# SR 87 CORRIDOR DEVELOPMENT STUDY

**MP 191 TO MP 250**

ADOT WORK TASK NO. MPD0045-18

ADOT CONTRACT NO. 17-017963

# DRAFT

**FEASIBILITY REPORT**

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*Y2K ENGINEERING*

SAGUARO GEOSERVICES

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## ACRONYMS & ABBREVIATIONS

| | |
|---|---|
| ADEQ | Arizona Department of Environmental Quality |
| ADOT | Arizona Department of Transportation |
| ADT | Average Daily Traffic |
| AGFD | Arizona Game and Fish Department |
| AJD | Approved Jurisdictional Determination |
| APE | Area of Potential Effects |
| ASM | Arizona State Museum |
| AWLW | Arizona Wildlife Linkages Workgroup |
| AZPDES | Arizona Pollutant Discharge Elimination System |
| BG | Block Group |
| CAA | Clean Air Act |
| CDS | Corridor Development Study |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| Corps | United States Corps of Army Engineers |
| CPS | Corridor Profile Study |
| CT | Census Tract |
| DMS | Dynamic Message Sign |
| DOT | Department of Transportation |
| DPS | Department of Public Safety |
| EO | Environmental Overview |
| EPA | Environmental Protection Agency |
| FDS | Field Data Services of Arizona |
| FEMA | Federal Emergency Management Agency |
| FHWA | Federal Highway Administration |
| FIRM | Flood Insurance Rate Map |
| FMYN | Fort McDowell-Yavapai Nation |
| GLO | General Land Office |
| HCM | Highway Capacity Manual |
| HSIP | Highway Safety Improvement Program |
| IP | Individual Permit |
| IPaC | Information for Planning and Consultation |
| KABCO | Police rating scale of crash injury severity |
| LCCA | Life Cycle Cost Analysis |
| LOS | Level of Service |
| LWCF | Land and Water Conservation Fund Act |
| MP | Mile Post |
| MPO | Metropolitan Planning Organization |
| NAAQS | National Ambient Air Quality Standards |
| NAC | Noise Abatement Criteria |
| NB | Northbound |
| NEPA | National Environmental Policy Act |
| NPDES | National Pollutant Discharge Elimination System |
| NRHP | National Register of Historic Places |
| NWP | Nationwide Permit |
| OERT | On-Line Environmental Review Tool |
| P2P | Planning to Programming |
| PES | Performance Effectiveness Score |
| PJD | Preliminary Jurisdictional Determination |
| PLZ | Potential Linkage Zone |
| PTI | Planning Time Index |
| ROW | Right-of-Way |
| RSA | Road Safety Assessment |
| SARA | Superfund Amendments and Reauthorization Act |
| SB | Southbound |
| SHPO | State Historic Preservation Office |
| SOV | Single Occupancy Vehicle |
| SR | State Route |
| SWPPP | Stormwater Pollution Prevention Plan |
| TAC | Technical Advisory Committee |
| TCDS | Traffic Count Database System |
| TNF | Tonto National Forest |
| TRB | Transportation Research Board |
| TTTI | Truck Travel Time Index |
| USGS | United States Geological Survey |
| WOUS | Waters of the United States |
| WQC | Water Quality Certification |

# 1 BACKGROUND INFORMATION

The Arizona Department of Transportation (ADOT) initiated this Corridor Development Study (CDS) of State Route 87 (SR 87) between mile post (MP) 191 and MP 250, to define and evaluate proposed improvements to this 59-mile segment of SR 87 between Fountain Hills, Arizona, and Payson, Arizona. The SR 87 corridor location is depicted in **Figure 1.** The corridor study area is shown in detail in **Figure 2**.

ADOT undertook a performance-based evaluation of the study area in the SR 87/SR 260/SR 377 Corridor Profile Study (SR 87 CPS), completed in March 2017. The CPS identified a range of planning-level strategic solutions addressing safety, mobility, and freight needs on SR 87 between MP 191 and MP 250. These high-level solution sets included several potential improvements that required more detailed evaluation and refinement before specific projects can be scoped and programmed. The SR 87 CDS advances the SR 87 CPS recommendations through a more detailed analysis to confirm the need, evaluate feasibility of, and provide more detailed information on the needs identified. Near-term and long-term plans are needed to help guide decisions in the future regarding prioritizing SR 87 corridor improvements.

This Feasibility Report recommends and prioritizes specific projects and implementation strategies, along with their associated costs, that address identified needs. This process was informed by a collaborative process involving a Technical Advisory Committee, stakeholders, and the public.

## 1.1 Previous Studies and Recommendations

Previous studies and reports applicable to the study are shown in **Appendix A.** These studies served as input to alternatives development and evaluation.

## 1.2 Upcoming Programmed Projects

The ADOT Five-Year Transportation Facilities Construction Program (2020 to 2024) lists one project within the corridor limits; SR 87 MP 247 Pine Creek Canyon Rd; Tree Removal. The funding for this project is through the Highway Safety Improvement Program ($240,000 in FY 2021 and $1,549,000 in FY 2022).

### *1.2.1 Land Ownership*

SR 87 study limits traverse multiple jurisdictions and land owned or managed by various entities in Maricopa and Gila counties. The southern section of the corridor, MP 191 to MP 193, traverses the Fort McDowell – Yavapai Indian Reservation. From MP 193 to MP 250, SR 87 travels through the Tonto National Forest, though there is a mix of private lands at various locations along the corridor; most notably near Sunflower, Deer Creek, and Rye. An overview of land uses along the corridor is provided below in **Table 1**. A map showing the distribution of land ownership along the corridor is provided in **Figure 7**.

**Table 1: Land Use**

| Land Use | Location | MP |
|---|---|---|
| **Large-lot residential** | Goldfield Ranch | 195-198 |
| **Commercial** | Sunflower | 218 |
| **Residential and ranch** | Deer Creek | 237-238 |
| **Commercial** | Rye | 239-241 |
| **Residential** | Oxbow Estates | 248-249 |
| **Residential** | Round Valley | 249-250 |

**Figure 1: Corridor Study Area**

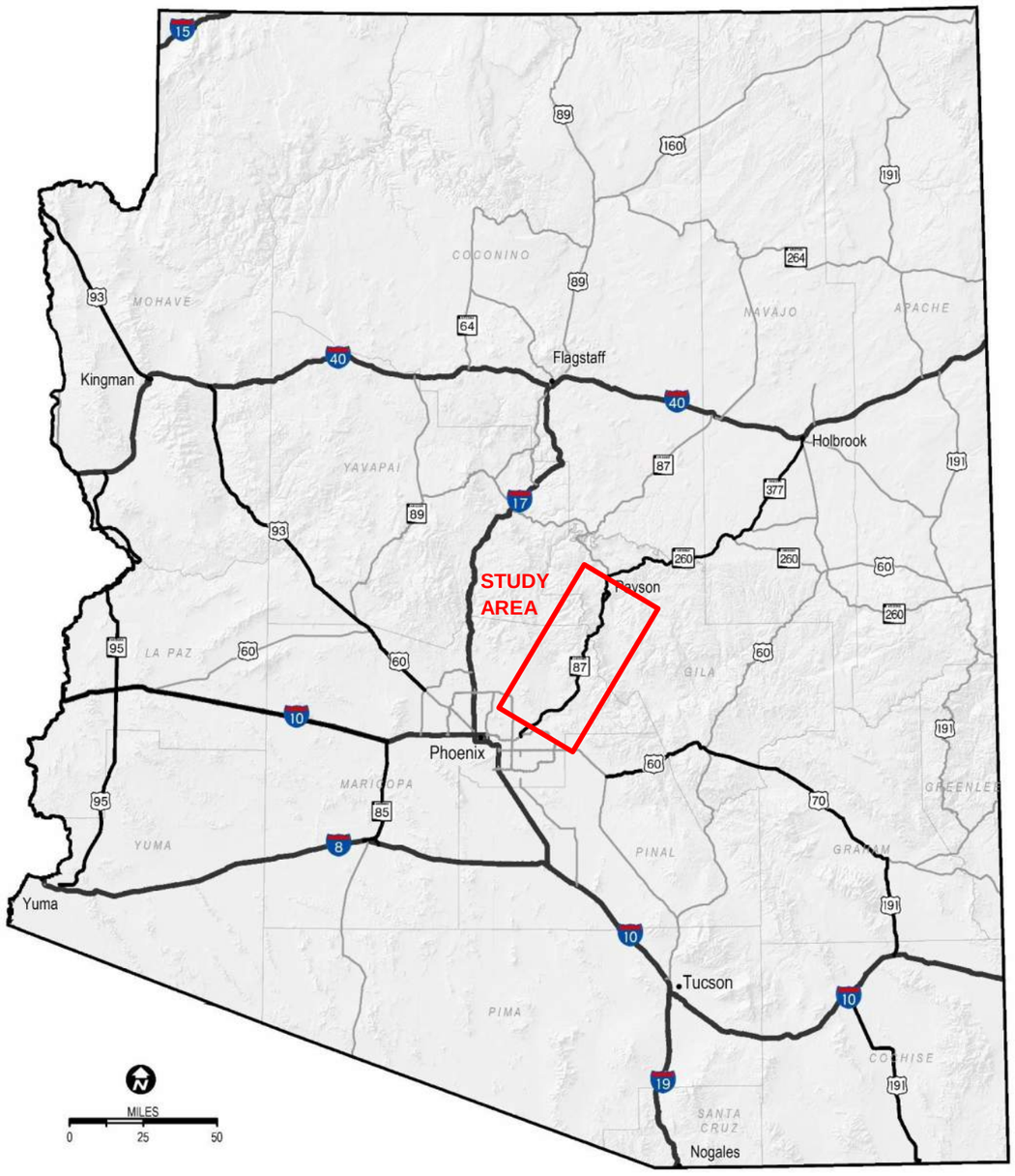
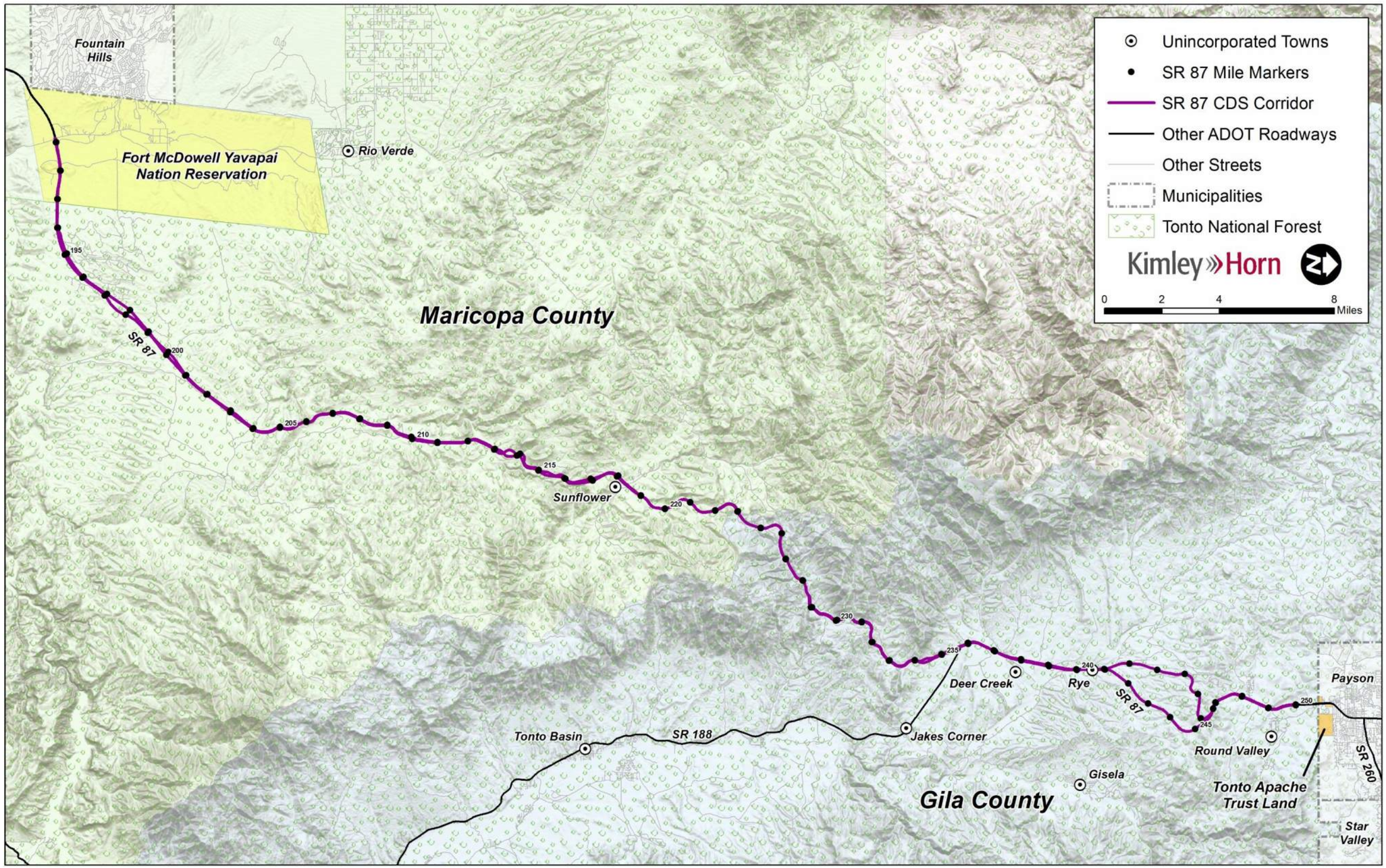


**Figure 2: Corridor Development Study Corridor**



## 1.3 Need for the Project

SR 87 is a key link between the Phoenix metropolitan area and the northeast region of the state and serves intrastate, interstate, and international commerce. SR 87, MP 191 to 250 connects cities and towns of Mesa, Fountain Hills, and Payson, along with the Salt River Pima-Maricopa Indian Community, Fort McDowell-Yavapai, and Tonto-Apache Tribes, as well as recreational areas and National Forests.

The SR 87/SR 260/SR 377 Corridor Profile Study (CPS), completed in March 2017, identified corridor needs in the areas of safety and freight mobility. Safety needs were identified as "high" for MP 191-MP 213, MP 213-MP 235, and MP 241-MP 250. Contributing factors identified in the CPS include:

- Speed too fast for conditions
- Improper lane changes
- Clear zone slopes and obstructions
- Slippery/wet pavement surface
- Roadway departure
- Driver inattention and driving under the influence
- Insufficient shoulder/rumble strip condition
- Lack of crossing opportunities

Freight needs were identified as "high" for the entire study limits (MP 191-250), due to the number of highway closures attributed to incidents/crashes, obstructions/hazards, or weather.

## 1.4 Characteristics of the Corridor

### *1.4.1 Existing Roadway System*

SR 87 within the study limits is generally a four-lane bifurcated and divided rural facility. There is a climbing lane on SR 87 SB between approximately MP 207 and MP 205. The corridor includes one grade-separated traffic interchange (TI) on SR 87 at Bush Highway at approximately MP 199. Intersections are listed below in **Table 2**.

**Table 2: SR 87 Intersections**

| MP | Intersection | Grade Separated | Access | Turn Lanes on SR 87 |
|---|---|---|---|---|
| **191.8** | Hiawatha Hood Road | - | 4-way | Left Only |
| **192.1** | Rodeo Drive | - | 4-way | Left Only |
| **194.5** | Burnt Water Tail | - | 3-way | Right and Left |
| **195.2** | Vista del Oro | - | 3-way | Right and Left |
| **196.0** | Goldfield Road | - | 3-way | Right and Left |
| **196.3** | Pleasant View Road | - | Right-in-right-out | Right Only |
| **196.6** | Median Crossover | - | 3-way | Left Only |
| **197.3** | Meridian Road | - | Right-in-right-out | Right Only |
| **199.1** | Bush Highway | Yes | Diamond Interchange | N/A |
| **203.9** | Cline Cabin Road | - | 4-way | Right and Left |
| **207.8** | FR 68 Access Road | - | 4-way | Right and Left |
| **209.5** | FR 68 | - | 4-way | Right and Left |
| **210.5** | Ballantine Trailhead | - | 4-way | Right and Left |
| **212.7** | Sycamore Creek | - | 4-way | None |
| **217.4** | FR 1704 | - | 3-way | None |
| **218.0** | Sunflower | - | 4-way | Right and Left |
| **218.5** | FR 22 | - | 3-way | Right and Left |
| **222.7** | FR 626 | - | 4-way | Right and Left |
| **229.6** | FR 26 | Box culvert under-crossing | Right-in-right-out | Right Only |
| **235.7** | SR 188 | - | 4-way | Right and Left |
| **236.7** | Unnamed Road | - | 3-way | Right and Left |
| **237.6** | Deer Creek Drive | - | 4-way | Right (NB) and Left (SB) Only |
| **238.5** | FR 1438 | - | 3-way | Right and Left |
| **239.2** | Barnhardt Road | - | 4-way | Left (NB) and Right (SB) Only |
| **239.5** | Gisela Road | - | 3-way | Right and Left |
| **240.0** | Matlock Gas | - | 3-way | None |
| **240.5** | South Rye Crossover | - | 4-way | None |
| **240.8** | North Rye Crossover | - | 4-way | No SB Right |
| **247.8** | FR 535 | - | 3-way | Left Only |
| **248.4** | Ox Bow Estates | - | 3-way | Left and Right |
| **248.7** | FR 375B | - | 3-way | Left Only |
| **249.0** | Gibson Ranch Road | - | 3-way | Left Only |

The existing highway was incrementally constructed over several decades. The original SR 87 highway is currently the southbound lanes, while the northbound lanes, constructed in the 1990's, are on new alignment. Through extended corridor segments, the northbound and southbound lanes are bifurcated and follow substantially different paths through mountainous terrain. Between MP 241 and MP 246, the northbound and southbound lanes are over a mile apart. Between MP 213 and MP 216, the southbound lanes cross over the northbound lanes and the carriageways are on opposite sides than that of a typical divided highway.

The existing cross section generally includes two 12-foot wide lanes in each direction, a 4-foot wide inside shoulder, and a 10-foot wide outside shoulder. However, there are several locations where the shoulders are narrower or do not exist; specifically, areas with a concrete center median such as MP 250 to MP 245, and MP 219 to MP 229 where the inside shoulder is often less than four feet.

The posted speed limit is 65 mph for most of the corridor. The southbound lanes have a speed limit of 55 mph between MP 247.4 and MP 243.5 due to tight curves and steep grades.

Assets within the corridor include the rest area (Mazatzal Rest Area at the southeast corner of SR 87 and SR 188, currently closed), dynamic message signs (DMS) located SR 87 NB, MP 191.2; and permanent traffic counters located at, SR 87 MP 235. There is a truck escape ramp on SR 87 NB near MP 227.

### *1.4.2 Existing Right-of-Way and Land Ownership*

ADOT right-of-way width varies within the study corridor. Older sections of the right-of-way (the southbound alignment just north of Rye, for example) are approximately 200 feet in width, with newer alignments generally 400 feet. Due to the rugged terrain, the median width varies and therefore affects the overall right-of-way width.

### 1.4.3 Existing Structures

There are 20 bridge structures located within the study corridor, as shown below in **Table 3**. According to the CPS, there are no deficient bridges along the corridor.

**Table 3: Bridge Structures**

| MP | Direction | Name | Length (ft) | Width (ft) |
|---|---|---|---|---|
| **191.3** | NB | Verde River | 1,610 | 44 |
| **191.3** | SB | Verde River | 1,600 | 44 |
| **207.6** | NB | Mesquite Wash | 275 | 44 |
| **210.9** | NB | Pine Creek | 245 | 44 |
| **212.6** | NB | Sycamore Creek | 260 | 42 |
| **212.6** | SB | Sycamore Creek | 365 | 44 |
| **213.3** | SB | South Crossover | 130 | 41 |
| **214.0** | SB | Unnamed | 1,070 | 44 |
| **215.7** | SB | Unnamed | 690 | 42 |
| **216.0** | SB | North Crossover | 160 | 42 |
| **218.5** | NB | Sycamore Creek | 725 | 42 |
| **218.5** | SB | Sycamore Creek | 720 | 42 |
| **219.5** | NB/SB | Kitty Joe Creek | 865 | 84 |
| **220.4** | NB/SB | Whiskey Springs | 495 | 88 |
| **221.5** | NB/SB | Kitty Joe Creek | 615 | 85 |
| **223.2** | NB/SB | Unnamed | 265 | 85 |
| **237.3** | NB | Deer Creek | 140 | 44 |
| **237.3** | SB | Deer Creek | 175 | 44 |
| **239.3** | NB | Rye Creek | 325 | 44 |
| **239.3** | SB | Rye Creek | 340 | 44 |

### 1.4.4 Topography

The SR 87 corridor climbs from the approximately 1,500 feet elevation in Fountain Hills, AZ, to the mountains of Payson, AZ at 4,890 feet. Corridor topography is characterized by mild rolling terrain, with sections of steep elevation gains and climbs, as it heads through Tonto National Forest towards Payson, AZ. Corridor topography is characterized below in **Table 4**.

**Table 4: Corridor Topography**

| Begin | End | Approx. Begin Milepost | Approx. End Milepost | Approx. Length (miles) | Character Description |
|---|---|---|---|---|---|
| **Fort McDowell Rd** | Sycamore Creek | 191 | 213 | 22 | This rural four-lane divided segment with uninterrupted flow has relatively mild rolling topography. |
| **Sycamore Creek** | SR 188 | 213 | 235 | 22 | This rural four-lane divided segment with uninterrupted flow has steep terrain and a curvy alignment. |
| **SR 188** | Rye | 235 | 241 | 6 | This rural four-lane divided segment with uninterrupted flow has mild rolling topography. |
| **Rye** | Green Valley Pkwy/BIA 101 | 241 | 250 | 9 | This rural segment with uninterrupted flow is a climbing four-lane divided section. |

### 1.4.5 Existing Drainage

Existing drainage consists of median ditches and sheet flow to the outside of the roadway prism. Off-site drainage within the corridor is captured in either bridge structures, box culvert structures, or pipe crossings and carried underneath the existing SR 87 roadway. Bridges and culverts are located at natural drainage crossing areas except for an engineered drainage channel on the east side of the roadway between MP 226 and MP 229, and a drainage structure on the east side of the roadway and within the median between MP 240 and Rye Creek.

The SR 87 corridor traverses several watersheds throughout the approximately 60-mile study limits. The watersheds and approximate locations along the corridor are provided in **Table 5**.

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) indicate 100-year floodplain delineation within the study corridor. **Figure 3** shows floodplains and existing drainage.

**Table 5: Watersheds**

| Watershed | Mileposts | Approx. Drainage Direction |
|---|---|---|
| **Camp Creek-Lower Verde River** | 191-194 | Northeast to Southwest |
| **Lower Salt River below Saguaro Lake** | 194-201 | Northeast to Southwest |
| **Lower Salt River-Apache, Canyon, and Saguaro Lake** | 201-204 | Northwest to Southeast |
| **Mesquite Wash-Sycamore Creek** | 204-223 | Northeast to Southwest |
| **Gun Creek-Tonto Creek** | 223-229 | West to East |
| **Rye Creek-Tonto Creek** | 229-250 | North to South |

### 1.4.6 Barriers and Guardrails

The existing barriers and guardrails along the SR 87 corridor are shown in **Figure 4**. For clarity, the guardrail and barriers are shown separately for the northbound and southbound directions. The barriers and guardrails were documented from the 2016 ADOT photo log, which is currently the latest data available. There is a total of 49.06 linear miles of guardrail and 13.36 linear miles of concrete barrier throughout the corridor.

Guardrail is most prevalent in the mountainous sections of the roadway between MP 205 and MP 234, and between MP 241 and MP 245, though isolated sections of guardrail exist in other portions of the corridor. There are two significant sections of the corridor that have a central concrete barrier, between MP 218 and MP 222 and between MP 223 and MP 227.5. Most of the concrete barrier on the remainder of the corridor is on bridge structures.

### 1.4.7 Shoulder Widths

Shoulder widths were documented from the 2016 ADOT photo log. Locations where the shoulder width is less than standard for a divided highway are highlighted in **Figure 5**. Shoulder widths of less than 10 feet on the right side of the road and less than 4 feet on the left side of the road are labeled as “deficient”.

Areas with center concrete barrier are largely deficient on the left side of the roadway in both directions. Additionally, the southbound lanes of SR 87 between MP 250 and MP 246 have no shoulders on either side of the roadway, and the right shoulder on northbound SR 87 between MP 241 and MP 248 is deficient. Other isolated sections of deficient shoulders occur along the corridor sporadically.

**Figure 3: FEMA 100-Year Floodplain and Existing Drainage**

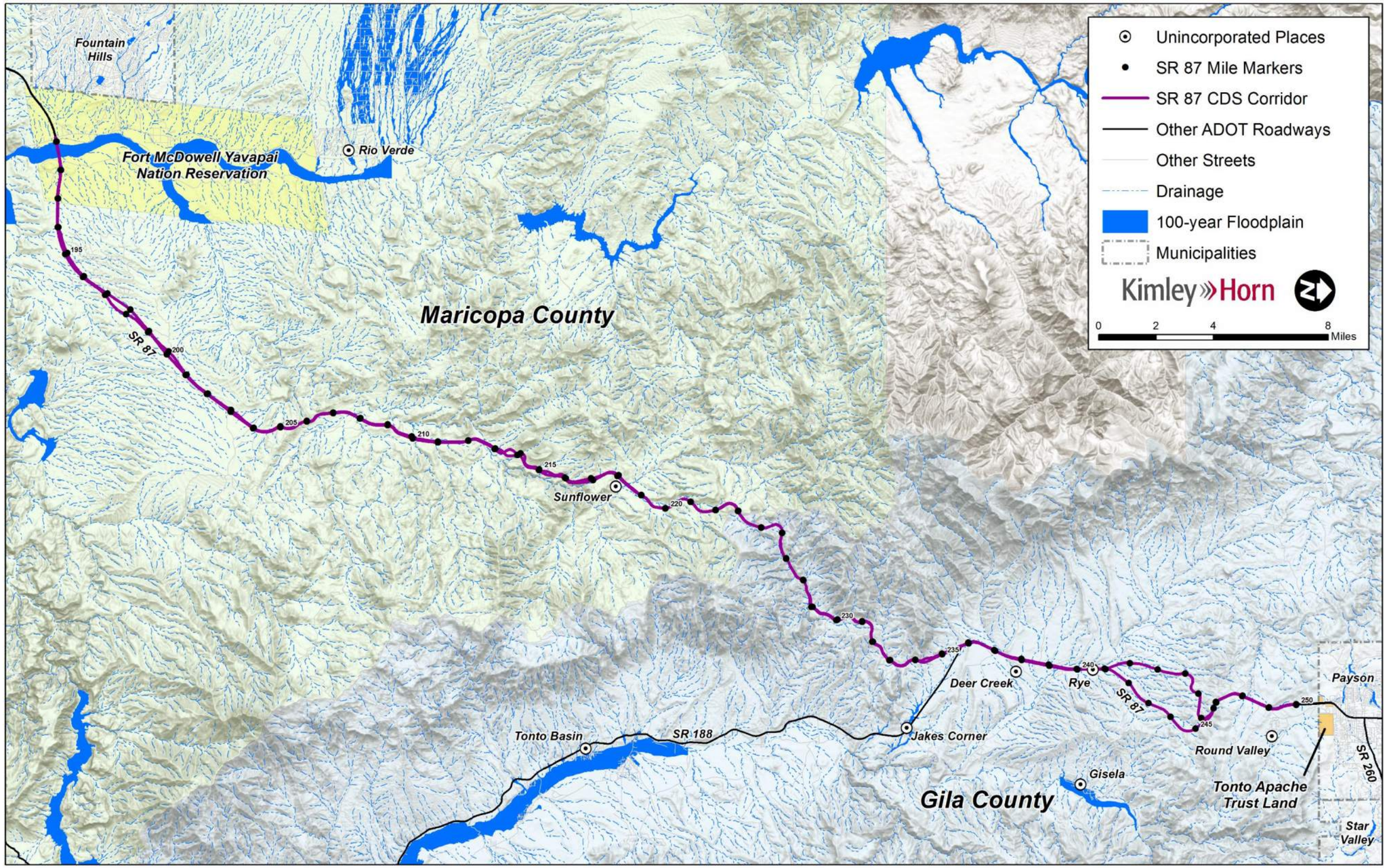
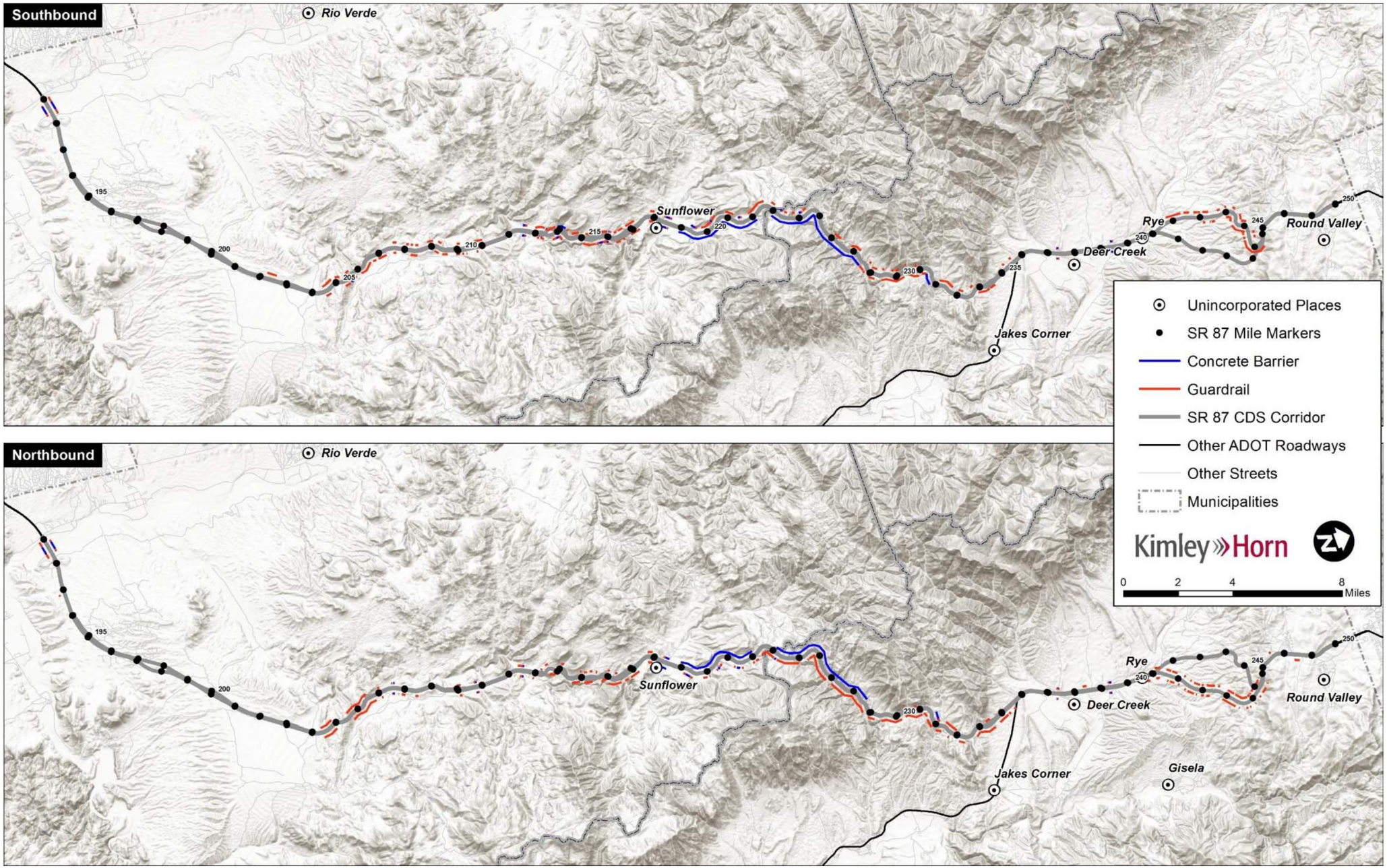


**Figure 4: Existing Guardrail and Barriers**



### 1.4.8 *Existing Utilities*

The utility companies and agencies which have facilities within or nearby the study corridor are provided in **Table 6**. Additional investigation is required during project development to identify the locations and limits of these utilities.

**Table 6: Existing Utilities**

| Owner | Facility Type |
|---|---|
| **Arizona Public Service** | Electric |
| **City of Phoenix Water Services Dept.** | Reclaimed Water, Sewer, Water |
| **Cox Communications** | CATV, Fiber |
| **CenturyLink** | Coaxial Cable, Fiber |
| **Fountain Hills Sanitary District** | Fiber, Reclaimed Water, Sewer |
| **Salt River Project** | Communication, Electric, Fiber, Irrigation |
| **TDS Telecom/AZ Telephone** | Fiber Optic, Telecom |
| **Town of Fountain Hills** | Conduit, Storm Drain |

### 1.4.9 *Geotechnical Considerations*

Several geotechnical and rock-fall issues were identified in the CPS, which have been re-evaluated and supplemented with additional locations upon further analysis. Each location is described in detail below and a map of identified geotechnical issues is provided in **Figure 6**.

#### 1.4.9.1 *Northbound MP 213.9-214.0*

On the west side of the roadway is a rock cut in weathered and heavily fractured and faulted granite. Erosion and raveling have caused fractured rock and decomposed granite to come right to the edge of pavement. The ditch width is questionably sufficient to keep this material out of the travel lanes.

#### 1.4.9.2 *Northbound MP 214.2-214.6*

This is a through cut on the original alignment of SR 87 and was not involved in the mid-1990's reconstruction. Most of the rock-fall concern relates to the cut slopes on the north side, which is on the inside of a super-elevated curve. The cut slopes that are on the south side of the highway at this location are not as tall and have slightly more favorable rock structure and ditch width.

There are two rock cuts within this stretch, a western reach (MP 214.2-214.3), and an eastern reach (MP 214.4-214.54), which are different in rock-fall character. The westernmost is comprised chiefly of heavily jointed and fractured granite which adjoins a very steep cut slope exhibiting decomposed granite overlain by colluvium forming the west end of the cut. A steep faulted contact between the two lithologies is several feet wide and is raveling and eroding. There are bodies of colluvium and old terrace gravels at places on the slope crest that release cobble size to gravel size material with some small boulders. No major kinematic instabilities were noted in this stretch, although no systematic studies were conducted to identify kinematic failure mechanisms. The chief concern is raveling of cobbles, small boulders, and jointed fragments.

The eastern reach within this interval is comprised entirely of moderately to heavily fractured, blocky granite. Despite the lack of systematic studies to identify kinematic instabilities, wedge sliding and toppling behaviors are apparent. The fractured, blocky granite is interspersed with zones of saprolite (decomposed granite) that encloses fragments of hard, angular to sub-rounded granite boulders. In this reach, the crest and face are eroding, particularly along faulted zones.

Throughout this stretch, the ditch is relatively narrow in proportion to the slope height and does not grade appreciably back toward the toe of the cut slope. Consequently, material that is released from the slope face or crest is more inclined to roll out onto the roadway shoulder or travel lanes than at other locations.

#### 1.4.9.3 *Northbound MP 215.0-216.0*

This stretch extends from MP 215 to the north crossover bridge and was not included in the mid-1990s reconstruction. The cut slopes in this reach are not very high but exhibit many different mechanisms of erosion and loosening. Near MP 215.8, on the west side, a small rockslide encroaches on the ditch. Because of the limited cut slope height, the rock fall run out potential is limited; the ditch is also quite narrow.

#### 1.4.9.4 *Southbound MP 216.2-216.5*

This is a section of road that was built as part of the mid-1990s reconstruction. At this location, a sequence of Tertiary Period valley fill sediments overlie granite above an ancient and weathered erosional surface. The depth of granite weathering below the sediment contact varies, and the cut slope was configured to ensure that the lower, steeper section was excavated entirely within the rock, and not the sediments. In this reach, several faults and dikes were encountered making high angles to the slope face. Recently, a wedge failure of moderate size has been released and sits in the ditch. Shortly after the 1990s reconstruction, the dikes and faults were already tending to erode, and consideration was given to reinforcing them with anchored shotcrete, although ultimately this treatment did not occur. The ditch seems to contain the material released from the slope, but the irregularity of the face and the amount of cleanup that has occurred in this reach is apparent.

#### 1.4.9.5 *Northbound MP 216.4-216.8*

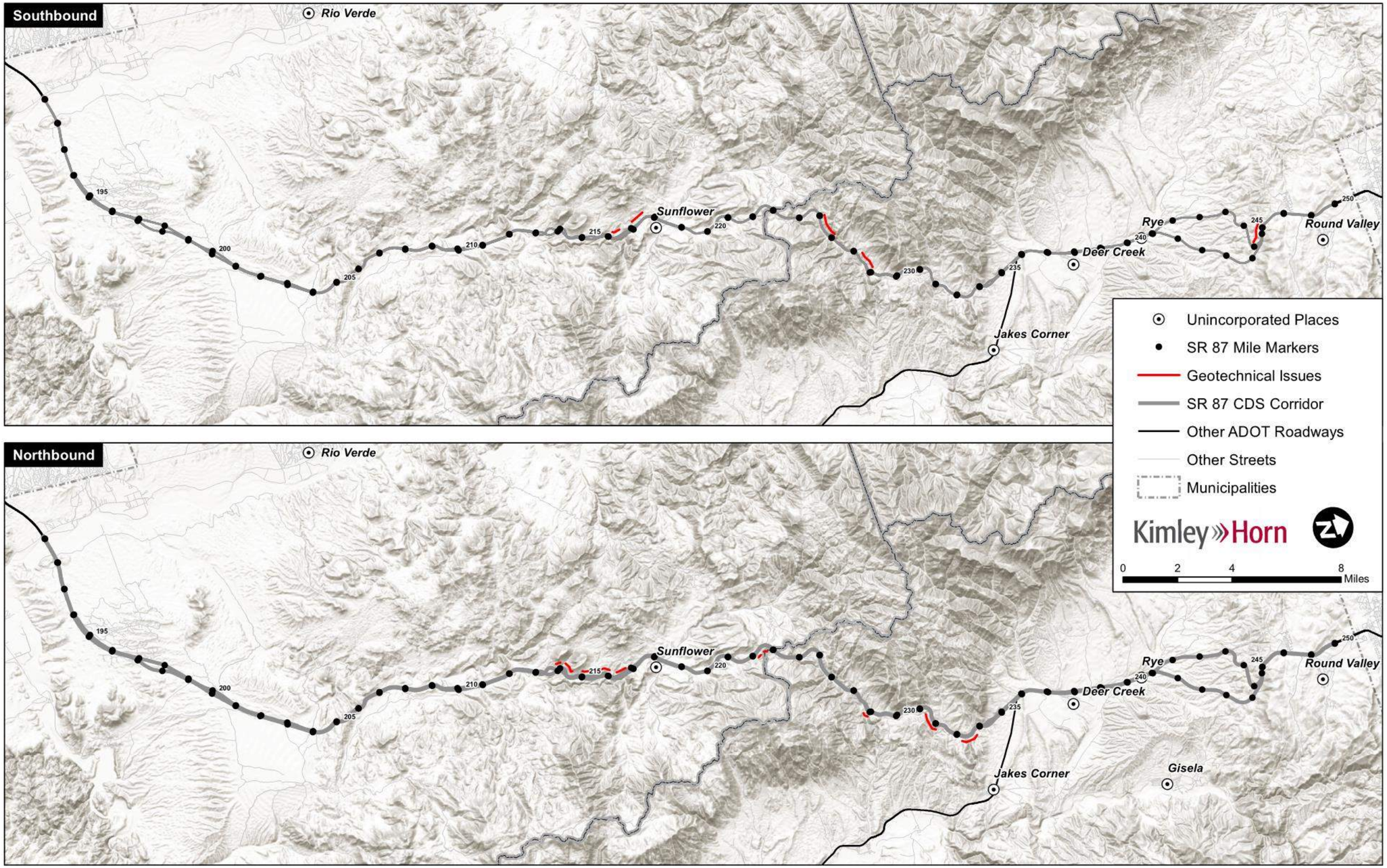
There is a relatively short cut in granite between MP 216.45 and 216.52 with a crosscutting dike exhibits plane shear failure as well as raveling from the densely fractured dike material. The ditch at this location is narrower than elsewhere along the highway. A short distance ahead, at MP 216.77 also on the northbound side, the west side rock cut contains a deeply eroded fault zone that is undercutting over-steepened material from the adjoining granite and intrusive dike assemblage.

#### 1.4.9.6 *Southbound MP 217.3-217.6*

Within this area is a feature known in the 1990s reconstruction as the "Red Cut". The east side of the northbound is comprised of unconsolidated colluvium and valley fill sediments, but the west side, on the southbound side, exhibited sediments only at the very top. Below it is a granite mass intruded by a dike and cut by a fault. During construction, this rock area failed several times, and was laid back. It has failed again along wedge forming features and has some over steepened areas. However, the ditch is quite wide, with a good cross slope, which has contained the failed material. Additional studies would be required to determine the stability of this cut area, and what, if any, action is merited.

**Figure 5: Shoulder Width Deficiencies**

**Figure 6: Identified Geotechnical Issues**



#### *1.4.9.7 Southbound MP 226.0-227.0*

The cuts along Slate Creek between approximately MP 226 and 227 on the north side appear generally stable, with localized raveling along zones of geologic discontinuities as well as erosion of small bodies of unconsolidated sediments close to the slope crests. However, because of the steepness of the terrain, any rockfall originating from the outcrops above the catch point limits could present a hazard.

Of all the rock cuts within the Slate Creek segment, the short one between MP 226.0 and 226.1 one appears to have the greatest potential for consistent production of rock fall. This stretch is characterized by a sequence of poorly stratified sediments containing a large percentage of small to large boulders in a weakly cemented sand gravel cobble matrix. Despite the wide shoulder setback, the height of the slope and the shape of the fragments that reach the shoulder enhance run out of released fragments.

#### *1.4.9.8 Southbound MP 228.2-228.5*

This stretch is at the base of the "Slate Creek" segment which was constructed in the 1970s. The cut slopes are on the north side of the roadway. The lithologies represented appear to be densely fractured and faulted bodies of granite, and metamorphic rock. The ditch has little cross slope, and typically appears to be about 25 feet wide. Additional ditch width and cross slope would aid in containment of rockfall material.

The cuts are quite high and steep. A close inspection revealed numerous plane shear and wedge geometries, for example one at about MP 228.45 where a very large wedge of rock fell out leaving a defile whose headwall exposes embedded fanglomerate or colluvial material at the crest. At other locations, prominent erosion along faults and shears, especially toward the west end of the cut before the guard rail, has resulted in isolated masses, blocks, and pinnacles.

#### *1.4.9.9 Southbound MP 228.7-229.0*

This is a through cut in a sequence of moderately to weakly cemented, somewhat stratified valley fill sands, gravel, cobbles, and small boulders. Its counterpart through cut on the northbound is almost entirely in heavily cemented fanglomerate, which was excavated with narrow catch benches, most of which have now filled up with detritus, although the bench faces themselves mostly appear quite stable and intact. The northbound slope contains the less cemented valley fill material only at the top. Therefore, it appears that the contact between the fanglomerate and valley fill material dips steeply to the northwest. On the southbound side, which was the stretch recommended for action, catch benches are no longer clear/evident, if they ever existed.

On both sides of this cut, the weakly cemented valley fill sediments exhibit some erosion and delivery of cobbles and small boulders to the ditch, especially on the left side, but there appears to be sufficient ditch width to contain the resulting rock fall. The slope on the right side is taller, but there does not appear to be much rock in the ditch, which seems to be of adequate width and cross slope. There is no evidence of large-scale rotational instability. Additional studies would be necessary to quantify the adequacy of the catchment ditches.

#### *1.4.9.10 Northbound MP 228.9-229.0*

Although the near-vertical bench faces in the cemented fanglomerate generally appear stable, the catch benches are filling up, and there is a layer of less cemented material at the top. It does not appear to be eroding extensively, as there is no slope above it to contribute drainage, but the catch benches are not adequate to attenuate the fall of any material released from the slope crest area. Material that does release from the slope face could be projected away from the face due to impact on the benches.

#### *1.4.9.11 Northbound MP 233.2-233.7*

This stretch contains through cuts in valley fill colluvium. An informal discussion with an ADOT employee who was involved in the original construction in this area observed some waste rock disposal in this area. Whether or not these cuts represent disposed waste rock is unclear but should be verified. Some of the fills show clear stratification, but others appear amorphous. The crest area is well vegetated, but the slope faces exhibit only spotty development of scrub brush. Heavy rill erosion is occurring, especially on the east side. Some very large slip outs have occurred during wet events, and have required re-contouring the slope, with additional erosional development within the re-contoured sections. Because the shoulder is so wide, there is little potential for rock-fall reaching the roadway, unless additional slip outs and mudslides take place.

#### *1.4.9.12 Southbound MP 242.0-247.0*

Although this section of roadway (Corvair Curve area) does not appear in the list of reaches of concern and does not exhibit significant rock-fall tendencies at present, the site distances are very short, and any realignment of the roadway to alleviate the sharp curvature would require cutting into the mountainside, increasing its height and possibly producing a rock-fall issue. This area was not field checked in any detail because of heavy traffic and time constraints, but the existing slopes appear to be relatively flat (1:1) and well vegetated, in deeply weathered Payson granite. Elsewhere, when steeper slopes have been attempted in the more weathered sections of Payson granite, they have often resulted in localized erosion and rock fall problems.

In the area MP 242 to MP 244.5, there are six cuts and rocks roll out into travel lanes during significant rainfall or snowmelt events.

In the area within MP 246.4 to 246.6 there are boulders at crest eroding out, and maintenance activity has occurred in the milepost range.

#### *1.4.9.13 Additional Heavy Rill Erosion*

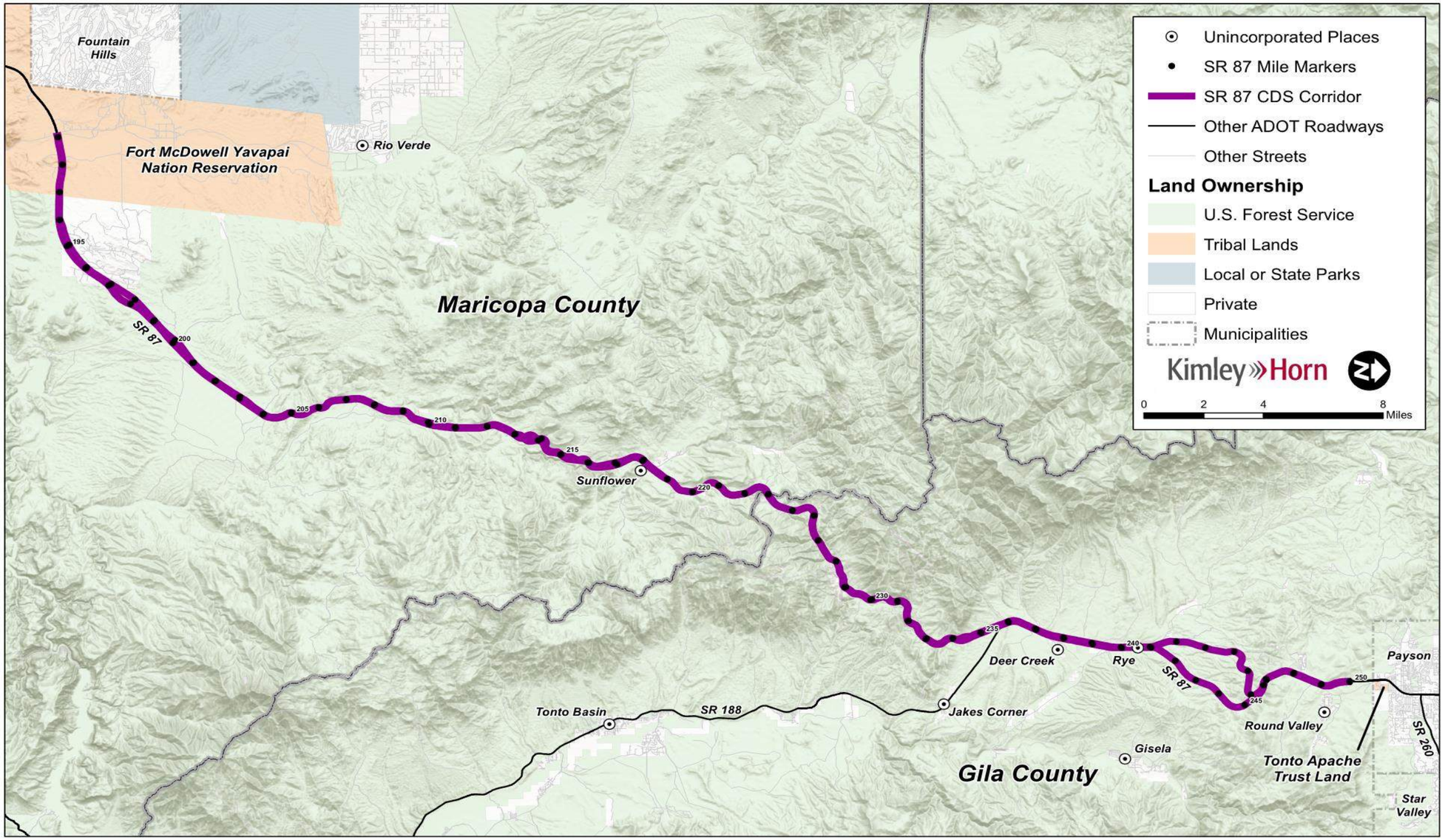
Additional heavy rill erosion is exhibited at other locations along the corridor, among them MP 231.5 to 232.1, 222.2, and 222.5 on the east side of the northbound lanes.

Various strategies have been tried within the SR 87 corridor to control erosion in the prominent slope cuts within unconsolidated material. One of the largest of these is immediately south of Sycamore Creek on the west side. It was originally constructed in the early 1990s with sinuous, lined catchment ditches, in lieu of crown ditches, extending across the slope face. Over time, heavy rill erosion developed that cut through these interceptor ditches. In the late 2000's, the reconstruction of southbound SR 87 between DOS S Ranch and Four Peaks Rd. also contained a provision to repair the eroded slope south of Sycamore Creek. A different style of catchment ditch was tried. It may be worth evaluating these different approaches in formulating an alternative strategy for control of rill erosion within the corridor.

#### *1.4.9.14 Other Issues*

stretches added subsequently, such as southbound 242-244.5 and 246.45-246.55? Or just refer the reader to the rock fall project packages for other sites?

**Figure 7: Land Ownership**



# 2 TRAFFIC AND SAFETY ANALYSIS

This chapter documents existing and projected traffic volumes, traffic patterns, and operations on SR 87 and intersecting roadways.

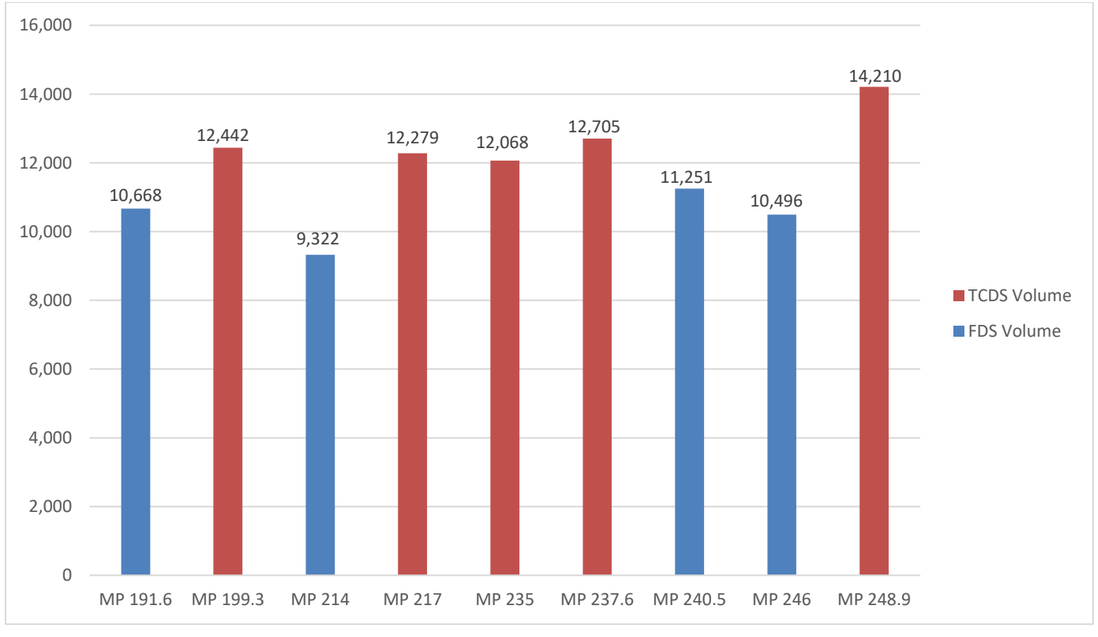
## 2.1 Traffic Data Sources

Traffic data were collected by Field Data Services of Arizona (FDS) on November 29, 2018. Count data collected include 24-hour average daily traffic (ADT) counts at four locations on the mainline of SR 87 as well as on several intersecting streets with SR 87. Data includes vehicle classification counts and speed data at select locations on the mainline SR 87. The collected data was supplemented by ADOT counts as reported to ADOT's Traffic Count Database System (TCDS). ADT counts were identified at five locations along the analysis corridor using the TCDS.

## 2.2 SR 87 Daily Traffic Volumes

The bi-directional ADT for each 24-hour count location is provided in **Figure 8**; five of the counts are from the TCDS and four are from FDS. The FDS counts were seasonally-adjusted (increased by 2%) based on data from the continuous count station located at MP 235 (refer to Section 2.3). Daily traffic volumes range from 9,300 to 14,200 vehicles per day throughout the corridor. The highest volumes in the corridor are present on the south side of Payson. The count locations are shown in **Figure 9**.

**Figure 8: Average Daily Traffic Volumes**




## 2.3 SR 87 Permanent Counter Station (Seasonal Traffic Fluctuations)

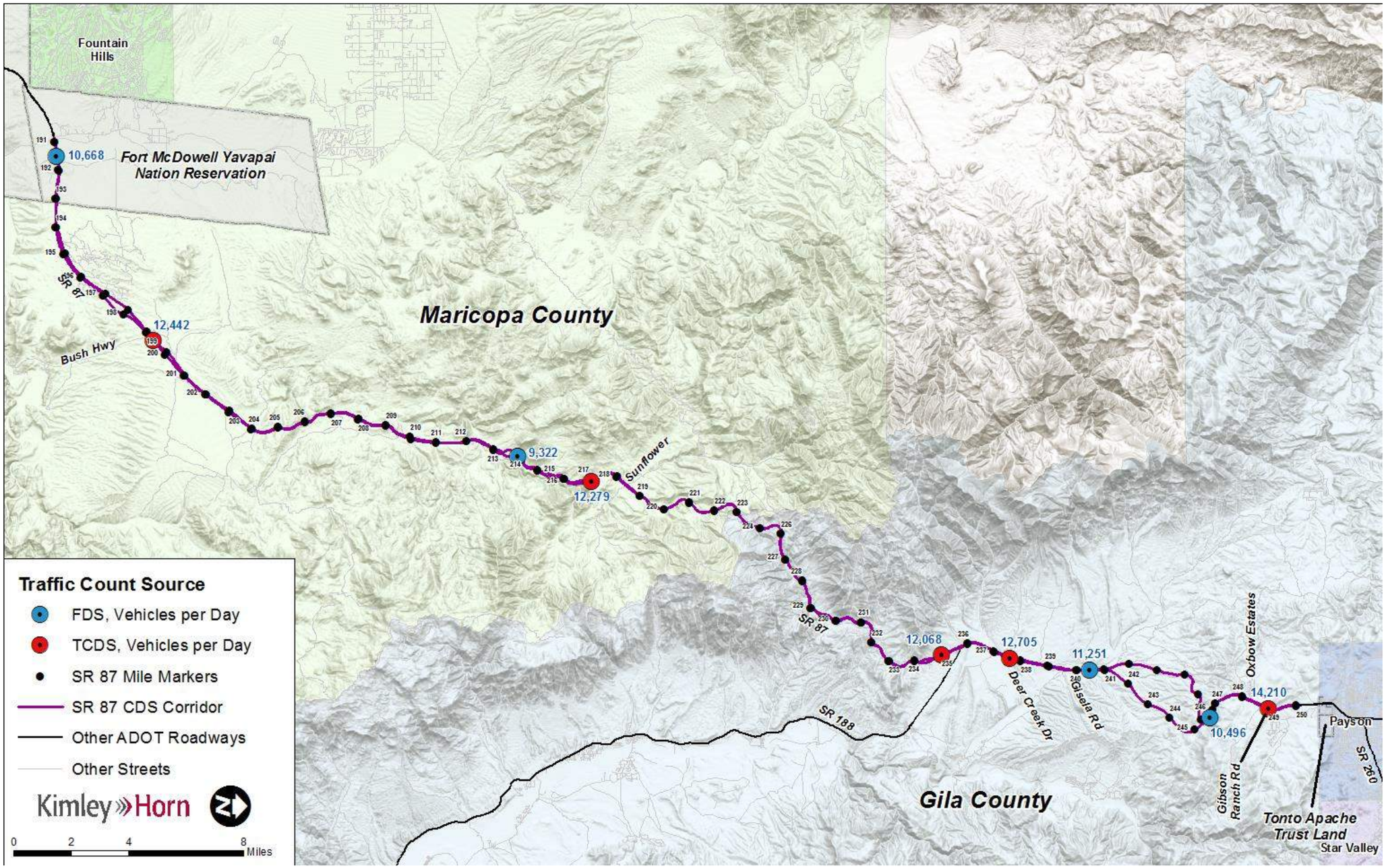
The SR 87 corridor is heavily influenced by seasonal and holiday traffic because it provides a connection between the Phoenix metro area and recreational opportunities in the mountainous northeastern part of the state. To quantify the impacts of summer and holiday travel on the corridor, the continuous count station within the corridor (located at MP 235, south of the intersection with SR 188) was analyzed for holiday and typical summer weekend travel.

Directional traffic volumes were analyzed throughout 2018 for weekdays, Fridays, Saturdays, and Sundays to assess the impact of summer travel on the corridor. Traffic volumes by day and month are provided in **Table 7** along with the total weekend travel volume (sum of Friday, Saturday, and Sunday). A comparison of the monthly average weekday and weekend volumes to the annual average weekday and weekend volumes on the SR 87 corridor at the location of the continuous count station (ID 100983, south of the SR 188 junction) shows that July is the month with the highest seasonal variation in volumes, with the July average weekday volumes being 127% of the annual average weekday volumes and the July average weekend volumes being 131% of the annual average weekend volumes.

**Table 7: Traffic Volumes by Month, 2018**

| Month | Avg. Weekday Volume | % of Annual Avg. Weekday Volume | Avg. Friday Volume | Avg. Saturday Volume | Avg. Sunday Volume | Avg. Weekend Volume | % of Annual Avg. Weekend Volume | % of Annual Avg. Weekly Traffic |
|---|---|---|---|---|---|---|---|---|
| January | 9,130 | 80% | 11,610 | 10,608 | 11,523 | 11,065 | 70% | 77% |
| February | 9,063 | 80% | 11,716 | 11,614 | 12,317 | 11,965 | 76% | 79% |
| March | 11,412 | 100% | 15,069 | 14,150 | 14,333 | 14,219 | 90% | 96% |
| April | 10,959 | 96% | 15,228 | 14,632 | 17,280 | 15,956 | 101% | 99% |
| May | 11,500 | 101% | 17,329 | 16,120 | 17,819 | 16,970 | 107% | 103% |
| June | 13,134 | 116% | 18,004 | 15,977 | 19,359 | 17,668 | 112% | 114% |
| July | 14,174 | 125% | 20,726 | 18,447 | 22,381 | 20,633 | 131% | 127% |
| August | 11,683 | 103% | 19,155 | 17,230 | 21,300 | 18,587 | 118% | 105% |
| September | 12,199 | 107% | 18,265 | 16,405 | 19,582 | 17,993 | 114% | 112% |
| October | 11,651 | 103% | 17,536 | 15,103 | 17,917 | 16,510 | 104% | 103% |
| November | 11,312 | 100% | 13,902 | 14,538 | 15,721 | 15,129 | 96% | 98% |
| December | 10,099 | 89% | 12,299 | 12,923 | 13,118 | 13,020 | 82% | 88% |
| Avg. Traffic | 11,360 | - | 15,903 | 14,812 | 16,887 | 15,810 | - | - |
| AADT | *12,068 vehicles per day* | | | | | | | |

**Figure 9: SR 87 Average Daily Traffic Count Locations**



Weekend traffic volumes during the summer can be nearly double those observed during the winter months. In addition, holiday weekends experience the highest traffic volumes. On Sunday, July 8, 2018, the permanent count station recorded a daily volume of 22,846 vehicles per day.

The directional distribution is also notable over the different days of the weekend. The predominant flow of traffic is northbound (NB) on Fridays with an average of 57.8% of the traffic traveling NB (minimum of 54.4% NB in February and November and a maximum of 62.7% NB in July). Saturdays have more balanced flow with an average of a 52%/48% directional split NB and southbound (SB), respectively. Sundays are largely the opposite of Fridays, with an average of 59.3% traveling SB (minimum of 56.3% in April and maximum of 64.5% in October). These directional splits further emphasize the impact of recreational travel on the corridor because of the observable imbalance of NB travel on Fridays and SB on Sundays, particularly in the summer months.

Throughout the stakeholder engagement process, the impact of summer weekends on corridor traffic, and holiday weekends in particular, were emphasized by agencies that have jurisdiction in the corridor. The issues are experienced most acutely toward the northern end of the corridor, where NB traffic backs up from the signalized intersections in Payson into the rural portions of the corridor. According to representatives from ADOT, the Town of Payson, and the Department of Public Safety (DPS), typical summer weekend traffic backs up to Gibson Ranch Road or Oxbow Estates (approximately MP 248.5) in the NB direction. Holiday weekends frequently see traffic backing up from Payson through Rye (approximately MP 241) with events such as a crash or a car fire backing traffic up to SR 188 (MP 235.7).

## 2.4 SR 87 Cross Road Traffic Volumes

Cross road traffic volumes were obtained from both the ADOT TCDS and count data collected by FDS. Cross road traffic volumes are provided in **Table 8** below. The roadways toward the north end of the corridor have higher overall volumes than the roadways in the southern portions of the corridor, though it should be noted that some roadways – Bush Highway in particular – have highly variable volumes due to recreational traffic.

**Table 8: Cross Road Traffic Volumes**

| Roadway | SR 87 Mile Post | ADT | Source |
|---|---|---|---|
| **Vista del Oro** | 195.2 | 194 | FDS |
| **Bush Highway** | 199.1 | 2,947 | MCDOT[1] |
| **Beeline Highway** | 218.0 | 62 | FDS |
| **Sunflower Frontage Road** | 218.0 | 458 | FDS |
| **SR 188** | 235.7 | 2,243 | FDS |
| **Deer Creek Drive** | 237.6 | 1,019 | TCDS |
| **Gisela Road (in SR 87 Median)** | 239.5 | 213 | TCDS |
| **Gisela Road (E of SR 87)** | 239.5 | 561 | TCDS |
| **Oxbow Trail** | 248.4 | 1,362 | TCDS |
| **Gibson Ranch Road** | 249.0 | 1,102 | TCDS |

[1]https://www.maricopa.gov/883/B

## 2.5 Speed Analysis

Speed data was collected by FDS at several locations along the SR 87 corridor at locations where stakeholders identified speeding as a relevant factor to safety or congestion during the stakeholder engagement process. The locations of the speed studies and collected speed data are provided in **Table 9**.

**Table 9: Speed Analysis Statistics**

| Mile Post | Dir. | Speed Limit | % of Traffic > 10mph under Speed Limit | 50th Percentile Speed | 85th Percentile Speed |
|---|---|---|---|---|---|
| **191.6** | NB | 65 | 2.7% | 72 mph | 74 mph |
| **191.6** | SB | 65 | 37.2% | 56 mph | 61 mph |
| **205.0** | NB | 65 | 8.4% | 70 mph | 74 mph |
| **214.0** | NB | 65 | 33.0% | 57 mph | 61 mph |
| **214.0** | SB | 65 | 16.3% | 65 mph | 72 mph |
| **221.0** | SB | 65 | 13.5% | 69 mph | 73 mph |
| **227.0** | NB | 65 | 16.9% | 63 mph | 69 mph |
| **240.5** | NB | 65 | 3.6% | 69 mph | 73 mph |
| **240.5** | SB | 65 | 1.5% | 72 mph | 74 mph |
| **243.5** | NB | 65 | 91.7% | 51 mph | 54 mph |
| **246.0** | NB | 65 | 44.4% | 56 mph | 63 mph |
| **246.5** | SB | 55 | 6.1% | 72 mph | 74 mph |

The speed data shows that speeding is an issue at several locations with horizontal curves, including SB MP 246.5 (Corvair Curve), where the 85th percentile speed is almost 20 mph over the speed limit; SB MP 214, which is an identified crash hot spot, and NB MP 205, which is also an identified crash hot spot.

The speed data showing percentage of traffic traveling greater than 10 mph under the speed limit supports a need for climbing lanes, including at NB MP 214 (33% greater than 10 mph under the speed limit); NB MP 227 (17% greater than 10 mph under the speed limit); and NB MP 243.5 (92% greater than 10 mph under the speed limit).

## 2.6 Future Traffic Volumes

Historical traffic volumes from the ADOT TCDS were used to develop future traffic forecasts for the 2030 and 2040 planning horizon years. There are five count locations along the corridor with historical average annual daily traffic (AADT) volumes from which historical trendlines could be developed. These count stations are located at MP 199.3, 217.0, 235.0, 237.6, and 248.9. Historical AADT volumes at each count station and their associated growth trendlines are shown in **Figure 10**.

Growth trendlines based on annual count data for every year between 1990 and 2018 were used to forecast future traffic volumes. The resulting 2030 and 2040 traffic forecasts are provided in

**Table** 10. A factor was applied to AADTs to estimate weekend volumes. Based on data from the continuous count station, weekend volumes are 39% higher than weekday volumes. This factor was used to convert forecasted AADT volumes to forecasted weekend volumes as weekend volumes are considered the “design” volumes due to how frequently volumes reach that level.

**Figure 10: Historic AADT Volumes and Growth Trendlines**

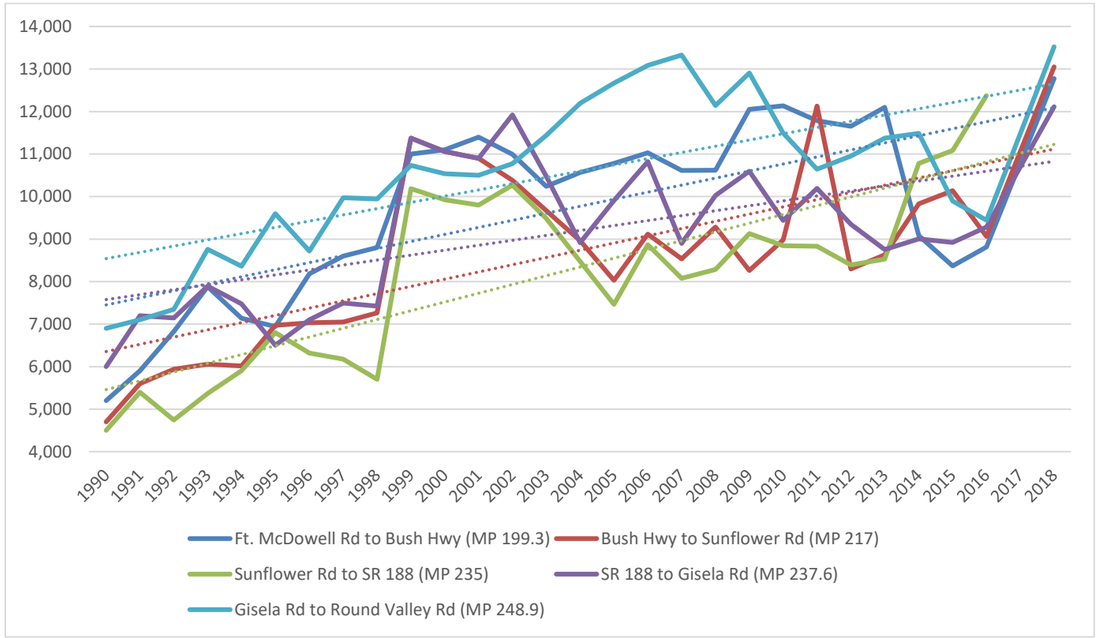



**Table 10: Forecasted AADT and Weekend Traffic Volumes**

| Segment | Annual Growth Rate* | Forecasted 2030 AADT | Forecasted 2030 Average Weekend Volumes | Forecasted 2040 AADT | Forecasted 2040 Average Weekend Volumes |
|---|---|---|---|---|---|
| **Ft. McDowell Rd to Bush Hwy (MP 199.3)** | 1.55% | 14,089 | 19,584 | 15,746 | 21,887 |
| **Bush Hwy to Sunflower Rd (MP 217)** | 1.75% | 12,990 | 18,056 | 14,691 | 20,420 |
| **Sunflower Rd to SR 188 (MP 235)** | 2.19% | 13,494 | 18,756 | 15,554 | 21,620 |
| **SR 188 to Gisela Rd (MP 237.6)** | 1.16% | 12,105 | 16,826 | 13,266 | 18,439 |
| **Gisela Rd to Round Valley Rd (MP 248.9)** | 1.26% | 14,267 | 19,831 | 15,735 | 21,871 |

***Growth rates calculated from a trendline based on annual count volumes from 1990-2018**

## 2.7 Future Traffic Operations

Roadway segment levels of service (LOS) for existing travel volumes and forecasted travel volumes were developed using the Highway Capacity Software, which uses methodologies from the Highway Capacity Manual (HCM) 2010 developed by the Transportation Research Board (TRB). The criteria for roadway segment LOS are provided in **Table 11**. These LOS within the corridor is provided in **Table 12**.

**Table 11: Level of Service Criteria for Roadway Segments**

| Level of Service | Density (pc/mi/ln)[1] |
|---|---|
| **A** | ≤11 |
| **B** | >11-18 |
| **C** | >18-26 |
| **D** | >26-35 |
| **E** | >35-45 |
| **F** | Demand exceeds capacity OR density >45 |

**Table 12: Existing and Forecasted Segment Levels of Service**

| Segment | Existing AADT | Existing Weekend | 2030 AADT | 2030 Average Weekend | 2040 AADT | 2040 Average Weekend |
|---|---|---|---|---|---|---|
| **Ft. McDowell Rd to Bush Hwy (MP 199.3)** | A | B | A | B | B | B |
| **Bush Hwy to Sunflower Rd (MP 217)** | A | B | A | B | A | B |
| **Sunflower Rd to SR 188 (MP 235)** | A | B | B | B | B | C |
| **SR 188 to Gisela Rd (MP 237.6)** | B | B | B | B | B | B |
| **Gisela Rd to Round Valley Rd (MP 248.9)** | B | C | B | C | B | C |

Levels of service are anticipated to remain at acceptable levels (LOS C or better) for the entire corridor through the planning horizon year of 2040.

## 2.8 Traffic Analysis Findings Summary

- LOS (volume/capacity) is expected to remain at acceptable levels (LOS B or better) through 2040 from an AADT perspective for all evaluated segments; however, average (and peak) weekends already experience LOS C or worse, and this condition is anticipated to further degrade over time as volumes continue to grow through 2040.
- Speed data shows high speed variability on both uphill and downhill sections, including at the following sections with historically high numbers of crashes:
  - MP 191.6 SB (5 mph difference between 50$^{th}$ and 85$^{th}$ percentile speed)
  - MP 214.0 SB (7 mph difference between 50$^{th}$ and 85$^{th}$ percentile speed)
  - MP 227.0 NB (6 mph difference between 50$^{th}$ and 85$^{th}$ percentile speed)

- MP 246.0 NB (7 mph difference between 50th and 85th percentile speed)

- Downhill sections, including Corvair curve (SB MP 245), are candidates for speed-reducing improvements to reduce the number of vehicles traveling greater than 10 mph over the speed limit.
- Uphill sections, including NB MP 213-216.5, NB MP 219-223, and NB MP 243-246.5, are candidates for capacity-enhancing improvements like climbing lanes.

## 2.9 Safety Analysis

### *2.9.1 2017 SR 87/SR 360/SR 377 Corridor Profile Study*

SR 87 between MP 191 and MP 250 was evaluated as part of the SR 87/SR 260/SR 377 Corridor Profile Study (CPS) completed in 2017. The safety performance analysis for the CPS reviewed historical crash data from 2010 to 2014 which revealed the overall corridor safety performance was "below average" compared to the performance of similar roadways on the State Highway System. Areas of concern identified in the 2017 CPS include:

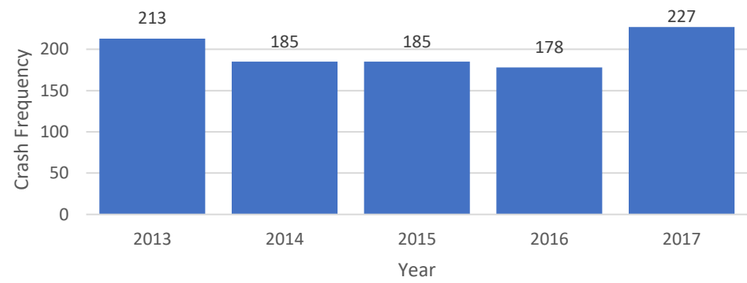
- The segment of SR 87 from Rye (MP 241) to Green Valley Pkwy/BIA 101 (MP 250) performed "below average" in the top five Arizona Strategic Highway Safety Plan (SHSP) emphasis areas. The segment of SR 87 from Fort McDowell Rd (MP 191) to SR 188 (MP 235) performed "below average" in motorcycle-involved crashes. The safety performance area became an emphasis area for the corridor in the CPS.
- SR 87 southbound at MP 246, known as Corvair Curve, has historically had many crashes. Temporary jersey barriers were placed in the past, but they have since been removed.
- The SR 188/SR 87 intersection experienced the greatest frequency of intersection related crashes. A Road Safety Assessment (RSA) was completed prior to 2016. The RSA observations identified that many vehicles ran the stop sign on SR 188. The area experiences heavy recreational use (trucks with trailers or boats). During outreach efforts for the CPS, a grade-separated interchange at SR 188/SR 87 was suggested by the District.

### *2.9.2 2013 – 2017 Corridor-Level Safety Analysis*

To gain insight into crash occurrence for the SR 87 corridor so that effective countermeasures can be identified, an updated analysis of crash data was performed for the most recent five years (2013-2017). The results of this analysis provide an overview of crash trends and patterns, and those resulting in fatalities (K) and serious injuries (A). Corridor-wide crash statistics are provided in **Figure 12**.

During the 2010 to 2014 evaluation period for the 2017 SR 87/SR 360/ SR 377 CPS, 971 crashes occurred between MP 191 and MP 250. During the 2013 to 2017 evaluation period for the 2019 SR 87 MP 191 to MP 250 CDS, 988 crashes occurred between MP 191 and MP 250, as shown in **Figure 11**. The overall trend of crash frequencies over both evaluation periods is about the same with an average of 196 crashes occurring annually. Preliminary 2018 crash statistics indicate a 6% increase in crashes along the corridor from 2017.

**Figure 11: Total Crash Frequencies (2013-2017)**




Each year, there have been between two and twelve crashes resulting in serious injury and between two and nine crashes resulting in death. **Figure 13** shows the number of crashes by injury severity. The following definitions and attributes of Injury Severity (Status) are extracted from the Model Minimum Uniform Crash Criteria (MMUCC) Guidelines, Fourth Edition (2012), as required by FHWA for MAP-21 compliance and to conform to KABCO framework. KABCO is used by law enforcement to code crashes by the severity of injury that occurs as follows:

1. No Injury (O) - No apparent injury is a situation where there is no reason to believe that the person received any bodily harm from the motor vehicle crash. There is no physical evidence of injury and the person does not report any change in normal function.
2. Possible Injury (C) - An injury reported or claimed which is not a fatal, suspected serious or suspected minor injury. Examples include momentary loss of consciousness, claim of injury, limping, or complaint of pain or nausea. Possible injuries are those which are reported by the person or are indicated by his/her behavior, but no wounds or injuries are readily evident.
3. Suspected Minor Injury (B) - A minor injury is any injury that is evident at the scene of the crash, other than fatal or serious injuries. Examples include lump on the head, abrasions, bruises, minor lacerations (cuts on the skin surface with minimal bleeding and no exposure of deeper tissue/muscle).
4. Suspected Serious Injury (A) - Any injury other than a fatal injury which results in one or more of the following:
    a. Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood
    b. Broken or distorted extremity (arm or leg)
    c. Crush injuries
    d. Suspected skull, chest, or abdominal injury other than bruises or minor lacerations
    e. Significant burns (second and third-degree burns covering 10% or more of the body)
    f. Unconsciousness when taken from the crash scene
    g. Paralysis
5. Fatal Injury (K) - Any injury that results in death within 30 days after the motor vehicle crash occurred. If the person did not die at the scene but died within 30 days of the motor vehicle crash in which the injury occurred, the injury classification should be changed from the attribute previously assigned to the attribute "Fatal Injury".

**Figure 12: SR 87 Corridor-Wide Crash Statistics (2013-2017)**

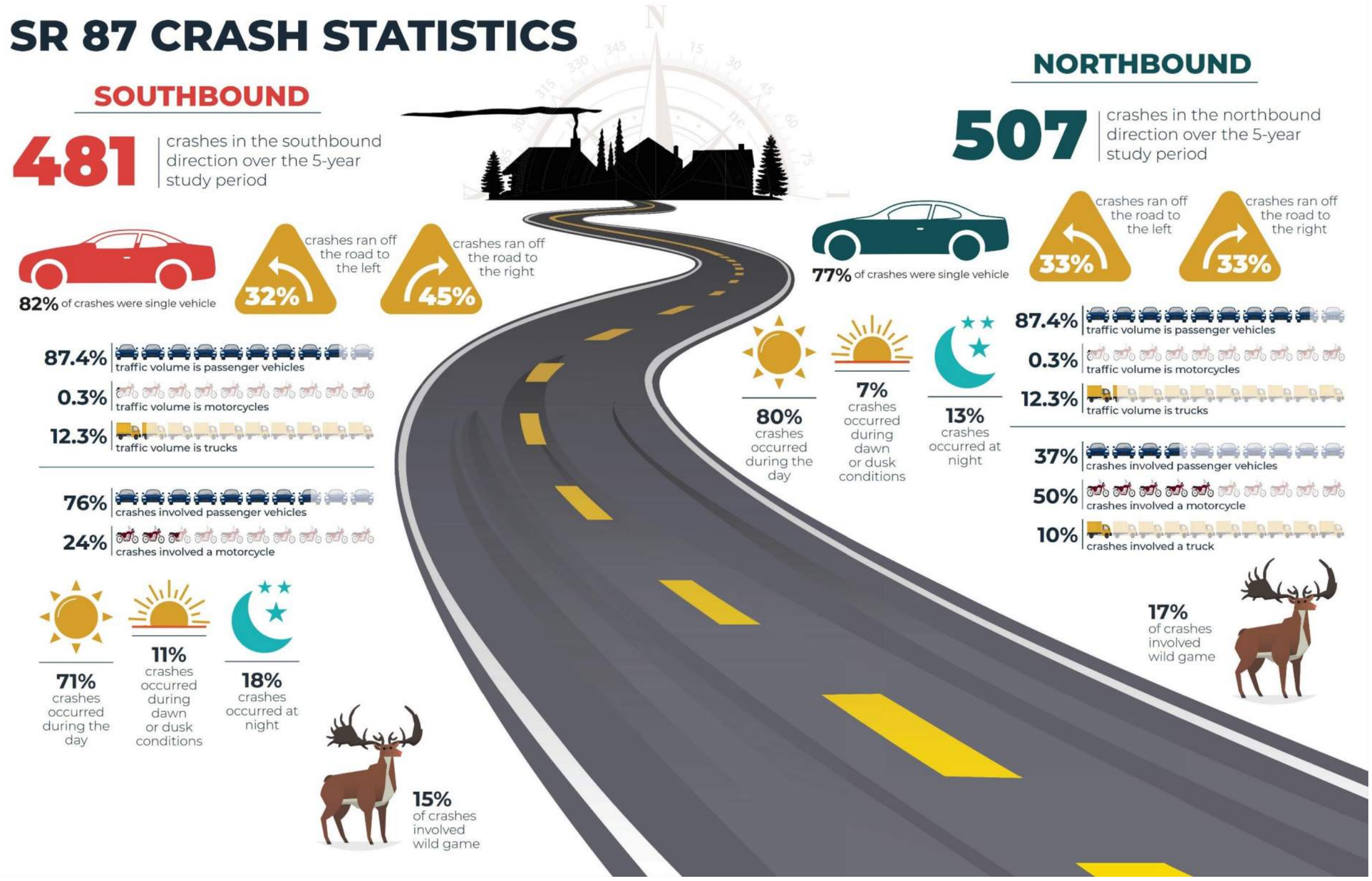
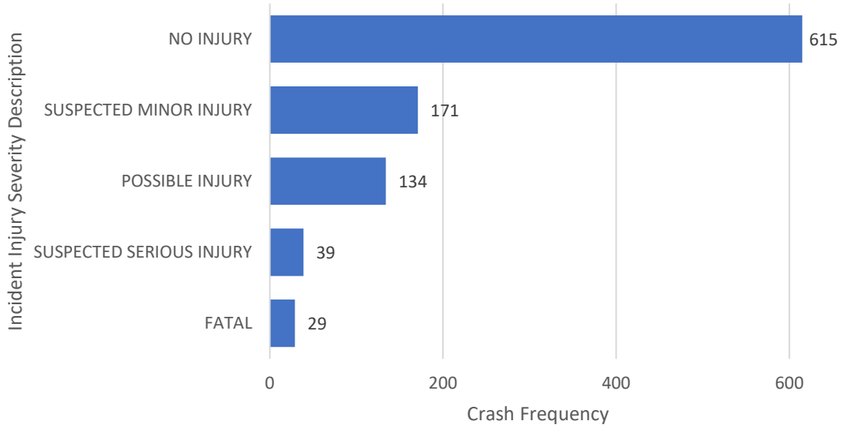
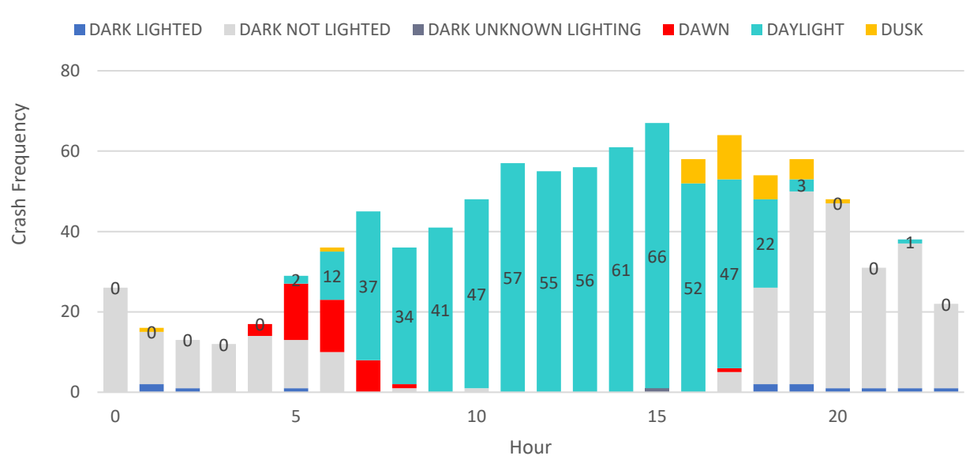


**Figure 13: Crashes by Injury Severity (2013-2017)**



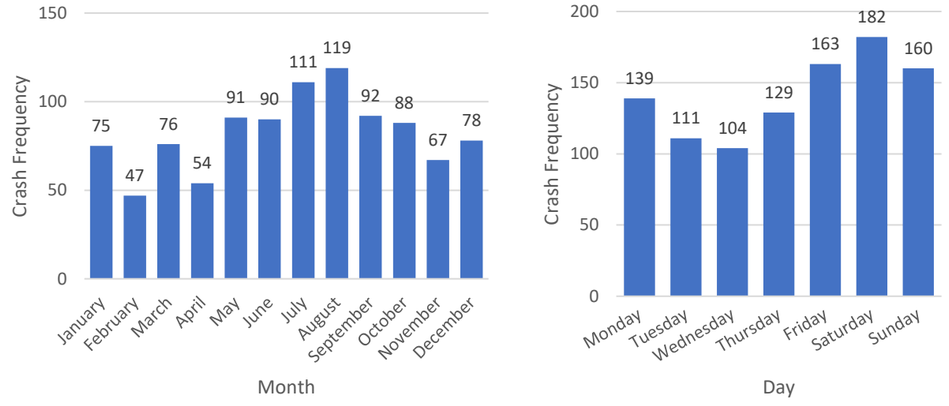

Crashes have occurred most frequently in afternoon and evening hours of the day as depicted by light condition in **Figure 14** below.

**Figure 14: Crashes by Hour of Day and Lighting Condition (2013-2017)**




The most crashes have occurred during the months of July and August and on weekends, as illustrated in **Figure 15**. This correlates with the greatest amounts of traffic on the corridor for recreation and tourism.

**Figure 15: Crashes by Month and Day (2013-2017)**




The most severe injury (A) and fatal crashes (K) have occurred during the months of March and May and on Saturdays and Sundays, as illustrated in **Figure 16**. Motorcyclists on the corridor are involved in 35% of acute injury and fatal crashes as shown in **Figure 17**; however, represent less than 1% of total traffic. The lack of a protected vehicle compartment means that motorcycle riders and passengers are much more vulnerable to injury crashes. The task of operating a motorcycle is much more demanding than operating a passenger vehicle. Riders must focus on coordinating speed and body lean, and managing traction and control, while navigating various surfaces, curves, and conditions.

**Figure 16: Severe Injury Crashes by Month and Day (2013-2017)**

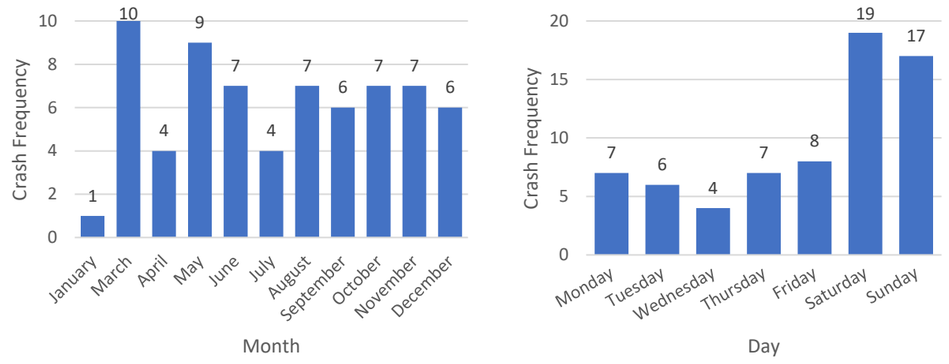
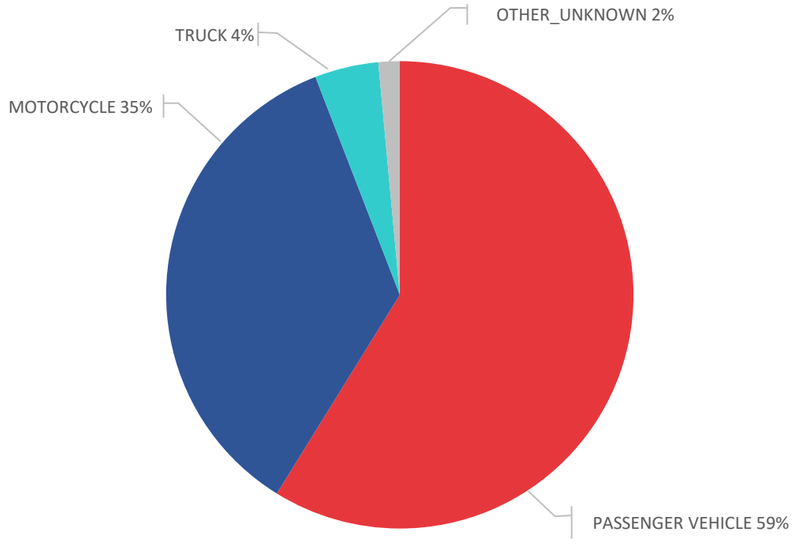


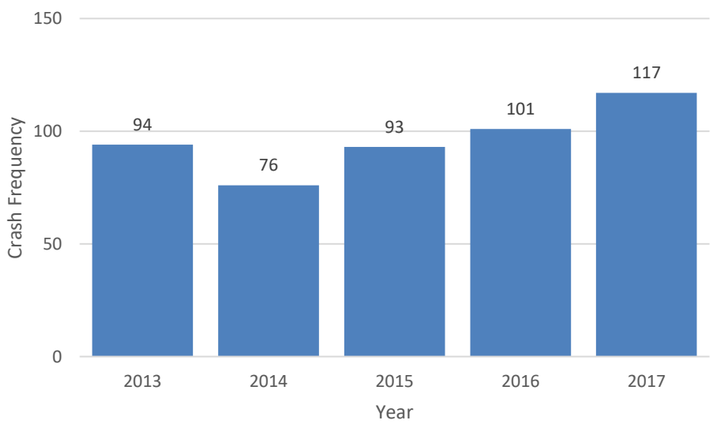
**Figure 17: Suspected Serious Injury (A) and Fatal Crashes (K) by Vehicle Type (2013-2017)**




### *2.9.3 2013 – 2017 Crash Trends and Hot Spots in the Southbound Direction*

There have been 481 crashes on SR 87 in the southbound direction between MP 191 and MP 250 over the past five years. The overall trend of crash frequencies over the five-year analysis period is increasing as shown in **Figure 18** despite the total annual crashes on the corridor maintaining a steady frequency.

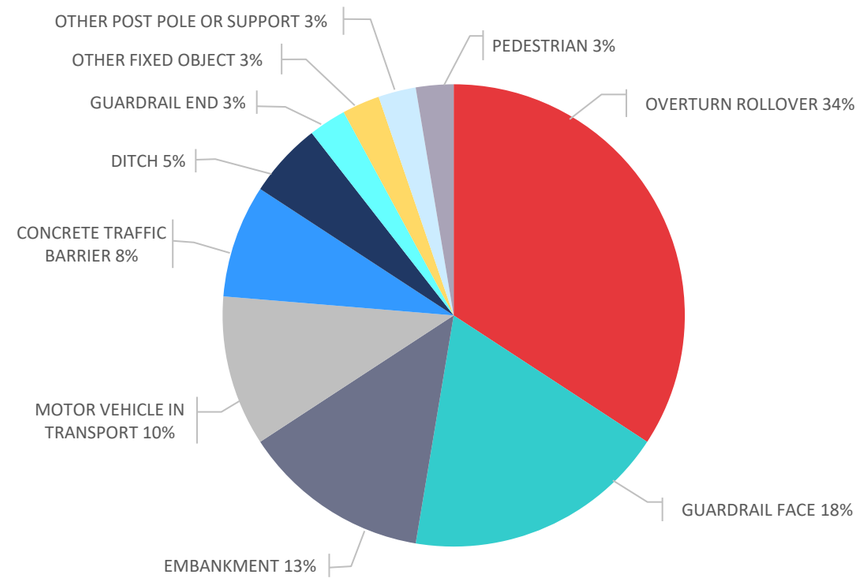
**Figure 18: Southbound Crash Frequencies (2013-2017)**




- 82% were single vehicle crashes.
- 90% of crashes occurred with dry surface conditions.
- 18% of crashes occurred at night, 71% occurred during the day, and 11% of crashes occurred during dawn or dusk conditions.
- 76% of crashes involved passenger vehicles. 24% crashes involved a motorcycle.
- Drivers were traveling too fast for conditions in 40% of the crashes.
- Alcohol, drugs, medication, or fatigue were influential in 37% of the crashes.
- 63% of drivers used a safety device (seat belt or helmet).
- 45% of crashes ran off the road to the right; 32% of crashes ran off the road to the left.

During the five-year study period, 17 crashes resulted in suspected serious injury (A) and 21 crashes resulted in death (K). A summary of first harmful event for the serious injury and fatal crashes in the southbound direction is provided in **Figure 19**.

**Figure 19: Southbound Serious Injury and Fatal Crashes by First Harmful Event (2013-2017)**




Crashes of all severities were reviewed by frequency, location, types, and trends. In the southbound direction, there is one hot spot that has a propensity for crashes as illustrated in **Figure 20** at MP 246, also known as Corvair Curve. Two additional locations were identified as hot spots for severe crashes, as illustrated in **Figure 21.** These locations have been further analyzed.

**Figure 20: Hot Spot Analysis of All Crashes (2013-2017)**

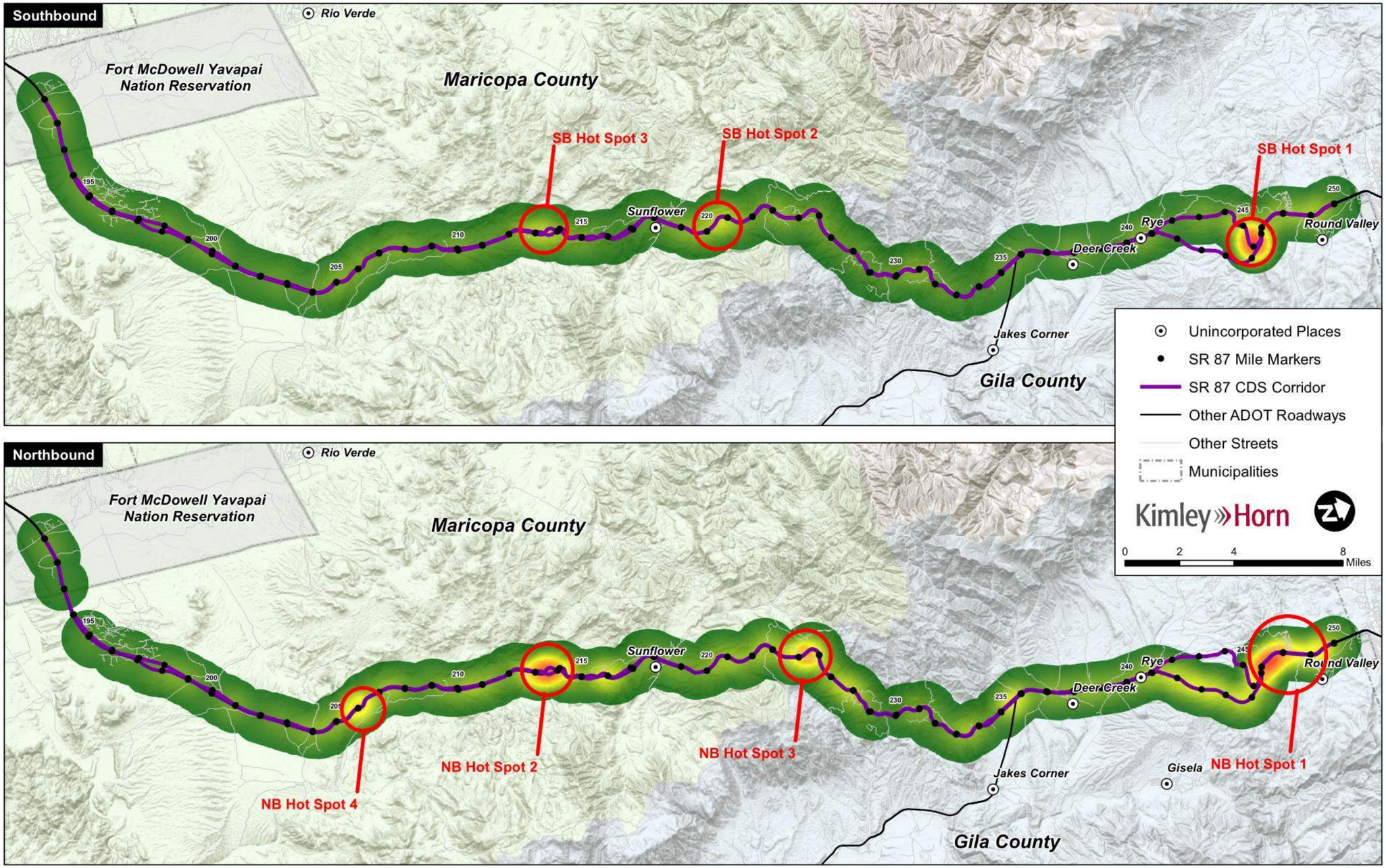
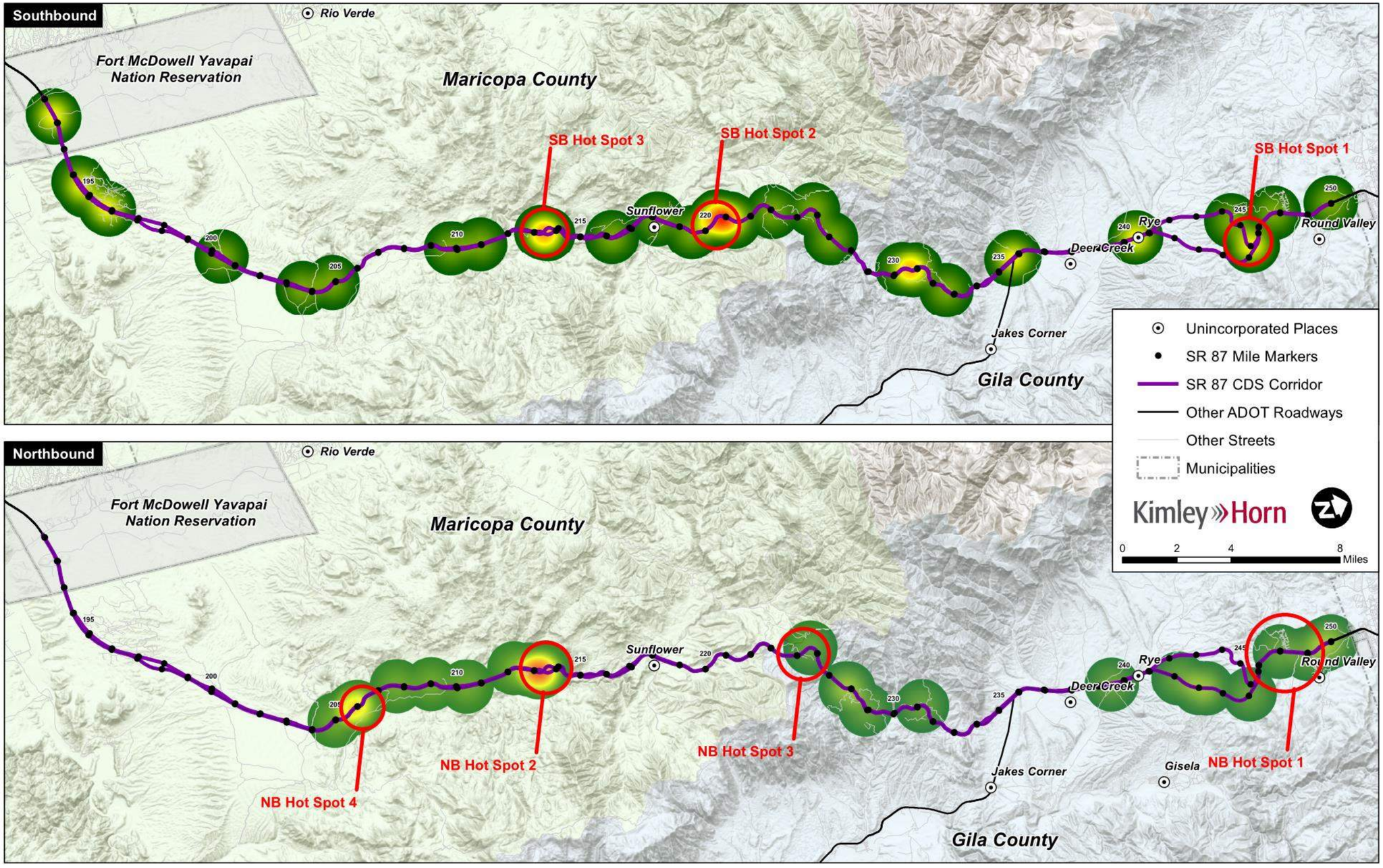


**Figure 21: Hot Spot Analysis of Serious Injury and Fatal Crashes (2013-2017)**



**SB Hot Spot Location 1 -** SR 87 southbound at MP 246, known as Corvair Curve, has historically had many crashes and continues to be identified as the most significant crash hot spot with 63 crashes on the curve (which is approximately 1.8 miles in length) for the five-year analysis period, and 41 of those crashes occurred within a 1,000-foot roadway segment within the curve. Below are statistics specifically for crashes at Corvair Curve:

- 87% were single vehicle crashes.
- 46% of crashes occurred with wet surface conditions; 11% occurred with ice, frost, or snow surface conditions.
- 46% of crashes occurred at night (there is no roadway lighting in this area).
- 94% of crashes involved passenger vehicles. One crash involved a motorcycle and two crashes involved trucks.
- Drivers were traveling too fast for conditions in 57% of the crashes.
- Alcohol, drugs, or fatigue were influential in six of the crashes.
- Four of the crashes involved wild game.
- 92% of drivers used a safety device (seat belt or helmet).
- One crash resulted in serious injury and one crash resulted in a fatality.

