TRAFFIC IMPACT STUDY

LOVELAND HOUSING AUTHORITY

Loveland, CO

PREPARED FOR:
Loveland Housing Authority

PREPARED BY:
Brian Horan, PE, PTOE
Daniela Gonzalez
Cooper Riddell-Brosig

Galloway & Company, Inc.
5500 Greenwood Plaza Blvd, Suite 200
Greenwood Village, CO 80111

DATE:
February 19, 2024
REVISED: June 17, 2024
REVISED: August 30, 2024
REVISED: October 29, 2024

Galloway comment response in GREEN near comments from the city

Executive Summary

Site Location and Study Area

The property that comprises the application area for the proposed development is approximately 52.45 acres in size and is identified as Larimer County Parcel Numbers 9635225901 and 9635218902. It is located east of Taft Avenue (CR-17) and south of 57th Street in Loveland, CO. It is zoned Planned Unit Development P-73 Crossroads Addition and is currently vacant.

The study area is generally bounded by Taft Avenue to the west, 57th Street to the north, and property lines to the east and south. The study area for the project includes intersections that could be affected by the proposed development:

- 57th Street/Taft Avenue
- 57th Street/Duffield Avenue
- 50th Street/Duffield Avenue

Description of Proposed Development

The Applicant, Loveland Housing Authority, seeks to develop the property with affordable residential housing uses. Site access is proposed via the existing full movement access at 57th Street/Duffield Avenue, a new right-in/right out (RIRO) access along 57th Street, and an additional full movement access south of the site with the extension of Duffield Avenue.

Proposed Dual 3/4 access at 57th/Duffield

Conclusions and Recommendations

Dual 3/4 access at 57th/Duffield was included for all total future analyses

Conclusions

Per LCUASS Table 4-1, overall LOS needs to be at a C or better to meet ACF (be acceptable)

Based on the results of this traffic impact study, the following may be concluded:

- Under existing traffic conditions, the intersections within the study area curr acceptable levels of service (LOS) "D" or better during the weekday AM ar queues remain within their respective storage lengths.

This was updated for all operation discussions

- Under background future 2028 and 2043 traffic conditions, without the development of the subject site, delays would increase at study intersections due to regional traffic growth and pipeline developments. Pipeline developments in the area are expected to improve the signalized intersection of 57th Street/Taft Avenue in background 2028 conditions based on their impact, and the intersection is expected to reach capacity with the existing lane use in study year 2043. Proposed intersection improvements are applied for study year 2043. With these improvements, the signalized intersection in the study is expected to operate at LOS "C" during the weekday AM peak hour and LOS "E" during the weekday PM peak hour.

- In the background future 2043 scenario, the NBL queue at the 57th Street/Taft Avenue intersection is expected to exceed its storage length during the PM peak hour due to pipeline developments.

- The proposed site development would generate, upon completion and full occupancy, 202 new weekday AM and 263 new weekday PM peak hour vehicle trips as well as 2,962 new weekday daily trips.

- Under total future 2028 and 2043 traffic conditions with development of the site, the intersections within the study area would operate consistent with background conditions with the exceptions of

the stop-controlled movements at the 57th Street/Duffield Avenue intersection which are shown to operate at LOS "D" in 2028 and LOS "F" in 2043 under total future conditions. However, these approaches are also shown to have a volume/capacity ratio, (V/C) of less than 1.0, suggesting additional capacity available for these movements. Signal warrants would not be triggered for this intersection. A scenario with double ¾ movements was analyzed and would mitigate this failure. Ultimately a roundabout will be provided for this intersection depending on certain triggers and funding.

Recommendations

- It is recommended that the Northbound left turn lane be extended to at least 225' storage length to meet LCUASS standards in the future design of the 57th Street/Taft Avenue intersection improvement in background conditions.
- It is recommended that the Applicant provide an additional westbound left lane and northbound through lane at 57th Street and Duffield Avenue. N t due to the substandard existing geometry the Applicant sho acity to the extent that physical site constraints (grade, proxim
- It is recommended that the Applicant coordinate possible pedestrian crossing solutions across 57th Street with the City. No specific recommendations are provided herein.
- It is recommended that the Applicant provides access consistent with the site plan contained herein.

Add capacity to the existing WB left

We are no longer recommending additional capacity here.

How can you provide a NB through when this intersection will be restricted to a 3/4? This does not make sense.

This was an error and should've said 57th St/Taft Ave - this was updated.

Need to add a recommendation to restrict the Duffield/57th intersection to dual 3/4 to mitigate the LOS failure

Dual 3/4 access at 57th/Duffield was included for all total future analyses

I would recommend you add some information related to the existing signalized ped crossing at Taft/57th as a safe crossing option

This information was added to the recommendations

The findings and conclusions need to address the short range LOS failures at Taft/57th and also any ACF exemptions that apply. An exemption can be made if a) the development does not contribute any volumes to the failing movement or b) the delay time is not increased by more than 2% due to the additional volume from the development

This information was added to the conclusion section

The recommendations need to include extending two NB through lanes on Taft Ave up to 57th and also the NB dedicated right turn lane at Taft/57th

This information was added to the recommendations section

Please add a recommendation for traffic calming at the south end of Duffield where it will connect to existing Duffield

A bullet with this information was added in the recommendations section.

57th Street

57th Street is constructed as a two-lane roadway with turn lanes at major intersections. The posted speed limit is 40 mph in the vicinity of the subject site. The City of Loveland classifies the roadway as a Major Arterial east of Taft Avenue and as a Minor Arterial west of Taft Avenue. The intersection with Taft Avenue operates under signalized control.

Duffield Avenue

Duffield Avenue is constructed as a two-lane roadway with a posted speed limit of 35 mph in the vicinity of the subject site. The City of Loveland classifies the roadway as a Major Collector. The intersections along the roadway operate under unsignalized control.

Please add description of 50th - Minor collector posted 25 mph

This information was added here.

