MEMORANDUM

Date:	Updated March 27, 2023	**TG:**	1.21146
To:	Matthew Grabau, GBNRTC		
From:	John Lewis, Aaron Crockett, Scott Le Vine (Transpo)		
cc:			
Subject:	Demographic Forecasts to Support 2050 MTP Update		

Objective

The main objective was to prepare updated demographic forecasts (population and households) at the TAZ-level for use in modeling year 2050 travel demand to support the Metropolitan Transportation Plan (MTP) update currently underway. A review of the current employment forecasts indicated that they were still valid for this MTP update such that no wholesale changes needed to be made to the regional growth estimates. The 2020 decennial population data, however, demonstrated a clear break with the previously assumed downward inter-decennial (2010-2019) trend.

The approach to developing the updates was designed to be consistent with the land-use-based forecasting approach developed in 2016 for GBNRTC, which was the basis for the current set of demographic forecasts. For reference, the 2016 work effort was itself an enhancement to prior practice which was based on a straight-line forward-projecting approach. Appendix A contains the report prepared for that work effort.

Approach

This update made use of the year 2020 person-level decennial Census datasets that have been recently published. Additionally, American Community Survey (ACS) data from other years (2018, 2019 & 2021) was utilized to provide context and fill in gaps. Finally, recent development activity since year 2020 as identified by GBNRTC staff and other peer agencies was incorporated to update population and households as well as key employment centers at the TAZ level.

Note: The household-level 2020 Census datasets have not yet been published by the Census Bureau and therefore were not available for this update. It is anticipated that a separate future task order may be developed to incorporate the household-level data into GBNRTC's demographic datasets when it is released later in 2023.

Demographic Data Assembled

Data was assembled from publicly available sources and included the following data sets:

- US Census Bureau
  - 2020 person-level decennial Census: Population at the Block Group Level; (Note: Household information had not been released at the time of this work effort),
  - 2021 ACS data: Population and Households at the Block Group Level;
- Relevant data from current and previous plans and programs of the region (e.g. anticipated major land use developments); and
- Existing decennial Census demographic data and TAZ-level data in the GBNRTC travel demand model, for comparison and validation.

Year 2020 Baseline Data

Year 2020 baseline data at the block group level for population, households and employment were assembled as a first step, which updates the earlier baseline data with the newest available Census observations

- **Population** - Year 2020 population was developed directly from the 2020 person-level decennial Census.
- **Households** – As year 2020 decennial census household data has not been released at the block group level as mentioned above, data from the 2021 American Community Survey (ACS) was used.
- **Employment** – Employment data was unchanged from the current dataset.

Table 1 shows the GBNRTC Region totals for population, households, and employment for the year 2020 data.

Table 1 – Year 2020 Baseline Data

Year	Population	Households	Employment
2020	1,166,902[1]	491,870	696,286

Update of Land-Use-Based Forecasting Tool

The spreadsheet model described in Appendix A was applied to develop future year 2050 forecasts at the Census block group level of geography. This model pivots off base year population data based on a set of calculations and assumptions on allocating land-use, type, and intensity of development. Table 2 below (next page) describes the land use classes.

[1] Includes Group Quarters

Table 2: GBNRTC Residential Land Use Classes

CODE	NAME	DESCRIPTION
RA	Agricultural	Limited, low-density residential uses that are complimentary to the rural atmosphere, but not to the extent that they compromise agricultural activities.
R1	Single-Family Moderate	Low-density residential development in the form of single-family detached dwellings.
R2	Two-Family Moderate	single-family attached and detached residential dwellings, including townhouses, duplexes and patio home configurations.
R3	Multifamily Moderate	Moderate and higher urban density residential development in a suburban setting including single and two-family dwellings.
R4	Multifamily High	High density residential. Primarily apartments and townhouses, oriented to the street.
R5	Mobile / Manufactured Home Park	Single family detached mobile dwelling units on individual lots.
C1	Traditional Neighborhood	Single-family residential on upper floors of commercial.
C2	Traditional Hamlet	Single-family, Two-family, or Multifamily dwellings above a business establishment.
C3	Central Business District	Commercial mix with mid-rise multifamily residential, and single/multifamily residential above ground floor commercial.

