MUG Meeting

Wednesday, July 23, 2025

Agenda

- Welcome & Announcements
- TDM23.2.1 - Next Model Release
- Boston Region STOPS
- Post-Pandemic Analysis
- Population Sampler
- Q&A

Welcome & Announcements

Welcome

MUG Meetings

- New releases (Latest: TDM23.2.0 on April 30th 2025)
- Sharing modeling best practices
- Engaging with stakeholders

Introductions

- Name
- Organization
- Use of TDM23

Community Announcements

Modeling Mobility Conference (modelingmobility.org): September 14-17

- Model Visualization Workshop
- Decision Making Under Deep Uncertainty Workshop
- Utility Platform
- Post-Pandemic Travel Patterns
- Parking Demand in Regional Models

Growing Team

- Network Specialist
- Model Manager

Model Support / Training

- Upcoming FTA STOPS

TDM23.2.1 - Next Model Release

TDM23.2.1 October 2025 - Next Model Release

- Fixes (TDM23 Issues)
  - Auto Transit Paths have negative values in drive time
  - Worker income splits are incorrect in model code
  - Invalid second path for "Metrics by Population" parameter
  - Debug Mode Produces Slightly Different TA Skims
  - Miscellaneous Network Edits

- Enhancements
  - Define LEAN mode files to keep
  - Subarea extraction from TDM23
  - Review / update summary log files
  - Uncertainty Growth Rate Updates for Publication
  - Add Air Quality results in AssignOnly runs
  - Updates on Utility Platform

- Documentation
  - Data Dictionary
  - Updated S&P Report

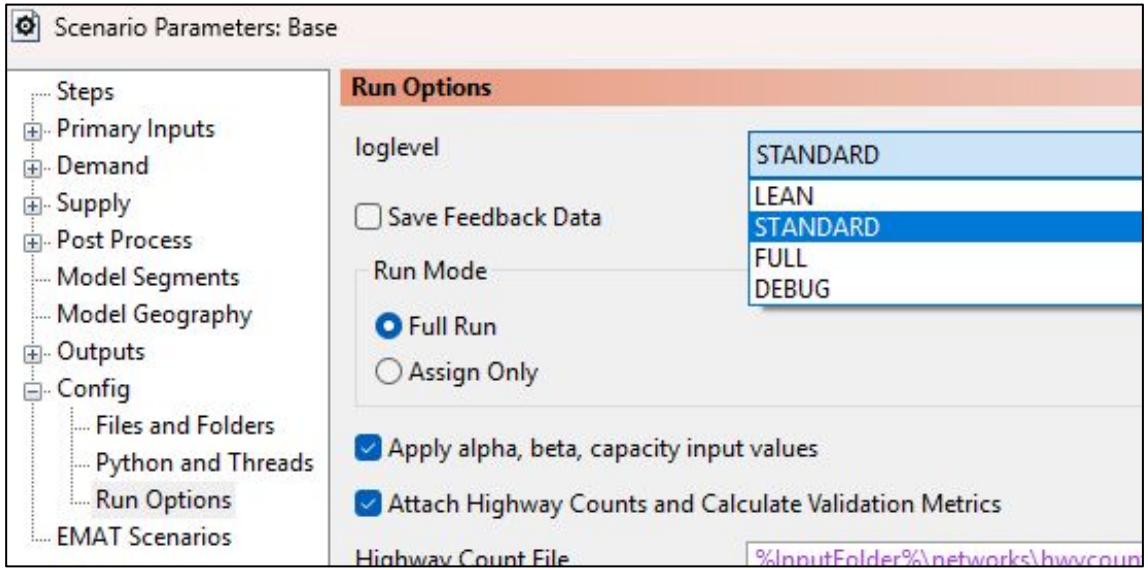
TDM23.2.1 - Model Run Modes

Proposed:

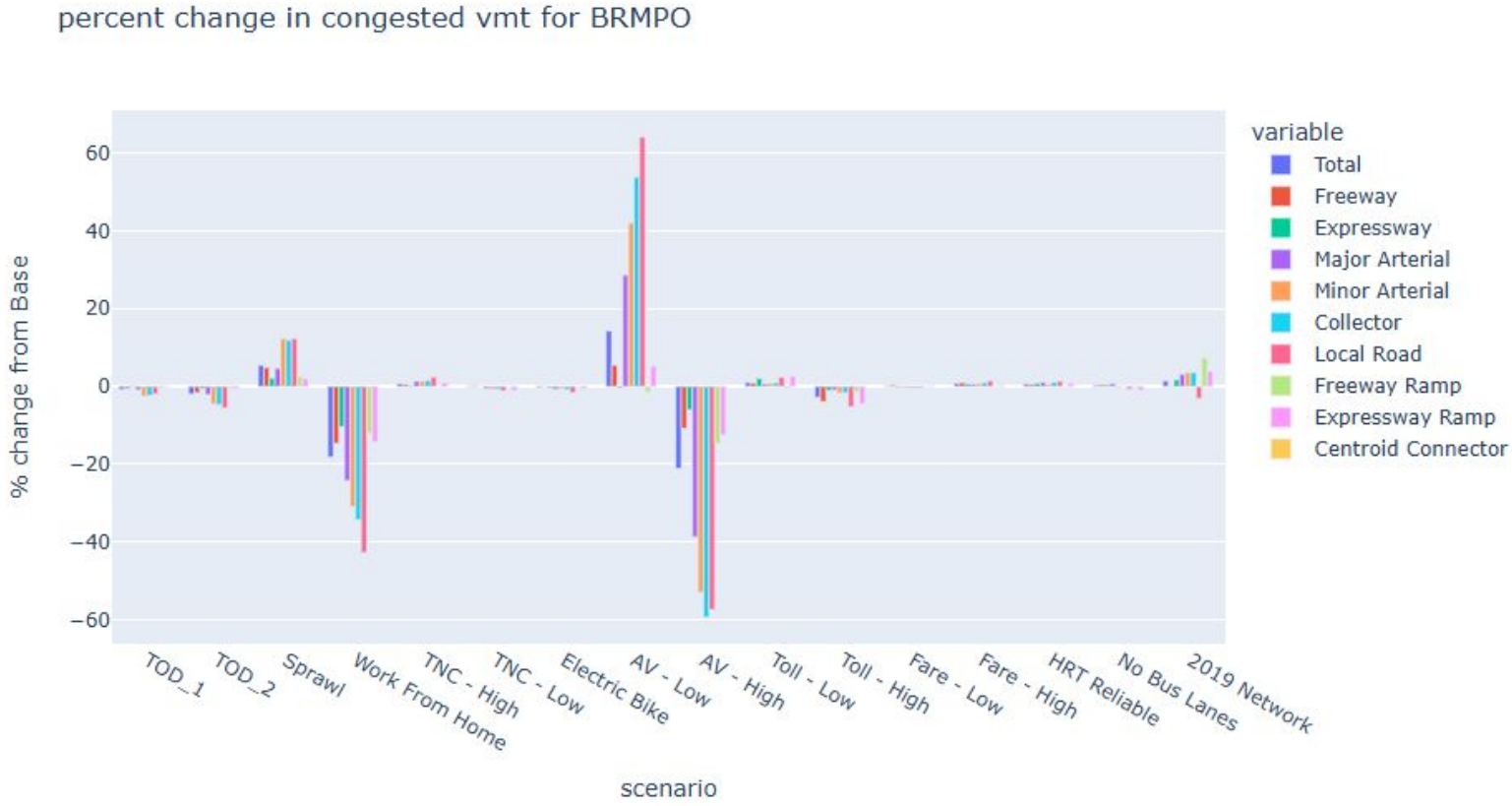
Transit mode-specific skims **only** in DEBUG mode

LEAN mode contains

- Assignment results
- Summaries
- Files required by Utility Platform (except Focus Demand/Supply)



