

## 4.0 MAJOR DESIGN FEATURES

### 4.1 Introduction

This section describes the major design features associated with the alternatives. All of the alternatives meet the ADOT design standards in the ADOT Roadway Design Guidelines.

### 4.2 Design Controls

The following design controls were used when considering the feasibility of the various alternative corridors and will be used in the future development of the design concept alternatives:

- Design Year: 2025
- Design Speed:
  - 75 mph desirable
- Typical Section: Four-lane Divided Rural Highway (Section RA, ADOT Roadway Design Guidelines)
  - Travel Lane Width: 12 feet
  - Outside Shoulder: 10 feet
  - Inside Shoulder: 4 feet
  - New Bridges: Shoulder plus 2 feet to face of barrier
  - Drainage Ditch Offset: 30-feet for Rural Sections
  - Median Width: Varies 70 feet to 600 feet
- Slope Criteria: ADOT Standard Detail C-02.10. No embankment slopes for any roadway section are to be steeper than 2:1.
- Gradient:
  - 3% Maximum (Rural Divided, Level Terrain)
  - 4% Maximum (Rural Divided, Rolling Terrain)
  - 6% Maximum (Rural Divided, Mountainous Terrain)
- Maximum Rural Superelevation: 0.10 ft/ft (Project area is under 4000 feet elevation)
- Maximum Curvature (based on max. superelevation of 0.10 ft/ft):

Design Speed (mph)	Degree of Curvature
70	3°30'

All other roadway features will follow current ADOT standards as described in ADOT's Roadway Design Guidelines.

### 4.3 Horizontal and Vertical Alignments

Using the design controls listed under Section 4.2, potential highway alignments were developed within each of the various corridor alternatives for use in determining the feasibility of the corridors for highway use and as a means of comparative evaluation between corridors. Independent horizontal and vertical alignments are recommended during the design concept development stage to best fit the landform and ensure least impact to the environment.

### 4.4 Access

The proposed Wickenburg Bypass will be a four-lane divided roadway with full access control to ensure smooth traffic operations and preclude uncontrolled future access and random strip development. Traffic interchanges will provide the only access to and from the new roadway, regardless of the alternative that will ultimately be selected. The interchanges will be located at the bypass' northern and southern termini on US 93 and US 60, respectively. An additional interchange will be provided between the Bypass and US 60 west of the Wickenburg Airport. At this time, an interchange is not planned where the Bypass would cross Vulture Mine Road, southwest of Wickenburg. However, if the Vulture Mine Road option for the CANAMEX corridor is considered, an interchange in this location could be developed but would not provide access to the remaining portion of Vulture Mine Road. Access control along the crossroads at the interchange locations should also be considered, where feasible, to allow for optimal traffic operations at the interchanges.

### 4.5 Right-of-Way

Less than 4 percent of the right-of-way required for the preferred corridor alternative will be acquired from private property. The remaining right-of-way required for the preferred alternative would come equally from the BLM and ASLD.

### 4.6 Drainage

Numerous major and minor drainage courses are crossed by the preferred corridor alternative, with the most significant crossings being the Hassayampa River near the southern terminus and Sols Wash near the northern terminus. Bridges were assumed over the Hassayampa River and Sols Wash, with pipes and box culverts used at all other crossings. Although a field reconnaissance was conducted to evaluate drainage requirements, hydrology and hydraulics analyses were not conducted. These analyses will need to be conducted during the Design Concept Report stage of project development.

### 4.7 Earthwork

Beginning at the southern terminus near the US 60/SR 74 junction, the preferred corridor alternative crosses the Hassayampa River and progresses northwesterly across the rugged foothills of the Vulture Mountains. The corridor then swings southwesterly and continues along the relatively flat terrain of the northern alluvial flanks of the mountains. As the corridor passes around the south side of the Caballeros Peaks, it turns northerly through the relatively rugged

foothills of the Vulture Mountains and continues north across gently rolling alluvial plains to its northern terminus at US 93.

In general, the materials throughout the length of the corridor should be relatively easy to excavate, although areas of varying degrees of cementation will be encountered. Volcanic and crystalline rock will be encountered in some areas of the Vulture Mountain foothills, and although marginally rippable at several locations, blasting will likely be required.