**SB Hot Spot Location 2 -** SR 87 southbound for the mile and a half between MP 220.0 to MP 221.5 is also identified as a hot spot for both the frequency and severity of crashes in the southbound direction, with 27 total crashes.

- 81% were single vehicle crashes.
- 15% of crashes occurred with wet surface conditions, 11% occurred with ice or frost conditions.
- 26% of crashes occurred at night (there is no roadway lighting in this area).
- 81% of crashes involved passenger vehicles, four crashes involved a motorcycle, and one involved a truck.
- Drivers were traveling too fast for conditions in 56% of the crashes.
- Alcohol was influential in two of the crashes.
- One of the crashes involved wild game, seven (26%) involved overturning, and eight (30%) struck the concrete barrier or guardrail.
- 78% of drivers used a safety device (seat belt or helmet).
- Three crashes resulted in serious injuries and two motorcycle crashes resulted in a fatality.
- 33% ran off the road to the right; 4% ran off the road to the left; 33% hit the concrete traffic barrier; four crashes involved equipment failure.

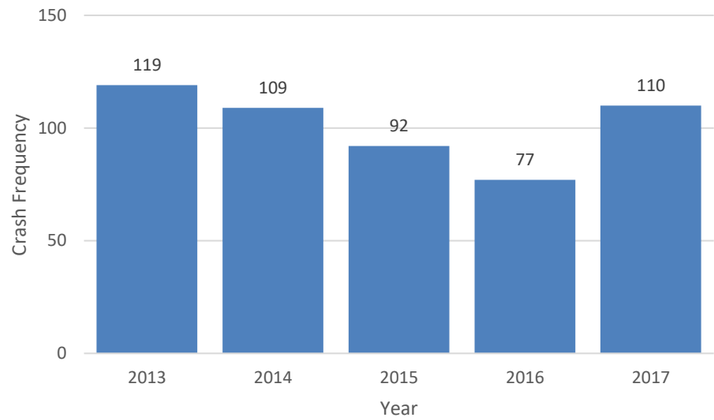
**SB Hot Spot Location 3 -** SR 87 southbound for the mile between MP 214.0 to MP 213.0 is also identified as a hot spot for both the frequency and severity of crashes in the southbound direction, with 20 total crashes.

- 48% were single vehicle crashes.
- 11% of crashes occurred with wet surface conditions.
- 19% of crashes occurred at night (there is no roadway lighting in this area).
- 75% of crashes involved passenger vehicles, two crashes involved a motorcycle, and two involved a truck.
- Drivers were traveling too fast for conditions in 33% of the crashes.
- Fatigue was influential in three of the crashes.
- Two of the crashes involved wild game, five (19%) involved overturning, and two (7%) struck the concrete barrier or guardrail.
- 63% of drivers used a safety device (seat belt or helmet).
- Two crashes resulted in serious injuries, of which, one was a motorcycle, and one crash resulted in a fatality.
- 11% ran off the road to the right; 19% ran off the road to the left; 19% hit another motor vehicle in transport; one crash involved equipment failure; one crash involved fire/explosion.

### *2.9.4 2013 – 2017 Crash Trends and Hot Spots in the Northbound Direction*

There have been 507 crashes on SR 87 in the northbound direction between MP 191 and MP 250 over the past five years. Twenty-two resulted in serious injury and eight resulted in death. The overall trend of crash frequencies has been slightly decreasing over the past five years of data as shown in **Figure 22**.

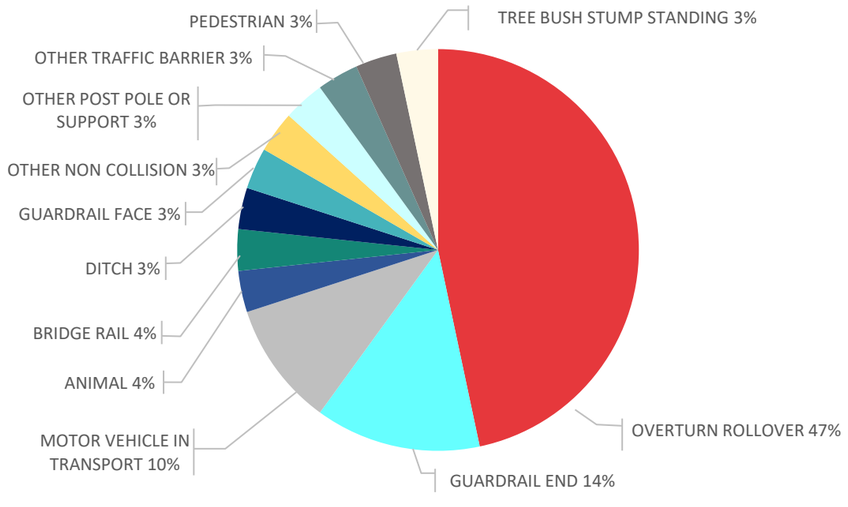
**Figure 22: Northbound Crash Frequencies (2013-2017)**




- 77% were single vehicle crashes.
- 90% of crashes occurred with dry surface conditions.
- 13% of crashes occurred at night. 80% occurred during the day.
- 37% of crashes involved passenger vehicles. 15 crashes (50%) involved a motorcycle and three crashes (10%) involved a truck.
- Drivers were traveling too fast for conditions in 43% of the crashes.
- Alcohol, drugs, or medication were influential in three (10%) of the crashes.
- One of the crashes involved wild game.
- 63% of drivers used a safety device (seat belt or helmet.)
- One of the crashes was crossover related and one was intersection related.
- 33% ran off the road to the right, 33% ran off the road to the left, two overturned, two crossed the centerline.

A summary of first harmful event for the serious injury and fatal crashes in the northbound direction is provided below in **Figure 23**.

**Figure 23: Northbound Serious Injury and Fatal Crashes by First Harmful Event (2013-2017)**




In the northbound direction, there are four notable hot spots that have a propensity for crashes as illustrated in **Figure 20**. Two of these have also been identified as hot spots for severity, as illustrated in **Figure 21**.

**NB Hot Spot Location 1** - SR 87 northbound between MP 247.0 to MP 249.9 is the hot spot with the greatest frequency of crashes in the northbound direction, with 62 crashes.

- 81% were single vehicle crashes.
- 95% of crashes occurred with dry surface conditions and one crash occurred with snowy surface conditions.
- 48% of crashes occurred at night (there is limited roadway lighting in this area).
- 79% of crashes involved passenger vehicles. More than half of these were “pickup trucks less than one ton”. Two crashes involved a motorcycle and eight crashes involved trucks.
- Drivers were traveling too fast for conditions in 19% of the crashes.
- Alcohol or fatigue were influential in six (10%) of the crashes.
- 45% of crashes involved wild game.
- 90% of drivers used a safety device (seat belt or helmet).
- One crash resulted in serious injury and two crashes resulted in fatalities.
- 24% of crashes ran off the road to the right; 13% ran off the road to the left; one overturned; two crossed the centerline and three involved a fire or explosion.
- Four crashes were intersection or crossover related.

**NB Hot Spot Location 2 -** SR 87 northbound between MP 213.0 to MP 214.9 is an identified hot spot for both the frequency and severity of crashes, with 48 crashes.

- 88% were single vehicle crashes.
- 77% of crashes occurred with dry surface conditions. 17% of crashes occurred with wet surface conditions, three crashes occurred with ice or frost surface conditions, and debris contributed to four crashes (three involving motorcycles).
- 19% of crashes occurred at night (there is no roadway lighting in this area).
- 60% of crashes involved passenger vehicles, 16 crashes (33%) involved a motorcycle, and two crashes involved trucks.
- Drivers were traveling too fast for conditions in 50% of the crashes.
- Fatigue was influential in two of the crashes.
- 13% of crashes involved wild game.
- 85% of drivers used a safety device (seat belt or helmet.)
- Six crashes resulted in serious injuries (all were motorcyclists), but there were no fatalities.
- 31% ran off the road to the right; 17% ran off the road to the left; 15% ran off the road into an embankment, guardrail, or other non-fixed object; one crossed the centerline, two involved a fire or explosion; and four involved equipment failures.
- Six occurred from MP 213.2 to MP 213.5 where the driver was negotiating a curve, ran off the road to the right, and the vehicle overturned. There is no guardrail or barrier on the right side of the roadway between MP 213 and MP 213.41.

**NB Hot Spot Location 3 -** SR 87 northbound between MP 223.8 to MP 224.8 is a hot spot for crash frequencies, with 30 crashes.

- 77% were single vehicle crashes.
- 65% of crashes occurred with dry surface conditions, 19% of crashes occurred with wet surface conditions, and 15% of crashes occurred with snow surface conditions.
- 38% of crashes occurred at night (there is no roadway lighting in this area).
- 92% of crashes involved passenger vehicles and one crash involved a truck.
- Drivers were traveling too fast for conditions in 50% of the crashes.
- Alcohol, illness, or fatigue was influential in four of the crashes.
- No crashes involved wild game.
- 88% of drivers used a safety device (seat belt or helmet).
- One crash resulted in a serious injury; there were no fatalities.
- 23% ran off the road to the right; 12% ran off the road to the left; 27% ran off the road into guardrail or concrete traffic barrier; two involved a fire or explosion; and three involved equipment failures.

**NB Hot Spot Location 4 -** SR 87 northbound between MP 205.0 and MP 206.5 is an identified hot spot for both the frequency and severity of crashes with 27 total crashes.

- 85% were single vehicle crashes.
- 85% of crashes occurred with dry surface conditions and 15% of crashes occurred with wet surface conditions.
- 11% of crashes occurred at night (there is no roadway lighting in this area).
- 56% of crashes involved passenger vehicles and 44% of crashes involved a motorcycle.
- Drivers were traveling too fast for conditions in 26% of the crashes.

- Alcohol was influential in one of the crashes.
- 37% of crashes involved a vehicle overturning.
- 78% of drivers used a safety device (seat belt or helmet.)
- Three crashes involving motorcyclists resulted in serious injuries, two crashes involving motorcyclists striking a guardrail end or face resulted in fatalities.
- 56% ran off the road to the left; 11% ran off the road into guardrail; one involved a fire or explosion; one involved equipment failure; one crossed the centerline; and four overturned or jackknifed.

### *2.9.5 2013 – 2017 Intersection and Intersection-Related Crash Trends and Hot Spots*

There are 33 intersections on SR 87 from MP 191 to MP 250. There are relatively few intersection-related crashes, with 18 occurring within the five-year analysis period as summarized below in Table 13.

**Table 13: Intersection Crash History**

| MP | Intersection | Grade Separated | Access | Crashes |
|---|---|---|---|---|
| **191.8** | Hiawatha Hood Road | No | 4-way | 1 |
| **192.1** | Rodeo Drive | No | 4-way | 0 |
| **194.5** | Burnt Water Tail | No | 3-way | 0 |
| **195.2** | Vista del Oro | No | 3-way | 0 |
| **196.0** | Goldfield Road | No | 3-way | 0 |
| **196.3** | Pleasant View Road | No | Right-in-right-out | 1 |
| **196.6** | Median Crossover | No | 3-way | 0 |
| **197.3** | Meridian Road | No | Right-in-right-out | 0 |
| **199.1** | Bush Highway | Yes | Diamond Interchange | 0 |
| **203.9** | Cline Cabin Road | No | 4-way | 1 |
| **207.8** | FR 68 Access Road | No | 4-way | 1 |
| **209.5** | FR 68 | No | 4-way | 0 |
| **210.5** | Ballantine Trailhead | No | 4-way | 1 |
| **212.7** | Sycamore Creek | No | 4-way | 1 |
| **217.4** | FR 1704 | No | 3-way | 0 |
| **218.0** | Sunflower | No | 4-way | 0 |
| **218.5** | FR 22 | No | 3-way | 0 |
| **220.0** | Unnamed Road | No | Right-in-right-out | 0 |
| **222.7** | FR 626 | No | 4-way | 0 |
| **229.6** | FR 26 | Yes | Right-in-right-out | 1 |
| **235.7** | SR 188 | No | 4-way | 4 |
| **236.7** | Unnamed Road | No | 3-way | 0 |
| **237.6** | Deer Creek Drive | No | 4-way | 0 |
| **238.5** | FR 1438 | No | 3-way | 0 |
| **239.2** | Barnhardt Road | No | 4-way | 0 |
| **239.5** | Gisela Road | No | 3-way | 1 |
| **240.0** | Matlock Gas | No | 3-way | 1 |
| **240.5** | South Rye Crossover | No | 4-way | 2 |
| **240.8** | North Rye Crossover | No | 4-way | 0 |
| **247.8** | FR 535 | No | 3-way | 1 |
| **248.4** | Ox Bow Estates | No | 3-way | 0 |
| **248.7** | FR 375B | No | 3-way | 0 |
| **249.0** | Gibson Ranch Road | No | 3-way | 2 |

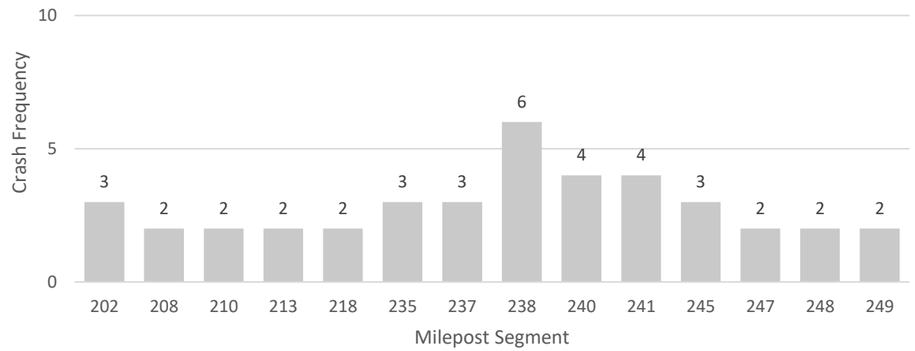
The SR 188/SR 87 intersection experienced the most intersection-related crashes. In 2016, signage, rumble strips, and turn lanes were added at the SR 188/SR 87 intersection upon recommendation of a Road Safety Assessment (RSA). There were no recorded crashes at this intersection in 2017. There is insufficient crash data available for a period after the improvements were made to draw conclusions from the improvements.

### *2.9.6 2013 – 2017 Other Crash Trends and Hot Spots*

#### *2.9.6.1 Animal – Related Crashes*

The most crashes involving animals have occurred on SR 87 SB between MP 238.0 and MP 238.9, as illustrated below in **Figure 24**, where SR 87 transverses Clover Wash and roadside vegetation is denser. Rye Creek to the north and Deer Creek to the south form part of the Tonto Creek Basin where wild game is prevalent.

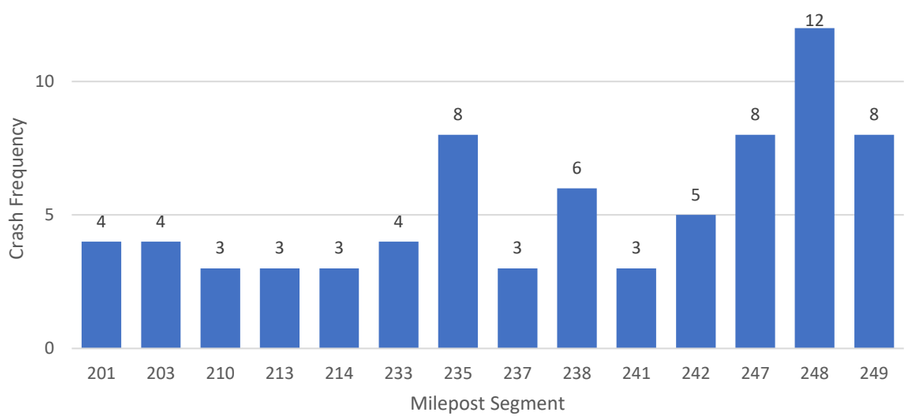
**Figure 24: Top 10 Southbound Segments for Animal-related Incidents**




The most crashes involving animals have occurred on SR 87 NB between MP 235.0 and MP 235.9, MP 238.0 and MP 238.9, MP 247.0 and MP 249.9 as illustrated below in **Figure 25**, where wild game is prevalent and roadside vegetation is denser. Between MP 235.0 and MP 235.9, there appears to be a water source to the east of SR 87 which may be attracting wild game.

Arizona is home to approximately 35,000 elk. The preferred and most effective wildlife mitigation on State highways are underpasses and overpasses in combination with wildlife fencing in between to direct the animals to these crossings. An at-grade elk detection and warning system currently exists on SR 260 (two lanes), ten miles east of Payson. Installed in 2007, at a cost of $700,000 for the three-mile project area, the system has reduced elk-vehicle crashes by 98%; from an average of 11 elk-vehicle collision per year to three over 10 years. Due to the volumes and speed of motor vehicle traffic on SR 87, an at-grade elk crossing is not recommended. Dynamic elk warning systems should be explored at hot spots for animal-related incidents as a near-term safety countermeasure. ADOT should coordinate with AGFD to locate and design grade separated crossings as the ultimate countermeasure.

**Figure 25: Top 10 Northbound Segments for Animal-related Incidents**




### *2.9.6.2 Rollover Crashes*

Rollover incidents are more likely to result in serious injury or death. Drivers travelling too fast for conditions navigating curves, swerving to avoid an object in the road, or who are impaired are more likely to lose control of their vehicle and run off the road. Depending on their vehicle type and presence of physical barriers, the vehicle may overturn. As depicted in **Figure 26** and **Figure 27**, the most rollover incidents occurred in the segment of SR 87 SB mileposts 194, 220, and 249 and in the segment of SR 87 NB mileposts 205, 207, and 213.

**Figure 26: Top 10 Southbound Segments for Rollover Incidents**

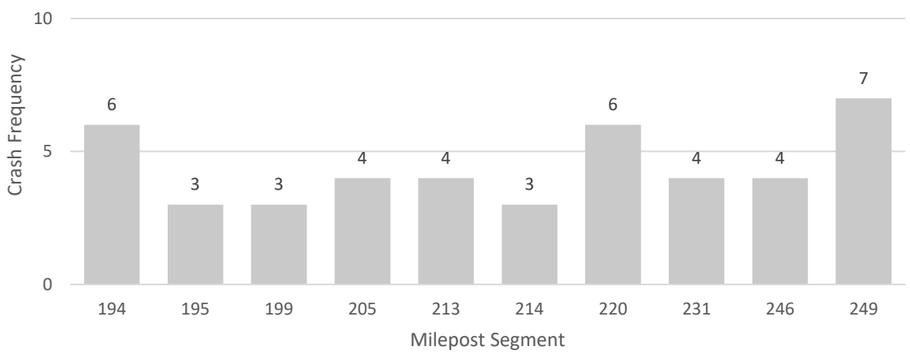
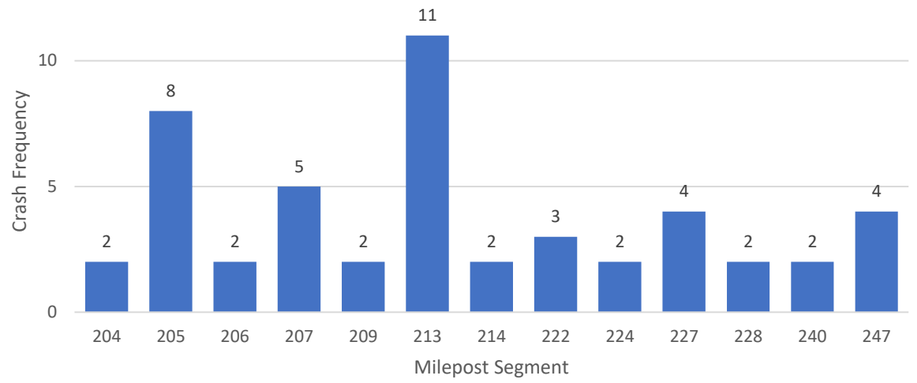



**Figure 27: Top 10 Northbound Segments for Rollover Incidents**




### *2.9.6.3 Debris-related Crashes*

There is a history of rockfall from embankments along the corridor. **Figure 28** and **Figure 29** indicate the segments along the corridor with the highest crash experience related to debris in the roadway.

**Figure 28: Top Southbound Segments for Incidents with Debris in the Roadway**

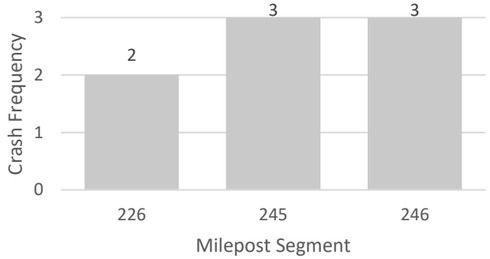
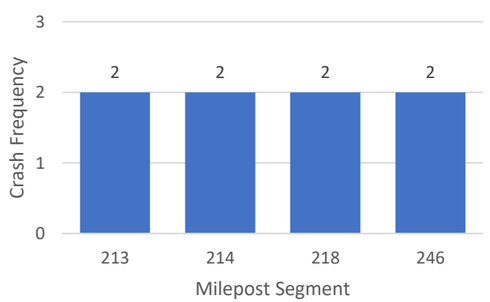



**Figure 29: Top Northbound Segments for Incidents with Debris in the Roadway**



### *2.9.7 Corridor Safety Analysis Summary*

The corridor safety analysis reveals the need to address crashes on horizontal curves, speeding-related crashes, crashes involving motorcycles, and run-off-road crashes. Likely contributing factors were developed based on the information obtained through the overall crash analysis, hot spot crash summaries, and previously completed safety-related projects. The following are primary contributing factors of crashes on SR 87 between MP 191 and MP 250:

- Speed too fast for conditions
- Roadway departure
- Pavement surface condition
- Improper lane changes
- Shoulder/rumble strip condition
- Roadway geometry
- Clear zone slopes and obstructions
- Slippery/wet pavement surface
- Animals on roadway
- Inadequate lighting
- Driving under the influence

The locations where solutions will be investigated in more depth are summarized below in **Table 14**.

### *2.9.8 Crash Variability and Regression to the Mean*

Crashes are random events that naturally fluctuate over time at any given site. Over a span of several years, crash data fluctuates between several high and low points around an expected average crash frequency. A short-term average crash frequency may be significantly higher or lower than the long-term average crash frequency. Typically, a minimum of three years of crash data is used for analysis. Five years of data was used in the analysis for the 2017 CPS and this study to avoid the regression to the mean phenomenon; however, shifts in the locations of crash hot spots along the corridor were observed between the two analysis periods. Safety countermeasures proposed in this study include both spot improvements and systemic improvements, which identify sites based on roadway characteristics.

**Table 14: Safety Summary on the SR 87 Corridor**

| Direction | Approx. Begin | Approx. End | Crash Frequency (per mile) | Description |
|---|---|---|---|---|
| **Northbound Corridor** | 191.0 | 250.0 | 507 (8.6) | • 77% were single vehicle crashes<br>• 50% involved a motorcycle<br>• 10% involved a truck<br>• 66% of vehicles ran off road<br>• Vehicles overturning, hitting guardrail end, and hitting other vehicles resulted in 70% of serious injury and fatal crashes |
| **Northbound Hotspot** | 205.0 | 206.5 | 27 (16.9) | • 15% occurred with wet surface conditions<br>• 44% involved a motorcycle<br>• 37% involved overturning<br>• 56% of vehicles ran off the road to the left<br>• 15% involved overturning or jackknifing |
| **Northbound Hotspot** | 205.0 | 205.9 | 8 (8.0) | • Crashes in the hot spot involved overturning |
| **Northbound Hotspot** | 213.0 | 214.0 | 48 (43.6) | • 23% occurred with wet, ice, or frost surface conditions<br>• 8% involved debris in the roadway<br>• 13% involved wild game<br>• 33% involved a motorcycle<br>• 48% of vehicles ran off the road |
| **Northbound Hotspot** | 213.0 | 213.9 | 11 (11.0) | • Crashes in the hot spot involved overturning |
| **Northbound Hotspot** | 223.8 | 224.8 | 30 (27.3) | • 34% occurred with wet or snow surface conditions<br>• 38% occurred at night<br>• 50% of drivers were traveling too fast for conditions<br>• 13% involved impairment<br>• 35% of vehicles ran off the road<br>• 27% of vehicles struck guardrail or concrete traffic barrier |
| **Northbound Hotspot** | 235.0 | 235.9 | 8 (8.0) | • Crashes involved wild game |
| **Northbound Hotspot** | 247.0 | 249.9 | 62 (21.4) | • 48% occurred at night<br>• 13% involved a truck<br>• 45% of crashes involved wild game<br>• 10% involved impairment<br>• 37% of vehicles ran off the road |
| **Northbound Hotspot** | 247.0 | 249.9 | 28 (9.7) | • Crashes in the hot spot involved wild game |
| **Southbound Corridor** | 250.0 | 191.0 | 481 (8.1) | • 82% were single vehicle crashes<br>• 24% involved a motorcycle<br>• 37% involved impairment<br>• 77% of vehicles ran off the road<br>• Vehicles overturning, hitting guardrail face, and hitting embankments resulted in 66% of serious injury and fatal crashes |
| **Southbound Hotspot** | 246.0 | 246.9 | 63 (63.0) | • 57% occurred with wet, ice, frost, or snow surface conditions<br>• 46% occurred at night<br>• 57% of drivers were traveling too fast for conditions<br>• 10% involved impairment |
| **Southbound Hotspot** | 194.9 | 194.0 | 6 (6.0) | • Crashes involved overturning |
| **Southbound Hotspot** | 220.0 | 221.5 | 27 (16.9) | • 26% occurred with wet, ice, frost, or snow surface conditions<br>• 56% of drivers were traveling too fast for conditions<br>• 26% involved overturning<br>• 33% ran off the road to the right |
| **Southbound Hotspot** | 220.9 | 220.0 | 6 (6.0) | • Crashes in the hot spot involved overturning |
| **Southbound Hotspot** | 238.9 | 238.0 | 6 (6.0) | • Crashes involved wild game |
| **Southbound Hotspot** | 249.9 | 249.0 | 7 (7.0) | • Crashes involved overturning |

# 3 ENVIRONMENTAL OVERVIEW (CORRIDOR LEVEL)

The following Environmental Overview (EO) documents environmental conditions within the SR 87 corridor study area to identify environmental opportunities and constraints that will be considered in developing and evaluating potential roadway improvements.

## 3.1 Affected Environment

### *3.1.1 Physical and Natural Environment*

#### *3.1.1.1 Topography/Physiology*

The EO study area consists of the existing ADOT right-of-way (ROW) along the study corridor. The SR 87 study area extends through multiple jurisdictions and land owned or managed by various entities in Maricopa and Gila counties. The southern portion of the corridor from MP 191 to MP 193, crosses the Fort McDowell-Yavapai Nation (FMYN) Reservation. From MP 193 to MP 250, SR 87 travels through the Tonto National Forest (TNF), though there is a mix of private lands at various locations along the corridor; most notably near Sunflower, Deer Creek, and Rye. The study area passes through the southern end of the McDowell Mountains, traverses the Mazatzal Mountains, crosses Sycamore Valley and Tonto Basin, increasing in elevation from approximately 1,365 feet above mean sea level (MSL) at MP 191 to 4,990 feet above MSL at MP 250.

#### *3.1.1.2 Vegetation*

According to Biotic Communities, Southwestern United States and Northwestern Mexico, the study area passes through the Arizona Upland Subdivision-Sonoran Desertscrub, Semi-Desert Grassland, Interior Chaparral, and Great Basin Conifer Woodland biotic communities. The majority of the study area is disturbed as it consists of SR 87 and associated roadway improvements (shoulders, entrance and exit ramps, turning lanes, bridges, emergency vehicle turnarounds, and bypasses). Areas adjacent to SR 87 primarily consist of undeveloped native lands. Vegetation within the study area consists of agave (*Agave sp*.), Arizona cypress (*Cupressus arizonica*), barrel cactus (*Ferocactus wislizenii*), blue paloverde (*Cercidium floridum*), buckhorn cholla (*Opuntia acanthocarpa*), catclaw acacia (*Acacia greggii*), creosote (*Larrea tridentata*), Engelmann's prickly pear (*Opuntia engelmannii*), foothill paloverde (*Parkinsonia microphylla*), Fremont cottonwood (*Populus fremontii*), Gambel oak (*Quercus gambelii*), Goodding's willow (*Salix gooddingii*), hedgehog cactus (*Echinocereus sp*.), Mormon tea (*Ephedra sp*.), ocotillo (*Fouquieria splendens*), one-seed juniper (*Juniperus monosperma*), saguaro (*Carnegiea gigantea*), and velvet mesquite (*Prosopis velutina*).

#### *3.1.1.3 Biology*

Threatened and Endangered Species

The official species list for the study area was obtained from the United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) system on December 19, 2018. The list included 14 threatened or endangered species and designated critical habitat for the Mexican spotted owl that should be evaluated during future projects. Species included in the USFWS list, are included in **Table 15.**

During future studies and projects conducted for the roadway improvements, the USFWS list of threatened, endangered, proposed, and candidate species and Arizona Game and Fish Department (AGFD) On-Line Environmental Review Tool (OERT) should be reviewed to determine if new species have been identified or any changes in listing status have occurred.

**Table 15: Species Included in USFWS Species List**

| Species | Status | Habitat Requirements (USFWS 2016) |
|---|---|---|
| ***Amphibians*** | | |
| **Chiricahua leopard frog** (***Rana chiricahuensis***) | ESA LT | Cienegas, pools, livestock tanks, lakes, reservoirs, streams and rivers between 3,281 and 8,890 feet elevation. Often restricted to the upper portion of watersheds that are free from non-native predators. |
| ***Birds*** | | |
| **California least tern** (***Sterna anitllarum browni***) | ESA LE | Open, bare or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems below 2,000 feet. |
| **Mexican spotted owl** (***Strix occidentalis lucida***) | ESA LT | Mature montane forest and woodland, shady wooded canyons, and steep canyons at elevations between 4,100 to 9,000 feet. Key habitat components include uneven-aged stands with high canopy closure, high tree density, and a sloped terrain. |
| **Designated Critical Habitat for Mexican spotted owl** | CH | Critical habitat is located within the study area. |
| **Southwestern willow flycatcher** (***Empidonax traillii extimus***) | ESA LE | Dense riparian woodland communities along rivers, streams, lakesides, and wetlands below 8,500 feet elevation. Prefers dense canopy cover, large volume of understory foliage, and surface water during mid-summer. |
| **Yellow-Billed Cuckoo** (***Coccyzus americanus***) | ESA LT | Uses large contiguous patches of multi-layered riparian habitat, such as cottonwood-willow gallery forests along rivers and streams below 6,600 feet in elevation. |
| **Yuma clapper rail** (***Rallus longirostris yumanensis***) | ESA LE | Requires wet substrate (mudflat, sandbar) with dense herbaceous or woody vegetation for nesting and foraging. Fresh-water marshes dominated by cattail or bulrush are preferred habitat. Typically found below 4,500 feet of elevation. |
| ***Fishes*** | | |
| **Desert pupfish** (***Cyprinodon macularius***) | ESA LE | Habitats include clear, shallow waters with soft substrates associated with cienegas, springs, streams, margins of larger lakes and rivers, shoreline pools, and irrigation drains and ditches below 5,200 feet in elevation. |
| **Gila chub** (***Gila intermedia***) | ESA LE | Found in pools in smaller streams, cienegas, and artificial ponds ranging in elevation from 609-1,676 meters. |
| **Gila Topminnow (incl. Yaqui)** (***Poeciliopsis occidentalis***) | ESA LE | Topminnow prefer shallow, warm, fairly quiet waters in ponds, cienegas, tanks, pools, springs, small streams and the margins of larger streams. Found below 4,500 feet of elevation. |
| **Razorback Sucker** (***Xyrauchen texanus***) | ESA LE | Mainstem channels to slow backwaters and lakes along the Colorado River. In impoundments, water depths of a meter or more over sand, mud or gravel substrate is preferred. |

| Species | Status | Habitat Requirements (USFWS 2016) |
|---|---|---|
| **Spikedace (*Meda fulgida*)** | ESA LE | Found in moderate to large perennial streams, where they inhabit shallow riffles (those shallow portions of the stream with rougher, choppy water) with sand, gravel, and rubble substrates. |
| **Woundfin (*Plagopterus argentissimus*)** | ESA LE/XN | Found in warm, swift streams of high turbidity, preferring a stream speed of one to two feet per second and a depth of eight to eighteen inches. Lives in part of salty streams, avoiding clear waters and rarely can be found in quieter pools. |
| ***Mammals*** | | |
| **Mexican gray wolf (*Canis lupus*)** | ESA LE/XN | Vegetation type not required for survival. However, habitat must support sufficient prey populations, such as elk or deer. Generally found between 3,000 to 12,000 feet of elevation. |
| **Status Definitions: CH = Critical Habitat; ESA = Endangered Species Act; LE = Listed Endangered, LT = Listed Threatened, XN = Experimental Non-essential Population** | | |

Arizona Special Status Species

The AGFD OERT report, accessed on December 19, 2018 listed 35 special status species and special areas documented within two miles of the EO study area. The species and special areas listed below in **Table 16** will need to be evaluated during further project designs.

**Table 16: Special Status Species Documented within Two Miles of Project Vicinity**

| Scientific Name | Common Name | USFWS | USFS* | SGCN* |
|---|---|---|---|---|
| ***Agave delamateri*** | Tonto Basin Agave | SC | S | |
| ***Agave murpheyi*** | Hohokam Agave | SC | S | |
| ***Agosia chrysogaster*** | Gila Longfin Dace | SC | | 1B |
| ***Aquila chrysaetos*** | Golden Eagle | BGA | | 1B |
| ***Aquila chrysaetos*** | Golden Eagle | BGA | | 1B |
| ***CH for Strix occidentalis lucida*** | Mexican Spotted Owl Designated Critical Habitat | | | |
| ***Catostomus clarkii*** | Desert Sucker | SC | S | 1B |
| ***Catostomus insignis*** | Sonora Sucker | SC | S | 1B |
| ***Cicindela oregona maricopa*** | Maricopa Tiger Beetle | SC | | |
| ***Coccyzus americanus*** | Yellow-billed Cuckoo (Western DPS) | LT | S | 1A |
| ***Cyprinodon macularius*** | Desert Pupfish | LE | | 1A |
| ***Falco peregrinus anatum*** | American Peregrine Falcon | SC | S | 1A |
| ***Fremontodendron californicum*** | Flannel Bush | | | |
| ***Gila robusta*** | Roundtail Chub | CCA | S | 1A |
| ***Gopherus morafkai*** | Sonoran Desert Tortoise | CCA | S | 1A |
| ***Haliaeetus leucocephalus (wintering pop.)*** | Bald Eagle - Winter Population | SC, BGA | S | 1A |
| ***Haliaeetus leucocephalus pop. 3*** | Bald Eagle - Sonoran Desert Population | SC, BGA | S | 1A |
| ***Heloderma suspectum cinctum*** | Banded Gila Monster | SC | | 1A |
| ***Heloderma suspectum*** | Reticulate Gila Monster | | | 1A |
| ***Heloderma suspectum*** | Gila Monster | | | 1A |
| ***Kinosternon sonoriense*** | Desert Mud Turtle | | | 1B |
| ***Lithobates yavapaiensis*** | Lowland Leopard Frog | SC | S | 1A |
| ***Lupinus lemmonii*** | Lemmon's Lupine | | S | |
| ***Myotis velifer*** | Cave Myotis | SC | | 1B |
| ***Poeciliopsis occidentalis*** | Gila Topminnow | LE | | 1A |
| ***Rallus obsoletus yumanensis*** | Yuma Ridgway's Rail | LE | | 1A |
| ***Strix occidentalis lucida*** | Mexican Spotted Owl | LT | | 1A |
| ***Tadarida brasiliensis*** | Brazilian Free-tailed Bat | | | 1B |
| ***Thamnophis eques megalops*** | Northern Mexican Gartersnake | LT | S | 1A |
| ***Xantusia bezyi*** | Bezy's Night Lizard | | S | 1B |

**Status Definitions: LE = Listed Endangered, LT = Listed Threatened, SC = Species of Concern, CCA = Candidate Conservation Agreement, BGA = Bald and Golden Eagle Protection Act**
***SGCN = AGFD Species of Greatest Conservation Need**
***USFS = United States Forest Service**

Initial scoping discussions with the TNF and the AGFD included the request for evaluation of wildlife movement corridors, Sonoran Desert tortoises, and Saguaro cacti. Recommendations included that existing culverts be modified to allow wildlife movement and passage. Installation of directional fencing was also recommended to encourage wildlife to utilize these culverts. It was requested that existing Sonoran desert tortoise fencing be maintained and additional fencing be installed to help reduce collisions from passing traffic. Lastly, it was recommended that all saguaro cacti be surveyed and analyzed during project design to prevent impacts from construction. Any saguaros which may be impacted, shall be salvaged and transplanted.

In addition to Federal and State listed species evaluations, consideration for potential Tribal species of concern should be reviewed for areas in the FMYN Reservation.

Arizona Potential Linkage Zones

The Arizona Wildlife Linkages Workgroup (AWLW) has taken a collaborative approach to account for habitat fragmentation associated with Arizona's continuing population, economical, and infrastructural growth. The AWLW has identified large blocks of protected habitat, potential important wildlife movement corridors between these blocks (potential linkage zones), and the factors threatening to disrupt the linkage zones.

The EO study area passes through Potential Linkage Zone (PLZ) 53 North-South Mazatzal Mountains. PLZ 53 has been identified as an important area of movement for 17 species native to Arizona (AWLW 2006).

Wildlife movement corridors should be considered during project design to determine the best way to construct the roadway improvements while maintaining uninhibited wildlife movement and connectivity within

the study area and vicinity. Major drainages and upland areas that have been identified as wildlife movement corridors should incorporate wildlife-friendly roadway design considerations such as wildlife-friendly fencing and oversized select drainage culverts/bridges for maximum large mammal passage to adequately address maintaining or improving wildlife movement capabilities within and through the roadway ROW, especially along regional drainages. Coordination with AGFD should be continued to ensure wildlife-friendly roadway crossings are incorporated where appropriate into the roadway improvement design.

#### Noxious and Invasive Plants

Noxious and invasive plant species are plants that are not native to Arizona and were introduced accidentally or intentionally. These plants rapidly displace desirable plants that provide habitat for wildlife and food for people and livestock. Noxious and invasive species are listed by state and federal law, and are generally considered exotic and negatively impact agriculture, navigation, fish, wildlife, and public health.

Under Executive Order 13112, dated February 3, 1999, projects that occur on federal lands or are federally-funded must be "subject to the availability of appropriations, and within administrative budgetary limits, use relevant programs and authorities to:

(1) Prevent the introduction of invasive species;
(2) Detect and respond rapidly to, and control, populations of such species in a cost-effective and environmentally sound manner;
(3) Monitor invasive species populations accurately and reliably; and
(4) Provide for restoration of native species and habitat conditions in ecosystems that have been invaded."

Noxious and invasive plant species present within the study area include buffelgrass (*Pennisetum ciliare*), Russian thistle (*Salsola tragus*), Caucasian blue stem (*Bothriochloa ischaemum*), and knapweed species (*Centaurea sp.*). During future projects and construction, mitigation measures should be implemented to prevent the introduction or further spreading of invasive species.

#### Arizona Protected Native Plants

The Arizona Native Plant Law (Arizona Revised Statues 3-905) protects listed native plant species from collection, removal, and/or destruction on all lands regardless of ownership. Protected native plants present in the study area include barrel cactus, blue paloverde, buckhorn cholla, Engelmann's prickly pear, foothill paloverde, hedgehog cactus, ocotillo, saguaro, and velvet mesquite. During future project designs, native plant surveys should be conducted to determine if any protected native plant species would be impacted as a result of the improvements. Coordination with the Arizona Department of Agricultural (AZDA) should be conducted as impacts to native plants may require a Notice of Intent and/or specific permitting prior to construction per Article 11: Arizona Native Plants. A salvage and/or re-vegetation plan may be necessary depending on the type of native plants and quantity impacted by construction.

### *3.1.1.4 Hydrology*

#### Clean Water Act (Section 404/401)

The U.S. Army Corps of Engineers (Corps) regulates the discharge of dredge and/or fill material into waters of the U.S. (WOUS) under Section 404 of the Clean Water Act (33 U.S.C. §1251 et seq. (1972)).

Any activity that will discharge dredge or fill material into jurisdictional waters, including wetlands, will require a Clean Water Act Section 404 Permit [either a Nationwide Permit (NWP) or an Individual Permit (IP)]. These activities include, but are not limited to, the installation of riprap, channel maintenance activities, bank protection, new bridges or extensions of bridges, corrugated metal pipes, and box culverts to allow for roadway crossings. It should be noted that the Environmental Protection Agency (EPA) is responsible for Section 401 Water Quality Certifications (WQC) on tribal lands that it has not delegated that authority to. Work in WOUS on Fort McDowell Yavapai Nation lands would have a Water Quality Certification (WQC) issued by the EPA.

The northern portion of the study area drains east/southeast toward Tonto Creek and the southern portion of the project area drains west/southwest toward the Verde River. Named potential WOUS within the EO study area include Boone Moore Wash, Camp Creek, Clover Wash, Corral Creek, Deer Creek, Gold Creek, Hardt Creek, Mesquite Wash, Picadilla Creek, Pine Creek, Rye Creek, Slate Creek, St. Johns Creek, Sycamore Creek, Sycamore Wash, and the Verde River. The EO study area also includes numerous unnamed ephemeral washes.

It is anticipated that several of the rivers, creeks, and washes in the study area could be determined to be potentially jurisdictional WOUS by the Corps. An evaluation to determine boundaries of WOUS should be conducted during the design phase of future projects through a Preliminary Jurisdictional Determination (PJD) or an Approved Jurisdictional Determination (AJD) to aid in avoiding and minimizing impacts to the WOUS. A PJD is a non-binding delineation that is typically pursued in the planning and design phases of a project. An AJD is a delineation that is binding for five years that requires more data and processing time through the Corps. After the delineation is complete, the project should be designed to avoid and minimize impacts to WOUS. If there are unavoidable impacts to WOUS, a Section 404 permit will then be required along with compensatory mitigation activities for the proposed impacts to WOUS.

#### Arizona Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) is a national permit program under Section 402 of the Clean Water Act that regulates discharges of pollutants from point sources into WOUS, including sediment and pollutants that can be generated during ground-disturbing activities and transported by stormwater runoff.

The Environmental Protection Agency has delegated to the Arizona Department of Environmental Quality the authority to operate the permit program within Arizona. The state's version of the NPDES permit program is referred to as the Arizona Pollutant Discharge Elimination System (AZPDES). The AZPDES permit program requires a general permit for construction activities that disturb one or more acres of land as well as for construction activities that disturb WOUS (Section 401 Certification). A Stormwater Pollution Prevention Plan (SWPPP) must be prepared as a part of the permit.

The construction of the roadway improvements would likely impact more than one acre of land and/or WOUS; therefore, a construction general permit, Section 401 Certification, and SWPPP will likely be required during future project development. However, project specific evaluations should occur during project design.

100-Year Floodplain

There is one mapped FEMA floodplain within the study area; the Verde River (Zone A). The FEMA floodplain is located on FIRM panel 04013C1825L effective October 16, 2013. Potential impacts to floodplains should be evaluated during project design.

### *3.1.1.5 Noise*

As required by 23 CFR 772.5, ADOT defines a Substantial Increase in noise levels as an increase in noise levels of 15 dB(A) in the predicted noise level over the existing noise level (shown in **Table 17**). Any Receptor that meets this criterion is considered impacted. The Federal Highway Administration (FHWA) traffic noise regulations do not define the point at which a noise level "approaches" the Noise Abatement Criteria (NAC) for a specific land use category. As required by 23 CFR 772.11(e), the point at which the noise levels "approach" the NAC is defined by ADOT as one dB(A), for Categories A, B, C, D, and E. There is no noise impact threshold for Category F or Category G locations.

**Table 17: 23 CFR Part 772, NAC**

| Activity Category | $L_{eq}$(h) | $L_{10}$(h)[2] | Analysis Location | Description of Activity Category |
|---|---|---|---|---|
| **A** | 57 | 60 | Exterior | Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. |
| **B**[3] | 67 | 70 | Exterior | Residential. |
| **C**[3] | 67 | 70 | Exterior | Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings. |
| **D** | 52 | 55 | Interior | Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios. |
| **E**[3] | 72 | 75 | Exterior | Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F. |
| **F** | | | | Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing. |
| **G** | | | | Undeveloped lands that are not permitted. |

[1]Either $L_{eq}$(h) or $L_{10}$(h) (but not both) may be used on a project.
[2]Either $L_{eq}$(h) and $L_{10}$(h) Activity Criteria values are for impact determination only and are not design standards for noise abatement measures.
[3]Includes undeveloped lands permitted for this activity category.

There are scattered noise sensitive receivers located within 650 feet of the existing SR 87 ROW; therefore, detailed noise analysis may be necessary to assess potential impacts near N. Blue Coyote Trail, Sunflower, Bear Creek (Deer Creek Drive), Rye, and Oxbow Estates as potential future projects are developed. In general, scope of work that increases highway capacity, alters the vertical or horizontal alignment requires detailed noise analyses.33.

### *3.1.1.6 Air Quality*

The federal Clean Air Act (CAA) requires that impacts to air quality be analyzed and addressed in the preparation of environmental documents. Pursuant to the CAA, the Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six air pollutants:

- Carbon monoxide (CO);
- Lead (Pb);
- Nitrogen dioxide ($NO_2$);
- Ozone ($O_3$);
- Particulate matter (PM) for both $PM_{10}$ and $PM_{2.5}$; and
- Sulfur dioxide ($SO_2$).

Based on federal and state air quality standards, a specific geographic area can be classified under the federal CAA as "attainment," "non-attainment," or "maintenance" for each criteria pollutant. The criterion for non-attainment designation varies by pollutant so that an area can be in attainment for some pollutants and non-attainment for others.

If a pollutant in a region meets or exceeds the NAAQS set by the EPA, it is defined as an attainment area. If a pollutant does not meet the minimum NAAQS, it is defined as a non-attainment area. Maintenance areas are areas previously defined as non-attainment areas that are in transition to becoming attainment areas after monitoring data demonstrates air quality standards are being met.

The study area from MP 191 to MP 197 is located within a non-attainment area for particulate matter ($PM_{10}$) and MP 191 to MP 193 is located within a maintenance area for carbon monoxide (CO). The study area from approximately MP 191 to MP 223 is within a non-attainment area for Ozone. There is a $PM_{10}$ maintenance area near Payson from approximately MP 246 to 250. Air quality analysis will need to be conducted to determine if the improvements to SR 87 will deem future projects as one of air quality concern.

### *3.1.1.7 Hazardous Materials*

Hazardous materials are regulated by the Federal Resources Conservation and Recovery Act (RCRA) (42 U.S.C. s/s 321 et seq. (P.L. 94-580) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) [(42 U.S.C. §9601 et seq. (1980)], commonly known as the Superfund. The Arizona Department of Environmental Quality (ADEQ) implements CERCLA and its amendments, the Superfund Amendments and Reauthorization Act (SARA) of 1986 (P.L. 99-499; October 17, 1986; 100 Stat. 1613).

ADEQ's eMaps website was reviewed for facilities with potential hazardous materials concerns. No facilities were documented within or adjacent to the study area. Additional review should be completed for potential hazardous materials during future project design.

### *3.1.1.8 Section 4(f) Resources*

Section 4(f) of the Department of Transportation (DOT) Act of 1966 stipulates that DOT agencies cannot approve the use of land from recreation areas, wildlife and waterfowl refuges, publicly owned parks, or private and public historical sites unless:

(a) There is no prudent or feasible alternative to using that land;
(b) The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use (49 CFR Part 303(c)); and
(c) The use would not affect the features, activities, or attributes which qualify the property for Section 4(f) consideration, and FHWA has made a determination that the Section 4(f) use is de minimis.

A "use" of a Section 4(f) resource, as defined in 23 CFR Part 774 occurs:

(1) When land is permanently incorporated into a transportation facility;
(2) When there is a temporary occupancy of land that is adverse in terms of the statute's preservationist purposes; or
(3) When there is a constructive use of the land.

A constructive use of a Section 4(f) resource (23 CFR 774.15) occurs when the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired, even though the transportation project does not incorporate land from the Section 4(f) resource. For example, a constructive use can occur when:

(a) The projected noise level increase attributable to the project substantially interferes with the use and enjoyment of a noise-sensitive facility of a resource protected by Section 4(f);
(b) The proximity of the proposed project substantially impairs aesthetic features or attributes of a resource protected by Section 4(f), where such features or attributes are considered important contributing elements to the value of the resource. An example of such an effect would be the location of a proposed transportation facility in such proximity that it obstructs or eliminates the primary views of an architecturally significant historical building, or substantially detracts from the setting of a park or historic site which derives its value in substantial part because of its setting; and/or,
(c) The project results in a restriction on access, which substantially diminishes the utility of a significant publicly owned park, recreation area, or historic site.

Potential Section 4(f) resources within the study area include the following recreation areas located in TNF:

- Diamond Trail is a 2.1-mile trail located near Sunflower.
- Sunflower Trail is a 5.1-mile trail located near Sunflower.
- Pine Creek Loop and Ballantine Trail is a 6.6-mile trail located near Fountain Hills.
- Mount Ord Trail is a 14.4-mile trail located near Rye.
- Deer Creek Loop Trail is a 15.9 mile trail located near Rye.

Archaeological sites that are eligible for the NRHP under Criteria A (event), B (person), or C (construction) are considered Section 4(f) resources and include roads, structures, and rock art. Section 4(f) properties within the study area include:

- Heber-Reno Sheep Driveway
- Forest Highway 9/ AZ U:8:60(ASM)/ AR-03-12-06-2028/ AR-03-12-04-1286
- State Route 87/ AZ AA:6:63(ASM)/ AR-03-12-03-680
- Sunflower CCC Camp/ AR-03-12-06-678/ NA17344
- Ashdale CCC Side Camp/ AZ U:3:61(ASM)/ AR-03-12-06-475
- Round Valley Site/ AZ U:3:341(ASM)/ AR-03-12-03-461
- AZ U:3:312(ASM)/ AR-03-12-03-575
- AZ U:3:313(ASM)/ AR-03-12-03-493
- AZ U:3:322(ASM)/ AR-O3-12-03-582
- AZ U:3:342(ASM)/ AR-03-12-03-460

Impacts to potential Section 4(f) resources must be reevaluated during project design, including appropriate consultation, as appropriate.

#### *3.1.1.9 Section 6(f) Resources*

The Land and Water Conservation Fund Act (LWCF) of 1965 (16 U.S.C. §§460l-4, et seq.) was signed into law on September 3, 1964. The purpose of the LWCF is to provide matching grants to state and local governments to acquire and develop public outdoor recreation areas and facilities. The LWCF strives to protect and maintain these areas and facilities for long-term, high-quality outdoor recreation experiences. The provisions under Section 6(f)(3) mandate that these investments be protected, but recognize that changes in land use, especially in growing urban areas, can impact these protected areas. The LWCF contains provisions to protect these areas from conversions. Property that is acquired or developed cannot be converted to uses other than public outdoor recreation uses unless it is approved by the Secretary of the Interior. The Secretary can approve such a land use change if the conversion is consistent with the then existing comprehensive statewide outdoor recreation plan. When necessary, the Secretary can also require that other properties be identified as a substitute for the loss of a converted outdoor recreation area. The other properties should be at least of equal fair market value and be similar in usefulness and location as the converted outdoor recreation area.

The list for LWCF-funded projects in Maricopa and Gila Counties was reviewed and it appears that no LWCF funded projects are present in the study area (NPS 2019). Therefore, there are no anticipated impacts to Section 6(f) resources at this time. However, evaluation as to the presence of Section 6(f) resources and potential impacts should be made during final project designs.

#### *3.1.1.10 Demographics, Socioeconomics Considerations and Title VI/Environmental Justice Populations*

Demographics

Population centers of various sizes exist along the SR 87 corridor. **Table 18** summarizes populations of communities along the corridor. While the Phoenix metropolitan area is projected to experience significant growth over the next 20 years (58% Maricopa County), moderate population growth is projected between 2010 and 2040 in these communities, per data provided by the Arizona State Demographer's Office.

**Table 18: Current and Future Population**

| Community | 2010 Population | 2016 Population Estimate | 2040 Population | % Change 2010-2040 | Total Growth |
|---|---|---|---|---|---|
| Maricopa County | 3,817,117 | 4,152,800 | 6,031,000 | 58% | 2,213,883 |
| Mesa | 439,041 | 467,600 | 597,200 | 36% | 158,159 |
| Fountain Hills | 22,489 | 23,800 | 30,400 | 35% | 7,911 |
| Gila County | 53,597 | 54,611 | 54,531 | 2% | 934 |
| Payson | 15,301 | 15,993 | 17,095 | 12% | 1,794 |

**Figure 30** shows the population density by census block group. While the overall population density is very low compared to the more urban areas that the highway serves, there are some areas of dense population at either end of the corridor. The central part of the corridor has very low population densities of less than two persons per square mile.

**Figure 31** shows median income by census block group. The highest median incomes are in the south-central portion of the corridor, where the median income is over $138,000. The lowest median income is on the Fort McDowell-Yavapai Indian Reservation, at less than $43,000.

**Figure 32** shows the percentage of unemployed adults over the age of 16. The highest unemployment rate is on the Fort McDowell – Yavapai Indian Reservation at 12.5%. The lowest unemployment rate is experienced is along the western side of the roadway at the northern end of the corridor, which has zero reported unemployed adults.

**Figure 33** shows the percentage of zero-vehicle households by census block group along the SR 87 corridor. The highest percentage of zero-vehicle households are along the south half of the corridor. Census block groups in the northern half of the corridor generally have lower rates of zero-vehicle households.

The purpose of a socioeconomic analysis is to describe the existing social conditions within the study area and identify populations that may require additional consideration during future investigations such as National Environmental Policy Act (NEPA) studies. Socioeconomic analyses are also used to identify environmental justice populations that may experience disproportionate adverse impacts from a project.

Environmental justice populations are minority populations that are protected by Title VI and Executive Order 12898. Title VI of the Civil Rights Act of 1964 and Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, issued February 11, 1994, require federally-funded projects to include identification of any disproportionately high and adverse human health effects from environmental impacts on minority and low-income people. These federal regulations also ensure that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination as a result of, proposed projects on the basis of race, color, age, sex, disability, income level, or national origin.

Disproportionately high and adverse effects on minority or low-income populations can be defined as an adverse effect that (1) is predominantly borne by a minority or low-income population; or (2) will be suffered by the minority or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or the non-low-income population. For the purpose of social impact analyses for minority and low-income populations, disproportionate adverse impacts are likely to occur when the minority or low-income population is either 50 percent or greater than the total population for the census tract (CT), block group (BG), or is more than double the percentage of the population within the comparative county.

Because this is a feasibility study and the detailed roadway improvements and implementation schedules are unknown, exact population group impacts cannot be determined as of the date of this document. General impacts such as additional potential increases in ambient noise levels may occur depending on the future scope of roadway improvements. Therefore, further consideration for disadvantaged populations may be warranted for future environmental clearance documents.

### *3.1.2 Cultural Resources*

A file search and literature review of the 59-mile-long segment of SR 87, between MP 191 and 250 in Maricopa and Gila Counties, Arizona was conducted. Records were examined in the Arizona State Museum (ASM) online AZSITE database and the online ADOT Portal database to determine the location of any previously conducted archaeological surveys or previously recorded archaeological sites within the existing ADOT ROW. General Land Office (GLO) maps and historic United States Geological Survey (USGS) topographic maps were also consulted to evaluate the possible presence of historic Euro-American infrastructure in the project area. The National Register Information System database was also reviewed. This Class I was conducted as a preliminary study; records from TNF or FMYN were not examined. However, project reports available on the ADOT portal were examined to identify sites on TNF and FMYN lands.

A total of 64 previous projects have been completed within the Area of Potential Effects (APE), including 45 survey projects, seven survey and data recovery projects, three data recovery projects, two archival studies, one monitoring project, and six other projects. Monitoring has been conducted during seven projects. A total of 199 sites have been previously documented within the APE. Cultural affiliations include Archaic, Hohokam, Salado, Central Arizona Tradition, Yavapai, Apache, and Euro-American affiliations. Site types include habitations, villages, artifact scatters, water control features, roads, a mine, and a sheep driveway. Of these sites, 120 have been determined or recommended eligible for inclusion on the National Register of Historic Places (NRHP), 35 sites have been determined or recommended not eligible for the NRHP; 43 sites are unevaluated, or the NRHP-status is unknown; and two sites have been completely destroyed, including one site previously determined eligible. Of the 199 sites in the project area, 101 have been previously subjected to a data recovery program, which include Phase 1 Testing, Phase 2 data recovery, eligibility testing, surface collection, or archival research. Work was primarily conducted within the ROW prior to the realignment of SR 87 and during maintenance projects for the highway.

Additionally, GLO plats and historic USGS topographic maps depict 94 historic map properties crossing the project area. These historic map properties comprise 53 roads, 26 unimproved roads, 10 trails, two structures, one fence, one ditch, and the Heber-Reno Sheep Driveway.

Sites that have not yet been subject to data recovery, but that are eligible for the NRHP, as well as sites for which the NRHP status is unevaluated or unknown, should be avoided by all ground-disturbing activities. If project plans may potentially impact a NRHP-eligible site or property that has not been completely excavated within the ROW, it is recommended that the site area be inspected at the beginning of the project to evaluate the site condition within the ROW. This field assessment is recommended to assist with making an updated NRHP-eligibility recommendation, and to identify avoidance areas. This information can be further used to develop appropriate treatment plans if a NRHP-eligible site cannot be avoided. The treatment plans should be developed in coordination with ADOT, TNF, FMYN, and the State Historic Preservation Office (SHPO), as appropriate. The plans should include a program for testing and data recovery prior to construction, and/or archaeological monitoring during all ground-disturbing activities. If work is proposed on lands owned or managed by the TNF or FMYN, the agency or tribe should be consulted with to determine if additional cultural resources or culturally sensitive areas are present within or adjacent to the project area.

All information contained in this document is the property of ADOT. It contains sensitive information about the location of cultural resources and is provided for information only as allowed by ADOT. If site locations are required for the planning process, please contact the ADOT Historic Preservation Specialist for access and permission. This information is not for distribution

**Figure 30: Population Density by Census Block Group**

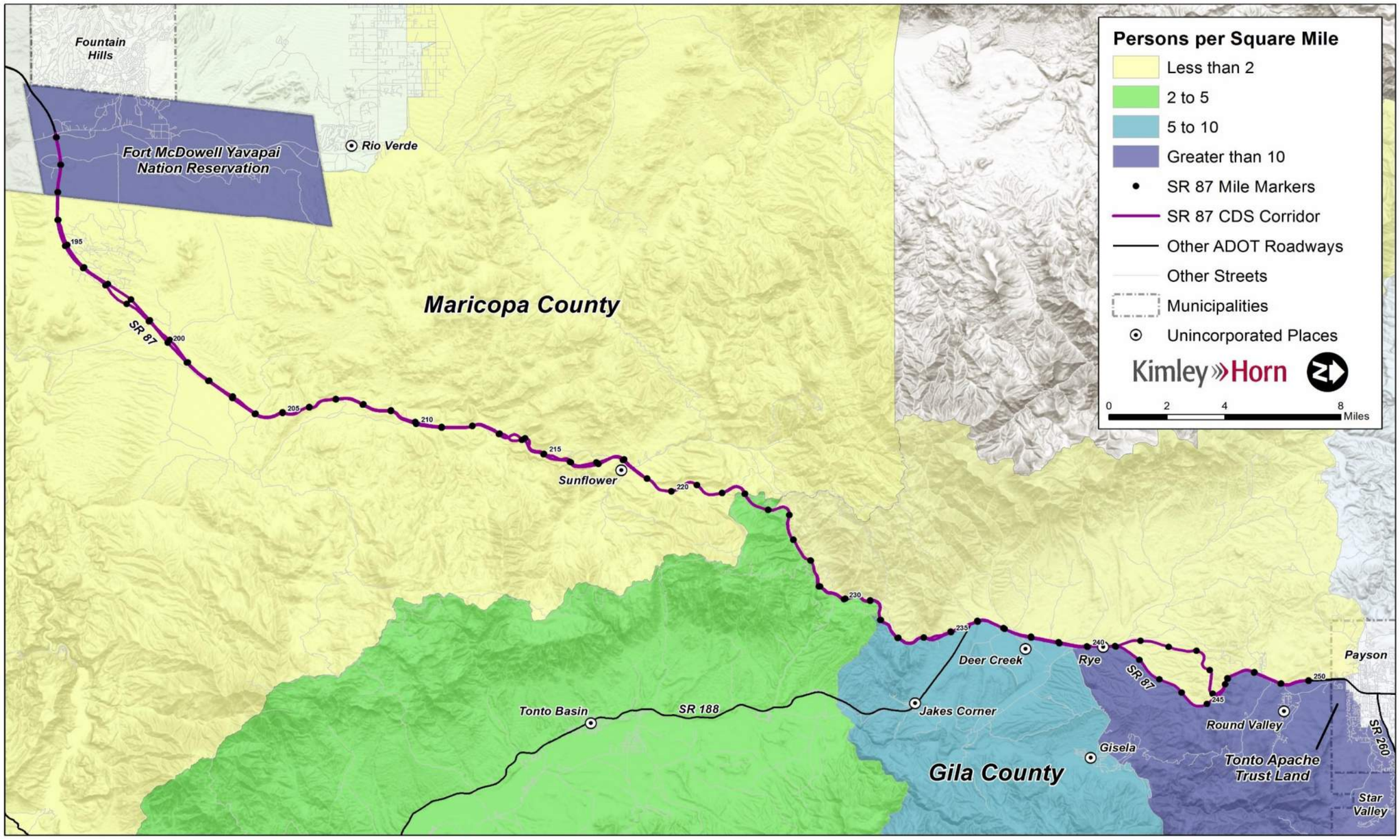


**Figure 31: Median Income by Census Block Group**

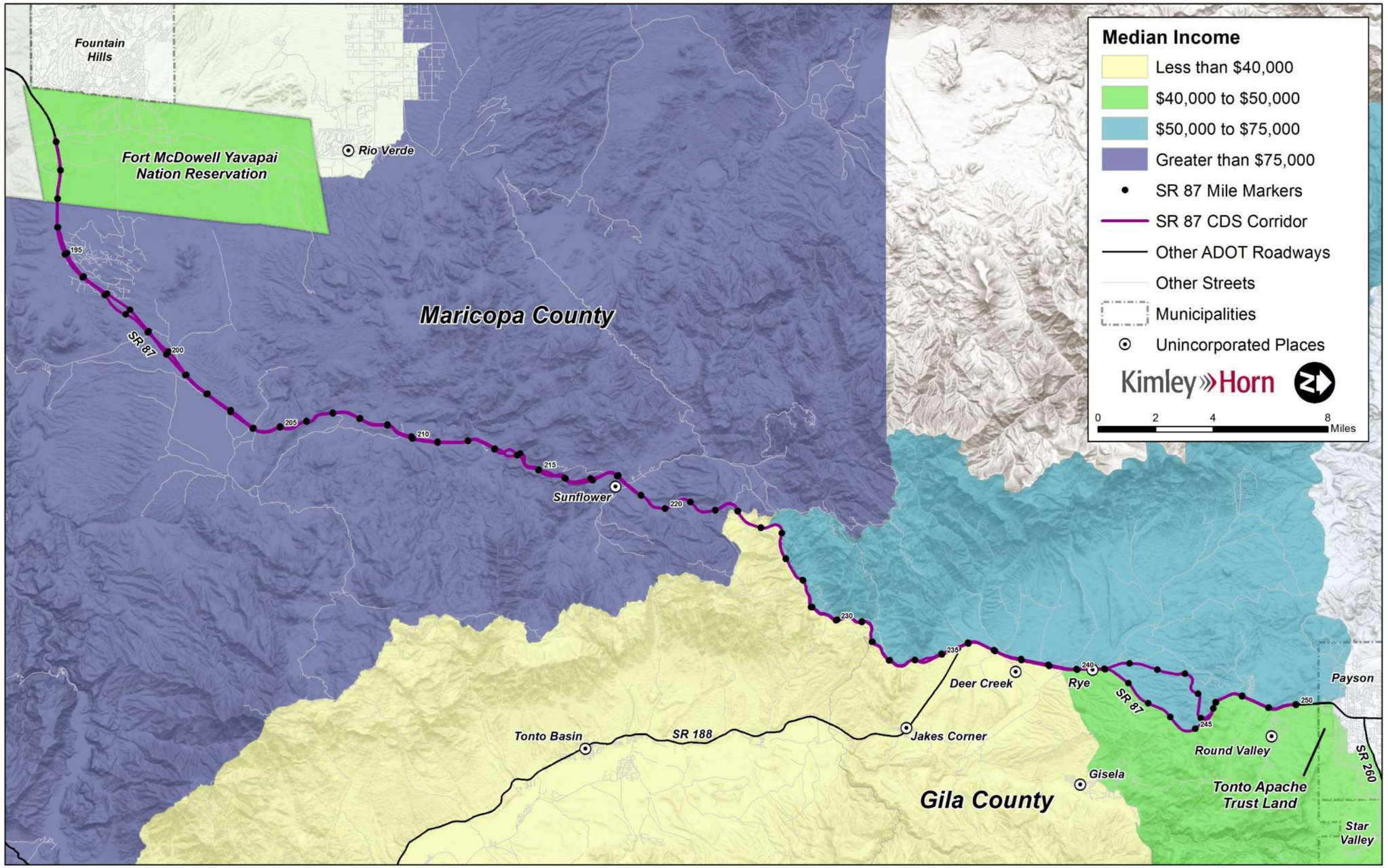


**Figure 32: Unemployed Population by Census Block Group**

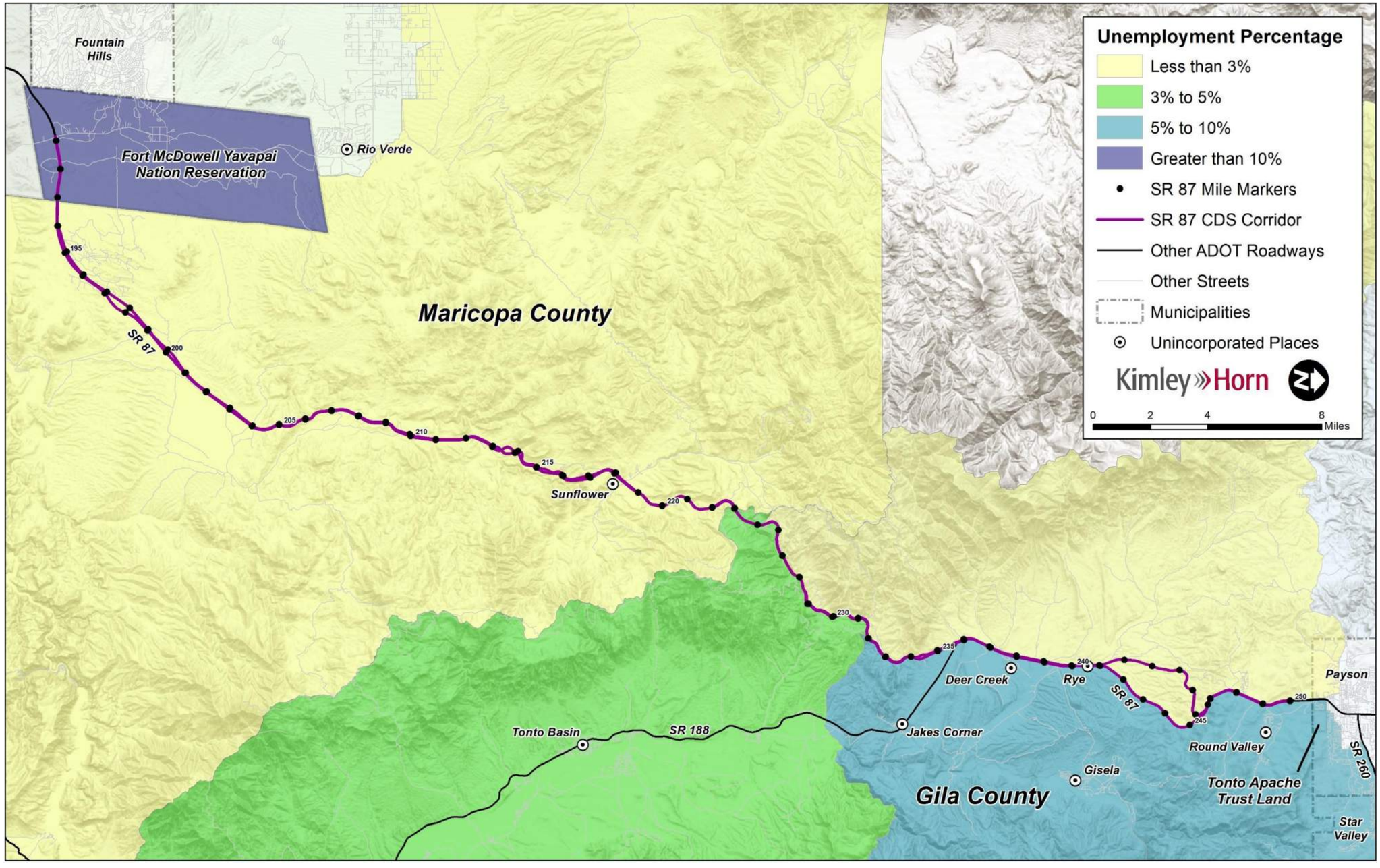
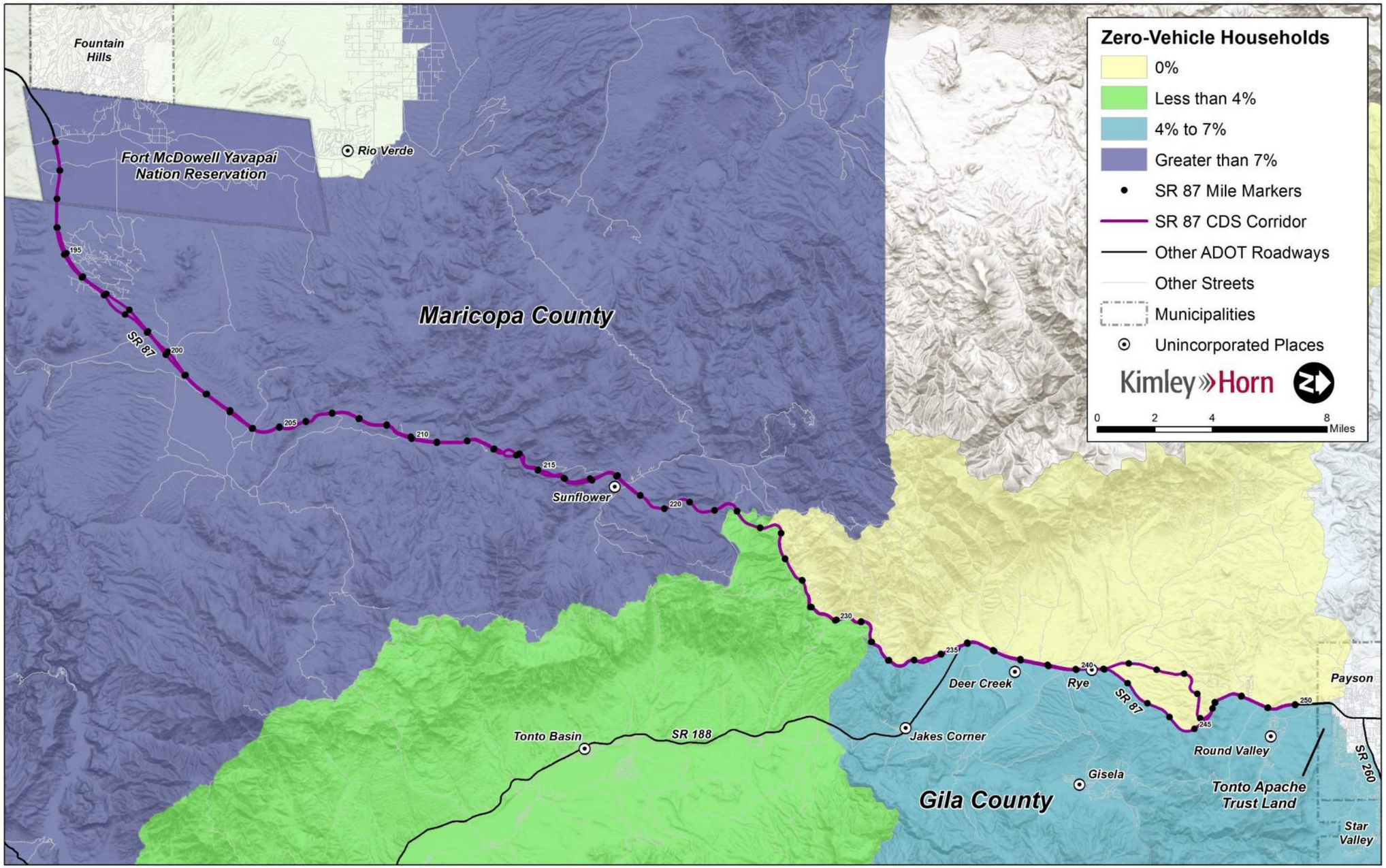


**Figure 33:Percentage of Zero-Vehicle Households by Census Block Group**



## 3.2 Environmental Overview Findings Summary

- Biological resources:
  - There are 14 threatened or endangered species likely present along the SR 87 corridor;
  - There are 35 Arizona special status species and areas within two miles of the corridor;
  - The corridor passes through PLZ 53 (North-South Mazatzal Mountains), where improvements should maintain uninhibited wildlife movement;
  - There are four noxious/invasive species identified along the corridor; and
  - There are nine protected plant species identified along the corridor.
- Cultural resources: sites not yet subject to data recovery, but eligible for NRHP or the status is unknown, should be avoided by ground-disturbing activities.
  - There are 199 cultural sites previously documented within the APE:
    - 120 sites determined or recommended eligible for the NRHP;
    - 35 sites not recommended for the NRHP;
    - 43 sites unevaluated or the NRHP status is unknown; and
    - Two sites have been destroyed.
- Clean Water Act: several rivers, creeks, and washes could be determined to be WOUS and an evaluation of boundaries should be conducted during design of future projects.
- Arizona Pollutant Discharge Elimination System: roadway improvements that impact more than one acre of land and/or WOUS would require Section 401 certification and a SWPPP.
- 100-year floodplains: the only FEMA-mapped floodplain in the study area is the Verde River.
- Noise: noise analyses will be necessary to assess potential impacts near the North Blue Coyote Trail, Sunflower, Bear Creek, Rye, and Oxbow Estates.
- Air quality: MP 191-197 is in nonattainment for $PM_{10}$ and MP 191-193 is in nonattainment for CO.
- Section 4(f) resources: five recreation sites and 10 archaeological sites are considered 4(f) resources.

# 4 ALTERNATIVE DEVELOPMENT AND EVALUATION

A list of 113 potential projects was developed that address corridor needs and deficiencies. The projects emanate from previous plans and studies, stakeholder engagement, analysis of the existing built conditions and deficiencies, the environmental overview, and the safety analysis. A complete list of the 113 projects is provided in **Appendix B**.

## 4.1 Projects Removed from Further Consideration

A corridor field review was performed in March 2019 to review the identified projects, refine the project limits, and identify design considerations that would impact the feasibility of specific project elements. Based upon the field review, several projects were removed from further consideration. Projects removed from further analysis are listed in **Table 19**.

**Table 19: Projects Removed from Further Consideration**

| Project No. | Description | MP | Justification for Removal |
|---|---|---|---|
| **5** | Add northbound guardrail | 194.0-194.9 | Slopes are modest and do not require guardrail protection |
| **7** | Improve geometrics at Vista del Oro intersection | 195.2 | No crashes (2013-2017), geometrics appear to be adequate |
| **9** | Prevent OHV access (SB) | 200.5 | Already addressed by ADOT |
| **10** | Prevent OHV access (NB) | 201.4 | Already addressed by ADOT |
| **16** | Speed feedback sign (NB) | 207.7 | Not an identified crash hot spot, too close to previous speed feedback sign recommendation |
| **48** | Speed feedback sign (NB) | 220.5 | Not an identified crash hot spot, on an uphill incline |
| **52** | Address erosion on east side of the road | 222.8-222.9 | Not an active issue |
| **61** | Reconstruct access ramp | 229.5 | Major reconstruction would be needed to address slope and geometrics for minimal improvement |
| **81** | Add SB left-turn lane and NB right-turn lane | 239.2 | The turn lanes would only serve a single private driveway (gated) |
| **82** | Address rough bridge transitions | 239.4 | Bridge transitions are adequate, NB bridge itself is bumpy |
| **105** | Address intersection grade issues at FR 375B | 231.0 | Project removed in favor of realigning FR 375B |

## 4.2 Project Packages

Projects were grouped, to the extent feasible, into 12 ‘major’ projects packages. The major projects packages were prepared with input from the ADOT Central and Northcentral districts to assemble project packages that can be considered through the ADOT Planning to Programming (P2P) process and the Highway Safety Improvement Program (HSIP).

Less construction-intensive project interventions such as ITS, signage, rock-fall, or shoulder improvements are grouped by project type and by ADOT district. These may be considered for funding through ADOT District Minor Funding or HSIP funds.

Large roadway-improvement focused projects are grouped by geographic location. These 12 major projects are listed below, and fact sheets showing their locations and individual project elements are on the subsequent pages.

- Package Project No. 1. Central District ITS/Signage Improvements (MP 191-218) – **Figure 34**
- Package Project No. 2. Central District Shoulder Improvements (MP 196-211) – **Figure 35**
- Package Project No. 3. Northbound Roadway Improvements (MP 212-218) – **Figure 36**
- Package Project No. 4. Central District Rock-Fall Mitigation (MP 213-218) – **Figure 37**
- Package Project No. 5. Northcentral District ITS/Signage Improvements (MP 218-251) – **Figure 38**
- Package Project No. 6. Northcentral District Rock-Fall Mitigation (MP 222-247) – **Figure 39**
- Package Project No. 7. Northbound Roadway Improvements (MP 218-226) – **Figure 40**
- Package Project No. 8. Slate Creek Roadway Improvements (MP 226-232) – **Figure 41**
- Package Project No. 9. Rye Roadway Improvements (MP 239-241) – **Figure 42**
- Package Project No. 10. Northbound Roadway Improvements (MP 241-248) – **Figure 43**
- Package Project No. 11. Southbound Roadway Improvements (MP 244-250) – **Figure 44**
- Package Project No. 12. Northbound Roadway Improvements (MP 247-250) – **Figure 45**

Projects that are geographically isolated were not packaged with others. **Table 20** lists these stand-alone projects.

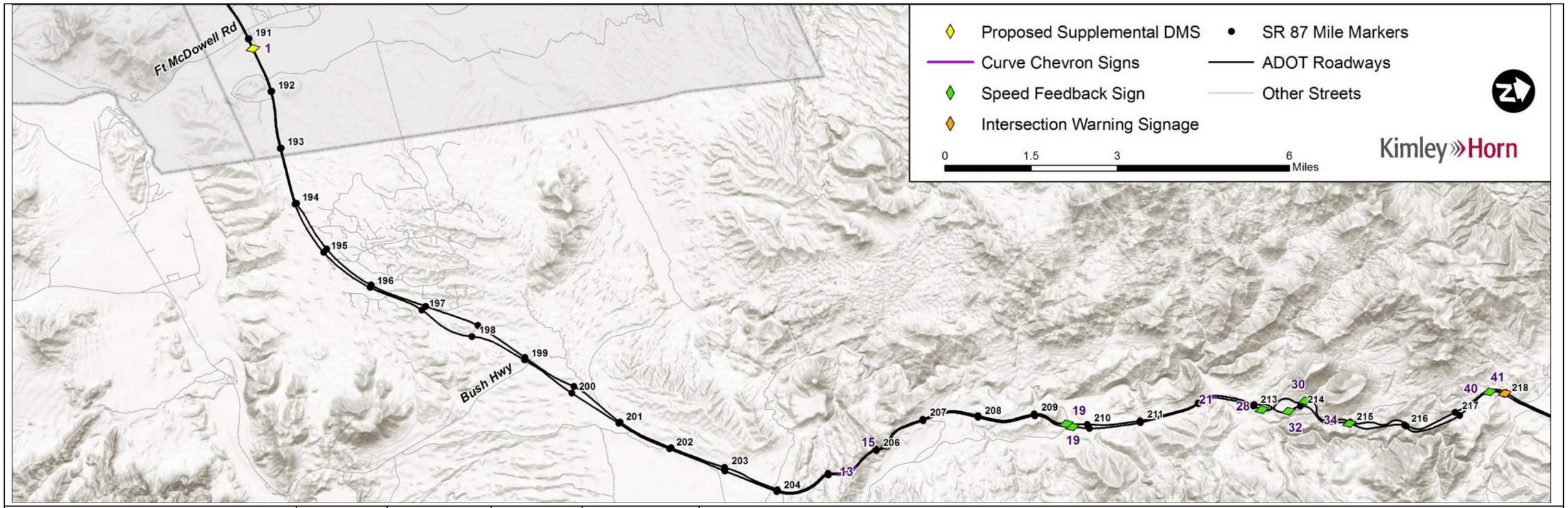
## 4.3 Project Cost Estimates

Itemized cost estimates were prepared for the Packaged Projects and presented in **Appendix D, Pre-Scoping Forms**. Costs for signage and ITS improvements were derived from the Corridor Profile Study.