Uncertainty Results



TDM23.2.1 - Subarea Extraction

Process

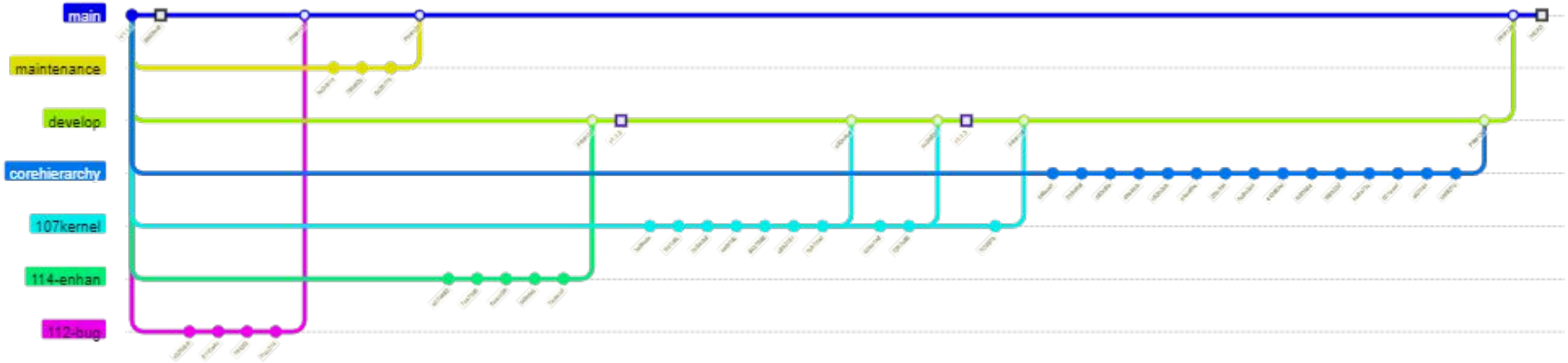
- Clips OD matrix, TAZs, and network to a subarea
- Original OD table and mode share remain unchanged
- Only paths and link volumes are updated
- Enables shorter run times

Guidelines & Testing

- Draft guidelines available
- Seeking volunteers to test
- Final version to be included in User Guide

TDM23.2.1 - Utility Platform

- Summary report bug fix and documentation enhancements
- Platform maintenance and development life cycle building
- Feedback mechanism
- Utility develop, upgrade, release and distribution



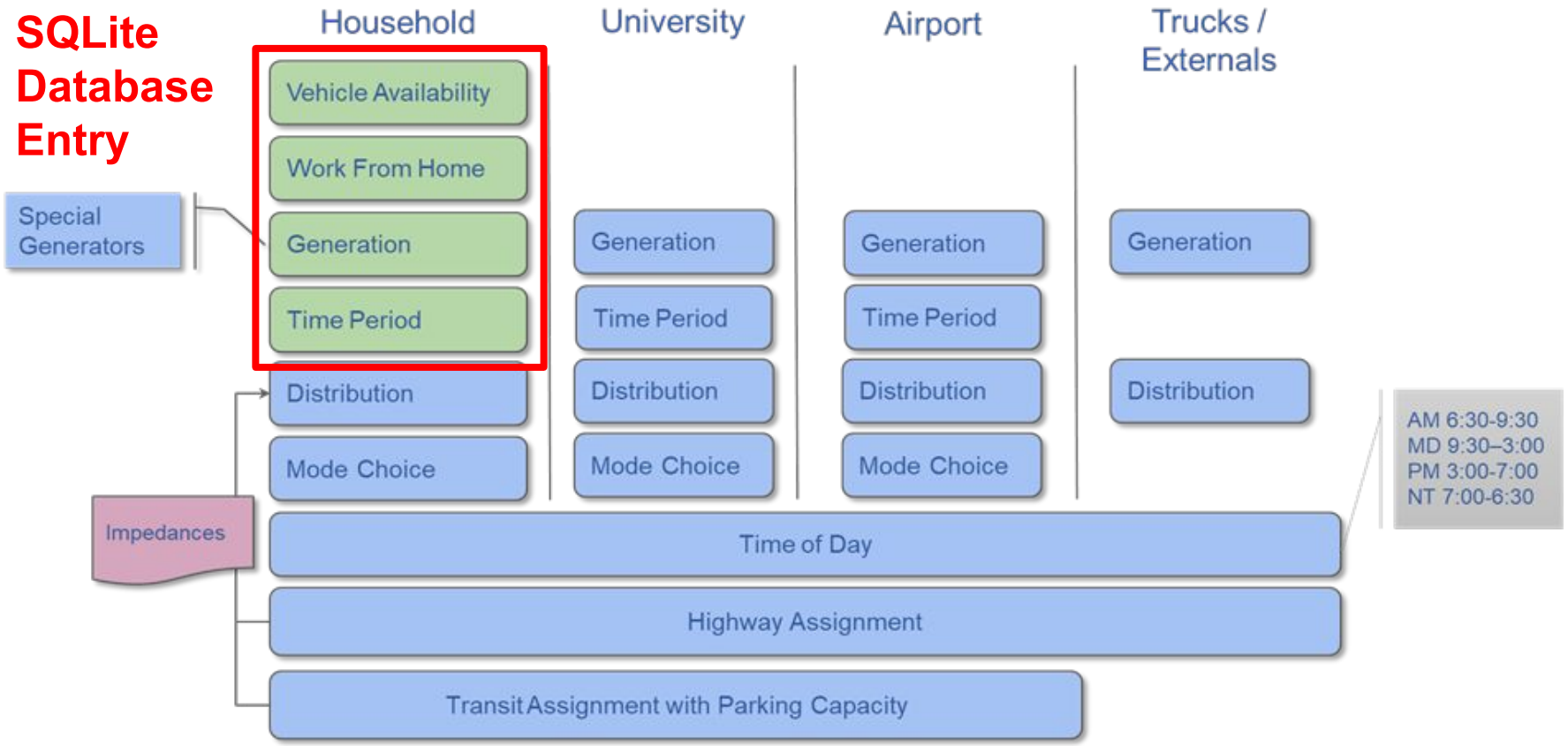
TDM23.2.1 / Summary Files

- **User Request:**
  - TAZ level summary data

TDM23.2.1 / Summary Files

- **Who is familiar with SQLite Databases?**
- **Who enjoys working with SQL Databases?**

TDM23.2.1 / Summary Files



TDM23.2.1 / Summary Files

Summary CSV Files Generated:

- **Median Household Income by TAZ**
- **Total Workers by TAZ**
- **Vehicle Availability by TAZ (iv, sv, zv)**

TDM23.2.1 / Summary Files

SQLite Database Access Utility Tool

Which would you find useful?

Checkbox-Column Selection

Custom Query Text

Grouped Geospatial Level

Data Browsing & Viewing

Other Features?

model.support@ctps.org

Boston Region STOPS

Boston Region STOPS

Simplified Trips-on-Project Software (STOPS)

- A streamlined travel model developed by the Federal Transit Administration (FTA)
- Generates ridership forecasts for transit projects
- Makes sophisticated transit forecasting accessible

Boston Region STOPS / Progress Update

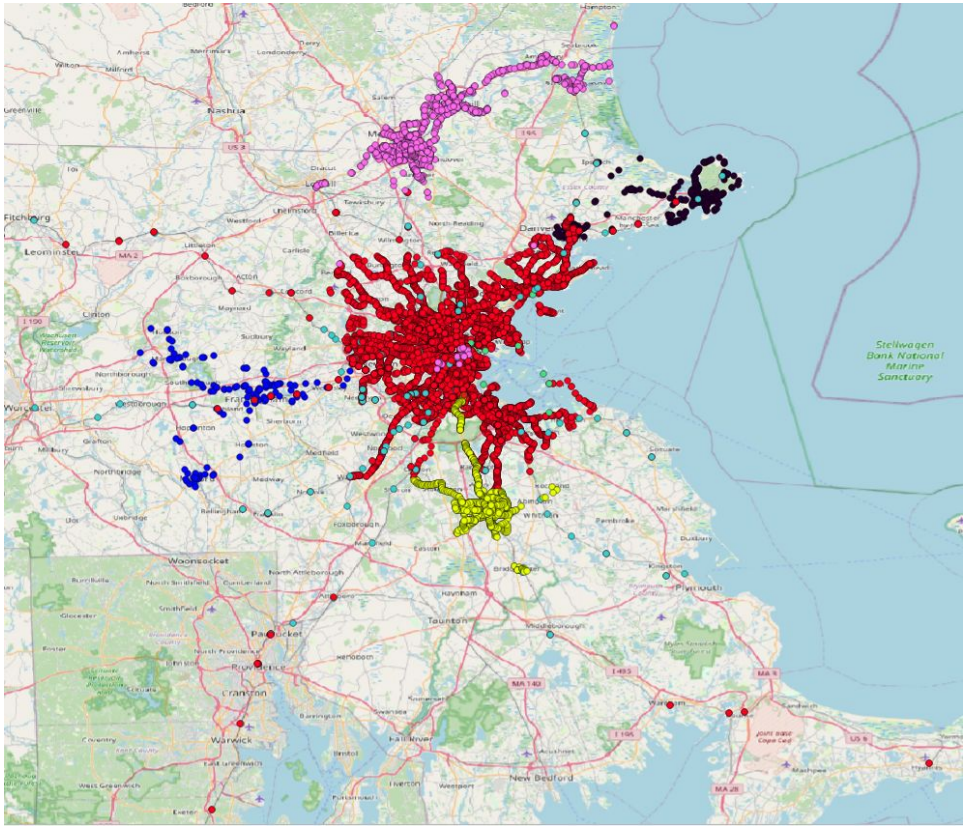
- Model development is now complete
- Plans to provide support

- Rollout in Fall 2025!

