

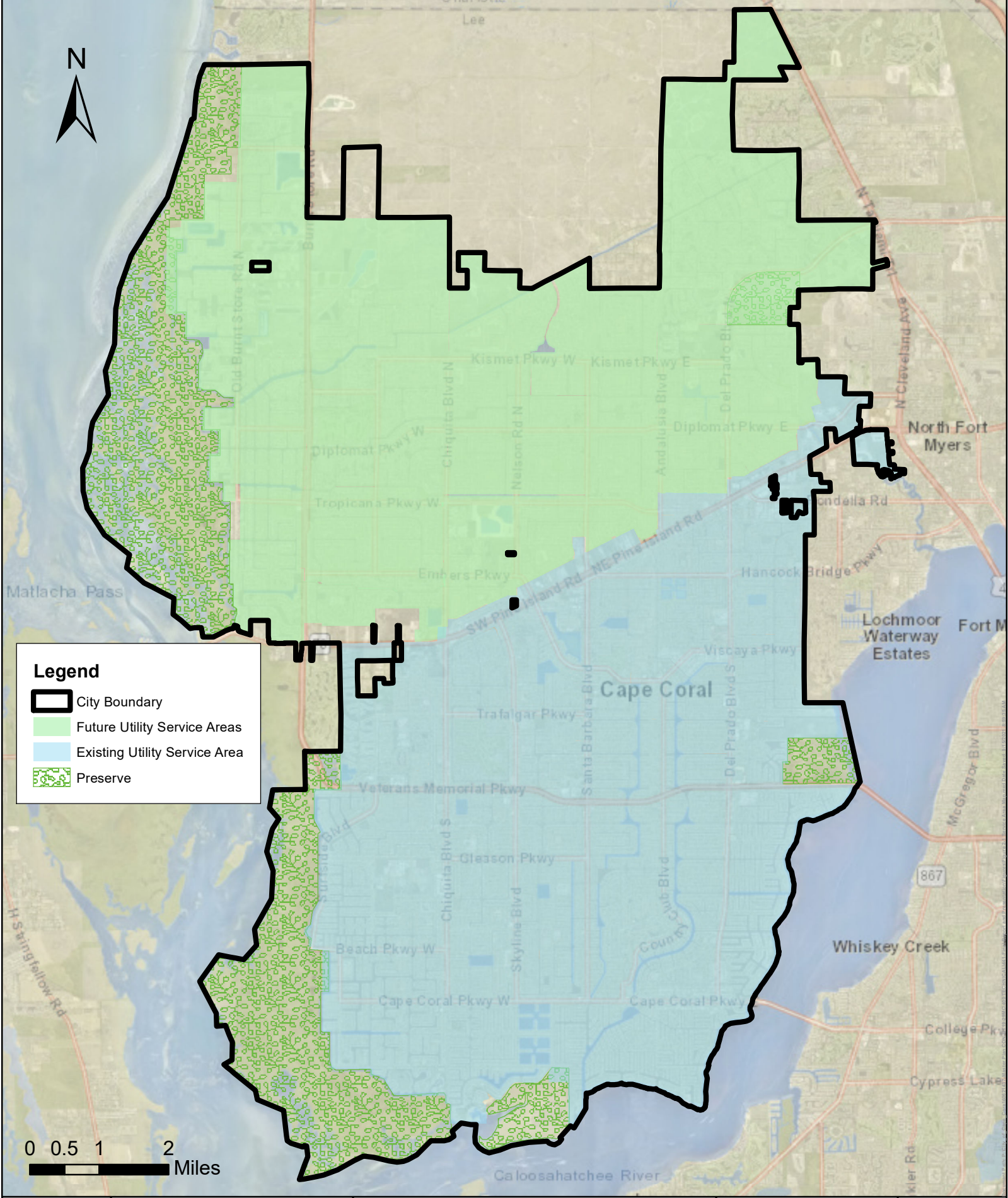
2. POPULATION AND GROWTH PROJECTIONS / UEP AREAS

The Master Plan establishes not just future population within the City Cape Coral Service Area, but where growth will occur to develop an appropriate capital improvement program.



2.1 Service Areas

The City of Cape Coral encompasses approximately 120 square miles, containing around 150,000 pre-platted building sites and is known for its extensive freshwater and saltwater canal system which spans over 400 miles. The City's utilities service area for potable water, wastewater, and irrigation quality (IQ) water extends to the entirety of the City. Progress is ongoing to expand service to the less developed areas located to the north in the form of Utility Extension Projects (UEPs) and also to a small area in the northeast called Entrada, where wastewater and irrigation services are provided by Florida Governmental Utility Authority (FGUA). **Figure 2-1** shows the location of the City's boundary, as well as the current and future service area.



