Memorandum

SRF No. 14166

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Subject: Growth Projections and Capacity Analysis – Grand Forks 2050 Land Use Plan

Introduction

This memorandum documents the methodology used to quantify future land use needs for the Grand Forks 2050 Land Use Plan. First, it documents population, household, and employment projections for 2050 and interim years using growth assumptions established for the Land Use Plan. Then, it examines growth capacity for each growth area (infill opportunities and Growth Tiers 1, 2, and 3) based on the preferred 2050 Future Land Use alternative. Next, it compares growth projections to capacity. Finally, the memo provides recommendations for allocating the projected growth increments to traffic analysis zones (TAZs).

2020 Population

The 2020 Decennial Census population of Grand Forks is 59,166. Discussion with City of Grand Forks staff, MPO staff, and the Land Use Subcommittee noted concerns about potential undercounting of three census tracts that include population in and around the University of North Dakota (UND) campus (Tracts 102, 103.01, and 103.02). These concerns are based on the large presence of the student population that can be difficult to accurately count and the fact that the COVID-19 pandemic forced UND to hold classes remotely, meaning many students where not present during the Census. In response to these concerns, Census Tracts 102, 103.01, and 103.02 were assumed to have no change from 2010 to 2020, resulting in an adjusted population of 60,543. This number is used as the baseline for all population, household, and employment projections. Table 1 provides Census counts for Tracts 102, 103.01, and 103.02.

Table 1. UND Area – Reported Population and Implied Change

Census Tract	2010 Census Count	2020 Census Count	Implied Population Change
102	4,663	4,248	-415
103.01	2,248	1,588	-660
103.02	2,682	2,396	-270
Total	9,593	8,232	-1,345

Annual Growth Rate

At its September 1, 2021 meeting, the Land Use Subcommittee adopted an annual growth rate of 1.56% to project the estimated 2050 City of Grand Forks population for planning purposes. This growth rate is derived from the 2020 adjusted population of 60,543.

Projections

Population

Applying the annual growth rate of 1.56%, the city's population is projected at 5-year intervals (Table 2). The population projection for 2050 is 96,326 (+35,783). Note that the growth increment for 2030 is +10,136, which represents 28% of the 2050 total. Likewise, the growth increment for 2035 is +15,824, or 44% of the total. These numbers and percentages are useful for understanding the intermediate impacts of growth and developing the intermediate travel demand model.

Table 2. Population Projection at 5-year Intervals

	2020	2025	2030	2035	2040	2045	2050
Total Population at 1.56% annual growth	60,543	65,415	70,679	76,367	82,512	89,152	96,326
Population Change from 2020	-	4,872	10,136	15,824	21,969	28,609	35,783
Percent of 2050 Growth	-	13.6%	28.3%	44.2%	61.4%	80.0%	100.0%

Employment

Industry employment data was obtained from EMSI. In 2020, there were 39,122 jobs in Grand Forks, including 30,367 private sector jobs and 8,759 government/university jobs. Using NAICS category descriptions, private sector jobs were assigned to generalized commercial and industrial categories. The commercial figures were analyzed by combining the retail and service jobs, while industrial figures were analyzed by combining the manufacturing, industrial, and wholesale trade

jobs. In total, we estimate 22,304 commercial jobs (73% of total jobs) and 8,063 industrial jobs (27%). In 2021, WSB provided similar numbers for its analysis of the entire metro area: 29,463 commercial jobs (78% of total jobs) and 8,497 industrial jobs (22%) for the metro.

Using the current breakdown of city commercial and industrial jobs obtained from EMSI, private sector job growth is scaled as a proportion to population growth (Table 3). While these projections assume the status quo is maintained, it is important to highlight recent economic trends. For example, the retail sector is still grappling with the effects of COVID-19, inflation, a general oversupply of commercial space, and a shrinking workforce. Meanwhile, the number of remote workers has increased. In addition, Grand Forks is making a concerted effort to promote job growth in the primary sector (i.e., industrial jobs). As industrial processes accelerate the shift to automation, fewer workers are needed, even as land requirements increase. These trends are reflected in the allocation of commercial and industrial growth areas on the Future Land Use Map.

