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February 3, 2021

Ms. Kathy Denzer
Senior Regulatory Analyst
Crestone Peak Resources

Re: Crestone Peak Resources
Lone Tree North - 2021 Update
Supplemental Traffic
Memorandum
Aurora, Colorado
LSC #210150

Dear Ms. Denzer:

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic memorandum for the proposed Crestone Peak Resources Lone Tree North well site (15 well heads) in Aurora, Colorado, to supplement the December 12, 2019 *ConocoPhillips Well Sites Lone Tree North and South Traffic Memorandum (TA)* by LSC.

REPORT CONTENTS

The report includes a review of the need for auxiliary turn lanes along the proposed haul route based on the NR-B/NR-C CDOT classifications in the *State Highway Access Code (SHAC)*.

LAND USE AND ACCESS

The Lone Tree North and South sites are being consolidated into the Lone Tree North site, but will have a total of 15 well heads rather than the 16 well heads per the TA. The private access roads connect directly to the Hayesmount Road alignment which is currently an existing private access easement. Other existing private access agreements exist between the Hayesmount Road alignment and CDOT right-of-way at the I-70/Airpark interchange. The Lone Tree North site location and the proposed haul route are shown in Figure 1 of the attached TA.

TRIP GENERATION

The currently proposed number of wells is consistent with the TA.

PEAK-HOUR IMPACTS ALONG THE PROPOSED HAUL ROUTE

The consolidation of the 15 wells onto the Lone Tree North site will result in a similar impact to the proposed haul route as identified in the TA.

SUMMARY

The previous TA did not recommend auxiliary turn lanes along the proposed haul route, primarily because most of the haul route is unpaved and located within unincorporated Arapahoe County and not within platted City of Aurora right-of-way. In addition, the impact of the site will be relatively short-term and the background traffic along most of the access easement haul route is low volume and primarily composed of other oil and gas related trips. This recommendation is still applicable because the proposed change to well locations will have a similar impact to the proposed haul route as identified in the TA.

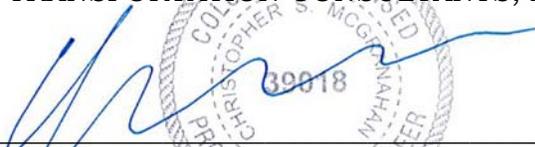
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We trust this supplemental traffic memorandum will assist you in gaining approval of the proposed Crestone Peak Resources well site referred to as Lone Tree North. Please contact me if you have any questions or need further assistance.

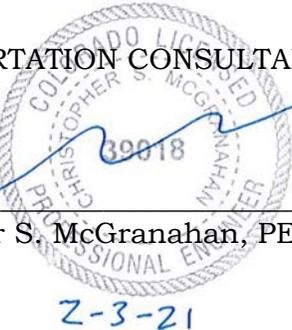
Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By



Christopher S. McGranahan, PE, PTOE
Principal



CSM/wc

Enclosures: December 12, 2019 *ConocoPhillips Well Sites Lone Tree North and South Traffic Memorandum (TA)*



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December 12, 2019

Ms. Melinda Lundquist, P.E.
CVL Consultants of Colorado
10333 E. Dry Creek Avenue, Suite 240
Englewood, CO 80112

Re: ConocoPhillips Well Sites
Lone Tree North #4-65 15-16
Lone Tree South #4-65 15-16
Traffic Memorandum
Aurora, Colorado
LSC #190754 & 190757

Dear Ms. Lundquist:

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic memorandum for the proposed ConocoPhillips Lone Tree North #4-65 15-16 and Lone Tree South #4-65 15-16 well sites (16 well heads) in Aurora, Colorado, as shown in Figure 1.

REPORT CONTENTS

The report includes a review of the need for auxiliary turn lanes along the proposed haul routes based on the NR-B/NR-C CDOT classifications in the *State Highway Access Code* (SHAC). The impacts of the Lone Tree North and Lone Tree South sites were both included in this report to demonstrate the combined impact on the existing street network.

LAND USE AND ACCESS

The two sites are proposed as oil and gas operations with a total of 16 well heads. The private access roads connect directly to the Hayeshmount Road alignment which is currently an existing private access easement. Other existing private access agreements exist between the Hayeshmount Road alignment and CDOT right-of-way at the I-70/Airpark interchange. The proposed haul route is shown in Figure 1.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

The major roadways along the haul route are shown on Figure 1 and are briefly described below.

- Private access easements exist between the I-70/Airpark interchange right-of-way through the Sky Ranch development in unincorporated Arapahoe County and continue south on the Hayesmount Road alignment within a private access easement. None of the proposed haul route is located within platted City of Aurora right-of-way. A majority of the haul route is unpaved but will be maintained by the applicant.
- **Existing or Proposed Private Access Roads** are gravel roadways that will provide access to the site. They will be maintained to accommodate construction traffic with a minimum width of 23 feet. Typically the first 100 feet from the public roadway network will be improved as a hard surface, but there are no paved public roadways near the site so this will not be necessary for these sites.

