



TOWN OF STRATHMORE

Transportation Master Plan Update

FINAL REPORT

September 2025





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1.0 Introduction

The Town of Strathmore (Strathmore, or the Town) retained ISL Engineering and Land Services Ltd. (ISL) to update the previous 2020 Transportation Master Plan (TMP).

For this TMP Update, Strathmore's Travel Demand Model as developed in 2020 was updated with the latest land use assumptions and road networks. Based on the TMP Update results, the road network upgrades required in the future were identified. The ultimate goal of the TMP is to provide a framework for Council and Administration to assess the capability of the road network to accommodate new development in the short and long term. This information is also useful for carrying out short- and long-term planning and budgeting, including development of off-site levies.

1.1 Background

The Town of Strathmore is located along the Trans-Canada Highway (TCH or Highway 1) in Southern Alberta within Wheatland County, approximately 50 kilometres east of Calgary. Strathmore had a population of 16,189 in 2024 according to Alberta Regional Dashboard. Similar to the 2020 TMP, the same population target of 28,000 by the 2049 horizon is maintained.

1.2 Purpose of Study

The primary objectives of the TMP update were to:

- Review new planning documents and the 2020 TMP.
- Confirm Future Population / Employment / Land Uses: As confirmed with the Town, the population of the 2049 horizon will be unchanged at 28,000. To add the newly proposed growth areas whilst maintaining the 28,000 population, adjustments to population and employment growth areas identified in the previous TMP will be required. The required population / employment adjustments by zone (both additions and reductions) were provided by the Town as inputs to the TMP.
- ISL reviewed current traffic data and recommended that the Existing horizon model can remain unchanged from the prior TMP because of the following:
 - Traffic volumes: The 2017 ATEC counts were referenced in the 2020 TMP. When compared to ATEC's latest counts (2023), the 2023 counts are similar or slightly lower than the 2017 counts. Therefore, the traffic count calibration from the existing model remains valid for this update.
 - Population: The Town's population has increased by ~2,600 from between 2018 (13,500) and 2024 (16,000), equivalent to ~3.1% / year growth. This is close to the 3.5% / year growth assumption used in the 2020 TMP.
 - Employment: Per Stats Canada, there is a decline in the employment rate (2016: 64% employed, 2024: 58%) and increase in unemployment (2016: 8.7% unemployed, 2024: 9.8% unemployed) in the Town.
 - Based on the above statistics, we would conclude either that a higher proportion of non-working retirees have moved to Strathmore, or that a greater proportion of residents now work from home, or some combination of both. In either case, the resulting traffic counts indicate relatively stable conditions and would support the continued validity of the original Existing horizon model.

- Update the 2049 AM and PM models with the following:
 - The updated land use / population / employment (as provided by the Town in Stage 1).
 - Road network / intersection improvements already constructed.
 - Update road network of planned areas (i.e. Lakewood, Legacy Farm, Westcreek)
 - Add south commercial corridor at the west end (Wildflower) and east end (Edgefield) of Town.
 - Add new planning areas (i.e. ASP west of Wildflower, annexation area).
- Update and calibrate the 2049 travel demand model in VISUM. It is noted that the previously analyzed option with the Highway 1 bypass will not be evaluated in this update, as communications with ATEC indicate this is not within the short or medium term capital plans.
- Similar to the 2020 TMP, only a 2049 travel demand model will be prepared. For the traffic volumes in the interim 2029 and 2039 horizons, the traffic volume differences between Existing and 2049 horizons will be calculated and will be proportioned to the 2029 and 2039 horizons.
- Complete updated 2029, 2039 and 2049 AM and PM peak intersection analysis in Synchro (stop controlled, signal) of major intersections as analyzed in the 2020 TMP. The following intersections will also be added: Wildflower Road / Lakewood access, Wildflower Road / Wildflower access, Westmount Road / south commercial corridor, TR 244 / Lakewood Circle, TR 244 / Wildflower Road, TR 244 / Highway 817, Wheatland Tr / Hillview Dr, Wheatland Tr / Brent Blvd, TR 244 / GFT
- Additional roundabout analysis in Sidra will be undertaken at: TR 244 / Wildflower Road, TR 244 / Highway 817, GFT / Archie Klaiber Trail, GFT / Parklane Drive.
- GFT / TR 244: complete illumination, signage, and intersection operation checks
- From the above analysis, the recommended intersection traffic control, configuration and road classifications will be updated
- Identify if a grade separated interchange at the west (Wildflower) and east (Edgefield) end of Strathmore on Highway 1 is required in any of the analyzed horizons. If not, determine the percentage of traffic increase beyond 2049 to trigger the interchanges.
- Ring Road Alignment drawing update: Add the roundabouts at GFT / Archie Klaiber Trail and GFT / Parklane Drive based on the completed designs. At new intersections, only the road right of way for the intersecting road will be added. The intersection details will be based on the schematic intersection graphics as generated by Synchro or Sidra.
- Update cost estimates (Class 5).

■ 2.0 Land Use and Modelling

Long-term forecasting for the TMP Update was completed with a Travel Demand Model that ties intimately to existing and future land use for Strathmore and provides a rational basis on which to assess and evaluate future network requirements. The Travel Demand Models developed for the TMP will also provide an effective foundation for Strathmore's ongoing use for future land use, infrastructure planning and design purposes. The following sections provide a summary of the land use assumptions that form the basis for the recommendations in this report.

2.1 Existing Model and Counts Comparison

As mentioned in Section 1.2, ISL reviewed the current traffic data and recommended that the Existing horizon model can remain unchanged from the prior TMP due to the following factors:

- **Traffic volumes:** The 2017 ATEC counts were referenced in the 2020 TMP. When compared to ATEC's latest counts (2023), the 2023 counts are similar or slightly lower than the 2017 counts. Therefore, the traffic count calibration from the existing model remains valid for this update.
- **Population:** The Town's population has increased by ~2,600 from between 2018 (13,500) and 2024 (16,000), equivalent to ~3.1% / year growth. This is close to the 3.5% / year growth assumption used in the 2020 TMP.
- **Employment:** Per Stats Canada, there is a decline in the employment rate (2016: 64% employed, 2024: 58%) and increase in unemployment (2016: 8.7% unemployed, 2024: 9.8% unemployed) in the Town.

Based on the above statistics and understanding general community trends, we would conclude either that a higher proportion of non-working retirees have moved to Strathmore, or that a greater proportion of residents now work from home, or some combination of both. In either case, the resulting traffic counts indicate relatively stable conditions and would support the continued validity of the original Existing horizon model.

2.1.1 Transportation Zone Update

For the model update, the transportation analysis zones (TAZ) were increased from a total of 50 to 64 internal zones; the updated model for Strathmore consists of 56 zones within Strathmore's town limits and 8 zones in Wheatland County surrounding Strathmore. The updated TAZ as shown in Exhibit 2.1 provided more refined TAZ that better differentiate separate land uses, recognize transportation barriers, and distribute traffic via relevant neighborhood access points.

The external zones from the 2020 TMP model remain unchanged for the updated model and no adjustments are required. External zones are used in the model to represent traffic passing into and out of Strathmore's transportation system from regional destinations, as shown in Table 2.1.

Table 2.1: External Zone Links

External Zone	Roadway	Direction
10001	Highway 1	West
10002	Township Road 244	West
10003	Range Road 253	North
10004	Highway 817	North
10005	George Freeman Trail	North
10006	Township Road 244	East
10007	Highway 1	East
10008	Highway 817	South

2.1.2 Existing Population and Employment

As the Existing model from the 2020 TMP was maintained, the Existing model's population data was extracted from the 2018 Census report. The data was further sub-divided into smaller zones per the Travel Demand Model. As the Town does not have detailed employment data (total employment or employment per zone), the employment data were estimated based on typical modelling practices in the Calgary region. The values for employment were reviewed and accepted by the Town prior to importing to the model. There are four employment categories:

- Retail Employment – employment at retail / higher-turnover businesses
- Non-Retail Employment – employment at non-retail / lower-turnover businesses including offices
- School Employment – employment at elementary / junior high / high schools
- Industrial Employment – employment at auto shops / industrial sites

In 2018, the Town has approximately 13,500 population, 5,600 households, and 2,800 jobs. The population and employment data used for the TMP update is summarized in Appendix A and shown in Exhibits 2.2 and 2.3, respectively. It is noted that for the AM peak model, if there is school in a zone, the Non-Retail employment was converted to school employment for trip generation purposes (higher trip generation rates for school employment in the AM peak).

2.1.3 Existing Roadway Classification

The existing road classifications and related roadway capacities were based on the 2006 TMP and revised as necessary for modelling purposes. The road classifications for Strathmore's transportation network was confirmed with the Town prior to importing to the model, as shown in Exhibit 2.4. More details can be found in Section 3.2.

2.2 Future Land Use and Modelling

For the TMP update, one future horizon in 2049 was modelled. The future land use was based on the latest available ASPs in the Town and future annexation area. Five ASPs were included in the future model:

- Lakewood Meadows: Zone 20;
- Wildflower Ranch: Zones 22 and 100;

- Westcreek: Zone 102;
- Edgefield: Zones 158 and 159; and
- Legacy Farm: Zone 132.

It is noted that the Coldwell Ranch ASP from the previous model is now assumed not to be developed by 2049 horizon, while Legacy Farm ASP is an additional ASP to the TMP update. Also, as confirmed with the Town, more land development focus is expected between Range Road 254 and Wildflower Road on the west side of the town.

2.2.1 Future Population and Employment

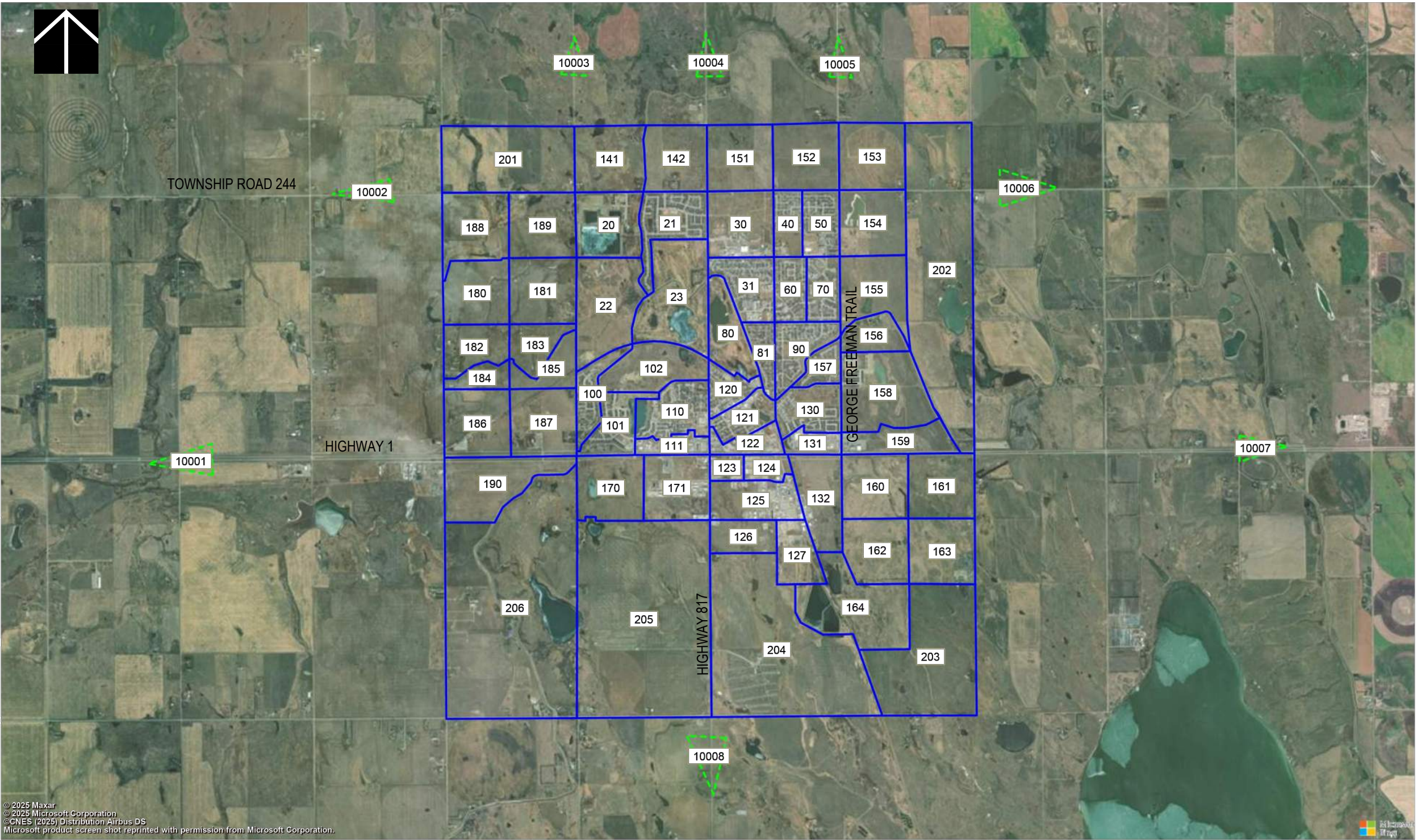
The updated future population and employment data as provided by the Town is summarized in Appendix B and shown in Exhibits 2.5 and 2.6, respectively. Based on the updated future population, household and employment data, it is forecast that, within 25 years, the Town will approximately increase population by 14,400 to 28,000, households by 5,600 to 11,200, and jobs by 1,600 to 4,400.

2.2.2 Future Roadway Classification

For the 2049 horizon Travel Demand Model, the future road classifications and capacities were based on the road function proposed in the ASPs. Where road classifications were unclear and/or where existing road classifications would not serve the intended growth, road classifications were assumed and/or adjusted considering the Town's local context. The road classifications used in the future Travel Demand Model are shown in Exhibit 2.7.