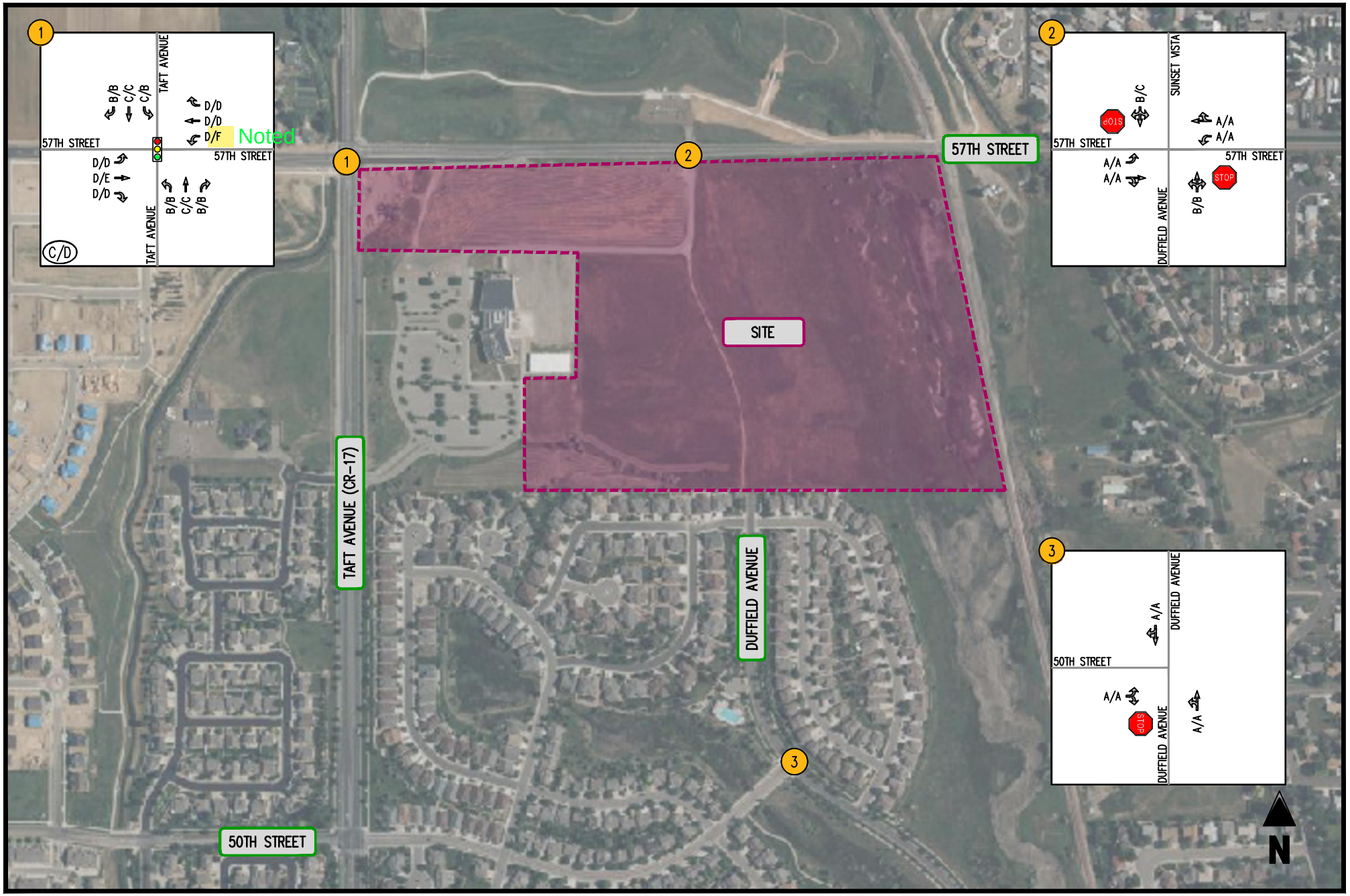

FIGURE 3-2
EXISTING LOS

LOVELAND HOUSING AUTHORITY
LOVELAND, CO

A/A INTERSECTION LOS

0000/0000 (AM PEAK HOUR/PM PEAK HOUR)

MOVEMENT

SIGNALIZED INTERSECTION

STOP STOP SIGN

YIELD SIGN

Table 3-1
Loveland Housing Authority - Loveland, CO
Existing Intersection Level of Service Summary (1) (2)

Intersection	Operating Condition	Street Name	Approach/ Movement	Existing 2023 AM Peak Hour	Existing 2023 PM Peak Hour
1 57th Street/Taft Avenue	SIGNAL	**Overall**		**C (28.8)**	**D (40.1)**
		57th Street	**EB**	**D (44.9)**	**D (53.3)**
			EBL	D (36.5)	D (42.3)
			EBT	D (49.8)	E (58.9)
			EBR	D (37.2)	D (42.3)
		57th Street	**WB**	**D (36.5)**	**E (77.4)**
			WBL	D (35.1)	F (116.2)
			WBT	D (37.5)	D (51.3)
			WBR	D (37.2)	D (39.0)
		Taft Avenue	**NB**	**C (27.7)**	**C (22.5)**
			NBL	B (14.5)	B (17.8)
			NBT	C (32.1)	C (24.6)
			NBR	B (17.3)	B (16.3)
		Taft Avenue	**SB**	**C (20.6)**	**C (23.4)**
			SBL	C (25.1)	B (17.3)
			SBT	C (20.3)	C (25.5)
			SBR	B (10.8)	B (12.3)
2 57th Street/Duffield Avenue	STOP	57th Street	**EB**	**A [0.0]**	**A [0.0]**
			EBL	A [8.0]	A [0.0]
			EBTR	A [0.0]	A [0.0]
		57th Street	**WB**	**A [0.3]**	**A [0.1]**
			WBL	A [8.9]	A [8.5]
			WBTR	A [0.0]	A [0.0]
		Duffield Avenue	**NB**	**B [13.0]**	**B [13.2]**
			NBLTR	B [13.0]	B [13.2]
		Sunset Vista	**SB**	**B [14.7]**	**C [20.2]**
			SBLTR	B [14.7]	C [20.2]
3 50th Street/Duffield Avenue	STOP	50th Street	**EB**	**A [0.0]**	**A [0.0]**
			EBLR	A [0.0]	A [0.0]
		Duffield Avenue	**NB**	**A [0.0]**	**A [0.0]**
			NBLT	A [0.0]	A [0.0]
		Duffield Avenue	**SB**	**A [0.0]**	**A [0.0]**
			SBTR	A [0.0]	A [0.0]

Notes : (1) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.
(2) Numbers in parenthesis () represent delay at signalized intersections in seconds per vehicle.

Add ACF Column Y/N
An ACF column was added for every scenario

N Noted

IV. Analysis of Future Conditions without Site Development

Methodology

The future traffic forecasts, without the proposed new use, were developed for 2028 and 2043 conditions based on a composite of existing baseline traffic volumes and regional traffic. A 2.0% growth factor per year was applied to existing through traffic on Taft Avenue.

Regional Growth

Increases in traffic associated with regional growth were estimated at 2.0 percent per year compounded for through movements along Taft Avenue up to 2028 as well as to 2043. This growth accounts for increases in traffic resulting from influences outside of the immediate study area. The resulting increases in volumes within the study area are reflected in Figure 4-1 for 2028 conditions and Figure 4-2 for 2043 conditions.

Pipeline Developments

Approved but unbuilt/unoccupied (i.e., "pipeline") developments were identified for consideration within the study. The following pipeline developments and development programs were included in the background and total future analysis for 2043 conditions:

Green Valley Ranch & Elkader

957	DU	Single Family Detached
23,000	SF	Shopping Center
5,000	SF	Fast Casual Restaurant
3,500	SF	Fast-food Restaurant with Drive-Through

Taft Ridge

675	DU	Single Family Detached
310	DU	Single Family Attached
10	FP	Gas Station/C-Store
17.424	KSF	Strip Retail Plaza (<40k)

Eagle Brook

36	DU	Single Family Detached Housing
48	DU	Multifamily Housing (Low-Rise)

The location of the pipeline developments in relation to the Applicant's property are shown in Figure 4-3. Improvements for the intersection of 57th Street/Taft Avenue were identified by pipeline developments and assumed built for 2043 (long-range) conditions.

Pipeline development impacts are proposed to be mitigated by the following improvements to the 57th Street/Taft Avenue intersection:

- Additional northbound through lane — Required by Legacy Crossing, south of 57th
- Converting the southbound right turn lane to a through/right lane — The wording was updated for this
- Dual westbound left turn lanes — Shows failing under existing conditions. Legacy will need to mitigate unless they are adding less than 2% to the delay time

Proposed Background future lane use and traffic control is shown in Figure 4-4.

We are no longer adding any trips to the WBL movement with the 3/4 access at 57th/Duffield.

