



March 9, 2023

Andrew Durling, AICP
 Wood Rodgers, Inc.
 1361 Corporate Boulevard
 Reno, NV 89502

Traffic Evaluation – S3-Robb Drive Zone Change

Dear Mr. Durling,

This traffic evaluation provides trip generation estimates, a generalized impact assessment, and traffic management recommendations needed for this project in combination with future adjacent development. The project site is located south of Interstate 80 (I-80) and east of Robb Drive. The subject site is shown in **Exhibit 1**. The roadways serving the project will be constructed in coordination with adjacent projects.

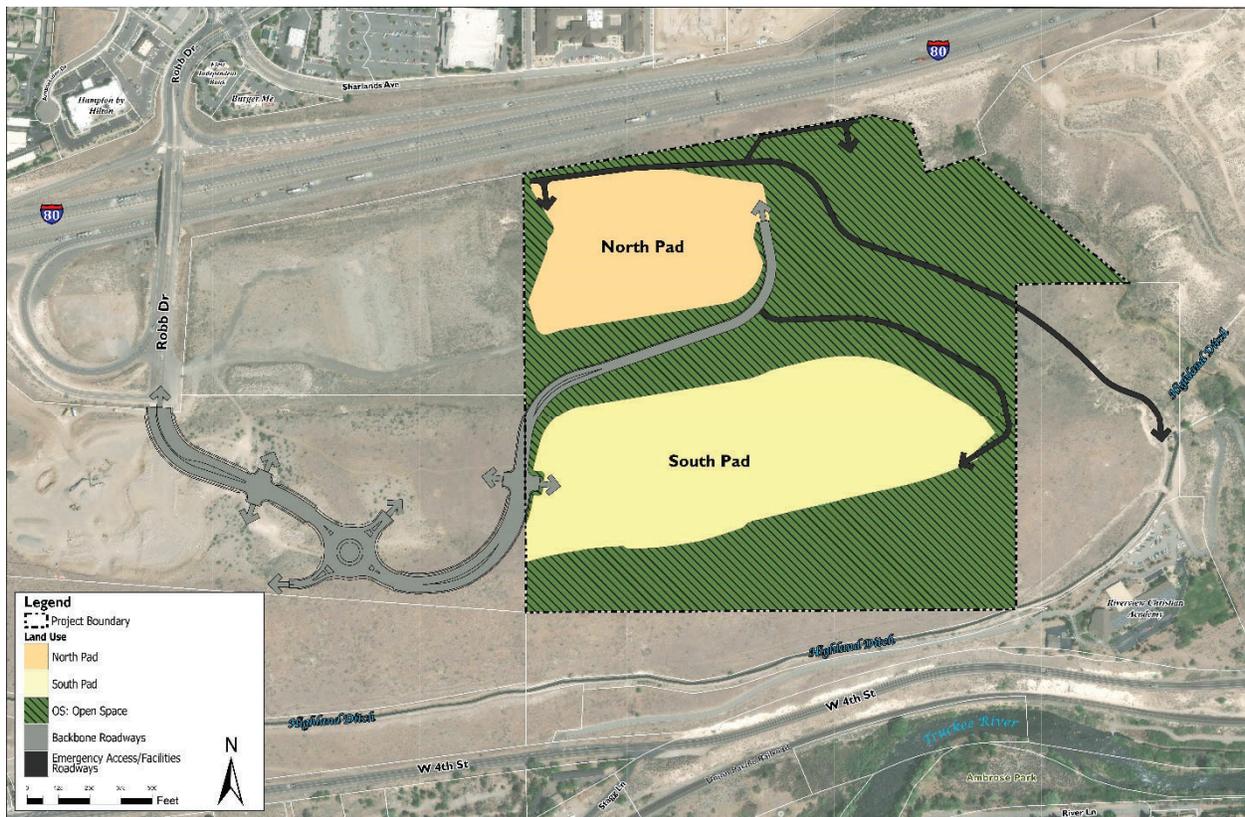


Exhibit 1: Robb Drive South Development Area

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 775.322.4300
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The following intersections are expected to serve the majority of project traffic:

- ▶ Robb Drive/I-80 Eastbound Ramps
- ▶ Robb Drive/I-80 Westbound Ramps
- ▶ Robb Drive/Sharlands Avenue, to a lesser extent

ANALYSIS METHODOLOGY

Level of service (LOS) is a term commonly used by transportation practitioners to measure and describe the operational characteristics of intersections, roadway segments, and other facilities. This term equates seconds of delay per vehicle at intersections to letter grades “A” through “F” with “A” representing optimum conditions and “F” representing breakdown or over capacity flows.

