

Rollins Consult LLC

July 27, 2021

Charles Buck, Traffic Consultant to Johnstown, FHU
6400 S Fiddlers Green Circle, Suite 500
Greenwood Village, CO 80111
Via e-mail

RE: Podtburg Golf Course PDP

Charles:

The proposed Podtburg Golf Course PDP is being submitted to the Town of Johnstown. An overall traffic study was performed for the proposed Podtburg ODP, entitled *Traffic Impact Study, Podtburg Development*, May 20, 2020, by Rollins Consult LLC. The proposed golf course has not been modified since the traffic study.

Based upon your previous comments it is noted that:

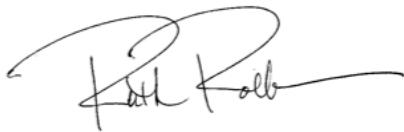
The applicant can operate the golf course with a full access to/from CR 44 with the condition that the access may be restricted to a $\frac{3}{4}$ movement or potentially a right-in-right-out only if operational or safety concerns arise.

The applicant will comply with this condition.

Please let me know if you have any questions or require additional information.

Sincerely,

Rollins Consult LLC

A handwritten signature in black ink, appearing to read 'Ruth Rollins', with a large, stylized initial 'R' at the beginning.

Ruth Rollins
President



MEMORANDUM

TO: Kim Meyer, Darryll Wolnik
FROM: Charles M. Buck, P.E., PTOE
DATE: July 9, 2020
SUBJECT: Traffic and Transportation Review
Podtburg ODP, 2nd Submittal
FHU Reference No. 199201-01

I have reviewed the submittal materials provided for the Podtburg ODP. This is a proposed mixed-use development, to consist of 458 single family homes, an 18-hole golf course, and about 70,000 square feet of commercial uses. The site is generally west of WCR 13 (Colorado Boulevard), between WCR 44 and WCR 42. I have reviewed these materials from the perspective of traffic and transportation engineering but not civil or utility engineering. I have reviewed a previous submittal for Podtburg, per my referral response dated March 27, 2020. In general, my previous comments have been adequately addressed with this current submittal. Relative to this, I have the following comments on the updated Traffic Impact Study (Rollins Consult, LLC, May 20, 2020):

1. This updated report addresses my previous concerns. I concur with the methods, assumptions, findings, and conclusions.
2. On pages 27 and 30, regarding the golf course access on CR 44: it is stated that this access may need to be restricted to right-in/right-out movements (RIRO). Per my previous comments, a $\frac{3}{4}$ movement access (allowing inbound left-turns) could also work, subject to analysis of a specific site plan. However, the analyses are based on long-range future conditions. In the interim, the applicant may operate this access as full-movement, with the condition that restriction to $\frac{3}{4}$, or potentially RIRO would be enacted if and when operational or safety concerns arise.

The above comments constitute my review of the Podtburg ODP 2nd Submittal. Please call if you have any questions or if you need additional information.

RESPONSE:

1. Comment Noted
2. Comment Noted

Traffic Impact Study Podtburg Development

May 20, 2020



Prepared for:
Greg Podtburg, Podtburg Dairy LLLP

Rollins Consult LLC

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1 INTRODUCTION

This report documents the results of a study to evaluate the potential traffic impacts of the proposed Podtburg Development project in the Town of Johnstown, Colorado. Rollins Consult LLC conducted the study as required by the Town for the development application associated with the proposed project.

PROJECT DESCRIPTION

The Podtburg Development project is located adjacent to the Town of Johnstown, west of Colorado Boulevard (Weld County Road 13) between Weld County Roads 44 (CR 44) and 42 (CR 42). The site is currently the Podtburg dairy farm. This development will replace the dairy with a golf course, residential dwellings and commercial use. The site is bounded by an irrigation lateral north of CR 44, Colorado Boulevard, CR 42 and existing residential/CR 11 on the west. The project site is comprised of approximately 400 acres. The site is surrounded by undeveloped land to the north, east and south. West of the site is residential development. Figure 1 illustrates the project location and study area.

The project site is depicted on Figure 2. The site was designed with the golf course central to the development. Each residential area has a simple roadway system to serve the residences. There are no pedestrian or bicycle connections between the three residential areas.

The project proposes the following land uses and transportation elements:

- An 18-hole golf course with a 18-hole pitch-n-putt, practice range, putting range and club house. Access to the golf course will be at a single access from CR 44.
- A total of 458 single family homes. These are located in three distinct areas. The northwest area, with 124 homes and two access locations, one from CR 44 and one from CR 11. The southeast area, with 192 homes and two access locations, one from Colorado Boulevard and one from CR 42. The southwest area with 142 homes with an access from CR 42.
- There are three commercial areas identified. Currently there are no specific plans for these three areas. It was assumed that each area of commercial would result in a FAR (Floor to Area Ratio) of 0.20. This resulted in the commercial at the northwest corner of Colorado/CR 44 being 12,000 SF (square feet), at the southwest corner of Colorado/CR 44 being 25,000 SF and at the northwest corner of Colorado/CR 42 at 33,000 SF. The following was assumed for commercial access:
 - NW of Colorado at CR 44 the commercial would use the proposed Golf Course access from CR 44.