EXISTING CONDITIONS

Figure 2 shows the existing traffic volumes, lane geometry, traffic control, and posted speed limits along the proposed haul route. Figure 3 shows the estimated 2022 background traffic along the private access easements which is primarily comprised of other oil and gas related trips.

SIGHT DISTANCE

The intersection sight distance is good along the proposed haul routes.

OPERATOR AGREEMENT BMP 27

The applicant has responded elsewhere to the various requirements of the Operator Agreement BMP 27.

TRIP GENERATION

Table 1 shows the typical daily PCE trips for the various phases of any one site. Table 1 also shows the estimated daily traffic volumes in passenger car equivalent (PCE) vehicles each day beginning on May 20, 2020 and ending on February 28, 2023 for the combined sites. This construction schedule of about 32 months is subject to change based on field conditions, but is a good estimate of the combined impact over time from the two sites. The various vehicle types are summarized in the attached Truck Footprint table by CVL Consultants.

Table 2 shows the eight scenarios with a PCE trip generation potential over 150 trips per day. Table 2 also estimates peak-hour trips by conservatively assuming the daily trips are distributed over a ten-hour day with a peaking factor of 2.0.

PEAK-HOUR IMPACTS ALONG THE PROPOSED HAUL ROUTE

Trip Assignment

Figure 4 shows the combined PCE trip assignment for both Scenarios 6 and 7 from Table 2. All other combinations of phases will have an equal or lower trip generation potential.

Total Turning Traffic

Figure 5 shows the estimated 2022 total traffic volumes along the proposed haul route.

I-70 Interchange and Frontage Road

The existing interchange is currently being studied to determine interim and long-term improvements as part of the *I-70 at Airpark & Watkins Interchange Study* which is being funded by the Sky Ranch and Prosper Farms developments. Any short-term or long-term interchange improvements will be vetted through this process.

Balance of Haul Route

The balance of the haul route from the I-70/Airpark Interchange to the two sites is unpaved and located on private easements within unincorporated Arapahoe County - none of the off-site haul route is within platted City of Aurora right-of-way.

SUMMARY

There are no recommended auxiliary turn lanes proposed along the haul route, primarily because most of the haul route is unpaved and located within unincorporated Arapahoe County and not within platted City of Aurora right-of-way. In addition, the impact of the sites will be relatively short-term and the background traffic along most of the access easement haul route is low volume and primarily composed of other oil and gas related trips.

* * * * *

We trust this traffic memorandum will assist you in gaining approval of the proposed ConocoPhillips well sites referred to as Lone Tree North #4-65 15-16 and Lone Tree South #4-65 15-16. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC

By 
Christopher S. McGranahan, PE, PTOE
Principal



12-12-19

CSM/wc

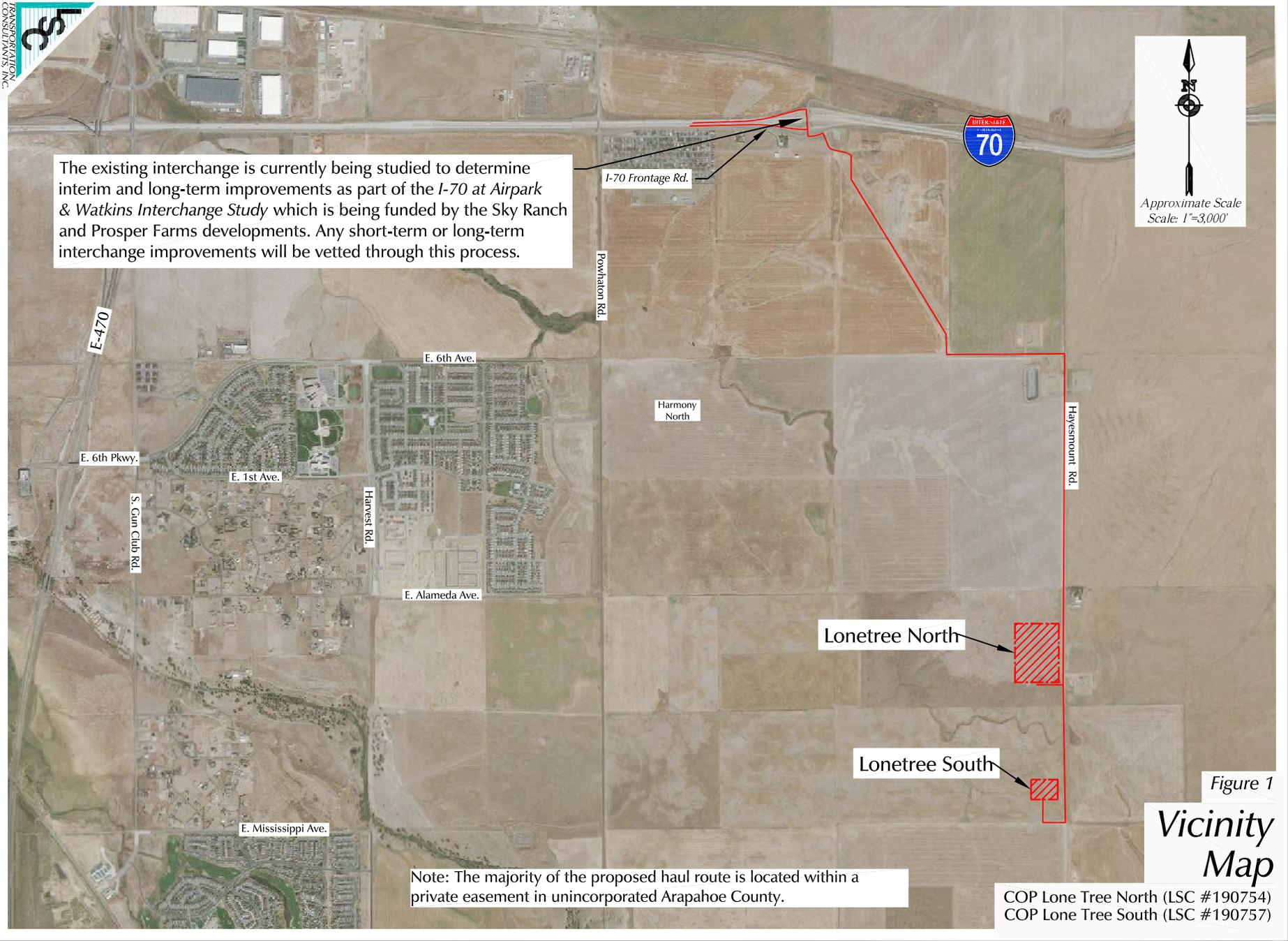
- Enclosures: Tables 1 and 2
- Figures 1 - 5
- Truck Footprint Table by CVL Consultants
- Traffic Counts

