

MEMORANDUM

To: City of Aurora Public Works, Traffic Division & Development Review

From: Cassie Slade, PE, PTOE

Date: January 17, 2024

Project: The Vistas at Kings Point in Aurora, Colorado

Subject: Pine Drive Right-of-Way Determination – Supporting Analysis

The Fox Tuttle Transportation Group is completing a traffic analysis for the proposed development of The Vistas at Kings Point project, which includes approximately 95± acres of vacant property located in the City of Aurora halfway between Parker Road and Ireland Way, east and south of E-470 and west of the Travois neighborhood. The project proposes to have the primary access on the future Aurora Parkway along the north property boundary. The Vistas at Kings Point development will include a combination of single-family and multi-family residential homes and a neighborhood park.

The purpose of this technical memorandum is to summarize the evaluation of Pine Drive without and with the planned extension to Aurora Parkway. The Pine Drive and Inspiration Corridors are shown in **Figure 1**.



Figure 1. Vicinity Map

Background

Pine Drive currently travels north-south between Mainstreet, near downtown Parker, to Inspiration Drive where the roadways create a 90-degree bend for continued travel. Currently, the roadway provides access to several existing suburban and rural residential communities and is within four municipal boundaries (City of Aurora, Town of Parker, Douglas County, and Arapahoe County). South of Lincoln Avenue, the cross-section of Pine Drive includes two travel lanes per direction with a center median (mix of raised, painted, or landscaped). Auxiliary lanes are provided at intersections as appropriate. North of Lincoln Avenue, the roadway narrows to one lane per direction with gravel shoulders.

Based on several municipal documents, the future plan for Pine Drive is to widen the two-lane section to four-lanes and to extend from Inspiration Drive to Aurora Parkway. The *Aurora Southeast Area Transportation Study (SEATS)* (2007) and the Aurora's Comprehensive Plan, *Aurora Places*, (October 2018) shows Pine Drive being extended as a four-lane minor arterial. The *Douglas County 2040 Transportation Master Plan* (2019) and Parker's Transportation Master Plan, *Parker 2035: Changes and Choices* (2018), also include the extension of Pine Drive and both documents recommended that Pine Drive be a four-lane minor arterial with Inspiration Drive remaining a two-lane collector. The Arapahoe County's *Transportation Master Plan* (December 2021) does not include Pine Drive or future connectivity to Aurora Parkway.

The April 2022 traffic count data indicated that there were 13,250 vehicles per day (vpd) on Pine Drive south of Inspiration Drive with a posted speed limit is 40 mph. Compared to the volume thresholds set forth by the City of Aurora and Douglas County, a two-lane roadway should be considered for widening once volumes exceed 12,000 vpd.

Presently, the City of Aurora is working with the Prairie Point (formerly known as Kings Point) development to design and construct the new Aurora Parkway as a four-lane cross-section that will ultimately connect Parker Road to Gartrell Road.

Forecasted Traffic Volumes

Roadway volumes along Pine Road have been forecasted for various regional plans. DRCOG Focus Model is a high-level traffic model that includes the majority of the Denver Front Range. The Vistas at Kings Point TIS further detailed the traffic forecasts, with a micro level analysis compared to the macro level of DRCOG and other planning documents. All of the forecasting models assumed Pine Drive would be widened and extended as a four-lane arterial.

Pine Drive Right-of-Way Determination

Supporting Analysis

January 17, 2024

Town of Parker's Roadway System Evaluation Update (December 2020) forecasted daily volumes per the methodologies prescribed by DRCOG and the National Cooperative Highway Research Program 65 Report to determine volumes and congestion throughout the transportation network. The traffic modeling indicated that Pine Drive will have 14,000 vpd in Year 2040. The forecasts indicate that the extension of Pine Drive will serve up to 6,000 vpd and up to 17,200 vpd will utilize Inspiration Drive regardless of the connection.

The daily roadway volumes from each the different traffic models are summarized in **Table 1** with the highest volume highlighted. All of the municipal traffic models assumed Pine Drive would be widened to four-lanes south of Inspiration Drive.

Table 1. Comparison of Forecasted Volumes on Pine Drive

Roadway Segment and Scenario		Daily Volume (vehicles per day, vpd)				
		SEATS Refresh (2040)	Parker Forecasts (2040)	DRCOG (2040)	Douglas County TMP (2040)	The Vistas at Kings Point TIS
Pine Dr. south of Inspiration Dr.	Without Extension	Not Provided	14,000	11,000	<20,000	14,000
	With Extension	Not Provided	17,000	Not Provided	<20,000	15,200
Pine Dr. south of Aurora Pkwy	Without Extension	Not Provided	Not Provided	Not Provided	<20,000	2,500
	With Extension	Not Provided	6,000	Not Provided	<20,000	6,500
Inspiration Dr. east of Pine Dr.	Without Extension	Not Provided	14,000	10,000	<10,000	14,000
	With Extension	Not Provided	17,000	Not Provided	<10,000	10,400

Table 1 can be summarized as follows:

- With or without the extension of Pine Drive, the estimated future daily volumes **south of Inspiration Drive** were just over the thresholds to consider widening to four lanes. Per the Douglas County 2040 Transportation Plan and the City of Aurora guidelines, a two-lane roadway may require widening if the daily volume exceeds 12,000 vpd.
- With the extension of Pine Drive, the volumes **on Pine Drive south of Inspiration Drive** are expected to increase. The range of volumes on that section of roadway is 15,200 vpd to 17,000 vpd.

- With the extension of Pine Drive, the range of volumes on **Pine Drive north of Inspiration Drive** is 6,000 vpd to 6,500 vpd.
- With the extension of Pine Drive, the Parker forecasts estimated that Inspiration Drive would have more traffic than without the Pine Drive extension.

