 8,494 | 53,747 |  |
|  |  |  |  |  |  |  |
| 0X0000 | TOD | 10000 | Peak | 4,366 | 28,630 |  |
|  |  | 20000 | OffPeak | 4,128 | 25,118 |  |
|  |  |  |  | 8,494 | 53,747 |  |
|  |  |  |  |  |  |  |
| 00X000 | MktSeg | 1000 | Non CBD | 7,277 | 44,126 |  |
|  |  | 2000 | CBD | 1,217 | 9,622 |  |
|  |  |  |  | 8,494 | 53,747 |  |
|  |  |  |  |  |  |  |
| 00X000 | Income | 1000 | Inc Grp 1 | 2,060 | 12,192 | <$16K |
|  |  | 2000 | Inc Grp 2 | 2,454 | 14,778 | $16K-$34K |
|  |  | 3000 | Inc Grp 3 | 1,252 | 8,073 | $34K-60K |
|  |  | 4000 | Inc Grp 4 | 1,118 | 8,581 | >$60K |
|  |  | 9000 | Inc N/A | 1,610 | 10,123 | Inc doesn't matter or unknown |
|  |  |  |  | 8,494 | 53,747 |  |
|  |  |  |  |  |  |  |
| 0000X0 | PremBus | 10 | Prem | 2,036 | 16,163 |  |
|  |  | 20 | Bus | 6,458 | 37,584 |  |
|  |  |  |  | 8,494 | 53,747 |  |
|  |  |  |  |  |  |  |
| 00000X | Access | 1 | Walk | 7,360 | 44,273 |  |
|  |  | 2 | Drive | 893 | 7,836 |  |
|  |  | 3 | DropOff | 241 | 1,639 |  |
|  |  |  |  | 8,494 | 53,747 |  |

## Calibration Procedure – “How To” Guide

This section is a step-by-step guide for mode choice calibration of the MRM model. It uses an element of the TRANSIMS open source C++ model and the basic nested logit model developed by AECOM in 2016.

TRANSIMS documentation and code can be found:

<https://code.google.com/archive/p/transims/>

The DOT site provides a definition of TRANSIMS:

<https://www.fhwa.dot.gov/planning/tmip/resources/transims/>

The mode choice program is a shell that allows the user to insert their specific coefficients, constants, input and output files, and even model code. It can work with either TransCad or Cube software. AECOM Consult provided the MRM team a working version of the program to use within the MRM model framework.

The program can be run in either production or calibration mode using the control files provided by AECOM.

### Mode Choice Program File Structure

All of the necessary files are in the master MRM directory and are copied to the local \Metrolina directory when a new model directory is built. For this documentation, directory references will be to \Metrolina\... Of course, if you make changes in the program or input files, you will need to copy those back to the MRM master so your changes are copied into new \Metrolina directories.

DON’T WORK IN THE MRM DIRECTORY. WORK IN \METROLINA AND COPY FINALIZED REPAIRS BACK TO MRM. This process has a lot of moving parts and you can easily screw it up.

#### Executable program

\Metrolina\Pgm\ModeChoice\ModeChoice.exe

#### Mode Choice Script

The script file contains the basic code for the MRM operation. It was written by AECOM and hasn’t been altered (as of 4/2017). It is found in

\Metrolina\<scenario>\ModeSplit\Inputs\Mode\_Choice\_Script.txt

#### Control files

Control files are text files that control operation of the model. They identifiy input trip and skim matricies, and other files needed for specific runs. The control files provided by AECOM have lines to specify if the run is a production run or calibration run. The default setup is for production with calibration lines commented out. The base files are in the \MS\_Control\_Template folder. The macro “Prepare Transit Files” copies the control files from the template to the \ModeSplit\Inputs\Controls folder and changes ALTNAME to <year> for the current run. The MRM has 8 control files – four trip purposes, peak and offpeak for each purpose.

\Metrolina\<scenario>\ModeSplit\Inputs\Controls\

<year>\_HBW\_PEAK.ctl

<year>\_HBW\_OFFPEAK.ctl

<year>\_HBO\_PEAK.ctl

<year>\_HBO\_OFFPEAK.ctl

<year>\_NHB\_PEAK.ctl

<year>\_NHB\_OFFPEAK.ctl

<year>\_HBU\_PEAK.ctl

<year>\_HBU\_OFFPEAK.ctl

#### Mode Constant and BiasConstant files

Each purpose/peak-offpeak has a two text files containing mode and bias constants. The files are in the \MS\_Control\_Template and are copied by “Prepare Transit Files” to the \ModeSplit\Inputs folder. In calibration, the mode Constant file is the primary output. The content of these files is discussed in the calibration section below.

\Metrolina\<scenario>\ModeSplit\Inputs\

HBW\_PEAK\_Constant.txt HBW\_PEAK\_Bias.txt

HBW\_OFFPEAK\_Constant.txt HBW\_OFFPEAK\_Bias.txt

HBO\_PEAK\_Constant.txt HBO\_PEAK\_Bias.txt

HBO\_OFFPEAK\_Constant.txt HBO\_OFFPEAK\_Bias.txt

NHB\_PEAK\_Constant.txt NHB\_PEAK\_Bias.txt

NHB\_OFFPEAK\_Constant.txt NHB\_OFFPEAK\_Bias.txt

HBU\_PEAK\_Constant.txt HBU\_PEAK\_Bias.txt

HBU\_OFFPEAK\_Constant.txt HBU\_OFFPEAK\_Bias.txt

#### Target files

In calibration mode, the user must provide the number of trips that the program tries to match through an iterative process. These files are **not** in the \MS\_Control\_Template. The user creates them (and creates the directory). Format matters! Targets are not needed for production runs.

\Metrolina\<scenario>\ModeSplit\Inputs\Targets\

HBW\_PEAK\_Targets.txt

HBW\_OFFPEAK\_Targets.txt

HBO\_PEAK\_Targets.txt

HBO\_OFFPEAK\_Targets.txt

NHB\_PEAK\_Targets.txt

NHB\_OFFPEAK\_Targets.txt

HBU\_PEAK\_Targets.txt

HBU\_OFFPEAK\_Targets.txt

#### Calibration output – new constants

A calibration run produces a new set of constants. These are found in the \Results subfolder in \ModeSplit. The format is the same as the input constants. When you are ready to test assignment, you must copy the new constants into the input directory and re-run the model in production mode.

\Metrolina\<scenario>\ModeSplit\Results\

HBW\_PEAK\_Constant\_New.txt

HBW\_OFFPEAK\_ Constant\_New.txt

HBO\_PEAK\_ Constant\_New.txt

HBO\_OFFPEAK\_ Constant\_New.txt

NHB\_PEAK\_ Constant\_New.txt

NHB\_OFFPEAK\_ Constant\_New.txt

HBU\_PEAK\_ Constant\_New.txt

HBU\_OFFPEAK\_ Constant\_New.txt

#### Calibration output – data

The calibration run creates a report text file and a data text file. In this setup, the data file is imported to the calibrate spreadsheet, so the report is pretty much handled by the spreadsheet.

\Metrolina\<scenario>\ModeSplit\Results\

HBW\_PEAK\_Data.txt

HBW\_OFFPEAK\_ Data.txt

HBO\_PEAK\_ Data.txt

HBO\_OFFPEAK\_ Data.txt

NHB\_PEAK\_ Data.txt

NHB\_OFFPEAK\_ Data.txt

HBU\_PEAK\_ Data.txt

HBU\_OFFPEAK\_ Data.txt

#### TAZ\_ATYPE.asc

TAZ\_ATYPE is the area type file used by the transit side of the model. It includes the field CBD\_FLAG which is the CBD definition used to define market segments.

#### Input trip and skim matricies

The standard set of input matrices is used in production or calibration mode. They are discussed elsewhere.

### MS Model Calibration Spreadsheets

The spreadsheet is designed to produce target person trips for each mode. Six final spreadsheets are in the I:\Calibrate\ModeChoice\_TCv7 folder. Format is similar for each.

MS\_HBW\_Peak\_Calibrate\_E\_Bias4\_170228.xlsx

MS\_HBW\_OffPeak\_Calibrate\_E\_170228.xlsx

MS\_HBO\_Peak\_Calibrate\_E\_170228.xlsx

MS\_HBO\_OffPeak\_Calibrate\_E\_170228.xlsx

MS\_NHB\_Calibrate\_E\_Bias2\_170228..xlsx

MS\_HBU\_Calibrate\_E\_170228.xlsx

#### Tabs

1. <purp>\_<peak/offpeak>\_Calc
   1. This is the work tab. Person trips, Home Survey trips, and O & D survey trips are inserted by formula from other tabs in this worksheet. Separate sets of columns are included for market segment 1 (NonCBD) and segment 2(CBD –CBDFeb2017). This page is explained in more detail in the Spreadsheet Flow section below. Print-outs of the final set of calibration tables are provided in Appendix A.
2. <purp>\_<peak/offpeak>\_Targets
   1. This is the output / export tab. It contains formulas from the MS Const Calc tab. Go to this page to export targets as a tab delimited text file (.txt)
3. OUTPUT\_<purp>\_<peak/offpeak>\_data
   1. This is a copy of the ModeSplit\Results\<purp>\_<peak/offpeak>**\_data**.txt file
   2. The data tab has results for each iteration. In columns L-T are simple equations to get the LAST iteration. These cells go to the tables on the Calc page. MAKE SURE YOU GET THE LAST ITERATION! – IT MAY BE DIFFERENT
4. Home Survey
   1. This contains trips from the 2012 home survey. Trips are provided by purpose, peak/offpeak, income (for HBW and HBO) and mode. For this exercise, Drive Alone, Pool 2, Pool 3+, Walk, and Bike are used.
5. Person Trips
   1. This table contains the person trips from the current 2013 run. Targets must sum to the number of person trips in these tables.
6. Onboard13
   1. This table contains 2013 Transit Onboard Survey

Each spreadsheet contains tabs that are set up to save as tab-delimited text files.

Targets are fixed numbers that the calibration model seeks to match. Targets are needed for each purpose (HBW, HBO, NHB, HBU), peak and offpeak, income group (HBW and HBO), each transit market (trips attracted to NonCBD and CBD) and each mode at each level of the mode choice decision tree.

Targets MUST sum to the number of trips for the input trip tables. Transit trip targets are based on the 2013 on-board survey. The consultant has cleaned the trip tables to identify linked trips (may have a transfer) and boardings. Target auto trips: drive alone, pool2, and pool3+; and non-motorized trips (walk and bike) are from the 2012 home survey. The home survey has insufficient transit trips for calibration.

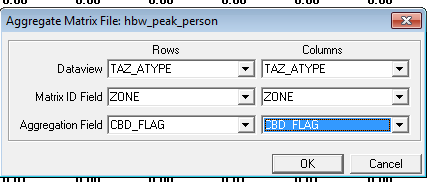
Spreadsheet flow

* Person trips from the trip tables
* Home Survey trips
* Onboard survey trips
* Transit trip targets are estimated from the on-board survey
* Non-motorized trips are estimated from the home survey
* Trips remaining after removing transit and non-motorized trips are allocated to auto travel
* Auto travel is allocated to drive alone, pool2 and pool3+
* Targets are copied to target tab with format required by mode choice
* After calibration run, Output DATA file is copied into spreadsheet OUTPUT tab
* Calc tab on spreadsheet provides comparison of target and output

The examples below are all taken from HBW-Peak tables. We have good survey samples of HBW Peak trips in nearly all modes and income groups. Other purposes do not have good samples. For example, we have no walk or bike HBO peak trips to the CBD in 3 of the 4 income categories. For transit trips with zero trips in a particular mode, the zero is changed to 1 trip. In non-motorized trips and auto trips where samples are poor, percentages are “borrowed.” Appendix A has all of the target worksheets and indicates all sources of borrowed allocations.

#### Person trips from trip tables

These are aggregations of the person trip tables produced by TOD1 and stored in the \2013\TripTables folder. The file TAZ\_ATYPE.asc in the \2013 directory is the summary file – use CBD\_FLAG as the Aggregation Field. Note that the 2030 CBD definition is being used for the TCv7 calibration.

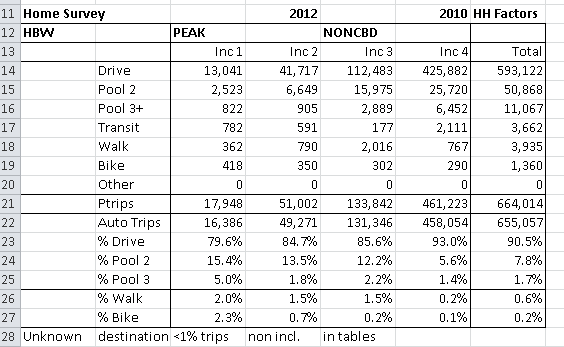


Each purpose, peak/offpeak, and income groups 1-4 for HBW and HBO need to have person trip input. On the MS spreadsheets, the PersonTrip tab has copy/paste tables from aggregating the trip tables by hand. These are brought into the calc tab by formula in the column format for the spreadsheet

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Person Trips** | |  | **2013** |  |  |  |
| **HBW** |  | **PEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | Person Trips | 28,577 | 66,298 | 161,466 | 488,766 | 745,107 |

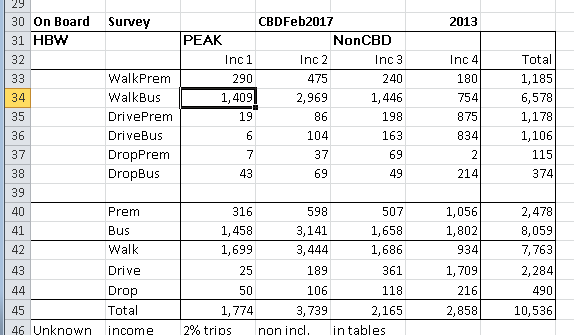
#### Home Survey Trips

Processing the in-home survey is discussed in the In-Home Survey section above. The results are in the MSAGGCODE\_HHTS\_Trips.xlsx spreadsheet. The download tab has the aggregation from TransCad and the Trip Tables tab formats the tables. These are copied to the MS Calibrate spreadsheets as values to the HomeSurvey tab. Not included in the download tables, but present in the MSAGGCODE spreadsheet are trips with unknown destination TAZ. These are a relatively small portion of the trip tables and are ignored. Home survey trips by transit or “other” mode are included in the table, but are not used in the calculations. Too few home survey trips use transit to provide a reliable sample. The percentages at the bottom of the table are carried forward.



#### On-board survey trips

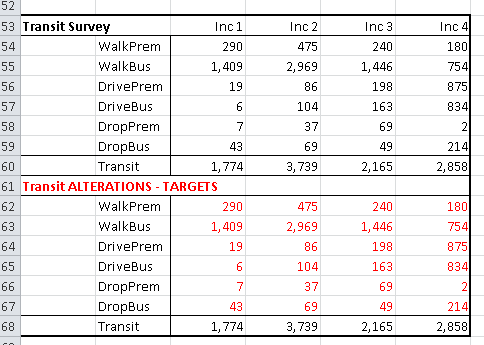
Processing the on-board survey is discussed in the On-Board Survey section above. The results are in the CATS\_2013\_OD\_Survey\_CBDFeb2017.xlsx spreadsheet. The download tab has the aggregation from TransCad and the Trip Tables tab formats the tables. These are copied to the MS Calibrate spreadsheets as values to the Onboard13 tab. The download tables include unknown income records. The unknown income trips are a relatively small portion of the total survey and are ignored.



#### Transit trip targets are estimated from the on-board survey

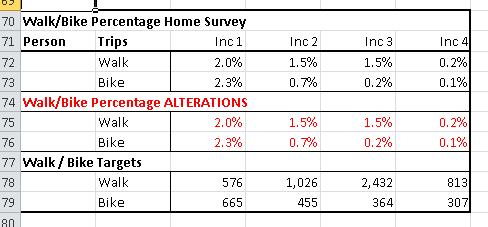
We are combining two different surveys and using a third number of person trips. Transit trips were surveyed in 2013 and factored based on 2013 CATS ridership. These are assumed to be specific numerical targets. All other modes calculated below are based on percentages of total trips from the home survey rather than using specific targets.

On the calc tab, the survey trips are provided directly from the survey with another block in red type that allows you to alter the target. The Altered Targets are carried forward in the process. It is a good idea to note where you change the targets.



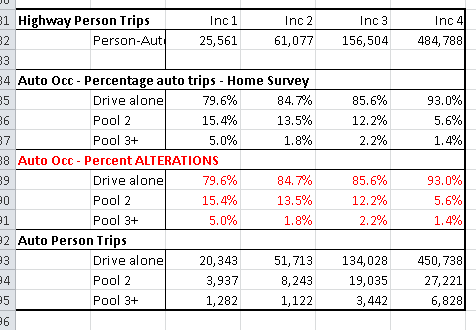
#### Non-motorized trips are estimated from the home survey

The percentage of walk and bike trips from the home survey are copied into the next table. A block allowing the user to change the percentage of trips is provided with red type. The targets below that are the trip table person trips \* the altered percentage.



#### Trips remaining are allocated to auto travel: drive alone, pool2 and pool3+

Transit and non-motorized trips are subtracted from the trip table. The rest are allocated to auto. The percentage of drive alone, pool2 and pool3+ trips from the home survey are copied into the next table. A block allowing the user to change the percentage of trips is provided with red type. The targets below that are the trip table person trips \* the altered percentage.



#### Targets are copied to target tab with format required by mode choice

The next table is the target summary. Order matters. Each nest in the logit model has a target and targets in the next level down need to be grouped together. For example, transit trips are split between walk approach, drive approach, and drop-off approach. The targets for these sub-groups must be together based on the nest (Walk Premium, Walk Bus)

**SAVE YOUR WORKSHEET AS AN EXCEL SPREADSHEET NOW**

The Targets tab on the spreadsheet contains the targets in mode choice program format. Segment has been added (1 for Non-CBD and 2 for CBD) as have minimum and maximum constants (-6 and 6)

**SAVE THIS SHEET AS A TAB DELIMITED TEXT FILE TO THE \ModeSplit\Inputs\Targets folder. The name you assign the file must be shown on the “CALIBRATION TARGET FILE” line in the control file**

HBW and HBO have separate spreadsheets for peak and offpeak. Each has one target file, and each has four income group targets. NHB and HBU have a single spreadsheet for Peak and OffPeak – but MUST have separate TARGET files. The NHB and HBU have 2 TARGET tabs – each must be saved separately.

#### Run the model

The process is described below

#### After calibration run, Output DATA file is copied into spreadsheet OUTPUT tab

When the calibration run is completed, an output data file is created. It contains data for each iteration for each mode, income group (model), non-cbd/cbd (segment)cell in the mode choice calibration. Output data file names are:

HBW\_PEAK\_DATA.txt

HBW\_OFFPEAK\_DATA.txt

HBO\_PEAK\_DATA.txt

HBO\_OFFPEAK\_DATA.txt

NHB\_PEAK\_DATA.txt

NHB\_OFFPEAK\_DATA.txt

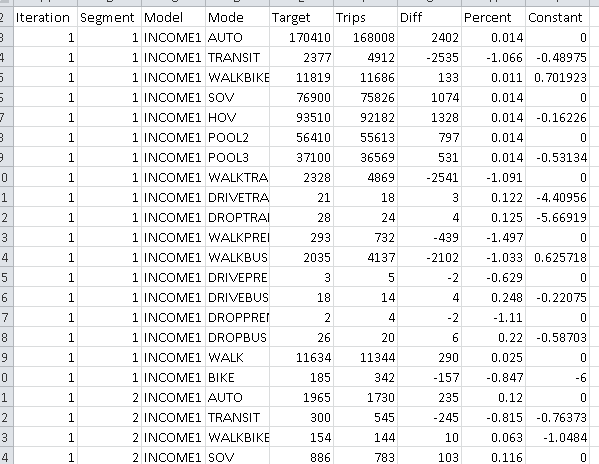
HBU\_PEAK\_DATA.txt

HBU\_OFFPEAK\_DATA.txt

Open in Excel (text, tab delimited) and copy entire file into OUTPUT tab in MS Calibrate spreadsheet. NHB and HBU MS Calibrate spreadsheets have two output tabs – one each for peak and offpeak.

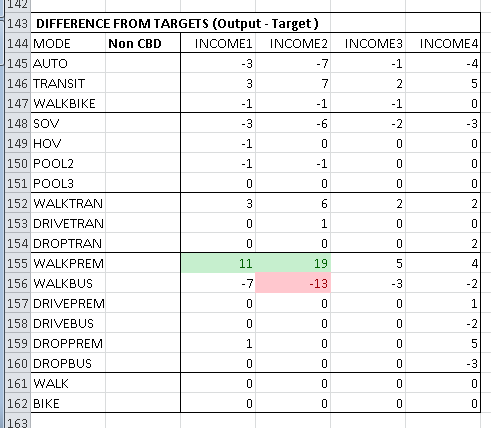
To the right of the import table is a set of formulas in columns L – T. Change the formula to the LAST iteration of the data table. For 10 iterations on HBW or HBO – the 10th iteration starts on line 1299. For 30 iterations, the 30th iteration starts on line 4179. NHB and HBO are shorter because they do not have income breakdowns.

The file looks like this



#### Calc tab on spreadsheet provides comparison of target and output

Back on the Calc tab, formulas fill Output trip tables and Output mode constant tables. Another table provides differences between target and output. Cells are highlighted red where output minus target is <= -10 or green when output minus target is >= 10 trips.



All tables on the calc tab of spreadsheets are provided in Appendix A.

### File Management

The base mode choice control and constant files are in the folder \MRM1701\_TOUR\MS\_Control\_Template. MS\_Control\_template is copied to your local \Metrolina directory. From the local copy, the program “Prepare\_Transit\_Files” copies file to your run directory and renames them with the run year. For example, ALTNAME\_HBO\_PEAK.ctl is renamed 2013\_HBO\_PEAK.ctl. The same mode choice control files are used for each scenario year.

Input to calibration requires three primary sets of files:

Control files ..\ModeSplit\Inputs\Controls

Target files ..\ModeSplit\Inputs\Targets

Mode Constant and Bias Constant files ..\ModeSplit\Inputs

Output from a calibration run includes

Constants\_New ..\ModeSplit\Results

Data ..\ModeSplit\Results

Print file ..\ModeSplit\**Inputs**

For the MRM, the mode choice model can be run either as a production run or as a calibration run. Either can be run from the MRM interface. Some files are used in both production and calibration. File names are generally the same for production or calibration.  ***The user must keep careful track of which files are included in the model run.***  Each type of file is discussed below.

Control files

..\ModeSplit\Inputs\Controls\2013\_<purp>\_<peak/offpeak>**.ctl**

Control files provide the C++ program the locations of data and parameters for the run. The control files all contain the lines necessary to perform calibration, but these lines are commented out in the template version.

Output files for calibration are in the folder ..\ModeSplit\Results

Output matricies are in the folder ..\ModeSplit

If you copy a previous targets spreadsheet, the output text tab will be named MS\_<purp>\_<tod>\_Targets\_<date>.txt

Output tables need to be saved to:

#### Metrolina\2013\ModeSplit\Inputs\Targets

This folder is probably not in your setup the first time you begin calibration. If not, create it and copy the target files into the folder.

The Mode Choice program reads tab-delimited text files. Each input file has a .txt file and a .txt.def file.

This should be saved in the \Metrolina\2013\ModeSplit\Input\Targets folder. The column widths are 10 for purp, segment, min & max constant and 11.9 for the targets (income 1-4 in HBW and HBO) and

In many cases the .txt.def file is created by the macros. For calibration, you need to make sure that the .txt.def file matches your .txt file. The name (up to .txt) must be the same and the column widths should match that saved in the excel spreadsheet.

#### .txt.def file

The TransSims mode choice program requires a data definition file for each input file. In most applications of the mode choice model, the .txt.def file is created by the macros, but for calibration, you must create / copy this file into the \targets directory (same location as the targets file). For HBW and HBO, the .txt.def file looks like this

TRANSIMS60, TAB\_DELIMITED, 1

MODE, STRING, 1, 10

SEGMENT, INTEGER, 2, 10

INCOME1, DOUBLE, 3, 11.9

INCOME2, DOUBLE, 4, 11.9

INCOME3, DOUBLE, 5, 11.9

INCOME4, DOUBLE, 6, 11.9

Min\_Const, INTEGER, 7, 10

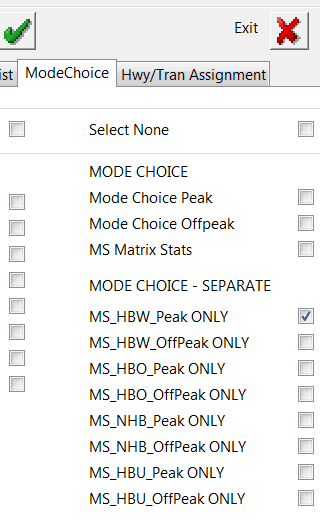
Max\_Const, INTEGER, 8, 10

Column names should match that in the .ctl file. NHB and HBU do not have INCOME, so column names should be NHB\_Peak… (whatever is shown in the .ct. file)

### Running Mode Choice in Calibration mode

The mode choice model input files include filenames of skims and trip tables, the bias constants and the script of the steps for the mode choice calculation. These files are provided to the model in Metrolina\MS\_Control\_Template folder. Among other things, the MRM job “Prepare Transit Files” copies and renames mode choice control files for each specific run.

The MRM user interface includes the ability to run individual Mode Choice jobs on the Mode Choice tab of the Run\_Partial\_Model page. After editing control files and targets – use these check boxes to run the calibration test.



To run the model in calibration mode, you alter files in

### Metrolina\2013\ModeSplit\Inputs\Controls

Each purpose, peak & offpeak has a separate control file with suffix .ctl

2013\_HBW\_PEAK.**ctl** 2013\_HBW\_OFFPEAK.ctl

2013\_HBO\_PEAK.ctl 2013\_HBW\_OFFPEAK.ctl

2013\_NHB\_PEAK.ctl 2013\_HBW\_OFFPEAK.ctl

2013\_HBU\_PEAK.ctl 2013\_HBW\_OFFPEAK.ctl

Each of these files already contain the commands for calibrating constants, but these are commented out for standard model runs. There are probably .prn files in the \inputs\controls directory also, but these are output files – you will use them to see how your calibration worked.

A copy of the 2013\_HBW\_Peak.ctl file is provided in figure X as an example. Relevant lines in the setup are highlighted on figure X. The calibration commands and files are commented out using “#” at the beginning of the line. Of course, if you are using different inputs than a standard model run, fix those names in the ctl file too.