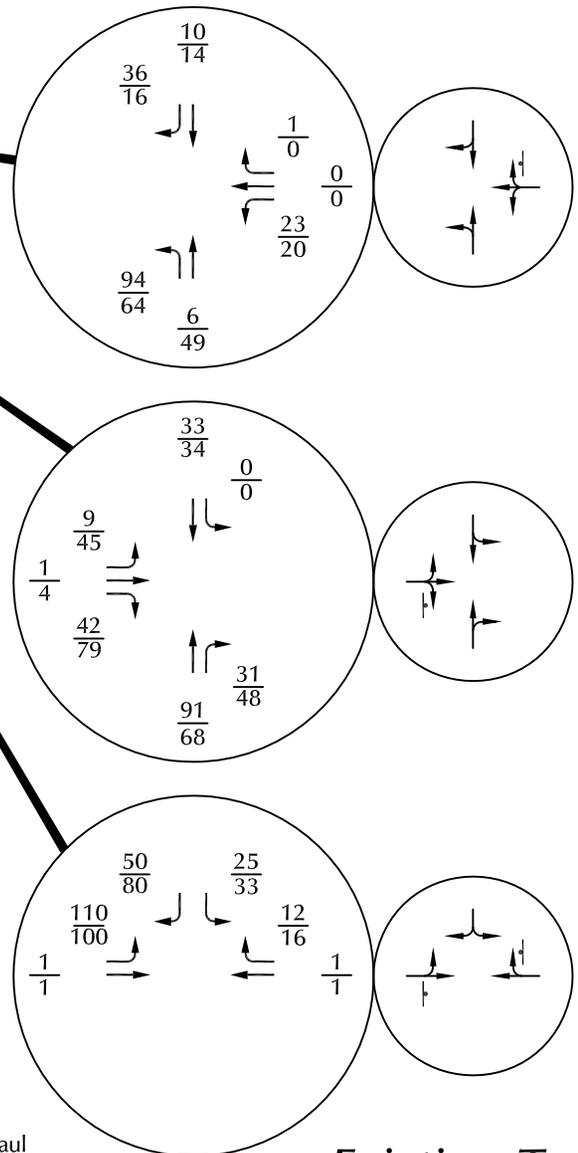
Table 2
ESTIMATED TRAFFIC GENERATION ⁽¹⁾
COP - Lone Tree North & Lone Tree South
Aurora, CO
LSC #190754 & #190757; December, 2019

