

**Transportation Impact Analysis  
for  
435 Eby Creek Road  
Eagle, Colorado**



**April 13, 2022**

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## **Statement of Engineering Qualifications**

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# Transportation Impact Analysis

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## 1.0 Project Description

McDowell Engineering has prepared this Level Two Auxiliary Traffic Impact Study for the proposed residential development at 435 Eby Creek Road in Eagle, Colorado. The purpose of this transportation impact analysis is to forecast and analyze the impacts of the additional traffic volumes associated with the addition of the mixed-use development on the surrounding roadway network.

The development is located approximately 500 ft northwest of the Eby Creek Road / Market Street roundabout in Eagle, CO. The proposed development will be constructed on a single lot comprised of 2.8 acres. The lot is currently undeveloped. The project is proposing a total of 30 residential units consisting of (18) two-bedroom units, (12) one-bedroom units with 60 parking spots. The property is accessed directly by Eby Creek Road east of the project site. Recommendations to mitigate any traffic impacts are also included. The analysis complies with Town of Eagle standards.

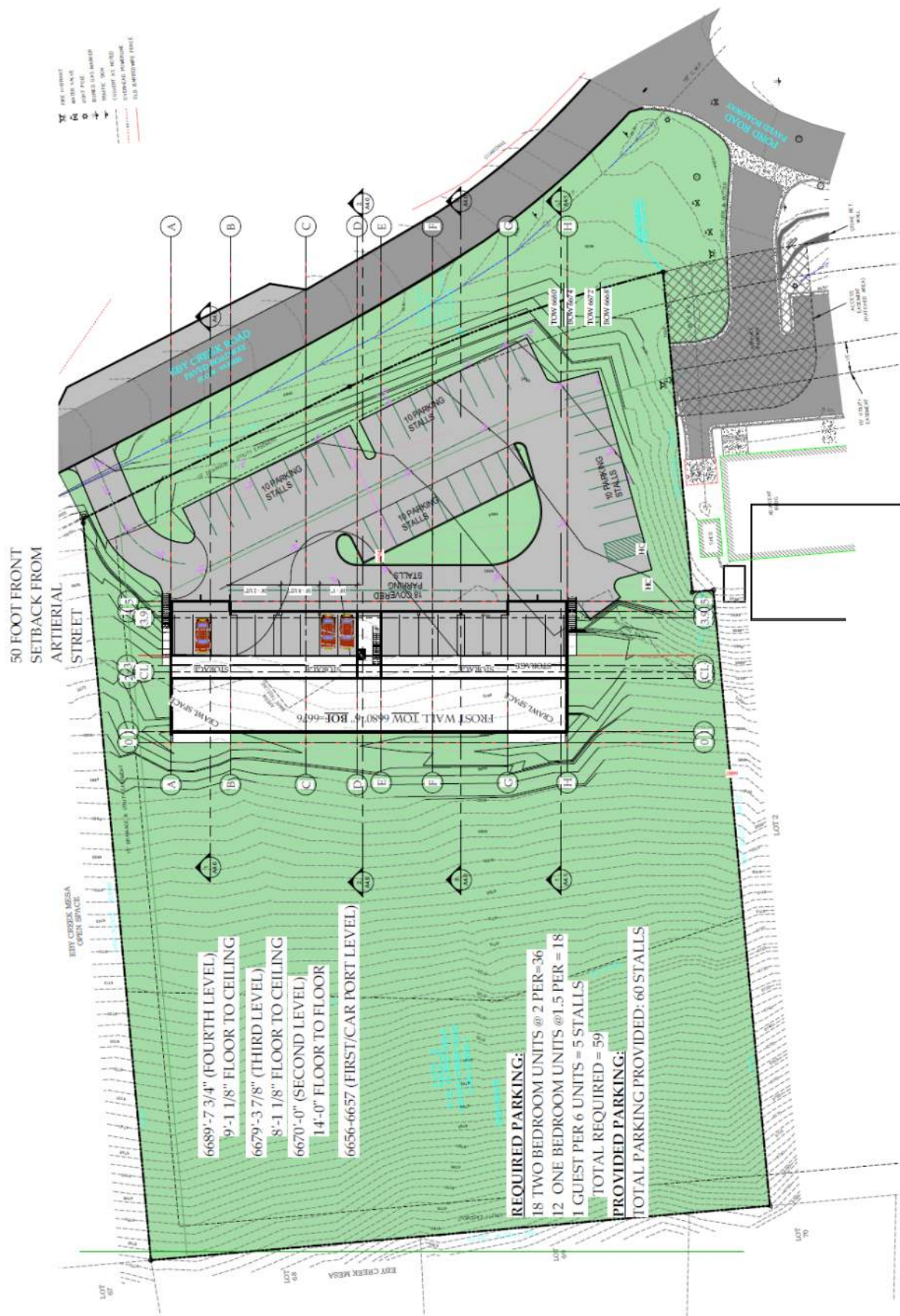
The location of the proposed development is shown in the vicinity map in **Figure 1**.

