Appendix A

Transit-Oriented Development Buildout Assumptions and Results

Introduction and Objectives

RKG Associates Inc. (RKG) constructed an Excel-based model to test potential development capacity around transit-oriented development (TOD) areas in Fitchburg, Lynn, Springfield, and Worcester. The model is informed by a variety of data sources including stakeholder interviews with local development experts, market studies with city and sub-city economic and demographic data, assessor data, and professional judgment.

The model methodology is standardized across all cities to ensure comparability. The core of the analysis is built around the assessor databases for each of the cities. Once provided with the assessor databases, RKG worked in conjunction with both the cities and MassINC to define the boundaries of the TOD areas under examination. With a defined boundary, approximately a one-half mile radius around each train station, RKG began constructing a model taking into consideration all the nuances related to development potential and capacity.

The overall process for building the model was to:

1. Obtain and verify the accuracy of city assessor data;

2. Quantify existing development in the TOD area;

3. Identify key variables/assumptions used for maximum buildout analysis;

4. Apply assumptions (based on market data, interviews, and professional judgment) to existing assessor data to generate maximum buildout values; and

5. Calculate and allocate net increment between maximum buildout and existing development to residential, commercial, and industrial uses.

Assessor Database

An assessor database file contains all the relevant information related to parcels across a city. Information such as ownership, location, value, size, number of units, etc. is contained within the database for each parcel. RKG obtained the assessor databases for each of the 4 case-study cities and then narrowed the parcels to those within the defined TOD boundary. Once left with the TOD parcels, an existing conditions analysis was conducted to determine the characteristics of those parcels, including size, built square footage, land-use category, assessed value, etc. These are explained below.

Land-Use Classification

Within an assessor's database there are numerous land use codes which identify a parcel's use. As part of the analysis, RKG simplified the classification to four categories: Residential, Commercial, Industrial, and Exempt. Simplifying the land-use classifications was essential for applying the buildout methodology. These were the categories used in the buildout scenarios.

Existing Lot Area

The existing lot area is the total square footage of the parcel. This metric is calculated based on the dimensions of the parcel itself, and is the basis for determining the floor area ratio (FAR).

Gross Building Area

Within the assessor database, the gross building area field provides a metric for how many sf of built space exist on each parcel. This metric takes into consideration all of the covered sf within a building, including the various floors of multistory buildings.

Floor Area Ratio (FAR)

The FAR is a calculation of the ratio between the gross building sf of a parcel and the lot area. The maximum allowable

FAR is often defined in the zoning ordinance. Large FARs indicate high levels of development density, while small FARs indicate a lower development density.

Parcel Specific Information

Specific information about each parcel was used to determine the existing development within the TOD areas. Essential data points from the assessor's database were: existing residential units; residential sf; commercial sf; and industrial sf RKG summarized this data for each city and used it as a starting point for the baseline existing development metrics.

Model Calculations

At a conceptual level, the maximum buildout model created by RKG applies a new average FAR to the existing parcels and then calculates the new residential, commercial, and industrial sf based on allocation factors derived from the market analysis and existing assessor data. The resulting calculation is the maximum potential buildout within the TOD district. Within the model, precautions were taken to ensure:

- Some existing tax-exempt property (typically owned by municipalities or non-profits) was *not* included in the maximum buildout unless specifically identified by the city as a potential development site;

- Parcels with single family homes were left unchanged not to increase density in traditional neighborhoods; and

- Parcels with an existing FAR *larger than* the new average FAR were left unchanged, such that radical changes to the overall neighborhood fabric would be minimized. For example, this means that a tall office tower would be assumed to remain in the future, whereas parcels with less than the average FAR would add building sf.

The average FAR approach was used because the zoning in some of the cities allowed for a very high FAR, and when applied across the TOD district yielded wildly unrealistic buildout numbers that would be inconsistent with the development characteristics of the city. If using the FAR allowances from the zoning, the resulting development potential would radically change the city urban fabric and result in high density levels found in major urban cores, such as Boston, which is inconsistent in character to the existing development pattern found in these Gateway Cities.