Boston Region STOPS / Overview

Transit Included:

- CATA
- MBTA
- MVRTA
- MWRTA



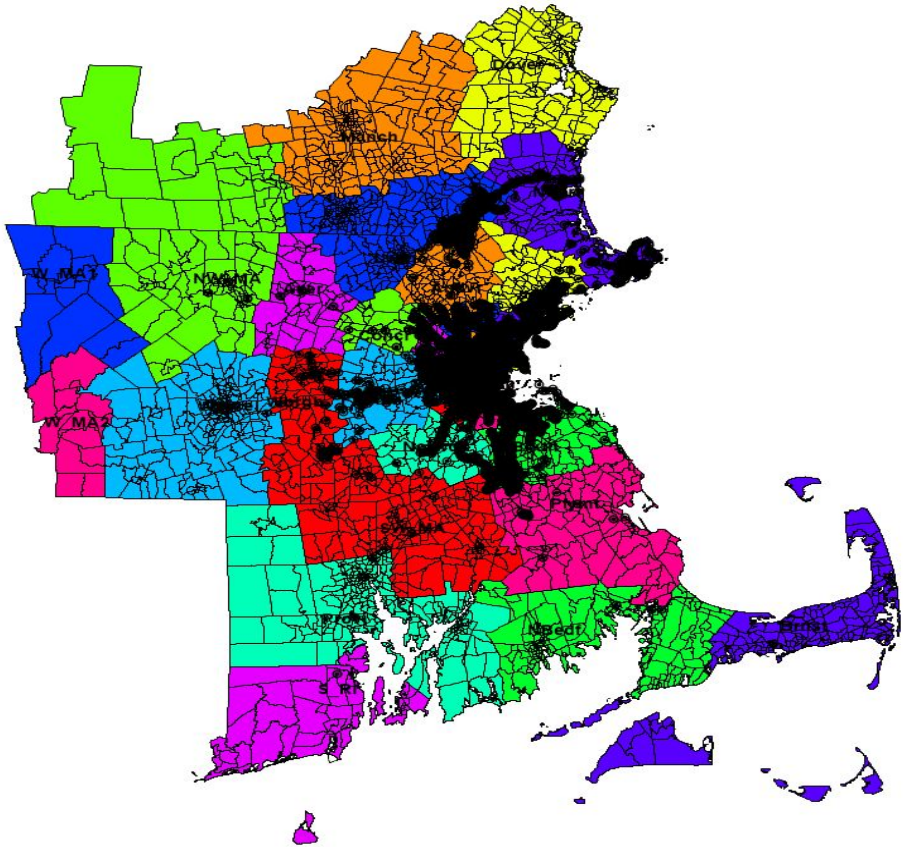
Boston Region STOPS / Overview

Geographic Extent:

- 35 Districts

This is a regional model.

Corridor calibrations may be required for specific projects.



Boston Region STOPS / Scenarios

Scenario Name	MBTA GTFS	Socioeconomics	Highway Skims
Calibration / Existing	Fall 2024	UrbanSim 2019	TDM23 2019
Build 2045	TDM23 2050	UrbanSim 2045	TDM23 2050
2050	TDM23 2050	UrbanSim 2050	TDM23 2050

Boston Region STOPS / Inputs

Model Setup Files

- GTFS Files
- Socioeconomic Data
- Highway Skims
- Route Fares
- Transit Ridership
- 2012-2016 ACS CTPP

Boston Region STOPS / Outputs

Boarding per route

Boarding per stop

System Level Detail

- Change in Automobile Person Miles Traveled
- Average System-Wide Transit Trip Length
- System-Wide Transfers per Trip
- Transit Trips by Trip Purpose
- Transit Trips by Auto Ownership

And a lot more!

Boston Region STOPS / Conclusion

- Ongoing progress to provide structured support
- Comparative model analysis reports
- More to come in the upcoming Rollout!

Link to FTA STOPS:
https://www.transit.dot.gov/funding/grant-programs/capital-investments/stops

Post-Pandemic Analysis

Post-Pandemic Memo

- Significant shifts in travel behavior observed post-pandemic
- Model update needed, but 2024–25 Massachusetts Travel Survey is still pending
- Use 2019 and 2022 Replica data to analyze changes in mobility patterns
- Assess Replica’s effectiveness for model calibration
- Identify model components needing adjustment to reflect post-pandemic behavior

Post-Pandemic Memo: Key Results

Component	Expected Changes	Replica Estimated Changes
Trip Generation	Decrease in total trips	**12.3% increase in total trips**
	Decrease in work trips	-14.5% work trips
	Increase in non-work trips	**26.4% non-work trips**
Trip Distribution	Lower share of work trips to CBD	-7% and -5% work trips to CBD from Ring 1,2 respectively
	Higher share of non-work intra-ring trips	5% non-work intra-ring trips in Ring 0 only
Mode Choice	Higher auto share	2% increase in auto share
	Lower transit share	-51.2% transit share
	Higher share of non-motorized trips	3.1% increase in non-motorized share
Highway	Lower VMT, especially in CBD or on arterials	-24% VMT in Ring 0
		-17% and -16% VMT for major and minor arterials

Post-Pandemic Scenario

- Activate WFH component in TDM23
- Review summary and validation reports
- Assess alignment with Replica and observations
- Evaluate if WFH activation is sufficient to explain post-pandemic behavior

WFH Scenario Testing in TDM23

- **WFH Modes Available**
  - No WFH (default, reflects 2019 baseline)
  - WFH for Workers Only
  - WFH for Employment Only
  - WFH for Both Workers and Employment (uses 2023 wfh rates)
- **Worker WFH Rates**
  - Defined by geography: Model Region, State, MPO, Town/City
  - Use a default rate per region, with overrides for specific areas (e.g., MPOs with distinct trends)
- **Employment WFH Rates**
  - Defined by job sector (not geographic)
- **Data Source**
  - Replica People dataset 2023 (person id, TAZ, job sector, WFH status)

WFH UI in TransCAD

WFH Mode

WFH Mode

- (●) No WFH
- ( ) WFH for workers only
- ( ) WFH for employment only
- ( ) WFH for both workers and employment

Employment

Remote Level by Job Sectors

Code	WFH Rate
1_constr	0.08
2_eduhlth	0.18
3_finance	0.39
4_public	0.32
5_info	0.43
6_ret_leis	0.1
7_manu	0.2
8_other	0.08
9_profbus	0.35
10_ttu	0.12

Workers

Regional Default WFH Rate: 0.21

WFH Rate by State

State	Different from Regional Default	WFH Rate
MA	☐	
NH	☐	
RI	☑	0.16

WFH Rate by MPO

MPO	Different from Regional and State Defaults	WFH Rate
BRMPO	☑	0.25
BRPC	☑	0.05
CCC	☑	0.1
CMRPC	☐	
FRCOG	☑	0.13
MRPC	☐	
MVC	☑	0.1
MVPC	☐	
NMCOG	☐	
NPEDC	☑	0.02
OCPC	☑	0.24
PVPC	☐	
SRPEDD	☐	

☐ Some towns/cities have different WFH rates from the regional/state/MPO defaults.