Table 3. Employment Projections at 5-Year Intervals

	2020	2025	2030	2035	2040	2045	2050
Population Projection	60,543	65,415	70,679	76,367	82,512	89,152	96,326
Employment Projection (Private Sector)	30,367	32,811	35,451	38,304	41,386	44,717	48,315
Employment Growth (Private Sector)	-	2,444	5,084	7,937	11,019	14,350	17,948
Commercial Job Growth	-	1,794	3,732	5,826	8,088	10,533	13,174
Industrial Job Growth	-	650	1,352	2,111	2,931	3,817	4,774

Households

The 2020 Census counted 25,446 occupied housing units in Grand Forks. With a 2020 population of 59,166, the average household size would be 2.33. The 2019 ACS provides a comparable estimate of 25,328 households, but gives the average household size as 2.08. Meanwhile, the growth capacity analysis assumed a ratio of 2.1 persons per household for the urban residential and rural residential categories. To be consistent with this methodology, we start with the ratio of 2.1 persons per household. Applying this ratio to the 2050 population projection yields 45,870 households in 2050.

To calculate the growth increment, we need the number of current households. However, we cannot simply use the ratio of 2.1 persons per household for 2020, as this implies 28,830 households for a population of 60,543, which is significantly higher than both the 2020 Census count (25,446 households) and the 2019 ACS estimate (25,328). Instead, we adopt the Census count of 25,446,

then scale this number to match the revised 2020 population estimate (60,543), which yields 26,038 households for 2020. Net household growth from 2020 to 2050 is +19,831 (45,870 – 26,038).[1] Using different ratios for household size in 2020 and 2050 implies that average household size decreases from 2.33 persons per household in 2020 to 2.1 persons per household in 2050. While this roundabout method was adopted to maintain internal consistency, it is important to note that the assumption of decreasing household size is consistent with demographic trends.

To derive growth increments for interim years, we apply the interim growth fractions (see Table 2) to the 2050 household projection – i.e., the 2025 growth increment represents 13.6% of 30-year household growth, 2030 represents 28.3% of growth, and so on. Then, each growth increment is added to the 2020 baseline, yielding the total number of households for each 5-year interval. Table 4 summarizes household projections for each planning increment.

The demand for single-family households (SF), multifamily households (MF), and "missing middle" homes can be estimated by applying existing housing shares to the household projections.

Here is the breakdown from the 2019 ACS:

- 1 unit (attached and detached single-family and mobile homes): 47.5%
- 2-4 units (twin homes, quadplexes, "missing middle", etc.): 7.7%
- 5+ units (multifamily apartments): 44.8%

Table 4. Household Projections at 5-Year Intervals

	2020	2025	2030	2035	2040	2045	2050
Population Projection	60,543	65,415	70,679	76,367	82,512	89,152	96,326
Household Projection	26,038	28,738	31,656	34,808	38,214	41,894	45,870
Household Growth	-	2,700	5,618	8,770	12,176	15,855	19,831
1 unit	-	1,283	2,668	4,166	5,783	7,531	9,420
2-4 units	-	208	433	675	938	1,221	1,527
5 or more units	-	1,210	2,517	3,929	5,455	7,103	8,884

Jobs-Housing Balance

The jobs-housing balance is a ratio that compares the number of jobs to the number of households within a region. Ideally, this ratio is around 1 (jobs and households are roughly equal). Based on our calculations, the jobs-housing ratio in 2020 is 1.17 (30,367 jobs/26,038 households). In 2050, the jobs-housing ratio would be 1.05 (48,315/45,870), following the assumption of decreasing household size.

[1] All calculations rounded to the nearest integer.

2050 Attainable (Growth Area Calculations)

This section documents the capacity of each growth area. The capacity for population, household, and employment growth is based on the developable acreage for the residential, commercial, industrial, and mixed-use areas that are depicted on the future land use map.

Process

Growth capacity was calculated by translating the 2050 growth increment for population, households, and employment to acreages for corresponding land uses. This process involved several factors/assumptions, outlined below. Table 5 describes how each factor relates to the future land use map:

- Floor area ratio (FAR)
- Percentage of use dedicated to retail commercial, non-retail commercial, and residential
- Estimated employees per square foot (E/KSF) for retail and non-retail uses
- Estimated dwelling units per acre (U/Acre)
- Gross area reduction
- Occupancy rate
- Persons per household (PPH)

The future land use map and 2050 growth tiers were developed in an iterative process, ensuring that the acreages depicted correspond to projected growth. First, capacity was calculated for infill areas (undeveloped properties only). Then, the Tier 1 growth area was sized to match the growth remainder.

