DEFM User Guide
Model Documentation and Training Examples

Demographic and Employment Model Update Project

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This document summarizes the basic steps in operation of the DEFM including scenario development, scenario management, output, and maintenance. It also documents the methods used in the allocation and describes the tabs in the DEFM spreadsheet.

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DEFM OPERATIONS OVERVIEW

INTRODUCTION

NJTPA's Demographic-Economic Forecasting Model (DEFM) is a core tool in the agency's long-range transportation planning work activities. The household and employment forecasts that NJTPA develops with the tool form the basis for several federally mandated and mission-critical work products and all decisions made by the MPO on infrastructure investments. Determining the magnitude and location of future household and employment growth is the first step in the long-range transportation planning process.

Modifications to the structure and operations of the DEFM were documented in Technical Memoranda for Tasks 1 through 5. The main objectives of the update projects are as follows.

- Streamline Use and Update Process
- Integrate with GIS (Input and Output)
- Integrate with NJRTM-E (Accessibility)
- Allow for Expansion and Modification

The revised DEFM has several key features designed to achieve the project objectives. These new features include the following.

- Integration with a dedicated DEFM Geo-database
  - Static Data Sources (e.g., TAZ structure, land use, subarea density information)
  - Scenario Data Sources (e.g. future year transit nodes and highway corridors, accessibility)
  - Output Measures (e.g., households, population, land use change)
- Flexibility in Base Year and Forecast Year Definition
- Flexibility in Development Context Typology
- Capability for Additional Indicators
- Streamlined Known-Project Data Entry
- Integration of Municipal Adjustment Worksheets

WORKFLOW SEQUENCE

Routine use of the DEFM will likely fall into one of the following basic workflow categories:

- Workflow 1 – Basic Scenario Development and Management
- Workflow 2 – Expert Functions
- Workflow 3 – Known Projects and Municipal Adjustments
- Workflow 4 – General Data Maintenance

Examples of these workflow activities are outlines below, illustrated with screenshots from the DEFM.

Workflow 1: Basic Scenario Development and Management

The development of scenarios in the DEFM is initiated with the **Start** tab.
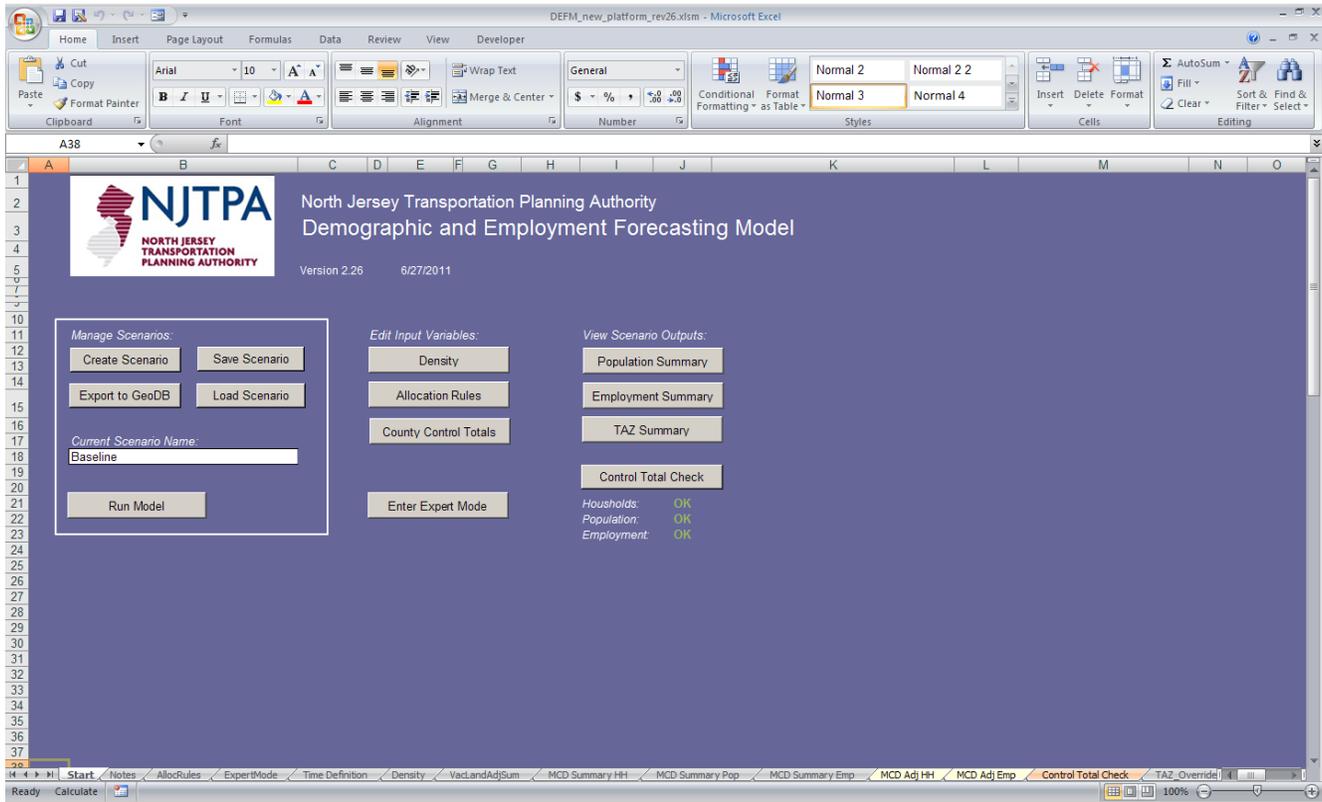
Select the **Create Scenario** button to develop a new allocation scenario in the DEFM. This will advance you to the Notes tab (see next page).

If you have previously created and saved a scenario select the **Load Scenario** button on the **Start** tab. You will be shown the standard Open File screen from Microsoft Excel and can navigate to the directory where you have stored an input file.

The DEFM automatically includes "_INPUT" in the filename for ease of recognition. Input files also contain special header information embedded in the spreadsheet recognized by the DEFM. Spreadsheets not recognized by the DEFM as input files will not be loaded.
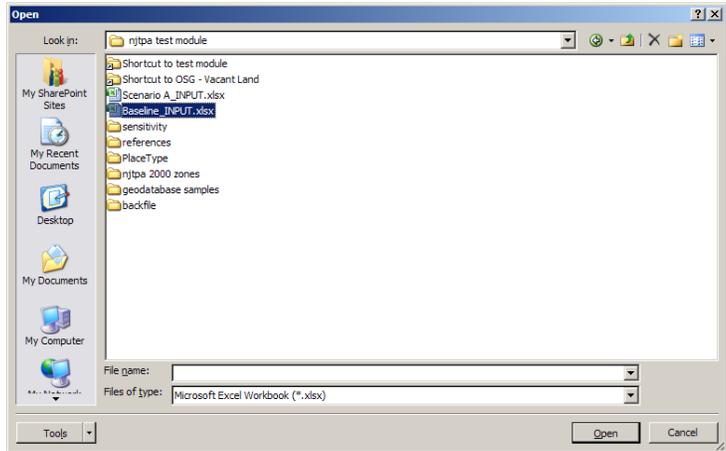
Once a scenario has been loaded you can select the **Run Model** button to apply the scenario assumptions and view the output results.
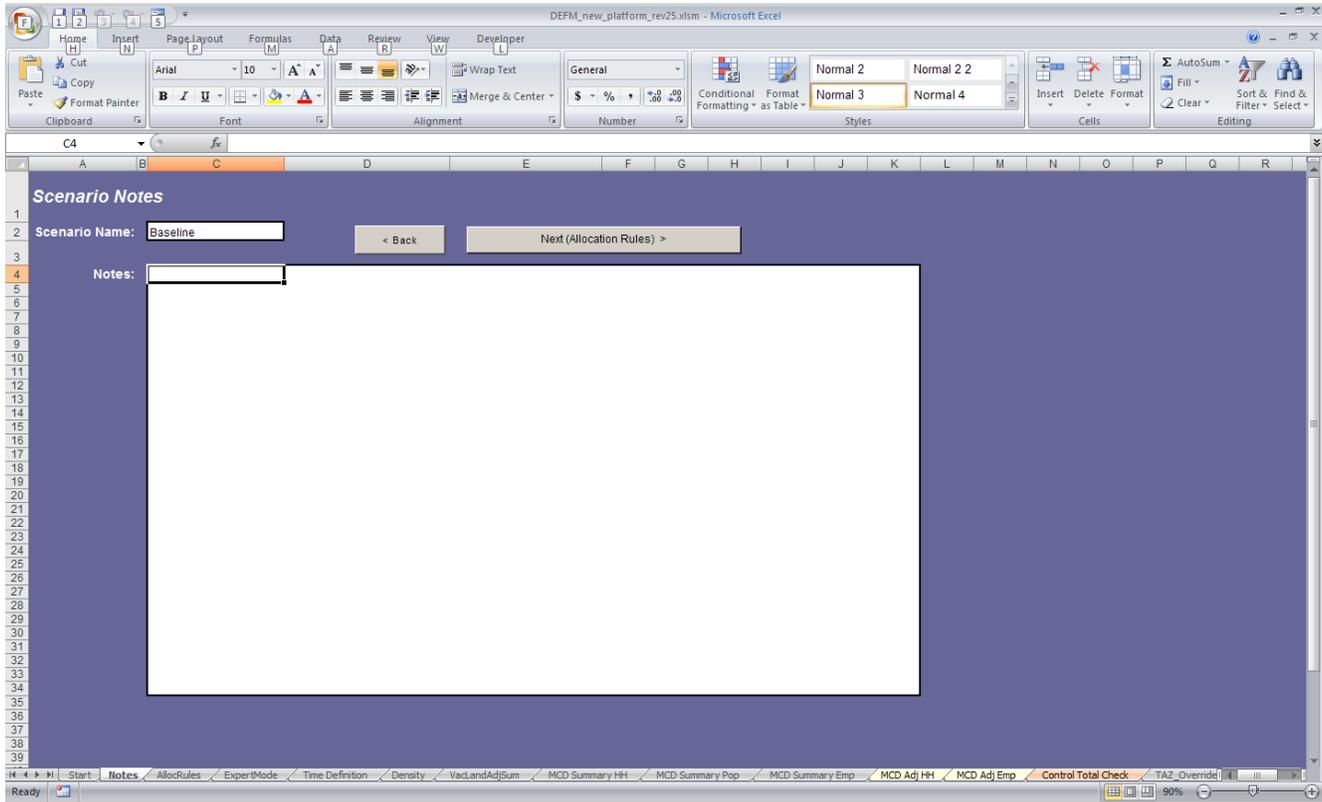
The next screen in the scenario development workflow is the **Notes** tab. This includes spaces for the entry of a scenario name, and notes to remind the user of the scenario purpose, description, or assumptions used to create the scenario.

Once you have entered the name and notes, select the **Next** button to advance to the **AllocRules** tab (see next page).

The **AllocRules** tab provides the opportunity to assign weights to the Development Potential Indicators (Allocation Factors). The indicators and weights are listed in separate tables: one applicable to the Household and Population allocation and one to the Employment allocation. Weights should be entered as whole numbers in the column next to the indicator name. Although any combination of weights can be entered, we recommend entering two digit weights with a sum equaling 100. Select the Recalculate Totals button anytime after entering a change to update the table totals.

Once you have reviewed or altered the indicators, select the **Next** button to advance to the **Density** tab (see next page).

The **Density** tab allows the user to review and edit the key assumptions on the number of household or employment units that can be assigned per acre of vacant developable land in a TAZ.

The density assumptions are displayed according to Development Context Type. Key metrics associated with each Type are displayed (i.e., number of zones and average density measures per acre) for reference.

The % Increase column is available for user input. This allows the user to specify a percentage increase in the household or employment density in the TAZs grouped into the Development Context Types. Increases in density are useful to represent changes in zoning or higher density development on newly developed land. Default entries reflect increases in density that are required to ensure that the model runs to completion.

This tab also provides the opportunity to enter an allowance for redevelopment in each Development Context Type area. The redevelopment allowance allows a percentage of land listed as Industrial or Other Build Land (i.e., commercial, residential) to be made available for the allocation of new households. This reflects an increased density and intensification of use that accompanies redevelopment.

Once you have reviewed or altered the density and redevelopment assumptions, select the **Next** button to run the model and advance to the **MCD Summary HH** tab (see next page).

The **MCD Summary HH** is the first of three output screens that summarize the allocations by municipality. Municipalities are listed alphabetically by name and are sorted by county. Other screens display outputs for population (**MCD Summary Pop**) and employment (**MCD Summary Emp**). You can navigate between the screens by using the **Next >** and < **Back** buttons at the top of the tab.

Note that these municipal totals include any adjustments attributable to the splitting of TAZs by municipal boundaries (as specified in the GeoDatabase and linked to the DEFM through the **Link_MCD-TAZ_Splits** tab).

Cycle through the **<Back** button to return to the **Start** tab.

Choose the TAZ Summary button to display the **Pop Output** tab and access TAZ-level output results for households and employment (by using the **Next >** and < **Back** buttons).

If you are satisfied with your scenario results, and wish to save the input parameters for future use, select the **Save Scenario** button on the **Start** tab. You will be shown the standard Save File screen from Microsoft Excel and can navigate to the directory where you wish to store an input file for future use.
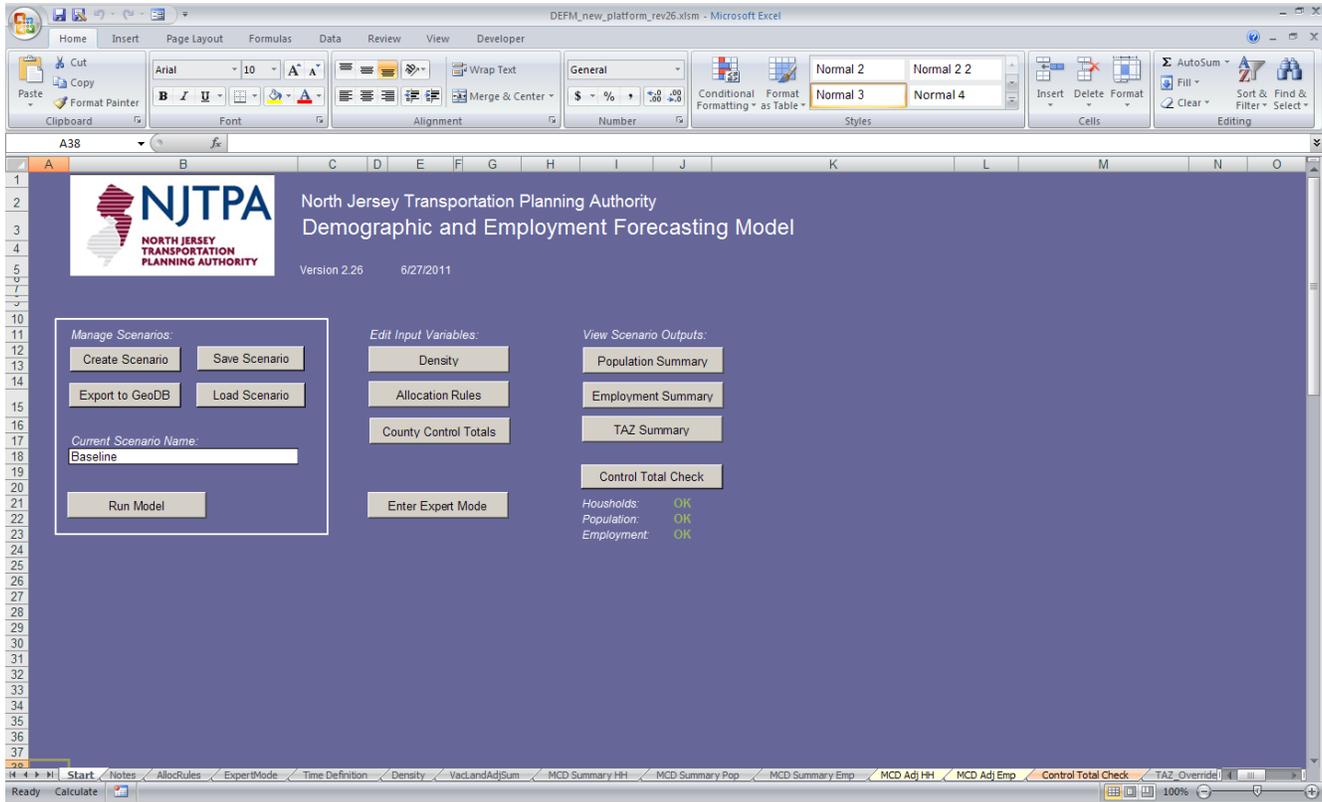
The **Control Total Check** button on the **Start** tab gives the user the opportunity to navigate to the **Control Total Check** tab (see page 16 for illustration and description). This tab provides a set of tables that indicate the difference between the county control totals for the key output measures (households, population, and employment), and the model results.

When the allocation process is functioning normally, this difference should be zero. Indicators on the **Start** tab below the **Control Total Check** button allow for a check of the allocation status at a glance. A display of "OK" in green indicates full allocation of the control totals in all the time steps.