Trip Generating Scenario	Estimated Begin Date ⁽⁴⁾	Estimated Duration ⁽⁴⁾	Trip Generation Rates ⁽²⁾				Vehicle - Trips Generated by Scenario						
			Average Weekday	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out	Average Weekday	AM Peak Hour ⁽³⁾ In	AM Peak Hour ⁽³⁾ Out	PM Peak Hour ⁽³⁾ In	PM Peak Hour ⁽³⁾ Out	
<i>Scenario</i>													
1	02-Jun-2020	15 days	-	-	-	-	-	-	156	16	16	16	16
2	10-Aug-2020	3 days	-	-	-	-	-	-	165	17	17	17	17
3	14-Oct-2020	3 days	-	-	-	-	-	-	165	17	17	17	17
4	12-Nov-2020	62 days	-	-	-	-	-	-	162	16	16	16	16
5	19-Nov-2021	15 days	-	-	-	-	-	-	162	16	16	16	16
6	27-Jan-2022	3 days	-	-	-	-	-	-	171	17	17	17	17
7	11-Mar-2022	3 days	-	-	-	-	-	-	171	17	17	17	17
8	18-Apr-2022	41 days	-	-	-	-	-	-	168	17	17	17	17

Notes:

- (1) This table summarizes the nine scenarios during which the combined sites are expected to generate more than 150 one-way passenger car equivalent trips per day.
- (2) Source: Duration and average weekday volume data provided by applicant.
- (3) Conservatively assumes daily trips are evenly distributed over a 10 hour day with a 2.0 peaking factor.
- (4) The proposed timeline is subject to change based on field conditions.





Approximate Scale
Scale: 1" = 1,200'

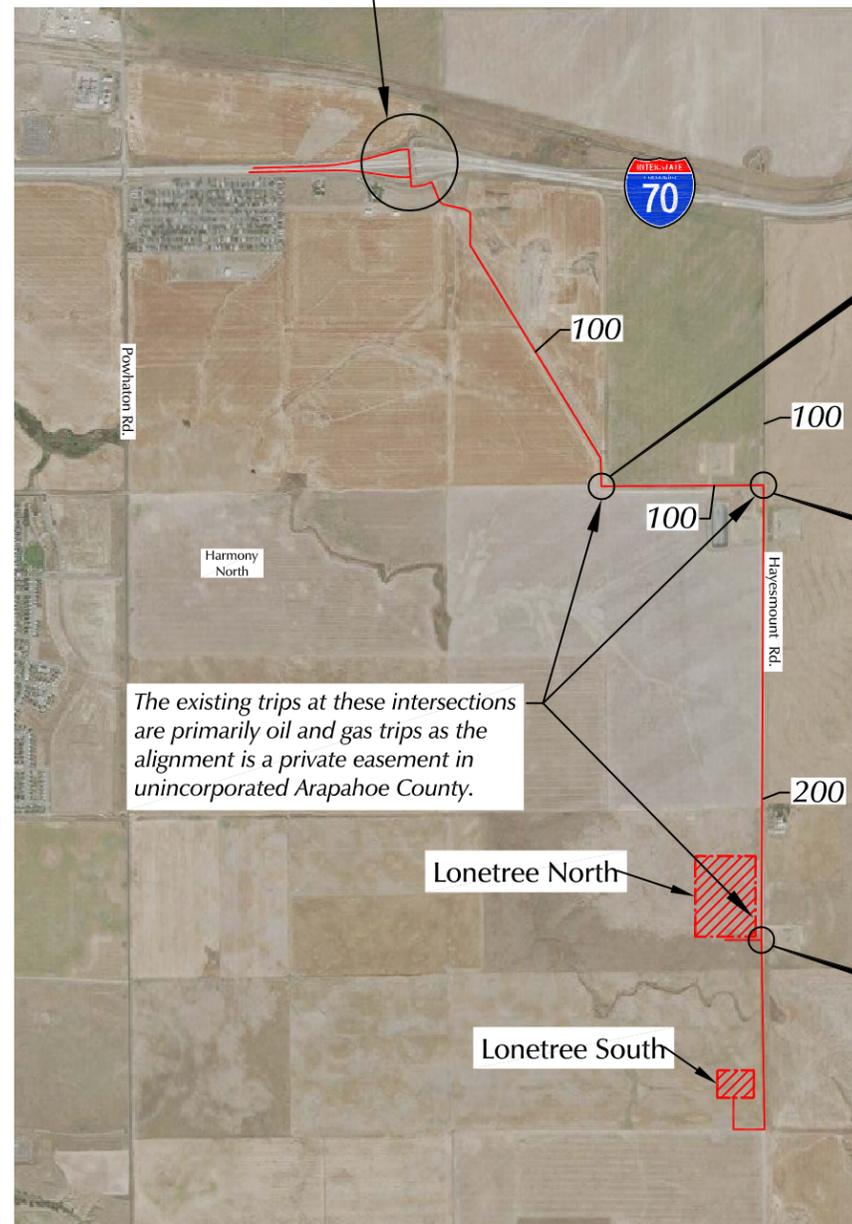
LEGEND:
 † = Stop Sign
 $\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic
 1,000 = Average Daily Traffic

Note: There is no posted speed limit for most of the haul route because it is unpaved and located within a private access easement in unincorporated Arapahoe County.