Figure 1: Vicinity Map



The project is proposing one access located on the northeast corner of the parcel. The access will have direct connectivity to Eby Creek Road. The internal traffic is two-way. The proposed site plan is shown in **Figure 2**.

Figure 2: Site Plan



## 2.0 Existing Conditions

### 2.1 Road Network

Eby Creek Road is a two-lane, north-south, paved road through northern Eagle. Eby Creek Road contains five roundabouts. The analysis will defer to the *State Highway Access Code*<sup>1</sup> (*Access Code*) for turn lane criteria such as turn lane lengths, storage requirements, et cetera.

Eby Creek Road is owned by the Town of Eagle within the vicinity of the site and has an equivalent classification as a NR-B, Non-Rural Arterial. The posted speed limit is 35mph within the vicinity of the site.

### 2.2 Site Access Description

The intersection of Eby Creek Road and the proposed site access is located approximately 300 ft north of the Eby Creek Road & Pond Road intersection. The site access is proposed as two-way, paved, and stop controlled in the eastbound direction.

### 2.3 Existing Traffic Data

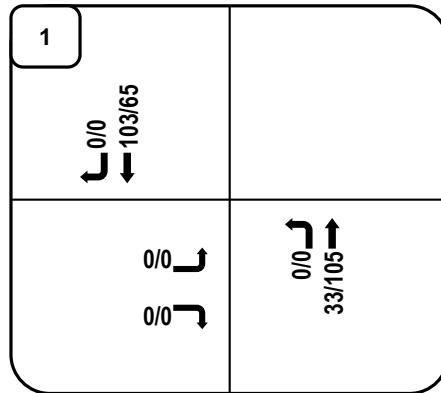
Eagle County<sup>2</sup> provides 24-hr data counts at various locations spread throughout Eagle County. There is a traffic count site just south of the project access containing 24-hr traffic count volumes from 2021. These 24-hr traffic counts can be found in **Figure 3**.

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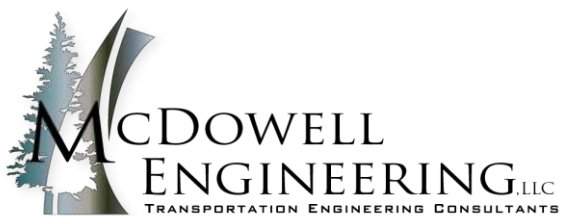
<sup>1</sup> *State Highway Access Code*. State of Colorado, 2002.

<sup>2</sup> <https://eaglecounty.maps.arcgis.com/apps/Solutions/s2.html?appid=ad3f9618355e47a6a0e0eabe5b73749e>; Eagle County, 2022.