Table 6 provides the gross developable acreage for commercial, industrial, residential, and mixed use. (A copy of the spreadsheet with full calculations has been provided to the client).

Table 5. Future Land Use Capacity Assumptions

Element	Description	Assumptions	
Floor Area Ratio (FAR)	Floor area ratio (FAR) is the measurement of a building's floor area in relation to the size of the lot/parcel that the building is located on. FAR is calculated by dividing the gross floor area of a building by the total buildable area of the piece of land upon which it is built. FAR is used to understand the intensity of non-residential development. Assumptions used are from comparable ND cities.	Commercial	0.2
		Industrial	0.15
		Mixed Use	0.2
		Public/Semi-Public	0.05
Retail Commercial, Non-retail Commercial, and Residential Percentages	Percentage of use assumed for different commercial types and residential use determines employment generation vs. population.	Commercial	70%(Retail), 30%(Non-retail), 0%(Residential)
		Industrial	0%(Retail), 100%(Non-retail), 0%(Residential)
		Mixed Use	30%(Retail), 30%(Non-retail), 40%(Residential)
		Public/Semi Public	0%(Retail), 100%(Non-retail), 0%(Residential)
		Rural Residential	0%(Retail), 0%(Non-retail), 100%(Residential)
		Urban Residential	0%(Retail), 0%(Non-retail), 100%(Residential)
Employees per Square Feet (E/KSF) for Retail and Non-retail	Based on national averages. Used to determine employment generation.	Commercial	1.6 (E/KSF) Retail; 0.8 Non-retail
		Industrial	0 Retail; 0.8 Non-retail
		Mixed Use	1.6 Retail; 0.8 Non-retail
		Public/Semi-Public	0 Retail; 1 Non-retail

Element	Description	Assumptions	Element
Dwelling Units Per Acre (U/Acre)	Assumptions generated from review of existing similar development types in the City of Grand Forks. The south growth area of the city was used to reflect the most common, recent residential development and density characteristics.	Mixed Use	10 (U/Acre)
		Rural Residential	0.7
		Urban Residential	5
Gross Area Reduction	Used to account for additional open space, such as right of way, storm water retention, and easements. Based on national averages per land use. Only applied to industrial and commercial uses. Urban Residential, Rural Residential, and Mixed Use densities assume gross acre reduction included in density averages.	Commercial	30% (of total area)
		Industrial	20%
Occupancy Rate	Taken from Grand Forks data, 2021 (Source – Grand Forks Herald).	Mixed Use	95% for all
		Rural Residential	
		Urban Residential	
Persons Per Household (PPH)	From American Community Survey 2019 estimates.	Mixed Use	1.3 (PPH)
		Rural Residential	2.1
		Urban Residential	2.1

Table 6. Gross Available Acres

Land Use Category	Infill	Tier 1	Tier 2	Tier 3	Total
Rural Residential	1	7	123	561	692
Urban Residential	320	2,780	2	39	3,141
Mixed Use	178	391	0	0	569
Industrial	720	3,218	1,533	8	5,479
Commercial	207	380	0	1	588

Capacity

Table 7 provides the calculated capacity for population, households, and employment within each planning area. Note that these calculations do not account for redevelopment that may occur within the city. Table 8 summarizes the growth versus capacity for infill areas and Tier 1.

Table 7. Attainable Population, Housing Units, and Employment

Planning Area	Growth Aspect	Attainable	Percentage of Total
Infill (City and County Islands)	Population	4,068	11.6%
	Dwelling Units	2,310	12.5%
	Employment	5,838	18.6%
Tier 1	Population	29,677	84.5%
	Dwelling Units	15,472	83.8%
	Employment	19,060	60.8%
Tier 2	Population	194	0.6%
	Dwelling Units	97	0.5%
	Employment	6,412	20.5%
Tier 3	Population	1,170	3.3%
	Dwelling Units	587	3.2%
	Employment	41	0.1%
Total	Population	35,109	
	Dwelling Units	18,466	
	Employment	31,351	
2050 Capacity (Infill + Tier 1)	Population	33,745	
	Dwelling Units	17,782	
	Employment	24,898	