When calibration is complete, new Purp, peak & offpeak \_Constant.txt file will be copied into the \MS\_Control\_Template to apply to all future model runs

Figure X. Mode Choice Control file sample

TITLE Metrolina HBW PEAK Mode Choice

PROJECT\_DIRECTORY D:\1701v7\Metrolina\2013

NUMBER\_OF\_THREADS 1

TRIP\_TABLE\_FILE TripTables\HBW\_PEAK\_TRIPS.mtx

TRIP\_TABLE\_FORMAT TRANSCAD

SKIM\_FILE\_1 AutoSkims\SPMAT\_auto.mtx //---- Peak SOV, HOV2 and HOV3+ Skims ----

SKIM\_FORMAT TRANSCAD

SKIM\_FILE\_2 Skims\TR\_NonMotorized.MTX // ----Walk/Bike skims ----

SKIM\_FORMAT TRANSCAD

SKIM\_FILE\_3 Skims\PK\_WKTRAN\_SKIMS.MTX // ----Peak walk access skims ----

SKIM\_FORMAT TRANSCAD

SKIM\_FILE\_4 Skims\PK\_DRVTRAN\_SKIMS.MTX //---- Peak Drive access skims ----

SKIM\_FORMAT TRANSCAD

SKIM\_FILE\_5 Skims\PK\_DROPTRAN\_SKIMS.MTX //---- Peak DropOff access skims ----

SKIM\_FORMAT TRANSCAD

**ZONE\_FILE TAZ\_ATYPE.ASC**

ZONE\_FORMAT TRANSCAD:TEXT

NEW\_TRIP\_TABLE\_FILE ModeSplit\HBW\_PEAK\_MS.mtx

NEW\_TRIP\_TABLE\_FORMAT TRANSCAD

SELECT\_TRIP\_TABLES INCOME1, INCOME2, INCOME3, INCOME4 //---- Cores in Trip Tables ----

MODE\_CONSTANT\_FILE ModeSplit\INPUTS\HBW\_PEAK\_Constant.txt

MODE\_BIAS\_FILE ModeSplit\INPUTS\HBW\_PEAK\_Bias.txt

MODE\_CHOICE\_SCRIPT ModeSplit\INPUTS\Mode\_Choice\_Script.txt

SEGMENT\_MAP\_FILE ModeSplit\INPUTS\Controls\Segment\_Map.txt

ORIGIN\_MAP\_FIELD CBD\_FLAG

DESTINATION\_MAP\_FIELD CBD\_FLAG

**##CALIBRATION\_TARGET\_FILE ModeSplit\INPUTS\Targets\HBW\_Target\_PEAK.txt**

**##CALIBRATION\_SCALING\_FACTOR 1.0**

**##MAX\_CALIBRATION\_ITERATIONS 10**

**##CALIBRATION\_EXIT\_RMSE 0.1**

**##NEW\_MODE\_CONSTANT\_FILE ModeSplit\Results\HBW\_PEAK\_Constant\_New.txt**

**##NEW\_CALIBRATION\_DATA\_FILE ModeSplit\Results\HBW\_PEAK\_Data.txt**

**##ADJUST\_FIRST\_MODE\_CONSTANTS FALSE**

**##REPORT\_AFTER\_ITERATIONS 3**

TRIP\_PURPOSE\_LABEL Home-Based Work

TRIP\_PURPOSE\_NUMBER 1 //---- HBW = 1, HBU = 2, HBO = 3, NHB = 4 ----

TRIP\_TIME\_PERIOD 1 //---- PEAK=1, OFFPEAK=2 ----

##SELECT\_ORIGIN\_ZONES 10251

##SELECT\_DESTINATION\_ZONES 10821

PRIMARY\_MODE\_CHOICE AUTO, TRANSIT, WALKBIKE

MODE\_CHOICE\_NEST\_1 AUTO = SOV, HOV

MODE\_CHOICE\_NEST\_2 HOV = POOL2, POOL3

MODE\_CHOICE\_NEST\_3 TRANSIT = WALKTRAN, DRIVETRAN, DROPTRAN

MODE\_CHOICE\_NEST\_4 WALKTRAN = WALKPREM, WALKBUS

MODE\_CHOICE\_NEST\_5 DRIVETRAN = DRIVEPREM, DRIVEBUS

MODE\_CHOICE\_NEST\_6 DROPTRAN = DROPPREM, DROPBUS

MODE\_CHOICE\_NEST\_7 WALKBIKE = WALK, BIKE

NESTING\_COEFFICIENT\_1 0.655

NESTING\_COEFFICIENT\_2 0.458

NESTING\_COEFFICIENT\_3 0.655

NESTING\_COEFFICIENT\_4 0.458

NESTING\_COEFFICIENT\_5 0.458

NESTING\_COEFFICIENT\_6 0.458

NESTING\_COEFFICIENT\_7 0.655

MODEL\_NAMES\_1 INCOME1, INCOME2, INCOME3, INCOME4

VEHICLE\_TIME\_VALUES\_1 -0.02202

WALK\_TIME\_VALUES\_1 -0.05680

DRIVE\_ACCESS\_VALUES\_1 -0.02202

WAIT\_TIME\_VALUES\_1 -0.03303

TRANSFER\_TIME\_VALUES\_1 -0.04404

PENALTY\_TIME\_VALUES\_1 -0.02202

COST\_VALUES\_1 -0.00329, -0.00165, -0.00089, -0.00070

USER\_VALUES\_1 -0.03290, -0.01650, -0.00890, -0.00700

DIFFERENCE\_VALUES\_1 -0.01542

MODE\_ACCESS\_MARKET\_1 SOV, POOL2, POOL3, DRIVEBUS, DRIVEPREM, DROPBUS, DROPPREM, WALKBUS, WALKPREM, WALK, BIKE

MODE\_ACCESS\_MARKET\_2 SOV, POOL2, POOL3, DRIVEBUS, DRIVEPREM, DROPBUS, DROPPREM

MODE\_ACCESS\_MARKET\_3 SOV, POOL2, POOL3

ACCESS\_MARKET\_NAME\_1 Can Walk to Transit at the Origin and Destination

ACCESS\_MARKET\_NAME\_2 Must Drive at the Origin and Can Walk to Transit the Destination

ACCESS\_MARKET\_NAME\_3 Must Drive

NEW\_TABLE\_MODES\_1 SOV = Drive Alone

NEW\_TABLE\_MODES\_2 POOL2 = Carpool 2

NEW\_TABLE\_MODES\_3 POOL3 = Carpool 3

NEW\_TABLE\_MODES\_4 WALKPREM = Wk-Premium

NEW\_TABLE\_MODES\_5 WALKBUS = Wk-Bus

NEW\_TABLE\_MODES\_6 DRIVEPREM = Dr-Premium

NEW\_TABLE\_MODES\_7 DRIVEBUS = Dr-Bus

NEW\_TABLE\_MODES\_8 DROPPREM = DropOff-Premium

NEW\_TABLE\_MODES\_9 DROPBUS = DropOff-Bus

NEW\_TABLE\_MODES\_10 WALK = Walk

NEW\_TABLE\_MODES\_11 BIKE = Bike

NEW\_MODE\_SUMMARY\_FILE ModeSplit\Results\2013\_HBW\_PEAK\_Summary.txt

NEW\_MARKET\_SEGMENT\_FILE ModeSplit\Results\2013\_HBW\_PEAK\_Segment.txt

**##NEW\_MODE\_SEGMENT\_FILE ModeSplit\Results\HBW\_Mode\_Seg.txt**

##NEW\_FTA\_SUMMIT\_FILE ModeSplit\Results\HBW\_Summit.bin

NEW\_PRODUCTION\_FILE ModeSplit\Results\2013\_HBW\_PEAK\_Productions.txt

NEW\_ATTRACTION\_FILE ModeSplit\Results\2013\_HBW\_PEAK\_Attractions.txt

MODECHOICE\_REPORT\_1 MODE\_CHOICE\_SCRIPT

MODECHOICE\_REPORT\_2 MARKET\_SEGMENT\_REPORT

MODECHOICE\_REPORT\_3 MODE\_SUMMARY\_REPORT

**##MODECHOICE\_REPORT\_4 CALIBRATION\_REPORT**

**##MODECHOICE\_REPORT\_5 TARGET\_DATA\_REPORT**

MODECHOICE\_REPORT\_6 MODE\_VALUE\_SUMMARY

MODECHOICE\_REPORT\_7 SEGMENT\_VALUE\_SUMMARY

##MODECHOICE\_REPORT\_8 MODE\_CHOICE\_STACK

##MODECHOICE\_REPORT\_9 ACCESS\_MARKET\_SUMMARY

##MODECHOICE\_REPORT\_10 LOST\_TRIPS\_REPORT

**Modifications to ctl file**

**ZONE\_FILE TAZ\_ATYPE.ASC**

Altering the definition of the CBD (described above) is reflected in this file. The CBD definition is loaded from \Metrolina\MS\_Control\_Template\TAZ\_ATYPE\_TRANSIT\_FLAGS.dbf AECOM set the definition based on year, but I changed it by adding six more CBD TAZ. If I keep this change, I must repair that file too. The TAZ added to the CBD are

TAZ 10005, 10011, 10017, 10018, 10020, 10030

CBD\_Flag – the field called is the third column (see TAZ\_ATYPE.DCT)

10005 1 **2** 100 1

10011 1 **2**  100 1

10017 1 **2** 100 1

10018 1 **2** 100 1

10020 1 **2** 100 1

10030 1 **2**  100 1

**##CALIBRATION\_TARGET\_FILE ModeSplit\INPUTS\Targets\HBW\_Target\_PEAK\_170208.txt**

This is your target file. Remove the comment flags “##”. Make sure it is the file you want.

**##CALIBRATION\_SCALING\_FACTOR 1.0**

**##MAX\_CALIBRATION\_ITERATIONS 10**

**##CALIBRATION\_EXIT\_RMSE 0.1**

**##NEW\_MODE\_CONSTANT\_FILE ModeSplit\Results\HBW\_PEAK\_Constant\_New.txt**

**##NEW\_CALIBRATION\_DATA\_FILE ModeSplit\Results\HBW\_PEAK\_Data.txt**

**##ADJUST\_FIRST\_MODE\_CONSTANTS FALSE**

**##REPORT\_AFTER\_ITERATIONS 3**

**##NEW\_MODE\_SEGMENT\_FILE ModeSplit\Results\HBW\_Mode\_Seg.txt**

**##MODECHOICE\_REPORT\_4 CALIBRATION\_REPORT**

**##MODECHOICE\_REPORT\_5 TARGET\_DATA\_REPORT**

Remove comment flags “##”, 20 or 30 iterations are an option (MAX\_CALIBRATION\_ITERATIONS) , but 10 will do to start

Report\_After\_Iterations is useful to see if anything is moving between start and end, but it makes a confusing output file – I usually leave it commented out unless things are moving very smoothly.

Note the names of the files

The \Results\HBW\_Peak\_Constant\_New.txt is what gets copied into the \MS\_Control\_Template

Keeping track of the correct .ctl file and the constant file is really, really, really important. You may or may not want to run all the purposes peak/offpeak at the same time. If you are comfortable enough to proceed, make sure you go back and re-comment out the calibration lines. But if you re-run “Prepare\_Transit\_Files”, you will overwrite your working files with the ones in \MS\_Control\_Template. Also it is really, really, really, important to make sure the correct, final constant files are copied into \MS\_Control\_Template of the master when you are done.

A few other lines are also commented out – that is fine. DO NOT uncomment the SELECT\_ORIGIN\_ZONES and SELECT\_DESTINATION\_ZONES . Only those zones will go through the mode choice. This is useful if you are tracing to see if the math works, but not to calibrate the whole model.

## Adjustment of AECOM transit targets based on Blue Line Boardings

The initial runs of the mode choice calibration provided a good match in mode choice, but low ridership on the light rail. The light rail boardings are the most carefully collected dataset for the model calibration. These boarding counts were the basis for expanding the on-board survey to represent the transit users. One complication in the adjustments is trip-table based. The home survey did not provide adequate samples for trips to the smaller mode-choice defined CBD. Relatively few trips from the lower income groups were attracted to the smaller CBD.

Table 2 shows results of Blue Line boardings using AECOM targets for transit mode choice.

Table 2 – Calibration version 4 – March 31, 2016

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Metrolina 2013 South LRT Boardings by Mode of Access** | | | | |  |  |  |  |  |  |
|  | 2013 On-Board Survey | | | | | mrm1602 - 2013 | | | | |
| StaName | PNR | Non-PNR |  |  | Total | PNR | Direct Walk | Bus Access | Direct Dropoff | Total |
| 7th St Station |  | 592 | 248 | 49 | 889 | 0 | 188 | 11 | 3 | 202 |
| CTC |  | 1,539 | 2,226 | 22 | 3,787 | 0 | 1,507 | 2,102 | 46 | 3,655 |
| 3rd St Sta |  | 950 | 148 | 7 | 1,105 | 0 | 929 | 62 | 19 | 1,010 |
| Stonewall Sta |  | 305 | 26 | 20 | 351 | 0 | 390 | 45 | 8 | 442 |
| CBD Stations | 0 | 3,386 | 2,648 | 98 | 6,132 | 0 | 3,014 | 2,220 | 75 | 5,309 |
| Carson Sta |  | 236 | 59 | 0 | 295 | 0 | 136 | 24 | 4 | 164 |
| Bland |  | 334 | 25 | 5 | 364 | 0 | 275 | 157 | 7 | 439 |
| East-West Sta |  | 478 | 223 | 15 | 716 | 0 | 406 | 89 | 11 | 507 |
| New Bern Sta |  | 508 | 22 | 37 | 567 | 0 | 534 | 42 | 11 | 586 |
| Southend Stations | 0 | 1,556 | 329 | 57 | 1,942 | 0 | 1,351 | 312 | 33 | 1,695 |
| ScaleybarkSt | 257 | 402 | 186 | 92 | 937 | 151 | 320 | 69 | 46 | 587 |
| Woodlawn Sta | 178 | 339 | 139 | 61 | 717 | 193 | 424 | 137 | 50 | 804 |
| Tyvola Sta | 316 | 467 | 141 | 5 | 929 | 137 | 405 | 447 | 19 | 1,008 |
| Archdale Sta | 33 | 524 | 210 | 20 | 787 | 6 | 408 | 66 | 18 | 499 |
| Arrowood Sta | 273 | 377 | 689 | 4 | 1,343 | 110 | 346 | 813 | 13 | 1,281 |
| SharonWest | 368 | 374 | 397 | 49 | 1,188 | 145 | 420 | 634 | 29 | 1,228 |
| S I-485 | 1,112 | 343 | 602 | 52 | 2,109 | 1,604 | 181 | 402 | 25 | 2,213 |
| PNR Stations | 2,537 | 2,826 | 2,364 | 283 | 8,010 | 2,346 | 2,504 | 2,569 | 200 | 7,619 |
| Total | 2,537 | 7,768 | 5,341 | 438 | 16,084 | 2,346 | 6,869 | 5,100 | 308 | 14,624 |

Survey boardings are provided in the first set of columns, modeled boardings in the second.

## Calibration Iterations

I went through five rounds of calibration. Below is a short summary of each (labeled A-E)

### Calibrate A

Trip targets are from surveys with very few changes to compensate for missing data. Mode choice Bias Constants were applied on HBW\_Peak and NHB\_Peak and NHB\_Offpeak. The mode choice calibration is better than for version 5, BUT LRT ridership is low (target 16,084 – model 11,248)

### Calibrate B

Transit paths in calibrate A all had very high dwell times on all transit trip tables. With advice from Caliper, dwell times in transit paths were repaired and the mode choice recalibrated to the same targets used in Calibrate A. LRT boardings were better (12,654) but still low.

### Calibrate C

NHB Walk Premium targets were increased by 2,000 trips to address low LRT boardings. Boardings were brought up to 14,408. This is still 1,600 below survey, but reasonably close to ver 5 (14,896)

### Calibrate D

Transit fares (modes.dbf) were updated to 2013 CATS fare. Calibration maximum iterations increased to 30. Light Rail boardings accurately reflect transit trips from On-board survey – BUT survey linked trips were estimated incorrectly (so everything up to now starts over)

### Calibrate E

Updated targets, path updates and fares from earlier runs kept. Bias Constants reset to zero and recalculated

## Blue Line light-rail boarding

Much of the focus of the transit calibration is accurate depiction of riders on the premium system – the LYNX Blue Line. Premium riders are much more likely to have a destination in the Charlotte center city and have a higher percentage of high-income patrons. For calibration purposes, we are comparing model results to actual riders. The tables below compare Blue Line boardings by station. The first set compare mode of access – walk directly to the rail station, drive to the rail station (park-n-ride), non-PNR in the survey which are primarily walk-up trips, bus trips – those that access rail by transfer from bus and drop-off at light rail stations. The 2010 tables compare model ridership to the 2009 survey. The 2013 and 2015 tables compare model ridership to the 2013 survey. Less robust survey techniques in 2009 make it impossible to provide all approach means for the 2009-2010 table. In each of the tables, stations are aggregated into 3 groups:

* CBD stations – stations within the I-277/I-77 freeway loop
* SouthEnd stations – stations in the central part of the line without park-n-ride lots
* PNR stations – stations from Scaleybark Rd to the end of the line – each with a park-ride lot (drive approach)

The calibration boardings for 2013 are provided in table 19.

2013 boardings by time-of-day are provided in table 20.

Table 19. 2013 Blue Line Boardings by Station

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2013 On-Board Survey | | | | | mrm1602 - 2013, calib 4b | | | | |
| StaName | PNR | Non-PNR | Bus | Drop | Total | PNR | Direct Walk | Bus Access | Direct Dropoff | Total |
| 7th St Station |  | 592 | 248 | 49 | 889 | 0 | 201 | 13 | 3 | 218 |
| CTC |  | 1,539 | 2,226 | 22 | 3,787 | 0 | 1,579 | 2,287 | 46 | 3,912 |
| 3rd St Sta |  | 950 | 148 | 7 | 1,105 | 0 | 950 | 54 | 19 | 1,023 |
| Stonewall Sta |  | 305 | 26 | 20 | 351 | 0 | 405 | 43 | 8 | 455 |
| CBD Stations | 0 | 3,386 | 2,648 | 98 | 6,132 | 0 | 3,135 | 2,397 | 76 | 5,607 |
| Carson Sta |  | 236 | 59 | 0 | 295 | 0 | 110 | 24 | 2 | 136 |
| Bland |  | 334 | 25 | 5 | 364 | 0 | 289 | 164 | 7 | 460 |
| East-West Sta |  | 478 | 223 | 15 | 716 | 0 | 434 | 95 | 11 | 540 |
| New Bern Sta |  | 508 | 22 | 37 | 567 | 0 | 572 | 31 | 11 | 614 |
| Southend Stations | 0 | 1,556 | 329 | 57 | 1,942 | 0 | 1,406 | 313 | 30 | 1,749 |
| ScaleybarkSt | 257 | 402 | 186 | 92 | 937 | 180 | 344 | 73 | 51 | 649 |
| Woodlawn Sta | 178 | 339 | 139 | 61 | 717 | 167 | 474 | 149 | 43 | 833 |
| Tyvola Sta | 316 | 467 | 141 | 5 | 929 | 203 | 434 | 464 | 21 | 1,122 |
| Archdale Sta | 33 | 524 | 210 | 20 | 787 | 4 | 437 | 110 | 20 | 570 |
| Arrowood Sta | 273 | 377 | 689 | 4 | 1,343 | 150 | 366 | 899 | 12 | 1,427 |
| SharonWest | 368 | 374 | 397 | 49 | 1,188 | 330 | 444 | 679 | 27 | 1,479 |
| S I-485 | 1,112 | 343 | 602 | 52 | 2,109 | 1,361 | 198 | 419 | 22 | 2,000 |
| PNR Stations | 2,537 | 2,826 | 2,364 | 283 | 8,010 | 2,394 | 2,698 | 2,793 | 196 | 8,081 |
| Total | 2,537 | 7,768 | 5,341 | 438 | 16,084 | 2,394 | 7,239 | 5,502 | 302 | 15,437 |

Overall, the model has about 600 fewer boardings than surveyed, even with the added trips to mode choice. The outer, PNR stations are very close, though with a 140 too many drive approach trips . Walk (Non-PNR) Bus and drop-offs are all a bit low. Southend trips are a little low as are CBD trips.

Table 20. 2013 Blue Line boardings by time-of-day

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 2013 On-Board Survey | | | mrm1602 - 2013, calib 4b | | |
| StaName | Peak | Off-Peak | Daily | Peak | Off-Peak | Daily |
| 7th St Station | 493 | 413 | 905 | 133 | 85 | 218 |
| CTC | 1,985 | 1,817 | 3,801 | 2,307 | 1,604 | 3,912 |
| 3rd St Sta | 758 | 348 | 1,106 | 685 | 337 | 1,023 |
| Stonewall Sta | 237 | 116 | 354 | 303 | 152 | 455 |
| CBD Stations | 3,472 | 2,694 | 6,166 | 3,428 | 2,179 | 5,607 |
| Carson Sta | 153 | 141 | 294 | 80 | 56 | 136 |
| Bland | 203 | 194 | 397 | 256 | 204 | 460 |
| East-West Sta | 364 | 370 | 734 | 289 | 251 | 540 |
| New Bern Sta | 295 | 273 | 568 | 314 | 300 | 614 |
| Southend Stations | 1,015 | 978 | 1,993 | 939 | 810 | 1,749 |
| ScaleybarkSt | 538 | 400 | 938 | 325 | 323 | 649 |
| Woodlawn Sta | 364 | 352 | 716 | 424 | 409 | 833 |
| Tyvola Sta | 535 | 393 | 928 | 638 | 484 | 1,122 |
| Archdale Sta | 412 | 376 | 788 | 319 | 251 | 570 |
| Arrowood Sta | 692 | 650 | 1,342 | 653 | 773 | 1,427 |
| SharonWest | 764 | 423 | 1,188 | 903 | 576 | 1,479 |
| S I-485 | 1,482 | 626 | 2,109 | 1,283 | 717 | 2,000 |
| PNR Stations | 4,788 | 3,221 | 8,009 | 4,546 | 3,534 | 8,081 |
| Total | 9,275 | 6,893 | 16,168 | 8,914 | 6,523 | 15,437 |

Time-of-day boardings are reasonably divided. The overall model boardings are 500 low, about 300 in peak and 200 in off-peak.

## Application of Mode Choice and transit assignment to 2010 and 2015

An additional test of the calibration is to determine how the calibration applies to other years. The MRM15v1.0 is currently calibrated to the year 2010. CATS performed an on-board survey in 2009 that should be comparable to 2010.

The initial application of the new mode choice and assignment model to 2010 resulted in higher ridership on the Blue Line in 2010 than in 2013. Further investigation revealed that the bus system feeding the light rail modeled for 2010 was more robust than the system in 2013. To provide a consistent comparison between runs, the 2013 CATS only transit system was loaded onto the 2010 highway network. New skims, mode choice, and assignment were performed on that system with 2010 person trip tables. . An additional application run was provided using the same 2013 CATS only transit network on the 2015 highway network The mode choice tables and runs provided below are based on a CATS ONLY bus system and 2015 highway network and trip tables. Boardings by mode of access for 2010 are shown on table 21. Boardings for 2015 are shown on table 22. Boardings by time of day are shown on tables 23 and 24 for 2010 and 2015 respectively.

Table 21. Table2010 Blue Line Boardings by Staion

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2009 On-Board Survey | | | | | mrm1602 - 2010, calib 4b | | | | |
| StaName | PNR | Non-PNR |  |  | Total | PNR | Direct Walk | Bus Access | Direct Dropoff | Total |
| 7th St Station | 0 | 1,030 |  |  | 1,030 | 0 | 177 | 12 | 3 | 192 |
| CTC | 0 | 3,389 |  |  | 3,389 | 0 | 1,471 | 2,137 | 43 | 3,650 |
| 3rd St Sta | 0 | 1,182 |  |  | 1,182 | 0 | 901 | 52 | 18 | 970 |
| Stonewall Sta | 0 | 217 |  |  | 217 | 0 | 350 | 44 | 7 | 401 |
| CBD Stations | 0 | 5,818 |  |  | 5,818 | 0 | 2,898 | 2,244 | 70 | 5,212 |
| Carson Sta | 0 | 245 |  |  | 245 | 0 | 93 | 23 | 2 | 118 |
| Bland | 0 | 250 |  |  | 250 | 0 | 266 | 149 | 7 | 422 |
| East-West Sta | 0 | 617 |  |  | 617 | 0 | 379 | 87 | 10 | 476 |
| New Bern Sta | 0 | 830 |  |  | 830 | 0 | 474 | 29 | 10 | 512 |
| Southend Stations | 0 | 1,942 |  |  | 1,942 | 0 | 1,212 | 288 | 28 | 1,528 |
| ScaleybarkSt | 281 | 230 |  |  | 511 | 173 | 313 | 64 | 47 | 596 |
| Woodlawn Sta | 292 | 334 |  |  | 626 | 190 | 441 | 138 | 40 | 809 |
| Tyvola Sta | 212 | 613 |  |  | 825 | 162 | 401 | 470 | 21 | 1,054 |
| Archdale Sta | 46 | 587 |  |  | 632 | 3 | 399 | 77 | 18 | 498 |
| Arrowood Sta | 251 | 811 |  |  | 1,062 | 146 | 323 | 837 | 11 | 1,317 |
| SharonWest | 294 | 572 |  |  | 866 | 215 | 423 | 640 | 27 | 1,305 |
| S I-485 | 1,430 | 867 |  |  | 2,297 | 1,375 | 167 | 397 | 21 | 1,959 |
| PNR Stations | 2,805 | 4,014 |  |  | 6,818 | 2,265 | 2,467 | 2,623 | 183 | 7,538 |
| Total | 2,805 | 11,774 |  |  | 14,579 | 2,265 | 6,576 | 5,156 | 281 | 14,278 |

The 2010 comparison is to boardings in the 2009 survey. We could not allocate approach by bus and direct walk in the 2009 survey. Overall, modeled trips are about 300 lower than surveyed. Once again, drive approach (PNR) is a little high, other approach methods are low. PNR station boarding are high, other sections are low.

Table 22.2015 Blue Line Boardings by Station

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2013 On-Board Survey | | | | | mrm1602 - 2015, calib 4b, 2013 CATS Transit | | | | |
| StaName | PNR | Non-PNR |  |  | Total | PNR | Direct Walk | Bus Access | Direct Dropoff | Total |
| 7th St Station |  | 592 | 248 | 49 | 889 | 0 | 209 | 16 | 3 | 228 |
| CTC |  | 1,539 | 2,226 | 22 | 3,787 | 0 | 1,588 | 2,414 | 48 | 4,050 |
| 3rd St Sta |  | 950 | 148 | 7 | 1,105 | 0 | 935 | 58 | 19 | 1,012 |
| Stonewall Sta |  | 305 | 26 | 20 | 351 | 0 | 426 | 45 | 8 | 479 |
| CBD Stations | 0 | 3,386 | 2,648 | 98 | 6,132 | 0 | 3,158 | 2,532 | 78 | 5,769 |
| Carson Sta |  | 236 | 59 | 0 | 295 | 0 | 120 | 3 | 2 | 125 |
| Bland |  | 334 | 25 | 5 | 364 | 0 | 308 | 175 | 7 | 490 |
| East-West Sta |  | 478 | 223 | 15 | 716 | 0 | 526 | 133 | 12 | 671 |
| New Bern Sta |  | 508 | 22 | 37 | 567 | 0 | 611 | 32 | 11 | 654 |
| Southend Stations | 0 | 1,556 | 329 | 57 | 1,942 | 0 | 1,565 | 343 | 32 | 1,940 |
| ScaleybarkSt | 257 | 402 | 186 | 92 | 937 | 182 | 363 | 74 | 52 | 671 |
| Woodlawn Sta | 178 | 339 | 139 | 61 | 717 | 207 | 494 | 158 | 45 | 904 |
| Tyvola Sta | 316 | 467 | 141 | 5 | 929 | 154 | 459 | 513 | 21 | 1,147 |
| Archdale Sta | 33 | 524 | 210 | 20 | 787 | 4 | 450 | 85 | 20 | 558 |
| Arrowood Sta | 273 | 377 | 689 | 4 | 1,343 | 162 | 390 | 925 | 12 | 1,490 |
| SharonWest | 368 | 374 | 397 | 49 | 1,188 | 316 | 453 | 709 | 28 | 1,505 |
| S I-485 | 1,112 | 343 | 602 | 52 | 2,109 | 1,294 | 212 | 465 | 22 | 1,992 |
| PNR Stations | 2,537 | 2,826 | 2,364 | 283 | 8,010 | 2,319 | 2,819 | 2,929 | 200 | 8,267 |
| Total | 2,537 | 7,768 | 5,341 | 438 | 16,084 | 2,319 | 7,542 | 5,805 | 310 | 15,976 |

The 2015 comparison to the 2013 survey is very close. Although we don’t have accurate 2015 boardings, overall ridership has been fairly constant since 2013.