Figure 3: Year 2021 Existing Traffic



\*Eby Creek Road volumes were approximated from Eagle County's 2021 AADT data.



**LEGEND:**

Directional Distribution = Inbound% (Outbound %)

AM/PM/SAT Volumes = XX/XX/XX VPH (in PCEs)

Turning Movements

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### **3.0 Infrastructure Assumptions**

#### **3.1 Existing & Committed Capital Improvement Projects**

The Town of Eagle is currently not planning for any capital improvement projects near the project vicinity.

#### **3.2 Planned or Existing Land Development Projects**

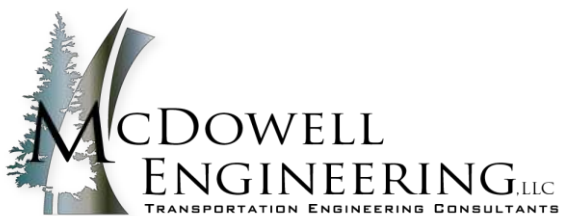
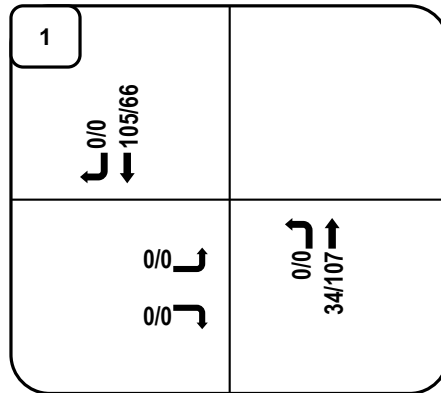
There is a 2.02-acre lot located approximately 800' south of the proposed development. This lot was previously a Burger King fast food restaurant. However, the lot was purchased in 2018 by North Eagle Investments LLC. At the time of this study, there has not been an approved new development at this lot. Therefore, the Town of Eagle does not have any adjacent land development projects underway that are anticipated to impact this analysis.

#### **3.3 Background Traffic Growth**

A traffic growth rate of 1% was used for the expected growth on Eby Creek Road. This growth rate was used due to Eby Creek Mesa being close to full buildout. A majority of the lots along Eby Creek Road north of the project site have already been developed. Therefore, there is very little expected growth on Eby Creek Road near the project vicinity.

Projected Year 2023 and 2045 background traffic can be seen in **Figure 4 and 5**.

Figure 4: Year 2023 Background Traffic



Eagle Eby Creek Multifamily Patriacca  
Eagle, CO

**LEGEND:**

Directional Distribution = Inbound% (Outbound %)

AM/PM/SAT Volumes = XX/XX/XX VPH (in PCEs)

