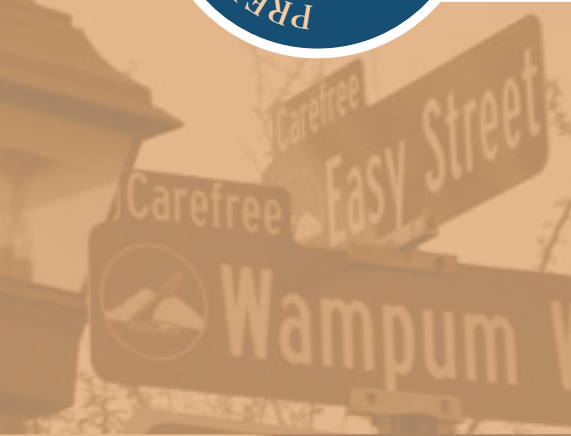


Project Assessment

Tom Darlington Drive and Cave Creek Road





Project Assessment

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Introduction

Project Description

Kimley-Horn and Associates, Inc. (Kimley-Horn) is currently under contract with the Town of Carefree (the Town) to develop a Comprehensive Sign Plan for the Town Center. As part of the project, Kimley-Horn is also developing roadway configuration alternatives along Tom Darlington Drive and Cave Creek Road to provide a better on-street parking and an overall better experience for multimodal road users traveling in and around the Town Center.

The Town of Carefree is a rural, residential township located in the northeast corner of the Phoenix Metropolitan Area in Maricopa County, Arizona. Per the Town's website, the community consists of 3,580 residents (2016) living in approximately 1,900 homes. It surrounds Black Mountain to the south and west, and its land mass also continues to the northeast of this prominent landmark. Carefree's Town Center is a geographically centralized, mixed-use destination with unique shops, art galleries, restaurants, and a 4-acre desert botanical garden which includes a splash pad, a playground, trails, art, and the Sanderson Lincoln Pavilion. The Pavilion hosts live entertainment, community events, and wellness activities.

This Project Assessment (PA) includes alternatives for converting the existing road cross-sections on Tom Darlington Drive and Cave Creek Road to include on-street parking with bike lanes. There are currently bike lanes along both roadways but no on-street parking. This document provides an overview of existing conditions, recommendations for future improvements, and recommendations for any further analysis that may be necessary prior to implementing improvements.

Project Purpose

The objective of the Town of Carefree Comprehensive Sign Plan for Town Center project is to develop a plan for traffic, roadway, and wayfinding improvements throughout the Carefree Town Center and along Tom Darlington Drive and Cave Creek Road which will:

- ▲ Enhance multimodal traffic circulation;
- ▲ Connect relevant points of interest; and
- ▲ Promote a 'complete streets' environment that can safely accommodate a variety of transportation modes.

As part of this project, a Comprehensive Sign Plan will be developed to improve street signage and provide a better experience for users approaching the Town Center.



This PA will focus on analyzing the feasibility of converting the existing road cross-section to include on-street parking with bike lanes while maintaining vehicle throughput of the corridor. Design concepts were developed to enhance multimodal traffic circulation, connect points of interest, and promote a “complete streets” environment. The following will be analyzed as part of the concept designs:

- ▲ New on-street parking
- ▲ Upgraded bike lanes
- ▲ New pavement markings
- ▲ New and/or upgraded Crosswalks
- ▲ Sidewalk and ADA ramp/driveway improvements
- ▲ Shared-use path connectivity

The PA will dive into different concept alternatives and the varying levels of roadway, traffic, and other impacts that each concept will have, including cost.

Study Area

The study area includes the Carefree Town Center and immediately surrounding street network. The total study area is approximately 0.12 square miles (79 acres). The proposed improvement limits on Tom Darlington Drive are from Bloody Basin Road to Cave Creek Road. The proposed improvement limits on Cave Creek Road are from Bloody Basin Road to Tom Darlington Drive.

A vicinity map of the corridor and surrounding area is shown in **Figure 1**. Significant points of interest and their locations within the study area are shown for reference.



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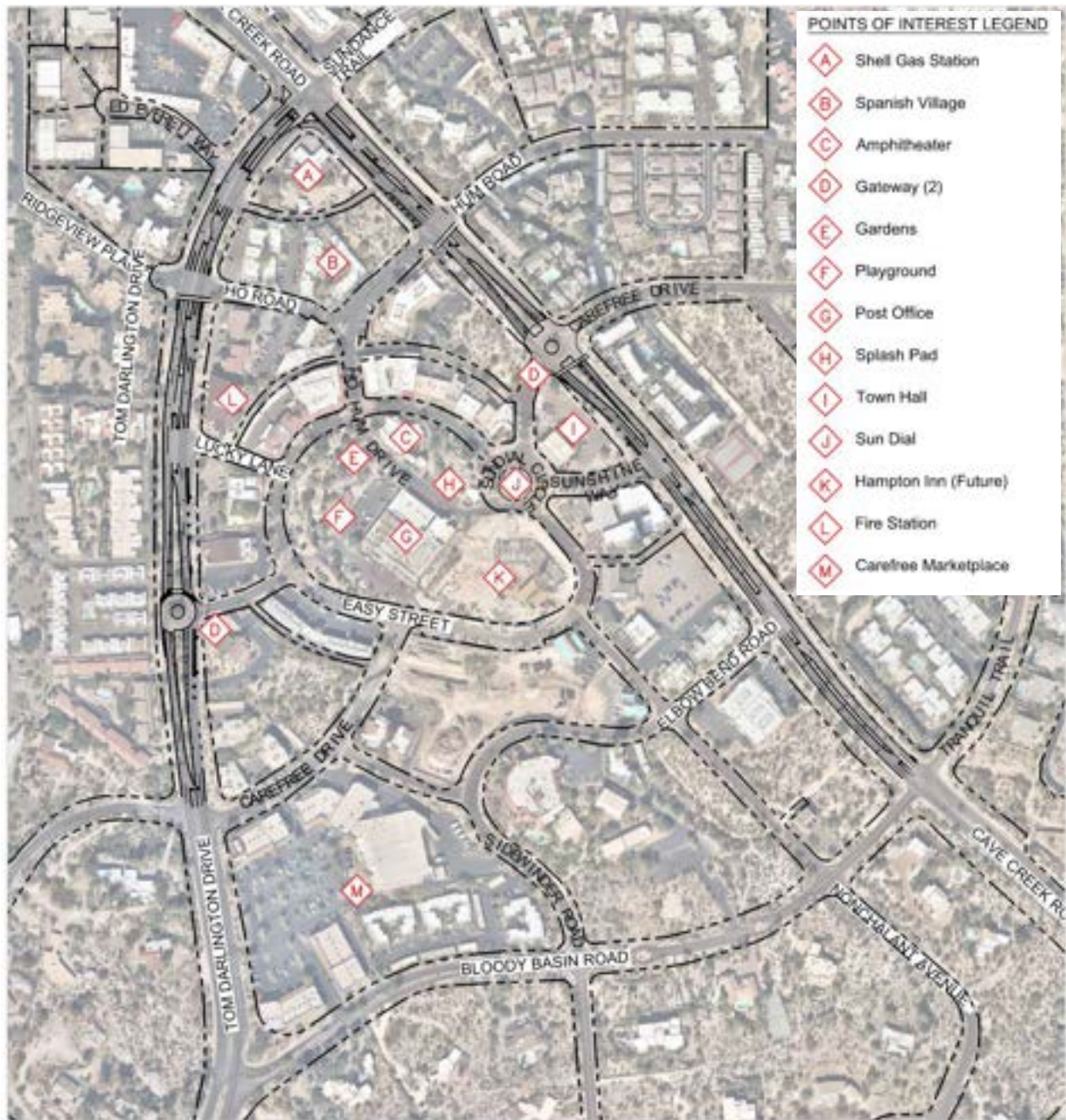


Figure 1: Vicinity Map

Existing Conditions

This section provides a detailed summary of the existing conditions of the study roadways and surrounding area. The information provided is based upon the Kimley-Horn Team's field observations and a review of other available information provided by the Town.

Field Review

Existing conditions field reviews were performed on Friday, September 10, 2021 from approximately 9AM to 12PM local time and on Saturday, November 6, 2021 from approximately 2PM to 5PM.

The purpose of the field reviews was to observe and record existing parking areas and vehicle, bicycle, and pedestrian behaviors that occur in and around the Town Center. Observations from the field reviews are noted throughout the applicable subsections of the **Existing Conditions** section of this report.

The following data was collected as part of the field reviews:

- ▲ **Transportation Observations:** The Team observed the Town Center and surrounding roadways on foot and by car to observe existing circulation patterns, access points, and traffic control and review existing signage and pavement markings.
- ▲ **Parking Observations:** The Team observed existing parking areas within the Town Center and along Tom Darlington Drive and Cave Creek Road to determine how these areas are being utilized during different types of events.
- ▲ **Sign Inventory:** An inventory of existing wayfinding signage within the Town Center and along Tom Darlington Drive and Cave Creek Road was collected. GPS locations were recorded and pictures of signs were taken.

NOTE: The November field review was performed during the Carefree Fine Art and Wine Festival to observe traffic and parking patterns during a special event, including the Town's strategy for road closures. During this field review, a significant portion of the Town Center street network north and west of the Sundial was closed to vehicle traffic to provide space for the event.

Land Use

The majority of the study area contains the Town Center, which consists of commercial lots with one garden office lot and one R-3 lot. Medical, personal, and professional offices account for more than half of the Town Center. A quarter of the developments are restaurants, bars, and



retail. The remaining land is occupied by government uses, religious centers, leisure uses, parking, residential, and undeveloped land.

The remaining study area consists of the roadway surrounding the Town Center extending to the Public Right of Way (ROW). The Land use along the periphery of the Town Center is a variety of residential districts and some commercial. Along Tom Darlington Drive from Bloody Basin Road to Carefree Drive is a Rural-70 Residential District and from Bloody Basin Road to Ed Everett Way is a R-3 Residential District. The west corner of the intersection of Cave Creek Road and Tom Darlington Drive has a variety of commercial properties. Along Cave Creek Road the land consists of a R-3 Residential District from Bloody Basin Road to Hum Road. The East corner of the 4-way stop intersection has been developed as a Garden Office. South of the Town Center is Bloody Basin Road consisting of a Rural-70 Residential District.

A vicinity map of the corridor and surrounding area was shown in **Figure 1**.

Project Area Landmarks and Attractions

The following is a summary of significant landmarks, attractions, and events located within the study area:

- ▲ **Transit:** There is no public transit offered with direct connection to Carefree. All transit offered is through private entities.
- ▲ **Schools:** Children residing in Carefree attend public, charter or private schools within the Cave Creek Unified School District (CCUSD). There are no schools located within the project limits. The closest schools are “Our Lady Catholic Preschool,” 2.5 miles to the East and “Quality Interactive Montessori,” 1.8 miles to the West.
- ▲ **Parks:** The Town Center has the Kiwanis Sundial Splash park comprised of Desert Gardens, sundial, splash pad, seating areas, water features, artworks, and playground. The area offers several Regional Parks and Conservation Areas.
- ▲ **Destinations / Attractions:** The Town Center includes unique shops, art galleries, restaurants, and a 4-acre desert botanical garden which includes a sundial, a splash pad, a playground, trails, art, and the Sanderson Lincoln Pavilion. Carefree is the closest developed Town to Bartlett Lake and all visitors of the Lake must pass through either the Carefree Town Center or residential areas. The Boulders Resort and Spa is located 2 miles South of the Town Center and CIVANA Wellness Resort and Spa is located within 1 mile from the Town Center. There are 7 golf courses and numerous hiking trails within the area and private businesses that offer various forms of outdoor adventure packages.



- ▲ **Postal Service:** There is no home mail delivery to residents of Carefree. All residents must physically pick up mail from the United States Postal Service office located in the Town Center.
- ▲ **Parades:** Annually the Town holds an electric light parade in coordination with the Christmas in Carefree Festival.
- ▲ **Events:** Various events occur around the Town throughout the year. The Town has the following events that occur weekly, monthly, and annually.
 - Chanukah in Carefree
 - Christmas in Carefree
 - Carefree Fine Art and Wine Festival (Winter, Spring, and Fall)
 - Desert Garden Seminars
 - Desert Hills Presbyterian Church holds a Concert Series
 - Sanderson Lincoln Pavilion holds concerts, fundraisers, and weekly farmers markets

Proposed Developments

The Town has provided information regarding current or proposed developments in the area that may affect the project. The following developments are proposed and within the study area:

- ▲ Hilton Hampton Inn (Carefree Town Center)
 - Location: Situated in the Town Center between Hum Road and Easy Street, directly east of the United States Postal Service
 - Type: Hotel with 97 rooms
 - Status: Under Construction with plans to open Summer 2022
- ▲ Resort Growth
 - Location: 21-acres northeast of Carefree Highway and Tom Darlington Drive
 - Type: Economically sustainable, destination-based hospitality/resort use, with limited compatible commercial retail uses
 - Status: Major General Plan Amendment
- ▲ Resort Growth and Lodging
 - Location: 40-acre State Land Parcel located southeast of Mule Train Road and Cave Creek Road



- Type: Future resort growth and lodging
- Status: Will be evaluated for resort and lodging in General Plan Update in 2022

Previous Studies and Initiatives

The following studies and initiatives have been performed by others, prior to this study:

Carefree General Plan – 2030 (2012)

The General Plan is a policy document that guides community development decisions to provide a sense of order, coordination and quality to the Town's policies and actions affecting growth. The Plan includes goals, objectives, and recommendations to guide the land use, circulation network, open space preservation and other public facilities and services.

Cave Creek - Carefree Transportation Framework Study (2014)

This document is a comprehensive master plan to guide transportation development in the communities of Cave Creek and Carefree. The goals of the transportation plan are the following:

- ▲ Provide transportation improvements that will enhance or preserve and not detract from the natural and social character of the area.
- ▲ Promote a balanced transportation system that provides adequate capacity for and convenient access to vehicle, transit, bicycle/pedestrian, and equestrian travel modes within the study area.
- ▲ Support the development of transportation related projects that encourage tourism and promote economic prosperity in the study area.
- ▲ Support transportation projects that are fiscally responsible and preserve existing infrastructure.
- ▲ Improve the safety of the transportation system for all travel modes in the study area.

The document contains several recommendations pertaining to parking, pedestrians, and special events, they are as follows:

- ▲ Develop on-street parking on Tom Darlington Drive north of Bloody Basin Road
- ▲ Develop on-street parking on Cave Creek Road west of Carefree Drive
- ▲ Prohibit on-street parking South of Bloody Basin Road
- ▲ Bike lanes and Sidewalks
- ▲ An optional shared-use path



- ▲ Additional sidewalks, traffic signals or other traffic devices
- ▲ Refine manual traffic control
- ▲ Provide a sense of arrival and a transition to one travel lane, as well as roadway design features that slow traffic approaching these pedestrian-oriented zones
- ▲ Provide additional wayfinding signage on Cave Creek Road
- ▲ Provide additional parking directional signage and publish parking information on-line
- ▲ Provide bypass route on bloody basin

Community Standards and Guidelines – Commercial – 2021

These outline the Town's expectations with regard to future development or redevelopment of multiple-family, garden, office, and commercial properties. The document provides guidelines that promote continuity in architecture, establish pedestrian and vehicular linkages, and mitigate negative impacts. Guidelines are provided for site planning and design, building architecture, landscaping, lighting, and signage.

Community Standards and Guidelines – Mountainside – 2021

These address the visual appearance of all site improvements with the goal of blending all improvements into the natural beauty and tranquility of the Sonoran Desert and preserving significant mountainside views that have historically defined the community's sense of place. The design standards and guidelines contain building practices that perpetuate the desired qualities of the community and environment. Definitions are provided for building sites, natural opportunities and constraints of a site, and identification of suitable building areas. Guidelines are provided for site improvements, building design, driveways, solid masonry walls, retaining walls and fences, solar panels and associated equipment, exterior lighting, and landscaping.

EDTAP/Planning and Zoning Study Session Redevelopment Area – 2021

This is a redevelopment plan to enable a special set of tools, where communities can use public resources to leverage private investment. The plan is currently under development and the initial findings are dominance of defective or inadequate street layout, faulty lot layout in relation to size, adequacy, accessibility or usefulness, unsanitary or unsafe conditions, deterioration of site or other improvements, diversity of ownership, defective or unusual conditions of title, and improper or obsolete subdivision planning. The study also recommends a boundary for the redevelopment area.



Town Center Pedestrian Crosswalk Solutions – Tech Memo #1: Crosswalk Alternatives Analysis – 2019

This report summarizes the study findings of the pedestrian and vehicular operational and safety existing conditions, develops a series of improvements alternatives, and identifies a preferred design alternative following a comprehensive assessment of each crosswalk location. Based on the report findings, crosswalk alternatives were recommended at Carefree Drive and Tom Darlington Drive, Ho Road and Tom Darlington Drive, Hum Road and Cave Creek Road, and Carefree Drive and Cave Creek Road.

Village Center Master Plan – 2015

Town leaders initiated the development of this Master Plan document to help focus community efforts and identify a revitalization framework that will allow the Village Center to reach its full potential. Some strategies recommended within the plan that are applicable are:

- ▲ Improve the Village Center’s Visibility and Access by celebrating points of arrival, decreasing number of entry drives, establish a hierarchy of street typologies, build upon the pedestrian and bicycle friendly design, and create additional parking opportunities; and
- ▲ Enhance the Village Center Experience by encouraging exploration by improving wayfinding and signage and improving sightlines into the Village Center.

Town of Carefree – ULI Arizona Technical Assistance Panel – Summary Report (2014)

The Town of Carefree ULI Arizona Technical Assistance Panel (Carefree AzTAP) examined opportunities to enhance the quality of the Town Center to create additional energy, foot traffic and visibility to support businesses and contribute to a stronger and more sustainable economy. The AzTAP process consisted of a site tour, panel discussion and a public forum. Challenges for redevelopment that were identified by the Town include lack of visibility, parking, minimal town land ownership, fractured ownership, existing stakeholders, funding, land use patterns, and seasonality. Opportunities for redevelopment identified by the Town include widening the mixture of amenities, restaurant emphasis, enhancing parking, creating a sense of entry, and messaging to market the Town center.

Amended Zoning Ordinance – 2004

The purpose of the Zoning Ordinance document is to conserve and promote the public health, safety, and general welfare by regulating the use of buildings, structures, and land and the intensity of land use for agriculture, residence, commercial, industry, and other purposes. This amendment was created to implement the adopted Town of Carefree General Plan.



Roadway

A full ADA evaluation was not conducted as part of this project, but aerial imagining was used to evaluate ramps, sidewalks, driveways, and general ADA conditions. Sidewalk and ramps currently exist only at or near crosswalks. The Wampum Way crosswalk possesses four ADA compliant ramps including those within the median refuge and all are protected by raised curbs. The sidewalk running along the west side of Tom Darlington Drive contains ramps that are not ADA compliant when crossing driveway locations and the sidewalk does not continue past the limits of Colina of Carefree Condominiums and the northern entrance of Double Gate Condominiums. The crosswalks at Ridgeview Place and Tom Darlington Drive and Hum Road and Cave Creek Road have an 8ft by 12ft at grade concrete pad on either side of the crosswalk with an 10ft by 2ft truncated dome Detectable Warning Pad (**Figure 2**). Neither side of the crosswalks have sidewalk attached to the pedestrian pads and therefore, they are not in ADA compliance. The Ridgeview Place crosswalk is equipped with a push button flashing beacon on either side of the crosswalk. The final existing crosswalk located at Carefree Drive and Cave Creek Road consists of four ADA compliant ramps including those within the median refuge. The pedestrian pads at this traffic circle are protected by raised curbs. Each side of the crosswalk connects to a sidewalk that leads into the Town center and residential area. The sidewalks do not continue which is another ADA compliance concern. The remainder of the corridor does not have sidewalk and or ADA compliance.



Figure 2: Pedestrian Crossing Pads at Tom Darlington Drive and Ridgeview Place
(Imagery Sources: Aerial - Nearmap, Street View - Google Maps)



Curb and Gutter

Curb and Gutter is currently utilized along the outside edges of the roadway near the traffic circles to control the roadway drainage. Curb and gutter is also utilized along the roadway medians though it is unclear whether or not the curb along the medians controls drainage as the roadway is assumed to be normal crown. Single curb is located along the pork chop islands at the Cave Creek Rd and Tom Darlington intersection.

Valley gutters are utilized along two driveways in the NB direction approaching the traffic circle.

Typical Sections

The following is a description of the existing typical roadway sections within the study area:

Tom Darlington Drive: Bloody Basin Drive to Cave Creek Road

- ▲ **Right-of-Way:** Maintains 130 feet
- ▲ **Existing Cross Sections:**
 - **General:**
 - **Bike Lanes and Shoulder:** All cross sections contain bike lanes in both directions and there is no dedicated shoulder parking within project limits. The northbound bike lane on Tom Darlington Drive ends approximately 300 feet before the intersection at Cave Creek Road.
 - **Curb and Gutter:** There is raised curb and gutter on a small section of the west side of Tom Darlington from approximately 200 feet north of Wampum Way to 100 feet north of Carefree Drive. There is a small section on the east side of Tom Darlington from approximately Carefree Drive to 100 feet north of Lucky Lane. Medians have raised curbs from Carefree Drive to Cave Creek Road, with the exceptions of the median in front of Fire Station #821 and the traffic circle island at Wampum Way. The remainder of this segment has no raised curb or gutter.
 - **Sidewalk:** There is approximately 275 feet of sidewalk on the west side of Tom Darlington at Wampum Way, and 50 feet on the east side tying into Wampum Way.
 - **Bloody Basin Road to Carefree Drive:** The existing cross-section consists of two through lanes in each direction. At Bloody Basin Road, the road is divided by a raised median with a southbound left turn lane onto Bloody Basin Road. The



raised median ends approximately 250 feet north of Bloody Basin Road and becomes a striped median with alternating left turn lanes up to Carefree Drive. In the northbound direction, there is a continuous right turn lane for Carefree Marketplace and Carefree Drive.

- **Carefree Drive to Lucky Lane:** There is an existing three-legged traffic circle located in the middle of this segment at Wampum Way and the number of through lanes in each direction varies within this segment as described below:
 - In the Northbound direction, the existing cross-section drops from two through lanes to one approximately 85 feet north of Carefree Drive. The curb lane becomes a dedicated right turn lane onto Wampum Way and northbound through traffic must merge left. On the north leg of the traffic circle, there are two receiving lanes and the roadway immediately widens back to two through lanes.
 - In the southbound direction, the existing cross section merges down from two through lanes to one beginning at Lucky Lane. On the south leg of the traffic circle, there is one receiving lane and the roadway does not widen back to two through lanes until approximately 150 feet north of Carefree Drive.
 - The majority of this segment is median-separated with striped left turn lanes at the north and south ends of the segment.
- **Lucky Lane to Ridgeview Place / Ho Road:** The existing cross section consists of two lanes in each direction and has the following features:
 - Median width and type varies through this segment. Just north of Lucky Lane, the median widens and consists of striped opposing left turn lanes adjacent to each other. To the north, there is an approximately 100-foot-long landscaped median followed by a striped left turn lane onto Ridgeview Place.
 - In the northbound direction, there is a striping break and regulatory signage that appears to create a dedicated right turn lane onto Ho Road. However, there does not appear to be sufficient width for a vehicle to use this as a right turn lane without encroaching into the bike lane and there are no turn lane arrow markings.
 - There is an existing striped crosswalk on the south leg at Ridgeview Place. This crossing is enhanced with a pedestrian-activated beacon.



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- **Ridgeview Place / Ho Road to Cave Creek Road:** The existing cross section generally consists of two through lanes in each direction. In the northbound direction, the existing cross-section changes approximately 220 feet south of Cave Creek Road to provide exclusive left-turn, through, and right-turn lanes. The curb lane becomes a dedicated right turn lane onto Cave Creek Road and northbound through traffic must merge left. A raised median begins where the dedicated left turn lane begins.
- See **Figures 3 through 8.**



Figure 3: Tom Darlington Drive near Carefree Marketplace (Looking Northbound)
Source: Google Earth (2021)



Figure 4: Tom Darlington Drive near Carefree Marketplace (Looking Southbound)
Source: Google Earth (2021)

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Figure 5: Tom Darlington Drive near Wampus Way (Looking Northbound)
Source: Google Earth (2021)



Figure 6: Tom Darlington Drive near Wampus Way (Looking Southbound)
Source: Google Earth (2021)



Figure 7: Tom Darlington Drive near Ridgeview Place (Looking Northbound)
Source: Google Earth (2021)



Figure 8: Tom Darlington Drive near Ridgeview Place (Looking Southbound)
Source: Google Earth (2021)

Intersection of Tom Darlington Drive and Cave Creek Road

- ▲ **Right-of-Way:** Varies between 80 feet and 130 feet
- ▲ **Existing Cross Sections:** The intersection operates under four-way stop-control and consists of the following cross sections:
 - **Northwest Leg (Cave Creek Road):** The southeastbound approach consists of two through lanes, a dedicated left turn lane, a channelized right turn lane, and a bike lane. The northwestbound departure consist of two through lanes and a bike lane.
 - **Northeast Leg (Tom Darlington Drive):** The southwestbound approach consists of one through lane. The northeastbound departure consists of one through lane. There are no bike lanes and no exclusive turn lanes.
 - **Southeast Leg (Cave Creek Road):** The northwestbound approach consists of two through lanes, a dedicated left turn lane, and a bike lane. The southeastbound departure lanes consists of two through lanes and one add-lane from the right turn movement on Tom Darlington.
 - **Southwest Leg (Tom Darlington Drive):** The northeastbound approach consists of one through lane, a dedicated left turn lane, and a channelized right turn lane. The southwestbound departure consists of two through lanes and a bike lane.
- ▲ There are raised medians on all approaches except on the northeast leg.



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- ▲ There are no existing sidewalks or ramps at the intersection.
- ▲ See **Figures 9 through 11.**



Figure 9: Intersection of Tom Darlington Drive and Cave Creek Road (Aerial View)
Source: Nearmap (2021)



Figure 10: Intersection of Tom Darlington Drive and Cave Creek Road
(Looking North on Tom Darlington Drive)



Figure 11: Intersection of Tom Darlington Drive and Cave Creek Road
(Looking Northwest on Cave Creek Road)

Cave Creek Road: Tom Darlington Drive to Bloody Basin Road

- ▲ **Right-of-Way:** Maintains 130 feet
- ▲ **Existing Cross Sections:**
 - **General:**
 - **Bike Lanes and Shoulder:** All cross sections contain bike lanes in both directions and there is no designated shoulder parking within project limits.
 - **Curb and Gutter:** There is a raised curb and gutter on the south side of Cave Creek Road from Tom Darlington Drive to 130 feet past Carefree Drive and on the north side of Cave Creek Road for 170 feet on each side of Carefree Drive. All medians are raised except for the traffic circle at Carefree Drive. The remainder of this segment has no raised curb or gutter.
 - **Sidewalk:** The south side of Cave Creek Road has 160 feet of meandering sidewalk from Hum Road toward Carefree Drive. Carefree Drive crosswalk has sidewalk paths extending into the Town

Core south of the crosswalk and residential area north of the crosswalk.

- **Southeast Direction:** The majority of the cross section consists of two through lanes divided by a raised median. The southeast direction of travel has a weaving lane receiving a right turn from Tom Darlington Drive where through traffic must merge before the lane turns into a dedicated right turn lane onto Hum Road. There is also a dedicated left turn lane onto Hum Road. After Hum Road the section drops to one lane, enters a traffic circle at Carefree Drive and then returns to two lanes. There is a dedicated right turn lane onto Sunshine Place and a dedicated left turn lane onto Tranquil Trail. The raised median provides breaks for each dedicated turn lane in each direction.
- **Northwest Direction:** Starting at Tranquil Trail the cross section consists of two through lanes divided by a raised median with a dedicated left turn lane onto Elbow Bend Road and Sunshine Place. The cross section drops to one lane after Sunshine Place, enters the traffic circle at Carefree Drive, and then returns to two lanes approximately 75 feet before Hum Road with a dedicated left turn lane onto Hum Road. There are dedicated left turn lanes for travelers to access the Shell gas station as well as to make a left onto Tom Darlington Drive at the four-way stop. The raised median provides breaks for each dedicated turn lane in each direction.

▲ See Figures 12 through 17.



Figure 12: Cave Creek near Elbow Bend (Looking Northbound)
Source: Google Earth (2021)



Figure 13: Cave Creek Road near Elbow Bend (Looking Southbound)
Source: Google Earth (2021)



Figure 14: Cave Creek Road near Carefree Drive (Looking Northbound)
Source: Google Earth (2021)

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Figure 15: Cave Creek Road near Carefree Drive (Looking Southbound)
Source: Google Earth (2021)



Figure 16: Cave Creek Road near Hum Road (Looking Northbound)
Source: Google Earth (2021)



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Figure 17: Cave Creek Road near Hum Road (Looking Southbound)
Source: Google Earth (2021)

Signing and Pavement Marking

Based on the field reviews, the following signing and pavement marking observations are noted for Tom Darlington Drive and Cave Creek Road within the project limits:

Tom Darlington Drive: Bloody Basin Drive to Cave Creek Road

- ▲ Within the project limits, Tom Darlington alternates between two lanes in each direction and one lane in each direction. It merges down to a single lane in each direction at the traffic circle at Wampum Way.
- ▲ The through lanes are separated by alternating raised medians and marked left turn lanes.
- ▲ Bicycle lanes are present on both sides of the roadway from Bloody Basin Drive to Ed Everett Way, terminating just prior to the intersection at Tom Darlington Drive and Cave Creek Road.
- ▲ There is an existing marked crosswalk with pedestrian-activated circular flashing beacons and in-street flashers on the south leg of Ridgeview Place. **(Figure 18)**
 - It was noted that there are no advanced stop bars at the crosswalk to separate vehicles from the crosswalk. **(Figure 19)**
- ▲ There is an existing marked crosswalk on the north leg of the traffic circle at Wampum Way. The crosswalks are curved to follow the curvature of the traffic circle, creating a longer walking path across the intersection. **(Figure 20)**
- ▲ There is an advanced warning sign at Carefree Marketplace advising through traffic to merge left. However, subsequent pavement arrows in advance of the traffic circle point to the right, indicating that vehicles need to merge right.
- ▲ In the northbound direction, there is a striping break and regulatory signage that appears to create a dedicated right turn lane onto Ho Road. However, there does not appear to be sufficient width for a vehicle to use this as a right turn lane without encroaching into the bike lane and there are no turn lane arrow markings.
- ▲ There are no bus stops within the project limits.
- ▲ There is no on-street parking markings or signage within the project limits.
- ▲ The posted speed limit is 30 MPH.

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Figure 18: Existing Flashing Beacon at Ridgeview Place and Tom Darlington Drive



Figure 19: Vehicle Stopped at Existing Crosswalk (South Leg of Tom Darlington Drive and Ridgeview Place)



Figure 20: Existing Crosswalk (North Leg of Tom Darlington Drive and Wampum Way)
Source: Nearmap (2021)



Cave Creek Road: Bloody Basin Drive to Tom Darlington Drive

- ▲ Within the project limits, Tom Darlington alternates between two lanes in each direction and one lane in each direction. It merges down to a single lane in each direction at the traffic circle at Carefree Drive.
- ▲ The through lanes are separated by alternating raised medians and marked left turn lanes.
- ▲ Bicycle lanes are present on both sides of the roadway from Bloody Basin Drive to Tom Darlington Drive, continuing through the intersection at Tom Darlington Drive and Cave Creek Road.
- ▲ There is an existing, unsignalized crosswalk on the south leg of Hum Road. It was noted that there are no advanced stop bars or yield markings at the crosswalk to separate vehicles from the crosswalk. (**Figure 21**)
- ▲ There is an existing marked crosswalk on the south leg of the traffic circle at Carefree Drive. (**Figure 22**)
- ▲ There are no bus stops within the project limits.
- ▲ There is no on-street parking markings or signage within the project limits, but there is a small parking area along the east side of the road adjacent to the tennis courts (south of the traffic circle). (**Figure 23**)
- ▲ The posted speed limit is 30 MPH and there is a solar-powered speed feedback sign on the northbound approach to the traffic circle.



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Figure 21: Existing Crosswalk (South Leg of Hum Road and Cave Creek Road)
Source: Neamap (2021)



Figure 22: Existing Crosswalk (South Leg of Carefree Drive and Cave Creek Road)
Source: Neamap (2021)



Figure 23: Existing Parking Area on Cave Creek Road
Source: Neamap (2021)

Traffic Volumes

Existing and forecasted traffic volumes were obtained from the *Town Center Pedestrian Crosswalk Solutions: Technical Memorandum #1 (Crosswalk Alternatives Analysis)* report prepared by RICK Engineering and dated November 25, 2019 (“the Crosswalk Study”).

A copy of the Crosswalk Study is provided in the **Appendix A** for reference.

Average Daily Traffic

Average Daily Traffic volumes from the Crosswalk Study are presented in **Table 1**.

Table 1: Daily Traffic Volumes from Crosswalk Study (by Others)

Date / Original Data Source	Roadway	Daily Total Traffic (vehicles per day, vpd)
2015 / MAG Maps	Tom Darlington Drive	13,000
	Cave Creek Road	15,000
2019 / Crosswalk Study (Adjusted Counts)	Tom Darlington Drive	8,457
	Cave Creek Road	6,349
2039 / Crosswalk Study (Forecasted)	Tom Darlington Drive	15,307
	Cave Creek Road	11,492

Notably, the reported 2015 MAG Volumes are significantly higher than the adjusted counts from the 2019 Crosswalk Study. This is unusual as traffic volumes typically are expected to increase over time. This discrepancy was explained in the Crosswalk Study as follows:

“As shown, the MAG traffic volumes are significantly higher than the current counted volumes. Most of the MAG data was collected in 2007 and 2008. The turning movements were collected in 2010. The years 2007 and 2008 were just before the economic recession and the traffic volumes were significantly higher. The volumes then dropped significantly due to the economic downturn. Since the base traffic volumes were collected before the recession, the MAG predicted 2015 volumes are typically significantly higher than the current situation.”

As shown in **Table 1**, the Crosswalk Study also developed forecasted traffic volumes for the year 2039 to provide an estimate of future traffic. Per the study, the 2039 volumes were developed using a 3% growth rate applied over 20 years.



Peak Hour Through Volumes

The Crosswalk Study also reported peak hour bi-directional through volumes as summarized in **Table 2**.

Table 2: Peak Hour Volumes from Crosswalk Study (by Others)

Date / Original Source	Roadway	Peak Hour Through Volumes (vph)
2019 / Crosswalk Study (Adjusted Counts)	Tom Darlington Drive	342
	Cave Creek Road	266
2039 / Crosswalk Study (Forecasted)	Tom Darlington Drive	619
	Cave Creek Road	482

Roadway Capacity Analysis

The forecasted traffic volumes were reviewed to determine how roadway capacity might be impacted if the number of lanes along Tom Darlington Drive and Cave Creek Road were to be reduced to one travel lane per direction. Based on the available data and existing roadway geometry within the study area, capacity issues are not anticipated. The following items are noted in support of this conclusion:

- ▲ In the Crosswalk Study, the forecast design year (2039, 20-year horizon) values were reported to be below the capacity of a single-lane roadway and future capacity issues were not anticipated.
- ▲ Under existing conditions, both Tom Darlington Drive and Cave Creek Road already merge down to a single lane near the traffic circles.
- ▲ The FHWA generally advises that roadways with an ADT of 20,000 vpd or less may be good candidates for a Road Diet and should be evaluated for feasibility. Based on the 2039 volumes from the Crosswalk study, future volumes are expected to remain well below this threshold for both roadways.
- ▲ The FHWA cites the state of Iowa's guidance which concludes that a road diet is "probably feasible at or below 750 vehicles per hour per direction (vphpd) during the peak hour." Based on the 2039 volumes from the Crosswalk study, future volumes are expected to remain well below this threshold for both roadways.

NOTE: It should be noted that this analysis is for the roadway segments within the study area only. It does not consider turning movement traffic patterns or volumes at the four-way stop controlled intersection of Cave Creek Road and Tom Darlington Drive or at the traffic circles. If significant changes are proposed at the intersections, it is recommended that additional analysis be performed to evaluate intersection capacity, geometry, and storage lengths and determine if additional improvements are needed.

Traffic and Parking Observations

Based on the field reviews, the following intersection control, traffic circulation, and parking observations are noted:

Intersection Control

▲ Traffic Circles

- There are two existing, one-way traffic circles within the project limits. The traffic circles have “gateway” architectural elements and are intended to serve as the primary entrance points to the Town Core.
- Within the traffic circles, the mainline vehicle movements operate as a free-flow condition (Tom Darlington Drive and Cave Creek Road). Side-streets operate under stop control. There is yield signage in the middle of the circles, meaning any vehicle making a left turn or U-turn from the mainline or entering the circle from the side streets must make a two-stage movement and yield to oncoming traffic. **(Figure 24)**

▲ Four-Way Stop Control

- The intersection of Tom Darlington Drive and Cave Creek Road operates under four-way stop control.

Traffic Circulation

- ▲ There is limited signage along Tom Darlington Drive and Cave Creek Road to direct traffic into the Town Center.
- ▲ Once within the Town Center, the roadway network is curved and segmented, creating many small intersections and parallel roadways. There is limited wayfinding signage to direct visitors to points of interest and parking areas.
- ▲ During large events, isolated roadways may be barricaded off for pedestrian activity, limiting circulation within the Town Center and limiting access to parking within the Town Core.



Figure 24: Vehicle Yielding During 2-Stage Left Turn at Traffic Circle
(Tom Darlington Drive, Looking South)
Source: Google Earth (2021)

Parking Observations

- ▲ The September Field Review was performed on a Friday during the weekly Farmer's Market.
 - There were no notable street closures, and the entirety of the event was contained within the landscaped/hardscaped area near the amphitheater.
 - Traffic volumes appeared to be relatively low and ample parking was available throughout the Town Core.
- ▲ The November Field Review was performed during the Carefree Fine Art and Wine Festival. During this event, several streets in the Town Center were closed, reducing the amount of available parking within the Town Center.
 - Vehicles were observed to be utilizing the shoulder along the west side of Tom Darlington Drive between Cave Creek Road and Bloody Basin Drive. Vehicles were also observed to be utilizing the shoulder along both sides of Cave Creek Road between Tom Darlington Drive and Bloody Basin Drive.
 - Vehicles utilized any available shoulder area where there was no curb. This resulted in vehicles blocking the bike lanes.
 - See **Figures 25 through 28**.
 - Vehicles were observed to be parking along minor streets such as Hum Road, north of Cave Creek Road. (**Figure 29**)



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- In the Town Core, several parking areas were blocked off or signed as “No Event Parking”. (Figure 30 and 31)
- In the Town Core, unmarked areas and extra-wide drive aisles were used as parking. (Figure 32)
- In the Town Core, several full-size parking spaces were occupied by motorcycles. Several vehicles were observed to nearly miss parked motorcycles that were obstructed from their view by other parked vehicles. (Figure 33 and 34)



Figure 25: Vehicles Parked on Shoulder (Tom Darlington Drive, Looking Northwest)



Figure 26: Vehicles Parked on Shoulder (Tom Darlington Drive, Looking North)



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Figure 27: Vehicles Parked on Shoulder (Tom Darlington Drive, Looking South)



Figure 28: Vehicles Parked on Shoulder (Cave Creek Road, Looking North)

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Figure 29: Vehicles Parked on Shoulder (Hum Road, Looking North)



Figure 30: "No Event Parking" Example (Near Cave Creek Road)



Figure 31: "No Event Parking" Example (Near Tom Darlington Drive)



Figure 32: Drive Aisle Used for Parking



Figure 33: Motorcycle Occupying Full Parking Space (Example 1)



Figure 34: Motorcycle Occupying Full Parking Space (Example 2)

Landscape Architecture

- ▲ **Pedestrian Pavements:** The existing segments of sidewalk along N Tom Darlington Drive and E Cave Creek Road, though limited in number, are consistent in both color and finish. The existing portions of sidewalk appear to be in good shape, without any major fracturing or shifting.
- ▲ **Plant Materials:** The plant materials found along the two corridors are generally consistent with a clear identifiable theme. There is a mixture of mesquite, palo verde, and other native trees, saguaros, multiple cacti species, agave, yucca, and a number of shrubs. The existing right-of-way planting areas have decomposed granite, exposed soil, and understory plantings for coverage. Adjacent development landscape beyond

the existing right-of-way may include plantings that are inconsistent with the theme of the two roadways, mostly consisting of but not limited to manicured hedge-like shrubs, large junipers, and other non-native plants. Planting areas have a pleasing density of plants along the two corridors.