A display of "Error" in red indicates that the full control total was not allocated in at least one of the timesteps. Select the **Control Total Check** button to see the detailed table in the event of an "Error" indicator. Non-zero results in the control total check table are an indication that the allocation of the control total was constrained by the availability of vacant developable land (i.e., the sum of the development capacity in a county's TAZs was lower than the capacity required by the control total).
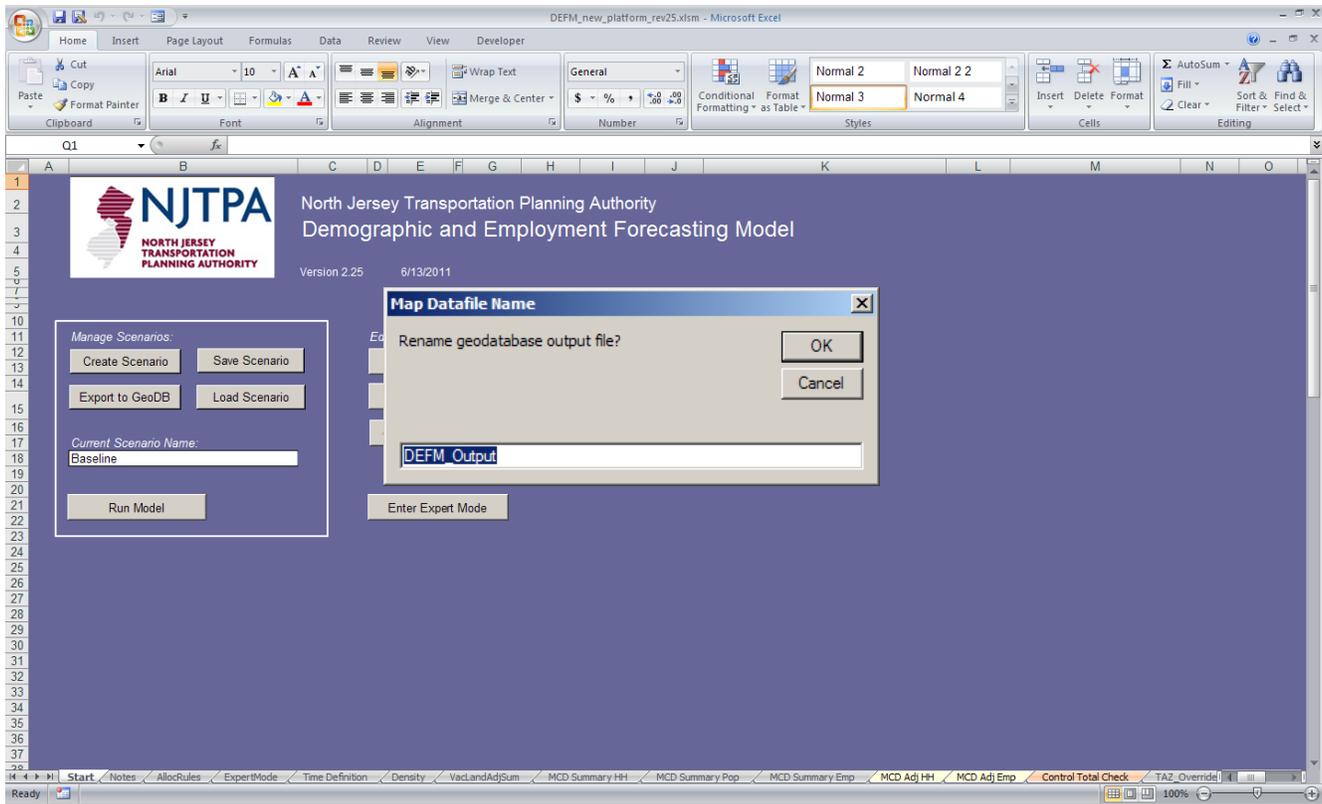
In addition to saving scenario parameters to an input file that may be reviewed separately, or reloaded for future use, scenario output measures (e.g., households by TAZ, for each timestep) can be saved as .xls files for automatic reference by the GeoDatabase.

Select the **Export to GeoDB** button to export two datafiles to the directory that contain the GeoDatabase. You will be provide with the opportunity to name the files. We recommend:

- *DEFM_Output* for the baseline file,
- *DEFM_Output_ScenarioA* for the first comparison file, and
- *DEFM_Output_ScenarioB* for a second comparison file.

These output files are automatically connected to the *NJTPA_Basemap.mxd* (see next page) file if they are located in the same directory.
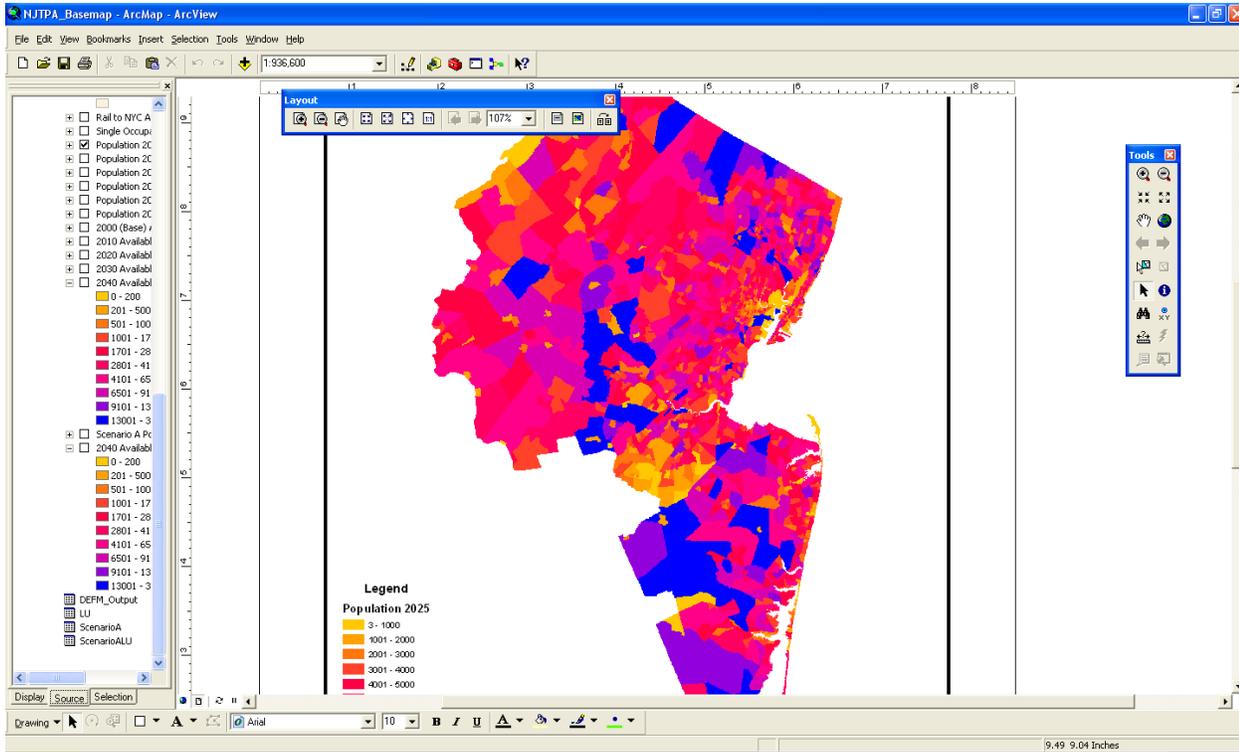
In ArcMap, the ***NJTPA_Basemap.mxd*** may be displayed to view and edit output displays. Templates have been created for thematic and point maps, and timestep animations. Other data (e.g., infrastructure and environmental features from the NJTPA GeoPortal) are also included in the .mxd file. The file may be edited and adapted at will by the user.

Workflow 2: Expert Functions

The **Start** tab contains a button that allows access to certain features not required for ordinary scenario development. This expert workflow is outlined below. The features may be viewed by selecting the **Enter Expert Mode** button to navigate to the **ExpertMode** tab.
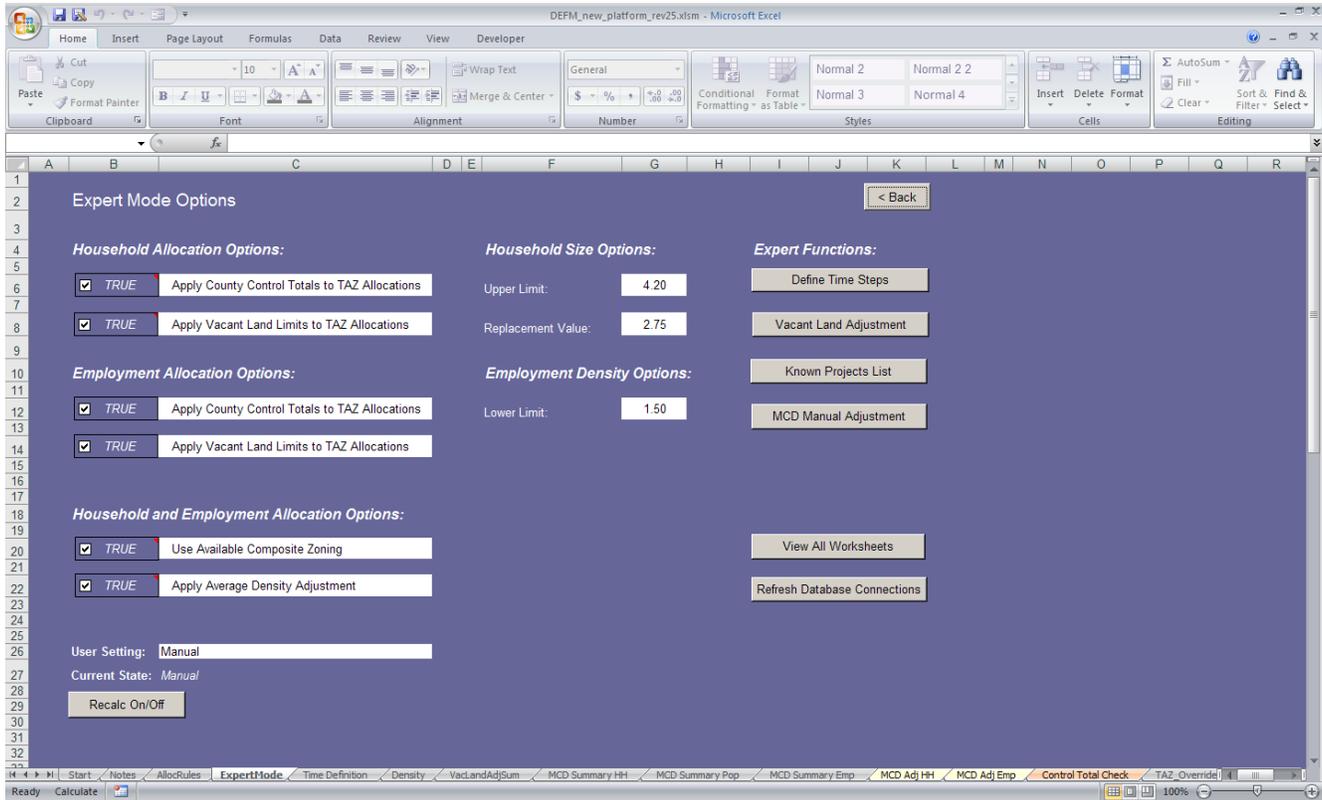
The following features are available for selection:

- **Apply County Control Totals to TAZ Allocations (Household and Employment)** - This checkbox enables or disables the county control total constraint for TAZ allocations—the default recommendation is TRUE.

- **Apply Vacant Land Limits to TAZ Allocations (Household and Employment)** – This checkbox enables or disables the vacant land constraint. Default is TRUE but the user may change to FALSE to facilitate sensitivity testing or to eliminate errors that arise when the constraint is reached in a county within the forecast period.

- **Use Available Composite Zoning** – This checkbox enables or disables the use of any composite zoning or buildout densities provided by the subregions (through GeoDatabase Link). Default is TRUE but the user may change to FALSE to use the observed or average density parameters.

- **Apply Average Density Adjustment** – This checkbox enables or disables use of Development Context Type average density rather than effective density by TAZ. Default is TRUE but the user may change to FALSE to incorporate localized conditions rather than regional level smoothing of density assumptions.

- **Recalc On/Off** - Toggle for automatic or manual recalculation (manual to avoid delay).

- **Household Size** Options provide ceiling for assumed HH size and replacement value for missing or error values.
- **Employment Density Options** are used to set floor for assumed density.

The **Vacant Land Adjustment** button on the __ExpertMode__ tab leads to the __VacLandAdjSum__ tab.

This tab provides the user with the opportunity to provide an upward adjustment to the vacant land inventory (by Development Context Type). The adjustment is applied as a percentage increase. This is useful in providing blanket correction for deficiencies and inaccuracies in the vacant developable land inventory. The default settings are based on increases required to avoid allocation errors under the Baseline scenario. These parameters can be altered as desired by the user. The **Apply Vacant Land Adjustment** checkbox provides a one-click enabling or disabling of the adjustment.

Workflow 3: Known Project and Municipal Adjustments

The **Known Projects List** button on the **ExpertMode** tab leads to the **ProjectData** tab.
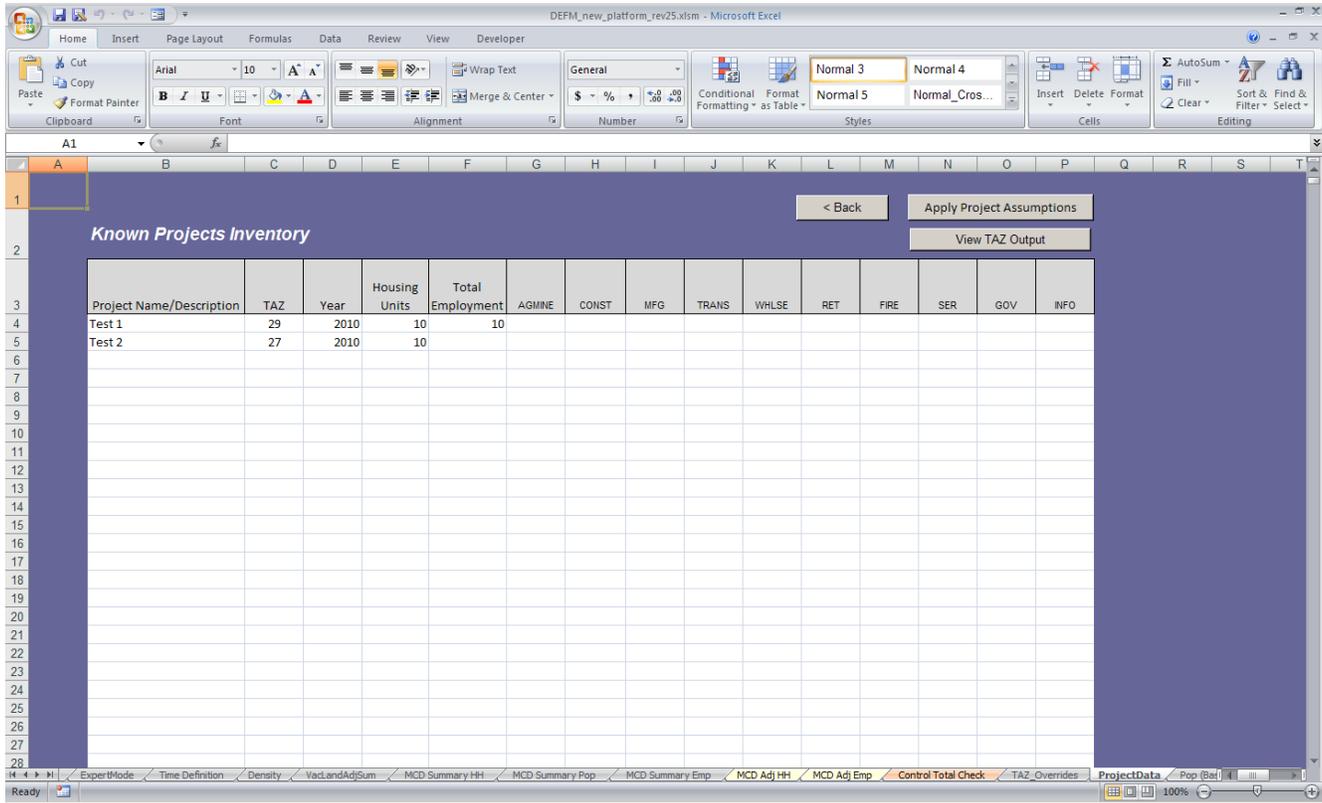
This tab provides the user with the opportunity to enter information on known development projects by TAZ location, and time period (DEFM forecast timestep). Key parameters are project name or description, TAZ (select from dropdown), Year (select from dropdown), number of Housing Units, Total Employment count, and count by major industry (optional).

Note that the year selected should be the closest time-step to the period when the new housing units or employment capacity are expected to be complete and ready for occupancy.

This sheet may be used to account for phasing in development projects by entering the same project name/description on a new line with the selection of a year. The number of units or employment should then reflect the increment available for occupancy in the specified time-step.

Note also, that the operation of the DEFM is not dependent on the order of the projects either by TAZ or by year. The user can feel free to reorder as desired.

Select the **Apply Project Assumption** button to ensure that edits you make to the page are reflected in the allocation. This action loads all the projects in the table into the allocation calculation sheets.

Select the **View TAZ Output** button following the update, to view the results of the changes in the TAZ level allocation.

The **MCD Manual Adjustment** button on the **ExpertMode** tab leads to the **MCD Adj HH** tab.

This tab allows the user to change the allocation totals by municipality to reflect a total household, population, or employment number for a given timestep. (Note that the values are expressed in cumulative totals for year specified, not increment of change). Multiple Adjustments may be entered into the table. These adjustments will be saved in a scenario input file created by the user.

Note that Municipal Adjustments supersede all allocations and known project adjustments. Municipal Adjustments consume vacant land inventory but are not constrained by it. Should an adjustment in a particular time-step consume the remaining development capacity, the DEFM will not allocate future growth to the municipality. Exceptions to this constraint are known projects (see previous page) or further Municipal Adjustments in subsequent time steps,

Enter the target total in the white box(s) applicable to the municipality and time step and select the **Update** button when finished with data entry.

This button will apply the changes to the allocation. When complete the user will be shown the **Control Total Check** tab (see next page).

The **View TAZ Adjustments** button leads the user to the TAZ level view. Select this button after the Update process.

Control Total Check

The tables below show the county control total remaining after a MCD or TAZ-level manual adjustment. A positive number (green cell) indicates that there is a sufficient excess in the control total to accommodate the adjustment. A negative number (red cell) means the adjustment exceeds the county control. Modify adjustments until all positive.

The tables below show the difference between the county control total and the model allocation. Zero values (green cells) indicate normal function. Non-zero values (red cells) indicate insufficient vacant land to accommodate control total growth. Modify control totals or vacant land/density allowances accordingly.

