

TOWN OF PARKER ROADWAY SYSTEM EVALUATION

Prepared for:

Town of Parker
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GLOSSARY OF TERMS

ADT	–	Average Daily Traffic
CIP	–	Capital Improvement Program
DRCOG	–	Denver Regional Council of Governments
NCHRP	–	National Cooperative Highway Research Program
TAZ	–	Traffic Analysis Zone
VPD	–	Vehicles per Day

I. INTRODUCTION

This report describes traffic forecasting completed in support of the Town of Parker's 2035 Master Plan and Roadway Capital Improvement Program (CIP). The goals for the study were to develop future volumes on the transportation network throughout the study area, to evaluate the impact of various road network improvements on the transportation system, and to provide information to the Town to aid in decisions regarding the phasing of improvement projects.

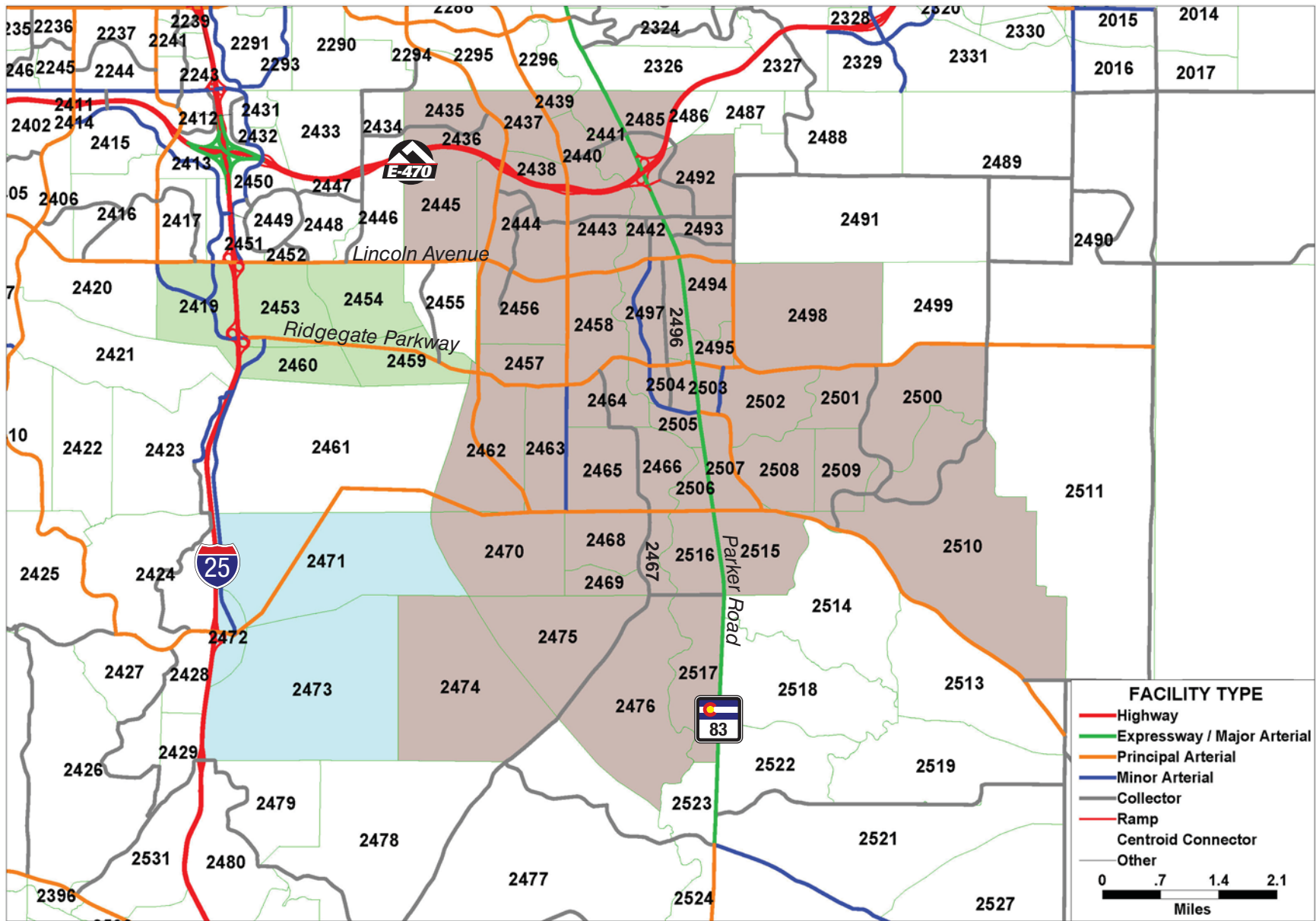
II. MODELING PROCESS AND BACKGROUND

The traffic forecasting completed for this project was based on the latest version of the Denver Regional Council of Governments (DRCOG) travel demand model. DRCOG is currently in a period of transition with regard to travel demand modeling as the agency moves from a traditional four-step model to an activity-based model. To date, the full transition process is incomplete, as the new activity-based model is not available for consultant use. DRCOG staff has accommodated this and similar projects with updated model files compatible with the four-step model, but including additional detail incorporated from the model transition process. These improvements focus on the land use, road network, and transit network inputs from the latest fiscally constrained travel demand model. This study used the latest travel demand model files available to perform the modeling process, Compass 4.0 (Cycle 2, 2012).