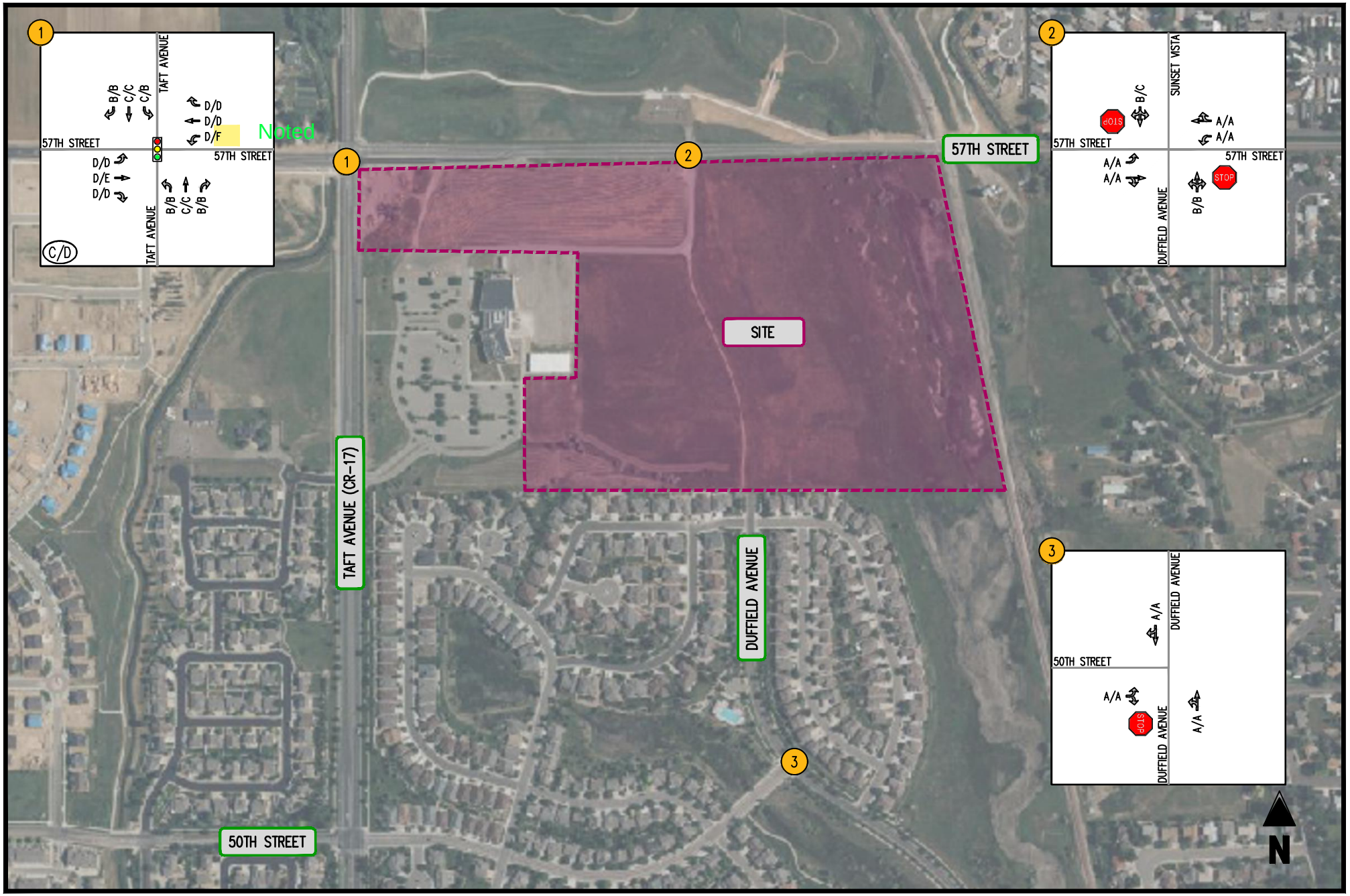

FIGURE 4-8
BACKGROUND 2028 LOS

LOVELAND HOUSING AUTHORITY
LOVELAND, CO

(A/A) INTERSECTION LOS

0000/0000 (AM PEAK HOUR/PM PEAK HOUR)

MOVEMENT

SIGNALIZED INTERSECTION

STOP SIGN

YIELD SIGN

Table 4-1
Loveland Housing Authority - Loveland, CO
Background Future Intersection Level of Service Summary (1) (2)

Intersection	Operating Condition	Street Name	Approach/ Movement	Existing 2023 AM Peak Hour	Existing 2023 PM Peak Hour	Background 2028 AM Peak Hour	Background 2028 PM Peak Hour	Background 2043 AM Peak Hour	Background 2043 PM Peak Hour
1 57th Street/Taft Avenue	SIGNAL	**Overall**		**C (28.8)**	**D (40.1)**	**C (28.2)**	**D (40.0)**	**F (126.1)**	**F (145.0)**
			EB	**D (44.9)**	**D (53.3)**	**D (44.5)**	**D (52.2)**	**F (94.1)**	**F (112.3)**
		57th Street	EBL	D (36.5)	D (42.3)	D (36.9)	D (42.8)	D (46.9)	F (123.5)
			EBT	D (49.8)	E (58.9)	D (48.9)	E (57.1)	F (132.7)	F (131.4)
			EBR	D (37.2)	D (42.3)	D (38.0)	D (43.1)	C (34.0)	D (41.0)
			WB	**D (36.5)**	**E (77.4)**	**D (37.3)**	**E (76.7)**	**C (33.5)**	**F (151.9)**
		57th Street	WBL *	D (35.1)	F (116.2)	D (35.6)	F (112.3)	C (33.6)	F (144.3)
			WBT	D (37.5)	D (51.3)	D (38.4)	D (53.5)	C (34.5)	F (185.6)
			WBR	D (37.2)	D (39.0)	D (38.0)	D (39.8)	C (30.8)	C (34.5)
			NB	**C (27.7)**	**C (22.5)**	**C (26.9)**	**C (23.9)**	**F (170.9)**	**F (120.5)**
		Taft Avenue	NBL	B (14.5)	B (17.8)	B (14.4)	B (18.9)	C (27.3)	F (175.7)
			NBT	C (32.1)	C (24.6)	C (31.1)	C (26.4)	F (221.6)	F (133.1)
			NBR	B (17.3)	B (16.3)	B (16.0)	B (15.8)	C (22.7)	C (20.3)
			SB	**C (20.6)**	**C (23.4)**	**C (20.3)**	**C (25.5)**	**F (131.1)**	**F (177.3)**
		Taft Avenue	SBL	C (25.1)	B (17.3)	C (23.5)	B (18.7)	E (79.9)	F (87.3)
			SBT	C (20.3)	C (25.5)	C (20.3)	C (27.8)	F (148.7)	F (213.4)
			SBR	B (10.8)	B (12.3)	B (10.4)	B (11.8)	B (17.0)	B (19.5)
Intersection Lane Improvements	SIGNAL	**Overall**		-	-	-	-	**C (34.6)**	**E (56.8)**
- Additional WBL lane			**EB**	-	-	-	-	**D (46.2)**	**D (53.8)**
- Additional NBT lane		57th Street	EBL	-	-	-	-	C (34.2)	F (116.3)
- Convert SBR lane to SBTR lane			EBT	-	-	-	-	E (56.5)	D (37.2)
			EBR	-	-	-	-	C (29.2)	C (29.6)
			WB	-	-	-	-	**C (31.7)**	**E (65.7)**
		57th Street	WBL	-	-	-	-	C (28.8)	C (32.7)
			WBT	-	-	-	-	C (33.8)	F (92.4)
			WBR	-	-	-	-	C (30.2)	C (29.5)
			NB	-	-	-	-	**C (31.9)**	**D (40.3)**
		Taft Avenue	NBL	-	-	-	-	C (21.4)	F (96.9)
			NBT	-	-	-	-	C (34.1)	C (33.5)
			NBR	-	-	-	-	C (26.8)	C (26.3)
			SB	-	-	-	-	**C (31.5)**	**E (67.3)**
		Taft Avenue	SBL	-	-	-	-	C (30.8)	C (27.2)
			SBTR	-	-	-	-	C (31.7)	E (72.4)
2 57th Street/Duffield Avenue	STOP								
			EB	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**
		57th Street	EBL	A [8.0]	A [0.0]	A [8.0]	A [0.0]	A [8.4]	A [0.0]
			EBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]
			WB	**A [0.3]**	**A [0.1]**	**A [0.3]**	**A [0.1]**	**A [0.2]**	**A [0.1]**
		57th Street	WBL	A [8.9]	A [8.5]	A [8.8]	A [8.5]	A [10.0]	A [9.3]
			WBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]
		Duffield Avenue	**NB**	**B [13.0]**	**B [13.2]**	**B [12.7]**	**B [13.1]**	**C [16.8]**	**C [18.2]**
			NBLTR	B [13.0]	B [13.2]	B [12.7]	B [13.1]	C [16.8]	C [18.2]
		Sunset Vista	**SB**	**B [14.7]**	**C [20.2]**	**B [14.4]**	**C [20.2]**	**C [21.8]**	**E [38.1]**
			SBLTR	B [14.7]	C [20.2]	B [14.4]	C [20.2]	C [21.8]	E [38.1]
3 50th Street/Duffield Avenue	STOP								
		50th Street	**EB**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [8.4]**	**A [8.4]**
			EBLR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [8.4]	A [8.4]
		Duffield Avenue	**NB**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [3.6]**	**A [2.6]**
			NBLT	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [7.3]	A [7.2]
		Duffield Avenue	**SB**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**
			SBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]

Notes : (1) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.
(2) Numbers in parenthesis () represent delay at signalized intersections in seconds per vehicle.
* Dual westbound left turn lanes in Total Future Scenarios
** No new site trips contributed to these approaches/movements
*** Delays for these intersections/approaches/movements increased by 2% or less

ACF compliance Y/N column

An ACF column was added for every scenario

V. Site Analysis

Overview

The Applicant is proposing to develop the approximately 52.45-acre site with residential use. For purposes of this study, the site is assumed to be complete and occupied in 2028. The following use and development programs were analyzed:

Build-Out 2028:

143	DU	Single Family Detached Housing
50	DU	Single Family Attached Housing
180	DU	Multifamily Housing (Low-Rise)

Proposed Site Access

Proposed access needs to be restricted to 3/4 to mitigate LOS failure of the NB left

Dual 3/4 access at 57th/Duffield was included for all total future analyses

As shown on the Applicant's conceptual plan (Figure 1-2), acces existing full movement access at 57th Street/Duffield Avenue, a n 57th Street, and an additional full movement access to the south Avenue. Proposed lane use and traffic control are shown in Figure 5-1 (2028) and Figure 5-2 (2043).