Average FAR

As part of the baseline market analysis, RKG undertook field research within each of the 4 cities. By talking with city officials and developers, and exploring the communities, the process enabled RKG to better understand the on-the-ground realities found within each community. In conjunction with both the fieldwork and assessor data, RKG delineated the TOD study areas into subareas based on like characteristics such as density, land use, and future development potential. For each of these subareas, an average FAR was calculated based on the parcel level data from the assessor database. The average FAR was used as a factor to apply the maximum build-out across all the parcels in the subarea based on the existing lot areas.

Table 1. Average Floor Area Ratios (FAR)

CITY	HIGHEST FAR	SECOND HIGHEST	THIRD HIGHEST
Fitchburg	1.67	1.20	0.68
Lynn	2.30	1.25	0.54
Springfield	1.67	1.20	0.68
Worcester	1.66	1.14	N/A

Note: The average FARs were calculated using the assessor database.

Estimation and Allocation of New Development

Using the average FAR as a multiplier, a calculation was done to determine the total square footage of development on each parcel across the subareas. This calculation led to the estimate of total development capacity or maximum TOD in each city. The total square footage was the basis to then estimate the optimal TOD buildout in terms of jobs and population.

Based on the total developable square footage, a percentage allocation was applied to approximate the likely residential, commercial, and industrial square footage that would result in the TOD buildout scenario. The maximum developable square footage was compared to the existing total square footage, and the increment of growth (difference) is then allocated to the respective development categories (residential, commercial, and industrial), based on allocation factors that are specific to each city. This method of allocating the increment ensures that aggregate development for all categories is not less than the existing development.[1] After calculating

the allocation of development, the sum totals were used as the maximum potential TOD buildout for each city. The allocation percentages were specific to each community and are shown below.

Table 2. Allocation Factors for Maximum Build-Out

CITY	RESIDENTIAL SF	COMMERCIAL SF	INDUSTRIAL SF
Fitchburg	60%	30%	10%
Lynn	70%	25%	5%
Springfield	60%	30%	10%
Worcester	65%	30%	5%

Note: These allocation factors were derived in coordination with MassINC.

Development Scenarios

To evaluate the potential development within each of the Gateway Cities, two scenarios were developed: 1) status quo and 2) maximum buildout.

Status-Quo

The status quo scenario provides a snapshot of the existing conditions plus near term growth (10 years) expected in each of the Gateway Cities. The status quo scenario utilizes the assessor's database as the base, but through information learned from fieldwork, additions were made to the baseline development numbers found in the assessor's database. These additions were necessary due to an information lag between new/proposed development and its inclusion in the assessor's database. This enabled the quantification and addition of new residential, commercial, and industrial development to the baseline metrics of the status quo scenario. For example, the large-scale mixed use development City Square project in Worcester was generally not in the assessor database even though major portions have recently been completed or will finish construction in 2018. So, that development was added to the status quo scenario.

In addition to these new pipeline projects, RKG included additional potential development absorption based on the market studies that were conducted for each city. This document is available in an online appendix. RKG established allocation parameters for both the Status Quo Scenario.

Maximum TOD Buildout

As stated earlier, the maximum buildout scenario applies large-scale changes to the existing built environment found in the Gateway Cities. This scenario envisions future development and redevelopment potential being allocated to underutilized and vacant sites in the TOD areas. In this way, the maximum buildout represents the long-term TOD potential of each city, recognizing that varying market conditions, transit service levels, and redevelopment incentives could accelerate or slow this long-term redevelopment potential. The idea behind this scenario was to quantify a future where maximum residential and commercial demand blossoms within the TOD district, and to estimate the development *capacity* growth opportunity not currently met by existing conditions.

Within this scenario, the average FAR for each subarea was applied to all the parcels found in each of the TOD areas (unless the parcel already exceeded the average). In some cases, tax-exempt properties were removed from the calculations if it seemed reasonable that those properties would not undergo any major changes in the next 10-15 years. Other tax exempt/municipally-owned properties such as underutilized parking lots were added back into the buildout model to indicate potential development opportunities.