At the start of the project, Town of Parker staff indicated a desire to use short term (2020) and long term (2035) planning horizons to evaluate the transportation system. DRCOG has not developed a 2020 model for the latest travel demand model so, in order to accomplish this goal, the 2025 DRCOG travel demand model was used to simulate the 2020 planning horizon. Due to the location of Parker and the associated travel patterns, much of the traffic using the road network is originating or destined for local destinations in the study area. In order to provide reasonable forecasts, the 2025 land use in the study area was replaced with 2020 land use forecasts developed by the Town and vehicular volumes on SH 83 were adjusted to 2020 traffic levels. This process resulted in a reasonable approximation of 2020 traffic forecasts within the study area. The 2035 DRCOG travel demand model was used, with land use adjustments within the study area developed by the Town.

III. LAND USE

Travel demand modeling provides vehicular volumes by using land use to generate trip origins and destinations within the model area, and assigns trips to the transportation system. In this process, land use inputs are a critical component to the accuracy of the model in predicting future volumes. DRCOG land use modelers are responsible for establishing and maintaining region-wide land use within the model area, and perform this assignment using the best information available at the time of development. For the Parker study, land use development plans were reviewed for the study area to ensure current land use planning expectations are incorporated into the models. For this study, three areas were examined for land use change due to their relevance to the planning area: the Town of Parker growth area, RidgeGate development located south of Lincoln Avenue around the I-25 interchange, and The Canyons located east of I-25 at the Hess Road interchange. **Figure 1** shows the development areas under consideration.



ZONES

- Parker Growth Area
- RidgeGate
- The Canyons
- XXXX TAZ Numbers

Figure 1
Land Use Study Area

NORTH



A. Parker Growth Area

Town of Parker staff adjusted the land use in traffic analysis zones (TAZ) located within this area. The analysis included initial review of the 2010 base travel demand model land use assumptions in comparison to the 2010 Census. This process was necessary because the development of the 2010 DRCOG model occurred by interpolating land use between the original 2005 calibrated model and the 2035 forecast model. Because of the timing of the model development, DRCOG has not revised the 2010 land use to reflect results from the 2010 Census. Updating the 2010 land use ensured that the foundation for the growth forecasts reflects development existing during that time period and led directly into land use forecast development for the 2020 and 2035 periods.

The households and employment growth projections used in developing this model are based on projections in the Parker 2035 Master Plan. The Town's population and employment projections differ from DRCOG's projections that were developed in 2009. The Town's population growth projections for 2035 are 32% lower than DRCOG's population growth projections and the Town's employment projections for 2035 are 34% higher than DRCOG's employment projections.

The 2010 employment was assigned to TAZs based on the following general assumptions:

- One employee per 375 square foot aggregate commercial area from the Assessor records
- Employee densities in industrial areas were decreased
- Employees were added for exempt uses such as churches and schools
- Assumed 3.5 employees per 100 households for home based businesses

New households were distributed to TAZs for the 2020 projections based on the Town's Quarterly Residential Summary capacities and were distributed to platted lots first and then by zoning capacity. New households were distributed to Traffic Analysis Zones for the 2035 projections based on existing zoning capacity and focused on sites that were either infill or contiguous to existing developed areas. **Table 1** shows the historic and projected population within the Town as developed for the 2035 Master Plan. For reference, build out of the Town of Parker is anticipated to include a population between 80,000 and 100,000.

Table 1. Town of Parker Population History and Projections

Year	Population	Housing Units	People per Household*	Population Annual Growth %
1981	281	No Data	No Data	
1990	5,450	2,095	2.75	33%
2000	23,558	8,352	2.96	15%
2010	45,297	16,533	2.84	7%
2015	47,814	17,483	2.84	1%
2020	50,354	18,858	2.77	1%
2025	53,484	20,108	2.76	1%
2030	54,962	20,983	2.72	1%
2035	56,962	21,733	2.72	1%

* People per Household calculations assume a 5.2% Vacancy Rate in 1990, 5% Vacancy Rate in 2000, and 3.7% Vacancy Rate in 2010 and later

New employees were distributed to the TAZs for 2020 and 2035 projections using existing zoning with a focus on infill and continuity. Future commercial space was generally divided into 50% retail and 50% service. **Figure 2** shows the employment forecasts within the Town as developed for the 2035 Master Plan.