**Table 20: Stand-Alone Projects**

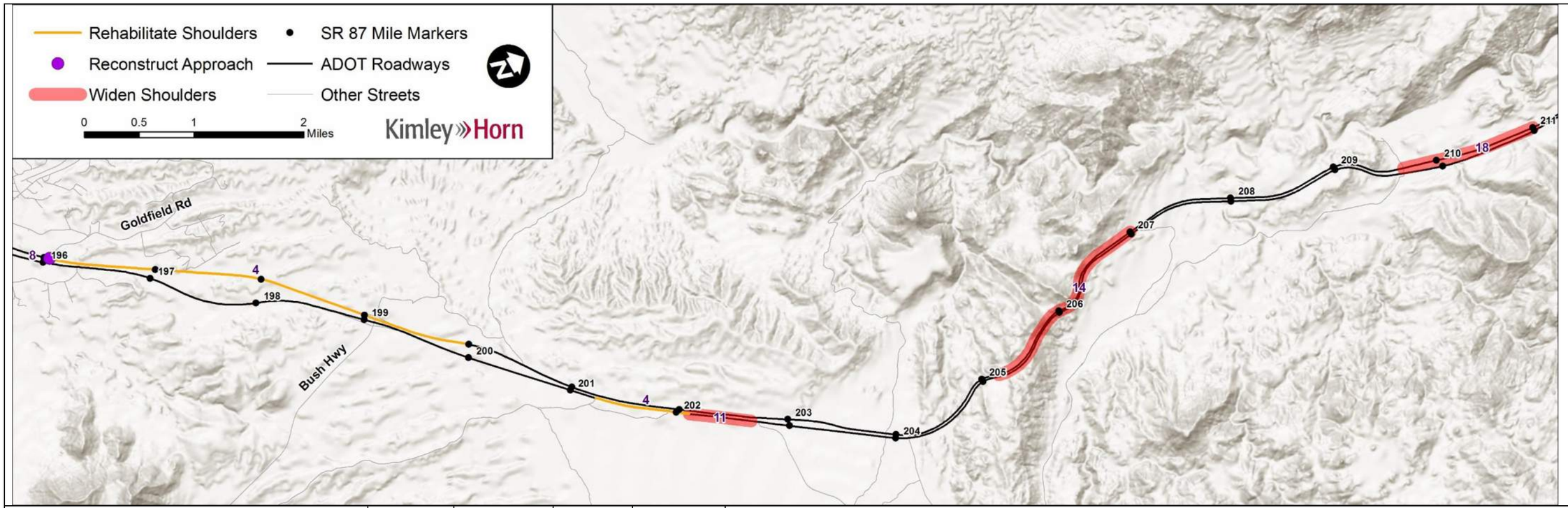
| Project No. | Description | MP | Est. Cost |
|---|---|---|---|
| **2** | NB RT lane, SB RT lane, outside accel lane at Hiawatha Hood | 191.8 | $701,800 |
| **3** | NB RT lane at Rodeo Rd | 192.1 | $184,900 |
| **6** | Improve intersection geometrics on SB side at Burnt Water Trail | 195.2 | $357,600 |
| **12** | Inside and outside accel lanes both directions - Four Peaks | 203.9 | $1,624,200 |
| **17** | Inside and outside accel lanes both directions - Mesquite OHV Area | 207.8 | $1,448,700 |
| **20** | Add NB outside accel lane, SB inside accel lane - Ballantine Trailhead | 210.4 | $1,373,300 |
| **24** | Construct new rest area | 212.7 | $8,300,000 |
| **42** | NB and SB inside and outside accel lanes, fix SB shoulders both sides – Sunflower | 218 | $1,928,300 |
| **62** | Prevent OHV access to SB lanes | 230.5 | $34,000 |
| **64** | Address dip in NB roadway | 230.5-230.6 | $712,600 |
| **70/71** | Wildlife fencing, signage, and crossing | 235-235.9 | $3,486,000 |
| **74** | Extend NB acceleration lane to 1300' - SR 188, SB inside accel lane | 235.7 | $911,200 |
| **75** | Evaluate grade separation - SR 188 (both directions) | 235.7 | $35,910,000 |
| **76** | Rehabilitate rest area | 235.7 | $4,150,000 |
| **78** | NB LT lane, SB RT lane - Deer Creek Dr | 237.6 | $619,500 |
| **79/80** | Wildlife fencing, signage, and crossing | 238-238.9 | $3,486,000 |

**Figure 34: Package Project No. 1. Central Dictrict ITS/Signage Improvements (MP 191-218)**




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. SB New DMS | 1 | 191.2 | 191.2 | $250,000 | Provides the ability to direct SB traffic to different routes (SR 87 vs. Shea Blvd.) in response to incidents further south on the corridor. |
| 2. NB curve chevron signage | 13 | 205.2 | 205.7 | $50,000 | Demonstrated crash history with a high percentage of run off the road crashes. |
| 3. NB speed feedback sign | 15 | 206.2 | 206.2 | $25,000 | Demonstrated crash history with 26% of crashes resulting from drivers traveling too fast for conditions. |
| 4. NB and SB speed feedback signs | 19 | NB 209.7<br>SB 209.6 | NB 209.7<br>SB 209.6 | $50,000 | Speeding is an issue at this location; the nearby speed analysis at MP 205 showed an 85th percentile speed of 74 mph. |
| 5. NB curve chevron signage | 21 | 212.2 | 212.4 | $12,500 | The downhill grade in combination with a curve increases the risk of run off the road crashes in this area. |
| 6. NB speed feedback sign | 28 | 213 | 213 | $25,000 | Six crashes occurred on the curve in this section where the vehicle ran off the road to the right and the vehicle overturned |
| 7. SB speed feedback sign | 32 | 213.6 | 213.6 | $25,000 | One fatal and three serious injury crashes occurred on the curve in this section |
| 8. NB speed feedback sign | 30 | 214 | 214 | $25,000 | This location is within an identified crash hot spot where 50% of crashes involved speeding. |
| 9. SB speed feedback sign | 34 | 215 | 215 | $25,000 | Speeding is an issue at this location, a speed study at MP 214 showed an 85th percentile speed of 72 mph. |
| 10. NB speed feedback sign | 40 | 217.8 | 217.8 | $25,000 | Demonstrated crash history at curves north of the proposed feedback sign location. |
| 11. Intersection warning signage | 41 | 218 | 218 | $5,000 | Relatively inexpensive treatment to increase awareness of the Sunflower intersection. |
| | | | **Total:** | **$517,500** | |

**Figure 35: Package Project No. 2. Central District Shoulder Improvements (MP 196-211)**

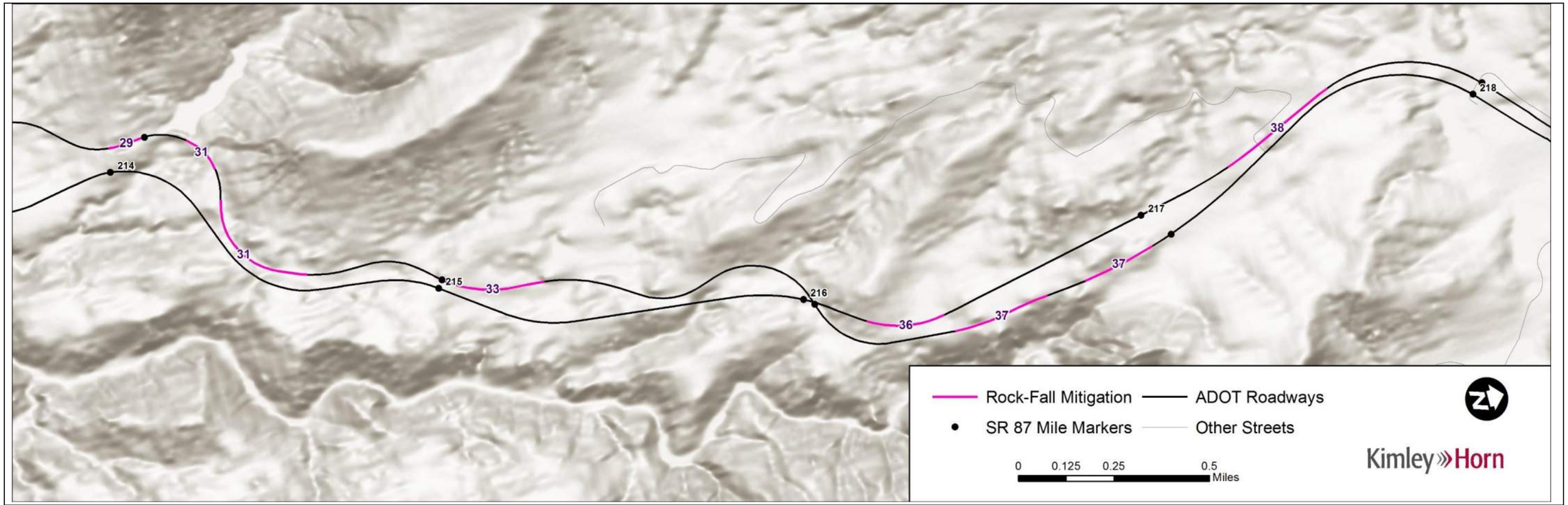



| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Rehabilitate shoulders | 4 | SB :196<br>NB:201.3 | SB:200<br>NB:202.1 | $2,560,400 | Current shoulders are in poor condition. |
| 2. Reconstruct north approach at Goldfield Rd | 8 | 196.1 | 196.1 | $76,800 | Current approach is in poor condition and in need of reconstruction. |
| 3. Widen NB inside shoulder to 4’ | 11 | 202.1 | 202.6 | $552,700 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| 4. Widen SB outside shoulder to 10’ | 14 | 205.2 | 207 | $3,247,500 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| 5. Widen SB inside shoulder to 4’ | 18 | 209.6 | 211 | $1,244,300 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| | | | **Total:** | **$7,681,700** | |

**Figure 36: Package Project No. 3. Northbound Roadway Improvements (MP 212-218)**

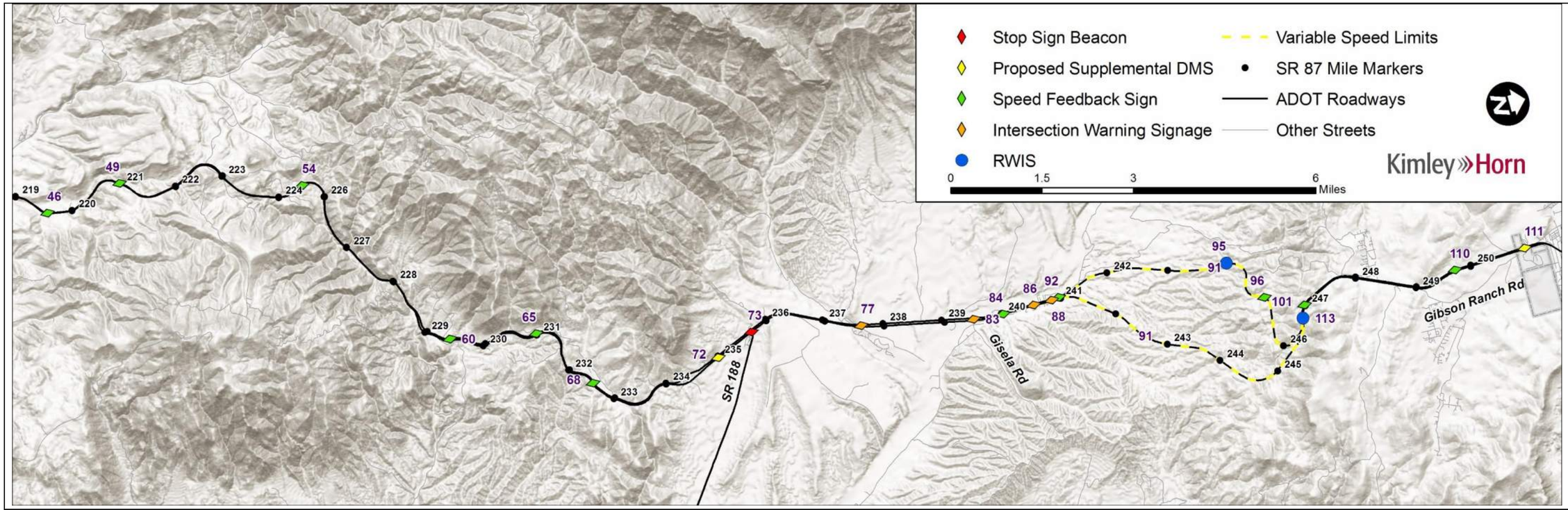

| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Widen NB inside shoulder to 4’ | 22 | 212.5 | 213 | $450,700 | Current inside shoulder is insufficient width |
| 2. Left- and right-turn/deceleration lanes, inside and outside lanes in both directions at the Log Coral Wash intersection | 23 | 212.7 | 212.7 | $2,330,600 | There are no turn/deceleration lanes at this intersection, there is a high percentage of vehicles with trailers that may warrant acceleration lanes. |
| 3. Construct NB climbing lane | 26 | 213 | 216.7 | $8,973,700 | Approximately 15% of traffic on this segment is heavy commercial vehicles, average speeds are 8 mph under the speed limit, 33% of vehicles are traveling greater than 10 mph under the speed limit, this location is within an identified crash hot spot. |
| 4. Add guardrail on east side of roadway | 27 | 213 | 213.4 | $207,700 | Six crashes occurred on the curve in this section where the vehicle ran off the road to the right and the vehicle overturned |
| 5. Address drainage issue between SB and NB alignments | 35 | 216 | 216 | $50,000 | During rain events, water draining from the southbound alignment seeps through the rock face onto the northbound alignment below, causing water to gather in the outside northbound travel lane. If this is in sufficient quantity to accumulate to hazardous amounts on the roadway, it implies a seepage mechanism that would not be expected in this rock and may imply geotechnical stability problems. |
| 6. Add NB left-turn and SB right-turn lane | 39 | 217.5 | 217.5 | $465,800 | There are currently no deceleration/turn lanes at this intersection. |
| | | | **Total:** | **$12,478,500** | |

**Figure 37: Package Project No. 4. Central District Rock-Fall Mitigation (MP 213-218)**




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. NB both sides – re-slope to ¾:1, widen and deepen ditches | 29 | 213.9 | 214 | $250,000 | Frequent cleanup required on shoulder, cut eroding and raveling, short sight distance |
| 2. NB left side – re-slope ¾:1 (1st stretch), ½:1 (2nd stretch, rock portions), and 1:1 (earth, saprolite); round crest in gravels; pinned netting in earthen materials; widen and deepen ditch; rock lined crown ditch | 31 | 1: 214.2<br>2: 214.4 | 1: 214.3<br>2: 214.6 | 1: $995,000<br>2: $350,000 | 1st stretch: Wedge and toppling geometries plus raveling lead to frequent rock on shoulder, differential erosion features slope to roadway<br>2nd stretch: Slabby granite with planar fractures leading to raveling, toppling and wedge releases to shoulder and roadway; accumulations of saprolite w/boulders at crest, some w/inclined surfaces toward roadway |
| 3. NB left side – scale, widen and deepen ditch | 33 | 215 | 215.2 | $170,000 | Erosion with unfavorable structure, inadequate ditch |
| 4. SB left side – heavy scaling, bolts, local pinned mesh | 36 | 216.1 | 216.2 | $450,000 | Erosion with favorable structure along faults and dikes, continuous and discontinuous fractures dipping toward roadway, toppling |
| 5. NB left side – heavy scaling, bolts, dowels (1st stretch); heavy scaling, spot rock bolting, erosion control (2nd stretch) | 37 | 1: 216.4<br>2: 216.7 | 1: 216.6<br>2: 216.9 | 1: $100,000<br>2: $100,000 | 1st stretch: Differential erosion in saprolite, may release large boulders, outward dipping sliding surface<br>2nd stretch: Continuous fractures dipping moderately outward, major erosion w/unfavorable structure, eroded faults at MP 216.77 |
| 6. SB left side – heavy scaling, pattern bolting, erosion control | 38 | 217.3 | 217.6 | $385,000 | Erosion, continuous fractures dipping outward, release along continuous dike, significant recent rockfall history |
| | | | **Total:** | **$2,800,000** | |

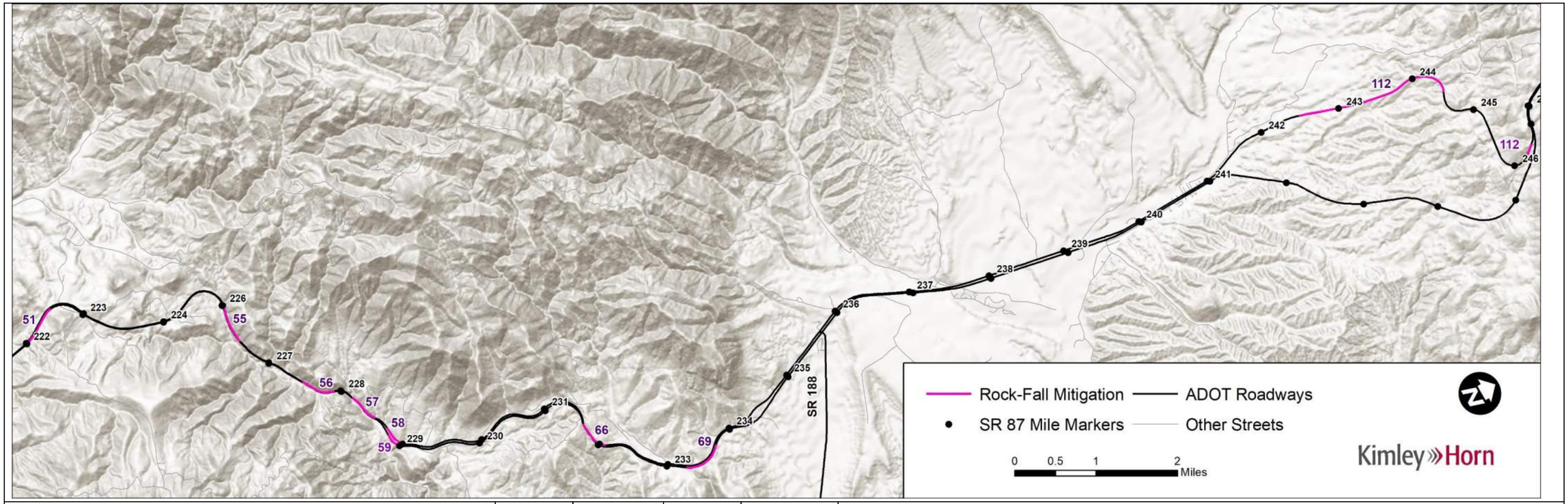
**Figure 38: Package Project No. 5. Northcentral District ITS/Signage Improvements (MP 218-251)**




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. SB speed feedback sign | 46 | 219.6 | 219.6 | $25,000 | Speeding is an issue at this location, a speed study at MP 221 showed an 85th percentile speed of 73 mph. |
| 2. SB speed feedback sign | 49 | 221 | 221 | $25,000 | Speeding is an issue at this location, a speed study at this location showed an 85th percentile speed of 73 mph. |
| 3. NB speed feedback sign | 54 | 224.5 | 224.5 | $25,000 | Within an identified crash hot spot where 50% of crashes involved traveling too fast for conditions, 27% of crashes ran into a concrete traffic barrier, 23% ran off the road to the right, 12% ran off the road to the left. |
| 4. SB speed feedback sign | 60 | 229.3 | 229.3 | $25,000 | A downhill grade leading into a relatively sharp curve (with a 55-mph advisory speed) is an optimal location for a speed feedback sign to reinforce the advisory speed. |
| 5. SB speed feedback sign | 65 | 231 | 231 | $25,000 | There is a small cluster of serious injury and fatal crashes at this location. A combination of a downhill grade and relatively sharp curves are optimal locations for a speed feedback sign. |
| 6. NB speed feedback sign | 68 | 232.5 | 232.5 | $25,000 | A 6% downhill grade leading into a relatively sharp curve is an optimal location for a speed feedback sign to reinforce the speed limit. |
| 7. New NB DMS | 72 | 235 | 235 | $250,000 | Provides the opportunity to inform NB drivers of incidents or extreme congestion leading into Payson, approximate delay times, and provides alternative route for travelers going to Show Low or I-40. |
| 8. WB stop sign beacon on SR 188 | 73 | 235.7 | 235.7 | $15,000 | Improves the visibility of the stop sign to slow traffic down in advance of the intersection. |
| 9. Intersection warning signage – Deer Creek Dr | 77 | 237.6 | 237.6 | $5,000 | Relatively inexpensive treatment to increase awareness of the Deer Creek Dr. intersection. |
| 10. Intersection warning signage at Gisela Road | 83 | 239.5 | 239.5 | $5,000 | Increase awareness and attention to cross-traffic at the Gisela Road intersection; one crash was reported in the crash analysis at this location. |
| 11. NB speed feedback sign | 84 | 240 | 240 | $25,000 | Reinforce the speed limit through the Rye area, the current 85th percentile speed is 73 mph. |

| | | | | | |
|---|---|---|---|---|---|
| 12. Intersection warning signage at the S. Rye Crossover | 86 | 240.5 | 240.5 | $5,000 | Increase awareness and attention to cross-traffic at the S. Rye Crossover intersection; two crashes were reported in the crash analysis at this location. |
| 13. Intersection warning signage at the N. Rye Crossover | 88 | 240.9 | 240.9 | $5,000 | Increase awareness and attention to the cross-traffic at the N. Rye Crossover intersection. |
| 14. Variable speed limits, with DMS on both ends | 91 | 241 | 247 | $844,000 | Add the ability to raise and lower speed limits in an area with a high propensity for crashes based on weather, events, crashes, or other factors where reduced speed limits may be warranted. |
| 15. SB speed feedback sign | 92 | 241 | 241 | $25,000 | Reinforce the speed limit through the Rye area, the current 85$^{th}$ percentile speed is 74 mph and the average speed is 72 mph. |
| 16. NB and SB RWIS with dynamic warning beacons | 95 | 244 | 244 | $60,000 | Provide the ability to warn drivers of adverse weather conditions, could be in communication with the proposed variable speed limits. |
| 17. SB speed feedback sign | 96 | 245 | 245 | $25,000 | Increase awareness of the speed limit on the long, downhill grade with sharp curves. |
| 18. NB and SB RWIS with dynamic warning beacons | 113 | 246.3 | 246.3 | $180,000 | In the northbound direction, provide the ability to warn drivers of adverse weather conditions and could be in communication with the proposed variable speed limits. In the southbound direction, provide a Dynamic Curve Warning System for Corvair Curve that uses supplemental beacons and/or messages that activate when a motorist approaches the curve at a high speed. A typical dynamic curve warning system combines a speed measuring device (such as loop detectors or radar) with flashing beacon and a variable message sign. The system can incorporate a camera to provide visual surveillance of the curve. The system is designed to slow high-speed vehicles as they approach and enter a horizontal curve. It works by measuring the speeds of approaching vehicles and providing messages to speeding drivers to slow down to an advisory speed. |
| 19. SB speed feedback sign | 101 | 247 | 247 | $25,000 | Reinforce the speed limit and driver awareness of their speeds, 85$^{th}$ percentile speeds are 19 mph over the speed limit and average speeds are 17 mph over the speed limit. |
| 20. SB speed feedback sign | 110 | 249.8 | 249.8 | $25,000 | Reinforce the speed limit and driver awareness of their speeds. |
| 21. New SB DMS | 111 | 251 | 251 | $250,000 | Provides the ability to advise SB traffic to turn around in response to incidents or extreme congestion on the SR 87 corridor south of Payson. |
| | | | **Total:** | **$1,894,000** | |

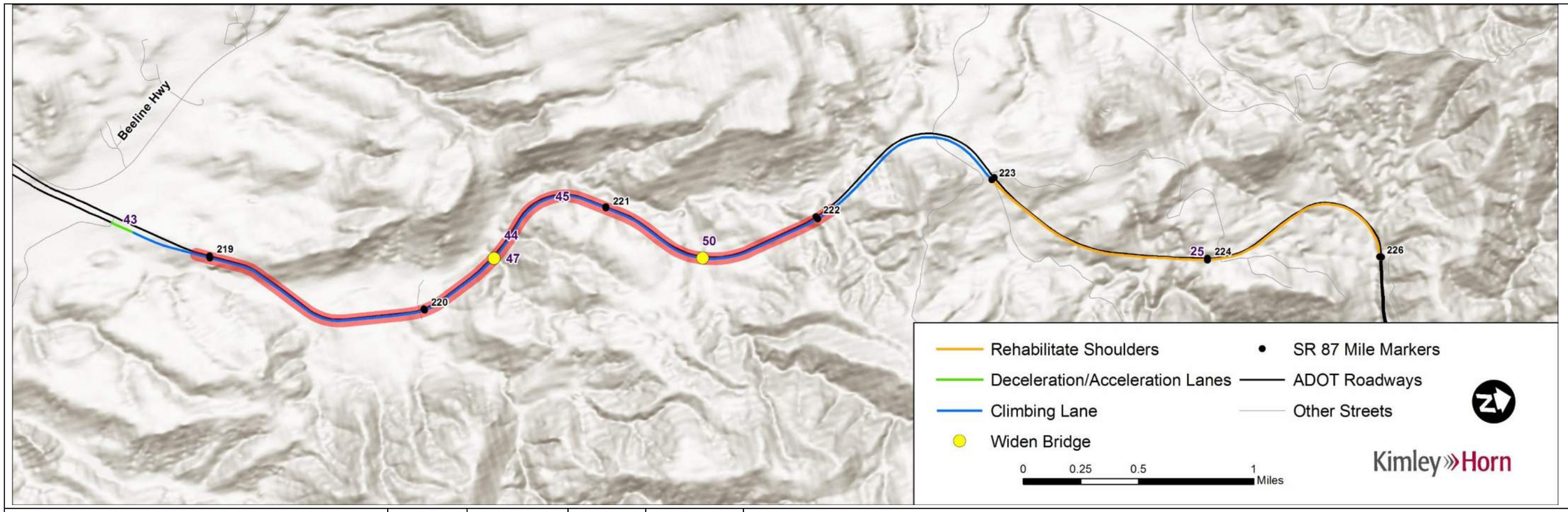
**Figure 39: Package Project No. 6. Northcentral District Rock-Fall Mitigation (MP 222-247)**




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. NB both sides – re-grade with rock-lined interceptor channels and crown ditch, gabions | 51 | 222 | 222.6 | $650,000 | Re-grade with rock-lined interceptor channels and crown ditch, gabions |
| 2. SB left side – pinned mesh in the narrow shoulder area, deepen ditch to 6', rock fence on bench, grade slope and scale (1st stretch); crest erosion, protect with thrie beam barrier, pinned mesh in crown area gravels, scale (2nd stretch); pinned mesh in the crest, deepen ditch, protect with weathering thrie beam barrier (3rd stretch) | 55 | 1: 226<br>2: 226.1<br>3: 226.3 | 1: 226.1<br>2: 226.3<br>3: 226.5 | 1: $440,000<br>2: $325,000<br>3: $550,000 | 1st stretch: Erosion with boulders, upper bench may be breached, potential upslope contribution above bench. Rock fall is frequent but widened paved shoulder keeps most rock off pavement, despite lack of ditch cross slope.<br>2nd stretch: Crest erosion, limited catchment with many rock falls<br>3rd stretch: Local terrace gravels at top of slope cut, rock face well vegetated and mostly stable but catchment is inadequate |
| 3. SB left side – deepen ditch by toe excavation, protect ditch cross slope with weathering thrie beam barrier | 56 | 227.5 | 227.9 | $250,000 | Tall cut appx 3/4:1 paved ditch inadequate depth. Rock slope mostly well vegetated and uniform, generally stable. Local raveling and release from crest. |
| 4. SB left side - spot and pattern rock bolting (crane basket), attenuators, local anchored mesh, heavy scaling, widen and deepen ditch and protect with weathering thrie beam or concrete barrier | 57 | 228.2 | 228.5 | $660,000 | High & steep cut, widespread plane shear and wedge fracture geometries, erosion along faults and shears. Ditch width and cross slope inadequate. Emergency cleanups have been infrequent, but free-standing rock erosion features are developing and may lead to significant and damaging future falls. |
| 5. SB left side – rock lined crown ditch, dress and revegetate slope, widen and deepen ditch and protect with weathering thrie beam barrier (1st stretch); SB right side - deepen ditch and protect with weathering thrie beam barrier | 58 | 1: 228.7<br>2: 228.8 | 1: 229<br>2: 229 | 1: $230,000<br>2: $150,000 | 1st stretch: Fanglomerate, benches 80%-90% eroded w/vegetation on remnants, rock fall almost to shoulder, ditch depth inadequate. Assume 2018 repair $$ appearing in District records was for this cut.<br>2nd stretch: Fanglomerate, many rocks in ditch, depth inadequate |

| | | | | | |
|---|---|---|---|---|---|
| 6. NB both sides – re-grade to eliminate remnant benches, use space to improve ditch configuration both sides | 59 | 228.8 | 229 | $160,000 | Looser material atop cut overlies denser fanglomerate. Catch benches have filled up, potential for rock bouncing out from face |
| 7. NB right side – re-grade with rock-lined interceptor channels and crown ditch, gabions (1st stretch); SB left side – in rock cut deepen ditch and protect with weathering thrie beam barrier, retain paved shoulders; in alluvium construct rock-lined crown and interceptor ditches, gabions as necessary (2nd stretch) | 66 | 1: 231.6<br>2: 231.7 | 1: 231.7<br>2: 232.1 | 1: $530,000<br>2: $485,000 | 1st stretch: Heavy rill erosion, obvious recent clean-up work<br>2nd stretch: Partial raveling but mostly kinematically stable rock slope with ditch of inadequate depth. North 2/3 is valley fill sediments with heavy rill erosion, locally undercutting slope face, no crown ditch |
| 8. NB right side – re-grade with rock-lined interceptor channels and crown ditch, gabions | 69 | 233.3 | 233.7 | $780,000 | Two tall cuts in unconsolidated alluvium, heavy rill erosion, widened shoulders, history of major sluffing & major reconstruction, may recur. |
| 9. SB left side – Move slope back 10 ft to widen and deepen ditch, revegetate earth slopes, R&R barrier with single-beam weathering type (1st stretch); SB left side – round crest & layback & widen ditch, protect deepened ditch with weathering single-beam barrier (2nd stretch) | 112 | 1: 242.5<br>2: 246.4 | 1: 244.5<br>2: 246.6 | 1: $500,000<br>2: $130,000 | 1st stretch: 6 cuts SB LT, rocks roll out into travel lanes during significant rainfall or snowmelt events<br>2nd stretch: Boulders at crest eroding out, maintenance activity has occurred in the MP range. |
| | | | **Total:** | **$5,840,000** | |

**Figure 40: Package Project No. 7. Northbound Roadway Improvements (MP 218-226)**




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Rehabilitate NB shoulders | 25 | 223 | 226 | $1,111,200 | The shoulders in this location are in poor condition, with significant cracking and vegetation growing. |
| 2. NB outside acceleration lane, SB inside acceleration lane at Bushnell Tanks intersection | 43 | 218.5 | 218.5 | $1,330,500 | Relatively high level of vehicles with trailers that may warrant acceleration lanes. |
| 3. Widen inside shoulders to 4’ and outside shoulders to 10’ | 44 | 218.9 | 222.1 | $4,061,600 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| 4. Construct NB climbing lane | 45 | 218.6 | 223 | $16,108,300 | Approximately 15% of traffic on this segment is heavy commercial vehicles, the uphill grade causes low speeds and large speed variances between vehicles. |
| 5. Widen Whiskey Springs bridge | 47 | 220.3 | 220.3 | $2,904,500 | Bridge will need to be widened to accommodate the proposed northbound climbing lane. |
| 6. Widen Kitty Joe Creek bridge | 50 | 221.4 | 221.4 | $3,772,500 | Bridge will need to be widened to accommodate the proposed northbound climbing lane. |
| | | | **Total:** | **$29,288,600** | |

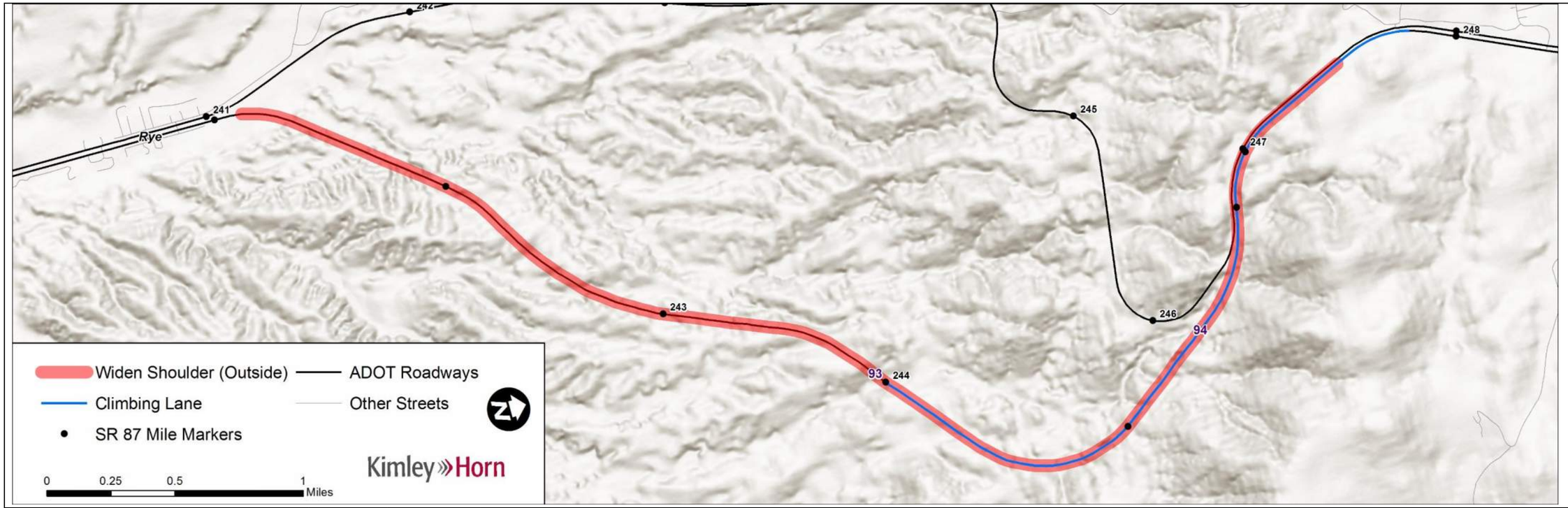
**Figure 41: Package Project No. 8. Slate Creek Improvements (MP 226-232)**


| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Rehabilitate NB shoulders | 25 | 227.8 | 229 | $666,700 | The shoulders in this location are in poor condition, with significant cracking and vegetation growing. |
| 2. Widen inside shoulders to 4’ and outside shoulders to 10’ | 53 | NB: 226<br>SB: 226 | NB: 227.8<br>SB: 228.5 | $15,448,300 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| 3. Widen SB inside shoulders to 4’ | 63 | 230.8 | 230.9 | $196,700 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| 4. Widen inside shoulder to 4’ in both directions | 67 | 231.5 | 232 | $1,301,100 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| | | | **Total:** | **$17,612,800** | |

**Figure 42: Package Project No. 9. Rye Improvements (MP 239-241)**

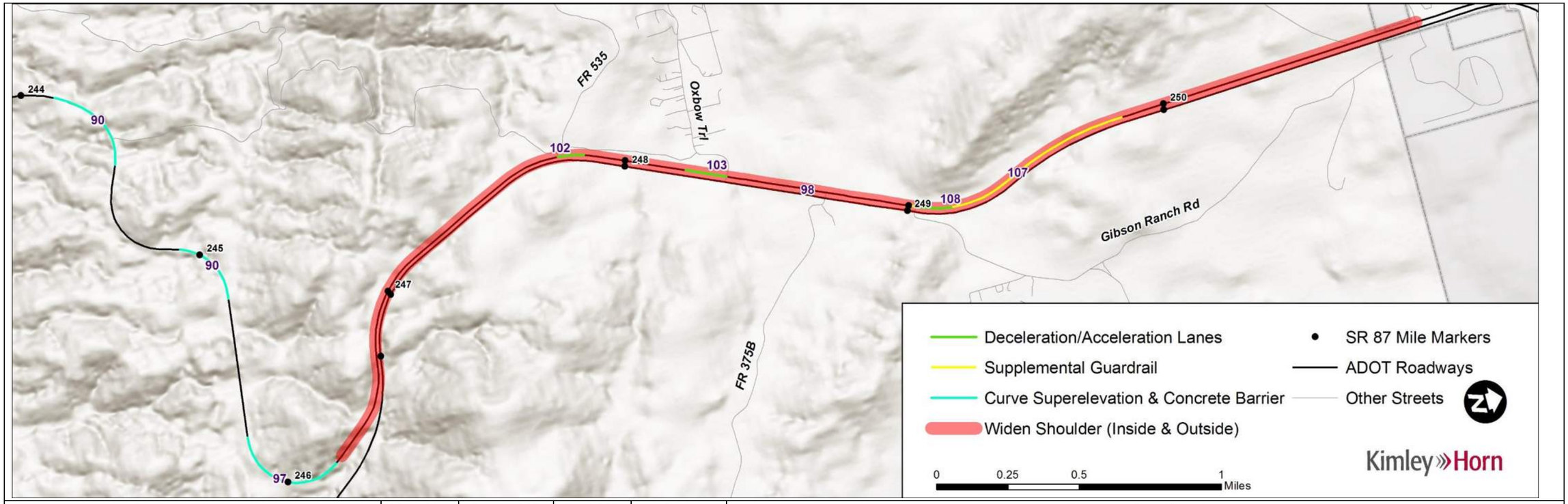

| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. NB outside acceleration lane at Gisela Rd. | 83 | 239.5 | 239.5 | $591,800 | Remove slow-moving vehicles from through travel lanes. |
| 2. NB left-turn lane, SB right-turn lane, NB inside acceleration lane, and SB outside acceleration lane at Matlock Gas | 85 | 240 | 240 | $1,593,600 | Provide turn/deceleration and acceleration lanes where they do not currently exist, particularly because of the slow-moving vehicles at this location. |
| 3. Right- and left-turn lanes, inside and outside acceleration lanes in both directions at the S. Rye Crossover | 87 | 240.5 | 240.5 | $3,477,800 | Provide turn/deceleration lanes where they do not currently exist, two crashes were reported in the crash analysis at this location. |
| 4. SB right-turn lane, NB inside and outside acceleration lanes at the N Rye Crossover | 89 | 240.9 | 240.9 | $1,331,700 | Provide turn/deceleration lane where it does not currently exist, especially because of the high speeds measured at this location. |
| | | | **Total:** | **$6,994,900** | |

**Figure 43: Package Project No. 10. Northbound Roadway Improvements (MP 241-248)**




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Widen NB outside shoulders to 10' | 93 | 241.1 | 247.5 | $4,249,200 | Existing shoulders are of an insufficient width for current highway standards and limit effective emergency response. |
| 2. Construct NB climbing lane | 94 | 244 | 247.8 | $8,968,600 | Approximately 12% of traffic on this segment is heavy commercial vehicles, average speeds are 16 mph under the speed limit, 92% of vehicles are traveling greater than 10 mph under the speed limit, the northern portion of the climbing lane is within an identified crash hot spot. |
| | | | **Total:** | **$13,217,800** | |

**Figure 44: Package Project No. 11. Southbound Roadway Improvements (MP 244-250)**




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Address curve superelevation, add concrete barrier | 90 | 1: 244.1<br>2: 244.9 | 1: 244.3<br>2: 245.2 | $4,276,300 | Improve the superelevation of curves to reduce run off the road crashes. |
| 2. Add superelevation to Corvair Curve, add concrete barrier. | 97 | 245.8 | 246.2 | $1,506,000 | This location is the most significant crash hot spot within the SR 87 corridor with 63 crashes on the curve, including one fatality and one serious injury during the crash analysis period. |
| 3. Widen SB inside and outside shoulders | 98 | 246.2 | 250.9 | $8,849,000 | Existing shoulders are of an insufficient width for current highway standards and limit effective emergency response. |
| 4. SB right-turn lane at FR 535 | 102 | 247.8 | 247.8 | $275,000 | Provide turn/deceleration lane where it does not currently exist, especially because of the high speeds measured at this location |
| 5. SB outside acceleration lane at Oxbow Trail | 103 | 248.4 | 248.4 | $591,800 | Remove slow-moving traffic from through travel lanes. |
| 6. Add SB guardrail, right side | 107 | 249 | 249.9 | $418,900 | Unprotected drop-off along the right side of the roadway. |
| 7. Realign SB left-turn lane at Gibson Ranch Road | 108 | 249 | 249 | $464,900 | Realign the SB left-turn lane across the median to be adjacent to NB traffic to improve sight distance and address median grade issue. Two crashes occurred at this intersection during the crash analysis period. |
| | | | **Total:** | **$16,381,900** | |

**Figure 45: Package Project No. 12. Northbound Roadway Improvements (MP 247-250)**


| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Install wildlife fencing and wildlife warning signage, and add a wildlife crossing overpass | 99/100 | 247 | 249.9 | $4,166,000 | 34 crashes in this segment involved wildlife in the crash analysis. |
| 2. NB inside acceleration lane at Oxbow Trail | 103 | 248.4 | 248.4 | $581,800 | Provide an acceleration lane to allow vehicles to accelerate and merge into traffic to avoid the sight distance and grade issues in the SR 87 median. |
| 3. Realign FR 375B | 104 | 248.6 | 248.6 | $247,900 | Remove sight distance and grade issues at the intersection of SR 87 and FR 375B. |
| 4. NB right-turn lane at FR 375B | 106 | 248.6 | 248.6 | $110,800 | Provide turn/deceleration lane where it does not currently exist. |
| 5. NB right-turn lane and outside acceleration lane at Gibson Ranch Road | 109 | 249 | 249 | $681,941 | Provide turn/deceleration lane where it does not currently exist. |
| | | | **Total:** | **$5,788,400** | |

# 5 PROJECT PRIORITIZATION

Projects were prioritized consistent with the Corridor Profile Study (CPS) methodology, developed for the four rounds of Corridor Profile Studies conducted from 2014 through 2018. A secondary methodology was utilized to evaluate and prioritize identified rock-fall areas throughout the corridor, called the Rock-fall Hazard Rating. These two methodologies and the resulting prioritization of projects are described in detail in the subsequent sections.

The CPS methodology conducts performance-based planning, identifies areas of need, develops and evaluates strategic solutions that are cost-effective, and accounts for potential risks. This purpose can be accomplished by following the process described below:

- Define corridor goals and objectives;
- Assess existing performance based on quantifiable performance measures;
- Propose various solutions to improve corridor performance;
- Identify quantifiable benefits relative to the performance measures for each proposed solution; and
- Prioritize solutions for future implementation, accounting for performance effectiveness and risk analysis findings.

The objective of this methodology is to identify a recommended set of prioritized potential solutions for consideration in future construction programs, derived from a transparent, defensible, logical, and replicable process. The following goals are identified as the outcome of this process:

- Link project decision-making and investments on key corridors to strategic goals
- Develop solutions that address identified corridor needs based on measured performance
- Prioritize improvements that cost-effectively preserve, modernize, and expand transportation infrastructure

## 5.1 Corridor Segments

To remain consistent with the CPS methodology applied during the SR 87/SR 260/SR 377 Corridor Profile Study, the same corridor segments were retained for this evaluation. Four segments from the CPS are within the project limits of the CDS:

- SR 87-3: MP 191-213
- SR 87-4: MP 213-235
- SR 87-5: MP 235-241
- SR 87-6: MP 241-250

These segments are also mapped in **Figure 47**. The corridor is segmented at logical breaks where the context changes due to differences in characteristics such as terrain, daily traffic volumes, or typical sections.

## 5.2 Corridor Performance

A series of performance measures is used to assess the SR 87 corridor. The results of the performance evaluation are used to define corridor needs relative to the long-term goals and objectives for the corridor.

### *5.2.1 Corridor Performance Framework*

The CPS methodology uses a performance-based process to define baseline corridor performance, diagnose corridor needs, develop corridor solutions, and prioritize strategic corridor investments. In support of this objective, a framework for the performance-based process was developed through a collaborative process involving ADOT and the CPS consultant teams.

**Figure 46** illustrates the performance framework, which includes a two-tiered system of performance measures (primary and secondary) to evaluate baseline performance.

**Figure 46: Corridor Profile Performance Framework**


The following five performance areas guide performance-based corridor analyses:

- Pavement
- Bridge
- Mobility
- Safety
- Freight

The performance measures include five primary measures: Pavement Index, Bridge Index, Mobility Index, Safety Index, and Freight Index. Additionally, a set of secondary performance measures provides for a more detailed analysis of corridor performance. Some performance measures have been retained from the SR 87/SR 260/SR 377 CPS, and some have been updated based on updated data collected for the CDS. **Table 21** provides a complete list of primary and secondary performance measures for each of the five performance areas as well as which performance measures have been updated for the CDS and which have been retained from the CPS.

**Figure 47: Corridor Profile Study Segments**

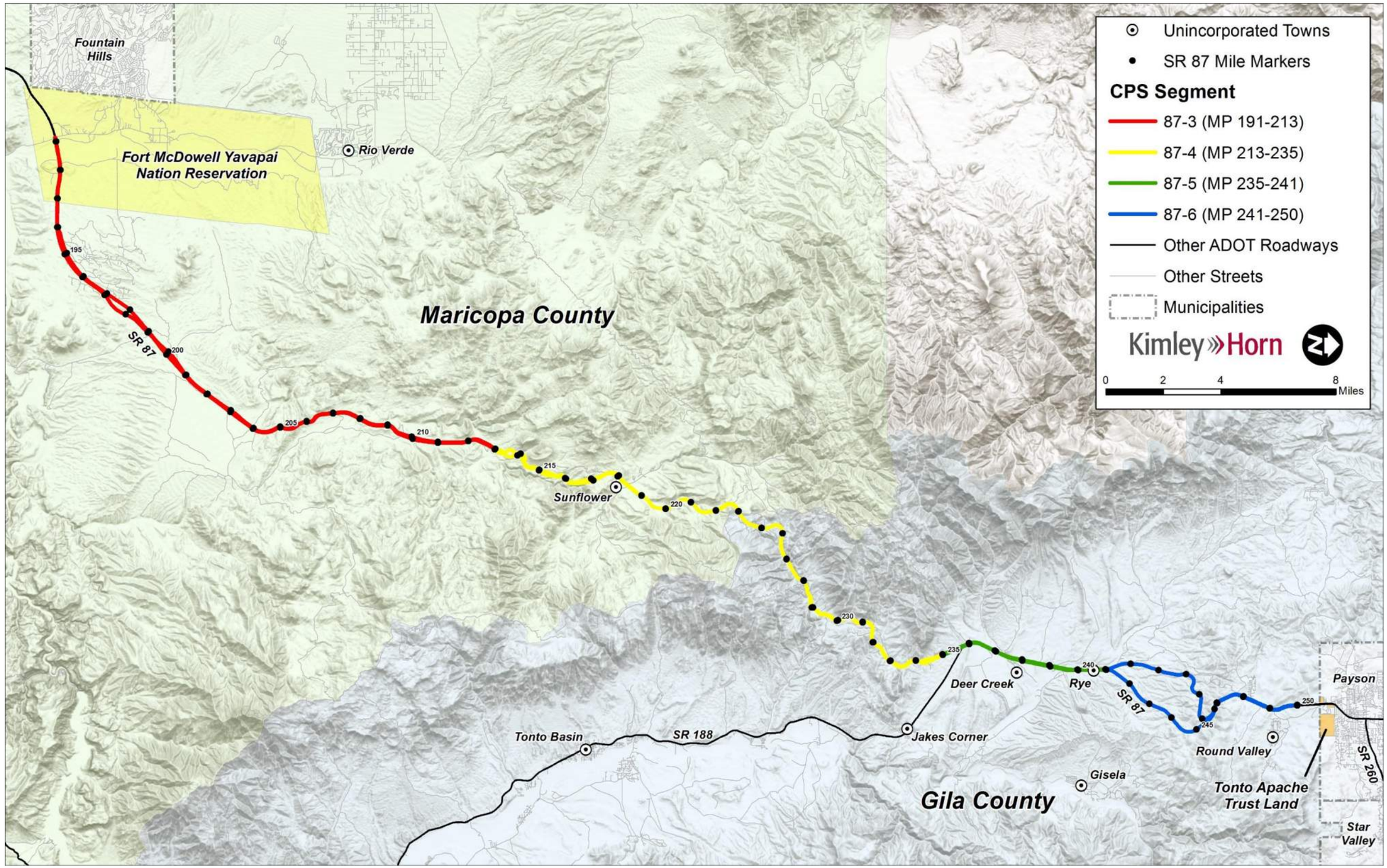


**Table 21: Corridor Performance Measures**

| Performance Area | Primary Measure | Secondary Measures | Updated from CPS |
|---|---|---|---|
| **Pavement** | **Pavement Index**<br>Based on a combination of International Roughness Index and cracking | • Directional Pavement Serviceability<br>• Pavement Failure<br>• Pavement Hot Spots | No – CPS pavement conditions have been utilized |
| **Bridge** | **Bridge Index**<br>Based on lowest of deck, substructure, and superstructure and structural evaluation rating | • Bridge Sufficiency<br>• Functionally Obsolete Bridges<br>• Bridge Rating<br>• Bridge Hot Spots | No – CPS bridge conditions have been utilized |
| **Mobility** | **Mobility Index**<br>Based on a combination of existing and future daily volume-to-capacity ratios | • Future Congestion<br>• Peak Congestion<br>• Travel Time Reliability<br>• Multimodal Opportunities | Yes – updated daily volumes and forecasts have been utilized |
| **Safety** | **Safety Index**<br>Based on frequency of fatal and incapacitating injury crashes | • Directional Safety Index<br>• Strategic Highway Safety Plan Emphasis Areas<br>• Crash Unit Types<br>• Safety Hot Spots | Yes – updated safety statistics for 2013-2017 were utilized |
| **Freight** | **Freight Index**<br>Based on bi-directional truck planning time index | • Recurring Delay<br>• Non-Recurring Delay<br>• Closure Duration<br>• Bridge Vertical Clearance<br>• Bridge Vertical Clearance Hot Spots | No – CPS freight metrics have been utilized |

Each of the primary and secondary performance measures identified in the table above is comprised of one or more quantifiable indicators. A three-level scale was developed as part of the CPS to standardize the performance scale across the five performance areas, with numerical thresholds specific to each performance measure:

Good/Above Average Performance – Rating is above the identified desirable/average range

Fair/Average Performance – Rating is within the identified desirable/average range

Poor/Below Average Performance – Rating is below the identified desirable/average range

The terms “good”, “fair”, and “poor” apply to the Pavement, Bridge, Mobility, and Freight performance measures, which have defined thresholds. The terms “above average”, “average”, and “below average” apply to the Safety performance measures, which have thresholds referenced to statewide averages at the time of the CPS.

### *5.2.2 Corridor Performance Summary*

**Table 22** shows a summary of corridor performance for all primary measures and secondary measure indicators for the SR 87 corridor. A weighted corridor average rating (based on the length of the segment) was calculated for each primary and secondary measure. Throughout the corridor, the pavement, bridge, and mobility performance areas performed generally “good” or “fair”. Safety and freight performance areas performed generally “poor/below average”. The following general observations were made related to the performance of the SR 87 corridor:

- Pavement Performance: The weighted average of the Pavement Index shows “good” overall performance; with the exception of Segment 87-3, which shows “fair” performance for the % Area Failure measure.
- Bridge Performance: The weighted average of the Bridge Index shows “fair” overall performance; all segments that include bridges have “good” or “fair” performance for Bridge Index, Sufficiency Rating, and Lowest Bridge Rating measures; Segment 87-6 contains no bridges.
- Mobility Performance: The weighted average of the Mobility Index shows “good” overall performance; Closure Extent, Directional Planning Time Index (PTI), % Bicycle Accommodation, and % Non-Single Occupancy Vehicle (SOV) Trips show “poor” or “fair” performance for the corridor in certain locations; all segments show “good” performance in the Mobility Index and Future Daily V/C measures.
- Safety Performance: The weighted average of the Safety Index and Directional Safety Index shows “below average” overall performance; in the 2013-2017 analysis period, there were 29 fatal crashes and 39 incapacitating crashes on the corridor.
- Freight Performance: The weighted average of the Freight Index shows “poor” performance; Closure Duration, Directional Truck Travel Time Index (TTTI), and Directional Truck PTI show “poor” or “fair” performance for the corridor.

**Table 22: Corridor Performance Summary by Segment and Performance Measure**

| Segment # | Segment Length (miles) | Pavement Performance Area | | | | Bridge Performance Area | | | | Mobility Performance Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pavement Index | Directional PSR | | % Area Failure | Bridge Index | Sufficiency Rating | % of Deck Area on Functionally Obsolete Bridges | Lowest Bridge Rating | Mobility Index[u] | Future Daily V/C[u] | Existing Peak Hour V/C[u] | | Closure Extent (instances/ milepost/ year/mile) | | Directional TTI (all vehicles) | | Directional PTI (all vehicles) | | % Bicycle Accommodation | % Non-Single Occupancy Vehicle (SOV) Trips |
| | | | NB/EB | SB/WB | | | | | | | | NB/EB | SB/WB | NB/EB | SB/WB | NB/EB | SB/WB | NB/EB | SB/WB | | |
| 87-3[2^a] | 22 | 3.80 | 3.80 | 3.88 | 11.4% | 6.95 | 96.20 | 0.0% | 6 | 0.22 | 0.25 | 0.14 | 0.14 | 0.87 | 0.11 | 1.05 | 1.04 | 1.54 | 1.48 | 99% | 16.7% |
| 87-4[2^a] | 22 | 4.05 | 3.84 | 3.93 | 0.0% | 6.31 | 89.18 | 0.0% | 6 | 0.29 | 0.36 | 0.34 | 0.35 | 1.47 | 0.15 | 1.17 | 1.05 | 2.05 | 1.47 | 86% | 5.2% |
| 87-5[2^a] | 5 | 4.55 | 4.35 | 4.36 | 0.0% | 6.31 | 99.60 | 0.0% | 6 | 0.21 | 0.23 | 0.16 | 0.16 | 0.23 | 0.07 | 1.01 | 1.08 | 1.42 | 1.51 | 92% | 12.9% |
| 87-6[2^a] | 10 | 4.15 | 4.10 | 3.96 | 0.0% | No Bridges | | | | 0.33 | 0.37 | 0.22 | 0.22 | 0.18 | 0.27 | 1.31 | 1.15 | 2.38 | 1.94 | 79% | 12.4% |
| **Weighted Corridor Average** | | 4.02 | 3.91 | 3.95 | 4.25% | 6.60 | 93.40 | 0.0% | 6 | 0.26 | 0.31 | 0.23 | 0.23 | 0.92 | 0.15 | 1.14 | 1.07 | 1.86 | 1.56 | 90% | 11.4% |

**SCALES**

| Performance Level | Non-Interstate | | | All | | | | Urban and Fringe Urban | All | Uninterrupted | | All | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Good/Above Average Performance | > 3.50 | > 3.50 | < 5% | > 6.5 | > 80 | < 12% | > 6 | < 0.71 | < 0.22 | < 1.15 | < 1.3 | > 90% | > 17% |
| Fair/Average Performance | 2.90 - 3.50 | 2.90 - 3.50 | 5% - 20% | 5.0 - 6.5 | 50 - 80 | 12% - 40% | 5 - 6 | 0.71 - 0.89 | 0.22 - 0.62 | 1.15 - 1.33 | 1.3 - 1.5 | 60% - 90% | 11% - 17% |
| Poor/Below Average Performance | < 2.90 | < 2.90 | > 20% | < 5.0 | < 50 | > 40% | < 5 | > 0.89 | > .62 | > 1.33 | > 1.5 | < 60% | < 11% |

| Performance Level | Rural | Interrupted | |
|---|---|---|---|
| Good/Above Average Performance | < 0.56 | < 1.3 | < 3.0 |
| Fair/Average Performance | 0.56 - 0.76 | > 1.3 & < 2.0 | > 3.0 & < 6.0 |
| Poor/Below Average Performance | > 0.76 | > 2.0 | > 6.0 |

^Uninterrupted Flow Facility
*Interrupted Flow Facility
[u]Performance Metric Updated for CDS
[a]2 or 3 or 4 Lane Divided Highway
[b]4 or 5 Lane Undivided Highway
[1]Fringe Urban Operating Environment
[2]Rural Operating Environment

**Table 22: Corridor Performance Summary by Segment and Performance Measure (Continued)**

| Segment # | Segment Length (miles) | Safety Performance Area | | | | | | | Freight Performance Area | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Safety Index[u] | Directional Safety Index[u] | | % of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors[u] | % of Fatal + Incapacitating Injury Crashes Involving Trucks[u] | % of Fatal + Incapacitating Injury Crashes Involving Motorcycles[u] | % of Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers[u] | Freight Index | Directional TTTI | | Directional TPTI | | Closure Duration (minutes/milepost/year/mile) | | Bridge Vertical Clearance (feet) |
| | | | NB/EB | SB/WB | | | | | | NB/EB | SB/WB | NB/EB | SB/WB | NB/EB | SB/WB | |
| 87-3[2^a] | 22 | 1.32 | 0.66 | 1.97 | 76% | Insufficient Data | 33% | Insufficient Data | 0.53 | 1.11 | 1.23 | 1.38 | 2.38 | 2674.13 | 59.53 | 16.97 |
| 87-4[2^a] | 22 | 1.77 | 0.67 | 2.86 | 66% | Insufficient Data | 48% | Insufficient Data | 0.51 | 1.37 | 1.14 | 2.38 | 1.56 | 4359.89 | 34.01 | 18.75 |
| 87-5[2^a] | 5 | 0.19 | 0.08 | 0.30 | Insufficient Data | Insufficient Data | Insufficient Data | Insufficient Data | 0.56 | 1.12 | 1.21 | 1.45 | 2.13 | 49.20 | 21.67 | No UP |
| 87-6[2^a] | 10 | 2.37 | 2.36 | 2.38 | 54% | Insufficient Data | 23% | Insufficient Data | 0.44 | 1.55 | 1.22 | 2.52 | 2.01 | 37.16 | 287.98 | No UP |
| **Weighted Corridor Average** | | 1.57 | 0.9 | 2.23 | 58% | Insufficient Data | 37% | Insufficient Data | 0.51 | 1.28 | 1.19 | 1.95 | 1.99 | 2633.32 | 85.53 | 17.86 |

**SCALES**

| Performance Level | 2 or 3 or 4 Lane Divided Highway | | | | | Uninterrupted | | | All | |
|---|---|---|---|---|---|---|---|---|---|---|
| Good/Above Average Performance | < 0.77 | < 44% | < 4% | < 16% | < 2% | > 0.77 | < 1.15 | < 1.3 | < 44.18 | > 16.5 |
| Fair/Average Performance | 0.77 - 1.23 | 44% - 54% | 4% - 7% | 16% - 26% | 2% - 4% | 0.67 - 0.77 | 1.15 - 1.33 | 1.3 - 1.5 | 44.18-124.86 | 16.0 - 16.5 |
| Poor/Below Average Performance | > 1.23 | > 54% | > 7% | > 26% | > 4% | < 0.67 | > 1.33 | > 1.5 | > 124.86 | < 16.0 |

| Performance Level | 4 or 5 Lane Undivided Highway | | | | | Interrupted | | |
|---|---|---|---|---|---|---|---|---|
| Good/Above Average Performance | < 0.80 | < 42% | < 6% | < 6% | < 5% | > 0.33 | < 1.3 | < 3.0 |
| Fair/Average Performance | 0.80 - 1.20 | 42% - 51% | 6% - 10% | 6% - 9% | 5% - 8% | 0.17 - 0.33 | 1.3 - 2.0 | 3.0 - 6.0 |
| Poor/Below Average Performance | > 1.20 | > 51% | > 10% | > 9% | > 8% | < 0.17 | > 2.0 | > 6.0 |

^Uninterrupted Flow Facility
*Interrupted Flow Facility
[u]Performance Metric Updated for CDS
[a]2 or 3 or 4 Lane Divided Highway
[b]4 or 5 Lane Undivided Highway
[1]Fringe Urban Operating Environment
[2]Rural Operating Environment

*Notes: "Insufficient Data" indicates there was not enough data available to generate reliable performance ratings*
*"No UP" indicates no underpasses are present in the segment*

## 5.3 Needs Assessment

### *5.3.1 Corridor Objectives*

Statewide goals and performance measures were established by the ADOT Long-Range Transportation Plan (LRTP), 2010-2035. Statewide performance goals that are relevant to SR 87 performance areas were identified as a part of the CPS and corridor goals were then formulated for each of the five performance areas that aligned with the overall statewide goals established by the LRTP. Based on stakeholder input, corridor goals, corridor objectives, and performance results from the CPS, three "emphasis areas" were identified for the SR 87 corridor: Mobility, Safety, and Freight.

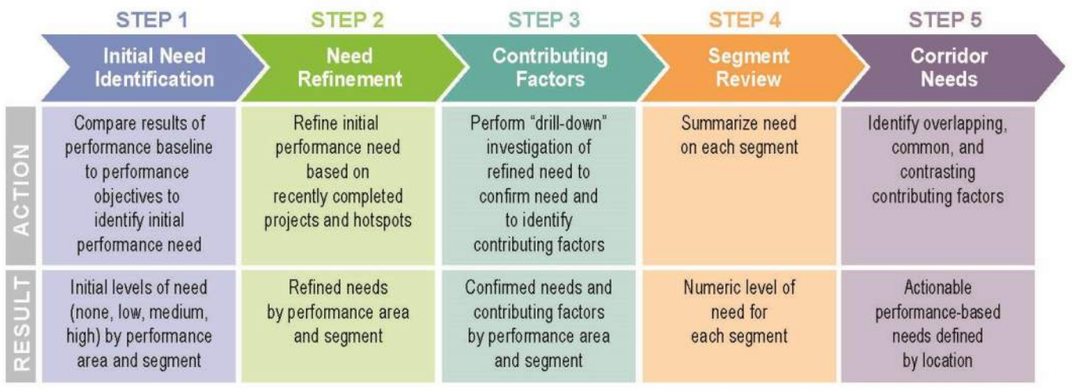
Taking into account the corridor goals and identified emphasis areas, performance objectives were developed for each quantifiable performance measure that identify the desired level of performance based on the performance scale levels for the overall corridor and for each segment of the corridor. For the performance emphasis areas, the corridor-wide weighted average performance objectives are identified with a higher standard than for the other performance areas.

Achieving corridor and segment performance objectives helps ensure that investments are targeted toward improvements that support the safe and efficient movement of travelers on the corridor. Corridor performance is measured against corridor and segment objectives to determine needs – the gap between observed performance and performance objectives.

### *5.3.2 Needs Assessment Process*

The performance-based needs assessment evaluates the difference between the baseline performance and the performance objectives for each of the five performance areas used to characterize the health of the corridor: Pavement, Bridge, Mobility, Safety, and Freight. The performance-based needs assessment process is illustrated in **Figure 48**.

**Figure 48: Needs Assessment Process**




The needs assessment compares baseline corridor performance with performance objectives to provide a starting point for the identification of performance needs. This mathematical comparison results in an initial need rating of None, Low, Medium, or High for each primary and secondary performance measure. An illustrative example of this process is shown in **Figure 49**.

**Figure 49: Initial Need Ratings in Relation to Baseline Performance (Bridge Example)**

| Performance Thresholds | Performance Level | Initial Level of Need | Description |
|---|---|---|---|
| 6.5 | Good | None* | All levels of Good and top 1/3 of Fair (>6.0) |
| | Good | | |
| | Good | | |
| | Fair | | |
| 5.0 | Fair | Low | Middle 1/3 of Fair (5.5-6.0) |
| | Fair | Medium | Lower 1/3 of Fair and top 1/3 of Poor (4.5-5.5) |
| | Poor | | |
| | Poor | High | Lower 2/3 of Poor (<4.5) |
| | Poor | | |

### *5.3.3 Summary of Needs*

**Table 23** provides a summary of needs for each segment across all performance areas, with the average need score for each segment presented in the last row of the table. A weighting factor of 1.5 is applied to the need scores identified as emphasis areas (Mobility, Safety, and Freight for the SR 87 corridor).

- Pavement Needs: all segments rank as Low or None for pavement needs.
- Bridge Needs: all segments rank as having a need of None for bridges.
- Mobility Needs: all segments rank as having a Low need for mobility.
- Safety Needs: segments 87-3, 87-4, and 87-6 all rank as High for safety. Segment 87-5 ranks as None for safety needs.
- Freight Needs: all segments rank as High for freight.
- Overlapping Needs: Segments 87-3, 87-4, and 87-6 all rank as High for both Safety and Freight.

**Table 23: Summary of Needs by Segment**

| Performance Area | Segment Number and Mileposts (MP) | | | |
|---|---|---|---|---|
| | 87-3 | 87-4 | 87-5 | 87-6 |
| | MP 191-213 | MP 213-235 | MP 235-241 | MP 241-250 |
| **Pavement** | Low | Low | None | None* |
| **Bridge** | None | None | None | None |
| **Mobility⁺** | Low | Low | Low | Low |
| **Safety⁺** | High | High | None | High |
| **Freight⁺** | High | High | High | High |
| **Average Need** | **1.77** | **1.77** | **0.92** | **1.62** |

⁺ Identified as Emphasis Areas for SR 68/SR 95 North Corridor
* A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance

| Level of Need | Average Need Range |
|---|---|
| None* | < 0.1 |
| Low | 0.1 - 1.0 |
| Medium | 1.0 - 2.0 |
| High | > 2.0 |

## 5.4 Solution Evaluation and Prioritization

The CPS evaluation methodology includes the following steps, as shown in **Figure 50**.

- **Life-Cycle Cost Analysis**: Pavement and Bridge projects are evaluated through an LCCA; however, no pavement or bridge projects have been proposed within the 12 major projects being evaluated. As such, this step was not completed for the SR 87 Corridor Development Study.
- **Performance Effectiveness Evaluation**: This step determines a Performance Effectiveness Score (PES) based on how much each project impacts the existing performance needs scores for each segment.
- **Solution Risk Analysis**: All candidate solutions advanced through the Performance Effectiveness Evaluation are also evaluated through a Solution Risk Process. A solution risk probability and consequence analysis was conducted to develop a solution-level risk weighting factor. This risk analysis is a numeric scoring system to help address the risk of not implementing a solution based on the likelihood and severity of the performance failure.
- **Candidate Solution Prioritization**: the PES, weighted risk factor, and segment average need score are combined to create a prioritization score. The projects are ranked by prioritization score from highest to lowest. The highest prioritization score indicates the candidate solution that is recommended as the highest priority based on this analysis. Solutions that address multiple performance areas tend to score higher in this process.

## 5.5 Summary of Corridor Recommendations

**Table 24** shows the prioritized projects recommended for the SR 87 corridor. Implementation of these solutions is anticipated to improve performance of the SR 87 corridor, primarily in the Safety and Freight performance areas. It should be noted that the two rock-fall projects were prioritized through the CPS process and will be prioritized using the Rock-fall Hazard Rating system in the following section.

**Figure 50: Project Evaluation Process**

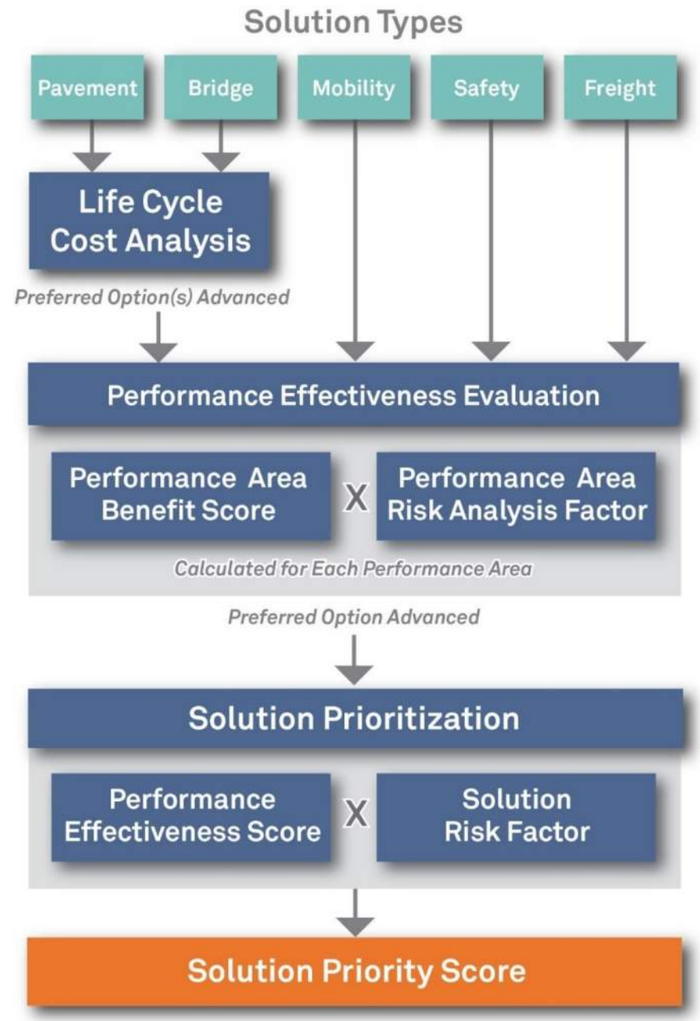


**Table 24: Prioritized Recommended Solutions**

| Rank | Package Project No. | Package Project Name | Package Project Scope | Est. Cost (in $M) | Prioritization Score |
|---|---|---|---|---|---|
| **1** | 5 | Northcentral District ITS/Signage Improvements (MP 218-251) | • NB speed feedback signs (MP 224.5, 232.5, 240.0)<br>• SB speed feedback signs (MP 219.6, 221.0, 229.3, 231.0, 241.0, 245.0, 247.0, 249.8)<br>• NB DMS (MP 235.0)<br>• SB DMS (MP 251.0)<br>• WB stop sign beacon on SR 188<br>• Intersection Warning Signage (Deer Creek Drive, Gisela Road, S. Rye Crossover, N. Rye Crossover)<br>• Variable speed limits with DMS on both ends<br>• SB RWIS with dynamic warning beacons (MP 244)<br>• NB and SB RWIS with dynamic warning beacons, southbound Dynamic Curve Warning System approaching Corvair Curve with camera surveillance (MP 246.3) | 1.89 | 130.1 |
| **2** | 8 | Slate Creek Improvements (MP 226-232) | • Rehabilitate NB shoulders (MP 227.8-229)<br>• Widen inside shoulders to 4’ and outside shoulders to 10’ (NB MP 226-227.8, SB MP 224.5-228.5)<br>• Widen SB inside shoulders to 4’ (MP 230.8-230.9)<br>• Widen inside shoulders to 4’ in both directions (MP 231.5-232) | 17.61 | 64.4 |
| **3** | 11 | Southbound Roadway Improvements (MP 244-250) | • Address curve superelevation and add concrete barrier (MP 244.1-244.3 and MP 244.9-245.2)<br>• Cut back slope and realign the Corvair Curve as well as add concrete barrier (MP 245.8-246.2)<br>• Widen SB inside shoulder to 4’ and outside shoulder to 10’ (MP 246.2-250.9)<br>• SB right-turn lane at FR 535<br>• SB outside acceleration lane at Oxbow Trail<br>• Add SB guardrail, west (right) side (MP 249.0-249.9)<br>• Realign SB left-turn lane and add an inside acceleration lane at Gibson Ranch Road | 16.38 | 61.9 |
| **4** | 12 | Northbound Roadway Improvements (MP 247-250) | • Install wildlife fencing, wildlife warning signage, and wildlife crossing overpass<br>• NB inside acceleration lane at Oxbow Trail<br>• Realign FR 375B<br>• NB right-turn lane at FR 375B<br>• NB right-turn lane and outside acceleration lane at Gibson Ranch Road | 5.79 | 61.0 |
| **5** | 2 | Central District Shoulder Improvements (MP 196-211) | • Rehabilitate shoulders (NB MP 201.3-202.1, SB MP 196.0-200.0)<br>• Reconstruct the north side street approach at Goldfield Road<br>• Widen NB inside shoulder to 4’ (MP 202.1-202.6)<br>• Widen SB outside shoulder to 10’ (MP 205.2-207.0)<br>• Widen SB inside shoulder to 4’ (MP 209.6-211.0) | 7.68 | 47.3 |
| **6** | 10 | Northbound Roadway Improvements (MP 241-248) | • Widen NB outside shoulder to 10’ (MP 241.1-247.5)<br>• Construct NB climbing lane (MP 244.0-247.8) | 13.22 | 20.7 |
| **7** | 1 | Central District ITS/Signage Improvements (MP 191-218) | • SB DMS (MP 191.2)<br>• NB curve chevron signage (MP 205.2-205.7, MP 212.2-212.4)<br>• NB speed feedback signs (MP 205.2, 209.7, 213.0, 214.0, 217.8)<br>• SB speed feedback signs (MP 209.6, 213.6, 215.0)<br>• Intersection warning signage at Sunflower | 0.52 | 8.5 |
| **8** | 9 | Rye Improvements (MP 239-241) | • NB outside and SB inside acceleration lanes at Gisela Road<br>• NB left-turn lane, SB right-turn lane, NB inside acceleration lane, SB outside acceleration lane at Matlock Gas<br>• Right- and left-turn lanes, inside and outside acceleration lanes in both directions at S. Rye Crossover<br>• SB right-turn lane, inside and outside acceleration lanes in both directions at N. Rye Crossover | 6.99 | 6.7 |

| Rank | Package Project No. | Package Project Name | Package Project Scope | Est. Cost (in $M) | Prioritization Score |
|---|---|---|---|---|---|
| **9** | 3 | Northbound Roadway Improvements (MP 212-218) | • Widen NB inside shoulder to 4' (MP 212.5-213.0)<br>• Left- and right-turn lanes, inside and outside acceleration lanes in both directions at Log Coral Wash<br>• Construct NB climbing lane (MP 213.0-216.7)<br>• Guardrail on east (right) side of the roadway (MP 213.0-213.4)<br>• Address drainage issue between SB and NB alignments (MP 216.0)<br>• Add NB left-turn lane and SB right-turn lane (MP 217.5) | 2.78 | 5.8 |
| **10** | 7 | Northbound Roadway Improvements (MP 218-226) | • Rehabilitate NB shoulders (MP 223.0-226.0)<br>• NB outside acceleration lane, SB inside acceleration lane at Bushnell Tanks<br>• Widen inside shoulders to 4' and outside shoulders to 10' (MP 218.9-222.1)<br>• Construct NB climbing lane (MP 218.6-223.0)<br>• Widen Whiskey Springs bridge to accommodate the climbing lane (MP 220.3)<br>• Widen Kitty Joe Creek bridge to accommodate the climbing lane (MP 221.4) | 29.29 | 3.0 |
| **-** | 4 | Central District Rock-Fall Mitigation (MP 213-218) | • NB both sides (MP 213.9-214)<br>• NB left side (MP 214.2-214.3, 214.4-214.6, 215-215.2, 216.4-216.6, 216.7-216.9)<br>• SB left side (MP 216.1-216.2, 217.3-217.6) | 2.80 | N/A (see section 5.6) |
| **-** | 6 | Northcentral District Rock-Fall Mitigation (MP 222-247) | • NB both sides (MP 222-222.6, 228.8-229)<br>• NB right side (MP 231.6-231.7, 233.3-233.7)<br>• SB left side (MP 226-226.5, 227.5-227.9, 228.2-228.5, 228.7-229, 231.7-232.1, 242.5-244.5, 246.4-246.6)<br>• SB right side (MP 228.8-229) | 5.84 | N/A (see section 5.6) |

## 5.6 Rockfall Hazard Rating System Prioritization

ADOT's Rockfall Hazard Rating System (RHRS) utilizes a combination of the physical characteristics of a slope and ditch, roadway characteristics, climate, as well as rockfall size and frequency to produce a numeric RHRS score which can be used to prioritize rockfall issues statewide on a single scale. A similar but distinct rating structure was used for soil cuts.

The RHRS form is broken down into 14 categories, each of which is rated between 1 and 81 points. The points from the 14 categories are summed to create a final RHRS score. Any location scoring over 500 points is recommended to be prioritized in near-term funding. The scoring system is shown in more detail in **Table 25**, a sample scorecard for the RHRS.

**Table 25: Rockfall Hazard Rating System Sample Scorecard**

| Rating | | | 1 Point | 3 Points | 9 Points | 27 Points | 81 Points |
|---|---|---|---|---|---|---|---|
| **Slope Height (ft.)** | | | 0-20 | 20-40 | 40-60 | 60-80 | >80 |
| **Slope Length (ft.)** | | | <100 | 100-200 | 200-400 | 400-800 | >800 |
| **Traffic (ADT)** | | | 1-1,000 | 1,000-2,000 | 2,000-3,000 | 3,000-5,000 | >5,000 |
| **Precip/Climate (inches/year)** | | | <8" Precip; warm winters | 8"-12" Precip; warm winters | 12"-16" Precip; short freezing periods | 16"-25" Precip; long freezing periods | >25" Precip; long freezing periods |
| **Ditch Dimensions (FHWA, 1989 Ditch Design Chart Depth and Width Criteria)** | | | Meets FHWA (1989) criteria | Adequate width with inadequate depth | Moderate catchment (50%-95% of criteria width) | Limited catchment (20%-50% of criteria width) | <20% of criteria width |
| **Sight Distance** | | | Adequate stopping distance (>1,500') full shoulder | Good visibility (1,000'-1,500') & shoulder width | Moderate visibility (600'-1,000') & shoulder width | Limited visibility (400'-600') & shoulder width | Very limited visibility (<400') & shoulder width, speed limit ≥45 mph |
| **Roadway Width (Including Paved Shoulders)** | | | >44' | 38'-44' | 30'-38' | 22'-30' | <22' |
| **GEOLOGIC CHARACTER** | **CASE 1** | **Structural Condition** | Massive, no fractures dripping out of slope | Discontinuous fractures, random orientation | Fractures form wedges | Discontinuous fractures dropping out of slope | Continuous fractures dripping out of slope |
| | | **Rock Friction** | Massive | Rough, irregular | Undulating | Planar | Smooth, slicken-sided or clay, gouge, faulted |
| | **CASE 2** | **Structural Condition** | None or 1 differential features | Few differential erosion features | Occasional erosion features | Many erosion features | Major erosion features |
| | | **Difference in Erosion Rates** | No difference or very small difference | Small difference | Moderate difference | Large difference, favorable structure | Large difference, unfavorable structure |
| **Slope Continuity** | | | No launching features | Possible launch features | Some minor features | Many launching features | Major launching features |
| **Block Size** | | | <6" | 6"-12" | 1'-2' | 2'-5' | >5' |
| **Rockfall History (Maint. Severity Rating)** | | | No falls (Severity 1) | Few falls (Severity 2) | Occasional falls (Severity 3) | Regular falls (Severity 4) | Many falls (Severity 5) |

There are slopes in both the Central (one location) and Northcentral (three locations) districts that rate as advisable to address due to their risk for rock-fall issues impacting the travel way. Locations that score above 500 on the RHR scale include:

- Northbound MP (214.2-214.3)
- Southbound MP (228.2-228.5)
- Southbound MP (242.5-244.5)
- Southbound MP (246.4-246.6)

The full list of RHRS ratings for each of the identified rock-fall areas is provided in **Table 26**.

**Table 26: Rockfall Hazard Rating System Prioritization**

| Project | Rock-fall Location | RHRS Score | Rank |
|---|---|---|---|
| **Package Project No. 4. Central District Rock-Fall Mitigation** | Northbound both sides (MP 213.9-214) | 294 | 18 |
| | Northbound left side (MP 214.2-214.3) | 552 | 2 |
| | Northbound left side (MP 214.4-214.6) | 474 | 5 |
| | Northbound left side (MP 215-215.2) | 474 | 5 |
| | Southbound left side (MP 216.1-216.2) | 376 | 11 |
| | Northbound left side (MP 216.4-216.6) | 450 | 6 |
| | Northbound left side (MP 216.7-216.9) | 424 | 10 |
| | Southbound left side (MP 217.3-217.6) | 474 | 5 |
| **Package Project No. 6. Northcentral District Rock-Fall Mitigation** | Both directions both sides (MP 222-222.6) | 308 | 16 |
| | Southbound left side (MP 226-226.1) | 430 | 9 |
| | Southbound left side (MP 226.1-226.3) | 364 | 12 |
| | Southbound left side (MP 226.3-226.5) | 442 | 7 |
| | Southbound left side (MP 227.5-227.9) | 432 | 8 |
| | Southbound left side (MP 228.2-228.5) | 666 | 1 |
| | Southbound left side (MP 228.7-229) | 274 | 19 |
| | Southbound right side (MP 228.8-229) | 228 | 20 |
| | Northbound both sides (MP 228.9-229) | 300 | 17 |
| | Northbound right side (MP 231.6-231.7) | 314 | 14 |
| | Southbound left side (MP 231.7-232.1) | 352 | 13 |
| | Northbound right side (MP 233.3-233.7) | 310 | 15 |
| | Southbound left side (MP 242.5-244.5) | 510 | 4 |
| | Southbound left side (MP 246.4-246.6) | 534 | 3 |

# 6 IMPLEMENTATION

A variety of funding sources can be considered as potential mechanisms for programming the projects identified as part of the CDS. Three potential sources include:

- P2P Programming (P2P): projects compete against projects from across the state through a standardized scoring process to identify statewide priority projects to be added to the 5-year program.
- District Minor Funding: state monies allocated to each of the seven ADOT districts across the state to fund projects identified as priorities by each district.
- Highway Safety Improvement Program (HSIP) Funding: HSIP funding is allocated to locations that have a demonstrated fatal and severe injury crash history and projects with effective countermeasures. HSIP funding can also be used for systemic improvements, such as ITS or signage improvements.

A potential funding source of the for each of the 12 packaged projects is identified in **Table 27**, though this list should not exclude exploration of additional funding sources.

**Table 27: Recommended Funding Sources**

| CPS Rank | Project | Potential Funding Source | | |
|---|---|---|---|---|
| | | P2P | District Minor | HSIP |
| **1** | Northcentral District ITS/Signage Improvements (MP 218-251) | | | X |
| **2** | Slate Creek Improvements (MP 226-232) | X | | |
| **3** | Southbound Roadway Improvements (MP 244-250) | X | | |
| **4** | Northbound Roadway Improvements (MP 247-250) | | X | |
| **5** | Central District Shoulder Improvements (MP 196-211) | | X | |
| **6** | Northbound Roadway Improvements (MP 241-248) | X | | |
| **7** | Central District ITS/Signage Improvements (MP 191-218) | | | X |
| **8** | Rye Improvements (MP 239-241) | | X | |
| **9** | Northbound Roadway Improvements (MP 212-218) | X | | |
| **10** | Northbound Roadway Improvements (MP 218-226) | X | | |
| **N/A** | Central District Rock-Fall Mitigation (MP 213-218) | | X | |
| **N/A** | Northcentral District Rock-Fall Mitigation (MP 222-247) | | X | |

P2P pre-scoping forms have been developed for each of the 12 packaged projects to provide background detail and justification to pursue projects through the P2P program. Although not all projects are recommended to be pursued through the P2P funding avenue, pre-scoping forms have been developed for all projects in the event that P2P funding becomes the preferred source in the future. The pre-scoping forms are provided in **Appendix D**.

# 7 PUBLIC AND AGENCY INVOLVEMENT

## 7.1 Technical Advisory Committee

ADOT established a Technical Advisory Committee (TAC) consisting of ADOT, FHWA, and Metropolitan Planning Organization (MPO) and Council of Governments (COG) representatives. Member organizations are summarized in **Table 28**.

**Table 28: Technical Advisory Committee Member Organizations**

| TAC Member Organizations |
|---|
| ADOT Bridge Design |
| ADOT Central District |
| ADOT Central District Traffic |
| ADOT Communications |
| ADOT Drainage Design |
| ADOT Environmental Planning Group |
| ADOT Geotechnical |
| ADOT Multimodal Planning |
| ADOT Northcentral District |
| ADOT Pavement Design |
| ADOT Project Management Group |
| ADOT Transportation Technology Group |
| ADOT Traffic Design |
| ADOT Traffic Systems Management and Operations |
| ADOT Tribal Coordination |
| ADOT Traffic Systems Management and Operations – Northern Region Traffic |
| Central Arizona Governments |
| Federal Highway Administration (FHWA) |
| FHWA Planning Region 1 |
| FHWA Project Delivery – Central |
| FHWA Project Delivery – North Central |
| Maricopa Association of Governments |
| Northern Arizona Council of Governments |

The Technical Advisory Committee met five times over the course of the project. Meeting summaries are provided in **Appendix C**.

## 7.2 Stakeholder Meetings

As discussed in Chapter 1, SR 87 is bounded by U.S. Forest Service land, except for both ends of the corridor. There are few residents in the corridor. As such, it was determined that outreach is best accomplished through individual stakeholder meetings and input from Technical Advisory Committee representatives.

Individual stakeholder meetings were held with representatives of municipalities, DPS, and ADOT to review potential projects and obtain input on potential issues and project ideas to address those issues. The purpose of the interviews was to:

- Inform stakeholders about the study process and intent
- Obtain input on the projects recommended through the Corridor Profile process
- Identify key concerns of stakeholders and the public regarding ADOT's efforts to improve traffic operations and safety on SR 87 within the study limits
- Identify environmental issues
- Identify opportunities beyond those already presented in previous studies

The format of the meetings was to review proposed projects from the Corridor Profile Study, determine if they should advance to further analysis or removed from further consideration or if previously recommended projects should be modified, or new projects discussed. A summary of the meeting input is summarized in **Table 29**.

**Table 29: Stakeholder Meeting Summaries**

| Stakeholder Meeting | Meeting Date | Input Received |
|---|---|---|
| ADOT Northcentral District | 9/18/2018 | • MP 201-202.5 the shoulders are in poor condition and have an old style of rumble strips. MP 203.9-208 has new slurry, but rumble strips are inconsistent.<br>• an overhead DMS sign in advance of the Fort McDowell Road intersection with real-time travel times to Payson and Show Low would allow vehicles to detour during times of extreme congestion.<br>• Rockfall mitigation is needed in these areas: NB MP 214.2-214.6, SB MP 228.9-228.7, and SB MP 228.5-228.0. At SB MP 217.6-218.0 It was indicated that this location had experienced enough rock-fall that the problem has largely taken care of itself and should be considered a low priority.<br>• The locations noted for speed feedback signs and speed advisory warning signs with flashing beacons at curves were noted as good locations. NB MP NB 224.5 was noted as a top priority.<br>• MP 229-218 has a lot of guardrail that inhibits emergency access. There are dips in the current shoulders that need to be addressed.<br>• In addition to widening inside shoulders, also improve areas where the outside shoulders are less than 10' as well because of guardrail, which should be remedied.<br>• Constructing a NB climbing lane at NB 213-215, this project is a top priority for the Central District.<br>• Constructing a NB climbing lane at MP 219-223, this project is a priority for the Northcentral District. Carry the climbing lane all the way to the brake check location at the summit of Mount Ord.<br>• Regarding the widening the Whiskey Springs Bridge and the Upper Kitty Joe Bridge, this is needed to accommodate the proposed climbing lane.<br>• Provide an overhead DMS sign in advance of the SR 188 intersection with real-time travel times to Payson and Show Low to provide drivers detour options<br>• Adding intersection warning signage at Sunflower (MP 218) would be beneficial due to a high amount of cross traffic.<br>• Regarding adding a merge lane from the brake check area (MP 223), trucks frequently use the shoulder to accelerate from the brake check area to merge back into traffic. This location could benefit from longer acceleration lanes to allow trucks to gain speed off the shoulders.<br>• Sloughing on the northbound side at MP 231 has been a continuous issue. There are also drainage issues in the area, resulting in mud over the road during a monsoon season. Identify locations where there are not 10' wide outside shoulders. |
| | | • Deer Creek Drive intersection - residential area, horse trailers entering and exiting west leg of intersection, signage should be added<br>• Gisela Road intersection – a lot of crossovers, signage should be added<br>• Rye (MP 240.5 and 240.9) – this section of roadway is straight and flat, leading to higher speeds. There is a lot of cross traffic in the area, signage should be added<br>• Adding a flashing beacon at WB stop sign on SR 188 was affirmed as a project that should remain in the study.<br>• SR 188 intersection - If acceleration lanes are lengthened or added, they should be concrete to avoid the current issue of a washboard effect on the asphalt because of heavy vehicle acceleration. Add a southbound acceleration lane along the median for traffic from SR 188. Turn lanes to SR 188 should be lengthened to allow for more deceleration distance.<br>• Constructing climbing lanes, NB MP 243-247- this project would work on normal weekends but may cause additional back-ups during congested times due to merging. The shoulders should get widened at the same time as this project (MP 241-247) to improve emergency response abilities.<br>• RWIS with Dynamic Weather Warning Beacons at MP 245 – low priority project. If it does move forward, move the SB location to MP 244 and NB location to MP 246 with cameras.<br>• Proposed variable speed limits, MP 241-246 - low priority.<br>• A SB DMS sign proposed at SB MP 247 would be more helpful near the casino, to provide people the opportunity to turn around at Gibson Ranch Road or Oxbow Trail before they enter the congested area. The sign could be mounted on a new pedestrian overpass.<br>• A DMS sign at NB MP 240 is not necessary – a sign before SR 188 or at the top of Mount Ord would be more useful.<br>• Widen shoulders at SB MP 246.2-250.9 - this should be a top priority, and that consistent 10' right shoulders should continue all the way to MP 241. Also, NB shoulders should be widened out where guardrails are to provide 10' of space for emergency response.<br>• Current superelevation and drainage issues at SB MP 241-250 cause sheets of water to cross the roadway and ADOT responds to crashes at these locations frequently during rain events, particularly at MP 246-242.<br>• SR 87 is becoming an alternate route for I-17, due to the unreliability of that facility. Drivers use SR 87 through Payson to SR 260 west to Camp Verde, or Lake Mary Road (County Road 3) to Flagstaff.<br>• Traffic volumes have been increasing rapidly over the last few years, particularly RV's and vehicles towing boats. Update the traffic analysis to more recent counts.<br>• Responding to incidents would be much easier if the entire corridor had 10' right shoulders.<br>• Proposed speed feedback signs should be incorporated into ADOT's real-time travel information to allow DMS signage to provide travel times to Payson and Show Low.<br>• Review appropriate applications of temporary transverse rumble strips.<br>• A runaway truck ramp was installed for northbound traffic near MP 227 due to the steep descent from the summit of Mount Ord. The lighted 'Occupied' sign should be relocated at the summit of Mount Ord.<br>• A concrete barrier at the 'Corvair Curve' (SB MP 246-245) would be very beneficial and encourage motorists to slow down through the curve.<br>• A project to reopen the rest area is in the 5-year program. |
| Department of Public Safety and Gila County | 10/23/2018 | • NB MP 224.5 is a great location for speed feedback signs; in fact, there could be more speed feedback signs on the northbound side in advance of curves going down the hill from the summit of Mount Ord.<br>• NB MP 213-215 there are a lot of crash and near misses in this area and a climbing lane would be very helpful to take slow traffic out of the through lanes.<br>• MP 223 – 228.5 is a 5+ mile stretch that has continuous concrete median barrier that does not provide adequate emergency crossover locations. An additional crossover |

| Stakeholder Meeting | Meeting Date | Input Received |
|---|---|---|
| | | would reduce emergency response times. A tunnel, like the one at MP 220, could be a good solution.<br>• Near NB 226, there is a location on the northbound side where there is a rise followed by an immediate left curve with poor superelevation that occasionally causes crashes.<br>• At MP 239.3, there are transitions between the roadway and the bridge over Rye Creek are bumpy and cause vehicles to bounce and lose control at the bridge.<br>• Regarding installing speed feedback signs and advisory warning signs with flashing beacons at curves, SB MP 247 is a good location because it would help reinforce the speed restrictions in advance of 'Corvair Curve'<br>• Regarding a project to widen shoulders at SB MP 246.2-250.9, there is only one safety pull-out in this stretch and it has very poor visibility for vehicles re-entering the roadway.<br>• The curve at SB MP 246 (Corvair Curve) is the biggest safety problem in the entire district. Crashes are mostly single vehicle – run off road and rollover crashes.<br>• Regarding a proposal to realign SR 87 to remove "Corvair Curve" (MP 246), an alternative could be to realign the SB lanes to the west to remove the curve and some of the subsequent sharp curves. There may be opportunities to follow the existing drainage elevations to straighten out the roadway.<br>• Regarding a proposal to address sight visibility issues at crossovers at Ox Bow Trl, FR 375B, and Gibson Ranch Rd, there is a difference in elevation between the two sides of SR 87, which causes sight distance issues and acceleration issues for vehicles turning onto the roadway from side streets. Additional acceleration lanes may be warranted at these locations.<br>• Regarding a proposed project to realign FR 375B, an alternative suggested was to realign FR 375B to a frontage road along the east side of SR 87 northward to Gibson Ranch Road. This alternative would allow for the removal of the intersection of SR 87 and FR 375B.<br>• The southern of the two crossover tunnels on SR 87, MP 220 is used heavily as an emergency crossover and may be a good model to improve emergency access in areas with center concrete barriers. |
| ADOT Central District | 10/23/2018 | • Supplemental DMS at SB MP 191.2 can alert drivers to crashes ahead so that they can detour onto Shea Boulevard or Gilbert Road. A SB DMS sign north of Bush Highway would be the optimal location, but there is no power available, so it would be expensive to implement.<br>• Between MP 194 to 205 NB and SB the shoulders are in acceptable condition but are approximately 25 years old and would likely need to be rehabilitated in the next 5-10 years.<br>• The inside shoulders MP 211-209 should be widened.<br>• Proposed speed feedback signs should be placed in advance of curves<br>• SB MP 212 -213 - supplemental chevron signs and delineators would be helpful.<br>• NB MP 214.2-214.6 should be a top priority for rock-fall mitigation.<br>• SB MP 217.6-218.0 is also in need of rock-fall mitigation.<br>• Intersection warning signs at Sunflower is a good idea.<br>• NB climbing lanes at NB MP 213-215 and NB MP 219-223 are a good idea<br>• There is a long gap in emergency crossovers between MP 213-217.5 and it would be nice to have additional access in this area, however; the terrain is challenging.<br>• There is a drainage structure on the SB roadway near MP 216 just north of the crossover bridge, but that water drains into the rocks just before it enters the structure and follows cracks in the rocks onto the northbound lanes and shoots out of the northbound lane under the crossover bridge, requiring roadway patches every time there is a sizeable rain event.<br>• The roadway is buckling from MP 217.2-217.7 (northbound and southbound), causing vehicles to bounce on the roadway, possibly contributed by standing water in the median.<br>• All of the guardrail in the Central District along SR 87 is at least several years old and does not meet current standards. If any of the projects impact the shoulders with guardrails, the guardrail will need to be replaced with the current standard. |
| Maricopa County, Town of Payson, Town of Fountain Hills | 10/30/2018 | • A supplemental DMS sign SB approximately MP 191.2 would be helpful to be able to alert drivers to congestion on Shea Boulevard in Fountain Hills so that drivers can divert to SR 87 or Gilbert Road.<br>• cross-traffic at Goldfield Ranch Road has been increasing in recent years, and more substantial infrastructure may be warranted. The alignment of some of the crossovers is atypical and may cause safety issues.<br>• it may be beneficial to add additional speed feedback signs on the northbound side of the roadway along the decline from the summit of Mount Ord along Slate Creek to approximately mile post 229.<br>• A DMS located NB at MP 235.5 would be very beneficial.<br>• At the SR 188 intersection - location may warrant grade separation in the future, but an added acceleration lane will help in the short-term.<br>• Public comments that the Mazatzal rest stop should be rehabilitated.<br>• Between NB MP 241- 246 observed that vehicles overheating on the long incline on the northbound lanes and that the shoulders are too narrow to safely pull out of traffic.<br>• Between Rye and Payson there is poor cell phone reception in this area and people that break down cannot call for help.<br>• Review the corridor for inadequate shoulder widths.<br>• MCDOT is adding message signs (both DMS and permanent signage) to Bush Highway warning drivers about wildlife (Salt River Horses). SR 87 may experience the same issues. |
| United States Forest Service and Game and Fish Department | 10/31/2018 | • Projects on U.S. Forest Service land shall follow the "Guidelines for Highway on BLM and USFS Lands".<br>• A highway easement deed may be required in areas of new construction. J. Mona added that this applies to any capacity improvements that require additional right-of-way.<br>• Planning for potential waste areas and/or borrow sources shall be coordinated in advance and analyzed during the NEPA planning phase. It is preferred that all projects are designed to be balanced.<br>• Contractor staging areas shall be sited in advance and analyzed during the NEPA planning phase.<br>• Construction water shall be coordinated in advance.<br>• Geotechnical exploration shall be analyzed early in the NEPA planning phase.<br>• Salvage and transplant Saguaro cacti that impacted by construction.<br>• Install directional fencing to encourage wildlife to use culverts for crossing.<br>• Modify existing culvert designs to accommodate wildlife movement and passage.<br>• Projects shall include treatment for noxious and invasive weeds.<br>• Provide livestock signage in the Bush Highway area (for the Salt River horses).<br>• Fence continuity shall be maintained in areas with active grazing allotments.<br>• Project shall include fire plan requirements.<br>• Projects shall comply with the Tonto National Forest Plan visual quality objectives.<br>• USFS may come out with an updated plan within the next two years, but that the current plan's requirements should suffice for the time being.<br>• Weathering steel shall be used for all new guardrail and galvanized end sections shall be treated with Natina.<br>• The area around MP 224 has continuously suffered from slope failures. A larger project involving a permanent solution should be developed rather than responding to potential and actual failures. Any improvements planned for this area should consider the larger permanent solution being developed.<br>• Be aware of a hazardous material waste site NB and SB near MP 248.8.<br>• USFS has changed its policy approach from minimizing the footprint of highways to allowing adequate right-of-way for stable slopes. USFS also believes that wide medians are more in line with the aesthetic guidelines in the Forest Plan.<br>• USFS would like to get a cultural survey for the entire corridor to speed up the process for general maintenance need |

| Stakeholder Meeting | Meeting Date | Input Received |
|---|---|---|
| Town of Payson | 11/6/2018 | • 'Corvair curve' (southbound curve at MP 246) is the biggest safety concern on the highway.<br>• Wrong-way drivers are sometimes an issue on SR 87. The most common location is people exiting the Mazatzal Casino<br>• Congestion on summer weekends is a major source of complaints received by the Town.<br>• Because the majority of vehicles are turning right at SR 260, all the vehicles are using the right lane and the left lane is relatively empty.<br>• At the intersection with SR 188, the southbound left and westbound left turn movements cause the majority of the crashes as they cross the northbound through lanes. if the Mazatzal Rest Area is reopened, it would likely exacerbate this problem. A preferred solution would to grade separate the intersection.<br>• Additional emergency crossovers would be helpful for emergency response purposes |
| ADOT Central District | 6/12/2019 | • Update description of project section 3 to "Reconstruct north leg at Goldfield Road"<br>• Check with TSMO on whether they want to add FMS conduit the length of the project (or at least to the DMS)<br>• Subdivide the rockfall mitigation that would be in the widening section and combine them into one project<br>• Combine the remainder of rockfall mitigation not included in comment above into another separate project<br>• Always keep the projects separated by ADOT District<br>• Ask the U.S. Forest Service for their preference on slope rockfall mitigation types – ADOT District Maintenance does not yet have a preference |
| | | |

### 7.3 Public Engagement

*TO BE INCLUDED FOLLOWING COMPLETION OF NEXT ROUND OF ENGAGEMENT IN SEPTEMBER 2019.*

# APPENDICES

## Appendix A: Previous Studies and Recommendations

| STUDY | SUMMARY | RECOMMENDATIONS |
|---|---|---|
| **Framework and Statewide Studies** | | |
| Arizona Statewide Dynamic Message Master Plan, November 2011 (Final) | This plan provides specific justification warrants, criteria, and consideration of permanent DMS design requirements for the Arizona highway system. | Proposed Dynamic Message Signs: SB SR 87 at MP 201 |
| ADOT Intelligent Transportation System Design Guide (2015) | This design guide provides direction on ITS for both rural and urban applications.<br><br>https://www.azdot.gov/docs/default-source/rural-public-transportation-program/adot-its-design-guide-052315.pdf?sfvrsn=4 | Provides design guidance for rural dynamic message signs, Remote Weather Information Systems (RWIS), and truck escape ramp detection and warning systems |
| ADOT Bicycle Safety Action Plan (2018) | The 2018 BSAP Update uses a data-driven approach to assess bicycle crashes on the State Highway System (SHS), and identify specific steps, actions, and potential countermeasures that, upon implementation and over time, will measurably reduce bicycle crashes, injuries, and fatalities on the SHS.<br><br>http://www.azbikeped.org/downloads/ADOT-Bicyclist-Safety-Action-Plan.pdf | The northern terminus of this study (MP 250) is the start of a 2018 BSAP Priority Location 19, which is located between MP 250 (Green Valley Parkway) and MP 253.2 (Forest Drive). Engineering countermeasures suggested included:<br>• Access Management Study - Conduct an access management study. Recommendations may include driveway consolidation and constructing a raised median.<br>• Striped Paved Shoulder - Assess feasibility of striped paved shoulder on SR 87. Per record drawings, SR 87 typical width is 68'. A 4' striped shoulder (as measured from gutter seam to the center of the white stripe) could be installed on SR 87 in both directions. Striped shoulder may require one or more travel lanes to be reduced to 11'. A striped or paved shoulder should also be considered for remainder of SR 87 north through the Town of Payson.<br>• Roadway Signing Improvements - Consider installing R4-11 BMUFL sign with R4-11aP Change Lanes to Pass plaque<br><br>Education countermeasures suggested partnering with Central Arizona Governments (CAG) and local agencies to provide education, outreach, and training to increase bicyclist and motorist awareness and improved behaviors. Increasing level of traffic bicycling skills can help to make bicyclists more comfortable when riding in traffic, improve relations between bicyclists and motorists, and facilitate the smooth and orderly flow of traffic. |
| **Regional Planning Studies** | | |
| SR 87/SR 260/SR 377 Corridor Profile Study, March 2017 (Final) | The SR 87/SR 260/SR 377 CPS defines solutions and improvements for the corridor that are evaluated and ranked to determine which investments offer the greatest benefit to the corridor in terms of enhancing performance.<br><br>https://azdot.gov/docs/default-source/planning/Corridor-Studies/sr-87-final-report-noappendix-031717.pdf?sfvrsn=2 | Bush Highway Area Safety and Freight Improvements (SR 87 MP 191-213) – Priority Rank 4<br>• Rehabilitate shoulders (NB/SB MP 194-205)<br>• Install speed feedback signs (NB MP 206.5 and 207.7, NB/SB before curves and intersection with FR 68 [MP 209.6])<br>• Widen inside shoulders (SB MP 211-209)<br><br>Sunflower Area Safety Improvements (SR 87 MP 213-235) – Priority Rank 5<br>• Install speed feedback signs and speed advisory warning signs with flashing beacons at curves (NB MP 213.2,214.0, 217.8, 220.5, 224.5, 232.5; SB MP 231.0, 229.3, 221.0, 219.6, 216.0, 214.3)<br>• Rehabilitate shoulders<br>• Widen inside shoulders (SB MP 228.5-226.0) |

| STUDY | SUMMARY | RECOMMENDATIONS |
|---|---|---|
| | | • Install rock-fall mitigation (NB MP 214.2-214.6; SB MP 228.9-228.7, 228.5-228.0, 217.6-218.0)<br><br><u>Sunflower Area Freight Improvements (SR 87 MP 213-223) – Priority Rank 13</u><br>• Construct NB climbing lane, MP 213-215 and MP 219-223<br>• Widen Whiskey Springs Bridge, #2515 MP 220.32<br>• Widen Upper Kitty Joe Bridge, #2497 MP 221.39<br><br><u>Slate Creek Pavement Improvements (SR 87 MP 224-226) – Priority Rank 14</u><br>• Replace Pavement<br><br><u>Rye Area Safety and Freight Improvements (SR 87 MP 235-241) – Priority Rank 1</u><br>• Install advisory sign about approaching area with intersections (Deer Creek Drive [MP 237.6], Gisela Road [MP239.5], two intersections in Rye [MP 240.5 and MP 240.9])<br>• Install reduced speed advisory sign on SR 87 (NB MP 240, SB MP 241)<br>• Install speed feedback signs (NB MP 240, SB MP 241)<br>• On SR 188 approaching SR 87 add flashing beacons to WB stop sign<br><br><u>Ox Bow Estates Area Safety Improvements (SR 87 MP 241-250) – Priority Rank 10</u><br>• Install speed feedback signs and speed advisory warning signs with flashing beacons at curves (SB MP 247, MP 245)<br>• Implement variable speed limits MP 241-246 with new DMS and Closed Circuit Television (CCTV) SB at MP 247 and new DMS and CCTV NB at MP 240<br>• Install Road Weather Information System (RWIS) at MP 245 with dynamic weather warning beacons<br><br><u>Ox Bow Estates Area Freight Improvements (SR 87 MP 243-247) – Priority Rank 15</u><br>• Construct NB climbing lane<br>• Install Intelligent Transportation System (ITS) conduit with all new infrastructure projects<br><br>**<u>Other Corridor Recommendations</u>**<br><br>• Implement a driving impaired and speeding safety education campaign along the corridor<br>• Coordinate with Arizona Game and Fish Department (AGFD) to conduct a study on vehicle/wildlife conflicts on SR 87 between MP 233 and MP 241<br><br>**<u>General Policy Recommendations</u>**<br><br>• Prepare strategic plans for CCTV camera and RWIS locations statewide<br>• Leverage power and communication at existing weigh-in-motion (WIM), dynamic message signs (DMS), and call box locations to expand ITS applications across the state<br>• Consider solar power for lighting and ITS where applicable<br>• Investigate ice formation prediction technology where applicable<br>• Conduct highway safety manual evaluation for all future programmed projects<br>• Develop infrastructure maintenance and preservation plans (including schedule and funding) for all pavement and bridge infrastructure replacement or expansion projects<br>• Develop standardized bridge maintenance procedures so districts can do routine maintenance work<br>• Review historical ratings and level of previous investment during scoping of pavement and bridge projects. In pavement locations that warrant further investigation, conduct subsurface investigations during project scoping to determine if full replacement is warranted |

| STUDY | SUMMARY | RECOMMENDATIONS |
|---|---|---|
| | | • For pavement rehabilitation projects, enhance the amount/level of geotechnical investigations to address issues specific to the varying conditions along the project<br>• Expand programmed and future pavement projects as necessary to include shoulders<br>• Expand median cable barrier guidelines to account for safety performance<br>• Install CCTV cameras with all DMS<br>• In locations with limited communications, use CCTV cameras to provide still images rather than streaming video<br>• Develop statewide program for pavement replacement<br>• Install additional continuous permanent count stations along strategic corridors to enhance traffic count data<br>• When reconstruction or rehabilitation activities will affect existing bridge vertical clearance, the dimension of the new bridge vertical clearance should be a minimum of 16.25 feet where feasible<br>• All new or reconstructed roadway/shoulder edges adjacent to an unpaved surface should be constructed with a Safety Edge<br>• Collision data on tribal lands may be incomplete or inconsistent; additional coordination for data on tribal lands is required to ensure adequate reflection of safety issues<br>• Expand data collection devices statewide to measure freight delay<br>• Evaluate and accommodate potential changes in freight and goods movement trends that may result from improvements and expansions to the state roadway network |
| BQAZ 2010 Statewide Transportation Planning Framework Final Report (2010) | This project developed a long-term transportation vision for 2050, with 2030 as an intermediate planning horizon. | Widen / upgrade SR 87 to 6 lanes (MP 177 to MP 253) |
| **Design Concept Reports, Project Assessments, and Scoping Documents** | | |
| SR 87, MP 224 to MP 226, Final Project Assessment (2012) | The Project Assessment was for a landslide mitigation project. The goal of the project was to reduce maintenance costs and provide an acceptable factor of safety for a landslide that became destabilized during the original construction between 1998 and 2001. | Construct landslide mitigation measures on SR 87 (MP 224-226) |
| SR 87 Slate Creek Slope Mitigation, MP 224 to MP 226, Draft Scoping Document (2016) | This was a scoping report for a slope management project | • Initiate a geotechnical investigation and evaluation to determine embankment soil properties, slope stability, and fissure information<br>• Remediate the 12-foot diameter multi-plate pipe<br>• Develop surface runoff design to protect moisture sensitive embankment soils<br>• Evaluate the need for reconstruction of the existing pavement and surface drainage system<br>• Evaluate the need for improved drainage for soil nail walls near MP 224 |

## Appendix B: Project List

| Proj. No. | Description | Project Limits | Packaged Project No. | Stand-Alone Project | Project Removed from Consideration |
|---|---|---|---|---|---|
| **1** | SB New DMS | 191.2 | Project No. 1. Central District ITS/Signage Improvements | | |
| **2** | NB RT lane, SB RT lane, outside accel lane at Hiawatha Hood | 191.8 | | X | |
| **3** | NB RT lane at Rodeo Rd | 192.1 | | X | |
| **4** | Rehabilitate shoulders | SB 196-200<br>NB 201.3-202.1 | Project No. 2. Central District Shoulder Improvements (MP 196-MP 211)) | | |
| **5** | Add northbound guardrail | 194.0-194.9 | | | X |
| **6** | Improve intersection geometrics on SB side at Burnt Water Trail | 195.2 | | X | |
| **7** | Improve geometrics at Vista del Oro intersection | 195.2 | | | X |
| **8** | Reconstruct north approach at Goldfield Rd | 196.1 | Project No. 2. Central District Shoulder Improvements (MP 196-MP 211) | | |
| **9** | Prevent OHV access (SB) | 200.5 | | | X |
| **10** | Prevent OHV access (NB) | 201.4 | | | X |
| **11** | Widen NB inside shoulder to 4’ | 202.1-202.6 | Project No. 2. Central District Shoulder Improvements (MP 196-MP 211)) | | |
| **12** | Inside and outside accel lanes both directions - Four Peaks | 203.9 | | X | |
| **13** | NB curve chevron signage | 205.2-205.7 | Project No. 1. Central District ITS/Signage Improvements | | |
| **14** | Widen SB outside shoulder to 10’ | 205.2-207 | Project No. 2. Central District Shoulder Improvements (MP 196-MP 211)) | | |
| **15** | NB speed feedback sign | 206.2 | Project No. 1. Central District ITS/Signage Improvements | | |
| **16** | Speed feedback sign (NB) | 207.7 | | | X |
| **17** | Inside and outside accel lanes both directions - Mesquite OHV Area | 207.8 | | X | |
| **18** | Widen SB inside shoulder to 4’ | 209.6-211 | Project No. 2. Central District Shoulder Improvements (MP 196-MP 211) | | |
| **19** | NB and SB speed feedback signs | NB 209.7<br>SB 209.6 | Project No. 1. Central District ITS/Signage Improvements | | |
| **20** | Add NB outside accel lane, SB inside accel lane - Ballantine Trailhead | 210.4 | | X | |
| **21** | NB curve chevron signage | 212.2-212.4 | Project No. 1. Central District ITS/Signage Improvements | | |
| **22** | Widen NB inside shoulder to 4’ | 212.5-213 | Project No. 3 Northbound Improvements (MP 212-218) | | |
| **23** | Left- and right-turn/deceleration lanes, inside and outside lanes in both directions at the Log Coral Wash intersection | 212.7 | Project No. 3 Northbound Improvements (MP 212-218) | | |
| **24** | Construct new rest area | 212.7 | | X | |
| **25** | Rehabilitate NB shoulders | 223-226 | Project No. 7. Northbound Improvements (MP 218.5-226) | | |
| **25** | Rehabilitate NB shoulders | 227.8-229 | Project No. 8 Slate Creek Improvements | | |
| **26** | Construct NB climbing lane | 213-216.7 | Project No. 3 Northbound Improvements (MP 212-218) | | |
| **27** | Add guardrail on east side of roadway | 213-213.4 | Project No. 3 Northbound Improvements (MP 212-218) | | |
| **28** | NB speed feedback sign | 213 | Project No. 1. Central District ITS/Signage Improvements | | |
| **29** | NB both sides – re-slope to ¾:1, widen and deepen ditches | 213.9 | Project No. 4. Central District Rock-Fall Mitigation | | |
| **30** | NB speed feedback sign | 214 | Project No. 1. Central District ITS/Signage Improvements | | |
| **31** | NB left side – re-slope ¾:1 (1st stretch), ½:1 (2nd stretch, rock portions), and 1:1 (earth, saprolite); round crest in gravels; pinned | 1 - 214.2-214.3<br>2 - 214.4-214.6 | Project No. 4. Central District Rock-Fall Mitigation | | |

| Proj. No. | Description | Project Limits | Packaged Project No. | Stand-Alone Project | Project Removed from Consideration |
|---|---|---|---|---|---|
| | netting in earthen materials; widen and deepen ditch; rock lined crown ditch | | | | |
| **32** | SB speed feedback sign | 213.6 | Project No. 1. Central District ITS/Signage Improvements | | |
| **33** | NB left side – scale, widen and deepen ditch | 215-215.2 | Project No. 4. Central District Rock-Fall Mitigation | | |
| **34** | SB speed feedback sign | 215 | Project No. 1. Central District ITS/Signage Improvements | | |
| **35** | Address drainage issue between SB and NB alignments | 216 | Project No. 3 Northbound Improvements (MP 212-218) | | |
| **36** | SB left side – heavy scaling, bolts, local pinned mesh | 216.1-216.2 | Project No. 4. Central District Rock-Fall Mitigation | | |
| **37** | NB left side – heavy scaling, bolts, dowels (1st stretch); heavy scaling, spot rock bolting, erosion control (2nd stretch) | 1 - 216.4-216.6<br>2 - 216.7-216.9 | Project No. 4. Central District Rock-Fall Mitigation | | |
| **38** | SB left side – heavy scaling, pattern bolting, erosion control | 217.3-217.6 | Project No. 4. Central District Rock-Fall Mitigation | | |
| **39** | Add NB left-turn and SB right-turn lane | 217.5 | Project No. 3 Northbound Improvements (MP 212-218) | | |
| **40** | NB speed feedback sign | 217.8 | Project No. 1. Central District ITS/Signage Improvements | | |
| **41** | Intersection warning signage | 218 | Project No. 1. Central District ITS/Signage Improvements | | |
| **42** | NB and SB inside and outside accel lanes, fix SB shoulders both sides – Sunflower | 218 | | X | |
| **43** | NB outside acceleration lane, SB inside acceleration lane at Bushnell Tanks intersection | 218.5 | Project No. 7. Northbound Improvements (MP 218.5-226) | | |
| **44** | Widen inside shoulders to 4’ and outside shoulders to 10’ | 218.9-222.1 | Project No. 7. Northbound Improvements (MP 218.5-226) | | |
| **45** | Construct NB climbing lane | 218.6-223 | Project No. 7. Northbound Improvements (MP 218.5-226) | | |
| **46** | SB speed feedback sign | 219.6 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **47** | Widen Whiskey Springs bridge | 220.3 | Project No. 7. Northbound Improvements (MP 218.5-226) | | |
| **48** | Speed feedback sign (NB) | 220.5 | | | X |
| **49** | SB speed feedback sign | 221 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **50** | Widen Kitty Joe Creek bridge | 221.4 | Project No. 7. Northbound Improvements (MP 218.5-226) | | |
| **51** | NB both sides – re-grade with rock-lined interceptor channels and crown ditch, gabions | 222-222.6 | Project No. 6. Northcentral Rock-Fall Mitigation | | |
| **52** | Address erosion on east side of the road | 222.8-222.9 | | | X |
| **53** | Widen inside shoulders to 4’ and outside shoulders to 10’ | NB: 226-227.8<br>SB: 226-228.5 | Project No. 8 Slate Creek Improvements | | |
| **54** | NB speed feedback sign | 224.5 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **55** | SB left side – pinned mesh in the narrow shoulder area, deepen ditch to 6’, rock fence on bench, grade slope and scale (1st stretch); crest erosion, protect with thrie beam barrier, pinned mesh in crown area gravels, scale (2nd stretch); pinned mesh in the crest, deepen ditch, protect with weathering thrie beam barrier (3rd stretch) | 1 - 226-226.1<br>2 - 226.1-226.3<br>3 - 226.3-226.5 | Project No. 6. Northcentral Rock-Fall Mitigation | | |
| **56** | SB left side – deepen ditch by toe excavation, protect ditch cross slope with weathering thrie beam barrier | 227.5-227.9 | Project No. 6. Northcentral Rock-Fall Mitigation | | |
| **57** | SB left side - spot and pattern rock bolting (crane basket), attenuators, local anchored mesh, heavy scaling, widen and deepen ditch and protect with weathering thrie beam or concrete barrier | 228.2-228.5 | Project No. 6. Northcentral Rock-Fall Mitigation | | |

| Proj. No. | Description | Project Limits | Packaged Project No. | Stand-Alone Project | Project Removed from Consideration |
|---|---|---|---|---|---|
| **58** | SB left side – rock lined crown ditch, dress and revegetate slope, widen and deepen ditch and protect with weathering thrie beam barrier (1st stretch); SB right side - deepen ditch and protect with weathering thrie beam barrier | 1 - 228.7-229<br>2 - 228.8-229 | Project No. 6. Northcentral Rock-Fall Mitigation | | |
| **59** | NB both sides – re-grade to eliminate remnant benches, use space to improve ditch configuration both sides | 228.9-229 | Project No. 6. Northcentral Rock-Fall Mitigation | | |
| **60** | SB speed feedback sign | 229.3 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **61** | Reconstruct access ramp | 229.5 | | | X |
| **62** | Prevent OHV access to SB lanes | 230.5 | | X | |
| **63** | Widen SB inside shoulders to 4’ | 230.8-230.9 | Project No. 8 Slate Creek Improvements (MP 226-232) | | |
| **64** | Address dip in NB roadway | 230.5-230.6 | | X | |
| **65** | SB speed feedback sign | 231 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **66** | NB right side – re-grade with rock-lined interceptor channels and crown ditch, gabions (1st stretch); SB left side – in rock cut deepen ditch and protect with weathering thrie beam barrier, retain paved shoulders; in alluvium construct rock-lined crown and interceptor ditches, gabions as necessary (2nd stretch) | 1 - 231.6-231.7<br>2 - 231.7-232.1 | Project No. 6. Northcentral Rock-Fall Mitigation | | |
| **67** | Widen inside shoulder to 4’ in both directions | 231.5-232 | Project No. 8 Slate Creek Improvements (MP 226-232) | | |
| **68** | NB speed feedback sign | 232.5 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **69** | NB right side – re-grade with rock-lined interceptor channels and crown ditch, gabions | 233.3-233.7 | Project No. 6. Northcentral Rock-Fall Mitigation | | |
| **70/71** | Wildlife fencing, signage, and crossing | 235-235.9 | | X | |
| **72** | New NB DMS | 235 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **73** | WB stop sign beacon on SR 188 | 235.7 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **74** | Extend NB acceleration lane to 1300' - SR 188, SB inside accel lane | 235.7 | | X | |
| **75** | Evaluate grade separation - SR 188 (BOTH DIRECTIONS) | 235.7 | | X | |
| **76** | Rehabilitate rest area | 235.7 | | X | |
| **77** | Intersection warning signage – Deer Creek Dr | 237.6 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **78** | NB LT lane, SB RT lane - Deer Creek Dr | 237.6 | | X | |
| **79/80** | Wildlife fencing, signage, and crossing | 238-238.9 | | X | |
| **81** | Add SB left-turn lane and NB right-turn lane | 239.2 | | | X |
| **82** | Address rough bridge transitions | 239.4 | | | X |
| **83** | Intersection warning signage at Gisela Road | 239.5 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **83** | NB outside acceleration lane at Gisela Rd. | 239.5 | Project No. 9. Rye Improvements | | |
| **84** | NB speed feedback sign | 240 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **85** | NB left-turn lane, SB right-turn lane, NB inside acceleration lane, and SB outside acceleration lane at Matlock Gas | 240 | Project No. 9. Rye Improvements | | |
| **86** | Intersection warning signage at the S. Rye Crossover | 240.5 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **87** | Right- and left-turn lanes, inside and outside acceleration lanes in both directions at the S. Rye Crossover | 240.5 | Project No. 9. Rye Improvements | | |

| Proj. No. | Description | Project Limits | Packaged Project No. | Stand-Alone Project | Project Removed from Consideration |
|---|---|---|---|---|---|
| **88** | Intersection warning signage at the N. Rye Crossover | 240.9 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **89** | SB right-turn lane, NB inside and outside acceleration lanes at the N Rye Crossover | 240.9 | Project No. 9. Rye Improvements | | |
| **90** | Address curve superelevation, add concrete barrier | 1 - 244.1-244.3<br>2 - 244.9-245.2 | Project No. 11. Southbound Improvements (MP 244-250) | | |
| **91** | Variable speed limits, with DMS on both ends | 241-247 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **92** | SB speed feedback sign | 241 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **93** | Widen NB outside shoulders to 10’ | 241.1-247.5 | Project No. 10. Northbound Improvements (MP241-247.8) | | |
| **94** | Construct NB climbing lane | 244-247.8 | Project No. 10. Northbound Improvements (MP241-247.8) | | |
| **95** | NB and SB RWIS with dynamic warning beacons | 244 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **96** | SB speed feedback sign | 245 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **97** | Add superelevation to Corvair Curve, add concrete barrier. | 245.8-246.2 | Project No. 11. Southbound Improvements (MP 244-250) | | |
| **98** | Widen SB inside and outside shoulders | 246.2-250.9 | Project No. 11. Southbound Improvements (MP 244-250) | | |
| **99/100** | Install wildlife fencing and wildlife warning signage, and add a wildlife crossing overpass | 247-249.9 | Project No. 12. Roadway Improvements (MP 247-250) | | |
| **101** | SB speed feedback sign | 247 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **102** | SB right-turn lane at FR 535 | 247.8 | Project No. 11. Southbound Improvements (MP 244-250) | | |
| **103** | SB outside acceleration lane at Oxbow Trail | 248.4 | Project No. 11. Southbound Improvements (MP 244-250) | | |
| **103** | NB inside acceleration lane at Oxbow Trail | 248.4 | Project No. 12. Roadway Improvements (MP 247-250) | | |
| **104** | Realign FR 375B | 248.6 | Project No. 12. Roadway Improvements (MP 247-250) | | |
| **105** | Address intersection grade issues at FR 375B | 231 | | | X |
| **106** | NB right-turn lane at FR 375B | 248.6 | Project No. 11. Southbound Improvements (MP 244-250) | | |
| **107** | Add SB guardrail, right side | 249-249.9 | Project No. 11. Southbound Improvements (MP 244-250) | | |
| **108** | Realign SB left-turn lane at Gibson Ranch Road | 249 | Project No. 11. Southbound Improvements (MP 244-250) | | |
| **109** | NB right-turn lane and outside acceleration lane at Gibson Ranch Road | 249 | Project No. 12. Roadway Improvements (MP 247-250) | | |
| **110** | SB speed feedback sign | 249.8 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **111** | New SB DMS | 251 | Project No. 5. Northcentral District ITS/Signage Improvements | | |
| **112** | SB left side – Move slope back 10 ft to widen and deepen ditch, revegetate earth slopes, R&R barrier with single-beam weathering type (1st stretch); SB left side – round crest & layback & widen ditch, protect deepened ditch with weathering single-beam barrier (2nd stretch) | 1 - 242.5-244.5<br>2 - 246.4-246.6 | Project No. 6. Northcentral Rock-Fall Mitigation | | |
| **113** | NB and SB RWIS with dynamic warning beacons | 246.3 | Project No. 5. Northcentral District ITS/Signage Improvements | | |

## Appendix C: TAC Meeting Notes

Kimley»Horn

***SR 87 Corridor Development Study***
***Technical Advisory Committee Meeting No. 1 / Kick-off Meeting***

Tuesday, September 25, 2018
1:00 pm – 2:00 pm
ADOT Engineering Building
205 S. 17th Avenue
Room 115, Gecko Conference Room
Phoenix, AZ 85007

**Attendees**

Asad Karim, *Arizona Department of Transportation*
Steve O'Brien, *Arizona Department of Transportation, Sr. Division Administrator, Project Management Group*
Jerry James, *Arizona Department of Transportation, Central District*
Raul Amavisca, *Arizona Department of Transportation, Central District*
Muhammad Saleque, *Arizona Department of Transportation, Traffic Design*
James J. Lemmon, *Arizona Department of Transportation, Geotechnical*
Heidi Yaqub, *Arizona Department of Transportation, Major Project Development*
Yudi Lei, *Arizona Department of Transportation, Transportation Systems Management and Operations*
Michelle Ogburn, *Arizona Department of Transportation, Environmental Planning Group*
Jerry McCoy, *Arizona Department of Transportation, Communications*
Brent Crowther, *Kimley-Horn*
Michael Grandy, *Kimley-Horn*
Allen Hathcock, *Kimley-Horn*
Chris Joannes, *Kimley-Horn*
Taylor Dunkle, *Kimley-Horn*
Yung Koprowski, *Y2K Engineering*
Robert Cummings, *Saguaro Geoservices*

*Telephone:*
Nate Reisner, *Arizona Department of Transportation, Northcentral District*
Joan Lovell, *Arizona Department of Transportation, Transportation Systems Management and Operations*
Scott Beck, *Arizona Department of Transportation, Transportation Systems Management and Operations*
Lydia Warnick, *Arizona Department of Transportation, Transportation Technology Group*

**Meeting Notes**

*Introduction*

Technical Advisory Committee (TAC) members and project team members provided brief introductions and detailed which organization they work for.