Vacancy

Vacancy metrics were calculated separately but factor into the existing capacity of cities to absorb additional housing units and employment if and when market conditions improve. High vacancy in existing building space is a significant problem in some of the Gateway Cities, especially upper-floor commercial spaces. In some instances, commercial vacancy is close to 60 percent in primarily older [Class B and C] office space that is often not even on the market for redevelopment. There are also first-floor commercial (retail/restaurant) vacancies in most cities. This creates challenges in applying vacancy factors to the three different scenarios. RKG obtained information about residential, commercial, and industrial vacancy from the cities themselves and made comparisons with data obtained from CoStar (a real-estate analytics firm). In general, the CoStar data vastly underestimates vacancies—primarily because it does not include any buildings and spaces that are not actively being marketed. (See the table below for a summary of the vacancy information provided by local development and planning officials.)

Table 3. Vacancy Rates

CITY	RESIDENTIAL SQ. FT.	COMMERCIAL SQ. FT.	INDUSTRIAL SQ. FT.
Fitchburg	5%	50%	20%
Lynn	0%	0%	0%
Springfield	5%	60%	10%
Worcester	5%	20%	10%

Note: These vacancy percentages were provided by each city.

Based on the available data, RKG tested the existing vacancy numbers against the Stronger Policy scenario, which attributes 50 percent of the city-wide market demand to the TOD area, of which 30 percent is created as new. In the case of commercial development, the current high levels of vacancy still outstrip the potential future market demand in nearly every community except for Lynn. The existing high level of commercial vacancy appears to be a structural problem that is difficult to mitigate, especially if rehabilitation costs and obsolesce of existing commercial spaces make it difficult to secure a long-term tenant. Existing residential vacancy within each of the communities was nominal, and thus did not result in any issues related to supply and demand imbalances.

Development Impacts: Housing Units, Population and Employment Calculations

As part of the scenario modeling the final outputs were translated into metrics associated with housing units, population, and employment. This information provides a clear understanding of the development impacts resulting from each development scenario tested.

Housing Units

To determine the number of housing units resulting from each of the scenarios, a standard metric of 1,000 sf per housing unit was applied to the calculated increment of residential development within each of the scenarios. This metric was used because it represents the average size of a new or rehabbed housing unit, typically an apartment or condo, found within urban areas such as the TOD district.

Population Calculations

Once the determination of the number of new housing units was made for each of the different scenarios, RKG then calculated the net new population based on the average household size of 1.7.

Table 7. Employment Multipliers

LAND USE	EMPLOYEE PER SF MULTIPLIER
Commercial	250
Industrial	400

Employment Calculations

To quantify the employment impact resulting from each of the development scenarios, multipliers were applied to the calculated commercial and industrial square footage. The table below shows the multipliers used for commercial and industrial properties. These multipliers were developed in part by looking at industry averages and existing employment within the cities.

Appendix C

Ridership and GHG Estimation

MassINC's Gateway Cities Transformative Transit Oriented Development (TOD) Project is a multi-step, collaborative research initiative to test strategies for leveraging existing rail infrastructure to stimulate growth in the state's Gateway Cities, centered on their rail stations areas. The focus of the transportation modeling research is to forecast commuter rail ridership in the four case study cities of Fitchburg, Lynn, Springfield, and Worcester under different scenarios.

Kittelson & Associates, Inc., has developed a ridership estimation model that tests scenarios involving changes in service, TOD, and station accessibility. This memorandum describes the model's functionality and the research and data used to develop it.

Background

The Gateway Cities ridership estimation model draws on national research from the Transit Cooperative Research Program (TCRP), a national research program administered by Transportation Research Board (TRB) and sponsored by the Federal Transit Administration. The most relevant research related to this project is *TCRP Report 153: Guidelines for Providing Access to Public Transportation Stations*, which establishes a process for planning access to transit stations and the associated ridership implications.[2] The research establishes a foundation upon which the Gateway Cities ridership model was built, centered around three core functions: identifying station typology, predicting station ridership, and estimating access modes of travel in the TOD areas.