- ▲ **Site Furnishings:** Site furnishings are non-existent along N Tom Darlington Drive and E Cave Creek Road. There is a lack of seating opportunities, site furnishings for litter/recycling receptacles, bike storage/staging, and pedestrian scale lighting. Impromptu seating at utility facilities such as transformers, communication boxes, and private development screen walls may be used but are not encouraged. The two corridors have no comfort features for rest, transit, or community social activities.
- ▲ **Wayfinding Elements:** Wayfinding elements throughout the two corridors are limited and inconsistent. There are a small number of facilities or streetscape elements to identify nearby destinations, direction, or distances to transportation or civic locations. However, these wayfinding elements may be difficult to read and are not located in ideal placements. Materials, direction, and scale of the existing elements vary throughout the Tom Darlington and Cave Creek corridors. Street signage and adjacent development monumentation signs exist within the corridor. Aside from the major gateway arches, a lack of branding or identity of the corridor is present in signage or furnishing materials.
- ▲ **Shade Structures:** Shade along the existing Tom Darlington and Cave Creek corridors for the pedestrian and bicycle environments is limited to trees within or near the public right-of-way. Trees are sparse and irregularly spaced along the streetscape of the corridor.



Figure 35: Plantings along E Cave Creek Drive



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Drainage

Tom Darlington Dr is improved with curb and gutter and the medians from Carefree Dr to approximately Lucky Ln. Pavement runoff on the west side of the road is conveyed within existing roadside swales. Roadway runoff on the east side of the road within this area is conveyed within curb and gutter and captured in roadway catch basins on the east side of Tom Darlington Drive. From Lucky Ln to Cave Creek road, there is no curb and gutter and pavement runoff is conveyed in roadside swales into existing area inlets along the east side of the road. There is an existing high point in the roadway near Lucky Ln. There are no inlets on the west side of Tom Darlington Dr as a portion of the roadway is superelevated to the east.

Most of Cave Creek Rd is sloped to the northwest within the project limits from Bloody Basin Rd to Tom Darlington Dr. There is minimal curb and gutter along this stretch of Cave Creek Rd. Pavement runoff sheetflows off the road and discharges into existing roadside swales. There are several inlets located on the west side of Cave Creek Rd that capture pavement runoff. There are offsite washes east of Cave Creek Rd where the pavement runoff ultimately discharges to.

Lighting

There is no existing street lighting on Tom Darlington Drive and Cave Creek Road within the project limits. The pedestrian crossing located at Ho Road and Tom Darlington Drive has pedestrian-activated flashing beacons, but no street lighting for the crosswalk. There are various accent lights that approach the roadway from the Town Center as well as mounted on the Gateways but no other sign lighting.

Utilities

Utilities located within the project area are summarized in **Table 3**.

Table 3: Utilities within Project Area

Utility	Facility	Contact	Phone Number
Arizona Public Service – Contract Locator West Side	Electric	APS Locate Department	(602) 493 - 4225
Black Mountain Sewer Corp. DBA Liberty Utilities	Sewer	Michelle Thompson	(480) 285 - 7229
Carefree Water Co., Inc.	Water	Andrew Espinoza	(480) 488 - 9100
Cox Communications - Maricopa	CATV, Fiber	USIC Dispatch Center	(800) 778 – 9140
CTLQL – Century Link	Coaxial, Fiber	USIC Dispatch Center	(800) 778 – 9140
Southwest Gas	Gas	ELM Locating Dispatch	(623) 780 – 3350
Town of Cave Creek	Reclaimed water, sewer, water	Brad Pater	(480) 797 - 7150

The utilities were located based on as-built and quarter section maps provided by the utility companies and the Town. Due to level of detail in these documents being limited, additional locating and potholing will be necessary in conjunction with any future design efforts to accurately depict utilities where underground work will be required.

Right-of-way

The right-of-way surrounding the Town Center is maintained by the Town of Carefree. Right-of-way on Cave Creek Road and Tom Darlington Drive maintains the width of 130 feet throughout. The Town Center right-of-way varies from 20 feet to 70 feet with most roads 50 feet wide.

Stakeholder Input

To kick off the project, a stakeholder meeting was held on Wednesday, July 28, 2021. Stakeholders included a panel of Town citizens and business owners as well as Town Staff.

During this meeting, the scope of the project was reviewed so stakeholders have a clear understanding of what is being evaluated, what is excluded from the study, and the general process necessary to complete the tasks. This section summarizes the feedback received during the meeting.

Challenges

Attendees were asked to identify challenges with wayfinding, circulation, and parking within the downtown area. Notable points of confusion are listed in **Table 4**.

▲ Circulation

- Unclear direction throughout Town
- Business signage clutter makes it hard to find businesses
- Confusing traffic circles
- There is none; Carefree isn't a standard place
- Consider enhancements at entrances to improve direction

Table 4: Points of Confusion

Points of Confusion
Gateways
Public Restrooms
Traffic Circles
Spanish Village
Intersection of Ho, Hum and Easy Street
Downtown
Basha's
Stagecoach Village

▲ Parking

- Need for designated employee parking
- Maps of public parking
- Need for additional capacity for growth
- Lack of parking during events
- Awareness on parking options throughout Town Center needed
- Residents and business owners do not feel there is enough parking. However, the real issue may be proximity to parking and not availability, meaning people want to park directly adjacent to their destination. In this instance, there is not enough parking in front of every business to accommodate every patron and/or employee.
- There is not enough safe sidewalk in the Town Center to encourage people to park a little farther and walk.
- Keelers area is most congested for parking on weekends. Could use safer pedestrian crossings across the roads.
- Parking at the Post Office is a challenge for residents, particularly during events.

▲ **Wayfinding**

- Too diverse
- No direction information
- Poor store name recognition
- Lack of legibility
- Poor locations
- Need for illumination
- Cohesive common theme
- No sandwich boards
- Provide direction kiosks at key links/bridges
- Provide misters or shade along pedestrian areas
- Use windows of empty buildings to display Town information, art, or desert education
- Incorporate a “treasure hunt” with public art pieces – desert features placed near walkways that people can walkthrough and find

▲ **Challenges for Customers**

- Hard to find businesses
- No clear route around Town Center
- Lack of sidewalks
- Lack of handicap parking
- Not enough parking during dinner hours

▲ **Other Thoughts**

- Carefree’s residents may be too spread out for bicycles and a shared path to be the predominant mode of transportation into the Town Center. There is still a need for residents to use vehicles to get into Town.
- Some residents avoid Downtown and would prefer to get through the area more quickly. They feel there is too much focus on tourists and not enough on locals.
- Alternatively, the business owners do not want high speeds and would like to encourage people to enter the Town Center more often.

Preliminary Roadway Evaluation & Design Concepts

Once a thorough existing conditions review had been completed and stakeholder input was received, Kimley-Horn used the information that had been gathered to develop several design concepts for Tom Darlington Drive and Cave Creek Road.

The design concepts are intended to enhance multimodal traffic circulation, connect points of interest, and promote a “complete streets” environment. At a minimum, the following general types of improvements have been incorporated into all concepts:

- ▲ New on-street parking
- ▲ Upgraded bike lanes with bike buffer, conflict-area pavement markings, and additional bike lane symbols
- ▲ New and/or upgraded Crosswalks
- ▲ Sidewalk and ADA ramp improvements
- ▲ A parking lot is recommended, in all concepts, to replace the existing dirt lot on the north side of Cave Creek Road east of the crosswalk located at Sunshine Way to increase safety and parking capacity

The design concepts include varying levels of roadway and traffic improvements and therefore vary in cost, ease of implementation, and overall impact. The following subsections describe each design concept in detail. A brief discussion of intersection control and additional traffic analysis needs is also included.

Roadway Concepts

Four concepts were developed in coordination with the Town and from input from Stakeholders. The four concepts developed for this project are described in **Table 5**.

Table 5: Summary of Design Concept Alternatives

	Concept 1: Parallel Parking with Lane Reduction	Concept 2: Additive Parking with Four Travel Lanes	Concept 3: Parking and Shared-Use Path Opposite of Town Core	Concept 4: Parking and Shared-Use Path Adjacent to Town Core
Description:	<p>This concept increases parking while maintaining the existing curb location and minimizing ground disturbance and ROW acquisition. Parallel parking is added by reducing the roadway to one lane in each direction and restriping the roadway to include on-street parking.</p> <p>New sidewalk and ADA ramps are added along both sides of the road to improve pedestrian connectivity.</p>	<p>This concept increases parking while maintaining the existing number of travel lanes. This concept requires some roadway reconstruction as parallel parking is added by widening the roadway and adding new on-street parking areas next to the bike lanes.</p> <p>New sidewalk and ADA ramps are added along both sides of the road to improve pedestrian connectivity.</p>	<p>This concept increases parking using a combination of parallel parking and angled parking. Angled parking is used in areas with sufficient ROW to maximize the number of new spaces.</p> <p>This concept also includes a Shared-Use Path (SUP) along the outside of the study roadways, opposite the Town Core, to improve bicycle and pedestrian connectivity. New sidewalk and ADA ramps are included where not covered by the SUP.</p>	<p>This concept optimizes the designs from the first three concepts, prioritizing increased parking along the roadway directly surrounding the core. Like Concept 3, this concept also includes a combination of parallel and angled parking and an SUP.</p> <p>In this concept, the SUP is located on the side of the roadway closest to the Town Core for increased foot and bike traffic around the Core. New sidewalk and ADA ramps are included where not covered by the SUP.</p>
Typical Sections:	The design reduces all lanes of travel within the project limits to a single 10-12ft lane to accommodate an 8ft wide parallel parking, 2ft wide buffer, 2ft wide curb/gutter, 5ft wide bicycle lane, and 4ft wide sidewalk. Some curbs have been extended or pavement markings adjusted to maintain a consistent lane width throughout the corridor.	The existing 5ft bike lane is maintained in place with modifications made to the striping in areas of right turns. Striped buffers and minor striping modifications are utilized in select areas to maintain consistent lane widths throughout the corridor.	The design reduces all lanes of travel within project limits to a single lane to accommodate for the west and south bound 12ft Shared-Use Path (SUP), 5ft landscape buffer, 2ft buffer/gutter, angled parking, and 14ft travel lane and to accommodate for the east and north bound 4ft sidewalk, 2ft buffer/gutter, 5ft bike lane, 8ft wide parallel parking, 2ft buffer, and 10-12ft travel lane.	The design reduces all lanes of travel within project limits to a single lane to accommodate for the east and north bound 14ft Shared-Use Path (SUP), 2ft buffer/gutter, angled parking, and 14ft travel lane and to accommodate for the west and south bound 4ft sidewalk, 2ft buffer/gutter, 8ft wide parallel parking, 2ft buffer, 5 ft bike lane and 10-12ft travel lane.
Parking Limits:	<p>Tom Darlington Drive: Carefree Drive to Cave Creek Road</p> <p>Cave Creek Road: Old Spanish Village Parkway to Bloody Basin Road</p>	<p>Tom Darlington Drive: Carefree Drive to Cave Creek Road</p> <p>Cave Creek Road: Tom Darlington Drive to Bloody Basin Road</p>	<p>Tom Darlington Drive: Carefree Drive to Cave Creek Road</p> <p>Cave Creek Road: Old Spanish Village Parkway to Bloody Basin Road</p>	<p>Tom Darlington Drive: Carefree Drive to Ed Everett Way</p> <p>Cave Creek Road: Old Spanish Village Parkway to Elbow Bend Road</p>
Parking Summary:	<p>New Parking Spaces:</p> <ul style="list-style-type: none"> • 153 parallel parking spaces • 54 motorcycle parking spaces • 15 parking lot spaces 	<p>New Parking Spaces:</p> <ul style="list-style-type: none"> • 159 parallel parking spaces • 50 motorcycle spaces 	<p>New Parking Spaces:</p> <ul style="list-style-type: none"> • 241 on-street parking spaces • 50 motorcycle parking spaces • 15 parking lot spaces 	<p>New Parking Spaces:</p> <ul style="list-style-type: none"> • 153 on-street parking spaces • 104 angled spaces adjacent to Town Core • 49 parallel spaces opposite to Town Core • 5 motorcycle parking spaces • 49 parking lot spaces
ROW Acquisition:	N/A	N/A	N/A	An additional parking lot is recommended in this concept requiring ROW acquisition behind the gas station

Bike Lane Considerations:

A bike lane is provided in both directions of travel.

The bicycle lane for this design concept was placed between the travel lane and on-street parking. At right turn lanes, the bicycle lane is to the left of the turn lane to enhance driver awareness of the bicyclist location and reduce potential for "right-hook" crashes. Additional locations for bike lane symbols have been included.

Dashed pavement markings are used to continue the delineation of the bike lane while highlighting driveways and the beginning of right turn lanes for vehicles. This helps to alert bicycles and vehicles to potential conflict areas.

A bike lane is provided in both directions of travel.

The bicycle lane for this design maintains the existing bike lane with some modifications to striping to provide increased guidance for bicyclists and increased visibility for drivers. Additional locations for bike lane symbols have been included.

Dashed pavement markings are used to continue the delineation of the bike lane while highlighting driveways and the beginning of right turn lanes for vehicles. This helps to alert bicycles and vehicles to potential conflict areas.

A SUP is provided across the street from the Town Core along southwestbound Tom Darlington and northwestbound Cave Creek Road. A bike lane is provided in the opposing directions, adjacent to the Town Core.

The 12' SUP is provided for bicyclists and pedestrians instead of a sidewalk and an on-street bike lane. This is to eliminate conflicts between bicycles in the bike lane and vehicles backing out of angled parking spaces.

The SUP is intended to be one-way for bicyclists.

The bicycle lane was placed between the travel lane and on-street parking. At right turn lanes, the bicycle lane is to the left of the turn lane to enhance driver awareness of the bicyclist location and reduce potential for "right-hook" crashes. Additional locations for bike lane symbols have been included.

Dashed pavement markings are used to continue the delineation of the bike lane while highlighting driveways and the beginning of right turn lanes for vehicles. This helps to alert bicycles and vehicles to potential conflict areas.

located on the South corner of Cave Creek Road and Tom Darlington Drive. Old Spanish Village Parkway is shifted north to make room for the SUP.

A bike lane is provided across the street from the Town Core along southwestbound Tom Darlington and northwestbound Cave Creek Road. A SUP is provided in the opposing directions, adjacent to the Town Core.

The 14' SUP is provided for bicyclists and pedestrians instead of a sidewalk and on-street bike lane. This is to eliminate conflicts between bicycles in the bike lane and vehicles backing out of angled parking spaces. This also allows the SUP to be routed south of the intersection at Tom Darlington and Cave Creek Road, separating bicycles and pedestrians from vehicle traffic at the 4-way stop.

The SUP is intended to be utilized in both directions for bicyclists.

The bicycle lane was placed between the travel lane and on-street parking. At right turn lanes, the bicycle lane is to the left of the turn lane to enhance driver awareness of the bicyclist location and reduce potential for "right-hook" crashes. Additional locations for bike lane symbols have been included.

Dashed pavement markings are used to continue the delineation of the bike lane while highlighting driveways and the beginning of right turn lanes for vehicles.

At the Carefree Drive and Cave Creek Road traffic circle, it is recommended to shift bicyclists onto the sidewalk to cross, avoiding conflicts within the traffic circle.

Bolded Green Text = Benefit
Bolded Orange Text = Drawback



Concept 1 was developed to minimize impacts and reduce cost. This proposed concept mostly maintains existing roadway edge, restripes to reduce to one lane, and adds parking where feasible. This concept does not require additional right-of-way, or widening, but does consider adding sidewalk for connectivity. While this concept is most cost effective in terms of roadway geometric improvements, it does however impact traffic by removing one travel lane the entire length of the project.

Concept 2 was developed to accomplish the goal of adding parking but not having impacts to traffic by maintaining existing travel lane geometry. This includes widening to accommodate on street parking, as well as sidewalk connectivity.

Concept 3 explored building off of Concept 1 but also adding angled parking where ROW allowed. To remove conflict between angled parked vehicles and bicyclist, this concept looked at adding a shared-use path opposite side of the Town Core where there is more available ROW.

Concept 4 is essentially a combination of the most favorable parts of the previous 3 concepts by maintaining lane configuration where possible, utilizing the space efficiently to implement parallel and angled parking, minimizing impacts to roadway widening. The shared-use path in this option, however, is located adjacent to the Town Core to minimize pedestrian crossing the roadway and to create a downtown feel near the Town Core.

Traffic Considerations

Design considerations related to intersection control and pedestrian crossings are described in this section.

Four-Way Stop

To maintain existing intersection capacity, the existing intersection of Tom Darlington Drive and Cave Creek Road is to remain under four-way stop-control with the existing approach lane configuration. Some striping modifications are proposed to improve bicycle and pedestrian safety and accommodate additional parking:

- ▲ General (All Concepts):
 - Pavement markings have been added to increase visibility of bike lanes and maintain lane width. The bike lanes on Tom Darlington have been extended all the way to the intersection.
 - The right turn lane approaching Cave Creek Road on Tom Darlington is buffered along the gas station entrance/exit to maintain lane width and provide an area for people exiting the business location.



- Marked crosswalks are shown for the southeast and southwest legs of the intersection for all concepts to provide a safe crossing location for pedestrians.
 - Concepts 1 and 4: Only one receiving lane is provided southbound onto Tom Darlington Drive to accommodate parallel parking.
 - Concept 2: All legs are to maintain the full number of approach and receiving lanes.
 - Concept 4: An additional crosswalk is shown across Sundance Trail.

Traffic Circles

The existing traffic circles allow mainline traffic on Cave Creek Road and Tom Darlington Drive to flow directly through the intersection without the need to decrease in speed or adjust vehicle path. All design concepts recommend curved pavement markings to be implemented in the traffic circle approach lanes to encourage traffic to slow down upon entry by guiding them in a circular motion. In the near-term, delineators could be provided to force vehicle to follow the striping. Long-term, it is recommended that the City consider upgrading the traffic circles to roundabouts. Additional traffic analysis would need to be performed to evaluate intersection capacity and determine appropriate roundabout improvements.

The previous crosswalk study identifies traffic circle alternatives. These have been integrated into the design concepts to accommodate the crosswalk and parking needs simultaneously.

Marked Crosswalks

All existing crosswalks are to remain in place with additional crossing locations proposed at Sunshine Way and Cave Creek Road and the intersection of Tom Darlington Drive and Cave Creek Road to provide a crossing for the pedestrians parking downstream of the crosswalks for the former location and to provide full intersection connectivity for the latter location. Crosswalk warrants will need to be conducted for justification and documentation. One of the suggested modifications to existing crosswalks is to straighten the alignment at the Wampum Way and Tom Darlington Drive traffic circle to reduce pedestrian crossing time. It is recommended that stop bars or yield markings be implemented at crosswalk location to create a buffer between the vehicle and pedestrians and to help improve site visibility of the pedestrian. Existing crosswalks are high-visibility ladder-style crosswalks and new crossings recommended would stay consistent with existing conditions. Additional considerations to increase pedestrian visibility are discussed in the Opportunities for Signing and Marking section.

Multi-Use Trail vs. Shared-Use Path

Multi-Use Trails (MUT) and Shared-Use Paths (SUP) were both evaluated for use. City of Phoenix standards describe each option as follows:



- ▲ **Multi-Use Trail (MUT):** The MUT is a 10' wide compacted decomposed granite (DG) surface stabilized to its full 3" depth and shall also have 2' DG shoulders, allowing pedestrian, bicycle, equestrian and maintenance vehicle use. Switchbacks and clearances for obstacles, vegetation, and plants will be measured from the edge of the MUT excluding the 2' shoulders where installed. All MUTs shall meet or exceed the Americans with Disabilities Act (ADA) requirements and shall be Barrier Free Trails.
- ▲ **Shared-Use Path (SUP):** The SUP is a non-equestrian 10' wide concrete pathway providing recreation and educational experiences. All SUPs shall meet or exceed the ADA requirements.

A MUT is a low-cost option that provides accessibility to all users including equestrians but may not be preferred by bicyclists using street bikes. MUT may also require more routine maintenance due to weather and erosion that can occur. A SUP does not permit for safe use by equestrians due to lack of traction but is more favorable to bicyclists with high speeds. The SUP also requires less routine maintenance, but maintenance and construction can be more costly than that for a MUP.

Typical Sections

The project corridor has varying cross-sections to account for dedicated turn lanes, driveways, major intersections, and traffic circles. **Figures 36 through 39** represent the typical cross section used to develop each design concept. It should be noted that the right-of-way varies beyond what is represented in these graphics. Landscape and bicycle buffers will vary accordingly.

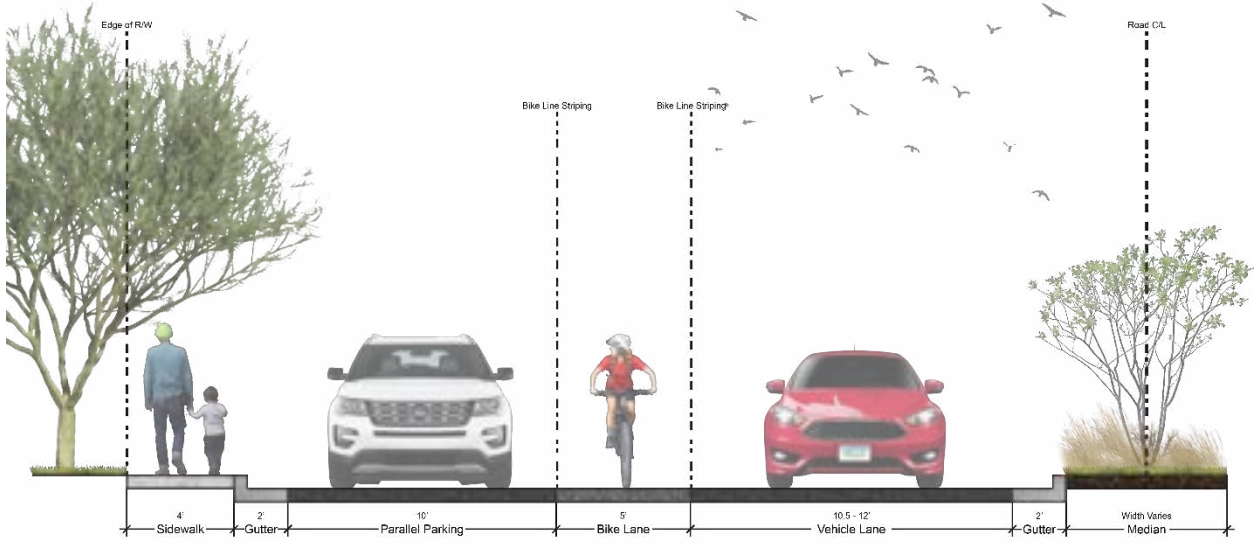


Figure 36: Typical Section for Concept 1

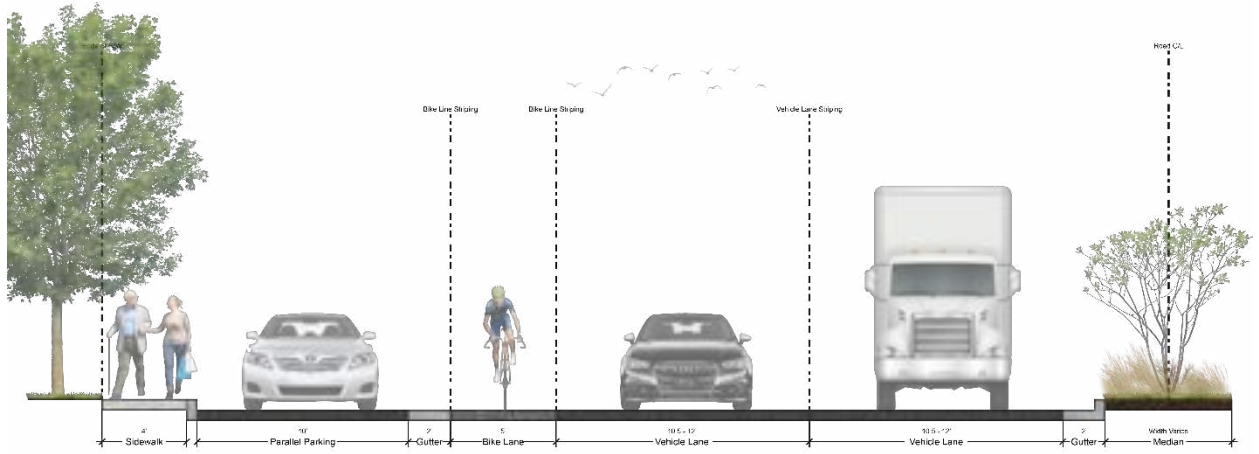


Figure 37: Typical Section for Concept 2

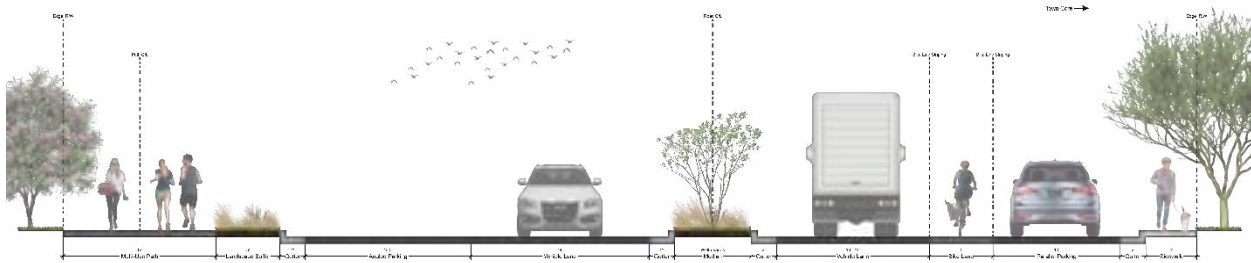


Figure 38: Typical Section for Concept 3

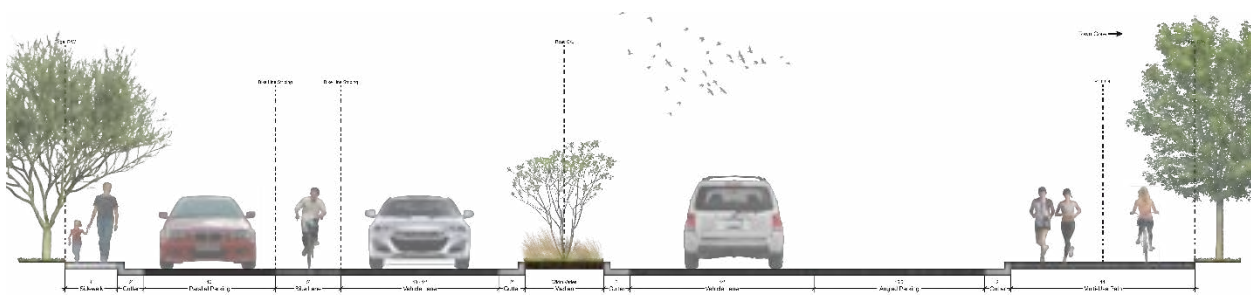


Figure 39: Typical Section for Concept 4

Recommended Improvements

After reviewing the concepts with the Town, it was determined that Concept 4 is best suited to meet the Town’s needs and goals and is the preferred concept. See **Appendix E** for the Preliminary Design Plans for Concept 4.

Typical Section

The recommended typical section possesses different layouts for each side of the roadway. This is due to the comments received by the Town to have the majority of the parking and pedestrian activity to be located adjacent to the Town Core to decrease the chances of pedestrians crossing the roadway in undesigned areas and increase wayfinding to the destinations the Town Core has to offer.

Therefore, typical section recommendations are described as the roadway adjacent to the Town core and the roadway Opposite to the Town core. Each side of the roadway is divided by either a 10ft-12ft turn lane or median that varies in width. Cross sections are recommended to vary according to special elements at specific locations as shown in the preliminary design plans



included with this document. Variances include on-street parking, bike lanes, traffic circles, existing exclusive right, and left turn lanes for entrances to existing developments, Town ROW availability, existing lane tapers, and existing median geometries. Occurrences of existing dedicated turn lanes are mentioned according to proximity to the core below.

Typical Section Adjacent to the Town Core

The typical section is recommended to be one lane with the minimum width of 14ft to meet the standard lane width behind angled parking. Angled parking is recommended along the core to increase parking capacity in areas with the least walking distance to desired destinations. The parking has an average width of 15.5ft from the outside of the travel lane to the edge of the curb/gutter which has a minimum width of 2ft. Outside of the curb is a 12-14ft SUP intended to be utilized by pedestrians and cyclists. The SUP varies according to available Town ROW. Tom Darlington Drive has existing dedicated right turn lanes located at Carefree Marketplace, Carefree Drive, Wampum Way, Lucky Lane, Ho Road, and Cave Creek Road. Cave Creek Road has existing dedicated right turn lanes located at Ho Road and Sunshine Way. Tom Darlington Drive has existing dedicated left turn lanes located at Carefree Drive, Lucky Lane, Villa Del Sol Condominiums north and south entrances, Ridgeview Place, Ed Everett Way, and Cave Creek Road. Cave Creek Road has existing dedicated left turn lanes located at Hum Road and Bloody Basin Road. The dedicated right turn lane on northbound Tom Darlington Drive and Wampum Way traffic circle is recommended to be removed to create geometric that follows traditional traffic circle designs. All other dedicated turn lanes are to remain with slight adjustments to existing geometry.

Typical Section Opposite to the Town Core

The typical section is recommended to be one 10ft minimum-14ft maximum lane with the average width of 12ft, a 5ft bike lane, a 10ft wide parallel parking lane, 2ft wide buffer/gutter, and a 4ft sidewalk. Tom Darlington Drive has no existing dedicated right turn lanes. Cave Creek Road has no existing dedicated right turn lanes. Tom Darlington Drive has existing dedicated left turn lanes located at Ho Road, Lucky Lane, Carefree Drive, Carefree Marketplace, and Bloody Basin Road. Cave Creek Road has existing dedicated left turn lanes at Elbow Bend Road, Sunshine Way, Ho Road, Old Spanish Village Parkway, and Tom Darlington Drive. All dedicated turn lanes are to remain with slight adjustments to existing geometry.

Alleyway North of Spanish Village

The alleyway north of Spanish Village, located behind the Shell gas station, will be utilized for the SUP and additional widening will be required north of the current alleyway to accommodate vehicle traffic as well as adding on-street angled parking on both sides of the new roadway alignment. New sidewalk, sidewalk ramps, curb, and gutter will also be installed on both sides of the new roadway.



Dirt Parking Lot Northeast of Cave Creek Road and Sunshine Way

A paved lot is recommended to replace the existing lot to optimize existing parking availability and enhance accessibility. The location was also determined to be ideal due to the proximity of the recommended crosswalk leading to the Town core.

Parking

Parking spaces are recommended to end and begin at least 20ft from all driveway entrances and intersections to permit for vehicle turning radii and driver stopping sight distances. All geometries of the parking spaces are to follow the guidelines stated in the Preliminary Roadway Evaluation and Design Considerations section of this report.

The parking lot located on Cave Creek Road across from Sunshine way is recommended to consist of two angled parking lanes divided by a minimum of 19ft wide one-way isle. Three arrows are to be painted using thermoplastic paint to guide vehicle traffic in a single direction.

The parking located on Old Spanish Village Parkway located behind the Shell gas station is recommended to consist of 45-degree angled parking with a 20ft minimum two-way isle.

Pathway Accessibility Improvements

A shared-use path is recommended adjacent to the Town Core as shown in the Preliminary Design Plans. The path is recommended to vary between 12ft and 14ft. The path is intended to enhance wayfinding and accessibility to the Town Core while permitting for safe travel for pedestrians and bicyclists to and from the Town Core.

Major Design Considerations

This section provides an overview of the design standards, guidance, and assumptions used to prepare the design concepts and associated cost estimates. Any specific requirements and other considerations that will need to be observed during design and/or construction are discussed.

Traffic Requirements

Traffic Analysis

A detailed traffic analysis was not included in the scope of this PA. A high-level review of existing volumes was provided in the Existing Conditions Section to determine if there are any preliminary concerns with changing the existing roadway configurations.

Further analysis will need to be performed if it is determined that the Town would like to move forward with one of the design concepts or other improvements that would modify existing roadway capacity and/or intersection control types. Changes that would warrant further analysis could include, but are not limited to, the following:



- ▲ Lane reductions (e.g., two lanes to one lane);
- ▲ Turn lane modifications (e.g., eliminate turn lane or reduce storage length);
- ▲ Changes to intersection approach configurations (e.g., reduction in number of approach or departure lanes; turning movement changes or restrictions; etc.); and/or
- ▲ Changes to intersection control types (e.g. unsignalized to signalized, traffic circle to roundabout, etc.).

Traffic Control

Prior to any construction, the contractor should be required to develop and submit traffic control plans in accordance with the requirements of the current editions of the City of Phoenix Traffic Barricade Manual and the Manual on Uniform Traffic Control Devices (MUTCD).

Proposed Developments

In the project limits there are multiple residential, mixed use and business developments planned. Developers should be required to perform a traffic impact analysis and identify any necessary capacity or safety improvements consistent with the Town's vision.

Signing and Pavement Markings

The *Manual on Uniform Traffic Control Devices (MUTCD)* is a nationally recognized standard for the design and construction of signing and pavement markings. At a minimum, requirements of the current edition of the MUTCD shall be met for all improvements. At this time, the 2009 edition with revisions (published May 2012) is the current edition and was used to develop the design concepts for this PA.

In some instances, additional design guidance above and beyond the MUTCD may be needed to maintain consistency with local signing and marking applications or to promote a safer multimodal environment. Additional guidance or design standards used for specific improvements is discussed throughout the following subsections.

Bike lanes are recommended to be constructed 5ft in width in all areas depicted in the preliminary design plans. Bike lanes should generally follow the parking and curb lines, except where it is desirable to shift the bike lane to increase visibility or better align the bike lane through an intersection.

A bicycle buffer of varying width should be provided. The buffer area should be hatched using an angled pattern for buffers 3ft to 4ft in width and should be hatched using a chevron pattern for buffers in excess of 4ft. Buffers narrower than 3ft should not include a hatch pattern for constructability purposes. It is recommended to use skipped stripe across all driveway entrances to emphasize the continuation of the bike lane across the entranceway and alert road



users of the conflict area. When bike lanes must cross an exclusive right turn lane, it is recommended to follow guidance from the *FHWA Separated Bike Lane Guide*. It is also recommended that the length of the conflict zone and right turn lanes be minimized as much as practicable to minimize the zone in which a bicyclist is in conflict with or positioned between vehicular traffic.

It is recommended for two new tapers to be implemented at each entrance of the project study area. A taper is placed on Tom Darlington Road, starting from Bloody Basin Road and bringing the traffic to a single lane at Carefree Drive. Another taper is placed on Cave Creek Road starting at Bloody Basin Road and bringing traffic to a single lane at Elbow Bend Road. The existing taper on Cave Creek Road starting at Ho/Hum Road in the eastbound direction will maintain existing entrance geometry with slight variations in alignment as it approaches the traffic circle at Carefree Drive to account for the 14ft lane width requirement behind angled parking.

The shared-use path is recommended to have a dashed line delineation between pedestrian and bicycle use located either 7ft or 8ft from the edge of pavement based on a 12ft or 14ft width of the pedestrian path, respectively. The lane measuring 7/8ft in width is to be labeled with bike symbols and the lane measuring 5/6ft in width is to be labeled with pedestrian symbols.

New signage associated with bike lane and SUP will be installed according to MUTCD guidance. Guide signs and warning signs should also be installed at appropriate locations to properly guide vehicles and pedestrians/bicyclists.

Local Signing and Marking Design Standards

The Town does not have its own signing and marking design standards. To maintain consistency with signing and marking applications in surrounding jurisdictions, City of Phoenix and City of Scottsdale design standards were applied when identifying size, placement, and materials for lane striping, legend text and symbols, and other signing and marking elements.

Merge Tapers

The design of merge tapers follows the MUTCD equation for roadways with a posted or statutory speed limit less than 45mph. A design speed of 30 mph was used for the speed limit (S) and the offset distance (W) varied depending on the parking style utilized.

The Arizona Department of Transportation (ADOT) published the Arizona Supplement to the 2009 MUTCD, which provides alternative advance warning distances (d) for use in determining signage placement (Table 2C-4). The ADOT supplement is commonly used for design in the state of Arizona and was used to develop the design concepts for this report.



Travel Lane Widths

AASHTO's *A Policy on Geometric Design of Highways and Streets* ("the Green Book") provides guidance for typical and minimum lane widths by facility type. In general, narrow lane widths are sufficient when appropriately implemented in areas of operating speeds under 35mph and are recommended as a safety measure to require drivers to remain focused and cognizant of their surroundings including nearby bicyclists and pedestrians.

For the design concepts, lane widths have been designed to match the existing roadway widths, which vary from 10ft to 12ft depending on location. The exception is the lane width adjacent to the angled parking where a minimum width of 14ft is used to provide additional space for vehicles to maneuver into and out of parking spaces, per *City of Phoenix Parking Lot Standards*. Lanes for the majority of the project are shown as 12ft due to the number of oversized vehicles and trailers that use the roadway to access recreational areas east of Carefree.

Parallel Parking Stall Dimensions

The following criteria was used to determine the size and spacing of parallel parking stalls:

- ▲ MUTCD Figure 3B-21, parallel parking spaces are required to be a minimum of 22-26ft in length and 8ft in width.
- ▲ City of Scottsdale Ordinances Sec. 9.106 requires an additional 2ft wide buffer along the lane of travel to allow the driver to exit the vehicle safely.

The parallel parking shown in the design concepts are 22ft in length and 10ft in width to account for the minimum parking stall dimensions plus safety buffer.

Angled Parking Stall Dimensions

The MUTCD provides general guidance for standard parking stall size and color but does not specifically cover angled parking layouts. To maintain consistency with surrounding jurisdictions and account for local conditions, minimum stall sizes were established using the following considerations:

- ▲ City of Phoenix Parking Lot Standards;
- ▲ Aerial parking measurements from local jurisdictions with similar tourist areas, including Old Town Scottsdale and Uptown Sedona; and
- ▲ Common vehicles types and sizes within the project vicinity.

Pull-in angled parking spaces were utilized in design and are rotated at 45-degrees towards the direction of travel and a minimum of 10ft in width and 22ft in length. 45-degree parking was selected to maximize parking count and fit the improvements within available right-of-way.



Bicycle Facilities

The “2015 Federal Highway Administration (FHWA) Separated Bike Lane Planning and Design Guide,” is the primary source of design guidance for the bicycle facilities proposed for this project including bike lane width of 5’ in each concept. This document builds upon the, “2014 NACTO Urban Bikeway Design Guide,” whilst ensuring compliance with the MUTCD.