Intersections

The complete methodology for intersection level of service analysis is established in *the Highway Capacity Manual (HCM) 6th Edition* published by the Transportation Research Board (TRB). **Table 1** presents the delay thresholds for each level of service grade at signalized and unsignalized intersections.

Table 1: Level of Service Definition for Intersections

| Level of Service | Brief Description | Average Delay (seconds per vehicle) | |
|------------------|--|-------------------------------------|----------------------------|
| | | Signalized Intersections | Unsignalized Intersections |
| A | Free flow conditions. | < 10 | < 10 |
| B | Stable conditions with some affect from other vehicles. | 10 to 20 | 10 to 15 |
| C | Stable conditions with significant affect from other vehicles. | 20 to 35 | 15 to 25 |
| D | High density traffic conditions still with stable flow. | 35 to 55 | 25 to 35 |
| E | At or near capacity flows. | 55 to 80 | 35 to 50 |
| F | Over capacity conditions. | > 80 | > 50 |

Source: *Highway Capacity Manual, 6th Edition*

Level of service calculations were performed for the study intersections using the Synchro 11 software package with analysis and results reported in accordance with *HCM 6th Edition* and *HCM 2000* methodology. *HCM 2000* results were reported for some intersections because as stated in the *HCM*, “*HCM 6th Edition* does not support more than one exclusive lane on turning movements.”



Level of Service Policy

City of Reno

The Regional Transportation Commission's (RTC) *2050 Regional Transportation Plan (RTP)* establishes level of service criteria for regional roadway facilities in the City of Reno, City of Sparks, and Washoe County. The current Level of Service policy is:

"All regional roadway facilities projected to carry less than 27,000 ADT at the latest RTP horizon – LOS D or better."

"All regional roadway facilities projected to carry 27,000 or more ADT at the latest RTP horizon – LOS E or better."

"All intersections shall be designed to provide a level of service consistent with maintaining the policy level of service of the intersecting corridors".

The segment of Robb Drive between the I-80 Westbound Ramps and Sharlands Avenue is projected to carry more the 27,000 ADT at the latest RTP horizon. All other roadway segments within the study area are projected to carry less than 27,000 ADT at the latest RTP horizon.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) *Traffic Impact Study Requirements* publication states:

Level of service "C" will be the design objective for capacity and under no circumstances will less than level of service "D" be accepted for site and non-site traffic.

The following level of service thresholds were used for this analysis:

- ▶ Robb Drive/I-80 Eastbound Ramps – LOS D
- ▶ Robb Drive/I-80 Westbound Ramps – LOS E
- ▶ Robb Drive/Sharlands Avenue – LOS E

EXISTING ROADWAY CONDITIONS

AM and PM peak hour level of service calculations, based on recent turning movement volumes at the existing intersections, are shown in **Table 2**.



Table 2: Existing Intersection Level of Service

| Intersection | Control | AM | | PM | |
|------------------------------------|------------------|--------------------|-----|--------------------|-----|
| | | Delay ¹ | LOS | Delay ¹ | LOS |
| Robb Dr/I-80 EB Ramps ² | No Control | | | | |
| Southbound Approach | | 0 | A | 0 | A |
| Eastbound Approach | | 0 | A | 0 | A |
| Robb Dr/I-80 WB Ramps ³ | Side Street Stop | | | | |
| Westbound Left/Through | | 25 | D | 18 | C |
| Westbound Right | | 12 | B | 35 | E |
| Northbound Left | | 13 | B | 9 | A |
| Robb Dr/Sharlands Ave | Signal | | | | |
| Overall | | 35 | D | 24 | C |

Notes: 1. Delay is reported in seconds per vehicle for the overall intersection for signalized intersections, and for the worst approach/movement for side street stop controlled intersections.

2. This intersection is currently uncontrolled with non-conflicting traffic on the southbound right-turn and eastbound left-turn movements only.

3. HCM 2000 results reported because HCM 6th Edition does not support more than one exclusive lane on turning movements.

Source: Headway Transportation, 2022

As shown in the table, the existing study intersections currently operate within policy level of service thresholds during the AM and PM peak hours.