2.2 Population Projections

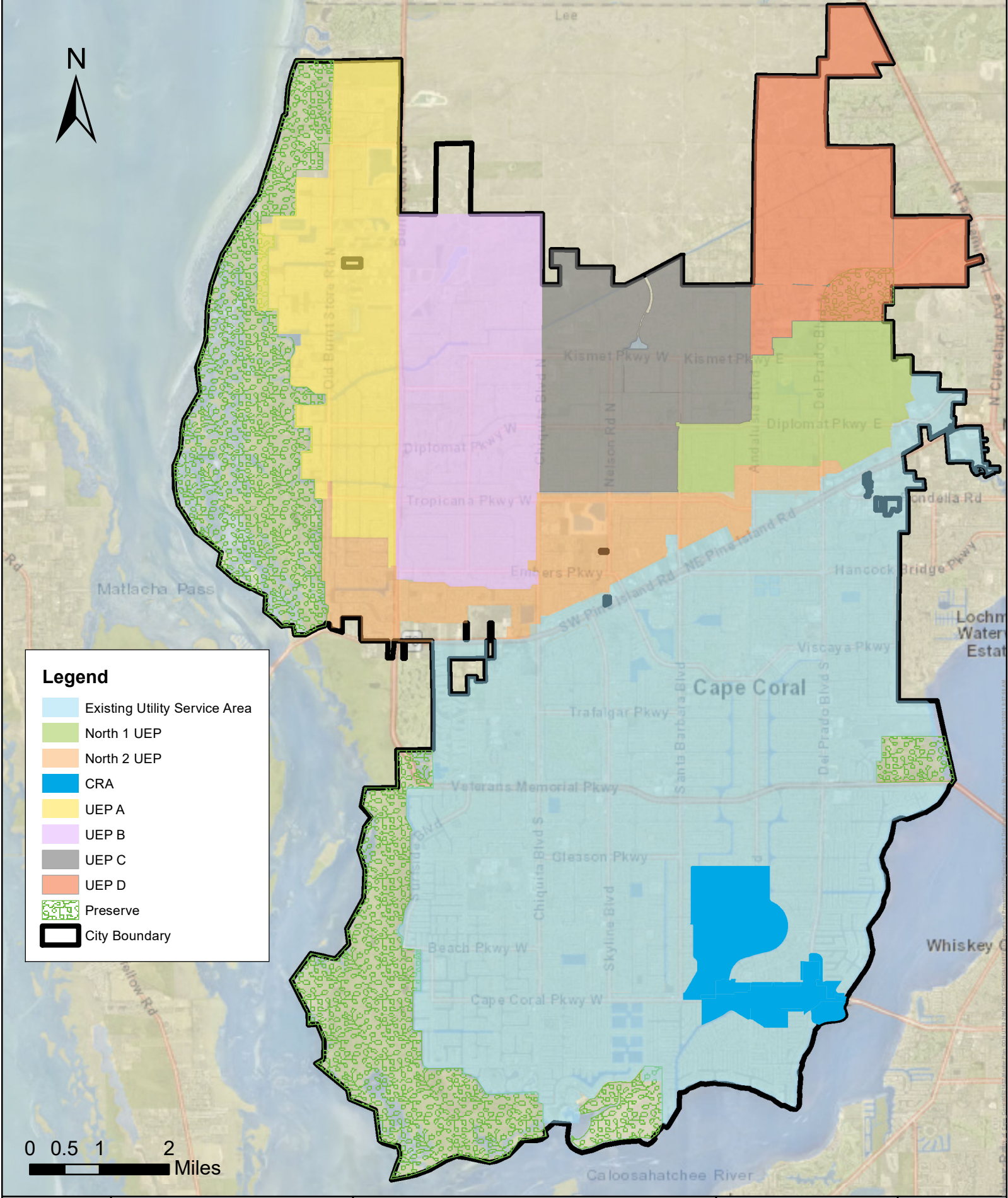
Population projections are needed to forecast future potable water, wastewater, and irrigation water, demands/flows over the planning horizon. The population forecast for the City was provided by Metro Forecasting Models, LLC (MFM) for the period of 2020 through 2080, and buildout conditions. The City projections prepared by MFM were based upon the permanent population on a fiscal year basis (October 1, year). There is a seasonal variation in Cape Coral's population and the impacts of the influx of tourists and part time residents are accounted for in this master planning effort by using per capita demands and flows that are based on a full year of historical usage data for potable, wastewater, and IQ water.

2.2.1 Interactive Growth Model® IGM

MFM used the Interactive Growth Model® (IGM) planning tool, which is a land use model that considers when and where growth is most likely to occur over time. The projections are based on detailed research and meetings with the Cape Coral Planning Department to understand the potential for future development. Demographics were carefully analyzed from 30 years of census data. The IGM uses a series of algorithms to anticipate residential, commercial, and industrial development and distribute it over the forecast period to the areas where it is most likely to occur. The parcel databases are then aggregated into 447 Traffic Analysis Zones (TAZs/zones) for the population forecast.

2.2.2 Delineation of Areas for Population Forecasts

The City's utilities service areas for potable water, sewer and irrigation quality water extend to the entirety of the City because the City plans to expand services to all areas. The overall City boundary was divided into areas so that the location of population growth could be identified. The primary division includes the area where utilities are already in place and the areas where utilities are planned to be extended known as UEPs. The existing service area located primarily south of Pine Island Road is referred to herein as "Cape Coral less UEPs". The UEPs that have been previously approved by City Council and are constructed or are under construction are referenced as UEP North 1 and UEP North 2. The remaining areas where utilities are planned in the future are referenced as UEP areas A, B, C and D. These areas were intentionally identified by letters to avoid confusion when eventually a prioritized list of UEPs would be developed with the next UEP (North 3, North 4, North 5) identified later in the planning effort. The City's total UEP area covers approximately 39 square miles north of Pine Island Road. **Figure 2-2** identifies the locations of the UEP areas as described above.



An area of special focus for the development of the population projections includes the Cape Coral Community Redevelopment Agency (CRA) area which is located within the existing service area as shown in **Figure 2-2**. The CRA area is a dependent Special District that is anticipated to undergo redevelopment over the next few decades bringing commercial development, and changes in land use and population.

A population forecast based upon permanent residents was provided by MFM for the City's service area for potable water, wastewater, and IQ water. Adjustments were later made to the initial MFM forecast to account for new commercial and residential developments (Pine Island Road Development and Hudson Creek Development) that submitted planning applications while the master planning effort was ongoing. The initial population forecast accounted for these new developments however the proposed density of the new developments was greater and timing for the growth (according to the developers) was more accelerated. In addition, the infill population growth rate was increased to 2% for the existing potable water and wastewater areas to account for the rapid growth and to provide a more conservative projection. The resulting population forecast is presented in **Table 2-1**. The population forecast was developed in five-year increments from 2020 to 2080 and for Buildout (BO) scenarios. Given that the service area boundaries for potable water, wastewater, and IQ water are the same, the total population for these service areas are also the same.

As indicated in **Table 2-1**, the population is projected to grow by approximately 38% from Year 2020 to Year 2040. It is also anticipated that a buildout population of approximately 366,393 persons will be reached sometime after the year 2080, which would be growth of about 85% from 2020 to buildout.