Table 23. 2010 Blue Line boardings by time-of-day

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 2009 On-Board Survey | | | mrm1602 - 2010, calib 4b | | |
| StaName | Peak | Off-Peak | Daily | Peak | Off-Peak | Daily |
| 7th St Station | 443 | 482 | 925 | 116 | 76 | 192 |
| CTC | 1,630 | 1,782 | 3,411 | 2,168 | 1,481 | 3,650 |
| 3rd St Sta | 936 | 338 | 1,274 | 659 | 311 | 970 |
| Stonewall Sta | 194 | 123 | 317 | 276 | 124 | 401 |
| CBD Stations | 3,202 | 2,724 | 5,926 | 3,219 | 1,993 | 5,212 |
| Carson Sta | 109 | 125 | 233 | 70 | 47 | 118 |
| Bland | 112 | 143 | 254 | 233 | 189 | 422 |
| East-West Sta | 244 | 328 | 572 | 257 | 219 | 476 |
| New Bern Sta | 392 | 397 | 788 | 265 | 247 | 512 |
| Southend Stations | 855 | 992 | 1,847 | 825 | 702 | 1,528 |
| ScaleybarkSt | 219 | 284 | 503 | 297 | 299 | 596 |
| Woodlawn Sta | 285 | 356 | 640 | 429 | 380 | 809 |
| Tyvola Sta | 385 | 422 | 807 | 604 | 450 | 1,054 |
| Archdale Sta | 274 | 345 | 618 | 265 | 233 | 498 |
| Arrowood Sta | 506 | 594 | 1,099 | 606 | 710 | 1,317 |
| SharonWest | 461 | 386 | 847 | 760 | 545 | 1,305 |
| S I-485 | 1,390 | 900 | 2,289 | 1,299 | 660 | 1,959 |
| PNR Stations | 3,518 | 3,285 | 6,803 | 4,260 | 3,278 | 7,538 |
| Total | 7,575 | 7,001 | 14,575 | 8,305 | 5,973 | 14,278 |

Comparison here is to the 2009 survey. Peak boardings are high and offpeak are low.

Table 25 2015 Blue Line boardings by time-of-day

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 2013 On-Board Survey | | | mrm1602 - 2015, calib 4b, 2013 CATS Transit | | |
| StaName | Peak | Off-Peak | Daily | Peak | Off-Peak | Daily |
| 7th St Station | 493 | 413 | 905 | 138 | 90 | 228 |
| CTC | 1,985 | 1,817 | 3,801 | 2,391 | 1,659 | 4,050 |
| 3rd St Sta | 758 | 348 | 1,106 | 680 | 332 | 1,012 |
| Stonewall Sta | 237 | 116 | 354 | 315 | 164 | 479 |
| CBD Stations | 3,472 | 2,694 | 6,166 | 3,524 | 2,245 | 5,769 |
| Carson Sta | 153 | 141 | 294 | 74 | 51 | 125 |
| Bland | 203 | 194 | 397 | 271 | 220 | 490 |
| East-West Sta | 364 | 370 | 734 | 357 | 315 | 671 |
| New Bern Sta | 295 | 273 | 568 | 330 | 323 | 654 |
| Southend Stations | 1,015 | 978 | 1,993 | 1,031 | 909 | 1,940 |
| ScaleybarkSt | 538 | 400 | 938 | 334 | 337 | 671 |
| Woodlawn Sta | 364 | 352 | 716 | 475 | 429 | 904 |
| Tyvola Sta | 535 | 393 | 928 | 643 | 504 | 1,147 |
| Archdale Sta | 412 | 376 | 788 | 299 | 258 | 558 |
| Arrowood Sta | 692 | 650 | 1,342 | 690 | 800 | 1,490 |
| SharonWest | 764 | 423 | 1,188 | 917 | 588 | 1,505 |
| S I-485 | 1,482 | 626 | 2,109 | 1,287 | 706 | 1,992 |
| PNR Stations | 4,788 | 3,221 | 8,009 | 4,645 | 3,623 | 8,267 |
| Total | 9,275 | 6,893 | 16,168 | 9,200 | 6,777 | 15,976 |

2015 time of boardings are very close to the 2013 survey.

## Bus Routes

We found a few differences between the model routes and O&D survey routes. To maintain comparison, the following adjustments were made to the TRACK\_ID to aggregate model data to match survey data

Model

52\_ IdlewildXB (52I & 52O) Track changed to 51\_Idlewild Road

46\_Harrisburg\_X(46I & 46O) Track changed to 40\_Albemarle-X

Survey

19\_Selwyn Track changed to 20 Queens Rd

NOT INCLUDED IN MODEL BUT PRESENT IN SURVEY

47, 49, & 50 – UNCC Yellow, Green, and Red. These are where most of the HBU trips are, but are generally below scope of the model because UNCC is 1 TAZ

84 – Gold Rush Orange – No expansion factors on survey – not included in results

94 – Mint Hill – Matthews – no expansion factors on survey – not included in results

## Appendix A

Calibration run E – Mode Choice calibration targets, calibration results, difference, coefficients

HBW.PK.Seg1 MS\_HBW\_Peak\_Calibrate\_E\_170301.xlsx PEAK NON-CBD

HBW.PK.Seg2 PEAK CBD

HBW.OP.Seg1 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2\_170302.xlsx OFFPEAK NON-CBD

HBW.OP.Seg2 OFFPEAK CBD

HBO.Pk.Seg1 MS\_HBO\_Peak\_Calibrate\_E\_Bias2\_170302.xlsx PEAK NON-CBD

HBO.Pk.Seg2 PEAK CBD

HBO.OP.Seg1 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2\_170228.xlsx OFFPEAK NON-CBD

HBO.OP.Seg2 OFFPEAK CBD

NHB.PK MS\_NHB\_PEAK\_Calibrate\_E\_Bias2\_170228.xlsx PEAK nonCBD/CBD

NHB.OP MS\_NHB\_OFFPEAK\_Calibrate\_E\_Bias2\_170228.xlsx OFFPEAK nonCBD/CBD

HBU.PK MS\_HBU\_PEAK\_Calibrate\_E\_170228.xlsx PEAK nonCBD/CBD

HBU.OP MS\_HBU\_OFFPEAK\_Calibrate\_E\_170301.xlsx OFFPEAK nonCBD/CBD

##### HBW.PK.Seg1 MS\_HBW\_Peak\_Calibrate\_E PEAK NON-CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Person Trips** | |  | **2013** |  |  |  |
| **HBW** |  | **PEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | Person Trips | 28,577 | 66,298 | 161,466 | 488,766 | 745,107 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **HBW** |  | **PEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | Drive | 13,041 | 41,717 | 112,483 | 425,882 | 593,122 |
|  | Pool 2 | 2,523 | 6,649 | 15,975 | 25,720 | 50,868 |
|  | Pool 3+ | 822 | 905 | 2,889 | 6,452 | 11,067 |
|  | Transit | 782 | 591 | 177 | 2,111 | 3,662 |
|  | Walk | 362 | 790 | 2,016 | 767 | 3,935 |
|  | Bike | 418 | 350 | 302 | 290 | 1,360 |
|  | Other | 0 | 0 | 0 | 0 | 0 |
|  | Ptrips | 17,948 | 51,002 | 133,842 | 461,223 | 664,014 |
|  | Auto Trips | 16,386 | 49,271 | 131,346 | 458,054 | 655,057 |
|  | % Drive | 80% | 85% | 86% | 93% | 91% |
|  | % Pool 2 | 15% | 13% | 12% | 6% | 8% |
|  | % Pool 3 | 5% | 2% | 2% | 1% | 2% |
|  | % Walk | 2% | 2% | 2% | 0% | 1% |
|  | % Bike | 2% | 1% | 0% | 0% | 0% |

HBW.PK.Seg1 MS\_HBW\_Peak\_Calibrate\_E PEAK NON-CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **On Board** | **Survey** |  | **CBDFeb2017** | | **2013** |  |
| **HBW** |  | **PEAK** |  | **NonCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | WalkPrem | 609 | 946 | 481 | 275 | 2,310 |
|  | WalkBus | 1,409 | 2,969 | 1,446 | 754 | 6,578 |
|  | DrivePrem | 19 | 94 | 209 | 882 | 1,204 |
|  | DriveBus | 6 | 104 | 163 | 834 | 1,106 |
|  | DropPrem | 15 | 57 | 86 | 6 | 164 |
|  | DropBus | 43 | 69 | 49 | 214 | 374 |
|  |  |  |  |  |  |  |
|  | Prem | 642 | 1,097 | 776 | 1,163 | 3,679 |
|  | Bus | 1,458 | 3,141 | 1,658 | 1,802 | 8,059 |
|  | Walk | 2,018 | 3,915 | 1,927 | 1,029 | 8,889 |
|  | Drive | 25 | 198 | 372 | 1,716 | 2,310 |
|  | Drop | 58 | 126 | 135 | 219 | 538 |
|  | Total | 2,100 | 4,239 | 2,434 | 2,965 | 11,737 |
| Unknown | income | 2% trips | non incl. | in tables |  |  |
|  |  |  |  |  |  |  |
| **MODE CHOICE TARGETS** | |  |  |  |  |  |
| **HBW** |  | **PEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | Person Trips | 28,577 | 66,298 | 161,466 | 488,766 |  |
|  |  |  |  |  |  |  |
| **Transit Survey** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | WalkPrem | 609 | 946 | 481 | 275 |  |
|  | WalkBus | 1,409 | 2,969 | 1,446 | 754 |  |
|  | DrivePrem | 19 | 94 | 209 | 882 |  |
|  | DriveBus | 6 | 104 | 163 | 834 |  |
|  | DropPrem | 15 | 57 | 86 | 6 |  |
|  | DropBus | 43 | 69 | 49 | 214 |  |
|  | Transit | 2,100 | 4,239 | 2,434 | 2,965 |  |
| **Transit ALTERATIONS - TARGETS** | | |  |  |  |  |
|  | WalkPrem | 609 | 946 | 481 | 275 |  |
|  | WalkBus | 1,409 | 2,969 | 1,446 | 754 |  |
|  | DrivePrem | 19 | 94 | 209 | 882 |  |
|  | DriveBus | 6 | 104 | 163 | 834 |  |
|  | DropPrem | 15 | 57 | 86 | 6 |  |
|  | DropBus | 43 | 69 | 49 | 214 |  |
|  | Transit | 2,100 | 4,239 | 2,434 | 2,965 |  |

NO ALTERATIONS

HBW.PK.Seg1 MS\_HBW\_Peak\_Calibrate\_E PEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Walk | 2.0% | 1.5% | 1.5% | 0.2% |
|  | Bike | 2.3% | 0.7% | 0.2% | 0.1% |
| **Walk/Bike Percentage ALTERATIONS** | | |  |  |  |
|  | Walk | 2.0% | 1.5% | 1.5% | 0.2% |
|  | Bike | 2.3% | 0.7% | 0.2% | 0.1% |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 576 | 1,026 | 2,432 | 813 |
|  | Bike | 665 | 455 | 364 | 307 |
| NO ALTERATIONS | |  |  |  |  |
| **Highway Person Trips** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Person-Auto | 25,235 | 60,578 | 156,235 | 484,681 |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 79.6% | 84.7% | 85.6% | 93.0% |
|  | Pool 2 | 15.4% | 13.5% | 12.2% | 5.6% |
|  | Pool 3+ | 5.0% | 1.8% | 2.2% | 1.4% |
| **Auto Occ - Percent ALTERATIONS** | | |  |  |  |
|  | Drive alone | 79.6% | 84.7% | 85.6% | 93.0% |
|  | Pool 2 | 15.4% | 13.5% | 12.2% | 5.6% |
|  | Pool 3+ | 5.0% | 1.8% | 2.2% | 1.4% |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 20,083 | 51,290 | 133,797 | 450,639 |
|  | Pool 2 | 3,886 | 8,175 | 19,002 | 27,215 |
|  | Pool 3+ | 1,266 | 1,113 | 3,436 | 6,827 |

NO ALTERATIONS

HBW.PK.Seg1 MS\_HBW\_Peak\_Calibrate\_E PEAK NON-CBD

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | | | | | | | |
| MODE | SEGMENT | INCOME1 | INCOME2 | INCOME3 | INCOME4 | Min\_Const | Max\_Const |
| AUTO | 1 | 25,235 | 60,578 | 156,235 | 484,681 | 0 | 0 |
| TRANSIT | 1 | 2,100 | 4,239 | 2,434 | 2,965 | -6 | 6 |
| WALKBIKE | 1 | 1,242 | 1,482 | 2,797 | 1,120 | -6 | 6 |
| SOV | 1 | 20,083 | 51,290 | 133,797 | 450,639 | 0 | 0 |
| HOV | 1 | 5,152 | 9,288 | 22,438 | 34,042 | -6 | 6 |
| POOL2 | 1 | 3,886 | 8,175 | 19,002 | 27,215 | -6 | 6 |
| POOL3 | 1 | 1,266 | 1,113 | 3,436 | 6,827 | -6 | 6 |
| WALKTRAN | 1 | 2,018 | 3,915 | 1,927 | 1,029 | -6 | 6 |
| DRIVETRAN | 1 | 25 | 198 | 372 | 1,716 | -6 | 6 |
| DROPTRAN | 1 | 58 | 126 | 135 | 219 | -6 | 6 |
| WALKPREM | 1 | 609 | 946 | 481 | 275 | -6 | 6 |
| WALKBUS | 1 | 1,409 | 2,969 | 1,446 | 754 | -6 | 6 |
| DRIVEPREM | 1 | 19 | 94 | 209 | 882 | -6 | 6 |
| DRIVEBUS | 1 | 6 | 104 | 163 | 834 | -6 | 6 |
| DROPPREM | 1 | 15 | 57 | 86 | 6 | -6 | 6 |
| DROPBUS | 1 | 43 | 69 | 49 | 214 | -6 | 6 |
| WALK | 1 | 576 | 1,026 | 2,432 | 813 | -6 | 6 |
| BIKE | 1 | 665 | 455 | 364 | 307 | -6 | 6 |
| **OUTPUT DATA** | |  |  |  |  |  |  |
| **Trips** | **HBW\_Peak\_Data** | | **Iteration** | **10** |  |  |  |
| MODE | SEGMENT | INCOME1 | INCOME2 | INCOME3 | INCOME4 |  |  |
| AUTO | 1 | 25,283 | 60,653 | 156,276 | 484,681 |  |  |
| TRANSIT | 1 | 2,053 | 4,163 | 2,394 | 2,966 |  |  |
| WALKBIKE | 1 | 1,241 | 1,481 | 2,796 | 1,120 |  |  |
| SOV | 1 | 20,121 | 51,354 | 133,832 | 450,639 |  |  |
| HOV | 1 | 5,162 | 9,299 | 22,444 | 34,042 |  |  |
| POOL2 | 1 | 3,893 | 8,185 | 19,007 | 27,215 |  |  |
| POOL3 | 1 | 1,268 | 1,114 | 3,437 | 6,827 |  |  |
| WALKTRAN | 1 | 1,971 | 3,841 | 1,885 | 1,205 |  |  |
| DRIVETRAN | 1 | 25 | 198 | 374 | 1,539 |  |  |
| DROPTRAN | 1 | 57 | 125 | 135 | 222 |  |  |
| WALKPREM | 1 | 467 | 729 | 379 | 289 |  |  |
| WALKBUS | 1 | 1,504 | 3,112 | 1,506 | 916 |  |  |
| DRIVEPREM | 1 | 19 | 91 | 207 | 527 |  |  |
| DRIVEBUS | 1 | 6 | 107 | 166 | 1,012 |  |  |
| DROPPREM | 1 | 11 | 53 | 85 | 7 |  |  |
| DROPBUS | 1 | 46 | 72 | 50 | 215 |  |  |
| WALK | 1 | 576 | 1,026 | 2,432 | 813 |  |  |
| BIKE | 1 | 665 | 455 | 364 | 307 |  |  |

HBW.PK.Seg1 MS\_HBW\_Peak\_Calibrate\_E PEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (Output - Target )** | | | |  |  |
| MODE | **Non CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 48 | 75 | 41 | 0 |
| TRANSIT |  | -47 | -76 | -40 | 1 |
| WALKBIKE |  | -1 | -1 | -1 | 0 |
| SOV |  | 38 | 64 | 35 | 0 |
| HOV |  | 10 | 11 | 6 | 0 |
| POOL2 |  | 7 | 10 | 5 | 0 |
| POOL3 |  | 2 | 1 | 1 | 0 |
| WALKTRAN |  | -47 | -74 | -42 | 176 |
| DRIVETRAN |  | 0 | 0 | 2 | -177 |
| DROPTRAN |  | -1 | -1 | 0 | 3 |
| WALKPREM |  | -142 | -217 | -102 | 14 |
| WALKBUS |  | 95 | 143 | 60 | 162 |
| DRIVEPREM |  | 0 | -3 | -2 | -355 |
| DRIVEBUS |  | 0 | 3 | 3 | 178 |
| DROPPREM |  | -4 | -4 | -1 | 1 |
| DROPBUS |  | 3 | 3 | 1 | 1 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | 0 | 0 | 0 | 0 |

HBW.PK.Seg1 MS\_HBW\_Peak\_Calibrate\_E PEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **Non CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 0 | 0 | 0 | 0 |
| TRANSIT |  | 1.032258 | 0.511538 | -1.231605 | -2.60578 |
| WALKBIKE |  | 0.377794 | 0.289958 | 0.278385 | -1.927903 |
| SOV |  | 0 | 0 | 0 | 0 |
| HOV |  | -1.848536 | -1.928538 | -1.954133 | -2.766498 |
| POOL2 |  | 0 | 0 | 0 | 0 |
| POOL3 |  | -1.492904 | -2.140082 | -1.789187 | -1.448746 |
| WALKTRAN |  | 0 | 0 | 0 | 0 |
| DRIVETRAN |  | -3.361971 | -2.132964 | -0.560616 | 0.564536 |
| DROPTRAN |  | -4.830407 | -3.691057 | -2.447413 | -4.294185 |
| WALKPREM |  | 0 | 0 | 0 | 0 |
| WALKBUS |  | 0.26312 | 1.042789 | 0.840112 | 0.469807 |
| DRIVEPREM |  | 0 | 0 | 0 | 0 |
| DRIVEBUS |  | -3.98985 | -1.590635 | -2.626209 | -0.422705 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | 0.266299 | -2.272763 | -4.208044 | 3.682272 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | -2.247754 | -3.604658 | -4.894098 | -3.770088 |

##### HBW.PK.Seg2 MS\_HBW\_Peak\_Calibrate\_E PEAK CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Person Trips** | |  | **2013** |  |  |  |
| **HBW** |  | **PEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| Person Trips | | 649 | 1,469 | 3,611 | 36,974 | 42,703 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **HBW** |  | **PEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| Drive |  | 227 | 591 | 588 | 19,730 | 21,135 |
| Pool 2 |  | 0 | 0 | 0 | 1,426 | 1,426 |
| Pool 3+ |  | 0 | 0 | 0 | 0 | 0 |
| Transit |  | 0 | 0 | 0 | 802 | 802 |
| Walk |  | 0 | 0 | 0 | 439 | 439 |
| Bike |  | 0 | 0 | 0 | 0 | 0 |
| Other |  | 0 | 0 | 0 | 0 | 0 |
| Ptrips |  | 227 | 591 | 588 | 22,397 | 23,802 |
| Auto Trips |  | 227 | 591 | 588 | 21,156 | 22,562 |
| % Drive |  | 100% | 100% | 100% | 93% | 94% |
| % Pool 2 |  | 0% | 0% | 0% | 7% | 6% |
| % Pool 3 |  | 0% | 0% | 0% | 0% | 0% |
| % Walk |  | 0% | 0% | 0% | 2% | 2% |
| % Bike |  | 0% | 0% | 0% | 0% | 0% |

HBW.PK.Seg2 MS\_HBW\_Peak\_Calibrate\_E PEAK CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **On Board** | **Survey** |  | **MRM1701\_CBD** | | **2013** |  |
| **HBW** |  | **PEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| WalkPrem |  | 86 | 106 | 170 | 226 | 587 |
| WalkBus |  | 182 | 203 | 239 | 448 | 1,072 |
| DrivePrem |  | 49 | 68 | 300 | 1,205 | 1,621 |
| DriveBus |  | 11 | 9 | 299 | 896 | 1,216 |
| DropPrem |  | 0 | 14 | 0 | 11 | 25 |
| DropBus |  | 16 | 20 | 26 | 144 | 207 |
|  |  |  |  |  |  |  |
| Prem |  | 316 | 377 | 709 | 1,879 | 3,281 |
| Bus |  | 28 | 43 | 325 | 1,051 | 1,447 |
| Walk |  | 97 | 115 | 468 | 1,123 | 1,803 |
| Drive |  | 182 | 217 | 239 | 459 | 1,097 |
| Drop |  | 65 | 88 | 326 | 1,349 | 1,828 |
| Total |  | 344 | 421 | 1,033 | 2,930 | 4,728 |
| Unknown | income | 2% trips | non incl. | in tables |  |  |
|  |  |  |  |  |  |  |
| **MODE CHOICE TARGETS** | |  |  |  |  |  |
| **HBW** |  | **PEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | Person Trips | 649 | 1,469 | 3,611 | 36,974 |  |
|  |  |  |  |  |  |  |
| **Transit Survey** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | WalkPrem | 86 | 106 | 170 | 226 |  |
|  | WalkBus | 182 | 203 | 239 | 448 |  |
|  | DrivePrem | 49 | 68 | 300 | 1,205 |  |
|  | DriveBus | 11 | 9 | 299 | 896 |  |
|  | DropPrem | 0 | 14 | 0 | 11 |  |
|  | DropBus | 16 | 20 | 26 | 144 |  |
|  | Transit | 344 | 421 | 1,033 | 2,930 |  |
| **Transit ALTERATIONS - TARGETS** | | |  |  |  |  |
|  | WalkPrem | 86 | 106 | 170 | 226 |  |
|  | WalkBus | 182 | 203 | 239 | 448 |  |
|  | DrivePrem | 49 | 68 | 300 | 1,205 |  |
|  | DriveBus | 11 | 9 | 299 | 896 |  |
|  | DropPrem | **1** | 14 | **1** | 11 |  |
|  | DropBus | 16 | 20 | 26 | 144 |  |
|  | Transit | 345 | 421 | 1,034 | 2,930 |  |

DROP PREMIUM – ZEROS CHANGED TO 1 (Inc 1 & 3)

HBW.PK.Seg2 MS\_HBW\_Peak\_Calibrate\_E PEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Walk | 0.0% | 0.0% | 0.0% | 2.0% |
|  | Bike | 0.0% | 0.0% | 0.0% | 0.0% |
| **Walk/Bike Percentage ALTERATIONS** | | |  |  |  |
|  | Walk | **2.0%** | **1.5%** | **1.5%** | 2.0% |
|  | Bike | **2.3%** | **0.7%** | **0.2%** | **0.1%** |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 13 | 23 | 54 | 725 |
|  | Bike | 15 | 10 | 8 | 23 |
| **All except Inc 4 walk (2%) - use same percentages from Non-CBD** | | | | | |
| **Highway Person Trips** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Person-Auto | 276 | 1,016 | 2,514 | 33,296 |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 100.0% | 100.0% | 100.0% | 93.3% |
|  | Pool 2 | 0.0% | 0.0% | 0.0% | 6.7% |
|  | Pool 3+ | 0.0% | 0.0% | 0.0% | 0.0% |
| **Auto Occ - Percent ALTERATIONS** | | |  |  |  |
|  | Drive alone | **79.6%** | **84.7%** | **85.6%** | **93.0%** |
|  | Pool 2 | **15.4%** | **13.5%** | **12.2%** | **5.6%** |
|  | Pool 3+ | **5.0%** | **1.8%** | **2.2%** | **1.4%** |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 220 | 860 | 2,153 | 30,957 |
|  | Pool 2 | 43 | 137 | 306 | 1,870 |
|  | Pool 3+ | 14 | 19 | 55 | 469 |
| **Use Auto occupancy from Non-CBD** | | |  |  |  |

HBW.PK.Seg2 MS\_HBW\_Peak\_Calibrate\_E PEAK CBD

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | |  |  |  |  |  |  |
| MODE | SEGMENT | INCOME1 | INCOME2 | INCOME3 | INCOME4 | Min\_Const | Max\_Const |
| AUTO | 2 | 276 | 1,016 | 2,514 | 33,296 | 0 | 0 |
| TRANSIT | 2 | 345 | 421 | 1,034 | 2,930 | -6 | 6 |
| WALKBIKE | 2 | 28 | 33 | 63 | 748 | -6 | 6 |
| SOV | 2 | 220 | 860 | 2,153 | 30,957 | 0 | 0 |
| HOV | 2 | 56 | 156 | 361 | 2,339 | -6 | 6 |
| POOL2 | 2 | 43 | 137 | 306 | 1,870 | -6 | 6 |
| POOL3 | 2 | 14 | 19 | 55 | 469 | -6 | 6 |
| WALKTRAN | 2 | 267 | 310 | 409 | 674 | -6 | 6 |
| DRIVETRAN | 2 | 60 | 77 | 598 | 2,102 | -6 | 6 |
| DROPTRAN | 2 | 17 | 34 | 27 | 155 | -6 | 6 |
| WALKPREM | 2 | 86 | 106 | 170 | 226 | -6 | 6 |
| WALKBUS | 2 | 182 | 203 | 239 | 448 | -6 | 6 |
| DRIVEPREM | 2 | 49 | 68 | 300 | 1,205 | -6 | 6 |
| DRIVEBUS | 2 | 11 | 9 | 299 | 896 | -6 | 6 |
| DROPPREM | 2 | 1 | 14 | 1 | 11 | -6 | 6 |
| DROPBUS | 2 | 16 | 20 | 26 | 144 | -6 | 6 |
| WALK | 2 | 13 | 23 | 54 | 725 | -6 | 6 |
| BIKE | 2 | 15 | 10 | 8 | 23 | -6 | 6 |
| **Trips** | **HBW\_Peak\_Data** | | **Iteration** | **10** |  |  |  |
| MODE | SEGMENT | INCOME1 | INCOME2 | INCOME3 | INCOME4 |  |  |
| AUTO | 2 | 278 | 1,016 | 2,554 | 33,318 |  |  |
| TRANSIT | 2 | 343 | 420 | 995 | 2,910 |  |  |
| WALKBIKE | 2 | 28 | 33 | 61 | 746 |  |  |
| SOV | 2 | 221 | 860 | 2,187 | 30,977 |  |  |
| HOV | 2 | 57 | 156 | 367 | 2,341 |  |  |
| POOL2 | 2 | 43 | 137 | 311 | 1,871 |  |  |
| POOL3 | 2 | 14 | 19 | 56 | 469 |  |  |
| WALKTRAN | 2 | 258 | 309 | 392 | 1,056 |  |  |
| DRIVETRAN | 2 | 60 | 77 | 558 | 1,698 |  |  |
| DROPTRAN | 2 | 25 | 34 | 45 | 157 |  |  |
| WALKPREM | 2 | 39 | 81 | 114 | 345 |  |  |
| WALKBUS | 2 | 220 | 228 | 278 | 711 |  |  |
| DRIVEPREM | 2 | 21 | 36 | 209 | 429 |  |  |
| DRIVEBUS | 2 | 39 | 41 | 349 | 1,268 |  |  |
| DROPPREM | 2 | 2 | 15 | 2 | 13 |  |  |
| DROPBUS | 2 | 23 | 20 | 43 | 145 |  |  |
| WALK | 2 | 13 | 23 | 53 | 716 |  |  |
| BIKE | 2 | 15 | 10 | 8 | 30 |  |  |