WFH Rates of these Towns/Cities:

Trip Generation

- Large decrease in HBW/NHBW production trips
- WFH rates do not impact non-work production trips
- Increase in non-work trips in Replica

Productions				
Purpose	**NO WFH**	**WFH**	**Change (%)**	**Replica (2019 vs 2022)**
HBW	6,614,267	5,187,203	-21.58%	-26.79%
HBPB	8,283,843	8,283,843	0.00%	20.11%
HBSC	2,064,901	2,064,901	0.00%	-9.64%
HBSR	7,620,362	7,620,362	0.00%	10.88%
NHBNW	9,387,685	9,387,685	0.00%	23.03%
NHBW	1,786,076	1,401,077	-21.56%	-29.21%

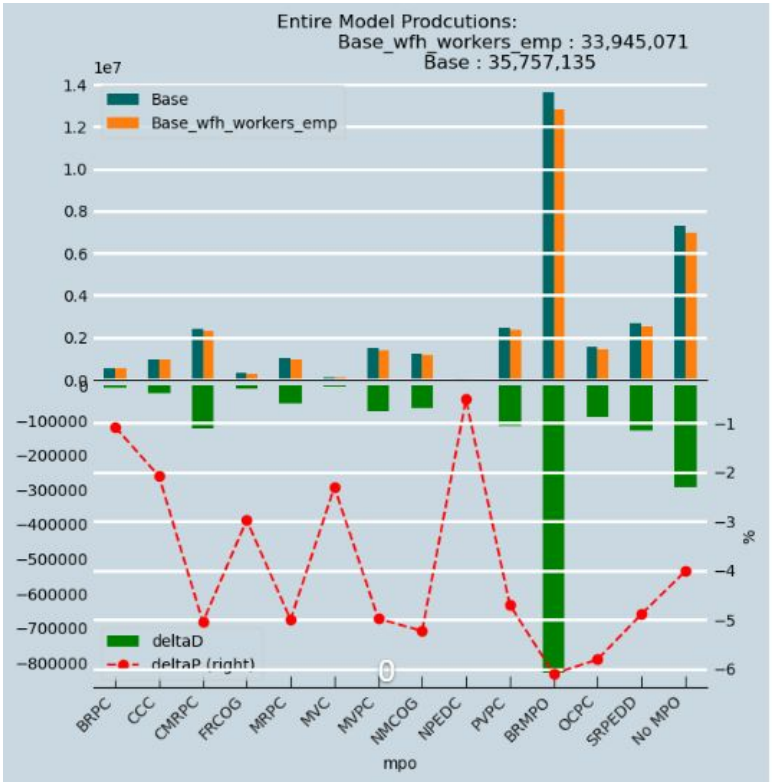
Trip Generation

- Large decrease in HBW/NHBW attraction trips
- Attraction rates impact all purposes apart from HBSC
- Trips are balanced to productions

Attractions				
Purpose	**NO WFH**	**WFH**	**Change (%)**	**Replica (2019 vs 2022)**
HBW	6,573,843	5,212,135	-20.71%	-26.79%
HBPB	8,285,785	7,854,617	-5.20%	20.11%
HBSC	1,119,388	1,119,388	0.00%	-9.64%
HBSR	7,008,437	6,676,424	-4.74%	10.88%
NHBNW	9,009,416	8,409,368	-6.66%	23.03%
NHBW	1,732,248	1,457,185	-15.88%	-29.21%

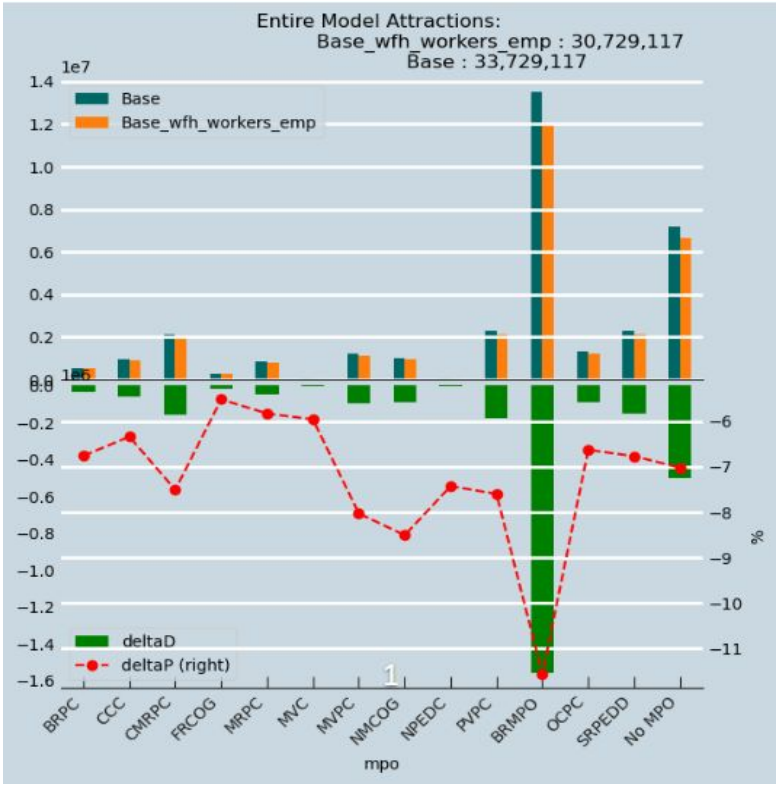
Productions by MPO

- BRMPO's high job concentration led to the largest decrease in production trips
- Higher WFH rate in BRMPO



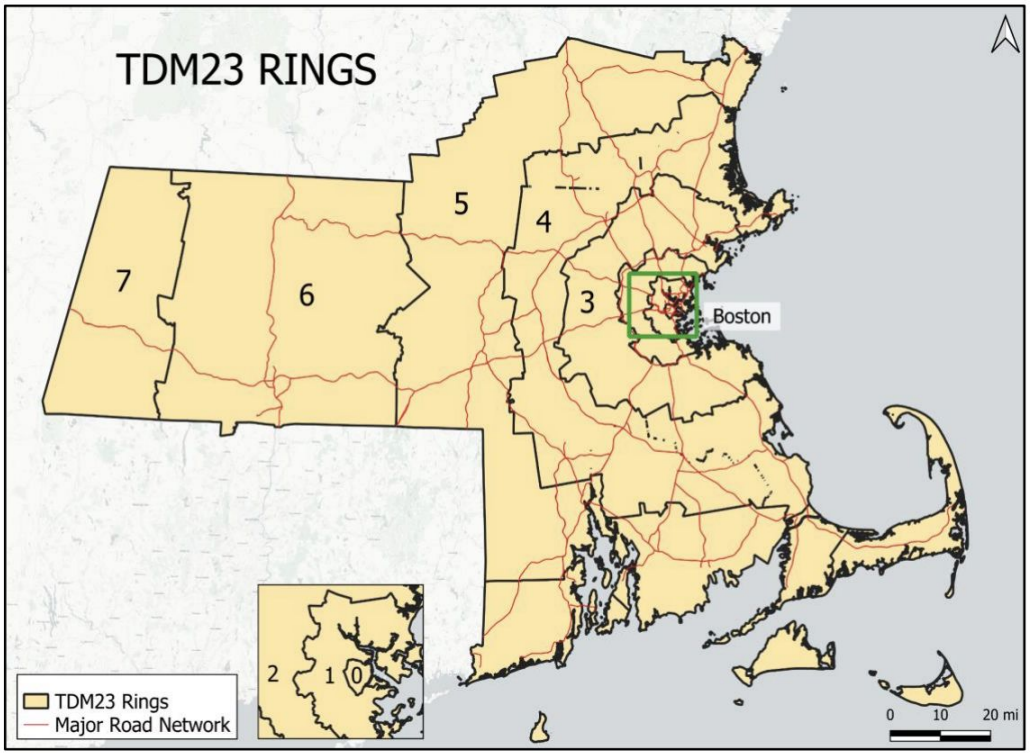
Attractions by MPO

- Similar patterns to production trips but,
- The decrease was more than double due to WFH impacts on other trip types
- BRMPO, as the CBD, experienced the largest impact due to more remote jobs



Trip Distribution

- Trip distribution is analyzed using the production-attraction format



Trip Distribution

Work trips attracted declined most significantly in the CBD (Ring 0)

Work Trips			
Ring	NO WFH	WFH	Change (%)
0	776,164	559,042	-27.97%
1	1,066,927	824,315	-22.74%
2	765,122	590,240	-22.86%
3	1,270,936	973,371	-23.41%
4	1,468,054	1,155,265	-21.31%
5	2,021,156	1,631,054	-19.30%
6	919,687	752,187	-18.21%
7	112,299	102,783	-8.47%
Total	8,400,344	6,588,257	-21.57%

Non work trips attracted to the CBD (Ring 0) decreased and were redistributed to outer rings