Turning Movements 

Project Number

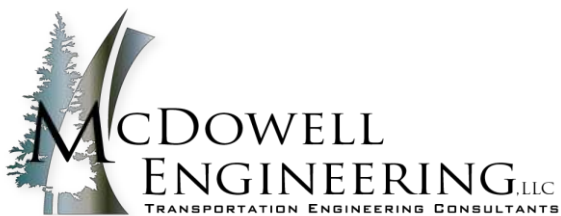
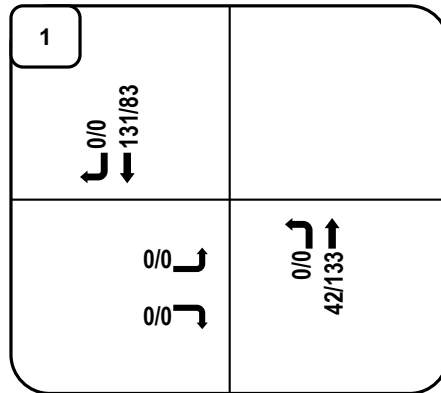
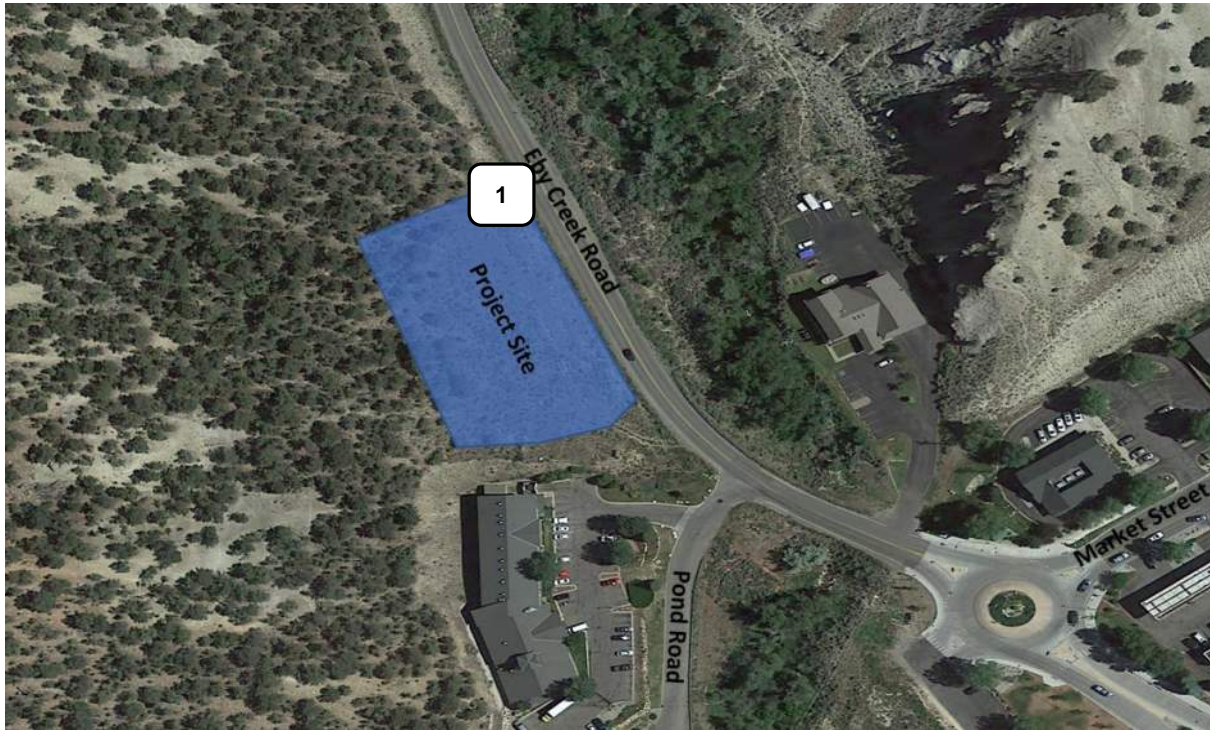
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Figure 5: Year 2045 Background Traffic




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**LEGEND:**

Directional Distribution = Inbound% (Outbound %)

AM/PM/SAT Volumes = XX/XX/XX VPH (in PCEs)

Turning Movements 

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## 4.0 Project Traffic

### 4.1 Trip Generation

Existing: The existing lot currently vacant.

Proposed Residential Development: The Eby Creek development is proposed to be a residential development, with 30 multi-family dwelling units. This falls under one land use code per the Institute of Transportation Engineers' 11<sup>th</sup> *Edition of the Trip Generation Manual*<sup>3</sup> (*Trip Generation Manual*), #220 Multifamily Housing (Low-Rise).

ITE's Trip Generation Manual Handbook calls for the fitted curve equations to be used for average weekday, morning peak hour, and afternoon peak hour traffic volumes. However, all the data points around the 30 dwelling unit point are very close to the average rate line. Therefore, the average rates for average weekday, morning peak hour, and afternoon peak hour were used instead of the fitted curve equations.