2.2.3 Future Background Traffic Growth

At the 2049 horizon, traffic to/from the external gates was also updated. The background traffic growth pattern was based on historic highway growth patterns. Using Average Annual Daily Traffic (AADT) data from ATEC (2008-2017), it is calculated that, near Strathmore, Highway 1 has a linear annual growth rate of 0.90%, and Highway 817 has a linear annual growth rate of 0.91%. It is noted that to be conservative, a minimum 1.0% linear annual growth rate was assumed for the study.



Legend:



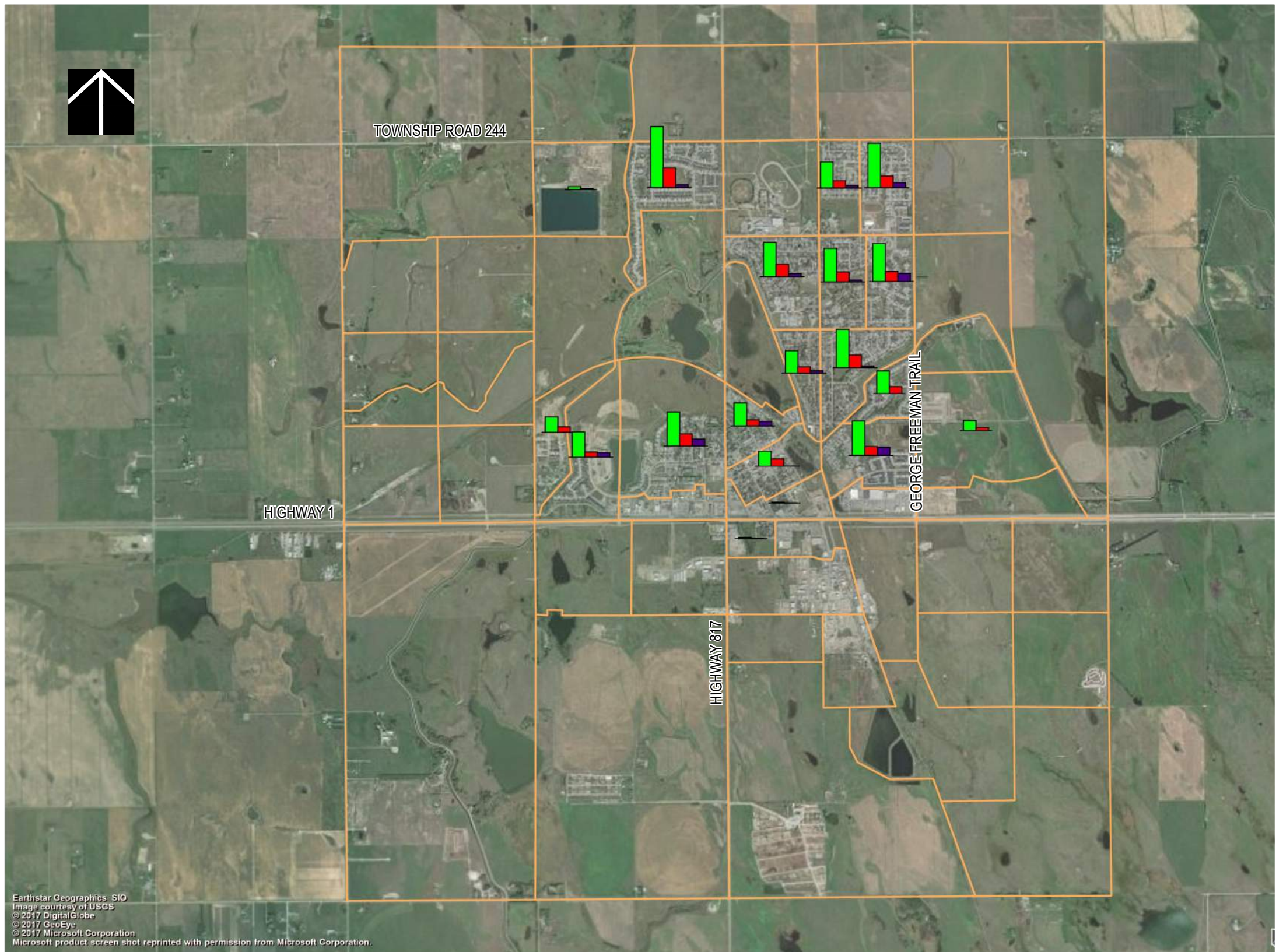
STRATHMORE TMP UPDATE

TRANSPORTATION ZONES

EXHIBIT 2.1
SEPTEMBER 2025



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Population and Household

Existing

Zone Boundary



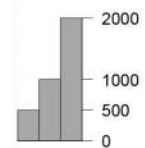
Chart

POPULATION

HOUSEHOLD SINGLE-FAMILY

HOUSEHOLD MULTI-FAMILY

Scaling



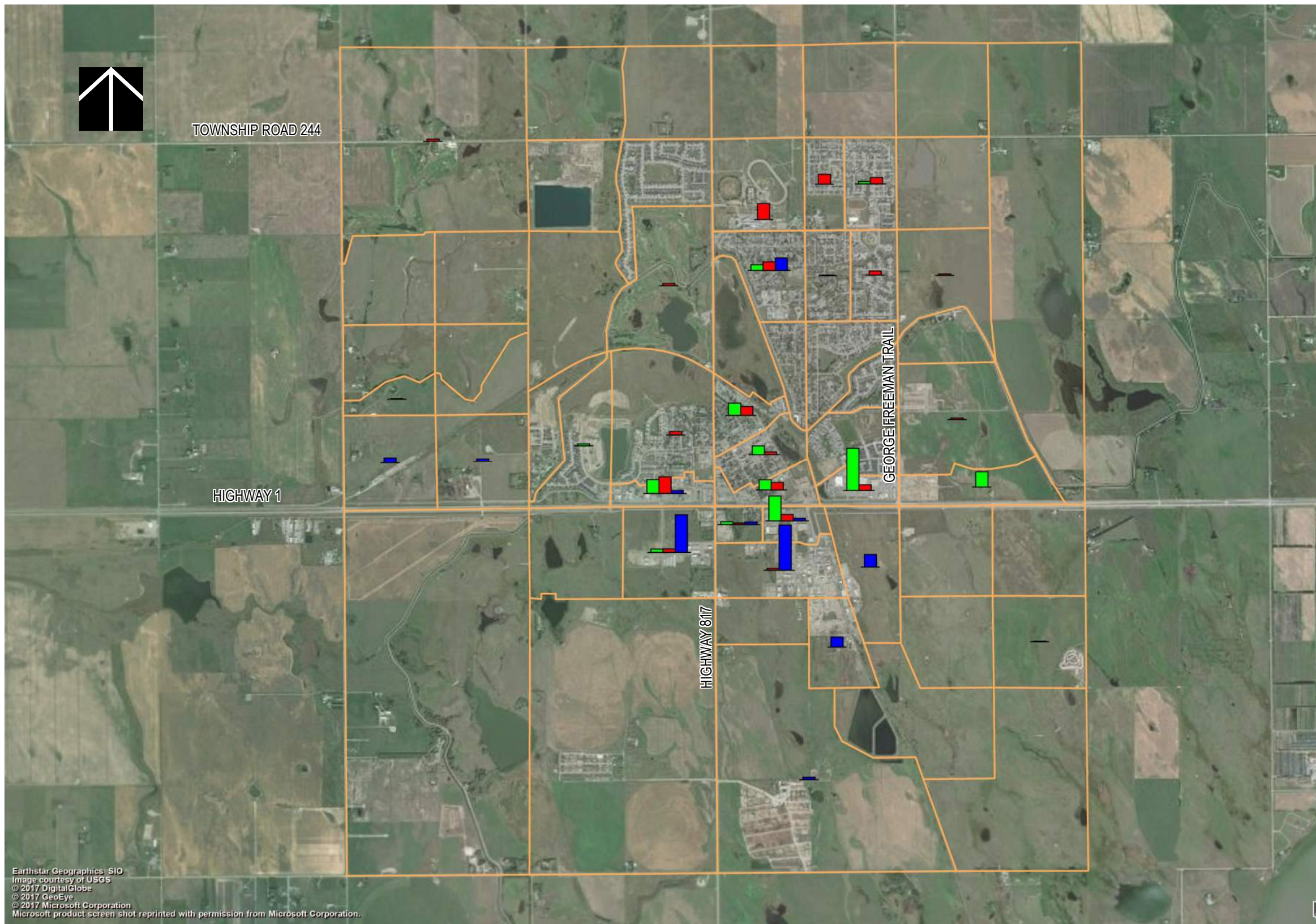
STRATHMORE TMP UPDATE

EXISTING POPULATION

EXHIBIT 2.2
SEPTEMBER 2025



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Employment
Existing
Zone Boundary