Trip Generation

Overview

Trip generation estimates for the weekday AM and PM peak hours, as well as the weekday average daily traffic (ADT), were derived from the standard Institute of Transportation Engineers (ITE) Trip Generation Manual rates/equations, as published in the 11th edition. The trip generation analysis is presented in Table 5-1.

Site Trips

The vehicle trips that would be generated by the proposed development plan are summarized in Table 5-1. As shown in Table 5-1, the site would generate upon completion and full occupancy 202 new weekday AM and 263 new weekday PM peak hour vehicle trips, as well as 2,962 new weekday daily trips.

Site Trip Distributions

The distribution of the anticipated trips generated by the completion of the proposed development was based on an examination of existing traffic counts and local knowledge. Existing travel patterns indicate the following distribution is appropriate in the forecasting of future site traffic and consistent with the agreed upon scope:

- To/from the east on 57th Street: 55%
- To/from the south on Taft Avenue: 25%
- To/from the north on Taft Avenue: 5%
- To/from the west on 57th Street: 5%
- To/from the south on Duffield Avenue: 10%

Site Trip Assignments

The assignment of the new vehicle trips generated upon the future build-out of the development project was based on the above distribution. The trips assignments are depicted in Figure 5-3.

Non-Auto Infrastructure & Safe Routes to School

During the scoping process, the City of Loveland requested that the study review safe routes to school (SRTS) for schools within a mile and a half of the subject site. SRTS is a comprehensive approach to providing and encouraging walking and biking routes to schools to facilitate safe options for children. Schools within 1.5 miles exist to the southeast and southwest of subject site, and as such, non-auto infrastructure to/from these areas was reviewed.

Figure 5-4 provides the non-auto infrastructure that would serve these areas. As can be seen in Figure 5-4, the subject project would be serviced with multiple walking and biking routes to nearby schools. Schools to the east of the subject site are currently challenged by a rail crossing as well as several gaps in the infrastructure. All schools within a mile and a half of the proposed site would have uninterrupted pedestrian and bicycle routes once the proposed sidewalks and bike lanes are constructed. There are adequate pedestrian crossing markings at major intersections along these routes. Additionally, there is a bus stop at W 50th St & Apricot Dr for the Laurene Edmondson Elementary School which will provide transportation to and from the school without the need for young children to cross the railroad tracks. The District has informed the project that if there is a need along N Duffield Ave that additional stops can be provided as there are additional stops along the same route in the neighborhoods on the northside of 57th St. The designated walk boundary for Laurene Edmonson does not cross the tracks to the west. This project will connect to the existing infrastructure to the extent possible as the applicant is currently coordinating those alternatives with the City.

It is desirable to connect to the pedestrian infrastructure north of 57th Street to connect to the Walmart Supercenter. Several options have been identified that would be feasible for the project:

- Pedestrian Crossing at 57th Street/Duffield Avenue. This option would require pedestrians to cross two travel lanes and a turn lane and would need a pedestrian connection on the north side of the road to connect to existing infrastructure.
- Pedestrian Crossing at 57th Street at the Rail Crossing. This alternative would provide the shortest travel distance to the Walmart Supercenter but would require coordination with the railroad.
- Connections to the existing crossing at 57th Street/Taft Avenue. This alternative would create some out of direction travel to the ultimate Walmart Supercenter destination.

Which one are you recommending? I do not believe the first two options are feasible and cannot be supported by the City. Also, the intersection of 57th/Duffield needs to be restricted to a 3/4 and will have a median in the center of 57th at the proposed crossing location in option 1.