Bike Buffer Locations and Widths

Buffers can be used to provide additional separation between bicycles and vehicles and to help maintain constant lane widths where the roadway width varies. Bike lane buffers between a vehicular lane and bicycle lane should be marked using crosshatched striping to discourage vehicular traffic from traveling in the buffer zone. The bike lane buffer will vary in size and cross-hatch depending on the roadway cross section:

- ▲ **>4’ Buffer:** Chevron pattern
- ▲ **3’ – 4’ Buffer:** 45-degree striped pattern
- ▲ It is impractical to cross-hatch bike lane buffers less than three feet in width.

Marked Crosswalks

All crosswalks shall be high-visibility, ladder-style striping to promote pedestrian safety. It is recommended that durable materials such as thermoplastic be used to improve durability and reduce maintenance. Regulatory signage, warning signage, stop bars, and yield bars shall be provided as appropriate per MUTCD requirements to warn vehicles of a potential conflict and maximize separation between crosswalk users and vehicles. Any existing crosswalks that do not meet current MUTCD standards should be upgraded.

Opportunities for Signing and Marking

The design characteristics discussed previously are the minimum design standards required to address the Town’s parking, pedestrian, and bicyclist needs as shown in the design concepts.

The following treatments are provided as additional options that could increase driver focus on bicyclists and pedestrians and enhance safety within the corridor. These are recommended for consideration during future project development. Implementation of these improvements should be driven by an engineering study and consider crash history, speeds, and traffic volumes:

- ▲ **Enhanced or Signalized Crosswalks:** Areas with high pedestrian activity may warrant enhancements or signalization to move pedestrians safely across the road. Examples include:
 - A Pedestrian Hybrid Beacon (PHB), sometimes called a “HAWK”, is a type of traffic control signal used to stop vehicle traffic and allow pedestrians to cross



safely. These are typically not recommended when pedestrian volumes and/or crash history are not sufficient to warrant signalization.

- Rectangular Rapid Flashing Beacons (RRFB) and Circular Rapid Flashing Beacons (CRFB) are two alternatives when a PHB is not warranted. Flashing beacons are typically a lower cost alternative to PHB signals and can still increase driver yielding behavior by alerting drivers to the presence of pedestrians.
- If the above enhancements are not warranted, Raised Pavement Markers can be placed on both approaches to a crosswalk.
- ▲ **High Visibility Bicycle Markings:** Green marked bike lanes improve bicycle safety by drawing attention to the bike lane and emphasizing bike priority.
- ▲ **Bike Buffer Enhancements:** In certain low-speed, urban environments flexible posts, raised pavement markers, raised curbs, planters and other items can be installed in the bike buffers to provide physical separation between bicycles and vehicles.

Roadway

Surface Preparation

Microseal will be used from Bloody Basin Rd to Carefree Dr to cover the striping obliteration and provide a blank surface for re-striping this segment of the corridor. Microseal will also be used from Tranquil Trail to Primrose Path for the same reason.

Mill and overlay will be used from Carefree Dr to Tranquil Trail to help with any grade adjustments needed for installing curb and gutter.

Steep driveways along the corridor will be replaced with COP P1243 style driveways to create an ADA compliant crossing. To tie the driveways back to the existing roadways, full depth AC replacement will be used.

The corridor contains cleared and graded ROW along edge of curb in various areas enabling easy installation of sidewalk. There are locations that will require additional considerations for the relocation and/or removal of landscaping, utilities, signage, drainage, existing curb locations, grade, and ROW availability.

New Pavement

The existing dirt parking lot located on the north side of Cave Creek Road, east of the existing crosswalk at Sunshine Way is recommended to be replaced with a paved lot permitting for an angled parking isle on each side. Full depth AC replacement will be utilized. Depth and materials will depend on Geotech recommendation and will need to be determined during final design.



The alleyway located behind Shell Gas Station, referred to as Old Spanish Village Parkway, is to be realigned with the purchase of ROW permitting for additional parking, wayfinding, and landscape architecture opportunities. Full depth AC replacement will be utilized. Depth and materials will depend on Geotech recommendation and will need to be determined during final design. The existing AC will be removed and replaced with a sidewalk MUT.

Curb and Gutter Improvements

Raised curbs are recommended to be implemented along edge of pavement to increase pedestrian safety.

MAG Type A, H=6" curb and gutter is recommended to capture the roadway drainage along the corridor. MAG Type A, H=6" single curb and gutter is recommended for the median improvements pending the recommendation of a final design drainage analysis. MAG Type A, H=6" is also recommended along the backs of curb ramps to account for grade differences that cannot be made up by grading inside the ROW.

ADA Improvements

It is recommended that all existing sidewalk ramps that are not ADA compliant be removed and replaced with ADA compliant ramps. All sidewalk ramp locations recommended within this plan are to be designed according to ADA compliance requirements to increase the accessibility for disabled persons within the Town of Carefree. Ramp replacement considerations should include consistency to provide a uniform project improving user expectation. City of Phoenix uses the, "2015 Uniform Standard Details for Public Works Construction," produced by the Maricopa Association of Governments (MAG). MAG released new sidewalk ramp details in January of 2018 and therefore, the new standards are utilized rather than what is within the COP standards.

Sidewalk ramps are subject to oversteer by large trucks and are therefore recommended to be 9" thick to prevent cracking.

It is recommended for the island located at the east corner of the 4-way stop intersection to be extended by 9ft to maintain lane width through the intersection and provide a bike and pedestrian refuge. Both islands are to have an ADA approved ramp and connecting sidewalk for each crosswalk approach providing a refuge location.

MAG directional sidewalk ramps are preferred at all locations which will better accommodate pedestrians throughout the project limits. MAG ADA retrofits for driveway entrances (P1243) are recommended to be installed at all driveways that do not provide a 4ft pedestrian path around the driveway. These recommendations consist of the minimum improvements required for the corridor to meet ADA requirements.



Drainage

The proposed roadway improvements will impact the existing drainage infrastructure within the project limits. The proposed drainage improvements will not impact the existing drainage patterns within the project limits and the historical outfalls will be maintained.

New catch basins will be installed to replace existing catch basins that are impacted by the new roadway curb and gutter. Additional storm drain will be needed in locations where the roadway is widened. Curb cuts and scuppers will be used to collect pavement runoff and discharge into existing roadside swales at similar locations where the existing runoff sheet flows off the road.

There is an existing low point along the Old Spanish Village Parkway that will be impacted by the proposed improvements. Grading and storm drain improvements will be needed in this area to capture runoff from the low point and discharge at locations that match the historical drainage patterns in this area. Additional topographic data and analysis of the existing culverts under Tom Darlington will be part of final design.

Alternatively, the Town could explore a closed underground drainage system during final design.

Lighting

The Town of Carefree has several lighting standards pertaining to roadways and pedestrian paths. These standards require bollard lighting for pedestrian pathways and parking areas to maintain the community's dark skies.

Due to the Town's dark-sky requirement, no recommendations for lighting have been made at this time. However, it is recommended that the town take lighting into consideration for future improvements to promote bicycle and pedestrian safety, especially at crosswalks and other points of conflict.

Utility Relocation Requirements

The identified utility companies with existing facilities within the project limits will need to be contacted to verify all utility locations and analyze for utility relocation needs. If utilities are not relocated this may cause pull boxes and other utilities to remain within parking locations, sidewalks, and ramps. A planning level evaluation of each utility type was developed during the creation of the planning level design. The appropriate actions and considerations for each utility need to be taken into final design by obtaining maps and record drawings.

Power

Overhead power (APS owned) runs along the south side of Cave Creek Road for the entirety of the project limits. There is one crossing to the north side of the road at Sunshine Way. The



utilities will most likely require coordination with APS for underground relocation for the implementation of the design this plan recommends.

The remaining of the corridor has in-pavement power provided by APS, identified by manhole covers. These are accompanied with power cabinetry and pedestals located behind the curb. These pedestals and cabinets will most likely require removal or relocation to implement the desired design.

Sewer

Sanitary sewer runs under the pavement, identified by manhole covers. Sanitary sewer is owned by Black Mountain Sewer Corporation.

Storm sewer runs under the pavement for most of the corridor with lines extending to the edge of pavement drainage. Most of the manholes are within the roadway with various locations behind the curb. The locations behind curb will require additional considerations and coordination for grading and sidewalk installation. Storm sewage is owned by the Town of Cave Creek.

Water and Irrigation

Carefree Water Co. provides water to the town through in pavement water lines. These are identified by manhole and handhole covers. Water valve boxes and fire hydrants are located behind the curb and will require additional considerations and coordination to implement the recommended design.

Irrigation runs along both sides of the roadway for the entirety of the corridor. This includes irrigation lines and utility boxes. Additional considerations and coordination with the Town of Cave Creek and/or Carefree Water Co. will be required to implement the design recommended in this plan.

Gas

Southwest gas lines are throughout the corridor located in pavement and behind the curb. Both were identified using marked handholes and pipeline markers. Blue stakes will need to be obtained and included within final design to ensure any conflicts are addressed accordingly before construction.

Communications

Century Link and Cox communications provide coaxial cable, CATV, and fiber optic utilities to the area. All communications are in ground and will require additional coordination. The highest point of conflict identified in the planning stage of design is located on the west side of Tom

Darling Drive, south of Ridgeview Place where a large pull box identifies in ground communications along the roadway.

Landscape Architecture

- ▲ Given the well-maintained state of the existing sidewalks, there are no recommendations for improvements to the existing walkways. Any future sidewalks along the two corridors should match the existing concrete color and finish to create a consistent look and feel along the walkway.
- ▲ Any plantings along N Tom Darlington Dr or E Cave Creek Road should remain consistent with the predominantly drought-tolerant plant palette that is evident along the two corridors. The use of plant species native to the Sonoran Desert is highly recommended.
- ▲ The addition of site furnishings such as benches, rest areas, litter/recycling receptacles, bike storage, and other seating opportunities is recommended along the corridors. These furnishings should blend with the existing landscape and materials throughout the project area.
- ▲ A series of cohesive and consistent wayfinding elements should be implemented along the roadways. These signage options should promote the identity of the town, include accurate and consistent branding, provide accurate and detailed direction, and blend with existing materials throughout the corridors.
- ▲ Shade trees are recommended directly adjacent to all existing and future sidewalks or pathways along the corridors. Densely planted trees or shade structures are heavily encouraged at all future seating or resting areas. Any new shade trees shall match the existing mesquite, palo verde, or other native species present within the project area.

Right of Way Requirements

Concept 4 will require improvements outside Town of Carefree’s ROW to create an ADA accessible SUP throughout the project limits. Coordination with the Town will be needed to determine if ROW acquisition is required at certain locations or if sidewalk easements will be acceptable. At other locations, limited right-of-way style ramps may be installed within City right-of-way, however, the City may prefer to obtain ROW or easements to install full ramps to better accommodate pedestrians. All locations where right-of-way is being encroached upon will need to be evaluated by the City and the project team on a case-by-case basis.

Below are some examples of possible ROW acquisition and coordination:



- ROW acquisition will be required to maintain SUP width and make connections to existing sidewalk at the Carefree Drive traffic circle on Cave Creek Road. The west corner will need approximately 200sqft from Lot 216-83-014 owned by A Development LLC. The south corner will not need right-of-way acquisition because Lot 216-83-001D is owned by the Town of Carefree for the Town Hall.
- Developing the parking lot along Old Spanish Village Parkway will require the right-of-way acquisition of approximately 750sqft from Lot 216-83-020B owned by Sundancer Center LLC, 4,350sqft from Lot 216-83-017D owned by WSP Carefree LLC, and the entirety of Lot 216-83-017F (10,345sqft) owned by WSP Carefree LLC.
- Right-of-way may need to be purchased to complete the construction of the parking lot recommended along the eastside of Cave Creek Drive. Approximately 335sqft of the proposed lot is within Carefree Terrace Condominiums Associations ROW (Lot 216-83-314A). It is assumed that the existing dirt lot within Carefree right-of-way is utilized by condominium residents and therefore, recommended for an agreement to be made to pave the existing lot in exchange for the ROW use.

Coordination with local businesses and property owners is suggested to connect to existing sidewalks outside of Town ROW that lead to the Town Core and local residencies and develop new ADA compliant sidewalks to create the wayfinding and connectivity the Town envisions.

- For example, a construction easement may be acquired to create a connection to the existing sidewalk at Chase Bank located at Tom Darlington Drive, north of Wampum Way. The construction easement would need to be obtained for approximately 70sqft in Lot 216-83-033 and 25sqft in Lot 216-83-034, both owned by JPMorgan Chase Bank.

Environmental Overview

An analysis of environmental requirements was not included in the scope of this PA. An environmental assessment will need to be conducted for this project to move forward. Depending on the funding source and extent of ground disturbances, environmental clearances may need to be obtained. It is recommended that the Town consult with an Environmental Engineering expert to determine exact requirements during the design and construction phases.



Project Assessment

Opinion of Probable Cost Estimate

The following is the opinion of probable cost for Concept 4:

ITEM NO.	ITEM	UNIT	15% PROJECT ASSESSMENT		
			DATE: 05/20/22		
			UNIT PRICE	Concept 4	
QUANTITY	AMOUNT				
M2050001	Roadway Excavation, Including Haul	Cu. Yd.	\$15.00	300	\$4,500.00
M2205010	Sawcut and Remove Grouted Rip Rap	Sq. Ft.	\$50.00	700	\$35,000.00
M3000052	Asphalt Concrete Pavement Milling (1.5" depth)	Sq. Yd.	\$10.00	44,100	\$441,000.00
M3001001	Sawcut & Remove Existing Asphalt Pavement	Sq. Yd.	\$6.00	2,200	\$13,200.00
M3001002	Sawcut & Remove Existing Curb & Gutter	Lin. Ft.	\$10.00	3,400	\$34,000.00
M3001003	Sawcut & Remove Existing Sidewalk & Ramp	Sq. Ft.	\$6.00	900	\$5,400.00
M3001004	Sawcut & Remove Existing Apron	Sq. Ft.	\$6.00	600	\$3,600.00
M3001005	Sawcut & Remove Existing Sidewalk	Sq. Ft.	\$6.00	2,700	\$16,200.00
M3010001	Subgrade Preparation	Sq. Yd.	\$12.00	4,400	\$52,800.00
M3100000	Aggregate Base Course	Ton	\$40.00	1,800	\$72,000.00
M3210115	Asphalt Concrete Surface Course, Type D 1/2, 1-1/2" Thick	Ton	\$130.00	4,200	\$546,000.00
M3210230	Asphalt Concrete Surface Course, Type C 3/4, 3" Thick	Ton	\$130.00	800	\$104,000.00
M3290100	Emulsified Asphalt For Tack Coat Type SS-1h	Ton	\$800.00	13.0	\$10,400.00
M3362100	Microseal Coat	Sq. Yd.	\$7.00	5,400	\$37,800.00
M3400242	Concrete Valley Gutter, Std. Detail 240 (9" Thick)	Sq. Ft.	\$20.00	400	\$8,000.00
M3400400	Concrete Sidewalk, Std. Detail P-1230	Sq. Ft.	\$10.00	51,500	\$515,000.00
M3400415	Truncated Domes for Sidewalk Ramps	Sq. Ft.	\$30.00	800	\$24,000.00
M3400488	Concrete Curb Ramp, (9" Thick)	Sq. Ft.	\$20.00	14,000	\$280,000.00
M3400543	Concrete Driveway Entrance, Std. Detail P-1243	Sq. Ft.	\$20.00	4,800	\$96,000.00
M3402201	Combined Concrete Curb and Gutter, Std. Detail 220, Type "A", H=6"	Lin. Ft.	\$35.00	9,500	\$332,500.00
M3402221	Concrete Single Curb, Std. Detail 222, Type "A"	Lin. Ft.	\$25.00	2,400	\$60,000.00
M3450010	Adjust Existing Concrete Water Meter Vault, Frame & Cover	Each	\$600.00	10	\$6,000.00
M3450020	Adjust Existing Manhole Frame and Cover, MAG Std Detail 422 and COP Detail P1430	Each	\$700.00	10	\$7,000.00
M3500010	Remove Portland Cement Concrete Single Curb; Curb and Gutter; Header Curb or Embankment Curb	Lin. Ft.	\$8.00	2,850	\$22,800.00
M3500020	Remove Portland Cement Concrete Sidewalk, Driveway, Valley Gutter & Slab	Sq. Ft.	\$5.00	2,900	\$14,500.00
M3500025	Remove Concrete Sidewalk, Tiles, Etc.	Sq. Ft.	\$20.00	500	\$10,000.00
M3500036	Remove Catch Basin	Each	\$2,000.00	10	\$20,000.00
M3500107	Remove Existing Reinforced Concrete Wall	Sq. Ft.	\$8.00	1,000	\$8,000.00
M3500109	Remove Block Wall	Lin. Ft.	\$50.00	100	\$5,000.00
M3500110	Remove Existing Fence	Lin. Ft.	\$4.00	400	\$1,600.00
M3500150	Remove Tree	Each	\$2,000.00	30	\$60,000.00
M3500170	Remove Bushes, Shrubs, Cacti or Small Trees	Each	\$100.00	200	\$20,000.00



Project Assessment

M3500034	Remove Existing Building and Other Permanent Structures	Job	\$50,000.00	1	\$50,000.00
M3500310	Remove Existing Rip-Rap	Sq. Ft.	\$45.00	3,000	\$135,000.00
M5050017	Concrete Retaining Wall, Per Plans	Sq. Ft.	\$110.00	400	\$44,000.00
M5052061	Replace Concrete Scupper Cover, MAG Standard Detail 203	Each	\$4,000.00	1	\$4,000.00
M0108003	Remove Existing Fire Hydrant	Each	\$3,500.00	2	\$7,000.00
	Underground Power	Lin. Ft.	\$500.00	2,500	\$1,250,000.00
CIVIL/TRAFFIC SUBTOTAL					\$4,356,390.00
M3500300	Obliterate Existing Pavement Symbols	Each	\$200.00	6	\$1,200.00
M3500400	Obliterate Existing Pavement Markings	Lin. Ft.	\$1.00	1,550	\$1,550.00
M3513100	Beacon Flashing Crossing	Each	\$25,000.00	1	\$25,000.00
M4204110	Sign Upgrades	Lump Sum	\$12,000.00	1	\$12,000.00
M4204505	Pavement Marking (Yellow Paint)	Lin. Ft.	\$1.25	7,000	\$8,750.00
M4204506	Pavement Marking (White Paint)	Lin. Ft.	\$1.50	18,100	\$27,150.00
M4204513	Pavement Marking (White Tape) Cat Track	Lin. Ft.	\$2.00	4,765	\$9,530.00
M4204520	Pavement Marking, Preformed, Type I Single Arrow	Each	\$100.00	43	\$4,300.00
M4204526	Pavement Marking (White Thermoplastics)	Lin. Ft.	\$1.50	4,635	\$6,952.50
M4204551	Pavement Marking (Symbol)	Each	\$150.00	96	\$14,400.00
CIVIL/TRAFFIC SUBTOTAL					\$110,832.50
	Concrete Catch Basin	Each	\$9,000.00	28	\$252,000.00
	Concrete Scupper and Spillway	Each	\$7,000.00	30	\$210,000.00
	Channel Grading	Cu. Yd.	\$40.00	300	\$12,000.00
	Storm Drain Manhole	Each	\$14,000.00	16	\$224,000.00
	Storm Drain Pipe	Lin. Ft.	\$200.00	400	\$80,000.00
DRAINAGE SIGNAL SUBTOTAL					\$778,000.00
	Landscape/Irrigation/Hardscape Allowance	Lump Sum	\$2,000,000.00	1	\$2,000,000.00
LANDSCAPE SUBTOTAL					\$2,000,000.00
CONSTRUCTION SUBTOTAL					\$7,245,132.50
	Unidentified Item Allowance	Lump Sum	20.0%	1	\$1,449,100.00
	Mobilization	Lump Sum	10.0%	1	\$724,600.00
	Construction Management	Lump Sum	10.0%	1	\$724,600.00
	Construction Survey & Layout	Lump Sum	1.0%	1	\$72,500.00
	Construction Record & Drawing Allowances	Lump Sum	1.0%	1	\$72,500.00
	Traffic Control	Lump Sum	7.0%	1	\$507,200.00
	Utility Relocations	Lump Sum	2.0%	1	\$145,000.00
	Contingency	Lump Sum	10.0%	1	\$724,600.00
	Testing & Materials	Lump Sum	1.0%	1	\$72,500.00
	Design	Lump Sum	12.0%	1	\$869,500.00
	Right-of-Way Acquisition	Sq. Ft.	\$	15,715	\$94,290.00
SUBTOTAL					\$5,456,390.00
PROJECT GRAND TOTAL					\$12,701,522.50

Appendix A

TOWN CENTER PEDESTRIAN CROSSWALK SOLUTIONS



TECHNICAL MEMORANDUM #1

CROSSWALK ALTERNATIVES ANALYSIS



25 NOVEMBER 2019



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EXECUTIVE SUMMARY

The Town of Carefree is a home for full time and seasonal residents, as well as many tourists, and is located in the northeast Phoenix metropolitan area. The Town Center is located at southeast side of the Tom Darlington Drive and Cave Creek Road intersection and includes numerous retail stores, restaurants, and other commercial and governmental activity centers. These roads are the two major arterials providing connectivity to the Town Center. Many people visit this place every day using all sorts of transportation modes including walking and biking along with personal vehicles.

Tom Darlington Drive and Cave Creek Road are carrying approximately 8,457 vehicles per day (vpd) and 6,349 vpd respectively. It is anticipated that the traffic volumes on Tom Darlington Drive and Cave Creek Road would increase to approximately 15,300 vpd and 11,500 vpd respectively over the next 20 years (i.e. year of 2039).

There are major residential multifamily residences on the west side of Tom Darlington Drive and the north side of Cave Creek Road. The existing crosswalks at (1) Tom Darlington Drive and Carefree Drive, (2) Tom Darlington and Ho Road, (3) Cave Creek Road and Carefree Drive, and (4) Cave Creek Road and Hum Road intersections provide the primary connectivity to the Town Center for pedestrians originating from the nearby neighborhoods. The Town of Carefree commissioned Rick Engineering Company to evaluate these four crosswalks to develop crosswalk solutions that will enhance their safe usage by pedestrians and bicyclists.

This report summarizes the study findings of the pedestrian and vehicular operational and safety existing conditions, develops a series of improvements alternatives, and identifies a preferred design alternative following a comprehensive assessment of each crosswalk location.

Four major elements were analyzed for development of the crosswalk design alternatives:

1. Signalized control
2. Roadway configurations
3. Advance warning signs
4. Advance pavement markings

Among signalized controls, rectangular rapid flashing beacons (RRFB), circular rapid flashing beacons (CRFB), and Pedestrian Hybrid Beacons (PHB), also known as HAWKs, were evaluated. The crosswalk locations do not meet the PHB warrants published in the Manual on Uniform Traffic Control Devices (MUTCD). Based on relative pros and cons, CRFBs were found to be more appropriate between the RRFB and CRFB options.

A series of roadway reconfigurations were evaluated that included shortening the crossing length, increasing sight visibility, narrowing travel lanes, constructing raised crosswalks, extending the existing single lanes, installing curb bulbouts, and installing patterned crossings. For advance pedestrian signs, four alternatives were reviewed: (1) standard advance pedestrian crossing warning signs, (2) solar LED blinker warning signs, (3) solar single flashing beacon warning signs, and (4) solar wig-wag flashing beacon warning signs. Additionally, two advance pavement markings were identified from the MUTCD which increase the compliance rates: (1) PED XING AHEAD and (2) YIELD markings.

Based on the pros and cons, relative performance (shown via a comparison chart), application effectivity, and suitability in improving the current situation (based on crash data review and speed study), the following design alternatives with the most promise were identified (see maps in the Preferred Alternatives section):

Carefree Drive and Tom Darlington Drive Crosswalk

- **Alternative 1:** Construct a curb bulbout, shorten the crossing length, eliminate sight visibility issues, construct a raised crosswalk, extend the existing single lane, increase the inscribed circular diameter of the traffic circle, install solar powered wig-wag flashing beacons, and install of PED XING and YIELD markings
Budgetary cost of \$58,000
- **Alternative 2:** Alternative 1 + installation of a solar powered CRFB at the crosswalk
Budgetary cost of \$88,000

Ho Road and Tom Darlington Drive Crosswalk

- **Alternative 1:** Eliminate sight visibility issues, construct a raised crosswalk and curb bulbouts, extend the existing single lane, install solar powered wig-wag flashing beacons, and install PED XING and YIELD markings, install solar powered dynamic speed feedback sign on the southbound approach, enhance existing pedestrian crosswalk signals, and construct median and pedestrian refuge island.
Budgetary cost of \$93,000

Hum Road and Cave Creek Road Crosswalk

- **Alternative 1:** Construct a raised crosswalk and curb bulbouts, extend the existing single lane, install solar powered wig-wag flashing beacons, install PED XING and YIELD markings, and relocate the existing solar powered dynamic speed feedback sign on southbound approach
Budgetary cost of \$89,000
- **Alternative 2:** Alternative 1 + Installation of solar powered CRFB at the crosswalk
Budgetary cost of \$119,000

Carefree Drive and Cave Creek Road Crosswalk

- **Alternative 1:** Shorten the crossing length, eliminate sight visibility issues, construct a raised crosswalk and curb bulbouts, extend the existing single lane, increase inscribed circular diameter of the traffic circle, install solar powered wig-wag flashing beacons, install PED XING and YIELD markings, and install solar powered dynamic speed feedback sign on northbound approach
Budgetary cost of \$76,000
- **Alternative 2:** Alternative 1 + installation of a solar powered CRFB at the crosswalk
Budgetary cost of \$106,000

Lighting of the crosswalks would improve nighttime safety. Solar power street lights would require a longer pole which can be used for CRFB as well. Therefore, in addition to the pole and luminaire, a solar panel, battery, and controller would be required. These items will add another \$9,000 to the cost at each location to provide streetlights at the crosswalks.

INTRODUCTION

This report has been prepared for and submitted to the Town of Carefree for the improvements of four pedestrian crossings located on Tom Darlington Drive and Cave Creek Road adjacent to the Carefree Town Center. Both Tom Darlington Drive and Cave Creek Road are major arterial roadways located on the west side and north side respectively of the Town Center. These two roadways provide connectivity to and through the Town, and each carries significant traffic.

There are major residential multifamily housing developments on the west side of Tom Darlington Drive and the north side of Cave Creek Road. The subject four crosswalks provide connectivity for the pedestrians between the residential neighborhoods and the town center and its shopping, restaurants, services, and other commercial and governmental activity centers. As the traffic on both of these roadways increase, and as the pedestrian activities increase, the need for a comprehensive reevaluation of the existing pedestrian crosswalk facilities is needed to ensure that motorized vehicle operators see the pedestrians clearly, acknowledge their presence by slowing down, and stopping to enable pedestrians to cross safely. The goal is to make the crosswalks safer and provide a higher level of comfort for the pedestrians to encourage them to use the provided crosswalks.



Figure 1: Crosswalk Location Map

The purpose of the study and this report is to provide a summary of our review of the existing traffic operational and safety situations, evaluate the existing crosswalks, identify improvement opportunities and options, and develop design alternatives to fulfill the Town's goal of providing safe and efficient transportation options for all transportation modes.

STUDY CROSSWALK LOCATIONS

The four crosswalk locations are named and mentioned in this report as follows:

Tom Darlington Drive Locations

- Tom Darlington Drive and Carefree Drive
- Tom Darlington Drive and Ho Road

Cave Creek Road Locations

- Cave Creek Road and Hum Road
- Cave Creek Road and Carefree Drive

Tom Darlington Drive and Carefree Drive Intersection

This intersection is a three leg intersection that has a traffic circle at its center. The traffic volumes of the north-south through movements are high (currently 8,457 vpd). The left turn movements from Carefree Drive to southbound Tom Darlington Drive is also relatively high. The crosswalk is located on the north side of the traffic circle following a radial circular path. Single approach and receiving lanes exist for southbound traffic, whereas a single approach lane and dual receiving lanes exist for northbound traffic. The two northbound receiving lanes increases the crossing distance and creates more conflict points between pedestrians and vehicles. **Figure 2** below shows the existing configuration of the Tom Darlington Drive and Carefree Drive intersection.



Figure 2: Tom Darlington Drive and Carefree Drive Intersection

Tom Darlington Drive and Ho Road Intersection

This intersection is a typical four leg intersection. The traffic volumes on the north-south through movements are high (currently 8,457 vpd) along with minimal volumes for the other turning movements. The crosswalk is located on south side of the intersection and it is equipped with existing signals that show a red stop light when activated by a pedestrian or bicyclist. There are two through lanes on both approaches at this intersection. **Figure 3** below shows the existing configuration of Tom Darlington Drive and Ho Road intersection.



Figure 3: Tom Darlington Drive and Ho Road Intersection

Cave Creek Road and Hum Road Intersection

This is a typical four leg intersection. The traffic volumes of east-west through movements are high (currently 6,349 vpd). The turning movements at this intersection are minimal in comparison. The crosswalk is located on the easterly side of the intersection. Dual approach lanes and a single receiving lane are present for the eastbound direction. The westbound direction has dual approach lanes and dual receiving lanes that increases the crossing distance for the pedestrians and creates more conflict points between pedestrians and vehicles. **Figure 4** shows the existing configuration of the Cave Creek Road and Hum Road intersection.



Figure 4: Cave Creek Road and Hum Road intersection

Cave Creek Road and Carefree Drive Intersection

This intersection is a four leg intersection with a traffic circle at its center. The traffic volumes of east-west through movements are high (currently 6,349 vpd). The southbound left turn movement from Cave Creek Road onto Carefree Drive is also high. The crosswalk is located on easterly side of the traffic circle. Single approach lanes exist in both directions, but there are dual receiving lanes on both approaches. The dual receiving lanes increase the crossing distance and creates more conflict points between pedestrians and vehicles. **Figure 5** shows the existing configuration of Cave Creek Road and Carefree Drive intersection.



Figure 5: Cave Creek Road and Carefree Drive Intersection

CRASH ANALYSIS

The last five years (i.e. year 2013-2017) of crash data was obtained from the ADOT crash database. There were 39 crashes in the study area over the five year period. Among these 39 crashes, 18 crashes occurred on Cave Creek Road and 21 crashes on Tom Darlington Drive. Among these 39 crashes, 14 crashes (36%) were speed related crashes. These speed related crashes indicate the need for speed reducing measures on both of these roadways. Additionally, 8 crashes (i.e. 21% crashes) occurred at nighttime. These nighttime crashes indicate that adding lighting at the pedestrian crossings would improve nighttime pedestrian and bicycle safety and would aid in reducing the probability of nighttime crashes. **Figure 6** below shows the crash locations (different symbols represent different years).



Figure 6: Crash locations (2013-2017) on Tom Darlington Drive and Cave Creek Road

TRAFFIC AND PEDESTRIAN OPERATIONAL ANALYSIS

Existing Traffic Analysis

Based on MAG published traffic volumes map, year 2015, the traffic volumes on a typical weekday on the adjacent roadways are reported as follows:

Tom Darlington Drive	13,000 vehicles per day (vpd)
Cave Creek Road	15,000 vpd

Based on ADOT Highway Performance Monitoring System (HPMS) database, the seasonal adjustment factor for this area is 0.911 (less than 1). However, our previous project experience in this area used a 5% increase to capture the effect of the seasonal population.

New traffic counts, including for both 24-hour AM and PM peak hours, was collected in October 8, 2019, while the schools were in sessions. After applying a 5% seasonal growth factor, the current traffic volumes on the adjacent roadways are as estimated as follows:

Tom Darlington Drive	8,457 vpd (2019)
Cave Creek Road	6,349 vpd (2019)

As shown, the MAG traffic volumes are significantly higher than the current counted volumes. Most of the MAG data was collected in 2007 and 2008. The turning movements were collected in 2010. The years 2007 and 2008 were just before the economic recession and the traffic volumes were significantly higher. The volumes then dropped significantly due to the economic downturn. Since the base traffic volumes were collected before the recession, the MAG predicted 2015 volumes are typically significantly higher than the current situation.

Forecasted Traffic Analysis

Based on the MAG Transportation Data Management System (TDMS) traffic data on Tom Darlington Drive near the project area, an average annual traffic growth factor of 3% was estimated for the project intersections. After applying the 3% annual combined growth factor (i.e. 1.81) to 2019 traffic volumes, for the design 20-year horizon (i.e. 2039), the traffic volumes are as projected as follows:

Tom Darlington Drive	15,307 vpd (2039)
Cave Creek Road	11,492 vpd (2039)

Peak hour turning movement counts were also performed on October 8, 2019. Applying the adjustment factor of 1.05 (5% increase for seasonal traffic) to the turning peak hour through movements at all four crosswalks yielded the results listed below, and also as shown in **Figure 7** on the following page. The maximum peak hour through volumes on Tom Darlington Drive and Cave Creek Road are as follows:

Tom Darlington Drive	342 vph for 2019	619 vph for 2039	(vph – vehicles per hour)
Cave Creek Road	266 vph for 2019	482 vph for 2039	

The forecast design year 2039 (20 year horizon) values are below the capacity of a single lane roadway, thus no capacity issues are anticipated. There are existing segments of single through lanes on each roadway.

Pedestrian Crossings Analysis

Pedestrian and bicycle crossing data at all four crosswalk locations were also collected on October 8, 2019 during both the AM and PM peak hours. These counts are presented below:

Tom Darlington Drive/Carefree Drive	3 in the AM peak hour	0 in the PM peak hour
Tom Darlington Drive/Ho Road	4 in the AM peak hour	1 in the PM peak hour
Cave Creek Road/Hum Road	5 in the AM peak hour	3 in the PM peak hour
Cave Creek Road/Carefree Drive	12 in the AM peak hour	12 in the PM peak hour



Figure 7: 2039 Peak Hour Through Traffic Volumes and Pedestrian Crossing Volumes

Vehicular Speed Analysis

Speed data was collected on both Tom Darlington Drive and Cave Creek Road between the crosswalks on each road. The posted speed limit on both roadways is 30 mph. The findings from speed study indicate that the 85% percentile speed values are approximately 30 mph for all approaches except the southbound direction on Tom Darlington Drive. **Figure 8** and **Figure 9** below show the speed study findings.

Figure 8: Speed Study Summary on Tom Darlington Drive

Direction	Time of Day	85th Percentile	95th Percentile
Northbound	AM	27	30
	PM	32	34
	Non-Peak Hours	30	32
Southbound	AM	36	39
	PM	31	34
	Non-Peak Hours	29	31

Figure 9: Speed Study Summary on Cave Creek Road

Direction	Time of Day	85th Percentile	95th Percentile
Northbound	AM	31	34
	PM	30	33
	Non-Peak Hours	30	33
Southbound	AM	27	33
	PM	29	31
	Non-Peak Hours	29	31

Existing dynamic speed feedback signs are located on eastbound Cave Creek Road and northbound on Tom Darlington Drive. The excessive speed on southbound of Tom Darlington indicates the value of adding a dynamic speed feedback sign.

ALTERNATIVES DEVELOPMENT, SCREENING, AND EVALUATION

A set of pedestrian crosswalk alternatives were developed based on the needs at each of the subject crosswalks. The following four major elements in the improvements alternatives were developed and reviewed for the existing conditions:

- Signalized control
- Roadway reconfigurations
- Advance signing
- Advance pavement markings

Detailed analyses, including identifying the pros and cons, relative performance, and benefits to offer to each crosswalk compared to the existing conditions have been analyzed and documented in the following sections.

Signalized Pedestrian Crossing System

Three types of crossings were reviewed as part of this project as presented below. It is noted that all three types can be operated using solar power and thus no new electric power source is needed.

- Rectangular rapid flashing beacon (RRFB) - **Figure 10**
- Circular rapid flashing beacon (CRFB) - **Figure 11**
- Pedestrian Hybrid Beacon (PHB)/High Intensity Activated Crosswalk Systems (HAWK) – **Figure 12**

These systems are actuated by the presence of pedestrians. The presence could be active detection such as push buttons as well as passive detections such as video, thermal, or infrared cameras. These measures provide protected crossings to pedestrians and bicyclists.

For both the RRFB and CRFB signals, the signals are dark until activated. When activated, the signals display flashing yellow beacons. When flashing yellow, vehicles are required to yield (and stop as needed) to pedestrians using the crosswalk, and vehicles are allowed to proceed when the crosswalk is clear.

The operational sequence of PHB/HAWK signals is as following:

1. Dark until activated
2. Flashing yellow upon activation
3. Steady yellow
4. Steady red during pedestrian walk interval
5. Alternative flashing red during pedestrian clearance interval
6. Dark again until activation

When flashing yellow starts upon activation, vehicles are required to slow down and prepare to stop on red and then wait at the stop bar until the signals go to the dark condition again.

The difference between the RRFB and CRFB is the shape of the flashing light on the roadside poles. CRFB uses circular rapid high intensity LED flashing lights whereas RRFB uses rectangular rapid flashing beacon lights. The construction cost of RRFB or CRFB is approximately 25% of the construction cost of PHB/HAWK (approximately \$50,000 versus \$200,000), but have 95% safety performance of the PHB.



Figure 10: RRFB pedestrian crossing



Figure 11: CRFB pedestrian crossing



Figure 12: PHB / HAWK pedestrian crossing

Figure 13 shows the pros and cons and Figure 14 shows the relative performance (merits and demerits) of these three signalized pedestrian crossings.