HBW.PK.Seg2 MS\_HBW\_Peak\_Calibrate\_E PEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (Output - Target )** | | | |  |  |
| MODE | **CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 2 | 0 | 40 | 22 |
| TRANSIT |  | -2 | -1 | -39 | -20 |
| WALKBIKE |  | 0 | 0 | -2 | -2 |
| SOV |  | 1 | 0 | 34 | 20 |
| HOV |  | 1 | 0 | 6 | 2 |
| POOL2 |  | 0 | 0 | 5 | 1 |
| POOL3 |  | 0 | 0 | 1 | 0 |
| WALKTRAN |  | -9 | -1 | -17 | 382 |
| DRIVETRAN |  | 0 | 0 | -40 | -404 |
| DROPTRAN |  | 8 | 0 | 18 | 2 |
| WALKPREM |  | -47 | -25 | -56 | 119 |
| WALKBUS |  | 38 | 25 | 39 | 263 |
| DRIVEPREM |  | -28 | -32 | -91 | -776 |
| DRIVEBUS |  | 28 | 32 | 50 | 372 |
| DROPPREM |  | 1 | 1 | 1 | 2 |
| DROPBUS |  | 7 | 0 | 17 | 1 |
| WALK |  | 0 | 0 | -1 | -9 |
| BIKE |  | 0 | 0 | 0 | 7 |

HBW.PK.Seg2 MS\_HBW\_Peak\_Calibrate\_E PEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 0 | 0 | 0 | 0 |
| TRANSIT |  | 2.847032 | 1.599548 | 1.222429 | -1.217127 |
| WALKBIKE |  | 0.269414 | -0.391765 | -0.320979 | 0.198489 |
| SOV |  | 0 | 0 | 0 | 0 |
| HOV |  | -2.611387 | -2.278865 | -2.149008 | -2.932916 |
| POOL2 |  | 0 | 0 | 0 | 0 |
| POOL3 |  | -2.210661 | -2.43336 | -1.963656 | -1.588936 |
| WALKTRAN |  | 0 | 0 | 0 | 0 |
| DRIVETRAN |  | -1.483353 | -1.597093 | 0.470256 | -0.53053 |
| DROPTRAN |  | -6 | -3.77968 | -6 | -4.503905 |
| WALKPREM |  | 0 | 0 | 0 | 0 |
| WALKBUS |  | -6 | -6 | -6 | -2.225289 |
| DRIVEPREM |  | 0 | 0 | 0 | 0 |
| DRIVEBUS |  | -6 | -6 | -5.698579 | -0.648911 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | 0.020874 | -5.127798 | 1.111087 | 1.626062 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | -2.361782 | -3.326092 | -4.377394 | -6 |

##### HBW.OP.Seg1 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BIAS CONSTANTS** | | **file date** | **2-Mar-17** |  |  |  |
| **HBW** |  | **OFFPEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
| **Bias** | **WalkPrem** | **0.5** | **0.5** | **0.5** |  |  |
|  |  |  |  |  |  |  |
| **Person Trips** | |  | **2013** |  |  |  |
| **HBW** |  | **OFFPEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | Person Trips | 16,172 | 37,520 | 91,378 | 276,605 | 421,675 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **HBW** |  | **OFFPEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | Drive | 14,180 | 33,288 | 78,099 | 235,992 | 361,560 |
|  | Pool 2 | 3,438 | 5,298 | 13,717 | 6,419 | 28,872 |
|  | Pool 3+ | 1,194 | 2,029 | 1,147 | 3,516 | 7,887 |
|  | Transit | 161 | 1,029 | 177 | 0 | 1,368 |
|  | Walk | 150 | 350 | 1,096 | 566 | 2,162 |
|  | Bike | 279 | 509 | 302 | 944 | 2,035 |
|  | Other | 0 | 0 | 0 | 362 | 362 |
|  | Ptrips | 19,403 | 42,503 | 94,539 | 247,799 | 404,245 |
|  | Auto Trips | 18,813 | 40,615 | 92,964 | 245,927 | 398,319 |
|  | % Drive | 75.4% | 82.0% | 84.0% | 96.0% | 90.8% |
|  | % Pool 2 | 18.3% | 13.0% | 14.8% | 2.6% | 7.2% |
|  | % Pool 3+ | 6.3% | 5.0% | 1.2% | 1.4% | 2.0% |
|  | % Walk | 0.8% | 0.8% | 1.2% | 0.2% | 0.5% |
|  | % Bike | 1.4% | 1.2% | 0.3% | 0.4% | 0.5% |
| Unknown | destination | <1% trips | non incl. | in tables |  |  |

HBW.OP.Seg1 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **MODE CHOICE TARGETS** | |  |  |  |  |
| **HBW** |  | **OFFPEAK** |  | **NONCBD** |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Person Trips | 16,172 | 37,520 | 91,378 | 276,605 |
|  |  |  |  |  |  |
| **Transit Survey** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | WalkPrem | 453 | 686 | 457 | 193 |
|  | WalkBus | 1,288 | 2,251 | 1,122 | 406 |
|  | DrivePrem | 12 | 31 | 119 | 269 |
|  | DriveBus | 6 | 30 | 16 | 69 |
|  | DropPrem | 9 | 46 | 13 | 4 |
|  | DropBus | 6 | 32 | 26 | 13 |
|  | Transit | 1,774 | 3,076 | 1,752 | 953 |
| **Transit ALTERATIONS - TARGETS** | | |  |  |  |
|  | WalkPrem | 453 | 686 | 457 | 193 |
|  | WalkBus | 1,288 | 2,251 | 1,122 | 406 |
|  | DrivePrem | 12 | 31 | 119 | 269 |
|  | DriveBus | 6 | 30 | 16 | 69 |
|  | DropPrem | 9 | 46 | 13 | 4 |
|  | DropBus | 6 | 32 | 26 | 13 |
|  | Transit | 1,774 | 3,076 | 1,752 | 953 |

HBW.OP.Seg1 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Walk | 0.8% | 0.8% | 1.2% | 0.2% |
|  | Bike | 1.4% | 1.2% | 0.3% | 0.4% |
| **Walk/Bike Percentage ALTERATIONS** | | |  |  |  |
|  | Walk | 0.8% | 0.8% | 1.2% | 0.2% |
|  | Bike | 1.4% | 1.2% | 0.3% | 0.4% |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 125 | 309 | 1,059 | 632 |
|  | Bike | 233 | 450 | 292 | 1,054 |
|  |  |  |  |  |  |
| **Highway Person Trips** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Person-Auto | 14,040 | 33,685 | 88,275 | 273,966 |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 75.4% | 82.0% | 84.0% | 96.0% |
|  | Pool 2 | 18.3% | 13.0% | 14.8% | 2.6% |
|  | Pool 3+ | 6.3% | 5.0% | 1.2% | 1.4% |
| **Auto Occ - Percent ALTERATIONS** | | |  |  |  |
|  | Drive alone | 75.4% | 82.0% | 84.0% | 96.0% |
|  | Pool 2 | 18.3% | 13.0% | 14.8% | 2.6% |
|  | Pool 3+ | 6.3% | 5.0% | 1.2% | 1.4% |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 10,583 | 27,609 | 74,160 | 262,898 |
|  | Pool 2 | 2,566 | 4,394 | 13,025 | 7,150 |
|  | Pool 3+ | 891 | 1,683 | 1,090 | 3,917 |

HBW.OP.Seg1 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | | | | | | | | | | | | |  |
| MODE | | SEGMENT | | INCOM1 | | INCOM2 | | INCOM3 | | INCOM4 | | Min\_Cnst | Max\_Cnst |
| AUTO | | 1 | | 14,040 | | 33,685 | | 88,275 | | 273,966 | | 0 | 0 |
| TRANSIT | | 1 | | 1,774 | | 3,076 | | 1,752 | | 953 | | -6 | 6 |
| WALKBIKE | | 1 | | 357 | | 759 | | 1,351 | | 1,686 | | -6 | 6 |
| SOV | | 1 | | 10,583 | | 27,609 | | 74,160 | | 262,898 | | 0 | 0 |
| HOV | | 1 | | 3,458 | | 6,077 | | 14,115 | | 11,067 | | -6 | 6 |
| POOL2 | | 1 | | 2,566 | | 4,394 | | 13,025 | | 7,150 | | -6 | 6 |
| POOL3 | | 1 | | 891 | | 1,683 | | 1,090 | | 3,917 | | -6 | 6 |
| WALKTRAN | | 1 | | 1,741 | | 2,937 | | 1,580 | | 598 | | -6 | 6 |
| DRIVETRAN | | 1 | | 18 | | 61 | | 134 | | 338 | | -6 | 6 |
| DROPTRAN | | 1 | | 15 | | 78 | | 38 | | 17 | | -6 | 6 |
| WALKPREM | | 1 | | 453 | | 686 | | 457 | | 193 | | -6 | 6 |
| WALKBUS | | 1 | | 1,288 | | 2,251 | | 1,122 | | 406 | | -6 | 6 |
| DRIVEPREM | | 1 | | 12 | | 31 | | 119 | | 269 | | -6 | 6 |
| DRIVEBUS | | 1 | | 6 | | 30 | | 16 | | 69 | | -6 | 6 |
| DROPPREM | | 1 | | 9 | | 46 | | 13 | | 4 | | -6 | 6 |
| DROPBUS | | 1 | | 6 | | 32 | | 26 | | 13 | | -6 | 6 |
| WALK | | 1 | | 125 | | 309 | | 1,059 | | 632 | | -6 | 6 |
| BIKE | | 1 | | 233 | | 450 | | 292 | | 1,054 | | -6 | 6 |
| **OUTPUT DATA** | | |  | |  | |  | |  | |
| **Trips** | **HBW\_OffPeak\_Data** | | | | **Iteration** | | **10** | |  | |
| MODE | SEG | | INCOME1 | | INCOME2 | | INCOME3 | | INCOME4 | |
| AUTO | 1 | | 14,045 | | 33,692 | | 88,284 | | 273,967 | |
| TRANSIT | 1 | | 1,769 | | 3,069 | | 1,742 | | 953 | |
| WALKBIKE | 1 | | 358 | | 759 | | 1,351 | | 1,686 | |
| SOV | 1 | | 10,587 | | 27,614 | | 74,168 | | 262,900 | |
| HOV | 1 | | 3,458 | | 6,078 | | 14,116 | | 11,067 | |
| POOL2 | 1 | | 2,567 | | 4,395 | | 13,026 | | 7,150 | |
| POOL3 | 1 | | 891 | | 1,683 | | 1,090 | | 3,917 | |
| WALKTRAN | | | 1,736 | | 2,930 | | 1,568 | | 598 | |
| DRIVETRAN | | | 18 | | 61 | | 135 | | 338 | |
| DROPTRAN | | | 15 | | 78 | | 39 | | 17 | |
| WALKPREM | | | 438 | | 665 | | 426 | | 191 | |
| WALKBUS |  | | 1,298 | | 2,264 | | 1,142 | | 407 | |
| DRIVEPREM | | | 12 | | 31 | | 119 | | 269 | |
| DRIVEBUS |  | | 6 | | 30 | | 16 | | 69 | |
| DROPPREM | | | 9 | | 46 | | 13 | | 4 | |
| DROPBUS | 1 | | 6 | | 32 | | 26 | | 13 | |
| WALK | 1 | | 125 | | 309 | | 1,059 | | 632 | |
| BIKE | 1 | | 233 | | 450 | | 292 | | 1,054 | |

HBW.OP.Seg1 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (OutPut-Target)** | | | |  |  |
| MODE | **Non CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 5 | 7 | 9 | 1 |
| TRANSIT |  | -5 | -7 | -10 | 0 |
| WALKBIKE |  | 1 | 0 | 0 | 0 |
| SOV |  | 4 | 5 | 8 | 2 |
| HOV |  | 0 | 1 | 1 | 0 |
| POOL2 |  | 1 | 1 | 1 | 0 |
| POOL3 |  | 0 | 0 | 0 | 0 |
| WALKTRAN |  | -5 | -7 | -12 | 0 |
| DRIVETRAN |  | 0 | 0 | 1 | 0 |
| DROPTRAN |  | 0 | 0 | 1 | 0 |
| WALKPREM |  | -15 | -21 | -31 | -2 |
| WALKBUS |  | 10 | 13 | 20 | 1 |
| DRIVEPREM |  | 0 | 0 | 0 | 0 |
| DRIVEBUS |  | 0 | 0 | 0 | 0 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | 0 | 0 | 0 | 0 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | 0 | 0 | 0 | 0 |
|  |  |  |  |  |  |
| **DIFFERENCE FROM TARGETS - Calibrate E (3/1/17) No Bias Constant** | | | | | |
| MODE | **Non CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 31 | 51 | 29 | 8 |
| TRANSIT |  | -31 | -52 | -30 | -8 |
| WALKBIKE |  | 1 | 0 | 0 | 0 |
| SOV |  | 23 | 41 | 25 | 9 |
| HOV |  | 7 | 9 | 5 | 0 |
| POOL2 |  | 6 | 7 | 4 | 0 |
| POOL3 |  | 2 | 3 | 0 | 0 |
| WALKTRAN |  | -30 | -52 | -31 | -8 |
| DRIVETRAN |  | 0 | 0 | 1 | 1 |
| DROPTRAN |  | 0 | -1 | 1 | -1 |
| WALKPREM |  | -93 | -154 | -88 | -19 |
| WALKBUS |  | 63 | 102 | 58 | 10 |
| DRIVEPREM |  | 0 | 0 | -1 | 0 |
| DRIVEBUS |  | 0 | 1 | 1 | 1 |
| DROPPREM |  | 0 | -2 | -2 | -1 |
| DROPBUS |  | 0 | 1 | 1 | 1 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | 0 | 0 | 0 | 0 |

HBW.OP.Seg1 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **Non CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 0 | 0 | 0 | 0 |
| TRANSIT |  | 2.021334 | 1.128168 | -0.717542 | -2.194559 |
| WALKBIKE |  | -0.508695 | -0.131852 | 0.083839 | -1.380945 |
| SOV |  | 0 | 0 | 0 | 0 |
| HOV |  | -1.588999 | -1.812824 | -1.779281 | -3.437822 |
| POOL2 |  | 0 | 0 | 0 | 0 |
| POOL3 |  | -1.401956 | -1.09749 | -2.555255 | -0.663463 |
| WALKTRAN |  | 0 | 0 | 0 | 0 |
| DRIVETRAN |  | -4.350794 | -3.178424 | -0.667026 | 0.000664 |
| DROPTRAN |  | -4.830528 | -3.34121 | -4.077083 | -5.464893 |
| WALKPREM |  | 0 | 0 | 0 | 0 |
| WALKBUS |  | 0.431605 | 1.521016 | 1.26484 | -0.809896 |
| DRIVEPREM |  | 0 | 0 | 0 | 0 |
| DRIVEBUS |  | 0.728814 | 1.171823 | -4.574469 | -2.962529 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | -4.456148 | -4.198909 | -1.523883 | -0.10722 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | -1.569102 | -2.169829 | -4.118947 | -2.039296 |

##### HBW.OP.Seg2 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BIAS CONSTANTS** | | **file date** | **2-Mar-17** |  |  |  |
|  | |  |  |  |  |  |
| **HBW** |  | **OFFPEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
| **Bias** |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Person Trips** | |  | 2013 |  |  |  |
| **HBW** |  | **OFFPEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| Person Trips |  | 367 | 831 | 2,043 | 20,925 | 24,166 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **HBW** |  | **OFFPEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| Drive |  | 483 | 500 | 177 | 6,561 | 7,721 |
| Pool 2 |  | 189 | 0 | 0 | 704 | 893 |
| Pool 3+ |  | 0 | 0 | 0 | 0 | 0 |
| Transit |  | 0 | 343 | 0 | 290 | 633 |
| Walk |  | 0 | 0 | 0 | 440 | 440 |
| Bike |  | 0 | 0 | 0 | 0 | 0 |
| Other |  | 0 | 0 | 0 | 0 | 0 |
| Ptrips |  | 672 | 843 | 177 | 7,995 | 9,688 |
| Auto Trips |  | 672 | 500 | 177 | 7,265 | 8,615 |
| % Drive |  | 72% | 100% | 100% | 90% | 90% |
| % Pool 2 |  | 28% | 0% | 0% | 10% | 10% |
| % Pool 3 |  | 0% | 0% | 0% | 0% | 0% |
| % Walk |  | 0% | 0% | 0% | 6% | 5% |
| % Bike |  | 0% | 0% | 0% | 0% | 0% |
| Unknown | destination | <1% trips | non incl. | in tables |  |  |

HBW.OP.Seg2 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **On Board** | **Survey** |  | **MRM1701\_CBD** | | **2013** |  |
| **HBW** |  | **OFFPEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| WalkPrem |  | 53 | 34 | 81 | 12 | 180 |
| WalkBus |  | 157 | 197 | 114 | 63 | 531 |
| DrivePrem |  | 6 | 90 | 89 | 170 | 356 |
| DriveBus |  | 0 | 3 | 1 | 59 | 63 |
| DropPrem |  | 2 | 0 | 0 | 0 | 2 |
| DropBus |  | 0 | 6 | 0 | 19 | 25 |
|  |  |  |  |  |  |  |
| Prem |  | 216 | 321 | 285 | 244 | 1,066 |
| Bus |  | 2 | 8 | 1 | 79 | 90 |
| Walk |  | 53 | 36 | 82 | 71 | 243 |
| Drive |  | 159 | 197 | 114 | 63 | 532 |
| Drop |  | 6 | 96 | 89 | 189 | 381 |
| Total |  | 218 | 330 | 286 | 323 | 1,156 |
| Unknown | income | 2% trips | non incl. | in tables |  |  |
|  |  |  |  |  |  |  |
| **MODE CHOICE TARGETS** | |  |  |  |  |  |
| **HBW** |  | **OFFPEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | Person Trips | 367 | 831 | 2,043 | 20,925 |  |
|  |  |  |  |  |  |  |
| **Transit Survey** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | WalkPrem | 53 | 34 | 81 | 12 |  |
|  | WalkBus | 157 | 197 | 114 | 63 |  |
|  | DrivePrem | 6 | 90 | 89 | 170 |  |
|  | DriveBus | 0 | 3 | 1 | 59 |  |
|  | DropPrem | 2 | 0 | 0 | 0 |  |
|  | DropBus | 0 | 6 | 0 | 19 |  |
|  | Transit | 218 | 330 | 286 | 323 |  |
| **Transit ALTERATIONS - TARGETS** | | |  |  |  |  |
|  | WalkPrem | 53 | 34 | 81 | 12 |  |
|  | WalkBus | 157 | 197 | 114 | 63 |  |
|  | DrivePrem | 6 | 90 | 89 | 170 |  |
|  | DriveBus | **1** | 3 | 1 | 59 |  |
|  | DropPrem | 2 | **1** | **1** | **1** |  |
|  | DropBus | **1** | 6 | **1** | 19 |  |
|  | Transit | 220 | 331 | 288 | 324 |  |
| **Drive and Drop - zeros changed to 1** | | |  |  |  |  |

HBW.OP.Seg2 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Walk | 0.0% | 0.0% | 0.0% | 5.5% |
|  | Bike | 0.0% | 0.0% | 0.0% | 0.0% |
| **Walk/Bike Percentage ALTERATIONS** | | |  |  |  |
|  | Walk | **0.8%** | **0.8%** | **1.2%** | 5.5% |
|  | Bike | **1.4%** | **1.2%** | **0.3%** | **0.4%** |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 3 | 7 | 24 | 1,152 |
|  | Bike | 5 | 10 | 7 | 80 |
| **All except Inc 4 walk (2%) - use same percentages from Non-CBD** | | | | | |
| **Highway Person Trips** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Person-Auto | 139 | 484 | 1,725 | 19,369 |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 71.9% | 100.0% | 100.0% | 90.3% |
|  | Pool 2 | 28.1% | 0.0% | 0.0% | 9.7% |
|  | Pool 3+ | 0.0% | 0.0% | 0.0% | 0.0% |
| **Auto Occ - Percent ALTERATIONS** | | |  |  |  |
|  | Drive alone | **75.4%** | **82.0%** | **84.0%** | **96.0%** |
|  | Pool 2 | **18.3%** | **13.0%** | **14.8%** | **2.6%** |
|  | Pool 3+ | **6.3%** | **5.0%** | **1.2%** | **1.4%** |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 105 | 396 | 1,449 | 18,587 |
|  | Pool 2 | 25 | 63 | 255 | 506 |
|  | Pool 3+ | 9 | 24 | 21 | 277 |
| **Use Auto occupany from Non-CBD** | | |  |  |  |

HBW.OP.Seg2 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | | | | | | | | | | | | |  |
| MODE | | SEGMENT | | INCOME1 | | INCOME2 | | INCOME3 | | INCOME4 | | Min\_Const | Max\_Const |
| AUTO | | 2 | | 139 | | 484 | | 1,725 | | 19,369 | | 0 | 0 |
| TRANSIT | | 2 | | 220 | | 331 | | 288 | | 324 | | -6 | 6 |
| WALKBIKE | | 2 | | 8 | | 17 | | 30 | | 1,232 | | -6 | 6 |
| SOV | | 2 | | 105 | | 396 | | 1,449 | | 18,587 | | 0 | 0 |
| HOV | | 2 | | 34 | | 87 | | 276 | | 782 | | -6 | 6 |
| POOL2 | | 2 | | 25 | | 63 | | 255 | | 506 | | -6 | 6 |
| POOL3 | | 2 | | 9 | | 24 | | 21 | | 277 | | -6 | 6 |
| WALKTRAN | | 2 | | 210 | | 231 | | 195 | | 74 | | -6 | 6 |
| DRIVETRAN | | 2 | | 7 | | 93 | | 91 | | 229 | | -6 | 6 |
| DROPTRAN | | 2 | | 3 | | 7 | | 2 | | 20 | | -6 | 6 |
| WALKPREM | | 2 | | 53 | | 34 | | 81 | | 12 | | -6 | 6 |
| WALKBUS | | 2 | | 157 | | 197 | | 114 | | 63 | | -6 | 6 |
| DRIVEPREM | | 2 | | 6 | | 90 | | 89 | | 170 | | -6 | 6 |
| DRIVEBUS | | 2 | | 1 | | 3 | | 1 | | 59 | | -6 | 6 |
| DROPPREM | | 2 | | 2 | | 1 | | 1 | | 1 | | -6 | 6 |
| DROPBUS | | 2 | | 1 | | 6 | | 1 | | 19 | | -6 | 6 |
| WALK | | 2 | | 3 | | 7 | | 24 | | 1,152 | | -6 | 6 |
| BIKE | | 2 | | 5 | | 10 | | 7 | | 80 | | -6 | 6 |
| **OUTPUT DATA** | | |  | |  | |  | |  | |
| **Trips** | **HBW\_OffPeak\_Data** | | | | **Iteration** | | **10** | |  | |
| MODE | SEG | | INCOME1 | | INCOME2 | | INCOME3 | | INCOME4 | |
| AUTO | 2 | | 140 | | 485 | | 1,726 | | 19,378 | |
| TRANSIT | 2 | | 219 | | 329 | | 286 | | 315 | |
| WALKBIKE | 2 | | 8 | | 17 | | 31 | | 1,232 | |
| SOV | 2 | | 106 | | 398 | | 1,450 | | 18,595 | |
| HOV | 2 | | 34 | | 87 | | 276 | | 783 | |
| POOL2 | 2 | | 25 | | 63 | | 255 | | 506 | |
| POOL3 | 2 | | 9 | | 24 | | 21 | | 277 | |
| WALKTRAN | 2 | | 202 | | 229 | | 192 | | 62 | |
| DRIVETRAN | 2 | | 10 | | 93 | | 90 | | 232 | |
| DROPTRAN | 2 | | 7 | | 7 | | 4 | | 20 | |
| WALKPREM | 2 | | 28 | | 29 | | 79 | | 5 | |
| WALKBUS | 2 | | 174 | | 200 | | 114 | | 57 | |
| DRIVEPREM | 2 | | 9 | | 79 | | 81 | | 172 | |
| DRIVEBUS | 2 | | 1 | | 15 | | 9 | | 60 | |
| DROPPREM | 2 | | 4 | | 1 | | 2 | | 1 | |
| DROPBUS | 2 | | 3 | | 6 | | 2 | | 19 | |
| WALK | 2 | | 3 | | 7 | | 24 | | 1,152 | |
| BIKE | 2 | | 5 | | 10 | | 7 | | 80 | |

HBW.OP.Seg2 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (OutPut-Target)** | | | |  |  |
| MODE | **CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 1 | 1 | 1 | 9 |
| TRANSIT |  | -1 | -2 | -2 | -9 |
| WALKBIKE |  | 0 | 0 | 1 | 0 |
| SOV |  | 1 | 2 | 1 | 8 |
| HOV |  | 0 | 0 | 0 | 1 |
| POOL2 |  | 0 | 0 | 0 | 0 |
| POOL3 |  | 0 | 0 | 0 | 0 |
| WALKTRAN |  | -8 | -2 | -3 | -12 |
| DRIVETRAN |  | 3 | 0 | -1 | 3 |
| DROPTRAN |  | 4 | 0 | 2 | 0 |
| WALKPREM |  | -25 | -5 | -2 | -7 |
| WALKBUS |  | 17 | 3 | 0 | -6 |
| DRIVEPREM |  | 3 | -11 | -8 | 2 |
| DRIVEBUS |  | 0 | 12 | 8 | 1 |
| DROPPREM |  | 2 | 0 | 1 | 0 |
| DROPBUS |  | 2 | 0 | 1 | 0 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | 0 | 0 | 0 | 0 |

