

Bioscience 5 (Fitzsimons)

1) The Fitzsimons Redevelopment Authority (FRA) Master Traffic Impact Study (MTIS) is Currently being updated by Kimley-Horn and will include a 2040 horizon analysis. The master study is not presently at a level to incorporate into this study. The master level study will evaluate all the key intersections in this study in detail as well as the full buildout of the Fitzsimons area.

2) Lane configurations have been changed along Scranton Street in the revised study. Two way stop control along the eastbound and westbound approaches of 22nd Avenue at Scranton Street have been incorporated.

3) It is understood that the surrounding street system is being constructed by other projects and by this development. However, the south access was conservatively analyzed to understand the needs of directing all traffic to Montview Boulevard if this development is completed prior to the completion of Scranton Street to the north. Bioscience 4 plans to construct 23rd Avenue between Racine Street and Scranton Street

Pret which is expected to closely coincide with development of Bioscience 5. The master level study will evaluate all these street connections and intersections in detail.

4) The MTIS is currently being updated by Kimley-Horn and the roundabout at 23rd and Racine is being reevaluated.

5) During the morning and afternoon peak hours, the predominant vehicle type expected to be generated by this project is passenger cars from employee/staff arrivals and

departures; therefore, heavy vehicle usage assumed is believed to be appropriate. As known, large trucks typically avoid the peak hours of the adjacent street traffic as identified from heavy vehicle percentage data along Colfax Avenue within the project limits. Heavy vehicle percentages decline by 93 percent (2.6% to 0.17%) from the off peak to the peak hour along Colfax Avenue.

Please see individual responses throughout this document.

Bioscience 5 (Fitzsimons)

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Bioscience 5 is a proposed warehousing development to be located on the northwest corner of the future 22nd Avenue and Revere Street intersection in Aurora, Colorado. Bioscience 5 will be bounded by the future streets of 23rd Avenue to the north, 22nd Avenue to the south, Revere Street to the east, and Racine Street to the west. Bioscience 5 is anticipated to include an approximate 90,000 square foot building comprised of warehousing space. It is expected that the project will be completed by 2020; therefore, analysis was conducted for the 2020 short term horizon. Through coordination with the City of Aurora, a five-year 2025 horizon was also included for evaluation.

The purpose of this traffic study is to identify project traffic generation characteristics and potential project traffic related impacts on the local street system, as well as to develop mitigation measures required for identified impacts. The following intersections were incorporated into this traffic study in accordance with the City of Aurora standards and requirements:

 22rd Avenue and Scranton It is understood that the]					
surrounding street system is						
 Montview Boulevard and Speing constructed by this project 						
and others . However, the south						
Regional access will be provided by Interstate 22 access was conservatively analyzed to understand the	Colfax					
Avenue (US-40). Primary access to the site will b needs of directing all traffic to	Peoria					
Street, and Fitzsimons Parkway. Direct access to t Montview Boulevard if this	one full					
movement access located on the west side of the development is complete prior to	en 23 rd					
Avenue is constructed, a full movement access is pr Street to the north. Bioscience 4	nue.					
plans to construct 23rd Avenue						
In the interim, Revere Street is expected to be confrom Racine Street to Scranton	project					
access. Based on this, traffic flow will not be stopp closely coincide with	erefore,					
delays cannot be reported by Highway Capacity development of Bioscience 5.	project					
driveway along 23 rd Avenue will be constructed i The master level study will	to 23 rd					
Avenue at buildout as 23 rd Avenue is not anticipated connections and intersections in	part of					
this project, 22 nd Avenue will be constructed fredetail.	Street					
alignment. It should be noted that 23 rd Avenue is anticipated to be constructed from Scranton						
Street to the west project limits when Bioscience 4 is developed, if not constructed by others						

Kimley-Horn and Associates, Inc. 096846000 – *Bioscience 5 (Fitzsimons)* Roadways surrounding the development are a requirement of the development.

proposed project development and expected traffic volumes resulted in the following recommendations and conclusions:

•	As part of this project, 22 nd Avenue will be constructed from Scranton Street to the Revere					
	Street alignment. Likewise, Revere Street will be constructed from 22 nd Avenue to the site					
	driveway. A full movement access is p	This intersection is	t side of the future Revere			
	Street. Ultimately, when 23rd Avenue is	meet warrants for all-	vement access is proposed			
	along the south side of 23rd Avenue. T	way stop control in	structed initially but will not			
	provide access to 23rd Avenue at b	the short-term	is not anticipated to be			
	constructed over to Scranton Street unti	intersection was	All-way stop will not be supported at this location unless the entire network			
•	The full movement access along Rever	evaluated with two- way stop control along the eastbound	is analyzed (see 2017 FRA study) and the MUTCD warrants are met.			
	"STOP" signs for the exiting approa	and westbound 22nd Avenue approaches	ovement lanes should be			
	sufficient for vehicles entering and exiti	in the revised	owever, three lane sections			
	along Revere Street and 23rd Avenue	consistent with the	as well. The entering and			
	exiting approaches of these accesses s	FRA study.	commodate heavy vehicles.			