Using data for over 450 rail transit stations throughout eight transit systems, TCRP 153 establishes eighteen station types and their corresponding access mode splits. These findings were then used to develop a ridership estimation model for each major access mode (auto, bicycle, walk, or feeder transit). These models take into account the station area's demo-graphic factors (including percentage of zero-car households, and employment and population density) as well as access opportunities (such as the number of parking spaces serving the station and available feeder transit service). The TCRP 153 research included the development of a spreadsheet tool to estimate ridership and impacts to ridership from changes in parking and access opportunities.[3] Several functions of the TCRP 153 ridership estimation tool are adapted for the Gateway Cities ridership model while additional functionality was developed for the model using findings from national research including TCRP 128,[4] NCHRP 758,[5] and relevant research published by TRB[6] and NJDOT/ FHWA.[7]

Gateway Cities Ridership Model

The Gateway Cities model is a set of four spreadsheet tools, with customized versions for the four case study cities. Each tool includes the following elements:

- A primary input tab including station characteristics, area demographics, and ridership data. These have been pre-filled with the necessary data, but can be updated as needed.

- Three function tabs for testing different scenarios. These can be used alone or in combination:

  - Service Changes to travel time, fares and frequency (headways)

  - TOD in terms of additional square feet of retail and office development, and housing units

  - Station Area Investment to improve local (walk, bike) access

- Three tabs contain defaults and assumptions. These are required for model functionality, but are not required to be changed by the user. Local or more current data can be used to update these defaults and assumptions.

The following sections provide more detail for each of these analytical elements.

The main input tab contains information specific to each case study city's station. The four primary sets of inputs are: 1) station type, 2) station parking and access characteristics, 3) station-area demographics, and 4) ridership data. The station type has been selected from the eighteen types identified in TCRP-153, and calibrated to match the access data collected by the MBTA from spring 2016 and spring 2017. The access mode shares for MBTA commuter rail stations were compared to the access mode shares for each station type in TCRP-153, and the most similar station type was selected, accounting for other station characteristics including number of parking spaces, cost of parking, parking utilization, number of bicycle parking spaces, round trip fare to CBD, number of connecting transit lines, transfer fee, and bicycle commute mode share.

The following station-area demographics and employment data were obtained from the U.S. Census Bureau (Table 1):

Since ACS data were collected at the census block groups level, the boundaries can extend beyond the half-mile radius around each station. The data were processed in GIS to estimate the population and household counts within the half-mile area. Job counts within a half-mile area around each station were obtained directly from the LEHD OnTheMap web application.

The final input is the number of average daily boardings at each station, which relies on the MBTA's most recent ridership statistics dating from 2014.[8] The mode splits for the selected station type area applied to the average daily boardings to estimate access mode share by auto (park & ride), auto (drop-off), feeder transit, bicycle, and walk. Ridership data for Springfield was based on estimates obtained from Connecticut DOT for the start of the New Haven-Hartford-Springfield commuter rail service that is scheduled to start in 2018 (increasing daily trains from 6 to 12 in Springfield).

Function 1: Service Changes

The Service Changes tab can be used to test scenarios involving changes in frequency, travel time, fares, and feeder bus access. This function was developed specifically for the Gateway Cities model, as it is not a component of the TCRP-153 tool. Ridership changes in response to service changes are based on elasticities compiled from national research including TCRP Report 95,[9] TCRP-165/TCQSM,[10] and research conducted by the Victoria Transport Policy Institute.[11] Examples based on commuter rail systems, from older or historic cities, or from Massachusetts were used to select elasticities most appropriate for Gateway Cities, shown in Table 2:

Proposed changes to each of these aspects of commuter rail service can be entered, and the model forecasts the change in ridership. A simple additive method is used to combine results from multiple service changes. While cross-elasticities would more accurately reflect the effects of multiple changes, they would introduce too much complexity into the model and hence are not part of this model.