B. Crowther began the meeting by discussing the study purpose for the SR 87 Corridor Development Study (CDS).

He stated that the CDS will advance recommendations made in the SR 87 / SR 260 / SR 377 Corridor Profile Study (CPS) completed in March 2017. M. Grandy was the Kimley-Horn project manager for the CPS. While the CPS study area was 200 miles of corridor, the CDS will instead focus on approximately 60 miles of roadway between MP 191 and MP 250. The CDS is comprised of four study tasks as follows: Project



Kimley»Horn

Management, Initial Scoping Report and Public Meeting Summary Reports, Traffic Analysis, and Feasibility Report.

*Group Discussion of Project Focus Areas*

B. Crowther led the group through a PowerPoint (attached) and subsequent discussion of initial issues identified for each segment. The corridor is separated into 5 segments.

Segment 1 – Bush Highway Area (MP 191 – MP 213):

- J. Lovell mentioned existing plans for a southbound DMS sign on a butterfly structure at the same location as existing northbound DMS (between MP 191 and 192), but mentioned that the existing northbound structure could be replaced.
- B. Crowther suggested that the concept is for a DMS to be relocated in advance of Bush Highway.
- M. Grandy requested statewide masterplan for DMS; J. Lovell will look for the document.

Segment 2 – Sunflower Area (MP 213 – MP 229):

- R. Cummings stated that he was familiar with some of the cuts along this section. He suggested that the limits of the rock fall areas be expanded to address issues along the segment. Portions of the section between MP 216 and MP 218 were highlighted as an additional rockfall area. NB 214-214.6, MP 216.2-216.3 may need to be added for consideration. He stated that the old northbound alignment has narrow shoulders and rock fall issues.
- R. Cummings continued by suggesting the frequent occurrence of landslides in the area as a potential study issue to be addressed. He mentioned instances of pavement settling by as much as a foot in certain areas.
- J. Lemmon stated that the landslides are a known issue caused by varying rock types and poor soil along the corridor. MP 226.2 was identified as an area of concern due to gravel falling onto the roadway.
- R. Amavisca mentioned that a limited amount of funding for mitigating rock fall issues was to be allocated to the various districts.
- N. Reisner mentioned that efforts have been made between MP 222 and MP 226 to temporarily address rock fall and landslide concerns, but that more permanent intervention is necessary.
- J. Lemmon confirmed that ADOT took material from the Slate Creek area to flatten the slope at MP 224.
- R. Cummings suggested MP 224- MP 226 as a potential study focus area. There are traditional treatments available except for the landslide and this is a monster challenge. How much money will be considered for investment for this known problem?
- M. Grandy – if we focus too much on this aspect, we'll lose sight of the rest of the corridor. Bob and JL agrees. Discussion about whether to exclude this area from project.
- R. Amavisca agreed that the land slide and rock fall issues should be documented fully so that everyone is aware of the issues in this area, but the landslide mitigation will be too complex to mitigate as part of this project.
- N. Reisner – North Central District completed a project referred to as a temporary solution. Slide area is right over Slade Creek where pipe is moving.
- J. Lemmon – project is fix for Slade Creek embankment and slope was flattened.
- R. Amavisca mention that SR 188 has been used as a detour in the past.
- J. Lovell commented that the ADOT Permits Department now limits DMS to side mounts / butterfly only; overheard DMS is no longer allowed so as not to impede the roadway for over-size loads.

- R. Cummings stated the need to look at potential crossover locations as they are currently very limited. May be of concern for DPS as well and opportunities to add more.
- R. Cummings continued by mentioning that fixing shoulder widths in the Slate Creek area is very difficult due to existing site constraints.

Segment 3 – Safety Focus Area (MP 229 – MP 234):

- J. Lemmon – MP extents for segments is described as 229 and 230. Need to clarify extents so there is not a missing one mile.
- B. Crowther asked N. Reisner is he can locate the RSA report for Segment 3.
- N. Reisner stated he is unaware of an RSA in that area, only of an RSA at SR 188.
- R. Cummings stated that a portion of fill in the segment may be in old filler. He asked J. Lemmon if he could locate information on cuts in native or fill materials. J. Lemmon responded he will investigate.

Segment 4 – Rye Area (MP 234 – MP 241):

- B. Crowther commented on the previously identified issue of evaluating the need for a southbound acceleration lane at the SR 188 intersection and expanded that to include the need to extend the northbound acceleration lane.

Segment 5 – Ox Bow Estates/Mazatzal Area (MP 241 – MP 250):

- R. Cummings emphasized the need to address the southbound horizontal curves along the segment, referring to the previously identified issue of reviewing the horizontal curves and superelevation for this segment.
- R. Cummings - Transverse rumble strips and advisory truck roll over sign are suggested.
- A. Hathcock – if shoulders are widened then additional rockfall mitigation may be needed or the slopes cut further back.

B. Crowther transitioned the discussion to additional key stakeholders for the project. R. Amavisca stated that he invited the local maintenance supervisor to the October meeting. Additional stakeholders suggested by the team:

- Maricopa County
- Gila County
- Town of Fountain Hills
- Town of Payson
- Bureau of Land Management
- Salt River Project
- Tonto Apache Nation
- Unincorporated communities along the corridor
- Commercial recreation companies with knowledge of the corridor

J. Lemmon suggested that Arizona Game and Fish Department may have an interest due to the number of wildlife strikes in the study area. He stated there may be the potential for wildlife crossings.

R. Cummings noted that there are commercial four-wheeling companies in the area that may have insight of issues along the corridor.

R. Amavisca mentioned that there is a towing company in Sunflower that may have insight on turnaround locations.



J. McCoy stated that further discussion can be made into the best way to engage private companies and small communities along the route. Gila County may have contacts.

J. Lemmon suggested that casinos at either end of the corridor would be good places to hold public meetings. M. Ogburn suggested that the Gila County Fair in Payson would be a good location to engage the public as well.

J. McCoy stated that a combination of online and in-person engagement opportunities may be necessary.

M. Ogburn stated that she was available to assist with environmental work for the project; she emphasized the necessity of including environmental impacts in the study. Cultural resources and 4F properties would be identified in the Environmental Overview.

R. Cummings stated that past projects in the area have had to pipe water across great distances to avoid impacts to endangered species.

S. Beck noted that there are several recommendations for projects utilizing solar powered speed feedback signs. They have implemented these on I-18 and results have shown very limited impact (about a 1% benefit) compared to the cost of installation and maintenance. He mentioned that with no enforcement there was no impact, and limited shoulder widths along the corridor limit enforcement opportunities as there isn't room for DPS to pull people over.

B. Crowther ended the meeting by discussing the remainder of the project schedule.

The meeting was completed around 2:05 pm.

*Next Steps*

B. Crowther reviewed next steps. These include initiating contact with the additional stakeholders identified in the meeting and finalizing the Project Management Plan (PMP).

It is anticipated that stakeholder interviews and Public Meeting No. 1 will take place during October and November. TAC Meeting No. 2 will be held in December of 2018 or early 2019.

**Attachments**

- PowerPoint presentation
- Sign-in sheet

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***SR 87 Corridor Development Study***
***Technical Advisory Committee Meeting No. 2***

Wednesday, December 12, 2018
1:00 pm – 2:00 pm
ADOT Engineering Building
205 S. 17th Avenue
Room 117, Arizona Conference Room
Phoenix, AZ 85007

**Attendees**

Asad Karim, *Arizona Department of Transportation*
Michelle Ogburn, *Arizona Department of Transportation, Environmental Planning Group*
Lydia Warnick, *Arizona Department of Transportation, Transportation Technology Group*
John Wennes, *Arizona Department of Transportation, Multimodal Planning*
Jerry Turner, *Arizona Department of Transportation, Central Distr. Highway Operations Technician Supervisor*
Eunice Chan, *Federal Highway Administration, Project Delivery – Central*
Bob Hazlett, *Maricopa Association of Governments*
Brent Crowther, *Kimley-Horn*
Allen Hathcock, *Kimley-Horn*
Chris Joannes, *Kimley-Horn*
Yung Koprowski, *Y2K Engineering*
Robert Cummings, *Saguaro Geoservices*

*Telephone:*
Nate Reisner, *Arizona Department of Transportation, Northcentral District*
Raul Amavisca, *Arizona Department of Transportation, Central District*
Charla Glendening, *Arizona Department of Transportation, Multimodal Planning*
Michael Grandy, *Kimley-Horn*

**Meeting Notes**

Technical Advisory Committee (TAC) members and project team members provided brief introductions and detailed which organization they work for.

B. Crowther led the group through a PowerPoint (attached) and subsequent discussion about progress on the project to date, including the completion of the Initial Scoping Report and stakeholder outreach efforts. Additionally, R. Cummings led the group through a series of photographs documenting geotechnical and rock-fall issues he had identified along the corridor.

Y. Koprowski then led the group through the initial safety analysis she had performed. Discussion regarding the safety analysis included:

- R. Cummings asked if the southbound segment between MP 213 and 214 should be evaluated as a crash hot spot because it appears to have a concentration of crashes in the maps.
  - Y. Koprowski responded that she would evaluate adding that area as an additional hot spot.
- B. Hazlett asked if the team could overlay the crash hot spots with the geotechnical issues to see if there is a correlation between the two.



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  - Y. Koprowski responded that there were not many crashes in the data that indicated that debris in the roadway was the cause, but that further analysis could be performed to see if there was indeed a correlation.
  - J. Turner added that every time there is an appreciable amount of rain his team has to clear debris from the roadway in this segment.
- J. Turner stated that the southbound segment between MP 213 and 214 has a concentration of truck crashes and that he believes the addition of curve chevron signage would help address the safety issue.
  - Y. Koprowski asked if J. Turner could provide any data on the frequency of guardrail strikes in this segment.
    - J. Turner responded that he could provide that information to the team.
- B. Hazlett asked if in most of the motorcycle crashes the rider was wearing a helmet.
  - Y. Koprowski responded that the majority were, but that there were some sever crashes involving motorcycles where the rider was not wearing a helmet.

B. Crowther then took the TAC members through the listing of initial projects compiled by the team to address the identified deficiencies and safety issues. The following is discussion regarding the initial projects:

- A. Hathcock asked if wildlife-involved crashes were being evaluated as part of the safety analysis.
  - Y. Koprowski responded that they were included in the crash data from ADOT.
  - M. Ogburn asked if the team could pull crash data from the elk detection system on SR 260 east of Star Valley to see if it has been effective in reducing wildlife crashes.
    - Y. Koprowski responded that the team would look into that location.
- B. Crowther asked the group if there were additional types of projects that should be evaluated or avoided.
  - J. Turner stated that the deceleration/turn lanes along the corridor work well, but that additional acceleration lanes would be beneficial to reduce crashes.
- B. Crowther asked if there have been any realignment studies performed in the vicinity of Corvair Curve (southbound MP 246) to address the safety issues at that location.
  - N. Reisner stated that he is not aware of any studies, but that it would have been completed under the old Prescott District of ADOT. He added that there was a project assessment completed to evaluate adding concrete barriers to the outside of the curve, but that it never moved past the evaluation phase.
  - N. Reisner asked if anyone has performed a ball-bank test to determine if the appropriate superelevation is present through the curve.
    - B. Crowther stated that he was not aware of any such studies, but that it could be a test that the team performs as part of this study.
- B. Crowther asked if ADOT was able to pull 85th percentile speed statistics from the speed feedback signs on I-17 to determine their effectiveness.
  - ADOT staff was not sure if those statistics could be obtained or not.
- B. Hazlett suggested that locations with concentrations of crashes could be designated as "Safety Corridors".
  - M. Ogburn added that safety corridors have doubled fines for infractions and that there is a zero-tolerance policy for speeding.

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- B. Hazlett stated that adequate locations for enforcement would be needed to make this strategy effective.

B. Crowther ended the meeting by discussing the remainder of the project schedule. He asked the group to provide any additional comments on the Initial Scoping Report by January 4th, 2019.

The meeting was concluded around 2:00 pm.

*Next Steps*

- Produce the Final Scoping Report
- Complete the Draft Traffic Analysis Report
- The next TAC meeting is estimated to occur in mid-February, 2019

**Attachments**

- PowerPoint presentation

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***SR 87 Corridor Development Study***
***Technical Advisory Committee Meeting No. 3***

Wednesday, February 13, 2019
1:00 pm – 2:00 pm
ADOT Engineering Building
205 S. 17th Avenue
Room 117, Arizona Conference Room
Phoenix, AZ 85007

**Attendees**

Asad Karim, *Arizona Department of Transportation*
Michelle Ogburn, *Arizona Department of Transportation, Environmental Planning Group*
Jose Rojas, *Arizona Department of Transportation, Central District*
Marcos Espinosa, *Arizona Department of Transportation, Central District*
John Wennes, *Arizona Department of Transportation, Multimodal Planning*
Ali Zareh, *Arizona Department of Transportation, Pavement Design*
Brent Crowther, *Kimley-Horn*
Chris Joannes, *Kimley-Horn*
Yung Koprowski, *Y2K Engineering*
Robert Cummings, *Saguaro Geoservices*

*Participating by Teleconference:*
Lydia Warnick, *Arizona Department of Transportation, Transportation Technology Group*
Nate Reisner, *Arizona Department of Transportation, Northcentral District*
Steve Orosz, *Arizona Department of Transportation, TSMO - Northern Region Traffic*
Michael Grandy, *Kimley-Horn*
Jennifer Simpkins, *Kimley-Horn*

**Meeting Notes**

B. Crowther led the group through a PowerPoint (attached) and subsequent discussion about progress on the project to date, including the completion of the Traffic Analysis, Environmental Overview, and Initial Project Packaging document. The traffic analysis portion of the report was discussed first; topics included:

- M. Obgurn asked why the traffic counts collected by Field Data Services of Arizona (FDS) were conducted on a weekday in November.
  - B. Crowther responded that traffic counts are typically collected mid-week (Tuesdays, Wednesdays, and Thursdays). While the team would have preferred to collect counts during the summer, the project schedule dictated a count collection period late in the year.
- B. Cummings asked why the counts at MP 214 were lower than surrounding counts.
  - B. Crowther and C. Joannes responded that there is likely a seasonal influence on the counts collected in November. The counts from ADOT are annualized to account for typical seasonal fluctuations and a similar methodology could be used to annualize the counts collected by FDS.
- S. Orosz asked what growth rate was used to forecast future traffic volume.

- C. Joannes replied that the forecasts were developed based on trendlines from annual counts performed between 1990 and 2018, not a specific growth rate that was applied to the latest count data. However, the annual growth rate could be back-calculated and added to the report.

- Y. Koprowski suggested that the forecasted levels of service be based on weekend volumes rather than weekday volumes as there are higher volumes on weekends than weekdays.
  - B. Crowther responded that an analysis for forecasted weekend volumes can be added to the report.
- S. Orosz asked if a weekend factor could be applied to the counts.
  - B. Crowther responded that data from the continuous count station on the corridor could be used to establish a weekend factor that could be applied to the counts.
- L. Warnick asked if a directional split for Fridays and Sundays could be added to the report.
  - C. Joannes responded that the team had already calculated the directional split and that it could be easily added into the report.

J. Simpkins led the group through the Environmental Overview portion of the document; topics discussed included:

- J. Wennes stated that he believed the environmental portion of the document was very good, but he had some additional comments on future steps of the process:
  - Make sure to double-check vegetation quantities for areas where it comes right up to the edge of the roadway, because that has been an oversight on recent ADOT projects where the environmental impacts end up larger than originally anticipated.
  - ADOT is anticipated to be assuming NEPA approval responsibility for FHWA to streamline the environmental process for transportation projects. There is currently a memorandum of understanding available for public comment regarding this proposal.
  - The Army Corps of Engineers may also give up Section 404 approval responsibility to the Arizona Department of Environmental Quality, which is also intended to streamline the environmental approval process.

C. Joannes led the group through the initial project packaging portion of the document; topics discussed included:

- M. Ogburn asked if the crash analysis period was long enough to capture crash trends along the corridor.
  - Y. Koprowski stated that the five-year analysis period is longer than most crash analyses, so it is highly likely that any existing crash trends would be visible. However, she stated that she would like to back-check the crash concentrations to ensure that all crashes are being considered and not just fatal and serious injury crashes.
- M. Ogburn stated that she would like to see the projects grouped geographically, regardless of cost, rather than by intervention level as proposed by the project team.
  - C. Joannes stated that the projects can be grouped that way, but it may be difficult to define project package limits due to the high number of projects throughout the length of the corridor.
- S. Orosz stated to be careful about removing treatments at specific locations, using intersection warning signage as an example, to make sure that there are consistent treatments throughout the corridor.



- B. Crowther added that there may be some projects that can be treated programmatically across the corridor, such as signage and ITS improvements.

B. Crowther ended the meeting by discussing the remainder of the project schedule. He asked the group to provide any additional comments on the Traffic Analysis, Environmental Overview, and Initial Project Packaging document by February 27th, 2019. He stated that an additional TAC meeting may be added in March to review the changes to the document.

The meeting was concluded around 2:00 pm.

*Next Steps*

- Update the Traffic Analysis, Environmental Overview, and Initial Project Packaging document based on feedback from the TAC.
- Begin the feasibility analysis of the project packages.
- The next TAC meeting is estimated to occur in mid-March 2019

**Attachments**

- PowerPoint presentation

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***SR 87 Corridor Development Study***
***Technical Advisory Committee Meeting No. 4***

Thursday, May 2, 2019
1:00 pm – 2:00 pm
ADOT Engineering Building
205 S. 17th Avenue
Room 117, Arizona Conference Room
Phoenix, AZ 85007

**Attendees**

Asad Karim, *Arizona Department of Transportation*
Jose Rojas, *Arizona Department of Transportation, Central District*
Jerry James, *Arizona Department of Transportation, Central District*
Raul Amavisca, *Arizona Department of Transportation, Central District*
John Wennes, *Arizona Department of Transportation, Multimodal Planning*
Lydia Warnick, *Arizona Department of Transportation, Transportation Technology Group*
Don Sneed, *Arizona Department of Transportation, Tribal Coordination*
James Lemmon, *Arizona Department of Transportation, Geotechnical*
Brent Crowther, *Kimley-Horn*
Michael Grandy, *Kimley-Horn*
Allen Hathcock, *Kimley-Horn*
Taylor Dunkle, *Kimley-Horn*
Robert Cummings, *Saguaro Geoservices*

*Participating by Teleconference:*
Jason Bottjen, *Arizona Department of Transportation, Multimodal Planning*
Jennifer Simpkins, *Kimley-Horn*

**Meeting Notes**

B. Crowther led the group through a PowerPoint (attached) and subsequent discussion about progress on the project to date, including updates from the last TAC meeting, how various projects were packaged together, and the P2P scoring methodology that will be used to rank projects. Discussion topics included:

- B. Crowther summarized the field review of potential projects that took place on March 5, 2019. During the field review projects were evaluated for overall feasibility and potential impacts to cost estimates were determined.
- The geotechnical projects are still under review at the time of this meeting. The rockfall hazard rating system was recently acquired and R. Cummings is in the process rating the geotechnical-focused projects, determining appropriate countermeasures, and establishing planning-level costs.
- B. Crowther summarized how identified projects were grouped together. Seven focus areas, split by mile posts (MP), were identified based on geographic clustering of projects which were subsequently assembled to form larger, grouped projects. B. Crowther then went through each of the seven grouped projects and the following items were discussed:
    - Project 1: NB MP 212-217
        - The main component of this project is the northbound climbing lane.



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        - L. Warnick commented that ADOT Transportation Technology Group wants fiber/conduit included in all project packages.
        - B. Crowther mentioned that speed feedback signs were still included within the projects and inquired on opinion of the ADOT Transportation Technology Group wants on those as potential projects.
            - L. Warnick responded that Traffic Operations and Safety groups are better equipped to discuss the inclusion of speed feedback signs within the projects.
        - B. Cummings asked if the climbing lane cost is inclusive of addressing rockfall issues due to widening the roadway to accommodate the climbing lane. Rockfall mitigation would be grouped in with the climbing lane if a new slope needs to be cut.
            - B. Crowther suggested leaving rockfall mitigation as a separate component, in case that piece is chosen to move forward, and the climbing lane is not.
            - A. Hathcock suggested coordination moving forward, identifying a correct cost for rockfall mitigation and stating that the rockfall would be mitigated with the climbing lane component.
    - Project 2: NB MP 218.5-223
        - The major components of this project is a climbing lane and widening. The climbing lane component includes the widening of the two bridges, Whiskey Springs bridge and Kitty Joe Creek bridge.
        - It was mentioned that Whiskey Springs bridge needs foundation improvements regardless of widening.
    - Project 3: MP 224.5-229
        - The major component of this project is shoulder widening.
        - J. Lemmon noticed a typo in the project 3 exhibit. MP was incorrectly listed as 214.5-229, the correct MP is 224.5-229. B. Crowther responded that the typo would be corrected.
        - A. Hathcock commented that often there are barriers are on the inside of this segment, so cost is inclusive of widening the outside and shifting the striping as part of widening the inside shoulders.
        - B. Cummings asked if slope modification was included in the pricing of widening to the outside.
            - A. Hathcock responded that the widening estimate was determined by the site visit, he will go back and revisit the opinion of probable cost to confirm.
    - Project 4: MP 239-241
        - The major components of this project are the left and right turn lanes at Matlock Gas and S. Rye Crossover.
    - Project 5: MP 241-246
        - The main components of this project are addressing the superelevation on the southbound lanes and a northbound climbing lane.
    - Project 6: MP 246-251
        - The major component of this project is widening the southbound shoulders.
        - A question was asked if the estimated costs including right-of-way acquisition.

- B. Crowther and A. Hathcock responded that they were unaware of any right-of-way concerns in this area.

▪ J. Wennes commented that a tree removal project is scheduled for FY 2022 within the limits of this project. This project may coincide with the wildlife fencing, warning signage, and crossing included as part of this project.

- Project 7: Corvair Curve
  - ▪ The purpose the realignment options identified for Corvair Curve was to address the crashes in the area.
  - ▪ A. Hathcock highlighted the two main alternatives identified. The first alternative is straightening the southbound alignment between existing MP 244 and 248. The second alternative is to widen the northbound alignment so both north and southbound follow the same alignment.
    - A. Hathcock described limitations of the alternative to straighten the alignment between MP 244 and 248. With the topography of the proposed alignment, and the fact that the second alternative would tie in at max 6% grade at both ends, the alignment would require tunneling, which was deemed infeasible.
    - A. Hathcock then discussed the other alternative to realign the southbound lanes to parallel the northbound lanes. This would require 325,000 CY of borrow and would cost $30-40 million to construct.
      - B. Cummings asked if widening would happen on one side or from the center.
      - A. Hathcock responded that widening will occur primarily to the west.
      - B. Cummings raised concerns from the type of cut material in this area, stating the closer to Payson the more rock there is.
      - It was brought up that project 5 includes a northbound climbing lane that is separate from the cost of this project.
      - B. Cummings asked who owns the land adjacent to this project.
      - B. Crowther responded that USFS owns the land in this area.
      - M. Grandy stated that project 5 includes improvements to the Corvair curve, which may not be necessary with realignment.
      - A. Hathcock stated that the profile exhibit shown includes guardrail, which was assumed cheaper than more cut for a wider median.
  - ▪ B. Crowther asked if the project team wanted to move forward with the option 2 (widening the northbound alignment) and agree that option 1 (straightening the southbound alignment) is infeasible.
    - M. Grandy suggested making the Corvair curve improvements from project 5 as a second alternative, eliminating the current option 2.
    - A. Hathcock suggests making a statement in the final report as to why option 2 was not feasible.
  - ▪ B. Crowther inquired about past effectiveness of improvements in this area.
    - R. Amavisca requested that proposed alternatives be compared with signage and rumble strips.
  - ▪ R. Amavisca suggested concrete barrier to improve the suggested alternative.





- ▪ A. Hathcock suggested looking at the types of crashes to determine the need for the various proposed alignments.
- ▪ It was mentioned that snow plows operate in the area, which may be why there is no concrete barrier.

- B. Crowther transitioned the conversation to discussing the P2P scoring methodology; the current method being used to score projects statewide. He stated that the team is considering applying the technical score and safety score portion of the P2P scoring process to prioritize SR 87 projects. He highlighted that the P2P technical scoring groups methodology has been obtained for bridge and geohazard groups. Safety, rest area, pavement, and environmental methodology is still needed.
  - The group suggested the following contacts to obtain the methodology:
    - ▪ Rest area – Robert Wheeler
    - ▪ Pavement – Yongki Li and Mafiz Mian
    - ▪ Safety – Kerry Wilcoxon
  - J. Lemmon stated that scoring 100 projects is a lot of work and focus should be given to the 7 large projects identified.
  - L. Warnick questioned if priorities were established in the Corridor Profile Study.
  - B. Crowther clarified that Kimley-Horn would apply the P2P methodology and is seeking methodology from the groups, and not for them to score the projects in response to questions about ADOT's availability to score the SR 87 projects.
  - R. Cummings wants to clarify if scoring is prioritizing projects within the project or statewide.
    - ▪ B. Crowther states that P2P scoring will accomplish both.
  - A. Karim suggested listing projects by area and scoring larger area projects.
    - ▪ B. Crowther stated this would be scoring the 7 larger projects identified.
  - R. Amavisca states that the methodology should be what Charla Glendening requires for ranking of projects, whether this be the Corridor Profile Study ranking or P2P scoring.
- A. Karim to coordinate a meeting to discuss prioritization methodology with D. Gabiou and C. Glendening.

The meeting was concluded around 2:00 pm.

*Next Steps*

- Meeting to finalize scoring methodology.
- Meeting with Northcentral District.
- Meeting with Central District.
- Refine and rank projects using scoring methodology identified.

**Attachments**

- PowerPoint presentation

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***SR 87 Corridor Development Study***
***Technical Advisory Committee Meeting No. 5***

Tuesday, August 27, 2019
1:00 pm – 2:00 pm
ADOT Engineering Building
205 S. 17th Avenue
Room 117, Arizona Conference Room
Phoenix, AZ 85007

**Attendees**

Asad Karim, *Arizona Department of Transportation*
Jose Rojas, *Arizona Department of Transportation, Central District*
John Wennes, *Arizona Department of Transportation, Multimodal Planning*
James Lemmon, *Arizona Department of Transportation, Geotechnical*
Eunice Chan, *Federal Highway Administration*
Brent Crowther, *Kimley-Horn*
Michael Grandy, *Kimley-Horn*
Chris Joannes, *Kimley-Horn*
Robert Cummings, *Saguaro GeoServices*
Yung Koprowski, *Y2K Engineering*

*Participating by Teleconference:*
Jennifer Simpkins, *Kimley-Horn*

**Meeting Notes**

B. Crowther led the group through a PowerPoint (attached) and subsequent discussion about progress on the project to date, including updates from the last TAC meeting, project packaging, and results from the project prioritization methodologies. Discussion topics included:

- J. Rojas asked if conduit costs were included in the project cost estimates.
  - B. Crowther and C. Joannes responded that conduit costs were not included with all projects because it was deemed infeasible to construct conduit with all projects.
- J. Lemmon stated that he had performed a relatively in-depth review of the rock-fall mitigation projects and that he generally agreed with the results and project packaging. He also stated that he noticed one of the project packages includes a wildlife overpass, but that ADOT has had limited success in identifying funding for such projects.
  - J. Wennes added that ADOT MPD would be coming out with an RFP in the near future which would address wildlife crashes statewide and identify funding opportunities for wildlife crossing enhancements. He stated that America's Transportation Infrastructure Act (ATIA) has identified approximately $250M in wildlife funding.
- J. Lemmon stated that the slopes around MP 226.1 has a high potential for debris to roll into the roadway. He also stated that it may be difficult to fund the larger rock-fall project packages at once because some locations are much more critical than others. He recommended an approach of securing funding for the high-priority rock-fall locations individually.
- R. Cummings noticed that Project #52 is already included within the milepost limits of Project #51 and should be removed.



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  - C. Joannes stated that the justification for removing Project #52 would be amended to state that.
- R. Cummings stated that the rankings are inconsistent between the Project Prioritization and Implementation sections.
  - C. Joannes stated that the order of the projects in the table in the Implementation section would be corrected.
- Y. Koprowski stated that MAG is implementing additional funding for ITS safety improvements, which could be added to the Implementation chapter of the report as an additional funding source for the Central District ITS/Signage Improvement project package.
- While discussing the proposed public engagement plan, Y. Koprowski suggested Nextdoor as another potential media outlet through which to promote the public survey.
- While discussing the preliminary roadway plans, R. Cummings asked if there was a way to include cut lines on the slopes to evaluate the level of earthwork required for roadway projects that will impact rock-fall mitigation locations.
  - B. Crowther responded that the budget and time allowed on this project could only support plan-view drawings; no survey has been completed so it is not possible to determine cut lines with any sort of accuracy.
- R. Cummings suggested reaching out to the National Parks Service to inquire about any rock-fall mitigation strategies that would not be acceptable to the Tonto National Forest for aesthetic reasons.
  - C. Joannes stated that he would reach out to NPS.
- A. Karim asked if the project packages are ready to be submitted into the P2P process during the next round of scoring.
  - B. Crowther stated that pre-scoping forms have been competed for all 12 packaged projects.

The meeting was concluded around 2:00 pm.

*Next Steps*

- Finalize the Feasibility Report based on the feedback from the TAC meeting and additional comments from the TAC upon further review of the draft report.

**Attachments**

- PowerPoint presentation

2

## Appendix D: Pre-Scoping Forms

# PACKAGE PROJECT 1 – CENTRAL DISTRICT ITS/SIGNAGE IMPROVEMENTS (MP 191-218)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **ADOT Project Manager:** |
| **Project Name:** Central District ITS/Signage Improvements | |
| **City/Town:** N/A | **County:** Maricopa |
| **COG/MPO:** MAG | **ADOT District:** Central |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 191 | |
| **End Limit:** 218 | |
| **Project Length:** 27 miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☒County ☐ADOT ☐Private ☒Federal ☒Tribal ☐Other | |

| PROJECT NEED |
|---|
| SR 87 Corridor from Milepost 191 through 218 is prone to motor vehicle accidents. Between 2013 and 2017, there were 373 crashes, 31 of which included a fatality or serious injury. |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☐Expansion |
| Improve safety in corridor by implementing improved signage and intelligent transportation system infrastructure. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☐Utilities |
| ☐Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>There should be minimal project risks since this exhibit is comprised primarily of signage work. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☒HSIP | ☒State |
| | ☐Local | ☐Private | ☐Tribal | ☐Other |

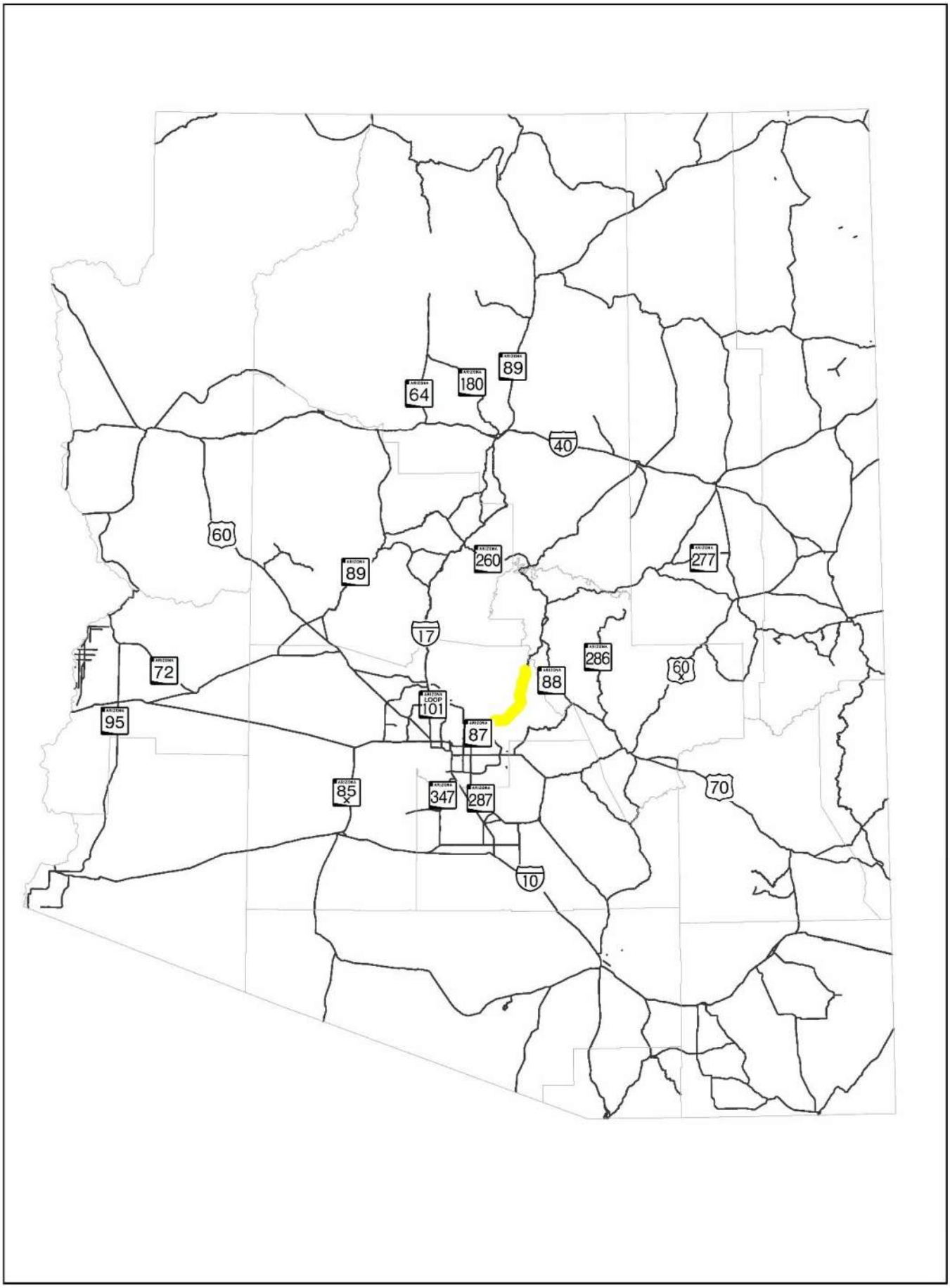
| COST ESTIMATE | | | |
|---|---|---|---|
| Design<br>$49,250.00 | Right-of-Way<br>$0.00 | Construction<br>$443,250.00 | Total<br>$492,500.00 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

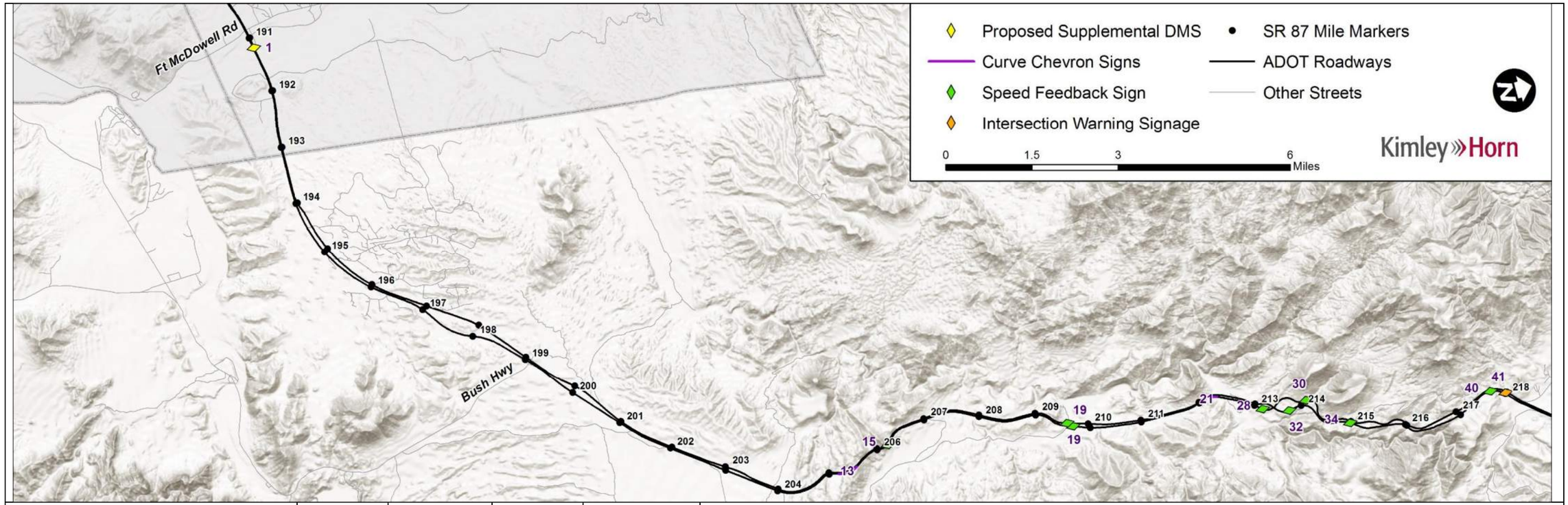
| ATTACHMENTS |
| --- |
| 1. Project Scope of Work<br>2. State Location Map<br>3. Project Vicinity Map<br>4. Itemized Cost Estimate<br>5. Conceptual Design Plans |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Southbound dynamic message sign (MP 191.2)<br>• Northbound curve chevron signage (MP 205.2-205.7)<br>• Northbound speed feedback sign (MP 206.2)<br>• Northbound and southbound speed feedback signs (NB MP 209.7, SB MP 209.6)<br>• Northbound curve chevron signage (MP 212.2-212.4)<br>• Northbound speed feedback sign (MP 213)<br>• Southbound speed feedback sign (MP 213.6)<br>• Northbound speed feedback sign (MP 214)<br>• Southbound speed feedback sign (MP 215)<br>• Northbound speed feedback sign (MP 217.8)<br>• Intersection warning signage – Sunflower (MP 218) |

ATTACHMENT 2: STATE LOCATION MAP



ATTACHMENT 3: PROJECT VICINITY MAP




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. SB New DMS | 1 | 191.2 | 191.2 | $250,000 | Provides the ability to direct SB traffic to different routes (SR 87 vs. Shea Blvd.) in response to incidents further south on the corridor. |
| 2. NB curve chevron signage | 13 | 205.2 | 205.7 | $50,000 | Demonstrated crash history with a high percentage of run off the road crashes. |
| 3. NB speed feedback sign | 15 | 206.2 | 206.2 | $25,000 | Demonstrated crash history with 26% of crashes resulting from drivers traveling too fast for conditions. |
| 4. NB and SB speed feedback signs | 19 | NB 209.7<br>SB 209.6 | NB 209.7<br>SB 209.6 | $50,000 | Speeding is an issue at this location; the nearby speed analysis at MP 205 showed an 85$^{th}$ percentile speed of 74 mph. |
| 5. NB curve chevron signage | 21 | 212.2 | 212.4 | $12,500 | The downhill grade in combination with a curve increases the risk of run off the road crashes in this area. |
| 6. NB speed feedback sign | 28 | 213 | 213 | $25,000 | Six crashes occurred on the curve in this section where the vehicle ran off the road to the right and the vehicle overturned |
| 7. SB speed feedback sign | 32 | 213.6 | 213.6 | $25,000 | One fatal and three serious injury crashes occurred on the curve in this section |
| 8. NB speed feedback sign | 30 | 214 | 214 | $25,000 | This location is within an identified crash hot spot where 50% of crashes involved speeding. |
| 9. SB speed feedback sign | 34 | 215 | 215 | $25,000 | Speeding is an issue at this location, a speed study at MP 214 showed an 85$^{th}$ percentile speed of 72 mph. |
| 10. NB speed feedback sign | 40 | 217.8 | 217.8 | $25,000 | Demonstrated crash history at curves north of the proposed feedback sign location. |
| 11. Intersection warning signage | 41 | 218 | 218 | $5,000 | Relatively inexpensive treatment to increase awareness of the Sunflower intersection. |
| | | | Total: | $517,500 | |

## ATTACHMENT 4: ITEMIZED COST ESTIMATE

Itemized cost estimates were not developed for the ITS/Signage projects.

## ATTACHMENT 5: PRELIMINARY PLANS

Preliminary (15%) plans were not developed for the ITS/Signage projects.

# PACKAGE PROJECT 2 – CENTRAL DISTRICT SHOULDER IMPROVEMENTS (MP 196-211)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **ADOT Project Manager:** |
| **Project Name:** Central District Shoulder Improvements (MP 196-211) | |
| **City/Town:** N/A | **County:** Maricopa |
| **COG/MPO:** MAG | **ADOT District:** Central |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 196 | |
| **End Limit:** 211 | |
| **Project Length:** 15 Miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☒County ☐ADOT ☒Private ☒Federal ☐Tribal ☐Other | |

| PROJECT NEED |
|---|
| Shoulders at several locations are of substandard widths, other locations are in need of reconstruction. The north approach of the intersection of SR 87 and Goldfield Road is in poor condition. |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☐Expansion |
| Widen shoulders to current standards, where needed, and rehabilitate shoulders in select locations to crate a consistent recovery area and improve emergency response. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☐Utilities |
| ☐Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>Click or tap here to enter text. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☒HSIP | ☒State |
| | ☐Local | ☐Private | ☐Tribal | ☐Other |

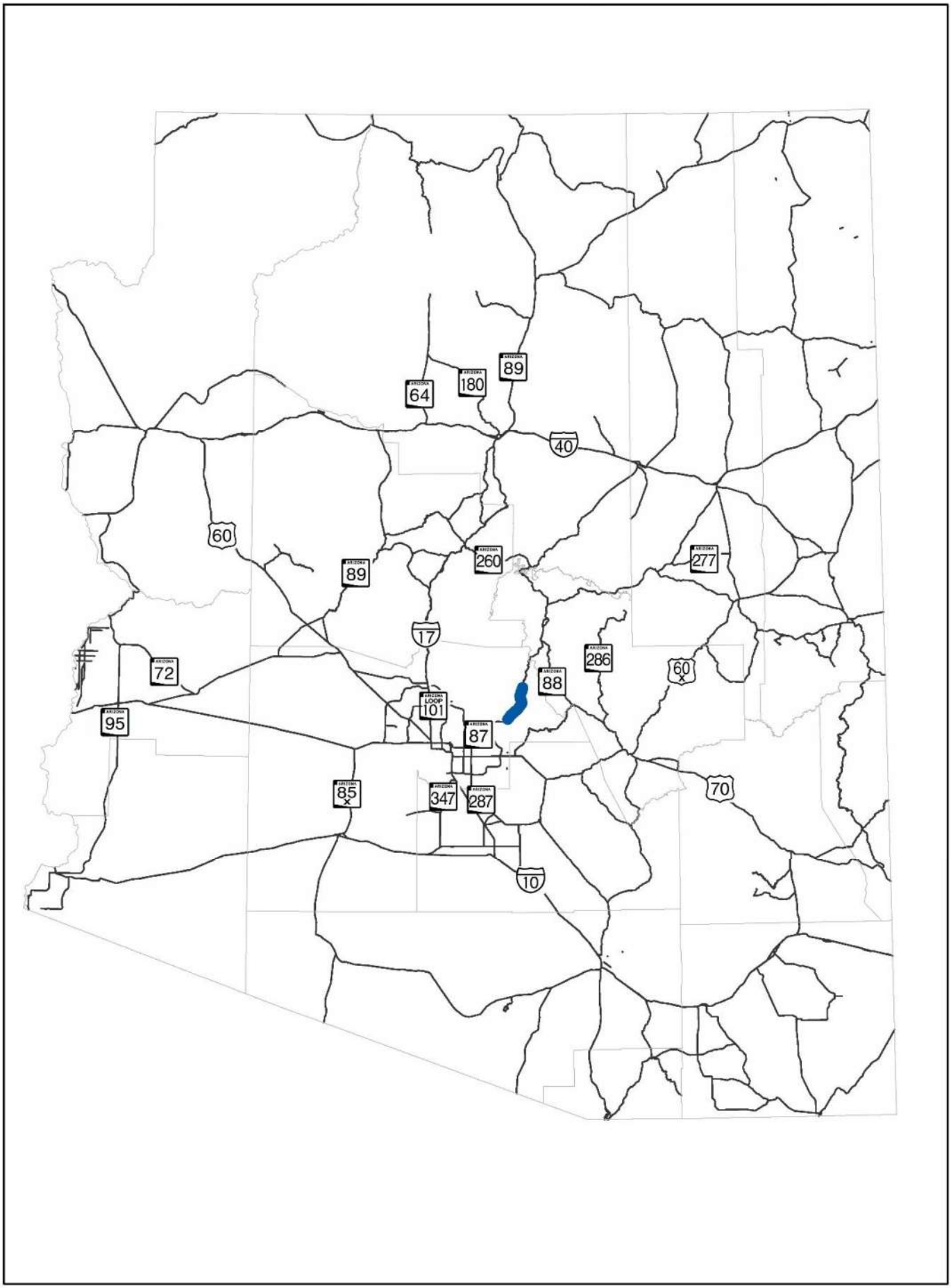
| COST ESTIMATE | | | |
|---|---|---|---|
| Design | Right-of-Way | Construction | Total |
| $548,600.00 | $0.00 | $7,133,100.00 | $7,681,700.00 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

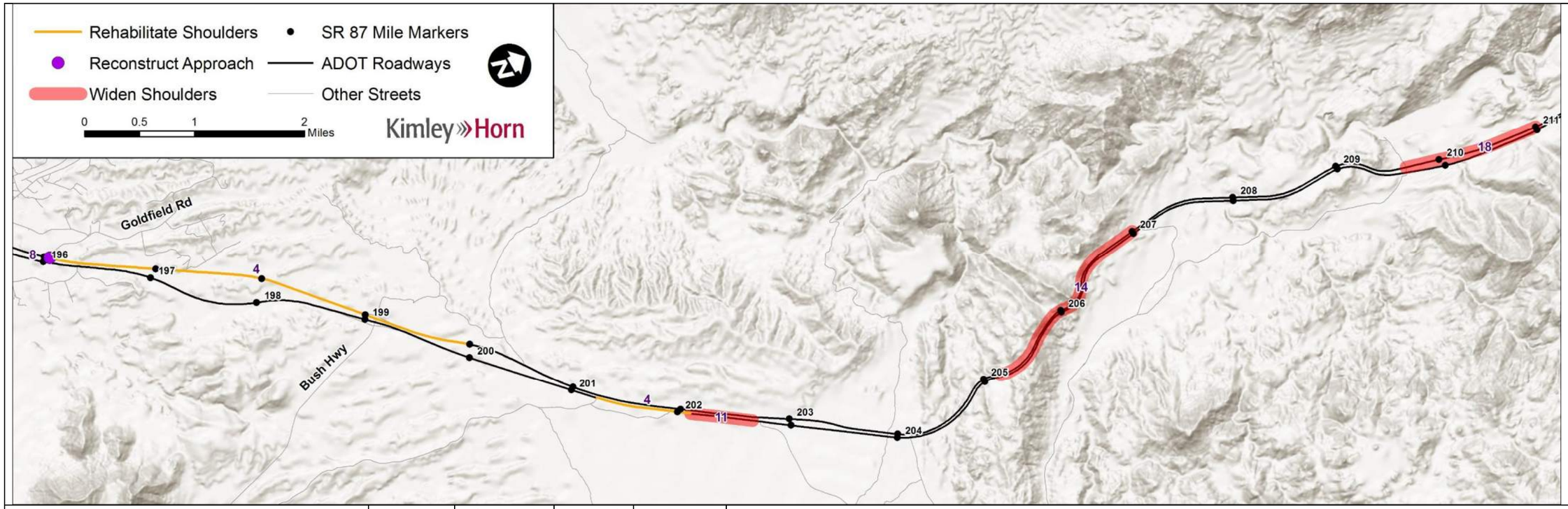
| ATTACHMENTS |
| --- |
| 1. Project Scope of Work<br>2. State Location Map<br>3. Project Vicinity Map<br>4. Itemized Cost Estimate<br>5. Conceptual Design Plans |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Rehabilitate shoulders (Southbound: MP 196-200, Northbound: MP 201.3-202.1)<br>• Reconstruct north approach at Goldfield Rd (MP 196.1)<br>• Widen northbound inside shoulder to four feet (MP 202.1-202.6)<br>• Widen southbound outside shoulder to ten feet (MP 205.2-207)<br>• Widen southbound inside shoulder to four feet (MP 209.6-211) |

ATTACHMENT 2: STATE LOCATION MAP



ATTACHMENT 3: PROJECT VICINITY MAP




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Rehabilitate shoulders | 4 | SB :196<br>NB:201.3 | SB:200<br>NB:202.1 | $2,560,400 | Current shoulders are in poor condition. |
| 2. Reconstruct north approach at Goldfield Rd | 8 | 196.1 | 196.1 | $76,800 | Current approach is in poor condition and in need of reconstruction. |
| 3. Widen NB inside shoulder to 4’ | 11 | 202.1 | 202.6 | $552,700 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| 4. Widen SB outside shoulder to 10’ | 14 | 205.2 | 207 | $3,247,500 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| 5. Widen SB inside shoulder to 4’ | 18 | 209.6 | 211 | $1,244,300 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| | | | Total: | $7,681,700 | |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**4. Rehabilitate northbound shoulders (MP 201.3-202.1)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2020053 | REMOVE (GR TERMINAL) | EACH | 2 | $400.00 | $800 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 1,038 | $5.00 | $5,190 |
| 2020085 | REMOVE BITUMINOUS PAVEMENT (MILLING) (3") | SQ.YD. | 6,456 | $3.00 | $19,368 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 1,182 | $120.00 | $141,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 191 | $100.00 | $19,100 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $4,150.00 | $4,150 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 1,038 | $30.00 | $31,140 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 1 | $2,500.00 | $2,500 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 1 | $800.00 | $800 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 8,300 | $0.75 | $6,225 |
| | | | **Roadway Construction Subtotal** | | **$241,113** |
| | Unidentified Item Allowance (15%) | | | | $ 36,167 |
| | | | | **Subtotal** | **$277,280** |
| | Water Supply/Dust Palliative (3%) | | | | $ 8,319 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 41,592 |
| | Erosion Control (1%) | | | | $ 2,773 |
| | Contractor Quality Control (2%) | | | | $ 5,546 |
| | Construction Surveying And Layout (2%) | | | | $ 5,546 |
| | | | | **Other Item Subtotal** | **$341,056** |
| | Mobilization (12%) | | | | $ 40,927 |
| | | | | **Construction Subtotal** | **$ 381,983** |
| | Engineering Design (10%) | | | | $ 38,199 |
| | Construction Engineering and Contingencies (20%) | | | | $ 76,397 |
| | Indirect Cost Allocation (10.02%) | | | | $ 38,275 |
| | | | | **Construction Total** | **$ 534,854** |

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# SR87 Corridor Development Study
# ITEMIZED COST ESTIMATE

**4. Rehabilitate southbound shoulders (MP 196 - 200)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 5,223 | $5.00 | $26,115 |
| 2020085 | REMOVE BITUMINOUS PAVEMENT (MILLING) (3") | SQ.YD. | 32,499 | $3.00 | $97,497 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 5,951 | $80.00 | $476,080 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 959 | $90.00 | $86,310 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $20,892.00 | $20,892 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 5,223 | $30.00 | $156,690 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 2 | $2,500.00 | $5,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 2 | $800.00 | $1,600 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 41,784 | $0.75 | $31,338 |
| | | | | **Roadway Construction Subtotal** | **$913,122** |
| | Unidentified Item Allowance (15%) | | | | $ 136,969 |
| | | | | **Subtotal** | **$1,050,091** |
| | Water Supply/Dust Palliative (3%) | | | | $ 31,503 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 157,514 |
| | Erosion Control (1%) | | | | $ 10,501 |
| | Contractor Quality Control (2%) | | | | $ 21,002 |
| | Construction Surveying And Layout (2%) | | | | $ 21,002 |
| | | | | **Other Item Subtotal** | **$1,291,613** |
| | Mobilization (12%) | | | | $ 154,994 |
| | | | | **Construction Subtotal** | **$ 1,446,607** |
| | Engineering Design (10%) | | | | $ 144,661 |
| | Construction Engineering and Contingencies (20%) | | | | $ 289,322 |
| | Indirect Cost Allocation (10.02%) | | | | $ 144,951 |
| | | | | **Construction Total** | **$ 2,025,541** |
| | **TOTAL SR87 Corridor Development Study COST** | | | | **$ 2,025,541** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**8. Reconstruct north approach at Goldfield Rd (MP 196.1)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 139 | $35.00 | $4,865 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 80 | $10.00 | $800 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 58 | $120.00 | $6,960 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 49 | $160.00 | $7,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 5 | $120.00 | $600 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $50.00 | $50 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| | | | **Roadway Construction Subtotal** | | **$34,615** |
| | Unidentified Item Allowance (15%) | | | | $ 5,193 |
| | | | | **Subtotal** | **$39,808** |
| | Water Supply/Dust Palliative (3%) | | | | $ 1,195 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 5,972 |
| | Erosion Control (1%) | | | | $ 399 |
| | Contractor Quality Control (2%) | | | | $ 797 |
| | Construction Surveying And Layout (2%) | | | | $ 797 |
| | | | | **Other Item Subtotal** | **$48,968** |
| | Mobilization (12%) | | | | $ 5,877 |
| | | | | **Construction Subtotal** | **$ 54,845** |
| | Engineering Design (10%) | | | | $ 5,485 |
| | Construction Engineering and Contingencies (20%) | | | | $ 10,969 |
| | Indirect Cost Allocation (10.02%) | | | | $ 5,496 |
| | | | | **Construction Total** | **$ 76,795** |

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# SR87 Corridor Development Study
## ITEMIZED COST ESTIMATE

**11. Widen northbound inside shoulder to 4' (MP 202.1 to 202.6)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 294 | $20.00 | $5,880 |
| 2020201 | SAW CUTTING | L.FT. | 2,640 | $2.50 | $6,600 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 5,870 | $8.00 | $46,960 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 1,076 | $60.00 | $64,560 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 631 | $160.00 | $100,960 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 44 | $120.00 | $5,280 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $2,640.00 | $2,640 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 1 | $800.00 | $800 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 2,640 | $0.75 | $1,980 |
| | | | **Roadway Construction Subtotal** | | **$249,160** |
| | Unidentified Item Allowance (15%) | | | | $ 37,374 |
| | | | | **Subtotal** | **$286,534** |
| | Water Supply/Dust Palliative (3%) | | | | $ 8,597 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 42,981 |
| | Erosion Control (1%) | | | | $ 2,866 |
| | Contractor Quality Control (2%) | | | | $ 5,731 |
| | Construction Surveying And Layout (2%) | | | | $ 5,731 |
| | | | | **Other Item Subtotal** | **$352,440** |
| | Mobilization (12%) | | | | $ 42,293 |
| | | | | **Construction Subtotal** | **$ 394,733** |
| | Engineering Design (10%) | | | | $ 39,474 |
| | Construction Engineering and Contingencies (20%) | | | | $ 78,947 |
| | Indirect Cost Allocation (10.02%) | | | | $ 39,553 |
| | | | | **Construction Total** | **$ 552,707** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**14. Widen southbound outside shoulder to 10' (MP MP205.2 - 207)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 8 | $5,000.00 | $40,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 1,220 | $20.00 | $24,400 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 2,745 | $5.00 | $13,725 |
| 2020201 | SAW CUTTING | L.FT. | 10,978 | $2.50 | $27,445 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 97,590 | $7.00 | $683,130 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 4,066 | $60.00 | $243,960 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 2,219 | $120.00 | $266,280 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 144 | $120.00 | $17,280 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $10,978.00 | $10,978 |
| 8050003 | SEEDING (CLASS II) | ACRE | 8 | $3,500.00 | $28,000 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 2,745 | $30.00 | $82,350 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 2 | $2,500.00 | $5,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 2 | $800.00 | $1,600 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 10,978 | $0.75 | $8,234 |
| | | | **Roadway Construction Subtotal** | | **$1,463,982** |
| | Unidentified Item Allowance (15%) | | | | $ 219,598 |
| | | | | **Subtotal** | **$1,683,580** |
| | Water Supply/Dust Palliative (3%) | | | | $ 50,508 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 252,537 |
| | Erosion Control (1%) | | | | $ 16,836 |
| | Contractor Quality Control (2%) | | | | $ 33,672 |
| | Construction Surveying And Layout (2%) | | | | $ 33,672 |
| | | | | **Other Item Subtotal** | **$2,070,805** |
| | Mobilization (12%) | | | | $ 248,497 |
| | | | | **Construction Subtotal** | **$ 2,319,302** |
| | Engineering Design (10%) | | | | $ 231,931 |
| | Construction Engineering and Contingencies (20%) | | | | $ 463,861 |
| | Indirect Cost Allocation (10.02%) | | | | $ 232,395 |
| | | | | **Construction Total** | **$ 3,247,489** |

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# SR87 Corridor Development Study
## ITEMIZED COST ESTIMATE

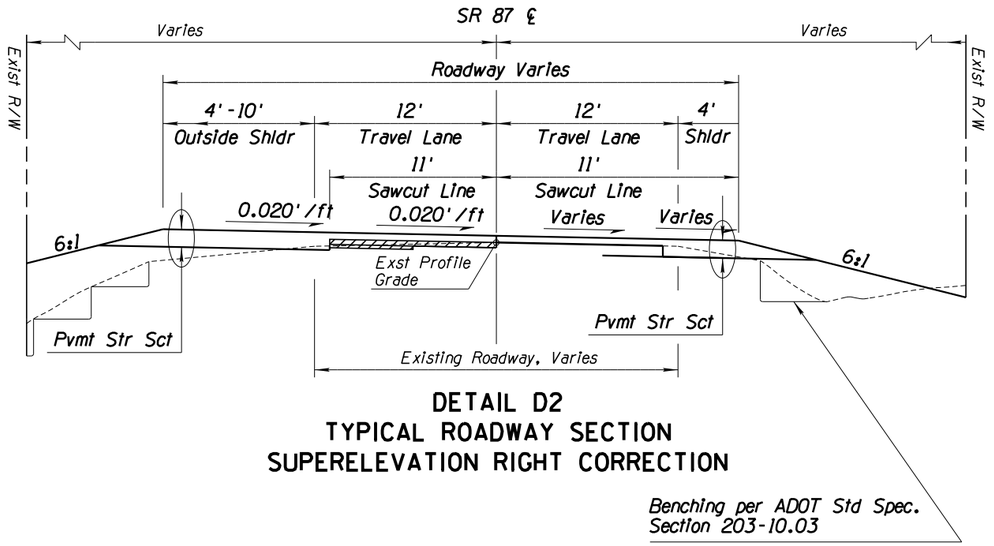
**18. Widen southbound inside shoulder to 4' (MP 209.6 - 211)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 2 | $5,000.00 | $10,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 779 | $20.00 | $15,580 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 2 | $400.00 | $800 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 400 | $5.00 | $2,000 |
| 2020201 | SAW CUTTING | L.FT. | 7,009 | $2.50 | $17,523 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 10,390 | $8.00 | $83,120 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 2,596 | $60.00 | $155,760 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 1,417 | $120.00 | $170,040 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 92 | $120.00 | $11,040 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $7,009.00 | $7,009 |
| 8050003 | SEEDING (CLASS II) | ACRE | 2 | $3,500.00 | $7,000 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 1,753 | $30.00 | $52,590 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 4 | $2,500.00 | $10,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 4 | $800.00 | $3,200 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 7,009 | $0.75 | $5,257 |
| | | | **Roadway Construction Subtotal** | | **$560,918** |
| | Unidentified Item Allowance (15%) | | | | $ 84,138 |
| | | | | **Subtotal** | **$645,056** |
| | Water Supply/Dust Palliative (3%) | | | | $ 19,352 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 96,759 |
| | Erosion Control (1%) | | | | $ 6,451 |
| | Contractor Quality Control (2%) | | | | $ 12,902 |
| | Construction Surveying And Layout (2%) | | | | $ 12,902 |
| | | | | **Other Item Subtotal** | **$793,422** |
| | Mobilization (12%) | | | | $ 95,211 |
| | | | | **Construction Subtotal** | **$ 888,633** |
| | Engineering Design (10%) | | | | $ 88,864 |
| | Construction Engineering and Contingencies (20%) | | | | $ 177,727 |
| | Indirect Cost Allocation (10.02%) | | | | $ 89,042 |
| | | | | **Construction Total** | **$ 1,244,267** |

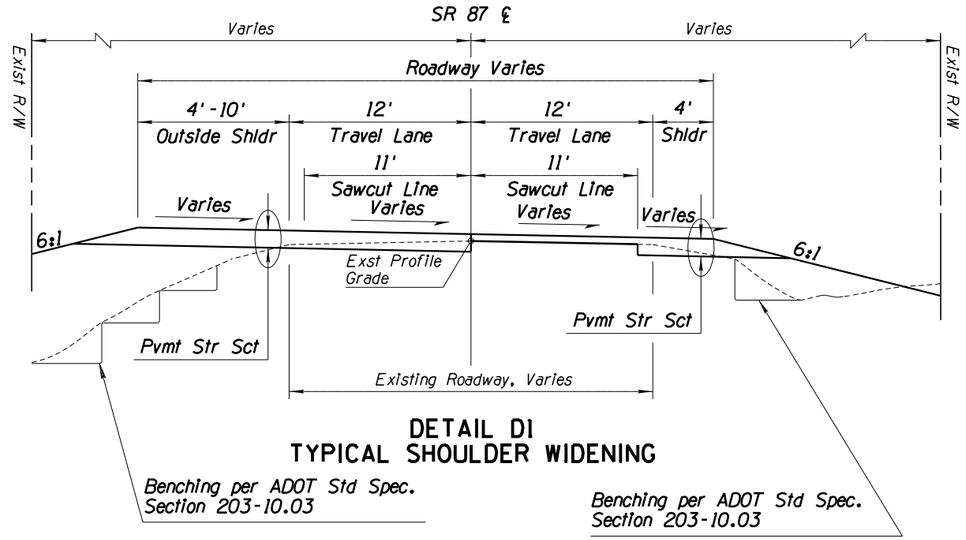
ATTACHMENT 5: PRELIMINARY PLANS

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

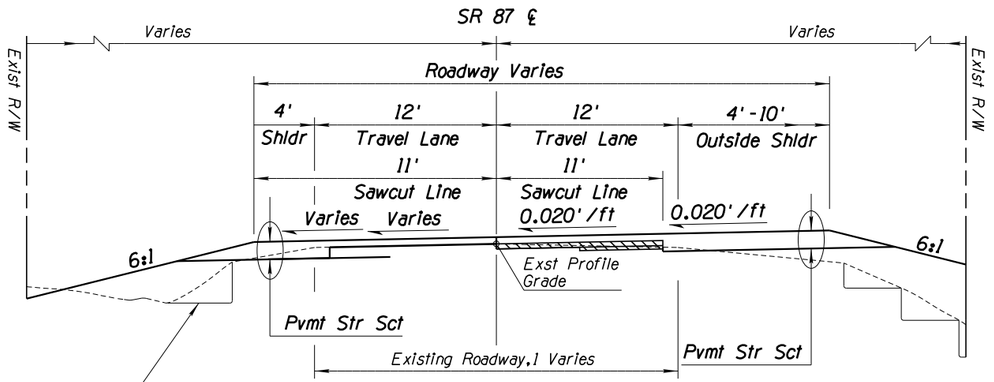
| SR 87 MILE POST STATION | | | |
|---|---|---|---|
| MP NB | STATION | MP SB | STATION |
| 196 | 101+73 | 196 | 101+18 |
| 197 | 155+53 | 197 | 154+02 |
| 198 | 207+69 | 198 | 207+94 |
| 199 | 261+02 | 199 | 259+13 |
| 200 | 314+21 | 200 | 311+72 |
| 201 | 367+73 | 201 | 364+06 |
| 202 | 419+18 | 202 | 417+81 |
| 203 | 471+36 | 203 | 470+65 |
| 204 | 526+28 | 204 | 523+10 |
| 205 | 577+70 | 205 | 575+84 |
| 206 | 630+73 | 206 | 628+30 |
| 207 | 682+81 | 207 | 680+28 |
| 208 | 736+47 | 208 | 734+12 |
| 209 | 788+55 | 209 | 786+62 |
| 210 | 842+08 | 210 | 839+50 |
| 211 | 894+91 | 211 | 890+40 |
| 212 | 942+20 | 212 | 939+42 |
| 213 | 998+65 | 213 | 995+55 |
| 214 | 1051+86 | 214 | 1050+06 |
| 215 | 1105+38 | 215 | 1095+77 |
| 216 | 1158+68 | 216 | 1147+95 |
| 217 | 1213+92 | 217 | 1199+48 |
| 218 | 1268+31 | 218 | 1250+20 |
| 219 | 1318+19 | 219 | 1304+12 |
| 220 | 1374+67 | 220 | 1359+76 |
| 221 | 1427+95 | 221 | 1412+99 |
| 222 | 1480+60 | 222 | 1465+84 |
| 223 | 1533+97 | 223 | 1518+89 |
| 224 | 1584+61 | 224 | 1570+72 |
| 225 | 1639+50 | 225 | 1625+29 |
| 226 | 1689+86 | 226 | 1676+32 |
| 227 | 1740+23 | 227 | 1726+14 |
| 228 | 1792+50 | 228 | 1778+04 |
| 229 | 1845+24 | 229 | 1831+98 |
| 230 | 1898+50 | 230 | 1884+70 |
| 231 | 1949+61 | 231 | 1933+71 |
| 232 | 1999+33 | 232 | 1985+29 |
| 233 | 2047+74 | 233 | 2033+06 |
| 234 | 2101+13 | 234 | 2085+05 |
| 235 | 2154+59 | 235 | 2137+29 |
| 236 | 2207+09 | 236 | 2189+44 |
| 237 | 2259+88 | 237 | 2240+86 |
| 238 | 2311+66 | 238 | 2293+85 |
| 239 | 2364+28 | 239 | 2344+91 |
| 240 | 2416+01 | 240 | 2397+41 |
| 241 | 2467+79 | 241 | 2448+96 |
| 242 | 2518+51 | 242 | 2496+68 |
| 243 | 2571+26 | 243 | 2549+70 |
| 244 | 2620+38 | 244 | 2601+82 |
| 245 | 2677+47 | 245 | 2655+01 |
| 246 | 2729+53 | 246 | 2703+04 |
| 247 | 2741+30 | 247 | 2747+68 |
| 248 | 2794+18 | 248 | 2801+15 |
| 249 | 2847+25 | 249 | 2854+41 |
| 250 | 2899+69 | 250 | 2906+58 |



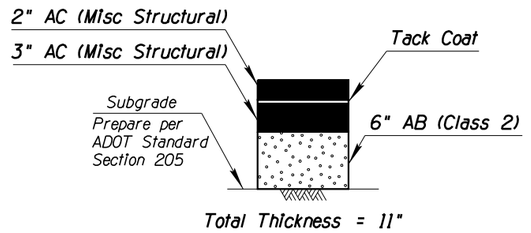

## DETAIL D2
## TYPICAL ROADWAY SECTION SUPERELEVATION RIGHT CORRECTION




## DETAIL D1
## TYPICAL SHOULDER WIDENING




## DETAIL D3
## TYPICAL ROADWAY SECTION SUPERELEVATION LEFT CORRECTION




Total Thickness = 11"

## PAVEMENT STRUCTURAL SECTION

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

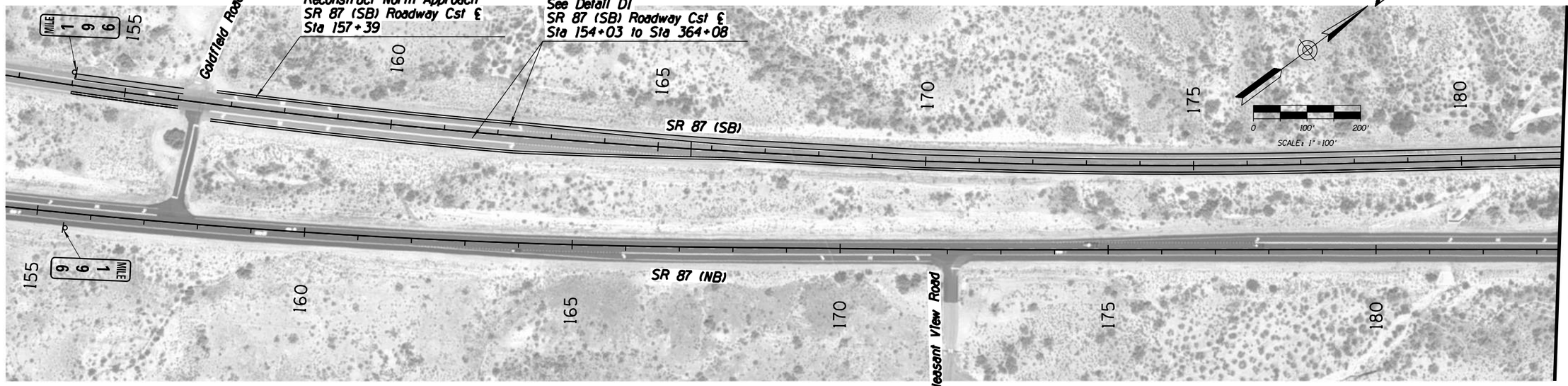
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

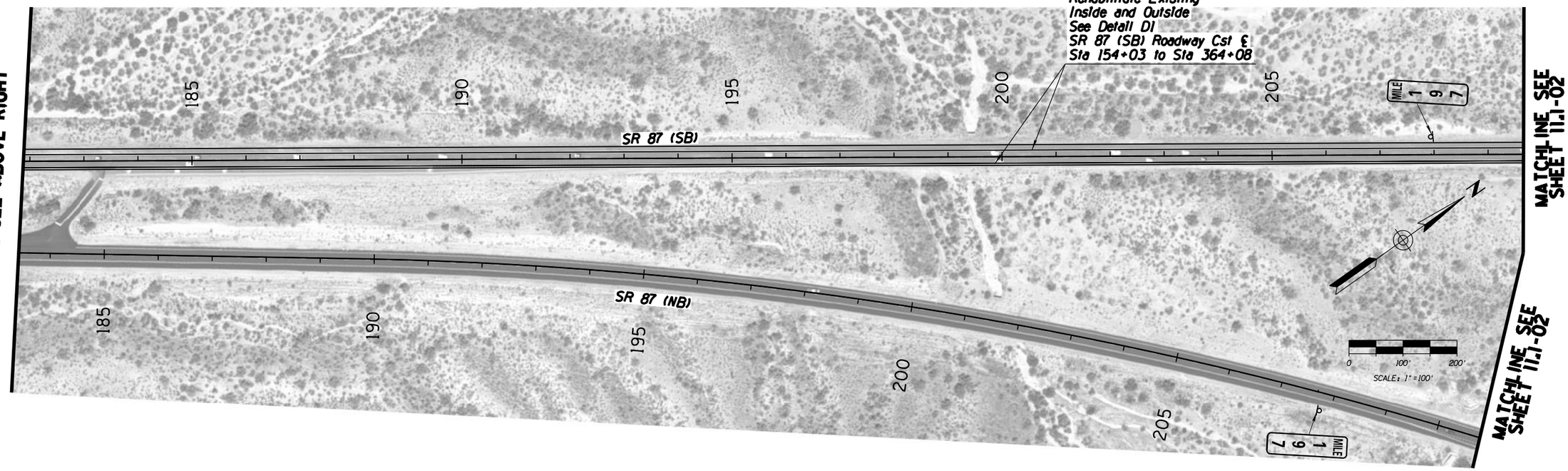
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | ___ OF ___ |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | |

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

10:28:19 AM 9/5/2019 TERRY.RADDEMAN K:\TUC_TPTO\291199004-ADOT SR 87 CORRIDOR DEV STUDY\TASKS\TASK 4 - FEASIBILITY REPORT\CADD\DETAILS.DGN

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT #2 CENTRAL DISTRICT
SHOULDER IMPROVEMENT
MP 196 TO 211

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 11.1-01 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
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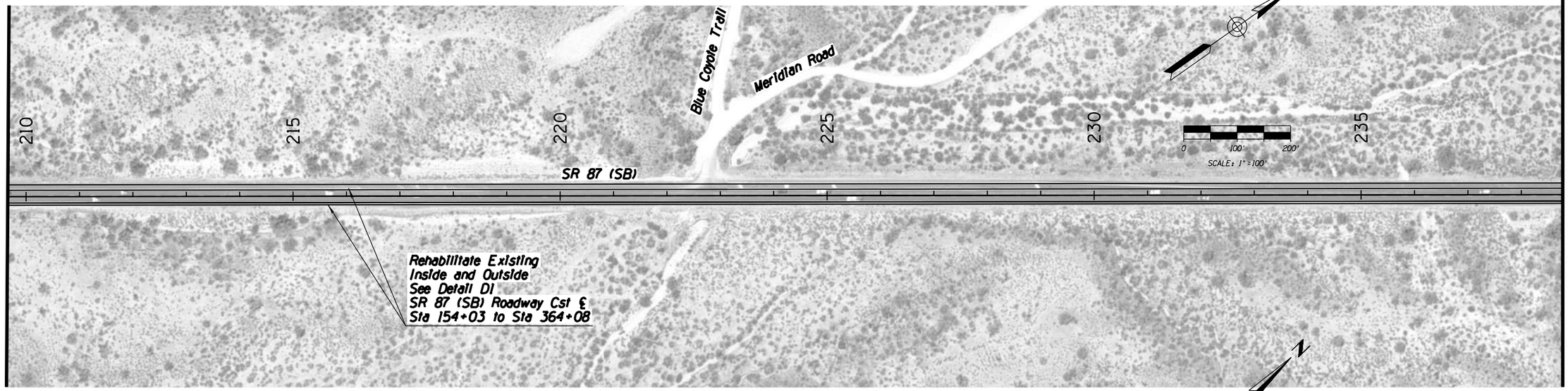
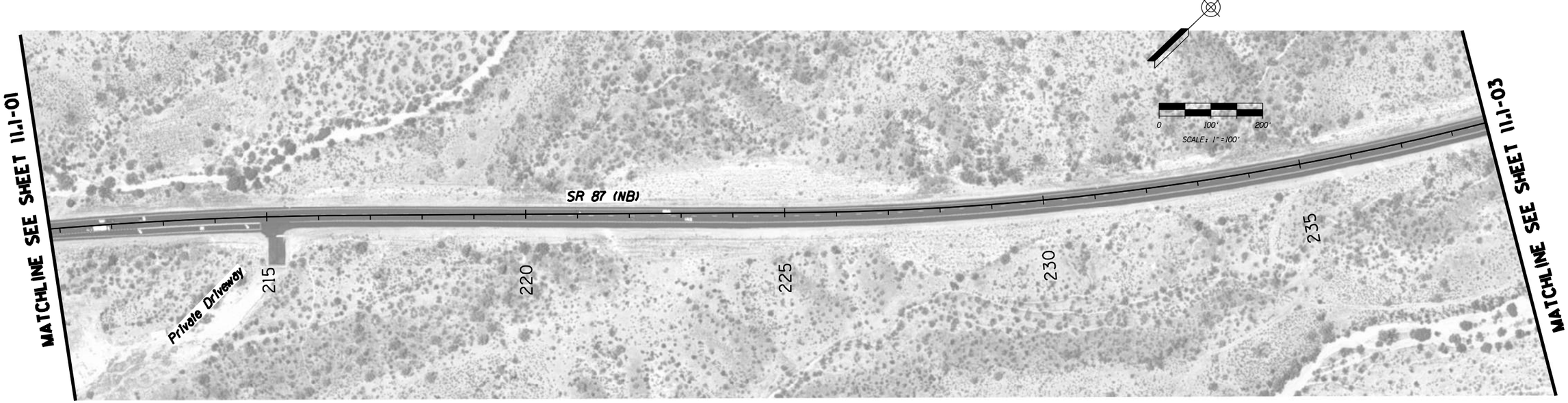
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT #2 CENTRAL DISTRICT
SHOULDER IMPROVEMENTS
MP 196 TO 211

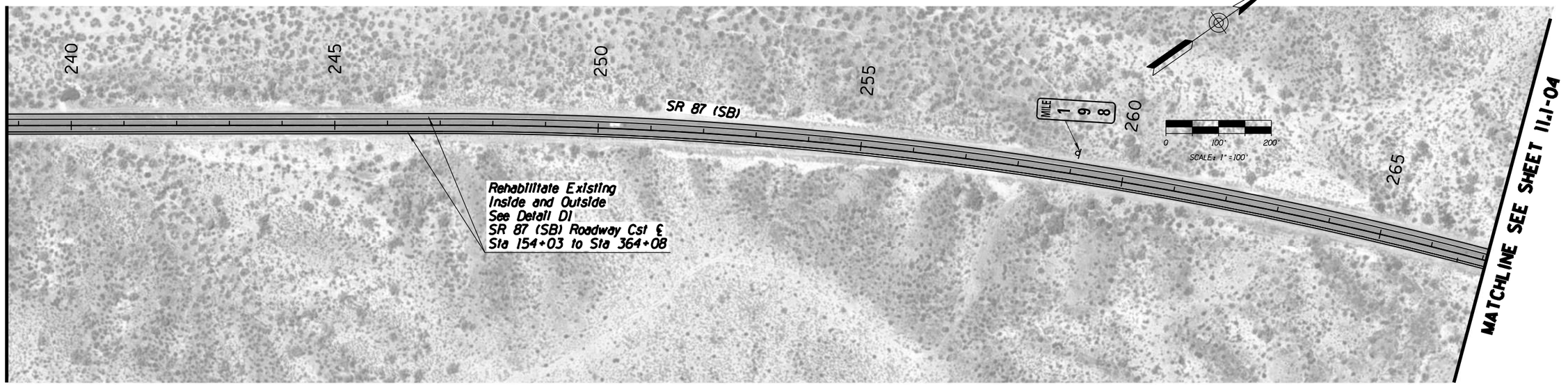
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

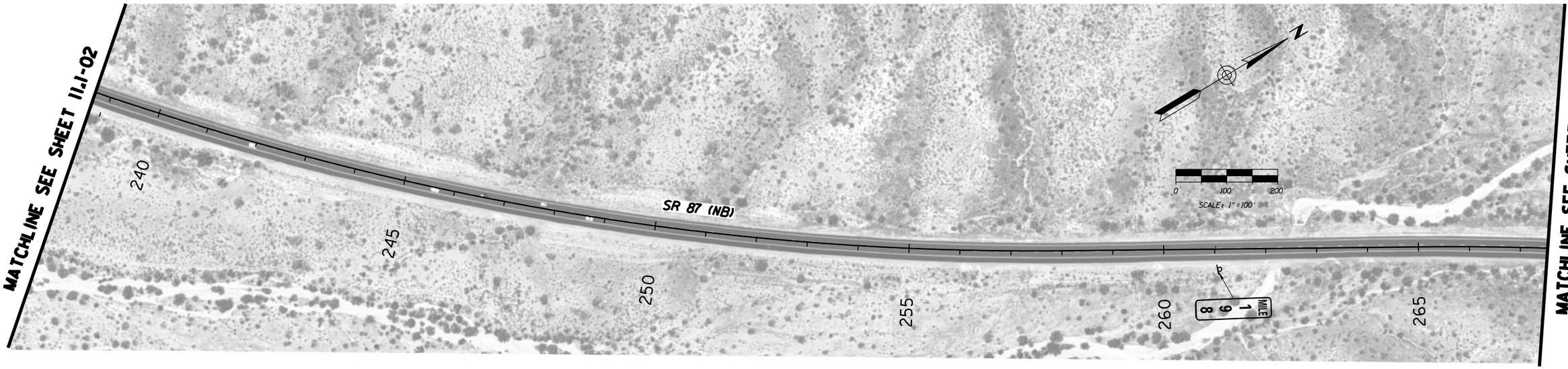
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 11.1-02 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT #2 CENTRAL DISTRICT
SHOULDER IMPROVEMENT
MP 196 TO 211

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 11.1-03 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
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| - | ARIZ. | - | | 59 | |
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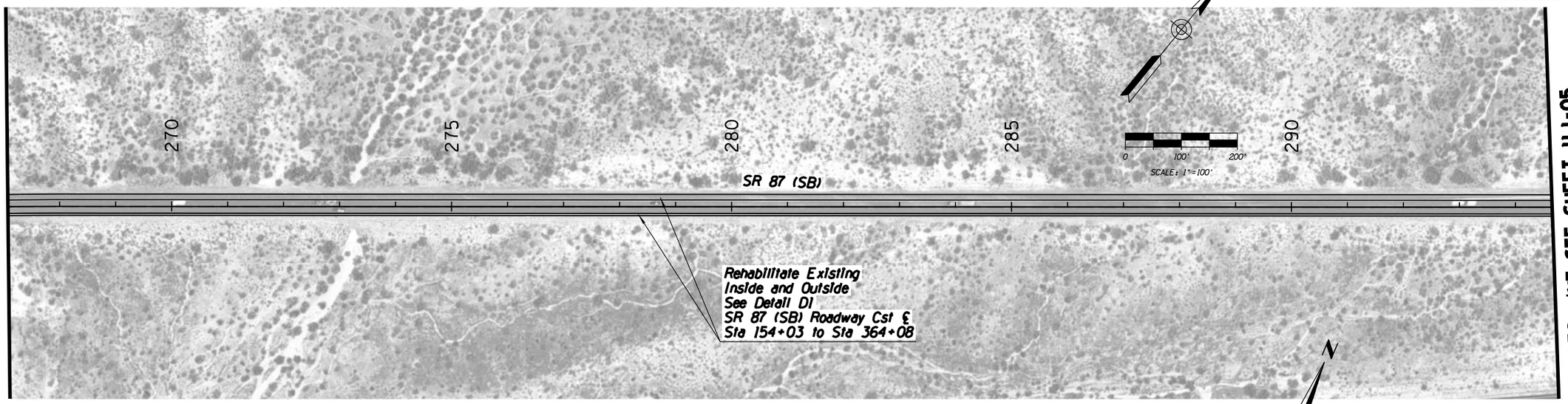


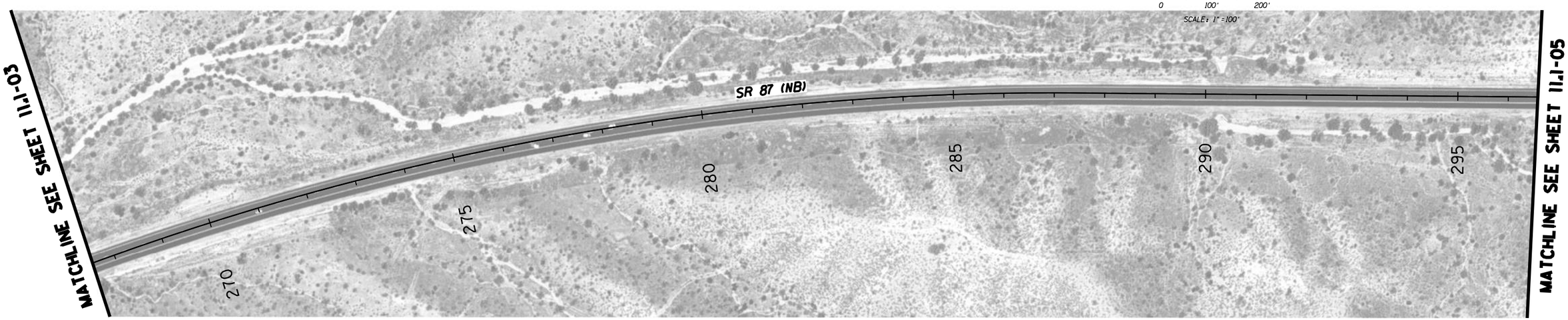


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT #2 CENTRAL DISTRICT
SHOULDER IMPROVEMENT
MP 196 TO 211

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

DWG NO. 11.1-04

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
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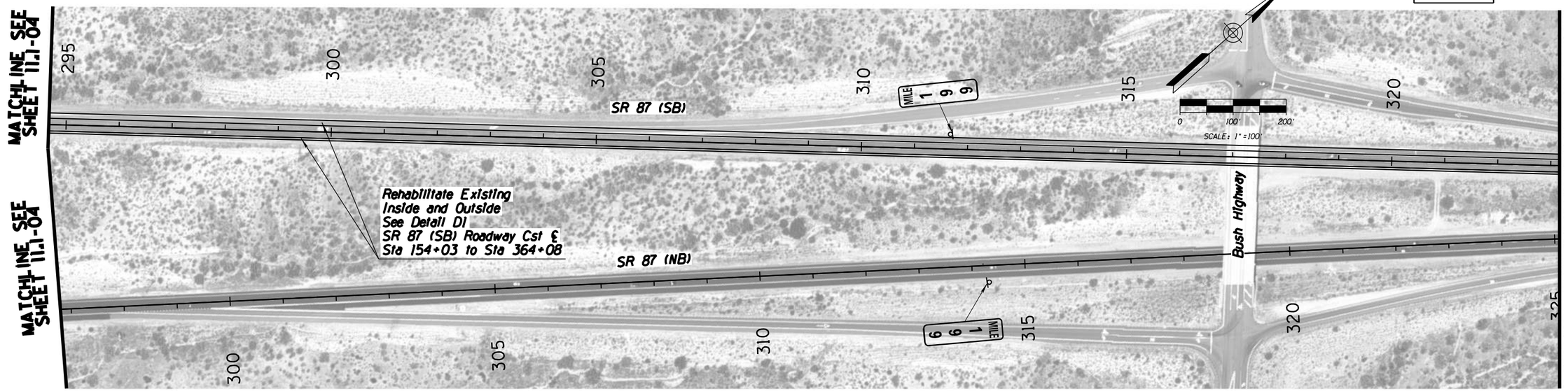