Households
Remaining County Control Total after Adjustment

	2005	2010	2015	2020	2025	2030	2035	2040
Bergen	6,469	3,981	4,602	10,266	12,952	13,005	13,432	5,453
Essex	4,289	6,976	4,366	9,487	10,493	8,128	6,922	7,962
Hudson	11,258	13,896	12,538	13,029	11,124	12,735	874	1
Hunterdon	2,273	1,766	800	1,287	1,440	1,421	542	1,578
Middlesex	13,834	4,803	17,052	19,557	18,580	19,542	19,769	13,898
Monmouth	11,670	814	5,828	5,783	6,405	3,810	2,913	5,790
Morris	5,608	1,167	4,069	2,337	3,637	10,614	3,146	2,770
Ocean	17,212	14,349	14,024	18,358	21,073	19,874	17,978	16,294
Passaic	4,452	3,401	5,424	8,967	10,718	9,211	7,090	7,163
Somerset	5,890	2,331	4,912	5,164	5,444	2,985	2,467	5,482
Sussex	2,426	6,433	3,781	3,897	3,091	3,163	3,330	4,584
Union	2,632	934	5,871	9,151	9,174	5,863	5,149	7,119
Warren	2,904	5,385	1,148	801	1,047	565	1,001	1,602

Households
Difference Between Control Total and Allocation by County

	2005	2010	2015	2020	2025	2030	2035	2040
Bergen	0	0	0	0	0	0	0	0
Essex	0	0	0	0	0	0	0	0
Hudson	0	0	0	0	0	0	0	0
Hunterdon	0	0	0	0	0	0	0	0
Middlesex	0	0	0	0	0	0	0	0
Monmouth	0	0	0	0	0	0	0	0
Morris	0	0	0	0	0	0	0	0
Ocean	0	0	0	0	0	0	0	0
Passaic	0	0	0	0	0	0	0	0
Somerset	0	0	0	0	0	0	0	0
Sussex	0	0	0	0	0	0	0	0
Union	0	0	0	0	0	0	0	0
Warren	0	0	0	0	0	0	0	0

Population
Remaining County Control Total after Adjustment

	2005	2010	2015	2020	2025	2030	2035	2040
Bergen	22,490	6,033	6,805	21,581	27,267	27,756	28,242	9,576
Essex	8,741	9,413	8,899	22,802	25,265	18,028	14,388	17,328
Hudson	24,463	33,544	27,003	26,796	19,801	20,120	4,298	1
Hunterdon	8,913	2,458	2,075	3,410	3,954	3,747	1,279	3,635
Middlesex	35,413	34,154	34,307	39,183	33,467	32,241	30,797	37,617
Monmouth	34,080	8,543	16,172	15,140	15,708	8,048	4,907	18,245
Morris	15,167	6,748	5,233	39	3,460	21,376	1,292	4,622
Ocean	42,540	26,043	30,852	40,665	46,135	42,160	37,027	35,403
Passaic	13,970	8,752	11,591	21,951	26,569	21,032	14,725	18,156
Somerset	17,137	10,853	11,710	12,050	12,320	5,496	3,915	15,126

Population
Difference Between Control Total and Allocation by County

	2005	2010	2015	2020	2025	2030	2035	2040
Bergen	0	0	0	0	0	0	0	0
Essex	0	0	0	0	0	0	0	0
Hudson	0	0	0	0	0	0	0	0
Hunterdon	0	0	0	0	0	0	0	0
Middlesex	0	0	0	0	0	0	0	0
Monmouth	0	0	0	0	0	0	0	0
Morris	0	0	0	0	0	0	0	0
Ocean	0	0	0	0	0	0	0	0
Passaic	0	0	0	0	0	0	0	0
Somerset	0	0	0	0	0	0	0	0

The **Control Total Check** tab provides an indication of the remaining control total in each county after the desired municipal adjustments. Green values are acceptable (they indicate sufficient control total capacity for the adjustment). Red values indicate that the adjustments you have entered exceed the control total within the county for a timestep. The adjustment or the control total must be altered to resolve.

The Difference Tables on the right hand side of the screen display the difference between the control total specified for each county and the allocated result. A zero value (green) is acceptable. A non-zero value (red) indicates that the allocation exceeds the available vacant land capacity. The capacity or the density assumptions must be altered to ensure that the control total is met.

Instructions for interpreting the tables are included on the screen.

The **View TAZ Adjustments** button leads the user to the TAZ level view of the Municipal Adjustments.

The default distribution of the Municipal Adjustments to the TAZs in the municipality is based on the previous timestep values (e.g. previous timestep total households in each TAZ as a proportion of total households in the municipality). The user may make further alterations as necessary to the default distribution by editing the values in this table. Care should be take to maintain the desired municipal total if TAZ values are altered.

Adjustments to municipal employment totals are made on the **MCD Adj Emp** tab accessible from the **MCD Adj HH** tab.

Workflow 4: General Data Maintenance

Key input variables to the model are maintained in the GeoDatabase. These include the TAZ definitions, land use data, composite zoning information, Development Context Type definitions, highway corridor and transit node indicators, State Plan areas, MCD-TAZ Splits (see below), and accessibility indicators (see Appendix B for definitions of the "Link" tabs and the corresponding table in the GeoDatabase).

These linked tables are contained in the yellow tabs at the end of the spreadsheet. They may be updated individually through the Data Refresh excel menu command or the **Refresh Database Connections button** on the **ExpertMode** tab. To ensure successful linking, maintain the GeoDatabase in the same directory as the DEFM spreadsheet.

If the directory structure has changed you may be asked by Excel to accept an updated location. Cycle through the **Yes** button to complete the update.
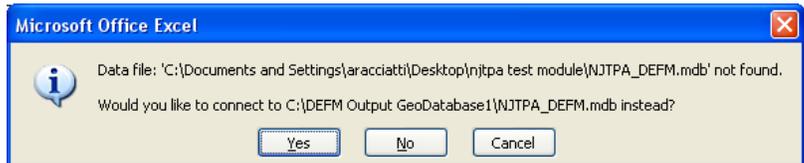
The GeoDatabase also includes the base year and previous year demographic data that is used in the estimation of two of the development potential indicators (share of base year value and share of previous year to base year growth). The base and previous years may be updated in the Geodatabase. Care should be taken to adhere to the existing table format as possible. Changes to the variable names (headers) are possible on the **Time Definition** tab accessible from the **ExpertMode** tab.
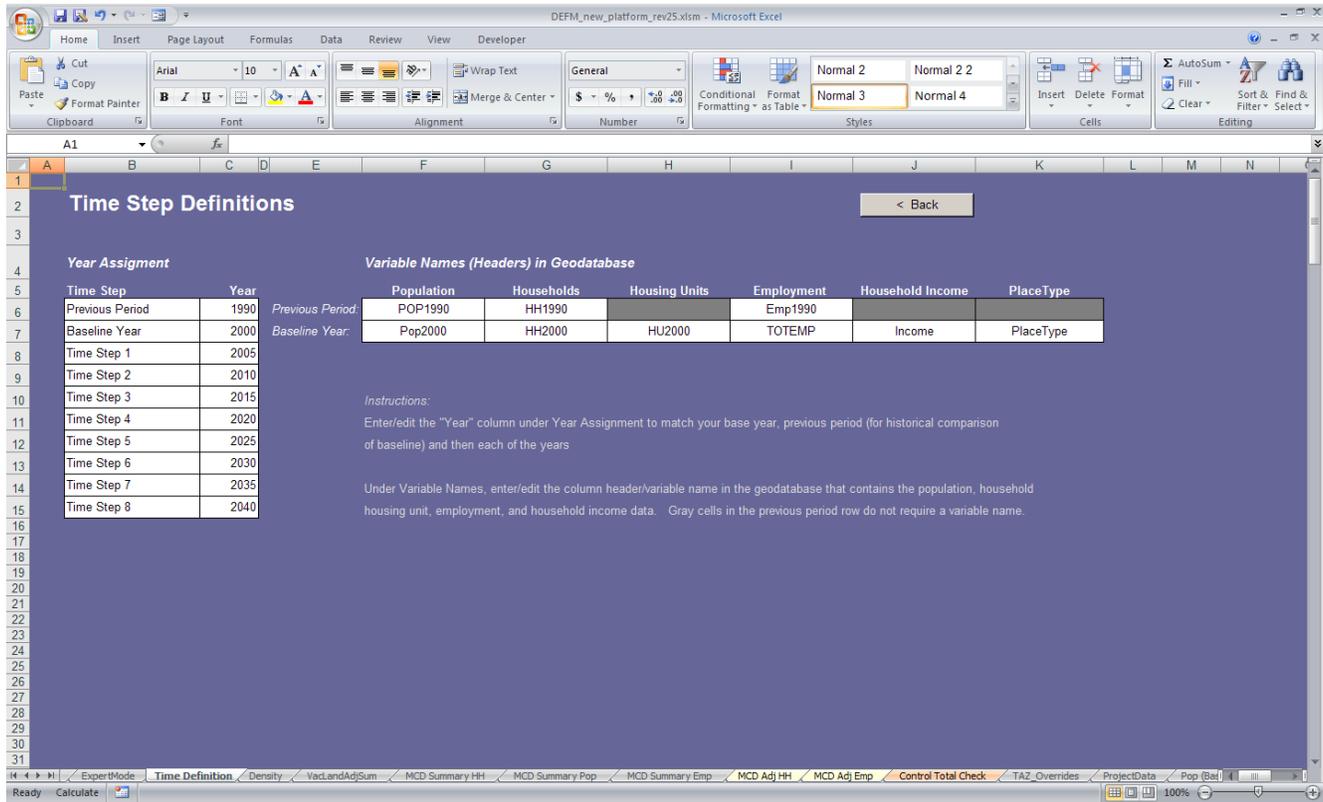
This page allows for the update of variable names (e.g., POP1990 to POP2000). These variable names are used in lookup functions that reference the "Link" tabs—so it is important that the names precisely match the column headers. The Population, Households, Housing Unit, and Employment variables reside in the **Link_Demo_Base** tab. The Household Income variable resides on the **Link_Zone_Tab** worksheet. The PlaceType variable resides in the **Link_Place_Type** tab.

This page also allows the user to define the base year, previous year and applicable time steps. The default is five-year increments in eight-steps. Changes made to the time step table are carried through all results and output pages after execution of the **Run Model** command on the **Start** tab.

Note that care must be taken to accurately specify the Previous Period and Base Year. The DEFM calculates the number of years separating the two periods, for the purpose of estimating growth rates. We recommend using a previous reference year that is five years or ten years earlier than the desired base year.

To provide the user with an example of the update of data in the DEFM, this section outlines the steps involved in changing the Development Context Typology.

Step 1: Add a table to the GeoDatabase. By adding a new data table directly to the GeoDatabase (***NJTPA_DEFM.mdb***) or by setting one up through creation of an ArcMap, the user can establish the data that will be imported into the DEFM. In this example (see screenshot below) the table is entitled PlaceType. The table can contain as many fields as the user wishes to specify but must at a minimum contain a variable with the Development Context Typology name: in this example it is BASESED.

Step 2: Establish a linked table in the DEFM. The **__Link_Place_Type__** tab contains the current Development Context Typology data table. The user must delete this table and replace it with a link to the new GeoDatabase Table. After the existing table is deleted in the DEFM, select cell A1 and go to the Data menu and select the **From Access** button in the "Get External Data" portion of the menu. Use the dialog box to locate the GeoDatabase (***NJTPA_DEFM.mdb***) and follow the prompts to select and import the new table.
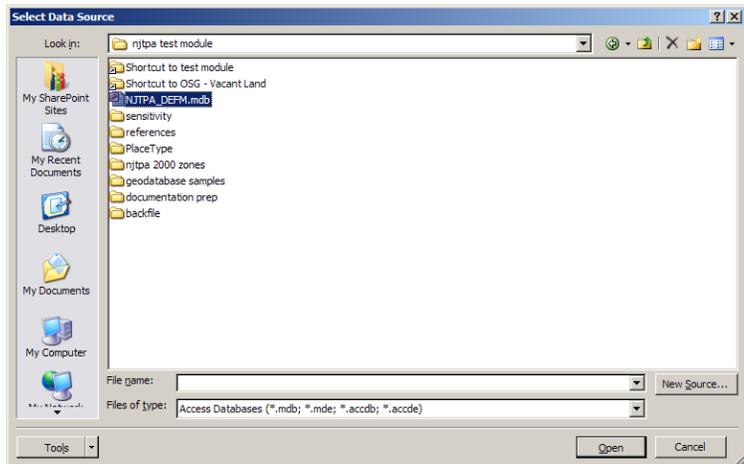
Once imported, the new table will appear in the DEFM as below. It is now linked to the GeoDatabase, and any change made in the database will appear in the table upon refresh.

Step 3: Update the variable reference in the **Time Definition** tab. The name of the variable in the new table is "BASESED". This is entered into the PlaceType cell in the Variable Name table (see screenshot at right).

Step 4: Run Model. The change to Development Context Typology data will be effective

after the DEFM has been run. Select the **Run Model** button on the **Start** tab.

Step 5: Adjust assumptions. In this example the new Development Context Typology definitions have been brought into the model. Since this data is used in the density adjustments, the user must navigate to the Density tab, a review and adjust the density assumptions to correspond to the new Development Context Typology definitions, as appropriate. Running the model again will ensure that these new assumptions are implemented in the scenario calculations.

Step 6: Save DEFM spreadsheet. To retain this change permanently, the user should save the DEFM spreadsheet with a new name and version number.

North Jersey Transportation Planning Authority   *Demographic & Employment Forecast Model Update*

APPENDIX A – OVERVIEW OF METHODS AND CALCULATIONS

This section describes the methods used in the DEFM to allocate regional and/or county control totals for population and employment to the MCD/TAZ level. The model allows for either a regional or county allocation approach. The methodology described below requires the compilation of several available GIS datasets maintained by NJTPA to develop a measure of development potential for each TAZ. The model provides for an adjustable weighting system allowing the user to specify the relative contribution each factor provides to the overall measure of local development potential.

Figure A- illustrates how the data inputs interact in the MCD/TAZ Allocation Module to produce projections for population and employment figures for each region. In addition, it highlights the important role county and regional control totals will play in the allocation process. While illustrative, the diagram does not necessarily capture every aspect of the model or the individual modules.

Figure A-1: MCD/TAZ Allocation Module Diagram
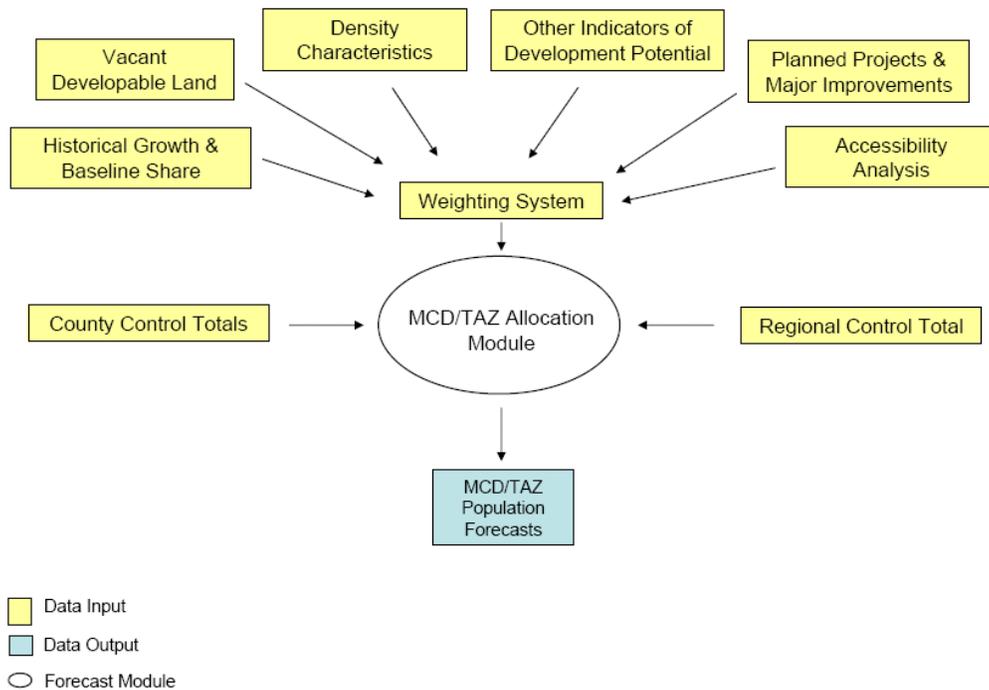
LOCAL DEVELOPMENT POTENTIAL

Growth in population and employment is allocated to TAZs and MCDs based on an estimation of the potential for these areas to develop during the forecast time horizon. The model will employ a measure of local development potential derived from readily available data on several factors that contribute to an area's attractiveness to residential or commercial development. These factors are outlined below.

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Historic Growth and Baseline Shares

Recent historic growth in population or employment is an indicator of an area's attractiveness to further development. The model incorporates measures of growth from a previous reference year to a base year (e.g., 1990 to 2000 growth) and base year shares of population and employment as the first step in the allocation process.

For the original historic growth numbers, population totals for each MCD and TAZ are the 100-percent population counts reported in the 2000 Census SF1. While the census reports the MCD population figures directly, TAZ population figures were calculated by compiling the population figures for the block groups contained within each TAZ and summing the totals. ArcMap was used to perform the geo-spatial component of the calculation. This step was repeated for the 1990 100-percent population count (STF-1) to derive an indicator of ten-year population growth in each zone.

The calculation of baseline TAZ employment share was carried over from the initial development of the DEFM and required the use of a GIS database. The ESRI Business Location file was added to an ArcMap dataview along with the TAZ boundary file for the NJTPA region, thereby producing a map with the business locations superimposed on the zonal structure file.[1] The business point file was then joined to the zonal structure using the spatial join function.[2] Following the spatial join, the new TAZ file contained the zones with employment data from the ESRI Business Location File. Subsequently, each TAZ received a proportionate value based on its share of total county population. An indicator for growth in employment from 1990 to 2000 was derived by applying the 1990 employment and estimated 2000 employment from exiting NJTPA projections to the new TAZ structure using an equivalency table provided by NJTPA.