Design Alternative		Pros	Cons
Option ID	Control Type		
#1	 <p>RRFB</p>	<ul style="list-style-type: none"> > Low construction cost > Low maintenance cost > Low operational cost > Less vehicular delay > Significant safety improvement 	<ul style="list-style-type: none"> > Slightly less safety benefit compared to PHB > Slightly less visible to pedestrian and drivers compared to CRFB > Has some continuous operational and maintenance cost
#2	 <p>CRFB</p>	<ul style="list-style-type: none"> > Low construction cost > Low maintenance cost > Low operational cost > Less vehicular delay > Higher visibility compared to RRFB and thus more efficient in drawing drivers attention and speed reduction > Significant safety improvement 	<ul style="list-style-type: none"> > Slightly less safety benefit compared to PHB > Has some continuous operational and maintenance cost
#3	 <p>PHB/HAWK</p>	<ul style="list-style-type: none"> > Highest safety improvements among RRFB, CRFB, and PHB/HAWK > Highly visible from far and more efficient in speed reduction 	<ul style="list-style-type: none"> > High construction cost > Medium to high maintenance cost > High operational cost > Longer delay for the cars and thus more emissions

Figure 13: Pros and Cons of Signalized Crosswalk Design Alternatives

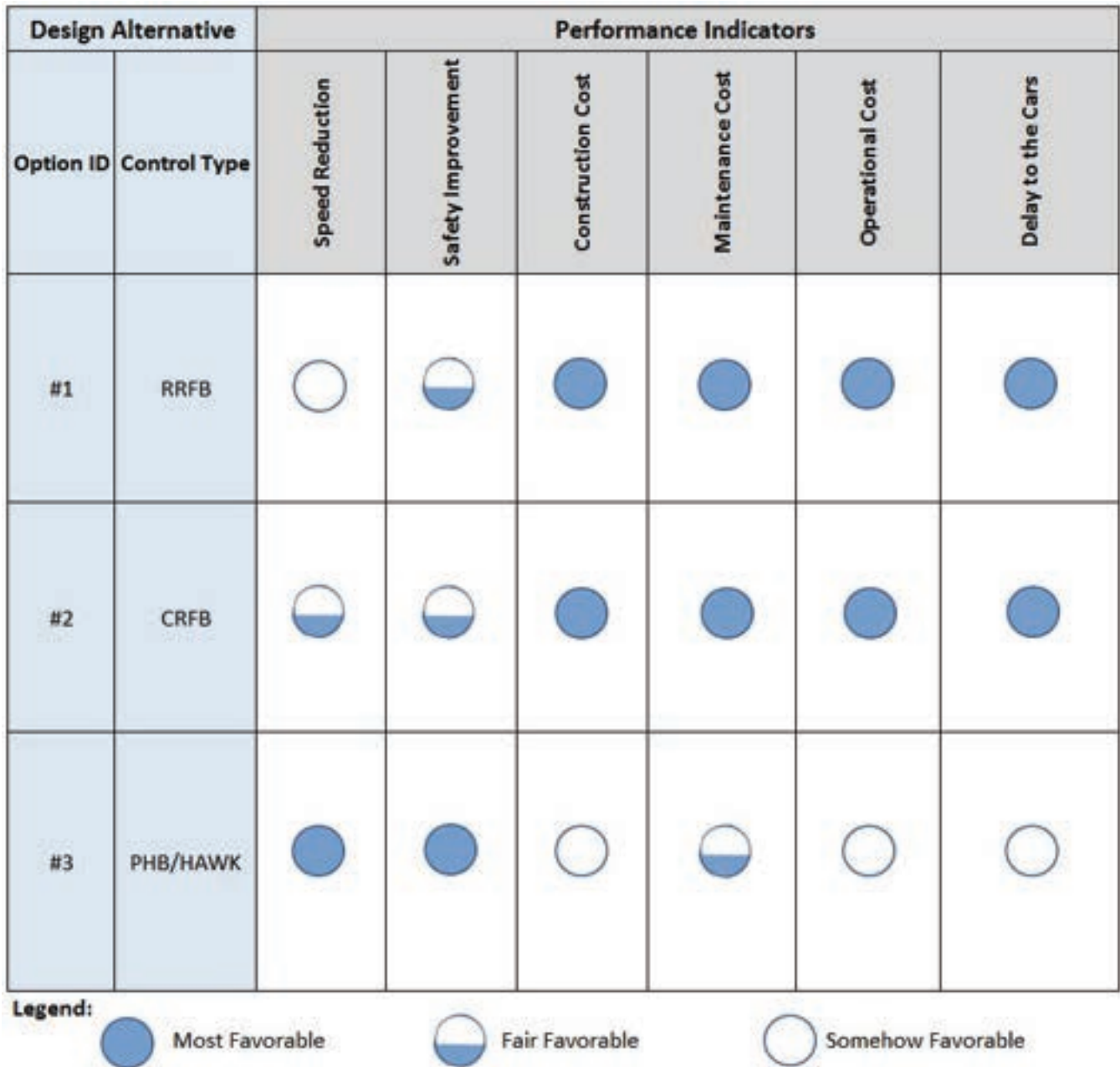


Figure 14: Relative Performance Evaluations for Signalized Crosswalk Design Alternatives

The Manual on Uniform Traffic Control Devices (MUTCD) warrants to justify installation of a PHB signal were checked. A minimum of 20 pedestrian crossings during the peak hour period are required for the installation of a PHB (refer to **Figure 15** next page), whereas a maximum of 12 pedestrian crossings was found at one of the crosswalks during a peak hour. Based on the actual count numbers, it has been concluded that none of the four locations meet the PHB warrant.

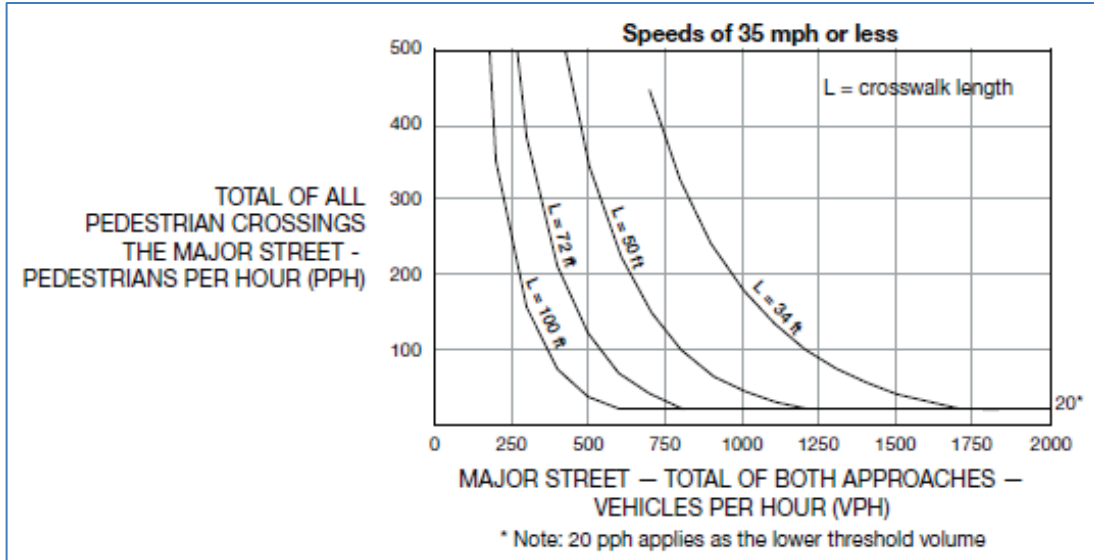


Figure 15: MUTCD PHB Warrant

Based on the analysis of these three types, the CRFB is preferred for these locations. An existing system similar to the CRFB is in place at Tom Darlington Drive and Ho Road. The existing system can be protected in place for this crosswalk and new elements can be added to improve its condition and effectiveness.

Median Extensions and Pedestrian Refuge Islands

Pedestrian refuge islands in medians are roadway features that can be installed to increase pedestrian comfort and safety. Medians serve to shorten the crosswalk length and only require pedestrians to look one direction against oncoming traffic for each side of the roadway to be crossed.

There are already wide medians for the crosswalks at Tom Darlington Drive and Carefree Drive and at Cave Creek Road and Carefree Drive serving as existing pedestrian refuge islands. However, the intersections at Tom Darlington Drive and Ho Road and at Cave Creek Road and Hum Road can have modifications made to the medians, if desired, to add pedestrian refuge islands via median extensions.

It is important to note that the typical geometry and operation of intersections can present several challenges. Sight distance is important for drivers to identify acceptable gaps in opposing traffic. Opposing left-turn lanes are typically aligned directly across from one another and immediately adjacent to the through lanes, as shown in **Figure 16**, No Offset (b), found on the next page. Thus, a left-turning vehicle in the left-turn lane can obstruct the view of oncoming vehicles, particularly those in the opposite left-turn lane. To improve sight distance and safety for left-turning drivers at intersections, the use of positive offset left-turn lanes is recommended whenever possible, as shown in **Figure 16**, Positive Offset (c), (next page).

Sight distance for left-turning vehicles is diminished by creating a negative offset as shown in **Figure 16**, Negative Offset (a), (next page). Sight distance, and thus safety, can be improved by shifting left-turn lanes that are currently aligned with no offset to the left to create a positive offset.

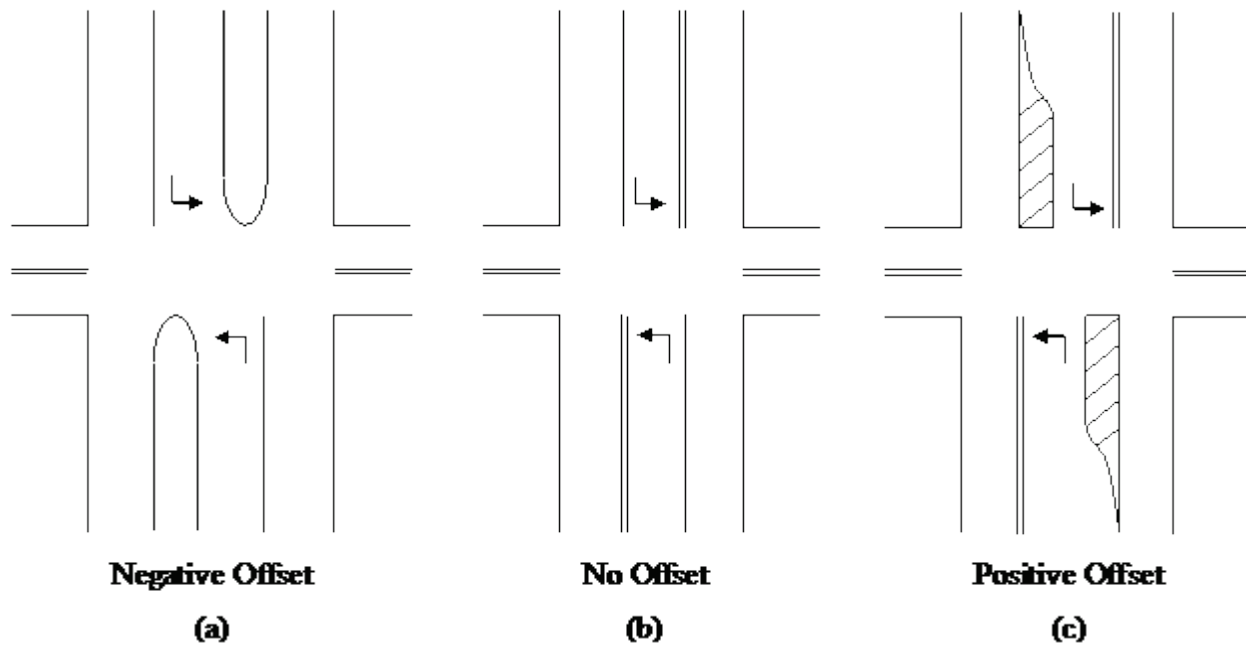


Figure 16: Left Turn Lane Configurations (courtesy FHWA)

MAG has recently completed a study on negative offset at intersections which revealed that negative offset at signalized and unsignalized intersections, with permissive operational conditions, has an adverse safety impact. The study findings align with national studies performed by Transportation Research Board (TRB). The recommendation is to provide positive offset (preferred), or at least zero offset left turn lanes, at intersections.

Considering this, modifications to the medians to add a pedestrian refuge island with zero offset left turn lanes at the Tom Darlington Drive and Ho Road intersection and at the Cave Creek Road and Hum Road intersection are proposed and presented herein in the Preferred Alternatives section of this report.

Crosswalk Markings

To increase the visibility of the raised crosswalk, a series of options are available (refer to **Figure 17** on the next page). Those options include:

1. Solid
2. Standard
3. Continental
4. Dashed
5. Zebra
6. Ladder

Other decorative options for the crosswalk markings are available and examples are shown later in this report (see **Figure 22** on page 23). Decorative and patterned crosswalks increase the visibility and enhance the aesthetics. However, these options may also require additional maintenance compared to the applied thermoplastic materials used for striping the crosswalk options listed above.

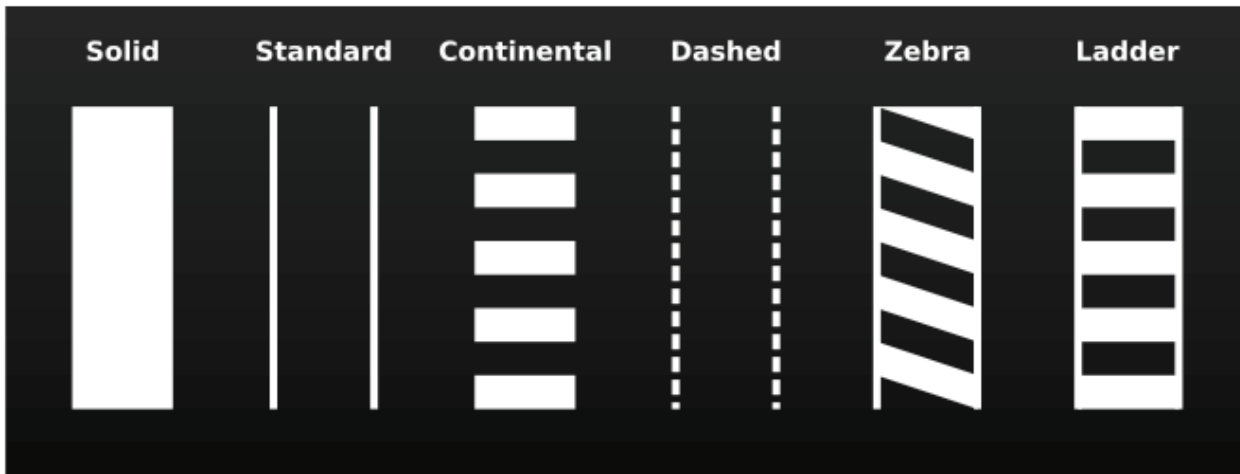


Figure 17: Typical Crosswalk Marking Examples

The ladder marking is proposed to be installed on the top flat portion of the raised crosswalk. Additionally, speed hump markings (Option B) recommended by MUTCD will be installed on the sloped portions of the raised crosswalk (refer to **Figure 18** below).

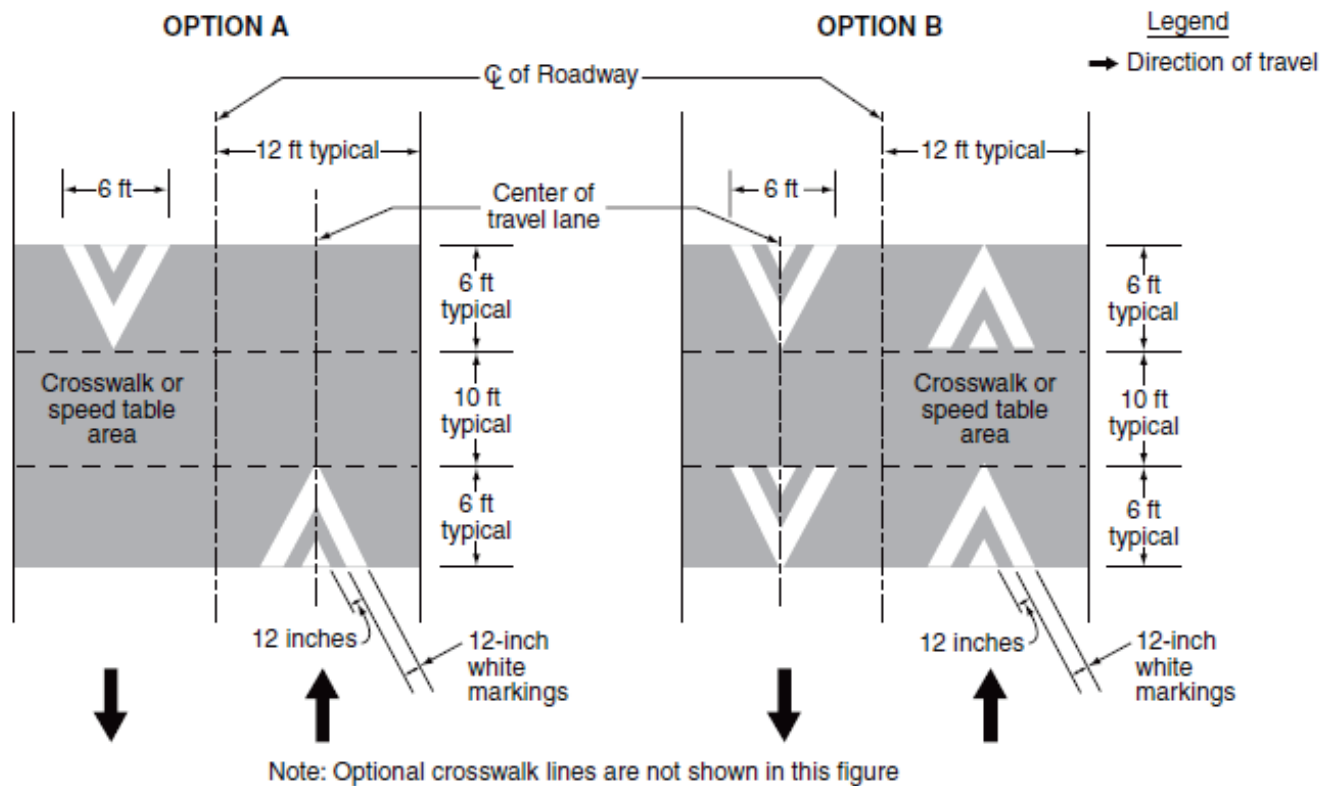


Figure 18: Speed Hump Marking Options

Refinement of Roadway Configuration

Seven different treatments in terms of roadway reconfiguration were reviewed based on the needs at the subject crosswalks. The treatments are as follows:

- Shortest crossings
- Increased sight visibility
- Narrowing the lanes
- Raised crosswalk
- Extend the existing single lanes
- Curb bulbouts
- Patterned crossing

It is always desirable that the crosswalks are the shortest distance to cross the street (refer to **Figure 19** next page), have clear sight visibility, and are located close to the intersection.

Near the crosswalks, the approach lane widths can be evaluated to potentially decrease the lane width. This creates the experience of 'side friction' for the driver which can influence the driver to slow down.

The suitability and applicability of the remaining four improvement options:

1. Raised crosswalk (**Figure 20**)
2. Extending the existing single lanes
3. Curb bulbouts (**Figure 21**) to shorten crossing distances
4. Decorative and patterned crosswalks (**Figure 22**)

These options were evaluated and the results are documented in the following sections of this technical memorandum.

A City of Mesa Standard Detail for a Speed Hump is included at the end of the Appendix. The design for the raised platform crosswalk will be similar in design except the top width will be 10 feet (instead of the 2' shown).



Figure 19: Shortest Pedestrian Crossing



Figure 20: Raised Pedestrian Crosswalk



Figure 21: Curb Bulbouts



Figure 22: Decorative / Patterned Pedestrian Crosswalks

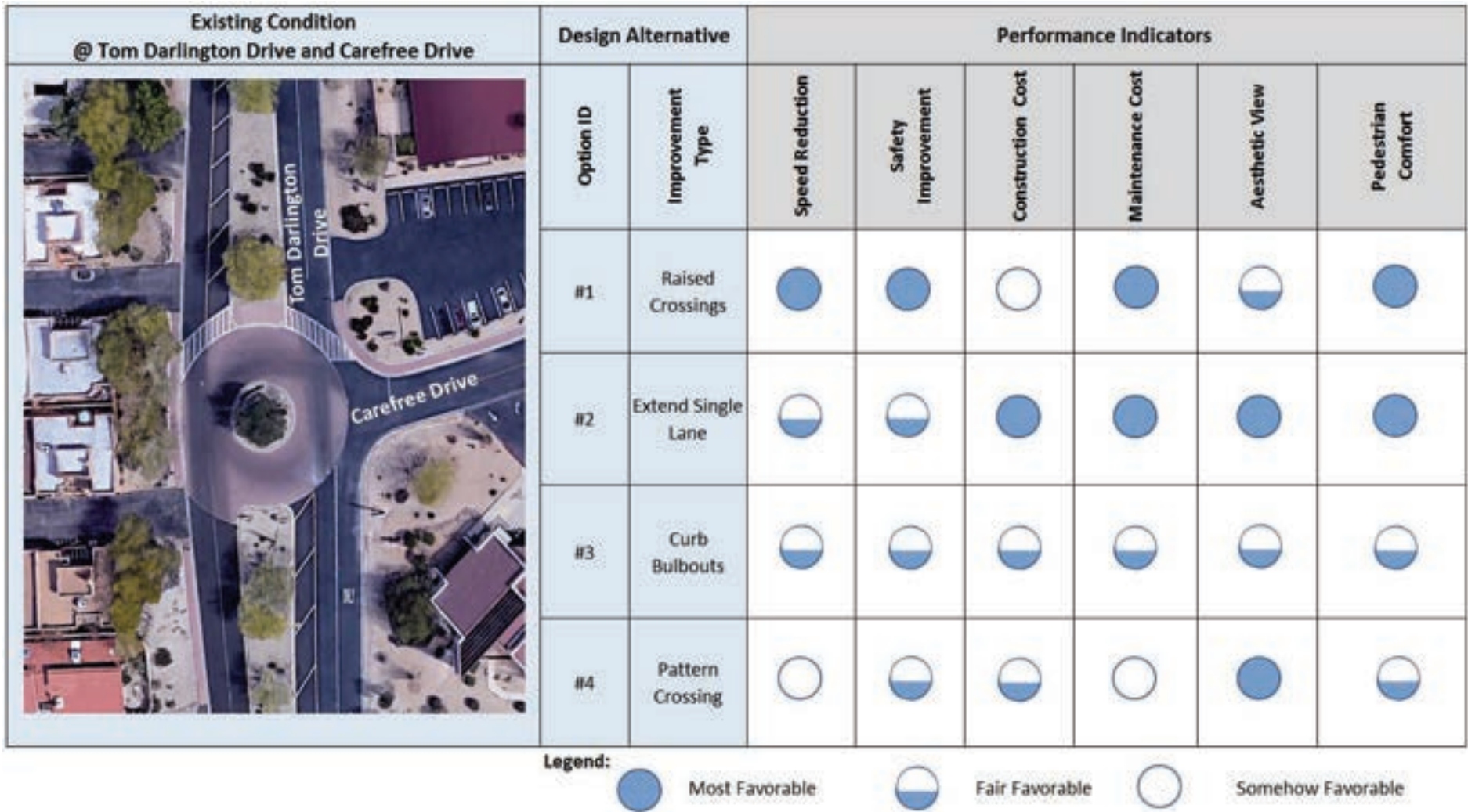



Figure 23: Evaluation of Relative Performance of Crosswalk Treatments for Tom Darlington Drive and Carefree Drive

Based on the performance evaluation, shortening the crossing, constructing a raised crosswalk, extending the existing single lane, and increasing the inscribed circle diameter (ICD) of the traffic circle would be effective improvements for the Carefree Drive and Tom Darlington Drive crossing.

Existing Condition @ Tom Darlington Drive and Ho Road		Design Alternative		Performance Indicators					
		Option ID	Improvement Type	Speed Reduction	Safety Improvement	Construction Cost	Maintenance Cost	Aesthetic View	Pedestrian Comfort
#1	Raised Crossings								
#2	Extend Single Lane								
#3	Curb Bulbouts								
#4	Pattern Crossing								

Legend: Most Favorable Fair Favorable Somehow Favorable

Figure 24: Evaluation of Relative Performance of Crosswalk Treatments for Tom Darlington Drive and Ho Road

Based on the performance evaluation, construction a raised crosswalk, extending the existing single lane, and constructing curb bulbouts at all four corners would be effective improvements for the Ho Road and Tom Darlington Drive crossing.

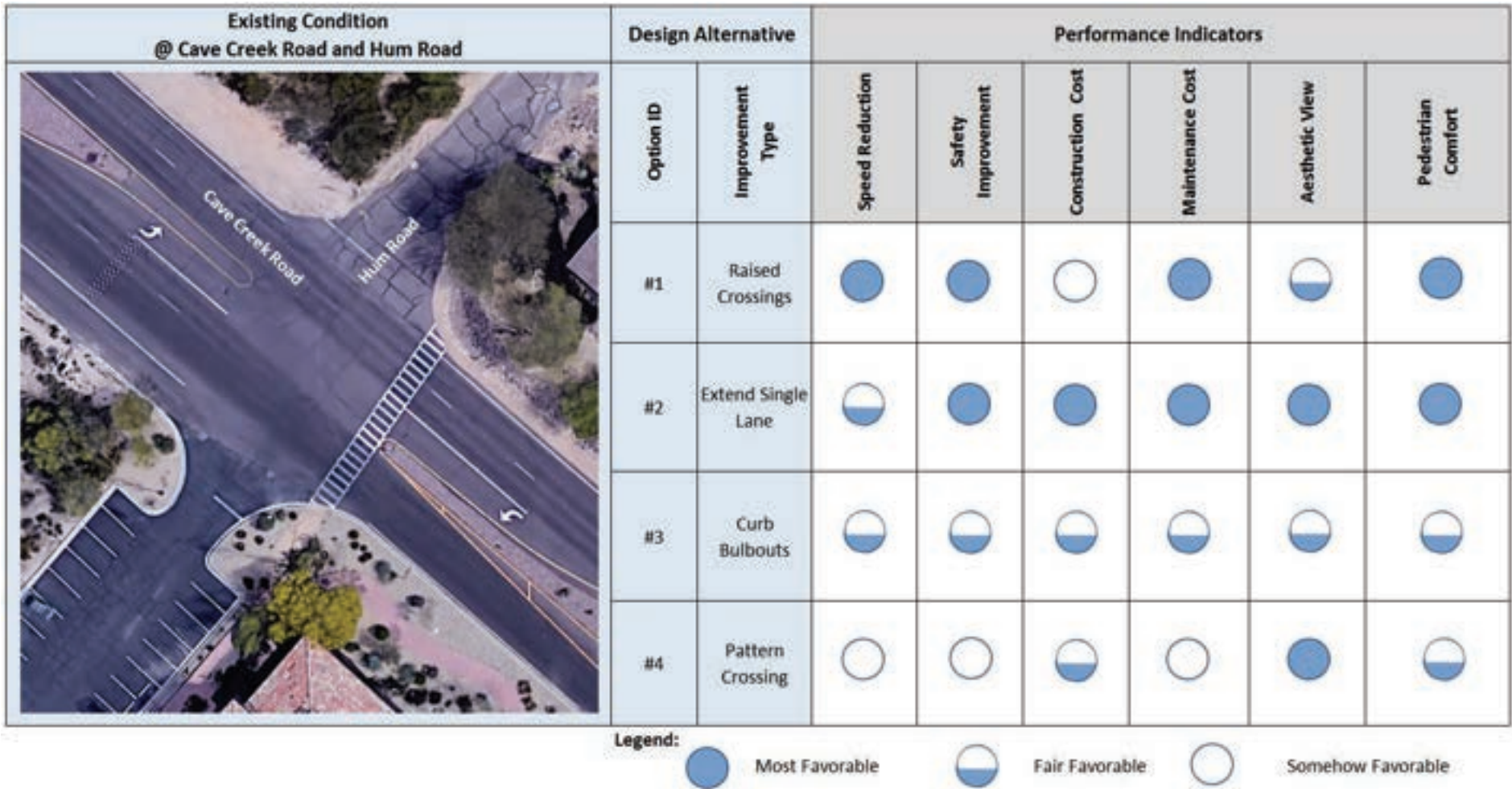


Figure 25: Evaluation of Relative Performance of Crosswalk Treatments for Cave Creek Road and Hum Road

Based on the performance evaluation, constructing a raised crosswalk and extending the existing single lane would be effective improvements for the Hum Road and Cave Creek Road crossing.

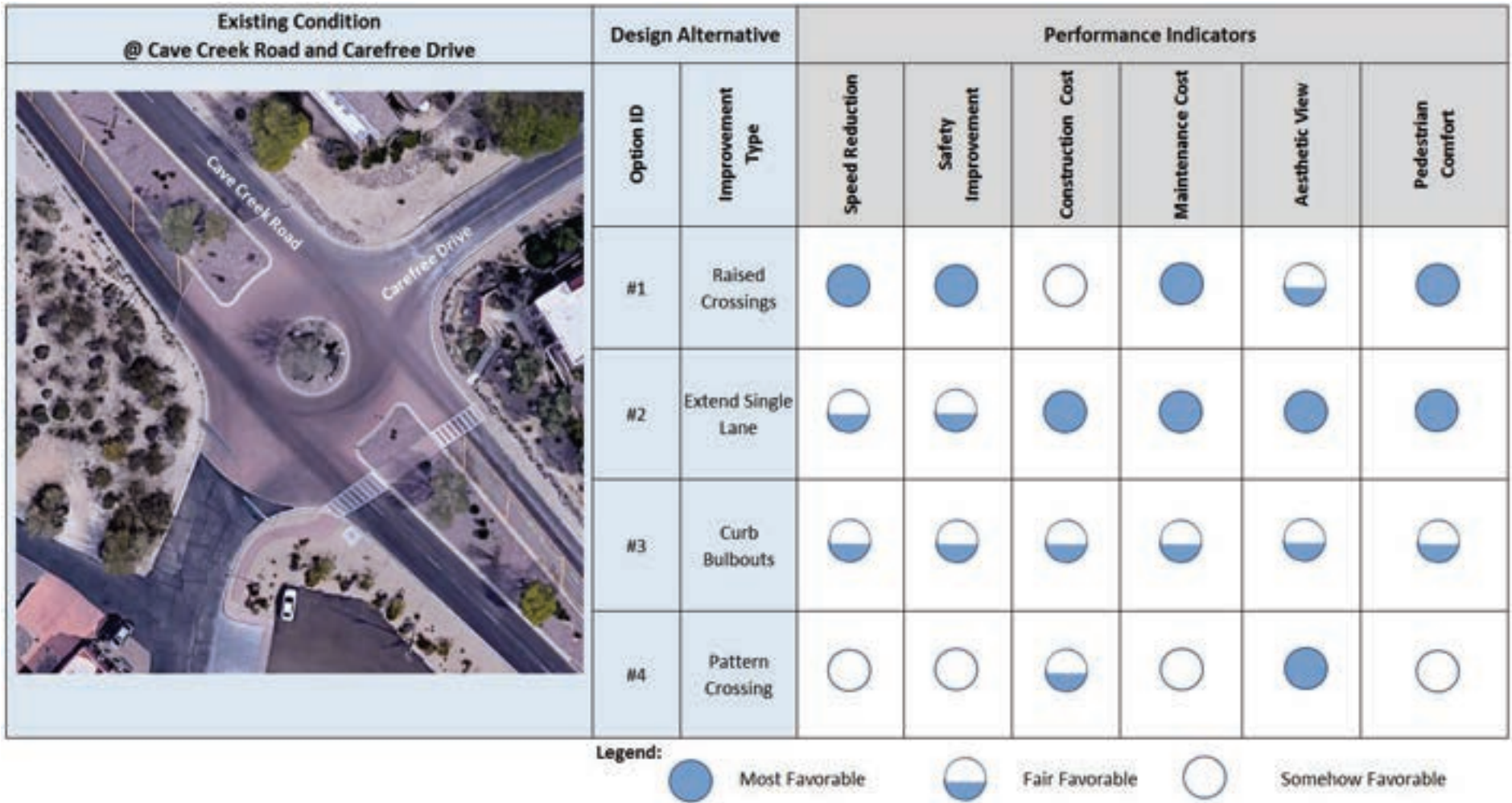


Figure 26: Evaluation of Relative Performance of Crosswalk Treatments for Cave Creek Road and Carefree Drive

Based on the performance evaluation, shortening the crossing length, constructing a raised crosswalk, extending the existing single lane, and increasing the inscribed circle diameter (ICD) of the traffic circle would be effective improvements for Carefree Drive and Cave Creek Road crossing.

Installation of Advance Pedestrian Warning Signs

Four different types of advance warning signs were reviewed to identify the application suitability at the subject four existing crosswalks. Solar wig-wag flashing beacon signs are the most expensive option, but have the highest capability of attracting the drivers' attention and are most effective in increasing the awareness of the presence of crosswalks ahead in all weather conditions. Options considered include:

- Standard advance pedestrian crossing warning sign (left picture **Figure 27** below)
- Solar LED 'blinker' warning sign (right picture **Figure 27** below)
- Solar single flashing beacon warning sign (left picture **Figure 28** next page)
- Solar wig-wag flashing beacon warning signs (right picture **Figure 28** next page)



Figure 27: Standard Advance Pedestrian Crossing Warning Sign (to the left)
Solar LED 'Blinker' Warning Sign (to the right)



Figure 28: Solar Single Flashing Beacon Warning Sign (to the left)
Solar Wig-Wag Flashing Beacon Warning Sign (to the right)

Installation of Pavement Markings

Two different types of advance pavement markings, as presented below, have been identified to use at the subject crosswalks.

- PED XING AHEAD marking see **Figure 29** next page
- YIELD markings see **Figure 30** next page

The PED XING AHEAD marking would be placed in advance of the crosswalk approximately 250 feet to provide a warning notice to the driver.

The YIELD markings, along with a sign, would be placed approximately 40 to 50 feet ahead of the crosswalk which is a designated stopping location to yield for the pedestrians using the crosswalk.



Figure 29: Pedestrian Crossing Ahead Pavement Marking

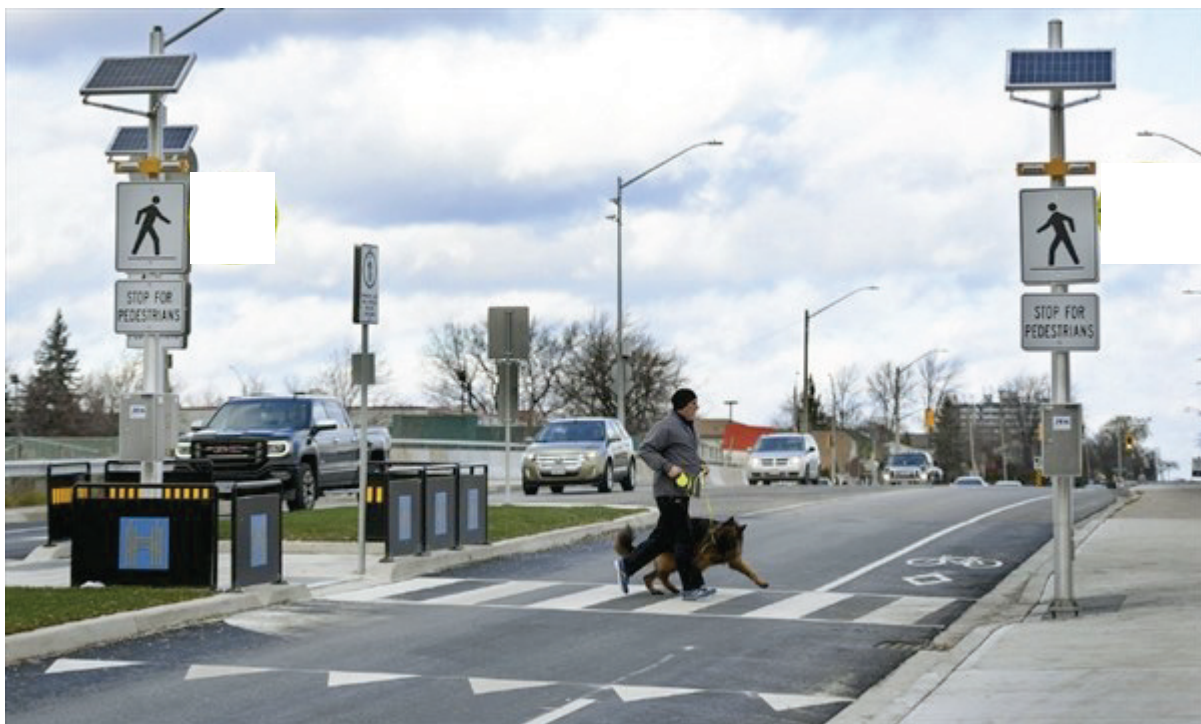


Figure 30: Pedestrian Yield Pavement Marking

PREFERRED ALTERNATIVES

Based on the analyses and relative performance comparisons set forth herein, the following operations are identified as ‘preferred’ alternatives for the subject four crosswalks:

CAREFREE DRIVE AND TOM DARLINGTON DRIVE

- **Alternative 1:**
 - ✓ Shortening of the crossing by providing a straight crosswalk
 - ✓ Eliminating sight visibility issues
 - ✓ Constructing a raised crosswalk
 - ✓ Installing curb bulbout, restriping, and extending the existing single lane concept from 500 feet south to 300 feet north of the intersection
 - ✓ Increasing the inscribed circle diameter and installing yellow markings around the traffic circle to reflect the narrower lane widths
 - ✓ Installing solar powered wig-wag flashing beacon advance warning signs at least 250 feet in advance on both approaches
 - ✓ Installing PED XING pavement markings at least 250 feet in advance on both approaches
 - ✓ Installing YIELD pavement marking approximately 40 to 50 feet in advance of the crosswalk on both approaches

- **Alternative 2:**
 - ✓ Alternative 1 + Installation of solar powered CRFBs at the crosswalk

The budgetary cost for this intersection is shown in the **Figure 31** below.

Crosswalk Location	Alternative	Elements	Itemized Cost	Total Cost
Carefree Drive and Tom Darlington Drive	Alternative #1	Install Crosswalk Markings	\$13,660	\$58,000
		Increase Sight Visibility	\$1,500	
		Construct Curb Bulbouts	\$6,000	
		Construct Raised Crosswalk (80 feet)	\$24,640	
		Increase Diameter Inscribed Circle	\$3,000	
		Installation of Solar Powered Wig-Wag Flashing Beacon (2)	\$4,000	
		Extension of Single Lane	\$2,500	
		Installation of PED XING marking (2)	\$1,200	
		Installation of YIELD marking (2 approaches)	\$1,500	
	Alternative #2	Alternative #1 + Installation of CRFBs (2)	\$88,000	\$88,000

Figure 31: Budgetary Cost for Carefree Drive and Tom Darlington Drive

See **Figure 32** on the next page for a conceptual layout of these recommended improvements.

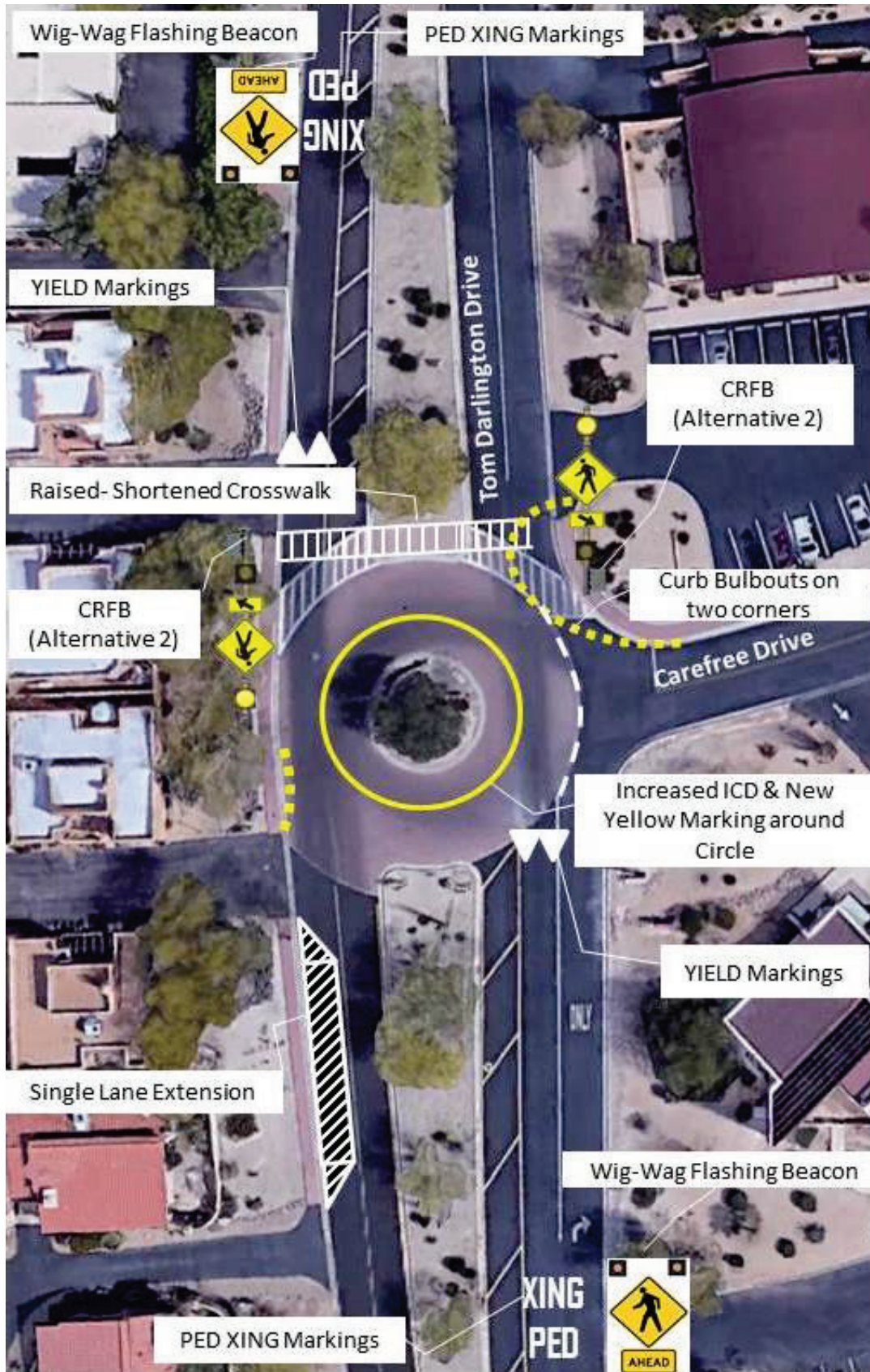


FIGURE 32: CAREFREE DRIVE AND TOM DARLINGTON DRIVE

HO ROAD AND TOM DARLINGTON DRIVE

- **Alternative 1:**
 - ✓ Constructing a raised crosswalk
 - ✓ Eliminating sight visibility issues
 - ✓ Installing curb bulbouts to make the corner radii sharper
 - ✓ Restriping an extension of the existing single lane concept from 550 feet south to 300 feet north of the intersection
 - ✓ Installing solar powered wig-wag flashing beacon advance warning signs at least 250 feet in advance on both approaches
 - ✓ Installing PED XING pavement markings at least 250 feet in advance on both approaches
 - ✓ Installing YIELD pavement markings approximately 40 to 50 feet in advance of the crosswalk on both approaches
 - ✓ Installing a solar powered dynamic speed feedback sign 300 feet in advance on southbound direction
 - ✓ Construct median for pedestrian refuge island
 - ✓ Enhancement of the existing pedestrian crosswalk signals

The budgetary cost for this intersection is shown in the **Figure 33** below.