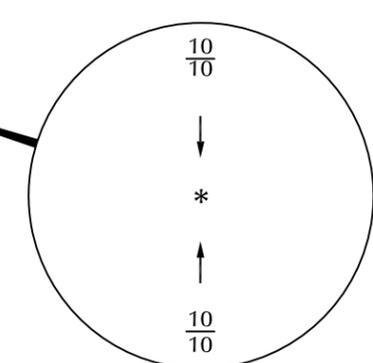
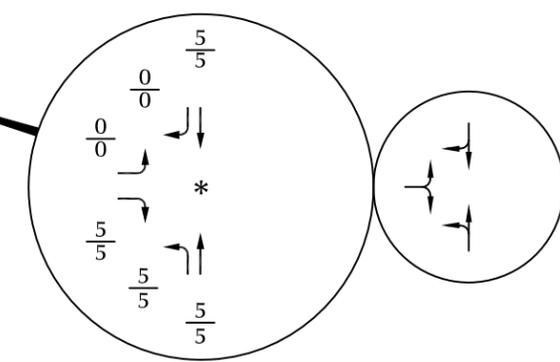
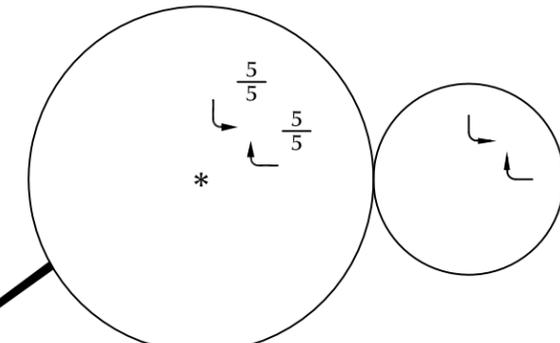
Figure 2
**Existing Traffic, Lane
 Geometry and Traffic Control**

COP Lone Tree North (LSC #190754)
 COP Lone Tree South (LSC #190757)

The existing interchange is currently being studied to determine interim and long-term improvements as part of the *I-70 at Airpark & Watkins Interchange Study* which is being funded by the Sky Ranch and Prosper Farms developments. Any short-term or long-term interchange improvements will be vetted through this process.



The existing trips at these intersections are primarily oil and gas trips as the alignment is a private easement in unincorporated Arapahoe County.



LEGEND:

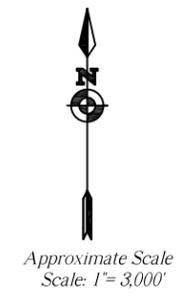
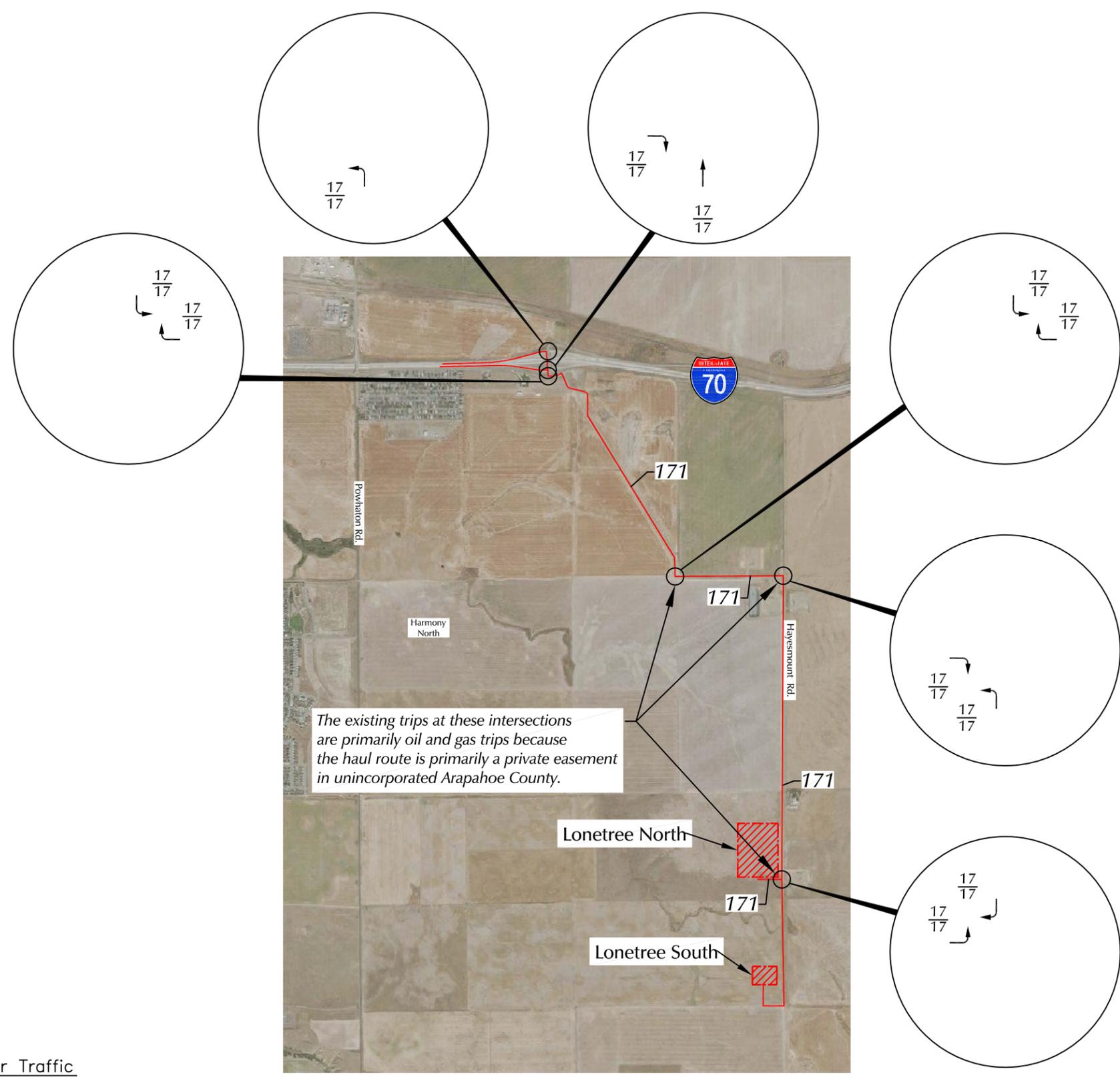
- = Stop Sign
- $\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic
- 1,000 = Average Daily Traffic