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Figure 1 – Project Location

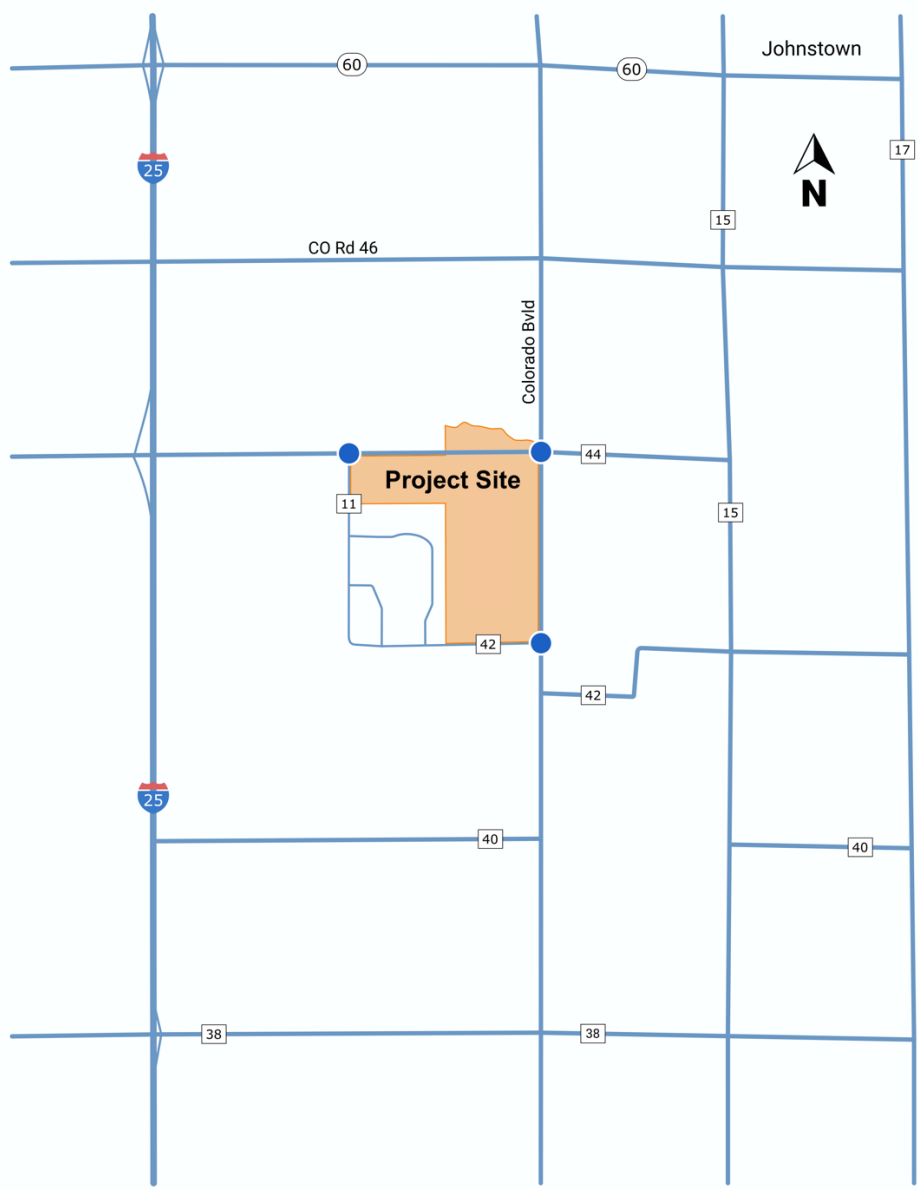


Figure 2 - Project Site Plan



OPTION 2 - CONCEPT PLAN

| NORTHWEST DEVELOPMENT AREA | |
|----------------------------|-------------|
| GOLF FRONTAGE LOTS | 74 (45x110) |
| OTHER LOTS | 50 (45x110) |
| TOTAL LOTS | 124 |
| (ORIGINAL LOTS 76) | |

| SOUTHWEST DEVELOPMENT AREA | |
|----------------------------|--------------|
| GOLF FRONTAGE LOTS | 38 (80x110) |
| OTHER LOTS | 104 (60x110) |
| TOTAL LOTS | 142 |
| (ORIGINAL LOTS 116) | |

| SOUTHEAST DEVELOPMENT AREA | |
|----------------------------|--------------|
| GOLF FRONTAGE LOTS | 58 (80x110) |
| OTHER LOTS | 134 (60x110) |
| TOTAL LOTS | 192 |
| (ORIGINAL LOTS 103) | |

- SW of Colorado/CR 44 the access would be to/from Colorado Boulevard.
- The commercial at the NW corner of Colorado/CR 42 would gain access from the residential street.

STUDY SCOPE

The scope of work for this study was developed in conjunction with the Town of Johnstown's traffic consultant. The base assumptions, technical methodologies, and geographic coverage of the study were all identified as part of the study approach. The study analyzes the potential project-generated traffic impacts on the adjacent street system.

This study will focus on build out of the development looking at the long range future year of 2035. Additional traffic studies will be performed as each phase of development is proposed. The analysis of future year traffic forecasts is based on projected conditions for 2035 (long range future conditions) both with and without the addition of the project traffic. The following transportation scenarios were analyzed for the AM and PM peak hours:

- **Existing Conditions** – The analysis of existing traffic conditions provides a basis for the remainder of the study. The existing transportation system is described. Peak hour intersection operations are evaluated.
- **Project Travel Demand** – The traffic generated by the Project will be estimated, distributed, and assigned to the transportation network.
- **2035 Background Conditions** – Future traffic conditions are projected without the proposed Project for the long range year 2035. The traffic volumes on the roadway system will be factored and analyzed to reflect conditions for 2035.
- **Total Future Conditions** – The traffic associated with the project will be projected and added to the Background traffic. The intersection operations will be determined.

The study examined three existing and seven future intersections within the study area. These were identified by the Town of Johnstown for inclusion in the study. The existing study intersections are shown on Figure 1 and listed below.

1. Colorado Boulevard & CR 44
2. Colorado Boulevard & CR 42
3. CR 11 & CR 44

Each of the proposed access streets from the golf course, residential and commercial areas of the development were analyzed. The following access streets were analyzed:

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4. North Access & CR 44
5. Golf/Commercial Access & CR 44
6. Colorado Boulevard & East Access
7. SE Access & CR 42
8. SW Access & CR 42
9. CR 11 & West Access
10. Colorado Boulevard & Commercial Access

2 EXISTING CONDITIONS

The transportation system has numerous elements that are described in this chapter. The roadway network identified for this study is described and traffic volume information presented for the study intersections.

ADJACENT LANDUSE

The Project site is located west of Colorado Boulevard and roughly between CRs 44 and 42. The site is currently operating as a dairy farm and is located southwest of downtown Johnstown. It is surrounded by undeveloped land to the north, east and south. West of the site is the Northmore Acres residential development.

TRANSPORTATION NETWORK

The primary roadways that serve the Project site are described below. Roadway designations were provided in the *Johnstown Transportation Master Plan*, February 2008.

Roadway Network

Colorado Boulevard (Weld County Road 13) – This is a two-lane north-south county road. Currently the speed limit is posted at 55 mph. There is no usable shoulder. Adjacent to the Project site the topography is down slopping from the south to the north. There is no designation in the Transportation Master Plan for current conditions, it is projected to function as a Regionally Significant Corridor – Major Arterial.

CR 44 is an east-west two-lane roadway. The speed limit is posted at 45 mph in the study area. No usable shoulders currently exist. West of the project site, CR 44 intersects with Interstate-25 with freeway access from all directions. West of I-25 it is State Highway 56. The topography adjacent to the Project site is rolling. The future designation of CR 44 is a Regionally Significant Corridor – Major Arterial.

CR 42 is an east-west two-lane roadway on the southern side of the Project site. There is no posted speed limit. CR 42 terminates at its' intersection with CR 11. This roadway will be designated as a Minor Arterial. Some of the roadway has slight rolling topography.

CR 11 is a north-south two-lane roadway that currently exists west of the Project site. This roadway provides access to the existing adjacent residential area. There are no posted speed limits and no usable shoulder. CR 11 runs from CR 44 south to CR 42. In the future it is identified as a Minor Arterial.

It should be noted that several of the roadways adjacent to the project site have rolling topography. The final locations of any access street should take into account adequate sight distance.

EXISTING TRAFFIC CONDITIONS

Existing intersection operations were evaluated for both the morning and evening peak hours. Intersection count data was collected on Thursday, October 3, 2019. Appendix A includes the intersection turning movement count data. The resulting peak hour turning movement are provided on Figure 3. The current lane configurations of the study intersections are shown on Figure 4.

Intersection Level of Service Analysis Methodologies

Transportation professionals evaluate intersections to determine how they are currently operating and will operate in the future. The methods employed can be found in the Transportation Research Board's, 6th Edition, 2016 *Highway Capacity Manual* (HCM). Level of service (LOS) is based on a "graded" system from LOS A, very little to no delays, to LOS F which represents excessive delays and congestion.

Within the Town's *Transportation Master Plan*, it states "The design standard capacities generally conform to level of service D, which is typically the design goal for Urban areas. The maximum capacity corresponds to the breakpoint between level of service E and F..." Based on this, LOS D will be the standard. Definitions for level of service are provided for both unsignalized (existing operations) and signalized conditions.

Unsignalized Intersection

Peak hour levels of motor vehicle delay at unsignalized intersections were estimated using the method from Chapter 17 of the 2016 *Highway Capacity Manual*. The delays for the entire intersection and for each of the constrained movements are reported. Table 1 summarizes the relationship between average control delay per vehicle and LOS for unsignalized intersections.