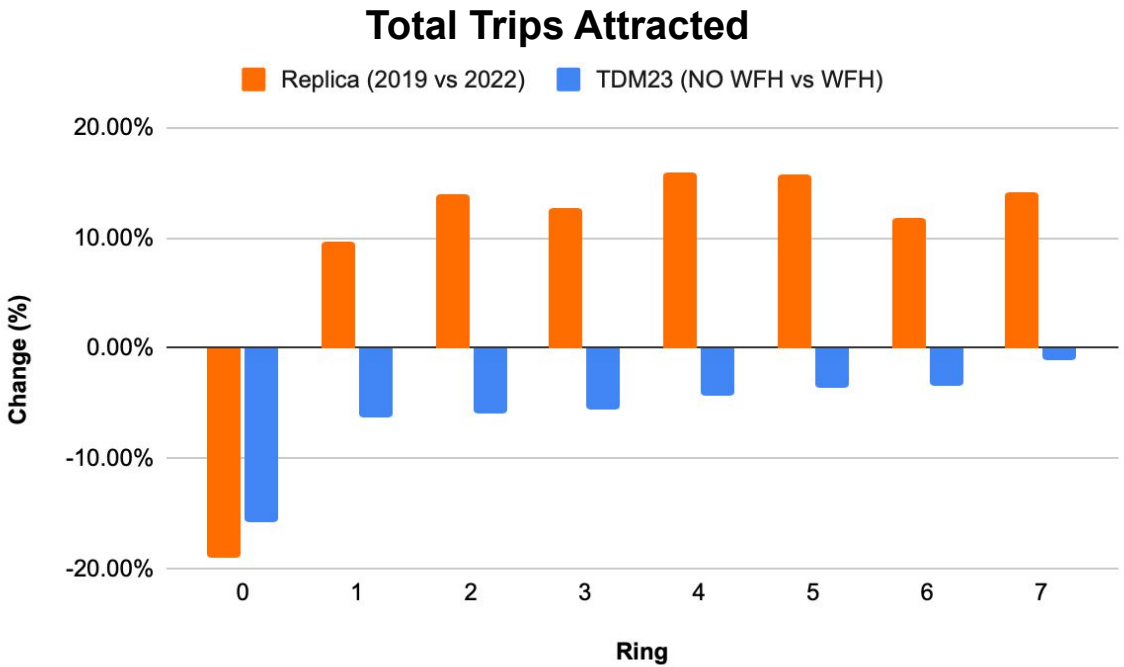
Non-Work Trips			
Ring	NO WFH	WFH	Change (%)
0	946,294	861,996	-8.91%
1	2,842,722	2,850,342	0.27%
2	2,420,741	2,422,510	0.07%
3	4,331,435	4,314,871	-0.38%
4	5,647,134	5,668,885	0.39%
5	7,395,148	7,442,851	0.65%
6	3,385,844	3,404,626	0.55%
7	433,770	437,007	0.75%
Total	27,403,088	27,403,087	0.00%

Trips attracted declined across most rings, but were more profound in Ring 0 due to remote work

Total Trips			
Ring	NO WFH	WFH	Change (%)
0	1,722,457	1,421,038	-17.50%
1	3,909,649	3,674,657	-6.01%
2	3,185,863	3,012,750	-5.43%
3	5,602,371	5,288,242	-5.61%
4	7,115,187	6,824,150	-4.09%
5	9,416,304	9,073,905	-3.64%
6	4,305,530	4,156,812	-3.45%
7	546,069	539,790	-1.15%
Total	35,803,431	33,991,344	-5.06%

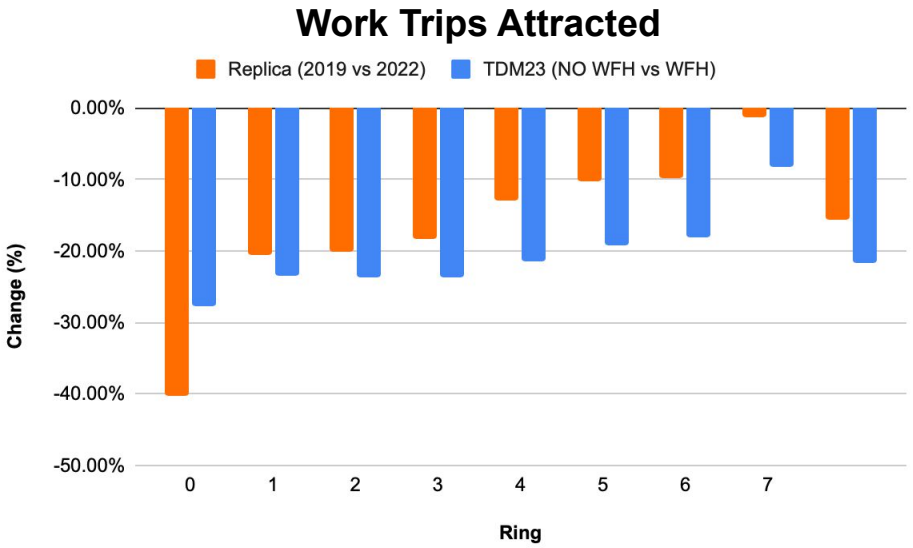
Trip Distribution

- TDM23 and Replica show similar decreases in trips to Ring 0, but differ across other rings
- Replica's increase in trips to outer rings is likely driven by a rise in non-work trips

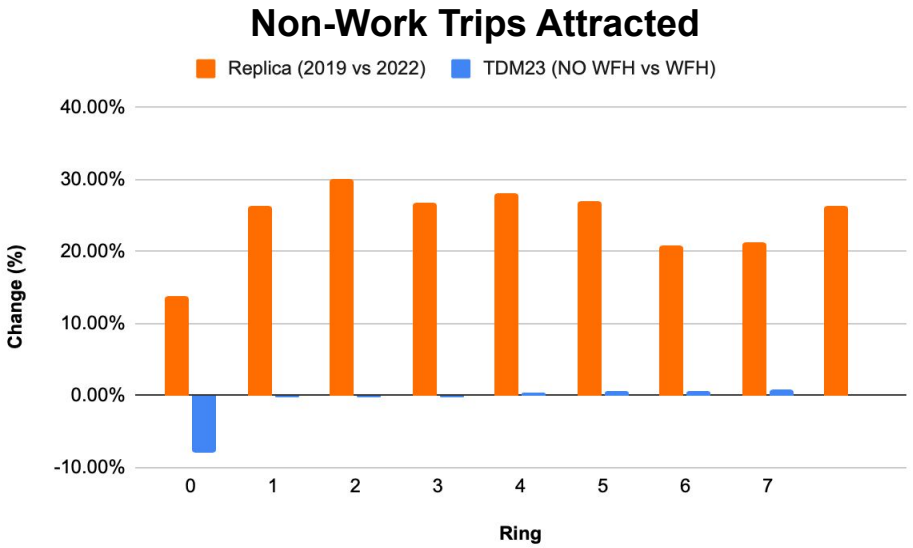


Trip Distribution

- TDM23 and Replica show similar overall work trip changes
- Replica shows a larger drop in work attraction trips to Ring 0



- TDM23 shows fewer non-work trips to Ring 0; Replica shows more to all rings
- Differences may stem from Replica's underlying architecture



Mode Choice

- After implementing WFH in TDM23, the change in mode share does not align with Replica's estimated shift from 2019 to 2022.

Mode	No WFH	WFH	Change (%)	Replica Change (2019 -> 2022)
Auto	86.20%	86.52%	**0.4%**	**2.00%**
Non-motorized	11.45%	11.42%	**-0.2%**	**3.10%**
Public Transit	2.36%	2.05%	**-12.9%**	**-51.20%**

Testing Scenarios with Reduced Transit Utility

- **Scenario 1:** WFH + Transit ASC reduced by 0.5
- **Scenario 2:** WFH + Transit ASC reduced by 1.0
- **Scenario 3:** WFH + Transit ASC reduced by 1.5

Reduced Transit Utility - Mode Choice

Scenario 1

- Public transit share declines in TDM23, but less than in Replica

Mode	No WFH	WFH & -0.5 ASC Transit	Change (%)	Replica Change (2019 -> 2022)
Auto	86.20%	86.96%	0.89%	2.00%
Non-motorized	11.45%	11.61%	1.43%	3.10%
Public Transit	2.36%	1.43%	-39.46%	-51.20%

Scenario 2

- Public transit share declines in TDM23, most closely reflecting Replica's estimated shift

Mode	No WFH	WFH & -1 ASC Transit	Change (%)	Replica Change (2019 -> 2022)
Auto	86.20%	87.28%	1.26%	2.00%
Non-motorized	11.45%	11.75%	2.64%	3.10%
Public Transit	2.36%	0.97%	-58.83%	-51.20%