It is important to note that this is the total population within the City service area and further analysis of "served" versus "unserved" population is completed herein.

Table 2-1: City of Cape Coral Total Population Projections

Year	Cape Coral, Less UEPs	North 2 UEP	North 1 UEP	UEP A	UEP B	UEP C	UEP D	Total Cape Coral
2020	147,970	7,420	7,605	5,158	12,785	8,313	8,567	197,818
2025	155,551	9,000	15,631	6,492	15,413	9,920	10,219	222,226
2030	162,250	10,685	17,097	7,979	18,265	11,556	11,580	239,412
2035	168,043	12,396	18,532	9,586	20,974	13,624	13,008	256,163
2040	173,127	14,096	19,893	11,269	24,250	15,884	14,601	273,120
2045	177,654	15,609	21,081	12,962	28,638	18,182	16,402	290,528
2050	181,354	16,807	21,960	14,610	32,554	20,016	17,946	305,247
2055	184,389	17,689	22,548	16,152	34,854	21,321	18,962	315,915
2060	186,752	18,441	23,037	17,537	36,353	22,288	19,693	324,101
2065	188,698	19,033	23,433	18,762	37,495	23,034	20,194	330,649
2070	190,260	19,555	23,768	19,889	38,419	23,622	20,599	336,112
2075	191,557	20,063	24,057	20,923	39,162	24,076	20,919	340,757
2080	192,644	20,560	24,308	21,849	39,773	24,426	21,185	344,745
Buildout	198,078	22,901	26,430	27,035	43,498	25,530	22,921	366,393

2.2.3 UEP Sub-areas and Final Prioritization

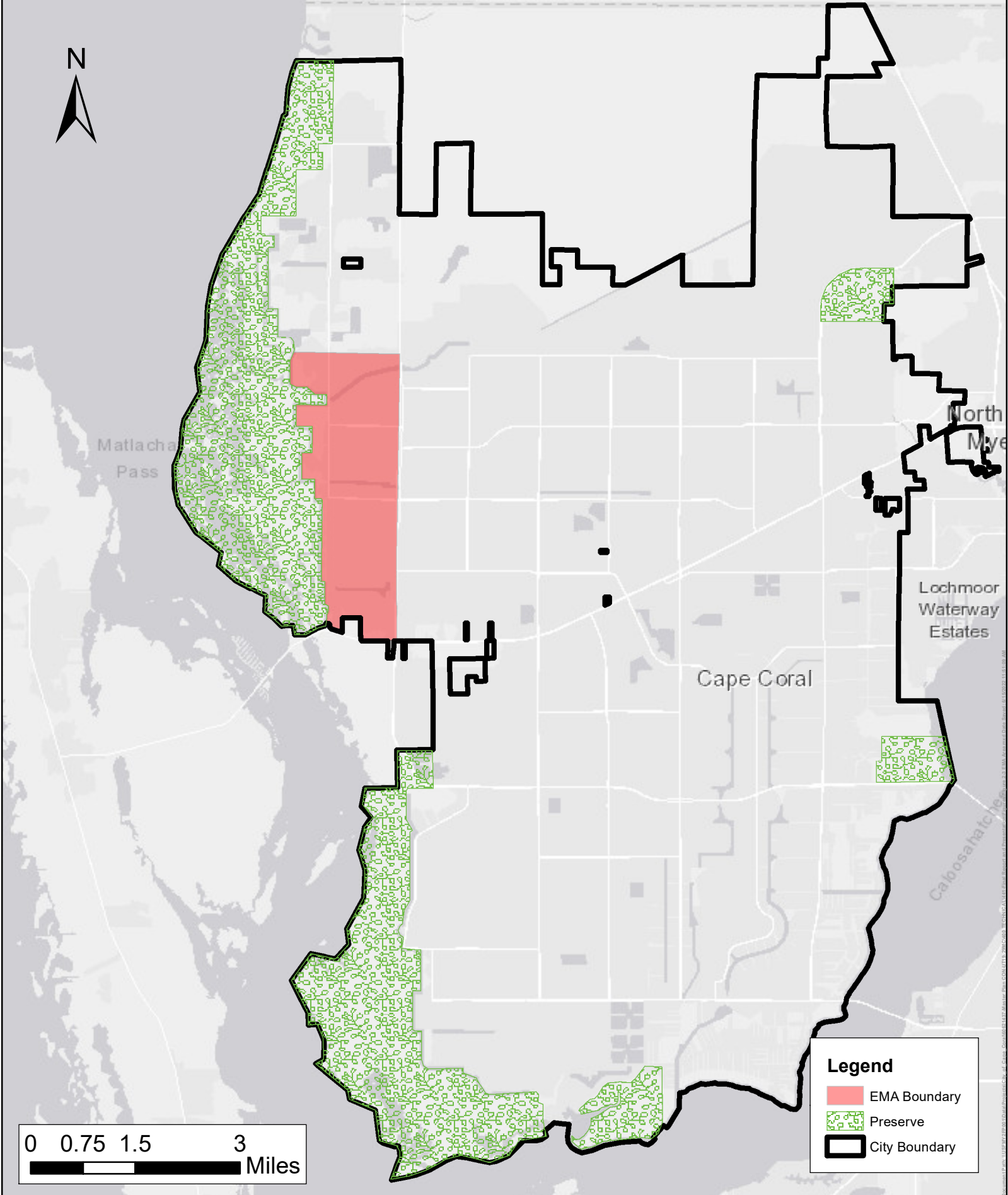
Currently, about 75% of the population and less than 60% of the land area within the City are served with potable water, irrigation, and wastewater collection. The City is continuing with extending utility service via the UEP program, which started in Year 2000 to expand utility service to unserved areas of the City. Construction of utilities to serve the North 2 UEP area has recently been completed and customer's utility connections are being made. The North 1 UEP improvements are currently under design.