Function 2: Transit-Oriented Development

The TOD function estimates the increases in ridership as a result of TOD within a quarter mile and within a half mile of the station. Station-area development forecasts (based on maximum TOD potential estimated by RKG) take place outside of the model and serve as an input for this function. The proposed development characteristics are entered as office and retail development square footage and number of residential housing units. The model's first step is to estimate the number of new trips by purpose (residential work and non-work, office, and retail) using the ITE *Trip Generation Manual, 8th Edition*.

The ridership modeling focused on the "Maximum TOD" scenario developed by the real estate forecasts. These estimates are summarized in the following table:

The following assumptions are used for all station models:

Table 4. Trip Generation Assumptions

TRIP PURPOSE	TRIP GENERATION
Residential (per unit)	6.65*
Office (per ksf)	11.01
Retail (per ksf)	42.94

*Residential trips are split 25% for work and 75% for non-work.

In the second step, the model applies the percent of trips captured by transit, resulting in new transit trips and new

total station ridership. Experience at commuter rail stations with transit-oriented development suggests around 17% of residential-based commute trips will use rail. To account for development further from the station, the analysis assumed a discounted capture rate for economic and residential activity beyond a ¼ mile of each station. The following assumptions, synthesized from relevant research based on case studies,[12] are used for transit capture:

Table 5. TOD Transit Capture Assumptions

TRIP PURPOSE	PERCENT CAPTURED BY TRANSIT (WITHIN 1/4-MILE)	PERCENT CAPTURED BY TRANSIT (OUTSIDE 1/4-MILE)
Residential Work	17.0%	8.5%
Residential Non-Work	3.5%	1.8%
Office	4.0%	2.0%
Retail	5.0%	2.5%

Function 3: Station Area Investment

The Station Area Investment function estimates the number of new riders as a result of walk- and bike-shed expansions using the TCRP-153 ridership regression model. The population living within these 15-minute travelsheds, based on ACS 2011-2015 5-Year Estimates, is calculated externally in GIS and entered into spreadsheet tool. The expansion of the travelsheds under different investment scenarios will vary according to the type and location of the new biking and walking connections or accessibility improvements, which were selected based on local knowledge of the station areas.

The station-area recommendations are organized into two categories. Primary Recommendations create new connections or improve existing links that expand the access walkshed or bikeshed for the station. These recommendations bring more people within a comfortable walk or bike ride to transit. Supporting Recommendations are improvements that will strengthen the connection between development and the stations. These improvements increase the likelihood that residents and employees in the TOD area will use transit, and are critical to enable the full potential of TOD.

The ratios of the population within the expanded and existing walk- and bike-sheds are applied to the station access regression models from TCRP-153 for walking and biking, resulting in the total number of new riders arriving by foot or bike as a result of station area investment. Since the TCRP-153 regression models overestimate ridership for Gateway Cities stations, a model adjustment factor (the ratio of the existing to predicted ridership) is applied to each city's total ridership output.

Ridership Model Summary

As shown in Figure 1, the station-specific data and existing ridership are used directly or indirectly in all three functions, and the change in ridership predicted by each function can be summed to arrive at the total new ridership under a particular scenario. The dashed lines indicate that the final step for total ridership may come from one or multiple functions depending on the scenario being tested. Additionally, the output from one function can be entered into another function as a new baseline. For example, it is likely that scenarios based on TOD may be tested first, and subsequent service changes or station area investment could then be tested using a ridership value resulting from TOD instead of the existing baseline.

Not all of the data in the station context tab are used directly in function calculations; some demographic and station characteristic components are provided for local context and are used by the analyst to calibrate the model and select appropriate scenarios.

Mode Share and Greenhouse Gas Estimates

The TOD and ridership forecasts were used to develop future travel mode share estimates for the new trips generated by the station-area development. Residents, employees, and visitors to transit-oriented development areas exhibit travel behavior less reliant on single-occupant vehicle travel than those within conventional development that is more spread out geographically.