HBW.OP.Seg2 MS\_HBW\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 0 | 0 | 0 | 0 |
| TRANSIT |  | 4.439253 | 1.614475 | 0.795289 | -3.908544 |
| WALKBIKE |  | 0.413057 | -0.401889 | -0.501347 | 1.988231 |
| SOV |  | 0 | 0 | 0 | 0 |
| HOV |  | -2.2093 | -2.047264 | -1.902456 | -3.547183 |
| POOL2 |  | 0 | 0 | 0 | 0 |
| POOL3 |  | -1.920763 | -1.311434 | -2.68054 | -0.759634 |
| WALKTRAN |  | 0 | 0 | 0 | 0 |
| DRIVETRAN |  | -6 | 0.94244 | -0.674783 | 2.687201 |
| DROPTRAN |  | -6 | -5.363695 | -6 | -2.991922 |
| WALKPREM |  | 0 | 0 | 0 | 0 |
| WALKBUS |  | -6 | -2.223519 | -5.360508 | 1.833266 |
| DRIVEPREM |  | 0 | 0 | 0 | 0 |
| DRIVEBUS |  | -2.255813 | -6 | -6 | -1.177436 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | -6 | -0.8287 | -3.86848 | 3.117966 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | -1.767951 | -1.839505 | -3.556619 | -5.947809 |

##### HBO.Pk.Seg1 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK NON-CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BIAS CONSTANTS** | | **file date** | **2-Mar-17** |  |  |  |
| **HBO** |  | **PEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
| **Bias** | **WalkPrem** | **0.5** | **0.5** | **0.5** |  |  |
|  | **DrivePrem** |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Person Trips** | |  | **2013** |  |  |  |
| **HBO** |  | **PEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | Person Trips | 184,606 | 283,786 | 374,546 | 1,083,382 | 1,926,320 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **HBO** |  | **PEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | Drive | 45,109 | 68,888 | 110,871 | 370,424 | 595,291 |
|  | Pool 2 | 33,090 | 69,444 | 104,610 | 311,727 | 518,870 |
|  | Pool 3+ | 21,763 | 56,509 | 81,607 | 217,442 | 377,320 |
|  | Transit | 1,943 | 886 | 735 | 1,099 | 4,664 |
|  | Walk | 7,012 | 12,893 | 10,058 | 20,409 | 50,373 |
|  | Bike | 0 | 318 | 0 | 3,050 | 3,368 |
|  | Other | 2,349 | 1,036 | 606 | 2,016 | 6,007 |
|  | Ptrips | 111,266 | 209,974 | 308,487 | 926,168 | 1,555,894 |
|  | Auto Trips | 99,961 | 194,841 | 297,087 | 899,593 | 1,491,482 |
|  | % Drive | 45% | 35% | 37% | 41% | 40% |
|  | % Pool 2 | 33% | 36% | 35% | 35% | 35% |
|  | % Pool 3 | 22% | 29% | 27% | 24% | 25% |
|  | % Walk | 6% | 6% | 3% | 2% | 3% |
|  | % Bike | 0% | 0% | 0% | 0% | 0% |
| Unknown | destination | <1% trips | non incl. | in tables |  |  |

HBO.Pk.Seg1 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK NON-CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **On Board** | **Survey** |  | **MRM1701\_CBD** | | **2013** |  |
| **HBO** |  | **PEAK** |  | **NonCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | WalkPrem | 484 | 497 | 320 | 51 | 1,352 |
|  | WalkBus | 2,035 | 1,836 | 596 | 308 | 4,775 |
|  | DrivePrem | 7 | 27 | 75 | 90 | 198 |
|  | DriveBus | 18 | 6 | 9 | 40 | 73 |
|  | DropPrem | 3 | 50 | 13 | 9 | 75 |
|  | DropBus | 26 | 55 | 9 | 9 | 100 |
|  |  |  |  |  |  |  |
|  | Prem | 494 | 575 | 407 | 150 | 1,625 |
|  | Bus | 2,079 | 1,898 | 614 | 357 | 4,948 |
|  | Walk | 2,518 | 2,334 | 916 | 359 | 6,127 |
|  | Drive | 25 | 33 | 84 | 130 | 271 |
|  | Drop | 30 | 105 | 22 | 18 | 175 |
|  | Total | 2,573 | 2,472 | 1,021 | 507 | 6,574 |
| Unknown | income | 2% trips | non incl. | in tables |  |  |
|  |  |  |  |  |  |  |
| **MODE CHOICE TARGETS** | |  |  |  |  |  |
| **HBO** |  | **PEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | Person Trips | 184,606 | 283,786 | 374,546 | 1,083,382 |  |
|  |  |  |  |  |  |  |
| **Transit Survey** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | WalkPrem | 484 | 497 | 320 | 51 |  |
|  | WalkBus | 2,035 | 1,836 | 596 | 308 |  |
|  | DrivePrem | 7 | 27 | 75 | 90 |  |
|  | DriveBus | 18 | 6 | 9 | 40 |  |
|  | DropPrem | 3 | 50 | 13 | 9 |  |
|  | DropBus | 26 | 55 | 9 | 9 |  |
|  | Transit | 2,573 | 2,472 | 1,021 | 507 |  |
| **Transit ALTERATIONS - TARGETS** | | |  |  |  |  |
|  | WalkPrem | 484 | 497 | 320 | 51 |  |
|  | WalkBus | 2,035 | 1,836 | 596 | 308 |  |
|  | DrivePrem | 7 | 27 | 75 | 90 |  |
|  | DriveBus | 18 | 6 | 9 | 40 |  |
|  | DropPrem | 3 | 50 | 13 | 9 |  |
|  | DropBus | 26 | 55 | 9 | 9 |  |
|  | Transit | 2,573 | 2,472 | 1,021 | 507 |  |

HBO.Pk.Seg1 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Walk | 6.3% | 6.1% | 3.3% | 2.2% |
|  | Bike | 0.0% | 0.2% | 0.0% | 0.3% |
| **Walk/Bike Percentage ALTERATIONS** | | |  |  |  |
|  | Walk | 6.3% | 6.1% | 3.3% | 2.2% |
|  | Bike | **0.1%** | 0.2% | **0.1%** | 0.3% |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 11,634 | 17,426 | 12,212 | 23,874 |
|  | Bike | 185 | 430 | 375 | 3,568 |
| **Zero trips percentage changed to 0.001 (0.1%)** | | | |  |  |
| **Highway Person Trips** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Person-Auto | 170,214 | 263,458 | 360,938 | 1,055,433 |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 45.1% | 35.4% | 37.3% | 41.2% |
|  | Pool 2 | 33.1% | 35.6% | 35.2% | 34.7% |
|  | Pool 3+ | 21.8% | 29.0% | 27.5% | 24.2% |
| **Auto Occ - Percent ALTERATIONS** | | |  |  |  |
|  | Drive alone | 45.1% | 35.4% | 37.3% | 41.2% |
|  | Pool 2 | 33.1% | 35.6% | 35.2% | 34.7% |
|  | Pool 3+ | 21.8% | 29.0% | 27.5% | 24.2% |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 76,812 | 93,148 | 134,699 | 434,594 |
|  | Pool 2 | 56,345 | 93,900 | 127,093 | 365,729 |
|  | Pool 3+ | 37,058 | 76,410 | 99,146 | 255,110 |

HBO.Pk.Seg1 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK NON-CBD

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | | | | | | | | | | | | | |
| MODE | | SEGMENT | | INCOME1 | | INCOME2 | | INCOME3 | | INCOME4 | | Min\_Cnst | Max\_Cnst |
| AUTO | | 1 | | 170,214 | | 263,458 | | 360,938 | | 1,055,433 | | 0 | 0 |
| TRANSIT | | 1 | | 2,573 | | 2,472 | | 1,021 | | 507 | | -6 | 6 |
| WALKBIKE | | 1 | | 11,819 | | 17,855 | | 12,587 | | 27,442 | | -6 | 6 |
| SOV | | 1 | | 76,812 | | 93,148 | | 134,699 | | 434,594 | | 0 | 0 |
| HOV | | 1 | | 93,403 | | 170,310 | | 226,239 | | 620,839 | | -6 | 6 |
| POOL2 | | 1 | | 56,345 | | 93,900 | | 127,093 | | 365,729 | | -6 | 6 |
| POOL3 | | 1 | | 37,058 | | 76,410 | | 99,146 | | 255,110 | | -6 | 6 |
| WALKTRAN | | 1 | | 2,518 | | 2,334 | | 916 | | 359 | | -6 | 6 |
| DRIVETRAN | | 1 | | 25 | | 33 | | 84 | | 130 | | -6 | 6 |
| DROPTRAN | | 1 | | 30 | | 105 | | 22 | | 18 | | -6 | 6 |
| WALKPREM | | 1 | | 484 | | 497 | | 320 | | 51 | | -6 | 6 |
| WALKBUS | | 1 | | 2,035 | | 1,836 | | 596 | | 308 | | -6 | 6 |
| DRIVEPREM | | 1 | | 7 | | 27 | | 75 | | 90 | | -6 | 6 |
| DRIVEBUS | | 1 | | 18 | | 6 | | 9 | | 40 | | -6 | 6 |
| DROPPREM | | 1 | | 3 | | 50 | | 13 | | 9 | | -6 | 6 |
| DROPBUS | | 1 | | 26 | | 55 | | 9 | | 9 | | -6 | 6 |
| WALK | | 1 | | 11,634 | | 17,426 | | 12,212 | | 23,874 | | -6 | 6 |
| BIKE | | 1 | | 185 | | 430 | | 375 | | 3,568 | | -6 | 6 |
| **OUTPUT** | **DATA** | |  | |  | |  | |  | |
| **Trips** | **HBO\_Peak\_Data** | | | | **Iteration** | | **10** | |  | |
| MODE | SEGMENT | | INCOME1 | | INCOME2 | | INCOME3 | | INCOME4 | |
| AUTO | 1 | | 170,182 | | 263,426 | | 360,925 | | 1,055,430 | |
| TRANSIT | 1 | | 2,605 | | 2,504 | | 1,033 | | 510 | |
| WALKBIKE | 1 | | 11,819 | | 17,856 | | 12,587 | | 27,442 | |
| SOV | 1 | | 76,797 | | 93,137 | | 134,694 | | 434,593 | |
| HOV | 1 | | 93,385 | | 170,289 | | 226,231 | | 620,837 | |
| POOL2 | 1 | | 56,334 | | 93,889 | | 127,089 | | 365,728 | |
| POOL3 | 1 | | 37,051 | | 76,401 | | 99,143 | | 255,109 | |
| WALKTRAN | 1 | | 2,552 | | 2,367 | | 928 | | 362 | |
| DRIVETRAN | | | 25 | | 33 | | 84 | | 130 | |
| DROPTRAN | 1 | | 29 | | 104 | | 22 | | 18 | |
| WALKPREM | | | 588 | | 601 | | 355 | | 58 | |
| WALKBUS | 1 | | 1,964 | | 1,766 | | 573 | | 304 | |
| DRIVEPREM | | | 7 | | 26 | | 61 | | 89 | |
| DRIVEBUS | 1 | | 18 | | 7 | | 23 | | 40 | |
| DROPPREM | | | 3 | | 50 | | 13 | | 9 | |
| DROPBUS | 1 | | 26 | | 54 | | 9 | | 9 | |
| WALK | 1 | | 11,475 | | 17,182 | | 12,157 | | 23,874 | |
| BIKE | 1 | | 344 | | 674 | | 430 | | 3,568 | |

HBO.Pk.Seg1 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (Output-Target)** | | | |  |  |
| MODE | **Non CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | -32 | -32 | -13 | -3 |
| TRANSIT |  | 32 | 32 | 12 | 3 |
| WALKBIKE |  | 0 | 1 | 0 | 0 |
| SOV |  | -15 | -11 | -5 | -1 |
| HOV |  | -18 | -21 | -8 | -2 |
| POOL2 |  | -11 | -11 | -4 | -1 |
| POOL3 |  | -7 | -9 | -3 | -1 |
| WALKTRAN |  | 34 | 33 | 12 | 3 |
| DRIVETRAN |  | 0 | 0 | 0 | 0 |
| DROPTRAN |  | -1 | -1 | 0 | 0 |
| WALKPREM |  | 104 | 104 | 35 | 7 |
| WALKBUS |  | -71 | -70 | -23 | -4 |
| DRIVEPREM |  | 0 | -1 | -14 | -1 |
| DRIVEBUS |  | 0 | 1 | 14 | 0 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | 0 | -1 | 0 | 0 |
| WALK |  | -159 | -244 | -55 | 0 |
| BIKE |  | 159 | 244 | 55 | 0 |
|  |  |  |  |  |  |
| **DIFFERENCE FROM TARGETS - Calibrate E (3/1/17) No Bias Constant** | | | | | |
| MODE | **Non CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 29 | 26 | 15 | 5 |
| TRANSIT |  | -30 | -27 | -16 | -5 |
| WALKBIKE |  | 0 | 1 | 0 | 0 |
| SOV |  | 13 | 9 | 6 | 2 |
| HOV |  | 16 | 17 | 10 | 3 |
| POOL2 |  | 9 | 9 | 5 | 2 |
| POOL3 |  | 6 | 8 | 4 | 1 |
| WALKTRAN |  | -28 | -26 | -17 | -6 |
| DRIVETRAN |  | -1 | 0 | 1 | 1 |
| DROPTRAN |  | -1 | 0 | 0 | 0 |
| WALKPREM |  | -93 | -77 | -48 | -12 |
| WALKBUS |  | 64 | 52 | 31 | 6 |
| DRIVEPREM |  | -2 | -1 | -12 | 0 |
| DRIVEBUS |  | 1 | 1 | 13 | 0 |
| DROPPREM |  | 0 | -1 | -1 | 0 |
| DROPBUS |  | 0 | 1 | 1 | 0 |
| WALK |  | -159 | -244 | -55 | 0 |
| BIKE |  | 159 | 244 | 55 | 0 |

HBO.Pk.Seg1 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **Non CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 0 | 0 | 0 | 0 |
| TRANSIT |  | -1.145237 | -1.499488 | -2.377507 | -4.513559 |
| WALKBIKE |  | 0.692423 | 1.296949 | 0.486061 | 0.082859 |
| SOV |  | 0 | 0 | 0 | 0 |
| HOV |  | -0.161865 | 0.259501 | 0.214193 | 0.083171 |
| POOL2 |  | 0 | 0 | 0 | 0 |
| POOL3 |  | -0.530974 | -0.267583 | -0.282133 | -0.385816 |
| WALKTRAN |  | 0 | 0 | 0 | 0 |
| DRIVETRAN |  | -3.01716 | -1.87765 | -0.583194 | 0.846025 |
| DROPTRAN |  | -5.063041 | -2.225508 | -3.173719 | -2.604563 |
| WALKPREM |  | 0 | 0 | 0 | 0 |
| WALKBUS |  | 0.918721 | 0.928434 | -1.127864 | 0.042043 |
| DRIVEPREM |  | 0 | 0 | 0 | 0 |
| DRIVEBUS |  | -0.50332 | -6 | -6 | -6 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | 0.703967 | -4.045014 | -5.76414 | -4.643943 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | -6 | -6 | -6 | -4.473584 |

##### HBO.Pk.Seg2 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BIAS CONSTANTS** | | **file date** | **2-Mar-17** |  |  |  |
| **HBO** |  | **PEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
| **Bias** | **WalkPrem** | **1** | **1** | **1** | **1** |  |
|  | **DrivePrem** |  |  | **1** | **1** |  |
|  |  |  |  |  |  |  |
| **Person Trips** | |  | 2013 |  |  |  |
| **HBO** |  | **PEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| Person Trips |  | 2,419 | 3,705 | 4,685 | 13,982 | 24,791 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **HBO** |  | **PEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| Drive |  | 189 | 159 | 708 | 2,586 | 3,641 |
| Pool 2 |  | 0 | 159 | 323 | 729 | 1,210 |
| Pool 3+ |  | 528 | 0 | 0 | 869 | 1,397 |
| Transit |  | 0 | 0 | 0 | 0 | 0 |
| Walk |  | 175 | 0 | 0 | 0 | 175 |
| Bike |  | 0 | 0 | 0 | 0 | 0 |
| Other |  | 0 | 0 | 0 | 0 | 0 |
| Ptrips |  | 891 | 318 | 1,031 | 4,184 | 6,423 |
| Auto Trips |  | 717 | 318 | 1,031 | 4,184 | 6,249 |
| % Drive |  | 26% | 50% | 69% | 62% | 58% |
| % Pool 2 |  | 0% | 50% | 31% | 17% | 19% |
| % Pool 3 |  | 74% | 0% | 0% | 21% | 22% |
| % Walk |  | 20% | 0% | 0% | 0% | 3% |
| % Bike |  | 0% | 0% | 0% | 0% | 0% |
| Unknown | destination | <1% trips | non incl. | in tables |  |  |

HBO.Pk.Seg2 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **On Board** | **Survey** |  | **MRM1701\_CBD** | | **2013** |  |
| **HBO** |  | **PEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| WalkPrem |  | **73** | **25** | **59** | **74** | 231 |
| WalkBus |  | **274** | **210** | **101** | **12** | 597 |
| DrivePrem |  | 0 | 28 | 89 | 53 | 170 |
| DriveBus |  | 0 | 0 | 0 | 3 | 3 |
| DropPrem |  | 0 | 0 | 0 | 0 | 0 |
| DropBus |  | 0 | 18 | 0 | 0 | 18 |
|  |  |  |  |  |  |  |
| Prem |  | 347 | 262 | 249 | 139 | 997 |
| Bus |  | 0 | 18 | 0 | 3 | 21 |
| Walk |  | 73 | 25 | 59 | 77 | 234 |
| Drive |  | 274 | 210 | 101 | 12 | 597 |
| Drop |  | 0 | 46 | 89 | 53 | 188 |
| Total |  | 347 | 280 | 249 | 143 | 1,018 |
| Unknown | income | WalkPrem | (44 trips) | Walk Bus | (40 trips) | allocated |
|  |  |  |  |  |  |  |
| **MODE CHOICE TARGETS** | |  |  |  |  |  |
| **HBO** |  | **PEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | Person Trips | 2,419 | 3,705 | 4,685 | 13,982 |  |
|  |  |  |  |  |  |  |
| **Transit Survey** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | WalkPrem | 73 | 25 | 59 | 74 |  |
|  | WalkBus | 274 | 210 | 101 | 12 |  |
|  | DrivePrem | 0 | 28 | 89 | 53 |  |
|  | DriveBus | 0 | 0 | 0 | 3 |  |
|  | DropPrem | 0 | 0 | 0 | 0 |  |
|  | DropBus | 0 | 18 | 0 | 0 |  |
|  | Transit | 347 | 280 | 249 | 143 |  |
| **Transit ALTERATIONS - TARGETS** | | |  |  |  |  |
|  | WalkPrem | 73 | 25 | 59 | 74 |  |
|  | WalkBus | 274 | 210 | 101 | 12 |  |
|  | DrivePrem | **1** | 28 | 89 | 53 |  |
|  | DriveBus | **1** | **1** | **1** | 3 |  |
|  | DropPrem | **1** | **1** | **1** | **1** |  |
|  | DropBus | **1** | 18 | **1** | **1** |  |
|  | Transit | 351 | 282 | 252 | 145 |  |
| **All zeros changed to 1** | |  |  |  |  |  |

HBO.Pk.Seg2 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Walk | 19.6% | 0.0% | 0.0% | 0.0% |
|  | Bike | 0.0% | 0.0% | 0.0% | 0.0% |
| **Walk/Bike Percentage ALTERATIONS** | | |  |  |  |
|  | Walk | **6.3%** | **6.1%** | **3.3%** | **2.2%** |
|  | Bike | **0.1%** | **0.2%** | **0.1%** | **0.3%** |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 152 | 228 | 153 | 308 |
|  | Bike | 2 | 6 | 5 | 46 |
| **Use same percentages from Non-CBD** | | | |  |  |
| **Highway Person Trips** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Person-Auto | 1,913 | 3,190 | 4,276 | 13,483 |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 26.4% | 50.0% | 68.7% | 61.8% |
|  | Pool 2 | 0.0% | 50.0% | 31.3% | 17.4% |
|  | Pool 3+ | 73.6% | 0.0% | 0.0% | 20.8% |
| **Auto Occ - Percent ALTERATIONS** | | |  |  |  |
|  | Drive alone | **45.1%** | **35.4%** | **37.3%** | **41.2%** |
|  | Pool 2 | **33.1%** | **35.6%** | **35.2%** | **34.7%** |
|  | Pool 3+ | **21.8%** | **29.0%** | **27.5%** | **24.2%** |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 863 | 1,128 | 1,596 | 5,552 |
|  | Pool 2 | 633 | 1,137 | 1,506 | 4,672 |
|  | Pool 3+ | 417 | 925 | 1,175 | 3,259 |
| **Use Auto occupany from Non-CBD** | | |  |  |  |

HBO.Pk.Seg2 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK CBD

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | | | | | | | | | | | | | |
| MODE | | SEGMENT | | INCOME1 | | INCOME2 | | INCOME3 | | INCOME4 | | Min\_Const | Max\_Const |
| AUTO | | 2 | | 1,913 | | 3,190 | | 4,276 | | 13,483 | | 0 | 0 |
| TRANSIT | | 2 | | 351 | | 282 | | 252 | | 145 | | -6 | 6 |
| WALKBIKE | | 2 | | 155 | | 233 | | 157 | | 354 | | -6 | 6 |
| SOV | | 2 | | 863 | | 1,128 | | 1,596 | | 5,552 | | 0 | 0 |
| HOV | | 2 | | 1,050 | | 2,062 | | 2,680 | | 7,931 | | -6 | 6 |
| POOL2 | | 2 | | 633 | | 1,137 | | 1,506 | | 4,672 | | -6 | 6 |
| POOL3 | | 2 | | 417 | | 925 | | 1,175 | | 3,259 | | -6 | 6 |
| WALKTRAN | | 2 | | 347 | | 235 | | 160 | | 86 | | -6 | 6 |
| DRIVETRAN | | 2 | | 2 | | 29 | | 90 | | 57 | | -6 | 6 |
| DROPTRAN | | 2 | | 2 | | 19 | | 2 | | 2 | | -6 | 6 |
| WALKPREM | | 2 | | 73 | | 25 | | 59 | | 74 | | -6 | 6 |
| WALKBUS | | 2 | | 274 | | 210 | | 101 | | 12 | | -6 | 6 |
| DRIVEPREM | | 2 | | 1 | | 28 | | 89 | | 53 | | -6 | 6 |
| DRIVEBUS | | 2 | | 1 | | 1 | | 1 | | 3 | | -6 | 6 |
| DROPPREM | | 2 | | 1 | | 1 | | 1 | | 1 | | -6 | 6 |
| DROPBUS | | 2 | | 1 | | 18 | | 1 | | 1 | | -6 | 6 |
| WALK | | 2 | | 152 | | 228 | | 153 | | 308 | | -6 | 6 |
| BIKE | | 2 | | 2 | | 6 | | 5 | | 46 | | -6 | 6 |
| **OUTPUT** | **DATA** | |  | |  | |  | |  | |
| **Trips** | **HBO\_Peak\_Data** | | | | **Iteration** | | **10** | |  | |
| MODE | SEGMENT | | INCOME1 | | INCOME2 | | INCOME3 | | INCOME4 | |
| AUTO | 2 | | 1,911 | | 3,185 | | 4,273 | | 13,484 | |
| TRANSIT | 2 | | 354 | | 286 | | 253 | | 144 | |
| WALKBIKE | 2 | | 154 | | 234 | | 158 | | 354 | |
| SOV | 2 | | 862 | | 1,126 | | 1,595 | | 5,552 | |
| HOV | 2 | | 1,049 | | 2,059 | | 2,679 | | 7,931 | |
| POOL2 | 2 | | 632 | | 1,135 | | 1,505 | | 4,672 | |
| POOL3 | 2 | | 417 | | 923 | | 1,174 | | 3,259 | |
| WALKTRAN | 2 | | 350 | | 238 | | 162 | | 86 | |
| DRIVETRAN | | | 2 | | 29 | | 90 | | 56 | |
| DROPTRAN | 2 | | 2 | | 19 | | 2 | | 2 | |
| WALKPREM | | | 82 | | 34 | | 62 | | 68 | |
| WALKBUS | 2 | | 268 | | 204 | | 99 | | 18 | |
| DRIVEPREM | | | 1 | | 24 | | 80 | | 49 | |
| DRIVEBUS | 2 | | 1 | | 5 | | 9 | | 7 | |
| DROPPREM | | | 1 | | 1 | | 1 | | 1 | |
| DROPBUS | 2 | | 1 | | 18 | | 1 | | 1 | |
| WALK | 2 | | 152 | | 228 | | 153 | | 308 | |
| BIKE | 2 | | 2 | | 6 | | 5 | | 46 | |

HBO.Pk.Seg2 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (Output-Target)** | | | |  |  |
| MODE | **CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | -2 | -5 | -3 | 1 |
| TRANSIT |  | 3 | 4 | 1 | -1 |
| WALKBIKE |  | -1 | 1 | 1 | 0 |
| SOV |  | -1 | -2 | -1 | 0 |
| HOV |  | -1 | -3 | -1 | 0 |
| POOL2 |  | -1 | -2 | -1 | 0 |
| POOL3 |  | 0 | -2 | -1 | 0 |
| WALKTRAN |  | 3 | 3 | 2 | 0 |
| DRIVETRAN |  | 0 | 0 | 0 | -1 |
| DROPTRAN |  | 0 | 0 | 0 | 0 |
| WALKPREM |  | 9 | 9 | 3 | -6 |
| WALKBUS |  | -6 | -6 | -2 | 6 |
| DRIVEPREM |  | 0 | -4 | -9 | -4 |
| DRIVEBUS |  | 0 | 4 | 8 | 4 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | 0 | 0 | 0 | 0 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | 0 | 0 | 0 | 0 |
|  |  |  |  |  |  |
| **DIFFERENCE FROM TARGETS - Calibrate E (3/1/17) No Bias Constant** | | | | | |
| MODE | **CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 8 | 2 | 5 | 1 |
| TRANSIT |  | -7 | -3 | -6 | -1 |
| WALKBIKE |  | -1 | 1 | 1 | 0 |
| SOV |  | 3 | 1 | 1 | 0 |
| HOV |  | 4 | 1 | 3 | 0 |
| POOL2 |  | 3 | 1 | 1 | 0 |
| POOL3 |  | 2 | 1 | 1 | 0 |
| WALKTRAN |  | -7 | -4 | -7 | 0 |
| DRIVETRAN |  | 0 | 0 | 1 | -1 |
| DROPTRAN |  | 0 | 0 | 0 | 0 |
| WALKPREM |  | -21 | -10 | -12 | -24 |
| WALKBUS |  | 15 | 6 | 5 | 24 |
| DRIVEPREM |  | 0 | -3 | -21 | -12 |
| DRIVEBUS |  | 0 | 3 | 22 | 12 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | 0 | 0 | 0 | 0 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | 0 | 0 | 0 | 0 |