- It is recommended that a R1-1 "STOP" sign be installed along the eastbound approach of the 22nd Avenue and Scranton Street intersection. The installation of this stop sign would convert this intersection to All-Way Stop Control as the current stop control along the northbound and westbound approaches only does not meet Highway Capacity Manual methodologies for standard operations. With All-Way Stop Control, R1-4 "ALL WAY" plaques are recommended to be installed underneath the existing and proposed "STOP" signs.
- The intersection of Montview Boulevard and Scranton Street is close to warranting signalization in the existing condition. With the addition of three adjacent projects as well as this Bioscience 5 project traffic, this intersection will likely warrant signalization by 2020. It should be noted that this intersection is not expected to meet signal warrants with morning peak hour volumes but will likely meet four-hour warrants with the inclusions of the shoulder hours during the afternoon peak hour (3 pm to 7 pm). As such, this intersection should be considered for signalization in the future. It is recommended that separate northbound and

2.0 INTRODUCTION

Kimley-Horn and Associates, Inc. has prepared this report to document the results of a Traffic Impact Study of future traffic conditions associated with the proposed Bioscience 5 warehousing development to be located on the northwest corner of the future 22nd Avenue and Revere Street intersection in Aurora, Colorado. Bioscience 5 will be bounded by the future streets of 23rd Avenue to the north, 22nd Avenue to the south, Revere Street to the east, and Racine Street to the west. A vicinity map illustrating the project location is shown in **Figure 1**. Bioscience 5 is anticipated to include an approximate 90,000 square foot building comprised of warehousing space. A conceptual site plan illustrating the development is shown in **Appendix G**. It is expected that the project will be completed by 2020; therefore, analysis was conducted for the 2020 short term horizon. Through coordination with the City of Aurora, a five-year 2025 horizon

was also included for evaluation.

2040 needs to also be analyzed within the completed roadway network.

The purpose of this traffic study is to identify project traffic generation characteristics and potential project traffic related impacts mitigation measures required for ide incorporated into this traffic study in a being updated by Kimley-Horn and will include a 2040 horizon. The master study is not at a level to the study is not at a le

- 22rd Avenue and incorporate into this study presently,
- Montview Boule but will be completed within the next six weeks.

Regional access will be provided by Interstate 225 (I-225), Interstate 70 (I-70), and Colfax Avenue (US-40). Primary access to the site will be provided by Montview Boulevard, Peoria Street, and Fitzsimons Parkway. Direct access to the project is proposed initially from one full movement access located on the west side of the future Revere Street. Ultimately, when 23rd Avenue is constructed, a full movement access is proposed on the south side of 23rd Avenue.

Intersections

The existing T-intersection of 22rd Avenue and Scranton Street operates with stop control along the northbound and westbound approaches. All three approaches of this intersection provide a single lane for shared movements.

The intersection of Montview Boulevard and Scranton Street currently operates with stop control along the northbound and southbound approaches. The eastbound and westbound approaches provide a left turn lane and a shared through/right turn lane. The northbound approach provides a shared left turn/through lane and a right turn lane while the southbound approach includes a single shared lane for all movements. The intersection lane configuration and control for the existing study area key intersections are shown in **Figure 3**.

3.3 Future Roadway Network

In the interim, Revere Street is expected to be constructed from 22nd Avenue to the project access. Based on this, traffic flow will not be stopped due to the initial configuration; therefore, delays cannot be reported by Highway Capacity Manual (HCM) methodologies. The project driveway along 23rd Avenue will be constructed initially but will not provide access to 23rd Avenue at buildout as 23rd Avenue is not anticipated to be constructed until the future. As part of this project, 22nd Avenue will be constructed from Scranton Street to the Revere Street noted that 22rd Avenue is anticipated to be constructed from Scranton alignment. It should here The master level Street to the west study will evaluate oscience 4 is developed, if not constructed by others prior. Further, Reveall these street nded from the project access to 23rd Avenue as part of connections and Bioscience 4. Bios d on the northwest corner of the 22nd Avenue and needs in detail. Scranton Street int This master study new parking lot has been constructed on this site and this parcel is not ar is currently bed by the studied horizons for purpose of this study. ongoing and

22nd Avenue and 2 incorporated into

plans; however, the this traffic study.

xpected to connect to Peoria Street in the short-term ections in the long-term future. Likewise, Racine Street

is not anticipated to connect to Montview Boulevard initially but is a planned connection in the long-term future. Revere Street is not planned to connect with Montview Boulevard.