Crosswalk Location	Alternative	Elements	Itemized Cost	Total Cost
Ho Road and Tom Darlington Drive	Alternative #1	Install Crosswalk Markings	\$13,050	\$93,000
		Increase Sight Visibility	\$1,500	
		Construct Curb Bulbouts	\$15,000	
		Construct Raised Crosswalk (75 feet)	\$23,100	
		Install Solar Powered Wig-Wag Flashing Beacon (2)	\$4,000	
		Extend Single Lane Concept	\$5,000	
		Install PED XING marking (2)	\$1,500	
		Install YIELD marking (2 approaches)	\$1,500	
		Install solar dynamic speed feedback sign	\$12,000	
		Construct Median/Pedestrian Refuge Island	\$27,000	
		Enhance Existing Crosswalk Signal	\$3,900	

Figure 33: Budgetary Cost for Ho Road and Tom Darlington Drive

See **Figure 34** on the next page for a conceptual layout of these recommended improvements.

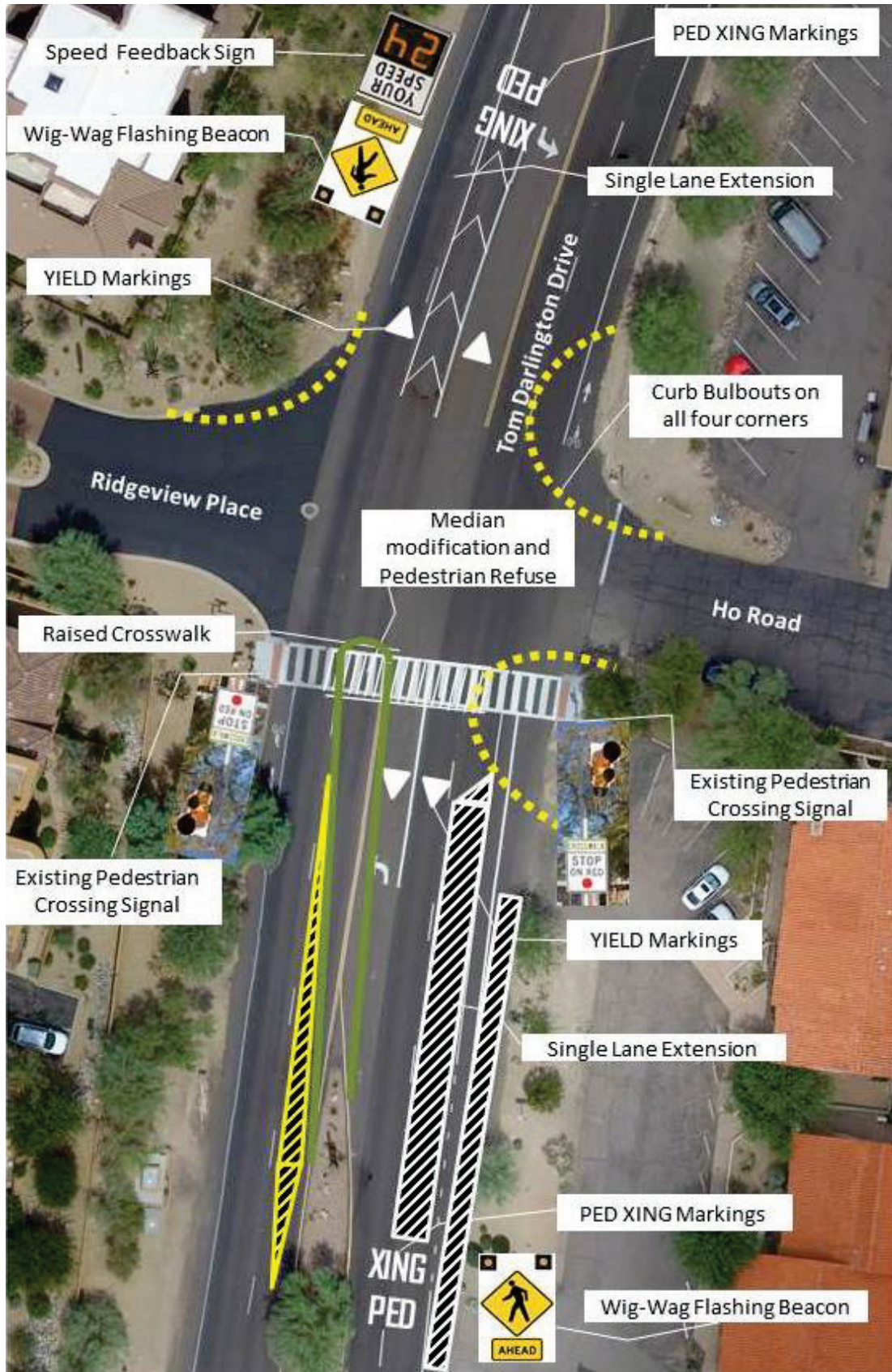


FIGURE 34: HO ROAD AND TOM DARLINGTON DRIVE

HUM ROAD AND CAVE CREEK ROAD

- **Alternative 1:**
 - ✓ Installing curb bulbouts to make the corner radii sharper
 - ✓ Constructing a raised crosswalk
 - ✓ Restriping and installing an extension of the existing single lane concept from 550 feet east to 300 feet west of the intersection
 - ✓ Relocating the existing a solar powered dynamic speed feedback sign to 300 feet in advance of the intersection in the eastbound direction
 - ✓ Installing solar powered wig-wag flashing beacon advance warning signs at least 250 feet in advance on both approaches
 - ✓ Installing PED XING pavement markings at least 250 feet in advance on both approaches
 - ✓ Installing YIELD pavement markings approximately 40 to 50 feet in advance of the crosswalk on both approaches

- **Alternative 2:**
 - ✓ Alternative 1 + Installation of solar powered CRFBs at the crosswalk

The budgetary cost for this intersection is shown in the **Figure 35** below.

Crosswalk Location	Alternative	Elements	Itemized Cost	Total Cost
Hum Road and Cave Creek Road	Alternative #1	Install Crosswalk Markings	\$12,180	\$89,000
		Construct Curb Bulbouts	\$12,000	
		Construct Raised Crosswalk (70 feet)	\$21,560	
		Extension of Single Lane	\$5,000	
		Relocate Existing Solar Dynamic Speed Feedback Sign	\$4,260	
		Install Solar Powered Wig-Wag Flashing Beacon (2)	\$4,000	
		Installation of PED XING marking (2)	\$1,500	
		Installation of YIELD marking (2 approaches)	\$1,500	
		Construct Median/Pedestrian Refuge Island	\$27,000	
	Alternative #2	Alternative #1 + Installation of CRFBs (2)	\$119,000	\$119,000

Figure 35: Budgetary Cost for Hum Road and Cave Creek Road

See **Figure 36** on the next page for a conceptual layout of these recommended improvements.

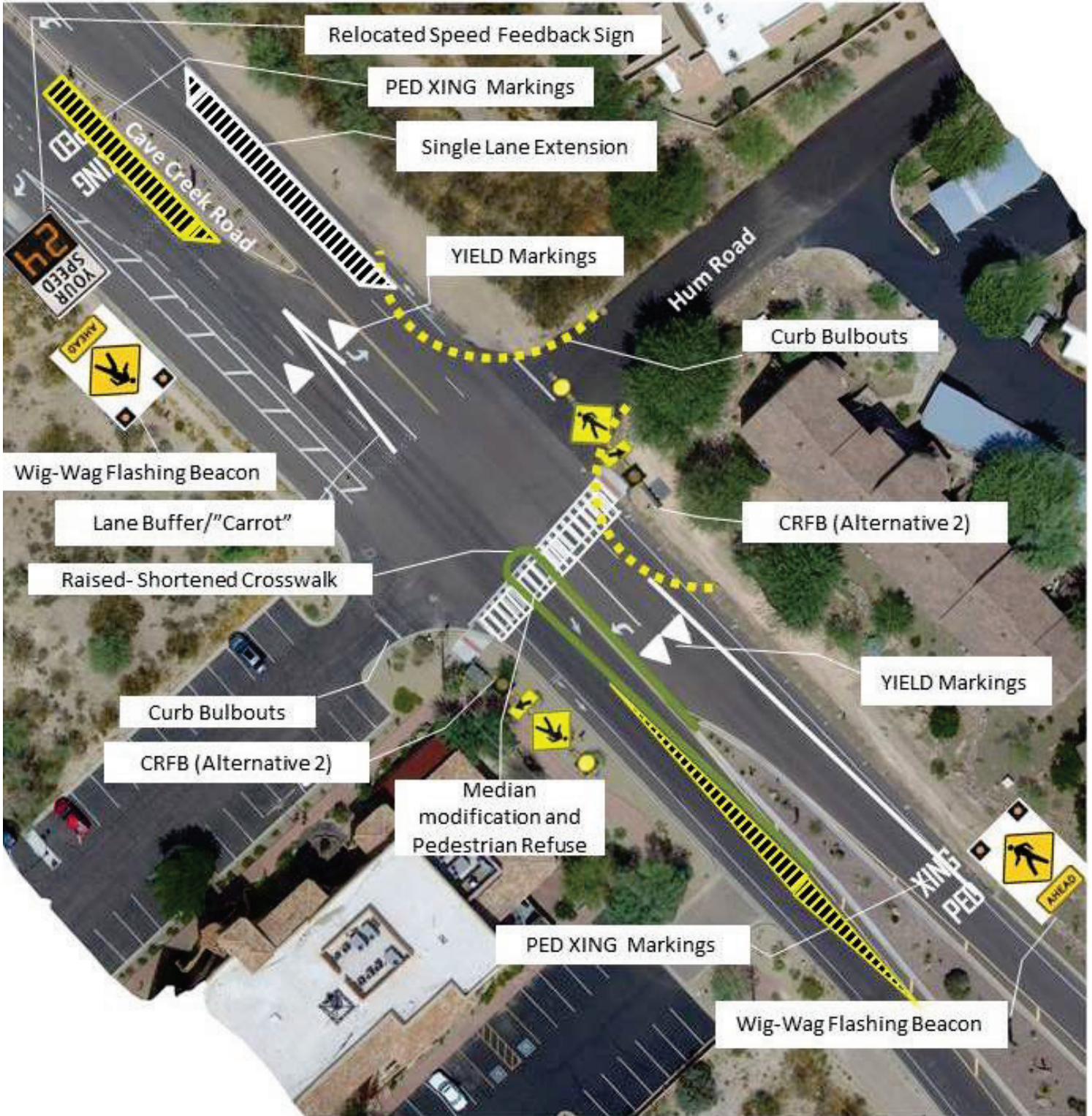


FIGURE 36: HUM ROAD AND CAVE CREEK ROAD

CAREFREE DRIVE AND CAVE CREEK ROAD

- **Alternative 1:**
 - ✓ Shortening the crossing by providing perpendicular crosswalk
 - ✓ Eliminating sight visibility issues
 - ✓ Installing curb bulbouts to make the corner radii sharper
 - ✓ Constructing a raised crosswalk
 - ✓ Restriping and installing an extension of the existing single lane concept from Elbow Bend Road to the east to 300 feet west of the intersection
 - ✓ Increasing the inscribed circle diameter of the traffic circle and installing yellow markings around the traffic circle
 - ✓ Installing solar powered wig-wag flashing beacon advance warning signs at least 250 feet in advance on both approaches
 - ✓ Installing PED XING pavement markings at least 250 feet in advance on both approaches
 - ✓ Installing YIELD pavement markings approximately 40 to 50 feet in advance of the crosswalk on both approaches
 - ✓ Installing a solar powered dynamic speed feedback sign 500 feet in advance on the westbound direction

- **Alternative 2:**
 - ✓ Alternative 1 + Installation of solar powered CRFB at the crosswalk

The budgetary cost for this intersection is shown in the **Figure 37** below.

Crosswalk Location	Alternative	Elements	Itemized Cost	Total Cost
Carefree Drive and Cave Creek Road	Alternative #1	Install Crosswalk Markings	\$14,790	\$76,000
		Increase Sight Visibility	\$1,500	
		Construct Curb Bulbouts	\$9,000	
		Construct Raised Crosswalk (85 feet)	\$26,210	
		Extend Single Lane Concept	\$2,500	
		Increase Diameter Inscribed Circle	\$3,000	
		Install Solar Powered Wig-Wag Flashing Beacon (2)	\$4,000	
		Install PED XING marking (2)	\$1,500	
		Install YIELD marking (2 approaches)	\$1,500	
		Install solar dynamic speed feedback sign	\$12,000	
	Alternative #2	Alternative #1 + Installation of CRFB	\$106,000	\$106,000

Figure 37: Budgetary Cost for Carefree Drive and Cave Creek Road

See **Figure 38** on the next page for a conceptual layout of these recommended improvements.

Adding solar powered street lights would increase the cost of each alternative by approximately \$10,000.



FIGURE 38: CAREFREE DRIVE AND CAVE CREEK ROAD

APPENDIX

Table: Seasonal Adjustment Factor Developed by ADOT Highway Performance Measure System

<u>Seasonal Factors</u>								
Group	U2							
From Year:	2016		To Year:	2016				
	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Month
Jan	1.451	1.005	0.956	0.942	0.939	0.987	1.140	-1.000
Feb	1.327	0.955	0.918	0.908	0.886	0.853	1.030	-1.000
Mar	1.253	0.915	0.898	0.915	0.864	0.844	1.010	-1.000
Apr	1.421	0.932	0.909	0.896	0.887	0.853	1.046	-1.000
May	1.361	1.005	0.919	0.906	0.886	0.876	1.103	-1.000
Jun	1.497	0.965	0.983	0.965	0.917	0.966	1.236	-1.000
Jul	2.033	1.248	1.037	1.226	1.081	0.968	1.302	-1.000
Aug	1.422	0.952	0.930	0.932	0.911	0.876	1.141	-1.000
Sep	1.383	1.028	0.926	0.911	0.904	0.866	1.111	-1.000
Oct	1.365	0.939	0.911	0.899	0.883	0.860	1.069	-1.000
Nov	1.370	0.937	0.911	0.898	0.959	0.919	1.073	-1.000
Dec	1.358	0.990	0.911	0.908	0.901	0.887	1.104	-1.000
Day	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	

Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Tuesday, October 08, 2019

City: Carefree

Project #: 19-1512-005

Location: Tom Darlington Dr. btwn. Ridgeview Pl. & Carefree Dr.

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	0	2			12:00	92	94		
00:15	2	2			12:15	92	99		
00:30	0	1			12:30	91	99		
00:45	1	3	0	5	12:45	116	391	84	376
01:00	0	0			13:00	71	112		
01:15	2	1			13:15	96	105		
01:30	0	3			13:30	92	85		
01:45	2	4	0	4	13:45	92	351	90	392
02:00	0	3			14:00	69	86		
02:15	1	2			14:15	82	85		
02:30	1	1			14:30	87	100		
02:45	1	3	0	6	14:45	69	307	83	354
03:00	0	1			15:00	71	79		
03:15	0	1			15:15	74	86		
03:30	0	0			15:30	82	70		
03:45	0	0	0	2	15:45	75	302	77	312
04:00	1	1			16:00	80	71		
04:15	1	3			16:15	72	79		
04:30	3	1			16:30	94	65		
04:45	4	9	3	8	16:45	82	328	68	283
05:00	9	9			17:00	72	79		
05:15	12	6			17:15	61	59		
05:30	13	11			17:30	59	50		
05:45	34	68	9	35	17:45	61	253	52	240
06:00	18	27			18:00	69	43		
06:15	30	24			18:15	45	40		
06:30	35	27			18:30	52	35		
06:45	46	129	41	119	18:45	58	224	44	162
07:00	33	50			19:00	37	26		
07:15	43	47			19:15	24	30		
07:30	40	44			19:30	27	29		
07:45	45	161	43	184	19:45	10	98	25	110
08:00	52	64			20:00	20	26		
08:15	53	58			20:15	16	16		
08:30	58	59			20:30	19	25		
08:45	99	262	68	249	20:45	16	71	12	79
09:00	77	71			21:00	11	12		
09:15	63	68			21:15	12	8		
09:30	82	63			21:30	10	16		
09:45	79	301	80	282	21:45	3	36	12	48
10:00	77	85			22:00	3	9		
10:15	82	98			22:15	5	4		
10:30	89	77			22:30	2	6		
10:45	116	364	104	364	22:45	5	15	4	23
11:00	92	88			23:00	6	1		
11:15	77	99			23:15	1	3		
11:30	90	84			23:30	2	1		
11:45	97	356	91	362	23:45	3	12	2	7
Total Vol.	1660	1620				2388	2386		
GPS Coordinates:	33.824141, -111.924705								

	Daily Totals				Combined			
	NB	SB	EB	WB				
	4048	4006			8054			
	AM				PM			
Split %	50.6%	49.4%	40.7%		50.0%	50.0%	59.3%	
Peak Hour	10:15	11:45	11:45		12:00	12:30	12:30	
Volume	379	383	755		391	400	774	
P.H.F.	0.82	0.97	0.99		0.84	0.89	0.96	

8457

Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Tuesday, October 08, 2019

City: Carefree

Project #: 19-1512-006

Location: Cave Creek Rd. btwn. Hum Rd. & Carefree Dr.

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	1	1			12:00	87	53		
00:15	1	0			12:15	72	78		
00:30	2	1			12:30	62	55		
00:45	2	6	2	4	12:45	68	289	65	251
01:00	0	0			13:00	64	58		
01:15	0	0			13:15	67	55		
01:30	1	0			13:30	58	74		
01:45	0	1	1	1	13:45	77	266	60	247
02:00	0	1			14:00	58	60		
02:15	1	0			14:15	70	59		
02:30	1	3			14:30	82	53		
02:45	0	2	0	4	14:45	82	292	61	233
03:00	1	0			15:00	66	56		
03:15	0	0			15:15	64	67		
03:30	0	1			15:30	52	49		
03:45	1	2	1	2	15:45	58	240	57	229
04:00	1	1			16:00	57	61		
04:15	2	0			16:15	57	53		
04:30	1	1			16:30	41	44		
04:45	2	6	4	6	16:45	58	213	40	198
05:00	5	6			17:00	54	39		
05:15	7	9			17:15	49	38		
05:30	5	14			17:30	31	29		
05:45	8	25	20	49	17:45	47	181	30	136
06:00	18	18			18:00	35	35		
06:15	19	32			18:15	35	27		
06:30	20	34			18:30	42	33		
06:45	14	71	48	132	18:45	29	141	26	121
07:00	20	46			19:00	23	25		
07:15	25	48			19:15	22	31		
07:30	29	52			19:30	20	27		
07:45	45	119	54	200	19:45	12	77	17	100
08:00	33	67			20:00	8	25		
08:15	41	61			20:15	7	21		
08:30	47	55			20:30	12	23		
08:45	73	194	66	249	20:45	9	36	16	85
09:00	70	51			21:00	3	9		
09:15	54	38			21:15	12	13		
09:30	46	60			21:30	7	15		
09:45	83	253	59	208	21:45	9	31	9	46
10:00	61	52			22:00	3	9		
10:15	67	57			22:15	4	5		
10:30	65	71			22:30	3	2		
10:45	75	268	76	256	22:45	4	14	3	19
11:00	86	56			23:00	3	2		
11:15	72	61			23:15	3	1		
11:30	73	51			23:30	4	3		
11:45	72	303	55	223	23:45	2	12	0	6
Total Vol.	1250	1334		2584		1792	1671		3463

GPS Coordinates: 33.825867, -111.921894

Daily Totals				
NB	SB	EB	WB	Combined
3042	3005			6047

6,349

	AM			PM		
Split %	48.4%	51.6%	42.7%	51.7%	48.3%	57.3%
Peak Hour	10:45	10:30	10:30	14:15	12:15	12:00
Volume	306	264	562	300	256	540
P.H.F.	0.89	0.87	0.93	0.91	0.82	0.90

Record		1 of 1		Goto Record		go	
Location ID	34754	MPO ID					
Type	LINK	HPMS ID					
On NHS	No	On HPMS	No				
LRS ID		LRS Loc Pt.					
SF Group	U3-7-South FC 5	Route Type					
AF Group		Route					
GF Group	U3-7-South	Active	Yes				
Class Dist Grp		Category					
Seas Class Grp	U3-7-South						
WIM Group							
QC Group	Default						
Funct'l Class	(5) Major Collector	Milepost					
Located On	Tom Darlington Dr						
Loc On Alias							
From Road	Carefree Hwy						
To Road	Cave Creek Rd						
More Detail							

STATION DATA

Directions: **2-WAY** NB SB ?

AADT ?								
	Year	AADT	DHV-30	K %	D %	PA	BC	Src
	2018	12,993 ³						Grown from 2017
	2017	12,410 ³						Grown from 2016
	2016	11,990 ³						Grown from 2015
	2015	11,732 ³						Grown from 2014
	2014	11,604	1,213	10	51			

|<< < > >>| 1-5 of 8

Travel Demand Model										
Model Year	Model AADT	AM PHV	AM PPV	MD PHV	MD PPV	PM PHV	PM PPV	NT PHV	NT PPV	

VOLUME COUNT			
	Date	Int	Total
👁	Thu 3/21/2019	15	15,652
👁	Wed 3/20/2019	15	15,965
👁	Mon 10/27/2014	15	11,980
👁	Sun 10/26/2014	15	8,556
👁	Sat 10/25/2014	15	12,053
👁	Fri 10/24/2014	15	13,841
👁	Thu 10/23/2014	15	12,646
👁	Wed 10/22/2014	15	12,186
👁	Tue 10/21/2014	15	11,612
👁	Wed 9/28/2011	15	11,389

|<< < > >>| 1-10 of 13
mm / dd / yyyy To Date

VOLUME TREND ?	
Year	Annual Growth
2018	5%
2017	4%
2016	2%
2015	1%
2014	82%
2013	1%
2012	0%



Pedestrian & Bicycle Study

N-S STREET: Tom Darlington Dr.
E-W STREET: Wampum Way

Date: 10/08/19
Day: TUESDAY

City: Carefree
Project #: 19-1512-001

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	0	2	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	1
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	0	0	2	1

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	0	0	0	0

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	0	0	0	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	0	0	0	0



Pedestrian & Bicycle Study

N-S STREET: Tom Darlington Dr.
E-W STREET: Ridgeview Pl.

Date: 10/08/19
Day: TUESDAY

City: Carefree
Project #: 19-1512-002

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	1
7:45 AM	0	1	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	2	0	0
TOTAL	0	3	0	1

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	0	0	0	0

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	1	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	0	1	0	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	0	0	0	0



Pedestrian & Bicycle Study

N-S STREET: Cave Creek Rd.
E-W STREET: Carefree Dr.

Date: 10/08/19
Day: TUESDAY

City: Carefree
Project #: 19-1512-003

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	1	0	0
7:15 AM	0	2	0	0
7:30 AM	0	1	0	1
7:45 AM	0	0	0	0
8:00 AM	0	1	1	0
8:15 AM	0	0	0	0
8:30 AM	0	2	0	0
8:45 AM	0	2	0	0
TOTAL	0	9	1	1

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	1	0
TOTAL	0	0	1	0

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	1	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	1	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	4	1	0
5:45 PM	0	4	0	0
TOTAL	0	10	1	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	1	0
TOTAL	0	0	1	0



Pedestrian & Bicycle Study

N-S STREET: Cave Creek Rd.
E-W STREET: Cave Creek Rd.

Date: 10/08/19
Day: TUESDAY

City: Carefree
Project #: 19-1512-004

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	2	0	0	0
7:15 AM	0	2	0	0
7:30 AM	0	1	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	2	3	0	0

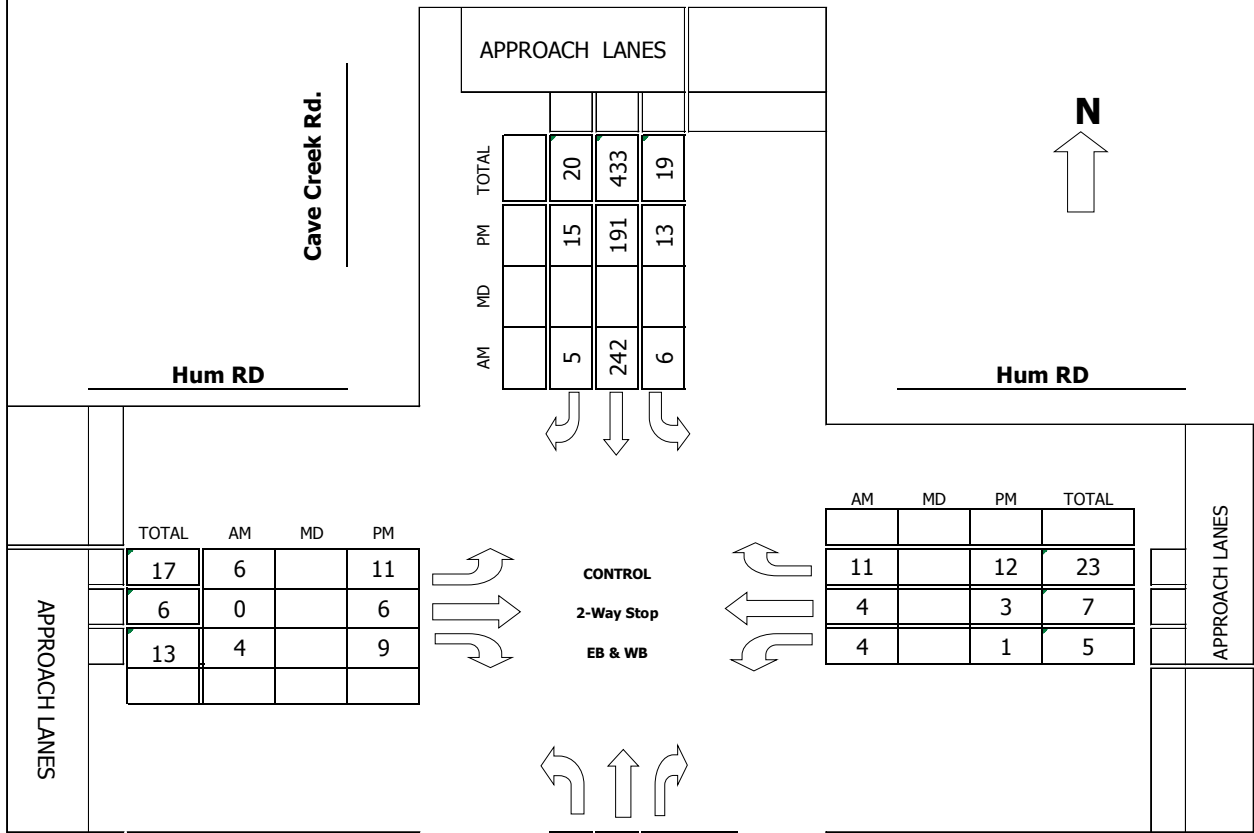
	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	0	0	0	0

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	1	0	0
5:00 PM	0	1	0	0
5:15 PM	0	0	0	0
5:30 PM	0	1	0	0
5:45 PM	0	0	0	0
TOTAL	0	3	0	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	0	0	0	0

Project #: 19-1512-004

TMC SUMMARY OF Cave Creek Rd. & Hum RD



	TOTAL	AM	MD	PM
APPROACH LANES	17	6		11
	6	0		6
	13	4		9

	AM	MD	PM	TOTAL
APPROACH LANES	11		12	23
	4		3	7
	4		1	5

APPROACH LANES				
	AM	MD	PM	TOTAL
	5		15	20
	242		191	433
	6		13	19

APPROACH LANES				
	TOTAL	AM	MD	PM
	15	6		9
	393	191		202
	2	1		1

LOCATION #: 19-1512-004

TURNING MOVEMENT COUNT

Cave Creek Rd. & Hum RD
(Intersection Name)

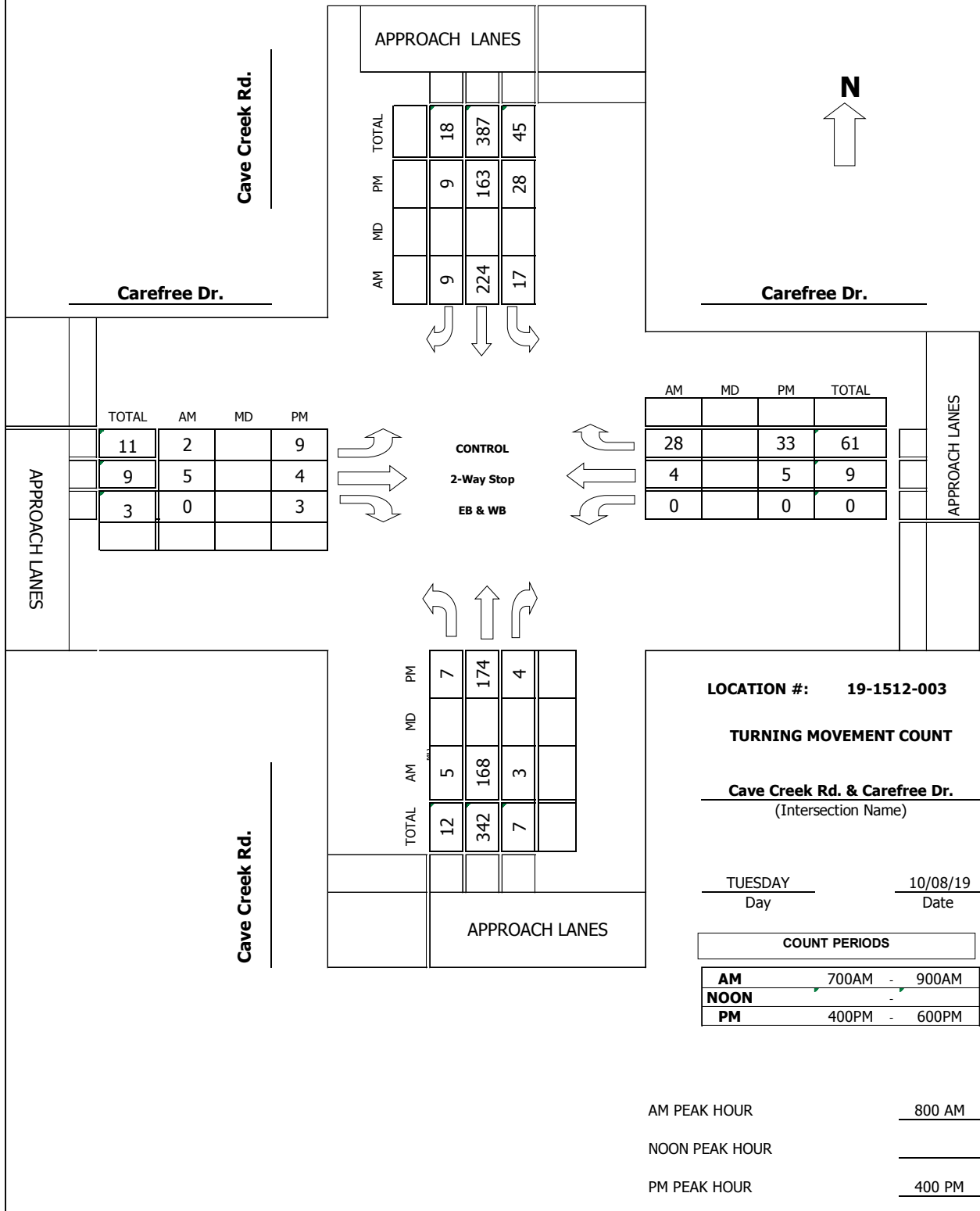
TUESDAY 10/08/19
Day Date

COUNT PERIODS		
AM	700AM	- 900AM
NOON		
PM	400PM	- 600PM

AM PEAK HOUR 800 AM
NOON PEAK HOUR _____
PM PEAK HOUR 400 PM

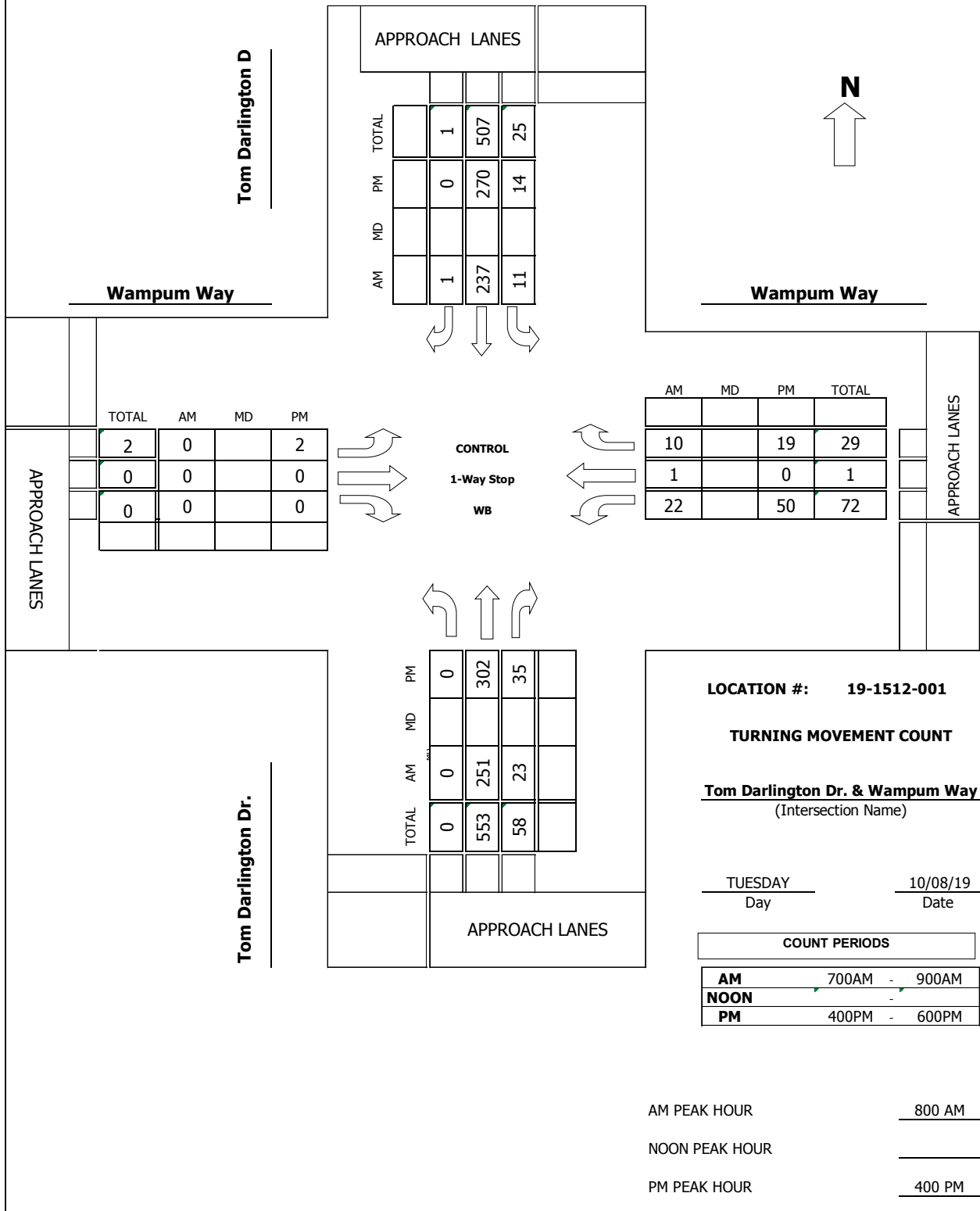
Project #: 19-1512-003

TMC SUMMARY OF Cave Creek Rd. & Carefree Dr.



Project #: 19-1512-001

TMC SUMMARY OF Tom Darlington Dr. & Wampum Way



LOCATION #: 19-1512-001

TURNING MOVEMENT COUNT

Tom Darlington Dr. & Wampum Way
(Intersection Name)

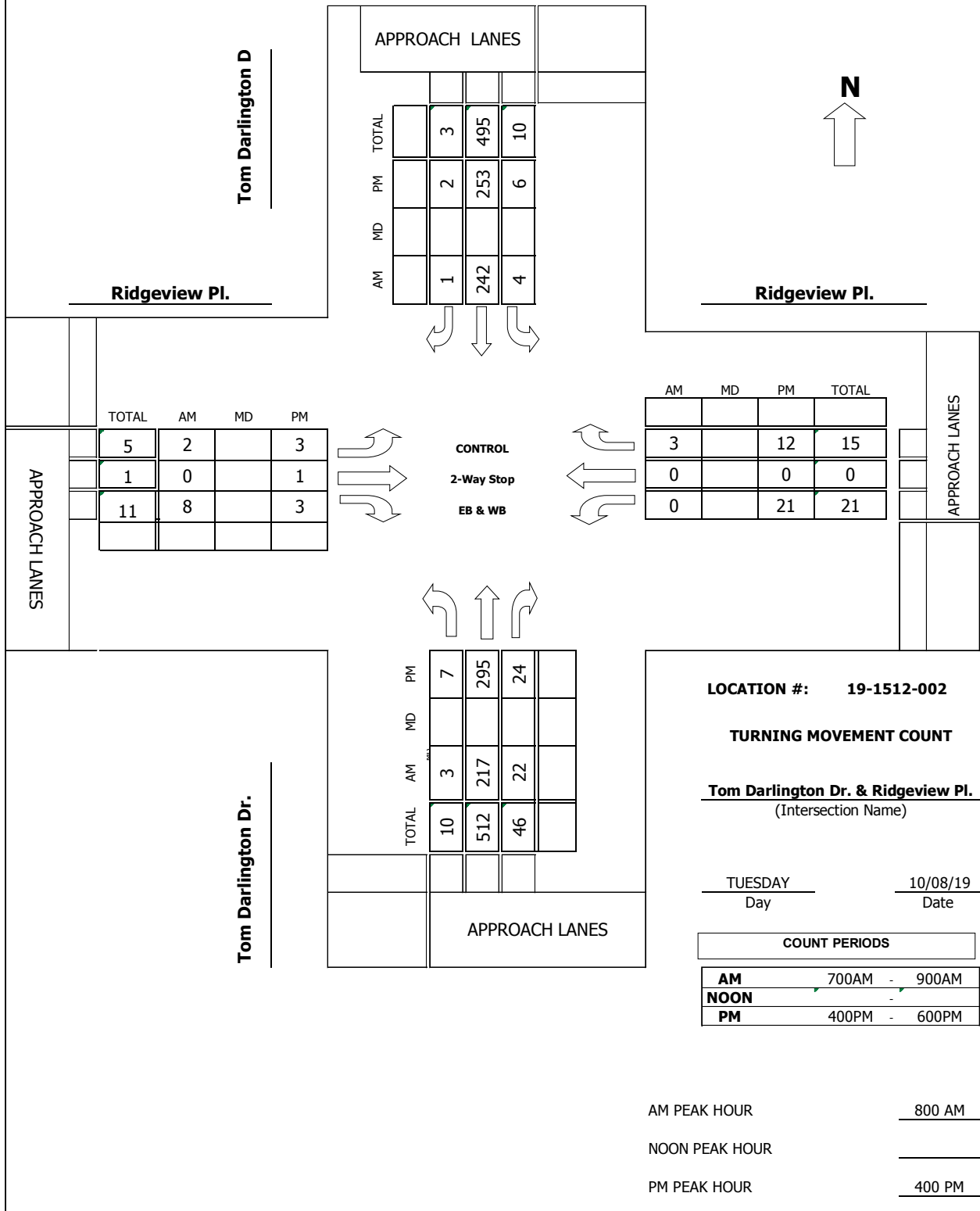
TUESDAY 10/08/19
Day Date

COUNT PERIODS	
AM	700AM - 900AM
NOON	-
PM	400PM - 600PM

AM PEAK HOUR 800 AM
NOON PEAK HOUR _____
PM PEAK HOUR 400 PM

Project #: 19-1512-002

TMC SUMMARY OF Tom Darlington Dr. & Ridgeview Pl.