Figure 3 – Existing Peak Hour Volumes

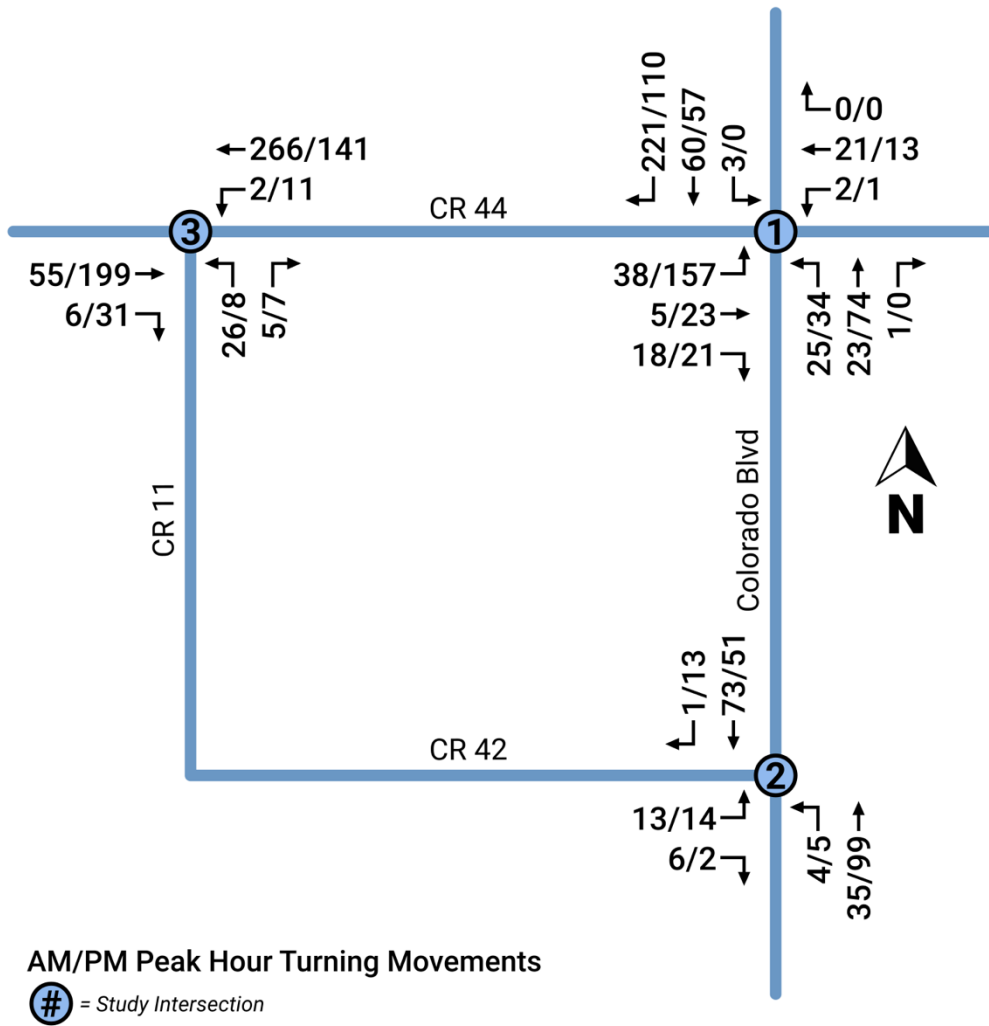


Figure 4 – Existing Intersection Configurations

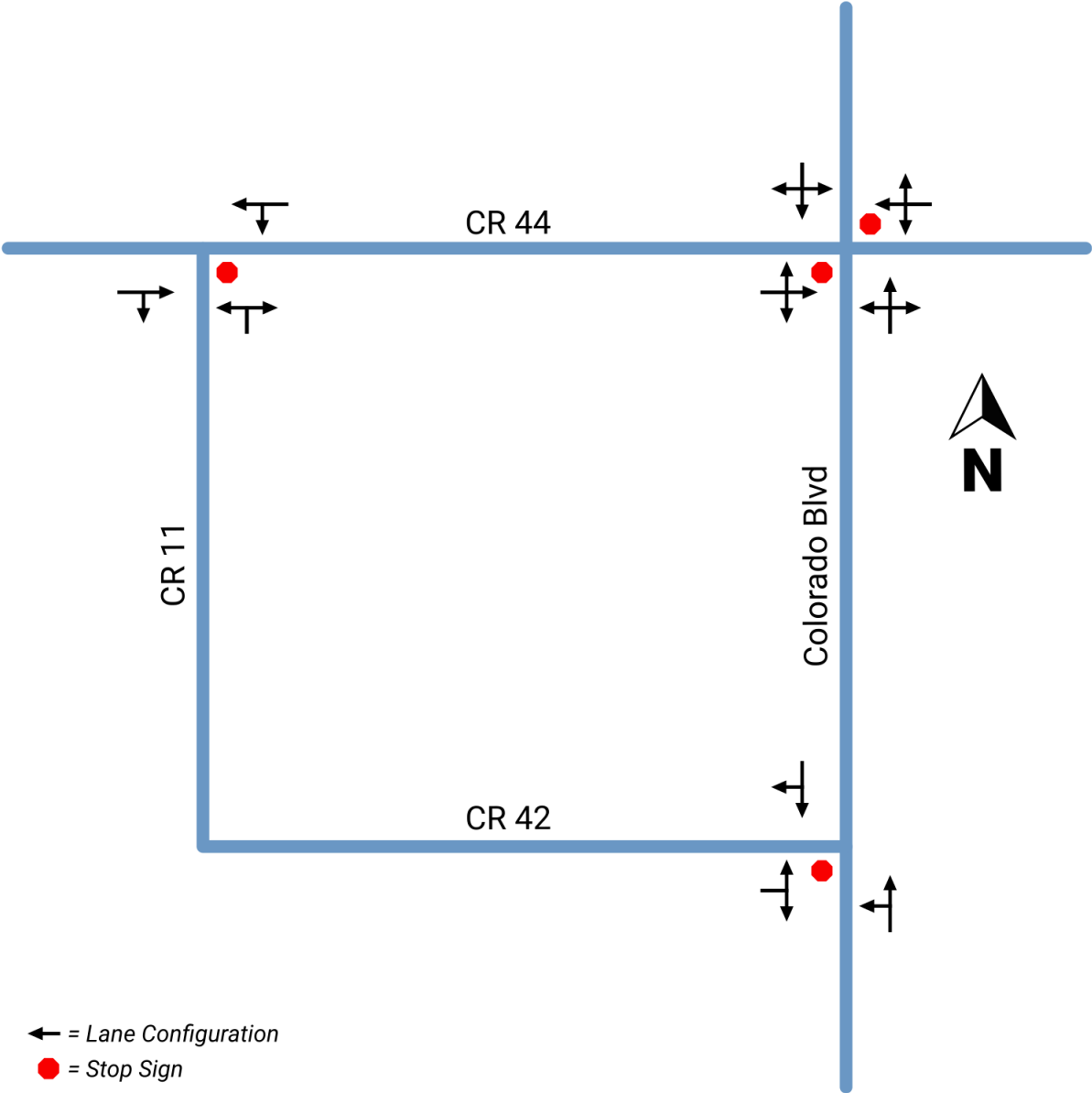


Table 1 Unsignalized Intersection Level of Service Definitions

| Level of Service | Average Control Delay Per Vehicle (Seconds) | Description |
|------------------|---|---|
| A | ≤10.0 | No delay for stop-controlled approaches. |
| B | 10.0 and ≤15.0 | Operations with minor delay. |
| C | >15.0 and ≤25.0 | Operations with moderate delays. |
| D | >25.0 and ≤35.0 | Operations with increasingly unacceptable delays. |
| E | >35.0 and ≤50.0 | Operations with high delays, and long queues. |
| F | >50.0 | Operations with extreme congestion, and with very high delays and long queues unacceptable to most drivers. |

Source: Transportation Research Board, Highway Capacity Manual, 2016.