A 5% multimodal trip reduction was used when calculating the total number of vehicular trips. This reduction was used to accommodate the projected multimodal trips to the nearby schools and businesses.

A seasonal adjustment factor was not applied due to Eby Creek being a local commuter road within the vicinity of the project and not being affected by seasonal traffic growth.

Proposed New Trips: The project will generate an anticipated 192 additional trips on the average weekday from the existing land use. This includes 4 inbound and 10 outbound trips during the morning peak hour. The evening peak hour is expected to generate 10 inbound and 7 outbound trips

Refer to **Table 1** for trip generation calculations and further breakdown of these trips.

**Table 1: Trip Generation Table**

| ITE Trip Generation Equation <sup>3</sup> |                    |    |            |              |              | Average Weekday | Morning Peak Hour Inbound |         | Morning Peak Hour Outbound |         | Evening Peak Hour Inbound |         | Evening Peak Hour Outbound |         |       |
|---|--------------------|----|------------|--------------|--------------|-----------------|---------------------------|---------|----------------------------|---------|---------------------------|---------|----------------------------|---------|-------|
| ITE Code                                  | Units <sup>2</sup> |    | Eq. Coef   | Avg. Weekday | AM Peak Hour | PM Peak Hour    | Trips (VPD)               | % Trips | Trips                      | % Trips | Trips                     | % Trips | Trips                      | % Trips | Trips |
| Proposed Land Use                         |                    |    |            |              |              |                 |                           |         |                            |         |                           |         |                            |         |       |
| Eby Creek Residential                     |                    |    |            |              |              |                 |                           |         |                            |         |                           |         |                            |         |       |
| #220 - Multifamily Housing (Low-Rise)     | 30                 | DU | Type a= b= | Rate 6.74    | Rate 0.47    | Rate 0.57       | 202                       | 24%     | 4                          | 76%     | 11                        | 62%     | 11                         | 38%     | 7     |
| Multi-Modal Reduction                     | -5%                |    |            |              |              |                 | -10                       |         | 0                          |         | -1                        |         | -1                         |         | 0     |
| Proposed New Trips                        |                    |    |            |              |              |                 | 192                       |         | 4                          |         | 10                        |         | 10                         |         | 7     |

**Notes:**

<sup>1</sup> Values obtained from *Trip Generation, 11th Edition*, Institute of Transportation Engineers, 2021.

<sup>2</sup> DU = Dwelling Units, kSF = 1,000 Square Feet

<sup>3</sup> Fitted curve equations from ITE Land Uses - Equation Type A is  $T = a * X + b$ , Equation Type B is  $\ln(T) = a * \ln(X) + b$ , Rate is  $T = a * X$

## 4.2 Trip Distribution

The anticipated arrival and departure routes of project-generated traffic is influenced by several factors including the following:

- The location of the site relative to other facilities and the roadway network
- The configuration of the existing and proposed adjacent roadway network
- Relative location of neighboring population centers

Directional Distribution: Based upon the proposed land use and the location of the project in relation to nearby population centers, one hundred percent (100%) of the site-generated traffic is anticipated to enter/exit the site from/to the south towards Eagle and zero percent (0%) is anticipated to enter/exit the site from/to the north towards Eby Creek Mesa.

Refer to **Figure 6** for directional distribution breakdowns.