ROBB DRIVE SOUTH DEVELOPMENT AREA

The S3-Robb Drive properties are part of the overall Robb Drive South development area that was analyzed in the *Traffic Impact Study for TCA Properties* (Headway Transportation, September 23, 2020) to develop long-term, planning level intersection and roadway improvement concepts for Robb Drive and the Robb Drive/I-80 interchange. The trip generation estimates for the overall Robb Drive South development area were calculated based on a hypothetical land use mix as contemplated by the adjacent land owners. The Simons property was included and analyzed based on the existing zoning (approximately 24 acres of large lot residential zoning yielding 24 single family units). The following estimates are for interchange concept planning purposes only.

Trip generation estimates for the overall Robb Drive South development area, after pass-by and internal capture reductions, were calculated based on ITE trip generation rates and methodologies and are as follows:

- ▶ Daily – 22,199 trips
- ▶ AM Peak Hour – 1,454 trips
- ▶ PM Peak Hour – 1,630 trips

Improvements to the Robb Drive/I-80 WB Ramps and Robb Drive/I-80 EB Ramps intersections were developed in phases based on the amount of anticipated development. **Attachments A, B, and C** show



the planned Phase 1, Phase 2, and Phase 3 interchange improvements, respectively. The S3-Robb Drive properties will have a proportional responsibility for funding or construction of the interchange improvements.

Phase 1 improvements include:

- ▶ Robb Drive/I-80 EB Ramps intersection – Add third (south) leg
 - » Intersection becomes stop controlled on EB approach
- ▶ Construct Robb Drive extension – south of I-80 EB Ramps
 - » 2-lane roadway
- ▶ Delineate SB through lane on Robb Drive at I-80 EB Ramps (pavement exists)
- ▶ Robb Drive/I-80 EB Ramps intersection – Add NB to WB left-turn lane and connection to I-80 EB on-ramp
 - » Vehicles on the ramp connector (NB to WB left-turn) would yield to SB right-turn on-ramp traffic from SB Robb Drive
- ▶ Install conduit for future signal

Phase 2 improvements include:

- ▶ Construct all intersection and all roadway geometrics to build-out conditions (without signals) and stripe out dual left-turns until signalized
- ▶ Install signal conduit/underground signal items

Phase 3 improvements include:

- ▶ Construct signals at Robb Drive/I-80 WB Ramps and Robb Drive/I-80 EB Ramps intersections
- ▶ Open all dual left-turn lanes with signalization (remove striping)

Analysis was also conducted to determine the overall capacity of each improvement phase. The Robb Drive/I-80 EB Ramps intersection was found to be the governing intersection in determining interchange capacity. **Table 3** shows the capacity of each improvement phase.



Table 3: Robb Drive Interchange – Estimated Capacity of Each Improvement Phase

| Phase | Peak Hour Traffic Volume Capacity After Improvements (PM Peak Hour) ¹ | Existing Trips at Robb Dr/I-80 EB Ramps ² (% of Phase Capacity) | TCA Trips (% of Phase Capacity) | Remaining Phase Capacity ³ (% of Phase Capacity) |
|---|--|--|---------------------------------|---|
| 1 – Create EB Ramps T-intersection | 1,520 trips | 1,060 trips – 70% | 240 trips – 16% | 220 trips – 14% |
| 2 – All future lanes minus dual lefts | 1,610 trips | 1,060 trips – 66% | 240 trips – 15% | 310 trips – 19% |
| 3 – Signalize EB and WB Ramps intersections | 3,325 trips | 1,060 trips – 32% | 240 trips – 7% | 2,025 trips – 61% |

Notes: 1. Based on PM peak hour traffic volume capacity at the Robb Drive/I-80 EB Ramps intersection.
 2. The Robb Drive/I-80 EB Ramps intersection governs capacity.
 3. This capacity remains for development projects south of the Robb Drive/I-80 interchange after TCA Properties is constructed (3,325 trips – 1,060 trips – 240 trips = 2,025 trips).
 Source: Headway Transportation, 2022

PROJECT CONDITIONS

Anticipated Land Uses & Trip Generation

The S3-Robb Drive parcels are currently zoned Large Lot Residential (1 acre lots) (LLR1). The project applicant is seeking to change the zoning to Specific Plan District (SPD).

The anticipated land uses assumed for planning level analysis, consistent with the proposed zone change, are:

- ▶ Multifamily Housing – 750 units
- ▶ Shopping Center – 100,000 square feet

Table 4 shows the estimated trip generation of these land uses including internal capture and pass-by reductions.