Vacant Developable Land

An estimate of vacant developable land in each TAZ provides an indicator of attractiveness for future growth and cap to the allocation of growth based on past trends. The vacant developable land calculation used in the DEFM reflects the OSG methodology for identifying vacant available land from New Jersey Department of Environmental Protection (NJDEP) land-cover surveys and excluding known public open space, land set aside for conservation, and environmentally sensitive sites.[3] This was the calculation conducted for the initial development of the DEFM. The calculation of available land acreage for each TAZ requires a two-step geo-spatial process performed in ArcMap: first, the union process combines the two inputs into a new shapefile. Then, the dissolve process combines all of the polygons from the output file – created in the previous step – that

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[1] NJTPA provided the Business Location File, which contains a geo-coded (address-matched) database of business establishments in New Jersey. A 2001 survey from *info*USA yielded the underlying business data. While the geographic database under-reports New Jersey employment, assuming little or no spatial correlation, the numbers allow for an accurate determination of relative employment shares by TAZ/MCD.

[2] The join function is a geo-spatial processing method available in ArcMap and most other commercial GIS software packages. The process allows for the aggregation of data based on each individual point's spatial location in relation to the underlying polygon file. After processing the spatial join, the GIS creates an output file that retains the spatial and tabular characteristics of the underlying polygon with additional columns populated by aggregated data from the point files comprised within its boundaries.

[3] OSG delivered the vacant-developable land file in November 2003. The file reports land use classifications developed from an assessment of aerial photography produced in 1995/1997.

possess a common zonal number.[4]

State Plan and Redevelopment Plan Areas

The DEFM creates a composite State Development and Redevelopment Plan (SDRP) Designation score for each TAZ based on a GIS analysis of the SDRP land area within each TAZ. In the calculation of the score, Metropolitan Areas are assigned a higher weight (5.0) than suburban (4.0), fringe (3.0), and rural (2.0) areas. Environmentally sensitive and restricted areas receive a weight of 0.1 in the index calculation. Designated centers also receive a weight of 5.0. The weight assignments are contained on the **TAZbySDRP** tab.

Accessibility

Accessibility to employment opportunities and labor force, retail and service locations, or other destinations is often a factor in the location of firms and residences. To account for the relative accessibility of each TAZ in each forecast year, an accessibility index is calculated. The accessibility index summarizes the cumulative changes in TAZ-to-TAZ travel times, whether by auto or transit. The accessibility index is calculated from base year to forecast year indicating an increase in accessibility to other zones due to capacity improvements or a decrease due to congestion as estimated in the last implementation of the NJRTM-E.

The generalized form of the accessibility index (A) for each zone i is:

$$A_i = \sum E_j / Imp_{ij}$$

Where:

E_j = employment in each zone j

Imp_{ij} = impedance from zone i to each zone j (For highway modes it is IVTT + OPC / Value of Time; for transit modes it is IVTT + 2.5 * OVTT + OPC / Value of Time)

The model will use an accessibility index derived from the NJRTM-E for each forecast year.

---

[4] The union function is a geo-spatial processing method available in ArcMap. The process creates a new file that contains all of the characteristics of the base file and the overlaid file, vacant and available land, that co-exist in geographic space. Second, we performed the dissolve process based on the unique TAZ identifier in the newly created union-output. The dissolve function merges all of the polygons with a common identification number (in this case, the TAZ code) and aggregates each polygon's underlying numeric attributes. The aggregated figures populate the selected columns in the dissolve-output file.

The accessibility index is calculated by the AccIndex.xls spreadsheet which contains the scripts for accessing the NJRTM-E files. (see Tech Memo 1 for description). For the highway modes, the index is calculated using the weighted SOV and HOV travel times. For the transit modes Drive Access and Walk Access are weighted and are calculated using appropriate IVTT, OVTT, and OPC parameters.

The highway index is computed for each origin in the NJTPA region for access to all zones. The transit index is computed for each origin in the NJTPA region for access to all zones, and as an alternate, for access to zones in Manhattan, south of 59th/60th streets, only (user choice).

The accessibility development potential indicator is expressed as a TAZ's share of total regional accessibility.

Density Characteristics

Without a comprehensive zoning map, net residential and employment densities provide a satisfactory means for illustrating the maximum extent of a particular parcel's development potential.[5] For areas in the process of development, net density calculations provide an approximation of the allowable density level within a TAZ. When coupled with a calculation of vacant available land, net residential and employment densities provide a reasonable method for allocating growth.

Each geographic zone (i.e., TAZ or MCD) has a characteristic net residential density. Net residential density equals the number of housing units per acre of residential land cover. The formula is as follows:

$$DUA_j = DU_j / Ra_j$$

DUA_j = dwelling units per net acres of residential land cover in geography j

DU_j = dwelling units in geography j

Ra_j = residential acreage in geography j

Similar to residential densities, each geographic zone has a characteristic net employment density. Net employment density equals the number of establishment-based jobs per acre of commercial land cover. The formula is as follows:

$$EBJA_j = EBJ_j / Ca_j$$

$EBJA_j$ = establishment-based jobs per net acres of commercial land cover in geography j

EBJ_j = establishment-based jobs in geography j

A_j = commercial acreage in geography j

To smooth out any localized extremes in density or anomalies in the density calculation and to provide for scenario testing by manipulating densities, the full range of observed population and employment densities were grouped by context development type to calculate an average. The average density for each development

---

[5] The hypothetical build-out scenario assumes that, in aggregate, development of parcels conforms to density allowable in the zoning ordinance. This assumption is necessary because a complete digital coverage of zoning districts and allowable densities in not available for municipalities in the NJTPA region.

context type is then calculated and applied to each TAZ in that group. The user has the option to replace the observed average density in each category for employment or population with another parameter estimate for scenario testing purposes.

Planned Projects and Major Improvements

To better estimate development potential, planning agencies for each county will be contacted and asked to provide information regarding all known large scale developments in the pipe-line. This inventory of known major development projects is expected to be most useful in allocating population and employment in the near-term. In addition, planned development and build-out estimates provide an opportunity for additional risk-based scenario testing.[6]

Other Indicators of Development Potential

Clearly, many other factors have a significant effect on the development potential of any MCD/TAZ. For an accurate allocation process, as many factors must be accounted for as possible. Thus, to supplement the other factors indicated above, the allocation module also accounts for the designated proposed future centers in SDRP and the presence of an existing or future transit node or existing or future major highway corridor. Additional factors may be added in the two unused indicator slots in each allocation worksheet (e.g., **Pop (1)** tab).

Weighting System

Incorporating the aforementioned indicators into the DEFM requires a determination of each individual indicator's relative contribution to overall development potential. Each individual factor interacts in the weighting system. The formulaic representation follows below:

$$D_j = bA + bB + bC...$$

D_j = development potential indicator for each zone $_j$

b = each factor's relative weight

A = individual factors

Weights for each input will be determined in the process of scenario development. One possible basis for determining weights is a budgeting allocation exercise such as that undertaken at a TAC meeting for the original DEFM model development project held on November 5, 2003.[7] Due to its subjective nature, the weighting system should be tested through alternative iterations and sensitivity exercises.

Employment and Population Allocations

Allocation based on ratio of development potential in MCD/TAZs to sum of development potential in region as a whole:

$$G_j^{t-t'} = G_T^{t-t'} \times \frac{D_j^a}{\sum D_i}$$

where:

---

[6] See Section 9.4.1 of the original DEFM documentation for the questionnaire submitted to the planning departments.

[7] See Section 9.5.1 and 9.5.2 of the original DEFM documentation for further discussion of the budgeting allocation exercise.

$G_j^{t-t'}$ = growth in sub-region j from previous forecast year to analysis year

$G_T^{t-t'}$ = total growth in NJTPA region from previous forecast year to analysis year

D_j = development potential in sub-region j

D_i = development potential in each sub-region i

Iterations/Growth Fitting

The DEFM undertakes three successive rounds of iterative population distribution as follows.

- Round 1 - In round one, the allocation module allocates regional population totals without regard to the quantity of available vacant land. The totals are allocated based on attributes of each zone (previous growth, accessibility, vacant land, transit/highway corridor) weighted in accordance with user defined settings. The regional assignment is then normalized to county control totals. Then, depending upon the setting, the module further adjusts the assigned values to account for developable land capacity constraints using the vacant developable land and net residential densities to constrain development in each zone according to capacity.

- Round 2 - In round two, the module repeats the process in round one assigning any growth in excess of capacity constraints applied in round 1 to other TAZs in the county with capacity to support the excess.

- Round 3 - Finally, in the third iteration, the allocation module assigns any portion of the county control total unassigned to a TAZ in rounds 1 and 2 to any TAZ with excess capacity according to the weighted allocation for round three specified by the user (allocation by proportion of vacant land or proportion of existing households or employment). By the third round all county control total household or employment growth is assigned to a TAZ. Household growth is then converted to population growth based on observed TAZ household size estimates adjusted for trends in household size estimated at the county level.

See Figure A-2, below, for an illustration of the step-wise allocation process.

Figure A-2: DEFM Allocation Process Diagram
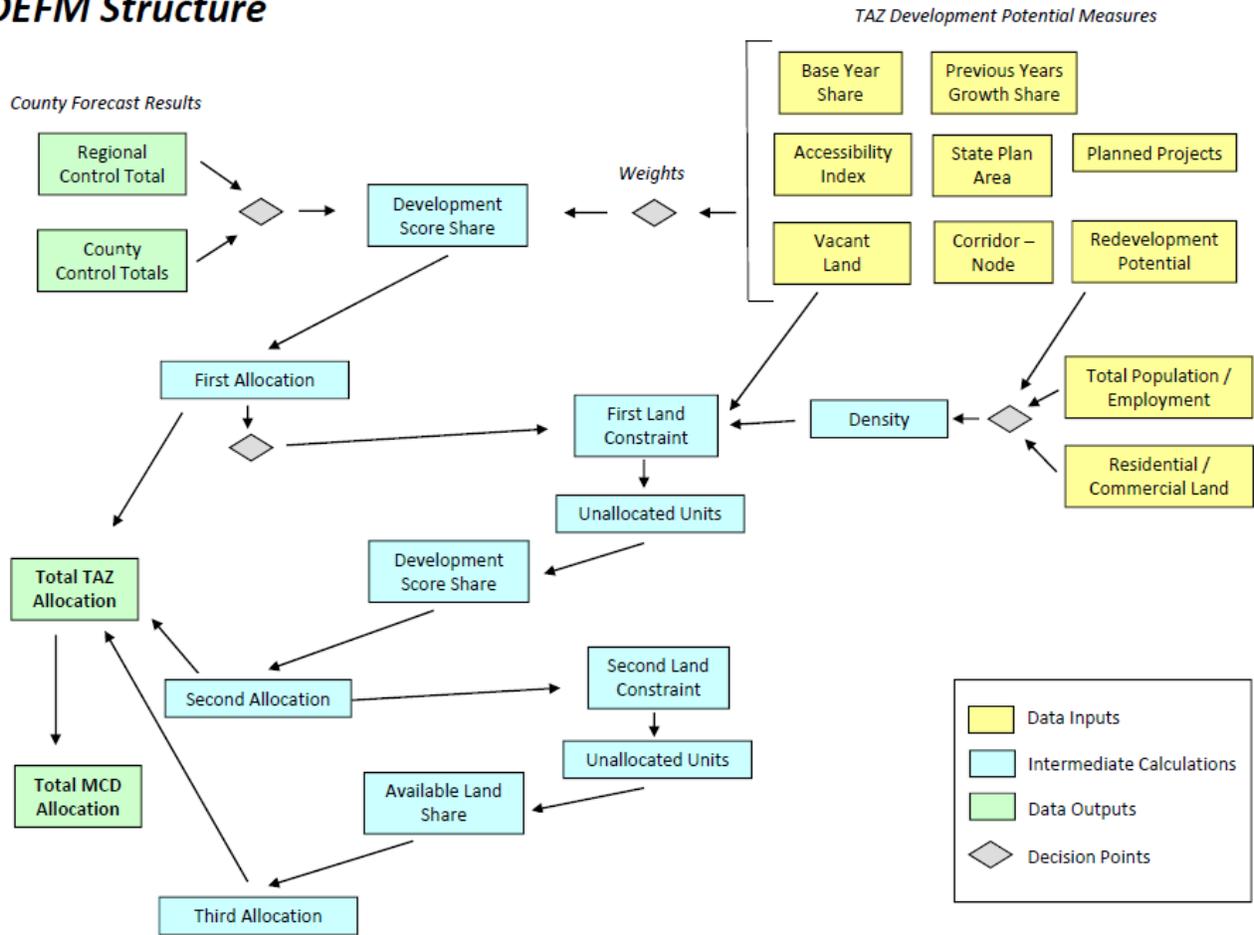
Model Adjustments

The DEFM allows the user to enter two types of adjustments that will supersede the allocation process outlined above. These adjustments are as follows.

- Known Project Inventory – Known or anticipated development projects can be listed on the **ProjectData** tab (see page 13), where the year of occupancy (closest time-step after expected occupancy) and expected number of units or expected employment capacity are noted. During the allocation process, if a TAZ's allocation (based on the three-round process) is lower than the total for that TAZ reflected in the known projects inventory then the allocation is adjusted upward to match the known project total. Vacant land is consumed according to the TAZ's density factor. The known projects adjustment is not constrained by vacant land capacity, however. If the allocation is higher than the known projects inventory, no change is made.

- Municipal Adjustment – After the scenario allocation process (engaged by selecting the **Run Model** button) the total output for households, population, and/or employment may be adjusted to meet a desired target for a municipality (see pages 14 through 16 for process beginning with the **MCD Adj HH** tab). Once an adjustment to the total is entered on the worksheet the DEFM overrides the allocation for each TAZ in the municipality to achieve the target total. Any change results in the consumption of vacant land (at the density applicable to each TAZ in the municipality), but the Municipal Adjustment

total is not constrained (i.e., the adjustment is made even in the absence of available development capacity within the municipal TAZs). In the event that an adjustment exhausts a municipality's development capacity, growth in future years may be accounted for by the user by entering a municipal adjustment in a subsequent time step or by adding a Known Project adjustment as outline above.

APPENDIX B – DESCRIPTION OF SPREADSHEET TABS

This appendix contains an annotated list of the tabs that comprise the DEFM Worksheet. The default setting for the DEFM allows for full display and navigation of these tabs at the bottom of the Excel window.

Start: This worksheet is the main user interface for the DEFM.

Notes: This worksheet allows users to enter text information describing scenarios.

AllocRules: Worksheet contains the weights to be assigned to the development potential indicators that are used for allocating control totals for households/population, and employment.

ExpertMode: This worksheet contains switches and cells for the entry of assumptions that are not required for the basic function of the DEFM

Time Definition: This worksheet contains a listing of the calendar years assigned to each model time step along with the definition of the base year and previous reference year. The sheet also allows the user to alter the variable names (headers) for key indicators in the Geodatabase.

Density: This worksheet allows users to adjust density assumptions for the allocation of households and employment to TAZs.

VacLandAdjSum: This worksheet allows users to change the vacant land total in zones, either increasing or decreasing the available acreage in a blanket entry for all zones in each of the Development Context Types.

MCD Summary HH: Worksheet summarizes household totals for MCDs.

MCD Summary Pop: Worksheet summarizes population totals for MCDs.

MCD Summary Emp: Worksheet summarizes employment totals for MCDs.

MCD Adj HH: This worksheet provides a table that allows the user to adjust the total number of households and total population count in a municipality for each time step.

MCD Adj Emp: This worksheet provides a table that allows the user to adjust the total employment count in a municipality for each time step.

Control Total Check: This worksheet contains tables that provide checks on the allocation process: Remaining County Control Totals after a manual municipal-level adjustment, and Difference between County Control Total and Allocation by County for each time step.

TAZ Overrides: This worksheet shows the detailed breakdown of a user's municipal adjustment by TAZ.

Project Data: This worksheet provides a table that allows the user to maintain an inventory of known development projects (in anticipated number of housing units or employment count) at the TAZ level.

Pop (Baseline): Worksheet contains the base year household and population data, development capacity, and density calculations for the TAZs.

Emp (Baseline): Worksheet contains the base year employment data, development capacity, and

density calculations for the TAZs.

CountyTotals: Worksheet provides a table for the user to enter the county control totals for households, population, and employment for each timestep in the forecast.

VacLandAdjDetail: Worksheet contains the calculations for vacant land for all TAZs, incorporating any user adjustments.

HHPivot: Excel pivot table summarizing TAZ household data by MCD.

PopPivot: Excel pivot table summarizing TAZ population data by MCD.

EmpPivot: Excel pivot table summarizing TAZ employment data by MCD.

HH Distributed: Worksheet contains the distribution of household counts from TAZ to MCD incorporating split zones.

Emp Distributed: Worksheet contains the distribution of employment counts from TAZ to MCD incorporating split zones.

POP Distributed: Worksheet contains the distribution of population counts from TAZ to MCD incorporating split zones.

HH (Output): Worksheet contains the allocation results for households by TAZ.

Emp (Output): Worksheet contains the allocation results for employment.

Pop (Output): Worksheet contains the allocation results for population.

TAZ (cap): Worksheet contains the calculation of development capacity (vacant developable land remaining for households and employment for each timestep after the base year.

Total Output: Worksheet contains the table that is used to write the DEFM forecast outputs to the Geodatabase.

LU: Worksheet contains the table that is used to write the DEFM forecast outputs (vacant land totals by timestep and vacant land consumption) to the Geodatabase.

CountyEnter (1): Worksheet contains the Time Step 1 county control totals.

Pop (1): Worksheet contains the Time Step 1 allocation of population.

Emp (1): Worksheet contains the Time Step 1 allocation of employment

CountyEnter (2): Worksheet contains the Time Step 2 county control totals.

Pop (2): Worksheet contains the Time Step 2 allocation of population.

Emp (2): Worksheet contains the Time Step 2 allocation of employment.

CountyEnter (3): Worksheet contains the Time Step 3 county control totals.

Pop (3): Worksheet contains the Time Step 3 allocation of population.

Emp (3): Worksheet contains the Time Step 3 allocation of employment.

CountyEnter (4): Worksheet contains the Time Step 4 county control totals.

Pop (4): Worksheet contains the Time Step 4 allocation of population.