Figure 2. Town of Parker Employment Forecasts

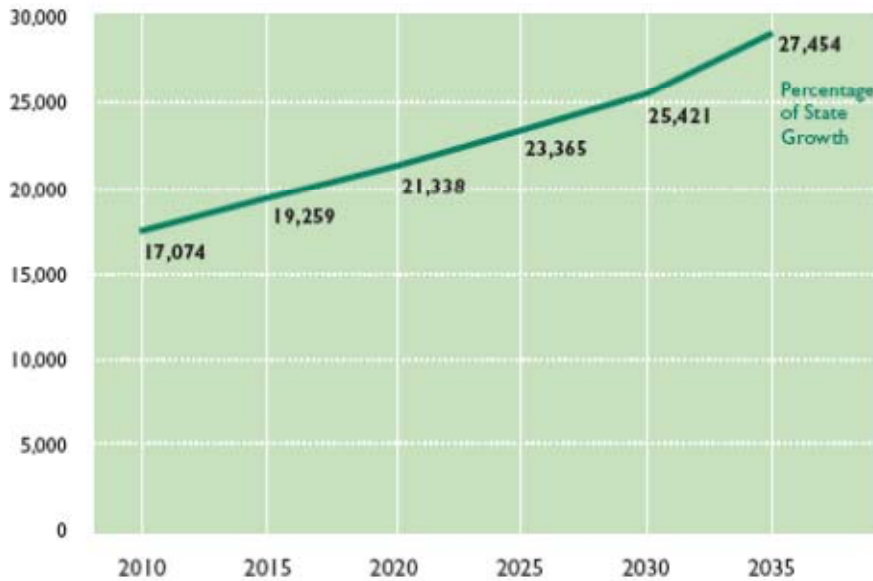


Table 2 provides the households and employment included in the 2010, 2020, and 2035 travel demand modeling for the Parker growth area. The Town’s urban growth boundary and TAZ boundaries do not align. The TAZs listed in **Table 2** include all TAZs that cover a portion of the Town’s urban growth boundary. **Figure 1** provides the location of all TAZs.

Table 2. Parker Growth Area Land Use

TAZ*	2010		2020		2035	
	HH	EMP	HH	EMP	HH	EMP
2435 (Compark)	0	1,536	0	1,928	0	2,424
2436 (Compark)	0	968	0	1,269	0	1,669
2437 (Compark)	913	32	1,022	36	1,022	36
2438 (Cottonwood Highlands)	0	221	0	261	438	661
2439 (Cottonwood)	275	10	275	10	275	10
2440 (Cottonwood)	993	10	993	10	993	160
2441 (Cottonwood)	362	475	362	790	362	840
2442 (Pine Ln & 20-Mile Rd)	1	822	1	992	1	1,792
2443 (Challenger Park)	1,178	360	1,178	400	1,178	450
2444 (Stonegate)	1,646	403	1,646	513	1,646	613
2445 (Grandview Estates)	201	10	201	10	201	185
2456 (Stonegate)	1,352	245	1,352	255	1,352	266
2457 (Bradbury Ranch)	534	19	534	19	688	419
2458 (Clarke Farms)	1,560	196	1,560	206	1,560	206
2462 (Newlin Meadows)	531	160	867	182	985	232
2463 (Bradbury Ranch)	1,149	115	1,149	115	1,149	315
2464 (Olde Town)	323	25	569	120	569	170
2465 (Horseshoe Ridge)	112	15	405	235	534	335
2466 (Salisbury Park)	7	105	7	105	7	205
2467 (Stroh Ranch)	302	15	302	15	302	115
2468 (Anthology)	225	60	343	64	578	364
2469 (Anthology)	47	5	47	5	152	9
2470 (Anthology)	0	0	0	0	198	400
2474 (Anthology)	0	0	0	0	0	0
2475 (Anthology)	3	0	3	0	204	7
2476 (Anthology)	15	11	15	11	15	11
2485 (Crown Point)	25	344	319	782	795	1,375
2492 (Crown Point)	682	2,019	682	2,329	682	2,629
2493 (Pine Ln & Parker Rd)	15	341	15	381	15	401
2494 (Parkglenn)	364	408	364	597	364	647
2495 (Old Town)	568	392	568	557	568	632
2496 (Parker Rd & Plaza Dr)	314	2,666	314	2,941	314	3,191