## 4.3 Trip Assignment

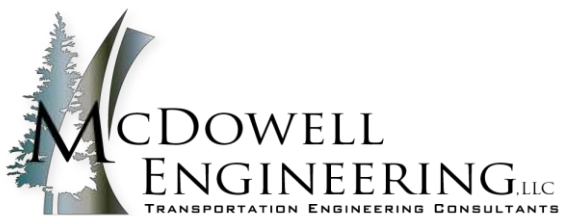
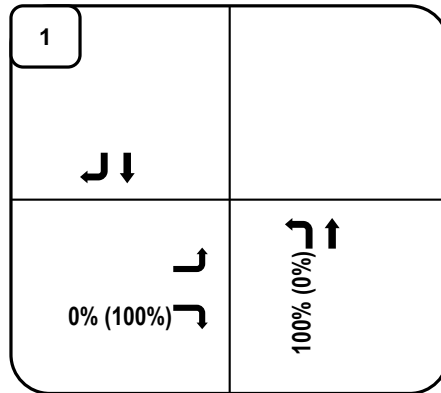
When the trip generation expected for this site is applied to the estimated trip distribution, the result is the anticipated assignment of trips on the roadway system. **Figure 7** depicts the new vehicle trips that are anticipated from the Eby Creek Residential project.

## 4.4 Total Traffic

The total traffic anticipated at each intersection is the sum of background traffic with the site-generated traffic.

For Year 2023, the background traffic (**Figure 4**) added to the site-generated traffic (**Figure 7**) yields the total Year 2023 traffic in **Figure 8**. For Year 2045, the background traffic (**Figure 5**) added to the site-generated traffic (**Figure 8**) yields the total Year 2045 traffic in **Figure 9**.

Figure 6: Year Project Generated Traffic Distribution Traffic



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**LEGEND:**

Directional Distribution = Inbound% (Outbound %)

AM/PM/SAT Volumes = XX/XX/XX VPH (in PCEs)

Turning Movements



Project Number

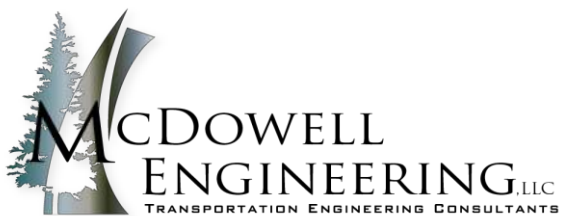
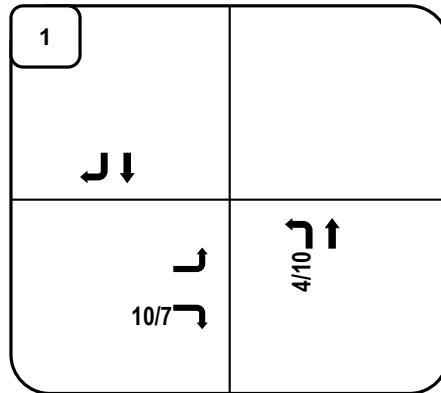
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Figure 7: Year Project Generated Traffic Assignment Traffic



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**LEGEND:**

Directional Distribution = Inbound% (Outbound %)

AM/PM/SAT Volumes = XX/XX/XX VPH (in PCEs)

Turning Movements

Project Number

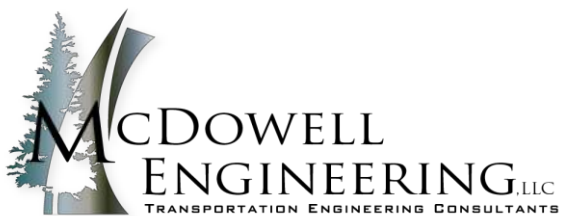
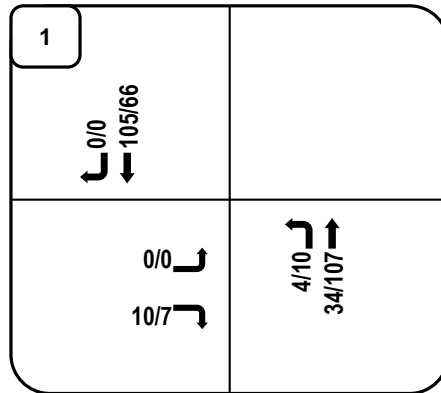
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Figure 8: Year 2023 Total Traffic



**LEGEND:**

Directional Distribution = Inbound% (Outbound %)

AM/PM/SAT Volumes = XX/XX/XX VPH (in PCEs)