Emp (4): Worksheet contains the Time Step 4 allocation of employment.

CountyEnter (5): Worksheet contains the Time Step 5 county control totals.

Pop (5): Worksheet contains the Time Step 5 allocation of population.

Emp (5): Worksheet contains the Time Step 5 allocation of employment.

CountyEnter (6): Worksheet contains the Time Step 6 county control totals.

Pop (6): Worksheet contains the Time Step 6 allocation of population.

Emp (6): Worksheet contains the Time Step 6 allocation of employment.

CountyEnter (7): Worksheet contains the Time Step 7 county control totals.

Pop (7): Worksheet contains the Time Step 7 allocation of population.

Emp (7): Worksheet contains the Time Step 7 allocation of employment.

CountyEnter (8): Worksheet contains the Time Step 8 county control totals.

Pop (8): Worksheet contains the Time Step 8 allocation of population.

Emp (8): Worksheet contains the Time Step 8 allocation of employment.

TAZbySDRP: Worksheet contains the calculation of the State Development and Redevelopment Plan (SDRP) indicator (weights and score for each SDRP area type).

Link_Demo_Base: Worksheet contains link to geodatabase for base year and previous reference year census and other key demographic statistics for each TAZ. This table is linked to the GeoDatabase table entitled: *TAZStats*. This worksheet also contains a table with more recent demographics linked to the database table entitled: *2005_Demographics*.

Link_Land_Base: Worksheet contains link to geodatabase for base year land use/land cover statistics (i.e., residential, commercial, industrial, and vacant land) for each TAZ. This table is linked to the GeoDatabase table entitled: *LandStats*.

Link_Comp_Zone: Worksheet contains link to geodatabase for table with TAZ-level assumptions on composite zoning our build-out density as provided by the sub-regions. This table is linked to the GeoDatabase table entitled: *CompZone*.

Link_Zone Tab: Worksheet contains link to geodatabase for table with TAZ definitions and statistics. This table is linked to the GeoDatabase table entitled: *2000 Zonal Boundary NJTPA*.

Link_Place_Type: Worksheet contains link to geodatabase for table with assignment of development context type to TAZs. This table is linked to the GeoDatabase table entitled: *PlaceType_SEZ*.

Link_Place_Node: Worksheet contains link to geodatabase for table with indicator of Transit Station nodes, and Highway Corridors by TAZ. This table is linked to the GeoDatabase table entitled: *Corridor_Node*.

Link_SDRP: Worksheet contains link to geodatabase for table with estimation of TAZ land area by SDRP category and center designation. This table is linked to the GeoDatabase table entitled: *SDRP*.

Link_MCD-TAZ Splits: Worksheet contains link to geodatabase for table with data on TAZs that are split across municipalities. This table is linked to the GeoDatabase table entitled: *MCD-TAZ_Splits*.

Link_Accessibility: Worksheet contains link to geodatabase for table with data accessibility indicator. This table is linked to the GeoDatabase table entitled: *Accessibility.*

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APPENDIX C – KEY MACROS USED IN DEFM SPREADSHEET

This appendix contains the full code of the key Visual Basic macros that are used in the operation of the DEFM. Macros included here are limited to those which involve calculations, or input or output routines. Macros which enable navigation through screens are not included. A brief description of the purpose, and location of the macro precedes the code.

Name:	SavePaste
Purpose:	Write scenario inputs and other key parameters to a .xlsx file for future retrieval by user.
Control:	**Save Scenario** button on **Start** tab
Location:	Module 9

```vb
Sub SavePaste()
'
oldWB = ActiveWorkbook.Name
Application.StatusBar = False
'
'
'  Check Scenario Name
'
Dim Message, Title, Default, MyValue
Message = "Rename scenario?"    ' Set prompt.
Title = "Scenario Name"    ' Set title.
Default = Sheets("Start").Range("B18")    ' Set default.
' Display message, title, and default value.
MyValue = inputbox(Message, Title, Default)
If MyValue = "" Then GoTo Closeout Else
If MyValue <> "" Then
Sheets("Start").Range("B18") = MyValue
Sheets("Notes").Range("C2") = MyValue
Sheets("Start").Select
Else
End If
'
'  Create New Workbook
'
Application.ScreenUpdating = False
Application.StatusBar = False
Dim defName As String
defName = Sheets("Start").Range("B18") & "_INPUT"
'
Set NewBook = Workbooks.Add
'
saveName = Application.GetSaveAsFilename(defName, fileFilter:="Microsoft Excel Workbook
(*.xlsx), *.xlsx")
If saveName <> False Then
'
cResp = MsgBox("Save as " & saveName & "?", vbOKCancel)
If cResp = vbCancel Then GoTo Closeout Else
NewBook.SaveAs Filename:=saveName
newWB = ActiveWorkbook.Name
'
'   Copy-out CountyTotals Sheet
'
Windows(newWB).Activate
Sheets.Add Before:=Sheets(1)
```

```
Sheets(1).Name = "CountyTotals"
'
Windows(oldWB).Activate
Application.StatusBar = "Saving Settings...10"
Sheets("CountyTotals").Activate
Range("A1:BB200").Select
Selection.Copy
'Application.CutCopyMode = False
Range("A1").Select
'
Windows(newWB).Activate
Sheets("CountyTotals").Activate
'
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteColumnWidths, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
Range("A1").Select
'
'   Copy-out ProjectData Sheet
'
Windows(newWB).Activate
Sheets.Add Before:=Sheets(1)
Sheets(1).Name = "ProjectData"
'
Windows(oldWB).Activate
Application.StatusBar = "Saving Settings...9"
Sheets("ProjectData").Activate
Range("A1:Z1000").Select
Selection.Copy
'Application.CutCopyMode = False
Range("A1").Select
'
Windows(newWB).Activate
Sheets("ProjectData").Activate
'
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteColumnWidths, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
Range("A1").Select
'
'   Copy-out TAZOverrides Sheet
'
Windows(newWB).Activate
Sheets.Add Before:=Sheets(1)
Sheets(1).Name = "TAZ_Overrides"
'
Windows(oldWB).Activate
Application.StatusBar = "Saving Settings...8"
Sheets("TAZ_Overrides").Activate
Range("A1:AB3000").Select
Selection.Copy
'Application.CutCopyMode = False
Range("A1").Select
'
Windows(newWB).Activate
```

```
Sheets("TAZ_Overrides").Activate
'
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteColumnWidths, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
Range("A1").Select
'
'    Copy-out MCD Adj Emp Sheet
'
Windows(newWB).Activate
Sheets.Add Before:=Sheets(1)
Sheets(1).Name = "MCD Adj Emp"
'
Windows(oldWB).Activate
Application.StatusBar = "Saving Settings...7"
Sheets("MCD Adj Emp").Activate
Range("A1:AO408").Select
Selection.Copy
'Application.CutCopyMode = False
Range("A1").Select
'
Windows(newWB).Activate
Sheets("MCD Adj Emp").Activate
'
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteColumnWidths, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
Range("A1").Select
'
'    Copy-out MCD Adj HH Sheet
'
Windows(newWB).Activate
Sheets.Add Before:=Sheets(1)
Sheets(1).Name = "MCD Adj HH"
'
Windows(oldWB).Activate
Application.StatusBar = "Saving Settings...6"
Sheets("MCD Adj HH").Activate
Range("A1:BF408").Select
Selection.Copy
'Application.CutCopyMode = False
Range("A1").Select
'
Windows(newWB).Activate
Sheets("MCD Adj HH").Activate
'
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteColumnWidths, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
Range("A1").Select
'
```

```vba
'   Copy-out VacLandAdjSum Sheet
'
Windows(newWB).Activate
Sheets.Add Before:=Sheets(1)
Sheets(1).Name = "VacLandAdjSum"
'
Windows(oldWB).Activate
Application.StatusBar = "Saving Settings...5"
Sheets("VacLandAdjSum").Activate
Range("A1:Z40").Select
Selection.Copy
'Application.CutCopyMode = False
Range("A1").Select
'
Windows(newWB).Activate
Sheets("VacLandAdjSum").Activate
'Range("A1").Select
'ActiveSheet.CheckBoxes.Add(300.75, 75, 168, 16.5).Select
'ActiveSheet.Paste
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteColumnWidths, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
Range("A1").Select
'
'   Copy-out Density Sheet
'
Windows(newWB).Activate
Sheets.Add Before:=Sheets(1)
Sheets(1).Name = "Density"
'
Windows(oldWB).Activate
Application.StatusBar = "Saving Settings...4"
Sheets("Density").Activate
Range("A1:W102").Select
Selection.Copy
'Application.CutCopyMode = False
Range("A1").Select
'
Windows(newWB).Activate
Sheets("Density").Activate
'
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteColumnWidths, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
Range("A1").Select
'
'   Copy-out Time Definition Sheet
'
Windows(newWB).Activate
Sheets.Add Before:=Sheets(1)
Sheets(1).Name = "Time Definition"
'
Windows(oldWB).Activate
Application.StatusBar = "Saving Settings...3"
Sheets("Time Definition").Activate
```

```
Range("A1:Z100").Select
Selection.Copy
'Application.CutCopyMode = False
Range("A1").Select
'
Windows(newWB).Activate
Sheets("Time Definition").Activate
'
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteColumnWidths, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
Range("A1").Select
'
'   Copy-out ExpertMode Sheet
'
Windows(newWB).Activate
Sheets.Add Before:=Sheets(1)
Sheets(1).Name = "ExpertMode"
'
Windows(oldWB).Activate
Sheets("ExpertMode").Activate
Range("A1:Z100").Select
Selection.Copy
'Application.CutCopyMode = False
Range("A1").Select
'
Windows(newWB).Activate
Sheets("ExpertMode").Activate
'
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteColumnWidths, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
Range("A1").Select
'
'   Copy-out AllocRules Sheet
'
Windows(newWB).Activate
Sheets.Add Before:=Sheets(1)
Sheets(1).Name = "AllocRules"
'
Windows(oldWB).Activate
Application.StatusBar = "Saving Settings...2"
Sheets("AllocRules").Activate
Range("A1:AZ100").Select
Selection.Copy
'Application.CutCopyMode = False
Range("A1").Select
'
Windows(newWB).Activate
Sheets("AllocRules").Activate
'
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
```

```
Selection.PasteSpecial Paste:=xlPasteColumnWidths, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
Range("A1").Select
'
'   Copy-out Notes Sheet
'
Windows(newWB).Activate
Sheets.Add Before:=Sheets(1)
Sheets(1).Name = "Notes"
'
Windows(oldWB).Activate
Application.StatusBar = "Saving Settings...1"
Sheets("Notes").Activate
Range("A1:Z100").Select
Selection.Copy
'Application.CutCopyMode = False
Range("A1").Select
'
Windows(newWB).Activate
Sheets("Notes").Activate
'
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Selection.PasteSpecial Paste:=xlPasteColumnWidths, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
Range("A1").Value = "NJTPA DEFM Scenario File v12"
'
'
'   Wrap-up
'
'
Application.StatusBar = "Saving Settings Complete"
ActiveWorkbook.Save
ActiveWorkbook.Close
Windows(oldWB).Activate
Sheets("Start").Activate
Application.ScreenUpdating = True
'
Else
End If
MsgBox ("Scenario saved to file.")
Closeout:
Application.StatusBar = False
Application.ScreenUpdating = True
End Sub
```

Name:	DataIN
Purpose:	Load scenario inputs and other key parameters from a .xlsx file that had been saved by a user for future retrieval.
Control:	**Load Scenario** button on **Start** tab
Location:	Module 9

```
Sub DataIN()
'
' pasteRec Macro
'
oldWB = ActiveWorkbook.Name
'
dfileName = Application _
    .GetOpenFilename("Microsoft Excel Workbook (*.xlsx), *.xlsx")
If dfileName <> False Then
    MsgBox "Open " & dfileName & "?"
Workbooks.Open Filename:=dfileName
newWB = ActiveWorkbook.Name
'
Windows(newWB).Activate
Sheets("Notes").Select
If Range("A1") <> "NJTPA DEFM Scenario File v12" Then
Workbooks(newWB).Close
Windows(oldWB).Activate
iResp = MsgBox("Not an Input File.  Select another file.", vbOKOnly)
GoTo Closeout
Else
End If
'
'
Windows(newWB).Activate
'
Application.StatusBar = False
Application.StatusBar = "Loading data file...10"
Application.ScreenUpdating = False
'
'   Notes Tab
'
    Windows(newWB).Activate
    Sheets("Notes").Select
    sName = Range("C2").Value
    Range("C4:K34").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("Start").Select
    Range("B18") = sName
    Sheets("Notes").Select
    Range("C2") = sName
    Range("C4").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
    Range("C4").Select
'
'   AllocRules Tab
'
    Windows(newWB).Activate
    Sheets("AllocRules").Select
    Range("G8:G17").Select
```

```
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
 Application.StatusBar = "Loading data file...9"
    Sheets("AllocRules").Select
    Range("G8").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
    Range("G8").Select
'
    Windows(newWB).Activate
    Sheets("AllocRules").Select
    Range("N8:N17").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("AllocRules").Select
    Range("N8").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
    Range("N8").Select
'
'   ExpertMode Tab
'
    Windows(newWB).Activate
    Sheets("ExpertMode").Select
    v1 = Range("B6").Value
    v2 = Range("B8").Value
    v3 = Range("B12").Value
    v4 = Range("B14").Value
    v5 = Range("B20").Value
    v6 = Range("B22").Value
 Windows(oldWB).Activate
Application.StatusBar = "Loading data file...8"
    Sheets("ExpertMode").Select
    Range("B6").Value = v1
    Range("B8").Value = v2
    Range("B12").Value = v3
    Range("B14").Value = v4
    Range("B20").Value = v5
    Range("B22").Value = v6
'
'   Time Definition Tab
'
 Windows(newWB).Activate
    Sheets("Time Definition").Select
    Range("C6:C15").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("Time Definition").Select
    Range("C6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
    Windows(newWB).Activate
    Range("F6:J7").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
```

```
    Range("F6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
    Range("C6").Select
'
'   Density Tab
'
 Windows(newWB).Activate
    Sheets("Density").Select
    Range("E6:E25").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
Application.StatusBar = "Loading data file...7"
    Sheets("Density").Select
    Range("E6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
    Windows(newWB).Activate
    Range("H6:H25").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Range("H6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
    Windows(newWB).Activate
    Range("K6:K25").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Range("K6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
    Range("E6").Select
'
'   VacLandAdjSum Tab
'
    Windows(newWB).Activate
    Sheets("VacLandAdjSum").Select
    Range("E6:E25").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
Application.StatusBar = "Loading data file...6"
    Sheets("VacLandAdjSum").Select
    Range("E6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
    Range("E6").Select
'
'   MCD Adj HH Tab
'
    Windows(newWB).Activate
    Sheets("MCD Adj HH").Select
    Range("H6:H389").Select
```

```
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
Application.StatusBar = "Loading data file...5"
    Sheets("MCD Adj HH").Select
    Range("H6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
  '
    Windows(newWB).Activate
    Sheets("MCD Adj HH").Select
    Range("J6:J389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj HH").Select
    Range("J6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
  '
    Windows(newWB).Activate
    Sheets("MCD Adj HH").Select
    Range("N6:N389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj HH").Select
    Range("N6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
  '
    Windows(newWB).Activate
    Sheets("MCD Adj HH").Select
    Range("P6:P389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj HH").Select
    Range("P6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
  '
    Windows(newWB).Activate
    Sheets("MCD Adj HH").Select
    Range("T6:T389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj HH").Select
    Range("T6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
  '
    Windows(newWB).Activate
    Sheets("MCD Adj HH").Select
    Range("V6:V389").Select
    Application.CutCopyMode = False
    Selection.Copy
```

```
Windows(oldWB).Activate
Sheets("MCD Adj HH").Select
Range("V6").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
'
Windows(newWB).Activate
Sheets("MCD Adj HH").Select
Range("Z6:Z389").Select
Application.CutCopyMode = False
Selection.Copy
Windows(oldWB).Activate
Sheets("MCD Adj HH").Select
Range("Z6").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
'
Windows(newWB).Activate
Sheets("MCD Adj HH").Select
Range("AB6:AB389").Select
Application.CutCopyMode = False
Selection.Copy
Windows(oldWB).Activate
Sheets("MCD Adj HH").Select
Range("AB6").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
'
Windows(newWB).Activate
Sheets("MCD Adj HH").Select
Range("AF6:AF389").Select
Application.CutCopyMode = False
Selection.Copy
Windows(oldWB).Activate
Sheets("MCD Adj HH").Select
Range("AF6").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
'
Windows(newWB).Activate
Sheets("MCD Adj HH").Select
Range("AH6:AH389").Select
Application.CutCopyMode = False
Selection.Copy
Windows(oldWB).Activate
Sheets("MCD Adj HH").Select
Range("AH6").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Application.CutCopyMode = False
'
Windows(newWB).Activate
Sheets("MCD Adj HH").Select
Range("AL6:AL389").Select
Application.CutCopyMode = False
Selection.Copy
Windows(oldWB).Activate
Sheets("MCD Adj HH").Select
Range("AL6").Select
```

```
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
    Windows(newWB).Activate
    Sheets("MCD Adj HH").Select
    Range("AN6:AN389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj HH").Select
    Range("AN6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
    Windows(newWB).Activate
    Sheets("MCD Adj HH").Select
    Range("AR6:AR389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj HH").Select
    Range("AR6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
    Windows(newWB).Activate
    Sheets("MCD Adj HH").Select
    Range("AT6:AT389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj HH").Select
    Range("AT6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
    Windows(newWB).Activate
    Sheets("MCD Adj HH").Select
    Range("AX6:AX389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj HH").Select
    Range("AX6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
    Windows(newWB).Activate
    Sheets("MCD Adj HH").Select
    Range("AZ6:AZ389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj HH").Select
    Range("AZ6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
```

```
    Range("H6").Select
'
'    MCD Adj Emp Tab
'
Windows(newWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("G6:G389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
Application.StatusBar = "Loading data file...4"
    Sheets("MCD Adj Emp").Select
    Range("G6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
Windows(newWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("K6:K389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("K6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
Windows(newWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("O6:O389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("O6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
Windows(newWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("S6:S389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("S6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
Windows(newWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("W6:W389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("W6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
```

```
        Application.CutCopyMode = False
'
Windows(newWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("AA6:AA389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("AA6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
Windows(newWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("AE6:AE389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("AE6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
Windows(newWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("AI6:AI389").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Sheets("MCD Adj Emp").Select
    Range("AI6").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
    Range("G6").Select
'
'   TAZ Overrides Tab
'
Windows(newWB).Activate
    Sheets("TAZ_Overrides").Select
    Range("E4:AB3000").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
Application.StatusBar = "Loading data file...3"
    Sheets("TAZ_Overrides").Select
    Range("E4").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
    Range("E4").Select
'
'   ProjectData Tab
'
Windows(newWB).Activate
    Sheets("ProjectData").Select
    Range("B4:P499").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
```

```
Application.StatusBar = "Loading data file...2"
    Sheets("ProjectData").Select
    Range("B4").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
    Range("B4").Select
'
'   CountyTotals Tab
'
    Windows(newWB).Activate
    Sheets("CountyTotals").Select
    Range("C4:AB16").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
Application.StatusBar = "Loading data file...1"
    Sheets("CountyTotals").Select
    Range("C4").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
'
    Windows(newWB).Activate
    Range("AD4:AK16").Select
    Application.CutCopyMode = False
    Selection.Copy
    Windows(oldWB).Activate
    Range("AD4").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Application.CutCopyMode = False
    Range("C4").Select
'
'   Reset Calc Sheet References
'
Sheets("Pop (1)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$E4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$M4"
'
Sheets("Pop (2)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$F4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$N4"
'
Sheets("Pop (3)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$G4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$O4"
'
Sheets("Pop (4)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$H4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$P4"
'
Sheets("Pop (5)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$I4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Q4"
'
Sheets("Pop (6)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$J4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$R4"
'
Sheets("Pop (7)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$K4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$S4"
```

```
'
Sheets("Pop (8)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$L4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$T4"
'
Sheets("Emp (1)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$U4"
'
Sheets("Emp (2)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$V4"
'
Sheets("Emp (3)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$W4"
'
Sheets("Emp (4)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$X4"
'
Sheets("Emp (5)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Y4"
'
Sheets("Emp (6)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Z4"
'
Sheets("Emp (7)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$AA4"
'
Sheets("Emp (8)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$AB4"
'
'    Wrap-Up
'
'   Clear clipboard
     Dim MyData As DataObject
     Dim inText As String
     Set MyData = New DataObject
     inText = ""
     MyData.SetText inText
     MyData.PutInClipboard
'
Workbooks(newWB).Close
Windows(oldWB).Activate
Sheets("Start").Select
Application.StatusBar = "Loading data file...Complete"
MsgBox "Datafile " & dataName & " loaded."
Application.StatusBar = False
Application.ScreenUpdating = True
'
End If
Closeout:
End Sub
```