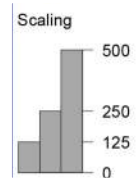


Chart

RETAIL

NON-RETAIL

INDUSTRIAL

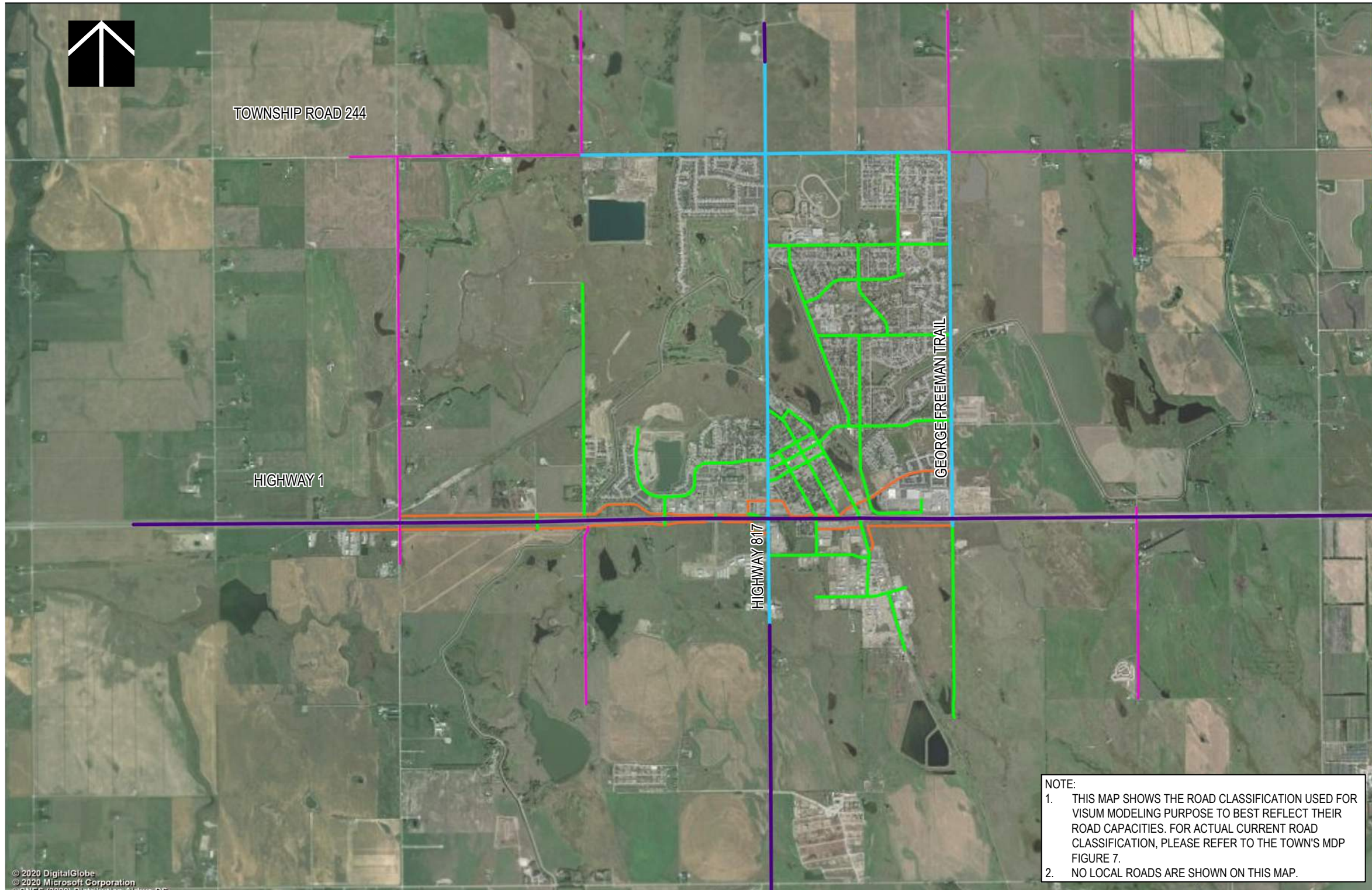


STRATHMORE TMP UPDATE

EXISTING EMPLOYMENT

EXHIBIT 2.3
SEPTEMBER 2025

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Road Classification

Type number

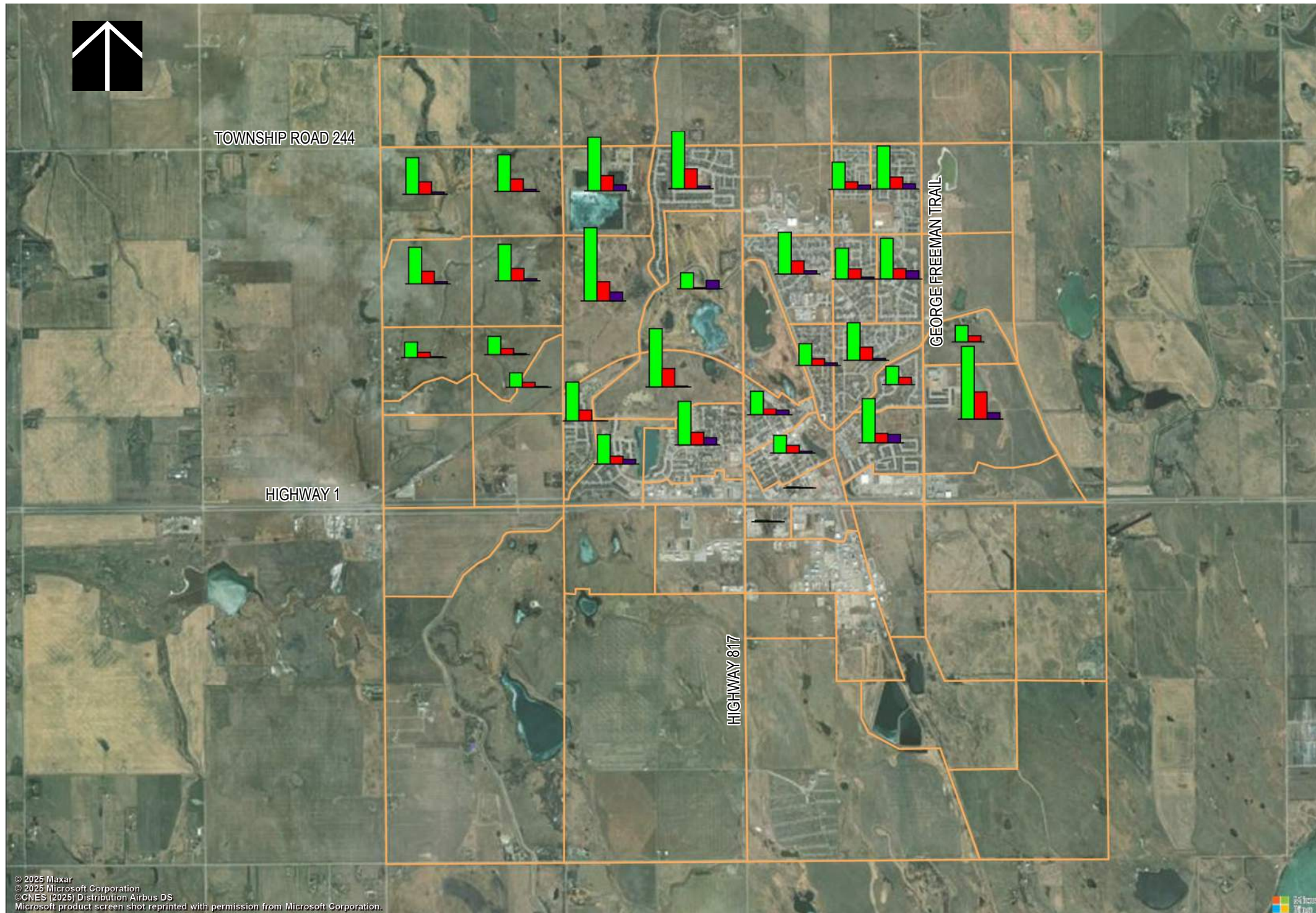
- Highway
- Arterial
- Collector
- Rural
- Service Road

STRATHMORE TMP UPDATE

EXISTING VISUM MODEL
ROAD CLASS

EXHIBIT 2.4
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Population and Household

Future

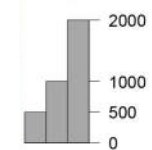
Zone Boundary



Chart

- POPULATION
- HOUSEHOLD SINGLE-FAMILY
- HOUSEHOLD MULTI-FAMILY

Scaling



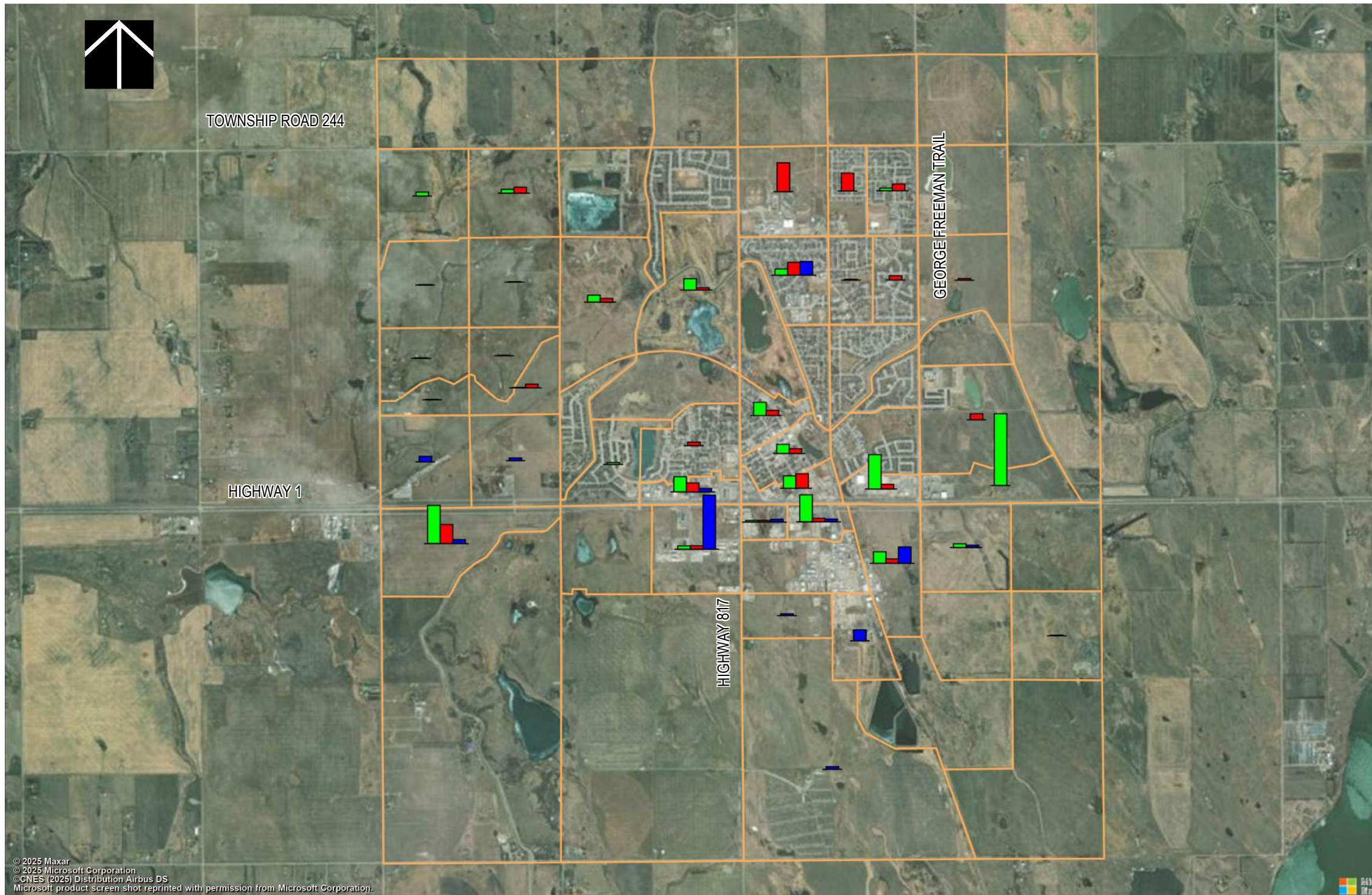
STRATHMORE TMP UPDATE

FUTURE POPULATION

EXHIBIT 2.5
SEPTEMBER 2025



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Employment
Future
Zone Boundary



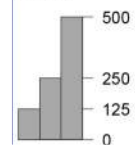
Chart

RETAIL

NON-RETAIL

INDUSTRIAL

Scaling



STRATHMORE TMP UPDATE

FUTURE EMPLOYMENT

EXHIBIT 2.6
SEPTEMBER 2025

■ 3.0 Travel Demand Model and Calibration

3.1 Travel Demand Modelling Update

The travel demand model update and the analysis undertaken in this study used the latest VISUM 2025 transportation planning software suite developed by PTV Group. This GIS-based travel forecasting model is a state-of-the-art transportation planning tool that can efficiently estimate changes in travel patterns and utilization of transportation systems in response to changes in land use, population, employment, and transportation infrastructure. It integrates mapping, land use planning, development projections, future traffic demand, and transportation networks to produce reliable traffic forecasts that can be interpreted easily and presented in effective visual format. It is also the most commonly used software for other Calgary-area municipalities including City of Airdrie, Town of Okotoks, Town of High River, Foothills County and Rocky View County.

The traditional four-step travel demand modelling process was used for this study, as shown in Figure 3.1 and summarized as follows:

- **Trip Generation** – residential, commercial, and industrial land uses are used to determine the number of peak hour trips being generated for the study area;
- **Trip Distribution** – zone-to-zone trip distribution is based on the road network impedance (i.e., travel time) and determines a zone-to-zone origin-destination (OD) trip matrix;
- **Mode Split** – the OD trip matrix is split into various travel modes, such as driving, walking, and transit. For this study, 100% of trips were assumed to be by passenger vehicle, with no additional mode split analysis;
- **Trip Assignment** – the estimated OD trip matrix is assigned onto the established road network to get link volumes for the existing and future traffic scenarios;

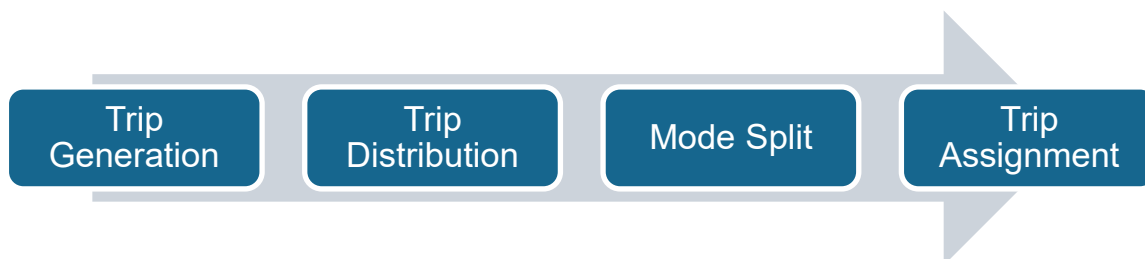


Figure 3.1: Traditional Four-Step Travel Demand Modelling Process

The existing travel demand model captures the existing travel patterns, including trip generation, trip distribution, trip assignment, and pass-by traffic through Strathmore. With a model calibrated to existing conditions, these characteristics can then be applied to the growth areas of Strathmore to forecast the future traffic volumes. The future transportation demand model provides Strathmore with a scalable, flexible platform that can be readily adapted over time to include additional scenarios or transportation complexity as Strathmore grows. The flow chart in Figure 3.2 is a general representation of the four-step travel demand modelling process implemented for this study.

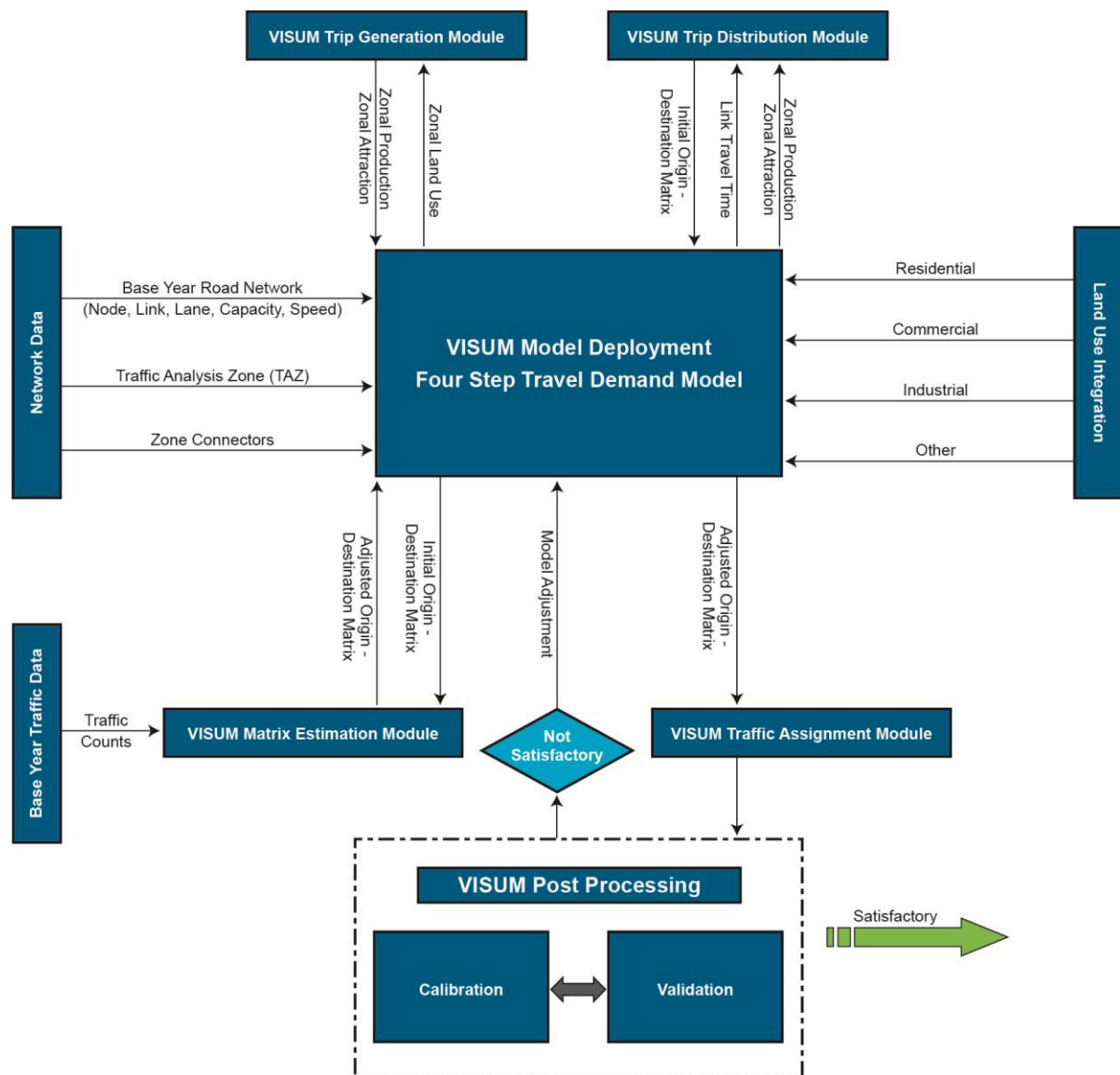


Figure 3.2: General Representation of Base Year Model Development

3.2 Roadway Capacity

Road link capacities within the VISUM model are based on their functional classification. Link capacities used in the TMP model are summarized in Table 3.1. The link capacities are generally conservative, in that they are based on the capacity of a single traffic lane, multiplied out to the total number of lanes on the road in a given scenario. There were additional variations in the model not noted here, such as reduced speed and capacity in roadways with lower speed limits to allow for an appropriate travel time penalty on such routes.