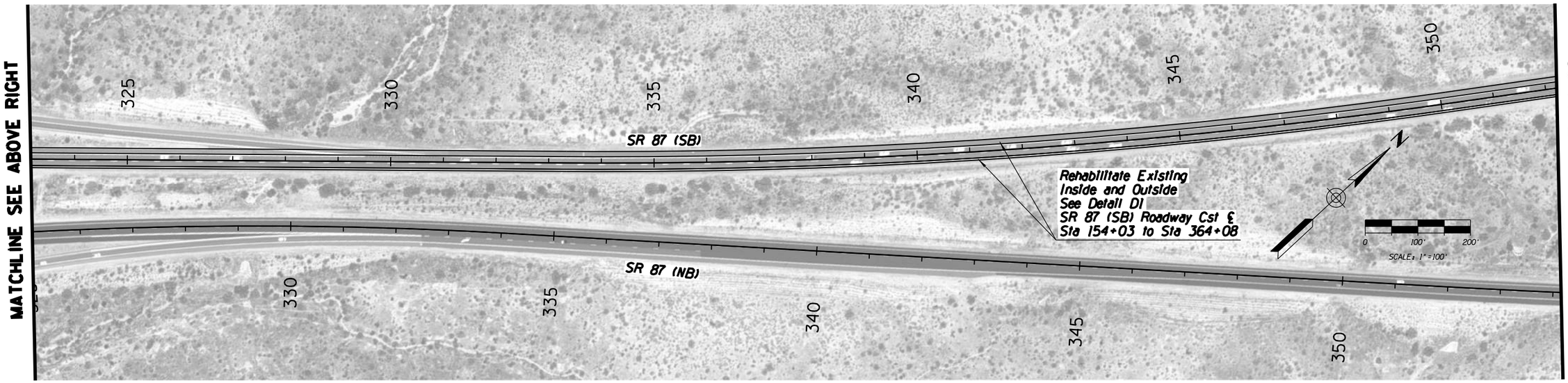


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "2 CENTRAL DISTRICT SHOULDER IMPROVEMENTS MP 196 TO 211

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. 11.1-05

___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
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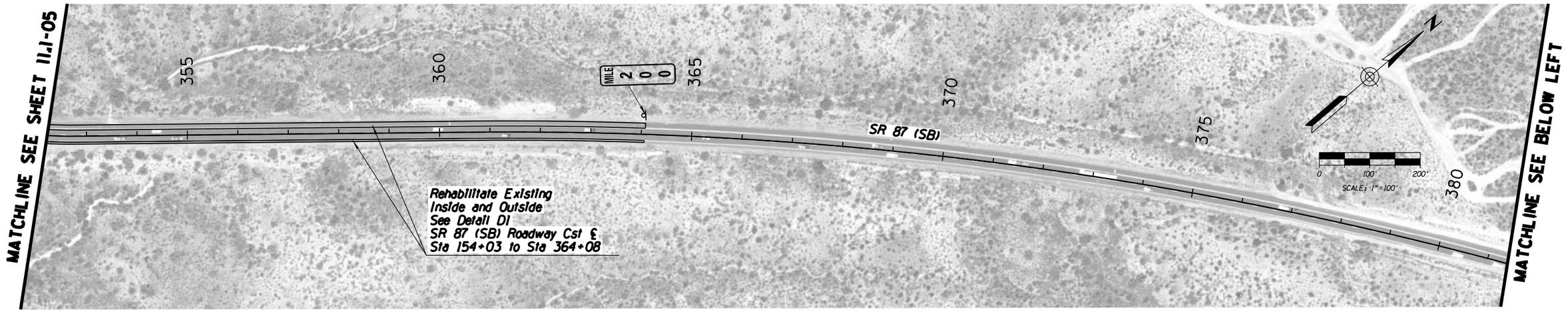


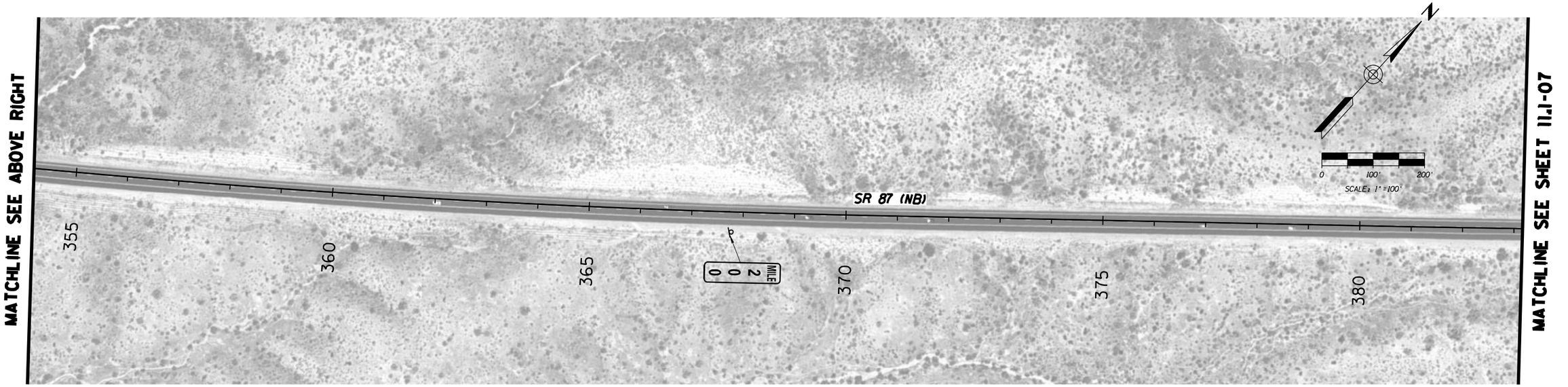


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "2 CENTRAL DISTRICT
SHOULDER IMPROVEMENTS
MP 196 TO 211

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR
CONSTRUCTION
OR RECORDING

DWG NO. 11.1-06

___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
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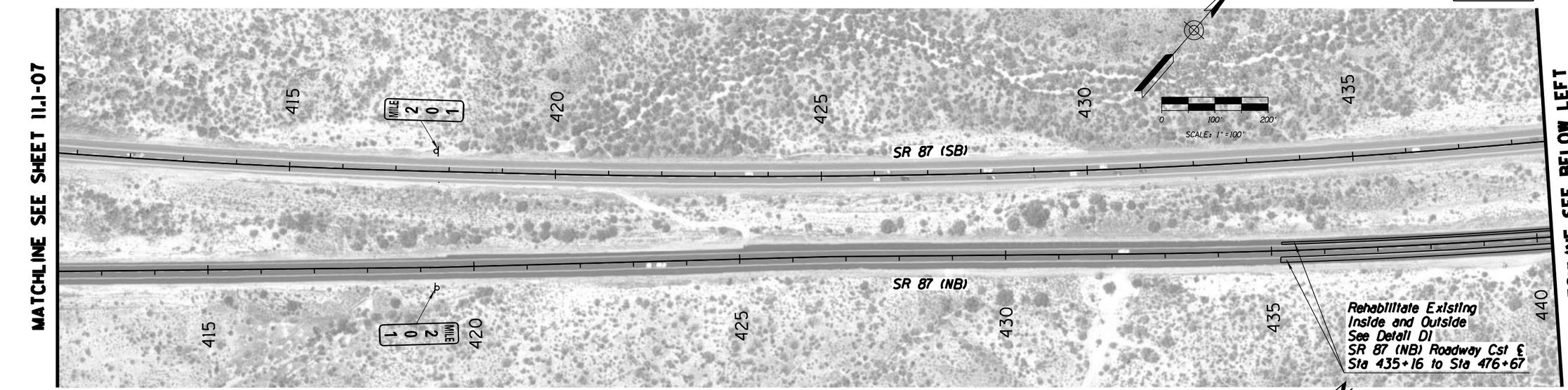
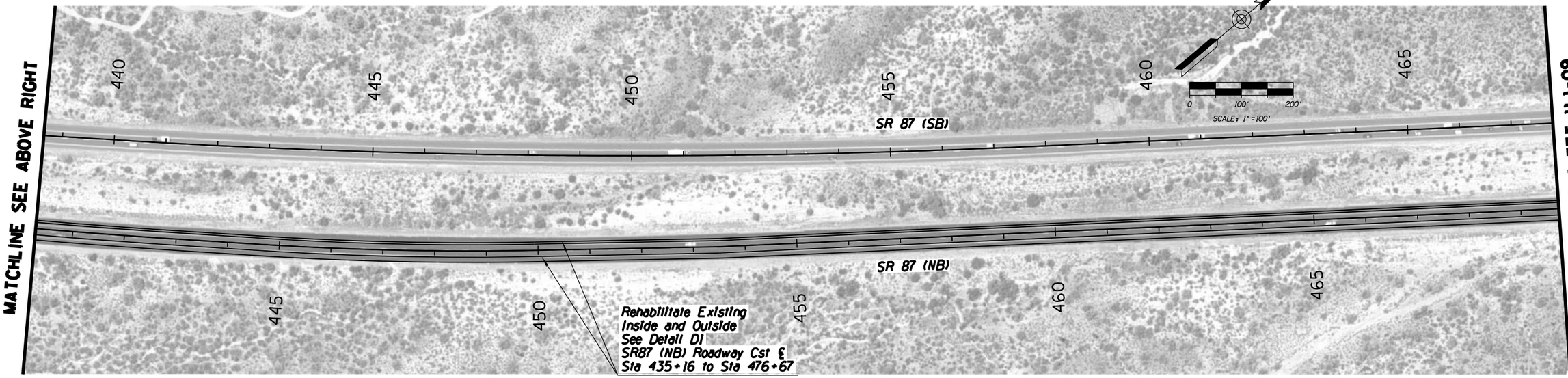



| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "2 CENTRAL DISTRICT
SHOULDER IMPROVEMENTS
MP 196 TO 211

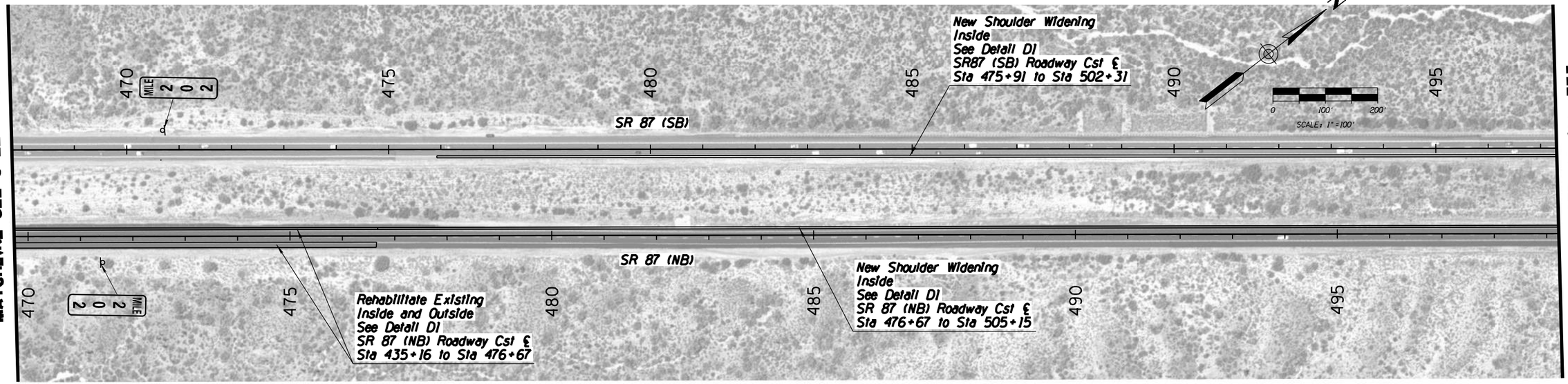
PRELIMINARY
STAGE I
Review
NOT FOR
CONSTRUCTION
OR RECORDING

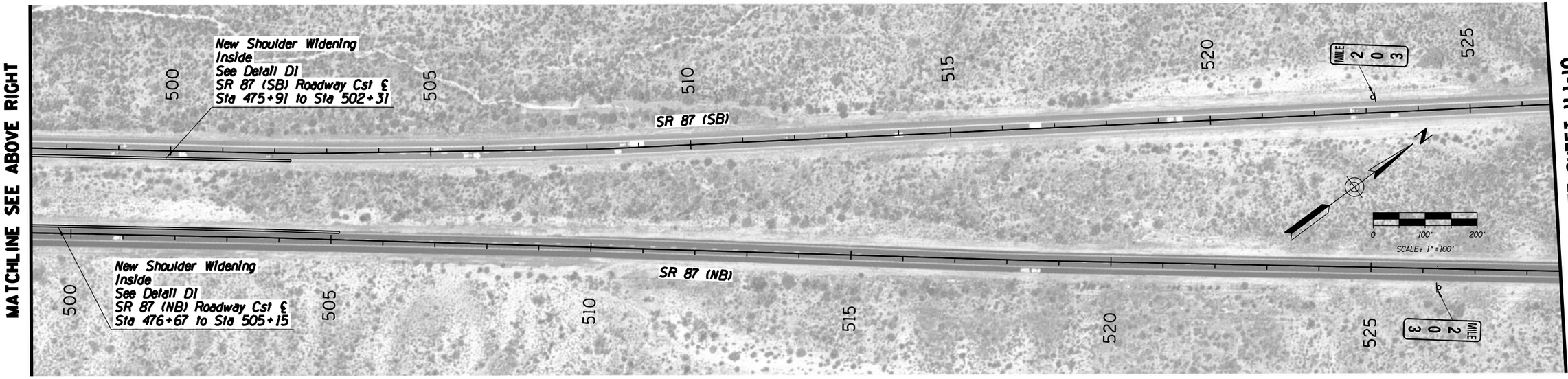
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 11.1-08 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

**PROJECT #2 CENTRAL DISTRICT SHOULDER IMPROVEMENTS MP 196 TO 211**

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

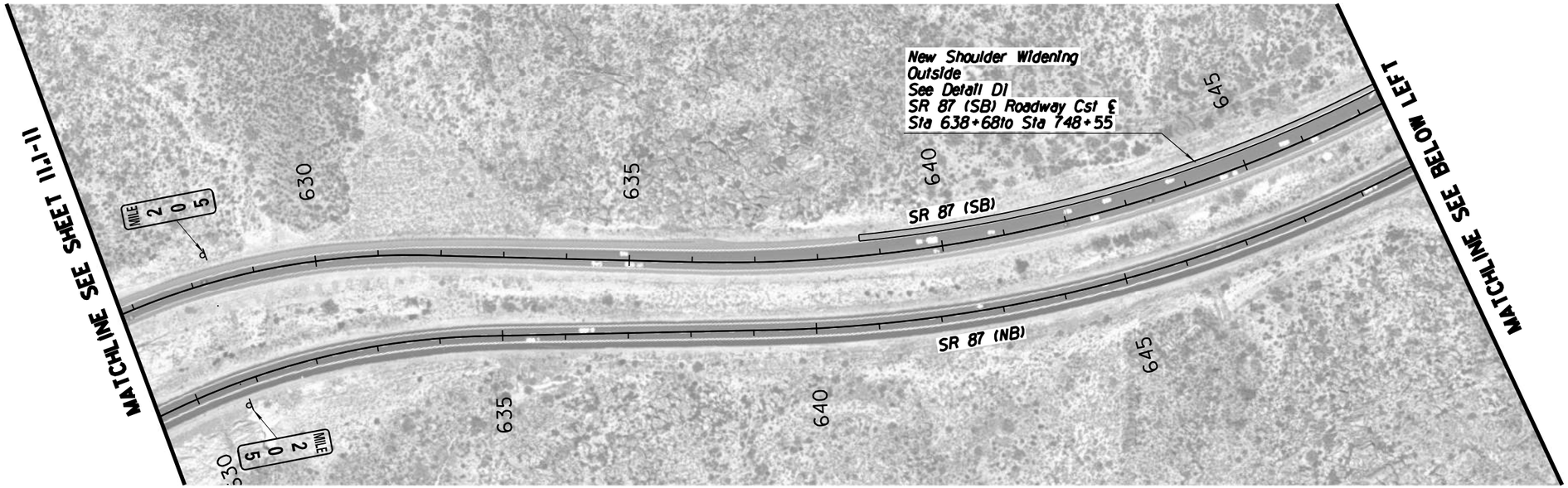
DWG NO. 11.1-09

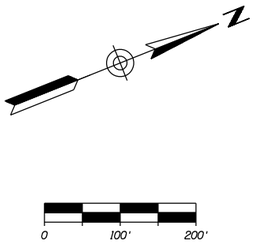
___ OF ___

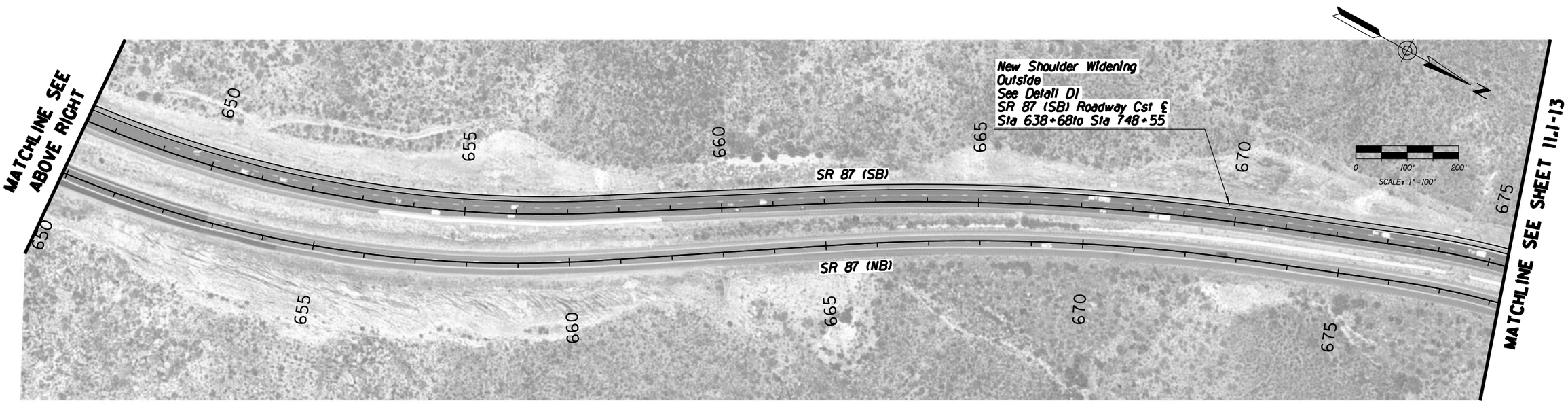
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |







| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT #2 CENTRAL DISTRICT
SHOULDER IMPROVEMENTS
MP 196 TO 211

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

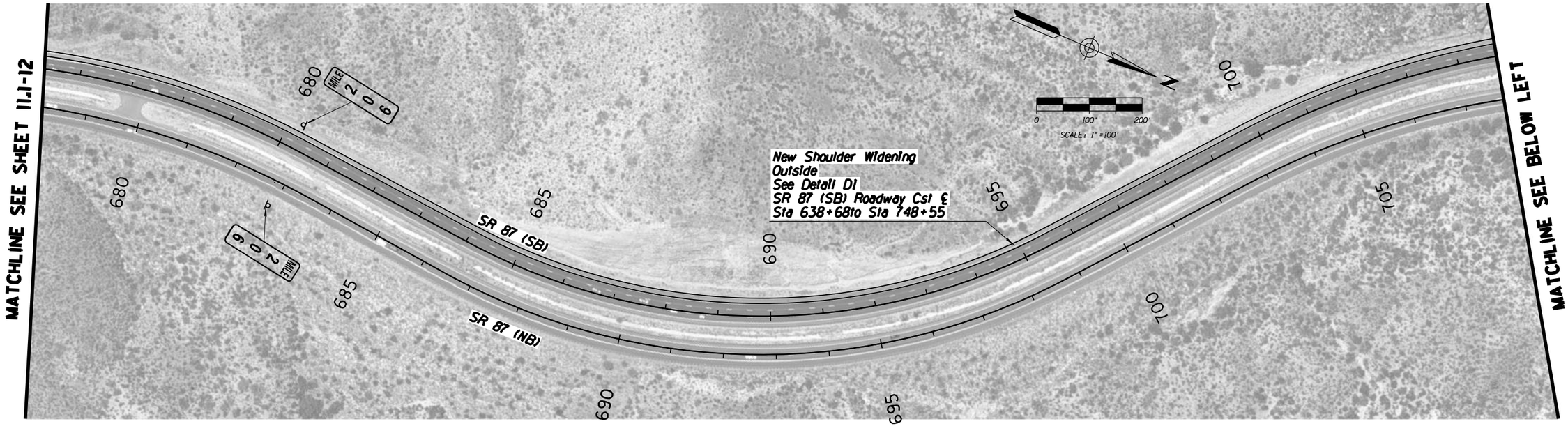
DWG NO. 11.1-12

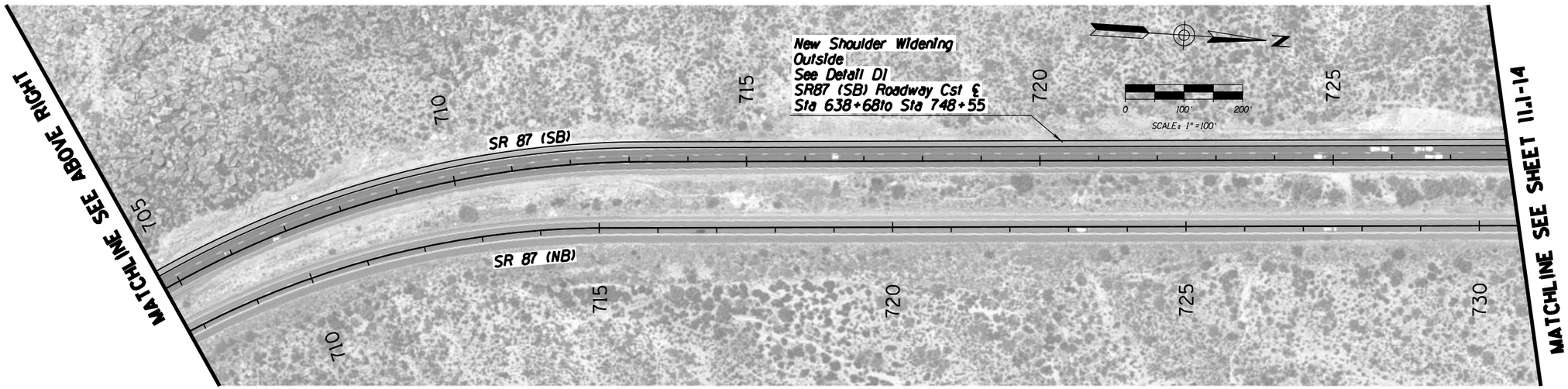
TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT #2 CENTRAL DISTRICT
SHOULDER IMPROVEMENTS
MP 196 TO 211

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

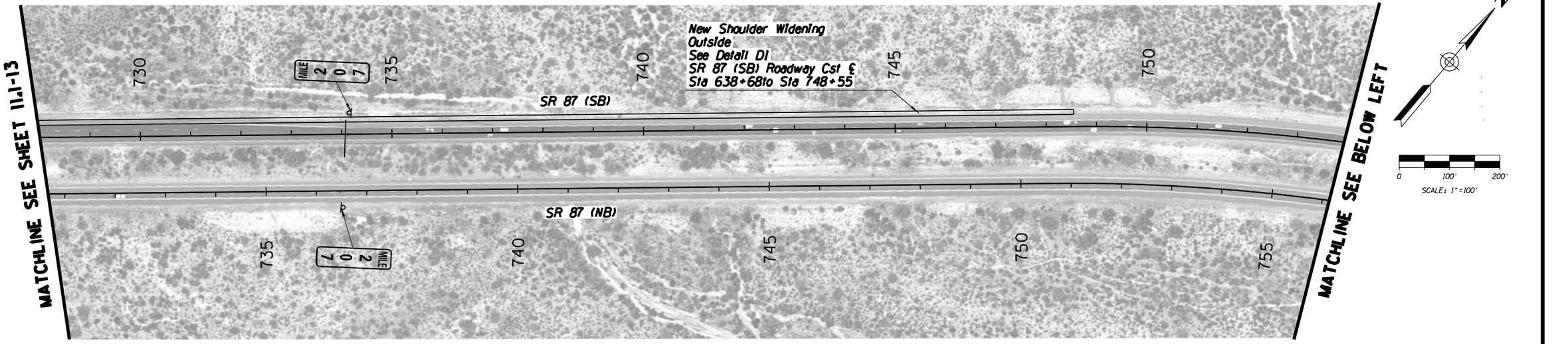
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 11.1-13 |

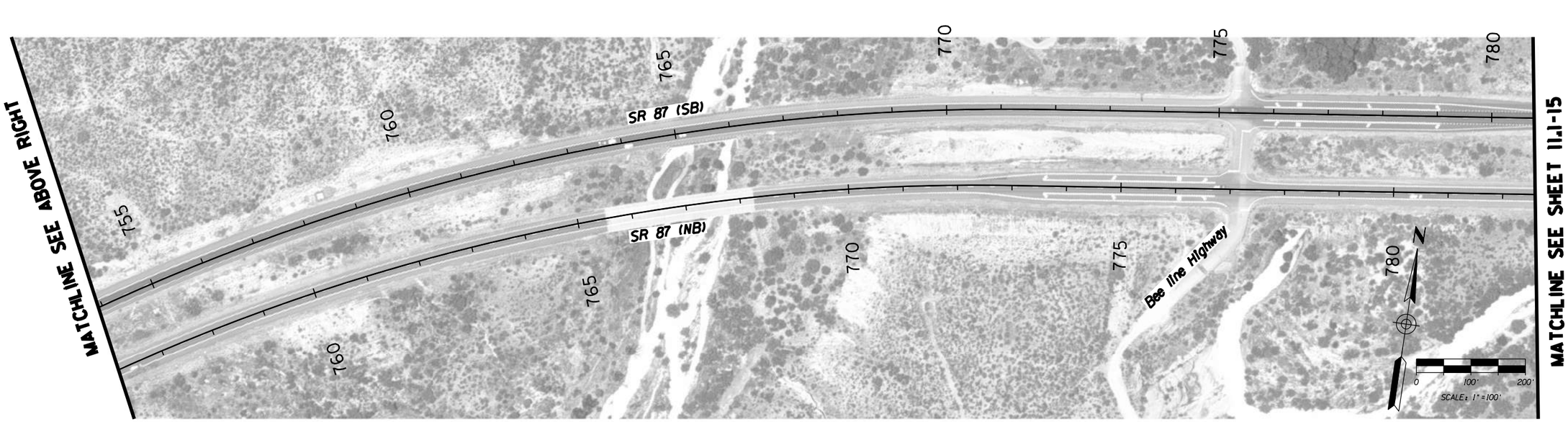
TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT #2 CENTRAL DISTRICT
SHOULDER IMPROVEMENTS
MP 196 TO 211

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

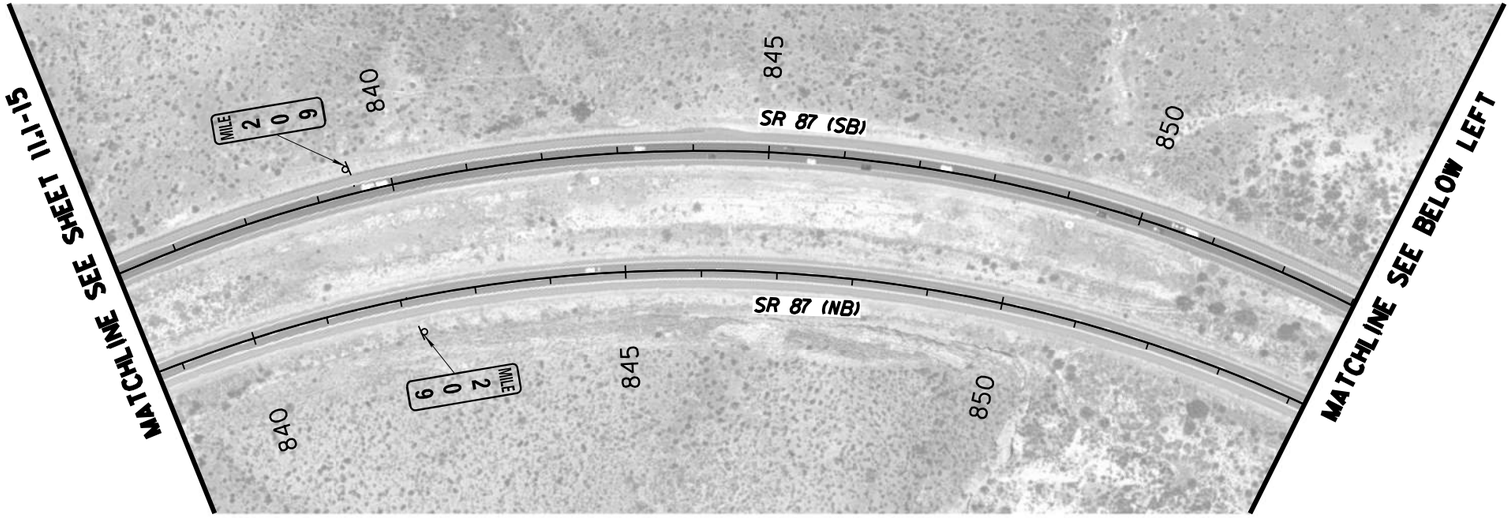
DWG NO. 11.1-14

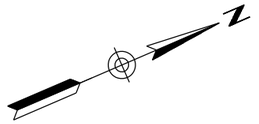
TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

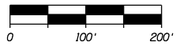
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

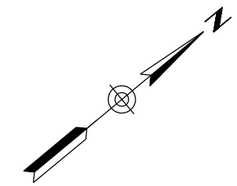


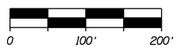




SCALE: 1" = 100'




SCALE: 1" = 100'

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "2 CENTRAL DISTRICT SHOULDER IMPROVEMENTS MP 196 TO 211

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

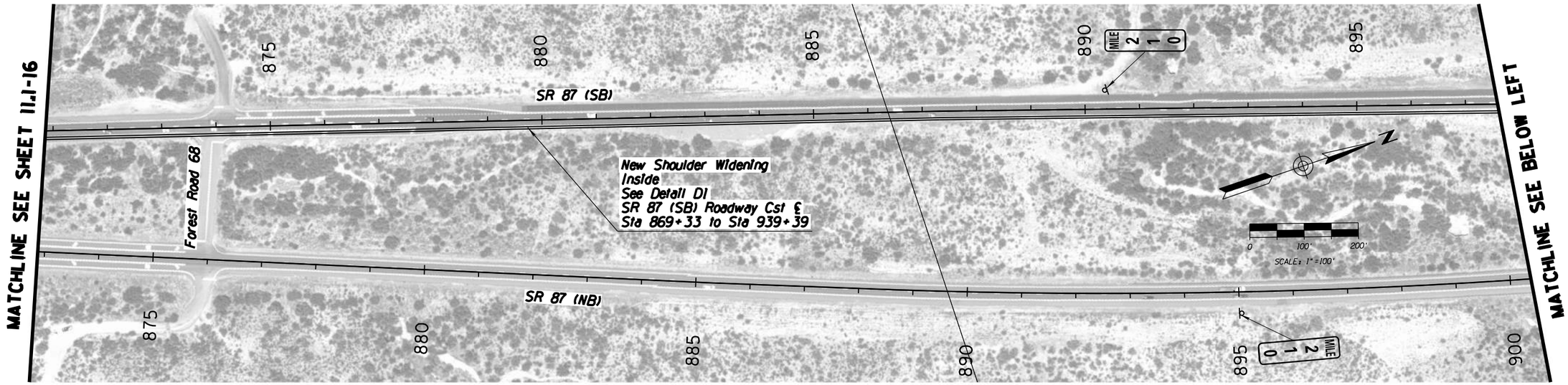
DWG NO. 11.1-16

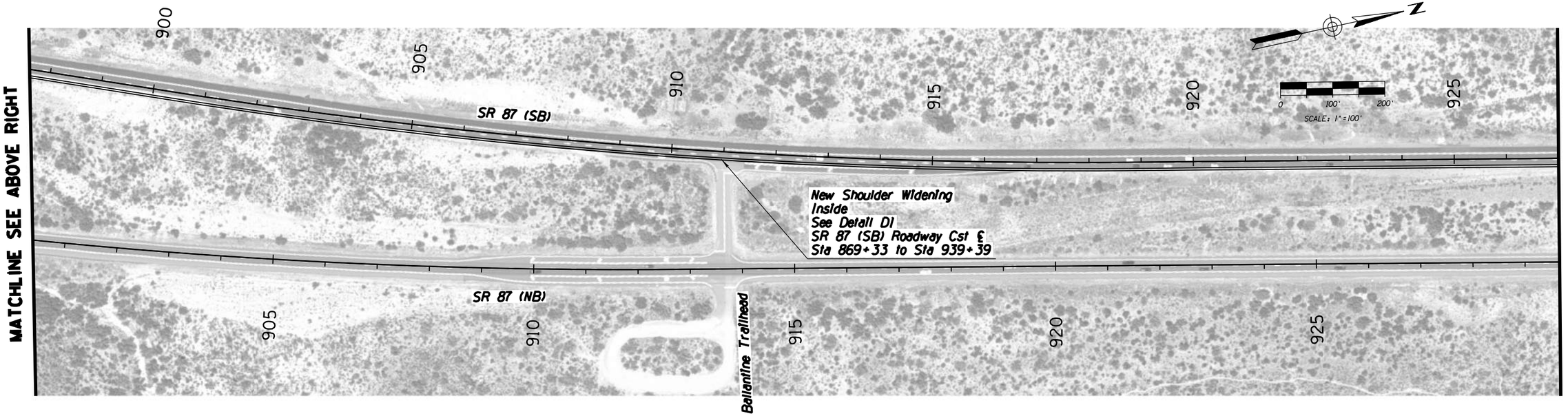
___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT #2 CENTRAL DISTRICT
SHOULDER IMPROVEMENT
MP 196 TO 211

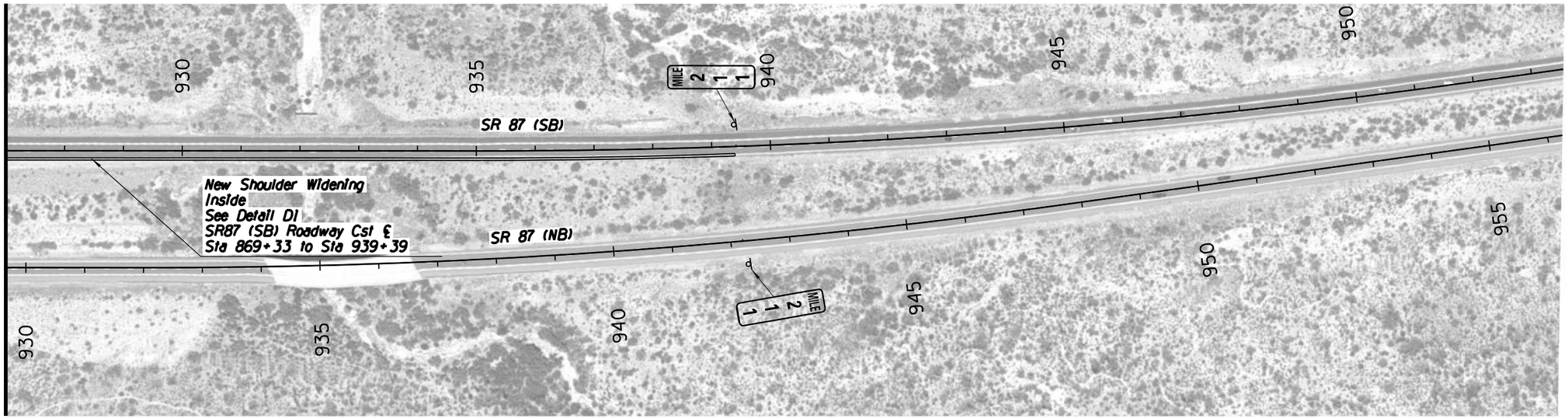
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 11.1-17 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE- | SURVEY NO.

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

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0 100' 200'

SCALE: 1" = 100'

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT #2 CENTRAL DISTRICT
SHOULDER IMPROVEMENTS
MP 196 TO 211

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 11.1-18 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

$TIME$ $DATE$ $USERNAME$ $FILE$

# PACKAGE PROJECT 3 – NORTHBOUND IMPROVEMENTS (MP 212-218)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **ADOT Project Manager:** |
| **Project Name:** Northbound Improvements (MP 212-218) | |
| **City/Town:** N/A | **County:** Maricopa |
| **COG/MPO:** MAG | **ADOT District:** Central |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 212 | |
| **End Limit:** 218 | |
| **Project Length:** 6 Miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☐County ☐ADOT ☐Private ☒Federal ☐Tribal ☐Other | |

| PROJECT NEED |
|---|
| There are large speed differentials in due to the sustained uphill grade, when combined with tight curves causes a safety hazard; two intersections do not have deceleration lanes; substandard shoulder widths in isolated locations. |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☒Expansion |
| Construct a climbing lane to remove slow-moving heavy vehicles from the through traffic lanes, construct site-specific improvements at isolated locations to improve intersection safety and bring shoulders to current standards. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☐Utilities |
| ☐Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>Click or tap here to enter text. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☒HSIP | ☒State |
| | ☐Local | ☐Private | ☐Tribal | ☐Other |

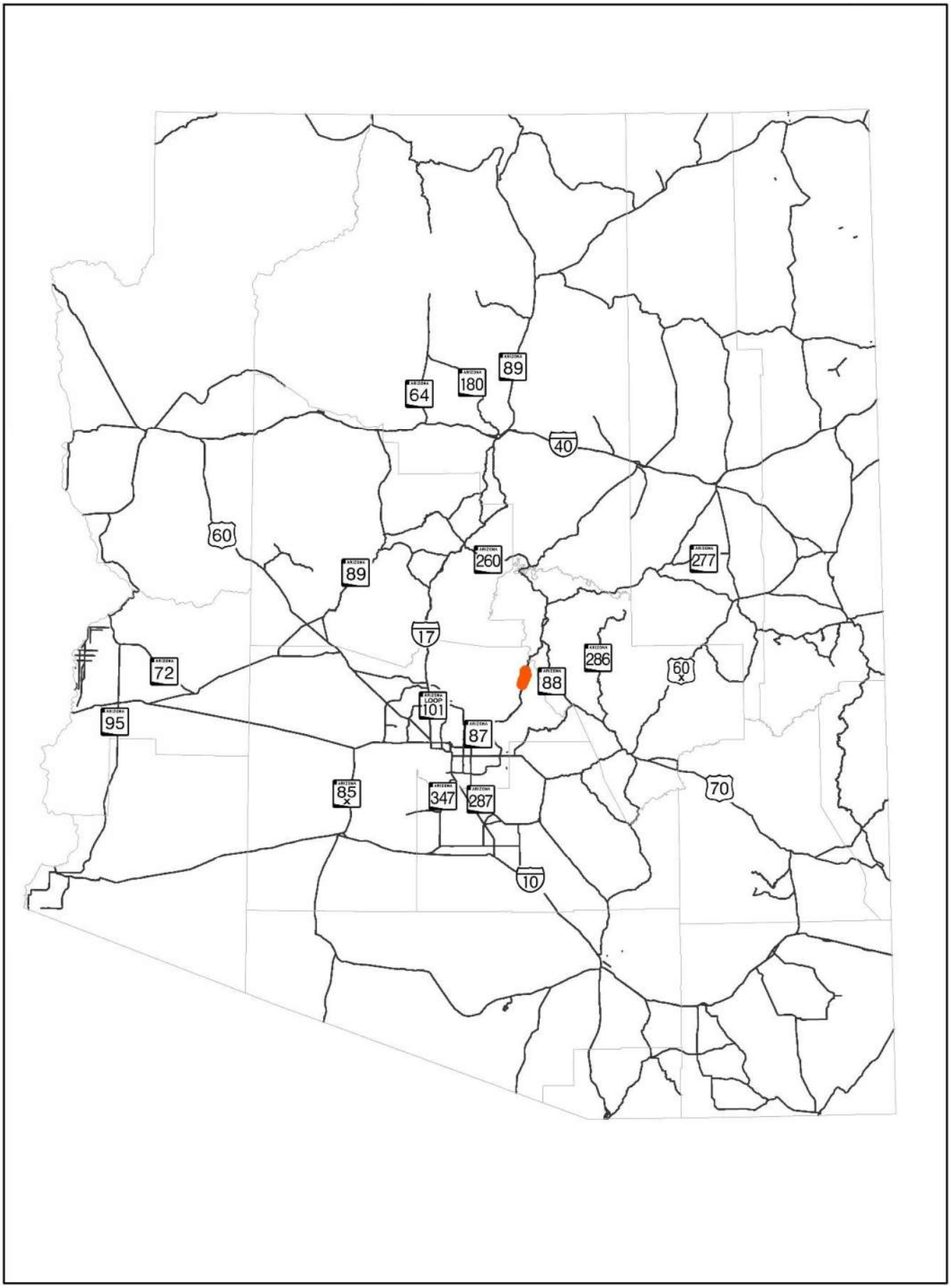
| COST ESTIMATE | | | |
|---|---|---|---|
| Design<br>$887,600.00 | Right-of-Way<br>$0.00 | Construction<br>$11,590,900.00 | Total<br>$12,478,500.00 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

| ATTACHMENTS |
| --- |
| 1. Project Scope of Work<br>2. State Location Map<br>3. Project Vicinity Map<br>4. Itemized Cost Estimate<br>5. Conceptual Design Plans |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Widen northbound inside shoulder to four feet (MP 212.5-213)<br>• Construct left- and right-turn lanes, inside and outside acceleration lanes in both directions at Log Coral Wash (MP 212.7)<br>• Construct northbound climbing lane (MP 213-216.7)<br>• Add guardrail on east side of roadway (MP 213-213.4)<br>• Address drainage issue between SB and NB alignments (MP 216)<br>• Construct northbound left- and southbound right-turn lane (MP 217.5-217.5) |

ATTACHMENT 2: STATE LOCATION MAP



ATTACHMENT 3: PROJECT VICINITY MAP


| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Widen NB inside shoulder to 4’ | 22 | 212.5 | 213 | $450,700 | Current inside shoulder is insufficient width |
| 2. Left- and right-turn/deceleration lanes, inside and outside lanes in both directions at the Log Coral Wash intersection | 23 | 212.7 | 212.7 | $2,330,600 | There are no turn/deceleration lanes at this intersection, there is a high percentage of vehicles with trailers that may warrant acceleration lanes. |
| 3. Construct NB climbing lane | 26 | 213 | 216.7 | $8,973,700 | Approximately 15% of traffic on this segment is heavy commercial vehicles, average speeds are 8 mph under the speed limit, 33% of vehicles are traveling greater than 10 mph under the speed limit, this location is within an identified crash hot spot. |
| 4. Add guardrail on east side of roadway | 27 | 213 | 213.4 | $207,700 | Six crashes occurred on the curve in this section where the vehicle ran off the road to the right and the vehicle overturned |
| 5. Address drainage issue between SB and NB alignments | 35 | 216 | 216 | $50,000 | During rain events, water draining from the southbound alignment seeps through the rock face onto the northbound alignment below, causing water to gather in the outside northbound travel lane. |
| 6. Add NB left-turn and SB right-turn lane | 39 | 217.5 | 217.5 | $465,800 | There are currently no deceleration/turn lanes at this intersection. |
| | | | Total: | $12,478,500 | |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**22. Widen northbound inside shoulder to 4' (MP 212.5)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 233 | $35.00 | $8,155 |
| 2020201 | SAW CUTTING | L.FT. | 2,092 | $2.50 | $5,230 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 3,100 | $10.00 | $31,000 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 698 | $120.00 | $83,760 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 346 | $160.00 | $55,360 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 21 | $120.00 | $2,520 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $2,092.00 | $2,092 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 2,092 | $0.75 | $1,569 |
| | | | **Roadway Construction Subtotal** | | **$203,186** |
| | Unidentified Item Allowance (15%) | | | | $ 30,478 |
| | | | | **Subtotal** | **$233,664** |
| | Water Supply/Dust Palliative (3%) | | | | $ 7,010 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 35,050 |
| | Erosion Control (1%) | | | | $ 2,337 |
| | Contractor Quality Control (2%) | | | | $ 4,674 |
| | Construction Surveying And Layout (2%) | | | | $ 4,674 |
| | | | | **Other Item Subtotal** | **$287,409** |
| | Mobilization (12%) | | | | $ 34,490 |
| | | | | **Construction Subtotal** | **$ 321,899** |
| | Engineering Design (10%) | | | | $ 32,190 |
| | Construction Engineering and Contingencies (20%) | | | | $ 64,380 |
| | Indirect Cost Allocation (10.02%) | | | | $ 32,255 |
| | | | | **Construction Total** | **$ 450,724** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**23. NB LT and RT lanes, inside and outside accel lanes and fix both shoulders at Log Coral Wash (MP 212.7)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 7,702 | $20.00 | $154,040 |
| 2020201 | SAW CUTTING | L.FT. | 4,332 | $2.50 | $10,830 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 3,860 | $10.00 | $38,600 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 3,273 | $60.00 | $196,380 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 2,526 | $80.00 | $202,080 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 204 | $100.00 | $20,400 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $4,332.00 | $4,332 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 4,332 | $0.75 | $3,249 |
| | | | **Roadway Construction Subtotal** | | **$648,411** |
| | Unidentified Item Allowance (15%) | | | | $ 97,262 |
| | | | | **Subtotal** | **$745,673** |
| | Water Supply/Dust Palliative (3%) | | | | $ 22,371 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 111,851 |
| | Erosion Control (1%) | | | | $ 7,457 |
| | Contractor Quality Control (2%) | | | | $ 14,914 |
| | Construction Surveying And Layout (2%) | | | | $ 14,914 |
| | | | | **Other Item Subtotal** | **$917,180** |
| | Mobilization (12%) | | | | $ 110,062 |
| | | | | **Construction Subtotal** | **$ 1,027,242** |
| | Engineering Design (10%) | | | | $ 102,725 |
| | Construction Engineering and Contingencies (20%) | | | | $ 205,449 |
| | Indirect Cost Allocation (10.02%) | | | | $ 102,930 |
| | | | | **Construction Total** | **$ 1,438,346** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**23. Southbound left- and right-turn lanes, inside and outside acceleration lanes and fix both shoulders at Log Coral Wash (MP 21**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 3,792 | $20.00 | $75,840 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 800 | $5.00 | $4,000 |
| 2020201 | SAW CUTTING | L.FT. | 2,133 | $2.50 | $5,333 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 1,900 | $10.00 | $19,000 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 1,578 | $60.00 | $94,680 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 1,188 | $120.00 | $142,560 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 95 | $120.00 | $11,400 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $2,133.00 | $2,133 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 800 | $30.00 | $24,000 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 2 | $2,500.00 | $5,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 2 | $800.00 | $1,600 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 2,133 | $0.75 | $1,600 |
| | | | **Roadway Construction Subtotal** | | **$402,245** |
| | Unidentified Item Allowance (15%) | | | | $ 60,337 |
| | | | | **Subtotal** | **$462,582** |
| | Water Supply/Dust Palliative (3%) | | | | $ 13,878 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 69,388 |
| | Erosion Control (1%) | | | | $ 4,626 |
| | Contractor Quality Control (2%) | | | | $ 9,252 |
| | Construction Surveying And Layout (2%) | | | | $ 9,252 |
| | | | | **Other Item Subtotal** | **$568,978** |
| | Mobilization (12%) | | | | $ 68,278 |
| | | | | **Construction Subtotal** | **$ 637,256** |
| | Engineering Design (10%) | | | | $ 63,726 |
| | Construction Engineering and Contingencies (20%) | | | | $ 127,452 |
| | Indirect Cost Allocation (10.02%) | | | | $ 63,854 |
| | | | | **Construction Total** | **$ 892,289** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**26. Construct northbound climbing lane (MP 213-216.7)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 14 | $5,000.00 | $70,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 2,231 | $20.00 | $44,620 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 5,019 | $5.00 | $25,095 |
| 2020201 | SAW CUTTING | L.FT. | 20,076 | $2.50 | $50,190 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 1,490 | $10.00 | $14,900 |
| 2030901 | BORROW | CU.YD. | 148,720 | $12.00 | $1,784,640 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 14,128 | $50.00 | $706,400 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 10,698 | $80.00 | $855,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 856 | $90.00 | $77,040 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $20,076.00 | $20,076 |
| 8050003 | SEEDING (CLASS II) | ACRE | 14 | $3,500.00 | $49,000 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 10,038 | $30.00 | $301,140 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 6 | $2,500.00 | $15,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 6 | $800.00 | $4,800 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 20,076 | $0.75 | $15,057 |
| | | | **Roadway Construction Subtotal** | | **$4,045,398** |
| | Unidentified Item Allowance (15%) | | | | $ 606,810 |
| | | | | **Subtotal** | **$4,652,208** |
| | Water Supply/Dust Palliative (3%) | | | | $ 139,567 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 697,832 |
| | Erosion Control (1%) | | | | $ 46,523 |
| | Contractor Quality Control (2%) | | | | $ 93,045 |
| | Construction Surveying And Layout (2%) | | | | $ 93,045 |
| | | | | **Other Item Subtotal** | **$5,722,220** |
| | Mobilization (12%) | | | | $ 686,667 |
| | | | | **Construction Subtotal** | **$ 6,408,887** |
| | Engineering Design (10%) | | | | $ 640,889 |
| | Construction Engineering and Contingencies (20%) | | | | $ 1,281,778 |
| | Indirect Cost Allocation (10.02%) | | | | $ 642,171 |
| | | | | **Construction Total** | **$ 8,973,725** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**27. Add guardrail on right (east) side of roadway (MP 213-213.4)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 950 | $10.00 | $9,500 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 2,135 | $30.00 | $64,050 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 2 | $2,500.00 | $5,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 2 | $800.00 | $1,600 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| | | | **Roadway Construction Subtotal** | | **$93,650** |
| | Unidentified Item Allowance (15%) | | | | $ 14,048 |
| | | | | **Subtotal** | **$107,698** |
| | Water Supply/Dust Palliative (3%) | | | | $ 3,231 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 16,155 |
| | Erosion Control (1%) | | | | $ 1,077 |
| | Contractor Quality Control (2%) | | | | $ 2,154 |
| | Construction Surveying And Layout (2%) | | | | $ 2,154 |
| | | | | **Other Item Subtotal** | **$132,469** |
| | Mobilization (12%) | | | | $ 15,897 |
| | | | | **Construction Subtotal** | **$ 148,366** |
| | Engineering Design (10%) | | | | $ 14,837 |
| | Construction Engineering and Contingencies (20%) | | | | $ 29,674 |
| | Indirect Cost Allocation (10.02%) | | | | $ 14,867 |
| | | | | **Construction Total** | **$ 207,744** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**39. Add northbound left-turn lane (MP 217.5)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 61 | $35.00 | $2,135 |
| 2020201 | SAW CUTTING | L.FT. | 541 | $2.50 | $1,353 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 490 | $10.00 | $4,900 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 381 | $120.00 | $45,720 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 289 | $160.00 | $46,240 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 24 | $120.00 | $2,880 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $541.00 | $541 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 181 | $30.00 | $5,430 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 1 | $2,500.00 | $2,500 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 1 | $800.00 | $800 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 541 | $1.50 | $812 |
| | | | **Roadway Construction Subtotal** | | **$126,810** |
| | Unidentified Item Allowance (15%) | | | | $ 19,022 |
| | | | | **Subtotal** | **$145,832** |
| | Water Supply/Dust Palliative (3%) | | | | $ 4,375 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 21,875 |
| | Erosion Control (1%) | | | | $ 1,459 |
| | Contractor Quality Control (2%) | | | | $ 2,917 |
| | Construction Surveying And Layout (2%) | | | | $ 2,917 |
| | | | | **Other Item Subtotal** | **$179,375** |
| | Mobilization (12%) | | | | $ 21,525 |
| | | | | **Construction Subtotal** | **$ 200,900** |
| | Engineering Design (10%) | | | | $ 20,090 |
| | Construction Engineering and Contingencies (20%) | | | | $ 40,180 |
| | Indirect Cost Allocation (10.02%) | | | | $ 20,131 |
| | | | | **Construction Total** | **$ 281,301** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

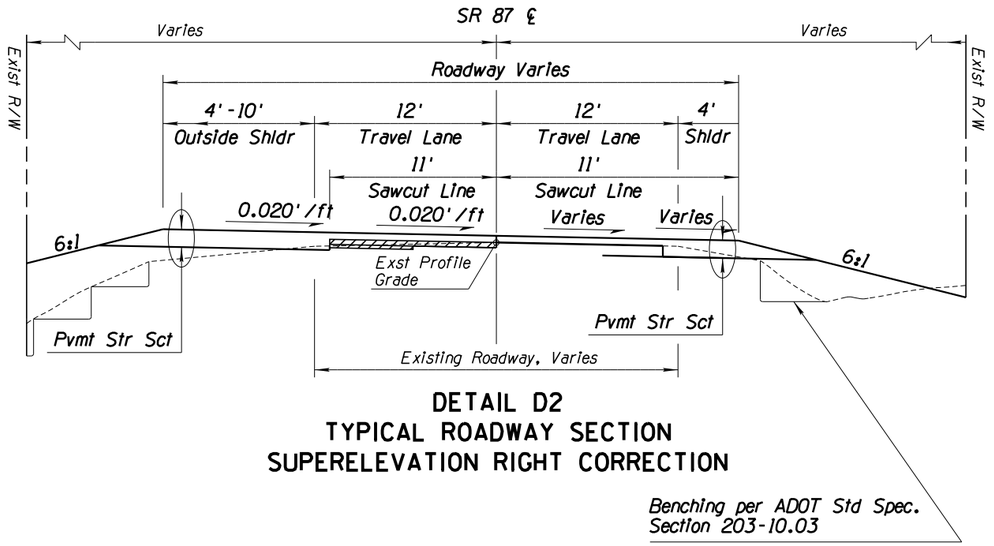
**39. Southbound right-turn lane (MP 217.5)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 61 | $35.00 | $2,135 |
| 2020201 | SAW CUTTING | L.FT. | 541 | $2.50 | $1,353 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 490 | $10.00 | $4,900 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 261 | $120.00 | $31,320 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 169 | $160.00 | $27,040 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 13 | $120.00 | $1,560 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $541.00 | $541 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 541 | $1.50 | $812 |
| | | | **Roadway Construction Subtotal** | | **$83,160** |
| | Unidentified Item Allowance (15%) | | | | $ 12,474 |
| | | | | **Subtotal** | **$95,634** |
| | Water Supply/Dust Palliative (3%) | | | | $ 2,870 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 14,346 |
| | Erosion Control (1%) | | | | $ 957 |
| | Contractor Quality Control (2%) | | | | $ 1,913 |
| | Construction Surveying And Layout (2%) | | | | $ 1,913 |
| | | | | **Other Item Subtotal** | **$117,633** |
| | Mobilization (12%) | | | | $ 14,116 |
| | | | | **Construction Subtotal** | **$ 131,749** |
| | Engineering Design (10%) | | | | $ 13,175 |
| | Construction Engineering and Contingencies (20%) | | | | $ 26,350 |
| | Indirect Cost Allocation (10.02%) | | | | $ 13,202 |
| | | | | **Construction Total** | **$ 184,476** |

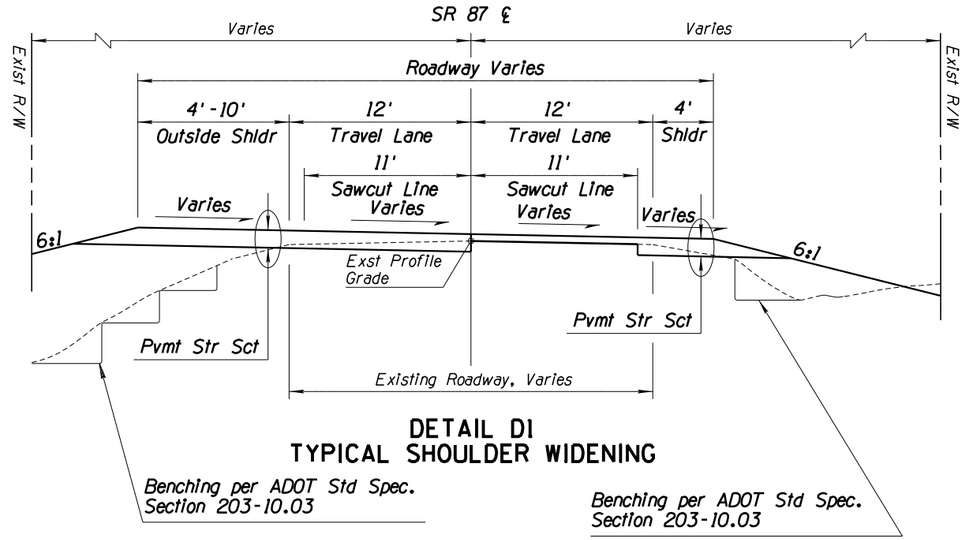
ATTACHMENT 5: PRELIMINARY PLANS

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

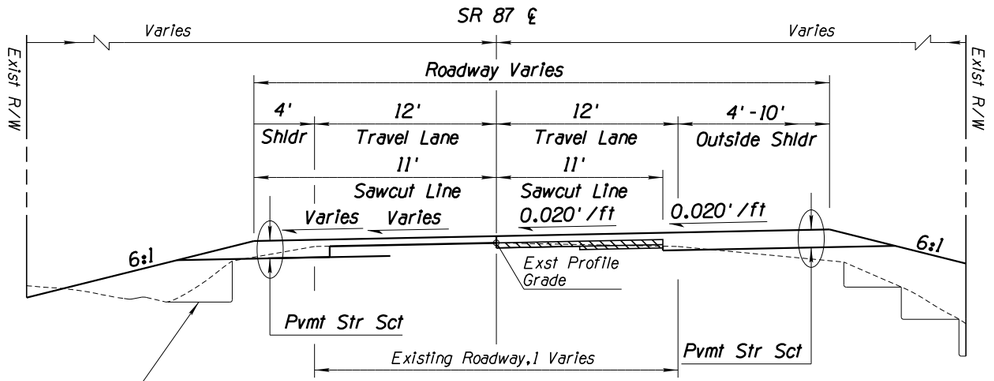
| SR 87 MILE POST STATION | | | |
|---|---|---|---|
| MP NB | STATION | MP SB | STATION |
| 196 | 101+73 | 196 | 101+18 |
| 197 | 155+53 | 197 | 154+02 |
| 198 | 207+69 | 198 | 207+94 |
| 199 | 261+02 | 199 | 259+13 |
| 200 | 314+21 | 200 | 311+72 |
| 201 | 367+73 | 201 | 364+06 |
| 202 | 419+18 | 202 | 417+81 |
| 203 | 471+36 | 203 | 470+65 |
| 204 | 526+28 | 204 | 523+10 |
| 205 | 577+70 | 205 | 575+84 |
| 206 | 630+73 | 206 | 628+30 |
| 207 | 682+81 | 207 | 680+28 |
| 208 | 736+47 | 208 | 734+12 |
| 209 | 788+55 | 209 | 786+62 |
| 210 | 842+08 | 210 | 839+50 |
| 211 | 894+91 | 211 | 890+40 |
| 212 | 942+20 | 212 | 939+42 |
| 213 | 998+65 | 213 | 995+55 |
| 214 | 1051+86 | 214 | 1050+06 |
| 215 | 1105+38 | 215 | 1095+77 |
| 216 | 1158+68 | 216 | 1147+95 |
| 217 | 1213+92 | 217 | 1199+48 |
| 218 | 1268+31 | 218 | 1250+20 |
| 219 | 1318+19 | 219 | 1304+12 |
| 220 | 1374+67 | 220 | 1359+76 |
| 221 | 1427+95 | 221 | 1412+99 |
| 222 | 1480+60 | 222 | 1465+84 |
| 223 | 1533+97 | 223 | 1518+89 |
| 224 | 1584+61 | 224 | 1570+72 |
| 225 | 1639+50 | 225 | 1625+29 |
| 226 | 1689+86 | 226 | 1676+32 |
| 227 | 1740+23 | 227 | 1726+14 |
| 228 | 1792+50 | 228 | 1778+04 |
| 229 | 1845+24 | 229 | 1831+98 |
| 230 | 1898+50 | 230 | 1884+70 |
| 231 | 1949+61 | 231 | 1933+71 |
| 232 | 1999+33 | 232 | 1985+29 |
| 233 | 2047+74 | 233 | 2033+06 |
| 234 | 2101+13 | 234 | 2085+05 |
| 235 | 2154+59 | 235 | 2137+29 |
| 236 | 2207+09 | 236 | 2189+44 |
| 237 | 2259+88 | 237 | 2240+86 |
| 238 | 2311+66 | 238 | 2293+85 |
| 239 | 2364+28 | 239 | 2344+91 |
| 240 | 2416+01 | 240 | 2397+41 |
| 241 | 2467+79 | 241 | 2448+96 |
| 242 | 2518+51 | 242 | 2496+68 |
| 243 | 2571+26 | 243 | 2549+70 |
| 244 | 2620+38 | 244 | 2601+82 |
| 245 | 2677+47 | 245 | 2655+01 |
| 246 | 2729+53 | 246 | 2703+04 |
| 247 | 2741+30 | 247 | 2747+68 |
| 248 | 2794+18 | 248 | 2801+15 |
| 249 | 2847+25 | 249 | 2854+41 |
| 250 | 2899+69 | 250 | 2906+58 |



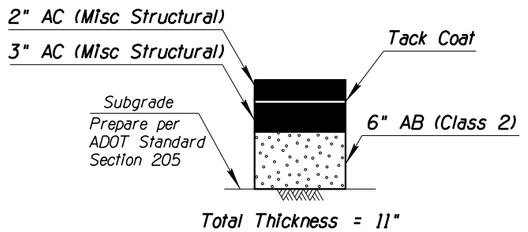

## DETAIL D2
## TYPICAL ROADWAY SECTION SUPERELEVATION RIGHT CORRECTION




## DETAIL D1
## TYPICAL SHOULDER WIDENING




## DETAIL D3
## TYPICAL ROADWAY SECTION SUPERELEVATION LEFT CORRECTION




Total Thickness = 11"

## PAVEMENT STRUCTURAL SECTION

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | ___ OF ___ |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | |

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

10:28:19 AM 9/5/2019 TERRY.RADDEMAN K:\TUC_TPTO\291199004-ADOT SR 87 CORRIDOR DEV STUDY\TASKS\TASK 4 - FEASIBILITY REPORT\CADD\DETAILS.DGN

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
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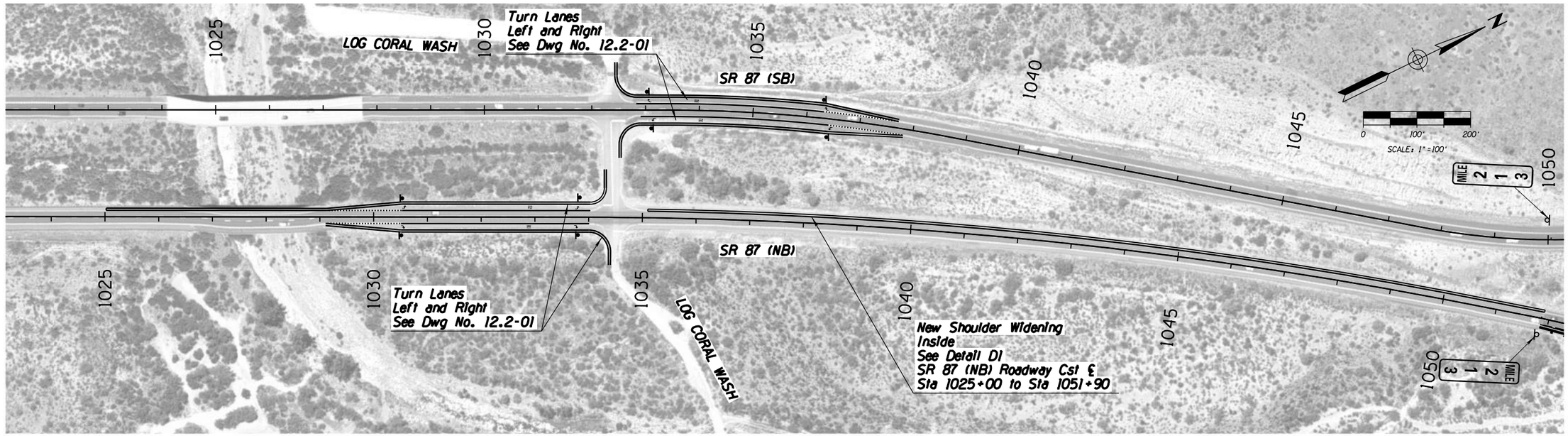


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "3 NB IMPROVEMENTS
MP 212 TO 218

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 12.1-01 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
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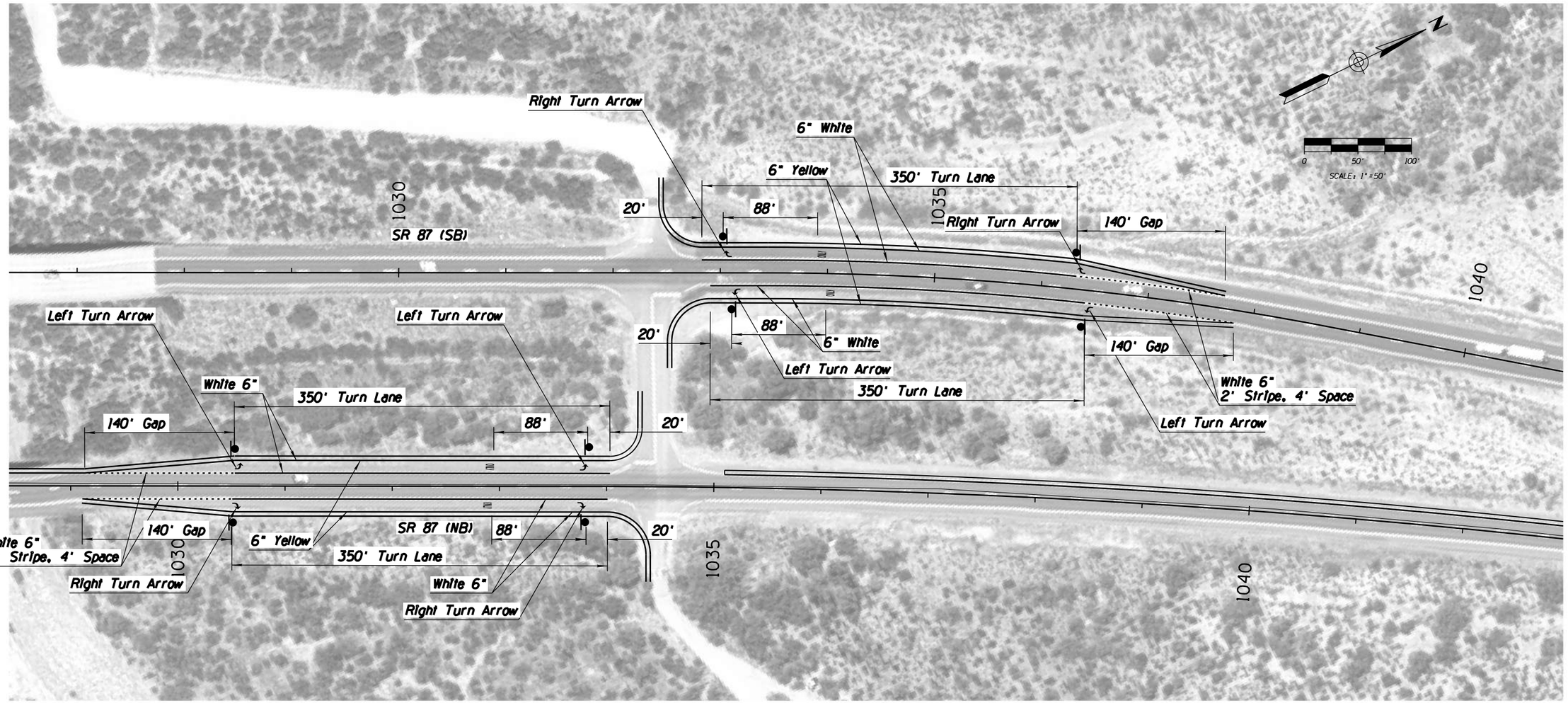


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "3 NB IMPROVEMENTS
MP 212 TO 218

ROUTE: SR 87
LOCATION: MP 190 TO MP 250

TRACS NO. XXXXX XXX

XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. 12.2-01

___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
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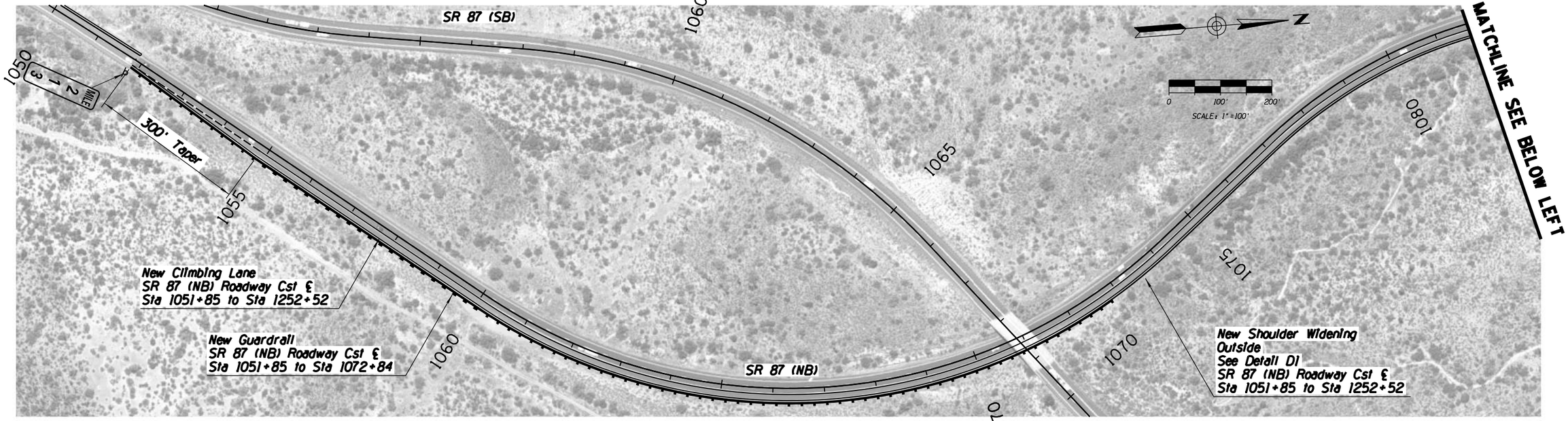


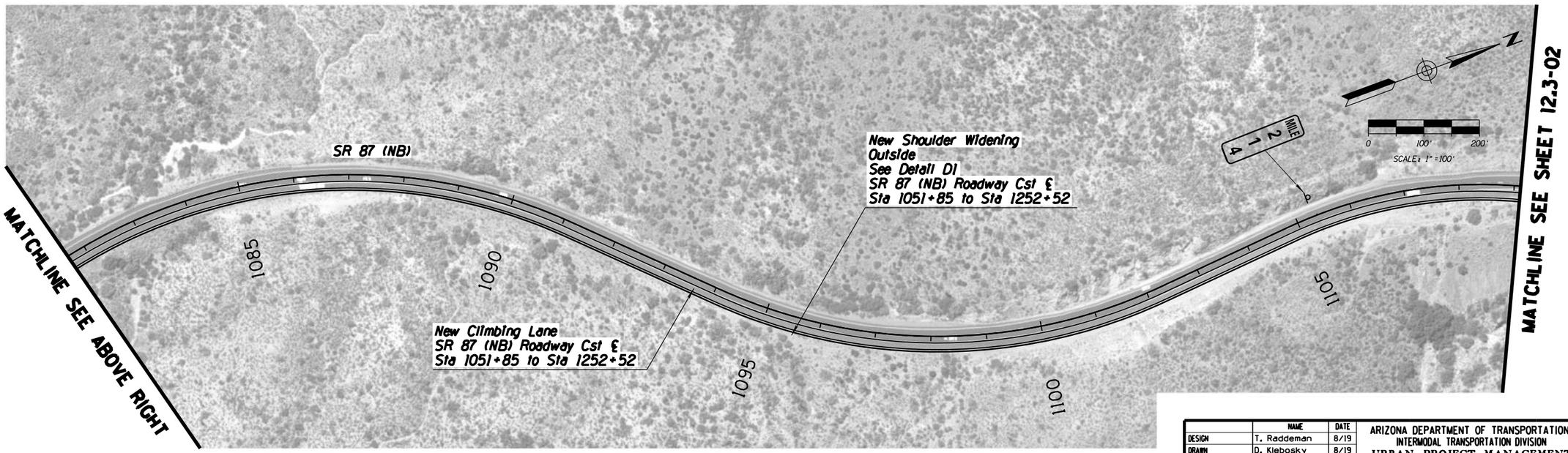


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "3 NB IMPROVEMENTS
MP 212 TO 218

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 12.3-01 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
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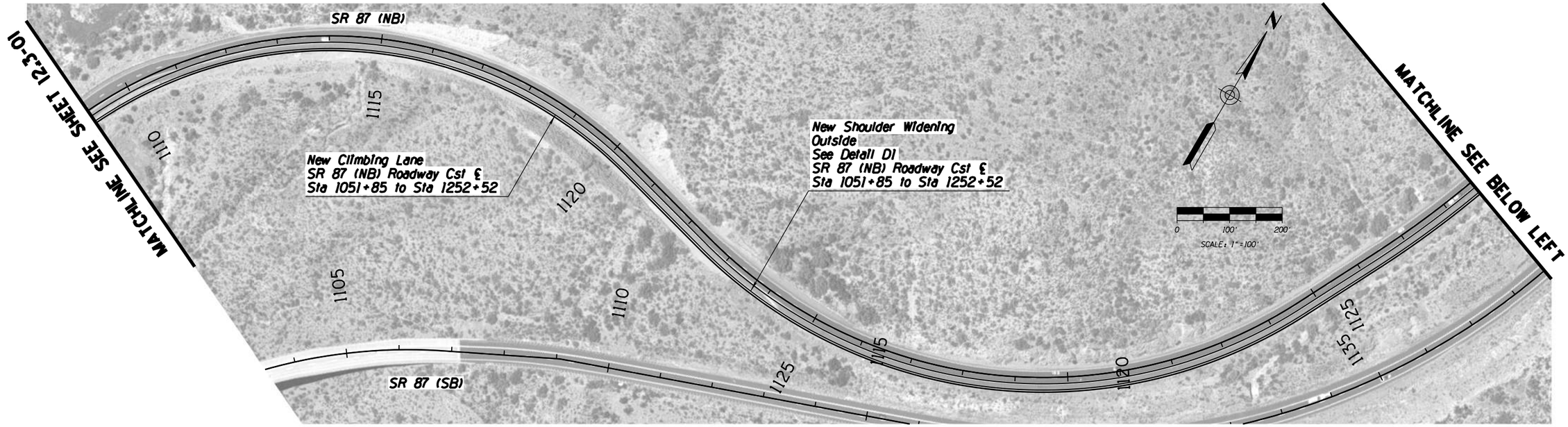


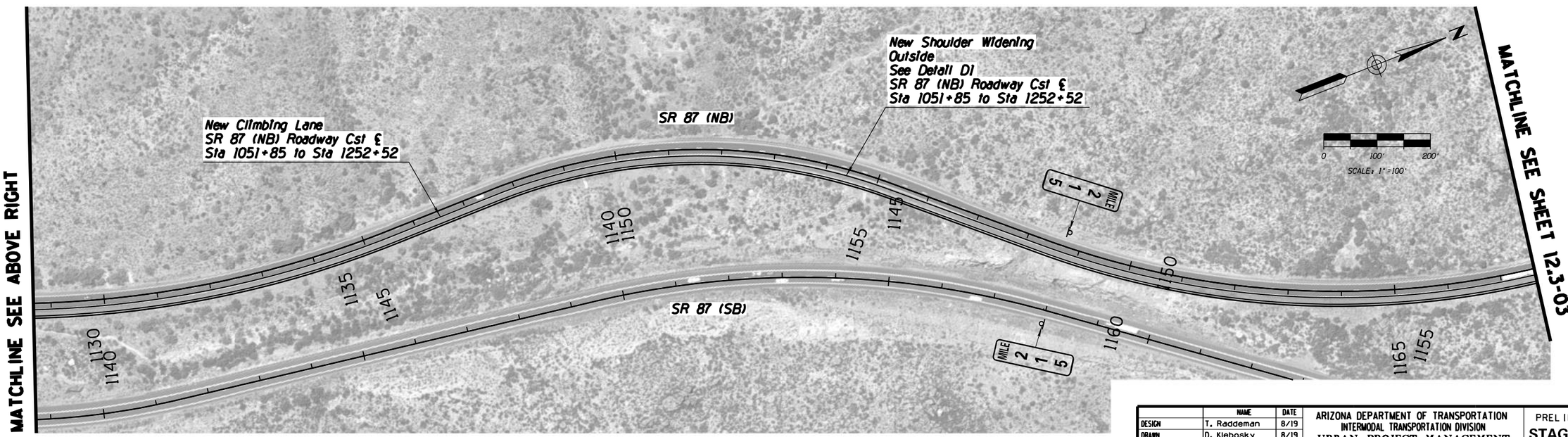


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "3 NB IMPROVEMENTS
MP 212 TO 218

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

DWG NO. 12.3-02

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
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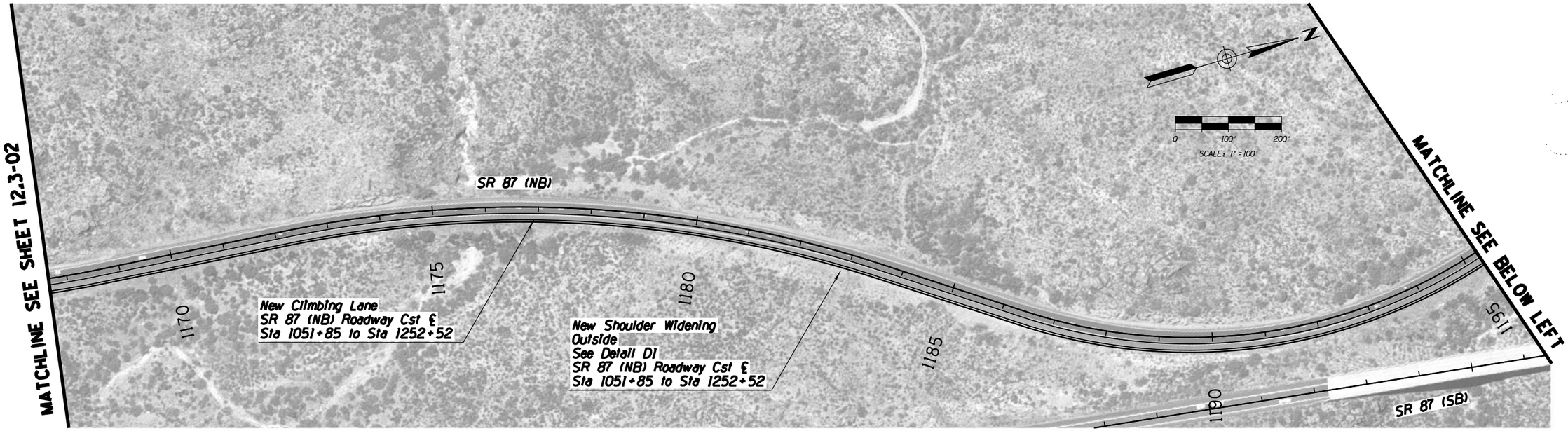


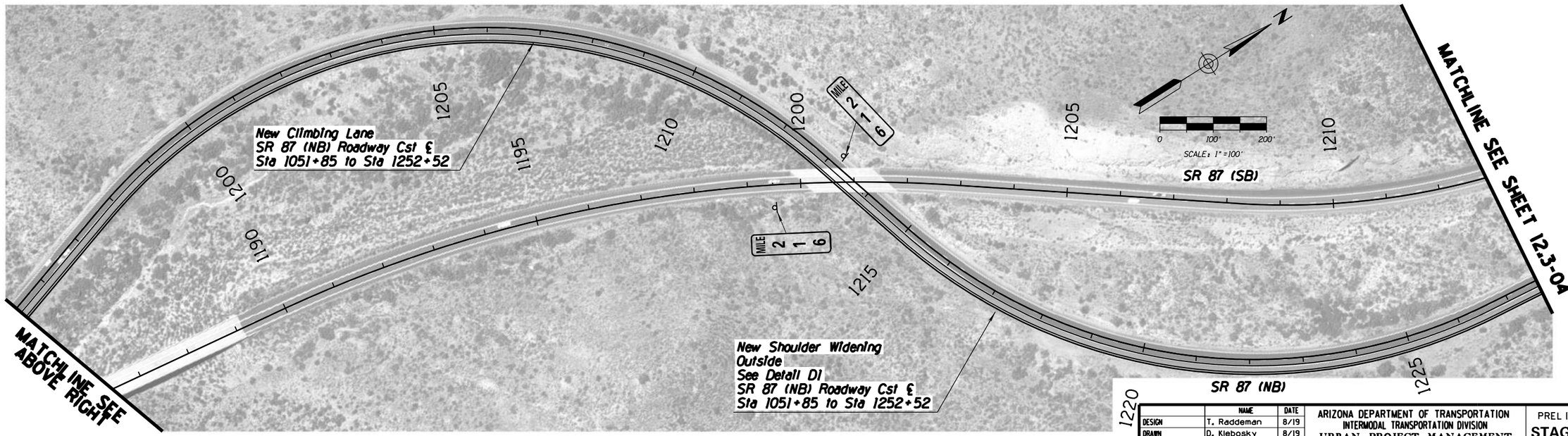


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "3 NB IMPROVEMENTS
MP 212 TO 218

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. 12.3-03

___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
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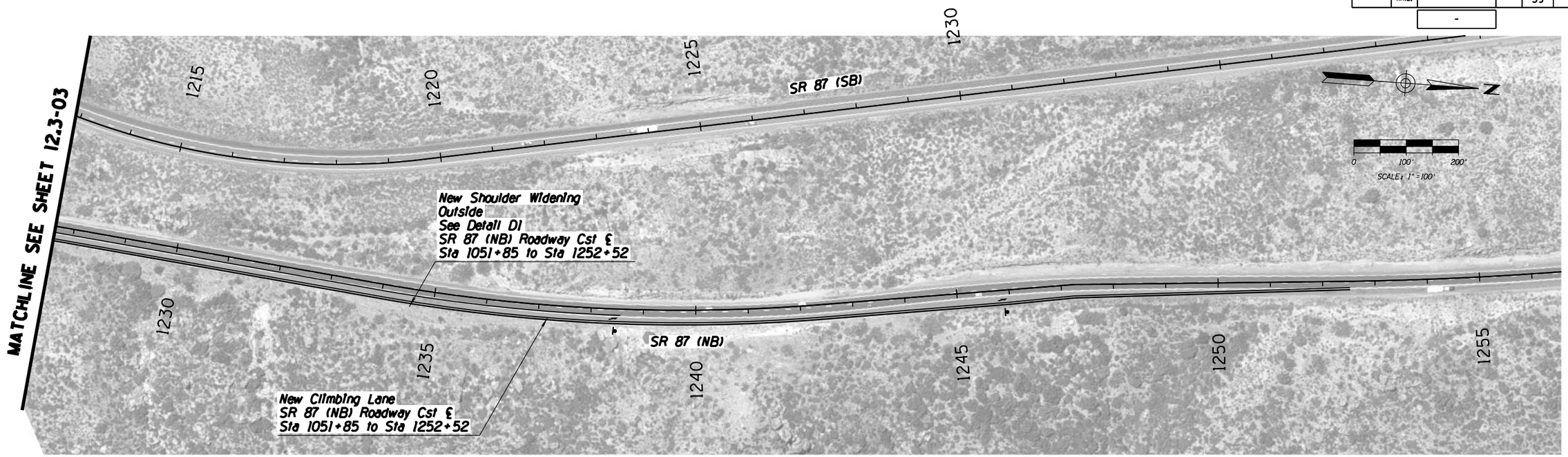


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "3 NB IMRPOVEMENTS
MP 212 TO 218

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

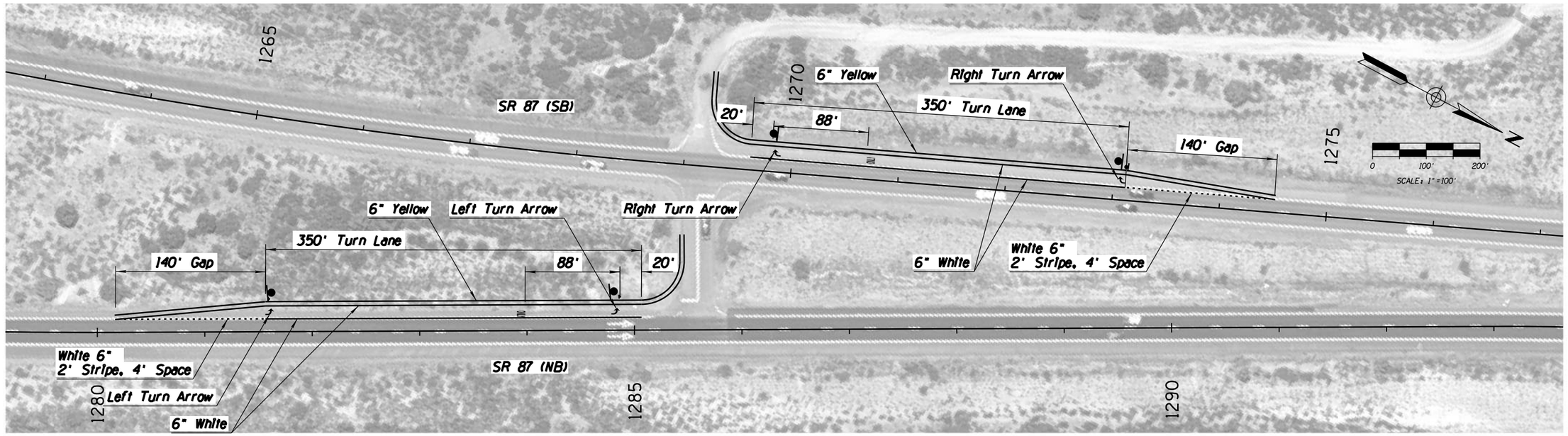
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 12.3-04 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | SS | 8/19 |
| DRAWN | CEM | 8/19 |
| CHECKED | RLK | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "3 NB IMPROVEMENTS
MP 212 TO 218

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 12.5-01 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

# PACKAGE PROJECT 4 – CENTRAL DISTRICT ROCK-FALL MITIGATION (MP 213-218)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **ADOT Project Manager:** |
| **Project Name:** Central District Rock-Fall Mitigation | |
| **City/Town:** N/A | **County:** Maricopa |
| **COG/MPO:** MAG | **ADOT District:** Central |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 214 | |
| **End Limit:** 218 | |
| **Project Length:** 4 Miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☐County ☐ADOT ☐Private ☒Federal ☐Tribal ☐Other | |

| PROJECT NEED |
|---|
| Erosion and rock-fall issues between MP 214 and 218 causing recurring maintenance issues and debris-related crashes |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☐Expansion |
| Mitigate rock-fall issues. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☐Utilities |
| ☐Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>Click or tap here to enter text. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☐HSIP | ☒State |
| | ☐Local | ☐Private | ☐Tribal | ☐Other |

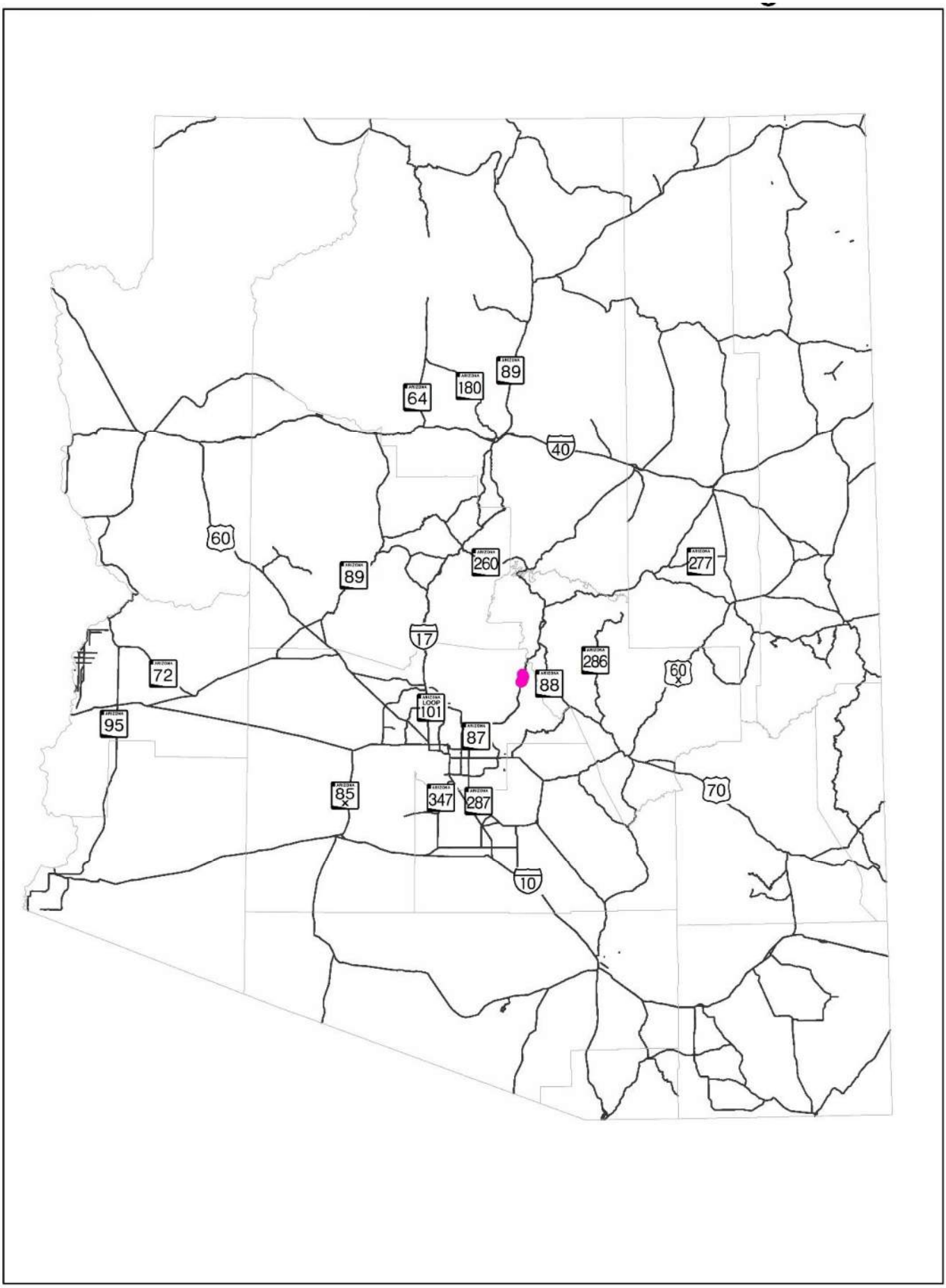
| COST ESTIMATE | | | |
|---|---|---|---|
| Design | Right-of-Way | Construction | Total |
| $280,000.00 | $0.00 | $2,520,000 | $2,800,000 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

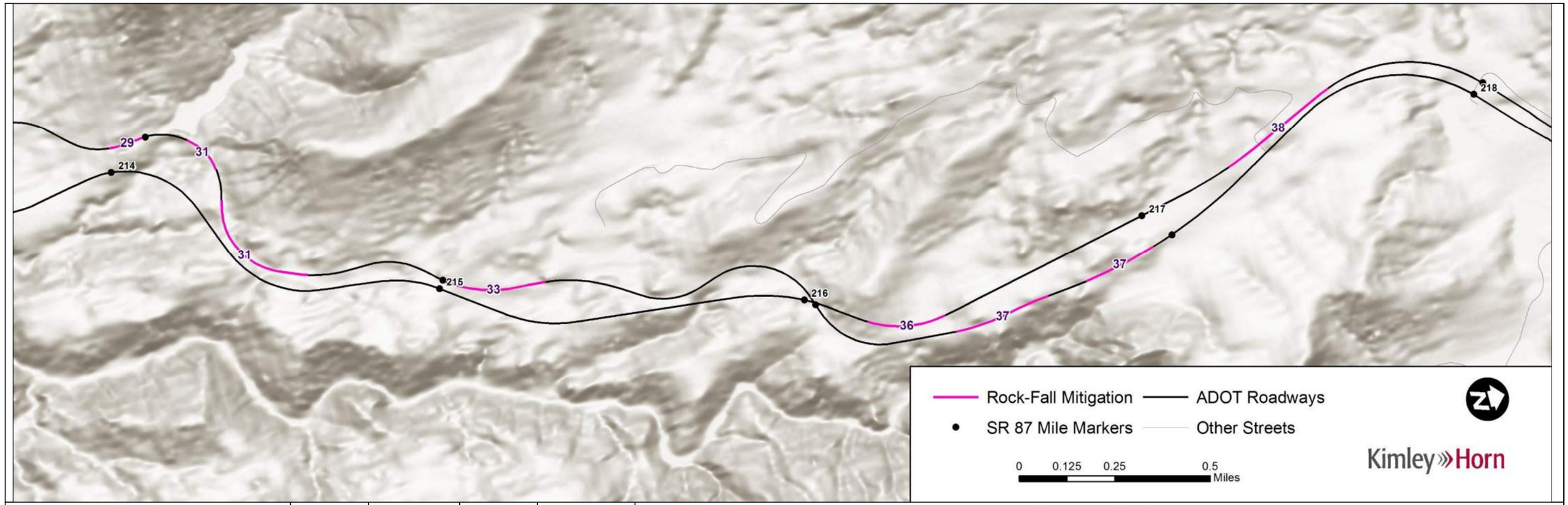
| ATTACHMENTS |
| --- |
| 1. Project Scope of Work<br>2. State Location Map<br>3. Project Vicinity Map<br>4. Itemized Cost Estimate<br>5. Conceptual Design Plans |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Northbound rock-fall mitigation – west side (MP 213.9-214)<br>• Northbound rock-fall mitigation – east side (MP 214.2-214.3)<br>• Northbound rock-fall mitigation – east side (MP 214.4-214.6)<br>• Northbound rock-fall mitigation – west side (MP 215-215.2)<br>• Southbound rock-fall mitigation – east side (MP 216.1-216.2)<br>• Northbound rock-fall mitigation – west side (MP 216.4-216.6)<br>• Northbound rock-fall mitigation – west side (MP 216.7-216.9)<br>• Southbound rock-fall mitigation – east side (MP 217.3-217.6) |

ATTACHMENT 3: STATE LOCATION MAP



ATTACHMENT 3: PROJECT VICINITY MAP




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. NB both sides – re-slope to ¾:1, widen and deepen ditches | 29 | 213.9 | 214 | $250,000 | Frequent cleanup required on shoulder, cut eroding and raveling, short sight distance |
| 2. NB left side – re-slope ¾:1 (1st stretch), ½:1 (2nd stretch, rock portions), and 1:1 (earth, saprolite); round crest in gravels; pinned netting in earthen materials; widen and deepen ditch; rock lined crown ditch | 31 | 1: 214.2<br>2: 214.4 | 1: 214.3<br>2: 214.6 | 1: $995,000<br>2: $350,000 | 1st stretch: Wedge and toppling geometries plus raveling lead to frequent rock on shoulder, differential erosion features slope to roadway<br>2nd stretch: Slabby granite with planar fractures leading to raveling, toppling and wedge releases to shoulder and roadway; accumulations of saprolite w/boulders at crest, some w/inclined surfaces toward roadway |
| 3. NB left side – scale, widen and deepen ditch | 33 | 215 | 215.2 | $170,000 | Erosion with unfavorable structure, inadequate ditch |
| 4. SB left side – heavy scaling, bolts, local pinned mesh | 36 | 216.1 | 216.2 | $450,000 | Erosion with favorable structure along faults and dikes, continuous and discontinuous fractures dipping toward roadway, toppling |
| 5. NB left side – heavy scaling, bolts, dowels (1st stretch); heavy scaling, spot rock bolting, erosion control (2nd stretch) | 37 | 1: 216.4<br>2: 216.7 | 1: 216.6<br>2: 216.9 | 1: $100,000<br>2: $100,000 | 1st stretch: Differential erosion in saprolite, may release large boulders, outward dipping sliding surface<br>2nd stretch: Continuous fractures dipping moderately outward, major erosion w/unfavorable structure, eroded faults at MP 216.77 |
| 6. SB left side – heavy scaling, pattern bolting, erosion control | 38 | 217.3 | 217.6 | $385,000 | Erosion, continuous fractures dipping outward, release along continuous dike, significant recent rockfall history |
| | | | Total: | $2,800,000 | |

## ATTACHMENT 4: ITEMIZED COST ESTIMATE

Itemized cost estimates were not developed for the rock-fall mitigation projects.

## ATTACHMENT 5: PRELIMINARY PLANS

Preliminary (15%) plans were not developed for the rock-fall mitigation projects.