A detailed discussion of the corridor geology and site conditions can be found in the report entitled "Preliminary Geotechnical Assessment, Design Concept Study of US 93, Santa Maria River – Wickenburg", dated July 2001.

## **4.8 Bypass Implementation**

It is estimated that the cost for constructing a four-lane divided highway bypass around Wickenburg will be approximately \$200 million (in 2000 dollars), including right-of-way. With a project investment of this magnitude, route construction must be implemented in phases that are relatively fundable. Also, each phase should be functional upon completion. Unfortunately, the location of the bypass does not lend itself to constructing short stretches of highway that are immediately usable by traffic when completed.

Figure 4-1 illustrates one likely option for phased construction, even though Phases 2 and 4 are considered relatively large projects. Phase 1 would provide an initial two-lane highway connection between US 60 and US 93 north of Wickenburg, thus offering the opportunity to bypass downtown Wickenburg. Phase 2 would continue the initial two-lane highway south to US 60 near Morristown, offering the opportunity for all regional traffic to bypass Wickenburg. Neither Phase 1 nor Phase 2 would include the construction of any of the planned interchanges.

Phase 3 would include the construction of an interchange at the northern terminus of the bypass on US 93 and complete the northerly leg of the bypass as a four-lane divided highway. Phase 4 would complete the southerly leg of the bypass to a four-lane divided highway with interchanges at US 60 west of the Wickenburg and at US 60 near Morristown, thus completing the bypass. Project specific phasing plans will be developed as part of the DCR process of project development.