Name:	Output_for_Mapping
Purpose:	Write output data to a .xls file for automated link to the Geodatabase.
Control:	**Export to GeoDB** button on **Start** tab
Location:	Module 13

```
Sub Output_for_Mapping()

' Macro recorded 5/11/2011 by Matthew Jacobs
'
Dim Message, Title, Default, MyValue
Message = "Rename geodatabase output file?"    ' Set prompt.
Title = "Map Datafile Name"    ' Set title.
Default = "DEFM_Output"    ' Set default.
' Display message, title, and default value.
MyValue = inputbox(Message, Title, Default)
If MyValue = "" Then GoTo Closeout Else
If MyValue <> "" Then
Sheets("Start").Select
Else
End If
'
'   Create New Workbook
'
Dim defName As String
defName = MyValue
'

    Sheets(Array("Total Output")).Select
    Sheets(Array("Total Output")).Copy
    Range("A1") = "TAZ"
    Range("AE1530") = Now


'
saveName = Application.GetSaveAsFilename(defName, fileFilter:="Microsoft Excel Workbook
(*.xls), *.xlsx")
If saveName <> False Then
'
cResp = MsgBox("Save as " & saveName & "?", vbOKCancel)
If cResp = vbCancel Then GoTo Closeout Else
'ActiveWorkbook.SaveAs Filename:=saveName
ActiveWorkbook.SaveAs Filename:=saveName, FileFormat:=xlAddIn
ActiveWorkbook.Close
'newWB = ActiveWorkbook.Name
'
'

    Sheets(Array("LU")).Select
    Sheets(Array("LU")).Copy
    Range("A1") = "TAZ"
    Range("AL1530") = Now
'
saveName2 = defName & "_LU.xls"
ActiveWorkbook.SaveAs Filename:=saveName2, FileFormat:=xlAddIn

'
    iAnswer = MsgBox("Output Complete", vbOKOnly)

ActiveWorkbook.Close
Sheets("Start").Select
End If
Closeout:
End Sub
```

Name:	CommandButton6_Click
Purpose:	Run model (calculate and update all output tables)
Control:	**Run Model** button on **<u>Start</u>** tab
Location:	Sheet 39 (Start)

```
Private Sub CommandButton6_Click()
Application.ScreenUpdating = False
Application.StatusBar = "Updating Estimates..."
Application.CalculateFull
Call UpdatePivots
Application.StatusBar = "Updating Result Tables..."
Application.CalculateFull
Sheets("Start").Select
Application.StatusBar = "Calculation Complete."
Application.StatusBar = False
Application.ScreenUpdating = True
ActiveWindow.DisplayWorkbookTabs = True
ActiveWindow.DisplayHeadings = True
ActiveWindow.DisplayVerticalScrollBar = True
ActiveWindow.DisplayHorizontalScrollBar = True
'
resp = MsgBox("Calculation Complete.", vbOKOnly)
Sheets("MCD Summary HH").Select
End Sub
```

Name:	Button23_Click
Purpose:	Refresh all connections to geodatabase (Link_ spreadsheets at the end of workbook)
Control:	**Refresh Database Connections** button on **ExpertMode** tab
Location:	Module 11

```
Sub Button23_Click()
    Sheets("Link_Demo_Base").Select
    Range("A2").Select
    ActiveWorkbook.RefreshAll
    resp = MsgBox("Input Data Refreshed.", vbOKOnly)
    Sheets("ExpertMode").Select

End Sub
```

Name:	calcOn
Purpose:	Toggle automatic calculation on or off depending on current state.
Control:	**Recalc On/Off** button on **ExpertMode** tab
Location:	Module 3

```
Sub calcOn()
'
' Macro1 Macro
' Macro recorded 7/15/2004 by Albert Racciatti
'
If Sheets("ExpertMode").Range("C26") = "Automatic" Then
Application.Calculation = xlCalculationManual
Sheets("ExpertMode").Range("C26") = "Manual"
Application.Calculate
Else
Sheets("ExpertMode").Range("C26") = "Automatic"
Application.Calculation = xlCalculationAutomatic
End If

End Sub
```

Name:	Button1_Click
Purpose:	Apply known project assumptions to allocation.
Control:	**Apply Project Assumptions** button on **Project Data** tab
Location:	Module 7

```
Sub Button1_Click()
On Error GoTo ErrorHandler

'Clear previous values
'
Sheets("Pop (1)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$E4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$M4"
'
Sheets("Pop (2)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$F4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$N4"
'
Sheets("Pop (3)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$G4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$O4"
'
Sheets("Pop (4)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$H4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$P4"
'
Sheets("Pop (5)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$I4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Q4"
'
Sheets("Pop (6)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$J4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$R4"
'
Sheets("Pop (7)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$K4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$S4"
'
Sheets("Pop (8)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$L4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$T4"
'
Sheets("Emp (1)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$U4"
'
Sheets("Emp (2)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$V4"
'
Sheets("Emp (3)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$W4"
'
Sheets("Emp (4)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$X4"
'
Sheets("Emp (5)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Y4"
'
Sheets("Emp (6)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Z4"
'
Sheets("Emp (7)").Select
```

```
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$AA4"
'
Sheets("Emp (8)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$AB4"
'
Calculate
'
'Begin data id and transfer
'
Sheets("ProjectData").Select
'
For tazCount = 4 To 499
Sheets("ProjectData").Select
Dim tazNum, huVal, empVal, yrVal, rNum, adjVal, allocVal As Double
'
tazNum = Cells(tazCount, 3).Value
yrVal = Cells(tazCount, 4).Value
huVal = Cells(tazCount, 5).Value
empVal = Cells(tazCount, 6).Value
'
yrChk1 = Range("AE4")
yrChk2 = Range("AE5")
yrChk3 = Range("AE6")
yrChk4 = Range("AE7")
yrChk5 = Range("AE8")
yrChk6 = Range("AE9")
yrChk7 = Range("AE10")
yrChk8 = Range("AE11")
'
If tazNum = 0 Then GoTo wrapUp Else
If yrVal = yrChk1 Then Sheets("Pop (1)").Select Else
If yrVal = yrChk2 Then Sheets("Pop (2)").Select Else
If yrVal = yrChk3 Then Sheets("Pop (3)").Select Else
If yrVal = yrChk4 Then Sheets("Pop (4)").Select Else
If yrVal = yrChk5 Then Sheets("Pop (5)").Select Else
If yrVal = yrChk6 Then Sheets("Pop (6)").Select Else
If yrVal = yrChk7 Then Sheets("Pop (7)").Select Else
If yrVal = yrChk8 Then Sheets("Pop (8)").Select Else
'
Set myRange = ActiveSheet.Range("B4:B2000")
rNum = Application.WorksheetFunction.Match(tazNum, myRange, 0)
adjVal = Cells(rNum + 3, 16).Value
allocVal = Cells(rNum + 3, 28).Value
checkVal = adjVal = 0 And huVal > allocVal
If checkVal Then Cells(rNum + 3, 16).Value = huVal Else
If tazNum = 0 Then GoTo wrapUp Else
'
If yrVal = yrChk1 Then Sheets("Emp (1)").Select Else
If yrVal = yrChk2 Then Sheets("Emp (2)").Select Else
If yrVal = yrChk3 Then Sheets("Emp (3)").Select Else
If yrVal = yrChk4 Then Sheets("Emp (4)").Select Else
If yrVal = yrChk5 Then Sheets("Emp (5)").Select Else
If yrVal = yrChk6 Then Sheets("Emp (6)").Select Else
If yrVal = yrChk7 Then Sheets("Emp (7)").Select Else
If yrVal = yrChk8 Then Sheets("Emp (8)").Select Else
'
empadjVal = Cells(rNum + 3, 16).Value
empallocVal = Cells(rNum + 3, 28).Value
empcheckVal = adjVal = 0 And empVal > allocVal
If empcheckVal Then Cells(rNum + 3, 16).Value = empVal Else
'
wrapUp:
Next tazCount
```

```
'
Calculate
'
Sheets("ProjectData").Select
MsgBox ("Project Inventory update is complete.")
Exit Sub
'
ErrorHandler:
MsgBox ("ERROR: TAZ " & tazNum & " not found or year entered is incorrect")
Resume Next
End Sub
```

Name:	ManualAdjust
Purpose:	Apply municipal adjustment assumptions to allocation calculations.
Control:	**Update** button on **MDC Adj HH** tab
Location:	Module 5

```
Sub ManualAdjust()
Sheets("HH_Distributed").Select
'
Range("V2") = "TAZ"
Range("W2") = "1 MCD Adj"
Range("X2") = "1 Model"
Range("Y2") = "1 Adj Dist"
Range("Z2") = "2 MCD Adj"
Range("AA2") = "2 Model"
Range("AB2") = "2 Adj Dist"
Range("AC2") = "3 MCD Adj"
Range("AD2") = "3 Model"
Range("AE2") = "3 Adj Dist"
Range("AF2") = "4 MCD Adj"
Range("AG2") = "4 Model"
Range("AH2") = "4 Adj Dist"
Range("AI2") = "5 MCD Adj"
Range("AJ2") = "5 Model"
Range("AK2") = "5 Adj Dist"
Range("AL2") = "6 MCD Adj"
Range("AM2") = "6 Model"
Range("AN2") = "6 Adj Dist"
Range("AO2") = "7 MCD Adj"
Range("AP2") = "7 Model"
Range("AQ2") = "7 Adj Dist"
Range("AR2") = "8 MCD Adj"
Range("AS2") = "8 Model"
Range("AT2") = "8 Adj Dist"

'
Range("U3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,2,FALSE)"
Range("V3").Formula = "=A3"
Range("W3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,5,FALSE)"
Range("X3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,4,FALSE)"
Range("Y3").Formula = "=IF($W3<>0,($W3-$U3)*$H3/$X3,0)"
'
Range("Z3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,11,FALSE)"
Range("AA3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,10,FALSE)"
Range("AB3").Formula = "=IF($Z3<>0,($Z3-$X3)*$I3/$AA3,0)"
'
Range("AC3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,17,FALSE)"
Range("AD3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,16,FALSE)"
Range("AE3").Formula = "=IF($AC3<>0,($AC3-$AA3)*$J3/$AD3,0)"
'
Range("AF3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,23,FALSE)"
Range("AG3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,22,FALSE)"
Range("AH3").Formula = "=IF($AF3<>0,($AF3-$AD3)*$K3/$AG3,0)"
'
Range("AI3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,29,FALSE)"
Range("AJ3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,28,FALSE)"
Range("AK3").Formula = "=IF($AI3<>0,($AI3-$AG3)*$L3/$AJ3,0)"
'
Range("AL3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,35,FALSE)"
Range("AM3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,34,FALSE)"
Range("AN3").Formula = "=IF($AL3<>0,($AL3-$AJ3)*$M3/$AM3,0)"
'
```

```
Range("AO3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,41,FALSE)"
Range("AP3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,40,FALSE)"
Range("AQ3").Formula = "=IF($AO3<>0,($AO3-$AM3)*$N3/$AP3,0)"
'
Range("AR3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,47,FALSE)"
Range("AS3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,46,FALSE)"
Range("AT3").Formula = "=IF($AR3<>0,($AR3-$AP3)*$O3/$AS3,0)"
'
Range("U3:AT3").Select
Selection.Copy
Range("U4:AT3999").Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
Sheets("HH_Distributed").Calculate
Range("U3:AT3999").Select
Selection.Copy
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
Application.CutCopyMode = False
Range("U2").Select
'
'TAZ Summary by Pivot Table
'
Sheets("HH_Distributed").Select
ActiveWorkbook.PivotCaches.Create(SourceType:=xlDatabase, SourceData:= _
    "HH_Distributed!R2C22:R3999C46", Version:=xlPivotTableVersion12). _
    CreatePivotTable TableDestination:="HH_Distributed!R4C63", TableName:= _
    "PivotTable2", DefaultVersion:=xlPivotTableVersion12
Sheets("HH_Distributed").Select
Cells(4, 63).Select
With ActiveSheet.PivotTables("PivotTable2").PivotFields("TAZ")
    .Orientation = xlRowField
    .Position = 1
    End With
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("1 Adj Dist"), "Sum of 1 Adj Dist", xlSum
'
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("2 Adj Dist"), "Sum of 2 Adj Dist", xlSum
'
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("3 Adj Dist"), "Sum of 3 Adj Dist", xlSum
    '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("4 Adj Dist"), "Sum of 4 Adj Dist", xlSum
    '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("5 Adj Dist"), "Sum of 5 Adj Dist", xlSum
    '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("6 Adj Dist"), "Sum of 6 Adj Dist", xlSum
        '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("7 Adj Dist"), "Sum of 7 Adj Dist", xlSum
        '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("8 Adj Dist"), "Sum of 8 Adj Dist", xlSum
'
With ActiveSheet.PivotTables("PivotTable2").PivotFields("TAZ")
    .PivotItems(" -   ").Visible = False
End With
With ActiveSheet.PivotTables("PivotTable2")
    .ColumnGrand = False
```

```
      .RowGrand = False
End With
'
Range("BL5:BS2999").Select
Selection.Copy
Sheets("TAZ_Overrides").Select
Range("E3").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
Application.CutCopyMode = False
'Range("E3").Formula = "=$A$1+5"
'Range("F3").Formula = "=$A$1+10"
'Range("G3").Formula = "=$A$1+15"
'Range("H3").Formula = "=$A$1+20"
'Range("I3").Formula = "=$A$1+25"
'Range("J3").Formula = "=$A$1+30"
'Range("K3").Formula = "=$A$1+35"
'Range("L3").Formula = "=$A$1+40"
'
Sheets("HH_Distributed").Select
Range("BK3:BS3999").Clear
'
Range("U2").Select
'
'
'
'POPULATION
'
'
Sheets("Pop_Distributed").Select
'
Range("V2") = "TAZ"
Range("W2") = "1 MCD Adj"
Range("X2") = "1 Model"
Range("Y2") = "1 Adj Dist"
Range("Z2") = "2 MCD Adj"
Range("AA2") = "2 Model"
Range("AB2") = "2 Adj Dist"
Range("AC2") = "3 MCD Adj"
Range("AD2") = "3 Model"
Range("AE2") = "3 Adj Dist"
Range("AF2") = "4 MCD Adj"
Range("AG2") = "4 Model"
Range("AH2") = "4 Adj Dist"
Range("AI2") = "5 MCD Adj"
Range("AJ2") = "5 Model"
Range("AK2") = "5 Adj Dist"
Range("AL2") = "6 MCD Adj"
Range("AM2") = "6 Model"
Range("AN2") = "6 Adj Dist"
Range("AO2") = "7 MCD Adj"
Range("AP2") = "7 Model"
Range("AQ2") = "7 Adj Dist"
Range("AR2") = "8 MCD Adj"
Range("AS2") = "8 Model"
Range("AT2") = "8 Adj Dist"

'
Range("U3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,3,FALSE)"
Range("V3").Formula = "=A3"
Range("W3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,7,FALSE)"
Range("X3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,6,FALSE)"
Range("Y3").Formula = "=IF($W3<>0,($W3-$U3)*$H3/$X3,0)"
```

```
'
Range("Z3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,13,FALSE)"
Range("AA3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,12,FALSE)"
Range("AB3").Formula = "=IF($Z3<>0,($Z3-$X3)*$I3/$AA3,0)"
'
Range("AC3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,19,FALSE)"
Range("AD3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,18,FALSE)"
Range("AE3").Formula = "=IF($AC3<>0,($AC3-$AA3)*$J3/$AD3,0)"
'
Range("AF3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,25,FALSE)"
Range("AG3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,24,FALSE)"
Range("AH3").Formula = "=IF($AF3<>0,($AF3-$AD3)*$K3/$AG3,0)"
'
Range("AI3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,31,FALSE)"
Range("AJ3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,30,FALSE)"
Range("AK3").Formula = "=IF($AI3<>0,($AI3-$AG3)*$L3/$AJ3,0)"
'
Range("AL3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,37,FALSE)"
Range("AM3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,36,FALSE)"
Range("AN3").Formula = "=IF($AL3<>0,($AL3-$AJ3)*$M3/$AM3,0)"
'
Range("AO3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,43,FALSE)"
Range("AP3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,42,FALSE)"
Range("AQ3").Formula = "=IF($AO3<>0,($AO3-$AM3)*$N3/$AP3,0)"
'
Range("AR3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,49,FALSE)"
Range("AS3").Formula = "=VLOOKUP($D3,'MCD Adj HH'!$D$6:$AZ$389,48,FALSE)"
Range("AT3").Formula = "=IF($AR3<>0,($AR3-$AP3)*$O3/$AS3,0)"
'
Range("U3:AT3").Select
Selection.Copy
Range("U4:AT3999").Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
Sheets("Pop_Distributed").Calculate
Range("U3:AT3999").Select
Selection.Copy
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
Application.CutCopyMode = False
Range("U2").Select
'
'TAZ Summary by Pivot Table
'
Sheets("Pop_Distributed").Select
ActiveWorkbook.PivotCaches.Create(SourceType:=xlDatabase, SourceData:= _
    "Pop_Distributed!R2C22:R3999C46", Version:=xlPivotTableVersion12). _
    CreatePivotTable TableDestination:="Pop_Distributed!R4C63", TableName:= _
    "PivotTable2", DefaultVersion:=xlPivotTableVersion12
Sheets("Pop_Distributed").Select
Cells(4, 63).Select
With ActiveSheet.PivotTables("PivotTable2").PivotFields("TAZ")
    .Orientation = xlRowField
    .Position = 1
    End With
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("1 Adj Dist"), "Sum of 1 Adj Dist", xlSum
'
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("2 Adj Dist"), "Sum of 2 Adj Dist", xlSum
'
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("3 Adj Dist"), "Sum of 3 Adj Dist", xlSum
```

```
'
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("4 Adj Dist"), "Sum of 4 Adj Dist", xlSum
    '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("5 Adj Dist"), "Sum of 5 Adj Dist", xlSum
    '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("6 Adj Dist"), "Sum of 6 Adj Dist", xlSum
        '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("7 Adj Dist"), "Sum of 7 Adj Dist", xlSum
        '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("8 Adj Dist"), "Sum of 8 Adj Dist", xlSum
'
With ActiveSheet.PivotTables("PivotTable2").PivotFields("TAZ")
    .PivotItems(" -   ").Visible = False
End With
With ActiveSheet.PivotTables("PivotTable2")
    .ColumnGrand = False
    .RowGrand = False
End With
'
Range("BL5:BS2999").Select
Selection.Copy
Sheets("TAZ_Overrides").Select
Range("M3").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
Application.CutCopyMode = False
'Range("M3").Formula = "=$A$1+5"
'Range("N3").Formula = "=$A$1+10"
'Range("O3").Formula = "=$A$1+15"
'Range("P3").Formula = "=$A$1+20"
'Range("Q3").Formula = "=$A$1+25"
'Range("R3").Formula = "=$A$1+30"
'Range("S3").Formula = "=$A$1+35"
'Range("T3").Formula = "=$A$1+40"
'Range("A1").Select
'
Sheets("Pop_Distributed").Select
Range("BK3:BS3999").Clear
'
Range("U2").Select
'
'
'Add values to calculation sheet
'
Sheets("Pop (1)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$E4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$M4"
'
Sheets("Pop (2)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$F4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$N4"
'
Sheets("Pop (3)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$G4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$O4"
'
Sheets("Pop (4)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$H4"
```

```
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$P4"
'
Sheets("Pop (5)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$I4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Q4"
'
Sheets("Pop (6)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$J4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$R4"
'
Sheets("Pop (7)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$K4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$S4"
'
Sheets("Pop (8)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$L4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$T4"
'
Sheets("Emp (1)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$U4"
'
Sheets("Emp (2)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$V4"
'
Sheets("Emp (3)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$W4"
'
Sheets("Emp (4)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$X4"
'
Sheets("Emp (5)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Y4"
'
Sheets("Emp (6)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Z4"
'
Sheets("Emp (7)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$AA4"
'
Sheets("Emp (8)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$AB4"
'
Sheets("Control Total Check").Select
'Application.ScreenUpdating = False
'Application.StatusBar = "Updating Result Tables..."
'
Calculate
Sheets("HHPivot").Select
Range("F15").Select
ActiveSheet.PivotTables("PivotTable2").PivotCache.Refresh
Sheets("Emp Pivot").Select
Range("F17").Select
ActiveSheet.PivotTables("PivotTable2").PivotCache.Refresh
Sheets("Pop Pivot").Select
Range("F16").Select
ActiveSheet.PivotTables("PivotTable2").PivotCache.Refresh
Sheets("MCD Adj HH").Select
Calculate
'
Application.StatusBar = False
Application.ScreenUpdating = True
'
Sheets("Control Total Check").Select
```

```
'
iResp = MsgBox("Municipal adjustments saved.", vbOKOnly)

End Sub
```