This information was clarified per our discussion

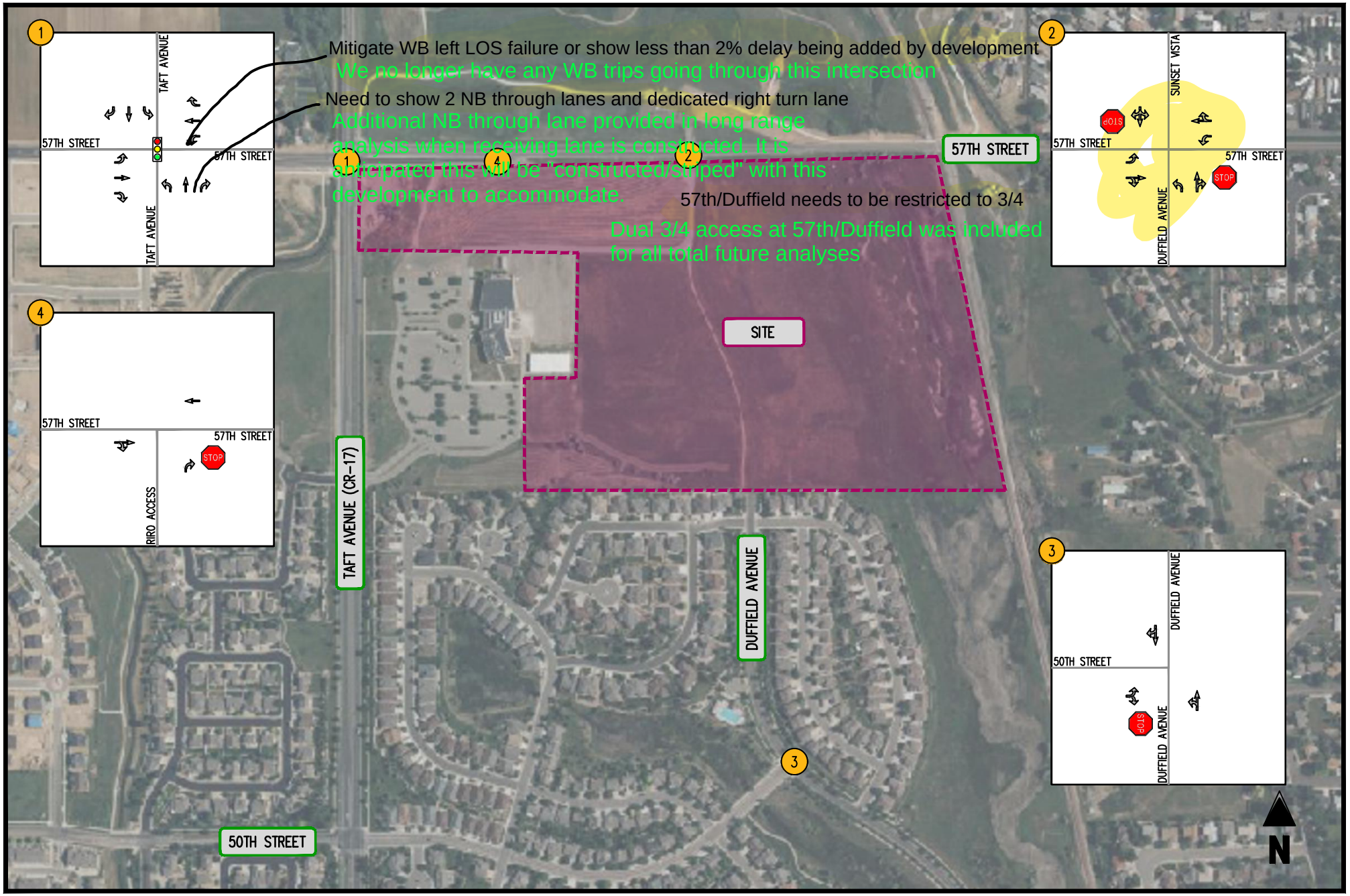

FIGURE 5-1
TOTAL FUTURE 2028 LANE USE AND TRAFFIC CONTROL

LOVELAND HOUSING AUTHORITY
LOVELAND, CO

MOVEMENT
SIGNALIZED INTERSECTION
STOP SIGN
YIELD SIGN

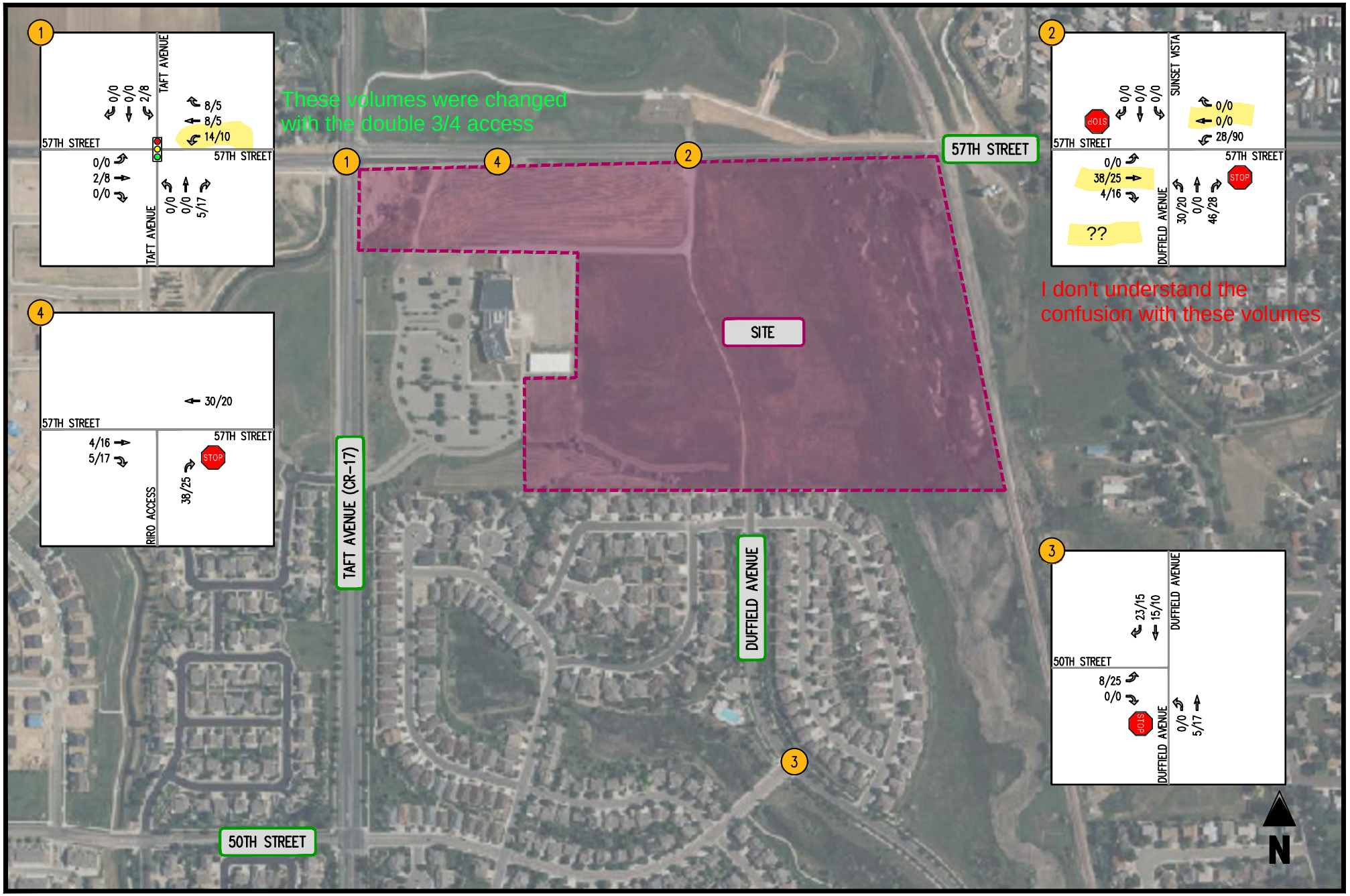

FIGURE 5-3
SITE TRIPS

LOVELAND HOUSING AUTHORITY
LOVELAND, CO

(A/A) INTERSECTION LOS

0000/0000 (AM PEAK HOUR/PM PEAK HOUR)

MOVEMENT

SIGNALIZED INTERSECTION

STOP SIGN

YIELD SIGN

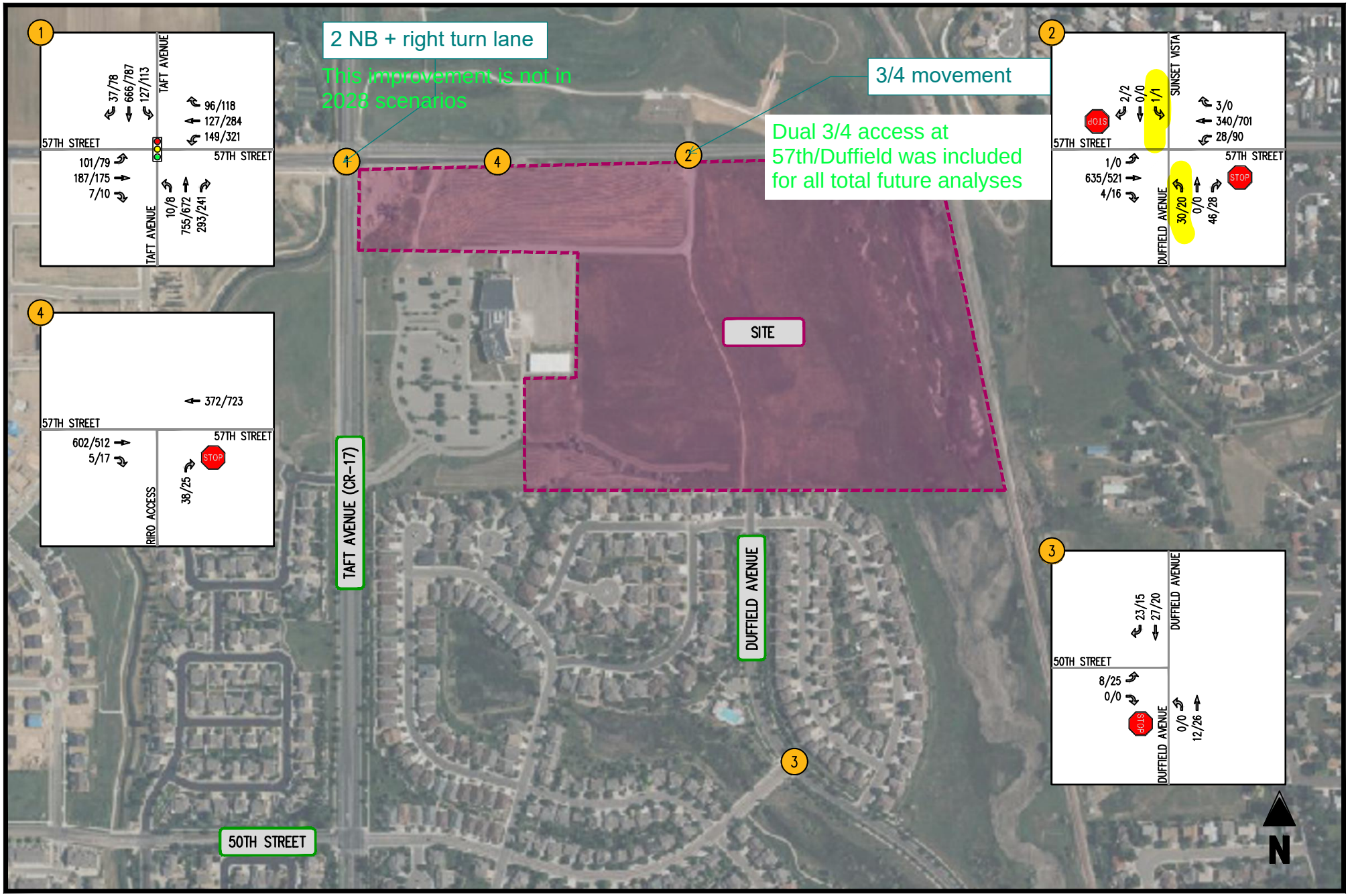

FIGURE 6-1
TOTAL FUTURE 2028 FORECASTS

LOVELAND HOUSING AUTHORITY
LOVELAND, CO

(A/A) INTERSECTION LOS
0000/0000 (AM PEAK HOUR/PM PEAK HOUR)