Table 3.1: Link Capacities

Road Classification	Capacity, veh/hr/lane	Speed, km/h
Freeway (Free Flow)	2,100	100-110
Highway	1000-1200	60-80
Arterial	900-1200	50-80
Collector	700-800	50-60
Local	350-400	30-50

Model outputs for scenario planning are based on the volume-to-capacity (v/c) ratio of each roadway, with ranges defined in Table 3.2. Given the conservative ranges for the link capacities, the macro-level planning works up to a capacity band ranging from 95% to 105% of link capacity. For example, the link capacities do not provide for channelized turn bays at intersections, which in practice will increase total capacity through a traffic signal on an arterial. The acceptance of certain higher-volume links in some cases has either been proven via more detailed micro-level analysis or is considered to be an acceptable level of congestion given the existing constraints and limitations of certain roadways.

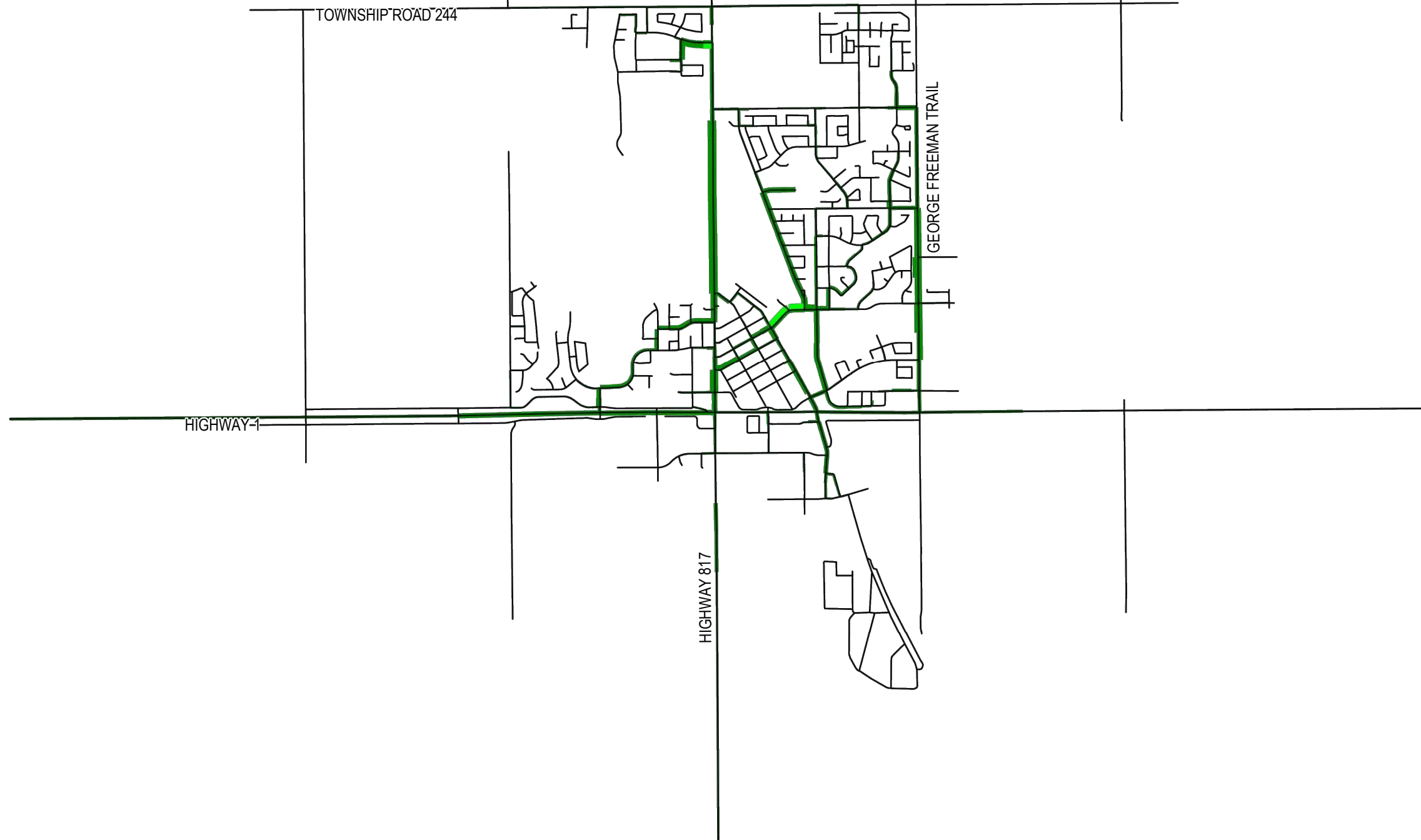
Table 3.2: Volume-to-Capacity Ratio Ranges

Colour	v/c Ratio	Notes
Dark Green	<0.60	Effective operations
Light Green	0.60 – 0.80	Effective operations
Yellow	0.80 – 0.95	Normal operations, urban traffic conditions
Orange	0.95 – 1.05	At or near capacity
Red	>1.05	Above capacity

3.3 Existing Horizon Calibration

Calibration plots of the existing network model for AM and PM peaks are provided in Appendix D. Regression values (R^2) of 0.89 were obtained for the network in both AM and PM peaks. These values represent strong convergence with the existing traffic data; the typical R^2 value for acceptance of a calibration model is 0.75 for a small to medium size municipality.

Volume-to-capacity (v/c) ratio plots for Strathmore's existing network in the AM and PM peaks are provided in Exhibits 3.1 and 3.2. The v/c ratio plots indicate all existing roadways within Strathmore show good operations with moderate volumes at both AM and PM peak times, and they do not indicate any major network congestion locations or bottlenecks.



AM Peak Hour Congestion Existing

Link bars

Volume capacity ratio PrT (AP)



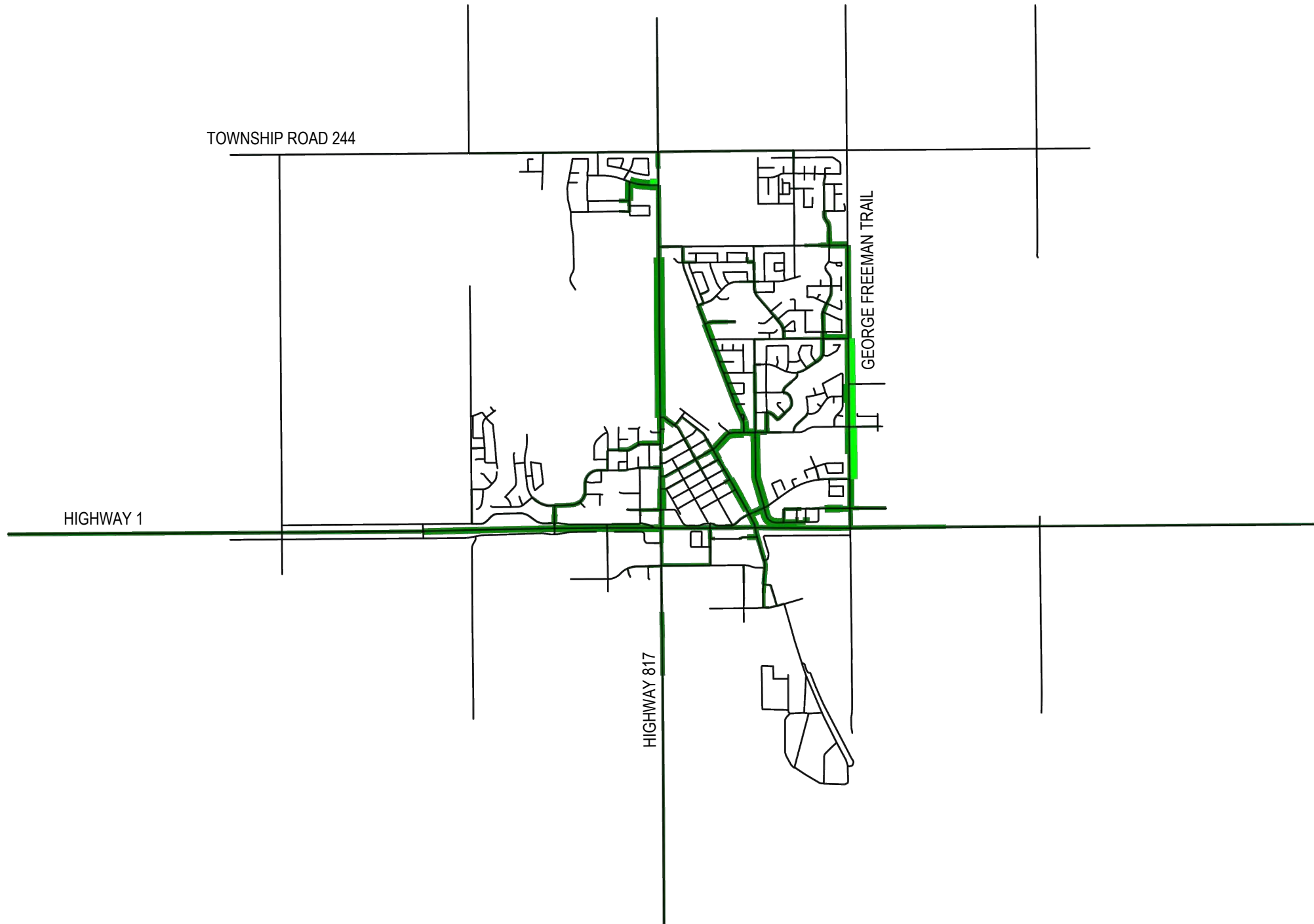
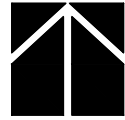
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EXISTING AM
V/C RATIO

EXHIBIT 3.1
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PM Peak Hour Congestion Existing

Link bars

Volume capacity ratio PrT (AP)



STRATHMORE TMP UPDATE

EXISTING PM
V/C RATIO

EXHIBIT 3.2
SEPTEMBER 2025



4.0 Future Scenario Road Network and Analysis

In the development of the VISUM model for the future horizon, land use and trip generation were added for the growth areas, along with background traffic growth for Highway 1 and Highway 817, as outlined in Section 2.2.

4.1 Future Scenario

For the TMP Model update, the road network scenario without the Highway 1 bypass at Strathmore was analyzed. For the 2049 Scenario (without the bypass), the v/c ratio plot for the AM and PM peaks are shown in Exhibits 4.1 and 4.2, respectively. The results indicate that there will be capacity constraints on short segments of Highway 817, the future realigned Wildflower Road and George Freeman Trail; to improve operations, twinning is required.

4.2 Future Detailed Intersection Analysis

Synchro is a widely used macroscopic software used for modelling, optimizing, managing, and simulating transportation networks to improve mobility. Synchro 11.0 was used to analyze the traffic operations at the Town's key intersections. The Level of Operating Service (LOS) A represents the highest LOS or generally free flowing conditions, while LOS F generally represents a breakdown or gridlock condition in vehicular flow. There are varying degrees of delay and LOS at the intermediate LOS B, C, D and E levels. LOS D is representative of normal peak hour congestion, while LOS E is representative of an intersection nearing its capacity. Typically, LOS D or better is the accepted standard for peak hour operations. LOS criteria for intersections are based on average delay per vehicle and are summarized in Table 4.1. Synchro also calculates each movement's volume-to-capacity ratio (v/c ratio). A v/c ratio of 1.0 represents an intersection or movement at full capacity. Typically, a v/c ratio of 0.90 or lower for all intersection movements is the accepted standard for peak hour operations in urban areas.

Table 4.1: Level of Service Criteria

LOS		A	B	C	D	E	F
Signalized	Average Delay per Vehicle (s/veh)	< 10	10 – 20	20 – 35	35 – 55	55 – 80	> 80
Unsignalized		< 10	10 – 15	15 – 25	25 – 35	35 – 50	> 50

Detailed traffic operation analysis was completed in Synchro at all major intersections (e.g. Collector-Collector level or higher). The Synchro results indicated that several intersections operated below criteria and intersection improvements are needed, as summarized in Table 4.2. It is cautioned that intersection turning volumes from a travel demand model cannot exactly predict the future volumes at a high level of accuracy, but can provide good basis for proposing future transportation network improvements. Local-level forecasting and analysis via Traffic Impact Assessments (TIAs) and Functional Planning Studies (FPS) should continue to be used as part of the development approval process as new growth areas come online, to determine local-scale recommendations.

Table 4.2: Future Intersection Traffic Operation Summary

Intersection	Operates beyond Criteria?
Township Road 244 / Highway 817	Yes
Highway 1 / Range Road 254	Yes
Highway 1 / Wildflower Road	Yes
Highway 1 / Westmount Road and Westmount Road / Pine Road	Yes
Highway 1 / Highway 817	Yes
Highway 817 / Westcreek ASP Access	Yes
Highway 1 / George Freeman Trail	Yes
Highway 1 / Edgefield Access (Sensitivity Analysis)	Yes
George Freeman Trail / Edgefield Place Access	Yes
George Freeman Trail / Archie Klaiber Trail	Yes
George Freeman Trail / Park Lane Drive	Yes
Wildflower Road / Wildrose Drive	Yes
Wheatland Trail / Brent Blvd	Yes

The analysis confirmed that the 13 intersections as listed in Table 4.2 will operate beyond the accepted capacity criteria in the 2049 horizon. Therefore, intersection and network improvements are required by the 2049 horizon to maintain acceptable operations.