*Traffic volumes estimated by LSC. These trips are mostly oil and gas related.

Figure 3
**Year 2022 Background Traffic,
Lane Geometry and Traffic Control**

COP Lone Tree North (LSC #190754)
COP Lone Tree South (LSC #190757)

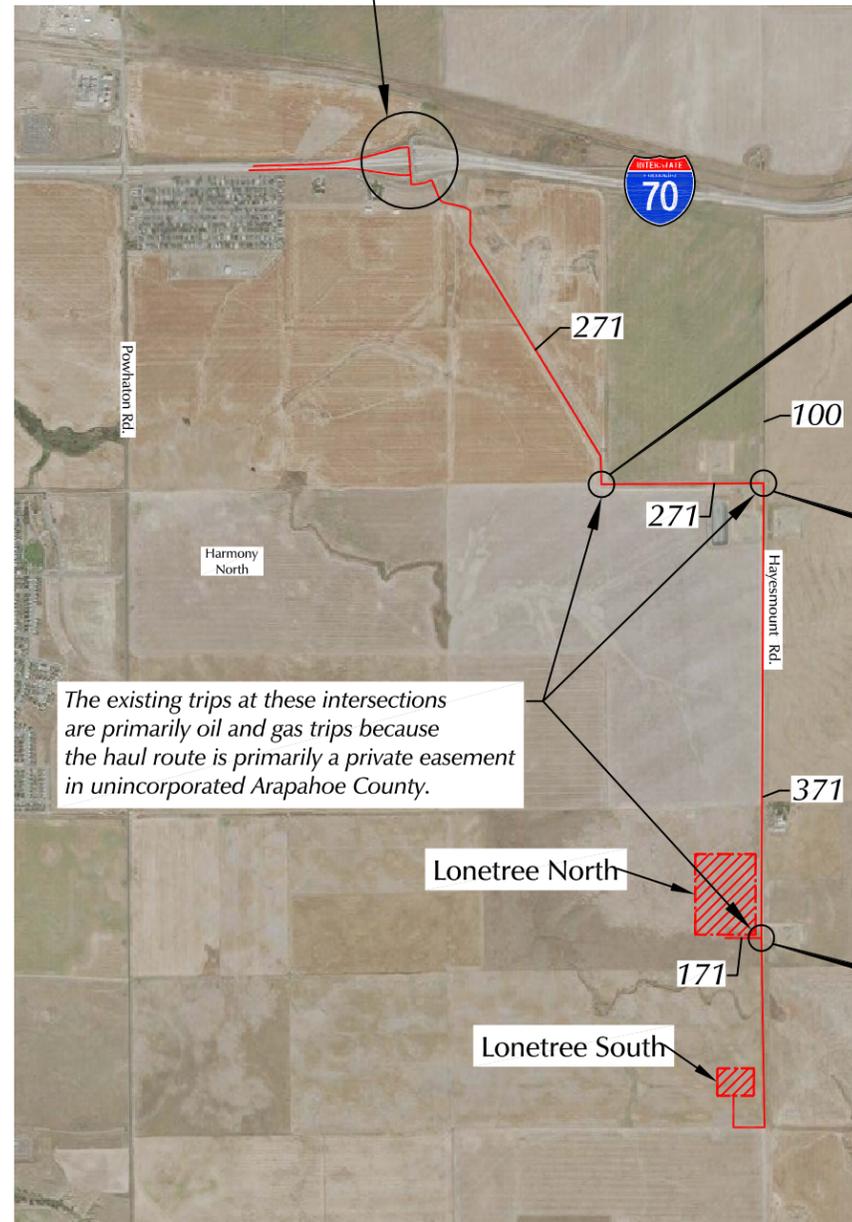


LEGEND:
 $\frac{26}{35}$ = AM Peak Hour Traffic
 $\frac{35}{35}$ = PM Peak Hour Traffic
 1,000 = Average Daily Traffic