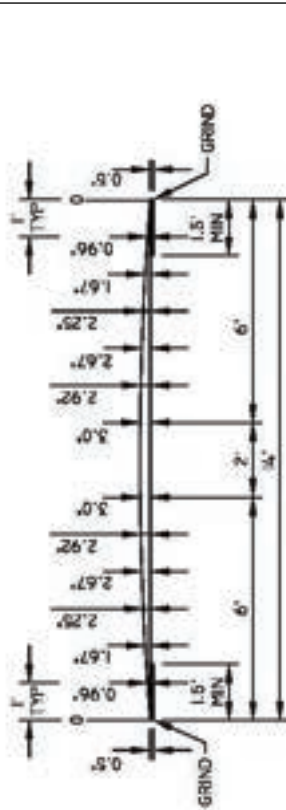
CITY OF MESA SPEED HUMP STANDARD DETAIL
INCREASE TOP WIDTH TO 12' AND HEIGHT TO 4"
FOR RAISED CROSSWALK

NOTES

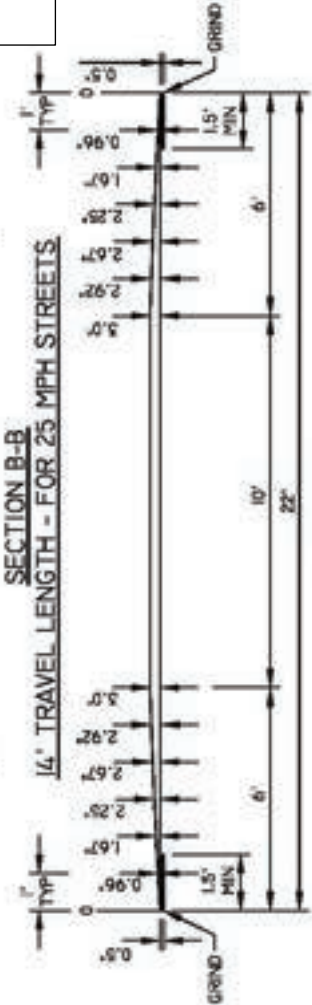
1. SPEED HUMPS SHALL NOT BE PLACED OVER MANHOLES, WATER VALVES, SURVEY MONUMENTS, ETC.
2. SPEED HUMPS SHALL NOT BE INSTALLED IN A LOCATION SUCH THAT DRAINAGE IS COMPROMISED.
3. SPEED HUMPS SHALL BE CONSTRUCTED WITH TYPE R-1/2" ASPHALT MIX PER THE LATEST EAST VALLEY ASPHALT (EVA) CRITERIA AND BE APPROVED BY EVA COMMITTEE. A TACK COAT SHALL BE APPLIED PRIOR TO APPLICATION OF PAVEMENT MATERIAL.
4. SPEED HUMPS TO BE 3" IN HEIGHT TO PROVIDE MAXIMUM EFFECTIVENESS, WHILE NOT BEING OVERLY RESTRICTIVE TO EMERGENCY POLICE AND FIRE VEHICLES.
5. STRIPING TO BE INSTALLED PER COM DETAIL M-15.01. BECAUSE THE WIDTHS OF STREETS VARY, SPEED HUMPS MAY REQUIRE ADDITIONAL MARKINGS. CONSULT TRAFFIC STUDIES STAFF AT 480-644-2160 FOR STREET WIDTHS GREATER THAN 40 FEET.
6. CONTACT THE CITY OF MESA SIGN SHOP AT 480-644-3175 TWO WEEKS PRIOR TO INSTALLATION TO COORDINATE PLACEMENT OF ADVANCE WARNING SIGNS.



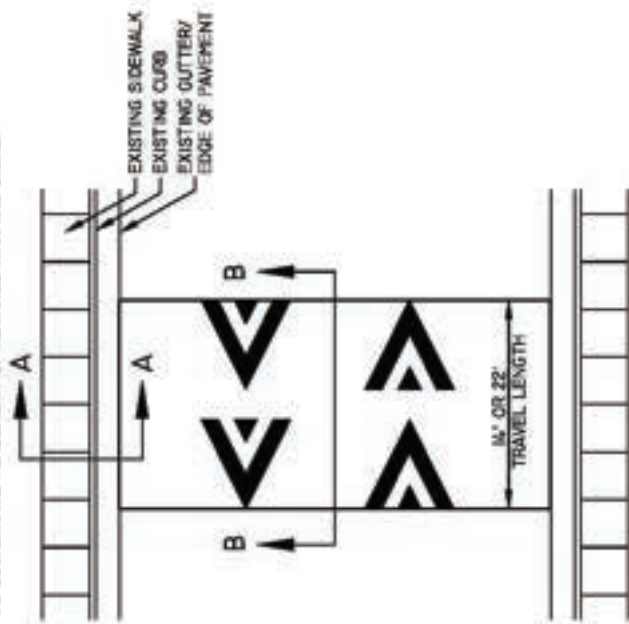
SECTION A-A



SECTION B-B
14' TRAVEL LENGTH - FOR 25 MPH STREETS



SECTION B-B
22' TRAVEL LENGTH - FOR 30 MPH STREETS



PLAN VIEW

NOT TO SCALE

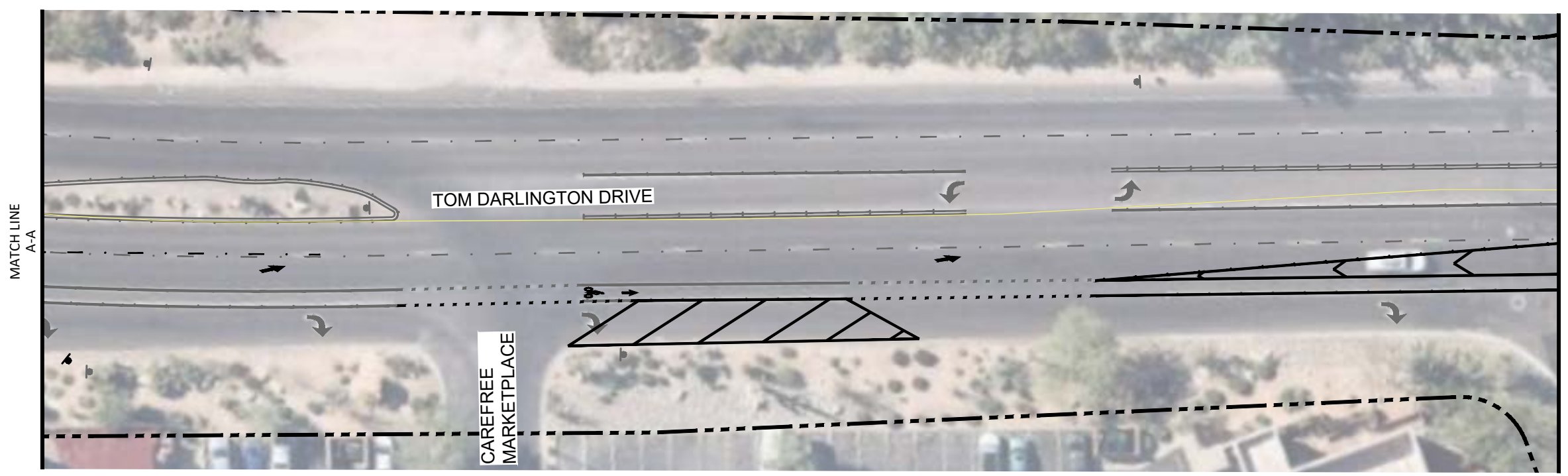
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Appendix B

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 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE
 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE
 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE

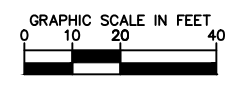
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		1	7
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

CONCEPT NO. 1:
TOM DARLINGTON DRIVE
 TOWN OF CAREFREE, ARIZONA

COMPREHENSIVE SIGN PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND TOM DARLINGTON DRIVE



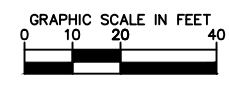
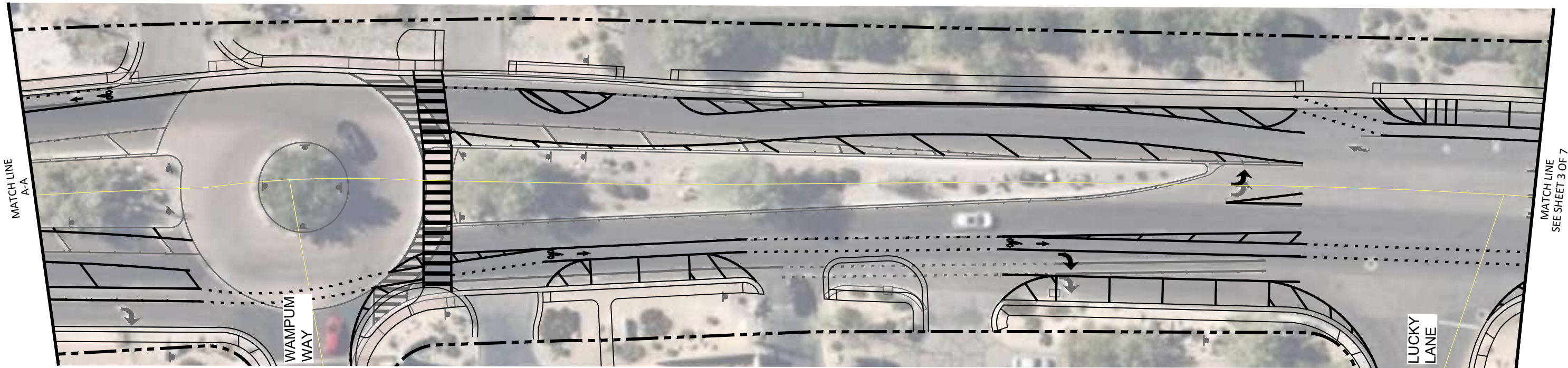
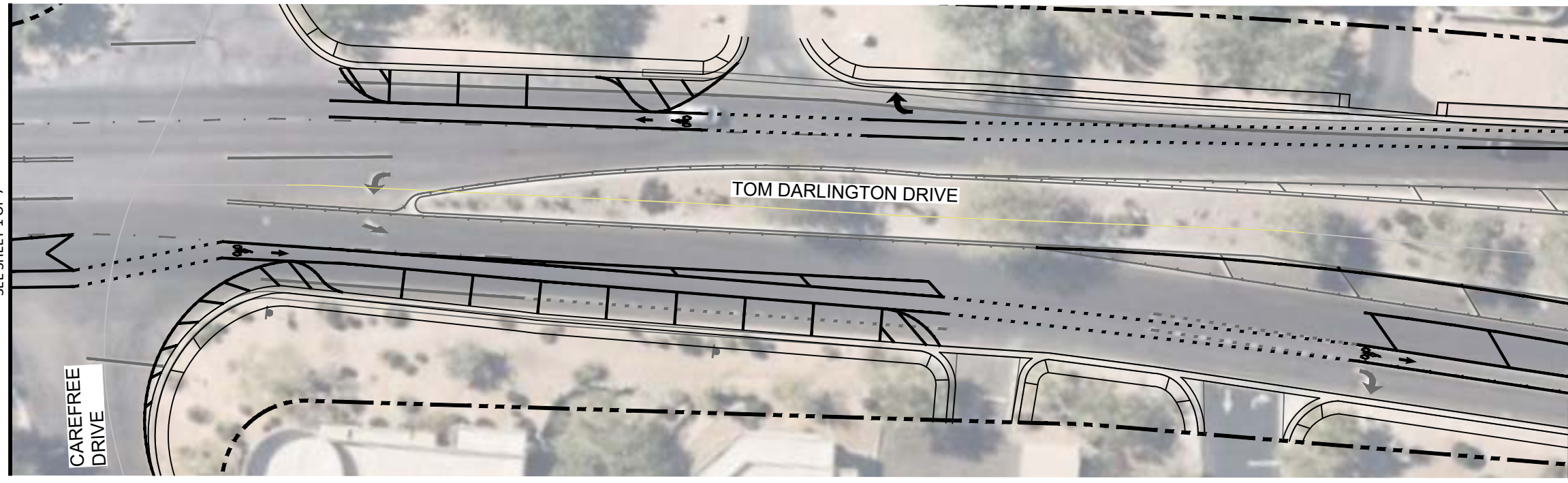
TOM DARLINGTON DRIVE : BLOODY BASIN ROAD TO CAVE CREEK ROAD
CONCEPT 1: LANE REDUCTION

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	1	7

SCALE: 1"=20'

4/7/2022 3:30 PM ERDMANN, SAMANTHA
 \\kimley-horn.com\mnt_phx2\tuc_la\0988351000_Carefree_Signage\CADD\Exhibits\Traffic\On Street Parking Exhibits_2.10.22.dwg
 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	
9	ARIZ.		2	7	
Kimley Horn 333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705 Phone: 520-615-9191 www.kimley-horn.com		DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22



TOM DARLINGTON DRIVE : BLOODY BASIN ROAD TO CAVE CREEK ROAD
CONCEPT 1: LANE REDUCTION

PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

CONCEPT NO. 1:
TOM DARLINGTON DRIVE
TOWN OF CAREFREE, ARIZONA

COMPREHENSIVE SIGN PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE

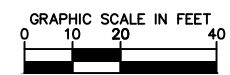
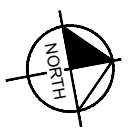
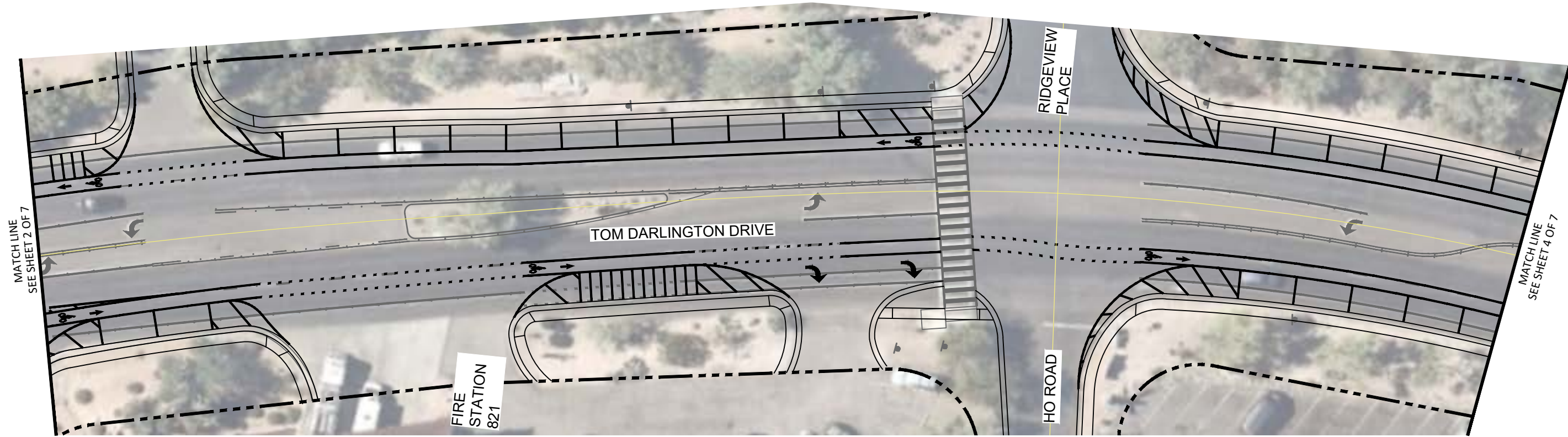
DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	2	7

SCALE: 1"=20'



F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		3	7
Kimley-Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	

NO.	DESCRIPTION	REV BY	CHK BY	DATE
	REVISION BY TOWN OF CAREFREE			
	ERDMANN, SAMANTHA			
	4/7/2022 3:30 PM			
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**TOM DARLINGTON DRIVE : BLOODY BASIN ROAD TO CAVE CREEK ROAD
CONCEPT 1: LANE REDUCTION**



PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

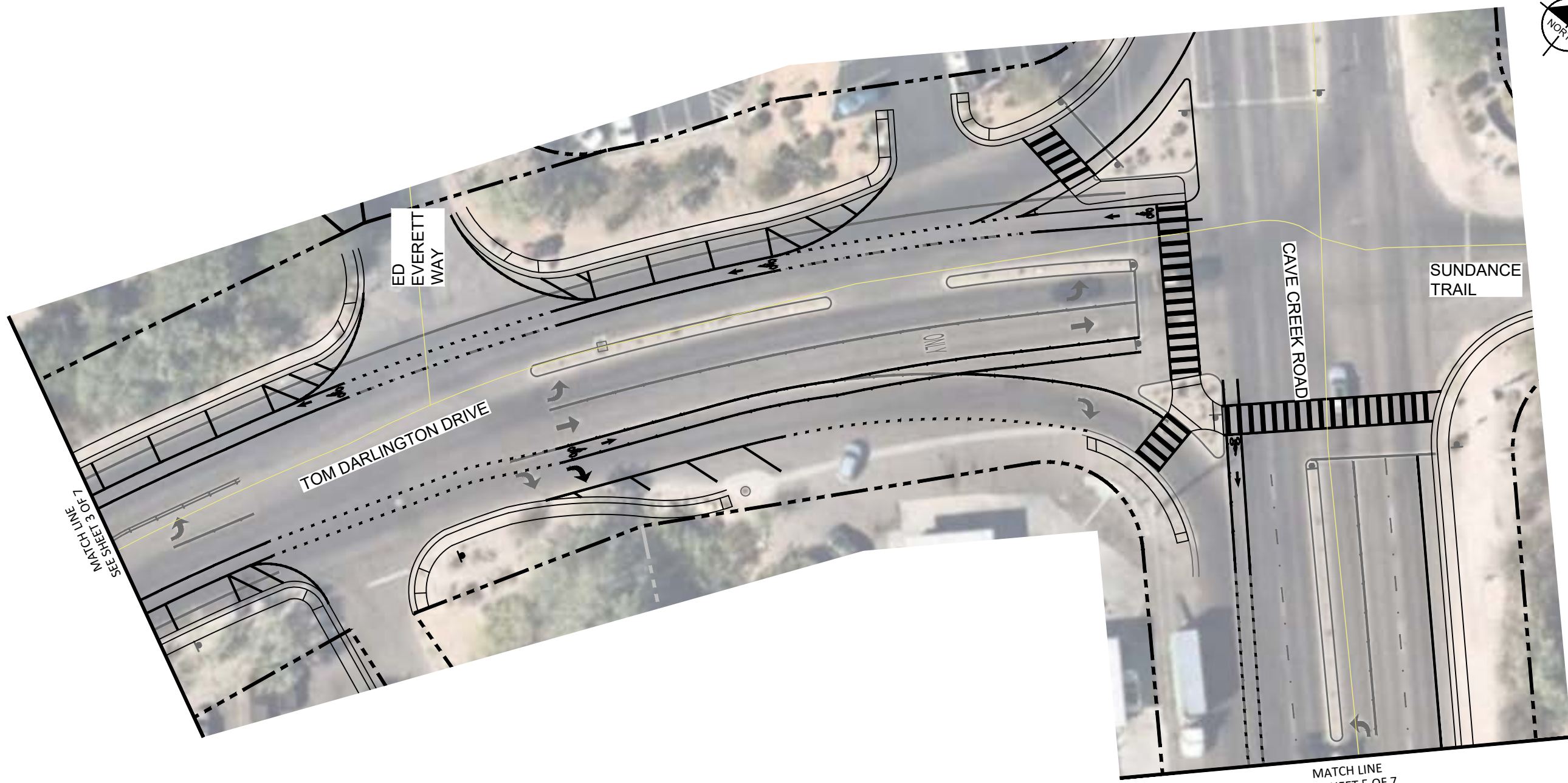
**CONCEPT NO. 1:
TOM DARLINGTON DRIVE
TOWN OF CAREFREE, ARIZONA**

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	3	7

SCALE: 1"=20'

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		4	7
Kimley Horn 333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705 Phone: 520-615-9191 www.kimley-horn.com				
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



NO.	REVISION BY	TOWN OF CAREFREE	DESCRIPTION	REV BY	CHK BY	DATE

MATCH LINE
SEE SHEET 5 OF 7



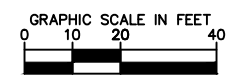
PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

**CONCEPT NO. 1:
INTERSECTION**
TOWN OF CAREFREE, ARIZONA

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	4	7

SCALE: 1"=20'

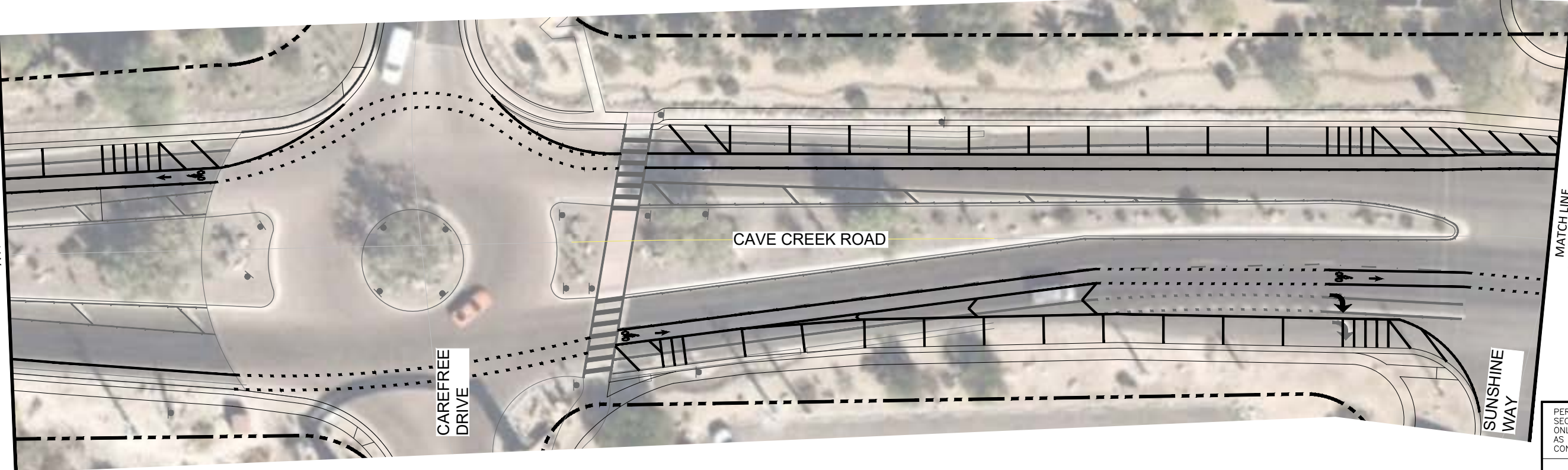
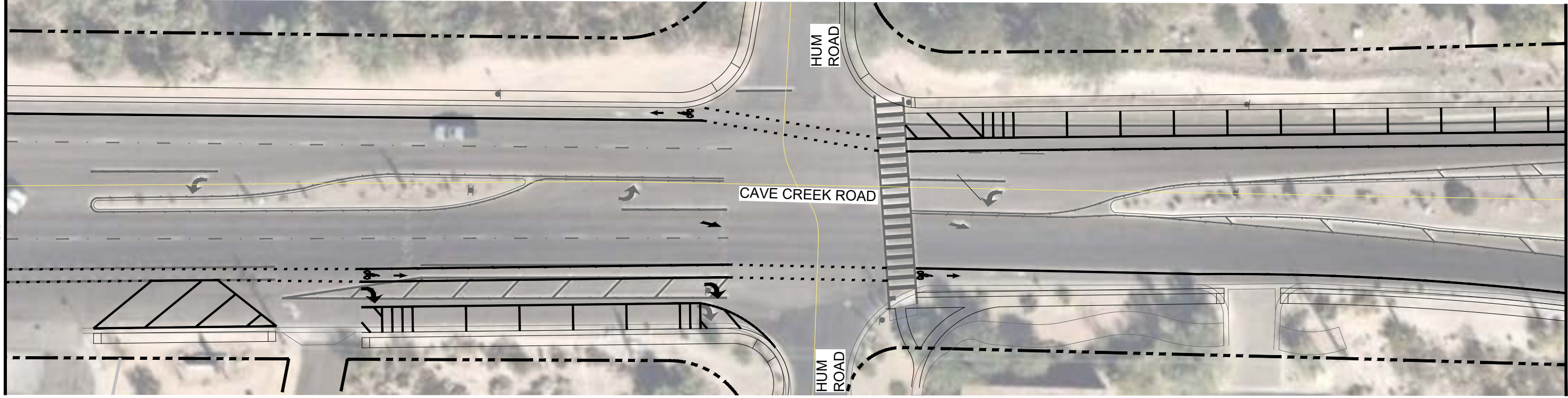


**TOM DARLINGTON DRIVE AND CAVE CREEK ROAD INTERSECTION
CONCEPT 1: LANE REDUCTION**

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NO.	DESCRIPTION	REV BY	CHK BY	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		5	7
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

**CONCEPT NO. 1:
CAVE CREEK ROAD**
TOWN OF CAREFREE, ARIZONA

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

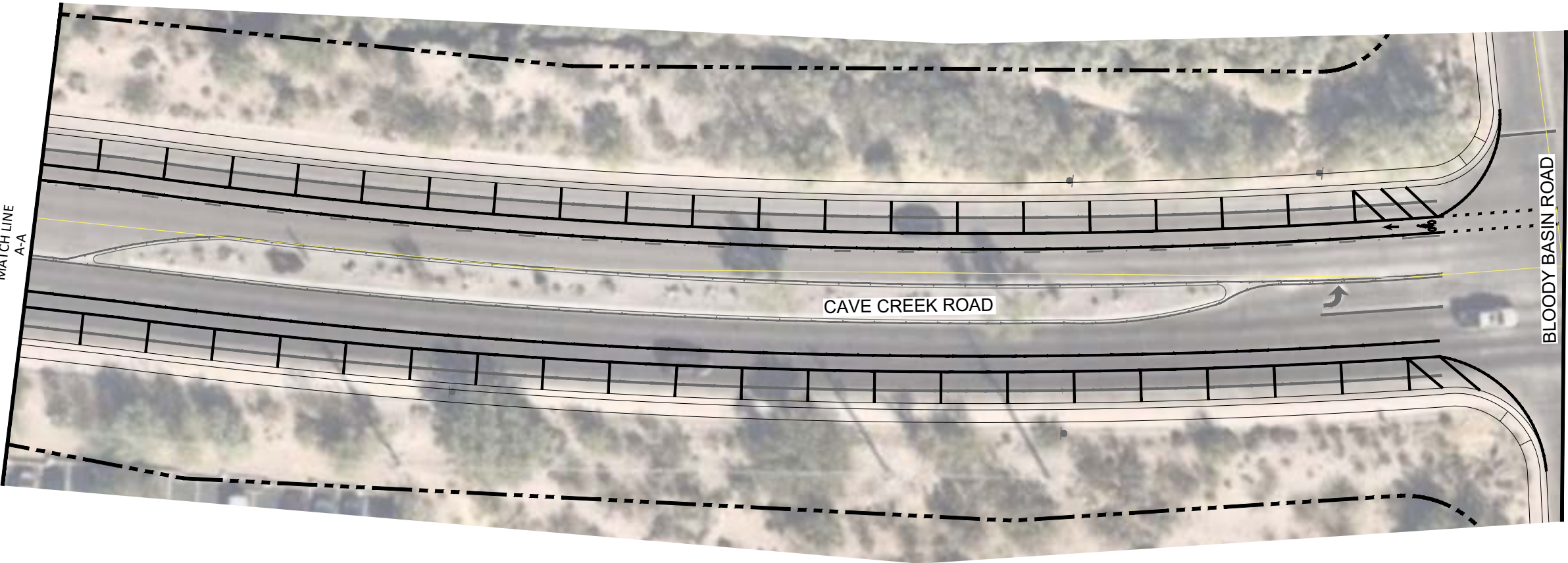
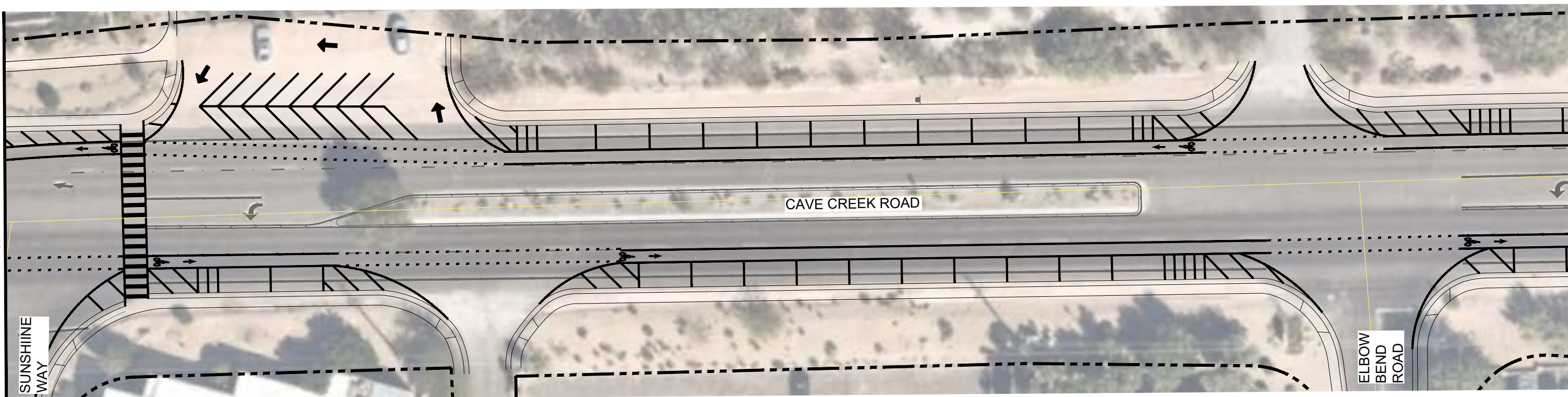
DR: SLE	DES: SEN/LB	CK: RF	SHEET NO.	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	5	7



CAVE CREEK ROAD : TOM DARLINGTON DRIVE TO BLOODY BASIN ROAD
CONCEPT 1: LANE REDUCTION

SCALE: 1"=20'

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		6	7
Kimley-Horn 333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705 Phone: 520-615-9191 www.kimley-horn.com				
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	

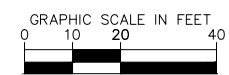


PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

**CONCEPT NO. 1:
CAVE CREEK ROAD**
TOWN OF CAREFREE, ARIZONA

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	6	7



**CAVE CREEK ROAD : TOM DARLINGTON DRIVE TO BLOODY BASIN ROAD
CONCEPT 1: LANE REDUCTION**

NO.	DESCRIPTION	REV BY	CHK BY	DATE

ERDMANN, SAMANTHA
4/77/2022 3:31 PM
4/77/2022 3:31 PM
ERDMANN, SAMANTHA

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		7	7
Kimley-Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



NO.	REVISION BY	TOWN OF CAREFREE	DESCRIPTION	REV BY	CHK BY	DATE
NO.	REVISION BY	TOWN OF CAREFREE	DESCRIPTION	REV BY	CHK BY	DATE



PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

**CONCEPT NO. 1:
CAVE CREEK ROAD**
TOWN OF CAREFREE, ARIZONA

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	7	7



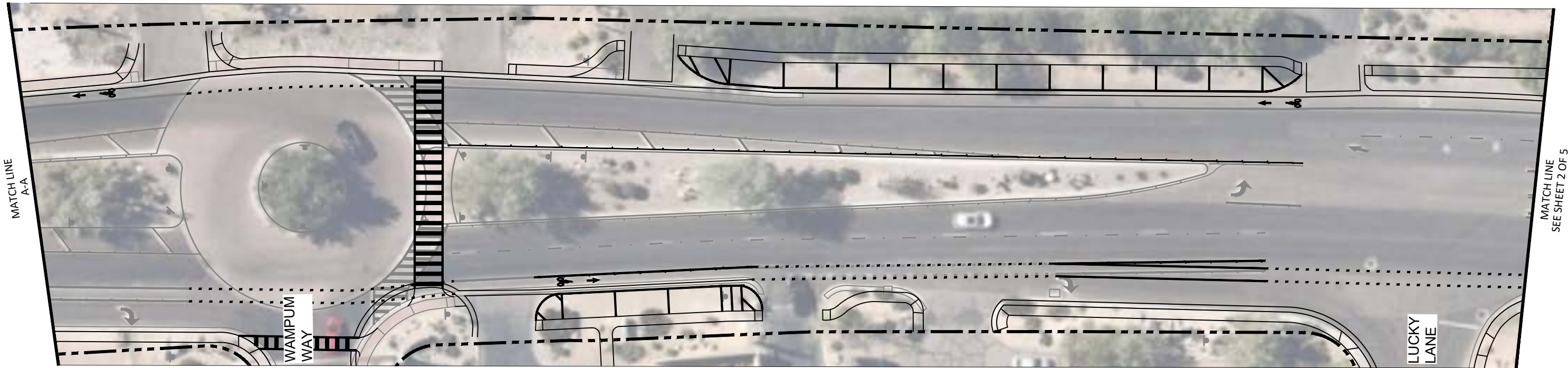
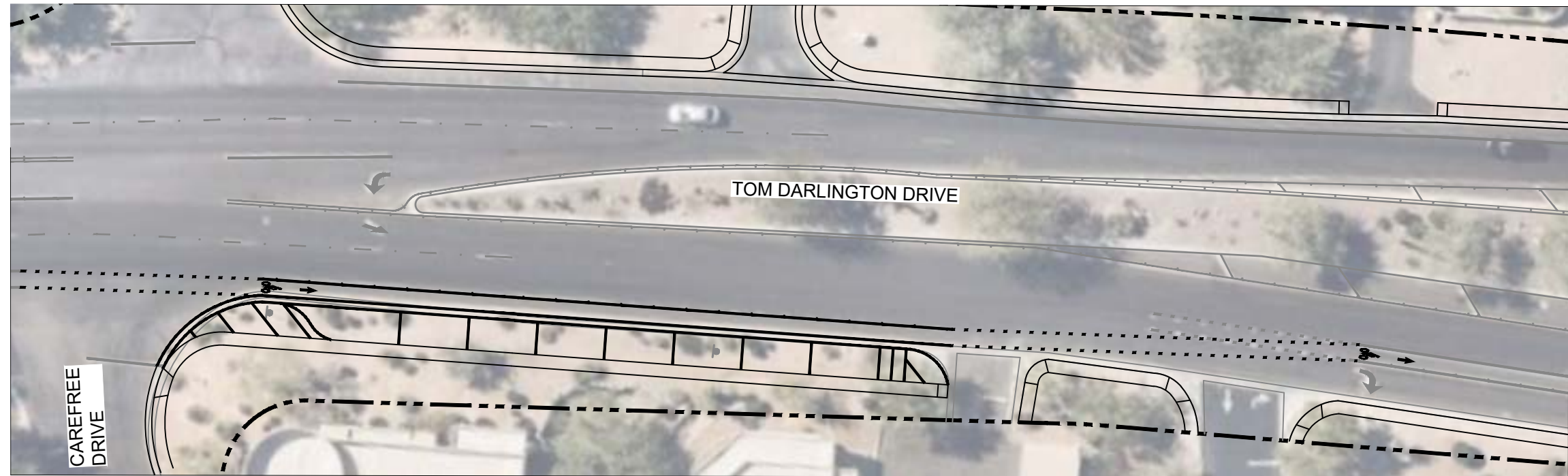
**CAVE CREEK ROAD : TOM DARLINGTON DRIVE TO BLOODY BASIN ROAD
CONCEPT 1: LANE REDUCTION**

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Appendix C

5/18/2022 4:04 PM
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 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		1	5
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	

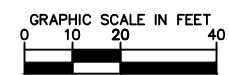


PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

**CONCEPT NO. 2:
 TOM DARLINGTON DRIVE
 TOWN OF CAREFREE, ARIZONA**

**COMPREHENSIVE SIGN
 PLAN FOR TOWN CENTER:
 CAVE CREEK ROAD AND
 TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	1	5

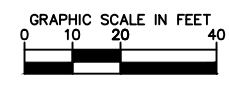
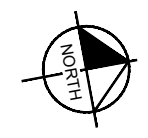
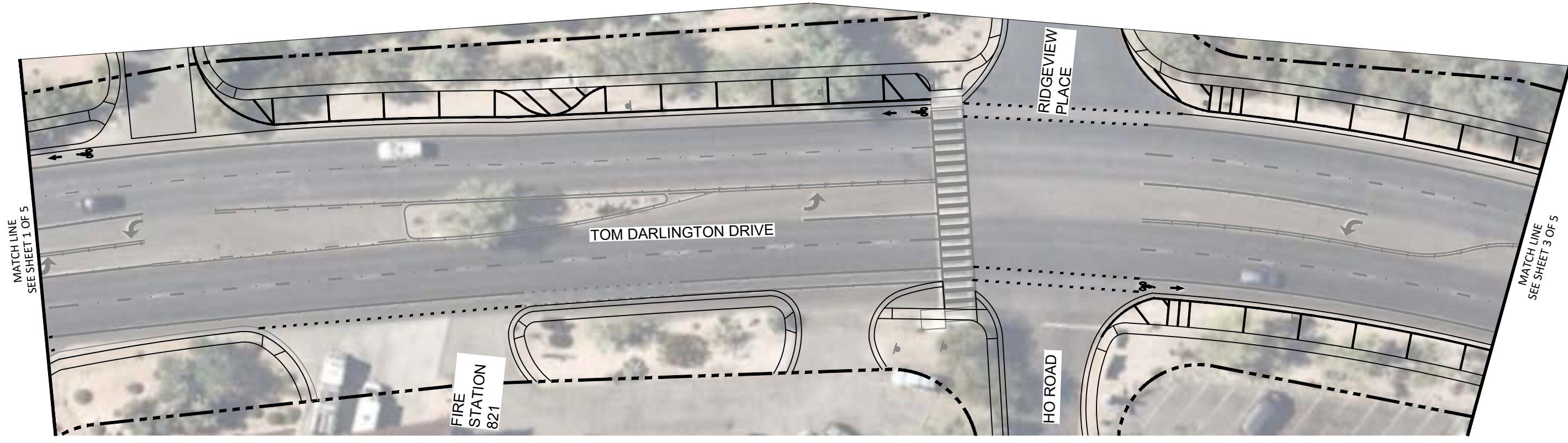