Town of Parker Roadway System Evaluation

TAZ*	2010		2020		2035	
	HH	EMP	HH	EMP	HH	EMP
2497 (Dransfeldt/Plaza West)	404	2,790	404	3,112	404	3,112
2498 (Pine Curve)	759	10	759	10	759	10
2500 (Canterberry)	681	78	681	78	681	78
2501 (Canterberry)	818	29	818	29	818	29
2502 (Rowley Downs)	931	150	931	170	931	270
2503 (Old Town)	459	571	459	621	585	718
2504 (Walmart/Target)	1	2,651	289	2,753	577	2,788
2505 (Flatacres Market)	0	615	0	665	0	665
2506 (Country Meadows)	197	68	197	118	197	118
2507 (Pine Bluffs)	180	441	435	591	531	594
2508 (Hidden River)	941	33	941	33	941	33
2509 (Idyllwilde)	110	10	494	24	592	31
2510 (Idyllwilde)	702	300	702	325	702	325
2515 (Colorado Golf Club)	107	94	107	284	107	377
2516 (Stroh Ranch)	1,435	577	1,512	643	1,512	643
2517 (Reata West)	1	80	1	155	1	305
TOTAL	21,423	20,485	23,823	24,749	26,485	30,865

* Named locations are for general location purposes only and do not reflect all places within a given zone

B. RidgeGate Development

The RidgeGate Development can effectively be divided into separate areas east and west of Interstate 25. The western area has already seen significant development while development on the eastern side has yet to occur.

- **RidgeGate West** – FHU has provided traffic impact study assistance towards the development of these parcels and is familiar with future development plans. **Table 3** provides the land use included in the base DRCOG model which is consistent with current development plans.

Table 3. RidgeGate West Development Land Use

Year	Area	Households	Employment
2020	TAZ 2419	960	5,857
	TOTAL	960	5,857
2035	TAZ 2419	1,329	8,287
	TOTAL	1,329	8,287

- **RidgeGate East** – FHU contacted the RidgeGate developer and confirmed current plans are consistent with those defined in the report, *Rampart Range Traffic Impact Analysis*, LSC Transportation Consultants, 2000. Indications from the developer are that the development of this area is contingent upon the extension of the nearby RTD light rail line east across I-25, planned to terminate within this development area. Plans for this area represent dense development with build out levels most similar to existing development in the Denver Tech Center (area bounded by I-25, DTC Parkway, Belleview Avenue, and I-225). While development of this type is ambitious, the study team has agreed that at full build out there is no reason to suggest that development cannot reach these levels. In order to incorporate these significant development plans without overwhelming the analysis with external development, the study team has agreed that for this area, 5% of build out development will be included in the 2020 model run and the land use in the base 2035 DRCOG model (which equals roughly 50% of the build out) be used in the 2035 model run.

Table 4 provides the land use included in the travel demand modeling process.

Table 4. RidgeGate East Development Land Use

Year	Area	Households	Employment
2020	TAZ 2453	123	2,511
	TAZ 2454	97	41
	TAZ 2459	165	13
	TAZ 2460	45	147
	TOTAL	430	2,712
2035	TAZ 2453	1,135	21,728
	TAZ 2454	891	351
	TAZ 2459	1,527	110
	TAZ 2460	420	1,274
	TOTAL	3,973	23,463
Build Out	TOTAL	8,607	54,231

C. The Canyons

FHU contacted the Planning Director for Castle Pines and confirmed that development plans described in the report, *The Canyons Master Transportation Study*, Fehr & Peers, 2009, are the most current details about the future development of The Canyons. The study team has agreed that for this area 25% of build out households and 10% of build out employment will be included in the 2020 model run and 50% of build out households and employment will be included in the 2035 model run. These development levels were selected to ensure the impact of future development in this area will be accounted for in the Hess Road forecasts. **Table 5** provides the land use included in the travel demand modeling process.

Table 5. The Canyons Land Use

Year	Area	Households	Employment
2020	TAZ 2471	312	53
	TAZ 2472	0	430
	TAZ 2473	313	53
	TOTAL	625	536
2035	TAZ 2471	625	268
	TAZ 2472	0	2,147
	TAZ 2473	625	268
	TOTAL	1,250	2,683
Build Out	TOTAL	2,500	5,367

IV. TRAFFIC FORECASTS

The goals for the study were to evaluate future volumes on the transportation network throughout the study area, to evaluate the impact of various road network improvements on the transportation system, and to provide information to the Town to aid in decisions regarding the phasing of transportation improvement projects. To accomplish these goals, base versions of the 2020 and 2035 road network were developed to serve as the starting point for the alternatives analyses. **Figure 3** shows the road network laneage assumptions from the Existing, Base 2020, and Base 2035 road networks. Using these models, several improvement projects were tested to evaluate the impact on the transportation network.

Two alternatives have been evaluated for the short-term horizon (2020).