The following steps were taken to update the spreadsheet model:

- Confirmed and loaded Census 2020 Population data into the tool at census block group level.
- Confirmed classifications of GBNRTC Census block groups based on density.
- Re-calculated growth factors in the land use classes (bins) defined by zoning-type and density.
- Applied the growth factors to develop year 2050 population forecasts for each Census block group.

Table 3 show the resultant growth factors by land use class, stratified by population density. There are two sets of growth factors:

- "Raw" – these are the growth factors as calculated by the spreadsheet tool; and
- "Capped" – these are the growth factors with a maximum (+1%) and minimum (-1%) growth rate applied.[2]

These growth factors were then applied to the base year 2020 population by land use class by population density bin to produce future year estimates. Table 4 shows the town level base year 2020 population, the forecasted year 2050 population without adjustment and the forecasted year 2050 population with the caps applied. These estimates indicate that population in the GBNRTC region would grow by between 8.5% and 11% by 2050. A visual interpretation of these data appears in Figure 1.

[2] The capping of annual growth factors within the bounds of +/-1%/yr is motivated to reduce the effect of statistical noise in cells with small sample sizes having an outsize impact on the regional population forecasts due to compounding of annual growth over the 30-year horizon.

Table 3 – Calculated Growth Rates by Land Use Type & Density

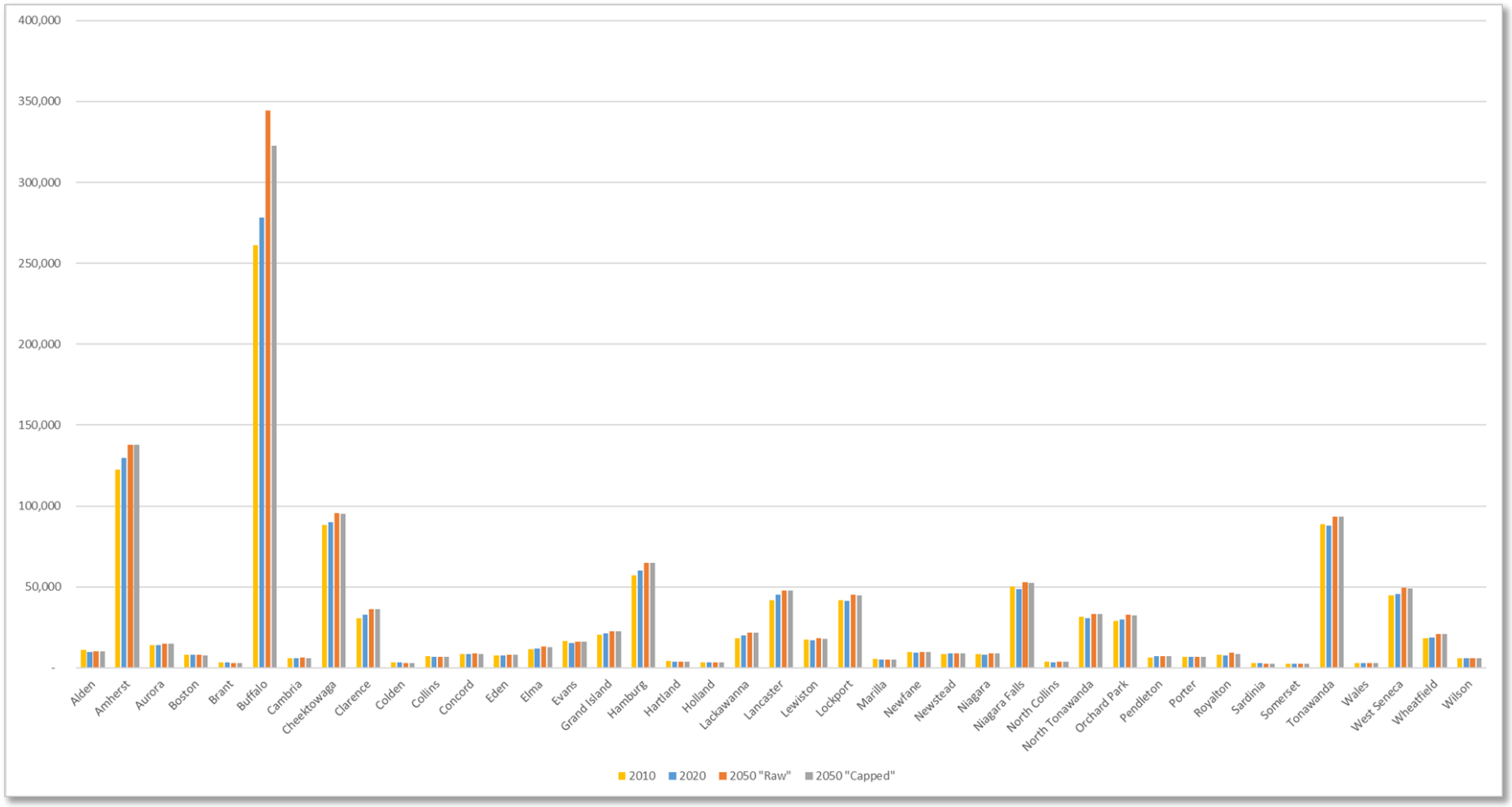
2010 to 2020 RAW Annualized Growth Rates	Land Use Type								
Population Density	**RA**	**R1**	**R2**	**R3**	**R4**	**R5**	**C1**	**C2**	**C3**
1: Less than 0.5 persons/Acre	-0.22%	-0.07%	0.09%	0.31%	-0.64%	-0.43%	0.11%	0.61%	2.02%
2: 0.5 to 5 Persons/Acre	0.10%	0.42%	0.18%	0.38%	1.35%	-0.62%	0.77%	0.77%	-0.12%
3: 5 to 15 Persons/Acre	0.00%	-0.08%	-0.14%	0.05%	-1.14%	1.18%	-1.14%	0.01%	0.68%
4: 15 to 25 Persons/Acre	0.00%	0.16%	1.15%	1.30%	0.45%	0.00%	2.19%	0.88%	0.61%
5: 25 to 50 Persons/Acre	0.00%	3.35%	1.33%	-0.05%	0.00%	0.00%	0.47%	2.15%	1.72%