4.2.1 Specific Intersection Discussions

The intersections that operated below the accepted capacity criteria are discussed as follows:

- Highway 1 / Westmount Road and Westmount Road / Pine Road: The northbound queue (52 metres) of the Highway 1 / Westmount Road intersection extends beyond the Pine Road intersection (approximately 26 metres from Highway 1), which creates a queue spillover issue for the traffic on Pine Road. At the time when land development occurs on the south side of Highway 1, it is recommended to relocate the Westmount Road / Pine Road intersection farther back (to at least with 82 metres, for the storage plus taper) from Highway 1 and align with the future south commercial corridor.
- Highway 1 / Wildflower Road: Upgrades to the intersection including signalization with northbound and southbound left turn and right turn bays, and dual EBL left turn bays (additional EBL turn lane) are required. With the recommended upgrades, the northbound queue and the southbound queue are 73 metres and 72 metres, respectively. It is recommended that the alignment of the future south commercial corridor to be at least 102 metres (storage plus taper) set back from Highway 1. Also, it is recommended to close the Westridge Road at the future Wildflower Road to accommodate the southbound queue. With these improvements, the intersection will operate acceptably in the 2049 horizon and an interchange is not warranted.
- Sensitivity analysis was also conducted to identify how much more traffic can be accommodated for the at-grade intersection prior to upgrading to an interchange configuration. The sensitivity analysis assumed 3 EBT and 3 WBT lanes, as well as 2 NBT and 2 SBT lanes at the intersection to be the maximum scale of an at-grade intersection. From the sensitivity analysis, it is concluded that approximately 60% additional traffic (equivalent to 20 years of traffic growth from the 2049 horizon based on 3% linear traffic growth per year) could be accommodated at the intersection prior to an interchange upgrade. With the 60% additional traffic growth, the EBL, WBT and SBL operated at v/c ratio of 0.97, 0.96 and 0.94 respectively. Also, the SBL turn movement operated at LOS F.

- Highway 1 / RR 254: upgrades to the intersection including signalization with northbound left turn bay and southbound left turn bay are required. With the recommended upgrades, the intersection will operate acceptably in the 2049 horizon and an upgrade to an interchange is not required.
- Highway 1 / Edgefield Access: Sensitivity analysis was conducted to identify how much more traffic can be accommodated for the at-grade intersection prior to upgrading to an interchange configuration. The sensitivity analysis assumed 3 EBT and 3 WBT lanes, as well as 2 NBT and 2 SBT lanes at the intersection to be the maximum scale of an at-grade intersection. From the sensitivity analysis results, it is concluded that approximately 150% additional traffic (equivalent to 50 years of traffic growth from the 2049 horizon based on 3% linear traffic growth per year) could be accommodated at the intersection prior to an interchange upgrade. With the additional 150% traffic growth, the WBT and SBL operated at v/c ratio of 0.97 and 1.00 respectively. Also, the SBL turn movement operated at LOS F.
- George Freeman Trail / Archie Klaiber Trail: Upgrade to dual lane roundabout.
- George Freeman Trail / Park Lane Drive: Upgrade to dual lane roundabout.
- Wheatland Trail / Brent Blvd: Add west leg and northbound left turn bay to the intersection and optimize the signal timing when development on the west side of Wheatland Trail occurs.

4.3 Future Road Improvement Recommendations

The future road improvement recommendations are summarized in Table 4.3.

Table 4.3: Future Road Improvement Recommendations

Road / Intersection	Improvement Description
Highway 817 (Westmount Dr - Westcreek ASP)	Twinning to 4 lanes
George Freeman Tr (Archie Klaiber Tr - Centennial Dr)	Twinning to 4 lanes
Wildflower Road (Highway 1 to 300m North of Highway 1)	Twinning to 4 lanes
Wildflower Road (Highway 1 to Township Road 244)	2 lanes Arterial construction
Wildflower Road / Wildrose Drive	Signalization with northbound and southbound left-turn bay
Township Road 244 / Highway 817	All-way stop control
Highway 1 / Range Road 254	Traffic Signalization
Highway 1 / Wildflower Road	Signalization with dual eastbound left-turn lanes
Highway 1 / Highway 817	Reconfiguration to provide left-turn bays on Highway 817 with signal retiming to eliminate split-phase operations
Highway 817 / Westcreek ASP Access	Signalization with eastbound right-turn bay
Wheatland Trail / Brent Blvd	Add west leg and northbound left-turn bay
Highway 1 / George Freeman Trail	Extend eastbound left-turn bay
Highway 1 / Edgefield Access	Traffic signalization
George Freeman Trail / Archie Klaiber Trail	Dual lane Roundabout
George Freeman Trail / Park Lane Drive	Dual lane Roundabout
Park Lane Drive / Thomas Drive	Convert to all-way stop

4.3.1 Timeline of Improvements

As the study findings illustrate that the improvements identified in the future network are mainly development-driven by the build-out of the ASP areas, the timeline of the improvements will primarily correlate with the progress of development build-out based on size and type of development, staging of development, and location of development.

When new developments are planned, it is recommended that a local-area TIA be undertaken to determine the timeline of specific improvements associated with the proposed development, tied to the proposed development phasing plans. Off-site levy collection for roadway improvements is a valuable tool to spread the cost of certain infrastructure improvements that benefit multiple growth areas fairly among the benefitting development cells, and to ensure the collection of funding for future upgrades based on cumulative impacts to the transportation network, even if a specific development in the near future does not by itself “trigger” a specific improvement.

To provide an initial basis for the Town’s infrastructure staging and budgeting plans, two interim study horizons were identified for this TMP update: a 5-year horizon in 2029 and 15-year horizon in 2039. Through interpolation of intersection turning volumes in the existing and 2049 horizons, intersection turning volumes for these two interim study horizons were generated and analyzed in Synchro. The improvement recommendations and the improvement horizons are summarized in Table 4.4 below.

4.3.2 Opinion of Probable Cost

Class 5 (order of magnitude) opinions of probable cost were prepared to provide information on potential future transportation infrastructure costs. The Class 5 cost estimates can be used to update and incorporate with other infrastructure budgeting tools to assist in planning budgets on a Town-wide scale for future transportation studies, designs, and capital construction projects. Future transportation studies and designs would provide more detailed estimates required to continually review and update the off-site levy bylaw, or to budget and implement individual projects.

The assumptions used in the development of the opinion of probable cost are as follows:

- Costs in 2025 dollars;
- Includes urban design with storm systems, but generally assuming discharge through communities to stormwater management facilities constructed by others;
- Excludes land acquisition (assumes that land will be dedicated to the Town through the development process);
- Class 5 (“Order of Magnitude”) cost estimate with an accuracy of +75% to -40%;
- Contingency of 30% and engineering / administration allowance of 15%;
- The suggested improvement horizon is estimated and will be subject to change due to actual development patterns;
- Assumed rural cross section for 2 lane roads, urban cross section for 4 lane roads;
- Unit costs used were taken from recent tender close bids from Calgary area projects:
 - Arterial:
 - Existing gravel road upgraded to 2-lane arterial with pathways on both sides and streetlights: \$6.7 Million per km;
 - Greenfield 2-lane arterial with pathways on both sides and streetlights: \$7.7 Million per km;

- Existing rural 2 lane paved road (no pathway) upgraded to 2-lane arterial with pathways on both sides and streetlights: \$4.1 Million per km;
- Widen from 2 lanes rural to 4 lanes Urban: \$14.5 Million per km;
- New Traffic Signal (Municipal Intersection): \$500,000;
- New Traffic Signal (ATEC Highway Intersection): \$750,000;
- No major utility relocations are considered;
- No modifications to existing accesses are considered;
- City of Calgary Typical Major Road Asphalt Pavement structure is used;
- Localized earth balance is assumed, with no Import fill considered;
- Assumed existing road needs to be replaced with the new pavement structure;
- Assumed that raising the existing road due to asphalt paving will not adversely affect existing grades at accesses and ditches;
- Assumed that pathways and streetlights will fit within the existing road right-of-way;
- Assumed that improvements to irrigation structures are not required at the WID canal crossing ;
- Assumed sidewalk only added (no boulevard) on the WID canal crossing;
- For signal timing coordination and optimization improvements, it is assumed that signal infrastructure upgrades are not required;
- The cost of the internal roads of lower classification within the ASP areas were assumed to be the responsibility of the developer as part of the Town's standard subdivision development agreement, and are not provided here.

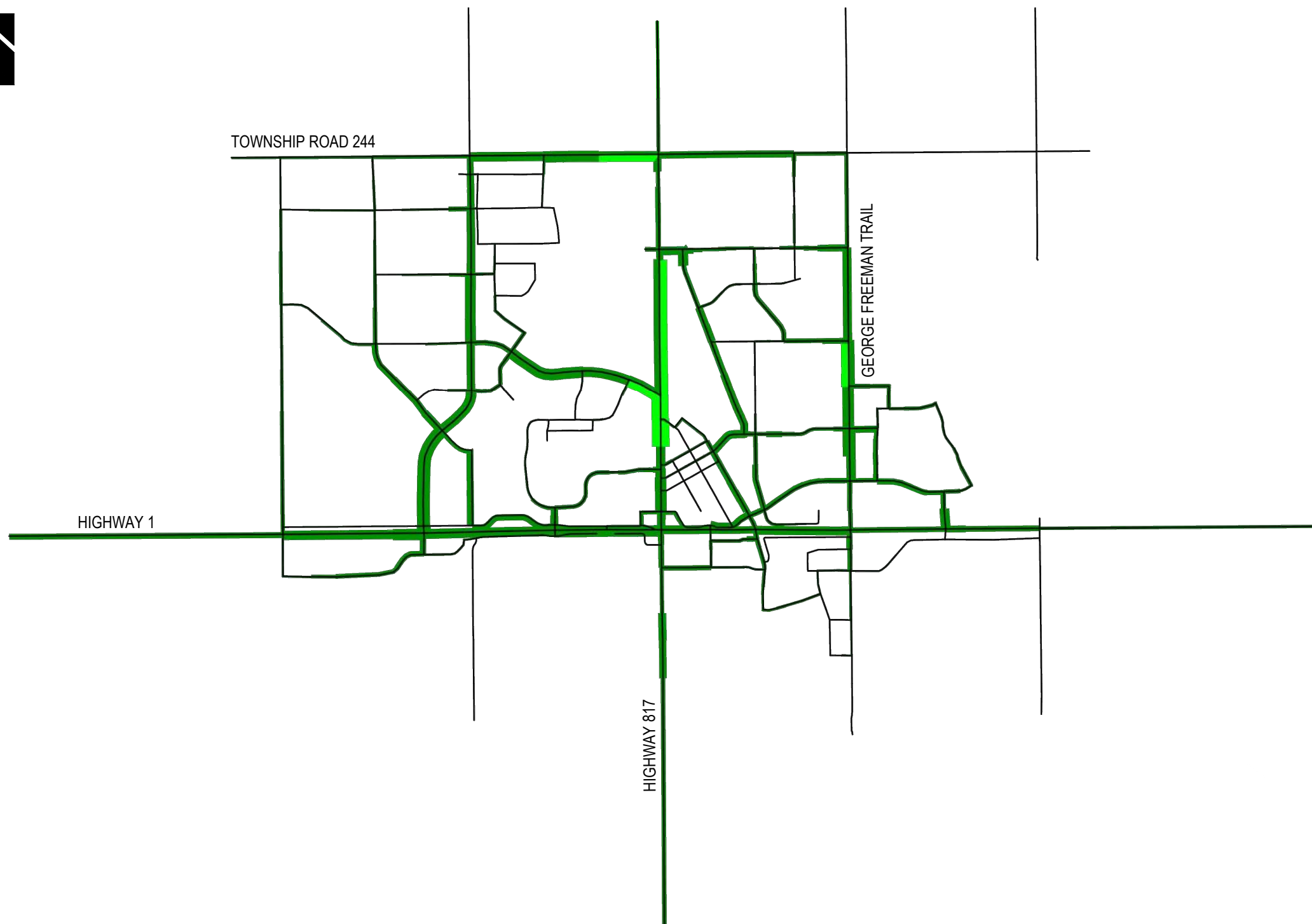
4.3.3 Future Improvements Summary for Capital Improvements

The recommended improvements with timelines and cost estimates are summarized in Table 4.4 and Exhibit 4.3. Additional notes are provided for the following corridors and intersections:

- Highway 1 / Highway 817 Intersection: It is recommended to have 4 through lanes on Highway 817 with opposing left-turn lanes at Highway 1. However, it is recognized that land acquisition is likely required for this level of upgrades. In the interim horizon, it is recommended to reconfigure the intersection to remove split phasing signal operation and allow for simultaneous northbound and southbound movements. Detailed design along with truck turning templates should be undertaken to confirm feasibility of this interim intersection configuration.