MOVEMENT
SIGNALIZED INTERSECTION
STOP SIGN
YIELD SIGN

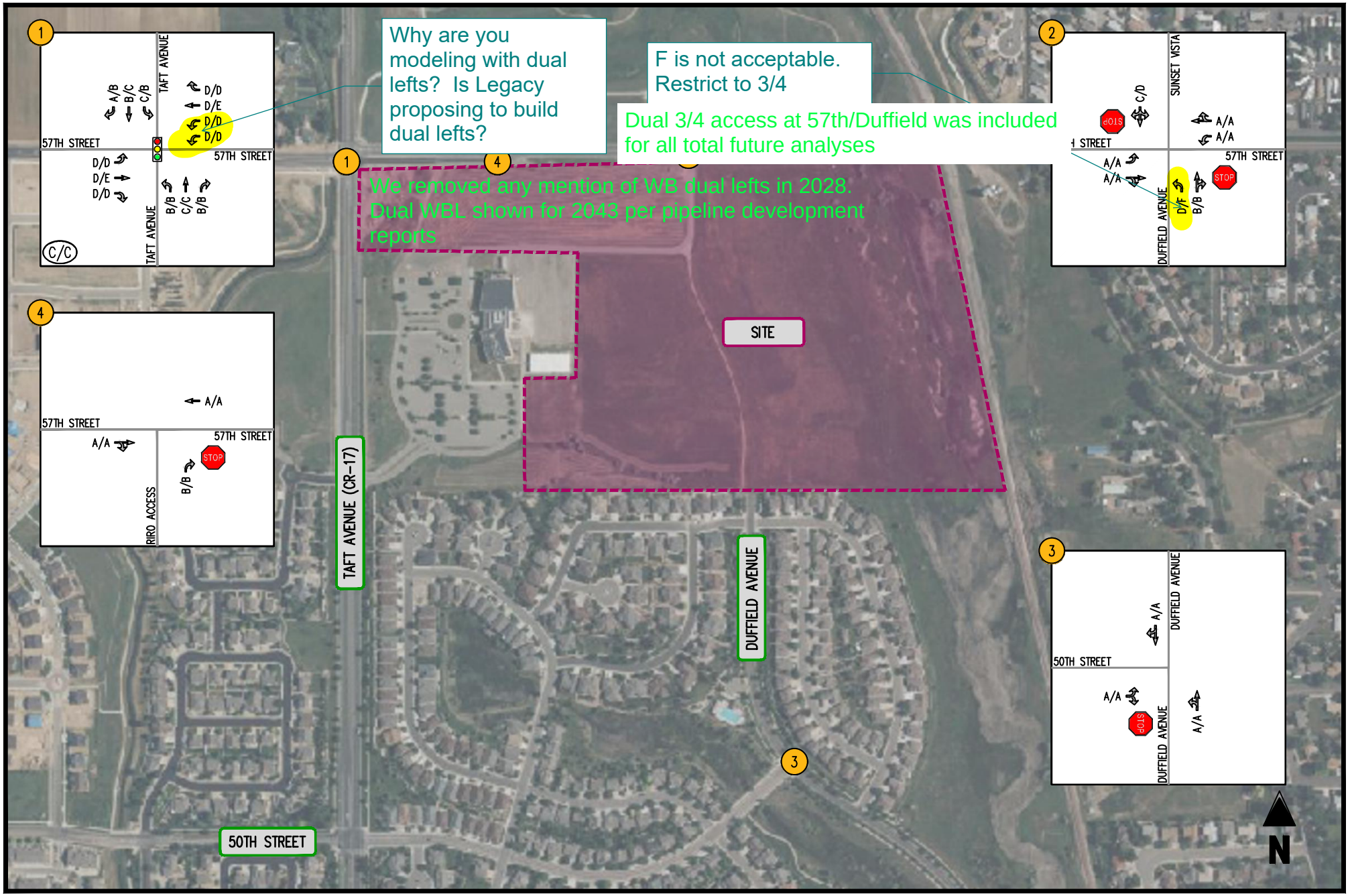

FIGURE 6-3
TOTAL FUTURE 2028 LOS

LOVELAND HOUSING AUTHORITY
LOVELAND, CO

A/A INTERSECTION LOS
0000/0000 (AM PEAK HOUR/PM PEAK HOUR)
MOVEMENT
SIGNALIZED INTERSECTION
STOP SIGN
YIELD SIGN

Need to add a column after each horizon year and indicate if it meets ACF.

An ACF column was added for every scenario

Table 6-1
Loveland Housing Authority - Loveland, CO
Total Future Intersection Level of Service Summary (1) (2