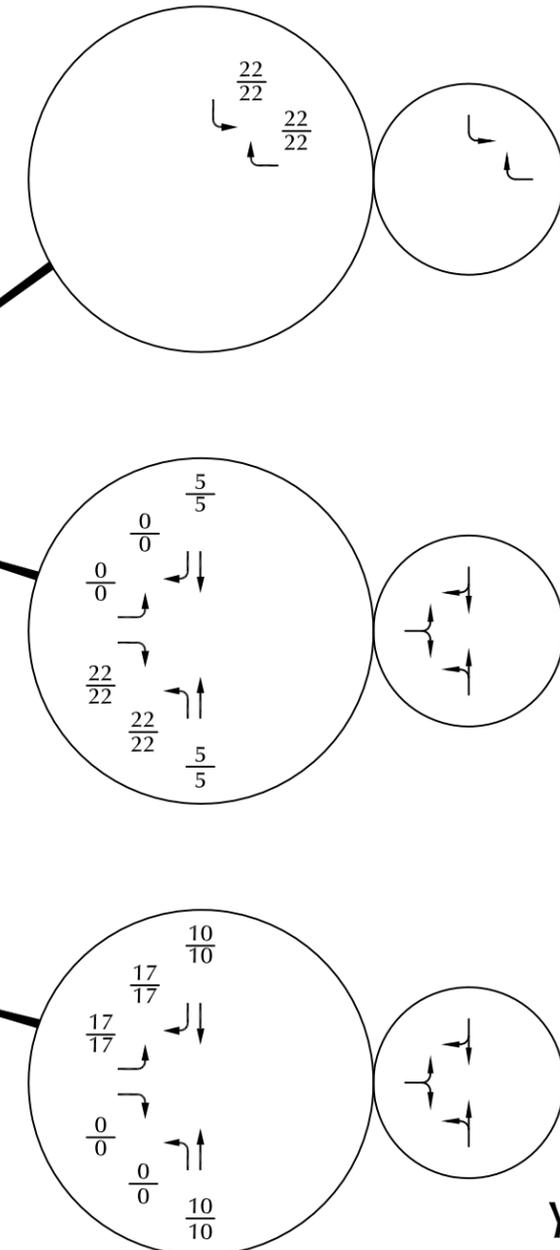


Figure 4
Combined Assignment of Site-Generated Traffic at Off-Site Intersections
 COP Lone Tree North (LSC #190754)
 COP Lone Tree South (LSC #190757)

The existing interchange is currently being studied to determine interim and long-term improvements as part of the *I-70 at Airpark & Watkins Interchange Study* which is being funded by the Sky Ranch and Prosper Farms developments. Any short-term or long-term interchange improvements will be vetted through this process.



- Note: No auxiliary turn lanes are recommended along the proposed haul route due to each of the following factors:
1. The majority of the haul route is existing gravel roads, that are not planned to be paved in the foreseeable future.
 2. The majority of the haul route is located on existing easements in unincorporated Arapahoe County.
 3. The impact to I-70 is less than twenty percent and the interchange is currently being studied for interim/ultimate improvements.
 4. The existing and background traffic is relatively low and comprised mostly of other oil and gas trips.



LEGEND:

- † = Stop Sign
- $\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic
- 1,000 = Average Daily Traffic



Figure 5
**Year 2022 Total Traffic,
 Lane Geometry and Traffic Control**

COP Lone Tree North (LSC #190754)
 COP Lone Tree South (LSC #190757)

<u>Truck Type</u>	<u>Description</u>	<u>Weight in lbs</u>	<u>Length in Feet</u>	<u>Axel Gap</u>	<u>Wheels</u>	<u>Number on Pad</u>
Q-10 Pump Truck	Pumping unit	93,320	54'	26'	22	14 active 2 spare
HT-2000	Pumping unit	83,500	53'	26'	18	2 active
FB4K Blender	Mixing Unit	86,780	54'	29'3"	18	1 active 1 spare
ADP	Mixing Unit	80,000	55'	29'3"	18	1 active 1 spare
TCC	Data Recording Unit	68,000	53'	26'	18	1 active
Iron Floats	Iron Storage and Transport	80,000	53'	29'3"	18	3 active
Iron Truck	Crane / Iron Storage	36,120	28'	20'	10	1 active 1 spare
Missile	High and Low Pressure Manifold	60,000	50'	45'	14	1 active
Chemical Floats	Chemical Storage and Transport	65,000	53'	26'	18	3 active
Chemical Iso	Chemical Storage and Transport	75,000	53'	27'6"	18	2 active 1 spare
Acid Tankers	Chemical Storage and Transport	74,000	53'	24'	18	1 active 1 spare
Con Ex Trailer	Parts and Maintenance Storage	62,000	53'	29'	18	1 active
PM Trailer	Oil and Fluid Storage Trailer	52,000	53'	21'	18	1 active
Mechanic Trailer	Tool and Parts Storage Trailer	41,000	48'	12'	8	1 active
Hose Trailer	Hose and Fitting Storage	28,000	42'	26'	14	1 active
Power Pack	Generator for TCC	24,000	38'	14'	14	1 active
Chem-Ad	Chemical Supply Truck	26,000	24'	18'	10	1 active
Sand Structure	Sand Storage and Delivery	30,000	40'	40'	14	1 active
Sand Forklift	Sand Loading	87,500	12'	12'	4	1 active 1 spare
FDP Tanker	Chemical Storage and Transport	66,000	48'	12'	18	1 active
Fuel Tanker	Fuel Storage and Transport	48,000	60'	27'	18	1 active