Table 4: S3-Robb Drive Estimated Trip Generation

| Land Use | Size | Trips | | | | |
|-----------------------------------|---------|---------------|------------|------------------|------------|------------------|
| | | Daily | AM | AM In/Out | PM | PM In/Out |
| Multifamily Housing | 750 du | 5,055 | 300 | 72 / 228 | 383 | 241 / 142 |
| Shopping Center | 100 ksf | 6,752 | 173 | 107 / 66 | 519 | 254 / 265 |
| Total | | 11,807 | 473 | 179 / 294 | 902 | 495 / 407 |
| <i>Internal Capture Reduction</i> | | <i>1,305</i> | <i>6</i> | <i>3 / 3</i> | <i>188</i> | <i>94 / 94</i> |
| <i>Pass-By Reduction</i> | | <i>949</i> | <i>0</i> | <i>0 / 0</i> | <i>145</i> | <i>78 / 67</i> |
| Net New Trips | | 10,502 | 467 | 176 / 291 | 714 | 401 / 313 |

Notes: du = dwelling units; ksf = 1,000 square feet
 Source: Headway Transportation, 2022



As shown in the table, the anticipated land uses are expected to generate approximately 10,502 Daily, 467 AM peak hour, and 714 PM peak hour trips.

When compared to the previously evaluated trip generation of the overall Robb Drive South development area (in the *Traffic Impact Study for TCA Properties*), the S3-Robb Drive trips are approximately 47 percent of the Daily trips ($10,502 / 22,199 = 0.47$), 32 percent of the AM peak hour trips ($467 / 1,454 = 0.32$), and 44 percent of the PM peak hour trips ($714 / 1,630 = 0.44$).

Table 5 shows the remaining capacity of the Phase 3 improvements after the TCA Properties and S3-Robb Drive projects are constructed (based on the assumed land uses listed above).

**Table 5: Robb Drive Interchange – Estimated Capacity of Phase 3 Improvements
After TCA & S3-Robb Drive**

| Phase | Peak Hour Traffic Volume Capacity After Improvements (PM Peak Hour) ¹ | Existing Trips at Robb Dr/I-80 EB Ramps ² (% of Phase Capacity) | TCA Trips (% of Phase Capacity) | S3-Robb Drive Trips (% of Phase Capacity) | Remaining Phase Capacity ³ (% of Phase Capacity) |
|---|--|--|---------------------------------|---|---|
| 3 – Signalize EB and WB Ramps intersections | 3,325 trips | 1,060 trips – 32% | 240 trips – 7% | 714 trips – 22% | 1,311 trips – 39% |

Notes: 1. Based on PM peak hour traffic volume capacity at the Robb Drive/I-80 EB Ramps intersection.
 2. The Robb Drive/I-80 EB Ramps intersection governs capacity.
 3. This capacity remains for development projects south of the Robb Drive/I-80 interchange after TCA and S3-Robb Drive are constructed ($3,325 \text{ trips} - 1,060 \text{ trips} - 240 \text{ trips} - 714 \text{ trips} = 1,311 \text{ trips}$).
 Source: Headway Transportation, 2022

The PM peak hour trips generated by the S3-Robb Drive properties are approximately 22 percent of the total capacity of the Phase 3 improvements to the Robb Drive interchange ($714 / 3,325 = 0.22$). Additionally, with TCA Properties and S3-Robb Drive project traffic, it is estimated that approximately 39 percent of the overall capacity of the Phase 3 improvements will remain.

In summary, the S3-Robb Drive trips are well within previous assumptions and well within the capacity of the planned interchange improvements.

CONCLUSIONS

The following is a list of our key findings:

- ▶ The S3-Robb Drive project is seeking a zoning change from Large Lot Residential (1 acre lots) (LLR1) to Specific Plan District (SPD).
- ▶ The S3-Robb Drive properties (750 multifamily units and 100,000 square feet of shopping center) are expected to generate approximately 10,502 Daily, 467 AM peak hour, and 714 PM peak hour trips



- ▶ The overall Robb Drive South development area was analyzed as part of *the Traffic Impact Study for TCA Properties* (Headway Transportation, 2022) and is anticipated to generate approximately 22,199 Daily, 1,454 AM peak hour, and 1,630 PM peak hour trips
- ▶ The estimated S3-Robb Drive trip generation with the proposed zoning is well within the overall trip generation of the Robb Drive South development area estimates.
- ▶ Improvement concepts for the Robb Drive/I-80 WB Ramps and Robb Drive/I-80 EB Ramps intersections were developed to accommodate long-term (future year) traffic volumes. The PM peak hour trip generation of the S3-Robb Drive properties is approximately 22 percent of the overall capacity of the Robb Drive interchange improvements (shown in **Table 5**).
- ▶ With TCA Properties and S3-Robb Drive project traffic, the estimated remaining capacity of the Phase 3 interchange improvements is approximately 39 percent (shown in **Table 5**).
- ▶ The S3-Robb Drive properties will have a proportional responsibility for funding or construction of the overall interchange improvements.