Intersection	Operating Condition	Street Name	Approach/ Movement	Background 2028 AM Peak Hour	Background 2028 PM Peak Hour	Background 2043 AM Peak Hour	Background 2043 PM Peak Hour	Total Future 2028 AM Peak Hour	Total Future 2028 PM Peak Hour	Total Future 2043 AM Peak Hour	Total Future 2043 PM Peak Hour	ACF Compliant? (Yes/No)
1 57th Street/Taft Avenue	SIGNAL	Overall		C (28.2)	D (40.0)	F (126.1)	F (145.0)	C (26.4)	C (31.9)	F (111.9)	F (134.3)	NO ***
			EB	D (44.5)	D (52.2)	F (94.1)	F (112.3)	D (44.7)	D (49.3)	F (98.5)	F (91.5)	NO ***
		57th Street	EBL	D (36.9)	D (42.8)	D (46.9)	F (123.5)	D (37.5)	D (41.8)	E (59.4)	F (122.3)	NO ***
			EBT	D (48.9)	E (57.1)	F (132.7)	F (131.4)	D (48.9)	D (53.1)	F (134.5)	F (96.9)	NO ***
			EBR	D (38.0)	D (43.1)	C (34.0)	D (41.0)	D (37.9)	D (41.8)	C (34.0)	D (38.9)	YES
			WB	D (37.3)	E (76.7)	C (33.5)	F (151.9)	D (38.7)	D (44.5)	C (34.5)	F (119.6)	NO ***
		57th Street	WBL *	D (35.6)	F (112.3)	C (33.6)	F (144.3)	D (35.4)	D (36.5)	C (30.9)	D (35.9)	NO ***
			WBT	D (38.4)	D (53.5)	C (34.5)	F (185.6)	D (41.2)	E (55.4)	D (37.3)	F (189.1)	NO ***
			WBR	D (38.0)	D (39.8)	C (30.8)	C (34.5)	D (40.8)	D (40.1)	C (32.7)	C (34.7)	YES
			NB	C (26.9)	C (23.9)	F (170.9)	F (120.5)	C (23.4)	C (23.6)	F (147.3)	F (119.0)	NO ***
		Taft Avenue	NBL	B (14.4)	B (18.9)	C (27.3)	F (175.7)	B (13.0)	B (18.9)	C (27.1)	F (180.8)	NO ***
			NBT	C (31.1)	C (26.4)	F (221.6)	F (133.1)	C (26.9)	C (26.3)	F (192.1)	F (133.1)	NO ***
			NBR	B (16.0)	B (15.8)	C (22.7)	C (20.3)	B (14.8)	B (16.3)	C (21.5)	C (21.0)	YES
			SB	C (20.3)	C (25.5)	F (131.1)	F (177.3)	B (18.2)	C (25.5)	F (112.0)	F (178.6)	NO ***
		Taft Avenue	SBL	C (23.5)	B (18.7)	E (79.9)	F (87.3)	C (20.8)	B (19.1)	F (84.2)	F (105.9)	NO
			SBT	C (20.3)	C (27.8)	F (148.7)	F (213.4)	B (18.2)	C (27.8)	F (124.3)	F (213.4)	NO ***
			SBR	B (10.4)	B (11.8)	B (17.0)	B (19.5)	A (9.4)	B (11.8)	B (15.8)	B (19.5)	YES
		Overall		-	-	C (34.6)	E (56.8)	-	-	C (35.0)	E (58.1)	NO ***
			EB	-	-	D (46.2)	D (53.8)	-	-	D (46.4)	D (52.7)	YES
		th Street	EBL	-	-	C (34.2)	F (116.3)	-	-	C (34.6)	F (115.8)	NO **
			EBT	-	-	E (56.5)	D (37.2)	-	-	E (56.7)	D (36.1)	YES
			EBR	-	-	C (29.2)	C (29.6)	-	-	C (29.2)	C (28.8)	YES
			WB	-	-	C (31.7)	E (65.7)	-	-	C (31.8)	E (60.7)	NO ***
		th Street	WBL	-	-	C (28.8)	C (32.7)	-	-	C (29.1)	C (33.7)	YES
			WBT	-	-	C (33.8)	F (92.4)	-	-	C (34.0)	F (84.2)	NO ***
			WBR	-	-	C (30.2)	C (29.5)	-	-	C (30.3)	C (28.8)	YES
			NB	-	-	C (31.9)	D (40.3)	-	-	C (32.5)	D (41.7)	YES
		ft Avenue	NBL	-	-	C (21.4)	F (96.9)	-	-	C (21.5)	F (99.6)	NO **
			NBT	-	-	C (34.1)	C (33.5)	-	-	C (34.7)	C (34.8)	YES
			NBR	-	-	C (26.8)	C (26.3)	-	-	C (27.7)	C (28.3)	YES
			SB	-	-	C (31.5)	E (67.3)	-	-	C (31.9)	E (74.3)	NO **
		Taft Avenue	SBL	-	-	C (30.8)	C (27.2)	-	-	C (31.6)	C (30.7)	YES
			SBTR	-	-	C (31.7)	E (72.4)	-	-	C (32.0)	F (80.3)	NO **
2 57th Street/Duffield Avenue	STOP		EB	A [0.0]	A [0.0]	A [0.0]	A [0.0]	-	-	-	-	-
		57th Street	EBL	A [8.0]	A [0.0]	A [8.4]	A [0.0]	-	-	-	-	-
			EBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	-	-	-	-	-
			WB	A [0.3]	A [0.1]	A [0.2]	A [0.1]	-	-	-	-	-
		57th Street	WBL	A [8.8]	A [8.5]	A [10.0]	A [9.3]	-	-	-	-	-
			WBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	-	-	-	-	-
			NB	B [12.7]	B [13.1]	C [16.8]	C [18.2]	-	-	-	-	-
		Duffield Avenue	NBLTR	B [12.7]	B [13.1]	C [16.8]	C [18.2]	-	-	-	-	-
			SB	B [14.4]	C [20.2]	C [21.8]	E [38.1]	-	-	-	-	-
		Sunset Vista	SBLTR	B [14.4]	C [20.2]	C [21.8]	E [38.1]	-	-	-	-	-
NB leg improvements	STOP		EB	-	-	-	-	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
		57th Street	EBL	-	-	-	-	A [8.0]	A [0.0]	A [8.4]	A [0.0]	YES
			EBTR	-	-	-	-	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
			WB	-	-	-	-	A [0.7]	A [1.0]	A [0.6]	A [0.8]	YES
		57th Street	WBL	-	-	-	-	A [9.1]	A [9.0]	B [10.5]	A [10.0]	YES
			WBTR	-	-	-	-	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
			NB	-	-	-	-	C [20.3]	D [32.1]	E [40.2]	F [101.4]	NO
		Duffield Avenue	NBL	-	-	-	-	D [29.9]	F [59.6]	F [71.6]	F [222.2]	NO
			NBTR	-	-	-	-	B [14.1]	B [12.4]	C [19.7]	C [15.1]	YES
			SB	-	-	-	-	C [16.6]	D [26.1]	D [27.7]	F [55.2]	NO **
		Sunset Vista	SBLTR	-	-	-	-	C [16.6]	D [26.1]	D [27.7]	F [55.2]	NO **
3 50th Street/Duffield Avenue	STOP		EB	A [0.0]	A [0.0]	A [8.4]	A [8.4]	A [8.8]	A [8.9]	A [8.8]	A [8.9]	YES
		50th Street	EBLR	A [0.0]	A [0.0]	A [8.4]	A [8.4]	A [8.8]	A [8.9]	A [8.8]	A [8.9]	YES
			NB	A [0.0]	A [0.0]	A [3.6]	A [2.6]	A [0.0]	A [0.0]	A [2.7]	A [1.2]	YES
		Duffield Avenue	NBLT	A [0.0]	A [0.0]	A [7.3]	A [7.2]	A [0.0]	A [0.0]	A [7.3]	A [7.3]	YES
			SB	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
		Duffield Avenue	SBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
4 57th Street/RIRO Access	STOP		EB	-	-	-	-	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
		57th Street	EBTR	-	-	-	-	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
			WB	-	-	-	-	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
		57th Street	WBT	-	-	-	-	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
			NB	-	-	-	-	B [13.5]	B [12.2]	C [18.5]	B [14.9]	YES
		RIRO Access	NBR	-	-	-	-	B [13.5]	B [12.2]	C [18.5]	B [14.9]	YES

Notes : (1) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.
(2) Numbers in parenthesis () represent delay at signalized intersections in seconds per vehicle.
* Dual westbound left turn lanes in Total Future Scenarios
** No new site trips contributed to these approaches/movements
*** Delays for these intersections/approaches/movements increased by 2% or less

You cannot model dual lefts in 2028 unless you are proposing to build them

We removed any mention of WB dual lefts in 2028. They are mentioned for 2043 per pipeline reports

Should be showing 2028 LOS results with 3/4 restriction and 2043 results with roundabout

A 3/4 access will be shown for total future 2028 and 2043. We are not providing a roundabout analysis at this time as no mitigation is required.

Need ACF compliance column for 2028 total

An ACF column was added for every scenario

Table 6-2
Loveland Housing Authority - Loveland, CO
Total Future Intersection Level of Service Summary - 3/4 Movement Scenario (1) (2)