Name:	ManualAdjustEMP
Purpose:	Apply municipal adjustment assumptions for employment to allocation calculations.
Control:	**Update** button on **MDC Adj Emp** tab
Location:	Module 5

```
Sub ManualAdjustEMP()
Sheets("Emp_Distributed").Select
'
Range("V2") = "TAZ"
Range("W2") = "1 MCD Adj"
Range("X2") = "1 Model"
Range("Y2") = "1 Adj Dist"
Range("Z2") = "2 MCD Adj"
Range("AA2") = "2 Model"
Range("AB2") = "2 Adj Dist"
Range("AC2") = "3 MCD Adj"
Range("AD2") = "3 Model"
Range("AE2") = "3 Adj Dist"
Range("AF2") = "4 MCD Adj"
Range("AG2") = "4 Model"
Range("AH2") = "4 Adj Dist"
Range("AI2") = "5 MCD Adj"
Range("AJ2") = "5 Model"
Range("AK2") = "5 Adj Dist"
Range("AL2") = "6 MCD Adj"
Range("AM2") = "6 Model"
Range("AN2") = "6 Adj Dist"
Range("AO2") = "7 MCD Adj"
Range("AP2") = "7 Model"
Range("AQ2") = "7 Adj Dist"
Range("AR2") = "8 MCD Adj"
Range("AS2") = "8 Model"
Range("AT2") = "8 Adj Dist"

'
Range("U3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,2,FALSE)"
Range("V3").Formula = "=A3"
Range("W3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,4,FALSE)"
Range("X3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,3,FALSE)"
Range("Y3").Formula = "=IF($W3<>0,($W3-$U3)*$H3/$X3,0)"
'
Range("Z3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,8,FALSE)"
Range("AA3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,7,FALSE)"
Range("AB3").Formula = "=IF($Z3<>0,($Z3-$X3)*$I3/$AA3,0)"
'
Range("AC3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,12,FALSE)"
Range("AD3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,11,FALSE)"
Range("AE3").Formula = "=IF($AC3<>0,($AC3-$AA3)*$J3/$AD3,0)"
'
Range("AF3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,16,FALSE)"
Range("AG3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,15,FALSE)"
Range("AH3").Formula = "=IF($AF3<>0,($AF3-$AD3)*$K3/$AG3,0)"
'
Range("AI3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,20,FALSE)"
Range("AJ3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,19,FALSE)"
Range("AK3").Formula = "=IF($AI3<>0,($AI3-$AG3)*$L3/$AJ3,0)"
'
Range("AL3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,24,FALSE)"
Range("AM3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,23,FALSE)"
Range("AN3").Formula = "=IF($AL3<>0,($AL3-$AJ3)*$M3/$AM3,0)"
'
```

```
Range("AO3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,28,FALSE)"
Range("AP3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,27,FALSE)"
Range("AQ3").Formula = "=IF($AO3<>0,($AO3-$AM3)*$N3/$AP3,0)"
'
Range("AR3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,32,FALSE)"
Range("AS3").Formula = "=VLOOKUP($D3,'MCD Adj Emp'!$D$6:$AZ$389,31,FALSE)"
Range("AT3").Formula = "=IF($AR3<>0,($AR3-$AP3)*$O3/$AS3,0)"
'
Range("U3:AT3").Select
Selection.Copy
Range("U4:AT3999").Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
Sheets("Emp_Distributed").Calculate
Range("U3:AT3999").Select
Selection.Copy
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
Application.CutCopyMode = False
Range("U2").Select
'
'TAZ Summary by Pivot Table
'
Sheets("Emp_Distributed").Select
ActiveWorkbook.PivotCaches.Create(SourceType:=xlDatabase, SourceData:= _
    "Emp_Distributed!R2C22:R3999C46", Version:=xlPivotTableVersion12). _
    CreatePivotTable TableDestination:="Emp_Distributed!R4C63", TableName:= _
    "PivotTable2", DefaultVersion:=xlPivotTableVersion12
Sheets("Emp_Distributed").Select
Cells(4, 63).Select
With ActiveSheet.PivotTables("PivotTable2").PivotFields("TAZ")
    .Orientation = xlRowField
    .Position = 1
    End With
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("1 Adj Dist"), "Sum of 1 Adj Dist", xlSum
'
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("2 Adj Dist"), "Sum of 2 Adj Dist", xlSum
'
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("3 Adj Dist"), "Sum of 3 Adj Dist", xlSum
    '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("4 Adj Dist"), "Sum of 4 Adj Dist", xlSum
    '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("5 Adj Dist"), "Sum of 5 Adj Dist", xlSum
    '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("6 Adj Dist"), "Sum of 6 Adj Dist", xlSum
        '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("7 Adj Dist"), "Sum of 7 Adj Dist", xlSum
        '
ActiveSheet.PivotTables("PivotTable2").AddDataField ActiveSheet.PivotTables( _
    "PivotTable2").PivotFields("8 Adj Dist"), "Sum of 8 Adj Dist", xlSum
'
With ActiveSheet.PivotTables("PivotTable2").PivotFields("TAZ")
    .PivotItems(" -   ").Visible = False
End With
With ActiveSheet.PivotTables("PivotTable2")
    .ColumnGrand = False
```

```
      .RowGrand = False
End With
'
Range("BL5:BS2999").Select
Selection.Copy
Sheets("TAZ_Overrides").Select
Range("U3").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
Application.CutCopyMode = False
'Range("U3").Formula = "=$A$1+5"
'Range("V3").Formula = "=$A$1+10"
'Range("W3").Formula = "=$A$1+15"
'Range("X3").Formula = "=$A$1+20"
'Range("Y3").Formula = "=$A$1+25"
'Range("Z3").Formula = "=$A$1+30"
'Range("AA3").Formula = "=$A$1+35"
'Range("AB3").Formula = "=$A$1+40"
'Range("A1").Select
'
Sheets("Emp_Distributed").Select
Range("BK3:BS3999").Clear
'
Range("U2").Select
'
'
'Add values to calculation sheet
'
Sheets("Pop (1)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$E4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$M4"
'
Sheets("Pop (2)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$F4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$N4"
'
Sheets("Pop (3)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$G4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$O4"
'
Sheets("Pop (4)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$H4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$P4"
'
Sheets("Pop (5)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$I4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Q4"
'
Sheets("Pop (6)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$J4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$R4"
'
Sheets("Pop (7)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$K4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$S4"
'
Sheets("Pop (8)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$L4"
Range("AU4").Resize(2999, 1).Formula = "=TAZ_Overrides!$T4"
'
Sheets("Emp (1)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$U4"
'
```

```
Sheets("Emp (2)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$V4"
'
Sheets("Emp (3)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$W4"
'
Sheets("Emp (4)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$X4"
'
Sheets("Emp (5)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Y4"
'
Sheets("Emp (6)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$Z4"
'
Sheets("Emp (7)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$AA4"
'
Sheets("Emp (8)").Select
Range("P4").Resize(2999, 1).Formula = "=TAZ_Overrides!$AB4"
'
Sheets("Control Total Check").Select
'Application.ScreenUpdating = False
'Application.StatusBar = "Updating Result Tables..."
'
Calculate
Sheets("HHPivot").Select
Range("F15").Select
ActiveSheet.PivotTables("PivotTable2").PivotCache.Refresh
Sheets("Emp Pivot").Select
Range("F17").Select
ActiveSheet.PivotTables("PivotTable2").PivotCache.Refresh
Sheets("Pop Pivot").Select
Range("F16").Select
ActiveSheet.PivotTables("PivotTable2").PivotCache.Refresh
Sheets("MCD Adj HH").Select
Calculate
'
Application.StatusBar = False
Application.ScreenUpdating = True
'
Sheets("Control Total Check").Select

End Sub
```

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APPENDIX D – DESCRIPTION OF MODEL TESTING

This appendix contains an overview of the testing procedures that were undertaken to ensure that the revised DEFM is functioning as designed. The testing included exercises to confirm that the navigation and streamlining improvements were functioning properly and that the links to the GeoDatabase were maintained. Overall the aim of the testing was to ensure that the allocations were properly calculated and the scenario features operated as intended. The testing included the following activities and findings.

NAVIGATION

The DEFM was updated to streamline navigation through the model by the user. These revisions involved the redesign of data entry screens and the workflow for the scenario development process. Testing of these features involved the following.

- Scenario workflow – Beginning with **Start** screen, the process of user data entry was tested including:

    - the ability of the user to enter a scenario name and notes.

    - the ability to change allocation rules for households and employment and the function of the Recalculate button to show changes in the total.

    - the **Density** assumption page was checked to ensure that the Development Context Type, zone and density information was reading correctly from the source tables and that revised density assumptions entered by the user were applied properly in the calculation process including links to **Pop (Baseline)** and **Emp (Baseline)** tabs.

- **Start** screen and **Expert Mode** links – Each button on the Start tab was tested to ensure it linked properly with the intended model screens and tables. The navigation links on the Expert Mode tab were also checked along with backward navigation enabling the user to retrace steps back to the **Start** page. The following tests were performed.

    - The check boxes on the **Expert Mode** tab were tested to ensure that they were properly linked to the calculation pages. The model was run with and without the county level control total function.

    - Errors found in the **Use Available Composite Zoning** and **Apply Average Density Assumption** check boxes (links and formulas on the **Pop (Baseline)** tab) were corrected.

    - Household size upper limit and replacement functions were tested with alternate values along with the lower limit employment density value.

    - The recalc on and off function was verified.

- **Run Model** button – The function of the run model button on the **Start** tab and **Density** tab was verified.

- Output screens – The output screens were checked to ensure that they were properly linked to the pivot tables and that the municipal and county level totals were accurate for each time step.

OPERATIONS

Key operational features of the revised DEFM were tested including the newly implemented scenario save and load functions and the tables linked to the GeoDatabase.

- Save-Out and Load-On functions – These functions were overhauled in the revision of the DEFM and so required thorough testing.

  - The Save-Out function was tested for the ability to save revised tables to a formatted .xlsx file. Alternate values were entered into tables and saved as scenarios to ensure that each change in the assumption tables was properly written to the saved data file.

  - The Load-In function was tested to ensure that values were pasted into the proper input cells and that only properly formatted data files would be accepted for Load-In by the DEFM.

  - Reloading of baseline data was checked to confirm that allocations could be reset to their original values after a new scenario was created and saved.

- GeoDatabase Connections – The nine tables linked to the Geo-Database were checked to ensure that the links could be maintained and refreshed with a change in directory structure and file location.

  - The **Refresh Database Connection** button on the **ExpertMode** tab was checked for function to update each table. Changes were made to each table in the GeoDatabase and after refresh the DEFM was checked to ensure that the changes were reflected in the linked tables.

  - The table refresh function was checked for its function when the location of the GeoDatabase was changed. (This requires user intervention to confirm the location of the GeoDatabase as each table is updated as described on page 18, above).

  - The placement of two tables on one tab was corrected. Under some circumstances this resulted in the overwriting of data in the second table if the number of columns in the first table was altered. Each linked table is now placed on its own tab in the DEFM.

  - Full replacement of a data table was tested through a change in the Development Context Typology table in the GeoDatabase. The DEFM table with the PlaceType categories was replaced with the older Strategy Evaluation District categories. All tables in the DEFM (e.g., **Density** tab) were checked to ensure that the replacement was reflected and the model was run using the older density categories to ensure that the allocation process would occur properly. The linked table was then replaced with the original PlaceType assignments and the model was rerun. The original baseline allocation was achieved showing that the table replacement was successful without resulting in errors or changes in the allocation calculations.

- Addition of TAZs was tested by adding 5 dummy zones to the TAZ table and verifying that they were properly imported into the DEFM data tables.

- Time Definition – The time definition assumptions were altered to ensure that the change in the definition of a time step (e.g., from 2000 to 2005 base year) was carried through the model calculation and output tables. 2005 base year and 2000 previous reference year data were tested to ensure that the model could be updated with revised demographics. (Employment data for this time period was not available so the 2000 baseline and 1990 previous year were retained in the delivered version of the DEFM.

- Known Project List – To ensure the proper function of this new feature in the DEFM, a variety of data entry tests were performed.

    - Household and employment totals below the calculated allocation in a TAZ were entered into the table to ensure that the allocated total was not affected.

    - Household and employment totals above the calculated allocation in a TAZ were entered into the table to ensure that the allocation was altered to account for the known project total.

    - 10 example projects were entered with a mix of TAZs and time-steps to ensure that the target household and employment numbers were reflected in the allocations.