HBO.Pk.Seg2 MS\_HBO\_Peak\_Calibrate\_E\_Bias2 PEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 0 | 0 | 0 | 0 |
| TRANSIT |  | -0.98403 | -2.166479 | -1.811351 | -3.13894 |
| WALKBIKE |  | -1.066759 | -0.129003 | -0.738869 | -1.147003 |
| SOV |  | 0 | 0 | 0 | 0 |
| HOV |  | -0.687338 | -0.00922 | 0.063727 | -0.040338 |
| POOL2 |  | 0 | 0 | 0 | 0 |
| POOL3 |  | -1.000828 | -0.504235 | -0.412847 | -0.491769 |
| WALKTRAN |  | 0 | 0 | 0 | 0 |
| DRIVETRAN |  | -2.762788 | 1.507579 | 0.763055 | -0.196617 |
| DROPTRAN |  | -4.622139 | -2.611458 | -4.058885 | -4.608598 |
| WALKPREM |  | 0 | 0 | 0 | 0 |
| WALKBUS |  | -0.649722 | 2.415836 | -1.633383 | -6 |
| DRIVEPREM |  | 0 | 0 | 0 | 0 |
| DRIVEBUS |  | -1.977408 | -6 | -6 | -6 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | -2.961403 | 1.969859 | -3.741951 | -3.25542 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | -5.999183 | -5.630212 | -5.251474 | -3.514077 |

##### HBO.OP.Seg1 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BIAS CONSTANTS** | | **file date** | **2-Mar-17** |  |  |  |
| **HBO** |  | **PEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
| **Bias** | **WalkPrem** | **0.5** | **0.5** | **0.25** |  |  |
|  | **DrivePrem** |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Person Trips** | |  | **2013** |  |  |  |
| **HBO** |  | **OFFPEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | Person Trips | 230,103 | 355,911 | 469,931 | 1,378,483 | 2,434,428 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **HBO** |  | **OFFPEAK** |  | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | Drive | 100,714 | 149,061 | 207,325 | 620,131 | 1,077,231 |
|  | Pool 2 | 73,797 | 134,428 | 172,914 | 424,729 | 805,869 |
|  | Pool 3+ | 25,981 | 68,540 | 66,849 | 199,182 | 360,551 |
|  | Transit | 6,511 | 1,800 | 735 | 1,845 | 10,892 |
|  | Walk | 10,692 | 9,975 | 7,883 | 17,419 | 45,968 |
|  | Bike | 867 | 0 | 0 | 4,953 | 5,820 |
|  | Other | 3,303 | 2,157 | 195 | 510 | 6,166 |
|  | Ptrips | 221,866 | 365,962 | 455,901 | 1,268,769 | 2,312,497 |
|  | Auto Trips | 200,492 | 352,029 | 447,088 | 1,244,042 | 2,243,651 |
|  | % Drive | 50% | 42% | 46% | 50% | 48% |
|  | % Pool 2 | 37% | 38% | 39% | 34% | 36% |
|  | % Pool 3 | 13% | 19% | 15% | 16% | 16% |
|  | % Walk | 5% | 3% | 2% | 1% | 2% |
|  | % Bike | 0% | 0% | 0% | 0% | 0% |
| Unknown | destination | <1% trips | non incl. | in tables |  |  |

HBO.OP.Seg1 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **On Board** | **Survey** |  | **MRM1701\_CBD** | | **2013** |  |
| **HBO** |  | **OFFPEAK** |  | **NonCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
|  | WalkPrem | **723** | **759** | **322** | **162** | 1,966 |
|  | WalkBus | **3,454** | **2,730** | **834** | **310** | 7,327 |
|  | DrivePrem | 32 | 27 | 25 | 74 | 158 |
|  | DriveBus | 40 | 5 | 37 | 23 | 105 |
|  | DropPrem | 28 | 24 | 5 | 18 | 74 |
|  | DropBus | 37 | 15 | 2 | 0 | 55 |
|  |  |  |  |  |  |  |
|  | Prem | 783 | 810 | 352 | 254 | 2,199 |
|  | Bus | 3,532 | 2,750 | 873 | 333 | 7,488 |
|  | Walk | 4,176 | 3,489 | 1,155 | 473 | 9,293 |
|  | Drive | 72 | 32 | 63 | 97 | 263 |
|  | Drop | 66 | 39 | 7 | 18 | 130 |
|  | Total | 4,314 | 3,560 | 1,225 | 588 | 9,686 |
| Unknown | income | WalkPrem | (37 trips) | Walk Bus | (132 trips) | allocated |
|  |  |  |  |  |  |  |
| **MODE CHOICE TARGETS** | |  |  |  |  |  |
| **HBO** |  | **OFFPEAK** | | **NONCBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | Person Trips | 230,103 | 355,911 | 469,931 | 1,378,483 |  |
|  |  |  |  |  |  |  |
| **Transit Survey** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | WalkPrem | 723 | 759 | 322 | 162 |  |
|  | WalkBus | 3,454 | 2,730 | 834 | 310 |  |
|  | DrivePrem | 32 | 27 | 25 | 74 |  |
|  | DriveBus | 40 | 5 | 37 | 23 |  |
|  | DropPrem | 28 | 24 | 5 | 18 |  |
|  | DropBus | 37 | 15 | 2 | 0 |  |
|  | Transit | 4,314 | 3,560 | 1,225 | 588 |  |
| **Transit ALTERATIONS - TARGETS** | | |  |  |  |  |
|  | WalkPrem | 723 | 759 | 322 | 162 |  |
|  | WalkBus | 3,454 | 2,730 | 834 | 310 |  |
|  | DrivePrem | 32 | 27 | 25 | 74 |  |
|  | DriveBus | 40 | 5 | 37 | 23 |  |
|  | DropPrem | 28 | 24 | 5 | 18 |  |
|  | DropBus | 37 | 15 | 2 | **1** |  |
|  | Transit | 4,314 | 3,560 | 1,225 | 589 |  |
| Drop Bus - inc 4 zero changed to1 | | |  |  |  |  |

HBO.OP.Seg1 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Walk | 4.8% | 2.7% | 1.7% | 1.4% |
|  | Bike | 0.4% | 0.0% | 0.0% | 0.4% |
| **Walk/Bike Percentage ALTERATIONS** | | |  |  |  |
|  | Walk | 4.8% | 2.7% | 1.7% | 1.4% |
|  | Bike | 0.4% | **0.1%** | **0.1%** | 0.4% |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 11,089 | 9,701 | 8,125 | 18,925 |
|  | Bike | 899 | 356 | 470 | 5,382 |
| **Zero trips percentage changed to 0.001 (0.1%)** | | | |  |  |
| **Highway Person Trips** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Person-Auto | 213,801 | 342,294 | 460,111 | 1,353,588 |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 50.2% | 42.3% | 46.4% | 49.8% |
|  | Pool 2 | 36.8% | 38.2% | 38.7% | 34.1% |
|  | Pool 3+ | 13.0% | 19.5% | 15.0% | 16.0% |
| **Auto Occ - Percent ALTERATIONS** | | |  |  |  |
|  | Drive alone | 50.2% | 42.3% | 46.4% | 49.8% |
|  | Pool 2 | 36.8% | 38.2% | 38.7% | 34.1% |
|  | Pool 3+ | 13.0% | 19.5% | 15.0% | 16.0% |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 107,399 | 144,939 | 213,364 | 674,738 |
|  | Pool 2 | 78,696 | 130,711 | 177,951 | 462,129 |
|  | Pool 3+ | 27,706 | 66,644 | 68,796 | 216,721 |

HBO.OP.Seg1 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | | | | | | | | | | | | | |
| MODE | | SEGT | | INCOME1 | | INCOME2 | | INCOME3 | | INCOME4 | | Min\_Cnst | Max\_Const |
| AUTO | | 1 | | 213,801 | | 342,294 | | 460,111 | | 1,353,588 | | 0 | 0 |
| TRANSIT | | 1 | | 4,314 | | 3,560 | | 1,225 | | 589 | | -6 | 6 |
| WALKBIKE | | 1 | | 11,988 | | 10,057 | | 8,595 | | 24,307 | | -6 | 6 |
| SOV | | 1 | | 107,399 | | 144,939 | | 213,364 | | 674,738 | | 0 | 0 |
| HOV | | 1 | | 106,402 | | 197,355 | | 246,747 | | 678,850 | | -6 | 6 |
| POOL2 | | 1 | | 78,696 | | 130,711 | | 177,951 | | 462,129 | | -6 | 6 |
| POOL3 | | 1 | | 27,706 | | 66,644 | | 68,796 | | 216,721 | | -6 | 6 |
| WALKTRAN | | 1 | | 4,176 | | 3,489 | | 1,155 | | 473 | | -6 | 6 |
| DRIVETRAN | | 1 | | 72 | | 32 | | 63 | | 97 | | -6 | 6 |
| DROPTRAN | | 1 | | 66 | | 39 | | 7 | | 19 | | -6 | 6 |
| WALKPREM | | 1 | | 723 | | 759 | | 322 | | 162 | | -6 | 6 |
| WALKBUS | | 1 | | 3,454 | | 2,730 | | 834 | | 310 | | -6 | 6 |
| DRIVEPREM | | 1 | | 32 | | 27 | | 25 | | 74 | | -6 | 6 |
| DRIVEBUS | | 1 | | 40 | | 5 | | 37 | | 23 | | -6 | 6 |
| DROPPREM | | 1 | | 28 | | 24 | | 5 | | 18 | | -6 | 6 |
| DROPBUS | | 1 | | 37 | | 15 | | 2 | | 1 | | -6 | 6 |
| WALK | | 1 | | 11,089 | | 9,701 | | 8,125 | | 18,925 | | -6 | 6 |
| BIKE | | 1 | | 899 | | 356 | | 470 | | 5,382 | | -6 | 6 |
| **OUTPUT DATA** | | |  | |  | |  | |  | |
| **Trips** | **HBO\_OffPeak\_Data** | | | | **Iteration** | | **10** | |  | |
| MODE | SEG | | INCOME1 | | INCOME2 | | INCOME3 | | INCOME4 | |
| AUTO | 1 | | 213,815 | | 342,309 | | 460,116 | | 1,353,588 | |
| TRANSIT | 1 | | 4,300 | | 3,545 | | 1,220 | | 588 | |
| WALKBIKE | 1 | | 11,988 | | 10,057 | | 8,595 | | 24,307 | |
| SOV | 1 | | 107,406 | | 144,945 | | 213,366 | | 674,738 | |
| HOV | 1 | | 106,409 | | 197,363 | | 246,749 | | 678,850 | |
| POOL2 | 1 | | 78,701 | | 130,717 | | 177,953 | | 462,129 | |
| POOL3 | 1 | | 27,708 | | 66,647 | | 68,797 | | 216,721 | |
| WALKTRAN | 1 | | 4,162 | | 3,474 | | 1,151 | | 472 | |
| DRIVETRAN | 1 | | 72 | | 32 | | 62 | | 97 | |
| DROPTRAN | 1 | | 65 | | 39 | | 7 | | 19 | |
| WALKPREM | | | 679 | | 712 | | 307 | | 161 | |
| WALKBUS | 1 | | 3,483 | | 2,762 | | 844 | | 311 | |
| DRIVEPREM | | | 32 | | 27 | | 25 | | 74 | |
| DRIVEBUS | 1 | | 40 | | 5 | | 37 | | 23 | |
| DROPPREM | 1 | | 28 | | 24 | | 5 | | 13 | |
| DROPBUS | 1 | | 37 | | 15 | | 2 | | 6 | |
| WALK | 1 | | 11,089 | | 9,701 | | 8,125 | | 18,925 | |
| BIKE | 1 | | 899 | | 356 | | 470 | | 5,382 | |

HBO.OP.Seg1 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (Output - Targets)** | | | |  |  |
| MODE | **Non CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 14 | 15 | 5 | 0 |
| TRANSIT |  | -14 | -15 | -5 | -1 |
| WALKBIKE |  | 0 | 0 | 0 | 0 |
| SOV |  | 7 | 6 | 2 | 0 |
| HOV |  | 7 | 8 | 2 | 0 |
| POOL2 |  | 5 | 6 | 2 | 0 |
| POOL3 |  | 2 | 3 | 1 | 0 |
| WALKTRAN |  | -14 | -15 | -4 | -1 |
| DRIVETRAN |  | 0 | 0 | -1 | 0 |
| DROPTRAN |  | -1 | 0 | 0 | 0 |
| WALKPREM |  | -44 | -47 | -15 | -1 |
| WALKBUS |  | 29 | 32 | 10 | 1 |
| DRIVEPREM |  | 0 | 0 | 0 | 0 |
| DRIVEBUS |  | 0 | 0 | 0 | 0 |
| DROPPREM |  | 0 | 0 | 0 | -5 |
| DROPBUS |  | 0 | 0 | 0 | 5 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | 0 | 0 | 0 | 0 |
|  |  |  |  |  |  |
| **DIFFERENCE FROM TARGETS - Calibrate E (3/1/17) No Bias Constant** | | | | | |
| MODE | **Non CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 56 | 38 | 16 | 3 |
| TRANSIT |  | -56 | -38 | -17 | -4 |
| WALKBIKE |  | 0 | 0 | 0 | 0 |
| SOV |  | 28 | 16 | 8 | 2 |
| HOV |  | 28 | 22 | 9 | 2 |
| POOL2 |  | 20 | 14 | 6 | 1 |
| POOL3 |  | 7 | 7 | 2 | 1 |
| WALKTRAN |  | -53 | -38 | -16 | -4 |
| DRIVETRAN |  | -1 | 0 | -1 | 0 |
| DROPTRAN |  | -2 | 0 | 0 | 0 |
| WALKPREM |  | -173 | -119 | -51 | -9 |
| WALKBUS |  | 119 | 81 | 34 | 5 |
| DRIVEPREM |  | -3 | 0 | 0 | 0 |
| DRIVEBUS |  | 2 | 0 | 1 | 0 |
| DROPPREM |  | -2 | 0 | 0 | -5 |
| DROPBUS |  | 1 | 0 | 0 | 5 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | 0 | 0 | 0 | 0 |

HBO.OP.Seg1 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK NON-CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **Non CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 0 | 0 | 0 | 0 |
| TRANSIT |  | -0.958628 | -1.425084 | -2.402482 | -3.755762 |
| WALKBIKE |  | 0.404051 | 0.256083 | -0.305001 | -0.473608 |
| SOV |  | 0 | 0 | 0 | 0 |
| HOV |  | -0.270133 | 0.053318 | -0.042006 | -0.19854 |
| POOL2 |  | 0 | 0 | 0 | 0 |
| POOL3 |  | -1.154375 | -0.732392 | -0.983246 | -0.781974 |
| WALKTRAN |  | 0 | 0 | 0 | 0 |
| DRIVETRAN |  | -1.375556 | -1.866033 | -1.680317 | -0.702976 |
| DROPTRAN |  | -3.147127 | -3.437438 | -4.692947 | -3.758053 |
| WALKPREM |  | 0 | 0 | 0 | 0 |
| WALKBUS |  | 1.902082 | 1.46563 | -0.383564 | -2.7577 |
| DRIVEPREM |  | 0 | 0 | 0 | 0 |
| DRIVEBUS |  | -0.704871 | -5.835206 | -0.627912 | -5.052006 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | -2.988002 | -4.98688 | -6 | -6 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | -4.892571 | -5.910668 | -5.377433 | -3.694723 |

##### HBO.OP.Seg2 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BIAS CONSTANTS** | | **file date** | **2-Mar-17** |  |  |  |
| **HBO** |  | **OFFPEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
| **Bias** | **WalkPrem** |  |  |  |  |  |
|  | **DrivePrem** |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Person Trips** | |  | 2013 |  |  |  |
| **HBO** |  | **OFFPEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| Person Trips |  | 3,052 | 4,709 | 5,954 | 17,905 | 31,620 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **HBO** |  | **OFFPEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| Drive |  | 349 | 0 | 1,609 | 4,369 | 6,327 |
| Pool 2 |  | 189 | 392 | 497 | 2,345 | 3,422 |
| Pool 3+ |  | 378 | 0 | 2,974 | 1,736 | 5,087 |
| Transit |  | 150 | 0 | 0 | 0 | 150 |
| Walk |  | 349 | 0 | 0 | 890 | 1,240 |
| Bike |  | 0 | 0 | 0 | 0 | 0 |
| Other |  | 0 | 0 | 0 | 0 | 0 |
| Ptrips |  | 1,415 | 392 | 5,079 | 9,340 | 16,225 |
| Auto Trips |  | 916 | 392 | 5,079 | 8,449 | 14,836 |
| % Drive |  | 38% | 0% | 32% | 52% | 43% |
| % Pool 2 |  | 21% | 100% | 10% | 28% | 23% |
| % Pool 3 |  | 41% | 0% | 59% | 21% | 34% |
| % Walk |  | 25% | 0% | 0% | 10% | 8% |
| % Bike |  | 0% | 0% | 0% | 0% | 0% |
| Unknown | destination | <1% trips | non incl. | in tables |  |  |

HBO.OP.Seg2 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **On Board** | **Survey** |  | **MRM1701\_CBD** | | **2013** |  |
| **HBO** |  | **OFFPEAK** |  | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 | Total |
| WalkPrem |  | **159** | **209** | **25** | **60** | 453 |
| WalkBus |  | **500** | **286** | **31** | **12** | 829 |
| DrivePrem |  | 7 | 13 | 60 | 124 | 204 |
| DriveBus |  | 6 | 0 | 0 | 7 | 13 |
| DropPrem |  | 0 | 9 | 0 | 0 | 9 |
| DropBus |  | 0 | 0 | 0 | 0 | 0 |
|  |  |  |  |  |  |  |
| Prem |  | 666 | 509 | 116 | 196 | 1,486 |
| Bus |  | 6 | 9 | 0 | 7 | 22 |
| Walk |  | 165 | 209 | 25 | 67 | 466 |
| Drive |  | 500 | 296 | 31 | 12 | 838 |
| Drop |  | 7 | 13 | 60 | 124 | 204 |
| Total |  | 671 | 518 | 116 | 203 | 1,508 |
| Unknown | income | WalkPrem | (45 trips) | Walk Bus | (41 trips) | allocated |
|  |  |  |  |  |  |  |
| **MODE CHOICE TARGETS** | |  |  |  |  |  |
| **HBO** |  | **OFFPEAK** | | **CBD** |  |  |
|  |  | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | Person Trips | 3,052 | 4,709 | 5,954 | 17,905 |  |
|  |  |  |  |  |  |  |
| **Transit Survey** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |  |
|  | WalkPrem | 159 | 209 | 25 | 60 |  |
|  | WalkBus | 500 | 286 | 31 | 12 |  |
|  | DrivePrem | 7 | 13 | 60 | 124 |  |
|  | DriveBus | 6 | 0 | 0 | 7 |  |
|  | DropPrem | 0 | 9 | 0 | 0 |  |
|  | DropBus | 0 | 0 | 0 | 0 |  |
|  | Transit | 671 | 518 | 116 | 203 |  |
| **Transit ALTERATIONS - TARGETS** | | |  |  |  |  |
|  | WalkPrem | 159 | 209 | 25 | 60 |  |
|  | WalkBus | 500 | 286 | 31 | 12 |  |
|  | DrivePrem | 7 | 13 | 60 | 124 |  |
|  | DriveBus | 6 | **1** | **1** | 7 |  |
|  | DropPrem | **1** | 9 | **1** | **1** |  |
|  | DropBus | **1** | **1** | **1** | **1** |  |
|  | Transit | 673 | 520 | 119 | 205 |  |
| **All zeros changed to 1** | |  |  |  |  |  |

HBO.OP.Seg2 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Walk | 24.7% | 0.0% | 0.0% | 9.5% |
|  | Bike | 0.0% | 0.0% | 0.0% | 0.0% |
| **Walk/Bike Percentage ALTERATIONS** | | |  |  |  |
|  | Walk | 24.7% | **2.7%** | **1.7%** | 9.5% |
|  | Bike | **0.4%** | **0.1%** | **0.1%** | **0.4%** |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 753 | 128 | 103 | 1,707 |
|  | Bike | 12 | 5 | 6 | 70 |
| **Walk trips for Inc 1 and Inc 4 from survey, all others from NonCBD** | | | | | |
| **Highway Person Trips** | | Inc 1 | Inc 2 | Inc 3 | Inc 4 |
|  | Person-Auto | 1,614 | 4,056 | 5,726 | 15,923 |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 38.1% | 0.0% | 31.7% | 51.7% |
|  | Pool 2 | 20.6% | 100.0% | 9.8% | 27.8% |
|  | Pool 3+ | 41.3% | 0.0% | 58.6% | 20.5% |
| **Auto Occ - Percent ALTERATIONS** | | |  |  |  |
|  | Drive alone | **50.2%** | **42.3%** | **46.4%** | **49.8%** |
|  | Pool 2 | **36.8%** | **38.2%** | **38.7%** | **34.1%** |
|  | Pool 3+ | **13.0%** | **19.5%** | **15.0%** | **16.0%** |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 811 | 1,717 | 2,655 | 7,937 |
|  | Pool 2 | 594 | 1,549 | 2,215 | 5,436 |
|  | Pool 3+ | 209 | 790 | 856 | 2,549 |
| **Use Auto occupany from Non-CBD** | | |  |  |  |

HBO.OP.Seg2 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | | | | | | | | | | | | | |
| MODE | | SEGMENT | | INCOME1 | | INCOME2 | | INCOME3 | | INCOME4 | | Min\_Const | Max\_Const |
| AUTO | | 2 | | 1,614 | | 4,056 | | 5,726 | | 15,923 | | 0 | 0 |
| TRANSIT | | 2 | | 673 | | 520 | | 119 | | 205 | | -6 | 6 |
| WALKBIKE | | 2 | | 765 | | 133 | | 109 | | 1,777 | | -6 | 6 |
| SOV | | 2 | | 811 | | 1,717 | | 2,655 | | 7,937 | | 0 | 0 |
| HOV | | 2 | | 803 | | 2,338 | | 3,071 | | 7,986 | | -6 | 6 |
| POOL2 | | 2 | | 594 | | 1,549 | | 2,215 | | 5,436 | | -6 | 6 |
| POOL3 | | 2 | | 209 | | 790 | | 856 | | 2,549 | | -6 | 6 |
| WALKTRAN | | 2 | | 659 | | 495 | | 56 | | 72 | | -6 | 6 |
| DRIVETRAN | | 2 | | 12 | | 14 | | 61 | | 131 | | -6 | 6 |
| DROPTRAN | | 2 | | 2 | | 10 | | 2 | | 2 | | -6 | 6 |
| WALKPREM | | 2 | | 159 | | 209 | | 25 | | 60 | | -6 | 6 |
| WALKBUS | | 2 | | 500 | | 286 | | 31 | | 12 | | -6 | 6 |
| DRIVEPREM | | 2 | | 7 | | 13 | | 60 | | 124 | | -6 | 6 |
| DRIVEBUS | | 2 | | 6 | | 1 | | 1 | | 7 | | -6 | 6 |
| DROPPREM | | 2 | | 1 | | 9 | | 1 | | 1 | | -6 | 6 |
| DROPBUS | | 2 | | 1 | | 1 | | 1 | | 1 | | -6 | 6 |
| WALK | | 2 | | 753 | | 128 | | 103 | | 1,707 | | -6 | 6 |
| BIKE | | 2 | | 12 | | 5 | | 6 | | 70 | | -6 | 6 |
| **Trips** | **HBO\_OffPeak\_Data** | | | | **Iteration** | | **10** | |  | |
| MODE | SEGMENT | | INCOME1 | | INCOME2 | | INCOME3 | | INCOME4 | |
| AUTO | 2 | | 1,620 | | 4,057 | | 5,726 | | 15,923 | |
| TRANSIT | 2 | | 667 | | 519 | | 119 | | 205 | |
| WALKBIKE | 2 | | 765 | | 133 | | 109 | | 1,777 | |
| SOV | 2 | | 814 | | 1,717 | | 2,655 | | 7,938 | |
| HOV | 2 | | 806 | | 2,339 | | 3,071 | | 7,986 | |
| POOL2 | 2 | | 596 | | 1,549 | | 2,215 | | 5,436 | |
| POOL3 | 2 | | 210 | | 790 | | 856 | | 2,549 | |
| WALKTRAN | 2 | | 645 | | 495 | | 56 | | 72 | |
| DRIVETRAN | 2 | | 13 | | 14 | | 61 | | 131 | |
| DROPTRAN | 2 | | 9 | | 10 | | 2 | | 2 | |
| WALKPREM | | | 137 | | 187 | | 25 | | 42 | |
| WALKBUS |  | | 508 | | 308 | | 31 | | 30 | |
| DRIVEPREM | | | 7 | | 13 | | 56 | | 120 | |
| DRIVEBUS | 2 | | 6 | | 1 | | 5 | | 11 | |
| DROPPREM | 2 | | 5 | | 8 | | 1 | | 1 | |
| DROPBUS | 2 | | 5 | | 2 | | 1 | | 1 | |
| WALK | 2 | | 751 | | 128 | | 103 | | 1,707 | |
| BIKE | 2 | | 14 | | 5 | | 6 | | 70 | |

HBO.OP.Seg2 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (Output - Targets)** | | | |  |  |
| MODE | **CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 6 | 1 | 0 | 0 |
| TRANSIT |  | -6 | -1 | 0 | 0 |
| WALKBIKE |  | 0 | 0 | 0 | 0 |
| SOV |  | 3 | 0 | 0 | 1 |
| HOV |  | 3 | 1 | 0 | 0 |
| POOL2 |  | 2 | 0 | 0 | 0 |
| POOL3 |  | 1 | 0 | 0 | 0 |
| WALKTRAN |  | -14 | 0 | 0 | 0 |
| DRIVETRAN |  | 1 | 0 | 0 | 0 |
| DROPTRAN |  | 7 | 0 | 0 | 0 |
| WALKPREM |  | -22 | -22 | 0 | -18 |
| WALKBUS |  | 8 | 22 | 0 | 18 |
| DRIVEPREM |  | 0 | 0 | -4 | -4 |
| DRIVEBUS |  | 0 | 0 | 4 | 4 |
| DROPPREM |  | 4 | -1 | 0 | 0 |
| DROPBUS |  | 4 | 1 | 0 | 0 |
| WALK |  | -2 | 0 | 0 | 0 |
| BIKE |  | 2 | 0 | 0 | 0 |

HBO.OP.Seg2 MS\_HBO\_OffPeak\_Calibrate\_E\_Bias2 OFFPEAK CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **CBD** | INCOME1 | INCOME2 | INCOME3 | INCOME4 |
| AUTO |  | 0 | 0 | 0 | 0 |
| TRANSIT |  | 1.298837 | 0.645348 | -2.099627 | -2.567788 |
| WALKBIKE |  | 1.349158 | -0.922042 | -1.453432 | 0.643068 |
| SOV |  | 0 | 0 | 0 | 0 |
| HOV |  | -0.609563 | -0.120335 | -0.139558 | -0.279828 |
| POOL2 |  | 0 | 0 | 0 | 0 |
| POOL3 |  | -1.460304 | -0.884955 | -1.06871 | -0.852734 |
| WALKTRAN |  | 0 | 0 | 0 | 0 |
| DRIVETRAN |  | -3.124859 | -2.671329 | 1.592738 | 1.46356 |
| DROPTRAN |  | -6 | -5.552434 | -4.886986 | -5.634407 |
| WALKPREM |  | 0 | 0 | 0 | 0 |
| WALKBUS |  | -4.402557 | -6 | -4.948261 | -6 |
| DRIVEPREM |  | 0 | 0 | 0 | 0 |
| DRIVEBUS |  | 0.653601 | -6 | -6 | -6 |
| DROPPREM |  | 0 | 0 | 0 | 0 |
| DROPBUS |  | -2.158038 | -6 | -2.80664 | -2.610324 |
| WALK |  | 0 | 0 | 0 | 0 |
| BIKE |  | -6 | -5.13581 | -4.580415 | -5.103369 |