Table 4.4: Recommended Improvements Staging, Horizon and Cost

Corridor / Intersection	Improvement Description	Class 5 Cost Estimate
Improvements by 2029		
Wildflower Road	Pave, 2 lane road with pathways and streetlights (both sides)	\$9,400,000
Wildflower Road	New, 2 lane road with pathways and streetlights (both sides)	\$10,000,000
Highway 1 & Wildflower Road	Signalization with NB and SB left turn and right turn bays	\$1,000,000
Highway 1 & Highway 817	Intersection reconfiguration	\$130,000
Highway 1 & Edgefield Access	New 2-way stop control intersection	\$1,500,000
Highway 817 & Westcreek Access	New 2-way stop control intersection	\$1,500,000
George Freeman Tr & Archie Klaiber Tr	Dual lane roundabout	\$4,200,000
George Freeman Tr & Park Lane Dr	Dual lane roundabout	\$4,700,000
George Freeman Trail	Twinning (Archie Klaiber Tr - Park Lane Dr)	\$0 (Included in the above roundabouts on GFT)
Township Road 244	Add pathways + streetlights (both sides)	\$2,900,000
Total (Rounded)		\$35,300,000
Improvements by 2039		
Highway 817	Twinning (Willow Dr - Westcreek)	\$10,000,000
Highway 1 & Range Road 254	Signalization with NB and SB left turn bays	\$880,000
Highway 817 & Westcreek Access	Signalization with NBL and EBR turn bays	\$1,000,000
George Freeman Trail & Edgefield Place	Signal retiming	\$20,000
Township Road 244 & Highway 817	4-way stop control	\$10,000
Total (Rounded)		\$12,000,000
Improvements by 2049		
Highway 1	Signal timing optimization and coordination	\$30,000
George Freeman Trail	Twinning (Park Lane Dr - Centennial Dr)	\$12,000,000
Wildflower Road	New, 4 lanes Arterial with pathways and streetlights (both sides) - Highway 1 to 300m north of Highway 1	\$5,300,000
Wildflower Road	New, 2 lanes Arterial with pathways and streetlights (300m north of Highway 1 to Wildflower Road)	\$12,000,000
Wildflower Road / Wildrose Drive	Signalization with NB and SB left turn bays	\$880,000
Highway 1 & Wildflower Road	Add an additional EBL turn bay	\$210,000
Highway 1 & George Freeman Trail	Extend EBL turn bay	\$62,000
Highway 1 & Edgefield Access	Signalization	\$780,000
Park Lane Drive & Thomas Drive	Convert to all-way stop	\$6,000
Total (Rounded)		\$31,000,000



AM Peak Hour Congestion Future

Link bars

Volume capacity ratio PrT (AP)

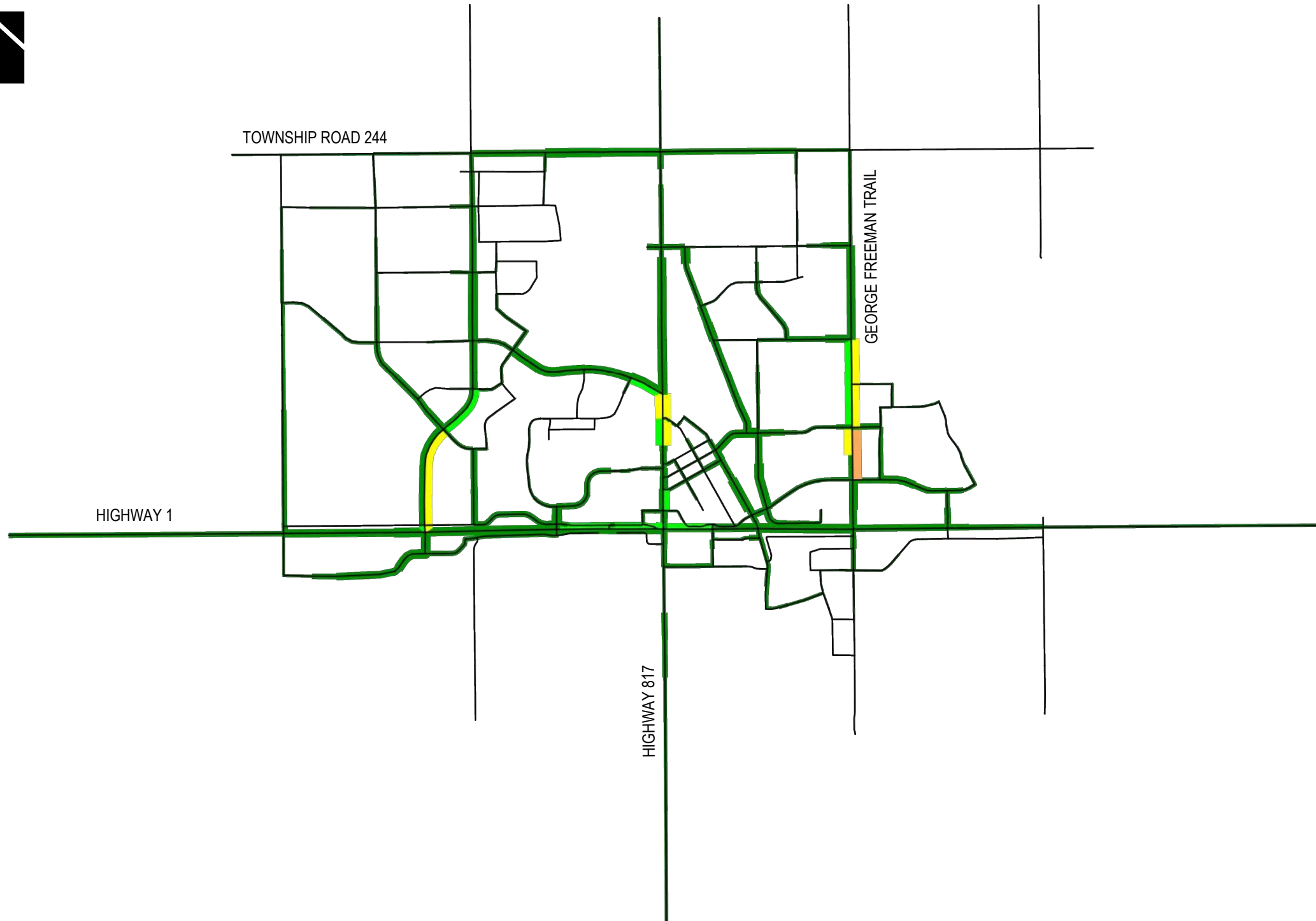


STRATHMORE TMP UPDATE

FUTURE AM
V/C RATIO

EXHIBIT 4.1
SEPTEMBER 2025





PM Peak Hour Congestion Future

Link bars

Volume capacity ratio PrT (AP)

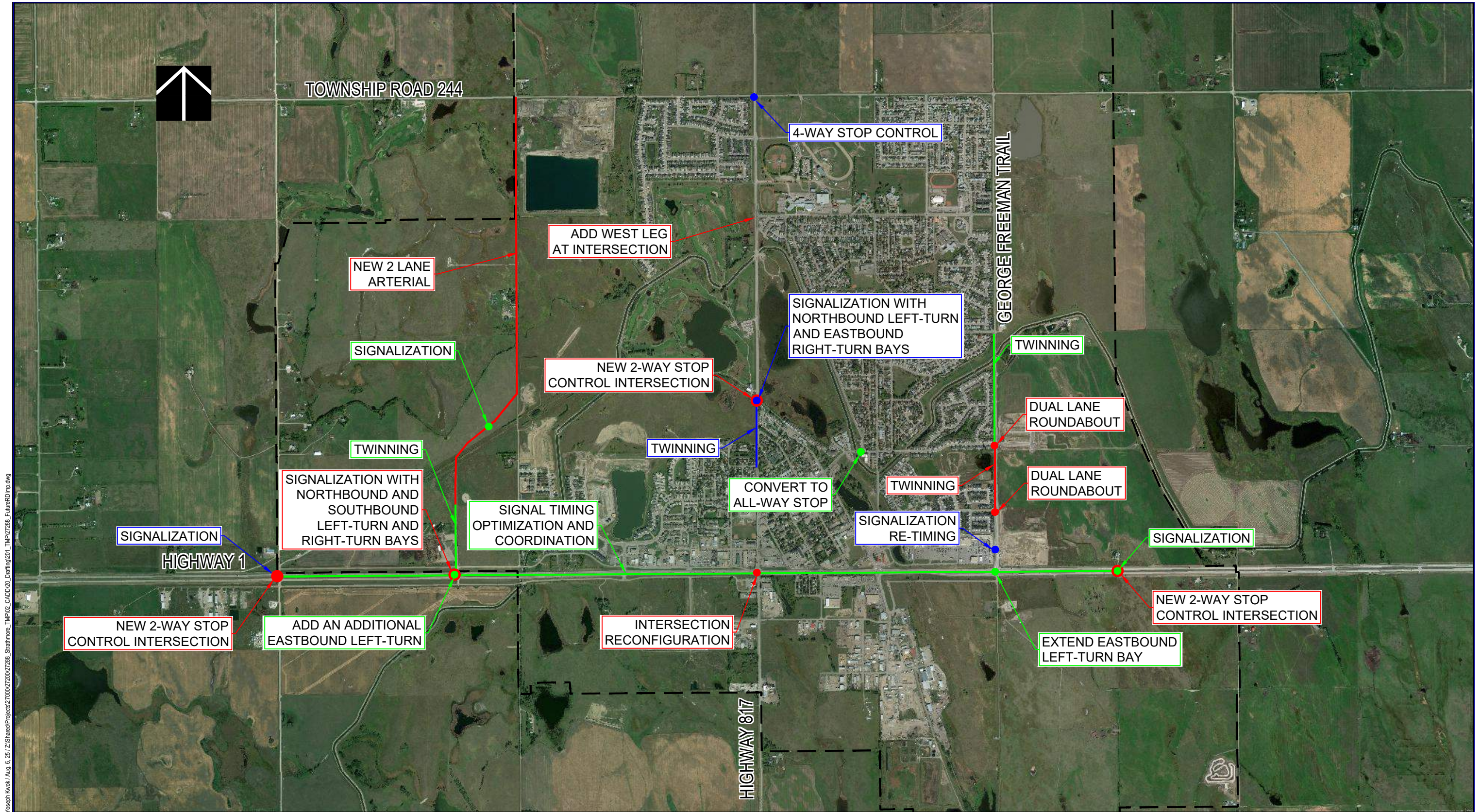


STRATHMORE TMP UPDATE

FUTURE PM
V/C RATIO

EXHIBIT 4.2
SEPTEMBER 2025





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Legend:

- 2029
- 2039
- 2049
- TOWN BOUNDARY



STRATHMORE TMP UPDATE

FUTURE ROAD IMPROVEMENT

EXHIBIT 4.3
SEPTEMBER 2025

5.0 Roadway Classifications and Typical Cross Sections

The existing roadway cross sections from the *Town of Strathmore Design Standards & Procedures for Development & Subdivision Infrastructure Policy (Strathmore Design Standards)* were reviewed and used as the basis for the proposed road cross sections.

5.1 Existing Classifications and Cross Sections

The existing road classifications, pavement widths and Right-Of-Way (ROW) widths per the *Strathmore Design Standards* are shown in Table 5.1.

Table 5.1: Strathmore Existing Roadway Cross Section

Existing Classification	ROW / Pavement Width
Residential Local, Sidewalk One Side	15.0 m / 10.0 m
Residential Local, Sidewalk Two Sides	15.5 m / 10.0 m
Industrial Local, 2 Lanes No Parking	17.0 m / 10.5 m
Major Collector, Undivided & Parking	22.0 m / 12.0 m
Primary Collector, Divided & No Parking	22.0 m / 13.0 m
Industrial Collector, 4 Lanes No Parking	22.0 m / 14.0 m
Major Arterial, 4 Lane No Parking	30.0 m / 14.0 m
Primary Arterial, Divided 4 Lanes	36.0 m / 15.0 m

5.2 Future Classifications and Typical Cross Sections

The review of the existing roadway classifications and cross sections found some inconsistency, especially regarding collector and primary collector streets. Therefore, this TMP proposed updated roadway cross sections (Table 5.2), which referenced the *2014 City of Calgary Complete Streets Guide*, which are widely referenced in the Calgary region. The typical road cross section drawings are shown in Exhibits 5.1. It is noted that road cross sections may vary from the typical road cross sections based on local context through the local development approval process; these can be verified during the Outline Planning process.

The following key principles were followed for the recommended cross sections:

- Maintain the same ROWs where practical for compatibility with existing road ROWs;
- Simplify road classification naming and match road ROW with road classification (wider road ROW for higher classification roads);
- Identify key arterial routes and protect the road ROW for future expansion and growth;
- For lower classification roadways (local and collector streets), differentiate residential and industrial roads as vehicle characteristics and road user needs are different;
- Promote walkability by removing the “local residential road with sidewalk on one side only” standard and providing pedestrian routes (sidewalks/pathways) on both sides of all roadways; and
- Include the active modes in the road ROW using multi-use pathways as the Town moves towards a multi-modal transportation network.