An approach was developed to identify the areal limits for a UEP and to determine a priority order for utility extension in the remaining unserved areas of the City. The UEP areas (previously referred to as A – D) were further subdivided to identify smaller areas that are approximately 3 square miles in size to limit overall disruption to the City and provide a more manageable area of construction. This size was also selected to target the construction cost to approximately \$150 million (M) since historically, UEP construction costs have been ranging \$40M to \$50 M per square mile. This resulted in the identification of ten future UEP areas which, based upon prioritization, are identified as North 3 through North 12.

Two of the main criteria utilized to prioritize the UEP areas were “where” will the most growth occur and whether the area was considered “environmentally sensitive”. The City's IGM was used to simulate growth patterns in the future UEP areas located north of Pine Island Road. This model considered the following factors to simulate the growth patterns:

- Environmentally Sensitive Areas
- Review of historic Building Permits and recent COs on a zone basis
- Commercial Development required to support increases in population
- Location/Availability of existing infrastructure – roads, potable water and wastewater
- National Wetland Inventory overlay
- Entitlements of Planned Development Projects – input from City Planning
- Buildout condition on a zone basis based on zoning, entitlements, and development trends

The area west of Burnt Store Road and South of Kismet Parkway as shown in **Figure 2-3** is considered an environmentally sensitive area by the City given the current number of septic systems per acre and the potential water quality impacts to the North Spreader Canal and Matlacha Pass. Therefore, this area was considered a priority area for the extension of public sewer/related utilities.



Additional criteria were also identified to help prioritize the UEP areas as described below. The criteria were weighted and scored according to City priorities where the existing population was considered the top priority for utility extension and therefore was provided the highest weighting with a total of 20 points possible for scoring. Residential growth, water quality, septic tank density and constructability were all considered the second priorities for utility extension and therefore 15 points were available for scoring. Operations and maintenance and “additional” commercial growth were also considered, but as a lower priority over all the other criteria and therefore scored based upon 10 total points.

- **Existing Population** in each UEP area was evaluated and scoring was determined by the 2020 population in terms of Equivalent Residential Units (ERUs) for each UEP subarea, which are shown in **Table 2-2**. The subarea with the highest population in 2020 received full points (20 points) for this category and the other areas were scored in relation to that maximum score. This criterion is also reflective of some policies in the Infrastructure Element of the City's Comprehensive Plan. The relevant policies are as follows:

“Policy 2.3.1. The City will amend its future land use map via the plan amendment process to include in the Urban Services Transition Area those subdivided units, non-platted areas, and miscellaneous subdivisions which are 30 or more percent developed and which are contiguous to the existing Urban Services Transition Area. Exceptions to this policy are provided for those extreme circumstances where the City has entered into an interlocal agreement to provide centralized utilities, or as provided in Policy 1.1.6 of the Infrastructure Element.”

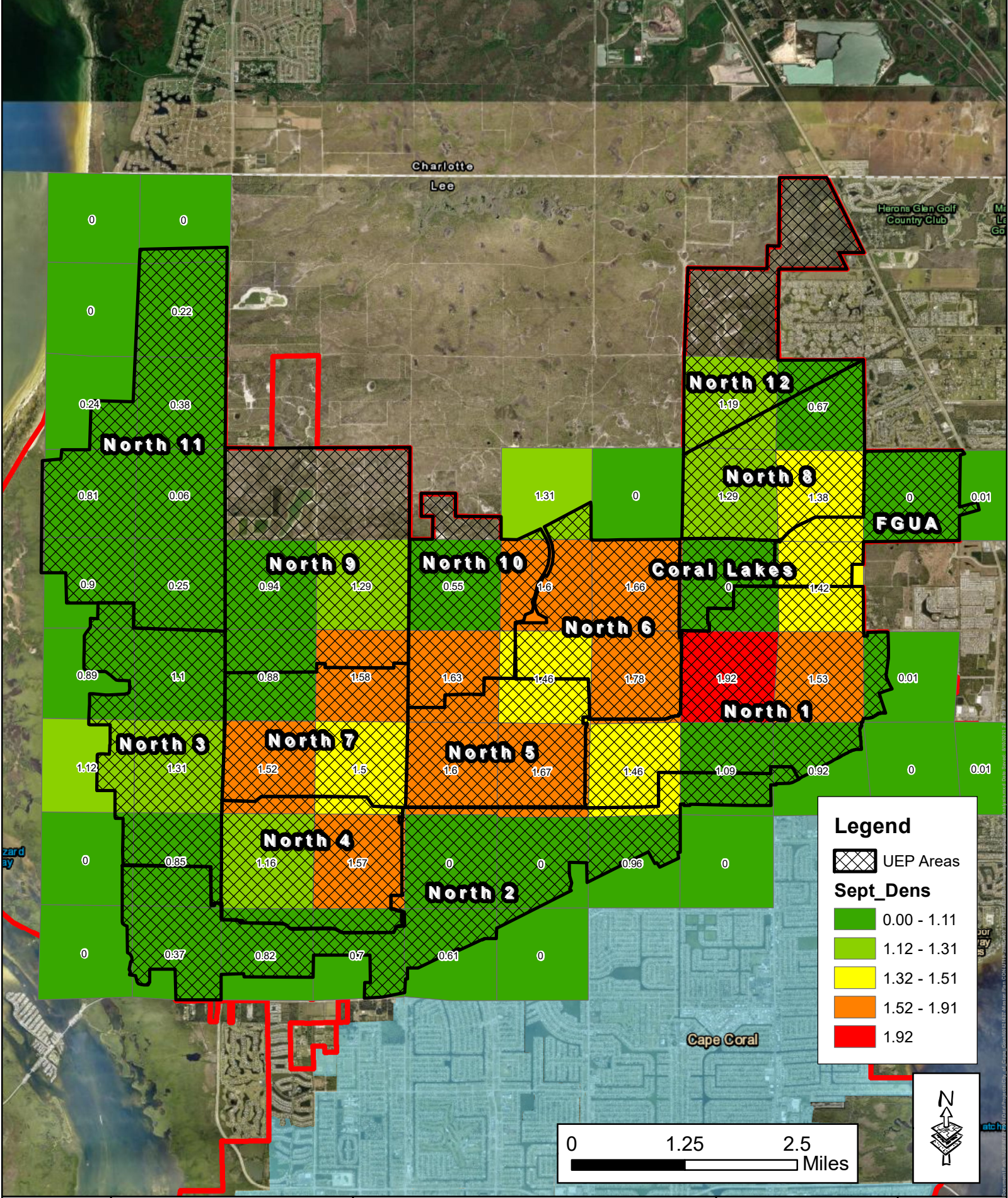
“Policy 2.3.2. Provision of potable water and/or sanitary sewer facilities beyond the area shown on the current five-year capital improvements plan will be guided by the following methodology unless as otherwise formulated by a comprehensive utility master plan:

1. The subdivided unit to receive sewer or water must be in the Urban Services Infill or Transition area (as defined by the Future Land Use Map, or any amendments thereto.)
2. The subdivided unit to receive sewer or water must be contiguous to a subdivided unit currently receiving sewer or water.”

Table 2-2: UEP Subarea Prioritization Matrix

UEP #	2020 # of ERUs	Buildout # of ERUs	Added ERUs (2020 to Buildout)	Percent Developed 2020	UEP Septic Density
North 3	1561	5607	4046	28%	1.06
North 4	1884	4928	3044	38%	1.27
North 5	1907	4670	2763	41%	1.60
Entrada & Coral Lakes	2067	2888	821	72%	Served
North 6	2239	6668	4429	34%	1.70
North 7	1555	4278	2723	36%	1.39
North 8	1370	4884	3514	28%	1.14
North 9 (includes Hudson Creek)	1170	8063	6893	15%	0.67
North 10 (includes Hudson Creek)	866	2870	2005	30%	1.00
North 11	791	6721	5930	12%	0.38
North 12	470	2680	2210	18%	0.41

- **Residential Growth** was evaluated in each UEP area based upon the population projections in terms of ERUs between the years 2025 and 2030. The area with the highest percent growth during that period received full points (15 points) for this category and the other areas were scored in relation to that max score.
- The **Water Quality** criterion was included to give more priority to areas that have an Environmental Management Area (EMA) designation. A score of fifteen points was provided to UEP areas that included an EMA area. Septic tank density in each UEP area was evaluated and scoring (15 points max) was included to give more priority to areas with the highest density of existing septic tank utilization. The City provided septic density data across the entire UEP area to determine composite septic densities for each UEP subarea. A map showing the septic density analysis is shown in **Figure 2-4**.
- **Constructability** was a criterion used to evaluate ease or difficulty of construction to extend utilities to the UEP area. Scoring (15 points max) was based upon the transmission main length required to achieve conveyance to each UEP subarea. The subarea for which the shortest total length of transmission main is needed to convey flows received the highest priority scoring.
- **Operations and Maintenance (O&M)** was a criterion added to evaluate whether a UEP area requires a new Treatment Plant. Scoring (10 points max) was based on whether the UEP area is dependent upon a new WRF in the north. Subareas where flows can be conveyed to the existing SW WRF receive full points because it has adequate treatment capacity, and a new plant and associated O&M costs are not needed. Flows that can be partially conveyed to the SW WRF receive 75% of points and flows that cannot be conveyed south receive 50% of points.



- **Additional Commercial Growth** was a criterion that was included to capture the commercial growth of recent planning applications submitted after the residential population forecast was completed. In addition, this criterion also considers the related commercial growth associated with the residential forecast. Therefore, scoring generally followed the results of Residential Growth scoring with a maximum score of (10 points).

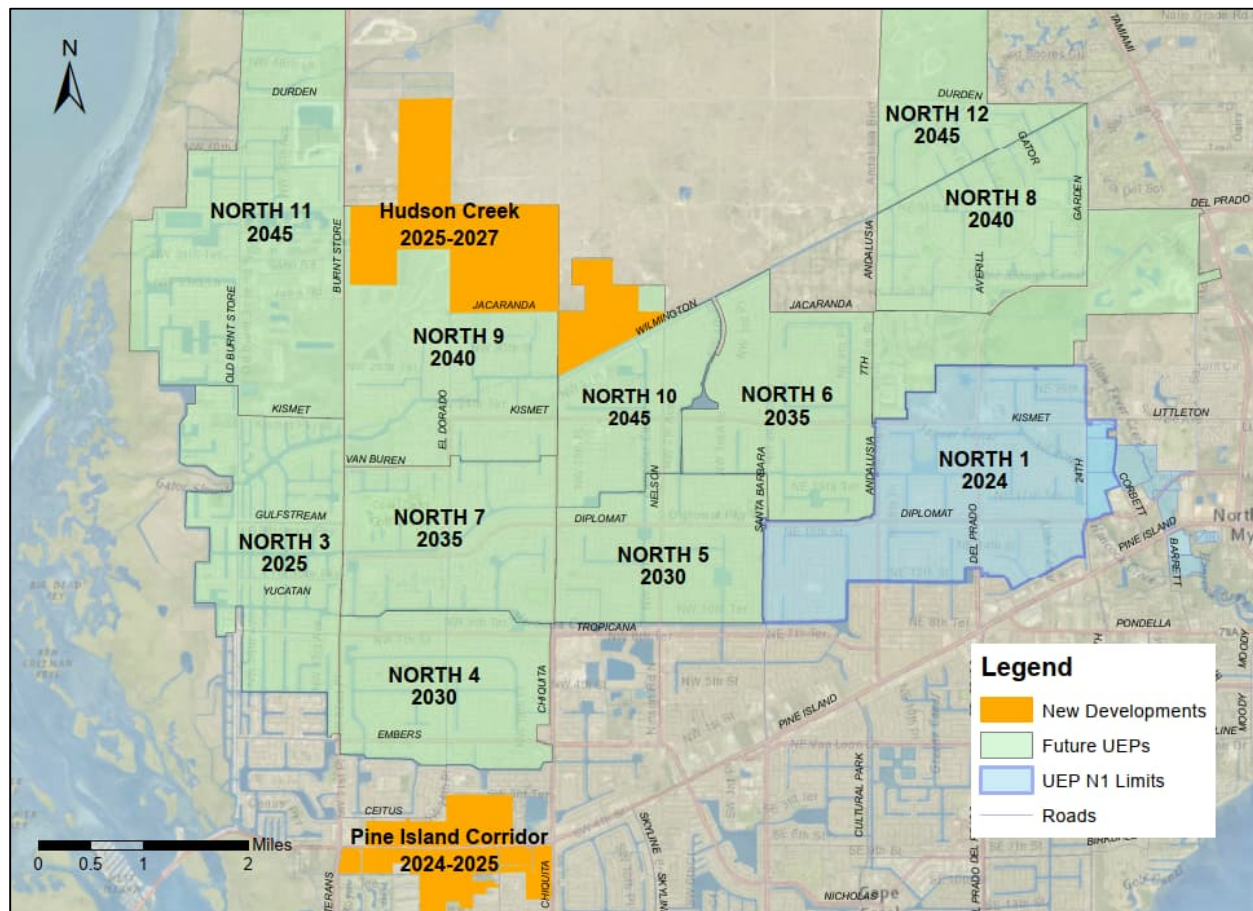
The results of the prioritization analysis for the UEP areas described above is shown in the form of a matrix in **Table 2-3**. The areas with the highest score are prioritized over those with lower scores so that the next UEP area to be constructed will be North 3, followed by North 4 through North 12.