Sincerely,
Headway Transportation, LLC

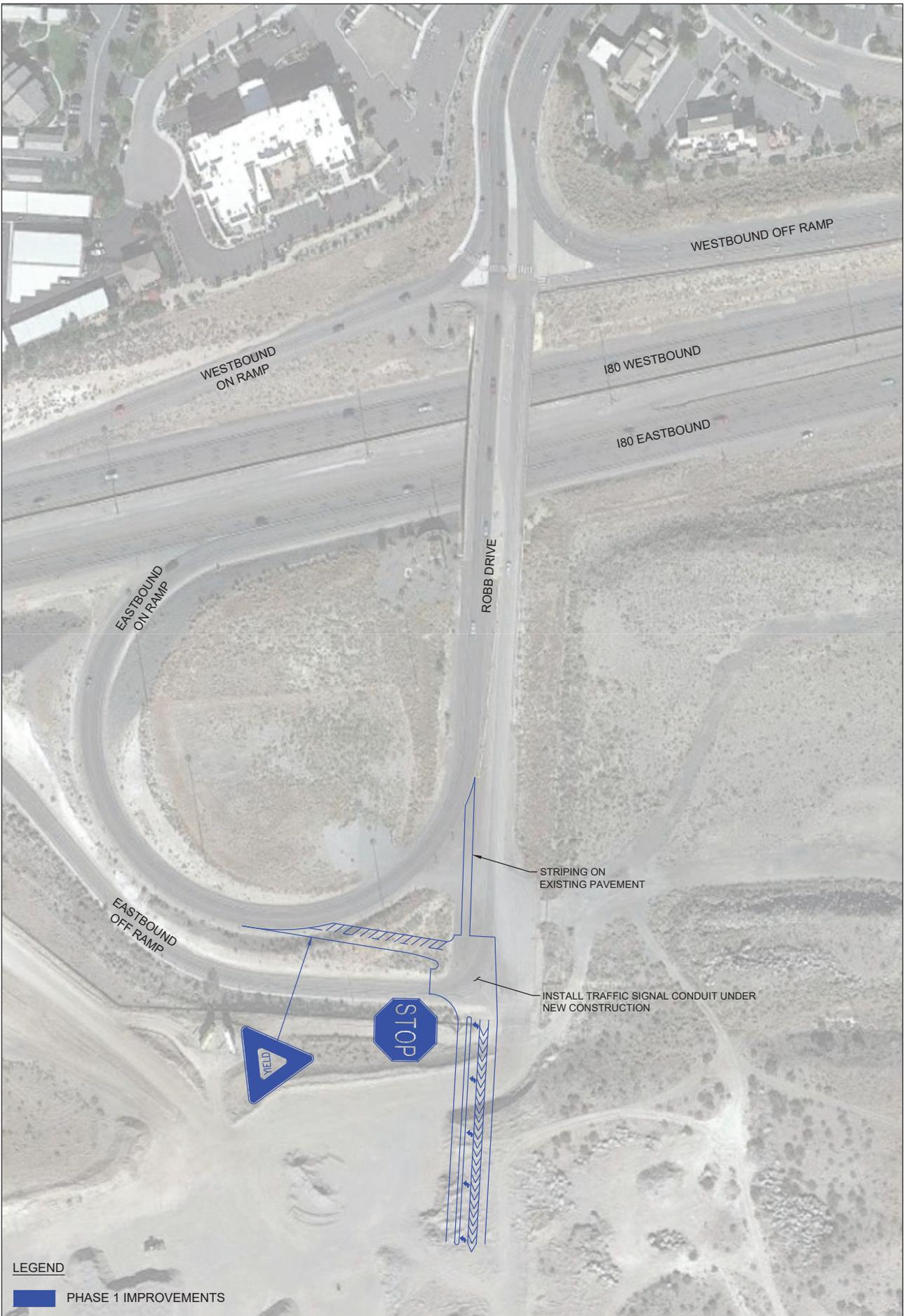


Marissa Harned, PE
Associate

Attachments:

- A – Phase 1 Improvements Figure
- B – Phase 2 Improvements Figure
- C – Phase 3 Improvements Figure





LEGEND

PHASE 1 IMPROVEMENTS





LEGEND

- PHASE 1 IMPROVEMENTS
- PHASE 2 IMPROVEMENTS