Include reference to MTIS, and future intersection control. Where is the discussion of the single lane roundabout at 23rd & Racine St?



5.2 Key Intersection Operational Analysis

Calculations for the level of service at the key intersections for the study area are provided in **Appendix D**. The existing year analysis is based on the lane geometry and intersection control shown in **Figure 3**. The Synchro Highway Capacity Manual (HCM) methodology reports were used to analyze intersection delay and level of service.

22nd Avenue and Scranton Street

The existing T-intersection of 22rd Avenue and Scranton Street operates with stop control along the northbound and westbound approaches. All three approaches of this intersection provide a single lane for shared movements. HCM does report level of service with stop control on perpendicular legs while a third leg does not have a stop condition; therefore, this intersection was analyzed with All-Way Stop Control in order to obtain a reported LOS.

With this modified control and the existing lane configurations, this intersection currently operates acceptably with LOS A during the morning and afternoon peak hours. With the existing lane configurations and the addition of project, this intersection is expected to continue to operate acceptably with LOS A during the weekday peak hours throughout the 2025 horizon. It is recommended that a R1-1 "STOP" sign be installed along the eastbound approach of the 22nd Avenue and Scranton Street intersection. **Table 3** provides the results of the level of service at this intersection.

	AM Peak Hour		PM Peak Hour	
Scenario	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
2019 Existing #	7.1	А	7.0	А
2020 Background #	7.9	А	7.4	А
2020 Background Plus Project #	Understood and analyzed as such in the revised traffic study.		7.6	А
2025 Background #			7.5	А
2025 Background Plus Project #			7.6	А

 Table 3 – 22nd Avenue and Scranton Street LOS Results

= Includes Stop Control along Eastbound Approach

Analyze this intersection with a E/W stop condition and Scranton St extending to 23rd. Ensure Intersection control matched MTIS for 2040.

Bold or otherwise highlight movements below the City's standards.

Table 4 – Montview Boulevard and Sethis has been esults					
	AM updated in the M Pea			k Hour	
Scenario	Dela revised traffic (sec/vistudy		ay /eh)	LOS	
2019 Existing		,		•	
Northbound Left/Through	-	A	173.3	F	
Northbound Right	12.8	В	12.6	В	
Eastbound Left	8.1	A	9.4	A	
Westbound Left	9.3	A	8.5	A	
Southbound Approach	12.1	В	28.3	D	
2020 Background					
Northbound Left/Through	-	A	>300	F	
Northbound Right	12.9	В	12.7	B	
Eastbound Left	8.4	A	9.7	A	
Westbound Left	9.4	A	8.5	A	
Southbound Approach	19.7	С	92.1	<u> </u>	
2020 Background Plus Project					
Northbound Left/Through	-	A	>300	F	
Northbound Right	12.9	В	12.7	В	
Eastbound Left	8.5	A	9.8	A	
Westbound Left	9.4	A	8.5	A	
Southbound Approach	22.6	С	164.1	<u> </u>	
2020 Background Plus Project (Signal) #	11.1	В	16.0	В	
2020 Background Plus Project (RAB) ##	10.3	В	11.0	В	
2025 Background				•	
Northbound Left/Through	-	A	>300	F	
Northbound Right	13.6	В	13.2	B	
Eastbound Left	8.5	A	10.1	В	
Westbound Left	9.6	A	8.6	A	
Southbound Approach	22.3	С	152.7	F	
2025 Background Plus Project (Signal) #	11.7	В	17.4	B	
2025 Background Plus Project (RAB) ##	11.6	В	13.0	В	

Table 4 – Montview Boulevard	and Set	his has	been	esu

= Traffic Signal; Includes Northbound and Southbound Left Turn Lane
= Roundabout; Single Lane Approaches

Project Accesses

A full movement access is proposed along the west side of the future Revere Street. In the interim, Revere Street is expected to be constructed from 22nd Avenue to the project access along Revere Street. Based on this, traffic flow will not be stopped due to the initial configuration; therefore, delays cannot be reported by HCM.

Ultimately, when 23rd Avenue is constructed, a full movement access is also proposed along the south side of 23rd Avenue. This driveway will be constructed initially but will not provide access to 23rd Avenue at buildout as 23rd Avenue is not anticipated to be constructed to Scranton Street until sometime in the future. As part of this project, 22nd Avenue will be constructed from Scranton Street to the Revere Street alignment. Likewise, Revere Street will be constructed from 22nd Avenue to the site driveway as part of this project. It should be noted that 23rd Avenue is anticipated to be constructed from Scranton Street to the west project limits when Bioscience 4 is developed if not constructed by others prior. Further, Revere Street will be extended from the project access to 23rd Avenue as part of Bioscience 4. Bioscience 4 is proposed on the northwest corner of the 22nd Avenue and Scranton Street intersection. Currently, a new parking lot has been constructed on this site and this parcel is not anticipated to be developed by the

studied horizons.