Signalized Intersections

Peak hour levels of motor vehicle delay at signalized intersections were estimated using methods provided in Transportation Research Board’s 2010 Highway Capacity Manual. This operations analysis method uses various intersection characteristics (such as traffic volumes, lane geometry, and signal phasing) to estimate the average control delay experienced by motorists traveling through an intersection. Control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. Table 2 summarizes the relationship between average control delay per vehicle and LOS for signalized intersections.

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Table 2 Signalized Intersection Level of Service Definitions

| Level of Service | Average Control Delay Per Vehicle (Seconds) | Description |
|------------------|---|--|
| A | ≤10.0 | Free Flow or Insignificant Delays: Operations with very low delay, when signal progression is extremely favorable and most vehicles arrive during the green light phase. Most vehicles do not stop at all. |
| B | >10.0 and ≤20.0 | Stable Operation or Minimal Delays: Generally, occurs with good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average delay. An occasional approach phase is fully utilized. |
| C | >20.0 and ≤35.0 | Stable Operation or Acceptable Delays: Higher delays resulting from fair signal progression and/or longer cycle lengths. Drivers begin having to wait through more than one red light. Most drivers feel somewhat restricted. |
| D | >35.0 and ≤55.0 | Approaching Unstable or Tolerable Delays: Influence of congestion becomes more noticeable. Longer delays result from unfavorable signal progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop. Drivers may have to wait through more than one red light. Queues may develop, but dissipate rapidly, without excessive delays. |
| E | >55.0 and ≤80.0 | Unstable Operation or Significant Delays: Considered to be the limit of acceptable delay. High delays indicate poor signal progression, long cycle lengths and high volume to capacity ratios. Individual cycle failures are frequent occurrences. Vehicles may wait through several signal cycles. Long queues form upstream from intersection. |
| F | >80.0 | Forced Flow or Excessive Delays: Occurs with oversaturation when flows exceed the intersection capacity. Represents jammed conditions. Many cycle failures. Queues may block upstream intersections. |

Source: Transportation Research Board, Highway Capacity Manual, 2016.

Existing Intersection Conditions

Using the HCM methodology, the weekday AM and PM peak hour intersection operations were determined. The results are provided in Table 3. As indicated in the table, each of the study intersections are currently operating at acceptable levels of service. The detailed analysis worksheets are provided in Appendix B.

Table 3 Existing Weekday Peak-Hour Intersection Level of Service

| # | Intersection | Overall Movement | AM Peak | | PM Peak | |
|---|--|------------------|---------|-----|---------|-----|
| | | | Delay | LOS | Delay | LOS |
| 1 | Colorado & CR 44 Two Way Stop Control | Overall | 2.8 | A | 6.2 | A |
| | | NB LT | 8 | A | 7.7 | A |
| | | EB L/T/R | 10.9 | B | 13.1 | B |
| | | WB L/T/R | 12 | B | 11.5 | B |
| | | SB LT | 7.3 | A | 0 | A |
| 2 | Colorado & CR 42 T-Stop Control | Overall | 1.6 | A | 1.1 | A |
| | | NB LT | 7.4 | A | 7.4 | A |
| | | EB L/T/R | 9.2 | A | 9.5 | A |
| 3 | CR 11 & CR 44 T-Stop Control | Overall | 1 | A | 0.6 | A |
| | | NB L/R | 10.6 | B | 10.5 | B |
| | | WB LT | 7.3 | A | 7.8 | A |

Notes:

1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. Average vehicle delay (in seconds per vehicle) is reported for both overall intersection and each constrained /STOP-controlled movement or approach.

3 PROJECT TRAVEL DEMAND

This chapter provides an overview of the project and a description of the travel demand methodology to estimate vehicle trip generation, distribution, and assignment of project-generated traffic along area roadways and intersections.

PROJECT CHARACTERISTICS

The proposed Podtburg development is a golf course, residential and commercial project located west of Colorado Boulevard between CR 44 and CR 42. The project site plan was depicted on Figure 2. The project is planned on approximately 400 acres. As shown on the figure, vehicular access to the project will be from: CR 44 (two locations), Colorado Boulevard (two locations), CR 42 (two locations) and a connection to CR 11. The project will be developed with a variety of uses:

- 458 single family homes
- An 18 hole golf course
- An 18 hole miniature golf course
- Commercial uses that could include up to 70,000 square feet.

The planned development surrounds the golf course. Each of the three residential areas have a roadway network to service it.

PROJECT TRIP GENERATION

The trip generation characteristics of the project were estimated using data from the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10th Edition. Table 4 provides the trip generation estimated for the project. As indicated in the table, the full buildout of the project is estimated to generate approximately 7,515 daily trips, 435 morning and 780 evening peak hour trips.

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Table 4 – Estimated Project Trip Generation

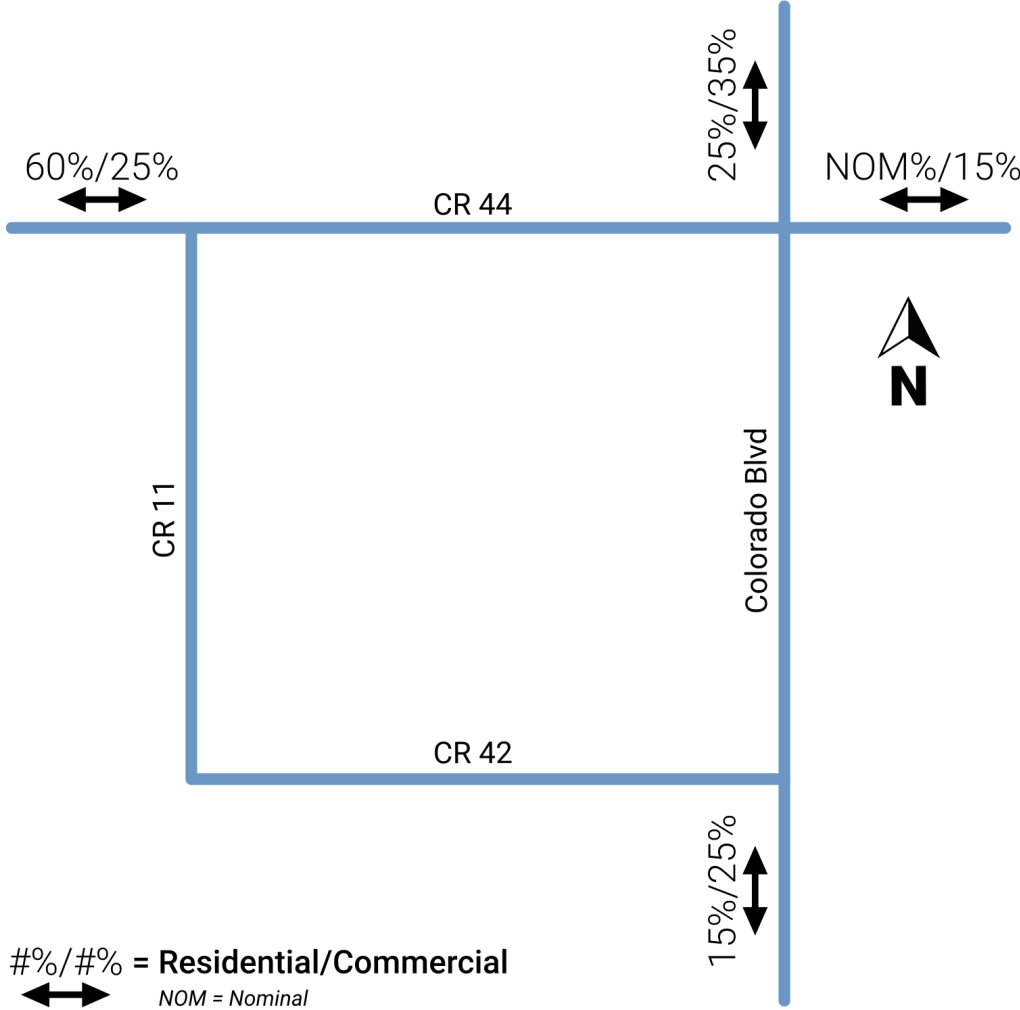
| ITE Land Use Code | | Project | | Project Trip Generation | | | | | | | |
|---|---------------|---------|-------|-------------------------|-------|-----|-------|-----|-----|-------|-----|
| Land Use | Land Use Code | Size | Units | Daily | AM | | | PM | | | |
| | | | | | IN | Out | Total | IN | Out | Total | |
| Single-Family Detached | 210 | 458 | DU | 4,324 | 85 | 254 | 339 | 286 | 168 | 453 | |
| Golf Course | 430 | 18 | Holes | 547 | 25 | 7 | 32 | 28 | 25 | 53 | |
| Miniature Golf Course | 431 | 18 | Holes | NA | NA | NA | NA | 2 | 4 | 6 | |
| Commercial at NW corner of Colorado/CR 42 | 820 | 33,000 | SF | 1,246 | 19 | 12 | 31 | 60 | 66 | 126 | |
| Commercial at NW corner of Colorado/CR 44 | 820 | 12,000 | SF | 453 | 7 | 4 | 11 | 22 | 24 | 46 | |
| Commercial at SW corner of Colorado/CR 44 | 820 | 25,000 | SF | 944 | 15 | 9 | 24 | 45 | 50 | 95 | |
| TOTAL BUILDOUT | | | | | 7,513 | 151 | 286 | 436 | 443 | 336 | 779 |
| Based on ITE Trip Generation 10th Edition | | | | | | | | | | | |
| NA = Not available | | | | | | | | | | | |