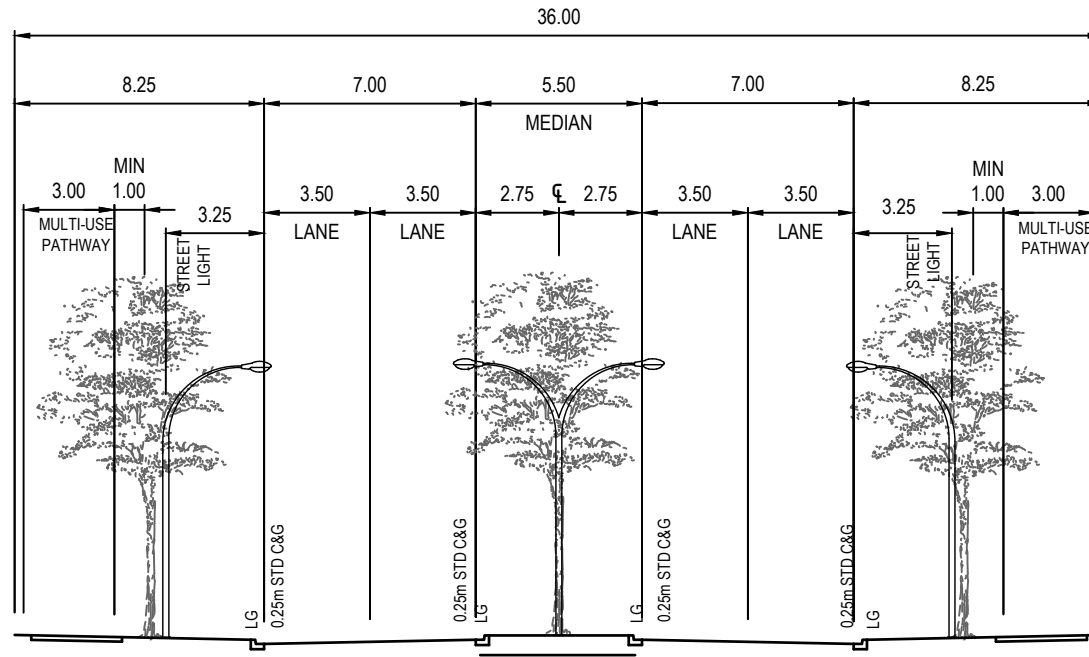
Table 5.2: Strathmore Proposed Roadway Cross Sections

Proposed Classification	ROW / Pavement Width
Residential Local, Sidewalk Two Sides	15.5 m / 9.0 m
Industrial Local, 2 Lanes No Parking	17.0 m / 9.0 m
Residential Collector, Undivided & Parking	22.0 m / 11.2 m
Industrial Collector, 2 Lanes Parking One Side	22.0 m / 12.0 m
Primary Collector, 4 Lanes No Parking	30.0 m / 14.0 m
Primary Collector, 2 Lanes Parking	30.0 m / 11.2 m
Arterial, Divided 4 Lanes	36.0 m / 14.0 m

The future road classification recommendations are summarized below and shown in Exhibit 5.2:

- **Highway:**
 - Highway 1: Highway 1 runs through the Town and is currently under the jurisdiction of ATEC. It is classified as a highway as it provides higher capacity with limited access;
- **Arterial:**
 - Highway 817: Highway 817 runs through the Town and is currently under the jurisdiction of ATEC. It is classified as an arterial due to its role in connecting the primary collector networks of surrounding development, and in providing access to some adjacent land uses. Consistent with other minor highways in comparable municipalities, it may be optimal in the coming decades for the Town to assume responsibility for the segment of Highway 817 within its boundaries, so that it has full decision-making authority for its development. Comparable regional examples include the transfer of Highway 2A to the jurisdiction of the Town of High River and Town of Okotoks;
 - Northern portion of the Ring Road: The Ring Road includes George Freeman Trail, Township Road 244, and Wildflower Road. They are part of the major road network that favors movement over access; ideally, access should be limited to defined intersection locations for the collector street network or major commercial access points (as opposed to individual site driveways);
- **Primary Collector:** Primary Collectors balance the needs of movement and access, and provide road network connectivity to arterial roads as entrance roads to major commercial and residential developments;
- **Collector:** Collector roads are a lower road class and primarily provide access to adjacent land uses while connecting to higher class roads, and they form the primary road network within neighborhoods;
 - **Service Road:** The service roads along Highway 1 function as collector roads and provide access to lands along the highways. ATEC recommends closure and realignment of service roads as redevelopment progresses due to the intersection spacing challenges between a service road and a highway, and this is also consistent with the traffic operation recommendations of this TMP;
- **Local:** Local roads are the lowest road class and primarily provides access to adjacent land uses. It is noted that local roads are not shown in the road classification map.

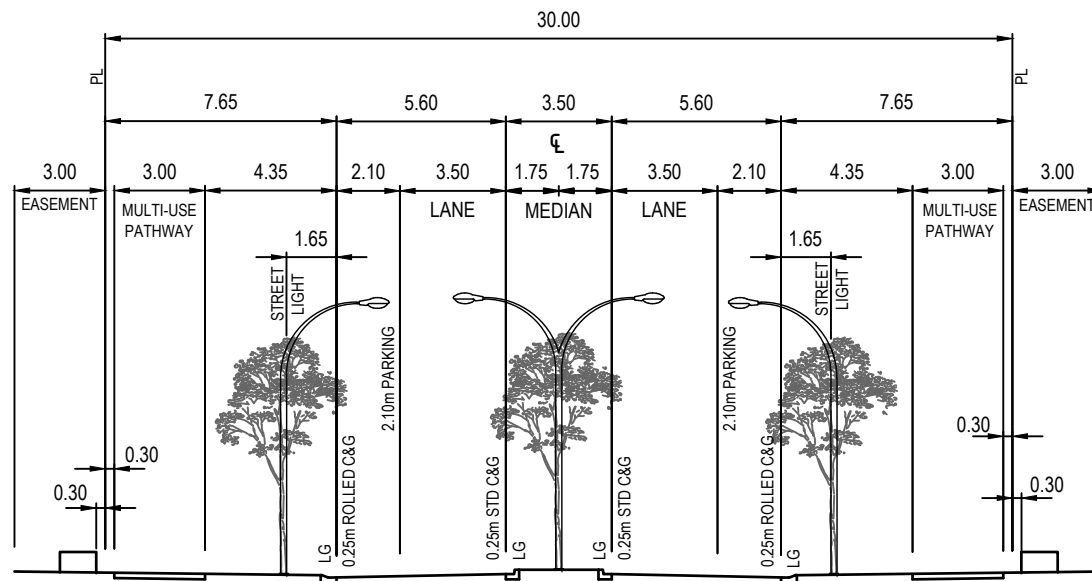
To accommodate the projected future growth of Strathmore, George Freeman Trail and Township Road 244 are proposed to be fully upgraded to arterial roads and the future Wildflower Road is proposed to connect Highway 1 and Township Road 244. A single-line alignment and ROW of the northern half of the ring road is shown in Exhibit 5.3.



Note :

1. WHERE DUAL LEFT-TURN LANES ARE REQUIRED, ADDITIONAL RIGHT-OF-WAY OF 9.0M IS REQUIRED IF THE RAISED MEDIAN IS PLACED BETWEEN OPPOSING TRAVEL DIRECTIONS; IF THE RAISED MEDIANS ARE PLACED ALSO BETWEEN THE LEFT-TURN AND THROUGH LANES, THEN AN ADDITIONAL RIGHT-OF-WAY OF 1.5M IS NEEDED.

2. EXISTING ARTERIAL ROADS MAY BE UNDIVIDED BY ELIMINATING 5.5m MEDIAN



EXISTING PRIMARY COLLECTOR MAY BE UNDIVIDED BY ELIMINATING 3.5m MEDIAN

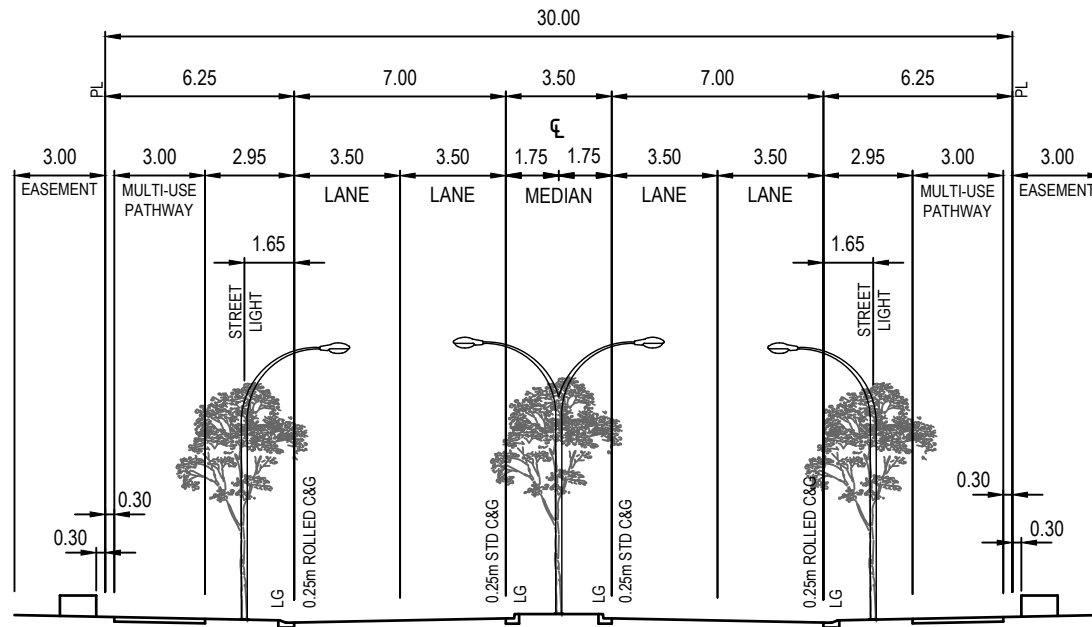


PRELIMINARY
FOR DISCUSSION ONLY
SUBJECT TO REVISION

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TYPICAL CROSS SECTION
PRIMARY COLLECTOR - 2 LANES

EXHIBIT 5.1.2
SEPTEMBER 2025



EXISTING PRIMARY COLLECTOR MAY BE UNDIVIDED BY ELIMINATING 3.5m MEDIAN



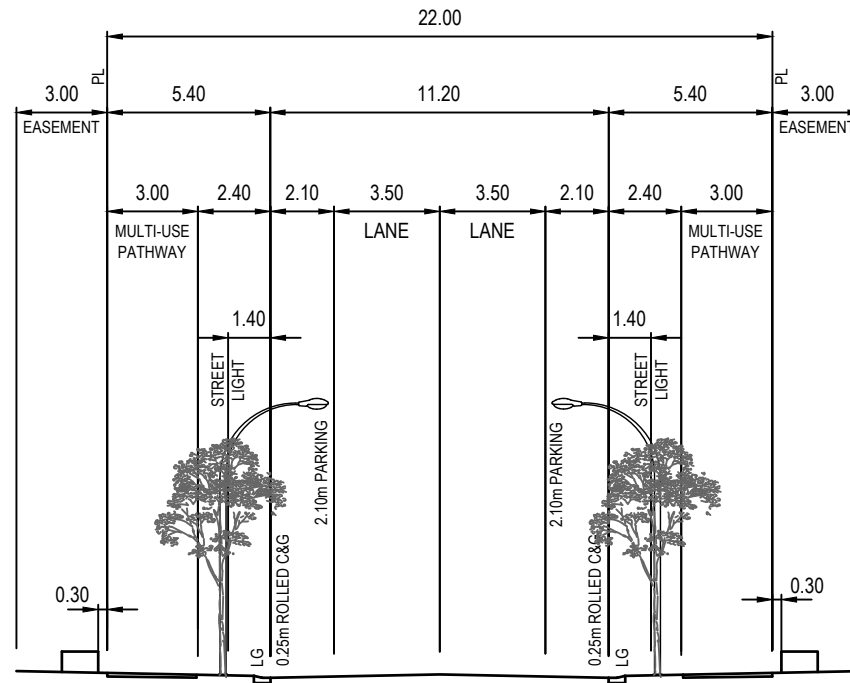
PRELIMINARY
FOR DISCUSSION ONLY
SUBJECT TO REVISION

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TYPICAL CROSS SECTION
PRIMARY COLLECTOR - 4 LANES

EXHIBIT 5.1.3
SEPTEMBER 2025

Services - Sep 3, 2022 StrathmoreProject:07000270002700027000 Strathmore TMP02 CAD000 Drawing:01 TMP02288 Final Typo Corrections



PRELIMINARY
FOR DISCUSSION ONLY
SUBJECT TO REVISION

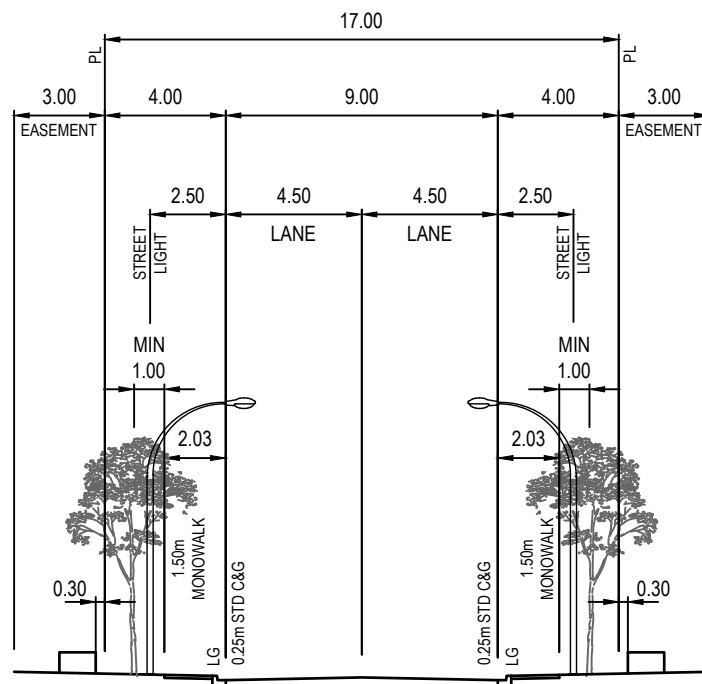
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TYPICAL CROSS SECTION
COLLECTOR STREET

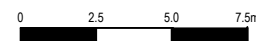
EXHIBIT 5.1.4
SEPTEMBER 2025



PRELIMINARY
FOR DISCUSSION ONLY
SUBJECT TO REVISION



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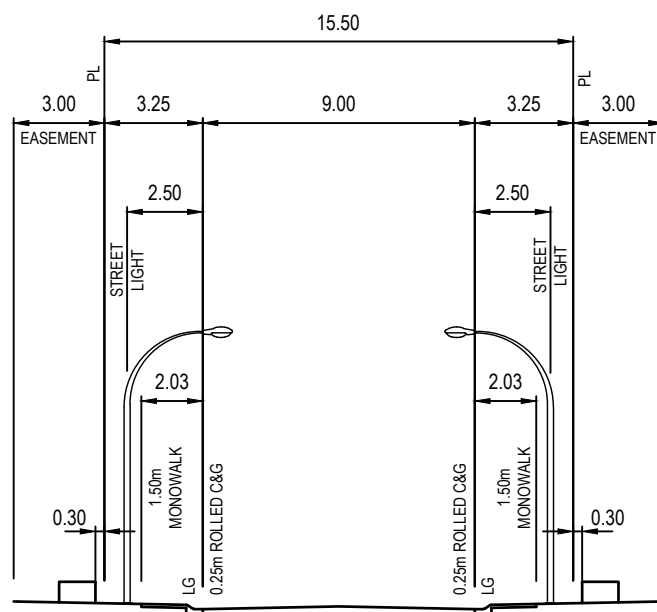
STRATHMORE TMP UPDATE