Scenario 3

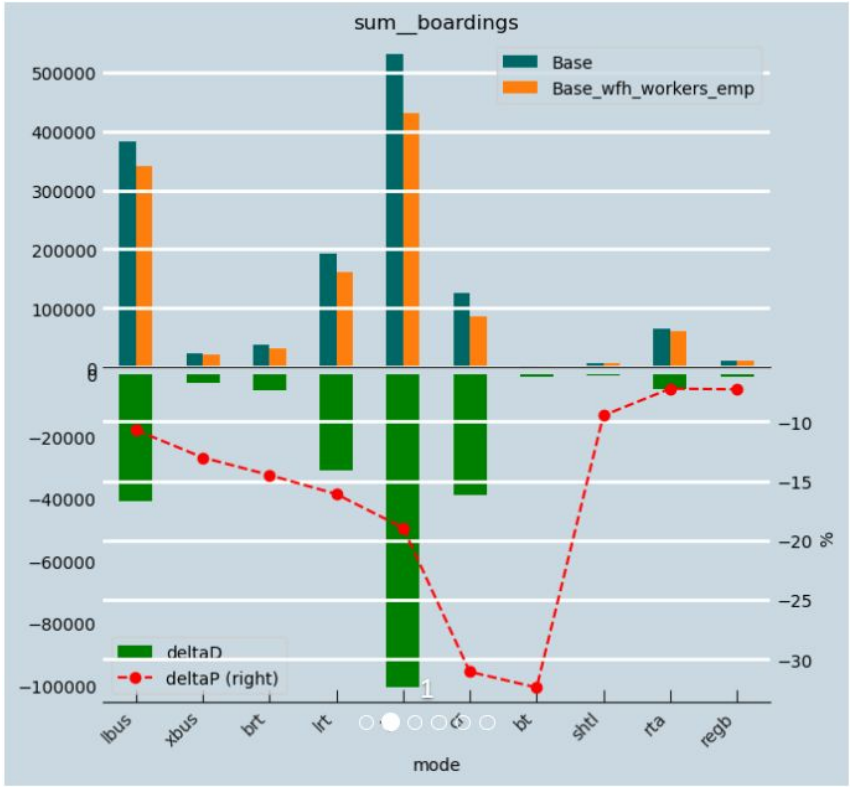
- Public transit share declines more sharply in TDM23 than in Replica

Mode	No WFH	WFH & -1.5 ASC Transit	Change (%)	Replica Change (2019 -> 2022)
Auto	86.20%	87.50%	1.51%	2.00%
Non-motorized	11.45%	11.85%	3.54%	3.10%
Public Transit	2.36%	0.65%	-72.56%	-51.20%

Transit Assignment

- Transit boardings have declined across all modes, with a sharper drop of ~35% in heavy rail and ~15% in commuter rail

- This is due to work trips comprising a large share of overall transit boardings, making the impact of WFH more significant.



Transit Validation

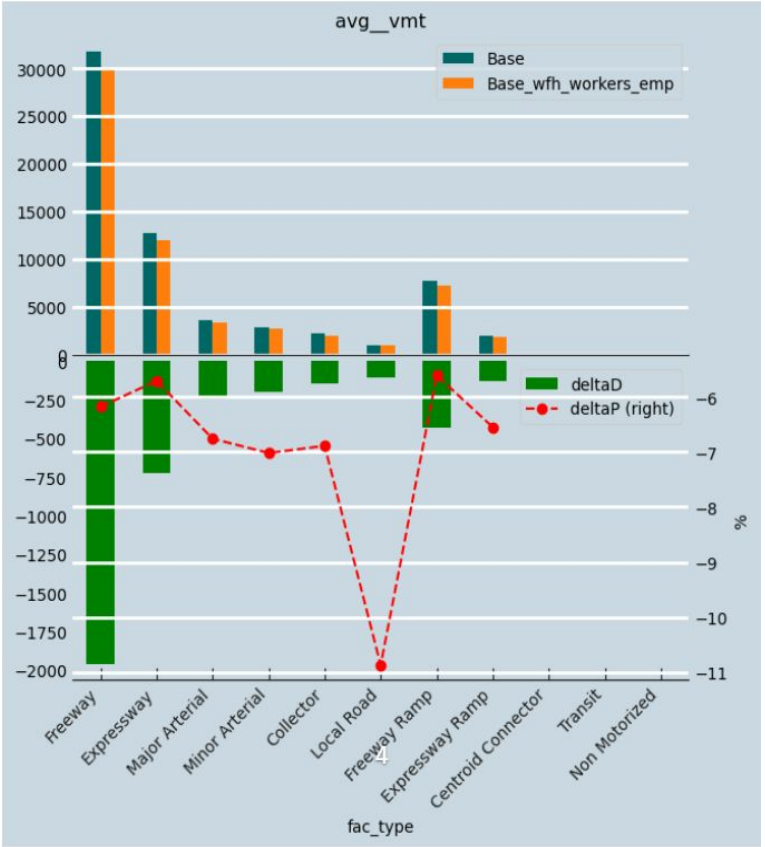
- Modeled boardings exceed observed counts for bus (+40%), light rail, and heavy rail (+33%), but are lower for BRT and commuter rail. This might be due to MBTA closures during that time
- Transit boardings do not match well observed data in the reduced ASC scenario

Mode	MBTA 2022	WFH	Change (%)
bus	261,938	440,375	68.1%
brt	37,981	31,627	-16.7%
lrt	125,667	161,856	28.8%
hr	292,978	430,438	46.9%
cr	84,004	86,697	3.2%
bt	3,259	2,009	-38.4%

Mode	MBTA 2022	WFH & -1 ASC Transit	Change (%)
bus	261,938	194,023	-25.9%
brt	37,981	14,244	-62.5%
lrt	125,667	78,518	-37.5%
hr	292,978	211,777	-27.7%
cr	84,004	40,551	-51.7%
bt	3,259	1,099	-66.3%

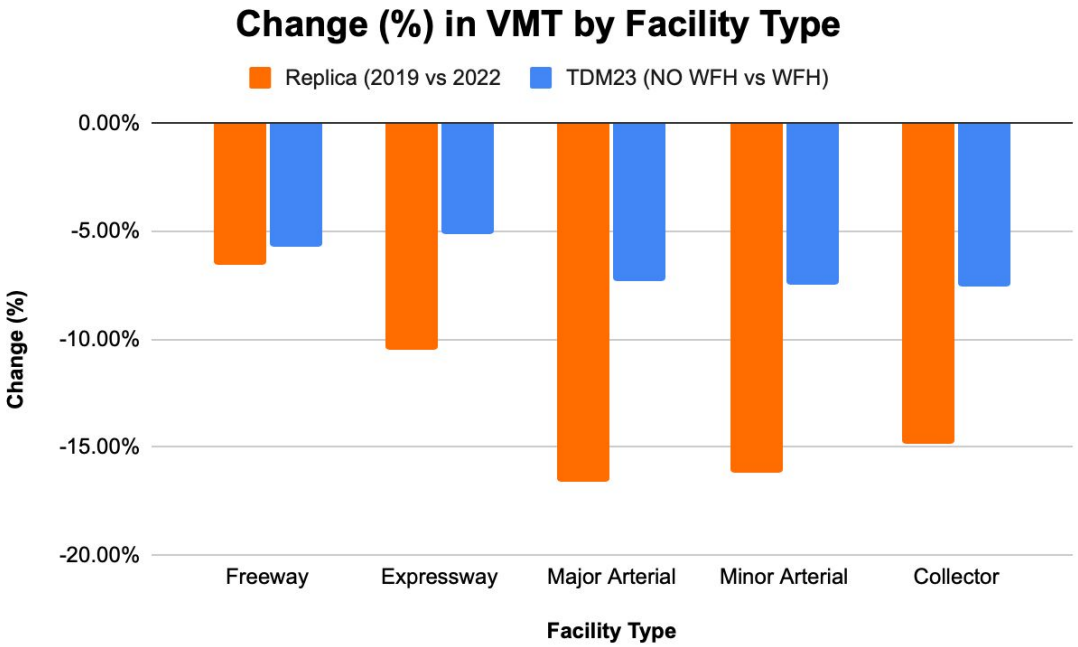
Highway Assignment

- VMT decreases across all facility types, with the largest reductions on freeways and expressways.