2010 to 2020 CAPPED Annualized Growth Rates (Maximum 1%, Minimum -1%)	Land Use Type								
Population Density	**RA**	**R1**	**R2**	**R3**	**R4**	**R5**	**C1**	**C2**	**C3**
1: Less than 0.5 persons/Acre	-0.22%	-0.07%	0.09%	0.31%	-0.64%	-0.43%	0.11%	0.61%	1.00%
2: 0.5 to 5 Persons/Acre	0.10%	0.42%	0.18%	0.38%	1.00%	-0.62%	0.77%	0.77%	-0.12%
3: 5 to 15 Persons/Acre	0.00%	-0.08%	-0.14%	0.05%	-1.00%	1.00%	-1.00%	0.01%	0.68%
4: 15 to 25 Persons/Acre	0.00%	0.16%	1.00%	1.00%	0.45%	0.00%	1.00%	0.88%	0.61%
5: 25 to 50 Persons/Acre	0.00%	1.00%	1.00%	-0.05%	0.00%	0.00%	0.47%	1.00%	1.00%

Table 4 – City Level Growth Estimates (Includes Group Quarters)

Municipality	Observed Census 2020	Projected 2050 (Unadjusted)	Annualized Growth Rate (Unadjusted)	Projected 2050 (Capped) Pop	Annualized Growth Rate (Capped)
Alden	9,706	10,323	0.20%	10,204	0.20%
Amherst	129,595	137,780	0.20%	137,661	0.20%
Aurora	13,943	14,833	0.20%	14,716	0.20%
Boston	7,948	7,873	0.00%	7,779	-0.10%
Brant	3,096	2,888	-0.20%	2,882	-0.20%
Buffalo	278,349	344,317	0.70%	322,649	0.50%
Cambria	5,743	6,276	0.30%	5,984	0.10%
Cheektowaga	89,877	95,313	0.20%	95,151	0.20%
Clarence	32,950	36,242	0.30%	36,234	0.30%
Colden	3,121	2,957	-0.20%	2,957	-0.20%
Collins	6,845	6,890	0.00%	6,849	0.00%
Concord	8,316	8,655	0.10%	8,584	0.10%
Eden	7,573	8,068	0.20%	7,931	0.20%
Elma	11,721	13,177	0.40%	12,886	0.30%
Evans	15,308	16,280	0.20%	16,075	0.20%
Grand Island	21,389	22,693	0.20%	22,659	0.20%
Hamburg	60,085	64,627	0.20%	64,632	0.20%
Hartland	3,700	3,602	-0.10%	3,567	-0.10%
Holland	3,281	3,169	-0.10%	3,127	-0.20%
Lackawanna	19,949	21,748	0.30%	21,684	0.30%
Lancaster	45,106	47,854	0.20%	47,663	0.20%
Lewiston	17,089	18,294	0.20%	17,948	0.20%
Lockport	41,439	45,335	0.30%	44,774	0.30%
Marilla	5,189	5,013	-0.10%	4,999	-0.10%
Newfane	9,304	9,666	0.10%	9,621	0.10%
Newstead	8,709	8,901	0.10%	8,790	0.00%
Niagara	7,903	8,670	0.30%	8,670	0.30%
Niagara Falls	48,671	52,635	0.30%	52,458	0.30%
North Collins	3,504	3,553	0.00%	3,543	0.00%
North Tonawanda	30,503	33,298	0.30%	33,303	0.30%
Orchard Park	29,686	32,608	0.30%	32,516	0.30%
Pendleton	7,035	7,180	0.10%	7,150	0.10%
Porter	6,513	6,702	0.10%	6,660	0.10%
Royalton	7,691	9,167	0.60%	8,264	0.20%
Sardinia	2,716	2,472	-0.30%	2,472	-0.30%
Somerset	2,597	2,599	0.00%	2,599	0.00%
Tonawanda	87,765	93,545	0.20%	93,372	0.20%
Wales	3,009	2,855	-0.20%	2,855	-0.20%
West Seneca	45,500	49,436	0.30%	49,043	0.30%
Wheatfield	18,631	20,768	0.40%	20,630	0.30%
Wilson	5,847	5,955	0.10%	5,851	0.00%
Total	1,166,902	1,294,217	0.30%	1,267,392	0.30%

Figure 1 – Town Level Population Growth Estimates



GBNRTC Regional Travel Model TAZ Level Estimates