Table 2-3: UEP Subarea Prioritization Matrix

Points	15	10	15	20	15	15	10	100
UEP	W/Q	Additional Commercial Growth	Residential Growth	Existing Population	Septic Tank Density	Constructability	O&M	SCORE
North 3	15	9	14	14	9	15	10	87
North 4	0	8	12	20	11	14	8	73
North 5	0	9	12	17	14	8	8	68
North 6	0	7	15	17	15	5	8	67
North 7	0	6	9	14	12	5	5	52
North 8	0	8	12	12	10	5	5	52
North 9	0	10	11	10	6	4	5	46
North 10	0	10	6	8	9	5	5	43
North 11	0	5	8	7	3	3	8	34
North 12	0	3	4	4	4	4	5	24

2.2.4 Utility Extension Schedule

The City priority is to extend utility service to all City residents and commercial developments. Therefore, there are plans to extend utility services to North 1 and the Pine Island Corridor by FY 2024. The City also plans to expand utilities to two UEP areas every five years starting using the established priority order with North 3 and Hudson Creek in FY 2025. UEP construction would finish in FY 2045 with the addition of North 10, 11 and 12. **Figure 2-5** shows the results of UEP prioritization and addition of new developments for use in Master Planning for the future service area. The schedule for utility extension is fairly aggressive and as design and construction of the UEP project areas continue, some delays are inherent. However, the schedule provided in **Figure 2-5** will provide adequate time for the City to plan for any additional needed infrastructure improvements outside the UEP project areas to support the expanded service areas.

Figure 2-5: UEP Subarea Prioritization and Construction Timeline

2.2.5 Served Population

Not all the properties located within the City's service area are being provided with City potable water, wastewater, and irrigation quality water. Therefore, an analysis was required to identify "served" versus "unserved" properties. Much of the area to the south of Pine Island Road is served with public utilities while there is a large area to the north of Pine Island Road that is not served. The area north of North 1 consists of the Entrada development in the East, which currently is provided City potable water. The wastewater and irrigation services are provided from FGUA, however the City has plans to provide irrigation and wastewater services to this area in the future. In the west is the Coral Lakes development which receives potable water and wastewater service from the City. The City plans eventually to also provide irrigation to this area. For this reason, this area was split into two areas which are generally considered as part of the existing service area, and the population projections consider each development to receive full utility service when North 6 is brought online.

The served population forecast used for projections of flows and demands is based on the total population forecast, a 2% infill rate for the existing service area, existing utility infrastructure, city records for service connections, and the UEP prioritization and timing established by the City. The

served population projections for potable water and wastewater are shown, along with the total projected populations, in **Table 2-4** as well as **Figure 2-6** and **Figure 2-7**. While the UEP populations were incorporated into the potable and wastewater served populations according to the UEP timing schedule established, a summary of the population projections by UEP area is presented in **Table 2-5** for reference.