Mode Share Estimate

To understand the potential benefit of TOD in the Gateway Cities, travel patterns of the "Maximum TOD" scenario were compared with a "business-as-usual" scenario. Since any development will create transportation trips, it is necessary to understand the impact of the TOD trips compared with the travel impact if they had been developed in a non-tran-

Figure 1. Model Components and Process
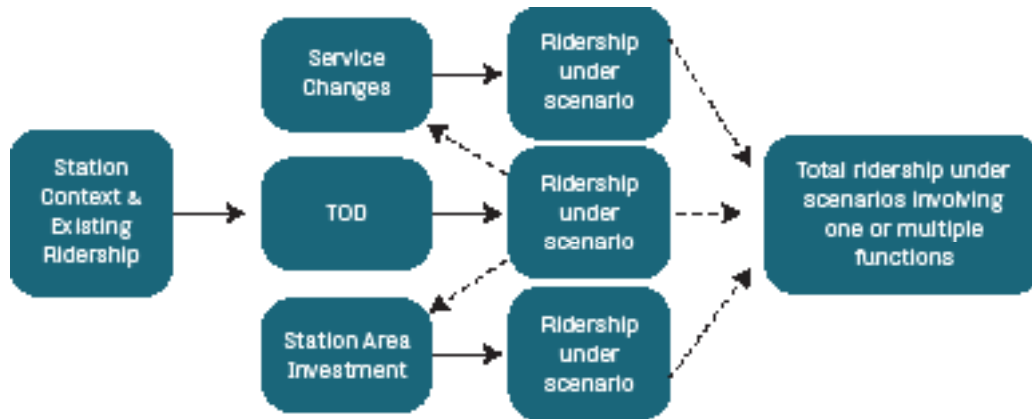
sit-oriented manner.

To quantify this difference, the analysis identified the total number of person-trips generated by the TOD as defined in the development forecasts for each city, irrespective of travel mode. Those person-trips were then translated into a business-as-usual scenario, assuming development patterns were to reflect the type of development present in each city today. City-wide average commute mode shares[13] were applied to those person-trips to estimate the trip-making characteristics of the business-as-usual scenario.

This process is described in more detail in the figure below and subsequent section:

Step 1: Estimate Total Trips from TOD

Transportation trips generated by the future TOD were calculated from the development scenarios for each of the Gateway Cities (Table 3) and the trip generation assumptions (Table 4) for each land use type. The resulting trips represent the total number of person-trips generated by the development, which was used as the starting point for both the "Maximum TOD" and the "business-as-usual" scenarios.

Step 2: Calculate Commute Mode Share

To understand travel behavior of the trips generated in each scenario, the new person-trips were assigned based on an estimate of commute mode share. Commute mode share data are available from the U.S. Census Bureau's American Community Survey (ACS) at the block group level, which provides an opportunity to geospatially compare travel behavior within each city.

For the "Maximum TOD" scenario, commute travel behavior is assumed to reflect current trends around each of the Gateway City rail stations. Existing commute mode share data were obtained for people living within a half-mile of each station and used as the starting point for the future commute mode share. But since the "Maximum TOD" scenario would likely attract residents and businesses interested in incorporating transit into their travel routine, the share of commuters using transit was adjusted upward to reflect typical transit commute ridership at commuter rail TODs.[14, 15]

The "business-as-usual" scenario was calculated following a similar approach. For comparison purposes, we assumed that the same amount of development would happen within each Gateway City—but in a way that is not oriented around transit—so the analysis expects travel patterns of future (non-TOD) growth to mirror each city's trends. ACS data were again used to develop existing commute mode share estimates, but this time using citywide data.