PROJECT TRIP DISTRIBUTION | ASSIGNMENT

The distribution of the project traffic onto the roadway system was based on: the existing peak hour traffic counts, the roadway network, the proposed land use, the location of the project within the region and the Town of Johnstown, traffic forecasts from the *Transportation Plan*, and input from the Town’s transportation consultant. The project trip distribution is depicted on Figure 5.

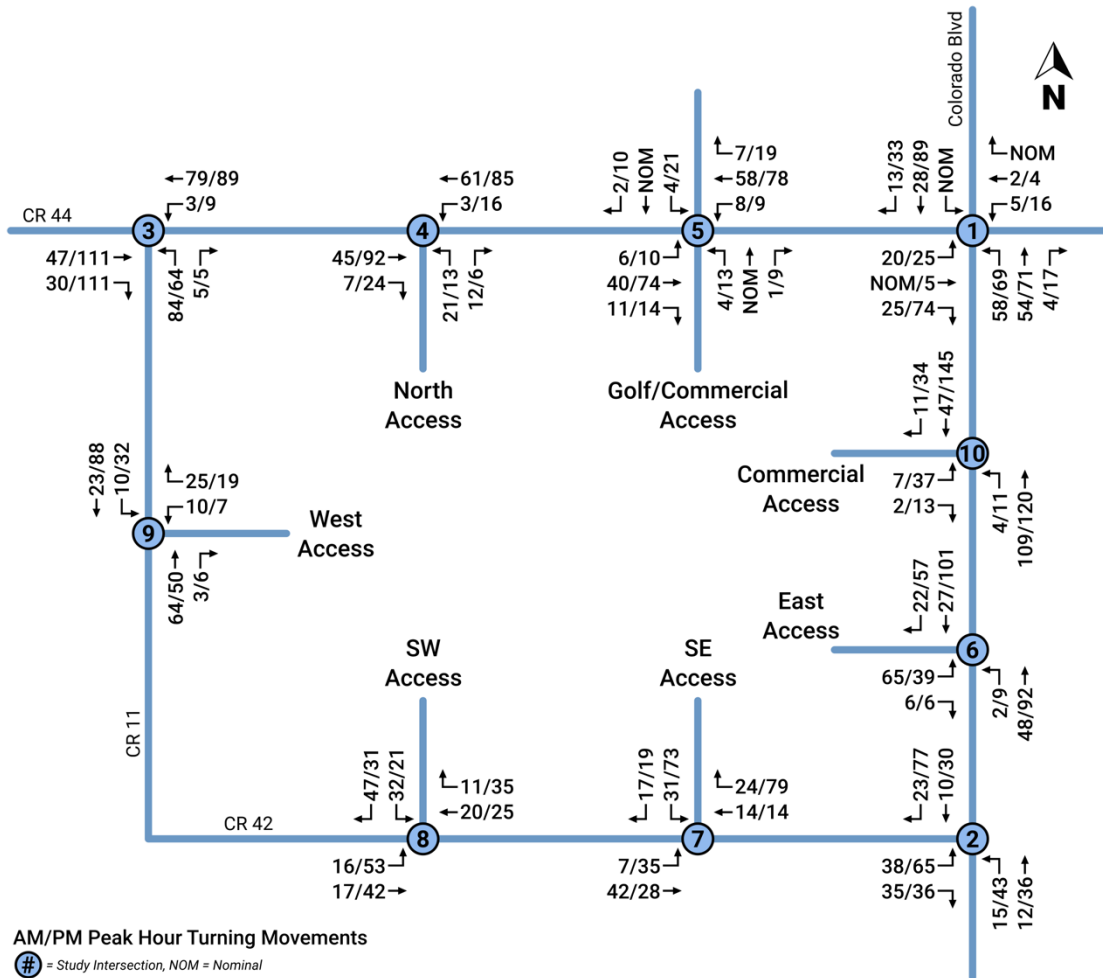
The project assigned peak hour traffic volumes for are shown on Figure 6.

Figure 5 – Trip Distribution



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Figure 6 – Project Traffic



4 FUTURE TRAFFIC PROJECTIONS

Estimates of future traffic conditions both with and without the proposed Project were necessary to evaluate the potential impact of the Project on the local street system. The background base traffic scenario represents future traffic conditions without the addition of the Project, while the total scenario represents future traffic conditions with completion of the proposed Project. The long range future year of 2035 was analyzed. The development of these future traffic scenarios is described in this chapter.