The next step was to develop year 2050 TAZ level estimates for the travel model for both population and households. Although the travel model does use population as an input to some of the model components, (estimating household vehicle availability and university travel), the primary input is households. To calculate TAZ level data from the block group level data, the following steps were taken:

1. Population was disaggregated from block group to the TAZ level. – This process consisted of leveraging the relationship between TAZ level and block group level in the current year 2019 travel model.
2. Growth factors were then calculated at the TAZ level for population.
3. The growth factors were applied to the year 2020 households to calculate future year households.

Note: Population estimates presented in the remainder of this memo regard GBNRTC Travel Model inputs and do not include persons living in group quarters.

Manual Adjustments to Account for Known Developments

Base and future year estimates of population, households, and employment were cross checked against known development projects in the Buffalo region by GBNRTC staff. Specific TAZs were identified where the development did not appear to be accounted for in the base year 2020 or future year 2050 estimates and manually adjusted to account for these projects. Table 5 shows the initial and adjusted regional totals for population, households, and employment.

Table 5 – Year 2020 and Year 2050 Regional Demographic Forecasts: Travel Model Inputs

Year	Population	Households	Employment
Initial 2020	1,135,047	491,019	695,786
Adjusted 2020	1,136,987	491,870	696,286
Initial 2050	1,229,271	532,520	768,693
Adjusted 2050	1,246,227	544,604	791,271

Interim Years

TAZ level Interim year forecasts were developed in 5-year increments between 2020 and 2050. Growth between years was based on the spreadsheet model forecasts and manual adjustments as described above. Table 6 shows the interim year regional totals for population, households, and employment.

Table 6 – Interim Year Regional Demographic Forecasts: Travel Model Inputs

Year	Population	Households	Employment
2020	1,136,987	491,870	696,286
2025	1,162,045	510,412	708,347
2030	1,176,114	515,756	724,849
2035	1,194,443	522,342	741,373
2040	1,209,835	528,211	756,603
2045	1,225,927	534,392	771,870
2050	1,246,237	544,604	791,271

Potential Future Updates

As more data from the 2020 decennial Census and newer ACS datasets are released, other components of the GBNRTC travel demand model's TAZ-level datasets that should be updated include:

- Households (data used in trip generation submodel)
  - Number of HH members
  - Number of workers in HH
  - HH Income
  - Number of children (5-18)