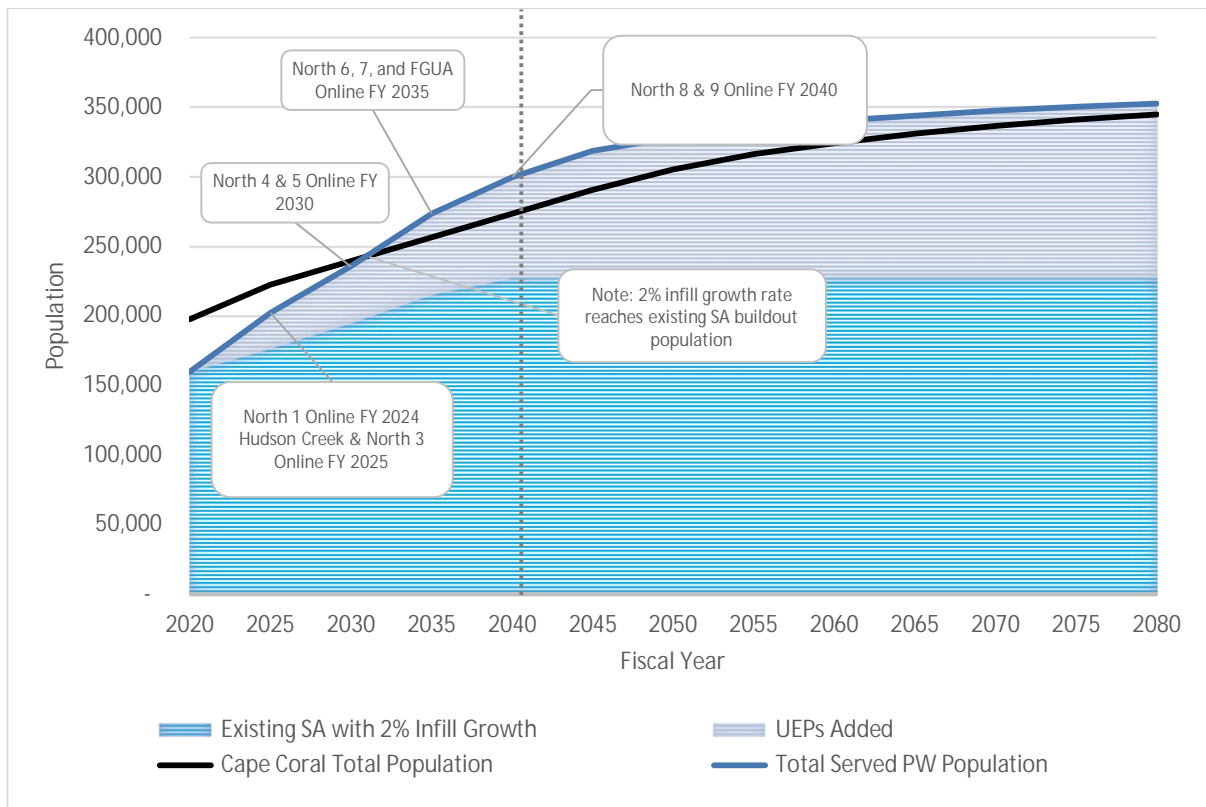
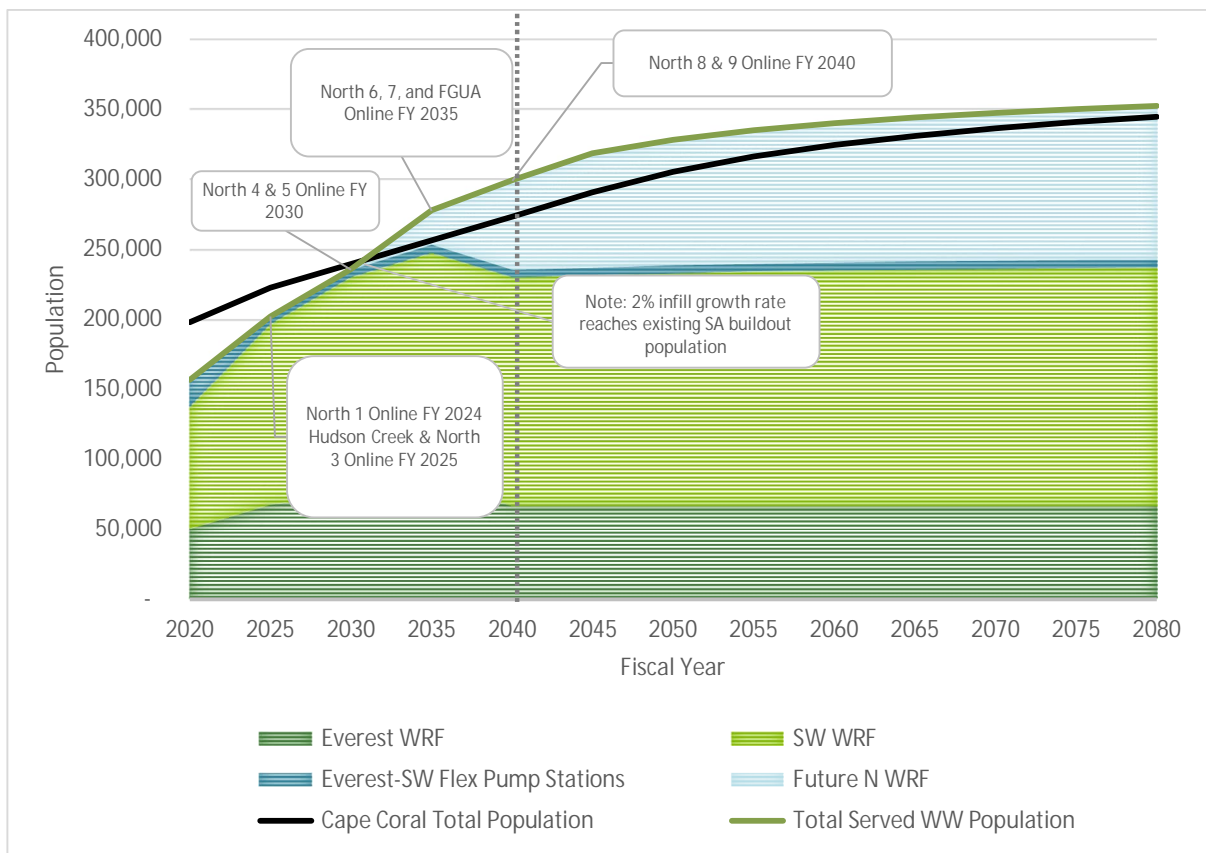
Table 2-4: Served Potable Water and Wastewater Population Projections