Table 8. Comparison of Growth Projections to Capacity of Infill Areas + Tier 1

Growth Aspect	2050 Growth Increment	Attainable	Attainable percentage of growth
Population	35,783	33745	94.3%
Households	19,831	17782	89.7%
Employment	17,948	24,898	138.7%

As Table 8 shows, the population capacity of infill areas + Growth Tier 1 is almost equivalent to projected growth. The capacity for housing represents about 90% of growth; additional housing could be supplied through redevelopment with the city and marginal development of Tier 2. Meanwhile, the employment capacity of infill areas + Tier 1 is more than sufficient to meet projected job growth. In general, development should be directed to infill areas and Tier 1, to minimize the burden on municipal infrastructure, unless there is a unique and compelling argument for locating development in Tier 2.

Redevelopment Impact

In addition to development of vacant property and greenfields, the Land Use Plan redesignates several areas of existing development within the corporate limits of Grand Forks. In all cases the alternate future land use designation is mixed use to allow for market flexibility and compact, higher density redevelopment opportunities. Table 9 identifies these "mixed use redevelopment opportunity areas" broken down by their existing land use classifications. The bottom of the table gives the capacity for population, housing, and employment growth (net change). These estimates are not included in the 2050 future land use capacity calculation due to the uncertainty of redevelopment.

Table 9. Mixed Use Redevelopment Opportunities*

Land Use	Acres
Commercial	217.4
Industrial	16.4
Public/Semi-Public	71.5
Residential	12.4
Total	317.7
Population Impact	+1,446
Housing Impact	+1,209
Employment Impact	+121

TAZ Allocation

Traffic forecasting involves the allocation of future households and employment to traffic analysis zones (TAZs). The growth projections, capacity analysis, and assumptions provided in this memorandum are intended to facilitate this allocation process.

Household Allocation

2050

As discussed, infill areas + Tier 1 can accommodate most of the projected residential growth through 2050. The 2050 traffic forecast could assume full buildout of urban residential and mixed use within these areas. However, a more realistic scenario would be to assume that some areas within Tier 2 will develop before Tier 1 reaches buildout. In that case, forecasters could focus the majority of growth within Tier 1 (80-90%), and allocate the remainder to TAZs within Tier 2.

2035

For 2035, projected household growth is +8,770. This represents about 49% of the capacity of infill areas + Tier 1. Interim growth should be allocated accordingly. Some assumptions will need to be made as to where growth will occur, and various modeling scenarios should be explored. For example, one scenario might assume full development of TAZs within the immediate urban fringe. In this case, fringe TAZs would be fully allocated until the growth increment is reached (+8,082 households). Or, modelers may assume that TAZs within the immediate fringe are partially allocated, with some "leap-frog" development allocated to more outlying TAZs. As a practical matter, significant residential development west of I-29 is unlikely to occur before the overpass is constructed. Therefore, modelers may choose to focus household allocation in the southern growth area (47th Avenue S to Merrifield Road) and ignore TAZs to the west.