BACKGROUND 2035 TRAFFIC PROJECTIONS

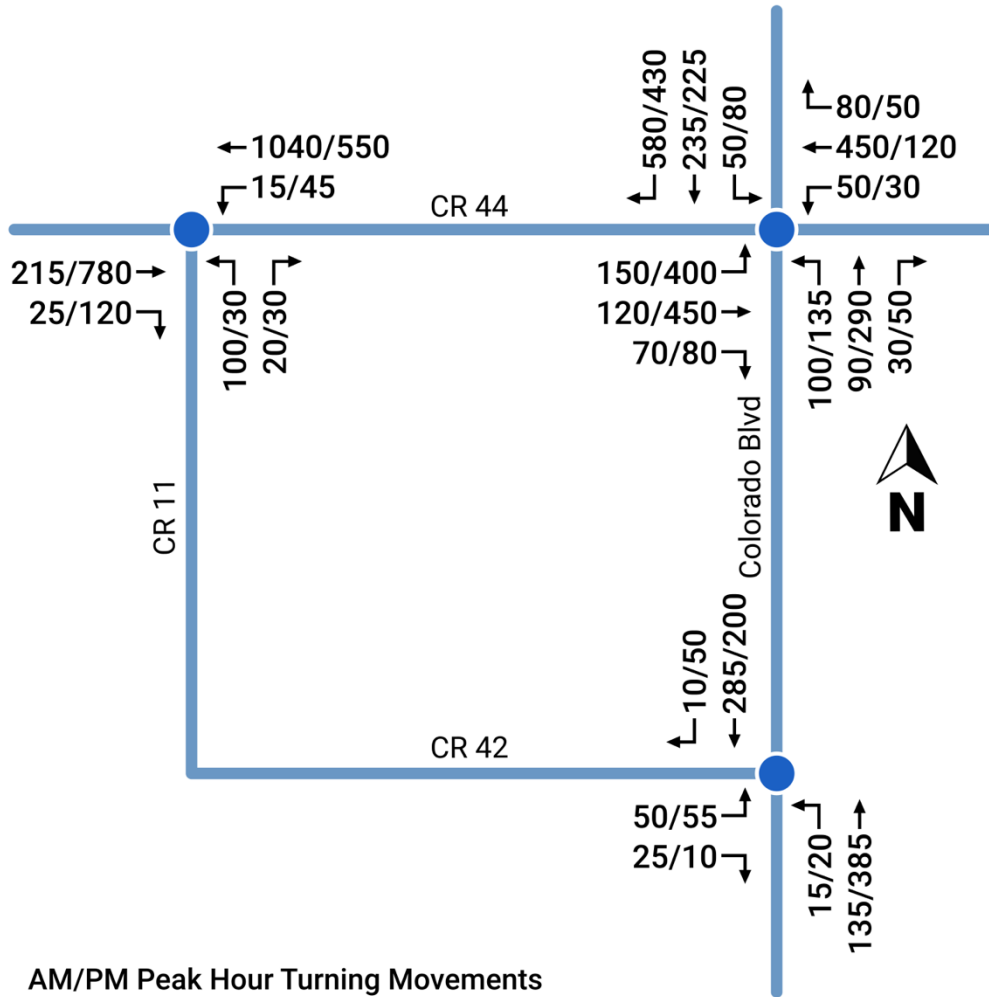
The background traffic projections reflect growth in traffic from ambient growth in the existing traffic volumes due to regional growth both in and outside of the study area. The ambient growth in traffic was determined with information from the Johnstown *Master Transportation Plan*. Based on these 2035 projections an annual compounded growth rate of up to 8.9% per year was established for the long range for the area. This is a high growth rate which reflects the existing rural nature of the area and the projected increase in population and employment. It should be noted that these projections include the proposed project and therefore some volumes were adjusted to account for this.

The resulting Background 2035 traffic projections for the study intersections are provided on Figure 7.

TOTAL TRAFFIC PROJECTIONS

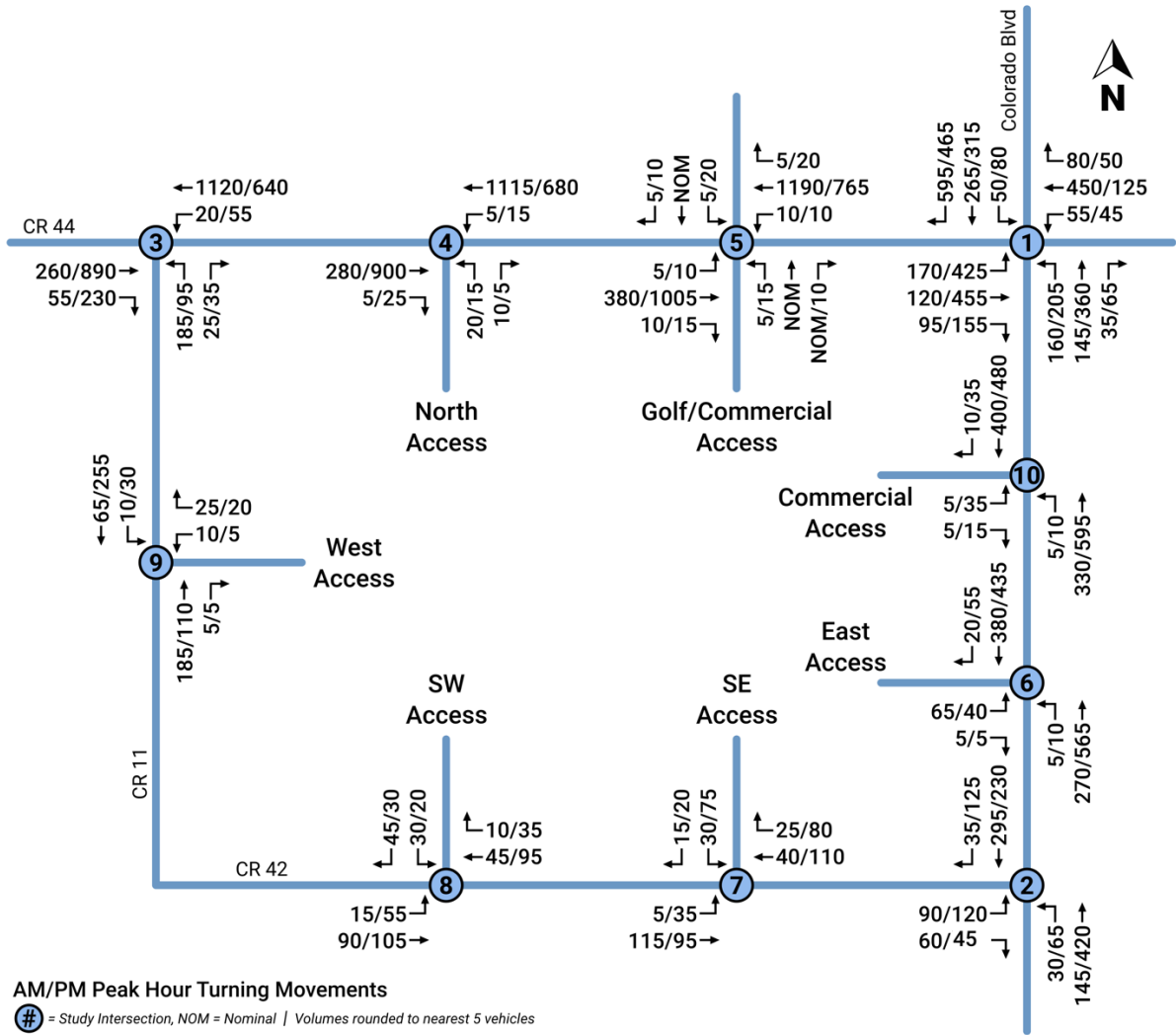
The total traffic projections include both the background plus project traffic. The project-generated traffic volumes from Figure 6 were added to the Year 2035 background traffic volumes illustrated on Figure 7 to develop background plus project peak hour traffic volumes. The resulting Year 2035 total traffic is depicted on Figure 8.

Figure 7 – Background Traffic 2035



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Figure 8 – Total Traffic 2035



5 TRAFFIC IMPACT ANALYSIS

This chapter presents an analysis of the potential impacts of the traffic generated by the proposed Podtburg Development project on the local street system. The analysis compares the projected levels of service at each study intersection under future background and total conditions to estimate the incremental increase in the delay caused by the proposed project. This provides the information needed to assess the potential impact of the project using the significance criteria.