Alternative 1 includes:

- Cottonwood Drive Extension (4-lane roadway) between Chambers Road and Jordan Road
- Todd-Dransfeldt Connection (2-lane roadway) between Jordan Rd and Twenty-Mile Road

Alternative 2 includes:

- Chambers Road Widening (4-lane roadway) between Hess Road and Ridgeway Road
- Hess Road Bridge Widening (4-lane roadway) between Motsenbocker Rd and Parker Rd
- Ridgeway Road Widening (4-lane roadway) between I-25 and Chambers Road
- Jordan Road Widening (4-lane roadway) between Mainstreet and Hess Road

Figure 4 provides traffic forecasts for the 2020 base and each of these two alternatives.

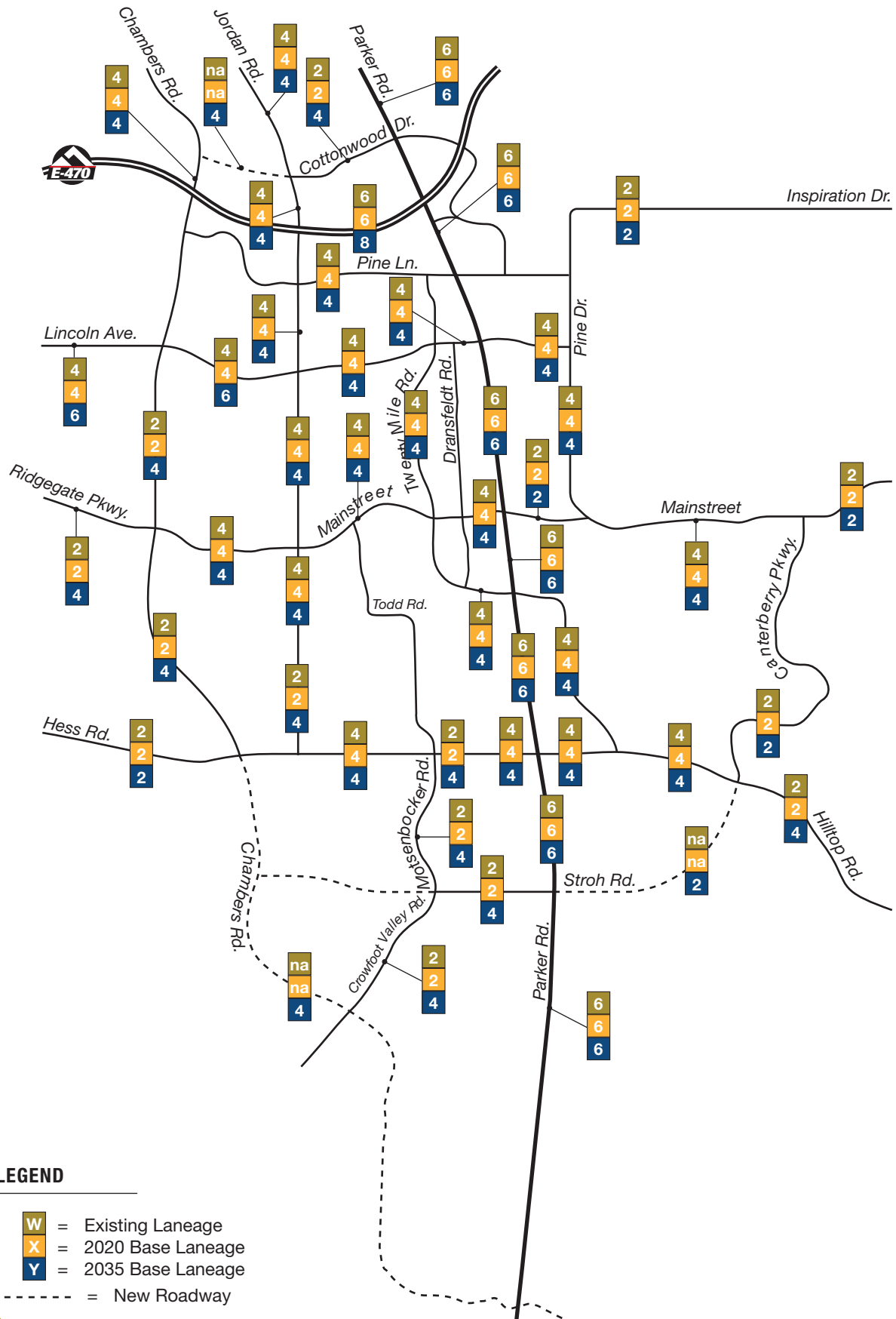
One alternative has been evaluated for the long-term horizon (2035).