Turning Movements 

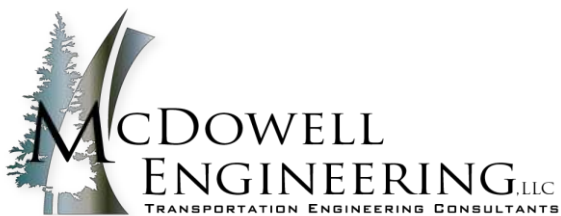
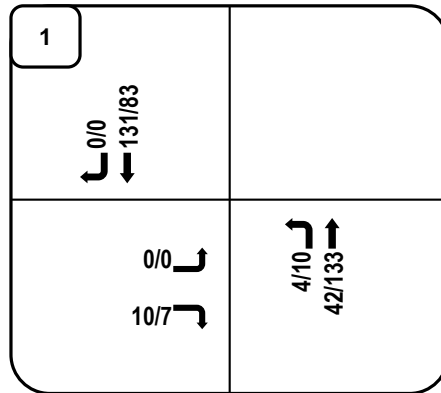
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Figure 9: Year 2045 Total Traffic



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**LEGEND:**

Directional Distribution = Inbound% (Outbound %)

AM/PM/SAT Volumes = XX/XX/XX VPH (in PCEs)

Turning Movements



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## 5.0 Traffic Analysis

### 5.1 Site Access and Circulation Evaluation

As seen in **Figure 2**, the conceptual site plan, the proposed project will have one access with direct connectivity to Eby Creek Road. The site access is located on the northeast corner of the lot. The site access is proposed as two-way, paved, and stop controlled in the eastbound direction.

Access spacing is determined by **Section 4.4** of the *Access Code*. The posted speed limit at the site access is 35 mph, with minimum access spacing of 250'. The properties located to the north and south of the project both have accesses at distances greater than 250'.

### 5.2 Site Accesses Sight Distance

Sight distance is determined by **Section 4.3** of the *Access Code*.

For a two-lane roadway with a speed limit of 35mph, the minimum sight distance along the highway is 250'. The site access has over 250' of sight distance in either direction; therefore, the site access exceeds the 250' minimum sight distance.

For a two-lane roadway with a speed limit of 35mph, the minimum entering sight distance is the 350'. The site access has over 350' in either direction, therefore, the site access exceeds the 350' minimum sight distance.

The minimum sight distance along the highway and minimum entering sight distance are met for the proposed project access.

### 5.3 Auxiliary Turn Lane Analysis

The *Access Code* establishes the need for auxiliary turn lanes on Colorado's highway network. Several criteria apply when determining the traffic volume thresholds such as highway classification, posted speed limit, turning traffic volumes, and safety/operations. Eby Creek Road is a local roadway. The analysis defers to the *Access Code* for turn lane criteria such as turn lane lengths, storage requirements, et cetera. Eby Creek Road has an equivalent classification as an NR-B, Non-Rural Arterial.


Based upon the categorization of Eby Creek Road as an NR-A, non-rural arterial and posted speed limit of 35mph, Section 3.11(4) of the *Access Code* requires auxiliary turn lanes for certain turning movement volumes. Auxiliary turn lanes are required on Eby Creek Road for more than 50vph making a right turn movement and 25vph making a left turn movement. Acceleration lanes are only required for specifically identified and documented safety and operations reasons.