Intersection	Operating Condition	Street Name	Approach/ Movement	Total Future 2028 AM Peak Hour	Total Future 2028 PM Peak Hour	Total Futu AM Peak Hour	Peak Hour	(Yes/No)
1 57th Street/Taft Avenue	SIGNAL	**Overall**		**C (26.3)**	**C (31.8)**	**F (111.7)**	**F (134.7)**	**NO *****
			EB	**D (44.7)**	**D (49.6)**	**F (98.1)**	**F (89.4)**	**NO *****
		57th Street	EBL	D (37.4)	D (41.9)	E (58.0)	F (122.2)	NO ***
			EBT	D (48.9)	D (53.5)	F (134.5)	F (93.4)	NO ***
			EBR	D (37.9)	D (41.9)	C (34.0)	D (38.6)	YES
			WB	**D (38.9)**	**D (44.5)**	**C (34.5)**	**F (117.9)**	**NO *****
		57th Street	WBL *	D (35.5)	D (36.5)	C (31.0)	D (35.5)	NO ***
			WBT	D (41.3)	D (55.0)	D (37.2)	F (184.7)	NO ***
			WBR	D (40.8)	D (40.3)	C (32.8)	C (34.5)	YES
			NB	**C (23.3)**	**C (23.5)**	**F (146.8)**	**F (122.6)**	**NO *****
		Taft Avenue	NBL	B (12.9)	B (18.9)	C (29.0)	F (193.8)	NO ***
			NBT	C (26.9)	C (26.2)	F (192.1)	F (135.6)	NO ***
			NBR	B (14.7)	B (16.1)	C (21.3)	C (21.0)	YES
			SB	**B (18.5)**	**C (25.8)**	**F (109.8)**	**F (178.6)**	**NO *****
		Taft Avenue	SBL	C (20.8)	B (19.1)	F (84.4)	F (105.9)	NO
			SBT	B (18.6)	C (28.1)	F (121.5)	F (213.4)	NO ***
			SBR	A (9.6)	B (11.9)	B (15.6)	B (19.5)	YES
	SIGNAL	**Overall**		-	-	**D (35.1)**	**E (57.1)**	**NO *****
			EB	-	-	**D (46.2)**	**D (53.8)**	**YES**
		57th Street	EBL	-	-	C (33.8)	F (116.3)	NO **
			EBT	-	-	E (56.7)	D (37.6)	YES
			EBR	-	-	C (29.2)	C (29.6)	YES
			WB	-	-	**C (31.5)**	**E (65.5)**	**NO *****
		57th Street	WBL	-	-	C (28.8)	C (34.4)	YES
			WBT	-	-	C (33.6)	F (91.9)	NO ***
			WBR	-	-	C (30.1)	C (29.5)	YES
			NB	-	-	**C (32.8)**	**D (41.9)**	**YES**
		Taft Avenue	NBL	-	-	C (21.9)	F (107.8)	NO **
			NBT	-	-	D (35.1)	C (33.6)	YES
			NBR	-	-	C (27.8)	C (27.4)	YES
			SB	-	-	**C (32.2)**	**E (67.3)**	**NO ****
		Taft Avenue	SBL	-	-	C (32.0)	C (29.4)	YES
			SBTR	-	-	C (32.4)	E (72.4)	NO **
2 57th Street/Duffield Avenue *NB leg improvements*	STOP		**EB**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**YES**
		57th Street	EBL	A [8.0]	A [0.0]	A [8.4]	A [0.0]	YES
			EBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
			WB	**A [0.7]**	**A [1.0]**	**A [0.6]**	**A [0.8]**	**YES**
		57th Street	WBL	A [9.1]	A [9.0]	B [10.5]	A [10.0]	YES
			WBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
			NB	**B [14.2]**	**B [12.4]**	**C [19.7]**	**C [15.2]**	**YES**
		Duffield Avenue	NBR	B [14.2]	B [12.4]	C [19.7]	C [15.2]	YES
			SB	**B [10.4]**	**B [14.0]**	**B [11.5]**	**C [19.2]**	**YES**
		Sunset Vista	SBR	B [10.4]	B [14.0]	B [11.5]	C [19.2]	YES
3 50th Street/Duffield Avenue	STOP		**EB**	**A [8.9]**	**A [9.0]**	**A [8.9]**	**A [9.0]**	**YES**
		50th Street	EBLR	A [8.9]	A [9.0]	A [8.9]	A [9.0]	YES
			NB	**A [0.0]**	**A [0.0]**	**A [2.7]**	**A [1.2]**	**YES**
		Duffield Avenue	NBLT	A [0.0]	A [0.0]	A [7.4]	A [7.3]	YES
			SB	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**YES**
		Duffield Avenue	SBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
4 57th Street/RIRO Access	STOP		**EB**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**YES**
		57th Street	EBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
			WB	**A [0.0]**	**A [0.0]**	**A [0.0]**	**A [0.0]**	**YES**
		57th Street	WBT	A [0.0]	A [0.0]	A [0.0]	A [0.0]	YES
			NB	**B [13.5]**	**B [12.3]**	**C [18.5]**	**B [14.9]**	**YES**
		RIRO Access	NBR	B [13.5]	B [12.3]	C [18.5]	B [14.9]	YES

Notes : (1) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.
(2) Numbers in parenthesis () represent delay at signalized intersections in seconds per vehicle.
* Dual westbound left turn lanes in Total Future Scenarios
** No new site trips contributed to these approaches/movements
*** Delays for these intersections/approaches/movements increased by 2% or less

Can't model with dual lefts unless you plan to build them

We removed any mention of WB dual lefts in 2028. They are mentioned for 2043 per pipeline reports

VII. Conclusions and Recommendations

Conclusions

Based on the results of this traffic impact study, the following may be concluded:

- Under existing traffic conditions, the intersections within the study area currently operate at overall acceptable levels of service (LOS) "D" or better during the weekday AM and PM peak hours, and queues remain within their respective storage lengths.

- Under background future 2028 and 2043 traffic conditions, without the development of the subject site, delays would increase at study intersections due to regional traffic growth and pipeline developments. Pipeline developments in the area are expected to improve the signalized intersection of 57th Street/Taft Avenue in background 2028 conditions based on their impact, and the intersection is expected to reach capacity with the existing lane use in study year 2043. Proposed intersection improvements are applied for study year 2043. With these improvements, the signalized intersection in the study is expected to operate at LOS "C" during the weekday AM peak hour and LOS "E" during the weekday PM peak hour.

- In the background future 2043 scenario, the NBL queue at the 57th Street/Taft Avenue intersection is expected to exceed its storage length during the PM peak hour due to pipeline developments.

- The proposed site development would generate, upon completion and full occupancy, 202 new weekday AM and 263 new weekday PM peak hour vehicle trips as well as 2,962 new weekday daily trips.

- Under total future 2028 and 2043 traffic conditions with development of the site, the intersections within the study area would operate consistent with background conditions with the exceptions of the stop-controlled movements at the 57th Street/Duffield Avenue intersection which are shown to operate at LOS "D" in 2028 and LOS "F" in 2043 under total future conditions. However, these ...nes are also shown to have a volume/capacity ratio, (V/C) of less than 1.0, suggesting ...l capacity available for these movements. Signal warrants would not be triggered for this ...ion. A scenario with double ¾ movements was analyzed and would mitigate this failure. ...y a roundabout will be provided for this intersection depending on certain triggers and

This one doesn't make sense to me. Add capacity to the existing WB left. NB through lane?

Recommendations

Only need to recommend improvements based on short range findings only

Recommendations were provided just for short range analysis

This was an error and should've said 57th St/Taft Ave - this was updated

- It is recommended that the Northbound left turn lane be extende... meet LCUASS standards in the future design of the 57th ... improvement in background conditions.

Indicate the need in 2028 or 2043

- It is recommended that the Applicant provide an additio... ...und through lane at 57th Street and Duffield Avenue. No queue... ... the substandard existing geometry the Applicant should provide additional stacking capacity to the extent that physical site constraints (grade, proximity to the rail crossing, etc.) allow.

This information was added.

- It is recommended that the Applicant coordinate possible pedestrian crossing solutions across 57th Street with the City. No specific recommendations are provided herein.

More detail

- It is recommended that the Applicant provide access consistent with ...

More information was added here.

APPENDIX A – Full Sized Conceptual Plan

Conclusions & Recommendations extended

1. Restrict Duffield/57th to dual 3/4 Dual 3/4 access at 57th/Duffield was included for all total future analyses
2. Dual WB lefts at Taft/57th? Detailed description of the ACF exemption criteria and how you qualify. We no longer contribute site trips to this movement. We added ACF compliance to LOS tables.
3. 2 NB thru lanes + dedicated right turn lane on Taft Ave s/o 57th - Developer obligation
   This information was clarified
4. Safe ped crossing on 57th - More detailed conclusion and explanation
   More detailed information was added in recommendations section.
5. Busing of students east of RR tracks - Provide confirmation from the school district
   This information was added in conclusions section.

Provide an exhibit that shows the following with the dual 3/4 restriction modeled at Duffield/57th.

1. Long and Short range projected ADT volume on Duffield North and South of 50th. LCUASS classification and volume threshold from 7-1
2. Long and short range projected ADT volume on 50th. LCUASS classification and threshold from 7-1
3. Existing daily volumes on Duffield and on 50th. You can use the data provided by the City.

The ADTs were added to the forecasting figures. LCUASS classifications and ADT volume thresholds were also added to these forecasting figures.