##### NHB.PK MS\_NHB\_PEAK\_Calibrate\_E\_Bias2 PEAK nonCBD/CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BIAS CONSTANTS** | | **file date** | **2-Mar-17** |  |  |  |
| **HBW** |  | Non CBD | CBD |  |  |  |
| **Bias** | **WalkPrem** | **0.5** |  |  |  |  |
|  | **DrivePrem** |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Person Trips** | |  | **2013** |  |  |  |
| **NHB** |  | **PEAK** |  |  |  |  |
|  |  | Non CBD | CBD |  |  | Peak |
|  | Person Trips | 718,265 | 14,749 |  |  | 733,014 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **NHB** |  | **PEAK** |  |  |  |  |
|  |  | Non CBD | CBD |  |  | Total |
|  | Drive | 296,110 | 7,780 |  |  | 303,890 |
|  | Pool 2 | 176,048 | 804 |  |  | 176,852 |
|  | Pool 3+ | 118,231 | 108 |  |  | 118,339 |
|  | Transit | 3,515 | 1,191 |  |  | 4,706 |
|  | Walk | 7,355 | 1,349 |  |  | 8,705 |
|  | Bike | 1,522 | 0 |  |  | 1,522 |
|  | Other | 21,266 | 0 |  |  | 21,266 |
|  | Ptrips | 624,047 | 11,233 |  |  | 635,280 |
|  | Auto Trips | 590,389 | 8,692 |  |  | 599,081 |
|  | % Drive | 50% | 90% |  |  | 51% |
|  | % Pool 2 | 30% | 9% |  |  | 30% |
|  | % Pool 3 | 20% | 1% |  |  | 20% |
|  | % Walk | 1% | 12% |  |  | 1% |
|  | % Bike | 0% | 0% |  |  | 0% |
| Unknown | destination | <1% trips | non incl. | in tables |  |  |

NHB.PK MS\_NHB\_PEAK\_Calibrate\_E\_Bias2 PEAK nonCBD/CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **On Board** | **Survey** |  | **MRM1701\_CBD** | | **2013** |  |
| **NHB** |  | **PEAK** |  |  |  |  |
|  |  | NonCBD | CBD |  |  | Total |
|  | WalkPrem | 566 | 105 |  |  | 671 |
|  | WalkBus | 1,425 | 168 |  |  | 1,593 |
|  | DrivePrem | 17 | 45 |  |  | 62 |
|  | DriveBus | 28 | 0 |  |  | 28 |
|  | DropPrem | 0 | 13 |  |  | 13 |
|  | DropBus | 64 | 0 |  |  | 64 |
|  |  |  |  |  |  |  |
|  | Prem | 583 | 163 |  |  | 746 |
|  | Bus | 1,516 | 168 |  |  | 1,685 |
|  | Walk | 1,991 | 273 |  |  | 2,264 |
|  | Drive | 44 | 45 |  |  | 90 |
|  | Drop | 64 | 13 |  |  | 77 |
|  | Total | 2,099 | 331 |  |  | 2,431 |
| Unknown | income | 2% trips | non incl. | in tables |  |  |
|  |  |  |  |  |  |  |
| **MODE CHOICE TARGETS** | |  |  |  |  |  |
| **NHB** |  | **PEAK** |  |  |  |  |
|  |  | NonCBD | CBD |  |  |  |
|  | Person Trips | 718,265 | 14,749 |  |  |  |
|  |  |  |  |  |  |  |
| **Transit Survey** | | NonCBD | CBD |  |  |  |
|  | WalkPrem | 566 | 105 |  |  |  |
|  | WalkBus | 1,425 | 168 |  |  |  |
|  | DrivePrem | 17 | 45 |  |  |  |
|  | DriveBus | 28 | 0 |  |  |  |
|  | DropPrem | 0 | 13 |  |  |  |
|  | DropBus | 64 | 0 |  |  |  |
|  | Transit | 2,099 | 331 |  |  |  |
|  |  |  |  |  |  |  |
|  | WalkPrem | 566 | 105 |  |  |  |
|  | WalkBus | 1,425 | 168 |  |  |  |
|  | DrivePrem | 17 | 45 |  |  |  |
|  | DriveBus | 28 | **1** |  |  |  |
|  | DropPrem | **1** | 13 |  |  |  |
|  | DropBus | 64 | **1** |  |  |  |
|  | Transit | 2,100 | 333 |  |  |  |

NHB.PK MS\_NHB\_PEAK\_Calibrate\_E\_Bias2 PEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | Non CBD | CBD |  |  |
|  | Walk | 1.2% | 12.0% |  |  |
|  | Bike | 0.2% | 0.0% |  |  |
| **Walk/Bike Percentage ALTERATIONS - CBD - Bike, Use NonCBD** | | | | |  |
|  | Walk | 1.2% | 12.0% |  |  |
|  | Bike | 0.2% | **0.2%** |  |  |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 8,466 | 1,771 |  |  |
|  | Bike | 1,752 | 36 |  |  |
|  |  |  |  |  |  |
| **Highway Person Trips** | | NonCBD | CBD |  |  |
|  | Person-Auto | 705,947 | 12,608 |  |  |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 50.2% | 89.5% |  |  |
|  | Pool 2 | 29.8% | 9.3% |  |  |
|  | Pool 3+ | 20.0% | 1.2% |  |  |
| **Auto Occ - Percent ALTERATIONS - none** | | | |  |  |
|  | Drive alone | 50.2% | 89.5% |  |  |
|  | Pool 2 | 29.8% | 9.3% |  |  |
|  | Pool 3+ | 20.0% | 1.2% |  |  |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 354,068 | 11,284 |  |  |
|  | Pool 2 | 210,506 | 1,167 |  |  |
|  | Pool 3+ | 141,373 | 157 |  |  |

NHB.PK MS\_NHB\_PEAK\_Calibrate\_E\_Bias2 PEAK nonCBD/CBD

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | | | | | | | |
| MODE | **PEAK** | NOD CBD | CBD |  |  | Min\_Const | Max\_Const |
| AUTO |  | 705,947 | 12,608 |  |  | 0 | 0 |
| TRANSIT |  | 2,100 | 333 |  |  | -6 | 6 |
| WALKBIKE |  | 10,218 | 1,807 |  |  | -6 | 6 |
| SOV |  | 354,068 | 11,284 |  |  | 0 | 0 |
| HOV |  | 351,879 | 1,324 |  |  | -6 | 6 |
| POOL2 |  | 210,506 | 1,167 |  |  | -6 | 6 |
| POOL3 |  | 141,373 | 157 |  |  | -6 | 6 |
| WALKTRAN |  | 1,991 | 273 |  |  | -6 | 6 |
| DRIVETRAN |  | 44 | 46 |  |  | -6 | 6 |
| DROPTRAN |  | 65 | 14 |  |  | -6 | 6 |
| WALKPREM |  | 566 | 105 |  |  | -6 | 6 |
| WALKBUS |  | 1,425 | 168 |  |  | -6 | 6 |
| DRIVEPREM |  | 17 | 45 |  |  | -6 | 6 |
| DRIVEBUS |  | 28 | 1 |  |  | -6 | 6 |
| DROPPREM |  | 1 | 13 |  |  | -6 | 6 |
| DROPBUS |  | 64 | 1 |  |  | -6 | 6 |
| WALK |  | 8,466 | 1,771 |  |  | -6 | 6 |
| BIKE |  | 1,752 | 36 |  |  | -6 | 6 |
| **OUTPUT DATA** | |  |  |  |  |
| **Trips** | **NHB\_Peak\_Data** | | **Iteration** | **10** |  |
| MODE | **PEAK** | **Non CBD** | **CBD** |  |  |
| AUTO |  | 706,001 | 12,609 |  |  |
| TRANSIT |  | 2,046 | 333 |  |  |
| WALKBIKE |  | 10,218 | 1,807 |  |  |
| SOV |  | 354,095 | 11,285 |  |  |
| HOV |  | 351,906 | 1,324 |  |  |
| POOL2 |  | 210,522 | 1,167 |  |  |
| POOL3 |  | 141,384 | 157 |  |  |
| WALKTRAN |  | 1,934 | 273 |  |  |
| DRIVETRAN |  | 46 | 46 |  |  |
| DROPTRAN |  | 67 | 14 |  |  |
| WALKPREM |  | 402 | 106 |  |  |
| WALKBUS |  | 1,531 | 167 |  |  |
| DRIVEPREM |  | 17 | 41 |  |  |
| DRIVEBUS |  | 28 | 5 |  |  |
| DROPPREM |  | 2 | 12 |  |  |
| DROPBUS |  | 64 | 2 |  |  |
| WALK |  | 8,466 | 1,771 |  |  |
| BIKE |  | 1,752 | 36 |  |  |

NHB.PK MS\_NHB\_PEAK\_Calibrate\_E\_Bias2 PEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (Output - Target )** | | | |  |  |
| MODE | **PEAK** | **Non CBD** | **CBD** |  |  |
| AUTO |  | 54 | 1 |  |  |
| TRANSIT |  | -54 | 0 |  |  |
| WALKBIKE |  | 0 | 0 |  |  |
| SOV |  | 27 | 1 |  |  |
| HOV |  | 27 | 0 |  |  |
| POOL2 |  | 16 | 0 |  |  |
| POOL3 |  | 11 | 0 |  |  |
| WALKTRAN |  | -57 | 0 |  |  |
| DRIVETRAN |  | 2 | 0 |  |  |
| DROPTRAN |  | 2 | 0 |  |  |
| WALKPREM |  | -164 | 1 |  |  |
| WALKBUS |  | 106 | -1 |  |  |
| DRIVEPREM |  | 0 | -4 |  |  |
| DRIVEBUS |  | 0 | 4 |  |  |
| DROPPREM |  | 1 | -1 |  |  |
| DROPBUS |  | 0 | 1 |  |  |
| WALK |  | 0 | 0 |  |  |
| BIKE |  | 0 | 0 |  |  |
|  |  |  |  |  |  |
| **DIFFERENCE FROM TARGETS - Calibrate E (3/1/17) No Bias Constant** | | | | | |
| MODE | **PEAK** | **Non CBD** | **CBD** |  |  |
| AUTO |  | 51 | -3 |  |  |
| TRANSIT |  | -51 | 4 |  |  |
| WALKBIKE |  | 0 | 0 |  |  |
| SOV |  | 26 | -2 |  |  |
| HOV |  | 25 | 0 |  |  |
| POOL2 |  | 15 | 0 |  |  |
| POOL3 |  | 10 | 0 |  |  |
| WALKTRAN |  | -54 | 4 |  |  |
| DRIVETRAN |  | 2 | 0 |  |  |
| DROPTRAN |  | 2 | 0 |  |  |
| WALKPREM |  | -154 | 10 |  |  |
| WALKBUS |  | 100 | -6 |  |  |
| DRIVEPREM |  | 0 | -4 |  |  |
| DRIVEBUS |  | 0 | 4 |  |  |
| DROPPREM |  | 2 | -1 |  |  |
| DROPBUS |  | 0 | 1 |  |  |
| WALK |  | 0 | 0 |  |  |
| BIKE |  | 0 | 0 |  |  |

NHB.PK MS\_NHB\_PEAK\_Calibrate\_E\_Bias2 PEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **PEAK** | **Non CBD** | **CBD** |  |  |
| AUTO |  | 0 | 0 |  |  |
| TRANSIT |  | -2.801098 | -2.453582 |  |  |
| WALKBIKE |  | -0.593481 | -0.107388 |  |  |
| SOV |  | 0 | 0 |  |  |
| HOV |  | -0.295373 | -2.448359 |  |  |
| POOL2 |  | 0 | 0 |  |  |
| POOL3 |  | -0.443615 | -2.220515 |  |  |
| WALKTRAN |  | 0 | 0 |  |  |
| DRIVETRAN |  | -2.681411 | -0.835309 |  |  |
| DROPTRAN |  | -5.265376 | -3.265041 |  |  |
| WALKPREM |  | 0 | 0 |  |  |
| WALKBUS |  | 0.600871 | -2.405101 |  |  |
| DRIVEPREM |  | 0 | 0 |  |  |
| DRIVEBUS |  | -0.496064 | -6 |  |  |
| DROPPREM |  | 0 | 0 |  |  |
| DROPBUS |  | 3.272636 | -6 |  |  |
| WALK |  | 0 | 0 |  |  |
| BIKE |  | -4.032306 | -5.497756 |  |  |

##### NHB.OP MS\_NHB\_OFFPEAK\_Calibrate\_E\_Bias2 OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BIAS CONSTANTS** | | **file date** | **1-Mar-17** |  |  |  |
| **HBW** |  | Non CBD | CBD |  |  |  |
| **Bias** | **WalkPrem** | **0.5** |  |  |  |  |
|  | **DrivePrem** |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Person Trips** | |  | 2013 |  |  |  |
| **NHB** |  | **OFFPEAK** |  |  |  |  |
|  |  | Non CBD | CBD |  |  | OffPek |
| Person Trips |  | 1,354,923 | 31,115 |  |  | 1,386,038 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **NHB** |  | **OFFPEAK** |  |  |  |  |
|  |  | Non CBD | CBD |  |  | Total |
| Drive |  | 618,009 | 9,941 |  |  | 627,950 |
| Pool 2 |  | 395,254 | 3,441 |  |  | 398,696 |
| Pool 3+ |  | 181,718 | 843 |  |  | 182,561 |
| Transit |  | 4,846 | 915 |  |  | 5,761 |
| Walk |  | 16,290 | 6,915 |  |  | 23,206 |
| Bike |  | 2,402 | 0 |  |  | 2,402 |
| Other |  | 18,650 | 0 |  |  | 18,650 |
| Ptrips |  | 1,237,170 | 22,056 |  |  | 1,259,226 |
| Auto Trips |  | 1,194,981 | 14,226 |  |  | 1,209,207 |
| % Drive |  | 52% | 70% |  |  | 52% |
| % Pool 2 |  | 33% | 24% |  |  | 33% |
| % Pool 3 |  | 15% | 6% |  |  | 15% |
| % Walk |  | 1% | 31% |  |  | 2% |
| % Bike |  | 0% | 0% |  |  | 0% |
| Unknown | destination | <1% trips | non incl. | in tables |  |  |

NHB.OP MS\_NHB\_OFFPEAK\_Calibrate\_E\_Bias2 OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **On Board** | **Survey** |  | **MRM1701\_CBD** | | **2013** |  |
| **NHB** |  | **OFFPEAK** |  |  |  |  |
|  |  | NonCBD | CBD |  |  | Total |
| WalkPrem |  | 652 | 121 |  |  | 773 |
| WalkBus |  | 2,162 | 374 |  |  | 2,536 |
| DrivePrem |  | 29 | 42 |  |  | 70 |
| DriveBus |  | 3 | 0 |  |  | 3 |
| DropPrem |  | 25 | 0 |  |  | 25 |
| DropBus |  | 31 | 0 |  |  | 31 |
|  |  |  |  |  |  |  |
| Prem |  | 2,843 | 537 |  |  | 3,380 |
| Bus |  | 59 | 0 |  |  | 59 |
| Walk |  | 656 | 121 |  |  | 777 |
| Drive |  | 2,187 | 374 |  |  | 2,561 |
| Drop |  | 59 | 42 |  |  | 101 |
| Total |  | 2,902 | 537 |  |  | 3,438 |
| Unknown | income | 2% trips | non incl. | in tables |  |  |
|  |  |  |  |  |  |  |
| **MODE CHOICE TARGETS** | |  |  |  |  |  |
| **NHB** |  | **OFFPEAK** |  |  |  |  |
|  |  | NonCBD | CBD |  |  |  |
|  | Person Trips | 1,354,923 | 31,115 |  |  |  |
|  |  |  |  |  |  |  |
| **Transit Survey** | | NonCBD | CBD |  |  |  |
|  | WalkPrem | 652 | 121 |  |  |  |
|  | WalkBus | 2,162 | 374 |  |  |  |
|  | DrivePrem | 29 | 42 |  |  |  |
|  | DriveBus | 3 | 0 |  |  |  |
|  | DropPrem | 25 | 0 |  |  |  |
|  | DropBus | 31 | 0 |  |  |  |
|  | Transit | 2,902 | 537 |  |  |  |
|  |  |  |  |  |  |  |
|  | WalkPrem | 652 | 121 |  |  |  |
|  | WalkBus | 2,162 | 374 |  |  |  |
|  | DrivePrem | 29 | 42 |  |  |  |
|  | DriveBus | 3 | **1** |  |  |  |
|  | DropPrem | 25 | **1** |  |  |  |
|  | DropBus | 31 | **1** |  |  |  |
|  | Transit | 2,902 | 540 |  |  |  |

NHB.OP MS\_NHB\_OFFPEAK\_Calibrate\_E\_Bias2 OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | Non CBD | CBD |  |  |
|  | Walk | 1.3% | 31.4% |  |  |
|  | Bike | 0.2% | 0.0% |  |  |
| **Walk/Bike Percentage ALTERATIONS - CBD - Bike, Use NonCBD** | | | | |  |
|  | Walk | 1.3% | 31.4% |  |  |
|  | Bike | 0.2% | **0.2%** |  |  |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 17,841 | 9,756 |  |  |
|  | Bike | 2,631 | 60 |  |  |
|  |  |  |  |  |  |
| **Highway Person Trips** | | NonCBD | CBD |  |  |
|  | Person-Auto | 1,331,550 | 20,759 |  |  |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 51.7% | 69.9% |  |  |
|  | Pool 2 | 33.1% | 24.2% |  |  |
|  | Pool 3+ | 15.2% | 5.9% |  |  |
| **Auto Occ - Percent ALTERATIONS - none** | | | |  |  |
|  | Drive alone | 51.7% | 69.9% |  |  |
|  | Pool 2 | 33.1% | 24.2% |  |  |
|  | Pool 3+ | 15.2% | 5.9% |  |  |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 688,638 | 14,506 |  |  |
|  | Pool 2 | 440,426 | 5,022 |  |  |
|  | Pool 3+ | 202,485 | 1,231 |  |  |

NHB.OP MS\_NHB\_OFFPEAK\_Calibrate\_E\_Bias2 OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | | | | | | | | | | | | | |
| MODE | | **OFFPEAK** | | NOD CBD | | CBD | |  | |  | | Min\_Const | Max\_Const |
| AUTO | | 2 | | 1,331,550 | | 20,759 | |  | |  | | 0 | 0 |
| TRANSIT | | 2 | | 2,902 | | 540 | |  | |  | | -6 | 6 |
| WALKBIKE | | 2 | | 20,472 | | 9,816 | |  | |  | | -6 | 6 |
| SOV | | 2 | | 688,638 | | 14,506 | |  | |  | | 0 | 0 |
| HOV | | 2 | | 642,912 | | 6,253 | |  | |  | | -6 | 6 |
| POOL2 | | 2 | | 440,426 | | 5,022 | |  | |  | | -6 | 6 |
| POOL3 | | 2 | | 202,485 | | 1,231 | |  | |  | | -6 | 6 |
| WALKTRAN | | 2 | | 2,814 | | 495 | |  | |  | | -6 | 6 |
| DRIVETRAN | | 2 | | 32 | | 43 | |  | |  | | -6 | 6 |
| DROPTRAN | | 2 | | 55 | | 2 | |  | |  | | -6 | 6 |
| WALKPREM | | 2 | | 652 | | 121 | |  | |  | | -6 | 6 |
| WALKBUS | | 2 | | 2,162 | | 374 | |  | |  | | -6 | 6 |
| DRIVEPREM | | 2 | | 29 | | 42 | |  | |  | | -6 | 6 |
| DRIVEBUS | | 2 | | 3 | | 1 | |  | |  | | -6 | 6 |
| DROPPREM | | 2 | | 25 | | 1 | |  | |  | | -6 | 6 |
| DROPBUS | | 2 | | 31 | | 1 | |  | |  | | -6 | 6 |
| WALK | | 2 | | 17,841 | | 9,756 | |  | |  | | -6 | 6 |
| BIKE | | 2 | | 2,631 | | 60 | |  | |  | | -6 | 6 |
| **Trips** | **NHB\_OffPeak\_Data** | | | | **Iteration** | | **10** | |  | |
| MODE | **OFFPEAK** | | **Non CBD** | | **CBD** | |  | |  | |
| AUTO |  | | 1,331,626 | | 20,756 | |  | |  | |
| TRANSIT |  | | 2,826 | | 543 | |  | |  | |
| WALKBIKE |  | | 20,472 | | 9,816 | |  | |  | |
| SOV |  | | 688,678 | | 14,504 | |  | |  | |
| HOV |  | | 642,948 | | 6,252 | |  | |  | |
| POOL2 |  | | 440,451 | | 5,021 | |  | |  | |
| POOL3 |  | | 202,497 | | 1,231 | |  | |  | |
| WALKTRAN |  | | 2,737 | | 497 | |  | |  | |
| DRIVETRAN |  | | 32 | | 43 | |  | |  | |
| DROPTRAN |  | | 57 | | 3 | |  | |  | |
| WALKPREM |  | | 420 | | 129 | |  | |  | |
| WALKBUS |  | | 2,317 | | 368 | |  | |  | |
| DRIVEPREM |  | | 29 | | 42 | |  | |  | |
| DRIVEBUS |  | | 3 | | 1 | |  | |  | |
| DROPPREM |  | | 25 | | 1 | |  | |  | |
| DROPBUS |  | | 31 | | 1 | |  | |  | |
| WALK |  | | 17,841 | | 9,652 | |  | |  | |
| BIKE |  | | 2,631 | | 164 | |  | |  | |

NHB.OP MS\_NHB\_OFFPEAK\_Calibrate\_E\_Bias2 OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (Output - Target )** | | | |  |  |
| MODE | **OFFPEAK** | **Non CBD** | **CBD** |  |  |
| AUTO |  | 76 | -3 |  |  |
| TRANSIT |  | -76 | 3 |  |  |
| WALKBIKE |  | 0 | 0 |  |  |
| SOV |  | 40 | -2 |  |  |
| HOV |  | 36 | -1 |  |  |
| POOL2 |  | 25 | -1 |  |  |
| POOL3 |  | 12 | 0 |  |  |
| WALKTRAN |  | -77 | 2 |  |  |
| DRIVETRAN |  | 0 | 0 |  |  |
| DROPTRAN |  | 2 | 1 |  |  |
| WALKPREM |  | -232 | 8 |  |  |
| WALKBUS |  | 155 | -6 |  |  |
| DRIVEPREM |  | 0 | 0 |  |  |
| DRIVEBUS |  | 0 | 0 |  |  |
| DROPPREM |  | 0 | 0 |  |  |
| DROPBUS |  | 0 | 0 |  |  |
| WALK |  | 0 | -104 |  |  |
| BIKE |  | 0 | 104 |  |  |
|  |  |  |  |  |  |
| **DIFFERENCE FROM TARGETS - Calibrate E (3/1/17) No Bias Constant** | | | | | |
| MODE | **OFFPEAK** | **Non CBD** | **CBD** |  |  |
| AUTO |  | 97 | -21 |  |  |
| TRANSIT |  | -98 | 14 |  |  |
| WALKBIKE |  | 0 | 7 |  |  |
| SOV |  | 51 | -14 |  |  |
| HOV |  | 47 | -6 |  |  |
| POOL2 |  | 33 | -5 |  |  |
| POOL3 |  | 15 | -1 |  |  |
| WALKTRAN |  | -99 | 13 |  |  |
| DRIVETRAN |  | 0 | 0 |  |  |
| DROPTRAN |  | 2 | 2 |  |  |
| WALKPREM |  | -296 | 43 |  |  |
| WALKBUS |  | 197 | -31 |  |  |
| DRIVEPREM |  | 0 | 0 |  |  |
| DRIVEBUS |  | 0 | 0 |  |  |
| DROPPREM |  | -1 | 1 |  |  |
| DROPBUS |  | 1 | 1 |  |  |
| WALK |  | 0 | -98 |  |  |
| BIKE |  | 0 | 105 |  |  |

NHB.OP MS\_NHB\_OFFPEAK\_Calibrate\_E\_Bias2 OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **OFFPEAK** | **Non CBD** | **CBD** |  |  |
| AUTO |  | 0 | 0 |  |  |
| TRANSIT |  | -3.090307 | -2.31656 |  |  |
| WALKBIKE |  | -0.537341 | 1.848268 |  |  |
| SOV |  | 0 | 0 |  |  |
| HOV |  | -0.287964 | -1.117687 |  |  |
| POOL2 |  | 0 | 0 |  |  |
| POOL3 |  | -0.817485 | -1.559865 |  |  |
| WALKTRAN |  | 0 | 0 |  |  |
| DRIVETRAN |  | -1.986498 | -0.402933 |  |  |
| DROPTRAN |  | -3.732446 | -6 |  |  |
| WALKPREM |  | 0 | 0 |  |  |
| WALKBUS |  | 1.195724 | -0.365226 |  |  |
| DRIVEPREM |  | 0 | 0 |  |  |
| DRIVEBUS |  | -5.307982 | -5.521877 |  |  |
| DROPPREM |  | 0 | 0 |  |  |
| DROPBUS |  | -2.168103 | -0.445022 |  |  |
| WALK |  | 0 | 0 |  |  |
| BIKE |  | -4.353071 | -6 |  |  |

##### HBU.PK MS\_HBU\_PEAK\_Calibrate\_E PEAK nonCBD/CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Person Trips** | |  | **2013** |  |  |  |
| **HBU** |  | **PEAK** |  |  |  |  |
|  |  | Non CBD | CBD |  |  | Peak |
|  | Person Trips | 55,221 | 982 |  |  | 56,203 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **HBU** |  | **PEAK** |  |  |  |  |
|  |  | Non CBD | CBD |  |  | Total |
|  | Drive | 23,771 | 0 |  |  | 23,771 |
|  | Pool 2 | 4,507 | 0 |  |  | 4,507 |
|  | Pool 3+ | 1,921 | 0 |  |  | 1,921 |
|  | Transit | 991 | 0 |  |  | 991 |
|  | Walk | 0 | 0 |  |  | 0 |
|  | Bike | 0 | 0 |  |  | 0 |
|  | Other | 446 | 0 |  |  | 446 |
|  | Ptrips | 31,636 | 0 |  |  | 31,636 |
|  | Auto Trips | 30,199 | 0 |  |  | 30,199 |
|  | % Drive | 78.7% | #DIV/0! |  |  | 78.7% |
|  | % Pool 2 | 14.9% | #DIV/0! |  |  | 14.9% |
|  | % Pool 3 | 6.4% | #DIV/0! |  |  | 6.4% |
|  | % Walk | 0.0% | #DIV/0! |  |  | 0.0% |
|  | % Bike | 0.0% | #DIV/0! |  |  | 0.0% |
| Unknown | destination | <1% trips | non incl. | in tables |  |  |