# PACKAGE PROJECT 5 – NORTHCENTRAL DISTRICT ITS/SIGNAGE IMPROVEMENTS (MP 218-251)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **ADOT Project Manager:** |
| **Project Name:** Northcentral District ITS/Signage Improvements | |
| **City/Town:** N/A | **County:** Maricopa/Gila |
| **COG/MPO:** MAG/CAG | **ADOT District:** Northcentral |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 218 | |
| **End Limit:** 250 | |
| **Project Length:** 32 Miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☒County ☐ADOT ☐Private ☒Federal ☐Tribal ☐Other | |

| PROJECT NEED |
|---|
| SR 87 Corridor from Milepost 198 through 250 is prone to motor vehicle accidents. Between 2013 and 2017, there were 615 crashes, 37 of which included a fatality or serious injury. There is also substantial congestion experienced during summer weekends south of Payson. |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☐Expansion |
| Improve safety/congestion by implementing improved signage and intelligent transportation system infrastructure. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☒Utilities |
| ☐Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>Providing power to the site for the installation of a new dynamic message sign. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☒HSIP | ☒State |
| | ☐Local | ☐Private | ☐Tribal | ☐Other |

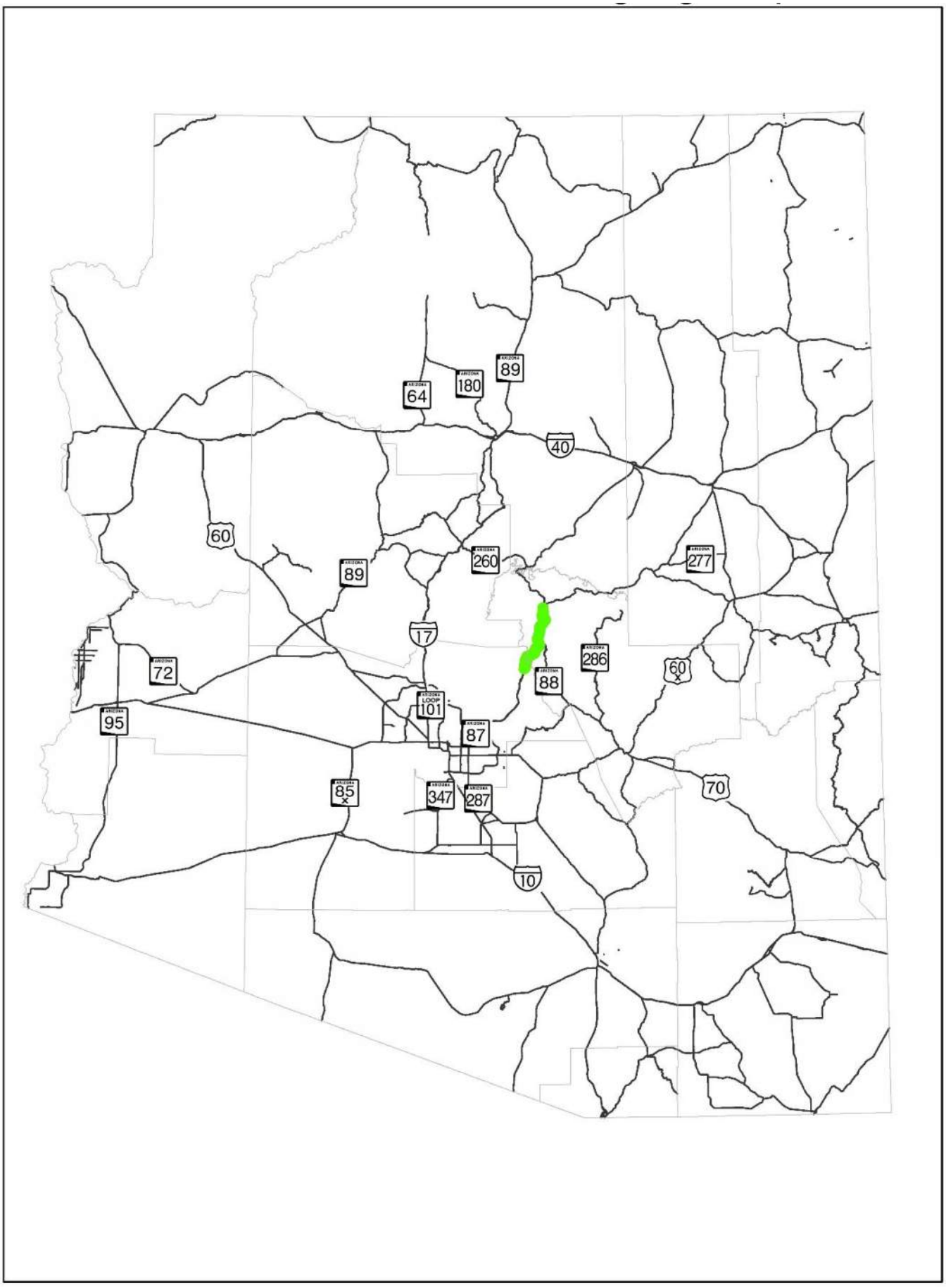
| COST ESTIMATE | | | |
|---|---|---|---|
| Design<br>$189,400.00 | Right-of-Way<br>$0.00 | Construction<br>$1,704,600.00 | Total<br>$1,894,000.00 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

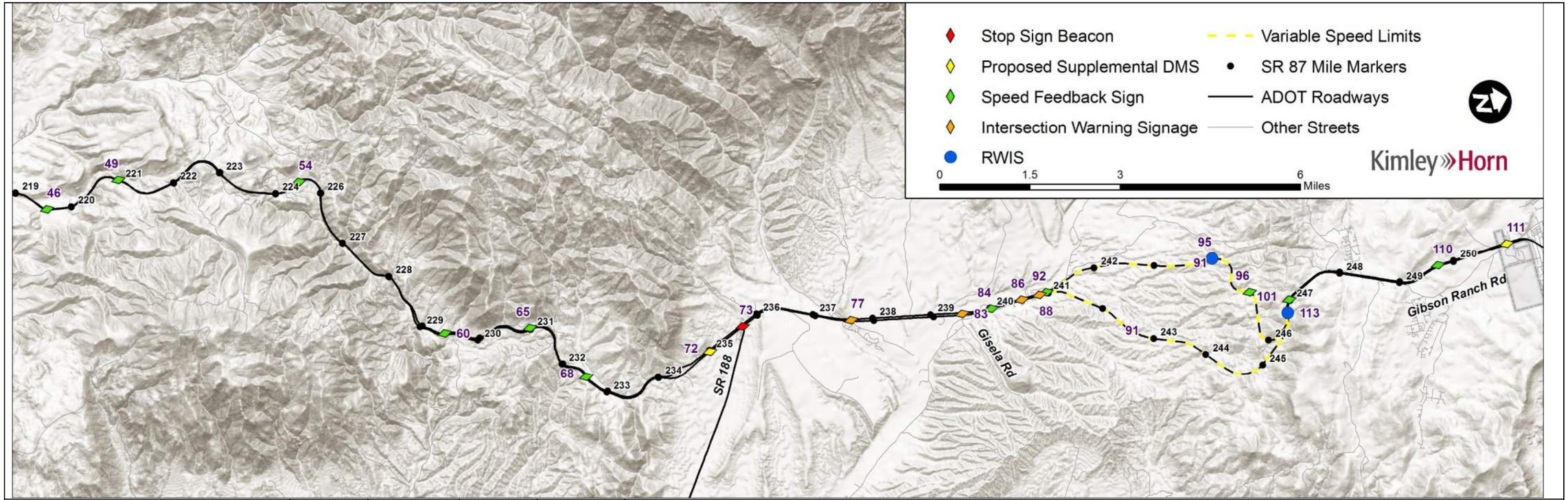
| ATTACHMENTS |
| --- |
| **1. Project Scope of Work**<br>**2. State Location Map**<br>**3. Project Vicinity Map**<br>**4. Itemized Cost Estimate**<br>**5. Conceptual Design Plans** |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Southbound speed feedback sign (MP 219.6)<br>• Southbound speed feedback sign (MP 221)<br>• Northbound speed feedback sign (MP 224.5)<br>• Southbound speed feedback sign (MP 229.3)<br>• Southbound speed feedback sign (MP 231)<br>• Northbound speed feedback sign (MP 232.5)<br>• Northbound dynamic message sign (MP 235)<br>• Westbound stop sign beacon – SR 188 (MP 235.7)<br>• Intersection warning signage – Deer Creek Drive (MP 237.6)<br>• Intersection warning signage – Gisela Road (MP 239.5)<br>• Northbound speed feedback sign (MP 240)<br>• Intersection warning signage – South Rye Crossover (MP 240.5)<br>• Intersection warning signage – North Rye Crossover (MP 240.9)<br>• Variable speed limits with dynamic message signs at both termini (MP 241-247)<br>• Southbound speed feedback sign (MP 241)<br>• Southbound road weather information system with dynamic warning beacons (MP 244)<br>• Southbound speed feedback sign (MP 245)<br>• Northbound and southbound RWIS with dynamic warning beacons (MP 246.3)<br>• Southbound speed feedback sign (MP 247)<br>• Southbound speed feedback sign (MP 249.8)<br>• Southbound dynamic message sign (MP 251) |

ATTACHMENT 2: STATE LOCATION MAP



ATTACHMENT 3: PROJECT VICINITY MAP




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. SB speed feedback sign | 46 | 219.6 | 219.6 | $25,000 | Speeding is an issue at this location, a speed study at MP 221 showed an 85th percentile speed of 73 mph. |
| 2. SB speed feedback sign | 49 | 221 | 221 | $25,000 | Speeding is an issue at this location, a speed study at this location showed an 85th percentile speed of 73 mph. |
| 3. NB speed feedback sign | 54 | 224.5 | 224.5 | $25,000 | Within an identified crash hot spot where 50% of crashes involved traveling too fast for conditions, 27% of crashes ran into a concrete traffic barrier, 23% ran off the road to the right, 12% ran off the road to the left. |
| 4. SB speed feedback sign | 60 | 229.3 | 229.3 | $25,000 | A downhill grade leading into a relatively sharp curve (with a 55-mph advisory speed) is an optimal location for a speed feedback sign to reinforce the advisory speed. |
| 5. SB speed feedback sign | 65 | 231 | 231 | $25,000 | There is a small cluster of serious injury and fatal crashes at this location. A combination of a downhill grade and relatively sharp curves are optimal locations for a speed feedback sign. |
| 6. NB speed feedback sign | 68 | 232.5 | 232.5 | $25,000 | A 6% downhill grade leading into a relatively sharp curve is an optimal location for a speed feedback sign to reinforce the speed limit. |
| 7. New NB DMS | 72 | 235 | 235 | $250,000 | Provides the opportunity to detour NB traffic onto SR 188 in response to incidents or extreme congestion leading into Payson. |
| 8. WB stop sign beacon on SR 188 | 73 | 235.7 | 235.7 | $15,000 | Improves the visibility of the stop sign to slow traffic down in advance of the intersection. |
| 9. Intersection warning signage – Deer Creek Dr | 77 | 237.6 | 237.6 | $5,000 | Relatively inexpensive treatment to increase awareness of the Deer Creek Dr. intersection. |
| 10. Intersection warning signage at Gisela Road | 83 | 239.5 | 239.5 | $5,000 | Increase awareness and attention to cross-traffic at the Gisela Road intersection; one crash was reported in the crash analysis at this location. |
| 11. NB speed feedback sign | 84 | 240 | 240 | $25,000 | Reinforce the speed limit through the Rye area, the current 85th percentile speed is 73 mph. |
| 12. Intersection warning signage at the S. Rye Crossover | 86 | 240.5 | 240.5 | $5,000 | Increase awareness and attention to cross-traffic at the S. Rye Crossover intersection; two crashes were reported in the crash analysis at this location. |
| 13. Intersection warning signage at the N. Rye Crossover | 88 | 240.9 | 240.9 | $5,000 | Increase awareness and attention to the cross-traffic at the N. Rye Crossover intersection. |
| 14. Variable speed limits, with DMS on both ends | 91 | 241 | 247 | $844,000 | Add the ability to raise and lower speed limits in an area with a high propensity for crashes based on weather, events, crashes, or other factors where reduced speed limits may be warranted. |
| 15. SB speed feedback sign | 92 | 241 | 241 | $25,000 | Reinforce the speed limit through the Rye area, the current 85th percentile speed is 74 mph and the average speed is 72 mph. |
| 16. NB and SB RWIS with dynamic warning beacons | 95 | 244 | 244 | $60,000 | Provide the ability to warn drivers of adverse weather conditions, could be in communication with the proposed variable speed limits. |
| 17. SB speed feedback sign | 96 | 245 | 245 | $25,000 | Increase awareness of the speed limit on the long, downhill grade with sharp curves. |

| | | | | | |
|---|---|---|---|---|---|
| 18. NB and SB RWIS with dynamic warning beacons | 113 | 246.3 | 246.3 | $180,000 | In the northbound direction, provide the ability to warn drivers of adverse weather conditions and could be in communication with the proposed variable speed limits. In the southbound direction, provide a Dynamic Curve Warning System for Corvair Curve that uses supplemental beacons and/or messages that activate when a motorist approaches the curve at a high speed. A typical dynamic curve warning system combines a speed measuring device (such as loop detectors or radar) with flashing beacon and a variable message sign. The system can incorporate a camera to provide visual surveillance of the curve. The system is designed to slow high-speed vehicles as they approach and enter a horizontal curve. It works by measuring the speeds of approaching vehicles and providing messages to speeding drivers to slow down to an advisory speed. |
| 19. SB speed feedback sign | 101 | 247 | 247 | $25,000 | Reinforce the speed limit and driver awareness of their speeds, 85$^{th}$ percentile speeds are 19 mph over the speed limit and average speeds are 17 mph over the speed limit. |
| 20. SB speed feedback sign | 110 | 249.8 | 249.8 | $25,000 | Reinforce the speed limit and driver awareness of their speeds. |
| 21. New SB DMS | 111 | 251 | 251 | $250,000 | Provides the ability to advise SB traffic to turn around in response to incidents or extreme congestion on the SR 87 corridor south of Payson. |
| | | | Total: | $1,894,000 | |

## ATTACHMENT 4: ITEMIZED COST ESTIMATE

Itemized cost estimates were not developed for the ITS/Signage Improvement projects.

## ATTACHMENT 5: PRELIMINARY PLANS

Preliminary (15%) plans were not developed for the ITS/Signage Improvement Projects

# PACKAGE PROJECT 6 – NORTHCENTRAL DISTRICT ROCK-FALL MITIGATION (MP 222-247)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **ADOT Project Manager:** |
| **Project Name:** Northcentral District Rock-Fall Mitigation | |
| **City/Town:** N/A | **County:** Gila |
| **COG/MPO:** MAG/CAG | **ADOT District:** Northcentral |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 222 | |
| **End Limit:** 234 | |
| **Project Length:** 12 Miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☐County ☐ADOT ☐Private ☒Federal ☐Tribal ☐Other | |

| PROJECT NEED |
|---|
| Erosion and rock-fall issues between MP 222 and 234 causing recurring maintenance issues and debris-related crashes |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☐Expansion |
| Mitigate rock-fall issues. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☐Utilities |
| ☐Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>Click or tap here to enter text. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☐HSIP | ☒State |
| | ☐Local | ☐Private | ☐Tribal | ☐Other |

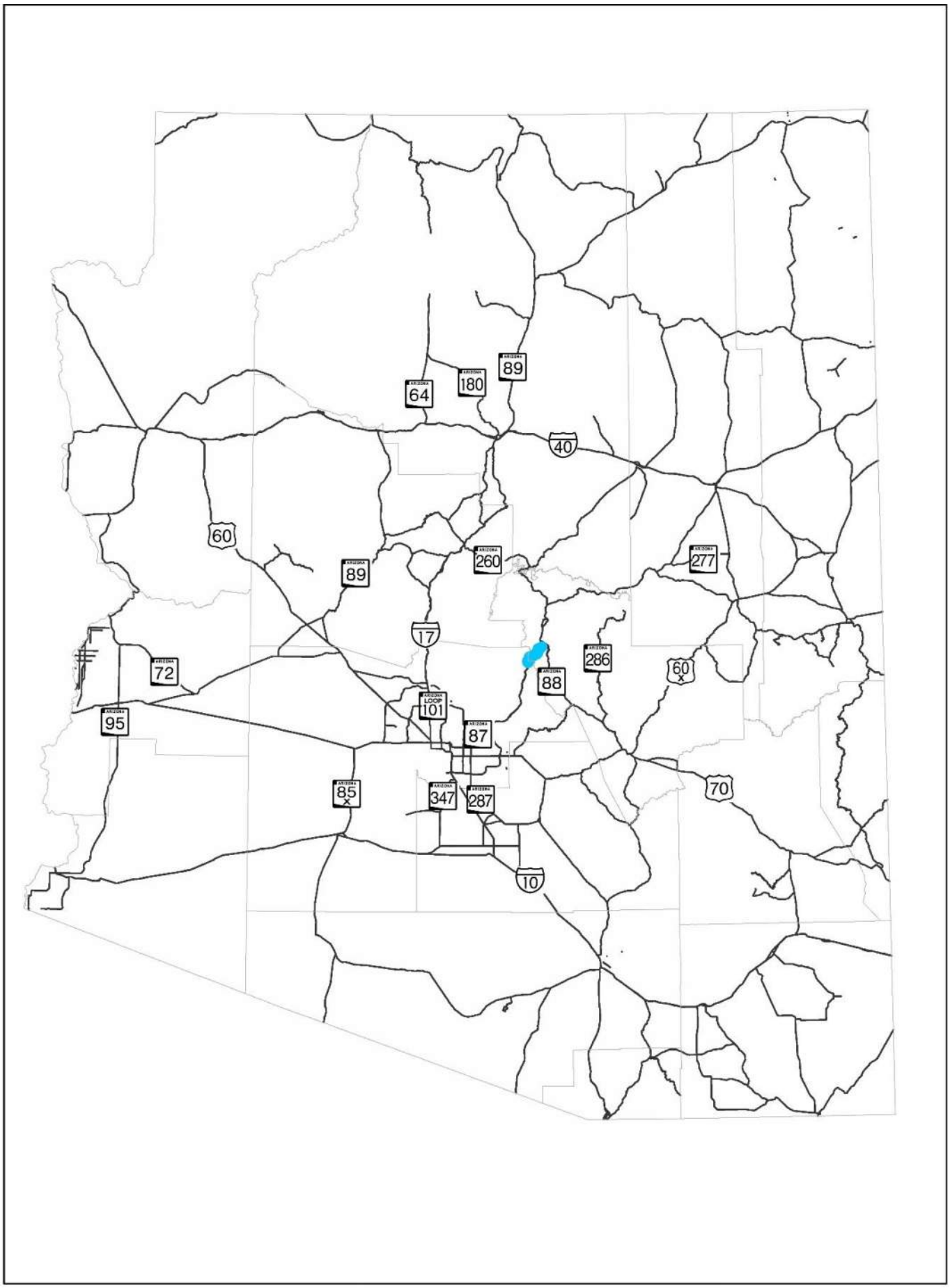
| COST ESTIMATE | | | |
|---|---|---|---|
| Design | Right-of-Way | Construction | Total |
| $584,000.00 | $0.00 | $5,256,000 | $5,840,000 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

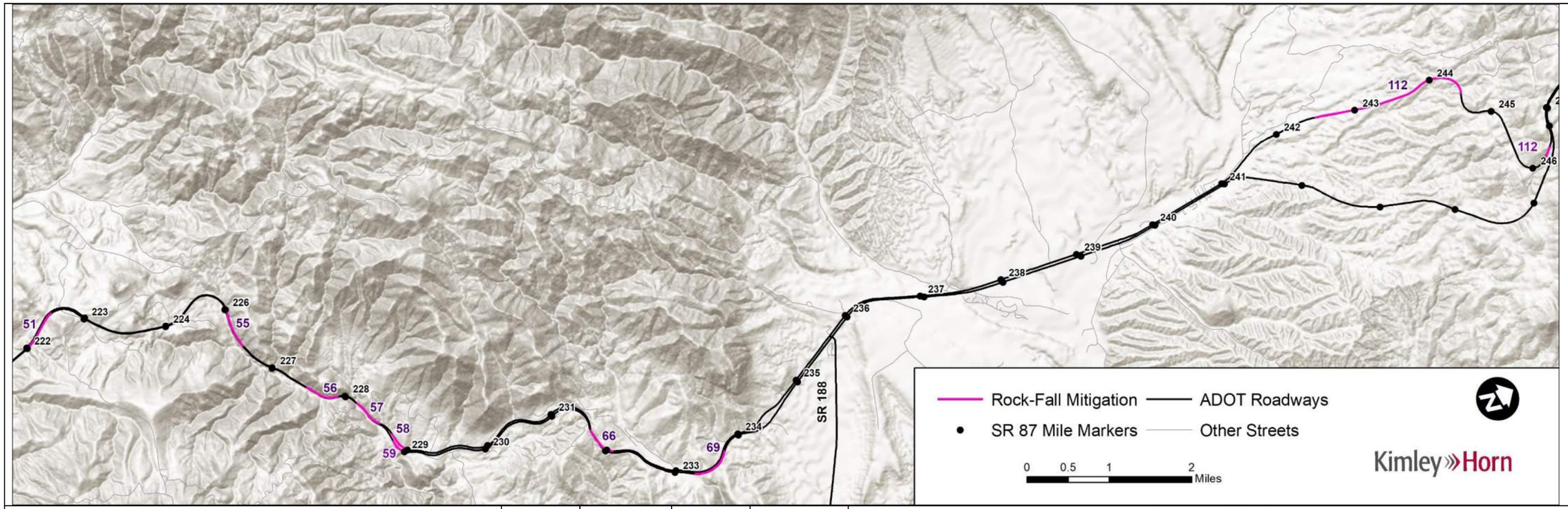
| ATTATCHMENTS |
| --- |
| 1. **Project Scope of Work**<br>2. **State Location Map**<br>3. **Project Vicinity Map**<br>4. **Itemized Cost Estimate**<br>5. **Conceptual Design Plans** |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Northbound rock-fall mitigation – east side (MP 222.2-222.6)<br>• Southbound rock-fall mitigation – west side (MP 226.1-226.5)<br>• Southbound rock-fall mitigation – west side (MP 227.5-227.9)<br>• Southbound rock-fall mitigation – west side (MP 228.2-228.5)<br>• Southbound rock-fall mitigation – both sides (MP 228.7-229.0)<br>• Northbound rock-fall mitigation – both sides (MP 228.9-229)<br>• Northbound rock-fall mitigation – east side (MP 231.6-231.7)<br>• Southbound rock-fall mitigation – east side (MP 231.7-232.1)<br>• Northbound rock-fall mitigation – east side (MP 233.3-233.7)<br>• Southbound rock-fall mitigation – east side (MP 242.5-244.5, 246.4-246.6) |

**ATTACHMENT 2: STATE LOCATION MAP**



**ATTACHMENT 3: PROJECT VICINITY MAP**




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. NB both sides – re-grade with rock-lined interceptor channels and crown ditch, gabions | 51 | 222 | 222.6 | $650,000 | Re-grade with rock-lined interceptor channels and crown ditch, gabions |
| 2. SB left side – pinned mesh in the narrow shoulder area, deepen ditch to 6', rock fence on bench, grade slope and scale (1st stretch); crest erosion, protect with thrie beam barrier, pinned mesh in crown area gravels, scale (2nd stretch); pinned mesh in the crest, deepen ditch, protect with weathering thrie beam barrier (3rd stretch) | 55 | 1: 226<br>2: 226.1<br>3: 226.3 | 1: 226.1<br>2: 226.3<br>3: 226.5 | 1: $440,000<br>2: $325,000<br>3: $550,000 | 1st stretch: Erosion with boulders, upper bench may be breached, potential upslope contribution above bench. Rock fall is frequent but widened paved shoulder keeps most rock off pavement, despite lack of ditch cross slope.<br>2nd stretch: Crest erosion, limited catchment with many rock falls<br>3rd stretch: Local terrace gravels at top of slope cut, rock face well vegetated and mostly stable but catchment is inadequate |
| 3. SB left side – deepen ditch by toe excavation, protect ditch cross slope with weathering thrie beam barrier | 56 | 227.5 | 227.9 | $250,000 | Tall cut appx 3/4:1 paved ditch inadequate depth. Rock slope mostly well vegetated and uniform, generally stable. Local raveling and release from crest. |
| 4. SB left side - spot and pattern rock bolting (crane basket), attenuators, local anchored mesh, heavy scaling, widen and deepen ditch and protect with weathering thrie beam or concrete barrier | 57 | 228.2 | 228.5 | $660,000 | High & steep cut, widespread plane shear and wedge fracture geometries, erosion along faults and shears. Ditch width and cross slope inadequate. Emergency cleanups have been infrequent, but free-standing rock erosion features are developing and may lead to significant and damaging future falls. |
| 5. SB left side – rock lined crown ditch, dress and revegetate slope, widen and deepen ditch and protect with weathering thrie beam barrier (1st stretch); SB right side - deepen ditch and protect with weathering thrie beam barrier | 58 | 1: 228.7<br>2: 228.8 | 1: 229<br>2: 229 | 1: $230,000<br>2: $150,000 | 1st stretch: Fanglomerate, benches 80%-90% eroded w/vegetation on remnants, rock fall almost to shoulder, ditch depth inadequate. Assume 2018 repair $$ appearing in PeCos was for this cut.<br>2nd stretch: Fanglomerate, many rocks in ditch, depth inadequate |
| 6. NB both sides – re-grade to eliminate remnant benches, use sace to improve ditch configuration both sides | 59 | 228.8 | 229 | $160,000 | Looser material atop cut overlies denser fanglomerate. Catch benches have filled up, potential for rock bouncing out from face |
| 7. NB right side – re-grade with rock-lined interceptor channels and crown ditch, gabions (1st stretch); SB left side – in rock cut deepen ditch and protect with weathering thrie beam barrier, retain paved shoulders; in alluvium construct rock-lined crown and interceptor ditches, gabions as necessary (2nd stretch) | 66 | 1: 231.6<br>2: 231.7 | 1: 231.7<br>2: 232.1 | 1: $530,000<br>2: $485,000 | 1st stretch: Heavy rill erosion, obvious recent clean-up work<br>2nd stretch: Partial raveling but mostly kinematically stable rock slope with ditch of inadequate depth. North 2/3 is valley fill sediments with heavy rill erosion, locally undercutting slope face, no crown ditch |
| 8. NB right side – re-grade with rock-lined interceptor channels and crown ditch, gabions | 69 | 233.3 | 233.7 | $780,000 | Two tall cuts in unconsolidated alluvium, heavy rill erosion, widened shoulders, history of major sluffing & major reconstruction, may recur. |

| | | | | | |
|---|---|---|---|---|---|
| 9. SB left side – Move slope back 10 ft to widen and deepen ditch, revegetate earth slopes, R&R barrier with single-beam weathering type (1st stretch); SB left side – round crest & layback & widen ditch, protect deepened ditch with weathering single-beam barrier (2nd stretch) | 112 | 1: 242.5<br>2: 246.4 | 1: 244.5<br>2: 246.6 | 1: $500,000<br>2: $130,000 | 1st stretch: 6 cuts SB LT, rocks roll out into travel lanes during significant rainfall or snowmelt events<br>2nd stretch: Boulders at crest eroding out, maintenance activity has occurred in the MP range. |
| | | | **Total:** | **$5,840,000** | |

## ATTACHMENT 4: ITEMIZED COST ESTIMATE

Itemized cost estimates were not developed for the rock-fall mitigation projects.

## ATTACHMENT 5: PRELIMINARY PLANS

Preliminary (15%) plans were not developed for the rock-fall mitigation projects.

# PACKAGE PROJECT 7 – NORTHBOUND IMPROVEMENTS (MP 218-226)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **ADOT Project Manager:** |
| **Project Name:** Northbound Improvements (MP 218-226) | |
| **City/Town:** N/A | **County:** Maricopa/Gila |
| **COG/MPO:** MAG/CAG | **ADOT District:** Northcentral |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 218 | |
| **End Limit:** 226 | |
| **Project Length:** 8 Miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☒County ☐ADOT ☐Private ☒Federal ☐Tribal ☐Other | |

| PROJECT NEED |
|---|
| Large speed differentials have been observed during a speed study at this location caused by slow truck speeds due to a steep uphill grade in the northbound direction. |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☒Expansion |
| Address large speed differentials by providing a climbing lane for trucks, while also making safety improvements at the Bushnell Tanks intersection and north of the climbing lane. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☐Utilities |
| ☒Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>Two bridges will need to be widened to accommodate the climbing lane. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☐HSIP | ☒State |
| | ☐Local | ☐Private | ☐Tribal | ☐Other |

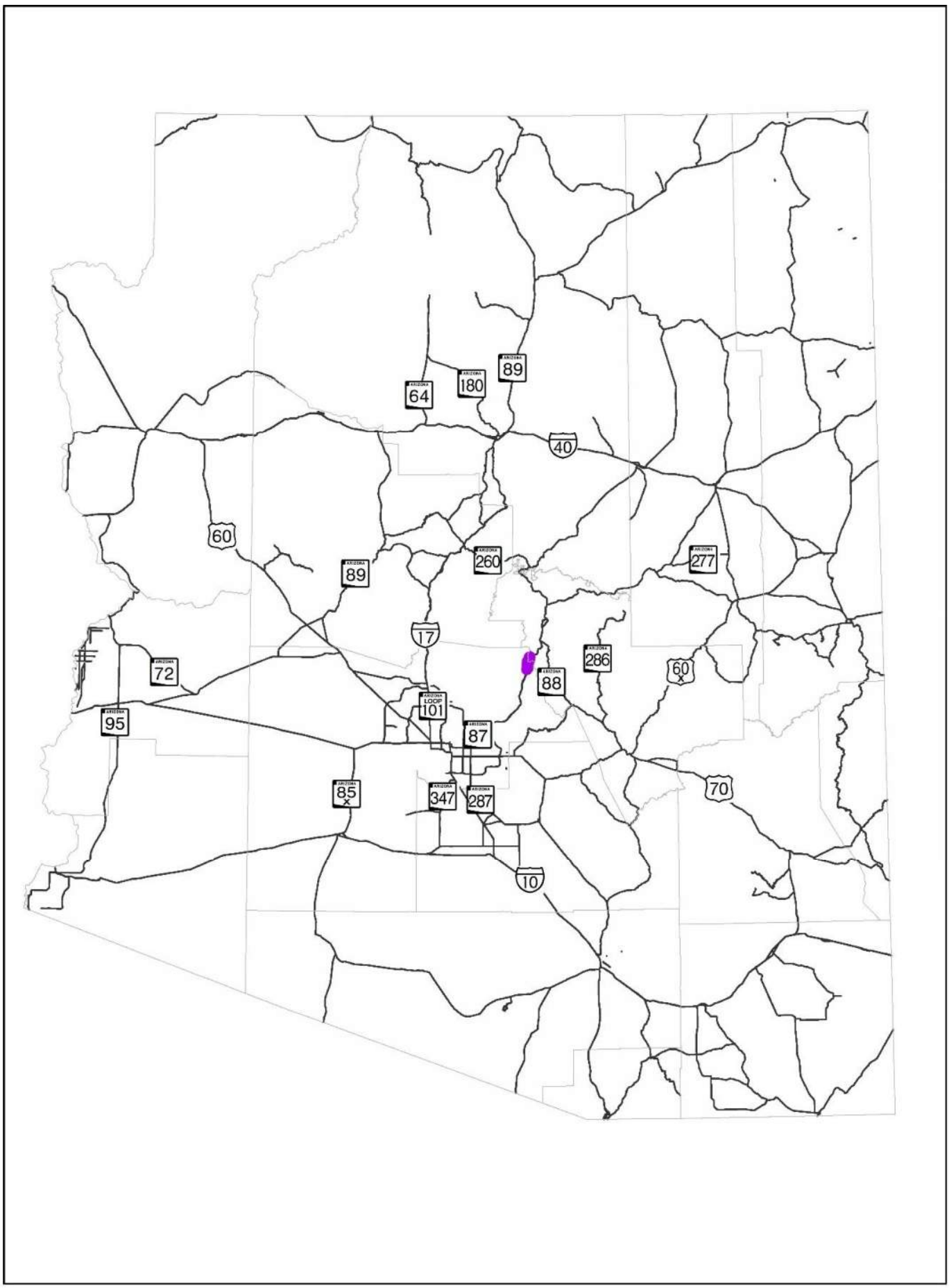
| COST ESTIMATE | | | |
|---|---|---|---|
| Design | Right-of-Way | Construction | Total |
| $2,091,700.00 | $0.00 | $27,196,900.00 | $29,288,600.00 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

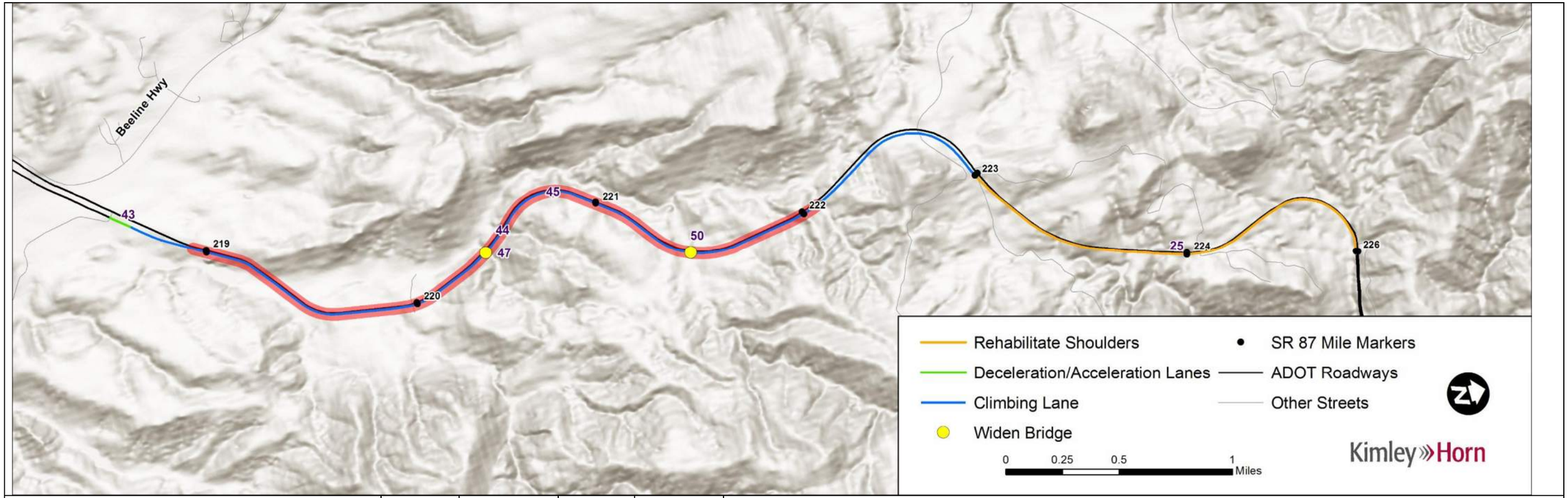
| ATTATCHMENTS |
| --- |
| 1. Project Scope of Work<br>2. State Location Map<br>3. Project Vicinity Map<br>4. Itemized Cost Estimates<br>5. Conceptual Design Plans |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Rehabilitate northbound shoulders (MP 223-226)<br>• Add northbound outside acceleration lane and southbound inside acceleration lane at the Bushnell Tanks Intersection (MP 218.5)<br>• Widen inside shoulders to 4' and outside shoulders to 10' (MP 218.9-222.1)<br>• Construct northbound climbing lane (MP 218.6-223)<br>• Widen the Whiskey Springs bridge to accommodate the proposed climbing lane (MP 220.3)<br>• Widen the Kitty Joe Creek bridge to accommodate the proposed climbing lane (MP 221.4) |

ATTACHMENT 2: STATE LOCATION MAP



ATTACHMENT 3: PROJECT VICINITY MAP




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Rehabilitate NB shoulders | 25 | 223 | 226 | $1,111,200 | The shoulders in this location are in poor condition, with significant cracking and vegetation growing. |
| 2. NB outside acceleration lane, SB inside acceleration lane at Bushnell Tanks intersection | 43 | 218.5 | 218.5 | $1,330,500 | Relatively high level of vehicles with trailers that may warrant acceleration lanes. |
| 3. Widen inside shoulders to 4’ and outside shoulders to 10’ | 44 | 218.9 | 222.1 | $4,061,600 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| 4. Construct NB climbing lane | 45 | 218.6 | 223 | $16,108,300 | Approximately 15% of traffic on this segment is heavy commercial vehicles, the uphill grade causes low speeds and large speed variances between vehicles. |
| 5. Widen Whiskey Springs bridge | 47 | 220.3 | 220.3 | $2,904,500 | Bridge will need to be widened to accommodate the proposed northbound climbing lane. |
| 6. Widen Kitty Joe Creek bridge | 50 | 221.4 | 221.4 | $3,772,500 | Bridge will need to be widened to accommodate the proposed northbound climbing lane. |
| | | | Total: | $29,288,600 | |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**25. Rehabilitate northbound shoulders – 223-226**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2020053 | REMOVE (GR TERMINAL) | EACH | 2 | $400.00 | $800 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 5,280 | $5.00 | $26,400 |
| 2020085 | REMOVE BITUMINOUS PAVEMENT (MILLING) (3") | SQ.YD. | 17,096 | $3.00 | $51,288 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 3,131 | $80.00 | $250,480 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 505 | $90.00 | $45,450 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $10,990.00 | $10,990 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 2,748 | $30.00 | $82,440 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 2 | $2,500.00 | $5,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 2 | $800.00 | $1,600 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 21,980 | $0.75 | $16,485 |
| | | | | **Roadway Construction Subtotal** | **$500,933** |
| | Unidentified Item Allowance (15%) | | | | $ 75,140 |
| | | | | **Subtotal** | **$576,073** |
| | Water Supply/Dust Palliative (3%) | | | | $ 17,283 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 86,411 |
| | Erosion Control (1%) | | | | $ 5,761 |
| | Contractor Quality Control (2%) | | | | $ 11,522 |
| | Construction Surveying And Layout (2%) | | | | $ 11,522 |
| | | | | **Other Item Subtotal** | **$708,572** |
| | Mobilization (12%) | | | | $ 85,029 |
| | | | | **Construction Subtotal** | **$ 793,601** |
| | Engineering Design (10%) | | | | $ 79,361 |
| | Construction Engineering and Contingencies (20%) | | | | $ 158,721 |
| | Indirect Cost Allocation (10.02%) | | | | $ 79,519 |
| | | | | **Construction Total** | **$ 1,111,202** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**43. Northbound outside acceleration lane at Bushnell Tanks (MP 218.5)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 1,600 | $20.00 | $32,000 |
| 2020201 | SAW CUTTING | L.FT. | 1,440 | $2.50 | $3,600 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 2,140 | $10.00 | $21,400 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 1,174 | $60.00 | $70,440 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 927 | $160.00 | $148,320 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 76 | $120.00 | $9,120 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $1,440.00 | $1,440 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 1,440 | $1.50 | $2,160 |
| | | | | **Roadway Construction Subtotal** | **$301,980** |
| | Unidentified Item Allowance (15%) | | | | $ 45,297 |
| | | | | **Subtotal** | **$347,277** |
| | Water Supply/Dust Palliative (3%) | | | | $ 10,419 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 52,092 |
| | Erosion Control (1%) | | | | $ 3,473 |
| | Contractor Quality Control (2%) | | | | $ 6,946 |
| | Construction Surveying And Layout (2%) | | | | $ 6,946 |
| | | | | **Other Item Subtotal** | **$427,153** |
| | Mobilization (12%) | | | | $ 51,259 |
| | | | | **Construction Subtotal** | **$ 478,412** |
| | Engineering Design (10%) | | | | $ 47,842 |
| | Construction Engineering and Contingencies (20%) | | | | $ 95,683 |
| | Indirect Cost Allocation (10.02%) | | | | $ 47,937 |
| | | | | **Construction Total** | **$ 669,874** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**43. Southbound inside acceleration lane at Bushnell Tanks (MP 218.5)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 292 | $20.00 | $5,840 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 2 | $400.00 | $800 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 350 | $5.00 | $1,750 |
| 2020201 | SAW CUTTING | L.FT. | 1,310 | $2.50 | $3,275 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 1,950 | $10.00 | $19,500 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 1,068 | $60.00 | $64,080 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 843 | $160.00 | $134,880 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 69 | $120.00 | $8,280 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $1,310.00 | $1,310 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 1,310 | $30.00 | $39,300 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 1 | $2,500.00 | $2,500 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 1 | $800.00 | $800 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 1,310 | $1.50 | $1,965 |
| | | | **Roadway Construction Subtotal** | | **$297,780** |
| | Unidentified Item Allowance (15%) | | | | $ 44,667 |
| | | | | **Subtotal** | **$342,447** |
| | Water Supply/Dust Palliative (3%) | | | | $ 10,274 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 51,368 |
| | Erosion Control (1%) | | | | $ 3,425 |
| | Contractor Quality Control (2%) | | | | $ 6,849 |
| | Construction Surveying And Layout (2%) | | | | $ 6,849 |
| | | | | **Other Item Subtotal** | **$421,212** |
| | Mobilization (12%) | | | | $ 50,546 |
| | | | | **Construction Subtotal** | **$ 471,758** |
| | Engineering Design (10%) | | | | $ 47,176 |
| | Construction Engineering and Contingencies (20%) | | | | $ 94,352 |
| | Indirect Cost Allocation (10.02%) | | | | $ 47,271 |
| | | | | **Construction Total** | **$ 660,557** |

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# SR87 Corridor Development Study
## ITEMIZED COST ESTIMATE

**44. Widen inside shoulders to 4' and outside shoulders to 10' (MP 218.9 – 222.1)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 4 | $5,000.00 | $20,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 3,755 | $20.00 | $75,100 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 4,224 | $5.00 | $21,120 |
| 2020201 | SAW CUTTING | L.FT. | 33,792 | $2.50 | $84,480 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 30,040 | $7.00 | $210,280 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 12,516 | $50.00 | $625,800 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 6,831 | $80.00 | $546,480 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 444 | $90.00 | $39,960 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $16,896.00 | $16,896 |
| 8050003 | SEEDING (CLASS II) | ACRE | 4 | $3,500.00 | $14,000 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 4,224 | $30.00 | $126,720 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 4 | $2,500.00 | $10,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 4 | $800.00 | $3,200 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 33,792 | $0.75 | $25,344 |
| | | | **Roadway Construction Subtotal** | | **$1,830,980** |
| | Unidentified Item Allowance (15%) | | | | $ 274,647 |
| | | | | **Subtotal** | **$2,105,627** |
| | Water Supply/Dust Palliative (3%) | | | | $ 63,169 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 315,845 |
| | Erosion Control (1%) | | | | $ 21,057 |
| | Contractor Quality Control (2%) | | | | $ 42,113 |
| | Construction Surveying And Layout (2%) | | | | $ 42,113 |
| | | | | **Other Item Subtotal** | **$2,589,924** |
| | Mobilization (12%) | | | | $ 310,791 |
| | | | | **Construction Subtotal** | **$ 2,900,715** |
| | Engineering Design (10%) | | | | $ 290,072 |
| | Construction Engineering and Contingencies (20%) | | | | $ 580,143 |
| | Indirect Cost Allocation (10.02%) | | | | $ 290,652 |
| | | | | **Construction Total** | **$ 4,061,582** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**45. Construct climbing lane (MP 218.6-223)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 16 | $5,000.00 | $80,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 2,582 | $20.00 | $51,640 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 5,809 | $5.00 | $29,045 |
| 2020201 | SAW CUTTING | L.FT. | 23,232 | $2.50 | $58,080 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 1,730 | $10.00 | $17,300 |
| 2030901 | BORROW | CU.YD. | 137,680 | $12.00 | $1,652,160 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 16,349 | $50.00 | $817,450 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 12,380 | $80.00 | $990,400 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 990 | $90.00 | $89,100 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $23,232.00 | $23,232 |
| 8050003 | SEEDING (CLASS II) | ACRE | 16 | $3,500.00 | $56,000 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 11,616 | $30.00 | $348,480 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 6 | $2,500.00 | $15,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 6 | $800.00 | $4,800 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 23,232 | $0.75 | $17,424 |
| | | | **Roadway Construction Subtotal** | | **$4,261,711** |
| | Two structures widening (12'*500'+12'*650') @ $250/sft | | | | $ 3,450,000 |
| | Unidentified Item Allowance (15%) | | | | $ 639,257 |
| | | | | **Subtotal** | **$8,350,968** |
| | Water Supply/Dust Palliative (3%) | | | | $ 250,530 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 1,252,646 |
| | Erosion Control (1%) | | | | $ 83,510 |
| | Contractor Quality Control (2%) | | | | $ 167,020 |
| | Construction Surveying And Layout (2%) | | | | $ 167,020 |
| | | | | **Other Item Subtotal** | **$10,271,694** |
| | Mobilization (12%) | | | | $ 1,232,604 |
| | | | | **Construction Subtotal** | **$ 11,504,298** |
| | Engineering Design (10%) | | | | $ 1,150,430 |
| | Construction Engineering and Contingencies (20%) | | | | $ 2,300,860 |
| | Indirect Cost Allocation (10.02%) | | | | $ 1,152,731 |
| | | | | **Construction Total** | **$ 16,108,319** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**47. Widen Whiskey Springs Bridge (MP 220.3)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| | | | | **Roadway Construction Subtotal** | **$5,000** |
| | Structure widening (12'*500') @ $250/sft | | | | $ 1,500,000 |
| | Unidentified Item Allowance (15%) | | | | $ 750 |
| | | | | **Subtotal** | **$1,505,750** |
| | Water Supply/Dust Palliative (3%) | | | | $ 45,173 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 225,863 |
| | Erosion Control (1%) | | | | $ 15,058 |
| | Contractor Quality Control (2%) | | | | $ 30,115 |
| | Construction Surveying And Layout (2%) | | | | $ 30,115 |
| | | | | **Other Item Subtotal** | **$1,852,074** |
| | Mobilization (12%) | | | | $ 222,249 |
| | | | | **Construction Subtotal** | **$ 2,074,323** |
| | Engineering Design (10%) | | | | $ 207,433 |
| | Construction Engineering and Contingencies (20%) | | | | $ 414,865 |
| | Indirect Cost Allocation (10.02%) | | | | $ 207,848 |
| | | | | **Construction Total** | **$ 2,904,469** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

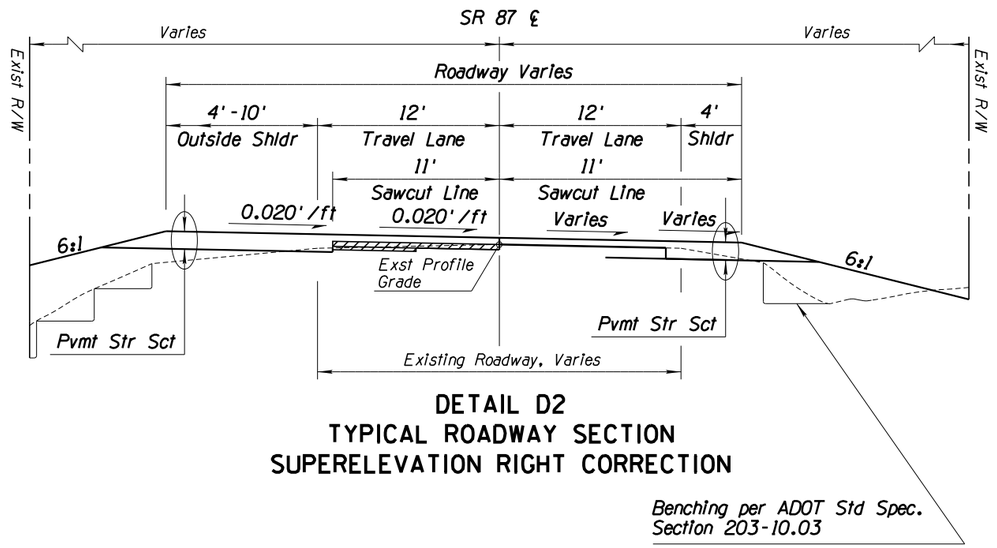
**50. Widen Kitty Joe Creek Bridge (MP 221.4)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| | | | | **Roadway Construction Subtotal** | **$5,000** |
| | Structure widening (12'*650') @ $250/sft | | | | $ 1,950,000 |
| | Unidentified Item Allowance (15%) | | | | $ 750 |
| | | | | **Subtotal** | **$1,955,750** |
| | Water Supply/Dust Palliative (3%) | | | | $ 58,673 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 293,363 |
| | Erosion Control (1%) | | | | $ 19,558 |
| | Contractor Quality Control (2%) | | | | $ 39,115 |
| | Construction Surveying And Layout (2%) | | | | $ 39,115 |
| | | | | **Other Item Subtotal** | **$2,405,574** |
| | Mobilization (12%) | | | | $ 288,669 |
| | | | | **Construction Subtotal** | **$ 2,694,243** |
| | Engineering Design (10%) | | | | $ 269,425 |
| | Construction Engineering and Contingencies (20%) | | | | $ 538,849 |
| | Indirect Cost Allocation (10.02%) | | | | $ 269,964 |
| | | | | **Construction Total** | **$ 3,772,481** |

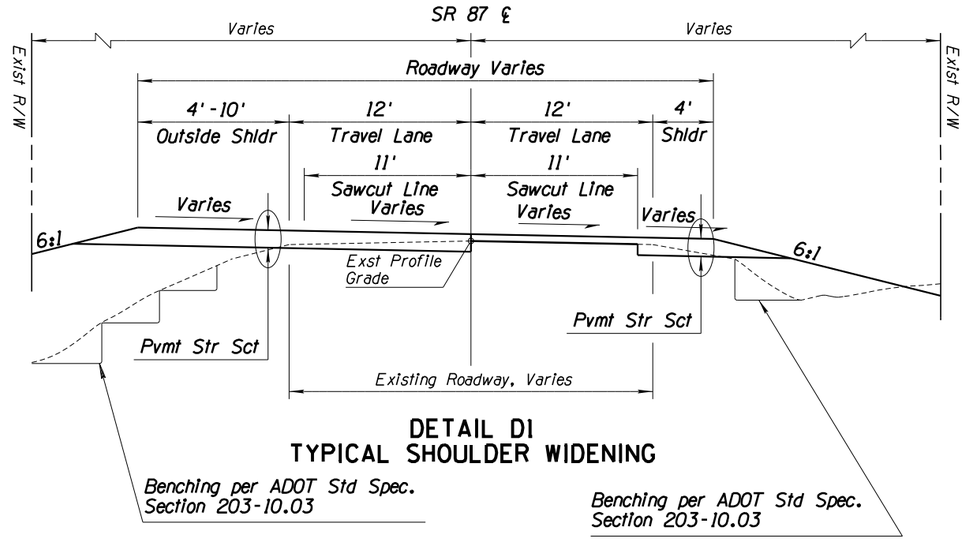
ATTACHMENT 5: PRELIMINARY PLANS

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

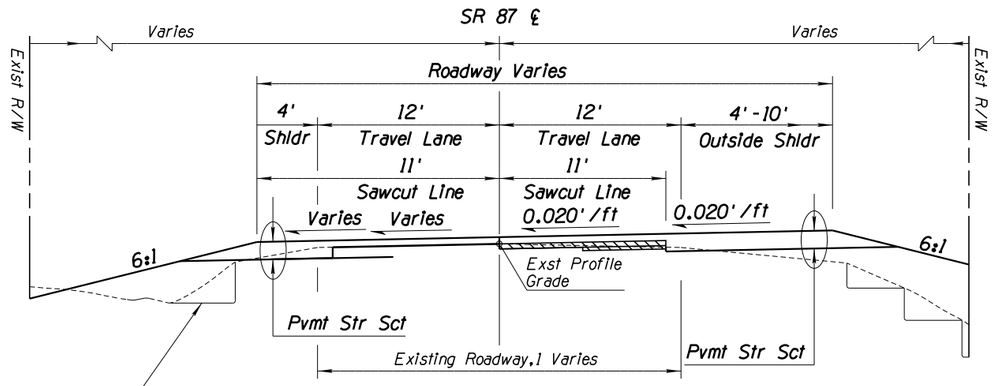
| SR 87 MILE POST STATION | | | |
|---|---|---|---|
| MP NB | STATION | MP SB | STATION |
| 196 | 101+73 | 196 | 101+18 |
| 197 | 155+53 | 197 | 154+02 |
| 198 | 207+69 | 198 | 207+94 |
| 199 | 261+02 | 199 | 259+13 |
| 200 | 314+21 | 200 | 311+72 |
| 201 | 367+73 | 201 | 364+06 |
| 202 | 419+18 | 202 | 417+81 |
| 203 | 471+36 | 203 | 470+65 |
| 204 | 526+28 | 204 | 523+10 |
| 205 | 577+70 | 205 | 575+84 |
| 206 | 630+73 | 206 | 628+30 |
| 207 | 682+81 | 207 | 680+28 |
| 208 | 736+47 | 208 | 734+12 |
| 209 | 788+55 | 209 | 786+62 |
| 210 | 842+08 | 210 | 839+50 |
| 211 | 894+91 | 211 | 890+40 |
| 212 | 942+20 | 212 | 939+42 |
| 213 | 998+65 | 213 | 995+55 |
| 214 | 1051+86 | 214 | 1050+06 |
| 215 | 1105+38 | 215 | 1095+77 |
| 216 | 1158+68 | 216 | 1147+95 |
| 217 | 1213+92 | 217 | 1199+48 |
| 218 | 1268+31 | 218 | 1250+20 |
| 219 | 1318+19 | 219 | 1304+12 |
| 220 | 1374+67 | 220 | 1359+76 |
| 221 | 1427+95 | 221 | 1412+99 |
| 222 | 1480+60 | 222 | 1465+84 |
| 223 | 1533+97 | 223 | 1518+89 |
| 224 | 1584+61 | 224 | 1570+72 |
| 225 | 1639+50 | 225 | 1625+29 |
| 226 | 1689+86 | 226 | 1676+32 |
| 227 | 1740+23 | 227 | 1726+14 |
| 228 | 1792+50 | 228 | 1778+04 |
| 229 | 1845+24 | 229 | 1831+98 |
| 230 | 1898+50 | 230 | 1884+70 |
| 231 | 1949+61 | 231 | 1933+71 |
| 232 | 1999+33 | 232 | 1985+29 |
| 233 | 2047+74 | 233 | 2033+06 |
| 234 | 2101+13 | 234 | 2085+05 |
| 235 | 2154+59 | 235 | 2137+29 |
| 236 | 2207+09 | 236 | 2189+44 |
| 237 | 2259+88 | 237 | 2240+86 |
| 238 | 2311+66 | 238 | 2293+85 |
| 239 | 2364+28 | 239 | 2344+91 |
| 240 | 2416+01 | 240 | 2397+41 |
| 241 | 2467+79 | 241 | 2448+96 |
| 242 | 2518+51 | 242 | 2496+68 |
| 243 | 2571+26 | 243 | 2549+70 |
| 244 | 2620+38 | 244 | 2601+82 |
| 245 | 2677+47 | 245 | 2655+01 |
| 246 | 2729+53 | 246 | 2703+04 |
| 247 | 2741+30 | 247 | 2747+68 |
| 248 | 2794+18 | 248 | 2801+15 |
| 249 | 2847+25 | 249 | 2854+41 |
| 250 | 2899+69 | 250 | 2906+58 |



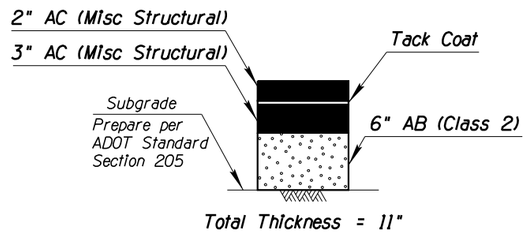

## DETAIL D2
## TYPICAL ROADWAY SECTION SUPERELEVATION RIGHT CORRECTION




## DETAIL D1
## TYPICAL SHOULDER WIDENING




## DETAIL D3
## TYPICAL ROADWAY SECTION SUPERELEVATION LEFT CORRECTION




Total Thickness = 11"

## PAVEMENT STRUCTURAL SECTION

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

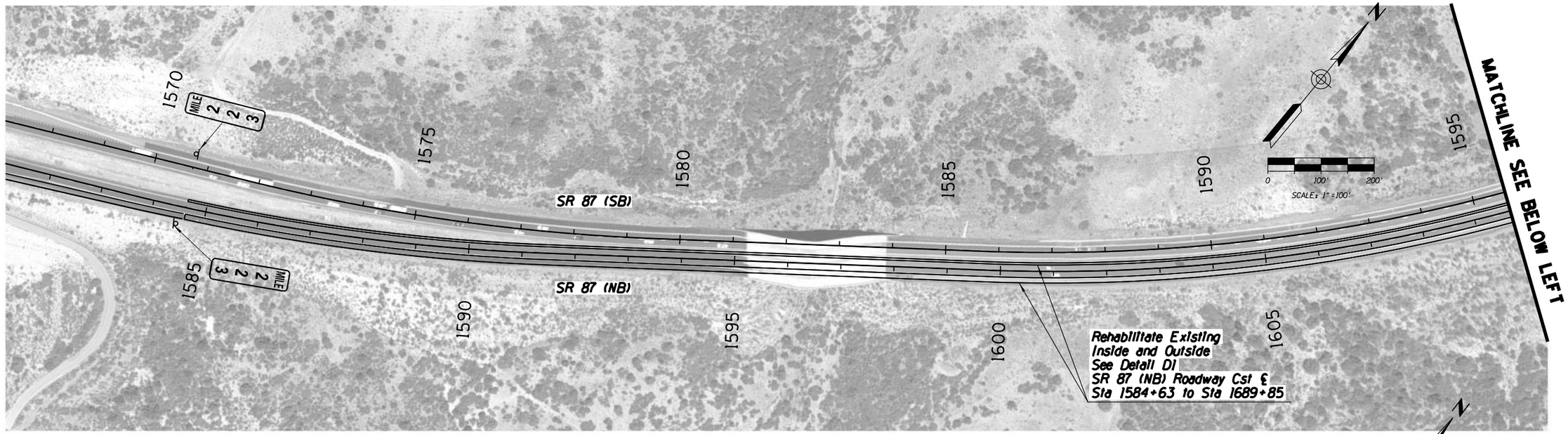
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

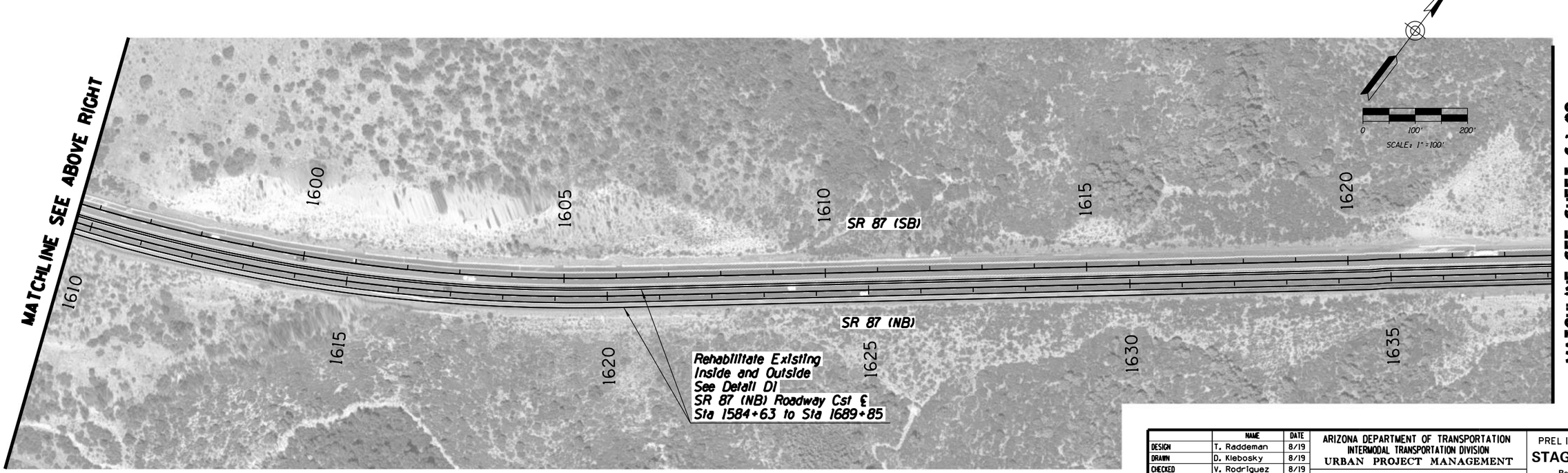
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | ___ OF ___ |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |

-




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "7 NB IMPROVEMENTS
MP 218.5 TO 226

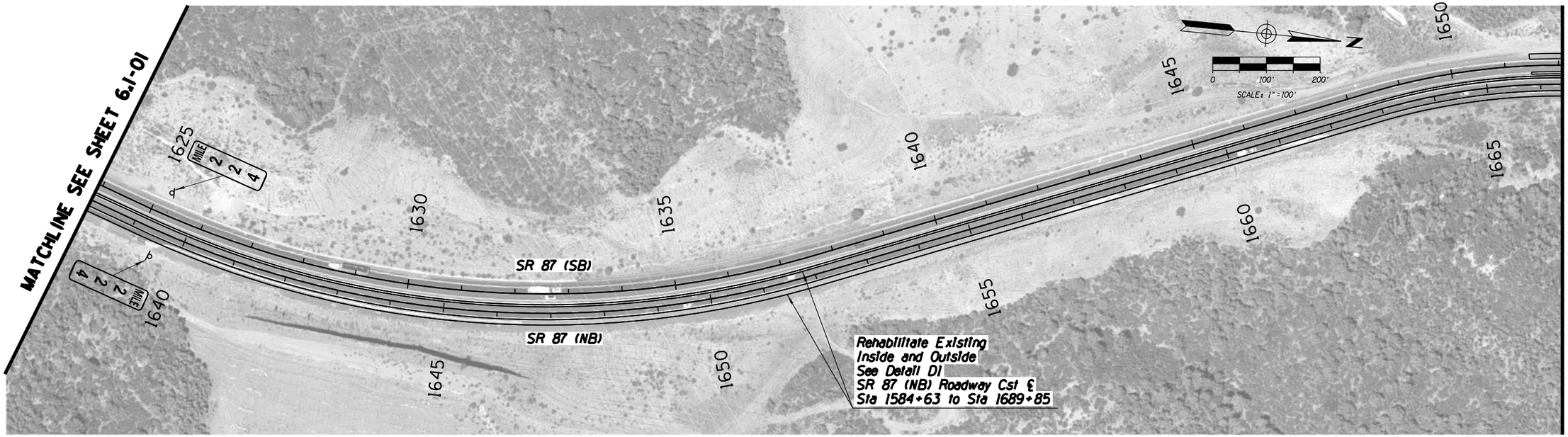
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

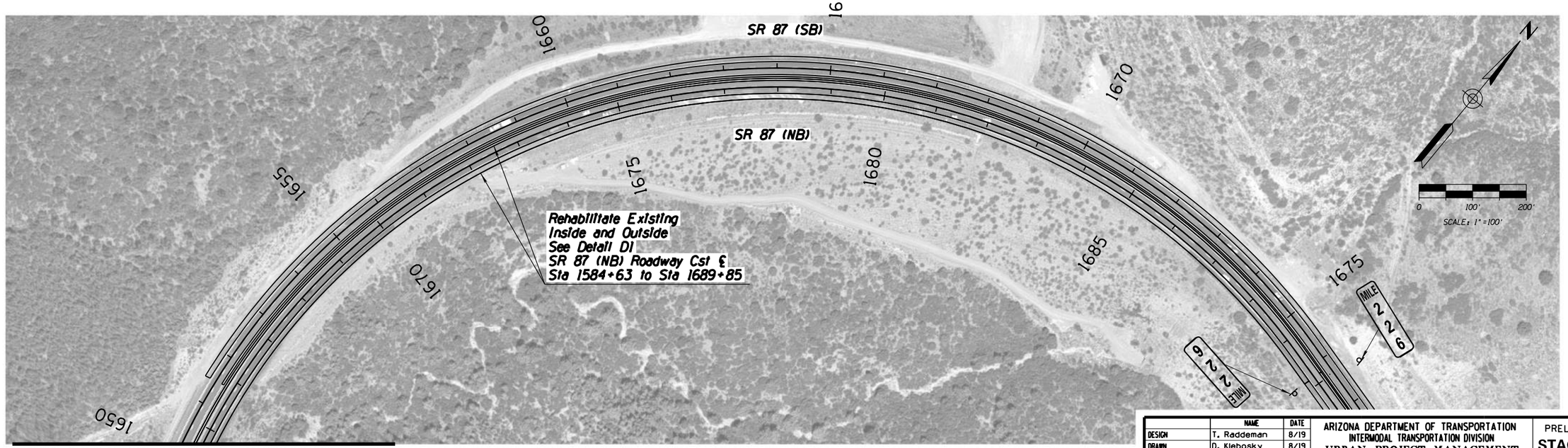
| ROUTE | LOCATION | DWG NO. 6.1-01 |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




MATCHLINE SEE ABOVE RIGHT

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "7 NB IMPROVEMENTS
MP 218.5 TO 226

ROUTE: SR 87
LOCATION: MP 190 TO MP 250

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

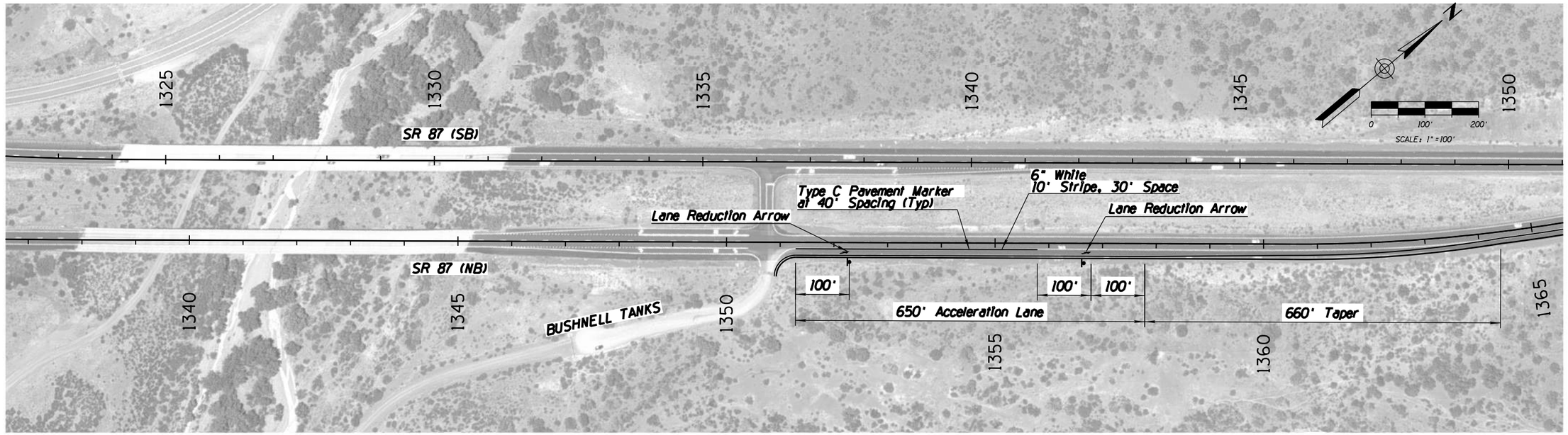
DWG NO. 6.1-02

___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

| | NAME | DATE |
|---|---|---|
| DESIGN | SS | 8/19 |
| DRAWN | CEM | 8/19 |
| CHECKED | RLK | 8/19 |

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INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "7 NB IMPROVEMENTS
MP 218.5 TO 226

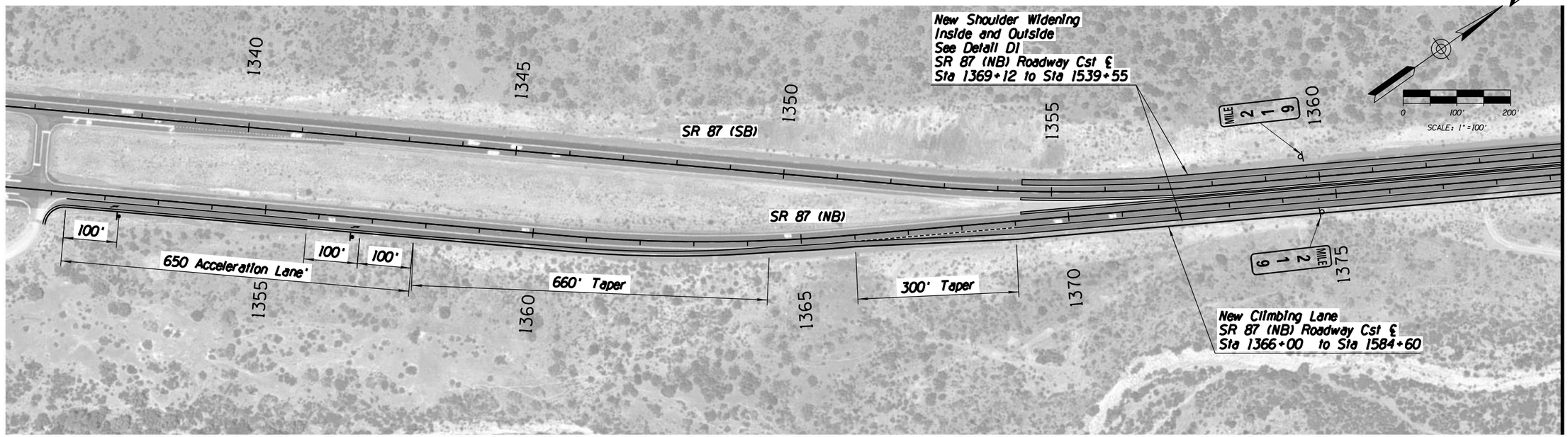
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

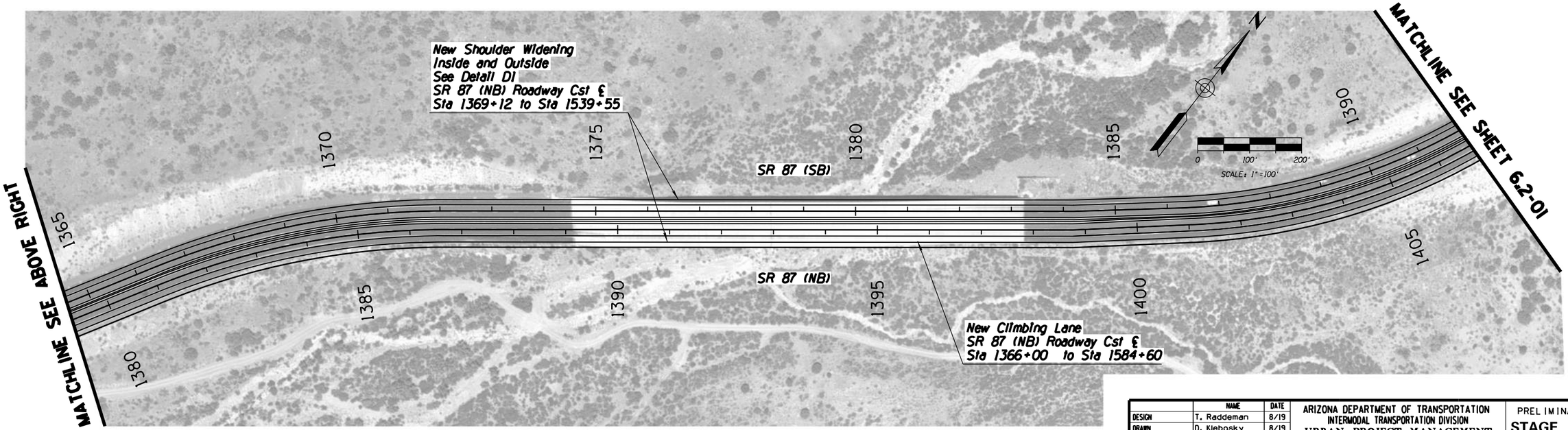
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 6.2-01 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "7 NB IMPROVEMENTS
MP 218.5 TO 226

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 6.4-01 |

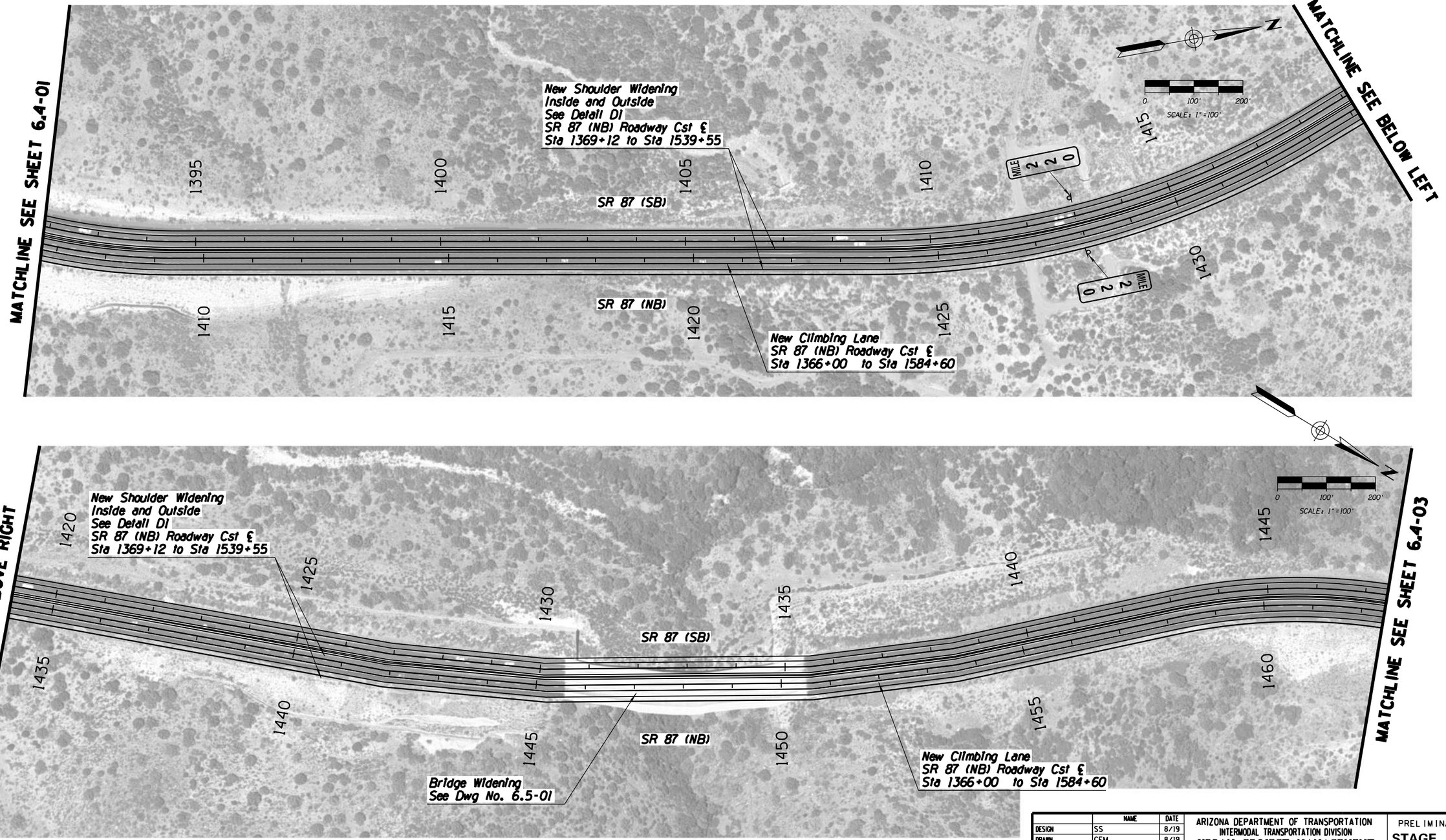
TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |

-




| | NAME | DATE |
|---|---|---|
| DESIGN | SS | 8/19 |
| DRAWN | CEM | 8/19 |
| CHECKED | RLK | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "7 NB IMPROVEMENTS
MP 218.5 TO 226

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 6.4-02 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

New Shoulder Widening
Inside and Outside
See Detail D1
SR 87 (NB) Roadway Cst ℄
Sta 1369+12 to Sta 1539+55

SR 87 (SB)

SR 87 (NB)

New Climbing Lane
SR 87 (NB) Roadway Cst ℄
Sta 1366+00 to Sta 1584+60

MILE 211

MILE 221

1450 1455 1460 1465 1470 1475 1480 1485 1490

N

0 100' 200'
SCALE: 1" = 100'

MATCHLINE SEE SHEET 6.4-02

MATCHLINE SEE BELOW LEFT

MATCHLINE SEE ABOVE RIGHT

MATCHLINE SEE SHEET 6.4-04

1480 1485 1490 1495 1500 1505 1510 1515

New Shoulder Widening
Inside and Outside
See Detail D1
SR 87 (NB) Roadway Cst ℄
Sta 1369+12 to Sta 1539+55

SR 87 (SB)

SR 87 (NB)

New Climbing Lane
SR 87 (NB) Roadway Cst ℄
Sta 1366+00 to Sta 1584+60

Bridge Widening
See Dwg No. 6.6-01

N

0 100' 200'
SCALE: 1" = 100'

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "7 NB IMPROVEMENTS
MP 218.5 TO 226

ROUTE: SR 87
LOCATION: MP 190 TO MP 250

TRACS NO. XXXXX XXX

XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

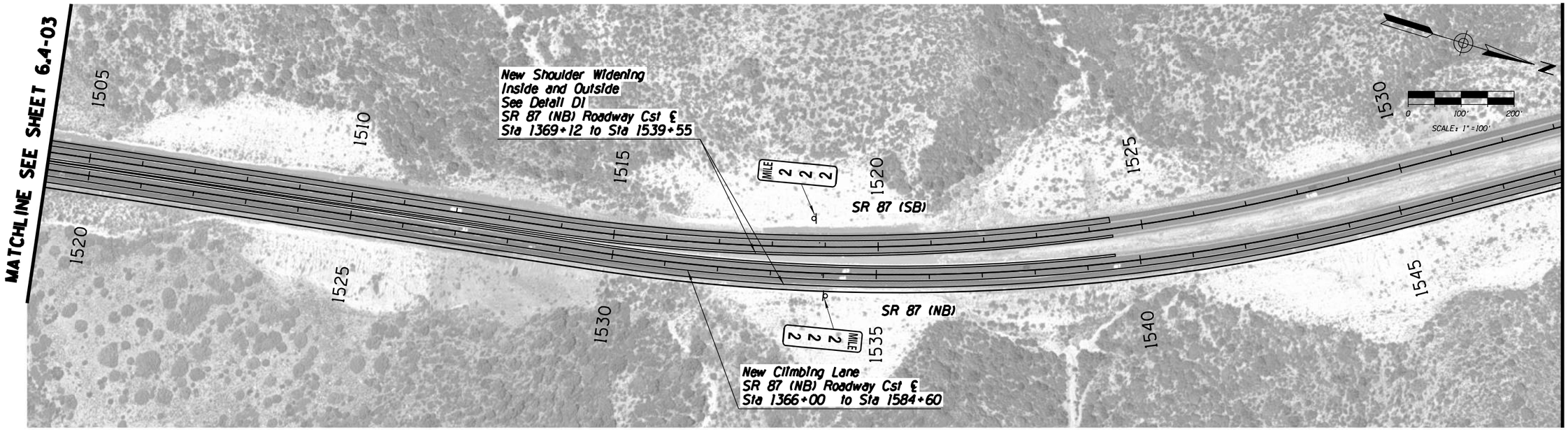
DWG NO. 6.4-03

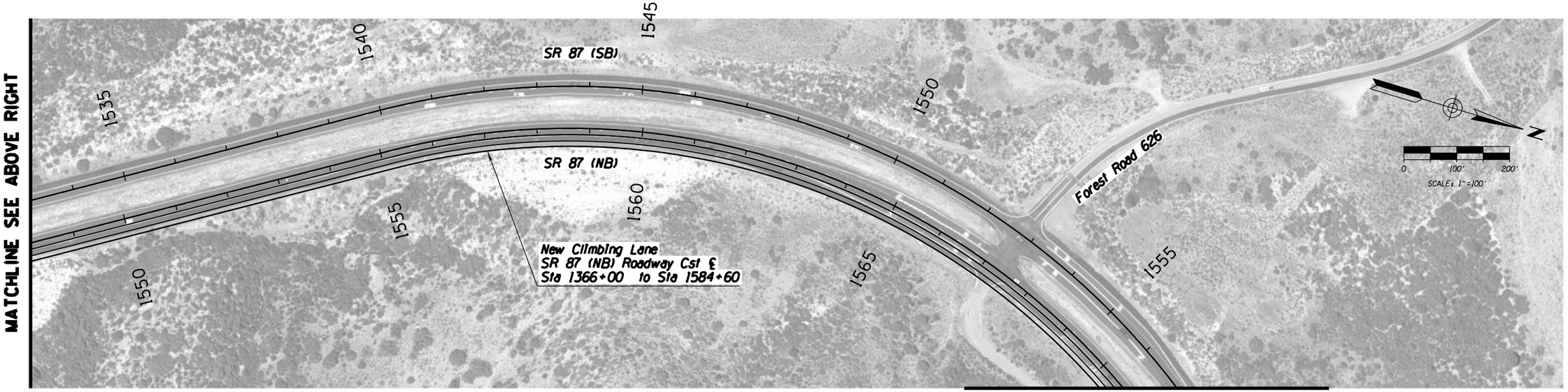
___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "7 NB IMPROVEMENTS
MP 218.5 TO 226

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

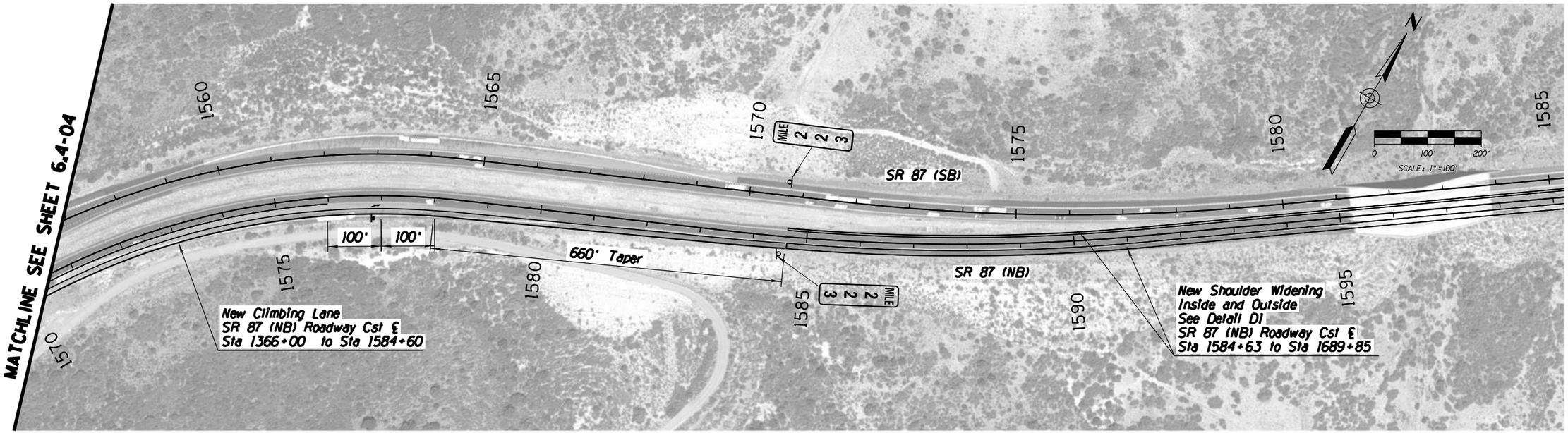
DWG NO. 6.4-04

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "7 NB IMPROVEMENTS
MP 218.5 TO 226

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

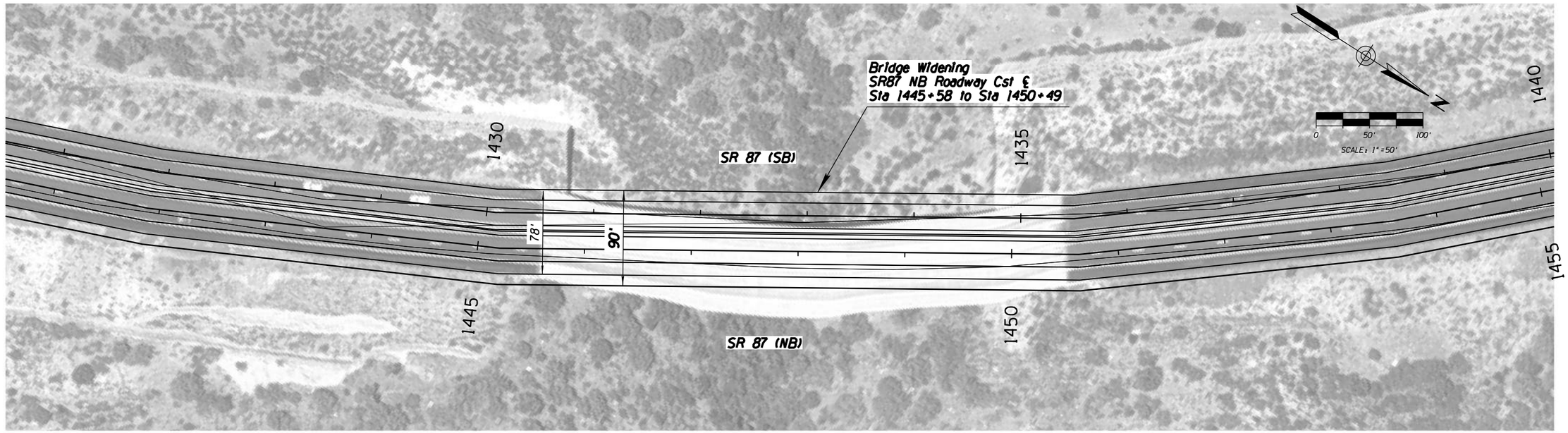
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 6.4-05 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "7 NB IMPROVEMENTS
MP 218.5 TO 226

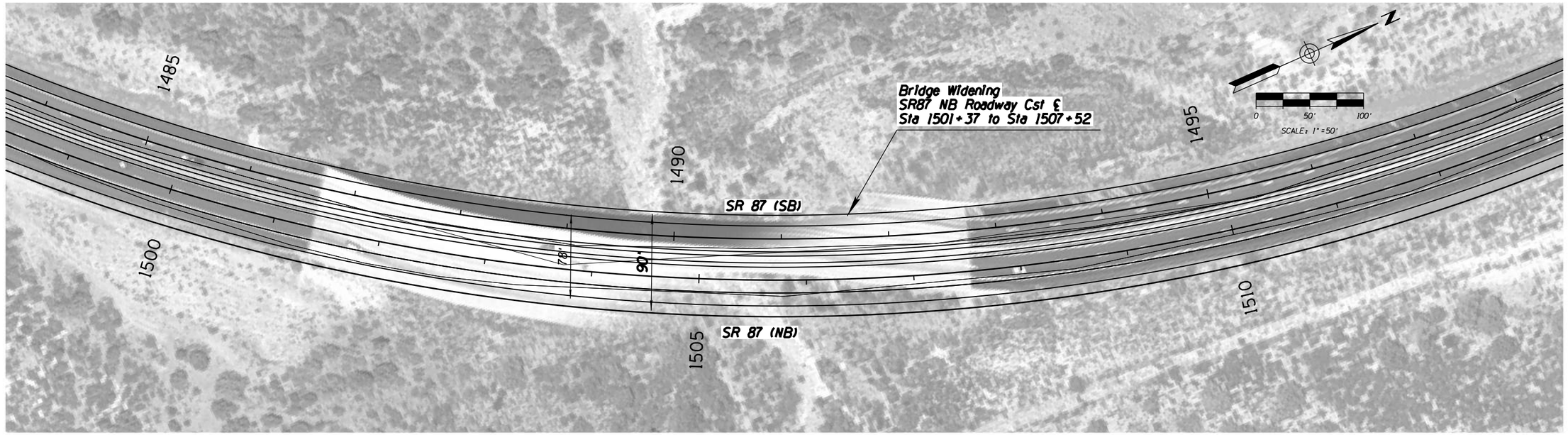
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. 6.5-01 |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "7 NB IMPROVEMENTS
MP 218.5 TO 226

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 6.6-01 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

# PACKAGE PROJECT 8 –
# SLATE CREEK IMPROVEMENTS
# (MP 226-232)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **ADOT Project Manager:** |
| **Project Name:** Slate Creek Improvements (MP 226-232) | |
| **City/Town:** N/A | **County:** Gila |
| **COG/MPO:** CAG | **ADOT District:** Northcentral |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 226 | |
| **End Limit:** 232 | |
| **Project Length:** 6 Miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☐County ☐ADOT ☐Private ☒Federal ☐Tribal ☐Other | |

| PROJECT NEED |
|---|
| Shoulder widths are substandard and are in poor condition in some areas causing safety and emergency response issues. |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☐Expansion |
| Widen shoulders, where they are substandard, and rehabilitate shoulders, where needed, to create a consistent recovery area and aid in emergency response. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☐Utilities |
| ☐Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>Click or tap here to enter text. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☒HSIP | ☒State |
| | ☐Local | ☐Private | ☒Tribal | ☐Other |

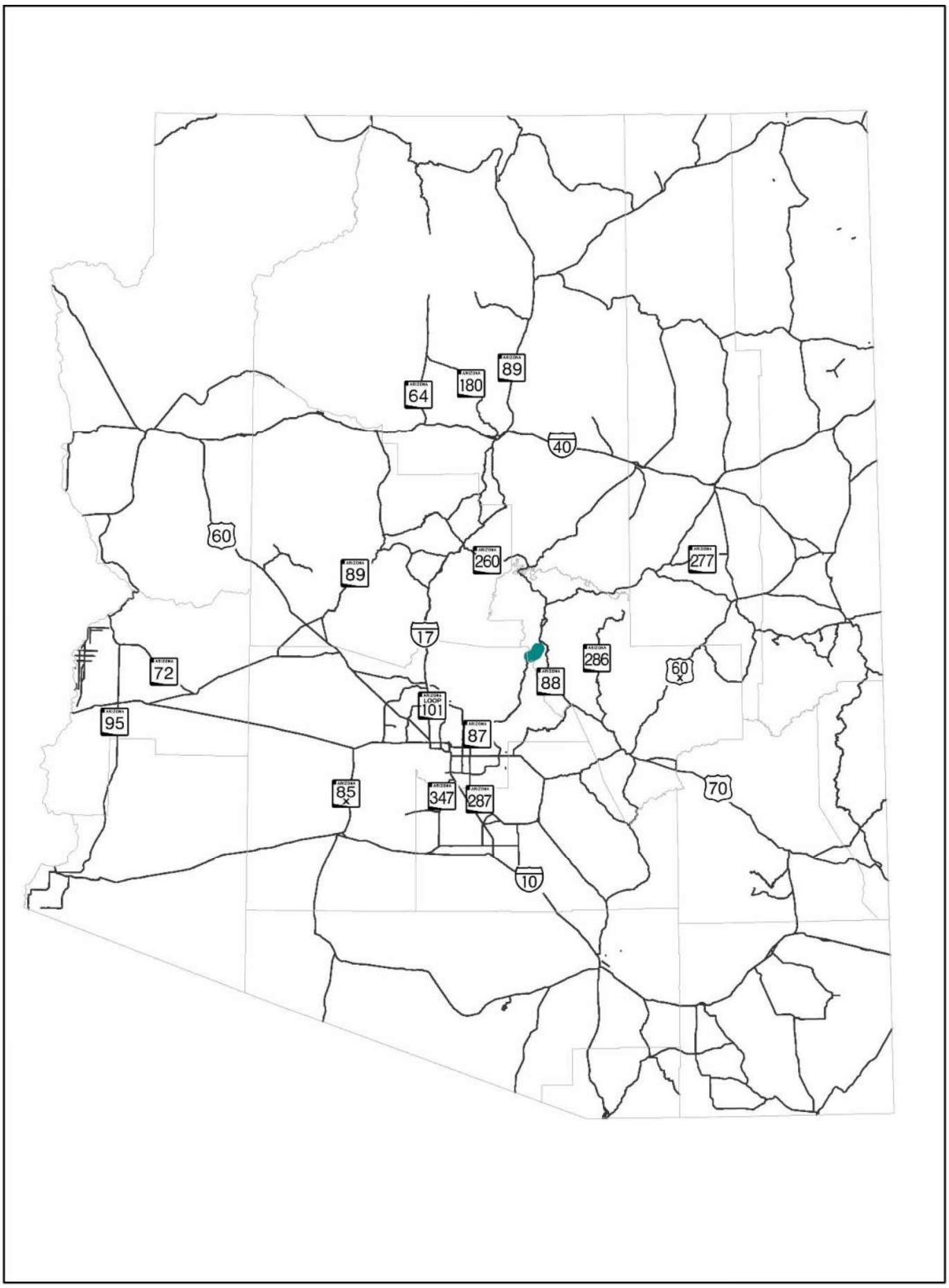
| COST ESTIMATE | | | |
|---|---|---|---|
| Design | Right-of-Way | Construction | Total |
| $1,257,900.00 | $0.00 | $16,354,900.00 | $17,612,800 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

| ATTACHMENTS |
| --- |
| 1. **Project Scope of Work**<br>2. **State Location Map**<br>3. **Project Vicinity Map**<br>4. **Itemized Cost Estimate**<br>5. **Conceptual Design Plans** |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Rehabilitate northbound shoulder (MP 227.8-229)<br>• Widen inside shoulders to four feet and outside shoulders to ten feet (Northbound: MP 226-227.8, Southbound: MP 226-228.5)<br>• Widen southbound inside shoulders to four feet (MP 230.8-230.9)<br>• Widen inside shoulder to four feet in both directions (MP 231.5-232) |

ATTACHMENT 2: STATE LOCATION MAP



ATTACHMENT 3: PROJECT VICINITY MAP


| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Rehabilitate NB shoulders | 25 | 227.8 | 229 | $666,700 | The shoulders in this location are in poor condition, with significant cracking and vegetation growing. |
| 2. Widen inside shoulders to 4' and outside shoulders to 10' | 53 | NB: 226<br>SB: 226 | NB: 227.8<br>SB: 228.5 | $15,448,300 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| 3. Widen SB inside shoulders to 4' | 63 | 230.8 | 230.9 | $196,700 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| 4. Widen inside shoulder to 4' in both directions | 67 | 231.5 | 232 | $1,301,100 | The current shoulders are of insufficient widths per current safety standards and for effective emergency response. |
| | | | Total: | $17,612,800 | |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**25. Rehabilitate northbound shoulders (MP 227.8-229)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2020053 | REMOVE (GR TERMINAL) | EACH | 1 | $400.00 | $400 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 686 | $5.00 | $3,430 |
| 2020085 | REMOVE BITUMINOUS PAVEMENT (MILLING) (3") | SQ.YD. | 8,248 | $3.00 | $24,744 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 1,510 | $120.00 | $181,200 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 244 | $100.00 | $24,400 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $5,301.70 | $5,302 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 1,326 | $30.00 | $39,780 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 1 | $2,500.00 | $2,500 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 1 | $800.00 | $800 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 10,604 | $0.75 | $7,953 |
| | | | **Roadway Construction Subtotal** | | **$300,509** |
| | Unidentified Item Allowance (15%) | | | | $ 45,077 |
| | | | | **Subtotal** | **$345,586** |
| | Water Supply/Dust Palliative (3%) | | | | $ 10,368 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 51,838 |
| | Erosion Control (1%) | | | | $ 3,456 |
| | Contractor Quality Control (2%) | | | | $ 6,912 |
| | Construction Surveying And Layout (2%) | | | | $ 6,912 |
| | | | | **Other Item Subtotal** | **$425,072** |
| | Mobilization (12%) | | | | $ 51,009 |
| | | | | **Construction Subtotal** | **$ 476,081** |
| | Engineering Design (10%) | | | | $ 47,609 |
| | Construction Engineering and Contingencies (20%) | | | | $ 95,217 |
| | Indirect Cost Allocation (10.02%) | | | | $ 47,704 |
| | | | | **Construction Total** | **$ 666,611** |

Kimley»Horn

**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**53. Widen northbound inside and outside shoulders (MP 226 – 227.8)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 11 | $5,000.00 | $55,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 3,286 | $20.00 | $65,720 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 3,697 | $5.00 | $18,485 |
| 2020201 | SAW CUTTING | L.FT. | 29,569 | $2.50 | $73,923 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 164,270 | $7.00 | $1,149,890 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 10,952 | $50.00 | $547,600 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 5,977 | $80.00 | $478,160 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 388 | $90.00 | $34,920 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $14,784.00 | $14,784 |
| 8050003 | SEEDING (CLASS II) | ACRE | 11 | $3,500.00 | $38,500 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 3,697 | $30.00 | $110,910 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 4 | $2,500.00 | $10,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 4 | $800.00 | $3,200 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 29,569 | $0.75 | $22,177 |
| | | | **Roadway Construction Subtotal** | | **$2,634,868** |
| | Unidentified Item Allowance (15%) | | | | $ 395,231 |
| | | | | **Subtotal** | **$3,030,099** |
| | Water Supply/Dust Palliative (3%) | | | | $ 90,903 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 454,515 |
| | Erosion Control (1%) | | | | $ 30,301 |
| | Contractor Quality Control (2%) | | | | $ 60,602 |
| | Construction Surveying And Layout (2%) | | | | $ 60,602 |
| | | | | **Other Item Subtotal** | **$3,727,022** |
| | Mobilization (12%) | | | | $ 447,243 |
| | | | | **Construction Subtotal** | **$ 4,174,265** |
| | Engineering Design (10%) | | | | $ 417,427 |
| | Construction Engineering and Contingencies (20%) | | | | $ 834,854 |
| | Indirect Cost Allocation (10.02%) | | | | $ 418,262 |
| | | | | **Construction Total** | **$ 5,844,809** |

Kimley»Horn

**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**53. Widen southbound inside and outside shoulders (MP 226 - 228.5)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 17 | $5,000.00 | $85,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 5,432 | $20.00 | $108,640 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 6,110 | $5.00 | $30,550 |
| 2020201 | SAW CUTTING | L.FT. | 48,880 | $2.50 | $122,200 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 271,560 | $7.00 | $1,900,920 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 18,104 | $50.00 | $905,200 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 9,880 | $80.00 | $790,400 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 641 | $90.00 | $57,690 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $24,440.00 | $24,440 |
| 8050003 | SEEDING (CLASS II) | ACRE | 17 | $3,500.00 | $59,500 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 6,110 | $30.00 | $183,300 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 4 | $2,500.00 | $10,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 4 | $800.00 | $3,200 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 48,880 | $0.75 | $36,660 |
| | | | **Roadway Construction Subtotal** | | **$4,329,300** |
| | Unidentified Item Allowance (15%) | | | | $ 649,395 |
| | | | | **Subtotal** | **$4,978,695** |
| | Water Supply/Dust Palliative (3%) | | | | $ 149,361 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 746,805 |
| | Erosion Control (1%) | | | | $ 49,787 |
| | Contractor Quality Control (2%) | | | | $ 99,574 |
| | Construction Surveying And Layout (2%) | | | | $ 99,574 |
| | | | | **Other Item Subtotal** | **$6,123,796** |
| | Mobilization (12%) | | | | $ 734,856 |
| | | | | **Construction Subtotal** | **$ 6,858,652** |
| | Engineering Design (10%) | | | | $ 685,866 |
| | Construction Engineering and Contingencies (20%) | | | | $ 1,371,731 |
| | Indirect Cost Allocation (10.02%) | | | | $ 687,237 |
| | | | | **Construction Total** | **$ 9,603,486** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**63. Widen southbound inside shoulder to 4' (MP 230.8-230.9)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 63 | $35.00 | $2,205 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 2 | $400.00 | $800 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 561 | $5.00 | $2,805 |
| 2020201 | SAW CUTTING | L.FT. | 561 | $2.50 | $1,403 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 840 | $10.00 | $8,400 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 187 | $120.00 | $22,440 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 93 | $160.00 | $14,880 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 6 | $120.00 | $720 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $561.00 | $561 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 561 | $30.00 | $16,830 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 1 | $2,500.00 | $2,500 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 1 | $800.00 | $800 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 561 | $1.50 | $842 |
| | | | **Roadway Construction Subtotal** | | **$88,685** |
| | Unidentified Item Allowance (15%) | | | | $ 13,303 |
| | | | | **Subtotal** | **$101,988** |
| | Water Supply/Dust Palliative (3%) | | | | $ 3,060 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 15,299 |
| | Erosion Control (1%) | | | | $ 1,020 |
| | Contractor Quality Control (2%) | | | | $ 2,040 |
| | Construction Surveying And Layout (2%) | | | | $ 2,040 |
| | | | | **Other Item Subtotal** | **$125,447** |
| | Mobilization (12%) | | | | $ 15,054 |
| | | | | **Construction Subtotal** | **$ 140,501** |
| | Engineering Design (10%) | | | | $ 14,051 |
| | Construction Engineering and Contingencies (20%) | | | | $ 28,101 |
| | Indirect Cost Allocation (10.02%) | | | | $ 14,079 |
| | | | | **Construction Total** | **$ 196,732** |

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# SR87 Corridor Development Study
## ITEMIZED COST ESTIMATE