Alternative 1 includes:

- Todd-Dransfeldt Connection (2-lane roadway) between Jordan Rd and Twenty-Mile Road
- Hess Road Widening (4-lane roadway) between I-25 and Chambers Road
- Lincoln Avenue Widening (6-lane roadway) between Jordan Road and Parker Road

Traffic forecasts for the 2035 base and this alternative have been provided as **Figure 5**.

Due to the complexity of real-world driver behavior and individual roadway characteristics, travel demand forecasting models cannot be expected to result in precise representation of traffic volumes on each roadway. A common technique used to improve the reliability of travel demand forecasts is referred to as post-processing adjustment. This technique uses comparisons of the base year model's predicted traffic volumes versus actual traffic counts. These comparisons provide estimations of the error associated with the model's representation of travel conditions. The model-produced forecasts can then be adjusted to account for the errors found in the model to provide more reliable forecasts. This post-processing adjustment process, as prescribed in the Transportation Research Board's publication *NCHRP 255*, was applied to all forecasts in this study.

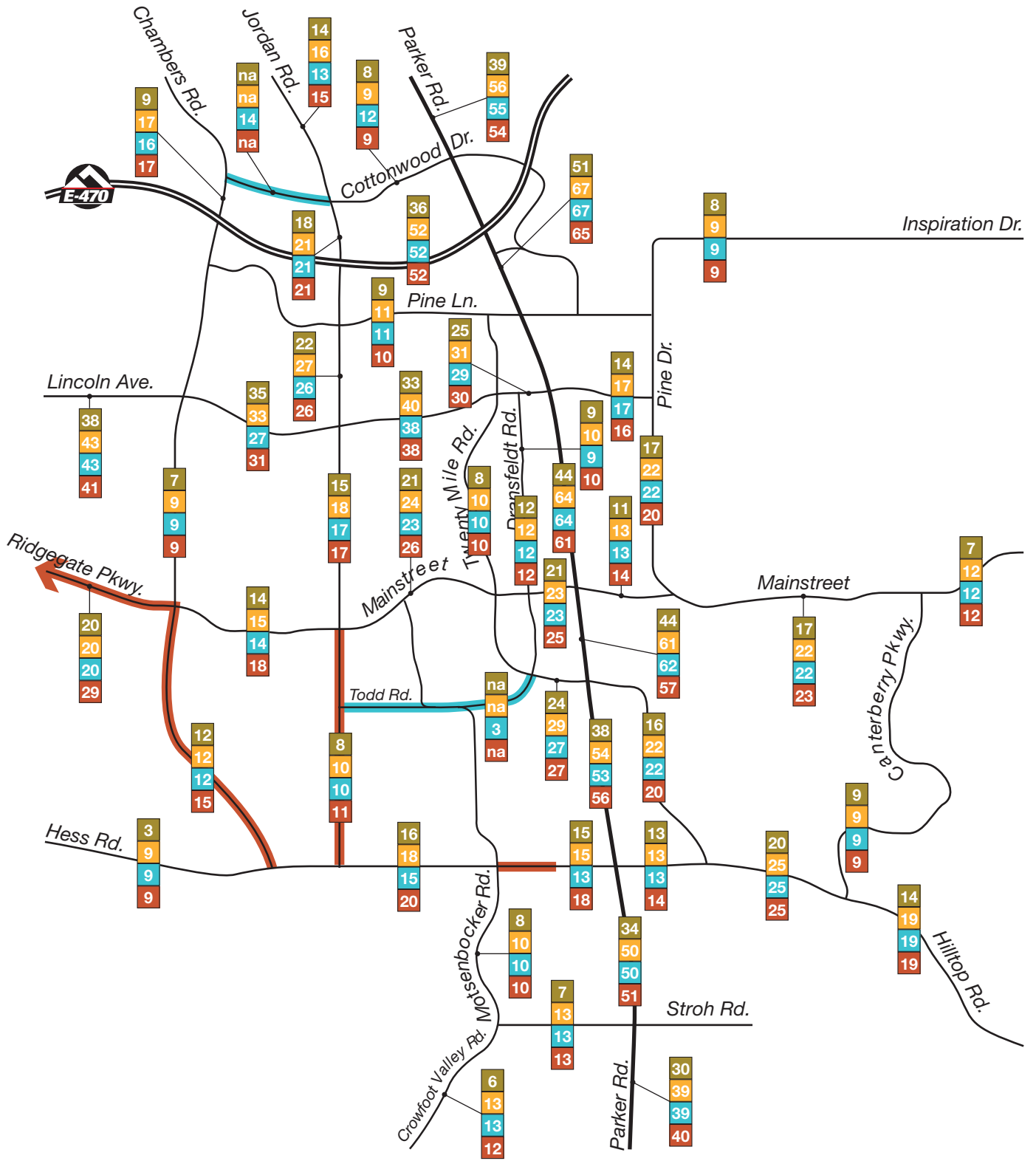


LEGEND

- W = Existing Laneage
- X = 2020 Base Laneage
- Y = 2035 Base Laneage
- - - - = New Roadway