Once studies horizons include 2040, does this statement still hold?

The full movement access along Revere Street as well as the full movement access along 23rd Avenue are recommended to operate with stop signs for the exiting approaches. Single share vehicles entering and exiting the site driveways Street and 23rd Avenue could be implemented as these accesses should be designed to accommod these accesses should be designed to accommod be invalid for the 2040 horizon at this point.

Update once trip distribution & 2040 is incorporated.

5.3 Turn Bay Vehicle Queuing Analysis

A vehicle queuing analysis was conducted for turn lance at the study area intersections. The queuing analysis was performed using the Synchr responses. esenting the results of the 95th percentile queue length. Results of the vehicle queuing analysis are shown in the following **Table 5** with calculations provided in queue operational outputs located in **Appendix F**.

Intersection Turn Lane	Existing Turn Lane Length (feet)	2020 Calculated Queue Length (feet)	2020 Recommended Turn Lane Length (feet)	2025 Calculated Queue Length (feet)	2025 Recommended Turn Lane Length (feet)
Montview Blvd & Scranton St					
(Signalized Condition)					
Eastbound Left	75'	41'	75'	41'	75'
Westbound Left	50'	27'	50'	27'	50'
Northbound Left	DNE	85'	100'	85'	100'
Southbound Left	DNE	57'	100'	59'	100'

Table 5 – Turn Lane Length Analysis Results

As shown in the table representing the queuing results, all anticipated vehicle queues are accommodated or managed within existing or proposed turn lanes at the study area intersections.

What % of heavy vehicles were included in this? Do lengths need to be increased based on the anticipated vehicles?

Based on the results of the intersection operational, signal warrant, turn lane length analysis,

the recommended lan The standard highway heavy vehicle usage of sections are shown in two percent was utilized in this study. During Figure 11. the morning and afternoon peak hours, the predominant vehicle type expected to be generated by this project is passenger cars from employee/staff arrivals and departures; therefore, heavy vehicle usage assumed is believed to be appropriate. As known, large trucks typically avoid the peak hours of the adjacent street traffic as identified from heavy vehicle percentage data along Colfax Avenue within the project limits. Heavy vehicle percentages decline by 93 percent (2.6% to 0.17%) from the off peak to the peak hour along Colfax Avenue.



6.0 CONCLUSIONS

Based on the analysis presented in this report, Kimley-Horn believes the proposed Bioscience 5 development will be successfully incorporated into the existing and future roadway network. The proposed project development and expected traffic volumes resulted in the following recommendations and conclusions:

- As part of this project, 22nd Avenue will be constructed from Scranton Street to the Revere Street alignment. Likewise, Revere Street will be constructed from 22nd Avenue to the site driveway. A full movement access is proposed along the west side of the future Revere Street. Ultimately, when 23rd Avenue is constructed, a full movement access is proposed along the south side of 23rd Avenue. This driveway will be constructed initially but will not provide access to 23rd Avenue at buildout as 23rd Avenue is not anticipated to be constructed over to Scranton Street until sometime in the future.
- The full movement access along Revere Street, as well as the full movement access along 23rd Avenue, are recommended to operate with stop control with the installation of R1-1 "STOP" signs for the exiting approaches. Single shared movement lanes should be sufficient for vehicles entering and exiting the site driveways; however, three lane sections along Revere Street and 23rd Avenue could be implemented as well. The entering and exiting approaches of these accesses should be designed to accommodate heavy vehicles.
- It is recommended that a R1-1 "STOP" sign be installed along the eastbound approach of the 22nd Avenue and Scranton Street intersection. The installation of this stop sign would convert this intersection to All-Way Stop Control as the current stop control along the northbound and westbound approaches only does not meet Highway Capacity Manual methodologies for standard operations. With All-Way Stop Control, R1-4 "ALL WAY" plaques are recommended to be installed underneath the existing and proposed "STOP" signs.
- The intersection of Montview Boulevard and Scranton Street is close to warranting signalization in the existing condition. With the addition of three adjacent projects as well as this Bioscience 5 project traffic, this intersection will likely warrant signalization by 2020. It

APPENDIX B

Adjacent Traffic Study Documents

Include the 2017 FRA MTIS study.

The 2017 FRA MTIS has been included in the revised study. Of note, this study is currently being updated by Kimley-Horn.

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LEGEND

ULLEVIG



Fitzsimons Compositive Elementary School - UPDATE 18-198 08/22/2018