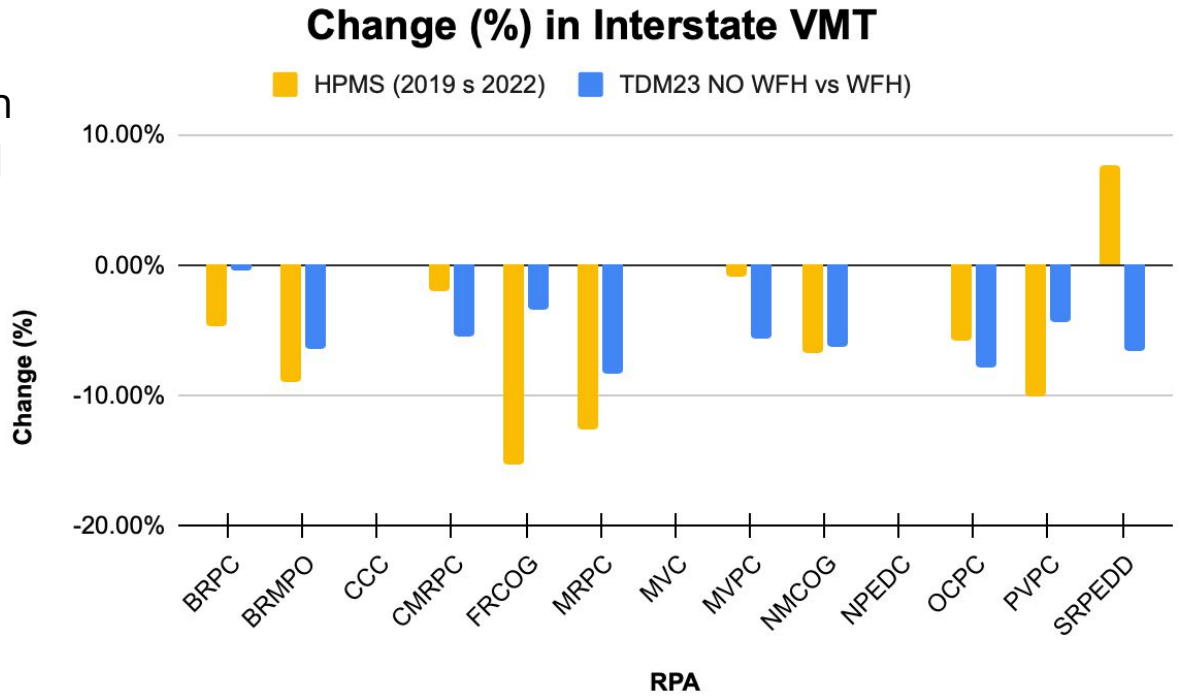
Highway Validation

- VMTs decrease across all facility types, with larger reductions on arterials
- Consistent with Replica's pattern, though smaller in magnitude



Highway Validation

- Interstate VMTs decrease almost across all RPAs in both TDM23 and HPMS



Conclusions & Next Steps

- Activating WFH is not enough to create a post-pandemic scenario
- Replica structure differs a lot from TDM23, but also between years (2022 vs 2024)

- 2024-2025 Massachusetts will be completed soon
- Network updates (e.g., GLX) are underway

Customizing Land Use Data for TDM23

MAPC
METROPOLITAN AREA PLANNING COUNCIL

Conor Gately - Senior Land Use and Transportation Analyst
Data Services Department, MAPC
July 23, 2025

Adjustments to Default Land Use

```
> pop
                        hid        block_id hh_inc persons workers children person_num   age is_worker wage_inc
                     <char>           <i64>  <int>   <int>   <int>    <int>      <int> <int>     <int>    <int>
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      3: 2011000980757_1515209 250010101001009 333470       2       1        0          1    65         0     1135
      4: 2011000980757_1515209 250010101001009 333470       2       1        0          2    64         1   332335
      5: 2012000013066_1726465 250010101001009 225042       2       2        0          1    70         1   198550
     ---
6998450: 2012000718207_2015874 250277614006200 159067       6       1        0          6    45         1    54838
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```