**67. Widen inside shoulder to 4' (MP 231.5-232)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 2 | $5,000.00 | $10,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 281 | $20.00 | $5,620 |
| 2020201 | SAW CUTTING | L.FT. | 2,527 | $2.50 | $6,318 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 3,750 | $10.00 | $37,500 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 843 | $120.00 | $101,160 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 418 | $160.00 | $66,880 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 25 | $120.00 | $3,000 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $2,527.00 | $2,527 |
| 8050003 | SEEDING (CLASS II) | ACRE | 2 | $3,500.00 | $7,000 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 2,527 | $0.75 | $1,895 |
| | | | | **Roadway Construction Subtotal** | **$246,900** |
| | Unidentified Item Allowance (15%) | | | | $ 37,035 |
| | | | | **Subtotal** | **$283,935** |
| | Water Supply/Dust Palliative (3%) | | | | $ 8,519 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 42,591 |
| | Erosion Control (1%) | | | | $ 2,840 |
| | Contractor Quality Control (2%) | | | | $ 5,679 |
| | Construction Surveying And Layout (2%) | | | | $ 5,679 |
| | | | | **Other Item Subtotal** | **$349,243** |
| | Mobilization (12%) | | | | $ 41,910 |
| | | | | **Construction Subtotal** | **$ 391,153** |
| | Engineering Design (10%) | | | | $ 39,116 |
| | Construction Engineering and Contingencies (20%) | | | | $ 78,231 |
| | Indirect Cost Allocation (10.02%) | | | | $ 39,194 |
| | | | | **Construction Total** | **$ 547,694** |

Kimley»Horn

**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

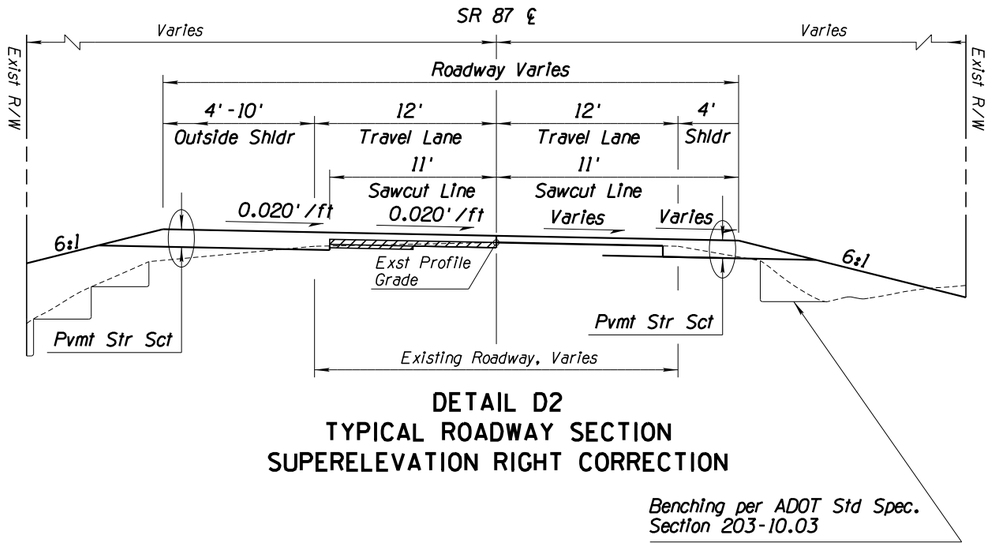
**67. Widen southbound inside shoulder to 4' (MP 231.5-232)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 2 | $5,000.00 | $10,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 281 | $20.00 | $5,620 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 2 | $400.00 | $800 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 2,528 | $5.00 | $12,640 |
| 2020201 | SAW CUTTING | L.FT. | 2,528 | $2.50 | $6,320 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 3,750 | $10.00 | $37,500 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 843 | $120.00 | $101,160 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 419 | $160.00 | $67,040 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 25 | $120.00 | $3,000 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $2,528.00 | $2,528 |
| 8050003 | SEEDING (CLASS II) | ACRE | 2 | $3,500.00 | $7,000 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 2,528 | $30.00 | $75,840 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 1 | $2,500.00 | $2,500 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 1 | $800.00 | $800 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 2,528 | $0.75 | $1,896 |
| | | | **Roadway Construction Subtotal** | | **$339,644** |
| | Unidentified Item Allowance (15%) | | | | $ 50,947 |
| | | | | **Subtotal** | **$390,591** |
| | Water Supply/Dust Palliative (3%) | | | | $ 11,718 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 58,589 |
| | Erosion Control (1%) | | | | $ 3,906 |
| | Contractor Quality Control (2%) | | | | $ 7,812 |
| | Construction Surveying And Layout (2%) | | | | $ 7,812 |
| | | | | **Other Item Subtotal** | **$480,428** |
| | Mobilization (12%) | | | | $ 57,652 |
| | | | | **Construction Subtotal** | **$ 538,080** |
| | Engineering Design (10%) | | | | $ 53,808 |
| | Construction Engineering and Contingencies (20%) | | | | $ 107,616 |
| | Indirect Cost Allocation (10.02%) | | | | $ 53,916 |
| | | | | **Construction Total** | **$ 753,420** |

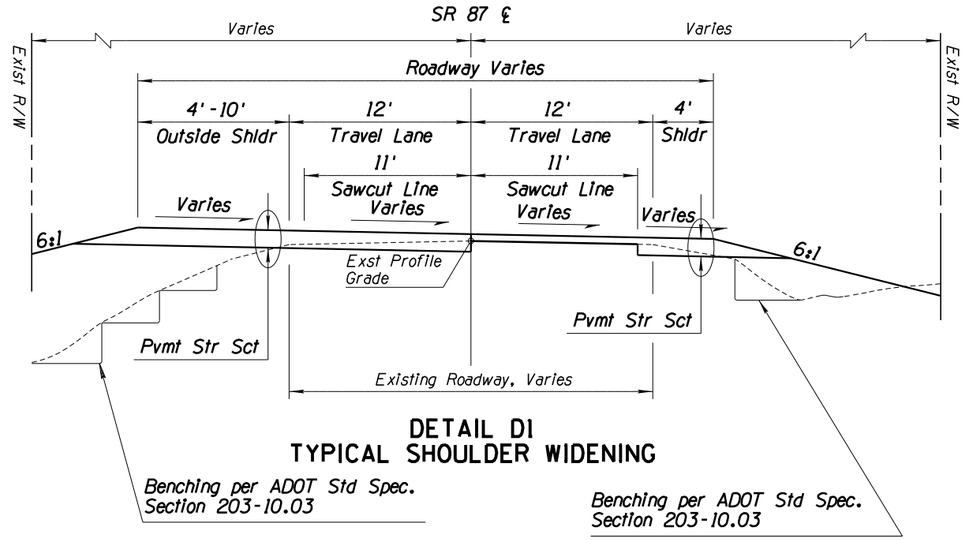
ATTACHMENT 5: PRELIMINARY PLANS

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

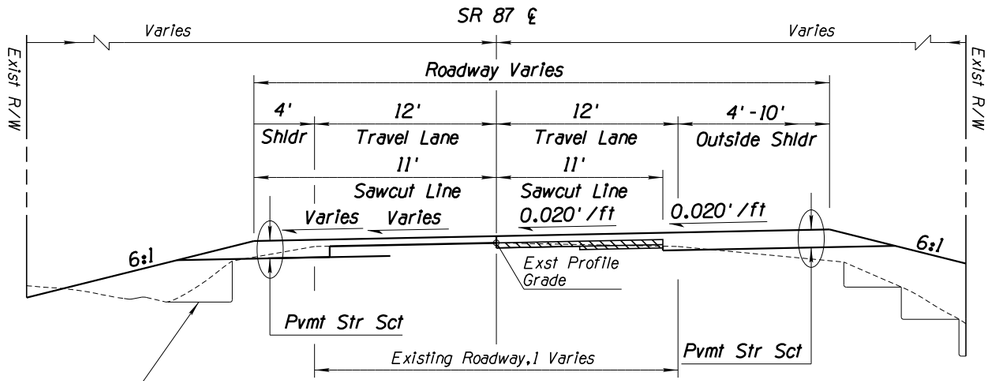
| SR 87 MILE POST STATION | | | |
|---|---|---|---|
| MP NB | STATION | MP SB | STATION |
| 196 | 101+73 | 196 | 101+18 |
| 197 | 155+53 | 197 | 154+02 |
| 198 | 207+69 | 198 | 207+94 |
| 199 | 261+02 | 199 | 259+13 |
| 200 | 314+21 | 200 | 311+72 |
| 201 | 367+73 | 201 | 364+06 |
| 202 | 419+18 | 202 | 417+81 |
| 203 | 471+36 | 203 | 470+65 |
| 204 | 526+28 | 204 | 523+10 |
| 205 | 577+70 | 205 | 575+84 |
| 206 | 630+73 | 206 | 628+30 |
| 207 | 682+81 | 207 | 680+28 |
| 208 | 736+47 | 208 | 734+12 |
| 209 | 788+55 | 209 | 786+62 |
| 210 | 842+08 | 210 | 839+50 |
| 211 | 894+91 | 211 | 890+40 |
| 212 | 942+20 | 212 | 939+42 |
| 213 | 998+65 | 213 | 995+55 |
| 214 | 1051+86 | 214 | 1050+06 |
| 215 | 1105+38 | 215 | 1095+77 |
| 216 | 1158+68 | 216 | 1147+95 |
| 217 | 1213+92 | 217 | 1199+48 |
| 218 | 1268+31 | 218 | 1250+20 |
| 219 | 1318+19 | 219 | 1304+12 |
| 220 | 1374+67 | 220 | 1359+76 |
| 221 | 1427+95 | 221 | 1412+99 |
| 222 | 1480+60 | 222 | 1465+84 |
| 223 | 1533+97 | 223 | 1518+89 |
| 224 | 1584+61 | 224 | 1570+72 |
| 225 | 1639+50 | 225 | 1625+29 |
| 226 | 1689+86 | 226 | 1676+32 |
| 227 | 1740+23 | 227 | 1726+14 |
| 228 | 1792+50 | 228 | 1778+04 |
| 229 | 1845+24 | 229 | 1831+98 |
| 230 | 1898+50 | 230 | 1884+70 |
| 231 | 1949+61 | 231 | 1933+71 |
| 232 | 1999+33 | 232 | 1985+29 |
| 233 | 2047+74 | 233 | 2033+06 |
| 234 | 2101+13 | 234 | 2085+05 |
| 235 | 2154+59 | 235 | 2137+29 |
| 236 | 2207+09 | 236 | 2189+44 |
| 237 | 2259+88 | 237 | 2240+86 |
| 238 | 2311+66 | 238 | 2293+85 |
| 239 | 2364+28 | 239 | 2344+91 |
| 240 | 2416+01 | 240 | 2397+41 |
| 241 | 2467+79 | 241 | 2448+96 |
| 242 | 2518+51 | 242 | 2496+68 |
| 243 | 2571+26 | 243 | 2549+70 |
| 244 | 2620+38 | 244 | 2601+82 |
| 245 | 2677+47 | 245 | 2655+01 |
| 246 | 2729+53 | 246 | 2703+04 |
| 247 | 2741+30 | 247 | 2747+68 |
| 248 | 2794+18 | 248 | 2801+15 |
| 249 | 2847+25 | 249 | 2854+41 |
| 250 | 2899+69 | 250 | 2906+58 |



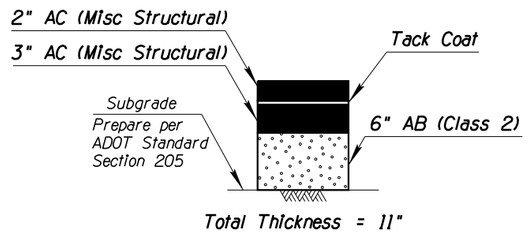

## DETAIL D2
## TYPICAL ROADWAY SECTION SUPERELEVATION RIGHT CORRECTION




## DETAIL D1
## TYPICAL SHOULDER WIDENING




## DETAIL D3
## TYPICAL ROADWAY SECTION SUPERELEVATION LEFT CORRECTION




Total Thickness = 11"

## PAVEMENT STRUCTURAL SECTION

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn

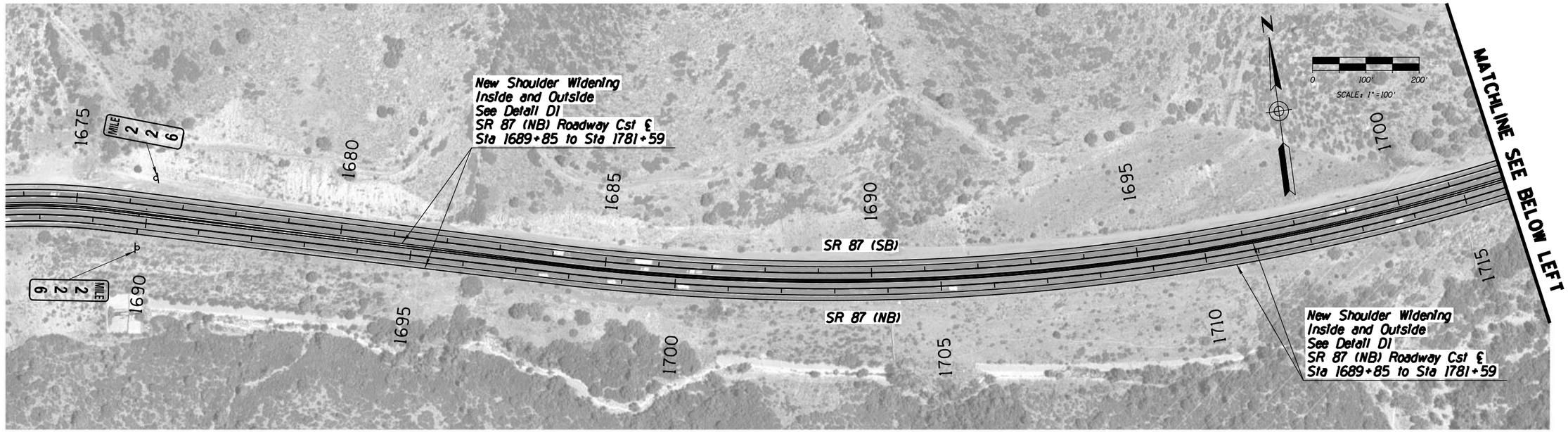

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

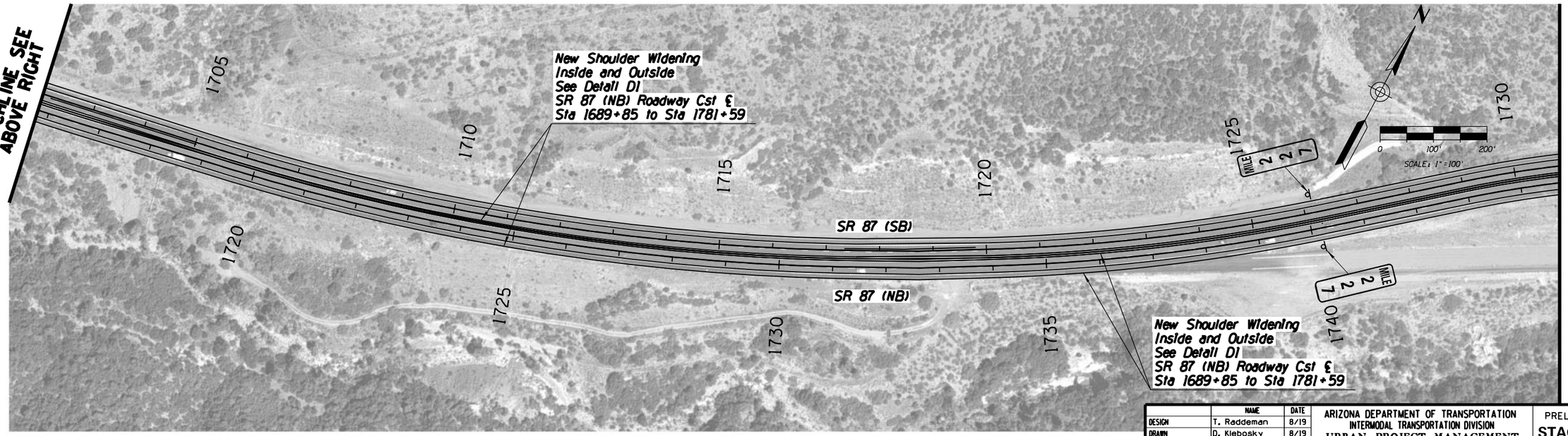
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | ___ OF ___ |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | |

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "8
SLATE CREEK IMPROVEMENTS
MP 226 TO 232

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 9.1-01 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

MATCHLINE SEE SHEET 9.1-01

New Shoulder Widening
Inside and Outside
See Detail D1
SR 87 (SB) Roadway Cst ℄
Sta 1651+45 to Sta 1804+39

1735 1740 1745 1750 1755

SR 87 (SB)

SR 87 (NB)

1745 1750 1755 1760 1765 1770

Runaway Truck Ramp

New Shoulder Widening
Inside and Outside
See Detail D1
SR 87 (NB) Roadway Cst ℄
Sta 1689+85 to Sta 1781+59

MATCHLINE SEE BELOW LEFT

N

0 100' 200'
SCALE: 1"=100'

MATCHLINE SEE ABOVE RIGHT

1760 1765 1770 1775 1780 1785

MILE 228

SR 87 (SB)

SR 87 (NB)

1775 1780 1785 1790 1795 1800

New Shoulder Widening
Inside and Outside
See Detail D1
SR87 (NB) Roadway Cst ℄
Sta 1689+85 to Sta 1781+59

Rehabilitate Existing
Inside and Outside
See Detail D1
SR 87 (NB) Roadway Cst ℄
Sta Sta 1781+59 to Sta 1845+00

New Shoulder Widening
Inside and Outside
See Detail D1
SR 87 (SB) Roadway Cst ℄
Sta 1651+45 to Sta 1804+39

1780 1785 1790 1795 1800

MATCHLINE SEE SHEET 9.1-03

N

0 100' 200'
SCALE: 1"=100'

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "8
SLATE CREEK IMPROVEMENTS
MP 226 TO 232

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

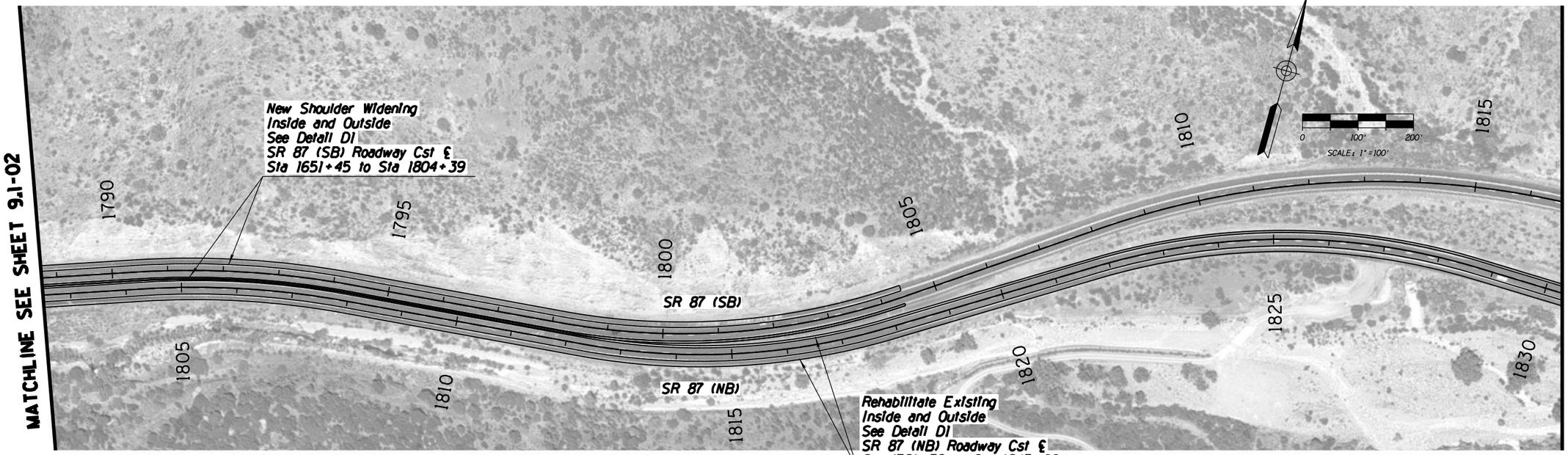
| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

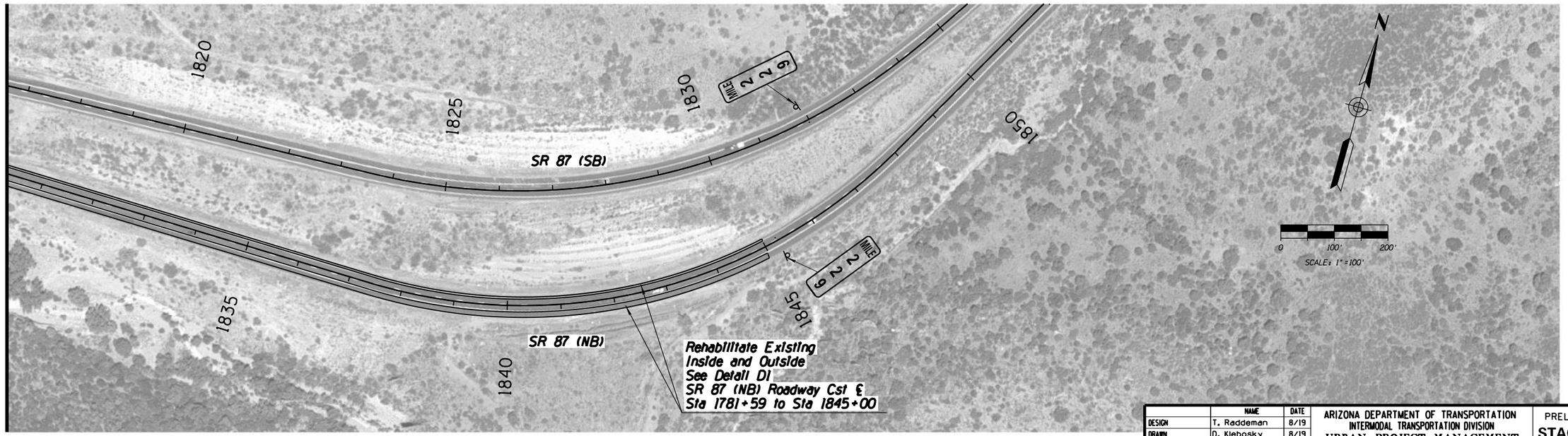
DWG NO. 9.1-02

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "8
SLATE CREEK IMPROVEMENTS
MP 226 TO 232

ROUTE: SR 87
LOCATION: MP 190 TO MP 250

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

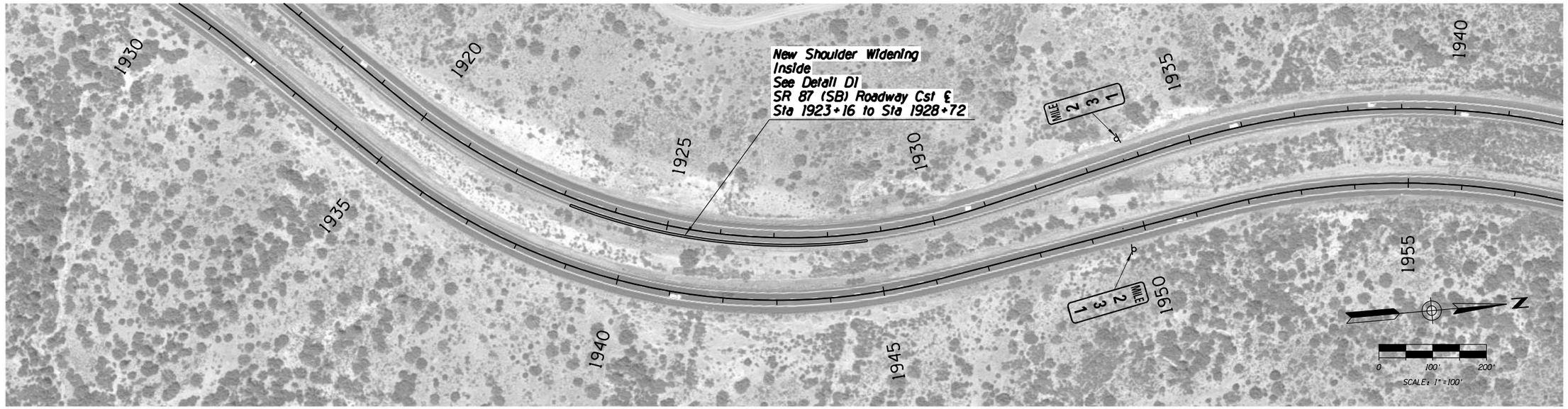
DWG NO. 9.1-03

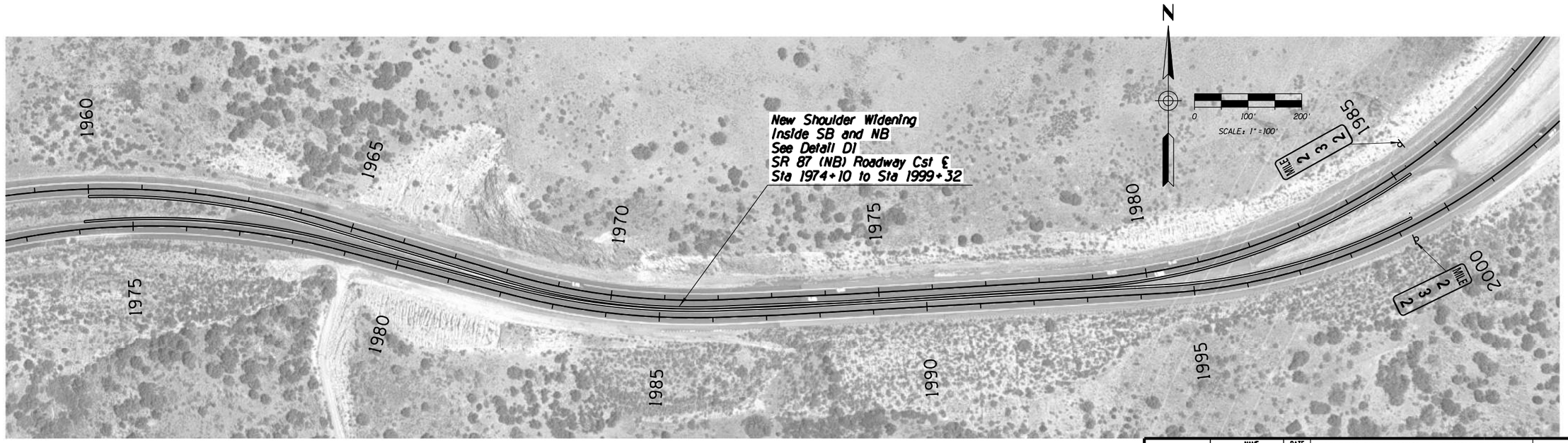
___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "8
SLATE CREEK IMPROVEMENTS
MP 226 TO 232

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 9.3-01 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

# PACKAGE PROJECT 9 – RYE IMPROVEMENTS (MP 239-241)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **ADOT Project Manager:** |
| **Project Name:** Rye Improvements (MP239-241) | |
| **City/Town:** N/A | **County:** Gila |
| **COG/MPO:** CAG | **ADOT District:** Northcentral |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 239 | |
| **End Limit:** 241 | |
| **Project Length:** 2 Miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☒County ☐ADOT ☒Private ☐Federal ☐Tribal ☐Other | |

| PROJECT NEED |
|---|
| This intersection density in this area is higher than the rest of the corridor and there are locations without deceleration lanes leading to large speed differentials in the through travel lanes. |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☐Expansion |
| Supplement signage to increase awareness of the presence of intersections and cross-traffic in the area, as well as add deceleration and acceleration lanes to remove slow-moving vehicles from the through travel lanes. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☐Utilities |
| ☐Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>Click or tap here to enter text. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☒HSIP | ☒State |
| | ☐Local | ☐Private | ☐Tribal | ☐Other |

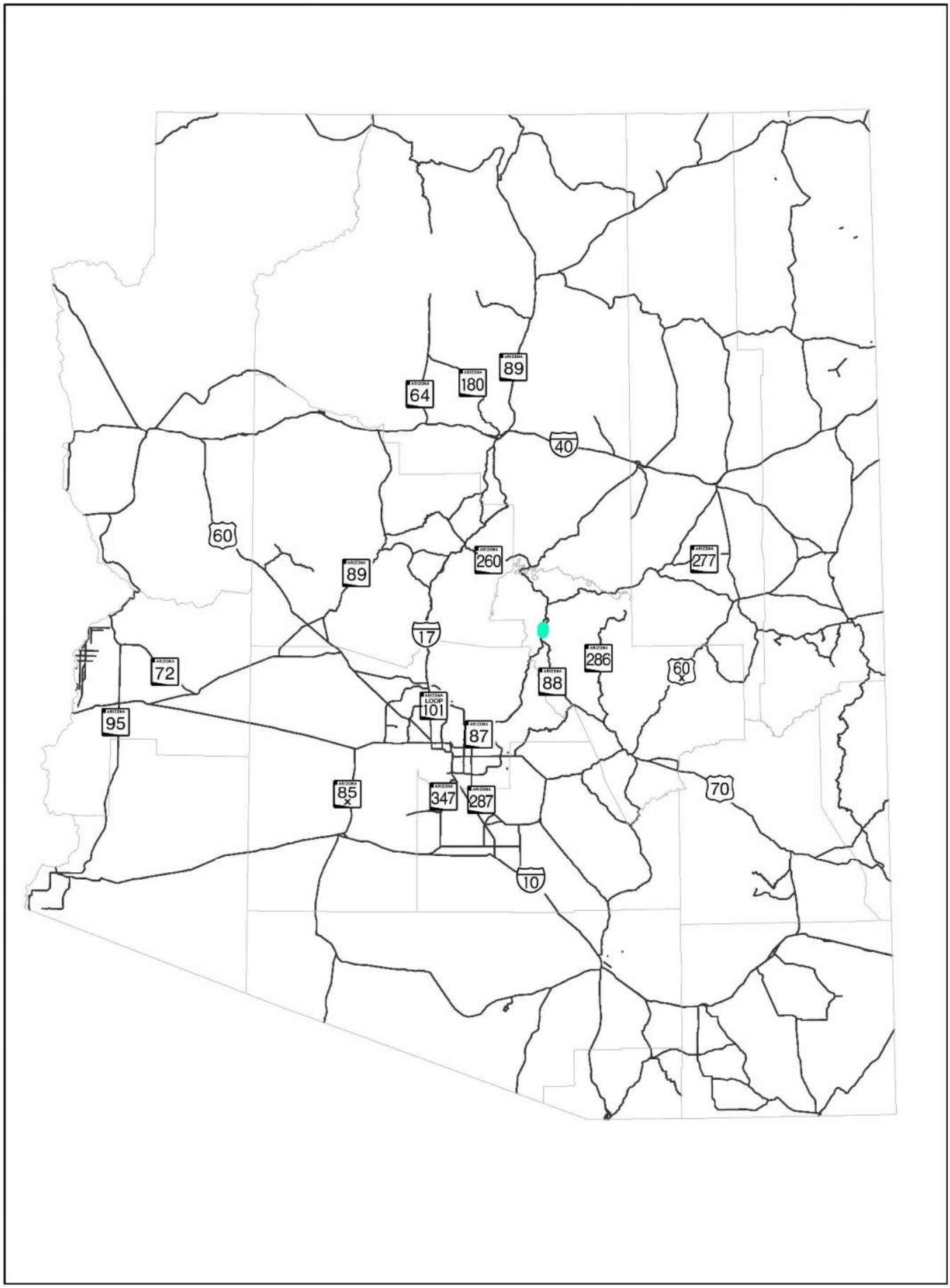
| COST ESTIMATE | | | |
|---|---|---|---|
| Design<br>$499,600.00 | Right-of-Way<br>$0.00 | Construction<br>$6,495,300.00 | Total<br>$6,994,900.00 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

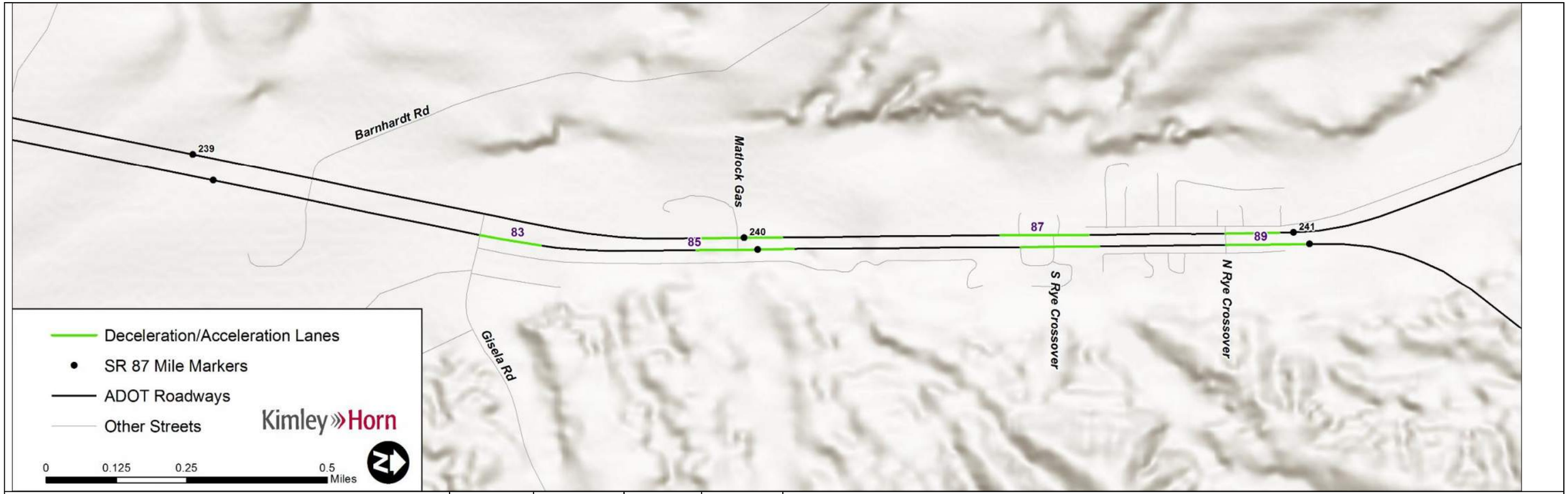
| ATTACHMENTS |
| --- |
| 1. Project Scope of Work<br>2. State Location Map<br>3. Project Vicinity Map<br>4. Itemized Cost Estimate<br>5. Conceptual Design Plans |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Construct northbound outside acceleration lane at Gisela Rd (MP 239.5)<br>• Construct northbound left-turn lane, southbound right-turn lane, northbound inside acceleration lane, and southbound outside acceleration lane at Matlock Gas (MP 240)<br>• Construct right- and left-turn lanes, inside and outside acceleration lanes in both directions at the South Rye Crossover (MP 240.5)<br>• Construct southbound right-turn lane, northbound inside and outside acceleration lanes at the North Rye Crossover (240.9) |

ATTACHMENT 2: STATE LOCATION MAP



ATTACHMENT 3: PROJECT VICINITY MAP




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. NB outside acceleration lane at Gisela Rd. | 83 | 239.5 | 239.5 | $591,800 | Remove slow-moving vehicles from through travel lanes. |
| 2. NB left-turn lane, SB right-turn lane, NB inside acceleration lane, and SB outside acceleration lane at Matlock Gas | 85 | 240 | 240 | $1,593,600 | Provide turn/deceleration and acceleration lanes where they do not currently exist, particularly because of the slow-moving vehicles at this location. |
| 3. Right- and left-turn lanes, inside and outside acceleration lanes in both directions at the S. Rye Crossover | 87 | 240.5 | 240.5 | $3,477,800 | Provide turn/deceleration lanes where they do not currently exist, two crashes were reported in the crash analysis at this location. |
| 4. SB right-turn lane, NB inside and outside acceleration lanes at the N Rye Crossover | 89 | 240.9 | 240.9 | $1,331,700 | Provide turn/deceleration lane where it does not currently exist, especially because of the high speeds measured at this location. |
| | | | Total: | $6,994,900 | |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**83. NB outside accel lane at Gisela Rd (MP 248.4)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 292 | $20.00 | $5,840 |
| 2020201 | SAW CUTTING | L.FT. | 1,310 | $2.50 | $3,275 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 1,170 | $10.00 | $11,700 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 922 | $120.00 | $110,640 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 699 | $160.00 | $111,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 56 | $120.00 | $6,720 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $1,310.00 | $1,310 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 1,310 | $1.50 | $1,965 |
| | | | **Roadway Construction Subtotal** | | **$266,790** |
| | Unidentified Item Allowance (15%) | | | | $ 40,019 |
| | | | | **Subtotal** | **$306,809** |
| | Water Supply/Dust Palliative (3%) | | | | $ 9,205 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 46,022 |
| | Erosion Control (1%) | | | | $ 3,069 |
| | Contractor Quality Control (2%) | | | | $ 6,137 |
| | Construction Surveying And Layout (2%) | | | | $ 6,137 |
| | | | | **Other Item Subtotal** | **$377,379** |
| | Mobilization (12%) | | | | $ 45,286 |
| | | | | **Construction Subtotal** | **$ 422,665** |
| | Engineering Design (10%) | | | | $ 42,267 |
| | Construction Engineering and Contingencies (20%) | | | | $ 84,533 |
| | Indirect Cost Allocation (10.02%) | | | | $ 42,352 |
| | | | | **Construction Total** | **$ 591,817** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**85. Northbound left-turn lane at Matlock Gas (MP 240)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 55 | $35.00 | $1,925 |
| 2020201 | SAW CUTTING | L.FT. | 490 | $2.50 | $1,225 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 440 | $10.00 | $4,400 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 345 | $120.00 | $41,400 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 262 | $160.00 | $41,920 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 21 | $120.00 | $2,520 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $490.00 | $490 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 490 | $1.50 | $735 |
| | | | **Roadway Construction Subtotal** | | **$108,115** |
| | Unidentified Item Allowance (15%) | | | | $ 16,218 |
| | | | | **Subtotal** | **$124,333** |
| | Water Supply/Dust Palliative (3%) | | | | $ 3,730 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 18,650 |
| | Erosion Control (1%) | | | | $ 1,244 |
| | Contractor Quality Control (2%) | | | | $ 2,487 |
| | Construction Surveying And Layout (2%) | | | | $ 2,487 |
| | | | | **Other Item Subtotal** | **$152,931** |
| | Mobilization (12%) | | | | $ 18,352 |
| | | | | **Construction Subtotal** | **$ 171,283** |
| | Engineering Design (10%) | | | | $ 17,129 |
| | Construction Engineering and Contingencies (20%) | | | | $ 34,257 |
| | Indirect Cost Allocation (10.02%) | | | | $ 17,163 |
| | | | | **Construction Total** | **$ 239,832** |

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# SR87 Corridor Development Study
## ITEMIZED COST ESTIMATE

**85. Northbound inside acceleration lane at Matlock Gas (MP 240)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 292 | $20.00 | $5,840 |
| 2020201 | SAW CUTTING | L.FT. | 1,310 | $2.50 | $3,275 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 1,170 | $10.00 | $11,700 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 922 | $120.00 | $110,640 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 699 | $160.00 | $111,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 56 | $120.00 | $6,720 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $1,310.00 | $1,310 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 1,310 | $1.50 | $1,965 |
| | | | **Roadway Construction Subtotal** | | **$266,790** |
| | Unidentified Item Allowance (15%) | | | | $ 40,019 |
| | | | | **Subtotal** | **$306,809** |
| | Water Supply/Dust Palliative (3%) | | | | $ 9,205 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 46,022 |
| | Erosion Control (1%) | | | | $ 3,069 |
| | Contractor Quality Control (2%) | | | | $ 6,137 |
| | Construction Surveying And Layout (2%) | | | | $ 6,137 |
| | | | | **Other Item Subtotal** | **$377,379** |
| | Mobilization (12%) | | | | $ 45,286 |
| | | | | **Construction Subtotal** | **$ 422,665** |
| | Engineering Design (10%) | | | | $ 42,267 |
| | Construction Engineering and Contingencies (20%) | | | | $ 84,533 |
| | Indirect Cost Allocation (10.02%) | | | | $ 42,352 |
| | | | | **Construction Total** | **$ 591,817** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**85. Southbound right-turn lane at Matlock Gas (MP 240)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 55 | $35.00 | $1,925 |
| 2020201 | SAW CUTTING | L.FT. | 490 | $2.50 | $1,225 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 440 | $10.00 | $4,400 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 236 | $120.00 | $28,320 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 154 | $160.00 | $24,640 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 12 | $120.00 | $1,440 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $490.00 | $490 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 490 | $1.50 | $735 |
| | | | **Roadway Construction Subtotal** | | **$76,675** |
| | Unidentified Item Allowance (15%) | | | | $ 11,502 |
| | | | | **Subtotal** | **$88,177** |
| | Water Supply/Dust Palliative (3%) | | | | $ 2,646 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 13,227 |
| | Erosion Control (1%) | | | | $ 882 |
| | Contractor Quality Control (2%) | | | | $ 1,764 |
| | Construction Surveying And Layout (2%) | | | | $ 1,764 |
| | | | | **Other Item Subtotal** | **$108,460** |
| | Mobilization (12%) | | | | $ 13,016 |
| | | | | **Construction Subtotal** | **$ 121,476** |
| | Engineering Design (10%) | | | | $ 12,148 |
| | Construction Engineering and Contingencies (20%) | | | | $ 24,296 |
| | Indirect Cost Allocation (10.02%) | | | | $ 12,172 |
| | | | | **Construction Total** | **$ 170,092** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**85. Southbound outside accel lane at Matlock Gas (MP 240)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 292 | $20.00 | $5,840 |
| 2020201 | SAW CUTTING | L.FT. | 1,310 | $2.50 | $3,275 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 1,170 | $10.00 | $11,700 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 922 | $120.00 | $110,640 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 699 | $160.00 | $111,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 56 | $120.00 | $6,720 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $1,310.00 | $1,310 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 1,310 | $1.50 | $1,965 |
| | | | **Roadway Construction Subtotal** | | **$266,790** |
| | Unidentified Item Allowance (15%) | | | | $ 40,019 |
| | | | | **Subtotal** | **$306,809** |
| | Water Supply/Dust Palliative (3%) | | | | $ 9,205 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 46,022 |
| | Erosion Control (1%) | | | | $ 3,069 |
| | Contractor Quality Control (2%) | | | | $ 6,137 |
| | Construction Surveying And Layout (2%) | | | | $ 6,137 |
| | | | | **Other Item Subtotal** | **$377,379** |
| | Mobilization (12%) | | | | $ 45,286 |
| | | | | **Construction Subtotal** | **$ 422,665** |
| | Engineering Design (10%) | | | | $ 42,267 |
| | Construction Engineering and Contingencies (20%) | | | | $ 84,533 |
| | Indirect Cost Allocation (10.02%) | | | | $ 42,352 |
| | | | | **Construction Total** | **$ 591,817** |

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# SR87 Corridor Development Study
## ITEMIZED COST ESTIMATE

**87. NB right- and left-turn lanes at S Rye Crossover (MP 240.5)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 218 | $35.00 | $7,630 |
| 2020201 | SAW CUTTING | L.FT. | 980 | $2.50 | $2,450 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 880 | $10.00 | $8,800 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 927 | $120.00 | $111,240 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 674 | $160.00 | $107,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 53 | $120.00 | $6,360 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $980.00 | $980 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 980 | $1.50 | $1,470 |
| | | | | **Roadway Construction Subtotal** | **$260,270** |
| | Unidentified Item Allowance (15%) | | | | $ 39,041 |
| | | | | **Subtotal** | **$299,311** |
| | Water Supply/Dust Palliative (3%) | | | | $ 8,980 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 44,897 |
| | Erosion Control (1%) | | | | $ 2,994 |
| | Contractor Quality Control (2%) | | | | $ 5,987 |
| | Construction Surveying And Layout (2%) | | | | $ 5,987 |
| | | | | **Other Item Subtotal** | **$368,156** |
| | Mobilization (12%) | | | | $ 44,179 |
| | | | | **Construction Subtotal** | **$ 412,335** |
| | Engineering Design (10%) | | | | $ 41,234 |
| | Construction Engineering and Contingencies (20%) | | | | $ 82,467 |
| | Indirect Cost Allocation (10.02%) | | | | $ 41,316 |
| | | | | **Construction Total** | **$ 577,352** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**89. Northbound inside and outside acceleration lanes at N Rye Crossover (MP 240.5)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 2 | $5,000.00 | $10,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 1,165 | $20.00 | $23,300 |
| 2020201 | SAW CUTTING | L.FT. | 2,620 | $2.50 | $6,550 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 4,660 | $10.00 | $46,600 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 3,106 | $60.00 | $186,360 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 2,648 | $80.00 | $211,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 224 | $100.00 | $22,400 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $2,620.00 | $2,620 |
| 8050003 | SEEDING (CLASS II) | ACRE | 2 | $3,500.00 | $7,000 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 2,620 | $0.75 | $1,965 |
| | | | | **Roadway Construction Subtotal** | **$523,635** |
| | Unidentified Item Allowance (15%) | | | | $ 78,546 |
| | | | | **Subtotal** | **$602,181** |
| | Water Supply/Dust Palliative (3%) | | | | $ 18,066 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 90,328 |
| | Erosion Control (1%) | | | | $ 6,022 |
| | Contractor Quality Control (2%) | | | | $ 12,044 |
| | Construction Surveying And Layout (2%) | | | | $ 12,044 |
| | | | | **Other Item Subtotal** | **$740,685** |
| | Mobilization (12%) | | | | $ 88,883 |
| | | | | **Construction Subtotal** | **$ 829,568** |
| | Engineering Design (10%) | | | | $ 82,957 |
| | Construction Engineering and Contingencies (20%) | | | | $ 165,914 |
| | Indirect Cost Allocation (10.02%) | | | | $ 83,123 |
| | | | | **Construction Total** | **$ 1,161,562** |

Kimley»Horn

# SR87 Corridor Development Study
## ITEMIZED COST ESTIMATE

**87. Southbound right- and left-turn lanes at the South Rye Crossover (MP 240.5)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 218 | $35.00 | $7,630 |
| 2020201 | SAW CUTTING | L.FT. | 980 | $2.50 | $2,450 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 880 | $10.00 | $8,800 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 927 | $120.00 | $111,240 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 674 | $160.00 | $107,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 53 | $120.00 | $6,360 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $980.00 | $980 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 980 | $1.50 | $1,470 |
| | | | **Roadway Construction Subtotal** | | **$260,270** |
| | Unidentified Item Allowance (15%) | | | | $ 39,041 |
| | | | | **Subtotal** | **$299,311** |
| | Water Supply/Dust Palliative (3%) | | | | $ 8,980 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 44,897 |
| | Erosion Control (1%) | | | | $ 2,994 |
| | Contractor Quality Control (2%) | | | | $ 5,987 |
| | Construction Surveying And Layout (2%) | | | | $ 5,987 |
| | | | | **Other Item Subtotal** | **$368,156** |
| | Mobilization (12%) | | | | $ 44,179 |
| | | | | **Construction Subtotal** | **$ 412,335** |
| | Engineering Design (10%) | | | | $ 41,234 |
| | Construction Engineering and Contingencies (20%) | | | | $ 82,467 |
| | Indirect Cost Allocation (10.02%) | | | | $ 41,316 |
| | | | | **Construction Total** | **$ 577,352** |

Kimley»Horn

**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**87. Southbound inside and outside acceleration lanes at S Rye Crossover (MP 240)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 2 | $5,000.00 | $10,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 1,165 | $20.00 | $23,300 |
| 2020201 | SAW CUTTING | L.FT. | 2,620 | $2.50 | $6,550 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 4,660 | $10.00 | $46,600 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 3,106 | $60.00 | $186,360 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 2,648 | $80.00 | $211,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 224 | $100.00 | $22,400 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $2,620.00 | $2,620 |
| 8050003 | SEEDING (CLASS II) | ACRE | 2 | $3,500.00 | $7,000 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 2,620 | $0.75 | $1,965 |
| | | | **Roadway Construction Subtotal** | | **$523,635** |
| | Unidentified Item Allowance (15%) | | | | $ 78,546 |
| | | | | **Subtotal** | **$602,181** |
| | Water Supply/Dust Palliative (3%) | | | | $ 18,066 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 90,328 |
| | Erosion Control (1%) | | | | $ 6,022 |
| | Contractor Quality Control (2%) | | | | $ 12,044 |
| | Construction Surveying And Layout (2%) | | | | $ 12,044 |
| | | | | **Other Item Subtotal** | **$740,685** |
| | Mobilization (12%) | | | | $ 88,883 |
| | | | | **Construction Subtotal** | **$ 829,568** |
| | Engineering Design (10%) | | | | $ 82,957 |
| | Construction Engineering and Contingencies (20%) | | | | $ 165,914 |
| | Indirect Cost Allocation (10.02%) | | | | $ 83,123 |
| | | | | **Construction Total** | **$ 1,161,562** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**89. Northbound inside and outside acceleration lanes at N Rye Crossover (MP 240.9)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 2 | $5,000.00 | $10,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 1,165 | $20.00 | $23,300 |
| 2020201 | SAW CUTTING | L.FT. | 2,620 | $2.50 | $6,550 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 4,660 | $10.00 | $46,600 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 3,106 | $60.00 | $186,360 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 2,648 | $80.00 | $211,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 224 | $100.00 | $22,400 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $2,620.00 | $2,620 |
| 8050003 | SEEDING (CLASS II) | ACRE | 2 | $3,500.00 | $7,000 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 2,620 | $0.75 | $1,965 |
| | | | **Roadway Construction Subtotal** | | **$523,635** |
| | Unidentified Item Allowance (15%) | | | | $ 78,546 |
| | | | | **Subtotal** | **$602,181** |
| | Water Supply/Dust Palliative (3%) | | | | $ 18,066 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 90,328 |
| | Erosion Control (1%) | | | | $ 6,022 |
| | Contractor Quality Control (2%) | | | | $ 12,044 |
| | Construction Surveying And Layout (2%) | | | | $ 12,044 |
| | | | | **Other Item Subtotal** | **$740,685** |
| | Mobilization (12%) | | | | $ 88,883 |
| | | | | **Construction Subtotal** | **$ 829,568** |
| | Engineering Design (10%) | | | | $ 82,957 |
| | Construction Engineering and Contingencies (20%) | | | | $ 165,914 |
| | Indirect Cost Allocation (10.02%) | | | | $ 83,123 |
| | | | | **Construction Total** | **$ 1,161,562** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

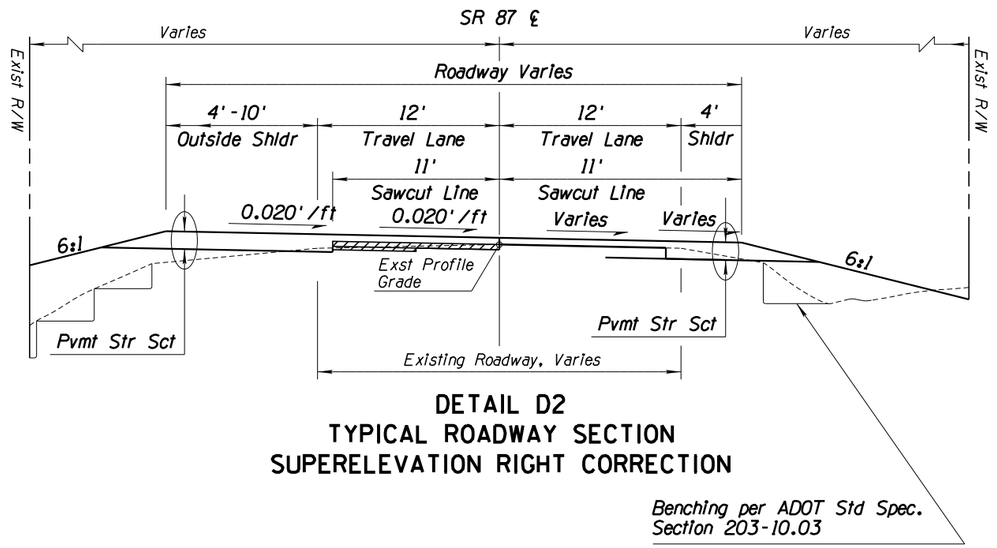
**89. Southbound right-turn lane at the North Rye Crossover (MP 240.9)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 55 | $35.00 | $1,925 |
| 2020201 | SAW CUTTING | L.FT. | 490 | $2.50 | $1,225 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 440 | $10.00 | $4,400 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 236 | $120.00 | $28,320 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 154 | $160.00 | $24,640 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 12 | $120.00 | $1,440 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $490.00 | $490 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 490 | $1.50 | $735 |
| | | | | **Roadway Construction Subtotal** | **$76,675** |
| | Unidentified Item Allowance (15%) | | | | $ 11,502 |
| | | | | **Subtotal** | **$88,177** |
| | Water Supply/Dust Palliative (3%) | | | | $ 2,646 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 13,227 |
| | Erosion Control (1%) | | | | $ 882 |
| | Contractor Quality Control (2%) | | | | $ 1,764 |
| | Construction Surveying And Layout (2%) | | | | $ 1,764 |
| | | | | **Other Item Subtotal** | **$108,460** |
| | Mobilization (12%) | | | | $ 13,016 |
| | | | | **Construction Subtotal** | **$ 121,476** |
| | Engineering Design (10%) | | | | $ 12,148 |
| | Construction Engineering and Contingencies (20%) | | | | $ 24,296 |
| | Indirect Cost Allocation (10.02%) | | | | $ 12,172 |
| | | | | **Construction Total** | **$ 170,092** |

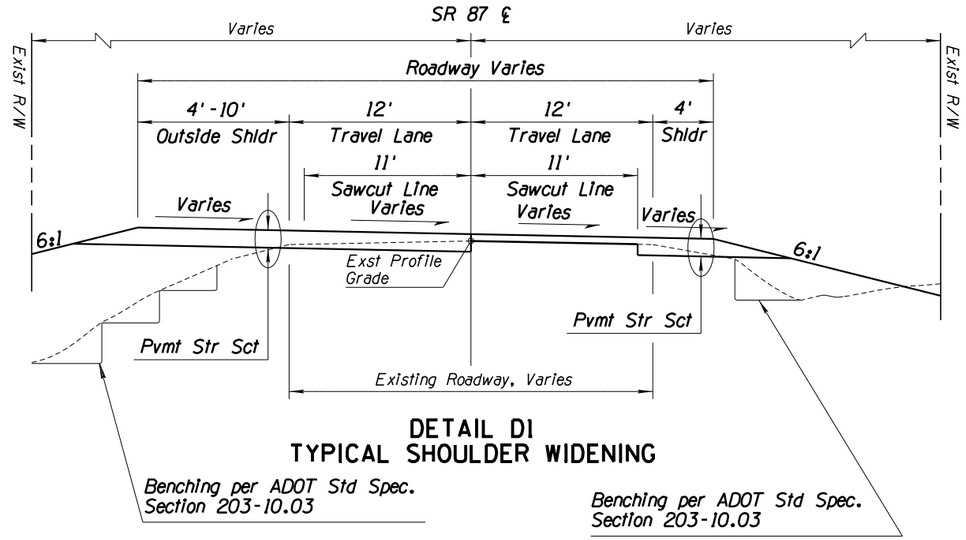
ATTACHMENT 5: PRELIMINARY PLANS

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

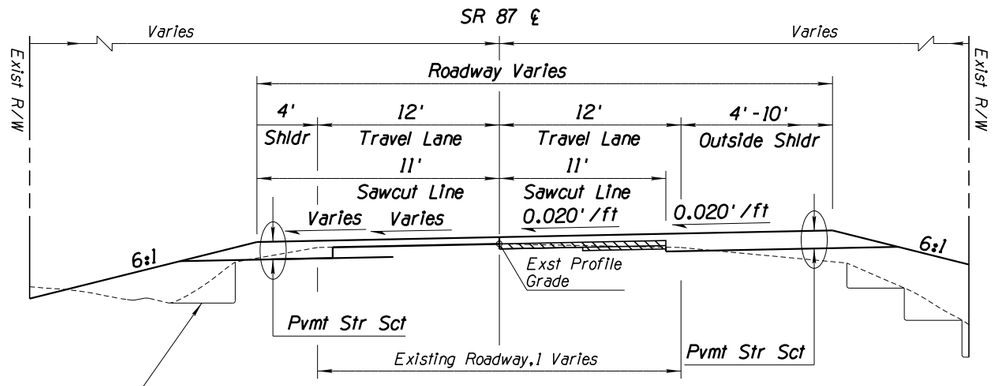
| SR 87 MILE POST STATION | | | |
|---|---|---|---|
| MP NB | STATION | MP SB | STATION |
| 196 | 101+73 | 196 | 101+18 |
| 197 | 155+53 | 197 | 154+02 |
| 198 | 207+69 | 198 | 207+94 |
| 199 | 261+02 | 199 | 259+13 |
| 200 | 314+21 | 200 | 311+72 |
| 201 | 367+73 | 201 | 364+06 |
| 202 | 419+18 | 202 | 417+81 |
| 203 | 471+36 | 203 | 470+65 |
| 204 | 526+28 | 204 | 523+10 |
| 205 | 577+70 | 205 | 575+84 |
| 206 | 630+73 | 206 | 628+30 |
| 207 | 682+81 | 207 | 680+28 |
| 208 | 736+47 | 208 | 734+12 |
| 209 | 788+55 | 209 | 786+62 |
| 210 | 842+08 | 210 | 839+50 |
| 211 | 894+91 | 211 | 890+40 |
| 212 | 942+20 | 212 | 939+42 |
| 213 | 998+65 | 213 | 995+55 |
| 214 | 1051+86 | 214 | 1050+06 |
| 215 | 1105+38 | 215 | 1095+77 |
| 216 | 1158+68 | 216 | 1147+95 |
| 217 | 1213+92 | 217 | 1199+48 |
| 218 | 1268+31 | 218 | 1250+20 |
| 219 | 1318+19 | 219 | 1304+12 |
| 220 | 1374+67 | 220 | 1359+76 |
| 221 | 1427+95 | 221 | 1412+99 |
| 222 | 1480+60 | 222 | 1465+84 |
| 223 | 1533+97 | 223 | 1518+89 |
| 224 | 1584+61 | 224 | 1570+72 |
| 225 | 1639+50 | 225 | 1625+29 |
| 226 | 1689+86 | 226 | 1676+32 |
| 227 | 1740+23 | 227 | 1726+14 |
| 228 | 1792+50 | 228 | 1778+04 |
| 229 | 1845+24 | 229 | 1831+98 |
| 230 | 1898+50 | 230 | 1884+70 |
| 231 | 1949+61 | 231 | 1933+71 |
| 232 | 1999+33 | 232 | 1985+29 |
| 233 | 2047+74 | 233 | 2033+06 |
| 234 | 2101+13 | 234 | 2085+05 |
| 235 | 2154+59 | 235 | 2137+29 |
| 236 | 2207+09 | 236 | 2189+44 |
| 237 | 2259+88 | 237 | 2240+86 |
| 238 | 2311+66 | 238 | 2293+85 |
| 239 | 2364+28 | 239 | 2344+91 |
| 240 | 2416+01 | 240 | 2397+41 |
| 241 | 2467+79 | 241 | 2448+96 |
| 242 | 2518+51 | 242 | 2496+68 |
| 243 | 2571+26 | 243 | 2549+70 |
| 244 | 2620+38 | 244 | 2601+82 |
| 245 | 2677+47 | 245 | 2655+01 |
| 246 | 2729+53 | 246 | 2703+04 |
| 247 | 2741+30 | 247 | 2747+68 |
| 248 | 2794+18 | 248 | 2801+15 |
| 249 | 2847+25 | 249 | 2854+41 |
| 250 | 2899+69 | 250 | 2906+58 |



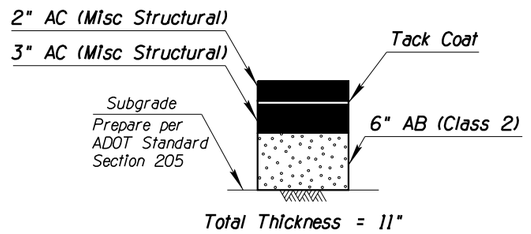

## DETAIL D2
## TYPICAL ROADWAY SECTION SUPERELEVATION RIGHT CORRECTION




## DETAIL D1
## TYPICAL SHOULDER WIDENING




## DETAIL D3
## TYPICAL ROADWAY SECTION SUPERELEVATION LEFT CORRECTION




Total Thickness = 11"

## PAVEMENT STRUCTURAL SECTION

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

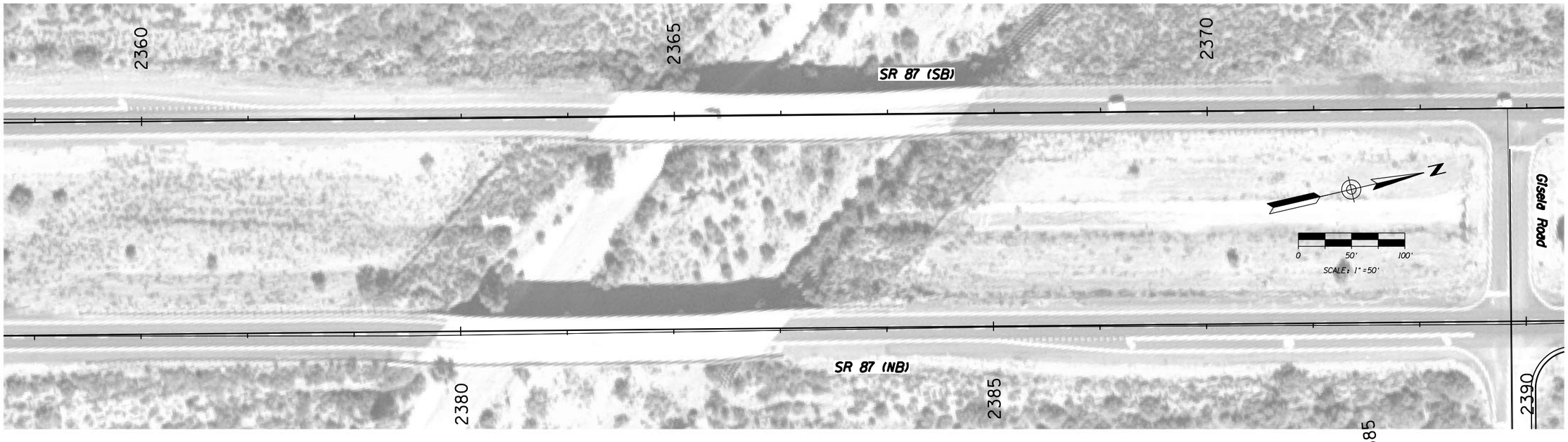
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | ___ OF ___ |

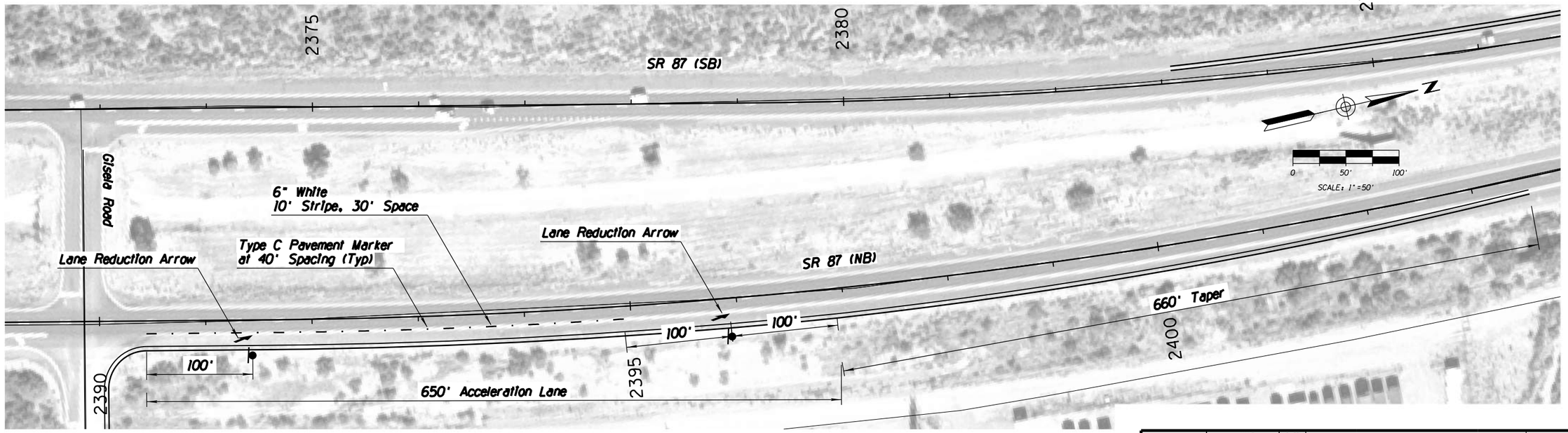
TRACS NO. XXXXX XXX | XXX-X(XXX)X

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "9 RYE IMPROVEMENTS
MP 239 TO 241

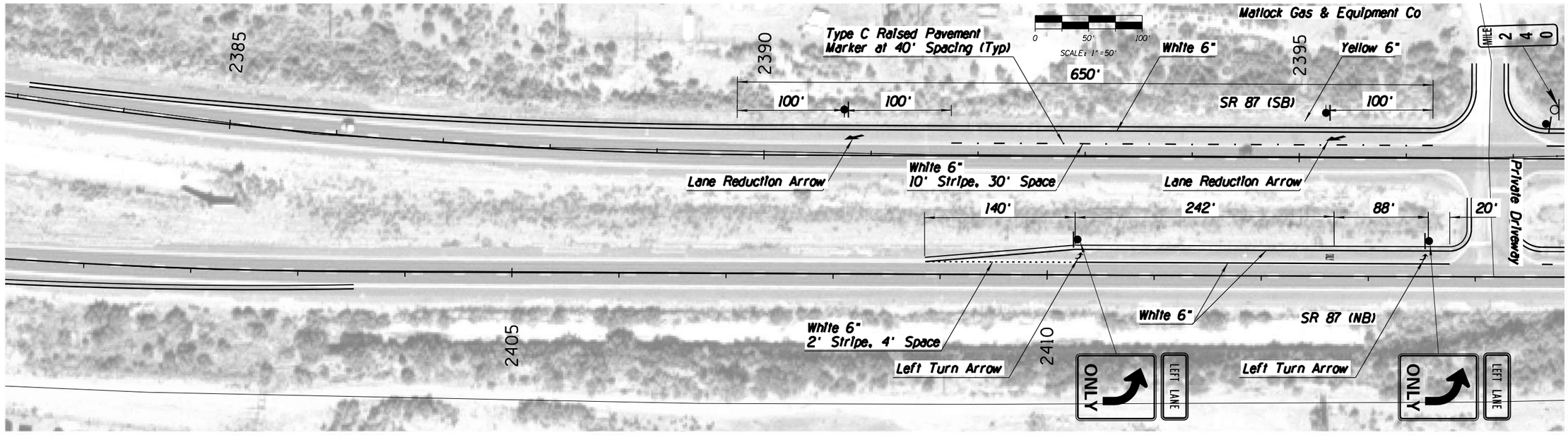
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

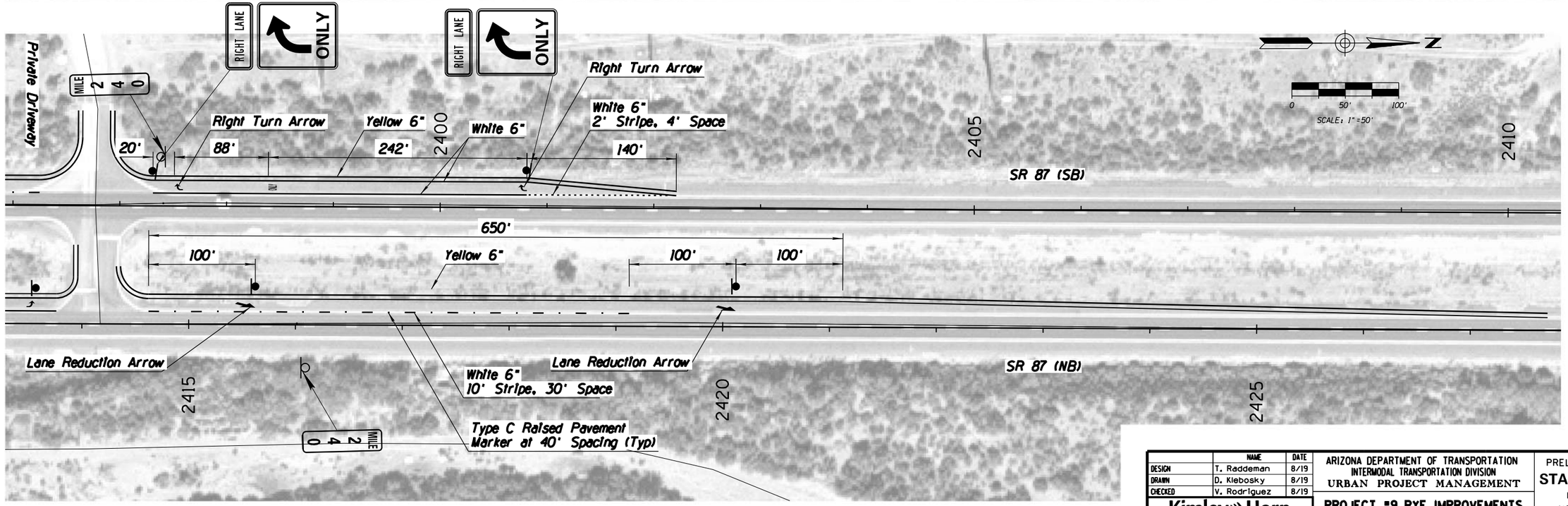
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 8.1-01 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "9 RYE IMPROVEMENTS
MP 239 TO 241

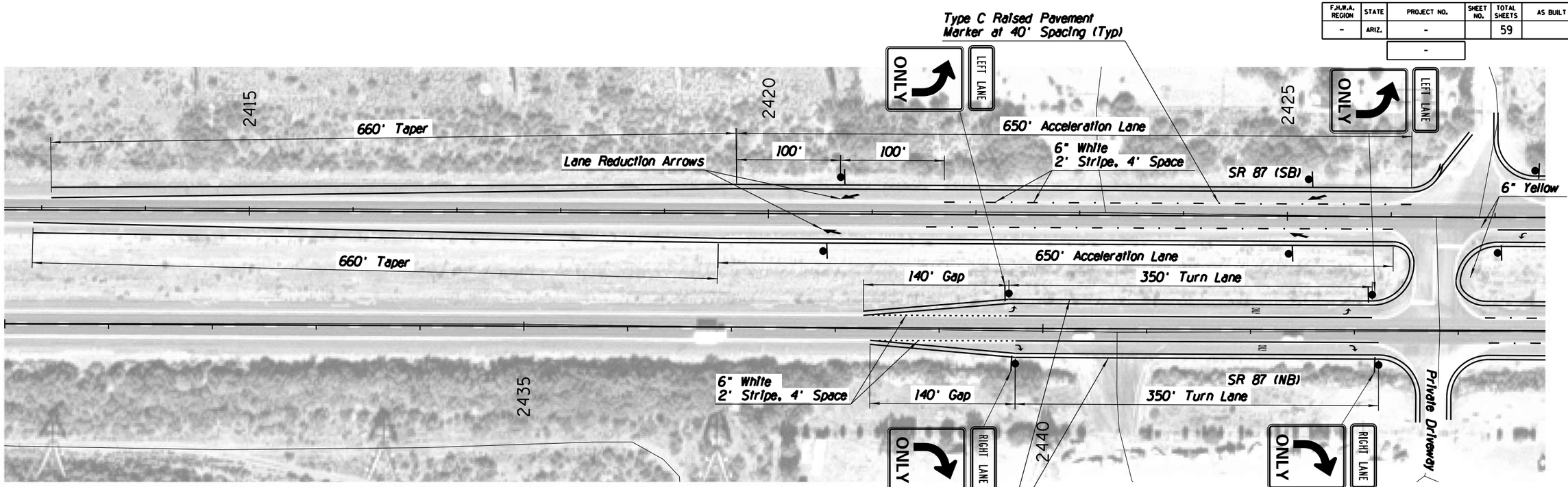
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

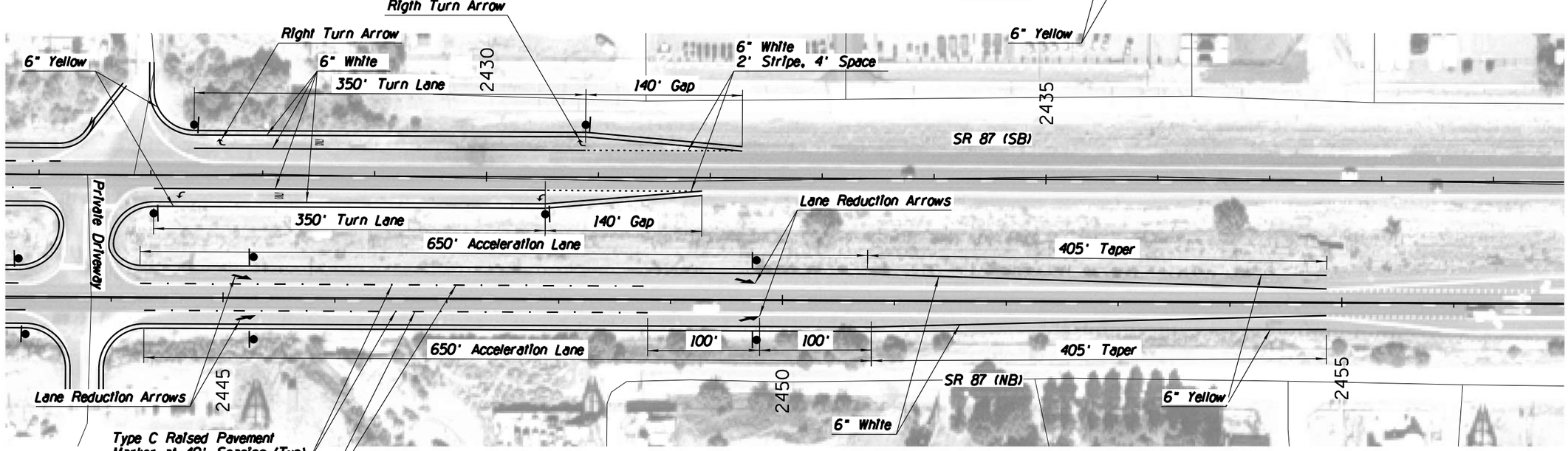
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 8.2-01 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "9 RYE IMPROVEMENTS
MP 239 TO 241

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

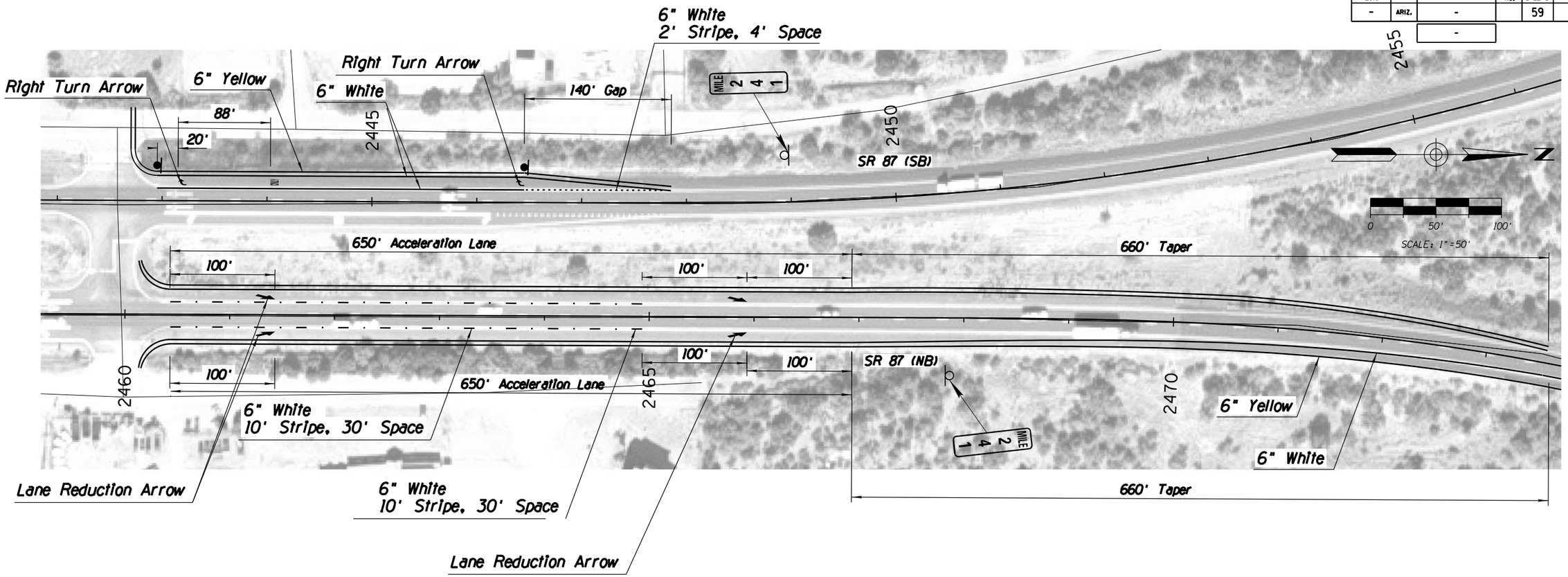
DWG NO. 8.3-01

___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "9 RYE IMPROVEMENTS
MP 239 TO 241

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 8.4-01 |

| TRACS NO. | | | SHEET |
|---|---|---|---|
| XXXXX XXX | | XXX-X(XXX)X | ___ OF ___ |

DATE- | LOCATION- | REVISIONS- | FINISHED PLANS- | SURVEY NO.

$TIME$ $DATE$ $USERNAME$ $FILE$

# PACKAGE PROJECT 10 – NORTHBOUND IMPROVEMENTS (MP 241-248)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **ADOT Project Manager:** |
| **Project Name:** Northbound Improvements (MP 241-248) | |
| **City/Town:** N/A | **County:** Gila |
| **COG/MPO:** CAG | **ADOT District:** Northcentral |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 241 | |
| **End Limit:** 248 | |
| **Project Length:** 8 Miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☐County ☐ADOT ☐Private ☒Federal ☐Tribal ☐Other | |

| PROJECT NEED |
|---|
| Shoulder widths are insufficient and slow-moving trucks on the uphill grade cause large speed differentials. |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☒Expansion |
| Increase shoulder widths to current standards to create a consistent recovery area and provide access for emergency vehicles. Construct a climbing lane to remove slow-moving truck traffic from the through travel lanes. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☐Utilities |
| ☐Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>Click or tap here to enter text. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☐HSIP | ☒State |
| | ☐Local | ☐Private | ☐Tribal | ☐Other |

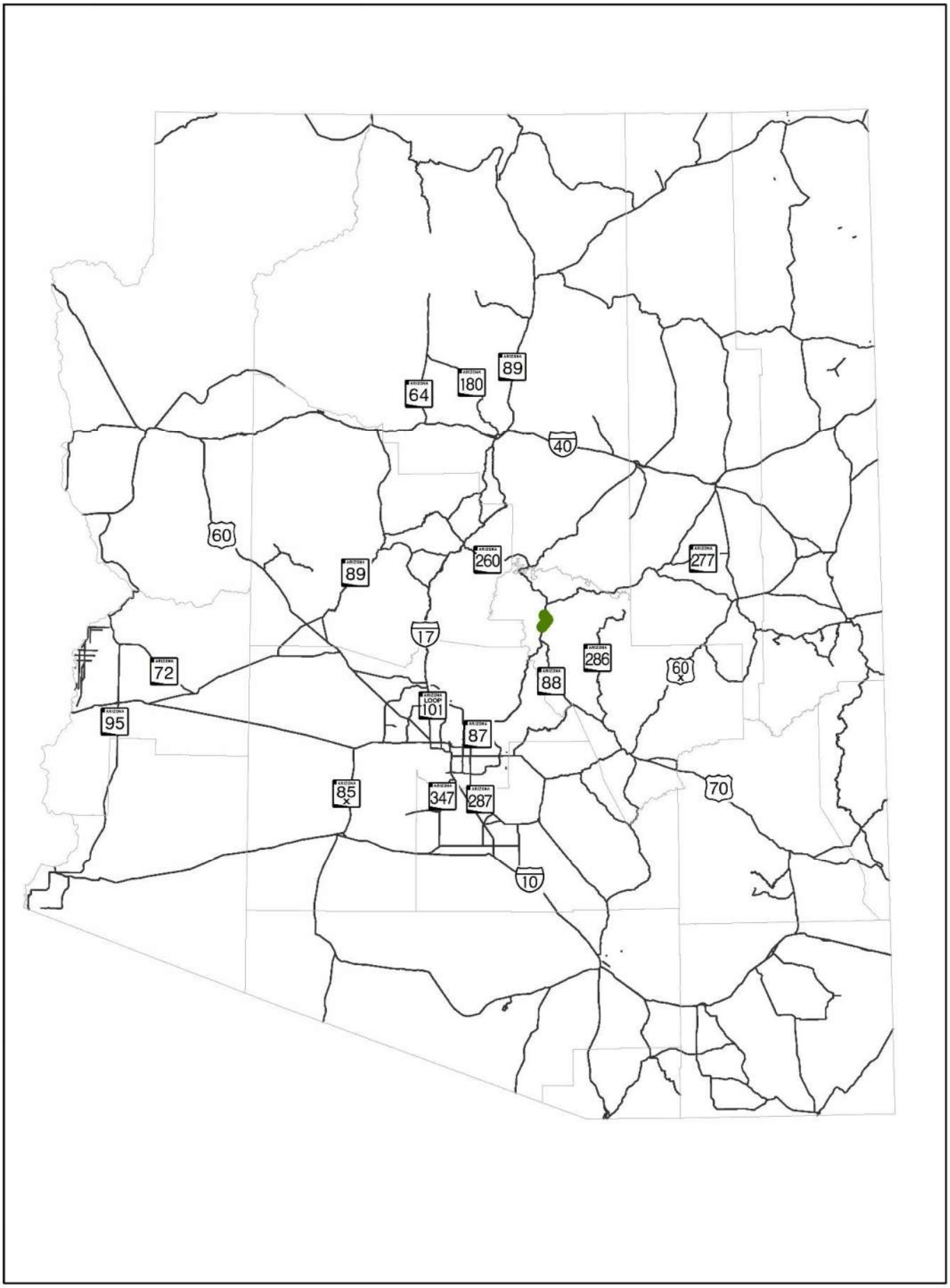
| COST ESTIMATE | | | |
|---|---|---|---|
| Design | Right-of-Way | Construction | Total |
| $944,000.00 | $0.00 | $12,273,800.00 | $13,217,800.00 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

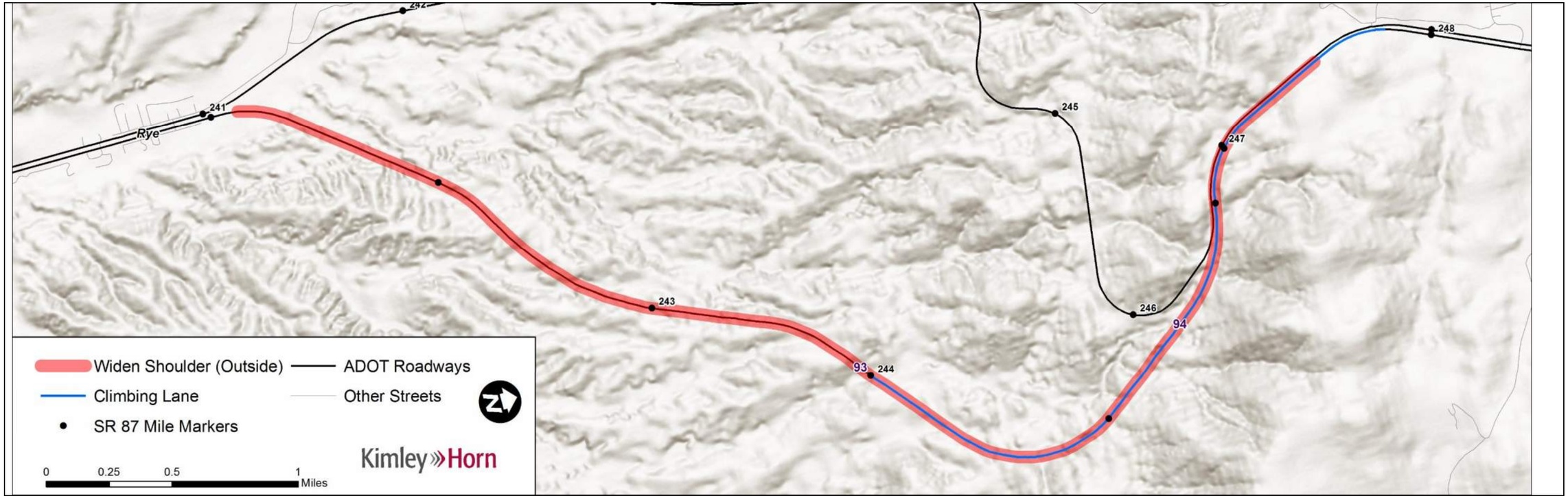
| ATTACHMENTS |
| --- |
| 1. Project Scope of Work<br>2. State Location Map<br>3. Project Vicinity Map<br>4. Itemized Cost Estimates<br>5. Conceptual Design Plans |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Widen northbound outside shoulder to ten feet (MP 241.1-247.5)<br>• Construct a northbound climbing lane (MP 244-2247.8) |

ATTACHMENT 2: STATE LOCATION MAP



ATTACHMENT 3: PROJECT VICINITY MAP




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Widen NB outside shoulders to 10' | 93 | 241.1 | 247.5 | $4,249,200 | Existing shoulders are of an insufficient width for current highway standards and limit effective emergency response. |
| 2. Construct NB climbing lane | 94 | 244 | 247.8 | $8,968,600 | Approximately 12% of traffic on this segment is heavy commercial vehicles, average speeds are 16 mph under the speed limit, 92% of vehicles are traveling greater than 10 mph under the speed limit, the northern portion of the climbing lane is within an identified crash hot spot. |
| | | | Total: | $13,217,800 | |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**93. Widen outside shoulder to 10' – 241.1-247.5**
**Project Location: SR87 Corridor Development Study**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 8 | $5,000.00 | $40,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 3,593 | $20.00 | $71,860 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 8,083 | $5.00 | $40,415 |
| 2020201 | SAW CUTTING | L.FT. | 32,332 | $2.50 | $80,830 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 47,900 | $7.00 | $335,300 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 10,778 | $50.00 | $538,900 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 5,347 | $80.00 | $427,760 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 318 | $90.00 | $28,620 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $32,332.00 | $32,332 |
| 8050003 | SEEDING (CLASS II) | ACRE | 8 | $3,500.00 | $28,000 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 8,083 | $30.00 | $242,490 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 4 | $2,500.00 | $10,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 4 | $800.00 | $3,200 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 32,332 | $0.75 | $24,249 |
| | | | **Roadway Construction Subtotal** | | **$1,915,556** |
| | Unidentified Item Allowance (15%) | | | | $ 287,334 |
| | | | | **Subtotal** | **$2,202,890** |
| | Water Supply/Dust Palliative (3%) | | | | $ 66,087 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 330,434 |
| | Erosion Control (1%) | | | | $ 22,029 |
| | Contractor Quality Control (2%) | | | | $ 44,058 |
| | Construction Surveying And Layout (2%) | | | | $ 44,058 |
| | | | | **Other Item Subtotal** | **$2,709,556** |
| | Mobilization (12%) | | | | $ 325,147 |
| | | | | **Construction Subtotal** | **$ 3,034,703** |
| | Engineering Design (10%) | | | | $ 303,471 |
| | Construction Engineering and Contingencies (20%) | | | | $ 606,941 |
| | Indirect Cost Allocation (10.02%) | | | | $ 304,078 |
| | | | | **Construction Total** | **$ 4,249,193** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

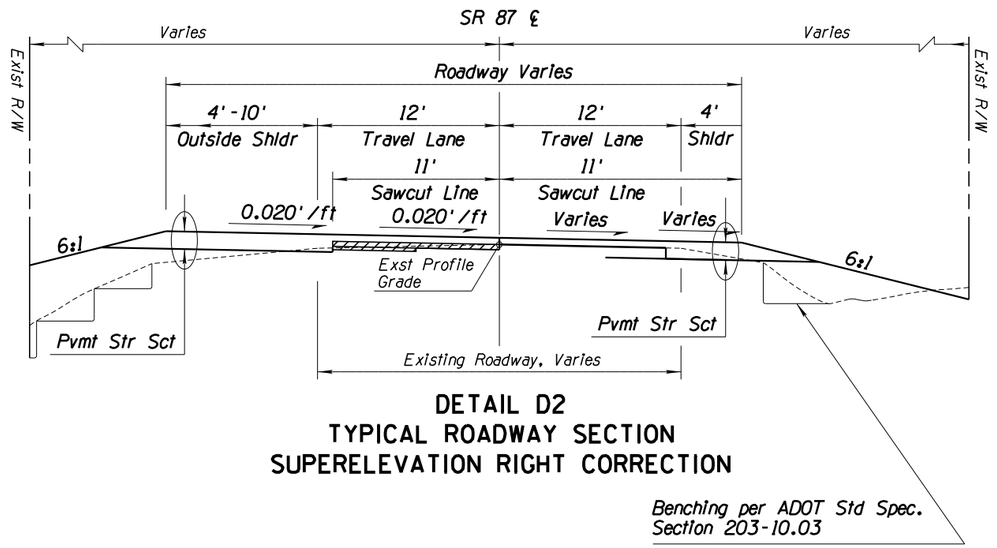
**94. Construct climbing lane – (MP 244-247.8)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 14 | $5,000.00 | $70,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 2,230 | $20.00 | $44,600 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 5,017 | $5.00 | $25,085 |
| 2020201 | SAW CUTTING | L.FT. | 20,065 | $2.50 | $50,163 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 1,490 | $10.00 | $14,900 |
| 2030901 | BORROW | CU.YD. | 148,630 | $12.00 | $1,783,560 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 14,120 | $50.00 | $706,000 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 10,692 | $80.00 | $855,360 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 855 | $90.00 | $76,950 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $20,064.00 | $20,064 |
| 8050003 | SEEDING (CLASS II) | ACRE | 14 | $3,500.00 | $49,000 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 10,032 | $30.00 | $300,960 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 6 | $2,500.00 | $15,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 6 | $800.00 | $4,800 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 20,065 | $0.75 | $15,049 |
| | | | | **Roadway Construction Subtotal** | **$4,043,090** |
| | Unidentified Item Allowance (15%) | | | | $ 606,464 |
| | | | | **Subtotal** | **$4,649,554** |
| | Water Supply/Dust Palliative (3%) | | | | $ 139,487 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 697,434 |
| | Erosion Control (1%) | | | | $ 46,496 |
| | Contractor Quality Control (2%) | | | | $ 92,992 |
| | Construction Surveying And Layout (2%) | | | | $ 92,992 |
| | | | | **Other Item Subtotal** | **$5,718,955** |
| | Mobilization (12%) | | | | $ 686,275 |
| | | | | **Construction Subtotal** | **$ 6,405,230** |
| | Engineering Design (10%) | | | | $ 640,524 |
| | Construction Engineering and Contingencies (20%) | | | | $ 1,281,047 |
| | Indirect Cost Allocation (10.02%) | | | | $ 641,805 |
| | | | | **Construction Total** | **$ 8,968,607** |

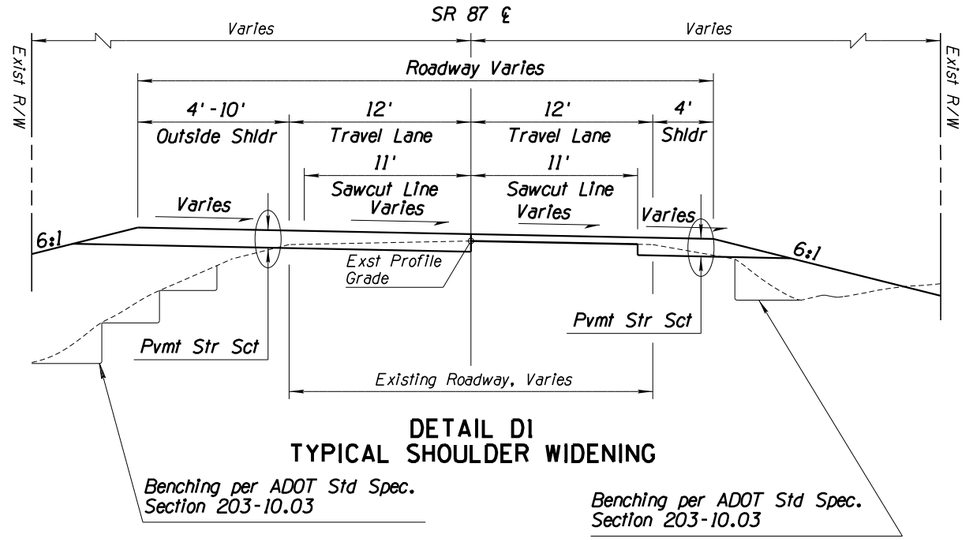
ATTACHMENT 5: PRELIMINARY PLANS

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

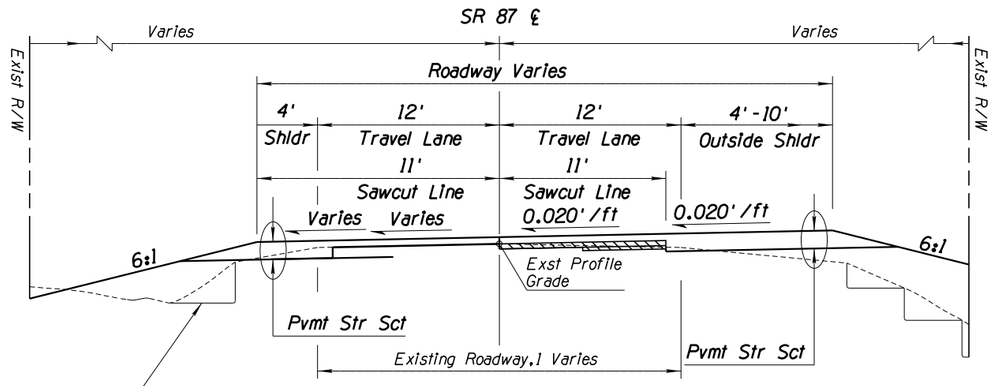
| SR 87 MILE POST STATION | | | |
|---|---|---|---|
| MP NB | STATION | MP SB | STATION |
| 196 | 101+73 | 196 | 101+18 |
| 197 | 155+53 | 197 | 154+02 |
| 198 | 207+69 | 198 | 207+94 |
| 199 | 261+02 | 199 | 259+13 |
| 200 | 314+21 | 200 | 311+72 |
| 201 | 367+73 | 201 | 364+06 |
| 202 | 419+18 | 202 | 417+81 |
| 203 | 471+36 | 203 | 470+65 |
| 204 | 526+28 | 204 | 523+10 |
| 205 | 577+70 | 205 | 575+84 |
| 206 | 630+73 | 206 | 628+30 |
| 207 | 682+81 | 207 | 680+28 |
| 208 | 736+47 | 208 | 734+12 |
| 209 | 788+55 | 209 | 786+62 |
| 210 | 842+08 | 210 | 839+50 |
| 211 | 894+91 | 211 | 890+40 |
| 212 | 942+20 | 212 | 939+42 |
| 213 | 998+65 | 213 | 995+55 |
| 214 | 1051+86 | 214 | 1050+06 |
| 215 | 1105+38 | 215 | 1095+77 |
| 216 | 1158+68 | 216 | 1147+95 |
| 217 | 1213+92 | 217 | 1199+48 |
| 218 | 1268+31 | 218 | 1250+20 |
| 219 | 1318+19 | 219 | 1304+12 |
| 220 | 1374+67 | 220 | 1359+76 |
| 221 | 1427+95 | 221 | 1412+99 |
| 222 | 1480+60 | 222 | 1465+84 |
| 223 | 1533+97 | 223 | 1518+89 |
| 224 | 1584+61 | 224 | 1570+72 |
| 225 | 1639+50 | 225 | 1625+29 |
| 226 | 1689+86 | 226 | 1676+32 |
| 227 | 1740+23 | 227 | 1726+14 |
| 228 | 1792+50 | 228 | 1778+04 |
| 229 | 1845+24 | 229 | 1831+98 |
| 230 | 1898+50 | 230 | 1884+70 |
| 231 | 1949+61 | 231 | 1933+71 |
| 232 | 1999+33 | 232 | 1985+29 |
| 233 | 2047+74 | 233 | 2033+06 |
| 234 | 2101+13 | 234 | 2085+05 |
| 235 | 2154+59 | 235 | 2137+29 |
| 236 | 2207+09 | 236 | 2189+44 |
| 237 | 2259+88 | 237 | 2240+86 |
| 238 | 2311+66 | 238 | 2293+85 |
| 239 | 2364+28 | 239 | 2344+91 |
| 240 | 2416+01 | 240 | 2397+41 |
| 241 | 2467+79 | 241 | 2448+96 |
| 242 | 2518+51 | 242 | 2496+68 |
| 243 | 2571+26 | 243 | 2549+70 |
| 244 | 2620+38 | 244 | 2601+82 |
| 245 | 2677+47 | 245 | 2655+01 |
| 246 | 2729+53 | 246 | 2703+04 |
| 247 | 2741+30 | 247 | 2747+68 |
| 248 | 2794+18 | 248 | 2801+15 |
| 249 | 2847+25 | 249 | 2854+41 |
| 250 | 2899+69 | 250 | 2906+58 |



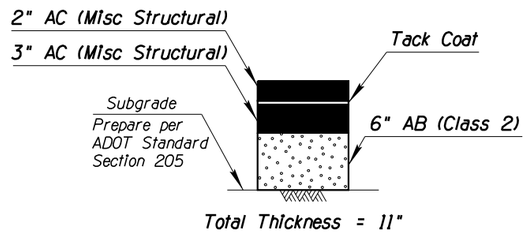

## DETAIL D2
## TYPICAL ROADWAY SECTION SUPERELEVATION RIGHT CORRECTION




## DETAIL D1
## TYPICAL SHOULDER WIDENING




## DETAIL D3
## TYPICAL ROADWAY SECTION SUPERELEVATION LEFT CORRECTION




Total Thickness = 11"

## PAVEMENT STRUCTURAL SECTION

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | ___ OF ___ |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | |

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

10:28:19 AM 9/5/2019 TERRY.RADDEMAN K:\TUC_TPTO\291199004-ADOT SR 87 CORRIDOR DEV STUDY\TASKS\TASK 4 - FEASIBILITY REPORT\CADD\DETAILS.DGN