**TYPICAL CROSS SECTION
INDUSTRIAL STREET**

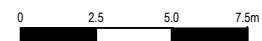
EXHIBIT 5.1.6
SEPTEMBER 2025



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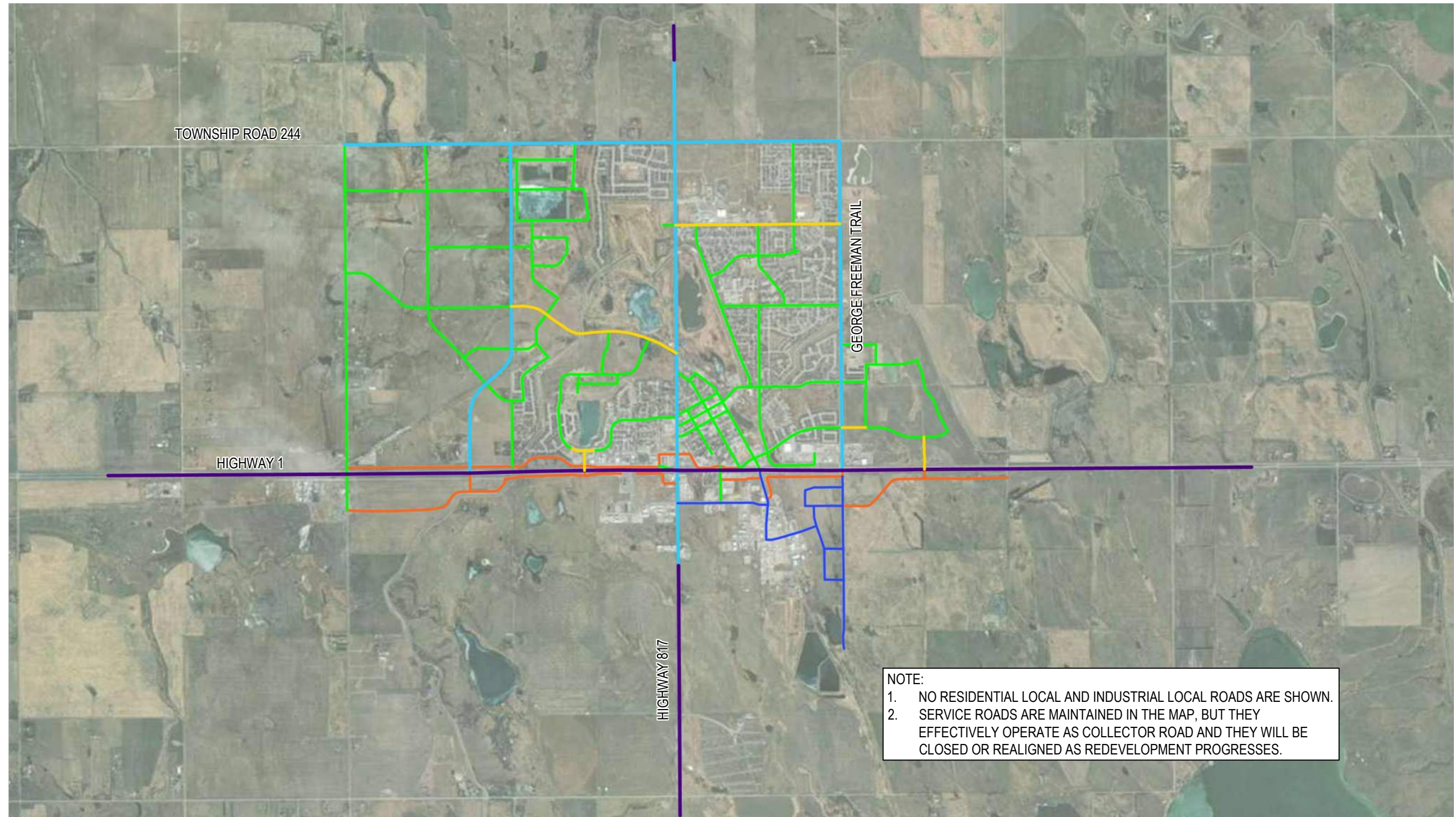


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STRATHMORE TMP
TYPICAL CROSS SECTION
RESIDENTIAL STREET

EXHIBIT 5.1.7
SEPTEMBER 2025



NOTE:
1. NO RESIDENTIAL LOCAL AND INDUSTRIAL LOCAL ROADS ARE SHOWN.
2. SERVICE ROADS ARE MAINTAINED IN THE MAP, BUT THEY EFFECTIVELY OPERATE AS COLLECTOR ROAD AND THEY WILL BE CLOSED OR REALIGNED AS REDEVELOPMENT PROGRESSES.

Road Classification

- Highway
- Arterial
- Primary Collector
- Collector
- Industrial Collector
- Service Road



STRATHMORE TMP UPDATE

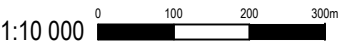
PROPOSED
ROAD CLASS

EXHIBIT 5.2
SEPTEMBER 2025

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STRATHMORE TMP UPDATE

RING ROAD ALIGNMENT
WEST SECTION

EXHIBIT 5.2.1
SEPTEMBER 2025



PRELIMINARY
FOR DISCUSSION ONLY
SUBJECT TO REVISION

Note:
ALIGNMENT IS TO BE COORDINATED WITH ADJACENT DEVELOPERS,
WHERE APPROPRIATE.

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STRATHMORE TMP UPDATE

RING ROAD ALIGNMENT
NORTH SECTION

EXHIBIT 5.2.2
SEPTEMBER 2025



PRELIMINARY
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Note:
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WHERE APPROPRIATE.

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GEORGE FREEMAN TRAIL

TOWNSHIP ROAD 244

HIGHWAY 1

Legend:

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STRATHMORE TMP UPDATE

RING ROAD ALIGNMENT
EAST SECTION

EXHIBIT 5.2.3
SEPTEMBER 2025



PRELIMINARY
FOR DISCUSSION ONLY
SUBJECT TO REVISION

Note:
ALIGNMENT IS TO BE COORDINATED WITH ADJACENT DEVELOPERS,
WHERE APPROPRIATE.

6.0 Closing

The Town of Strathmore Transportation Master Plan Update provides a framework for Council and Administration to assess the capability of the road network to accommodate new development in the short and long term, and to carry out short- and long-term planning and budgeting.

This study proposes various road improvement recommendations totaling approximately \$78 Million for the next 25 years. It is recommended that the Town undertake a Parks, Open Space, Trail, and / or Active Transportation Master Plan to develop a comprehensive trail network with an implementation strategy. It is expected that the Town will update its Off-Site Levy Bylaw to reflect the proposed transportation improvement projects. Additionally, the Town may need to update its Design Standards & Procedures for Development & Subdivision Infrastructure Policy to reflect the proposed typical road cross sections, if adopted.

Finally, it is recommended that the Transportation Master Plan be updated every five to ten years to reflect the land use changes and/or policy directions, preferably in concurrence with the Municipal Development Plan to ensure integrated land use and transportation planning. Timing for the updates can be based on the pace of development and growth, with more frequent updates warranted if growth accelerates.



APPENDIX
Existing Population and Employment

A

Existing Population and Employment

Zone ID	Population	Residential			Employment				
		Total	Single Family	Multi Family	Total	Retail	Non-Retail	School	Industrial
20	76	30	30	0	0	0	0	0	0
21	1,573	618	544	74	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0
23	0	0	0	0	16	0	16	0	0
30	0	0	0	0	147	0	72	75	0
31	1,137	447	357	90	195	41	38	25	90
40	689	271	201	70	111	0	111	0	0
50	1,173	466	325	141	62	17	20	25	0
60	842	331	280	51	5	0	5	0	0
70	1,107	511	284	227	29	0	29	0	0
80	0	0	0	0	0	0	0	0	0
81	592	250	180	70	0	0	0	0	0
90	1,026	403	355	48	0	0	0	0	0
100	387	152	152	0	0	0	0	0	0
101	632	272	146	126	14	14	0	0	0
102	0	0	0	0	0	0	0	0	0
110	1,209	543	343	200	24	0	0	24	0
111	0	0	0	0	182	100	60	0	22
120	653	296	171	125	121	87	34	0	0
121	428	214	208	6	82	62	19	0	0
122	28	11	0	11	156	83	48	25	0
123	36	14	14	0	39	10	11	0	18
124	0	0	0	0	220	179	23	0	18
125	0	0	0	0	338	0	13	0	325
126	0	0	0	0	0	0	0	0	0
127	0	0	0	0	72	0	0	0	72
130	1,221	480	251	229	0	0	0	0	0
131	0	0	0	0	259	228	31	0	0
132	0	0	0	0	90	0	0	0	90
141	0	0	0	0	0	0	0	0	0
142	0	0	0	0	0	0	0	0	0

Zone ID	Population	Residential			Employment				
		Total	Single Family	Multi Family	Total	Retail	Non-Retail	School	Industrial
151	0	0	0	0	0	0	0	0	0
152	0	0	0	0	0	0	0	0	0
153	0	0	0	0	0	0	0	0	0
154	5	2	2	0	0	0	0	0	0
155	0	0	0	0	11	0	11	0	0
156	0	0	0	0	0	0	0	0	0
157	494	194	194	0	0	0	0	0	0
158	214	84	84	0	21	0	0	21	0
159	0	0	0	0	189	189	0	0	0
160	0	0	0	0	0	0	0	0	0
161	0	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0
163	0	0	0	0	4	0	4	0	0
164	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0
171	0	0	0	0	321	24	25	0	271
180	0	0	0	0	0	0	0	0	0
181	0	0	0	0	0	0	0	0	0
182	3	1	1	0	0	0	0	0	0
183	0	0	0	0	0	0	0	0	0
184	3	1	1	0	4	0	4	0	0
185	0	0	0	0	0	0	0	0	0
186	0	0	0	0	36	0	0	0	36
187	0	0	0	0	18	0	0	0	18
188	0	0	0	0	0	0	0	0	0
189	0	0	0	0	16	0	16	0	0
190	0	0	0	0	0	0	0	0	0
201	0	0	0	0	0	0	0	0	0
202	0	0	0	0	0	0	0	0	0
203	0	0	0	0	0	0	0	0	0
204	0	0	0	0	18	0	0	0	18
205	0	0	0	0	0	0	0	0	0
206	0	0	0	0	0	0	0	0	0
Total	13,528	5,591	4,123	1,468	2,800	1,036	590	194	980



APPENDIX

Future Population and Employment

B

Future Population and Employment (2049)

Zone ID	Population	Residential			Employment				
		Total	Single Family	Multi Family	Total	Retail	Non-Retail	School	Industrial
20	1,457	579	414	165	0	0	0	0	0
21	1,573	618	544	74	0	0	0	0	0
22	2,083	769	524	244	73	48	0	25	0
23	438	267	35	232	95	80	16	0	0
30	0	0	0	0	201	0	76	125	0
31	1,137	447	357	90	229	44	40	50	95
40	742	314	201	113	124	0	124	0	0
50	1,173	466	325	141	64	18	21	25	0
60	842	331	280	51	6	0	6	0	0
70	1,107	511	284	227	30	0	30	0	0
80	0	0	0	0	0	0	0	0	0
81	592	250	180	70	0	0	0	0	0
90	1,026	403	355	48	0	0	0	0	0
100	1,074	301	296	5	0	0	0	0	0
101	805	338	212	126	14	14	0	0	0
102	1,594	531	505	27	0	0	0	0	0
110	1,209	543	343	200	24	0	0	24	0
111	0	0	0	0	191	106	63	0	23
120	653	296	171	125	128	92	36	0	0
121	481	257	208	49	99	65	34	0	0
122	28	11	0	11	188	87	51	50	0
123	36	14	14	0	41	11	11	0	19
124	0	0	0	0	232	189	24	0	19
125	0	0	0	0	356	0	13	0	343
126	0	0	0	0	13	0	0	0	13
127	0	0	0	0	76	0	0	0	76
130	1,221	480	251	229	0	0	0	0	0
131	0	0	0	0	272	240	32	0	0
132	0	0	0	0	224	80	5	25	114
141	0	0	0	0	0	0	0	0	0
142	0	0	0	0	0	0	0	0	0

Zone ID	Population	Residential			Employment				
		Total	Single Family	Multi Family	Total	Retail	Non-Retail	School	Industrial
151	0	0	0	0	0	0	0	0	0
152	0	0	0	0	0	0	0	0	0
153	0	0	0	0	0	0	0	0	0
154	5	2	2	0	0	0	0	0	0
155	0	0	0	0	11	0	11	0	0
156	452	167	167	0	0	0	0	0	0
157	494	194	194	0	0	0	0	0	0
158	2,418	930	757	174	41	0	0	41	0
159	0	0	0	0	552	552	0	0	0
160	0	0	0	0	43	27	0	0	16
161	0	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0
163	0	0	0	0	4	0	4	0	0
164	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0
171	0	0	0	0	427	24	25	0	377
180	1,000	400	340	60	3	3	0	0	0
181	1,000	400	340	60	3	3	0	0	0
182	422	169	143	25	3	3	0	0	0
183	500	200	170	30	3	3	0	0	0
184	3	1	1	0	4	0	4	0	0
185	394	158	134	24	28	3	0	25	0
186	0	0	0	0	38	0	0	0	38
187	0	0	0	0	19	0	0	0	19
188	1,000	400	340	60	27	27	0	0	0
189	1,000	400	340	60	68	27	16	25	0
190	0	0	0	0	425	266	133	0	27
201	0	0	0	0	1	0	1	0	0
202	0	0	0	0	0	0	0	0	0
203	0	0	0	0	0	0	0	0	0
204	0	0	0	0	19	0	0	0	19
205	0	0	0	0	0	0	0	0	0
206	0	0	0	0	0	0	0	0	0
Total	27,958	11,146	8,428	2,718	4,399	2,008	778	414	1,199



APPENDIX

Existing Model Calibration Plots

C