Employment Allocation

2050

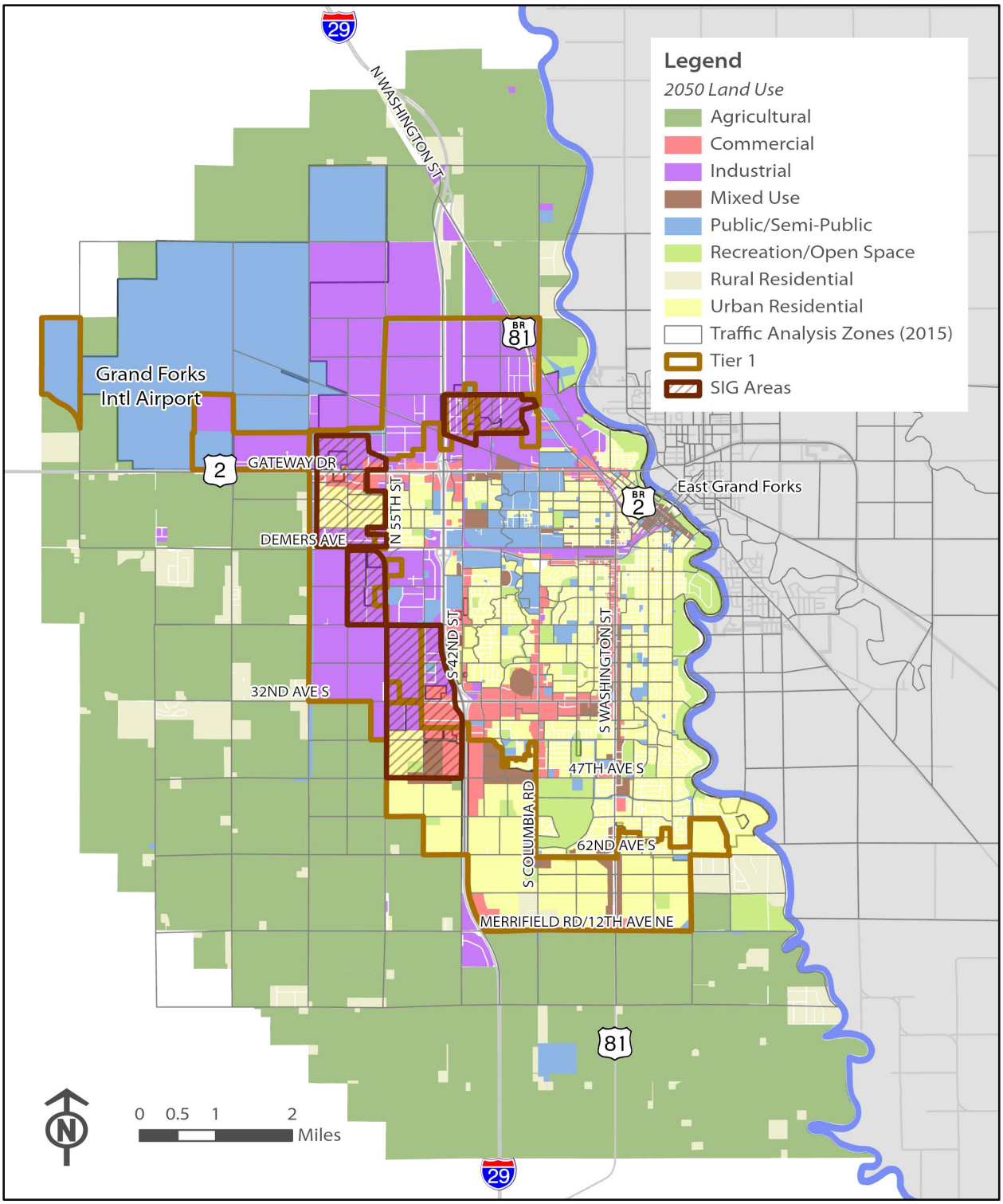
Projected employment growth represents 72.1% of the capacity of infill areas and Tier 1. Therefore, Tier 1 will not be fully developed by 2050. Again, some assumptions must be made for allocating growth. One assumption could be to fully allocate TAZs located within the Strategic Infrastructure Growth (SIG). Next, employment allocation could be focused in TAZs that are adjacent to SIG areas and/or adjacent to TAZs that contain existing development. Allocation proceeds until the growth target (+17,948) is reached.

2035

For 2035, projected employment growth is +7,937. Again, this represents 44.2% of the 2050 growth increment. SIG areas will be able to accommodate most if not all of this growth. If employment

growth exceeds the capacity of SIG areas, adjacent TAZs should be allocated until the growth target is reached.

The map on page 11 overlays the future land use layer, the Tier 1 growth area, and SIG areas with the existing TAZ structure.


Legend
2050 Land Use
Agricultural
Commercial
Industrial
Mixed Use
Public/Semi-Public
Recreation/Open Space
Rural Residential
Urban Residential
Traffic Analysis Zones (2015)
Tier 1
SIG Areas
29
N WASHINGTON ST
BR 81
Grand Forks Intl Airport
2
GATEWAY DR
N 55TH ST
DEMERS AVE
BR 2
East Grand Forks
S 42ND ST
S WASHINGTON ST
32ND AVE S
47TH AVE S
S COLUMBIA RD
62ND AVE S
MERRIFIELD RD/12TH AVE NE
81
29
0 0.5 1 2
Miles