    - The known project list was reordered to ensure that position in the table had no effect on transfer of the data to the calculation sheets (**Pop (1)**, **Emp (1)**, etc.).

    - During the course of the testing an error in the application of the known project list to the last time step was identified and corrected (macro error).

- Municipal Adjustment – To ensure the proper function of this new feature in the DEFM, a variety of data entry tests were performed.

    - Household, population, and employment targets were entered into municipalities chosen for a spot check. Two from each county were altered in multiple time-steps to ensure that they were properly reflected in the calculation sheets (e.g., column P of the **Pop (8)** tab) and the output tables.

    - County control totals were verified to ensure that the allocation was properly accounting for the adjustments by altering the totals in other municipalities within the county.

    - The function of the control total check tables was verified by entering municipal adjustments in excess of a county's control total for a time step.

    - During the course of the testing an error in the application of the municipal adjustments to the last two time steps was identified and corrected (cell reference error in macro).

    - The TAZ-level adjustment function was verified by altering the default allocation of a municipal adjustment to the TAZs in a municipality.

- Map connection – Several scenarios were generated and GeoDatabase output tables were generated (**Export to GeoDB** button on the **Start** tab) for each one to test the link to the GeoDatabase.

CALCULATION

Model calculations were checked, by altering input assumptions and base data to ensure that changes were properly reflected in the calculation tables and final model results. Checks included those outlined above and the following:

- Alteration of density assumptions

- Alteration of allocation rules

- Alteration in vacant land increase assumptions and blanket vacant land adjustment checkbox (on/off)

- Alteration in transit node and highway corridor indicator values

- Alteration in average density assumptions (on/off)

- Change in vacant land constrained (on/off)

- Change in county control total constraint (on/off)

- Change in Development Context Typology (reversion to Strategy Evaluation District types)

- Change in Time Definition (use of 2005 base year and 2000 previous reference year)

- Verification of proper municipal totals from TAZs (spot check) including check of TAZ-MCD split calculation for split zones.

- Verification of county control total allocation (in scenarios where vacant land / development capacity is available at a county level for each time step).

- Verification of Known Project list assumptions in and Municipal Adjustments in final output tables.

OUTPUT SENSITIVITY

Testing of the revised DEFM included the development of an allocation factor sensitivity test, modeled after testing conducted during the original development of the DEFM. This testing was designed to demonstrate how allocation factors could be varied to develop scenarios, and how the function of the DEFM remains consistent with the earlier version.

Three scenarios were created in the DEFM as follows.

- Example Baseline Allocation – This example places weight relatively evenly across the allocation factors. The baseline corresponds to settings used in the original DEFM testing (developed through workshop exercises with the sub-regions) that were found to provide a balanced allocation with respect to vacant and center-oriented scenarios (see below). The baseline scenario setting is characterized by the following.

  - Even weights across measures (see Figure D-1 for settings).

Figure D-1 Allocation Factor Weights – Baseline Scenario

Allocation Factor Weights (Enter Values to Sum to 100)	
Previous Share of Growth in Households	20
Share of Total Households	20
Accessibility Index - Highway	10
Accessibility Index - Transit	10
Vacant Developable Land	15
State Plan Area Designation	20
Proximity to Highway Corridor	0
Proximity to Transit Corridor	5
Total:	100

  - PlaceType Average Density Setting – The **Apply Average Density Adjustment** check box was enabled on the **ExpertMode** tab. This applies the average density for a Development Context Type to all TAZs in that category, smoothing out high and low extremes in the observed data.

- Vacant Land Allocation– This example places all weight in the allocation on the availability of vacant developable land in a TAZ. Other development potential indicators are not included in the allocation calculation. This simulates the extreme example of land availability as the only factor in the location of future household and employment growth. The scenario was based on the following settings.

  - 100% Weight to Vacant Land Indicator

  - TAZ-Level Effective Density – The **Apply Average Density Adjustment** check box was disabled (off) on the **ExpertMode** tab. This results in the use of observed densities (calculated TAZ by TAZ)—maintaining any trends in above or below average density.

  -

- Transit-Oriented Allocation
    - 50% Transit Accessibility / 50% Transit Node
    - PlaceType Average Density Setting – The **Apply Average Density Adjustment** check box was enabled on the **<u>ExpertMode</u>** tab. This applies the average density for a Development Context Type to all TAZs in that category, smoothing out high and low extremes in the observed data.

The assumptions outlined above produced allocation results that were consistent with the intended purpose of each scenario.

Figure D-2 shows the results by scenario for aggregated groupings of the development context types (i.e., urban = all types labeled "metropolitan" and "urban;" suburban = "suburb" type; rural = "rural area" and "rural town" types; and vacation area is preserved as a separate category).

Figure D-2

Scenario Comparison Chart by Area Category: 2000-2025 Change in HH

	Transit	Baseline	Vacant
Rural	47,050	63,199	83,736
Suburban	70,983	77,727	81,127
Urban	343,984	321,061	297,948
Vacation Area	2,814	2,844	2,020
	464,832	464,832	464,832
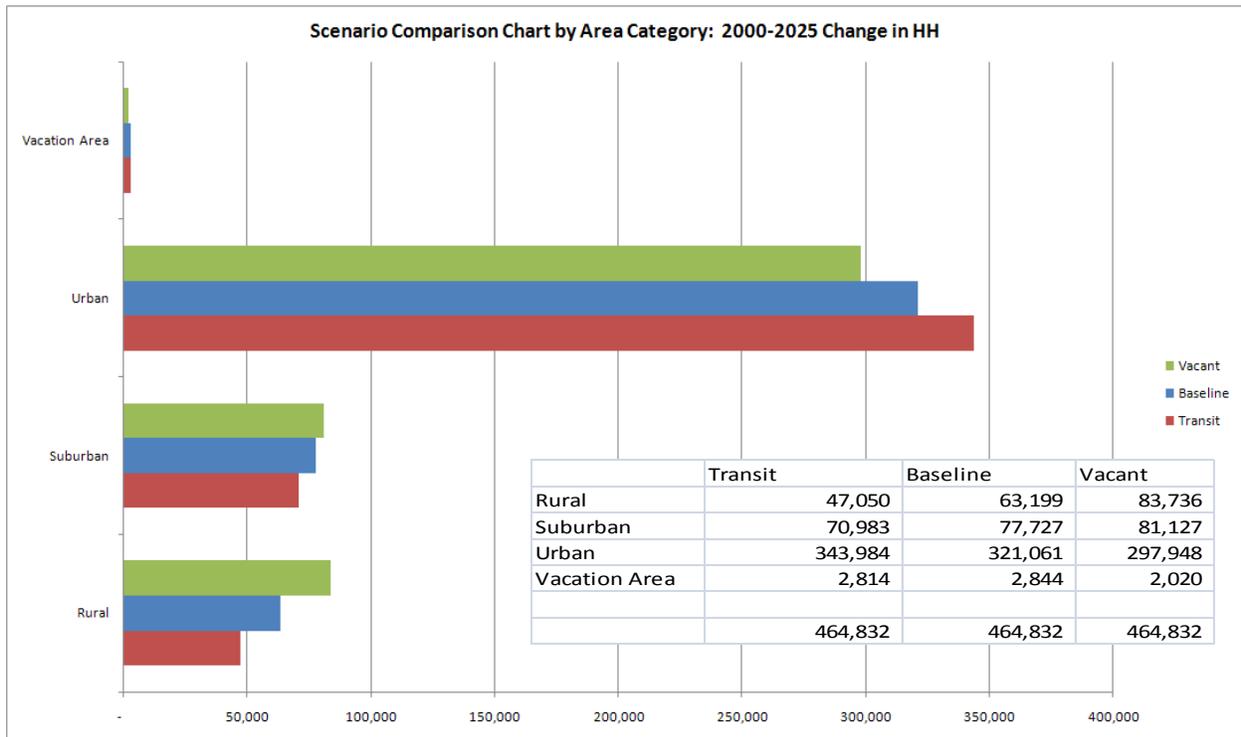
As intended, the baseline scenario, which places allocation weights relatively evenly across the allocation factors results in an overall change in households that falls between the extremes derived from the "all vacant" scenario and the "transit/center-oriented" scenario. In the urban areas, for example, the change in households from 2000 to 2025 is just under 300,000 when vacant land is the only allocation factor. In the baseline scenario, the allocations for this grouping of TAZs is 321,000. For the scenario which places the predominant weight on the location of transit nodes and transit accessibility, the total household change in the period is 344,000. The findings are reversed, as we would expect, for the other development context categories, which have a higher availability of vacant land and lower transit access, overall. Vacation areas, which in the North Jersey region are densely developed and have transit access, generally follow the pattern

of the urban areas.

It is important to note that while the totals for each development context type change from scenario to scenario as the allocation factors are varied, the overall total (464,832) stays constant, reflecting the sum of the county control totals specified for this period in the DEFM.

Figure D-3 provides the same scenario comparison for the full detail of the development context types. Notable is that while the pattern of transit oriented development favoring urban areas holds for the mature metropolitan, metropolitan with office, and urban center areas, the areas designated metropolitan with shopping center, show less growth in the transit scenario, indicative of higher levels of vacant land and lower levels of transit access in this areas.

Figure D-3

PlaceType	Transit	Baseline	Vacant
10 Vacation Area	2,814	2,844	2,329
09 Rural Area	35,380	46,683	58,771
08 Rural Town	11,670	16,516	23,544
07 Suburb	70,983	77,727	79,355
06 Urban Area	29,677	32,615	31,280
05 Urban Center	41,695	41,268	36,676
04 Metropolitan with Shopping Center	24,812	27,303	30,248
03 Metropolitan with Office	17,381	16,165	14,906
02 Metropolitan with Industry	18,676	17,139	17,662
01 Mature Metropolitan	211,743	186,569	170,061
	464,832	464,832	464,832

The sensitivity test outlined above is consistent with the testing conducted during the original model development project. See Figure D-4 for the output of scenario tests done during the initial DEFM

development project in 2004. While the development context types and allocation factors have changed with the latest task to update and refine the DEFM (making direct comparisons impossible) the direction and magnitude of the differences between a vacant land, and center-oriented scenario are similar to those presented above in Figure D-2.

Figure D-4
Scenario Sensitivity Testing from Initial DEFM Model Development Project (2004)
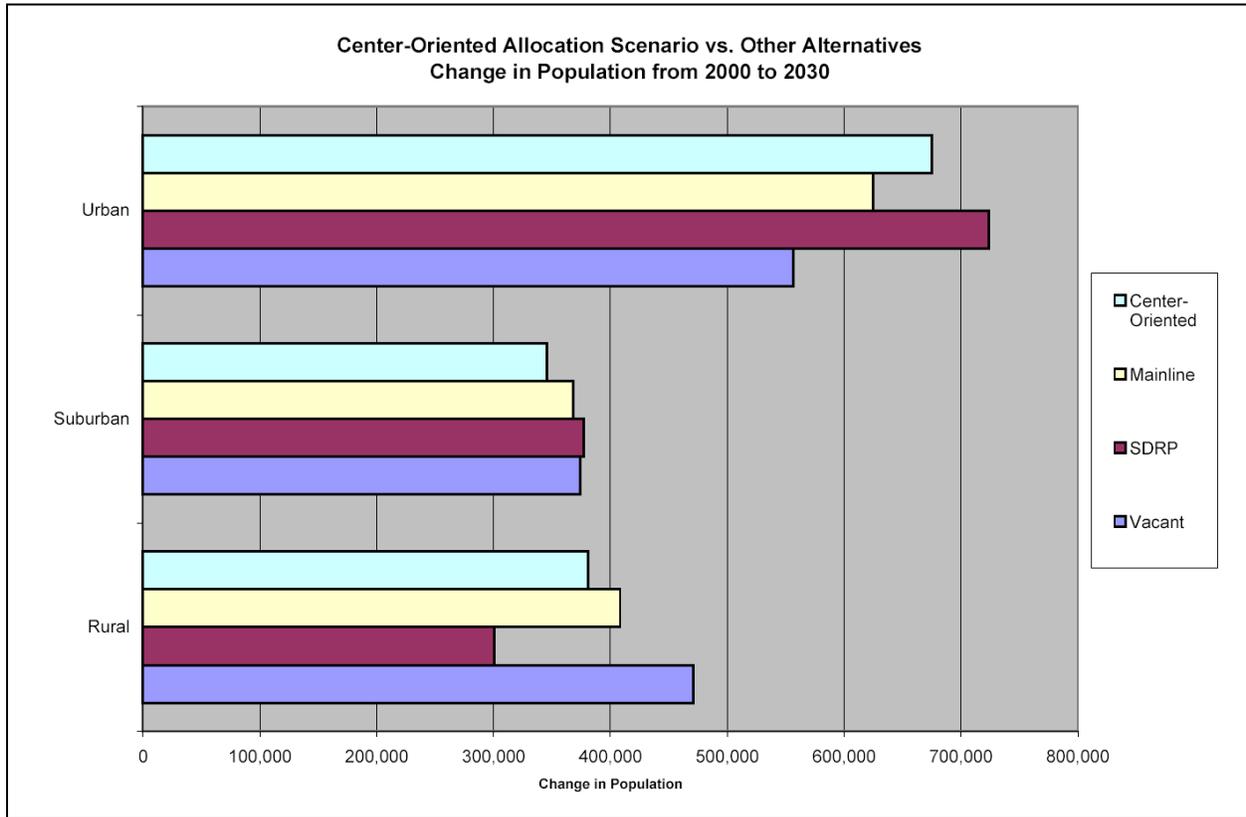
The vacant land constraint plays an important role in limiting the allocation of households and employment to a level that corresponds with an area's development capacity (with allowances for redevelopment and errors in the vacant land inventory). Without the vacant land constraint, the allocation process relies strictly on the development potential indicators. Figure D-5 shows the results of the Transit-Oriented scenario described above, with and without the vacant land constraint, applied. For reference the Baseline scenario is also displayed.

Scenario Comparison Chart by Area Category: 2000-2040 Change in HH
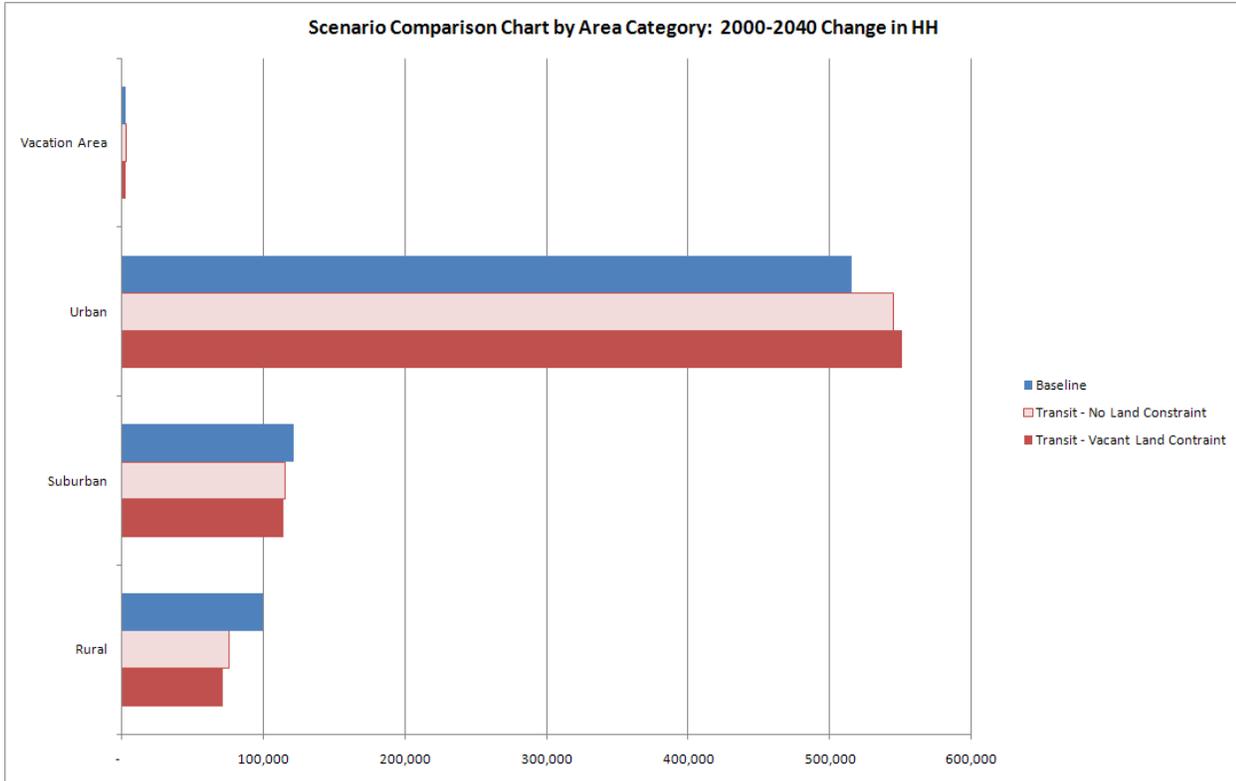
In general, a center-oriented urban scenario can be strengthened by increasing redevelopment potential and vacant land adjustment, freeing up more capacity in the core for development. Conversely, lower assumptions in redevelopment allowance and vacant land adjustment will favor allocation to suburban and rural areas which as a whole have excess capacity for development.

As the exercise in Figure D-5 shows, however, elimination of the vacant land constraint all-together does not necessarily result in more development directed toward the urban core. In the case of the transit scenarios, the allocation is more evenly distributed among the major development context categories without the function of the vacant land constraint. The removal of the vacant land constraint results in fewer households assigned to the urban areas and more households to the suburban and rural areas. This is most likely attributable to limited development densities around transit nodes and transit accessible locations near suburban and rural areas. When densities are not constrained, development opportunities increase in those areas. This illustrates how the vacant land constraint (and the corresponding assumptions on redevelopment capacity and vacant land adjustment) can be used to complement the allocation factors.

CONCLUSION

The testing conducted for the revised version of the DEFM shows that the model features and calculations are functioning as intended. Testing revealed a few problem areas (cell reference and macro execution errors) that were resolved before final delivery. Sensitivity tests are generally consistent with expected results and the findings of previous model testing.