Aurora Parkway Capacity

The future Aurora Parkway is anticipated to be a four-lane divided roadway that travels east-west from Parker Road to Gartrell Road. Aurora Parkway has been analyzed and can accommodate the volumes of the proposed Vistas at Kings Point development as well as the developments to the east (Overlook at Kings Point) and to the west (Kings Point South). It is noted that Aurora Parkway has sufficient capacity to serve all three developments without the extension of Pine Drive.

Challenges of Implementation

Although Pine Drive being extended to the north from Inspiration Drive to Aurora Parkway has been shown in several planning documents within the City of Aurora, Town of Parker, and Douglas County, it will be a difficult roadway to accommodate with existing properties and the vision of proposed developments. The list of challenges is below:

- Limited available right-of-way due to large overhead electric lines and property boundaries, especially for a four-lane roadway.
- Limited alignment options due to large overhead electric lines.
- Challenging topography and drainage.
- Existing substation along the west side of the alignment may impact the ability to extend Pine Drive.
- Several property owners that do not want Pine Drive extended north due to the right-of-way dedication needed and impact to the existing and future residents.
- Volume forecasts on the extension do not warrant the need for a four-lane roadway.

Methodology

To determine the future peak hour traffic projections in the Vista at Kings Point TIS, the following steps were applied:

1. Reviewed the travel model forecasts and roadway volumes in the regional planning documents which included the development of the Kings Point area (now known as Prairie Point).
2. Assumed 32% of the traffic on Inspiration Drive redirects to the Pine Drive Extension (4,150 vpd of 13,000 vpd).
3. Estimated turning movement intersection volumes for the intersections of Pine Drive at Inspiration Drive and Aurora Parkway at Pine Drive.
4. Calculated trip generation for Vista and Overlook with the applicable trip rates contained in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*¹.
5. Assigned development trips regionally and locally through all the impacted study intersections. Assumed 23% of development trips utilize Pine Drive to Inspiration Drive with 13% headed south on Pine Drive and 10% headed east on Inspiration Drive.
6. Calculated roadway segment volumes by assuming PM peak hour volumes are 10% of the daily volume.

Roadway Segment Analysis

The *NEATS Refresh Study* provides guidelines to equate roadway capacity to a desired level-of-service (LOS) based on roadway classification, daily traffic volume, and number of general travel lanes. The *NEATS Refresh Study Table 2* summarizes the recommended range of daily traffic volumes and equivalent LOS. Per City of Aurora guidelines, roadway capacity is acceptable at LOS D or better and may need to be widened if the roadway operations fall below LOS D. For Pine Drive, the maximum forecasted daily volumes were compared to the thresholds set forth by the *NEATS Refresh Study* for a minor arterial with four lanes and for a collector with two lanes to determine the LOS for each segment, as shown in **Table 2**.

¹ *Trip Generation Manual, 11th Edition*, Institute of Transportation Engineers, 2021.

The Pine Drive corridor was forecasted to have up to 6,600 vpd which is below the 12,000 vpd for a collector roadway. There will be excess capacity available on Pine Drive, approximately 5,400 vpd, in case there are fluctuations in forecasts or an incident that redirects traffic from a parallel route.

Impacts to Other Roadways

Per the various traffic forecasts and detailed analysis, Pine Drive was estimated to have available capacity on a daily basis and during the peak hours. Therefore, it is not anticipated traffic will reroute from Pine Drive to other parallel roadways or divert their route through and beyond the study area. It is anticipated that there will not be negative impacts to the parallel and connected roadways with the proposed reduction in cross-section on Pine Drive.

The regional and localized traffic models included forecasts on Aurora Parkway, Inspiration Drive, Parker Road, and Gartrell Road. The daily volumes and lane configurations were consistent for all of these arterial roadways and not anticipated to be impacted by the reduction in lanes on Pine Drive in the future.

Impacts to Pedestrian and Bicycle Facilities

A change in the planned cross-section of Pine Drive from four-lanes to two-lanes is not anticipated to negatively impact the pedestrian and bicycle connectivity or accessibility. Regardless of the number of travel lanes, the roadway cross-section is required to include multi-modal facilities and the City requires safe travel and crossing opportunities for non-auto travelers.

The reduction of roadway width along Pine Drive is likely to positively impact the pedestrian and bicyclist experience with a narrower crossing distance and slower vehicle speeds.

Conclusions

It is anticipated that the proposed two-lane collector cross-section for Pine Drive between Aurora Parkway and Inspiration Drive can adequately accommodate the full buildout of the developments along and near the corridor. The daily volumes from traffic modeling efforts are significantly below the City's threshold for a four-lane roadway. The forecasted roadway peak hour conditions equate to LOS B, which indicates a two-lane roadway is acceptable.

Pine Drive Right-of-Way Determination

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January 17, 2024

The reduction in width on Pine Drive will have the following positive impacts compared to a wider cross-section:

- Enhanced experience for all roadway users with lane configuration that matches the operational and safety needs
- Reduced weaving movements and conflicts between intersections
- Reduced crossing distance for pedestrians and bicyclists
- Anticipated reduced speeds with a narrow corridor which improves safety
- Anticipated reduced delay and queuing on side streets
- Improved atmosphere for community and neighborhood interaction
- Reduced impervious surface
- Reduced maintenance time and money

I hope that the contents of this memorandum are helpful to you. If you have any questions, please feel free to give me a call.

Sincerely,

FOX TUTTLE TRANSPORTATION GROUP, LLC



Cassie Slade, P.E., PTOE
Principal