SIGNIFICANT TRAFFIC IMPACT CRITERIA

Threshold criteria were applied to determine if the growth in traffic due to regional growth/other projects and/or the proposed Project has a significant traffic impact at an intersection. If the future traffic projections for either Background (without Project) or Total (with Project) resulted in any portion of an intersection to exceed the LOS standards, this would be considered an impact.

As presented earlier, based on the Town of Johnstown standards, LOS D is the design objective for an intersection. Level of service E may be acceptable given the projected urban levels of population and employment. Level of service F is unacceptable.

FUTURE TRAFFIC CONDITIONS

The future traffic projections at the study intersections were analyzed to determine their future operating conditions. No known improvement projects were provided for this study. Therefore, the primary roadways (Colorado, CR 44, CR 42 and CR 11) were assumed to remain at their two-lane configuration. It is recognized that each of these roadways are planned as four-lane facilities as shown in the *Master Street Plan*.

The initial analysis of the intersection of Colorado Boulevard and CR 44 indicated failure of this intersection under two-way stop control and a single lane approach for each direction. Under future background conditions this location will need the following:

- Separate left-turn lanes for all directions
- An exclusive southbound right-turn lane
- Signalization

With regards to signalization, the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), US Department of Transportation, 2009 Edition including revisions 1 and 2 dated May 2012, provides guidance on when signals may be warranted. Warrant 3 peak hour volumes is provided in Appendix C. Based on these graphs, the projected volumes would satisfy the warrant for roadways above 40 mph.

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The intersection operations for Year 2035 was analyzed with the improvements shown above (at Colorado/CR44) for both the background and total traffic projections. The operational results, for each of the study intersections, are provided in Table 5 for both the background and total traffic scenarios.

Note that the results provided in Table 5 indicate both the overall delay/LOS for the intersection and the delay/LOS for each constrained movement and/or approach. If an intersection, a movement, or approach is projected to operate at unacceptable levels it is highlighted in grey.

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Table 5 - Future 2035 Intersection Level of Service

| # | Intersection | Movement | AM Peak Hr | | | | PM Peak Hr | | | |
|----|---|----------|------------|-----|-------|-----|------------|-----|-------|-----|
| | | | Background | | Total | | Background | | Total | |
| | | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| 1 | Colorado & CR 44 Signal | Overall | 27.3 | C | 30.1 | C | 15.1 | B | 21.5 | C |
| | | EB | 10.7 | B | 10.7 | B | 15.4 | B | 23.9 | C |
| | | WB | 24.9 | C | 33.4 | C | 22.0 | C | 23.0 | C |
| | | NB | 21.1 | C | 28.9 | C | 17.8 | B | 28.0 | C |
| | | SB | 37.0 | D | 37.3 | D | 11.1 | B | 13.6 | B |
| 2 | Colorado & CR 42 T-Stop Control | Overall | 2 | A | 3.4 | A | 1.6 | A | 5.4 | A |
| | | NB LT | 8 | A | 8.1 | A | 7.9 | A | 8.3 | A |
| | | EB | 12.5 | B | 13.4 | B | 15.5 | C | 29.4 | D |
| 3 | CR 11 & CR 44 T-Stop Control | Overall | 6.3 | A | 56.5 | F | 2 | A | 33.8 | D |
| | | NB | 73 | F | 448 | F | 43.3 | E | 500 | F |
| | | WB LT | 7.8 | A | 8 | A | 10.5 | B | 12 | B |
| 4 | North Access & CR 44 T-Stop Control | Overall | | | 0.6 | A | | | 0.6 | A |
| | | NB LT | | | 39.1 | E | | | 54 | F |
| | | NB RT | | | 10 | B | | | 17.3 | C |
| | | WB LT | | | 7.9 | A | | | 10.4 | B |
| 5 | Golf/Commercial Access & CR 44 Two-Way Stop Control | Overall | | | 0.7 | A | | | 3.8 | A |
| | | NB | | | 59 | F | | | 105 | F |
| | | EB LT | | | 11.8 | B | | | 9.7 | A |
| | | WB LT | | | 8.2 | A | | | 10.8 | B |
| | | SB | | | 48.3 | E | | | 135 | F |
| 6 | Colorado & East Access T-Stop Control | Overall | | | 1.5 | A | | | 1 | A |
| | | NB LT | | | 8.2 | A | | | 8.5 | A |
| | | EB | | | 16.1 | C | | | 24.3 | C |
| 7 | SE Access & CR 42 T-Stop Control | Overall | | | 2 | A | | | 3.2 | A |
| | | EB LT | | | 7.4 | A | | | 7.7 | A |
| | | SB | | | 9.5 | A | | | 11.3 | B |
| 8 | SW Access & CR 42 T-Stop Control | Overall | | | 3.5 | A | | | 2.7 | A |
| | | EB LT | | | 7.4 | A | | | 7.6 | A |
| | | SB | | | 9.3 | A | | | 10 | B |
| 9 | CR 11 & West Access T-Stop Control | Overall | | | 1.4 | A | | | 1.1 | A |
| | | WB | | | 9.8 | A | | | 9.6 | A |
| | | SB LT | | | 7.7 | A | | | 7.5 | A |
| 10 | Colorado & Commercial Access T-Stop | Overall | | | 0.2 | A | | | 1 | A |
| | | NB LT | | | 8.2 | A | | | 8.6 | A |
| | | EB LT | | | 15.4 | C | | | 26.5 | D |
| | | EB RT | | | 10.8 | B | | | 11.7 | B |

1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. Average vehicle delay (in seconds per vehicle) is reported for both overall intersection and each constrained STOP-controlled movement or approach.
3. Delays greater than 50 seconds are rounded to nearest second.
4. Grey highlighted indicates intersection/movement operating at unacceptable LOS conditions.

The study results for 2035 indicate the following:

- The northbound movements at CR 11 and CR 44 will operate at LOS F under both Background and Total traffic conditions. Under Total traffic conditions during the morning peak hour the overall intersection will operate at LOS F.
- Under Total traffic conditions, the proposed North Access at CR 44 will operate at LOS E or F.
- The proposed Golf/Commercial Access will operate at LOS F for both the northbound and southbound directions.

FUTURE YEAR 2035 IMPROVEMENT MEASURES

The proposed improvement measures for each intersection are described below. The level of service analysis with the improvements are shown in Table 6. The resulting intersection configurations are illustrated on Figure 9.

CR 11 at CR 44

This location is projected to experience long delays under both Background and Total traffic conditions. The peak hour volumes were evaluated to determine if signalization would be warranted. During the morning peak hour, the minor street (CR 11) is projected to have 210 VPH and the major street (CR 44) 1,140 VPH. This satisfies the peak hour warrants provided in Appendix C. The following is recommended;

- Signalize intersection
- Provide an eastbound right-turn lane
- Provide an westbound left-turn lane
- Provide both a right-turn and left-turn lane in the northbound direction

North Access at CR 44

The northbound left-turn is projected to experience high delays. With signalization of CR 11 at CR 44, most of the left-turns will either shift to CR 11 or take advantage of gaps in the traffic flows along CR 44 due to the future signals on CR 44 at both CR 11 and Colorado Boulevard. It is recommended that this location be shifted to the west such that it could align with a future roadway to the north of CR 44. Sight distance should be checked to verify it's adequate.

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Golf/Commercial Access at CR 44

The north and southbound traffic will experience long delays. As development plans are proposed that will utilize this access, the design of this location will be reassessed. It is anticipated that the Golf/Commercial access could be limited to right-turns only.