**Table 2** summarizes the Auxiliary Turn Lane Requirements for the site access according to the *Access Code*.

**Table 2: Auxiliary Turn Lane Requirements**

| # | Int.                         | Movement | Accel or Decel | Posted Speed Limit (MPH) | Road Classification | SHAC Trigger Volume (VPH) | Year 2021 Existing |    | Year 2023 BG |    | Year 2045 BG |    | Year 2023 Total |    | Year 2045 Total |    | Existing Turn Lane | Access Code Required Turn Lane | Trigger Year & Condition |
|---|------------------------------|----------|----------------|--------------------------|---------------------|---------------------------|--------------------|----|--------------|----|--------------|----|-----------------|----|-----------------|----|--------------------|--------------------------------|--------------------------|
|   |                              |          |                |                          |                     |                           | A                  | PM | A            | PM | A            | PM | A               | PM | A               | PM |                    |                                |                          |
| 1 | Eby Creek Road & Site Access | EBL      | Dec            | 20                       | NR-B                | > 25                      | 0                  | 0  | 0            | 0  | 0            | 0  | 0               | 0  | 0               | 0  | None               | N/A                            | Does Not Trigger         |
|   |                              | EBR      | Dec            | 20                       | NR-B                | > 50                      | 0                  | 0  | 0            | 0  | 0            | 0  | 10              | 7  | 10              | 7  | None               | N/A                            | Does Not Trigger         |
|   |                              | NBL      | Dec            | 35                       | NR-B                | > 25                      | 0                  | 0  | 0            | 0  | 0            | 0  | 4               | 10 | 4               | 10 | None               | N/A                            | Does Not Trigger         |
|   |                              | SBR      | Dec            | 35                       | NR-B                | > 50                      | 0                  | 0  | 0            | 0  | 0            | 0  | 0               | 0  | 0               | 0  | None               | N/A                            | Does Not Trigger         |

<sup>1</sup>Based upon *State Highway Access Code* requirements for an NR-B roadway with posted speed of 20 or 35 mph.

 Triggered by State Highway Access Code Volumes

 Triggered by State Highway Access Code Safety and Operations

As seen from **Table 2**, the Eby Creek Residential development does not trigger any acceleration or deceleration lanes with current and future forecasted traffic volumes.

## 5.4 Multimodal Access

An onsite visit was performed. Several bicyclists were observed riding along Eby Creek Road. Several pedestrians were also observed going out for a walk along Eby Creek Road. It is recommended that the Eby Creek Residential development build a sidewalk along the frontage of the property since the development is near several local businesses, restaurants, and grocery stores. This would allow the residents a safe route along Eby Creek Road.

## 6.0 Summary and Recommendations

The proposed Eby Creek Residential development will be constructed on 1 lot comprised of 2.8 acres total. The lot is currently vacant. The project is proposing a total of 30 residential units consisting of (18) two-bedroom units, (12) one-bedroom units with 60 parking spots. The property is accessed directly by Eby Creek Road east of the project site.

Trip Generation: The multifamily residential project is anticipated to generate 192 vehicle trips per day (vpd) on the average weekday. Peak hour traffic on a weekday at project buildout is anticipated to be 14 vehicles per hour (vph) during the morning peak hour (4 inbound + 10 outbound) and 17 vph during the evening peak hour (10 inbound + 7 outbound).

Turn Lane Analysis: The traffic volumes generated by the site do not trigger any deceleration or acceleration turn lanes.

Based upon the analysis presented in this report, the proposed Eby Creek Residential project is anticipated to be successfully incorporated into the existing roadway network.

## 7.0 Appendix

### 7.1 Reference Documents

1. *State Highway Access Code*. State of Colorado, 2002.
2. <https://eaglecounty.maps.arcgis.com/apps/Solutions/s2.html?appid=ad3f9618355e47a6a0e0eabe5b73749e>; Eagle County, 2022.
3. *Trip Generation Manual, 11<sup>th</sup> Edition*. Institute of Transportation Engineers, 2021.

### 7.2 Included Documents

1. Traffic counts from:  
<https://eaglecounty.maps.arcgis.com/apps/Solutions/s2.html?appid=ad3f9618355e47a6a0e0eabe5b73749e>

## Traffic Counts

From: <https://eaglecounty.maps.arcgis.com/apps/Solutions/s2.html?appid=ad3f9618355e47a6a0e0eabe5b73749e>