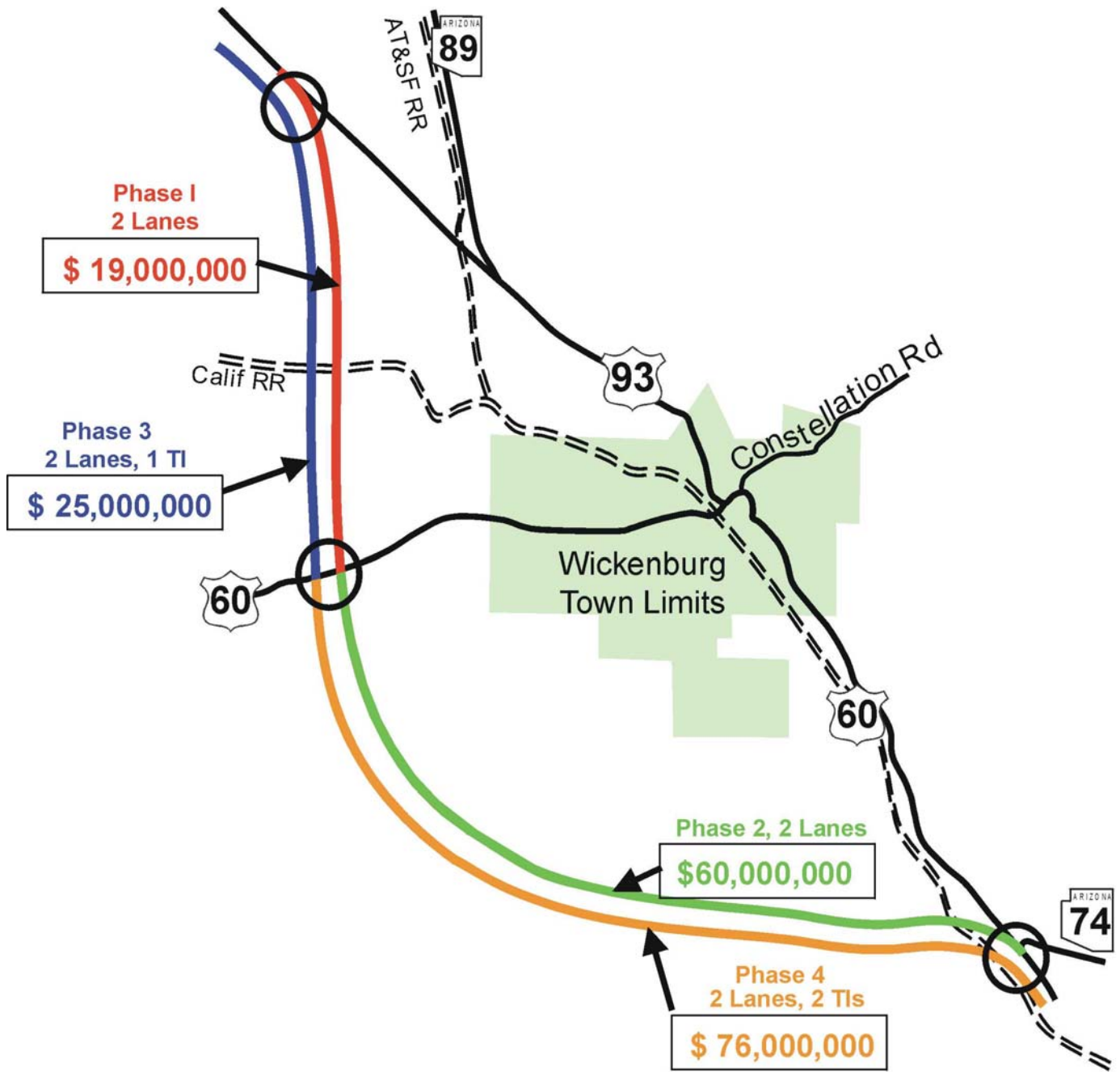
## **4.9 Utilities**

Overhead and underground utilities will be encountered at the project termini, as well as at the crossing of US 60 west of Wickenburg. The specific utilities and probable relocation/adjustment plans will be determined during the development of the DCR.

## **4.10 Bridges**

A preliminary need for bridges was investigated along the bypass corridor. As the entire bypass is on new alignment, there are no existing bridges to evaluate within the study limits. However, twenty new bridges will be required at four drainage crossings, three interchange locations, two railroad overcrossings, and one roadway grade separation.

As this is a feasibility study, only the location and approximate span of the crossings have been identified. The crossing feature is a description of the feature being crossed by the bridge. The bridge length is the projected length of the structure measured along the top of the deck. No detailed evaluation as to the type of structure required is provided at this time. That evaluation will occur during the eventual development of the DCR.



**Figure 4-1 Potential Bypass Implementation Concept**

Table 4-1. Future Bridge Locations

Location	No. of Bridges	Crossing Feature	Bridge Length	Comments
System Interchange with US 60, US 93, and SR 74	2	New Wick. Access Road	(2) 130 ft	Depending on the TI configuration, this structure would be the initial bridge over US 60 and/or a new access road to the Wickenburg Area.
BNSF East Railroad Crossing	2	Single Track Crossing: 30-Ft	130 ft	Likely a single span AASHTO Girder Bridge over the single track rail line. Bridge clearance will be 23 ft over the existing track.
Hassayampa River Crossing	2	Hassay. River: 1000 Ft	1800 ft	Wide open crossing of the Hassayampa River. A multi- span girder bridge is likely.
Syndicate Wash	2	Major Wash: 30-Ft	110 ft	Major wash crossing that may require a CBC, superbox, or bridge structure. Further evaluation is required.
Vulture Mine Road	2	Future 4-Lane Road 65-Ft	130 ft	No access provided from the Bypass mainline. Simple overcrossing of potential 4-lane roadway. However, if the Vulture Mine Road option for the CANAMEX corridor is considered, an interchange in this location could be developed but would not provide access to the remaining portion of Vulture Mine Road to the north.
Hartman Wash	2	Major Wash: 30-Ft	110 ft	Major wash crossing that may require CBC, superbox, or bridge structure. Further evaluation is required.
US 60 West Interchange	2	5-Lane Undivide	150 ft	Interchange bridge over potentially widened US 60

Location	No. of Bridges	Crossing Feature	Bridge Length	Comments
		d Hwy: 100-Ft		highway
Sols Wash	2	Major Wash: 100-Ft	180 ft	A major wash crossing that may require CBC, superbox, or bridge structure. Further evaluation is required.
BNSF West Railroad Crossing	2	Single Track Crossing: 30-Ft	130 ft	Likely a single span AASHTO Girder Bridge over the single track crossing. Bridge will be 23-ft over the existing tracks
US 93 North Interchange	2	3-Lane Access Road	130 ft	Existing US 93 will connect to the mainline and go over the TI access road. The access road will likely be designed for a 5-lane facility.