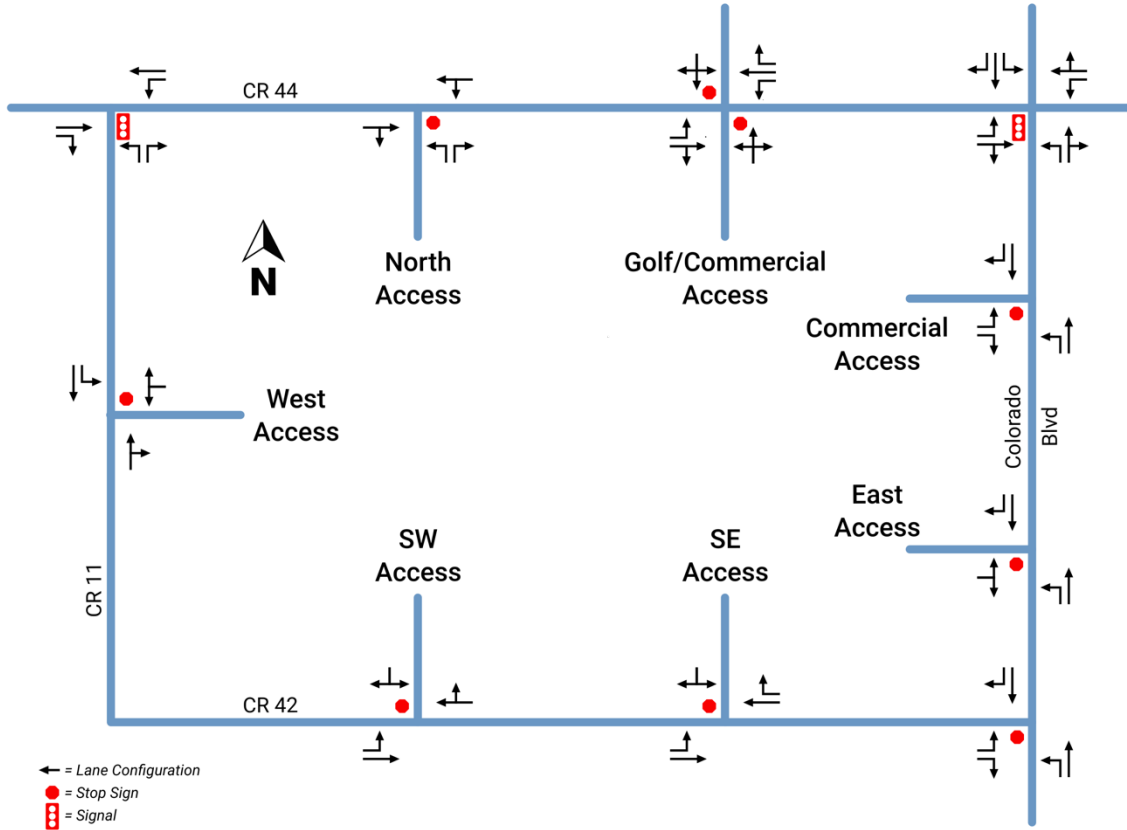
Table 6 - Improved 2035 Intersection Level of Service

| # | Intersection | Movement | AM Peak Hr | | PM Peak Hr | |
|---|-------------------------|----------|------------|-----|------------|-----|
| | | | Total | | Total | |
| | | | Delay | LOS | Delay | LOS |
| 3 | CR 11 & CR 44 Signal | Overall | 23.3 | C | 15.7 | B |
| | | EB | 5.1 | A | 17.8 | B |
| | | WB | 26.1 | C | 11.2 | B |
| | | NB | 34.9 | C | 20.9 | C |

Notes:

1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. Average vehicle delay (in seconds per vehicle) is reported for both overall intersection and each constrained movement/approach.

Figure 9 – 2035 Intersection Configurations



6 SITE DESIGN AND AUXILIARY LANE ANALYSIS

INTERNAL SITE TRAFFIC

The Project site was designed to accommodate the traffic generated by the project. The Town of Johnstown, within Chapter 4 of the *Master Transportation*, has established that Local streets can accommodate between 800 to 1,000 daily vehicular trips and Residential Collectors between 1,500 to 2,000. It was estimated that the Local streets within Podtburg Development should be designed to the local street standard with the exception of the southeast roadway adjacent to the commercial area. This section should be designed as a Residential Collector.

AUXILIARY LANES

An analysis was conducted to determine the need for auxiliary right-turn and left-turn lanes at the Project access locations. The projected peak hour traffic volumes at these locations are provided on Figure 8. The Town uses the Colorado Department of Transportation's (CDOT), *State Highway Access Code*, August 31, 1998, with updates in March 2002. The left and right-turn lane volume thresholds for each roadway category are provided below.

NR – A Non-Rural Principal Highway

- Left-turn lane threshold = 10 VPH
- Right-turn lane threshold = 25 VPH

NR – B Non-Rural Arterial – Speed Limit at 40 mph

- Left-turn lane threshold = 25 VPH
- Right-turn lane threshold = 50 VPH

CR 44 and Colorado Blvd. would be classified as a NR-A facility and CRs 42 and 11 would be NR-B. Based on these criteria the following lanes will be required:

- At Colorado and the Commercial Access, a southbound right-turn and northbound left-turn lanes.
- At Colorado and the East Access, a southbound right-turn and northbound left-turn lanes.

- Southeast Access at CR 42 a westbound right-turn and eastbound left-turn lanes.
- Southwest Access at CR 42 an eastbound left-turn lane.
- CR 11 at West Access an southbound left-turn lane.
- At the Golf/Commercial access eastbound left-turn, westbound left-turn and westbound right-turn lane. Note this location will require additional analysis when a site specific development is proposed and may be restricted to right-turns only from the access.

The ultimate intersection configurations are illustrated on Figure 9.

7 CONCLUSIONS

This study was undertaken to analyze the potential long range traffic impacts of the proposed Podtburg Development project in the Town of Johnstown. The following summarizes the results of this analysis:

- The full buildout proposed Project consists of 458 single family homes, an 18 hole golf-course, and 18 hole miniature golf course, and an estimated 70,000 square feet of commercial.
- The Project site is located generally between CR 44 and CR 42 and west of Colorado Boulevard. This land is currently occupied by the Podtburg dairy.
- The Project is expected to generate approximately 7,500 daily trips, 435 trips during the AM peak hour and 780 trips during the PM peak hour.
- Currently the study intersections on both Colorado Boulevard and CR 44 are operating at acceptable levels.
- Under future 2035 background conditions the intersection of Colorado Boulevard and CR 44 will require signalization, left-turn lanes on all approaches, and a southbound right-turn lane.
- Numerous intersections will require improvements under the 2035 Total traffic conditions.
 - CR 11/CR 44: signalization, a westbound left-turn lane, eastbound right-turn lane, and northbound right and left-turn lanes.
 - North Access/CR 44 should be designed with exclusive northbound right and left-turn lanes.
 - Golf/Commercial Access: this access should be re-evaluated when a site plan is proposed.
 - Colorado/Commercial Access: the site design should include an exclusive right-turn and left-turn lane from the access. On Colorado Boulevard a northbound left-turn and southbound right-turn lane.
 - Colorado/East Access: a northbound left-turn lane and southbound right-turn lane.
 - SE Access/CR 42: westbound right-turn lane and eastbound left-turn lane.
 - SW Access/CR 42: an eastbound left-turn lane.
 - CR 11/West Access: an southbound left-turn lane.

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- It is recommended that the North Access be moved to the west such that it could align with a future roadway on the north side of CR 44.
- Due to the topography, all access streets should be located such that adequate sight distance is achieved.
- As each site specific development plan is developed, a traffic study should be prepared.