Fiscal Year	Cape Coral Total Population	PW Served Population			WW Served Population				
		Existing SA with 2% Infill Growth	UEPs Added	Total Served PW Population	Everest WRF	SW WRF	Everest-SW Flex Pump Stations	Future N WRF	Total Served WW Population
2020	197,818	159,922	-	159,922	50,445	87,084	18,990	-	156,519
2025	222,226	176,567	25,437	202,004	67,967	128,925	5,112	-	202,004
2030	239,412	194,944	40,586	235,530	74,523	155,486	5,521	-	235,530
2035	256,163	215,234	58,173	273,407	80,998	166,551	5,978	24,067	277,594
2040	273,120	227,312	72,222	299,534	66,914	163,099	5,566	63,523	299,102
2045	290,528	227,312	91,095	318,407	66,914	164,710	5,566	81,054	318,244
2050	305,247	227,312	100,753	328,065	66,914	166,123	5,566	89,462	328,065
2055	315,915	227,312	107,504	334,816	66,914	167,282	5,566	95,054	334,816
2060	324,101	227,312	112,575	339,887	66,914	168,190	5,566	99,217	339,887
2065	330,649	227,312	116,585	343,897	66,914	168,850	5,566	102,567	343,897
2070	336,112	227,312	119,964	347,276	66,914	169,384	5,566	105,412	347,276
2075	340,757	227,312	122,804	350,116	66,914	169,810	5,566	107,826	350,116
2080	344,745	227,312	125,208	352,520	66,914	170,149	5,566	109,891	352,520
Buildout	366,393	227,312	139,081	366,393	66,914	171,603	5,566	122,310	366,393

Table 2-5: Summary of UEP Populations

Fiscal Year	UEPs													
	North 1	North 6	North 3	North 5	North 4	Coral Lakes	FGUA	North 7	North 8	Hudson Creek	North 9	North 10	North 11	North 12
2020	7,605	4,911	3,424	4,181	4,132	1,129	3,403	3,410	3,005	4,464	-	-	1,734	1,030
2025	15,631	5,894	4,322	4,986	4,934	1,268	3,928	4,035	3,735	5,484	-	-	2,170	1,288
2030	17,097	6,933	5,288	5,797	5,759	1,387	4,068	4,687	4,536	6,645	-	-	2,691	1,589
2035	18,532	7,978	6,293	6,564	6,568	1,485	4,187	5,338	5,380	6,900	758	492	3,293	1,956
2040	19,893	8,999	7,283	7,262	7,317	1,485	4,416	5,968	6,217	6,900	2,383	1,305	3,986	2,483
2045	21,081	9,958	8,207	7,881	8,004	1,485	4,685	6,557	7,016	6,900	5,223	2,297	4,755	3,216
2050	21,960	10,793	9,035	8,399	8,589	1,485	4,848	7,083	7,742	6,900	7,778	3,028	5,575	3,871
2055	22,548	11,301	9,712	8,816	9,071	1,485	4,848	7,536	8,361	6,900	9,117	3,434	6,440	4,268
2060	23,037	11,699	10,222	9,142	9,469	1,485	4,848	7,916	8,881	6,900	9,838	3,677	7,315	4,479
2065	23,433	12,028	10,575	9,398	9,776	1,485	4,848	8,228	9,223	6,900	10,339	3,860	8,187	4,638
2070	23,768	12,305	10,862	9,600	10,023	1,485	4,848	8,483	9,487	6,900	10,731	3,999	9,027	4,779
2075	24,057	12,538	11,096	9,758	10,215	1,485	4,848	8,680	9,700	6,900	11,044	4,103	9,827	4,886
2080	24,308	12,732	11,286	9,875	10,364	1,485	4,848	8,840	9,872	6,900	11,301	4,187	10,563	4,980
Buildout	26,430	14,623	12,297	10,240	10,807	1,485	4,848	9,382	10,712	6,900	12,593	4,483	14,738	5,876

1. North 2 was considered a part of the existing service area and therefore not included in the population summary above.
2. North 1 population was increased by 6,600 people starting 2025 which is the equivalent population for proposed flows from the additional North Pine Island Road developments (also increased total population).
3. A portion of Old UEP 5 is currently served by the City (Existing Service Area) and the rest is served by FGUA. This is assumed to also be served by the City in 2030.
4. Hudson Creek proposed flows have an equivalent population of 6,900 people which was subtracted from areas North 9 and North 10.

Figure 2-6: Potable Water Total vs. Served Population**Figure 2-7: Wastewater Total vs. Served Population**

As shown in the above figures, the projected total served population for both potable water and wastewater exceeds the total Cape Coral population after FY 2030 and continues through 2080. This is due to the conservative 2% growth rate that was applied to the infill population which reaches the projected buildout population. The grey dashed line in **Figures 2-6** and **2-7** represents the end of the 20-year planning horizon (FY 2020 through FY 2040), indicating that projections after this point are more uncertain and should be revisited for future planning.

The forecast assumes the total population will be 100% served at buildout. It should also be noted that the forecast assumes UEPs are completely served which is a conservative assumption as connecting to the City system will happen over some period after the UEP is online.

Also developed were served population projections for the IQ system. The number of Equivalent Residential Units (ERUs) provided with irrigation water from the City for FY 2020 was estimated by Stantec in the 2019 Rate Sufficiency Study as 58,450 which is 128,181 served customers using an occupancy rate of 2.55 and vacancy of 14% established by MFM. This was used as the baseline for the IQ served population.

The served population projections for the IQ system were based on the total growth projections developed by MFM for the existing and future service areas in accordance with the UEP schedule. It was assumed, as determined from discussions with City Staff, that only 95% of that total population would be served by the City's IQ water and the remaining 5% would receive irrigation water provided by neighborhood lakes or other private supplies. In addition, it was assumed that 95% of the City's existing service area will be served by the year 2080, resulting in a 5-year average infill population of 1,836. Therefore, the served IQ population projections is the total of the adjusted total growth projections and the infill population.

It should be noted that projected populations between 2040 and buildout were only interpolated for potable water and wastewater to facilitate the identification of major infrastructure improvements needed, such as plant expansions. The served population projections for the IQ system are shown in **Table 2-6** and **Figure 2-8**.

Table 2-6: Served IQ Water Population Projections

Fiscal Year	Cape Coral Total Population	Served IQ Population	Development Timeline
2020	197,818	128,181	
2025	222,226	170,433	Add North 1, North 2 North 3 and Hudson Creek
2030	239,412	194,758	North 4 and North 5
2035	256,163	217,502	North 6, Coral Lakes, North 7
2040	273,120	243,799	North 8 and North 9
Buildout	366,393	348,073	All UEPS

Figure 2-8: IQ Water System Total vs. Served Population