Figure 3
Base Model Roadway Laneage



LEGEND

volumes x 1000 vpd

- W** = Existing Volume
- X** = 2020 Forecast No Build
- Y** = 2020 Forecast with Cottonwood Extension and Todd-Dransfeldt Connection
- Z** = 2020 Forecast with Chambers, RidgeGate, Jordan Widening, and Hess Bridge Widening

Figure 4
2020 Traffic Forecasts



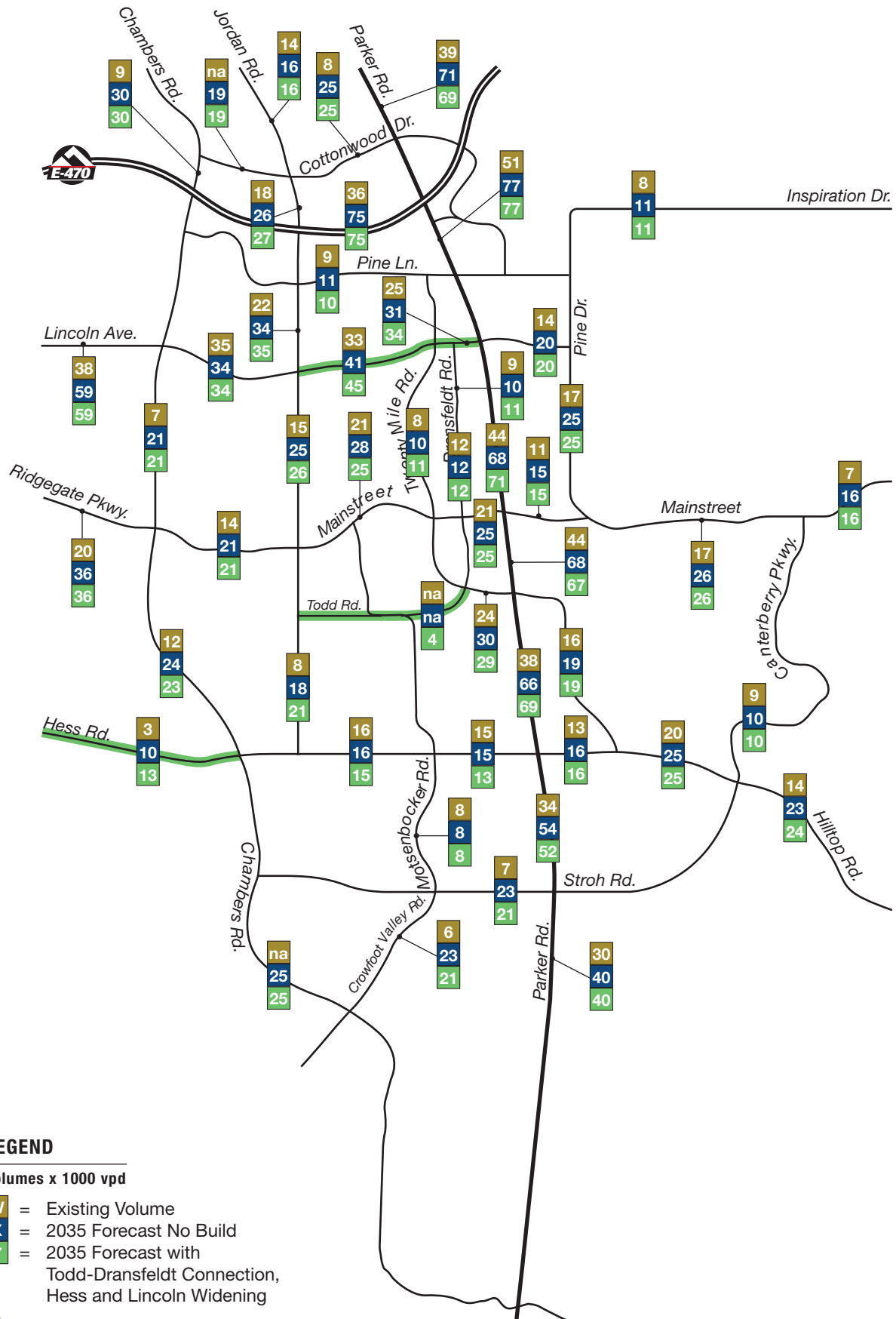


Figure 5
 2035 Traffic Forecasts

V. FINDINGS AND DISCUSSION

The travel demand forecasts performed for this study have been provided as **Figures 5** and **6**. Roadway improvements evaluated as part of the alternatives have been summarized and are discussed below.