Traffic:

Frac Fleet: Mobilizes once monthly

FDP: 1 delivery per day

Acid: 2 Deliveries per day

Sand: 40-50 deliveries per day

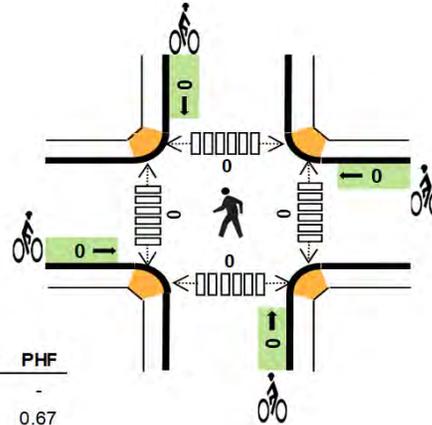
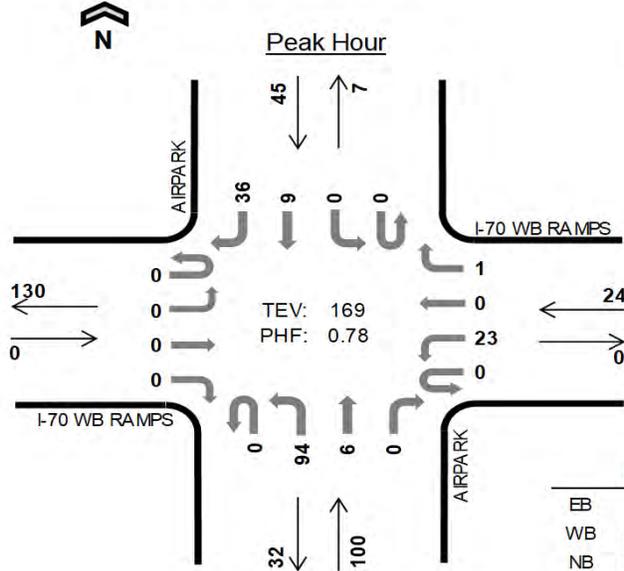
Fuel: 1 Delivery

All other Chemicals: 3 Deliveries per week as needed

AIRPARK I-70 WB RAMP



Date: Wed, May 09, 2018
 Count Period: 7:00 AM to 9:00 AM
 Peak Hour: 7:00 AM to 8:00 AM



	HV %:	PHF
EB	-	-
WB	4.2%	0.67
NB	12.0%	0.81
SB	4.4%	0.80
TOTAL	8.9%	0.78

Two-Hour Count Summaries

Interval Start	I-70 WB RAMP				I-70 WB RAMP				AIRPARK				AIRPARK				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	6	0	0	0	25	0	0	0	0	2	9	42	0
7:15 AM	0	0	0	0	0	9	0	0	0	29	2	0	0	0	4	10	54	0
7:30 AM	0	0	0	0	0	4	0	1	0	24	2	0	0	0	2	8	41	0
7:45 AM	0	0	0	0	0	4	0	0	0	16	2	0	0	0	1	9	32	169
8:00 AM	0	0	0	0	0	5	0	0	0	12	6	0	0	0	3	5	31	158
8:15 AM	0	0	0	0	0	3	1	0	0	14	4	0	0	0	3	3	28	132
8:30 AM	0	0	0	0	0	4	0	1	0	24	5	0	0	0	6	5	45	136
8:45 AM	0	0	0	0	0	3	0	0	0	11	7	0	0	0	7	7	35	139
Count Total	0	0	0	0	0	38	1	2	0	155	28	0	0	0	28	56	308	0
Peak Hour	0	0	0	0	0	23	0	1	0	94	6	0	0	0	9	36	169	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	4	1	5	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	3	1	4	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	1	3	3	7	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	3	1	4	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	1	2	3	6	0	0	0	0	0	0	0	0	0	0
Count Total	0	3	24	9	36	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	1	12	2	15	0	0	0	0	0	0	0	0	0	0