**TOM DARLINGTON DRIVE : BLOODY BASIN ROAD TO CAVE CREEK ROAD
 CONCEPT 2: ADDITIVE PARKING**

SCALE: 1"=20'

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 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		2	5
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



**TOM DARLINGTON DRIVE : BLOODY BASIN ROAD TO CAVE CREEK ROAD
 CONCEPT 2: ADDITIVE PARKING**



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**CONCEPT NO. 2:
 TOM DARLINGTON DRIVE
 TOWN OF CAREFREE, ARIZONA**

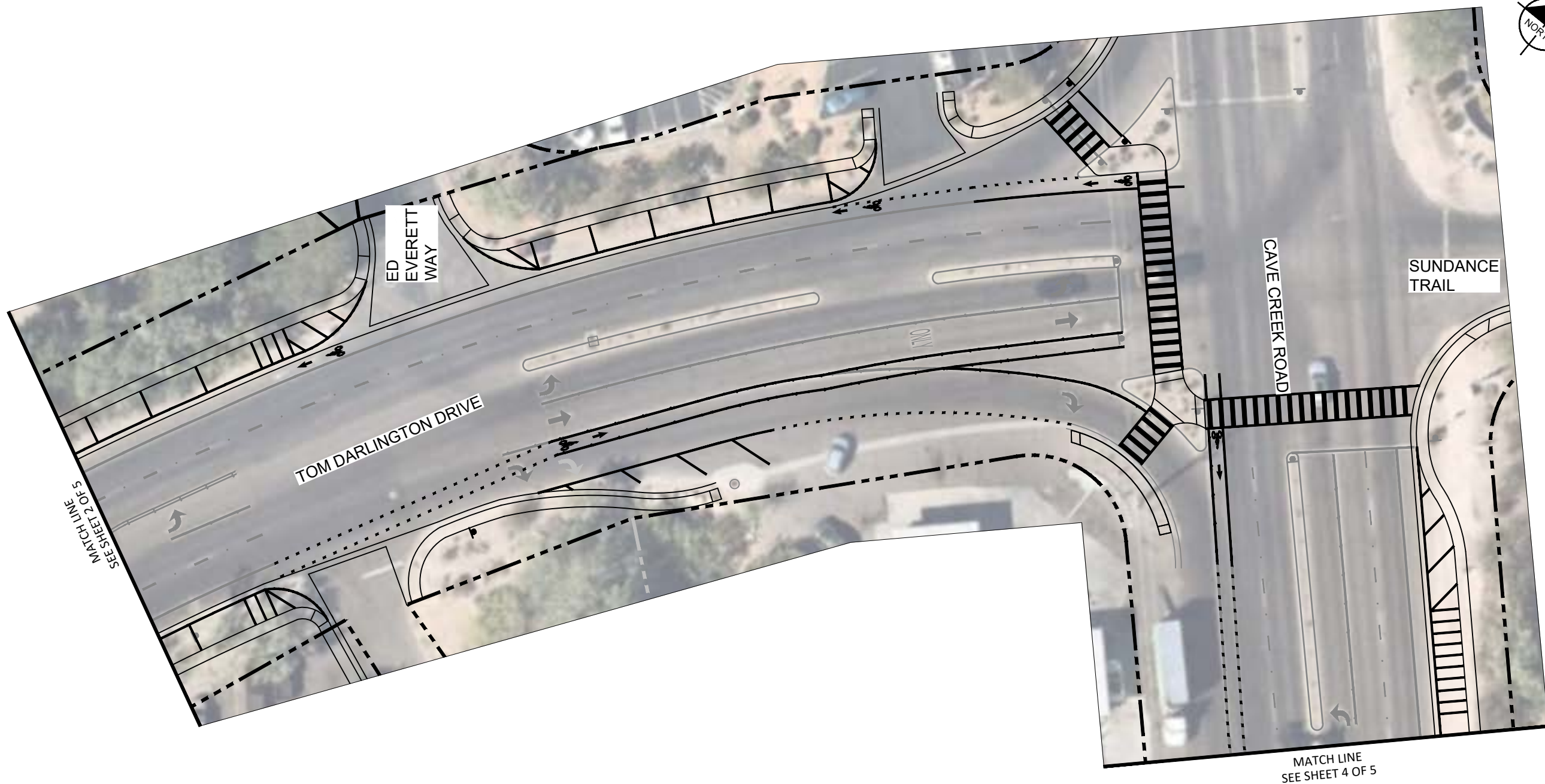
**COMPREHENSIVE SIGN
 PLAN FOR TOWN CENTER:
 CAVE CREEK ROAD AND
 TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	2	5

SCALE: 1"=20'

5/18/2022 4:04 PM
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 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		3	5
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



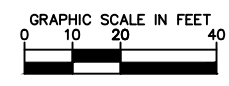
PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

**CONCEPT NO. 2:
 INTERSECTION**
 TOWN OF CAREFREE, ARIZONA

**COMPREHENSIVE SIGN
 PLAN FOR TOWN CENTER:
 CAVE CREEK ROAD AND
 TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	3	5

SCALE: 1"=20'

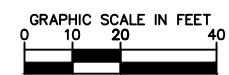
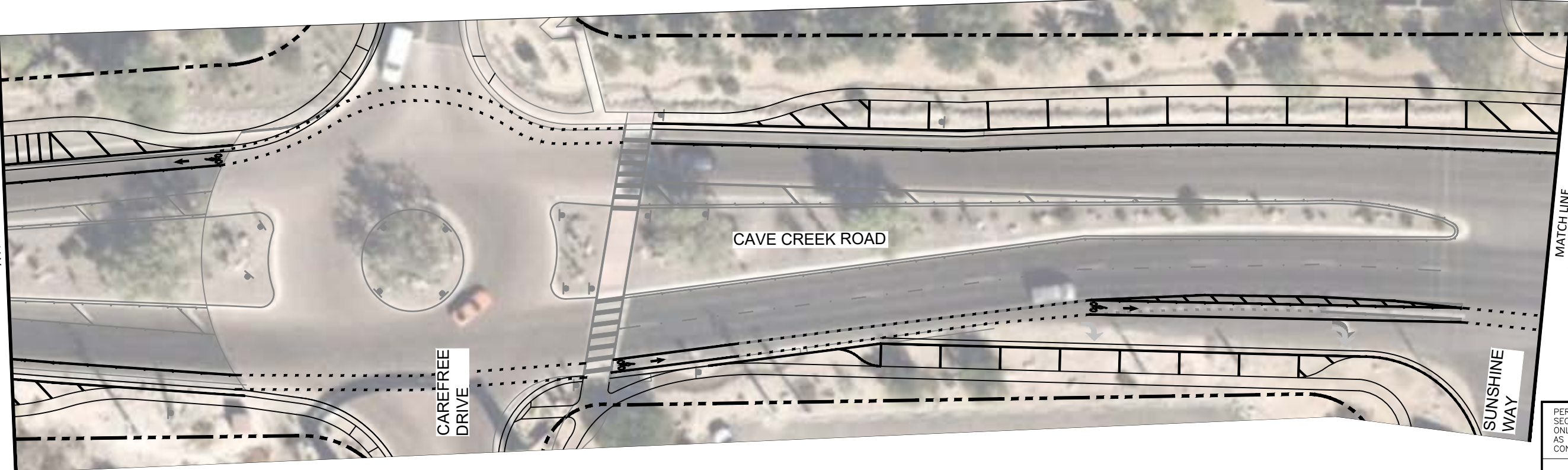
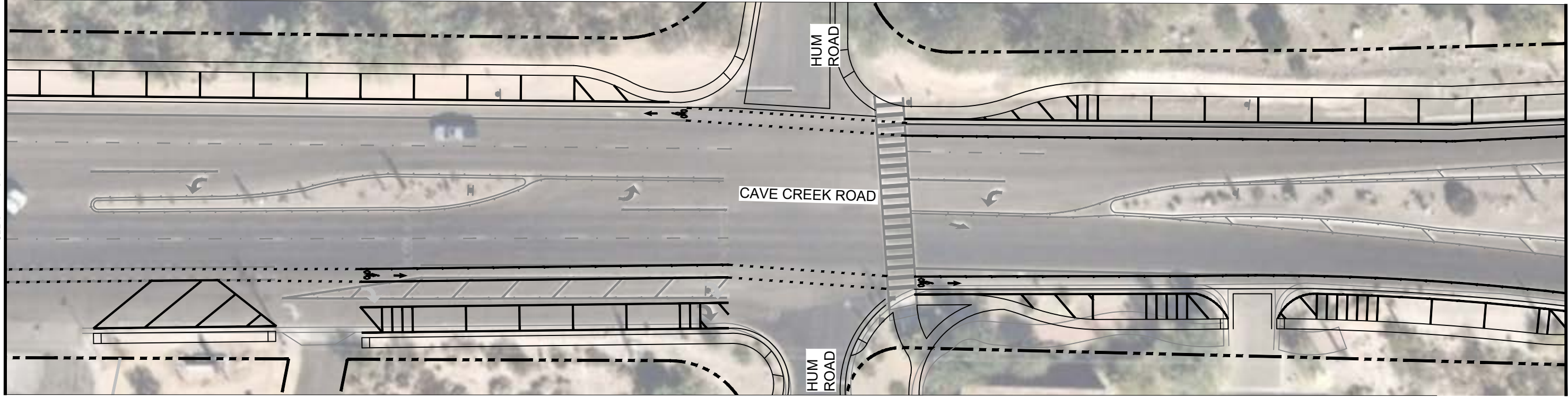


**TOM DARLINGTON DRIVE AND CAVE CREEK ROAD INTERSECTION
 CONCEPT 2: ADDITIVE PARKING**

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NO.	DESCRIPTION	REV BY	CHK BY	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		4	5
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



CAVE CREEK ROAD : TOM DARLINGTON DRIVE TO BLOODY BASIN ROAD
CONCEPT 2: ADDITIVE PARKING

PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

CONCEPT NO. 2:
CAVE CREEK ROAD
TOWN OF CAREFREE, ARIZONA

COMPREHENSIVE SIGN PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND TOM DARLINGTON DRIVE

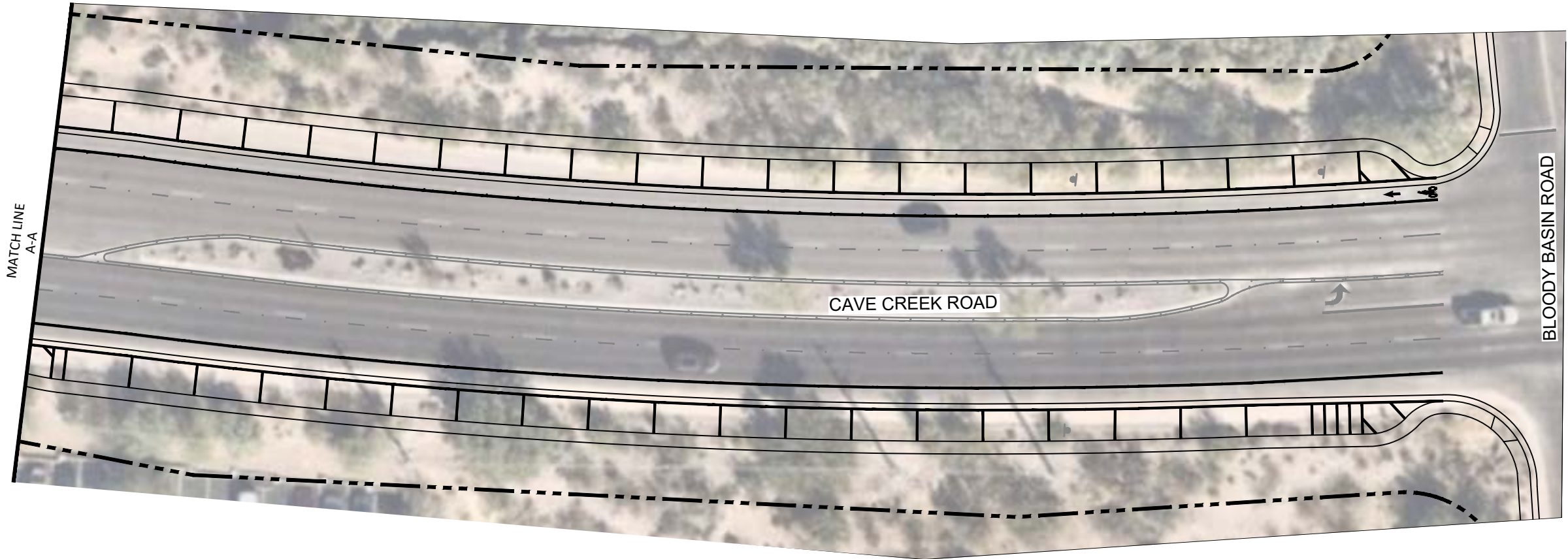
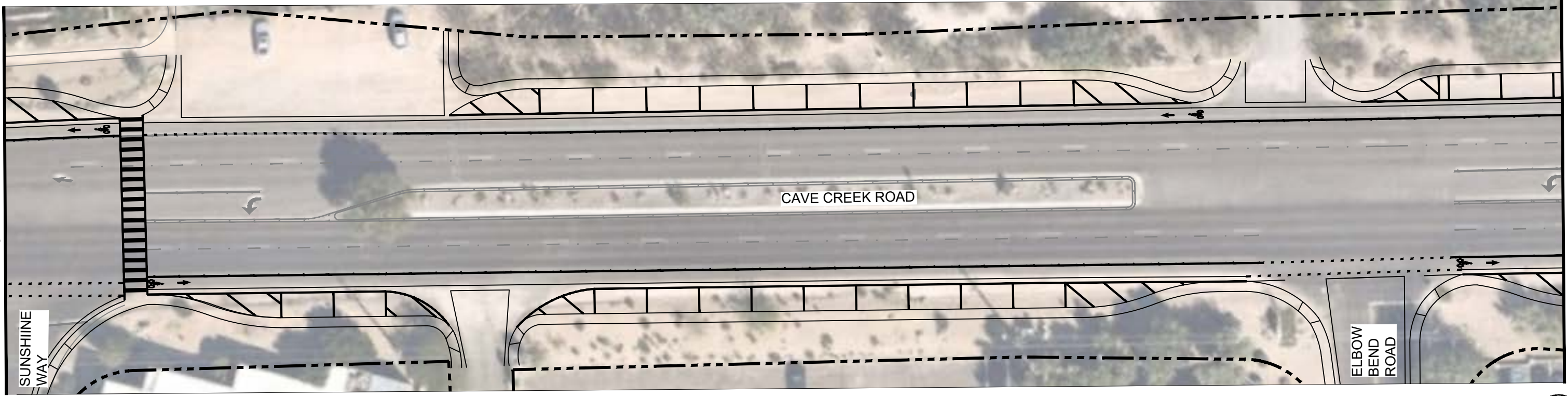
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DATE: 02/22	DATE: 02/22	DATE: 02/22	4	5

SCALE: 1"=20'

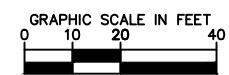


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 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE
 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE
 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		5	5
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



**CAVE CREEK ROAD : TOM DARLINGTON DRIVE TO BLOODY BASIN ROAD
 CONCEPT 2: ADDITIVE PARKING**



PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

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 CAVE CREEK ROAD
 TOWN OF CAREFREE, ARIZONA**

**COMPREHENSIVE SIGN
 PLAN FOR TOWN CENTER:
 CAVE CREEK ROAD AND
 TOM DARLINGTON DRIVE**

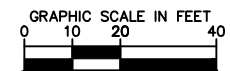
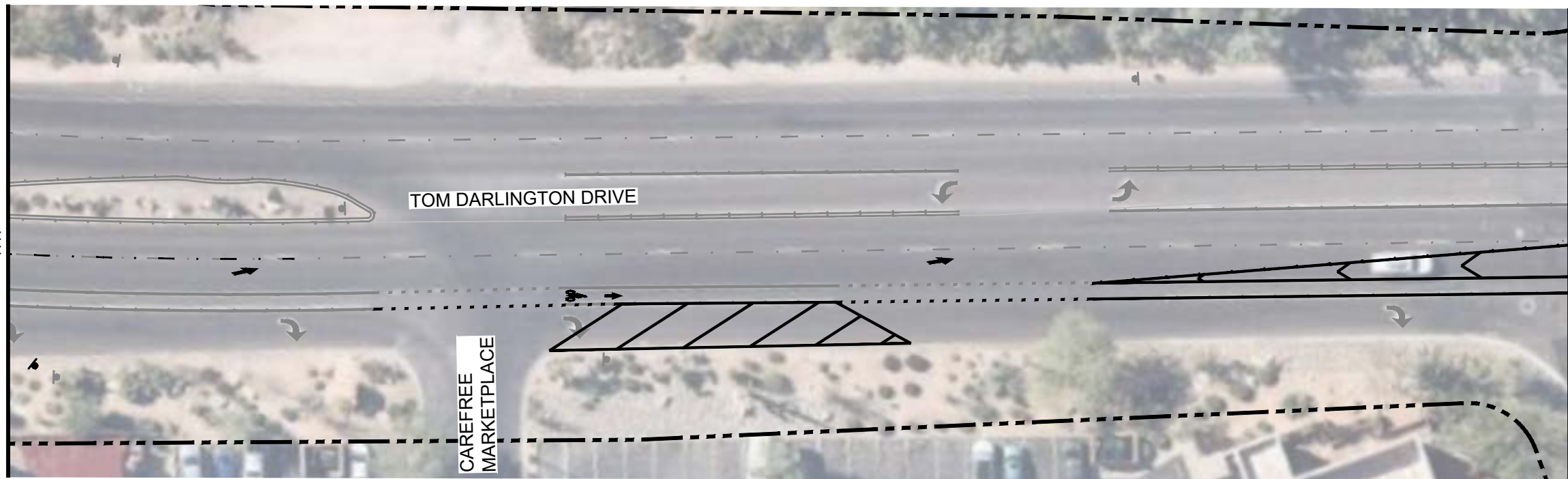
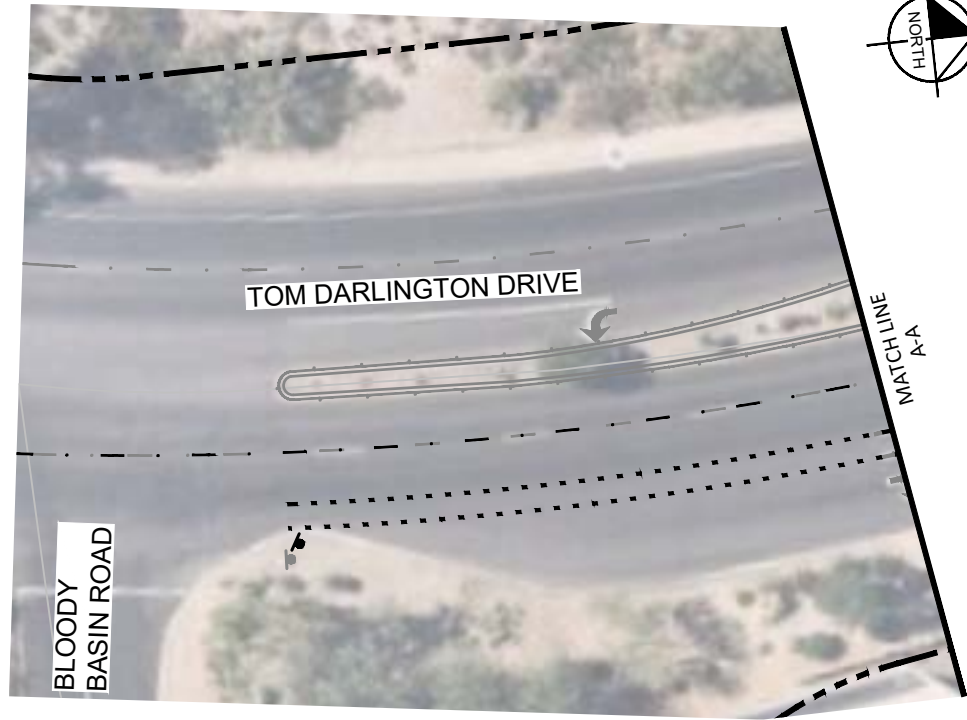
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DATE: 02/22	DATE: 02/22	DATE: 02/22	5	5
SCALE: 1"=20'				



Project Assessment

Appendix D

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 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE



**TOM DARLINGTON DRIVE : BLOODY BASIN ROAD TO CAVE CREEK ROAD
 CONCEPT 3: PARKING AND MULTI-USE PATH OPPOSITE TOWN CORE**

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		1	7
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	

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 TOM DARLINGTON DRIVE
 TOWN OF CAREFREE, ARIZONA**

**COMPREHENSIVE SIGN
 PLAN FOR TOWN CENTER:
 CAVE CREEK ROAD AND
 TOM DARLINGTON DRIVE**

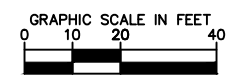
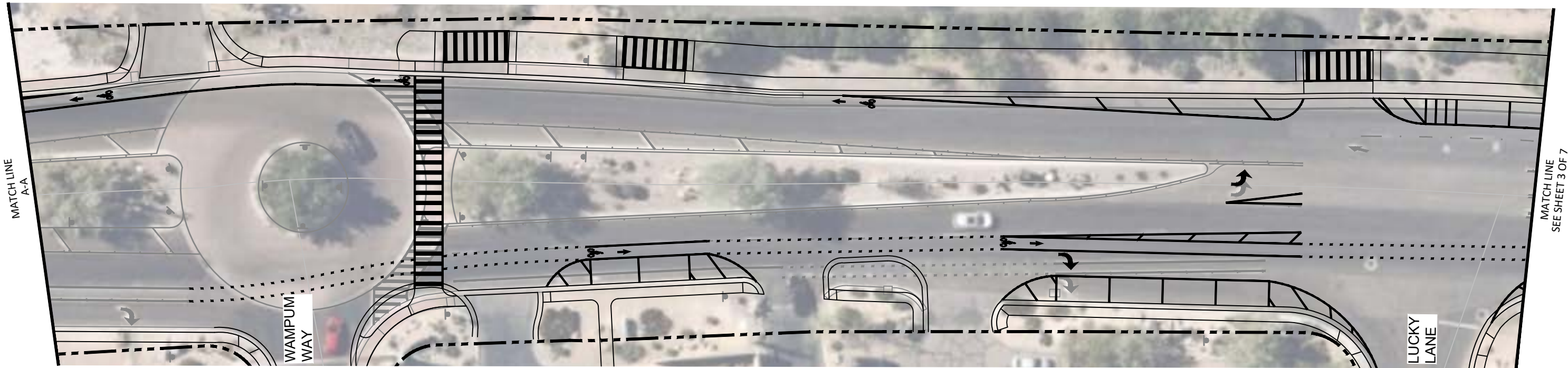
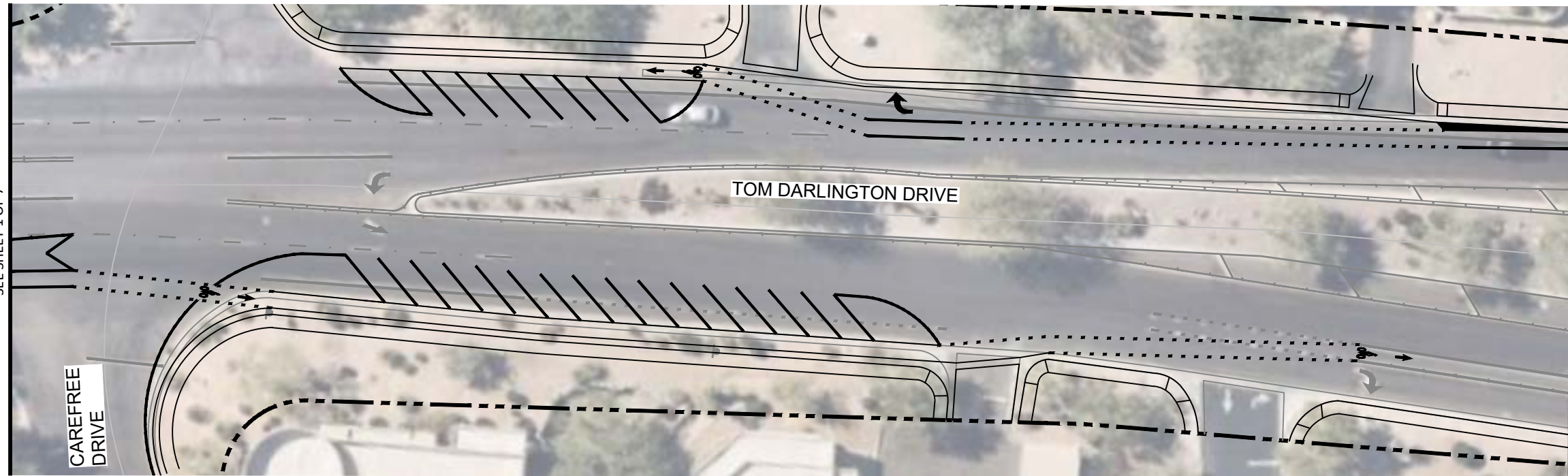
DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	1	7

SCALE: 1"=20'



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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	
9	ARIZ.		2	7	
Kimley Horn 333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705 Phone: 520-615-9191 www.kimley-horn.com		DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22



**TOM DARLINGTON DRIVE : BLOODY BASIN ROAD TO CAVE CREEK ROAD
CONCEPT 3: PARKING AND MULTI-USE PATH OPPOSITE TOWN CORE**

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**CONCEPT NO. 3:
TOM DARLINGTON DRIVE
TOWN OF CAREFREE, ARIZONA**

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

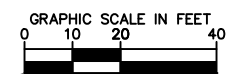
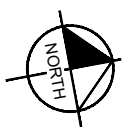
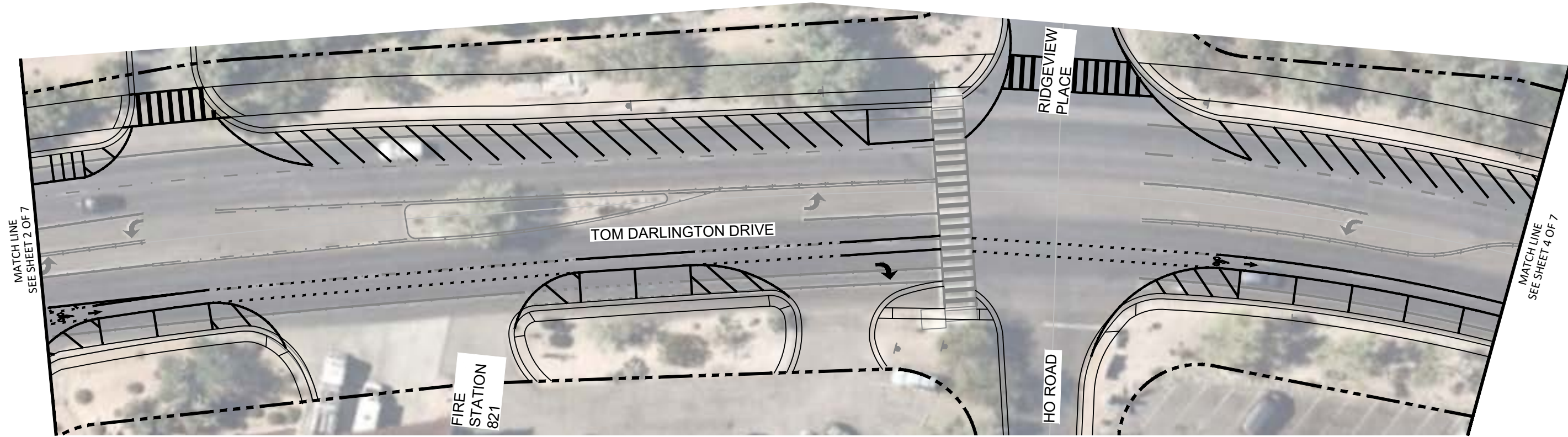
DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	2	7

SCALE: 1"=20'



F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		3	7
Kimley-Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	

NO.	DESCRIPTION	REV BY	CHK BY	DATE



**TOM DARLINGTON DRIVE : BLOODY BASIN ROAD TO CAVE CREEK ROAD
CONCEPT 3: PARKING AND MULTI-USE PATH OPPOSITE TOWN CORE**



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**CONCEPT NO. 3:
TOM DARLINGTON DRIVE
TOWN OF CAREFREE, ARIZONA**

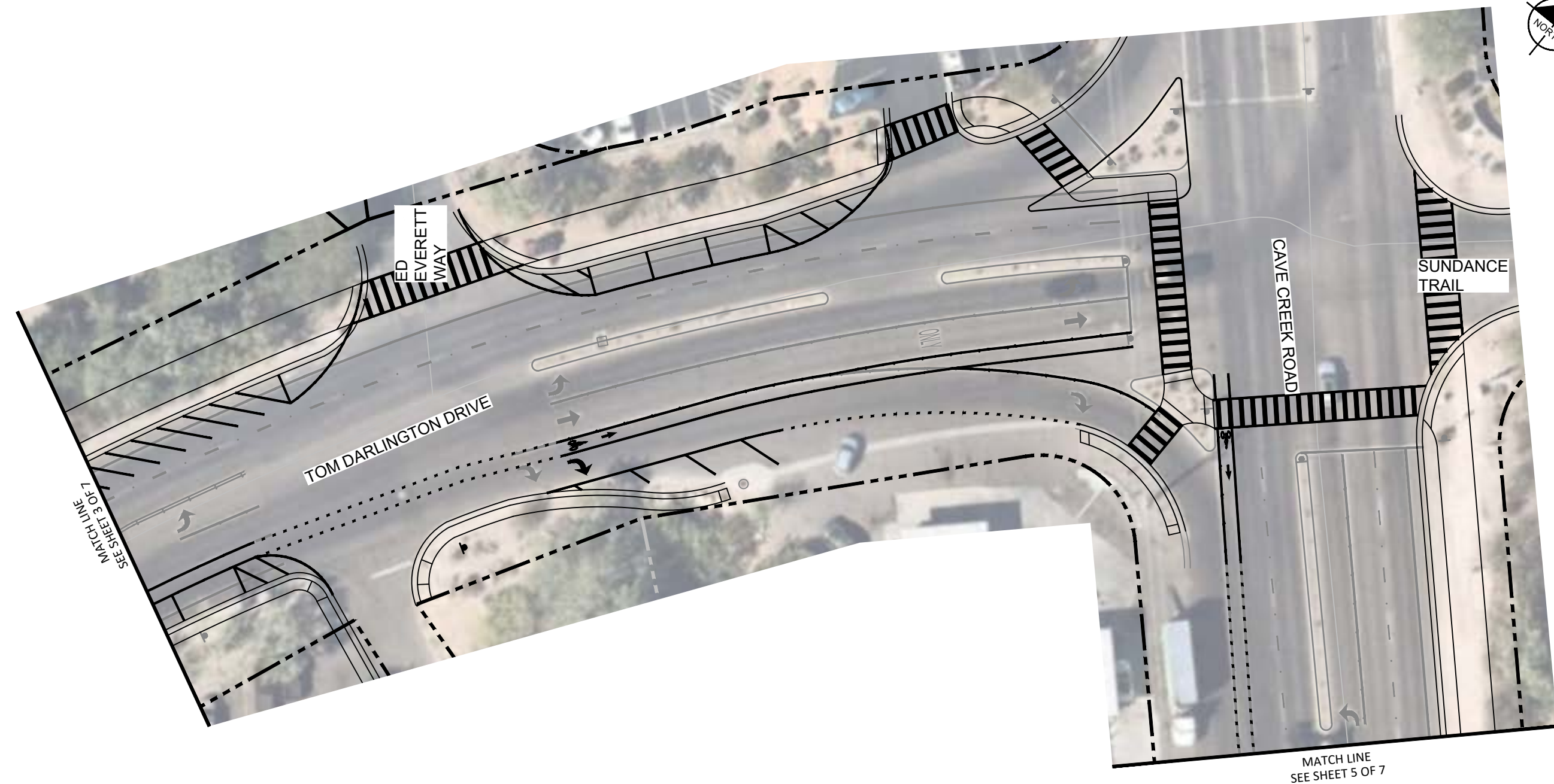
**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	3	7

SCALE: 1"=20'

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 NO. DESCRIPTION REV BY (CKD BY) DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		4	7
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



MATCH LINE
SEE SHEET 5 OF 7

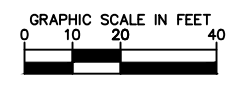


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**CONCEPT NO. 3:
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 TOWN OF CAREFREE, ARIZONA

**COMPREHENSIVE SIGN
 PLAN FOR TOWN CENTER:
 CAVE CREEK ROAD AND
 TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	4	7



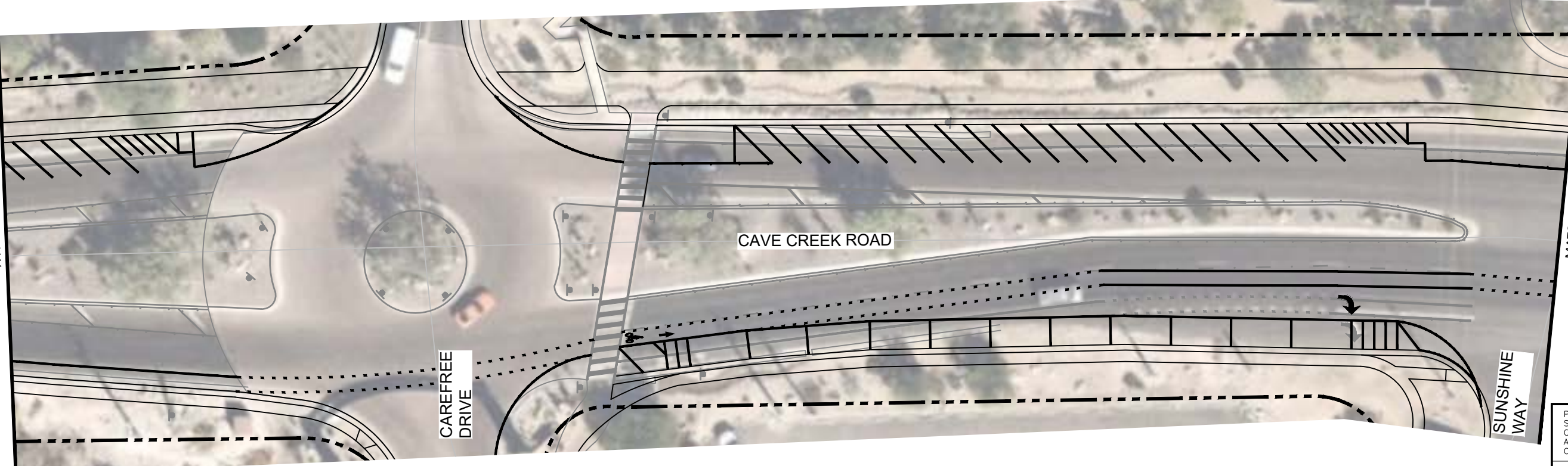
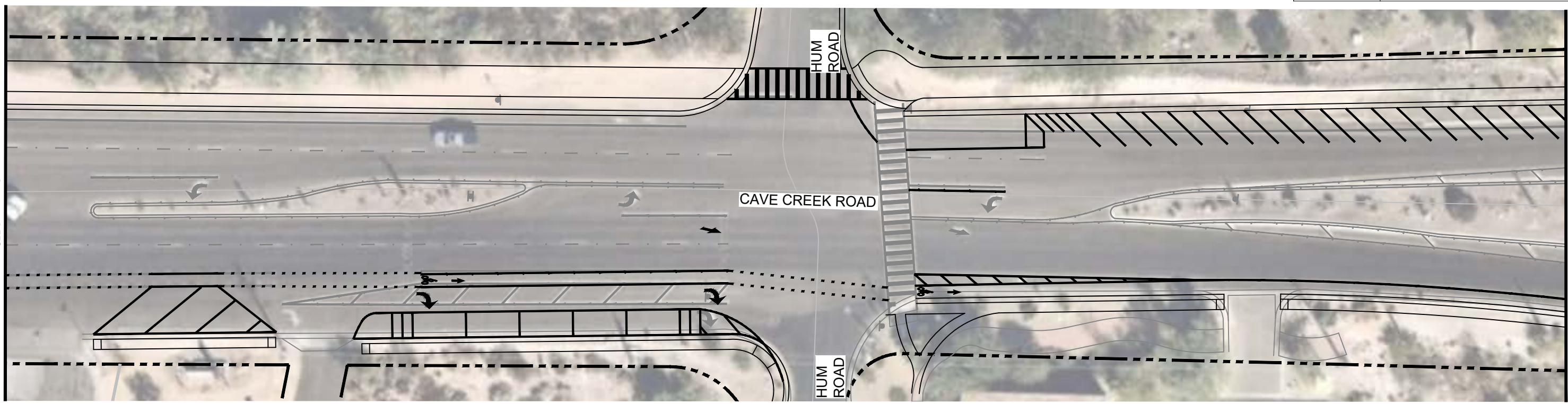
**TOM DARLINGTON DRIVE AND CAVE CREEK ROAD INTERSECTION
 CONCEPT 3: PARKING AND MULTI-USE PATH OPPOSITE TOWN CORE**

SCALE: 1"=20'

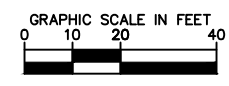
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NO.	DESCRIPTION	REV BY	CHK BY	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		5	7
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



**CAVE CREEK ROAD : TOM DARLINGTON DRIVE TO BLOODY BASIN ROAD
CONCEPT 3: PARKING AND MULTI-USE PATH OPPOSITE TOWN CORE**



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**CONCEPT NO. 3:
CAVE CREEK ROAD
TOWN OF CAREFREE, ARIZONA**

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO.	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	5	7