HBU.PK MS\_HBU\_PEAK\_Calibrate\_E PEAK nonCBD/CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **On Board** | **Survey** |  | **MRM1701\_CBD** | | **2013** |  |
| **HBU** |  | **PEAK** |  |  |  |  |
|  |  | NonCBD | CBD |  |  | Total |
|  | WalkPrem | 161 | 0 |  |  | 161 |
|  | WalkBus | 1,047 | 40 |  |  | 1,087 |
|  | DrivePrem | 195 | 0 |  |  | 195 |
|  | DriveBus | 25 | 0 |  |  | 25 |
|  | DropPrem | 51 | 0 |  |  | 51 |
|  | DropBus | 46 | 0 |  |  | 46 |
|  |  |  |  |  |  |  |
|  | Prem | 407 | 0 |  |  | 407 |
|  | Bus | 1,119 | 40 |  |  | 1,159 |
|  | Walk | 1,209 | 40 |  |  | 1,249 |
|  | Drive | 220 | 0 |  |  | 220 |
|  | Drop | 97 | 0 |  |  | 97 |
|  | Total | 1,526 | 40 |  |  | 1,566 |
| Unknown | income | 2% trips | non incl. | in tables |  |  |
|  |  |  |  |  |  |  |
| **MODE CHOICE TARGETS** | |  |  |  |  |  |
| **HBU** |  | **PEAK** |  |  |  |  |
|  |  | NonCBD | CBD |  |  |  |
|  | Person Trips | 55,221 | 982 |  |  |  |
|  |  |  |  |  |  |  |
| **Transit Survey** | | NonCBD | CBD |  |  |  |
|  | WalkPrem | 161 | 0 |  |  |  |
|  | WalkBus | 1,047 | 40 |  |  |  |
|  | DrivePrem | 195 | 0 |  |  |  |
|  | DriveBus | 25 | 0 |  |  |  |
|  | DropPrem | 51 | 0 |  |  |  |
|  | DropBus | 46 | 0 |  |  |  |
|  | Transit | 1,526 | 40 |  |  |  |
| **Transit ALTERATIONS - TARGETS** | | |  |  |  |  |
|  | WalkPrem | 161 | **4** | 11% |  |  |
|  | WalkBus | 1,047 | **28** | 69% |  |  |
|  | DrivePrem | 195 | **5** | 13% |  |  |
|  | DriveBus | 25 | **1** | 2% |  |  |
|  | DropPrem | 51 | **1** | 3% |  |  |
|  | DropBus | 46 | **1** | 3% |  |  |
|  | Transit | 1,526 | 40 |  |  |  |
| **Transit - CBD USE NONCBD PERCENTAGES** | | | | | |  |

HBU.PK MS\_HBU\_PEAK\_Calibrate\_E PEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | NonCBD | CBD |  |  |
|  | Walk | 0.0% | #DIV/0! |  |  |
|  | Bike | 0.0% | #DIV/0! |  |  |
| **Walk/Bike Percentage ALTERATIONS - USE HBO** | | | |  |  |
|  | Walk | **3.2%** | **3.2%** |  |  |
|  | Bike | **0.2%** | **0.2%** |  |  |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 1,788 | 32 |  |  |
|  | Bike | 120 | 2 |  |  |
|  |  |  |  |  |  |
| **Highway Person Trips** | | Inc 1 | Inc 2 |  |  |
|  | Person-Auto | 51,788 | 908 |  |  |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 78.7% | #DIV/0! |  |  |
|  | Pool 2 | 14.9% | #DIV/0! |  |  |
|  | Pool 3+ | 6.4% | #DIV/0! |  |  |
| **Auto Occ - Percent ALTERATIONS - CBD Use NonCBD** | | | | |  |
|  | Drive alone | 78.7% | **78.7%** |  |  |
|  | Pool 2 | 14.9% | **14.9%** |  |  |
|  | Pool 3+ | 6.4% | **6.4%** |  |  |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 40,764 | 715 |  |  |
|  | Pool 2 | 7,729 | 136 |  |  |
|  | Pool 3+ | 3,294 | 58 |  |  |

HBU.PK MS\_HBU\_PEAK\_Calibrate\_E PEAK nonCBD/CBD

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | |  |  |  |  |  |  |
| MODE | **PEAK** | NOD CBD | CBD |  |  | Min\_Const | Max\_Const |
| AUTO |  | 51,788 | 908 |  |  | 0 | 0 |
| TRANSIT |  | 1,526 | 40 |  |  | -6 | 6 |
| WALKBIKE |  | 1,907 | 34 |  |  | -6 | 6 |
| SOV |  | 40,764 | 715 |  |  | 0 | 0 |
| HOV |  | 11,024 | 193 |  |  | -6 | 6 |
| POOL2 |  | 7,729 | 136 |  |  | -6 | 6 |
| POOL3 |  | 3,294 | 58 |  |  | -6 | 6 |
| WALKTRAN |  | 1,209 | 32 |  |  | -6 | 6 |
| DRIVETRAN |  | 220 | 6 |  |  | -6 | 6 |
| DROPTRAN |  | 97 | 3 |  |  | -6 | 6 |
| WALKPREM |  | 161 | 4 |  |  | -6 | 6 |
| WALKBUS |  | 1,047 | 28 |  |  | -6 | 6 |
| DRIVEPREM |  | 195 | 5 |  |  | -6 | 6 |
| DRIVEBUS |  | 25 | 1 |  |  | -6 | 6 |
| DROPPREM |  | 51 | 1 |  |  | -6 | 6 |
| DROPBUS |  | 46 | 1 |  |  | -6 | 6 |
| WALK |  | 1,788 | 32 |  |  | -6 | 6 |
| BIKE |  | 120 | 2 |  |  | -6 | 6 |
| **OUTPUT DATA** | |  |  |  |  |
| **Trips** | **HBU\_Peak\_Data** | | **Iteration** | **10** |  |
| MODE | **PEAK** | **NonCBD** | **CBD** |  |  |
| AUTO |  | 51,796 | 908 |  |  |
| TRANSIT |  | 1,516 | 40 |  |  |
| WALKBIKE |  | 1,908 | 34 |  |  |
| SOV |  | 40,771 | 714 |  |  |
| HOV |  | 11,025 | 194 |  |  |
| POOL2 |  | 7,730 | 136 |  |  |
| POOL3 |  | 3,295 | 58 |  |  |
| WALKTRAN |  | 1,199 | 32 |  |  |
| DRIVETRAN |  | 221 | 6 |  |  |
| DROPTRAN |  | 97 | 2 |  |  |
| WALKPREM |  | 138 | 3 |  |  |
| WALKBUS |  | 1,060 | 28 |  |  |
| DRIVEPREM |  | 144 | 4 |  |  |
| DRIVEBUS |  | 76 | 2 |  |  |
| DROPPREM |  | 51 | 1 |  |  |
| DROPBUS |  | 46 | 1 |  |  |
| WALK |  | 1,783 | 32 |  |  |
| BIKE |  | 125 | 2 |  |  |

HBU.PK MS\_HBU\_PEAK\_Calibrate\_E PEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (Output-Targets)** | | | |  |  |
| MODE | **PEAK** | **NonCBD** | **CBD** |  |  |
| AUTO |  | 8 | 0 |  |  |
| TRANSIT |  | -10 | 0 |  |  |
| WALKBIKE |  | 1 | 0 |  |  |
| SOV |  | 7 | -1 |  |  |
| HOV |  | 1 | 1 |  |  |
| POOL2 |  | 1 | 0 |  |  |
| POOL3 |  | 1 | 0 |  |  |
| WALKTRAN |  | -10 | 0 |  |  |
| DRIVETRAN |  | 1 | 0 |  |  |
| DROPTRAN |  | 0 | -1 |  |  |
| WALKPREM |  | -23 | -1 |  |  |
| WALKBUS |  | 13 | 0 |  |  |
| DRIVEPREM |  | -51 | -1 |  |  |
| DRIVEBUS |  | 51 | 1 |  |  |
| DROPPREM |  | 0 | 0 |  |  |
| DROPBUS |  | 0 | 0 |  |  |
| WALK |  | -5 | 0 |  |  |
| BIKE |  | 5 | 0 |  |  |

HBU.PK MS\_HBU\_PEAK\_Calibrate\_E PEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **PEAK** | **NonCBD** | **CBD** |  |  |
| AUTO |  | 0 | 0 |  |  |
| TRANSIT |  | -0.552388 | -2.143529 |  |  |
| WALKBIKE |  | 1.313599 | -0.085384 |  |  |
| SOV |  | 0 | 0 |  |  |
| HOV |  | -1.90323 | -2.228434 |  |  |
| POOL2 |  | 0 | 0 |  |  |
| POOL3 |  | -1.268031 | -1.605864 |  |  |
| WALKTRAN |  | 0 | 0 |  |  |
| DRIVETRAN |  | -0.052999 | -0.365224 |  |  |
| DROPTRAN |  | -1.996246 | -2.398557 |  |  |
| WALKPREM |  | 0 | 0 |  |  |
| WALKBUS |  | 0.645555 | 1.25393 |  |  |
| DRIVEPREM |  | 0 | 0 |  |  |
| DRIVEBUS |  | -6 | -6 |  |  |
| DROPPREM |  | 0 | 0 |  |  |
| DROPBUS |  | -5.370287 | -4.032679 |  |  |
| WALK |  | 0 | 0 |  |  |
| BIKE |  | -6 | -5.159027 |  |  |

##### HBU.OP MS\_HBU\_OFFPEAK\_Calibrate\_E OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Person Trips** | |  | **2013** |  |  |  |
| **HBU** |  | **OFFPEAK** |  |  |  |  |
|  |  | Non CBD | CBD |  |  | OffPek |
| Person Trips |  | 23,040 | 410 |  |  | 23,450 |
|  |  |  |  |  |  |  |
| **Home Survey** | |  | **2012** |  | **2010** | **HH Factors** |
| **HBU** |  | **OFFPEAK** |  |  |  |  |
|  |  | Non CBD | CBD |  |  | Total |
| Drive |  | 26,567 | 0 |  |  | 26,567 |
| Pool 2 |  | 5,395 | 0 |  |  | 5,395 |
| Pool 3+ |  | 1,093 | 0 |  |  | 1,093 |
| Transit |  | 950 | 0 |  |  | 950 |
| Walk |  | 0 | 0 |  |  | 0 |
| Bike |  | 0 | 0 |  |  | 0 |
| Other |  | 470 | 0 |  |  | 470 |
| Ptrips |  | 34,475 | 0 |  |  | 34,475 |
| Auto Trips |  | 33,055 | 0 |  |  | 33,055 |
| % Drive |  | 80.4% | #DIV/0! |  |  | 80.4% |
| % Pool 2 |  | 16.3% | #DIV/0! |  |  | 16.3% |
| % Pool 3 |  | 3.3% | #DIV/0! |  |  | 3.3% |
| % Walk |  | 0.0% | #DIV/0! |  |  | 0.0% |
| % Bike |  | 0.0% | #DIV/0! |  |  | 0.0% |
| Unknown | destination | <1% trips | non incl. | in tables |  |  |

HBU.OP MS\_HBU\_OFFPEAK\_Calibrate\_E OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **On Board** | **Survey** |  | **MRM1701\_CBD** | | **2013** |  |
| **HBU** |  | **PEAK** |  |  |  |  |
|  |  | NonCBD | CBD |  |  | Total |
| WalkPrem |  | 165 | 6 |  |  | 171 |
| WalkBus |  | 1,124 | 73 |  |  | 1,196 |
| DrivePrem |  | 95 | 5 |  |  | 100 |
| DriveBus |  | 58 | 0 |  |  | 58 |
| DropPrem |  | 17 | 0 |  |  | 17 |
| DropBus |  | 101 | 0 |  |  | 101 |
|  |  |  |  |  |  |  |
| Prem |  | 1,383 | 84 |  |  | 1,468 |
| Bus |  | 176 | 0 |  |  | 176 |
| Walk |  | 223 | 6 |  |  | 229 |
| Drive |  | 1,140 | 73 |  |  | 1,213 |
| Drop |  | 196 | 5 |  |  | 201 |
| Total |  | 1,559 | 84 |  |  | 1,643 |
| Unknown | income | 2% trips | non incl. | in tables |  |  |
|  |  |  |  |  |  |  |
| **MODE CHOICE TARGETS** | |  |  |  |  |  |
| **HBU** |  | **OFFPEAK** |  |  |  |  |
|  |  | NonCBD | CBD |  |  |  |
|  | Person Trips | 23,040 | 410 |  |  |  |
|  |  |  |  |  |  |  |
| **Transit Survey** | | Inc 1 | Inc 2 |  |  |  |
|  | WalkPrem | 165 | 6 |  |  |  |
|  | WalkBus | 1,124 | 73 |  |  |  |
|  | DrivePrem | 95 | 5 |  |  |  |
|  | DriveBus | 58 | 0 |  |  |  |
|  | DropPrem | 17 | 0 |  |  |  |
|  | DropBus | 101 | 0 |  |  |  |
|  | Transit | 1,559 | 84 |  |  |  |
| **Transit ALTERATIONS - TARGETS** | | |  |  |  |  |
|  | WalkPrem | 165 | **9** | 11% |  |  |
|  | WalkBus | 1,124 | **61** | 72% |  |  |
|  | DrivePrem | 95 | **5** | 6% |  |  |
|  | DriveBus | 58 | **3** | 4% |  |  |
|  | DropPrem | 17 | **1** | 1% |  |  |
|  | DropBus | 101 | **5** | 6% |  |  |
|  | Transit | 1,559 | 84 |  |  |  |
| **Transit - CBD USE NONCBD PERCENTAGES** | | | | | |  |

HBU.OP MS\_HBU\_OFFPEAK\_Calibrate\_E OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Walk/Bike Percentage Home Survey** | | | | | |
| **Person** | **Trips** | NonCBD | CBD |  |  |
|  | Walk | 0.0% | #DIV/0! |  |  |
|  | Bike | 0.0% | #DIV/0! |  |  |
| **Walk/Bike Percentage ALTERATIONS - USE HBO** | | | |  |  |
|  | Walk | **7.6%** | **3.2%** |  |  |
|  | Bike | **0.3%** | **0.2%** |  |  |
| **Walk / Bike Targets** | |  |  |  |  |
|  | Walk | 1,760 | 13 |  |  |
|  | Bike | 58 | 1 |  |  |
| **All except Inc 4 walk (2%) - use same percentages from Non-CBD** | | | | | |
| **Highway Person Trips** | |  |  |  |  |
|  | Person-Auto | 19,663 | 312 |  |  |
|  |  |  |  |  |  |
| **Auto Occ - Percentage auto trips - Home Survey** | | | |  |  |
|  | Drive alone | 80.4% | #DIV/0! |  |  |
|  | Pool 2 | 16.3% | #DIV/0! |  |  |
|  | Pool 3+ | 3.3% | #DIV/0! |  |  |
| **Auto Occ - Percent ALTERATIONS - CBD Use NonCBD** | | | | |  |
|  | Drive alone | 80.4% | **78.7%** |  |  |
|  | Pool 2 | 16.3% | **14.9%** |  |  |
|  | Pool 3+ | 3.3% | **6.4%** |  |  |
| **Auto Person Trips** | |  |  |  |  |
|  | Drive alone | 15,804 | 245 |  |  |
|  | Pool 2 | 3,209 | 46 |  |  |
|  | Pool 3+ | 650 | 20 |  |  |
| **Use Auto occupany from Non-CBD** | | |  |  |  |

HBU.OP MS\_HBU\_OFFPEAK\_Calibrate\_E OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TARGETS TO MODE CHOICE CALIBRATION** | | | | | | | | | | | | | |
| MODE | | **OFFPEAK** | NOD CBD | | | CBD | |  | |  | | Min\_Const | Max\_Const |
| AUTO | |  | 19,663 | | | 312 | |  | |  | | 0 | 0 |
| TRANSIT | |  | 1,559 | | | 84 | |  | |  | | -6 | 6 |
| WALKBIKE | |  | 1,818 | | | 14 | |  | |  | | -6 | 6 |
| SOV | |  | 15,804 | | | 245 | |  | |  | | 0 | 0 |
| HOV | |  | 3,859 | | | 66 | |  | |  | | -6 | 6 |
| POOL2 | |  | 3,209 | | | 46 | |  | |  | | -6 | 6 |
| POOL3 | |  | 650 | | | 20 | |  | |  | | -6 | 6 |
| WALKTRAN | |  | 1,289 | | | 70 | |  | |  | | -6 | 6 |
| DRIVETRAN | |  | 152 | | | 8 | |  | |  | | -6 | 6 |
| DROPTRAN | |  | 118 | | | 6 | |  | |  | | -6 | 6 |
| WALKPREM | |  | 165 | | | 9 | |  | |  | | -6 | 6 |
| WALKBUS | |  | 1,124 | | | 61 | |  | |  | | -6 | 6 |
| DRIVEPREM | |  | 95 | | | 5 | |  | |  | | -6 | 6 |
| DRIVEBUS | |  | 58 | | | 3 | |  | |  | | -6 | 6 |
| DROPPREM | |  | 17 | | | 1 | |  | |  | | -6 | 6 |
| DROPBUS | |  | 101 | | | 5 | |  | |  | | -6 | 6 |
| WALK | |  | 1,760 | | | 13 | |  | |  | | -6 | 6 |
| BIKE | |  | 58 | | | 1 | |  | |  | | -6 | 6 |
| **Trips** | **HBU\_OffPeak\_Data** | | | | **Iteration** | | **10** | |  | |
| MODE | **OFFPEAK** | | | **NonCBD** | **CBD** | |  | |  | |
| AUTO |  | | | 19,671 | 312 | | 0 | | 0 | |
| TRANSIT |  | | | 1,551 | 84 | | 0 | | 0 | |
| WALKBIKE |  | | | 1,818 | 14 | | 0 | | 0 | |
| SOV |  | | | 15,811 | 246 | | 0 | | 0 | |
| HOV |  | | | 3,861 | 66 | | 0 | | 0 | |
| POOL2 |  | | | 3,210 | 46 | | 0 | | 0 | |
| POOL3 |  | | | 650 | 20 | | 0 | | 0 | |
| WALKTRAN |  | | | 1,280 | 70 | | 0 | | 0 | |
| DRIVETRAN |  | | | 153 | 8 | | 0 | | 0 | |
| DROPTRAN |  | | | 118 | 6 | | 0 | | 0 | |
| WALKPREM |  | | | 140 | 7 | | 0 | | 0 | |
| WALKBUS |  | | | 1,139 | 62 | | 0 | | 0 | |
| DRIVEPREM |  | | | 95 | 5 | | 0 | | 0 | |
| DRIVEBUS |  | | | 58 | 3 | | 0 | | 0 | |
| DROPPREM |  | | | 16 | 1 | | 0 | | 0 | |
| DROPBUS |  | | | 102 | 5 | | 0 | | 0 | |
| WALK |  | | | 1,622 | 13 | | 0 | | 0 | |
| BIKE |  | | | 196 | 1 | | 0 | | 0 | |

HBU.OP MS\_HBU\_OFFPEAK\_Calibrate\_E OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DIFFERENCE FROM TARGETS (Output-Targets)** | | | |  |  |
| MODE | **OFFPEAK** | **NonCBD** | **CBD** |  |  |
| AUTO |  | 8 | 0 |  |  |
| TRANSIT |  | -8 | 0 |  |  |
| WALKBIKE |  | 0 | 0 |  |  |
| SOV |  | 7 | 1 |  |  |
| HOV |  | 2 | 0 |  |  |
| POOL2 |  | 1 | 0 |  |  |
| POOL3 |  | 0 | 0 |  |  |
| WALKTRAN |  | -9 | 0 |  |  |
| DRIVETRAN |  | 1 | 0 |  |  |
| DROPTRAN |  | 0 | 0 |  |  |
| WALKPREM |  | -25 | -2 |  |  |
| WALKBUS |  | 15 | 1 |  |  |
| DRIVEPREM |  | 0 | 0 |  |  |
| DRIVEBUS |  | 0 | 0 |  |  |
| DROPPREM |  | -1 | 0 |  |  |
| DROPBUS |  | 1 | 0 |  |  |
| WALK |  | -138 | 0 |  |  |
| BIKE |  | 138 | 0 |  |  |

HBU.OP MS\_HBU\_OFFPEAK\_Calibrate\_E OFFPEAK nonCBD/CBD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Constants** |  |  |  |  |  |
| MODE | **OFFPEAK** | **NonCBD** | **CBD** |  |  |
| AUTO |  | 0 | 0 |  |  |
| TRANSIT |  | 0.973399 | 0.372867 |  |  |
| WALKBIKE |  | 3.075769 | 0.763795 |  |  |
| SOV |  | 0 | 0 |  |  |
| HOV |  | -1.899784 | -2.129743 |  |  |
| POOL2 |  | 0 | 0 |  |  |
| POOL3 |  | -1.981373 | -1.45649 |  |  |
| WALKTRAN |  | 0 | 0 |  |  |
| DRIVETRAN |  | -1.213099 | -1.67418 |  |  |
| DROPTRAN |  | -3.781218 | -3.895956 |  |  |
| WALKPREM |  | 0 | 0 |  |  |
| WALKBUS |  | 1.962915 | 2.042189 |  |  |
| DRIVEPREM |  | 0 | 0 |  |  |
| DRIVEBUS |  | -0.41591 | -1.010546 |  |  |
| DROPPREM |  | 0 | 0 |  |  |
| DROPBUS |  | 0.810761 | 1.429847 |  |  |
| WALK |  | 0 | 0 |  |  |
| BIKE |  | -6 | -5.041991 |  |  |

## Calibration Process Notes

### Round A

Dated 170209 and 170210

Targets primarily from surveys – adjusted to reflect zero or very low values from surveys. Walk/Bike and Auto Occupancy to CBD are the main culprits.

Initially run on the 9th and 10th, but rerun 2/15 after nulling out Naveen’s bias constants

#### HBW Peak

MS\_HBW\_Peak\_Calibrate\_A\_170209

**Bias Constants – all zero**

Transit - CBD – replace 0 trips with 1 (Drop Prem inc 1 and 3)

Walk / Bike – CBD – use non-cbd percentages except Walk – Income 4 (2.0% instead of 0.2%)

Auto Occupancy – CBD – Use non-cbd percentages

MS\_HBW\_Peak\_Calibrate\_A\_Bias1\_170209

Bias Constants

CBD DrivePrem 1,1,1,1 test to see what happens

MS\_HBW\_Peak\_Calibrate\_A\_Bias2\_170209

Bias Constants

CBD DrivePrem 0,0, 1, 1

DriveBus 0,0,-1,-1

Iterations = 5 – may not be enough

MS\_HBW\_Peak\_Calibrate\_A\_Bias3\_170216

Bias Constants

CBD DrivePrem 1, 1, 2, 2

DriveBus -1, -1,-2,-2

Iterations = 5

#### HBW OffPeak

MS\_HBW\_OffPeak\_Calibrate\_A\_170209

**Bias Constants – all zero**

Transit - CBD – replace 0 trips with 1 (Several)

Walk / Bike – CBD – use non-cbd percentages except Walk – Income 4 (5.5% instead of 0.2%)

Auto Occupancy – CBD – Use non-cbd percentages

#### HBO Peak

MS\_HBO\_Peak\_Calibrate\_A\_170209

**Bias Constants – all zero**

Transit - CBD – replace 0 trips with 1 (Several)

Walk / Bike – Inc 1 and 3 0 % changed to 0.1% (non-CBD), CBD – use non-cbd percentages Auto Occupancy – CBD – Use non-cbd percentages

#### HBO OffPeak

MS\_HBO\_OffPeak\_Calibrate\_A\_170209

**Bias Constants – all zero**

Transit - NonCBD, CBD – replace 0 trips with 1 (Several)

Walk / Bike – Inc 2 and 3 0 % changed to 0.1% (non-CBD),

CBD – use non-cbd percentages except walk inc 1 **(24.7%)** and inc 4 **(9.5%)**

Auto Occupancy – CBD – Use non-cbd percentages

#### NHB Peak

MS\_NHB\_Calibrate\_A\_170210

**Bias Constants – all zero**

Transit - non CBD/CBD - replace 0 trips with 1 (Several)

Walk / Bike – Bike CBD changed from 0 to 0.2% (same as non-CBD)

#### NHB OffPeak

MS\_NHB\_Calibrate\_A\_170210

**Bias Constants – all zero**

Transit - non CBD/CBD - replace 0 trips with 1 (Several)

Walk / Bike – Bike CBD changed from 0 to 0.2% (same as non-CBD)

#### HBU Peak

MS\_HBU\_Calibrate\_A\_170210

**Bias Constants – all zero**

Transit - CBD – all approach with same % as nonCBD

Walk / Bike - all – use HBO %

Auto Occupancy – CBD – Use non-cbd percentages

HBU surveyed trips and HBU modeled trips are not particularly good. Most of the survey trips are from the three UNCC shuttles that are not included in the model. HBU is important with the extension to UNCC.

#### HBU OffPeak

MS\_HBU\_Calibrate\_A\_170210

**Bias Constants – all zero**

Transit - CBD – all approach with same % as nonCBD

Walk / Bike - all – use HBO %

Auto Occupancy – CBD – Use non-cbd percentages

See HBU Peak comment

### Proceed to Assignment

### Calibrate B

#### Dwell Time

All Transit Paths in Calibrate A had extremely high dwell times – TC 7 uses Dwell Time On and Dwell Time Off. At the advice of Caliper, I made the following update to ***set\_tnet.rsc***

// TC ver 7 repair - 2/2017

// Opts.Field.[Route Dwell Time] = "DWELL"

Opts.Field.[Route Dwell On Time] = "DWELL"

Opts.Field.[Route Dwell Off Time] = "DWELL"

Path dwell times were back to zeros (dwell time included in schedules, not modeled separately). I kept the Bias constants from calib A. (so far)

#### Mode Choice

HBW Peak went high on premium drives. I am going to leave it for now to see what happens with assignment. All other purposes / peak-offpeak look better.

Calibrate C

Although mode choice targets matched quite well, light-rail boardings are well below that surveyed

Modeled trips were over 1,400 lower than observed. The largest difference is in walk approach trips. NHB trips were adjusted first (run 4a). NHB trips are generally less reliable to predict because people tend to forget side-trips when reporting on home-interview surveys. For rail trips, NHB trips would be commonly be short trips starting at work or other non-home location for a meal or shopping.

Through several iterations, the trips shown in table 3 contain trips added to premium transit categories. following trips were added to For run 4a, walk to premium trips were added to mode choice targets. To balance the added premium transit trips, the same number of trips were removed from **non-transit** modes proportionally to their total number of person trips. The added trips are greater than the 1,400 lower boardings because the calibration program could not add sufficient trips without reaching the cap on constants (described below). Even with the higher targets, Blue Line boardings are still 600 lower than observed ridership as shown on table X.