```
> emp
             block_id 1_constr 2_eduhlth 3_finance 4_public 5_info 6_ret_leis 7_manu 8_other 9_profbus 10_ttu total_jobs total_households
                <i64>    <num>     <num>     <num>    <num>  <num>      <num>  <num>   <num>    <num>  <num>      <num>            <num>
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    3: 250010101001009        0         1         0        4      0          0      0       0        0      0          5                4
    4: 250010101001017        0         1         0        0      0          0      0       0        0      0          1                2
    5: 250010101001023        0         0         0        0      0          0      0       0        0     10         10                0
   ---
131531: 250277614003026        0         0         0        0      0          0      0       0        0      0          0                3
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131535: 250277614005023        0         0         0        0      0          0      0       0        0      0          0               10
```
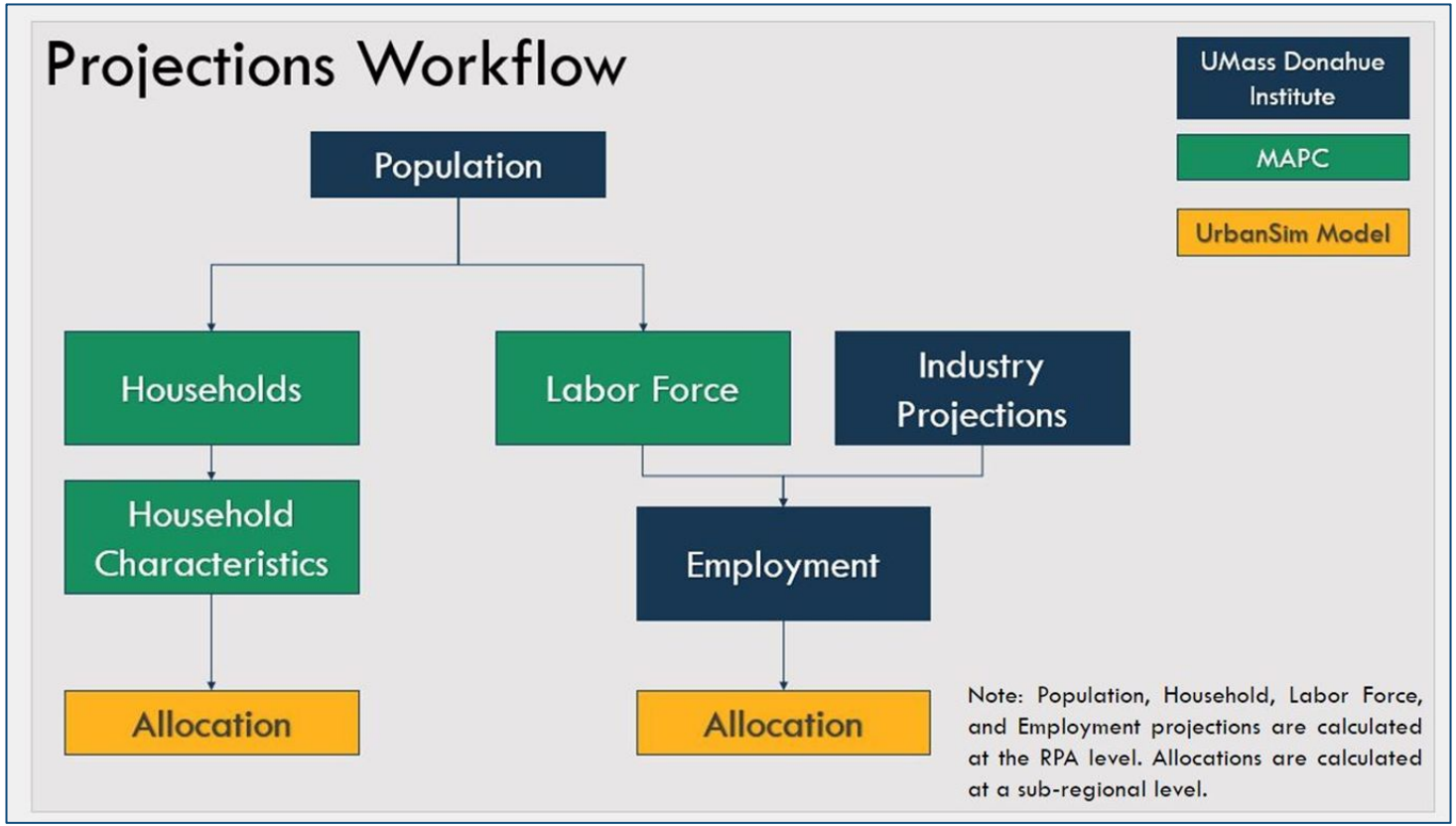

Adjustments to Default Land Use

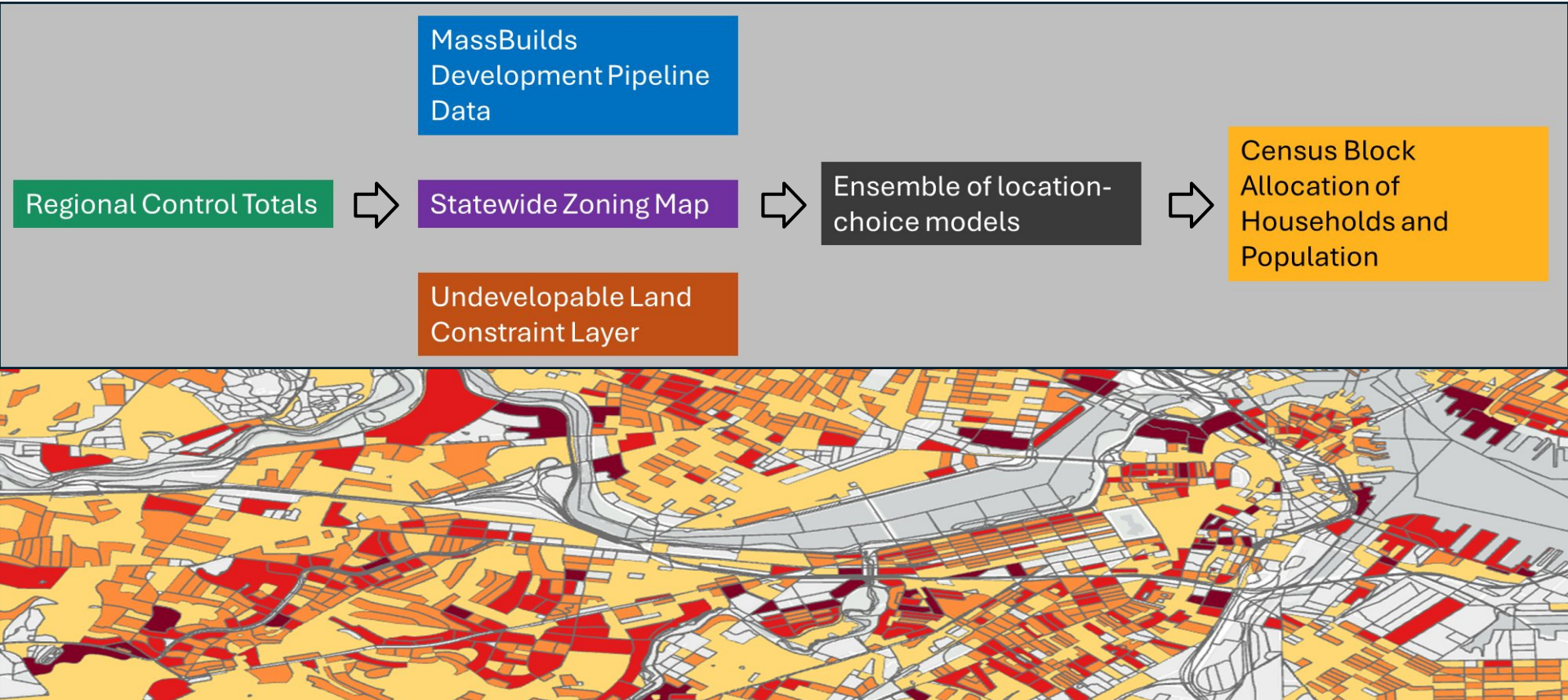
- Adjust number of households in a TAZ
  - Can add or remove households via a random sampling process
  - Additional households can be added by sampling existing households from a predefined set of TAZs

- Adjust number of jobs by sector in a TAZ
  - Can add/remove jobs in specific sectors
  - Can add/remove jobs while maintaining existing sector shares of total jobs

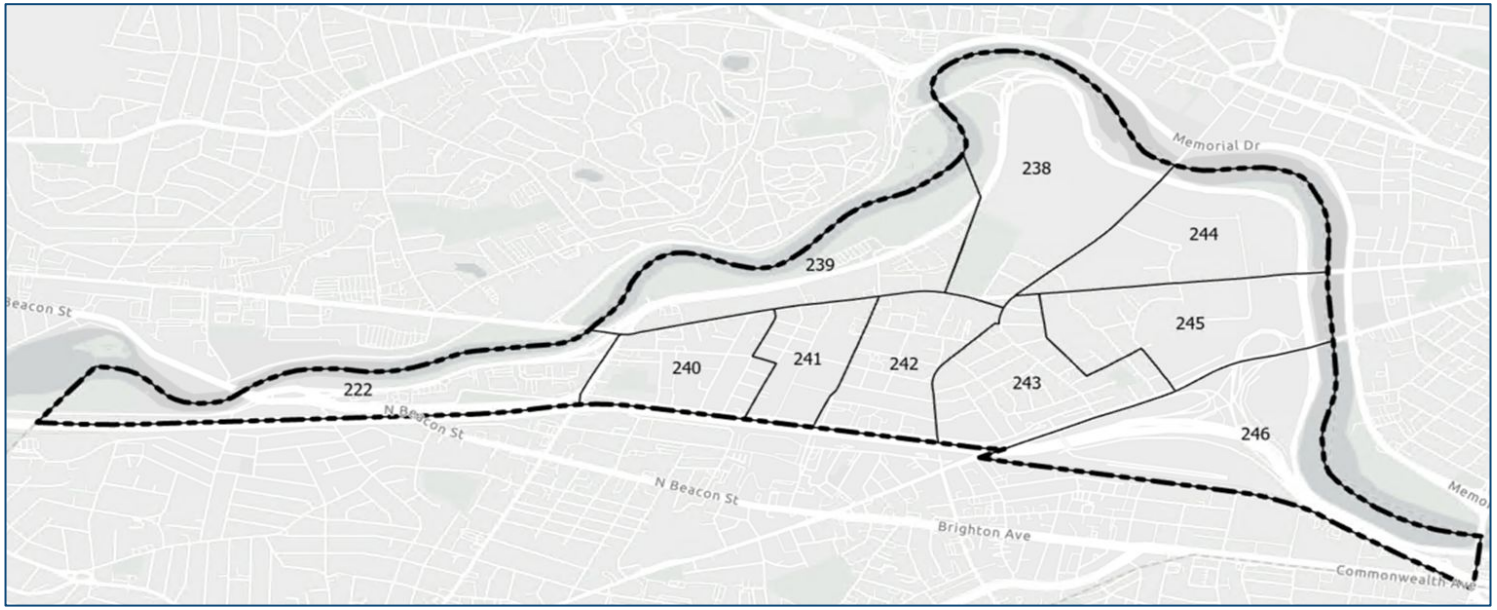
UrbanSim Land Use Allocation Model



UrbanSim Land Use Allocation Model



Adjustments to Default Land Use



Housing Unit Information				
taz_id	Note	Target Units Adjusted for Growt	Additional Units to Add:	New TDM 2050 Total:
222	Households in future year may be low	773	470	773
238		731	42	731
239	Households in future year may be low	1364	404	1364
240		1353	152	1353
241	Households in future year may be low	982	702	982

Adjustments to Default Land Use

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	year	taz_id	hh	emp_tot	emp1	emp2	emp3	emp4	emp5	emp6	emp7	emp8	emp9	emp10
2	2050	222	470	0	0	0	0	0	0	0	0	0	0	0
3	2050	238	42	0	0	0	0	0	0	0	0	0	0	0
4	2050	239	962	4340	0	0	0	0	0	52	0	0	4288	0
5	2050	240	152	0	0	0	0	0	0	0	0	0	0	0
6	2050	241	702	3219	0	0	0	0	0	81	0	0	3138	0
7	2050	242	0	3030	0	0	0	0	0	104	0	0	2926	0
8														

- Worksheet template with the number of additional households and jobs requested for each TAZ
- List of TAZs from which to sample the additional households
  - For employment, we just adjust the block-level numbers directly
  - For households, we sample from blocks in the target TAZs and add those on the original data

Reach out to cgately@mapc.org

Expect lead times of 2-4 weeks

METROPOLITAN AREA PLANNING COUNCIL

Conor Gately - Senior Land Use and Transportation Analyst
Data Services Department, MAPC
July 23, 2025

Q&A

Q&A

- DEBUG vs. FULL vs. LEAN mode?
- Utility Platform feedback?
- Testers for subarea extraction process?
- SQLite utility features?
- Post Pandemic Scenario DIscussion
- Feedback on Land Use adjustment process?

Thank you!
See you in the Fall!