- **Cottonwood Extension** – The extension of Cottonwood Drive between Chambers Road and Jordan Road is expected to occur with adjacent private development. The new connection is designed to be built as a 4-lane roadway connecting to existing Cottonwood Drive to the east. Currently, Cottonwood Drive between Jordan Road and Parker Road is a 2-lane roadway. Traffic forecasts completed for the short term build condition indicate that traffic volumes will not exceed the current capacity of the existing 2-lane roadway between Jordan Road and Parker Road. By 2035, if the new extension is complete and further development occurs in the Compark and Cottonwood Developments the roadway will need to be widened to 4-lanes to accommodate new demand.
- **Todd-Dransfeldt Connection** – The extension of Todd Road and Dransfeldt Road is designed to connect Jordan Road and Twenty-Mile Road. Forecast volumes along this route do not show significant regional trip making on this facility in the future. This does not say anything for potential local traffic that may be introduced on the facility as adjacent development progresses. At this time, the short term and long term forecasts confirm that a 2-lane road is adequate, with the potential for additional auxiliary laneage at intersections as necessary as future development occurs.
- **Chambers Road Widening** – The widening of Chambers Road between Hess Road and Mainstreet to 4-lanes was evaluated in the short term with the widening of Ridgeway Parkway between I-25 and Chambers Road. Based on traffic forecasts, widening is not critical by 2020. This recommendation assumes no development within Anthology in the short term. If substantial Anthology development occurs, Chambers Road widening will be necessary. The 2035 forecasts show that widening of Chambers Road will be needed by 2035.
- **Hess Road Bridge Widening** – Forecasting for Hess Road between Motsenbocker Road and Parker Road indicates that volumes may increase with the bridge widening. Currently, 4-lanes exist on the east and west sides of the bridge with the only 2-lane section being the bridge. Short term (2020) forecasts suggest a bottleneck will occur at the location without widening. The current land use vision does not suggest further traffic volume growth in the long term planning horizon.
- **Ridgeway Parkway Widening** – As is already being experienced on Ridgeway Parkway between I-25 and Chambers Road, this section is forecast to continue to experience significant demand. To alleviate congestion on this portion of Ridgeway, the travel demand modeling suggests that the roadway would be well served with widening to 4-lanes by 2020. The modeling suggests that 4-lanes will provide acceptable operations in 2035. Further local development along this corridor may require additional auxiliary lanes and signal control configurations to continue to provide acceptable operations. Mainstreet within Town of Parker limits is currently 4 through lanes, which will continue to provide acceptable operations to 2035.

- **Jordan Road Widening** – The widening of Jordan Road between Hess Road and Mainstreet to 4-lanes was evaluated in the short term with the widening of Ridgeway Parkway between I-25 and Chambers Road. Based on the traffic forecasts, widening is not needed by 2020. This recommendation assumes no development within Anthology in the short term, if development occurs, Chambers Road widening will be necessary. The long range forecasts show that widening of Jordan Road will be needed by 2035 especially with development of the proposed middle/high school site.
- **Hess Road Widening** – This project includes widening of Hess Road between I-25 and Chambers Road to 4-lanes. The existing model predicts significantly higher traffic volumes than were measured in 2012. While there is still some opportunity for traffic volumes to adjust to account for the new connection, the model is currently overstating the demand to this corridor. Traffic forecasts provided for this study have been adjusted to account for the over-estimation of the model and forecasts indicate that no widening will be needed in the short term. Long range (2035) forecasts show traffic volumes beginning to approach 2-lane capacity, so volumes should be monitored as development occurs to determine the need for widening.
- **Lincoln Avenue Widening** – The widening of Lincoln Avenue between Jordan Road and Parker Road to 6-lanes is recommended by 2035. This section is forecast to operate near capacity for the existing 4-lane segment in 2020 and will need to be widened in the future.
- **Parker Road** – The Parker Road corridor is expected to experience significant traffic growth in the long term. Volume increases along this corridor will include increases to congestion during the peak periods, but also include spreading as existing times of uncongested travel become more congested. Beyond acceleration/deceleration lanes which CDOT is currently constructing through the corridor, there are no plans at this time to provide additional lanes to Parker Road. As future volumes increase, the Town can expect enhancements will be necessary to the main east-west arterials in order to allow signal timing, and associated capacity, along Parker Road to be maximized.
- **E-470** – The E-470 Tollway is expected to experience significant traffic growth in the long term. As volumes increase, the E-470 Authority will continue laneage and interchange enhancements to maintain operations along the corridor. Expected through laneage improvements include widening to 4-lanes in each direction west of Parker Road by 2035. Long range planning by the E-470 Authority also includes the addition of fly-over ramps connecting E-470 and Parker Road.