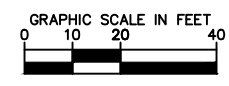
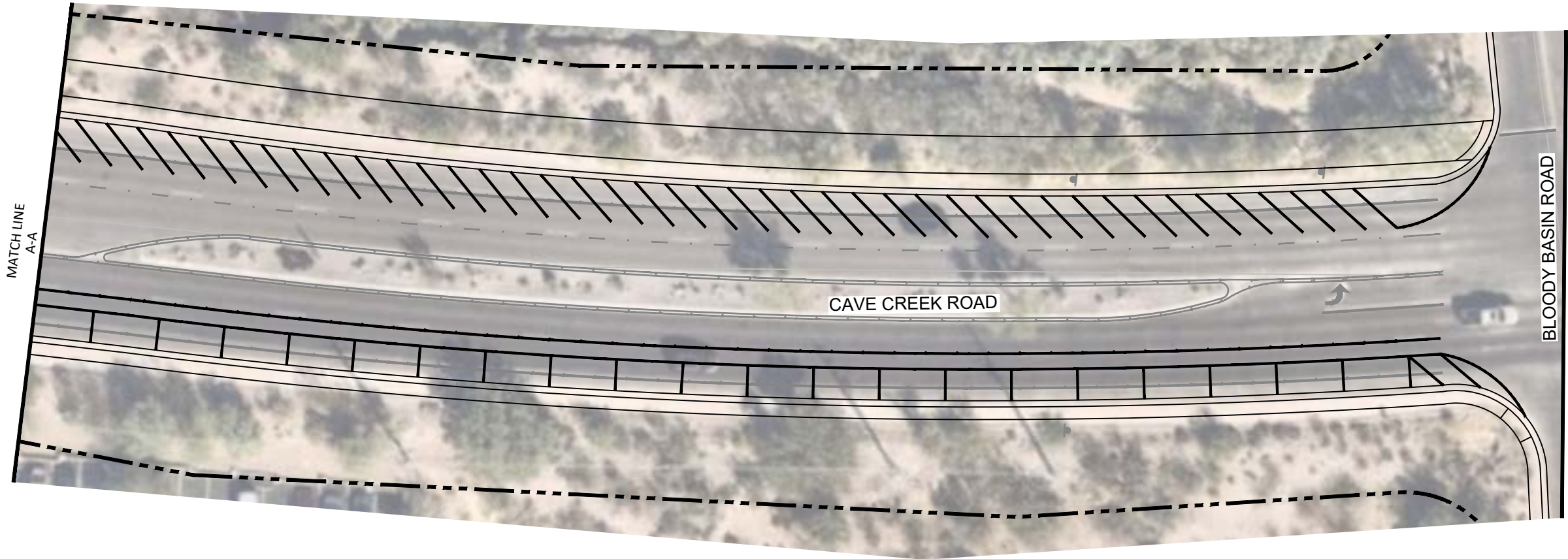
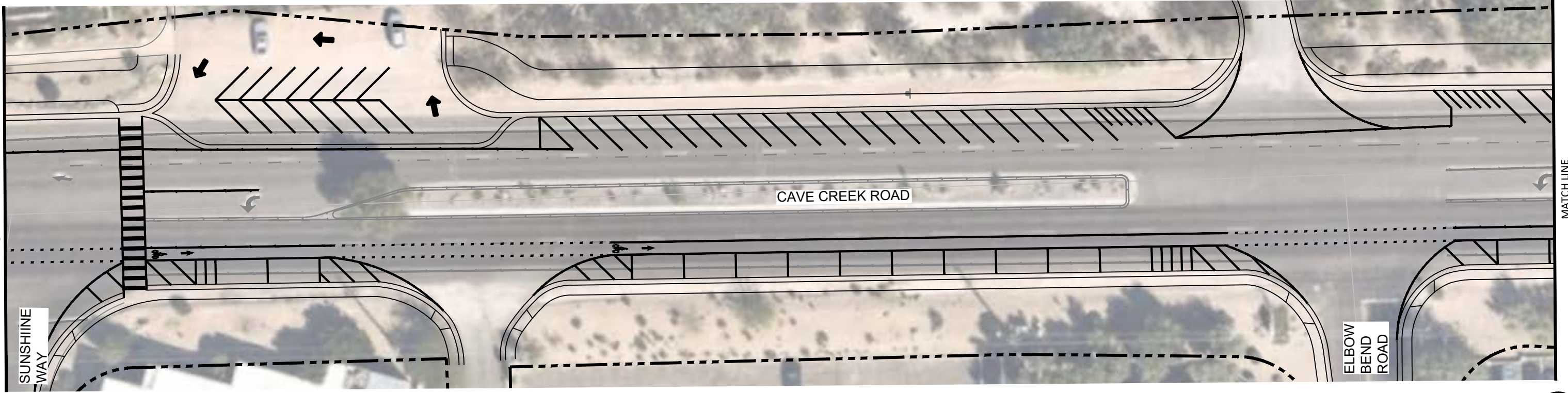
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NO.	DESCRIPTION	REV BY	CHK BY	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		6	7
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



**CAVE CREEK ROAD : TOM DARLINGTON DRIVE TO BLOODY BASIN ROAD
CONCEPT 3: PARKING AND MULTI-USE PATH OPPOSITE TOWN CORE**

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**CONCEPT NO. 3:
CAVE CREEK ROAD
TOWN OF CAREFREE, ARIZONA**

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	6	7
SCALE: 1"=20'				



F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		7	7
Kimley Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



MATCH LINE
SEE SHEET 6 OF 7

CAVE CREEK ROAD

NO.	REVISION BY TOWN OF CAREFREE DESCRIPTION	REV BY	CHK BY	DATE

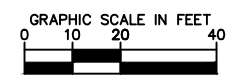


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**CONCEPT NO. 3:
CAVE CREEK ROAD**
TOWN OF CAREFREE, ARIZONA

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	7	7



**CAVE CREEK ROAD : TOM DARLINGTON DRIVE TO BLOODY BASIN ROAD
CONCEPT 3: PARKING AND MULTI-USE PATH OPPOSITE TOWN CORE**

SCALE: 1"=20'

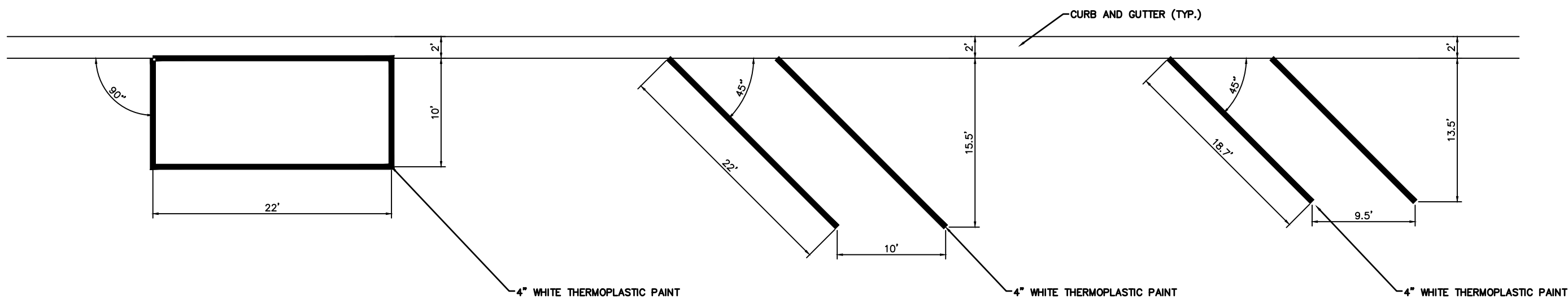


Appendix E

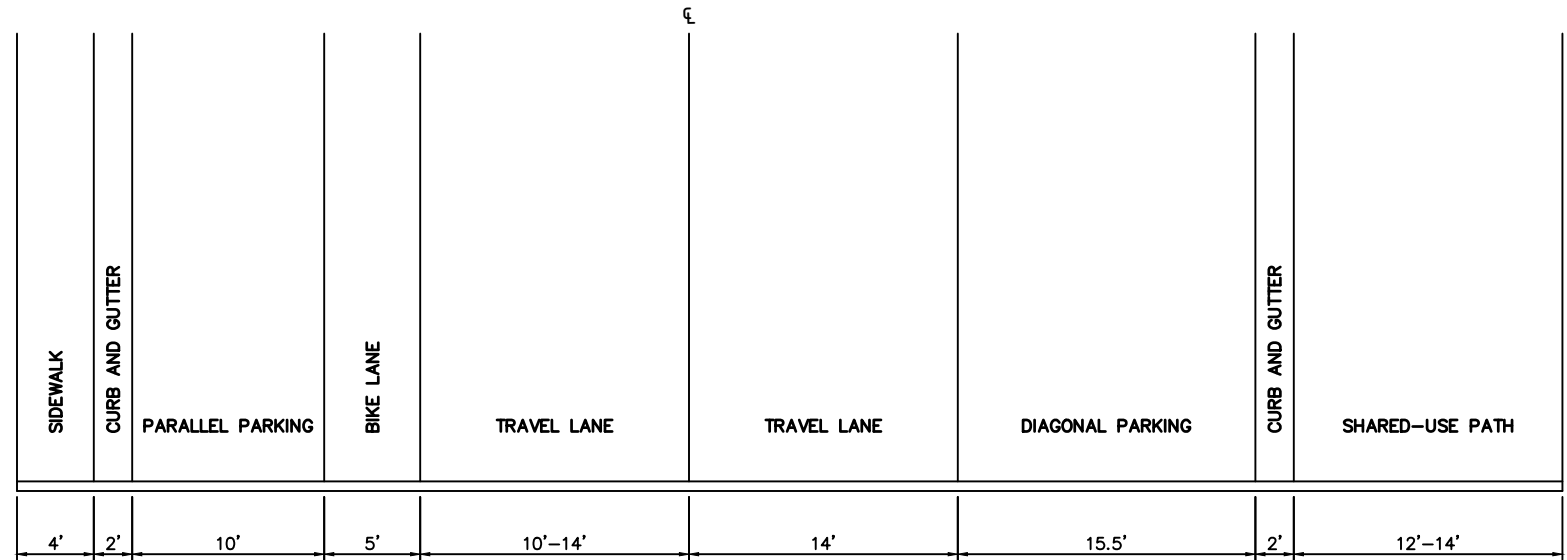
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PARALLEL PARKING**

**DETAIL 2
ON-STREET DIAGONAL PARKING**

**DETAIL 3
LOT DIAGONAL PARKING**



TYPICAL SECTION



TOWN CENTER →

CONCEPT 4: PARKING STALL DETAILS AND ROADWAY TYPICAL SECTION



PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

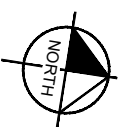
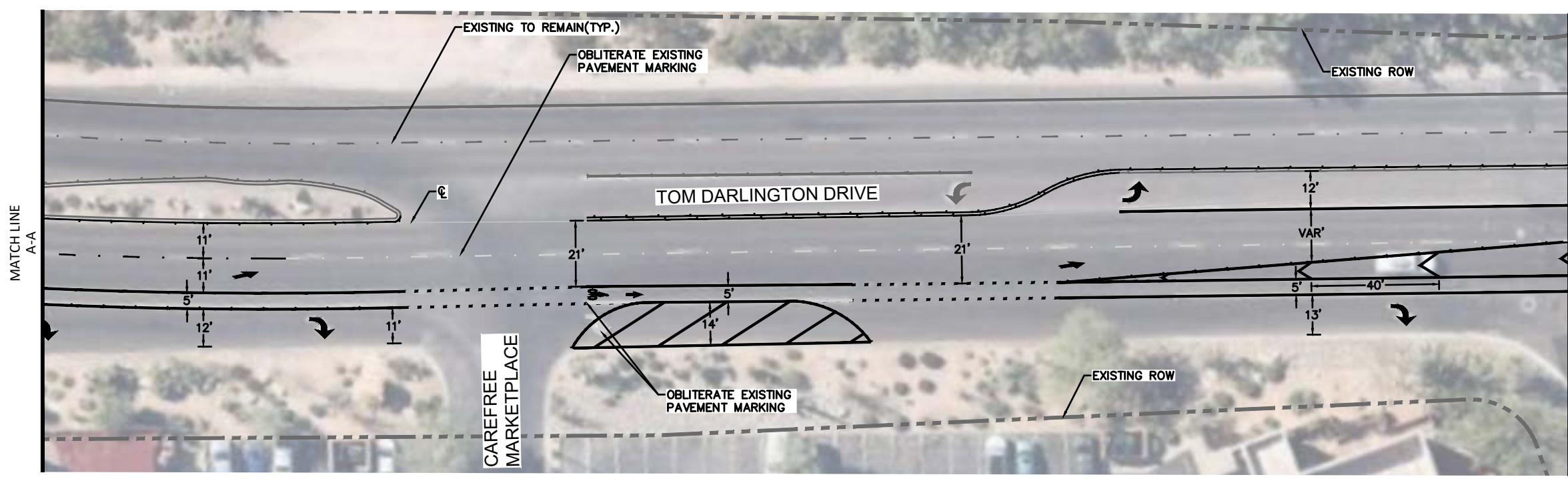
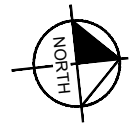
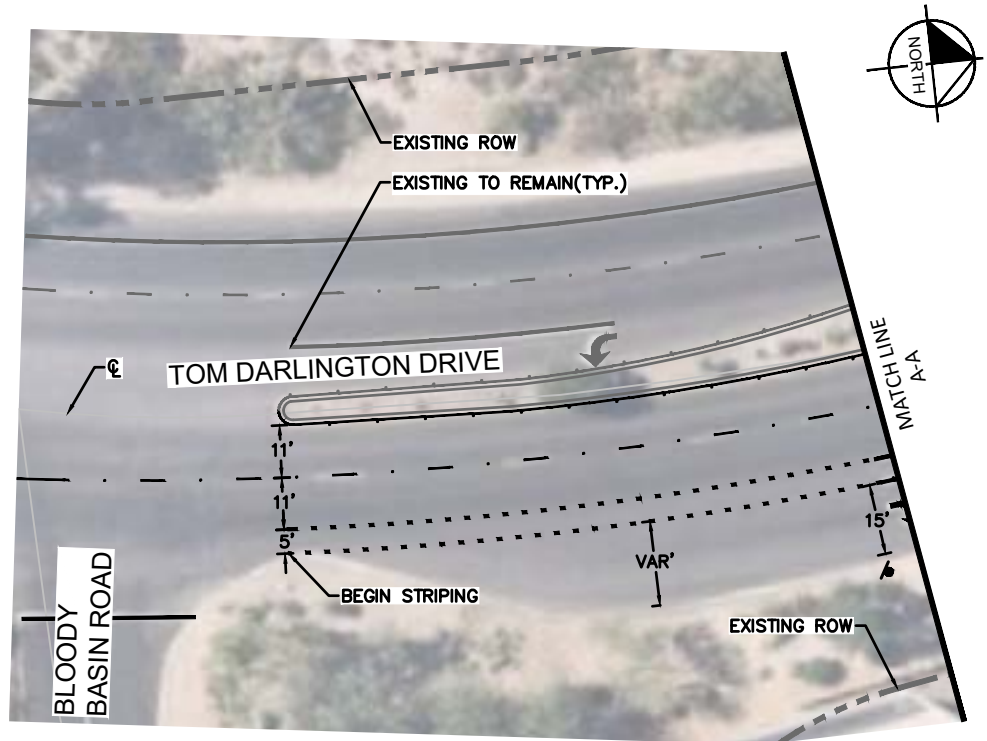
**CONCEPT NO. 4:
STANDARDS**

TOWN OF CAREFREE, ARIZONA

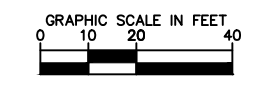
**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

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 ERDMANN, SAMANTHA
 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE
 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE
 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CKD BY) DATE

2/21/2022 7:43 PM
 ERDMANN, SAMANTHA
 REVISION BY TOWN OF CAREFREE
 DESCRIPTION
 NO.
 REV BY
 OKD BY
 DATE



MATCH LINE
SEE SHEET 3 OF 7



TOM DARLINGTON DRIVE : BLOODY BASIN ROAD TO CAVE CREEK ROAD
CONCEPT 4: PARKING AND MULTI-USE PATH ADJACENT TOWN CORE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		2	7
Kimley-Horn 333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705 Phone: 520-615-9191 www.kimley-horn.com				
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



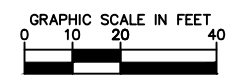
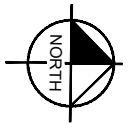
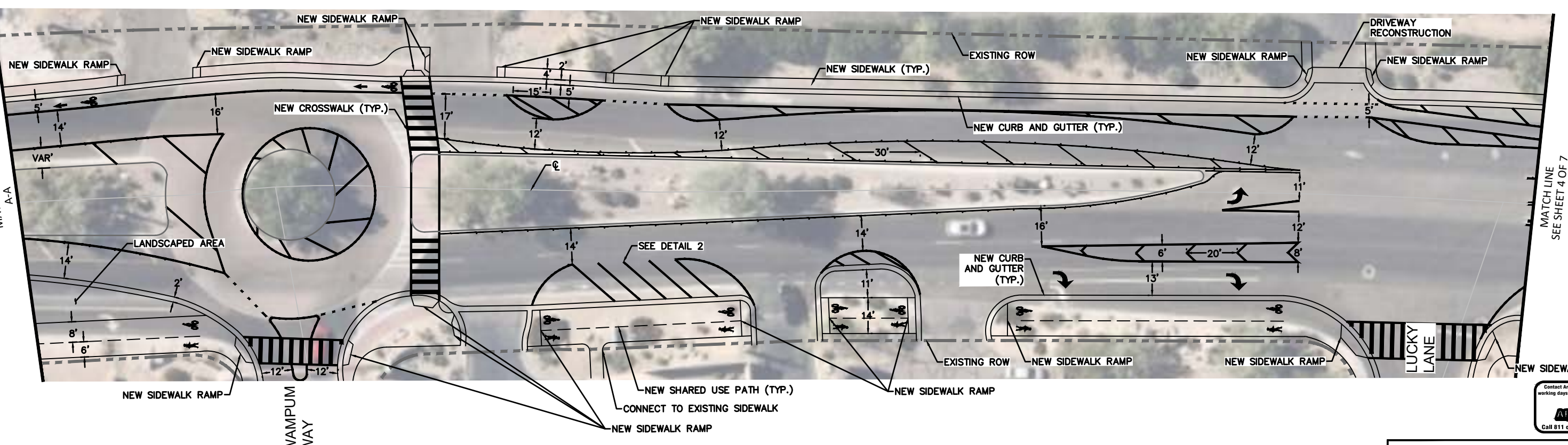
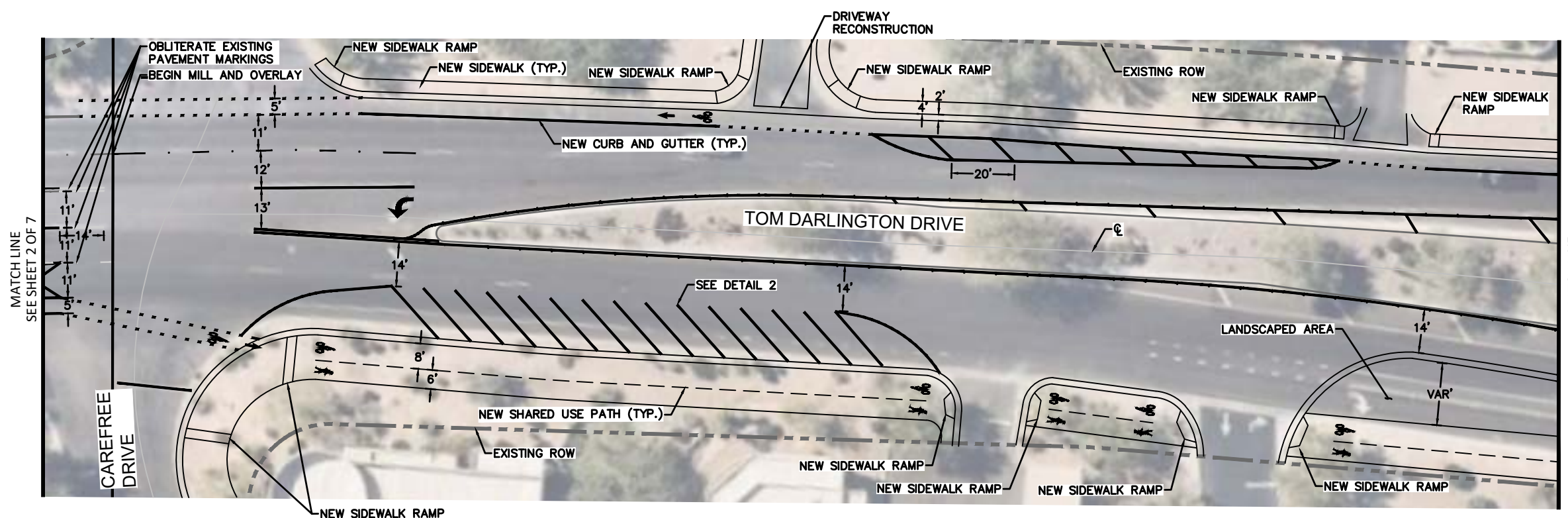
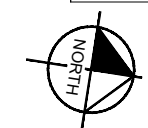
PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

CONCEPT NO. 4:
TOM DARLINGTON DRIVE
TOWN OF CAREFREE, ARIZONA

COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	2	7
SCALE: 1"=20'				

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		3	7
Kimley-Horn 333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705 Phone: 520-615-9191 www.kimley-horn.com				
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



TOM DARLINGTON DRIVE : BLOODY BASIN ROAD TO CAVE CREEK ROAD
 CONCEPT 4: PARKING AND MULTI-USE PATH ADJACENT TOWN CORE

PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

CONCEPT NO. 4:
TOM DARLINGTON DRIVE
TOWN OF CAREFREE, ARIZONA

COMPREHENSIVE SIGN PLAN FOR TOWN CENTER: CAVE CREEK ROAD AND TOM DARLINGTON DRIVE

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	3	7

SCALE: 1"=20'



NO.	DESCRIPTION	REV BY	CHK BY	DATE

REVISION BY TOWN OF CAREFREE

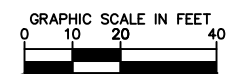
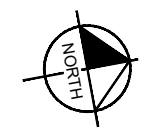
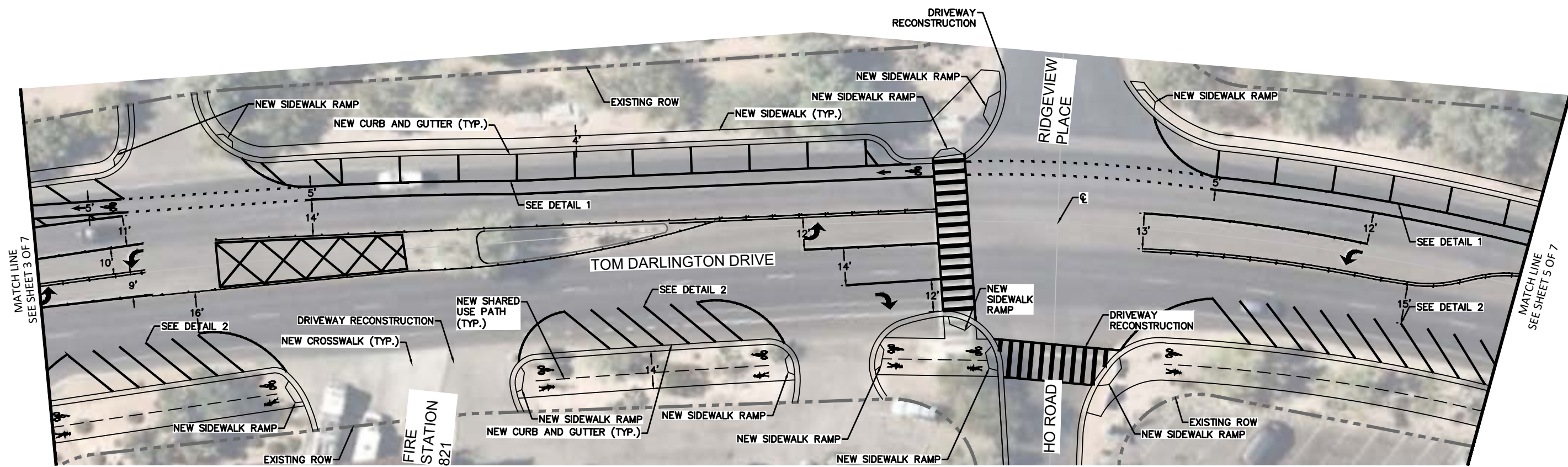
ERDMANN, SAMANTHA

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		4	7
Kimley-Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	

NO.	DESCRIPTION	REV BY	CHK BY	DATE



**TOM DARLINGTON DRIVE : BLOODY BASIN ROAD TO CAVE CREEK ROAD
CONCEPT 4: PARKING AND MULTI-USE PATH ADJACENT TOWN CORE**



PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

**CONCEPT NO. 4:
TOM DARLINGTON DRIVE
TOWN OF CAREFREE, ARIZONA**

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

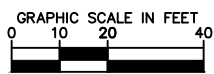
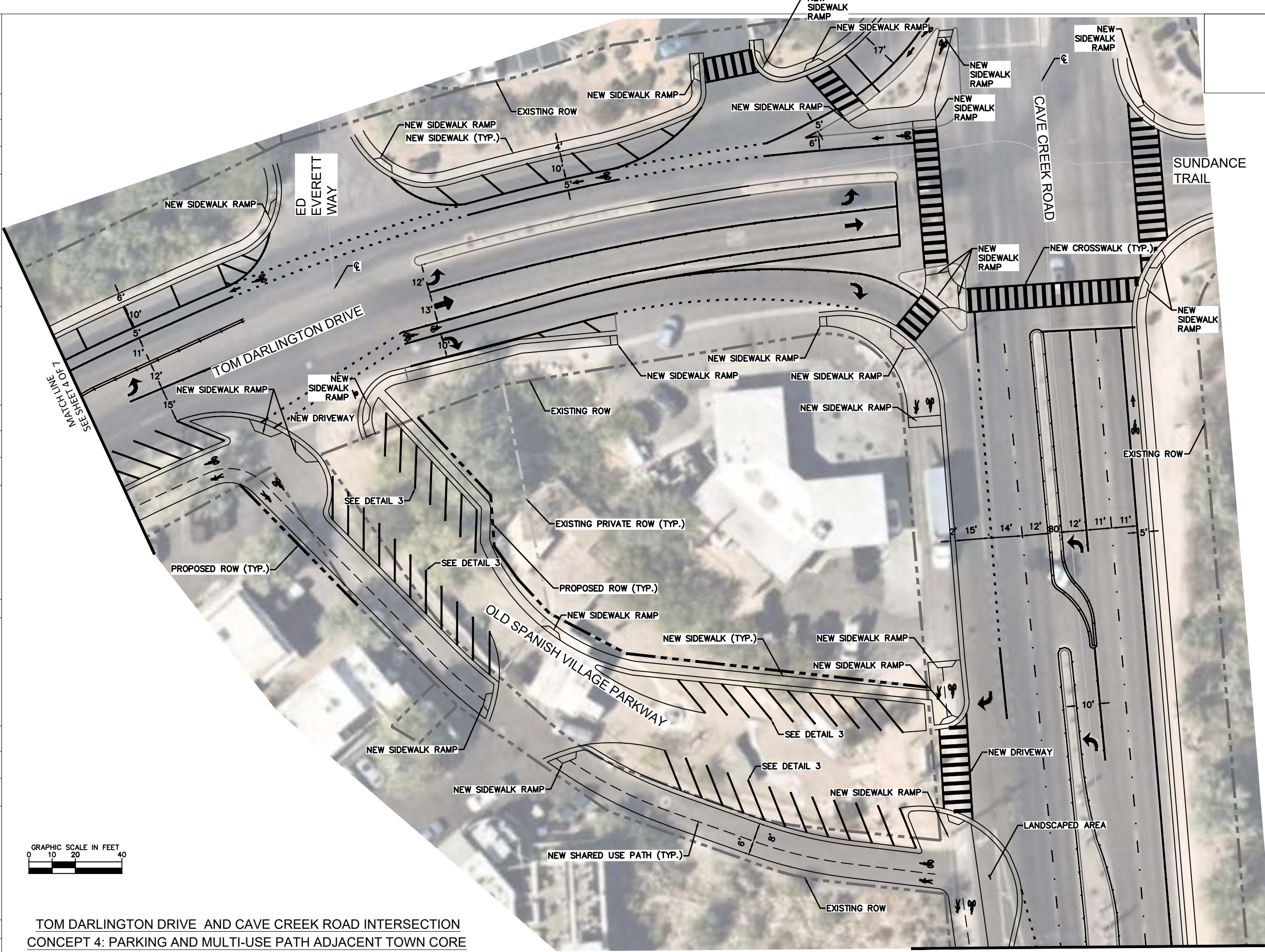
DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	4	7

SCALE: 1"=20'

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		5	7
Kimley-Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



NO.	DESCRIPTION	REV BY	CHK BY	DATE



**TOM DARLINGTON DRIVE AND CAVE CREEK ROAD INTERSECTION
CONCEPT 4: PARKING AND MULTI-USE PATH ADJACENT TOWN CORE**



PER THE CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

**CONCEPT NO. 4:
INTERSECTION
TOWN OF CAREFREE, ARIZONA**

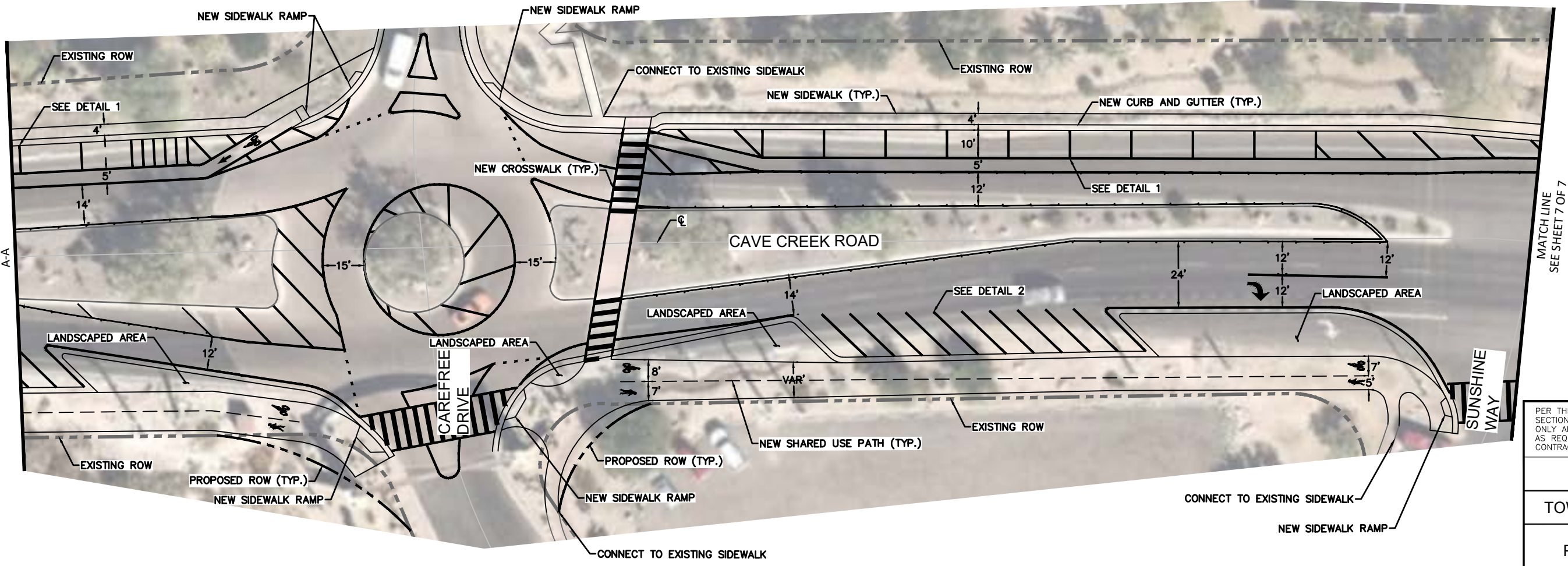
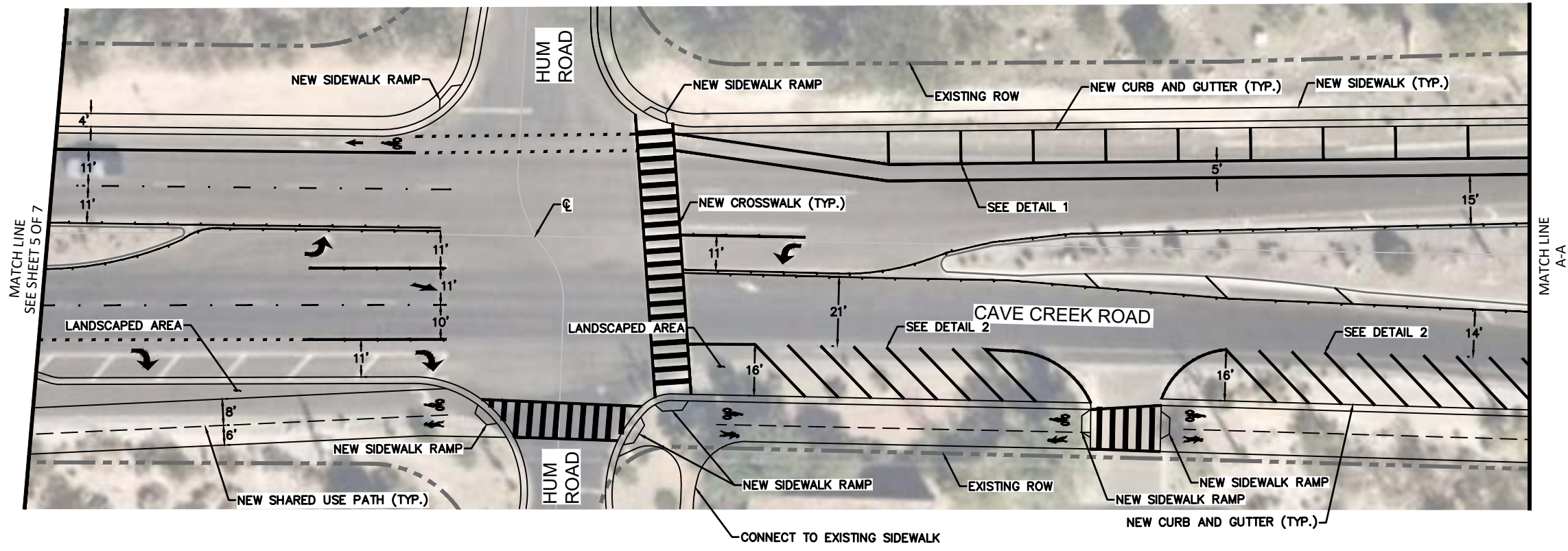
**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	5	7

SCALE: 1"=20'

MATCH LINE
SEE SHEET 6 OF 7

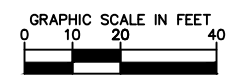
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	ARIZ.		6	7
Kimley-Horn		333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705	Phone: 520-615-9191 www.kimley-horn.com	
DR: SLE	DES: SEN/LB	CK: RF	DATE: 02/22	



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**CONCEPT NO. 4:
CAVE CREEK ROAD
TOWN OF CAREFREE, ARIZONA**

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
CAVE CREEK ROAD AND
TOM DARLINGTON DRIVE**



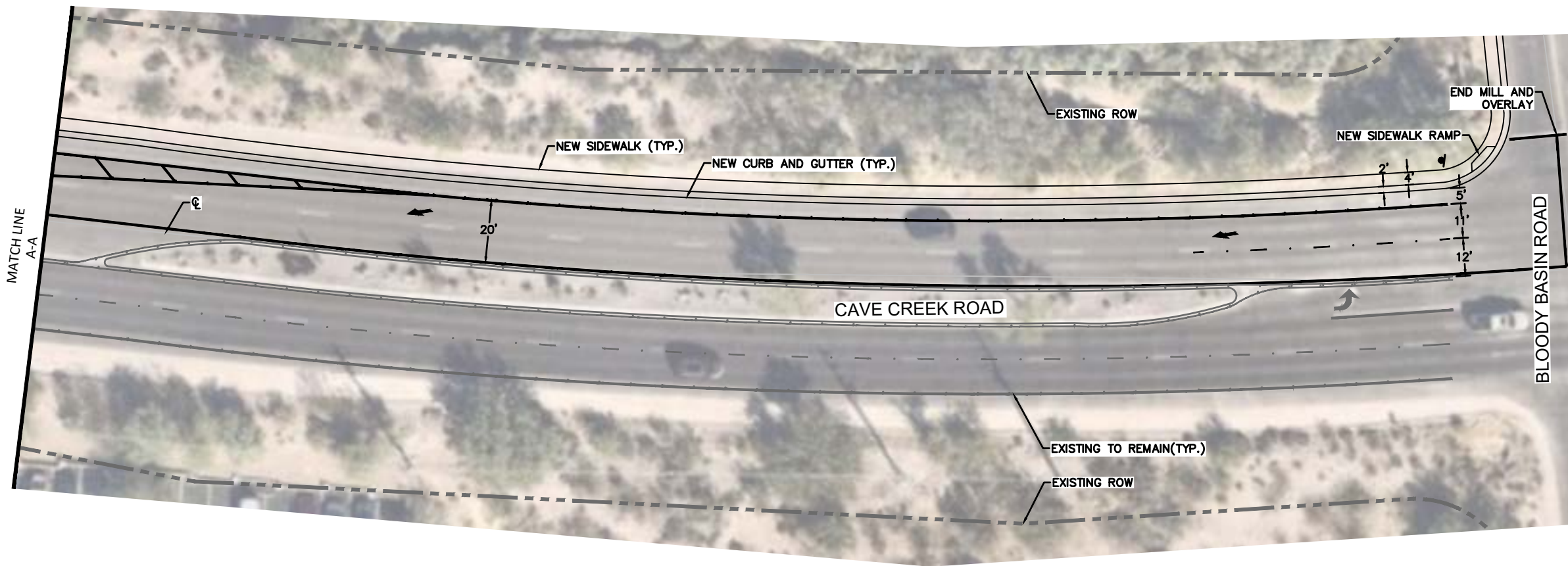
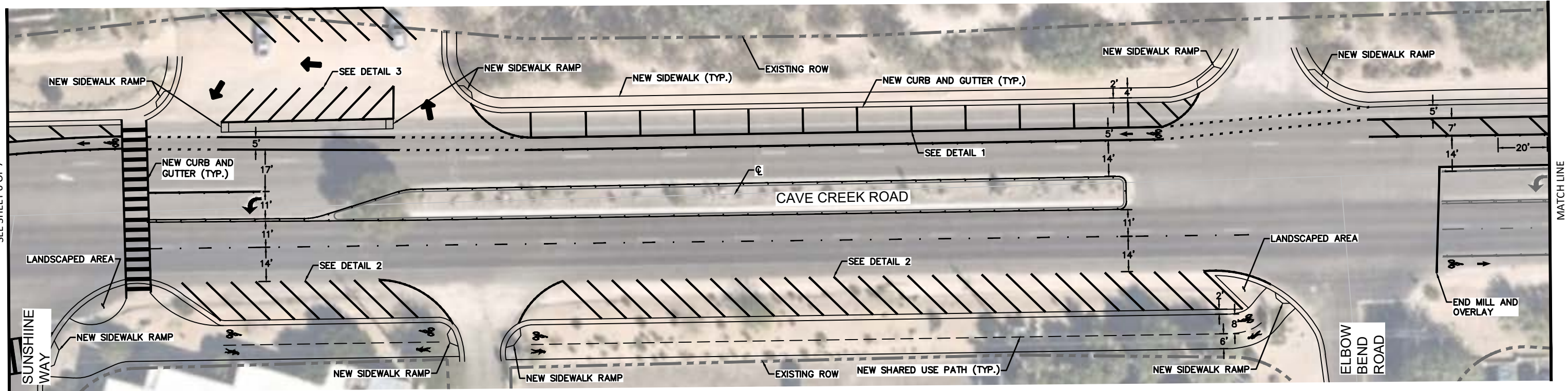
**CAVE CREEK ROAD : TOM DARLINGTON DRIVE TO BLOODY BASIN ROAD
CONCEPT 4: PARKING AND MULTI-USE PATH ADJACENT TOWN CORE**

DR: SLE	DES: SEN/LB	CK: RF	SHEET NO:	TOTAL SHEETS
DATE: 02/22	DATE: 02/22	DATE: 02/22	6	7

SCALE: 1"=20'

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 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CK) BY DATE
 ERDMANN, SAMANTHA
 REVISION BY TOWN OF CAREFREE
 NO. DESCRIPTION REV BY (CK) BY DATE
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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
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Kimley-Horn 333 E WETMORE ROAD SUITE 280 TUCSON, AZ 85705 Phone: 520-615-9191 www.kimley-horn.com				
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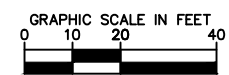
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**CONCEPT NO. 4:
CAVE CREEK ROAD
TOWN OF CAREFREE, ARIZONA**

**COMPREHENSIVE SIGN
PLAN FOR TOWN CENTER:
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DATE: 02/22	DATE: 02/22	DATE: 02/22	7	7

**CAVE CREEK ROAD : TOM DARLINGTON DRIVE TO BLOODY BASIN ROAD
CONCEPT 4: PARKING AND MULTI-USE PATH ADJACENT TOWN CORE**



2/21/2022 7:43 PM
 ERDMANN, SAMANTHA
 REVISION BY TOWN OF CAREFREE
 DESCRIPTION
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