Step 3: Non-Commute Mode Share

Although commute trips are the most well-understood, they represent the minority of daily travel. Non-commute trips (e.g., shopping, errands, school) typically make up around two-thirds

Total Trips from TOD → Commute Mode Share → Non-Commute Mode Share → Commute and Non-Commute Trips
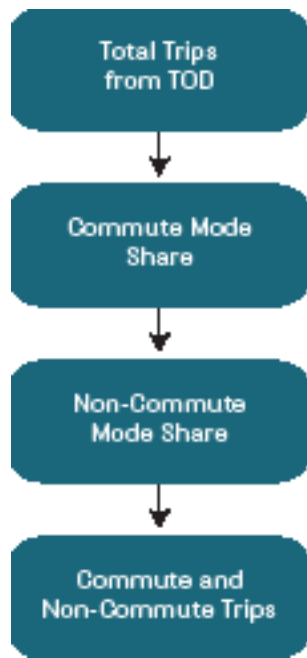
of trips in a given area, but they are not tracked as closely or regularly. The National Household Travel Survey (NHTS) maintains a national travel trend database. These data are collected using travel diaries that track travel behavior over an extended period of time on a sample of people across the country. Travel statistics are available through this database, including trip purpose, travel mode, travel distance, and vehicle occupancy (i.e., the average number of people in a driving trip).

NHTS data are not available to specific geographies, but still can be used to estimate the travel behavior for non-commute trips. Starting with the commute-trip characteristics collected above, the NHTS data were used to calibrate each city's non-commute travel patterns. The non-commute trips were divided into four categories:

• Family/personal errands
• School or church
• Social and recreational
• Other

Based on the calibrated NHTS data for each city, each non-commute trip type was estimated to represent a total number of trips and assigned the corresponding travel mode for each scenario.

Step 4: Commute and Non-Commute Trips

Using the total number of person-trips for each scenario and in each city, the number of vehicle trips were derived.

Greenhouse Gas (GHG) Estimates

The total number of vehicle trips arising out of Step 4 above was then used to estimate the aggregate vehicle-miles traveled (VMT) for each scenario. Average trip distance was calculated for each trip type and each scenario. "Business-as-usual" trips were estimated based on data from NHTS data, while "Maximum TOD" trips were estimated based on data from TCRP Report 128 which suggest the average trip is about 25% shorter than those trips made in conventional developments.[16] Table 6 provides the trip distance assumptions.

Table 6. Average Vehicle Trip Length Assumptions

TRIP PURPOSE	NON-TOD "BUSINESS-AS-USUAL"	TOD "MAX TOD"
Commute	13.4 miles	10 miles
Non-commute	8.7 miles	6.5 miles

Using these trip distance assumptions along with the mode share estimates above, vehicle trips were converted in Vehicle-Miles Traveled (VMT). The VMT estimates were then converted to greenhouse gas (GHG) estimates using average fuel efficiency rates and conversions provided by the Environmental Protection Agency.[17] While the TOD scenarios predict a reduction in VMT, there may be an increase in commuter rail service to meet the increase in demand for transit. To capture this potential, the additional rail service results in an increase in carbon emissions associated with the diesel fuel consumption.[18] These assumptions are provided in Table 7 which shows that per passenger mile auto travel generates about 2.7 times as much GHG compared to rail travel.

Table 7. Greenhouse Gas Emissions Assumptions

	AUTOMOBILE	COMMUTER RAIL
CO2 per passenger mile	.91 lbs	.34 lbs

In each case, the changes in travel were modeled alongside the vehicle-related emissions increases. Table 8 illustrates the results of the TOD travel compared with the "business-as-usual" scenario.

Summary

The Gateway Cities analysis shows that investment and incentives in TOD have significant potential to increase transit ridership, and reduce vehicle travel and greenhouse gas emissions. The analysis demonstrates the scale of the potential impact if the maximum TOD scenario were realized. Using the tools and models developed through this research effort, future analysis can test future scenarios in these and other Gateway Cities.

Appendix C Endnotes

1   We recognize that some existing uses could be converted to another use (e.g., office space converted to housing units), but decided not to arbitrarily estimate those use conversions as part of this analysis. In a later step, we discuss re-use of existing space that is vacant which does allow for some conversions to alternate use.

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13   American Community Survey (ACS) 2011-2015 5-Year Estimates, U.S. Census Bureau

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