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
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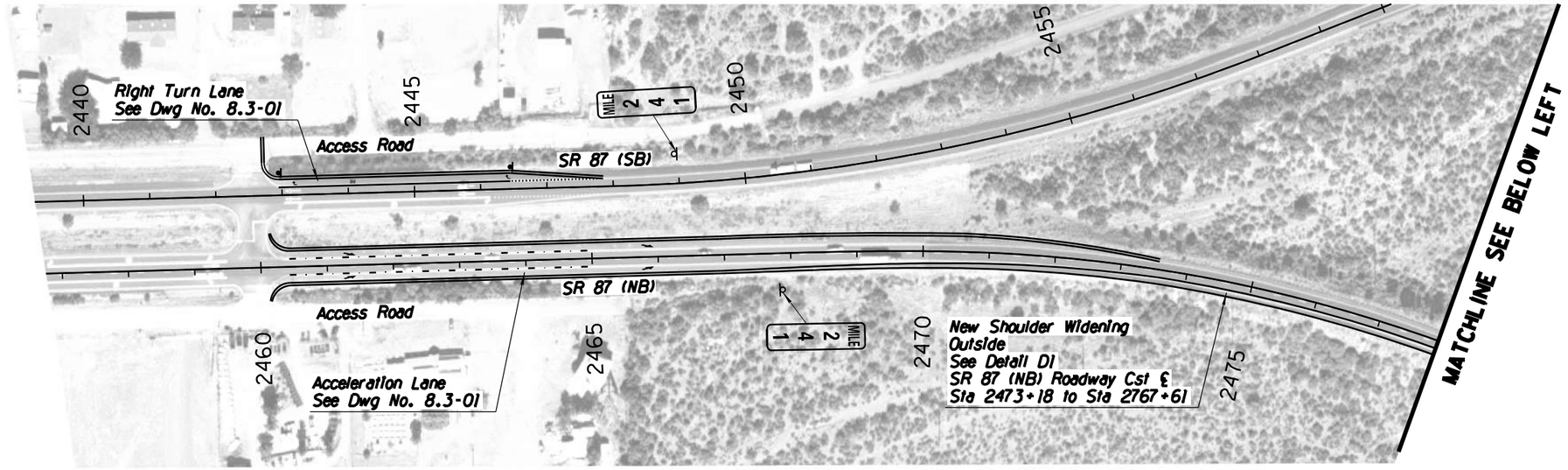


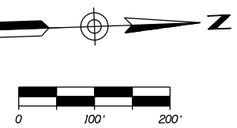


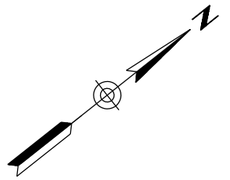


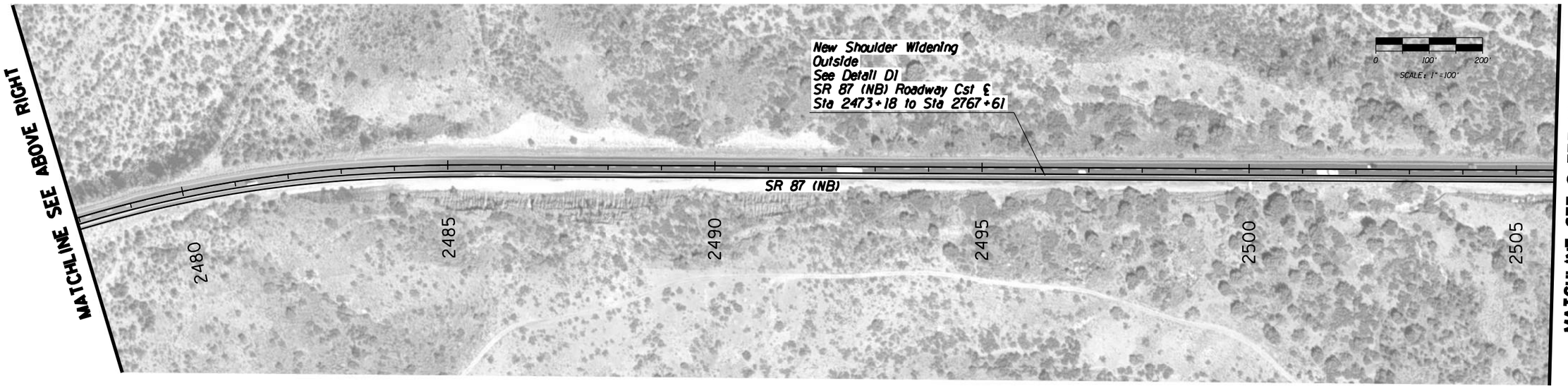


| | NAME | DATE |
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| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "10 NB IMPROVEMENTS
MP 241 TO 247.8

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. 10.1-01

___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
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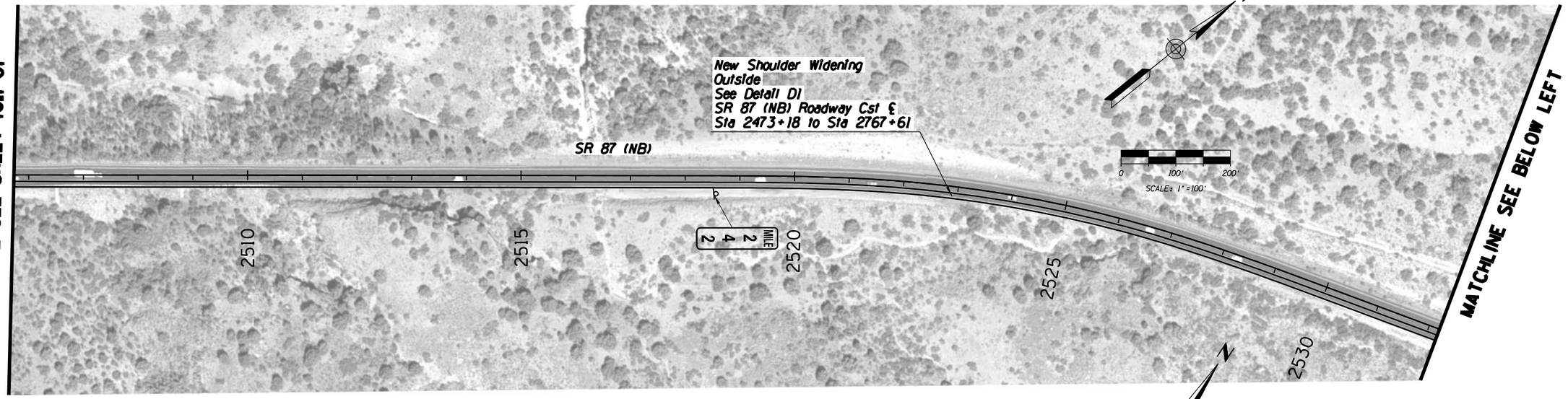


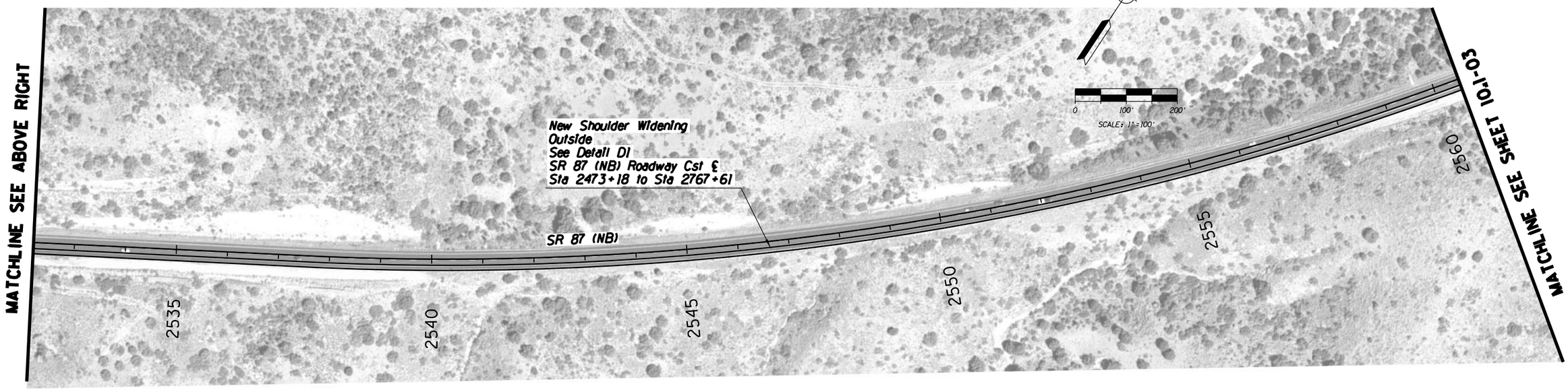


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "10 NB IMPROVEMENTS
MP 241 TO 247.8

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. 10.1-02

___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
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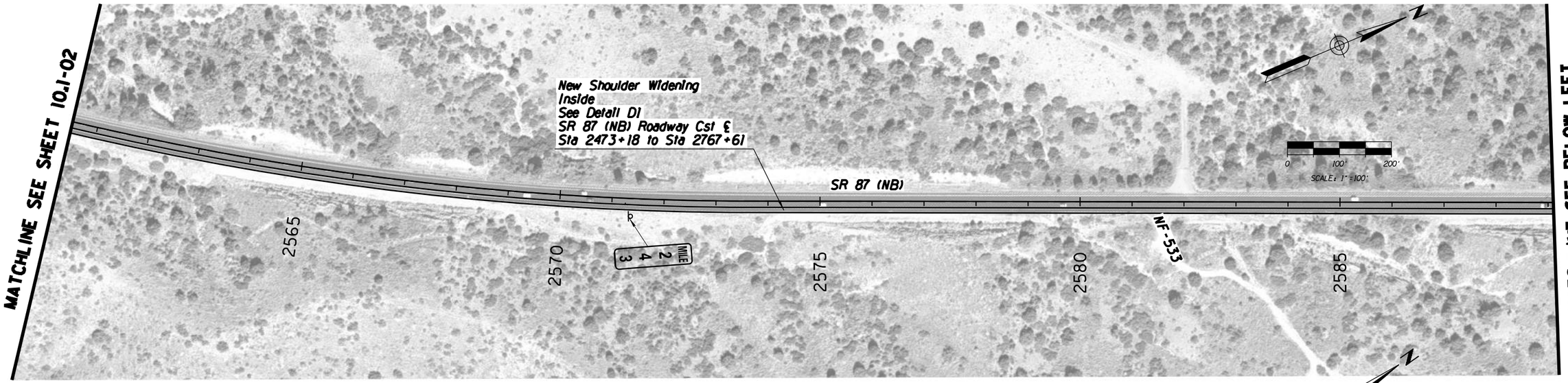


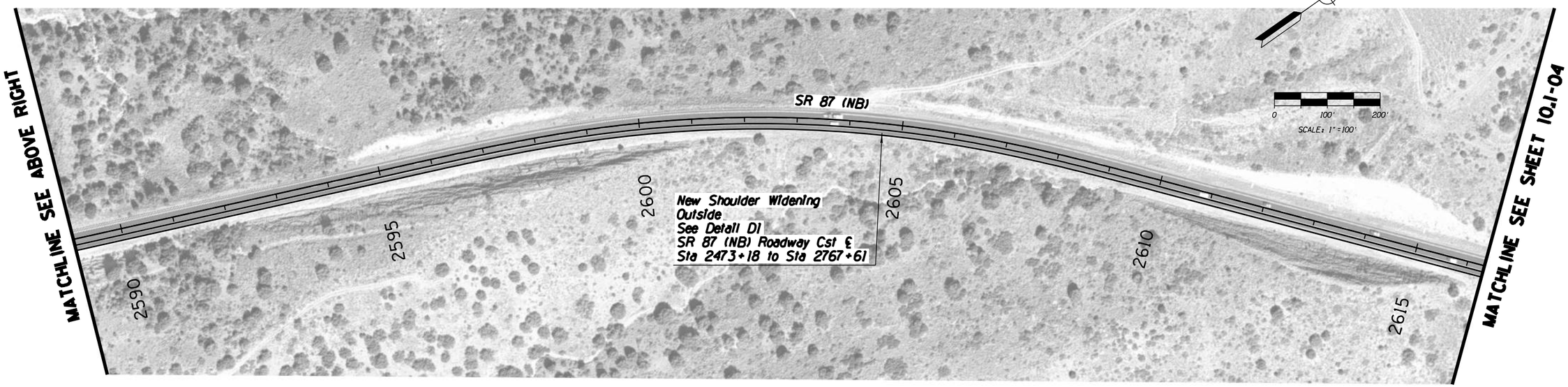


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "10 NB IMPROVEMENTS
MP 241 TO 247.8

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

DWG NO. 10.1-03

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
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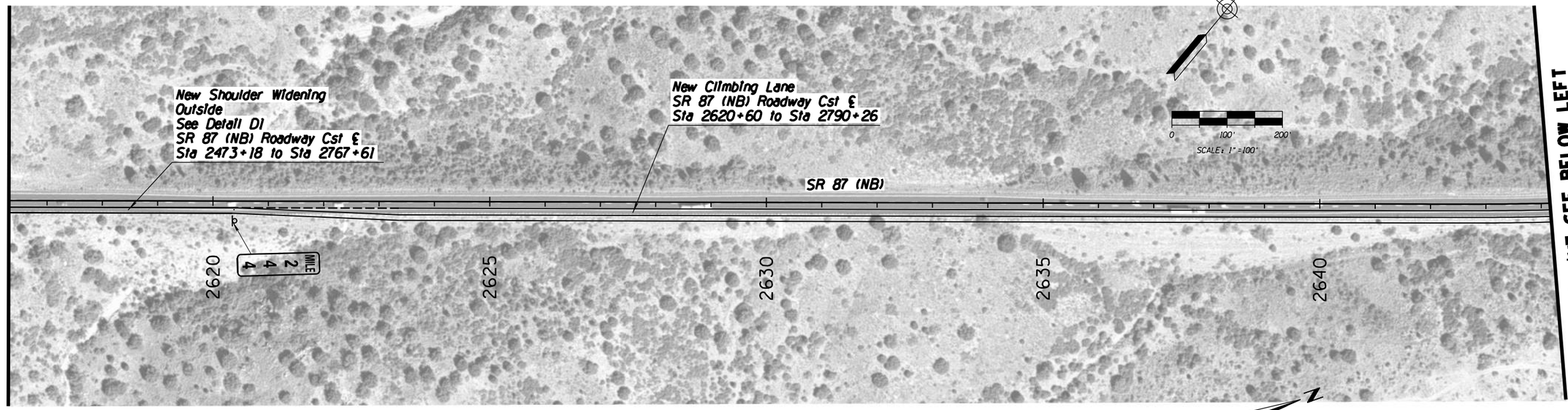





| | NAME | DATE |
|---|---|---|
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| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "10 NB IMPROVEMENTS
MP 241 TO 247.8

ROUTE: SR 87
LOCATION: MP 190 TO MP 250

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. 10.1-04

___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
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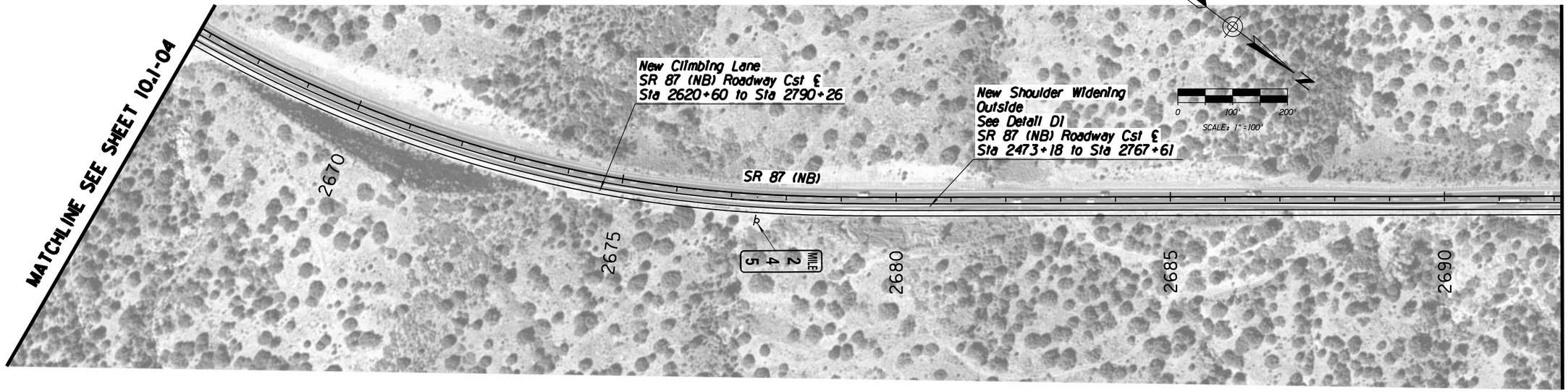


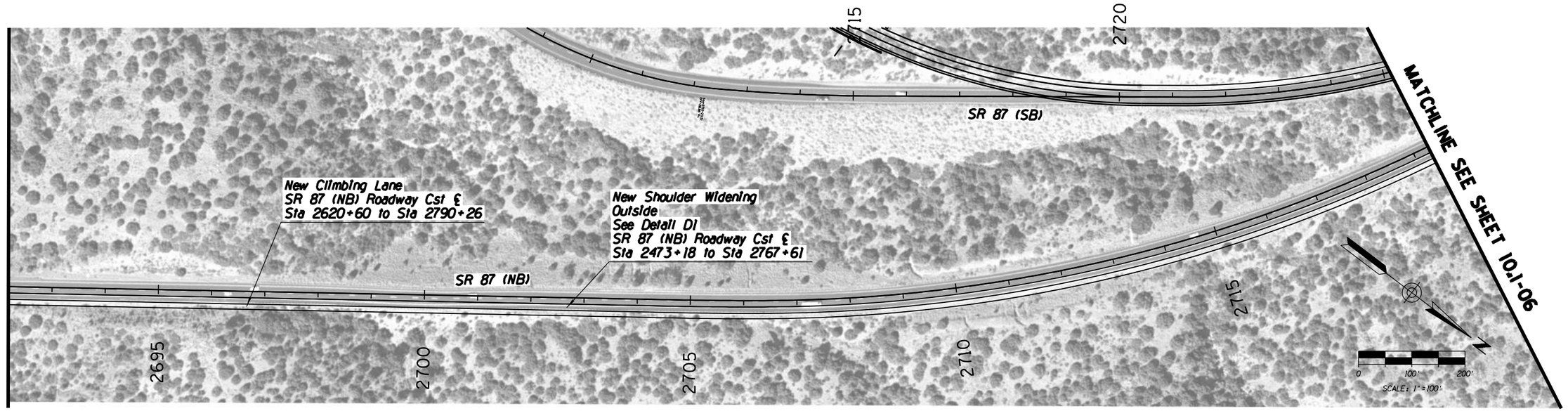


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "10 NB IMPROVEMENTS
MP 241 TO 247.8

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

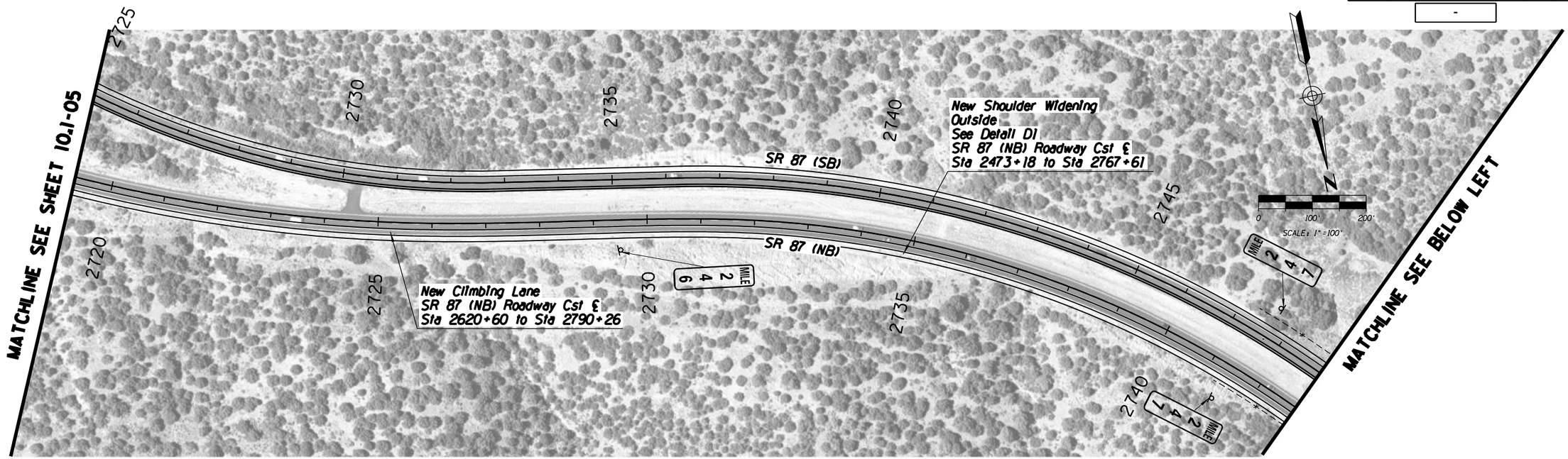
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 10.1-05 |

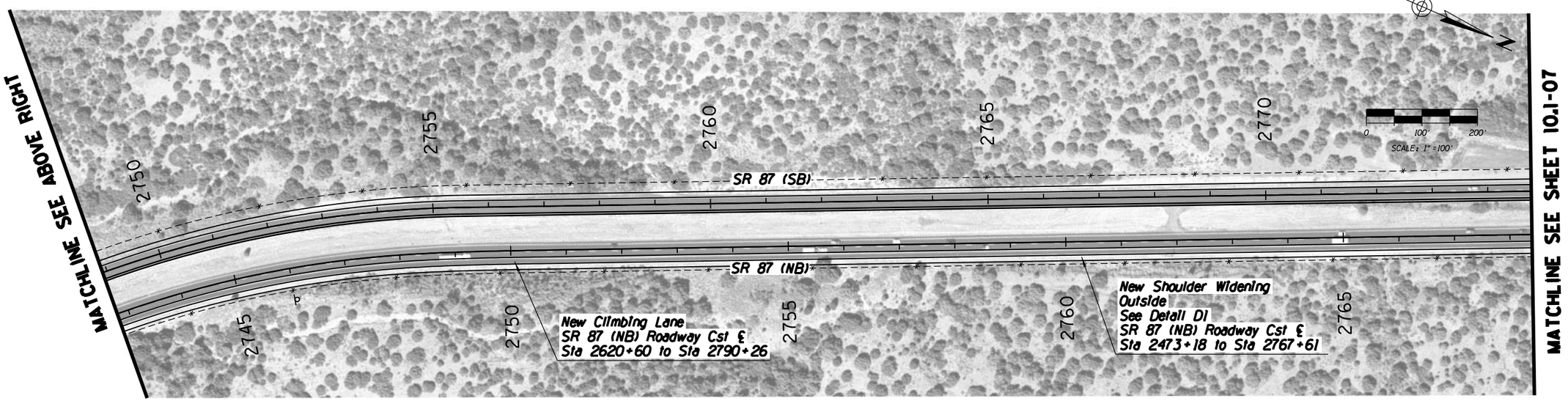
TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "10 NB IMPROVEMENTS
MP 241 TO 247.8

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

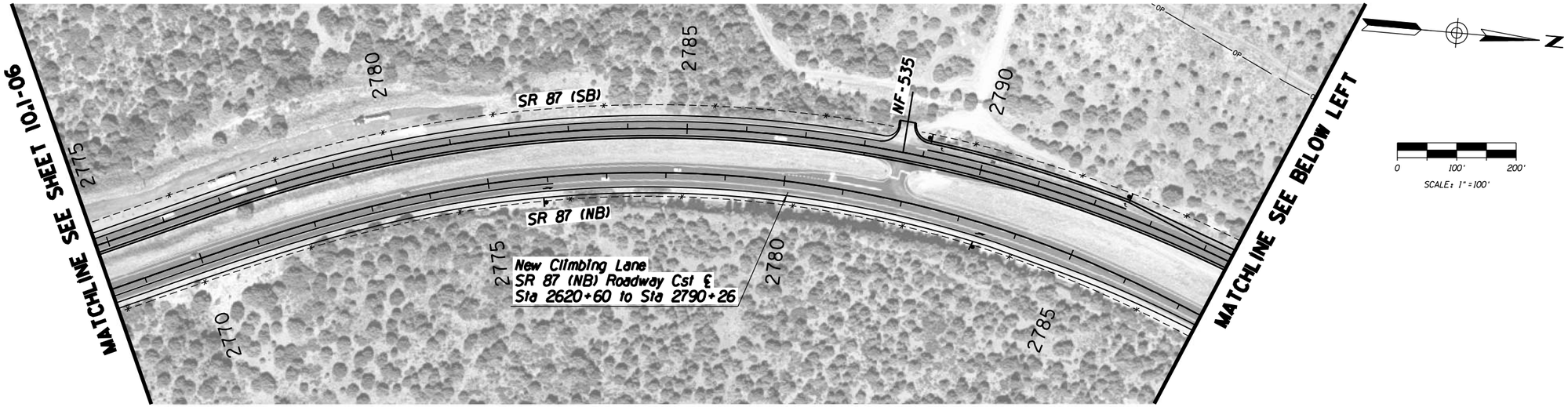
DWG NO. 10.1-06

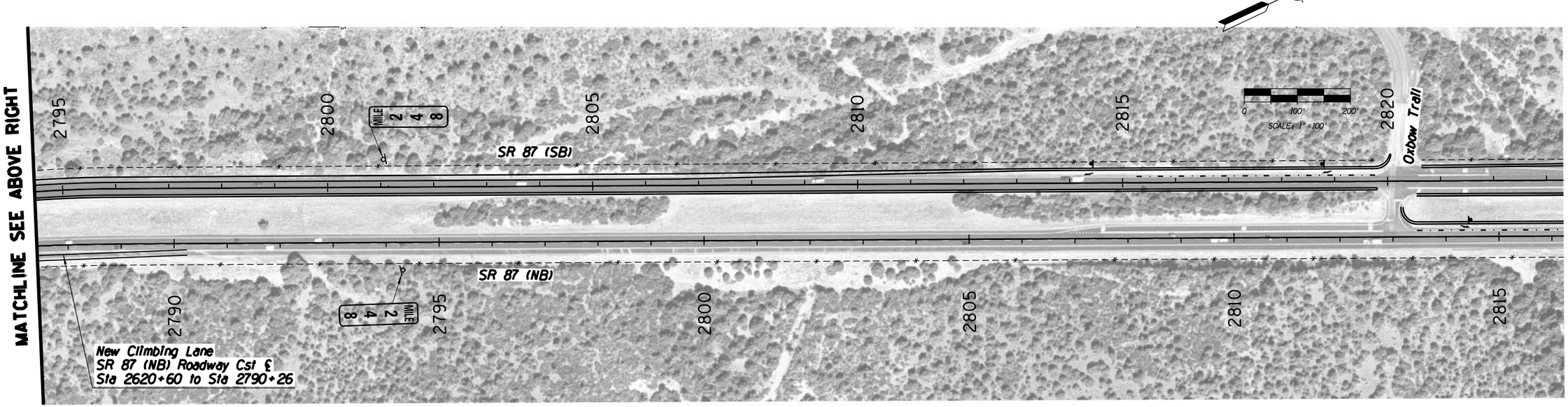
___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "10 NB IMPROVEMENTS
MP 241 TO 247.8

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 10.1-07 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

# PACKAGE PROJECT 11 – SOUTHBOUND IMPROVEMENTS (MP 244-250)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **Project Manager:** |
| **Project Name:** Southbound Improvements (MP 244-250) | |
| **City/Town:** N/A | **County:** Gila |
| **COG/MPO:** CAG | **ADOT District:** Northcentral |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 241 | |
| **End Limit:** 250 | |
| **Project Length:** 9 Miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☒County ☐ADOT ☒Private ☒Federal ☐Tribal ☐Other | |

| PROJECT NEED |
|---|
| Improve safety and emergency access through roadway and shoulder improvements. |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☒Expansion |
| Improve shoulders and roadway safety features to improve safety and emergency response times. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☐Utilities |
| ☐Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>Click or tap here to enter text. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☒HSIP | ☒State |
| | ☐Local | ☐Private | ☐Tribal | ☐Other |

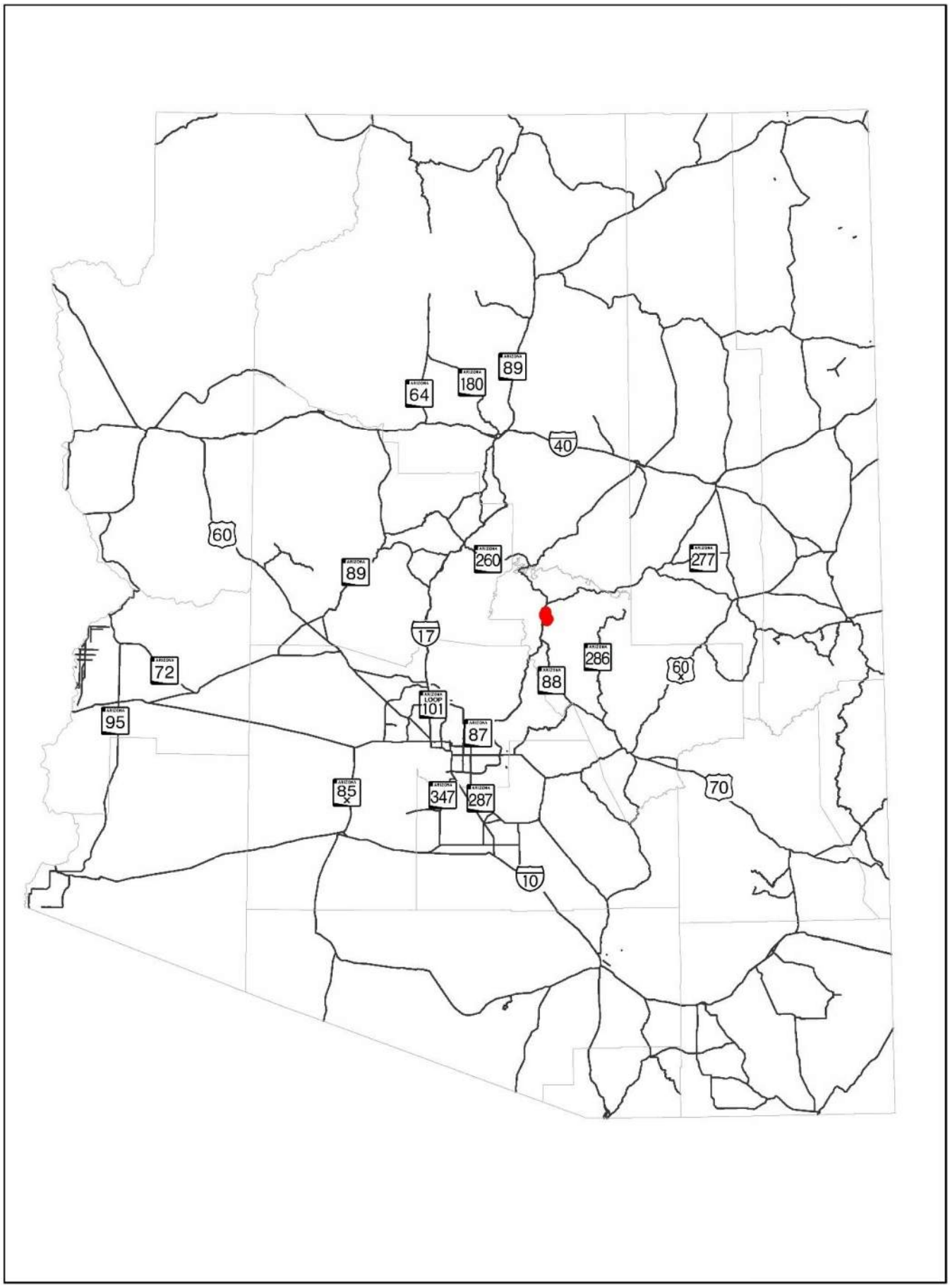
| COST ESTIMATE | | | |
|---|---|---|---|
| Design | Right-of-Way | Construction | Total |
| $1,170,000.00 | $0.00 | $15,211,900.00 | $16,381,900.00 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

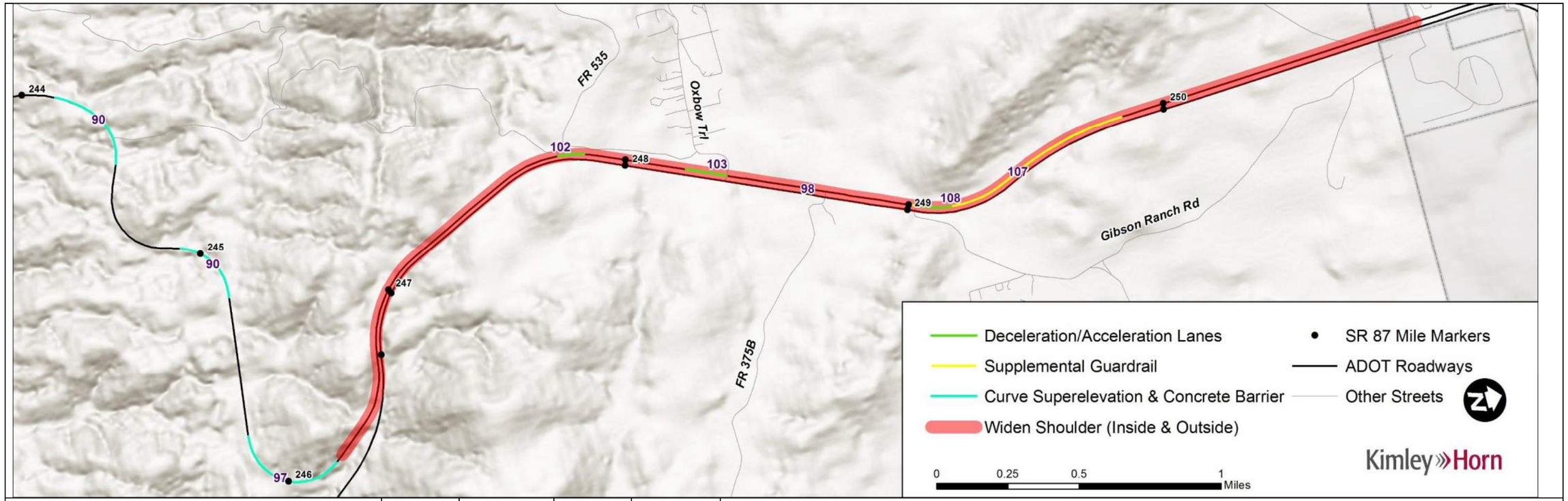
| ATTACHMENTS |
| --- |
| 1. Project Scope of Work<br>2. State Location Map<br>3. Project Vicinity Map<br>4. Itemized Cost Estimates<br>5. Conceptual Design Plans |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Address curve superelevation (MP 244.1-244.3 2, MP 244.9-245.2)<br>• Cut back slope and realign Corvair Curve as well as construct a concrete barrier on the east side of the curve (MP 245.8-246.2)<br>• Widen southbound inside and outside shoulders to 4 feet and 10 feet, respectively (MP 246.2-250.9)<br>• Southbound right-turn lane – FR 535 (MP 247.8)<br>• Southbound outside acceleration lane – Oxbow Trail (MP 248.4)<br>• Add southbound guardrail – west side (MP 249-249.9)<br>• Realign southbound left-turn lane and southbound inside acceleration lane – Gibson Ranch Road (MP 249) |

ATTACHMENT 2: STATE LOCATION MAP



ATTACHMENT 3: PROJECT VICINITY MAP




| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Address curve superelevation, add concrete barrier | 90 | 1: 244.1<br>2: 244.9 | 1: 244.3<br>2: 245.2 | $4,276,300 | Improve the superelevation of curves to reduce run off the road crashes. |
| 2. Add superelevation to Corvair Curve, add concrete barrier. | 97 | 245.8 | 246.2 | $1,506,000 | This location is the most significant crash hot spot within the SR 87 corridor with 63 crashes on the curve, including one fatality and one serious injury during the crash analysis period. |
| 3. Widen SB inside and outside shoulders | 98 | 246.2 | 250.9 | $8,849,000 | Existing shoulders are of an insufficient width for current highway standards and limit effective emergency response. |
| 4. SB right-turn lane at FR 535 | 102 | 247.8 | 247.8 | $275,000 | Provide turn/deceleration lane where it does not currently exist, especially because of the high speeds measured at this location |
| 5. SB outside acceleration lane at Oxbow Trail | 103 | 248.4 | 248.4 | $591,800 | Remove slow-moving traffic from through travel lanes. |
| 6. Add SB guardrail, right side | 107 | 249 | 249.9 | $418,900 | Unprotected drop-off along the right side of the roadway. |
| 7. Realign SB left-turn lane at Gibson Ranch Road | 108 | 249 | 249 | $464,900 | Realign the SB left-turn lane across the median to be adjacent to NB traffic to improve sight distance and address median grade issue. Two crashes occurred at this intersection during the crash analysis period. |
| | | | Total: | $16,381,900 | |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**90. Improve superelevation of curves (MP 244.1-244.3 and 244.9-245.2)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 6 | $5,000.00 | $30,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 15,732 | $20.00 | $314,640 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 2,000 | $5.00 | $10,000 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 82,800 | $7.00 | $579,600 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 6,900 | $50.00 | $345,000 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 5,615 | $80.00 | $449,200 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 465 | $90.00 | $41,850 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $3,726.00 | $3,726 |
| 8050003 | SEEDING (CLASS II) | ACRE | 6 | $3,500.00 | $21,000 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 3,726 | $30.00 | $111,780 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 2 | $2,500.00 | $5,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 2 | $800.00 | $1,600 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 3,726 | $0.75 | $2,795 |
| | | | **Roadway Construction Subtotal** | | **$1,927,791** |
| | Unidentified Item Allowance (15%) | | | | $ 289,169 |
| | | | | **Subtotal** | **$2,216,960** |
| | Water Supply/Dust Palliative (3%) | | | | $ 66,509 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 332,544 |
| | Erosion Control (1%) | | | | $ 22,170 |
| | Contractor Quality Control (2%) | | | | $ 44,340 |
| | Construction Surveying And Layout (2%) | | | | $ 44,340 |
| | | | | **Other Item Subtotal** | **$2,726,863** |
| | Mobilization (12%) | | | | $ 327,224 |
| | | | | **Construction Subtotal** | **$ 3,054,087** |
| | Engineering Design (10%) | | | | $ 305,409 |
| | Construction Engineering and Contingencies (20%) | | | | $ 610,818 |
| | Indirect Cost Allocation (10.02%) | | | | $ 306,020 |
| | | | | **Construction Total** | **$ 4,276,334** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**97. Cut back slope and realign Corvair Curve as well as a concrete barrier (MP 245.8-246.2)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 3 | $5,000.00 | $15,000 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 90,890 | $7.00 | $636,230 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $4,090.00 | $4,090 |
| 8050003 | SEEDING (CLASS II) | ACRE | 3 | $3,500.00 | $10,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 4,090 | $0.75 | $3,068 |
| | | | | **Roadway Construction Subtotal** | **$678,888** |
| | Unidentified Item Allowance (15%) | | | | $ 101,834 |
| | | | | **Subtotal** | **$780,722** |
| | Water Supply/Dust Palliative (3%) | | | | $ 23,422 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 117,109 |
| | Erosion Control (1%) | | | | $ 7,808 |
| | Contractor Quality Control (2%) | | | | $ 15,615 |
| | Construction Surveying And Layout (2%) | | | | $ 15,615 |
| | | | | **Other Item Subtotal** | **$960,291** |
| | Mobilization (12%) | | | | $ 115,235 |
| | | | | **Construction Subtotal** | **$ 1,075,526** |
| | Engineering Design (10%) | | | | $ 107,553 |
| | Construction Engineering and Contingencies (20%) | | | | $ 215,106 |
| | Indirect Cost Allocation (10.02%) | | | | $ 107,768 |
| | | | | **Construction Total** | **$ 1,505,953** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**98. Widen inside and outside shoulders (MP 246.2-250.9)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 17 | $5,000.00 | $85,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 10,729 | $20.00 | $214,580 |
| 2020053 | REMOVE (GR TERMINAL) | EACH | 4 | $400.00 | $1,600 |
| 2020071 | REMOVE GUARD RAIL | L.FT. | 6,035 | $5.00 | $30,175 |
| 2020201 | SAW CUTTING | L.FT. | 48,280 | $2.50 | $120,700 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 107,290 | $7.00 | $751,030 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 23,246 | $50.00 | $1,162,300 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 15,082 | $80.00 | $1,206,560 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 1,108 | $90.00 | $99,720 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $24,140.00 | $24,140 |
| 8050003 | SEEDING (CLASS II) | ACRE | 17 | $3,500.00 | $59,500 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 6,035 | $30.00 | $181,050 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 2 | $2,500.00 | $5,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 2 | $800.00 | $1,600 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 48,280 | $0.75 | $36,210 |
| | | | **Roadway Construction Subtotal** | | **$3,989,165** |
| | Unidentified Item Allowance (15%) | | | | $ 598,375 |
| | | | | **Subtotal** | **$4,587,540** |
| | Water Supply/Dust Palliative (3%) | | | | $ 137,627 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 688,131 |
| | Erosion Control (1%) | | | | $ 45,876 |
| | Contractor Quality Control (2%) | | | | $ 91,751 |
| | Construction Surveying And Layout (2%) | | | | $ 91,751 |
| | | | | **Other Item Subtotal** | **$5,642,676** |
| | Mobilization (12%) | | | | $ 677,122 |
| | | | | **Construction Subtotal** | **$ 6,319,798** |
| | Engineering Design (10%) | | | | $ 631,980 |
| | Construction Engineering and Contingencies (20%) | | | | $ 1,263,960 |
| | Indirect Cost Allocation (10.02%) | | | | $ 633,244 |
| | | | | **Construction Total** | **$ 8,848,982** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**102. Southbound right-turn lane at FR 535 (MP 247.8)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 55 | $35.00 | $1,925 |
| 2020201 | SAW CUTTING | L.FT. | 490 | $2.50 | $1,225 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 440 | $10.00 | $4,400 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 400 | $120.00 | $48,000 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 316 | $160.00 | $50,560 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 26 | $120.00 | $3,120 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $490.00 | $490 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 490 | $1.50 | $735 |
| | | | | **Roadway Construction Subtotal** | **$123,955** |
| | Unidentified Item Allowance (15%) | | | | $ 18,594 |
| | | | | **Subtotal** | **$142,549** |
| | Water Supply/Dust Palliative (3%) | | | | $ 4,277 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 21,383 |
| | Erosion Control (1%) | | | | $ 1,426 |
| | Contractor Quality Control (2%) | | | | $ 2,851 |
| | Construction Surveying And Layout (2%) | | | | $ 2,851 |
| | | | | **Other Item Subtotal** | **$175,337** |
| | Mobilization (12%) | | | | $ 21,041 |
| | | | | **Construction Subtotal** | **$ 196,378** |
| | Engineering Design (10%) | | | | $ 19,638 |
| | Construction Engineering and Contingencies (20%) | | | | $ 39,276 |
| | Indirect Cost Allocation (10.02%) | | | | $ 19,678 |
| | | | | **Construction Total** | **$ 274,970** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**103. SB Outside Acceleration Lane at Oxbow Trail (MP 248.4)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 292 | $20.00 | $5,840 |
| 2020201 | SAW CUTTING | L.FT. | 1,310 | $2.50 | $3,275 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 1,170 | $10.00 | $11,700 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 922 | $120.00 | $110,640 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 699 | $160.00 | $111,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 56 | $120.00 | $6,720 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $1,310.00 | $1,310 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 1,310 | $1.50 | $1,965 |
| | | | **Roadway Construction Subtotal** | | **$266,790** |
| | Unidentified Item Allowance (15%) | | | | $ 40,019 |
| | | | | **Subtotal** | **$306,809** |
| | Water Supply/Dust Palliative (3%) | | | | $ 9,205 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 46,022 |
| | Erosion Control (1%) | | | | $ 3,069 |
| | Contractor Quality Control (2%) | | | | $ 6,137 |
| | Construction Surveying And Layout (2%) | | | | $ 6,137 |
| | | | | **Other Item Subtotal** | **$377,379** |
| | Mobilization (12%) | | | | $ 45,286 |
| | | | | **Construction Subtotal** | **$ 422,665** |
| | Engineering Design (10%) | | | | $ 42,267 |
| | Construction Engineering and Contingencies (20%) | | | | $ 84,533 |
| | Indirect Cost Allocation (10.02%) | | | | $ 42,352 |
| | | | | **Construction Total** | **$ 591,817** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**107. Add guardrail on the west side of the SB lanes (MP 249-249.9)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 2,120 | $10.00 | $21,200 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $4,000.00 | $4,000 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 4,752 | $30.00 | $142,560 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 2 | $2,500.00 | $5,000 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 2 | $800.00 | $1,600 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $6,000.00 | $6,000 |
| | | | **Roadway Construction Subtotal** | | **$188,860** |
| | Unidentified Item Allowance (15%) | | | | $ 28,329 |
| | | | | **Subtotal** | **$217,189** |
| | Water Supply/Dust Palliative (3%) | | | | $ 6,516 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 32,579 |
| | Erosion Control (1%) | | | | $ 2,172 |
| | Contractor Quality Control (2%) | | | | $ 4,344 |
| | Construction Surveying And Layout (2%) | | | | $ 4,344 |
| | | | | **Other Item Subtotal** | **$267,144** |
| | Mobilization (12%) | | | | $ 32,058 |
| | | | | **Construction Subtotal** | **$ 299,202** |
| | Engineering Design (10%) | | | | $ 29,921 |
| | Construction Engineering and Contingencies (20%) | | | | $ 59,841 |
| | Indirect Cost Allocation (10.02%) | | | | $ 29,981 |
| | | | | **Construction Total** | **$ 418,945** |

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# SR87 Corridor Development Study
# ITEMIZED COST ESTIMATE

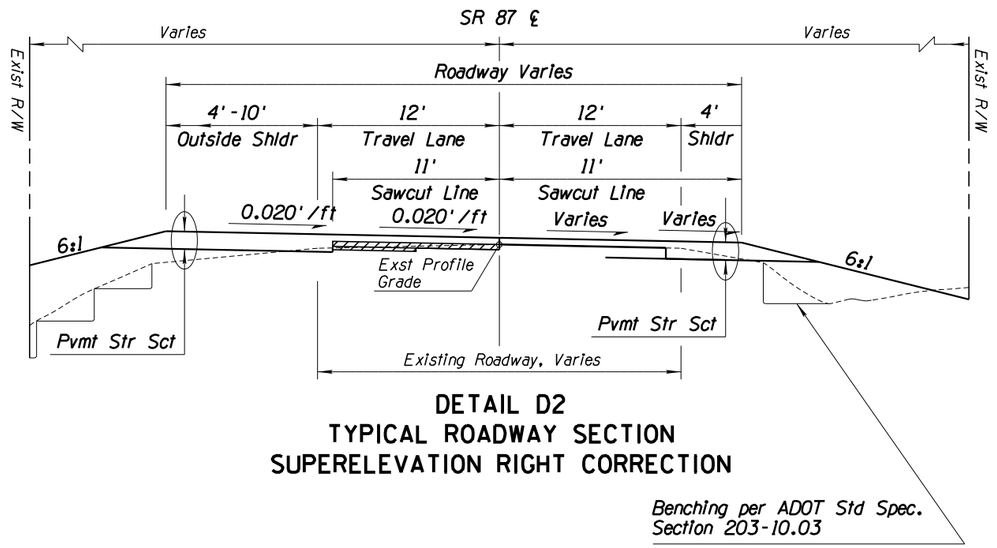
**108. Realign SB left-turn lane at Gibson Ranch Road (MP 249)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 1,695 | $20.00 | $33,900 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 910 | $10.00 | $9,100 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 588 | $120.00 | $70,560 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 482 | $160.00 | $77,120 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 40 | $120.00 | $4,800 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $610.00 | $610 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| | | | | **Roadway Construction Subtotal** | **$209,590** |
| | Unidentified Item Allowance (15%) | | | | $ 31,439 |
| | | | | **Subtotal** | **$241,029** |
| | Water Supply/Dust Palliative (3%) | | | | $ 7,231 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 36,155 |
| | Erosion Control (1%) | | | | $ 2,411 |
| | Contractor Quality Control (2%) | | | | $ 4,821 |
| | Construction Surveying And Layout (2%) | | | | $ 4,821 |
| | | | | **Other Item Subtotal** | **$296,468** |
| | Mobilization (12%) | | | | $ 35,577 |
| | | | | **Construction Subtotal** | **$ 332,045** |
| | Engineering Design (10%) | | | | $ 33,205 |
| | Construction Engineering and Contingencies (20%) | | | | $ 66,409 |
| | Indirect Cost Allocation (10.02%) | | | | $ 33,271 |
| | | | | **Construction Total** | **$ 464,930** |

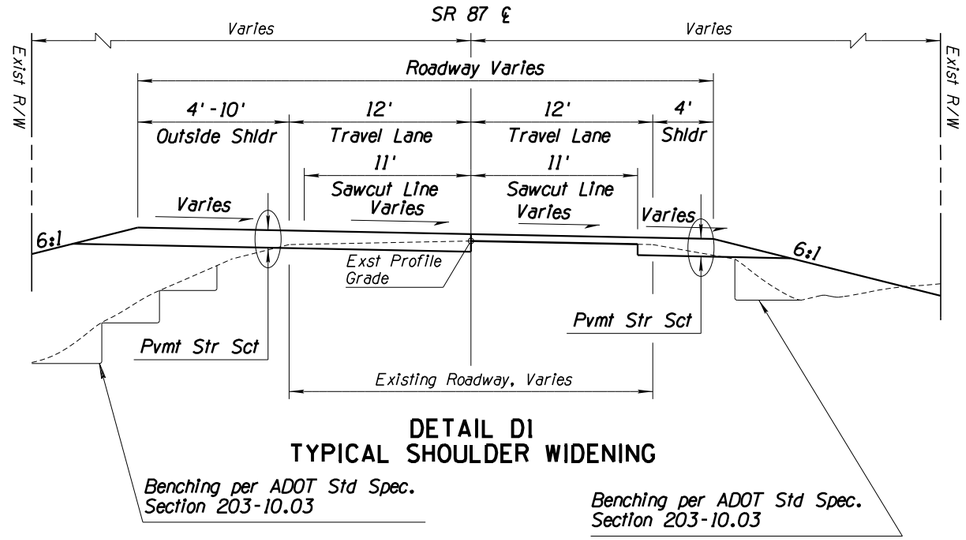
ATTACHMENT 5: PRELIMINARY PLANS

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

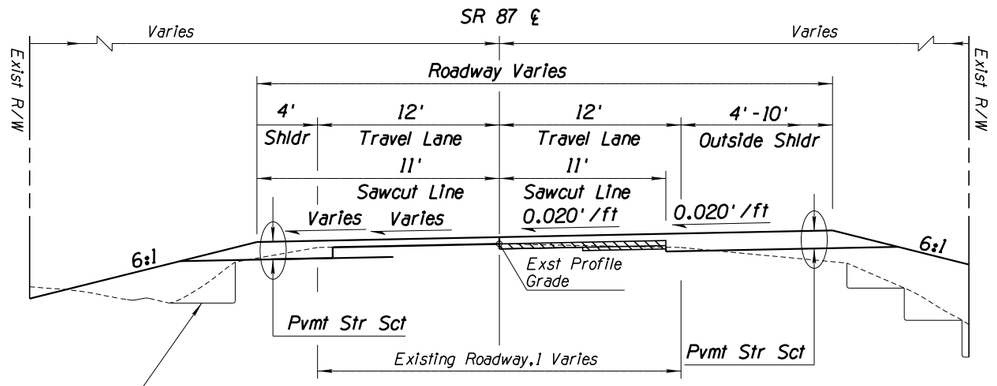
| SR 87 MILE POST STATION | | | |
|---|---|---|---|
| MP NB | STATION | MP SB | STATION |
| 196 | 101+73 | 196 | 101+18 |
| 197 | 155+53 | 197 | 154+02 |
| 198 | 207+69 | 198 | 207+94 |
| 199 | 261+02 | 199 | 259+13 |
| 200 | 314+21 | 200 | 311+72 |
| 201 | 367+73 | 201 | 364+06 |
| 202 | 419+18 | 202 | 417+81 |
| 203 | 471+36 | 203 | 470+65 |
| 204 | 526+28 | 204 | 523+10 |
| 205 | 577+70 | 205 | 575+84 |
| 206 | 630+73 | 206 | 628+30 |
| 207 | 682+81 | 207 | 680+28 |
| 208 | 736+47 | 208 | 734+12 |
| 209 | 788+55 | 209 | 786+62 |
| 210 | 842+08 | 210 | 839+50 |
| 211 | 894+91 | 211 | 890+40 |
| 212 | 942+20 | 212 | 939+42 |
| 213 | 998+65 | 213 | 995+55 |
| 214 | 1051+86 | 214 | 1050+06 |
| 215 | 1105+38 | 215 | 1095+77 |
| 216 | 1158+68 | 216 | 1147+95 |
| 217 | 1213+92 | 217 | 1199+48 |
| 218 | 1268+31 | 218 | 1250+20 |
| 219 | 1318+19 | 219 | 1304+12 |
| 220 | 1374+67 | 220 | 1359+76 |
| 221 | 1427+95 | 221 | 1412+99 |
| 222 | 1480+60 | 222 | 1465+84 |
| 223 | 1533+97 | 223 | 1518+89 |
| 224 | 1584+61 | 224 | 1570+72 |
| 225 | 1639+50 | 225 | 1625+29 |
| 226 | 1689+86 | 226 | 1676+32 |
| 227 | 1740+23 | 227 | 1726+14 |
| 228 | 1792+50 | 228 | 1778+04 |
| 229 | 1845+24 | 229 | 1831+98 |
| 230 | 1898+50 | 230 | 1884+70 |
| 231 | 1949+61 | 231 | 1933+71 |
| 232 | 1999+33 | 232 | 1985+29 |
| 233 | 2047+74 | 233 | 2033+06 |
| 234 | 2101+13 | 234 | 2085+05 |
| 235 | 2154+59 | 235 | 2137+29 |
| 236 | 2207+09 | 236 | 2189+44 |
| 237 | 2259+88 | 237 | 2240+86 |
| 238 | 2311+66 | 238 | 2293+85 |
| 239 | 2364+28 | 239 | 2344+91 |
| 240 | 2416+01 | 240 | 2397+41 |
| 241 | 2467+79 | 241 | 2448+96 |
| 242 | 2518+51 | 242 | 2496+68 |
| 243 | 2571+26 | 243 | 2549+70 |
| 244 | 2620+38 | 244 | 2601+82 |
| 245 | 2677+47 | 245 | 2655+01 |
| 246 | 2729+53 | 246 | 2703+04 |
| 247 | 2741+30 | 247 | 2747+68 |
| 248 | 2794+18 | 248 | 2801+15 |
| 249 | 2847+25 | 249 | 2854+41 |
| 250 | 2899+69 | 250 | 2906+58 |



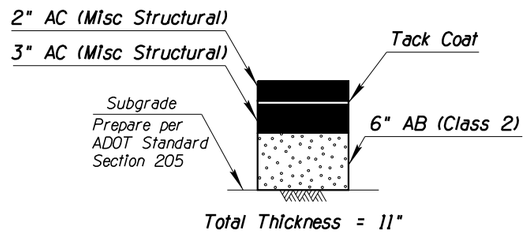

## DETAIL D2
## TYPICAL ROADWAY SECTION SUPERELEVATION RIGHT CORRECTION




## DETAIL D1
## TYPICAL SHOULDER WIDENING




## DETAIL D3
## TYPICAL ROADWAY SECTION SUPERELEVATION LEFT CORRECTION




Total Thickness = 11"

## PAVEMENT STRUCTURAL SECTION

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

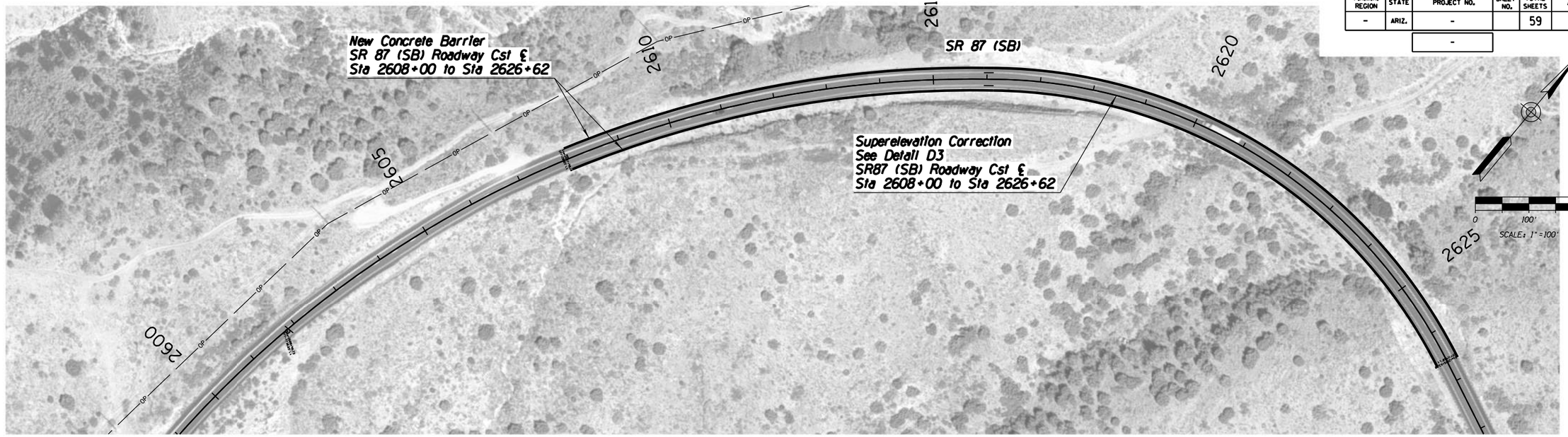
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

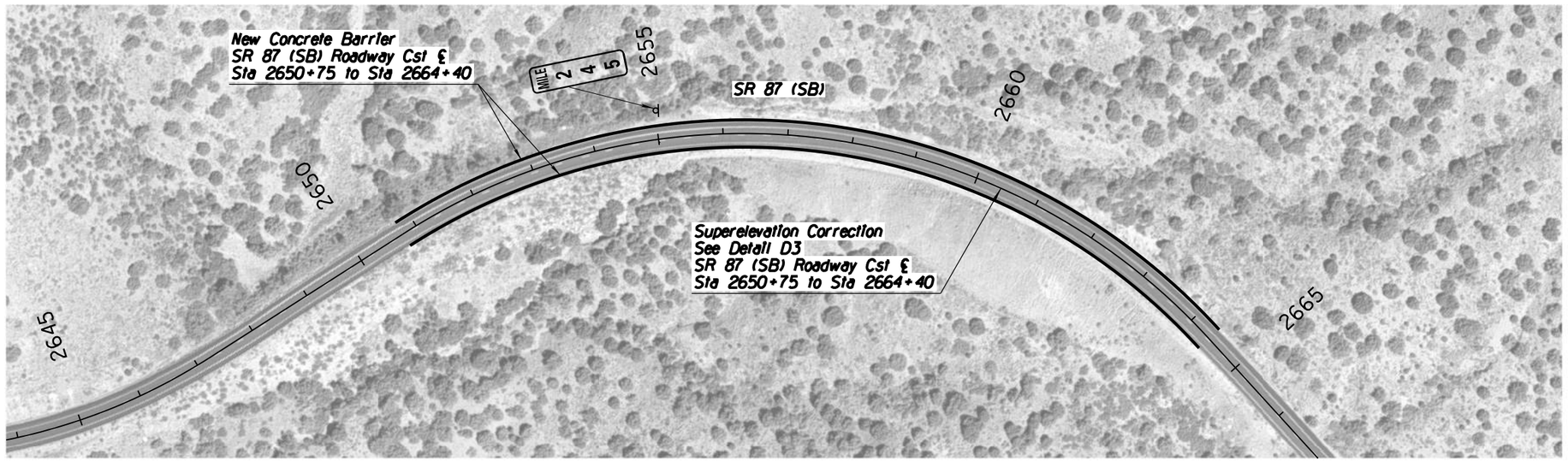
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | ___ OF ___ |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | |

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

10:28:19 AM 9/5/2019 TERRY.RADDEMAN K:\TUC_TPTO\291199004-ADOT SR 87 CORRIDOR DEV STUDY\TASKS\TASK 4 - FEASIBILITY REPORT\CADD\DETAILS.DGN

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS
MP 241 TO 250

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 5.1-01 |

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
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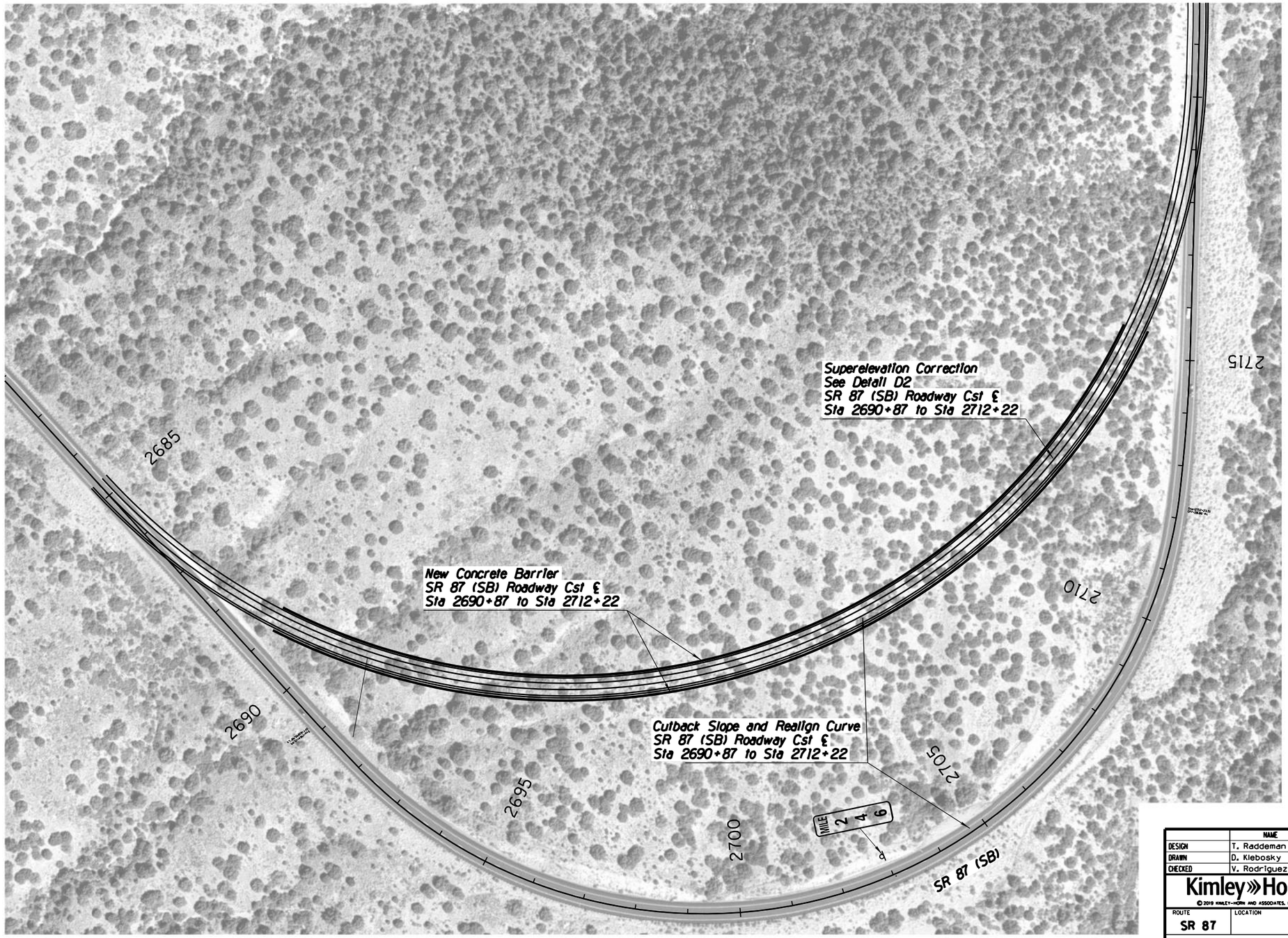
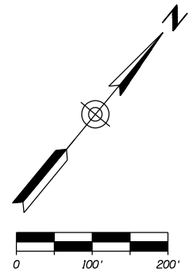
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS
MP 241 TO 250

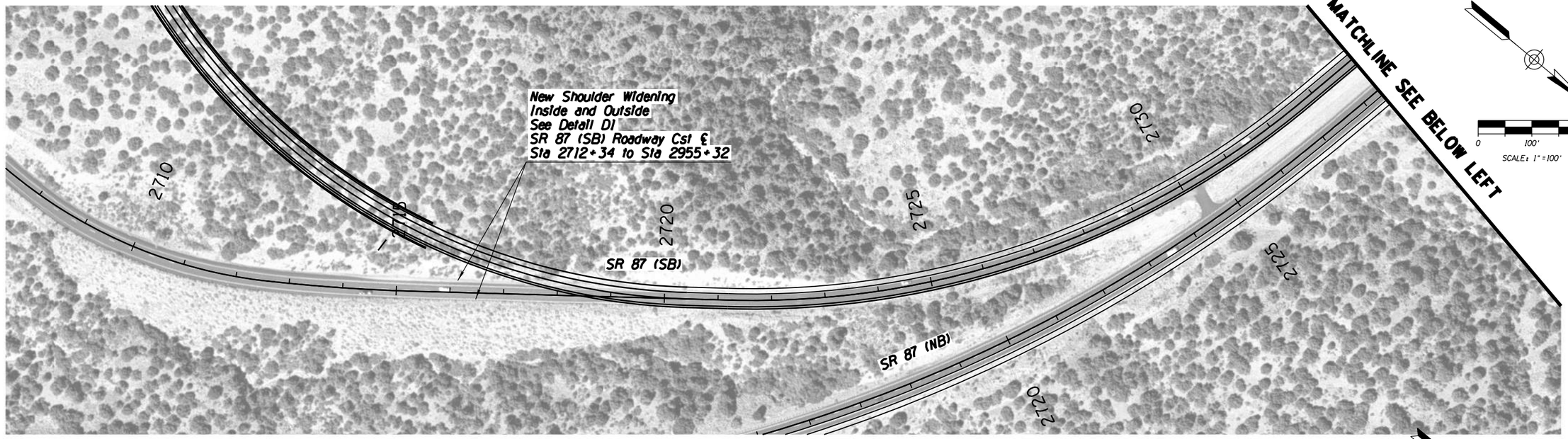
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

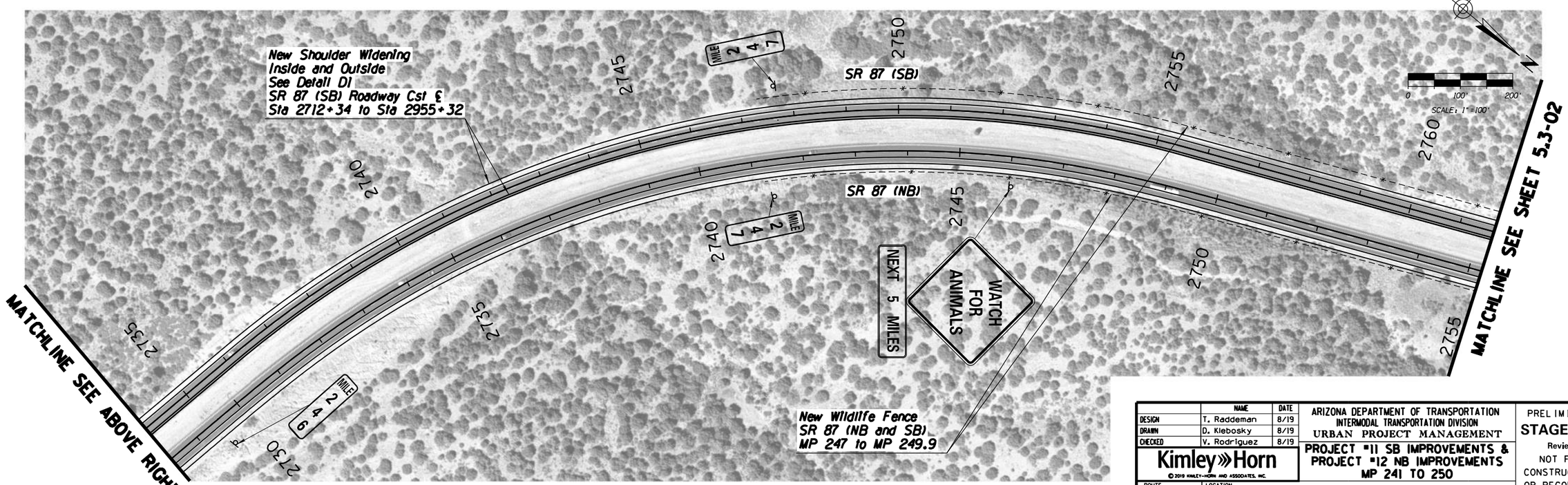
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 5.2-01 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. 5.3-01 |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
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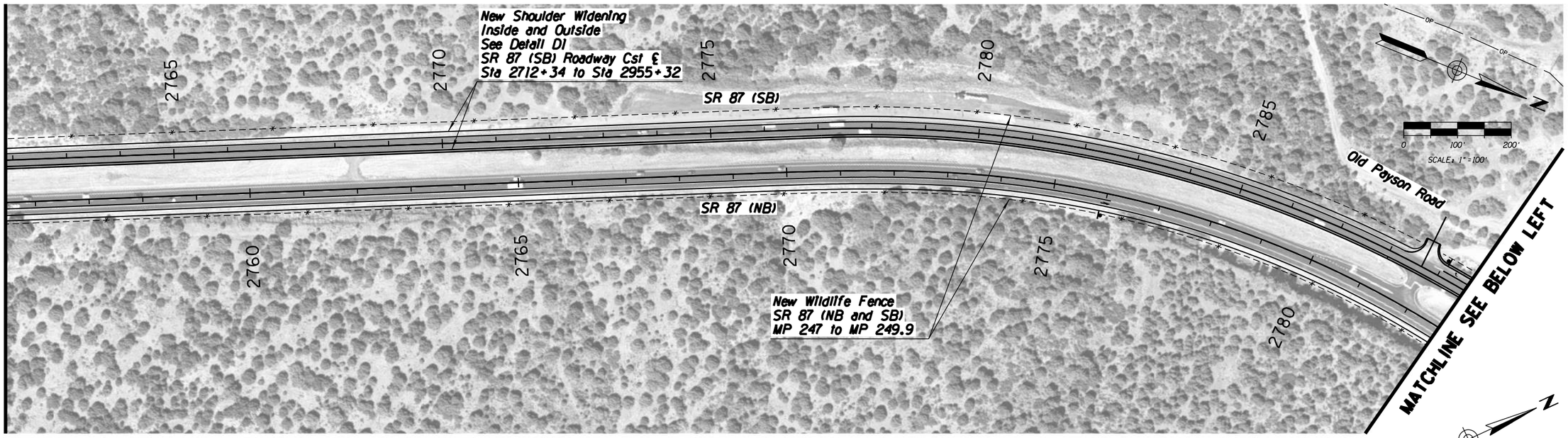
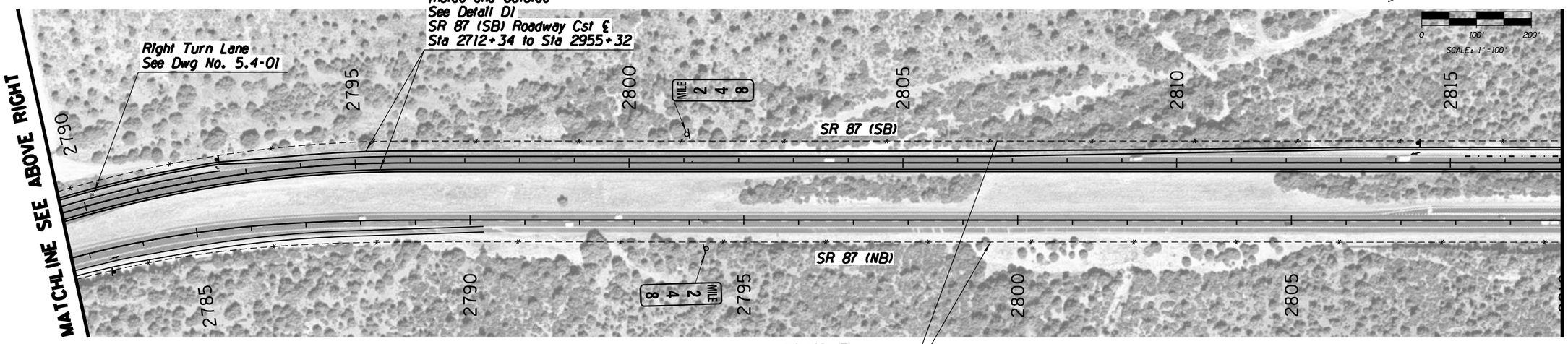
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 5.3-02 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
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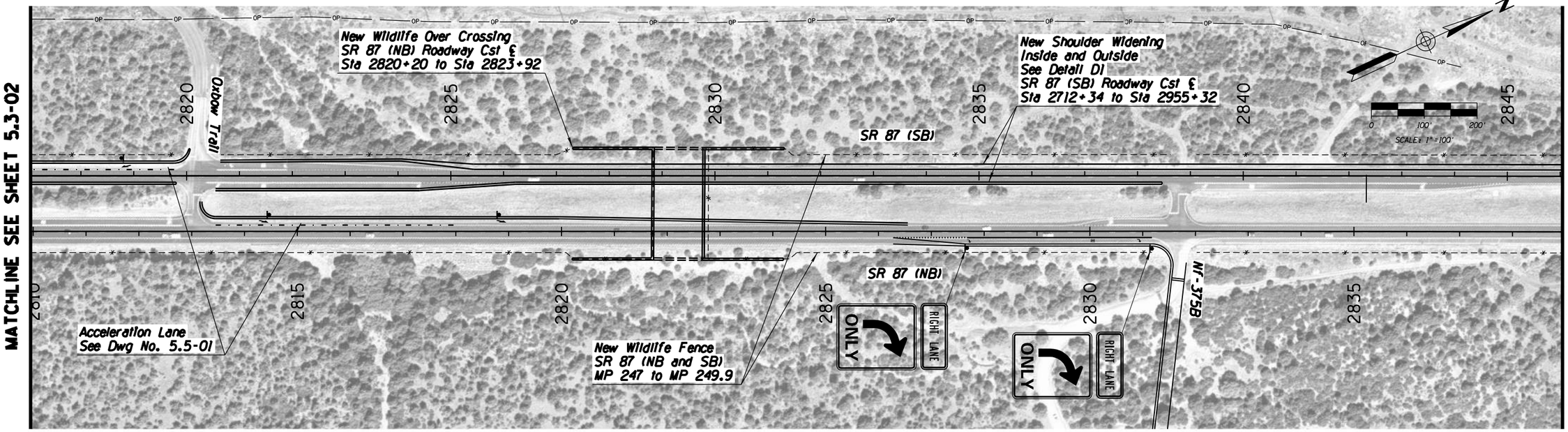


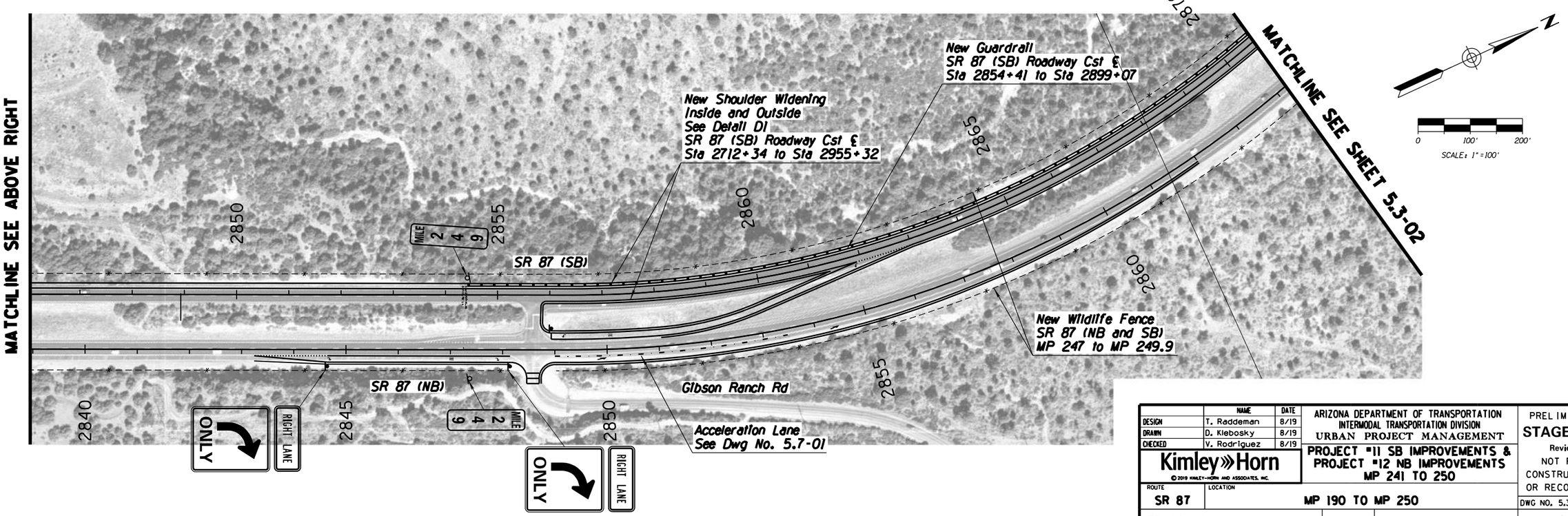


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 5.3-03 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
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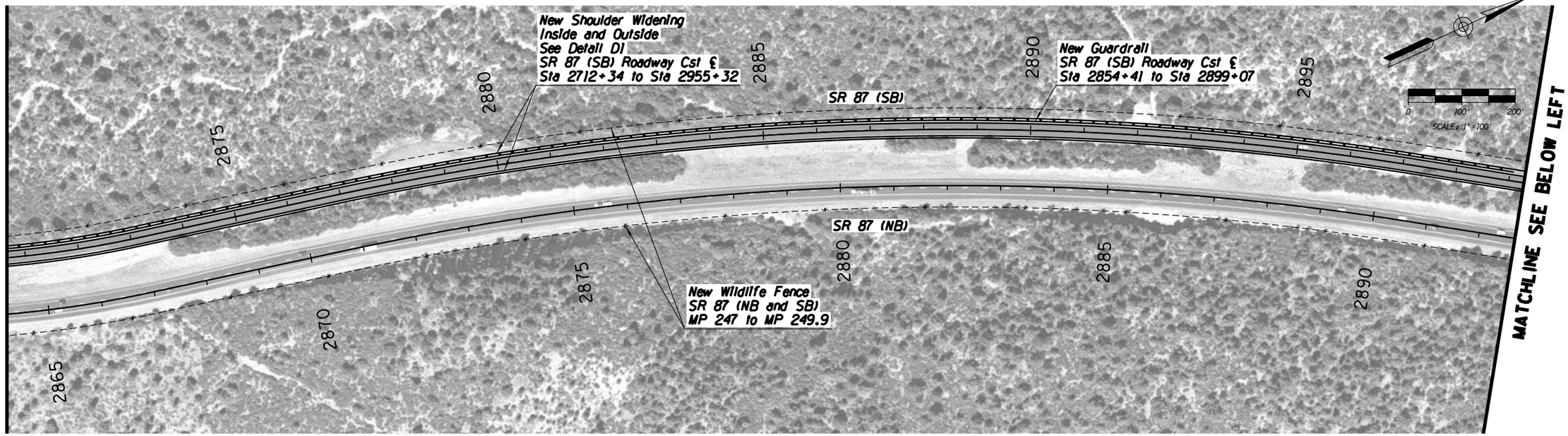


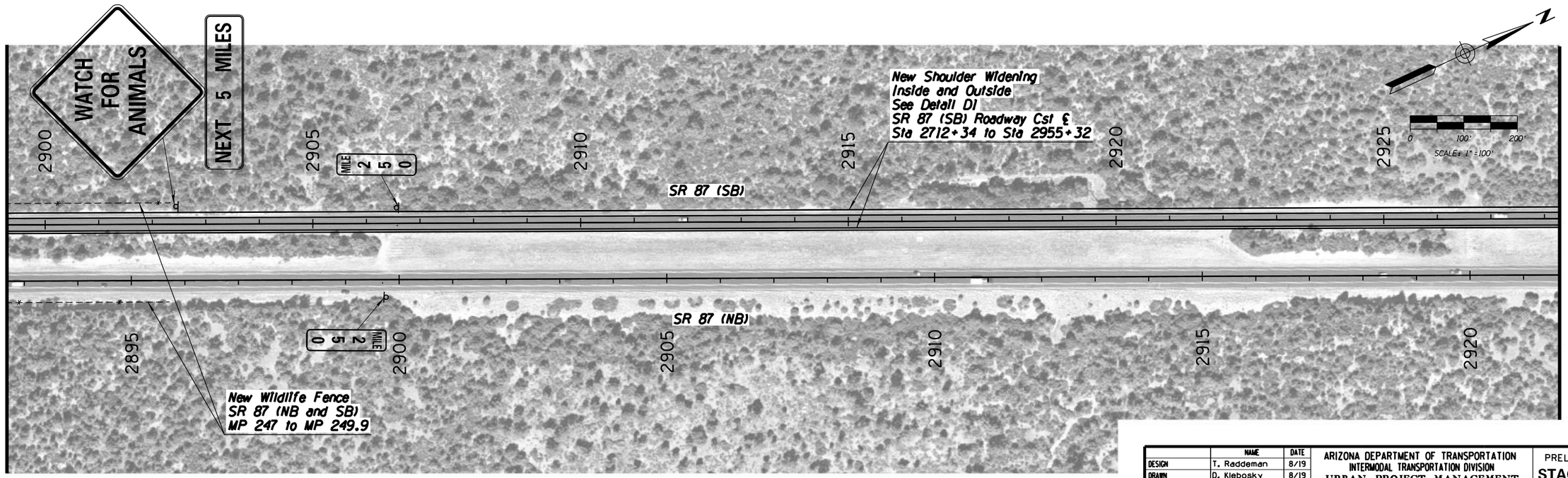


| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

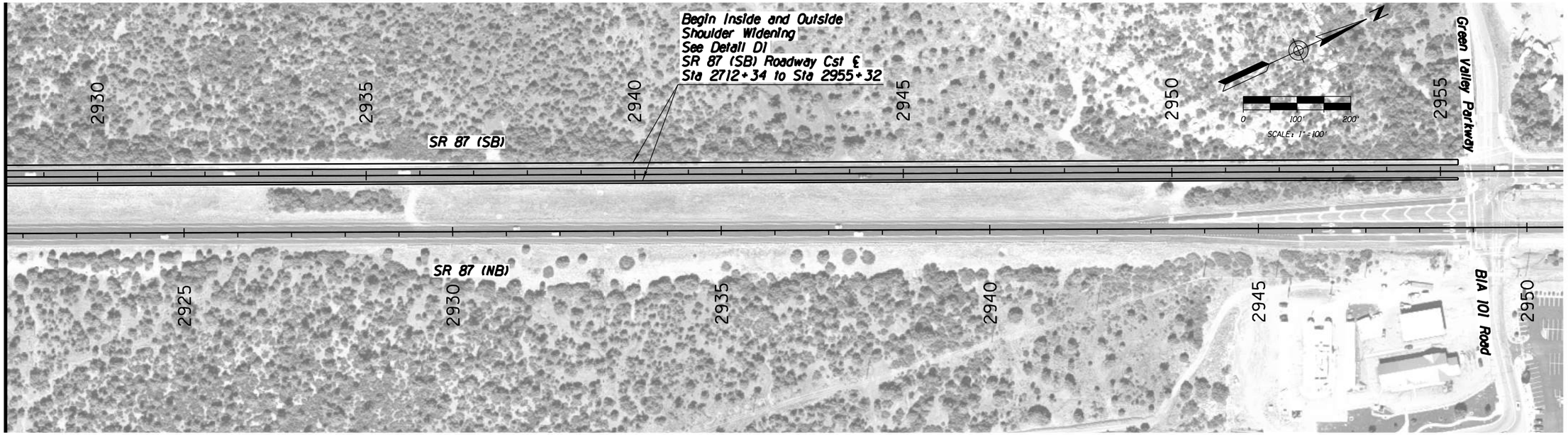
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 5.3-04 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

MATCHLINE SEE SHEET 5.3-04




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

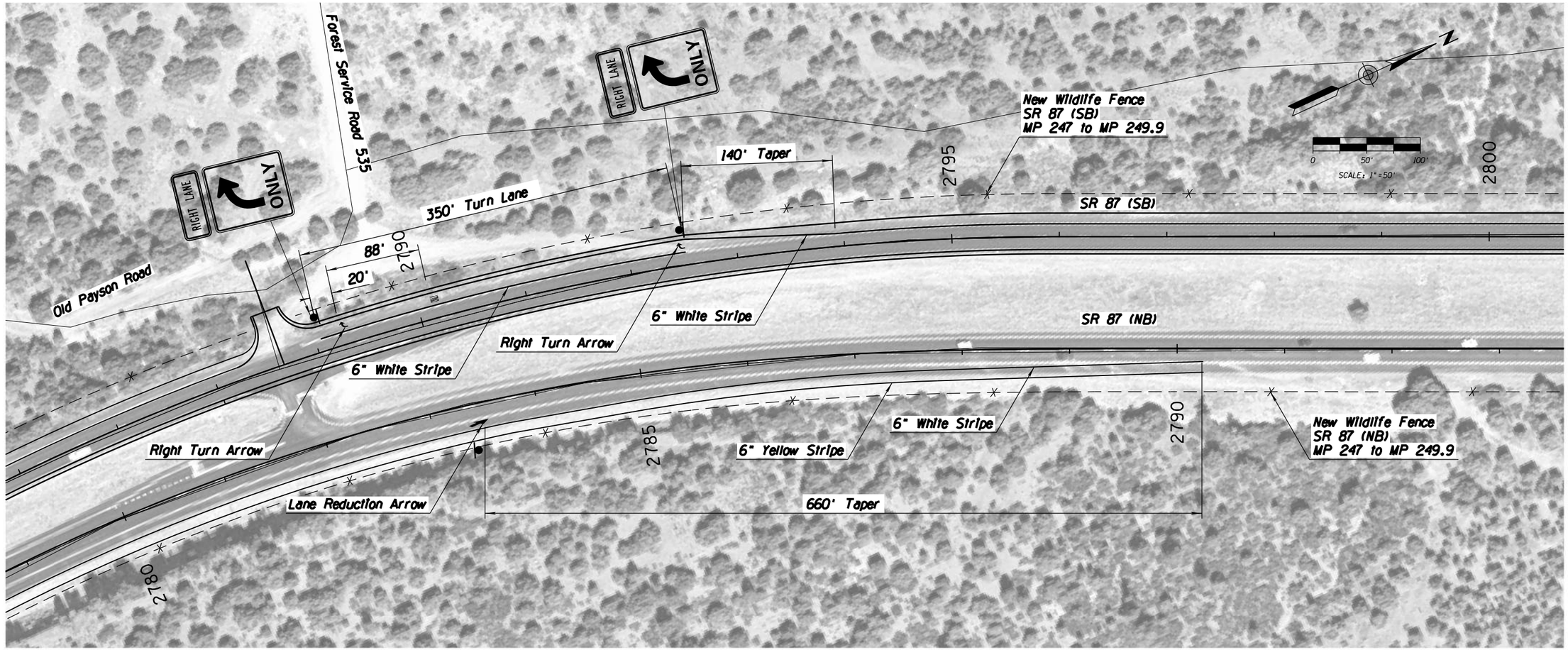
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. 5.3-05 |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT #11 SB IMPROVEMENTS &
PROJECT #12 NB IMPROVEMENTS
MP 241 TO 250

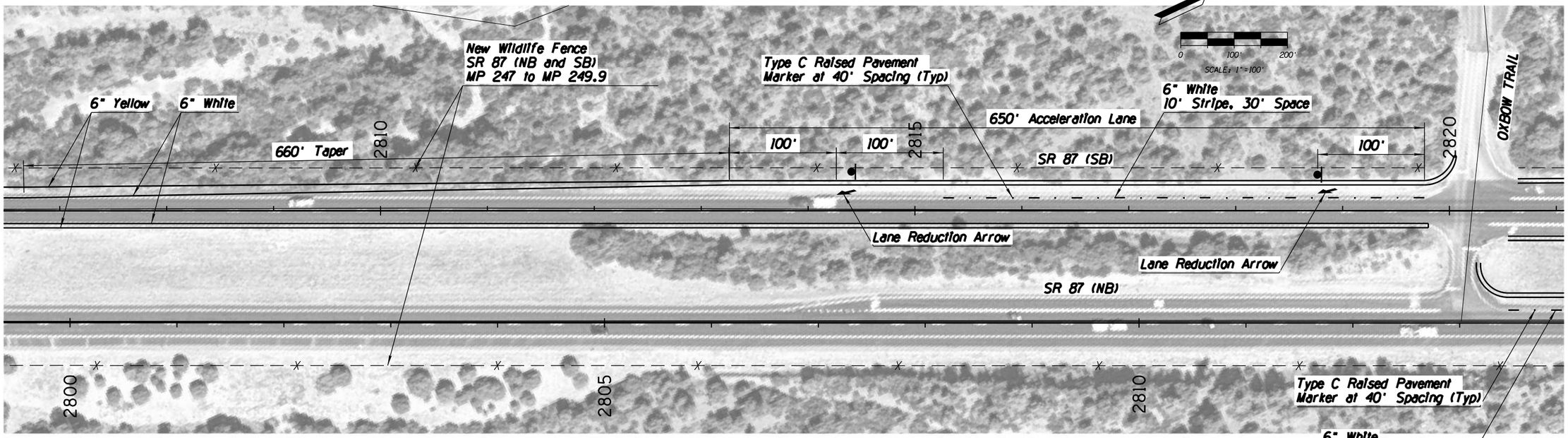
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 5.4-01 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

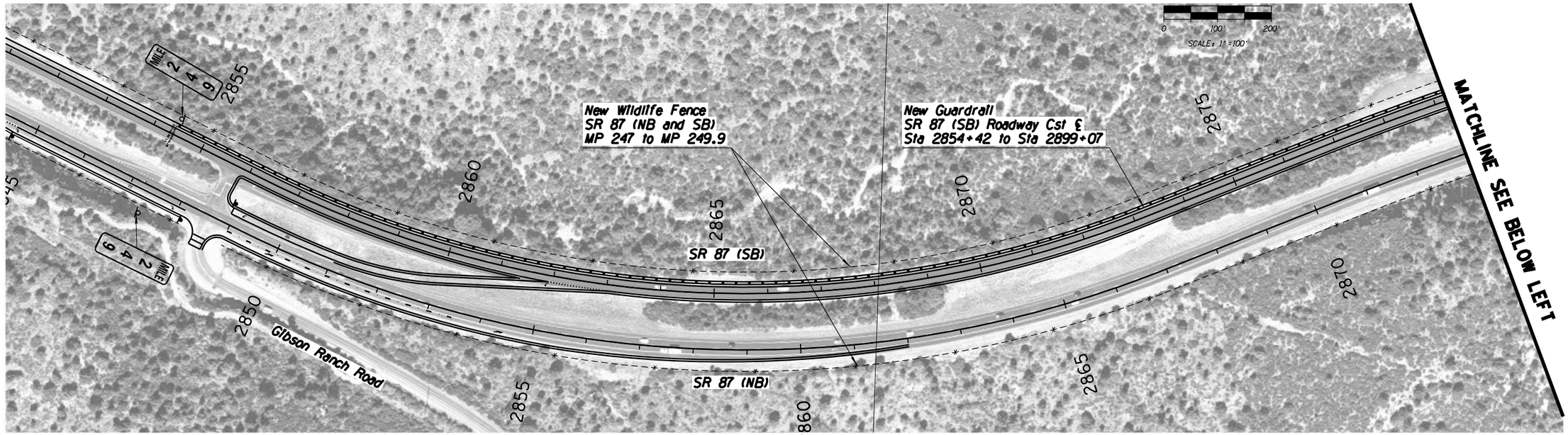
DWG NO. 5.5-01

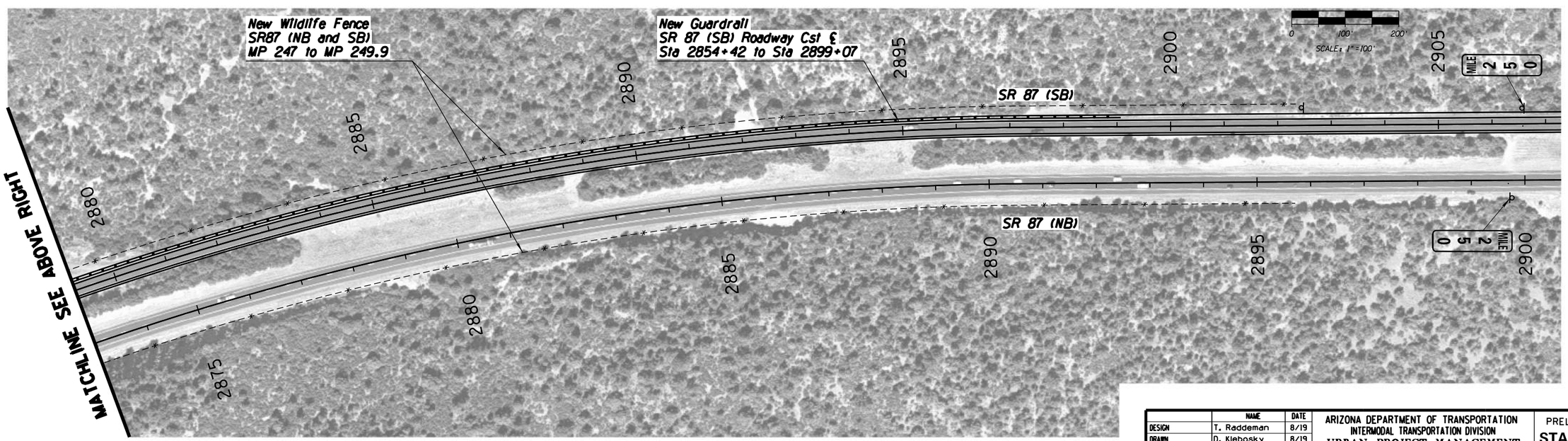
TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

MAINLINE SIGN LOCATIONS
STA 2408+00 TO STA 2460+00

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. 5.6-01 |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
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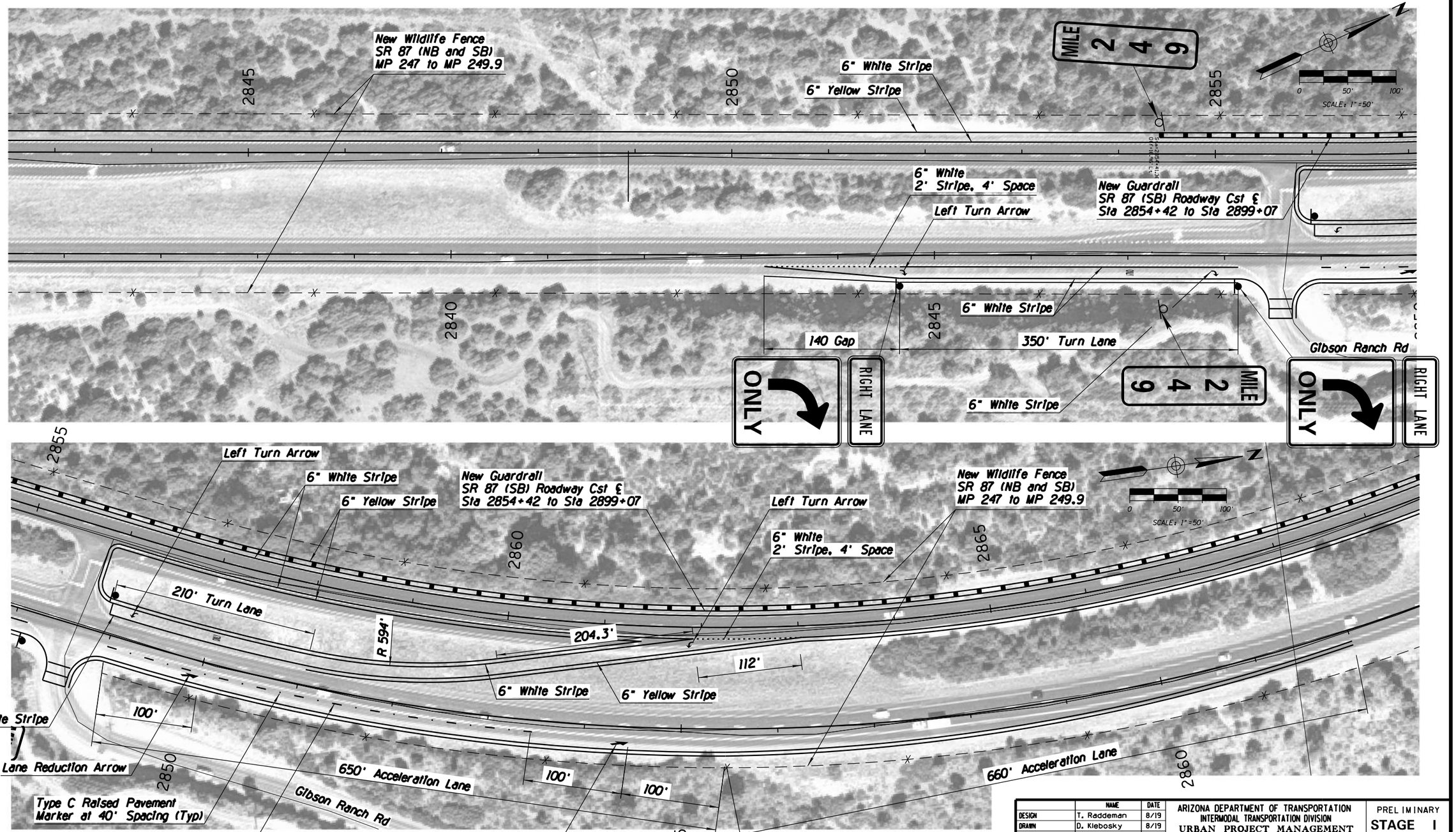



| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVMENTS
MP 241 TO 250

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

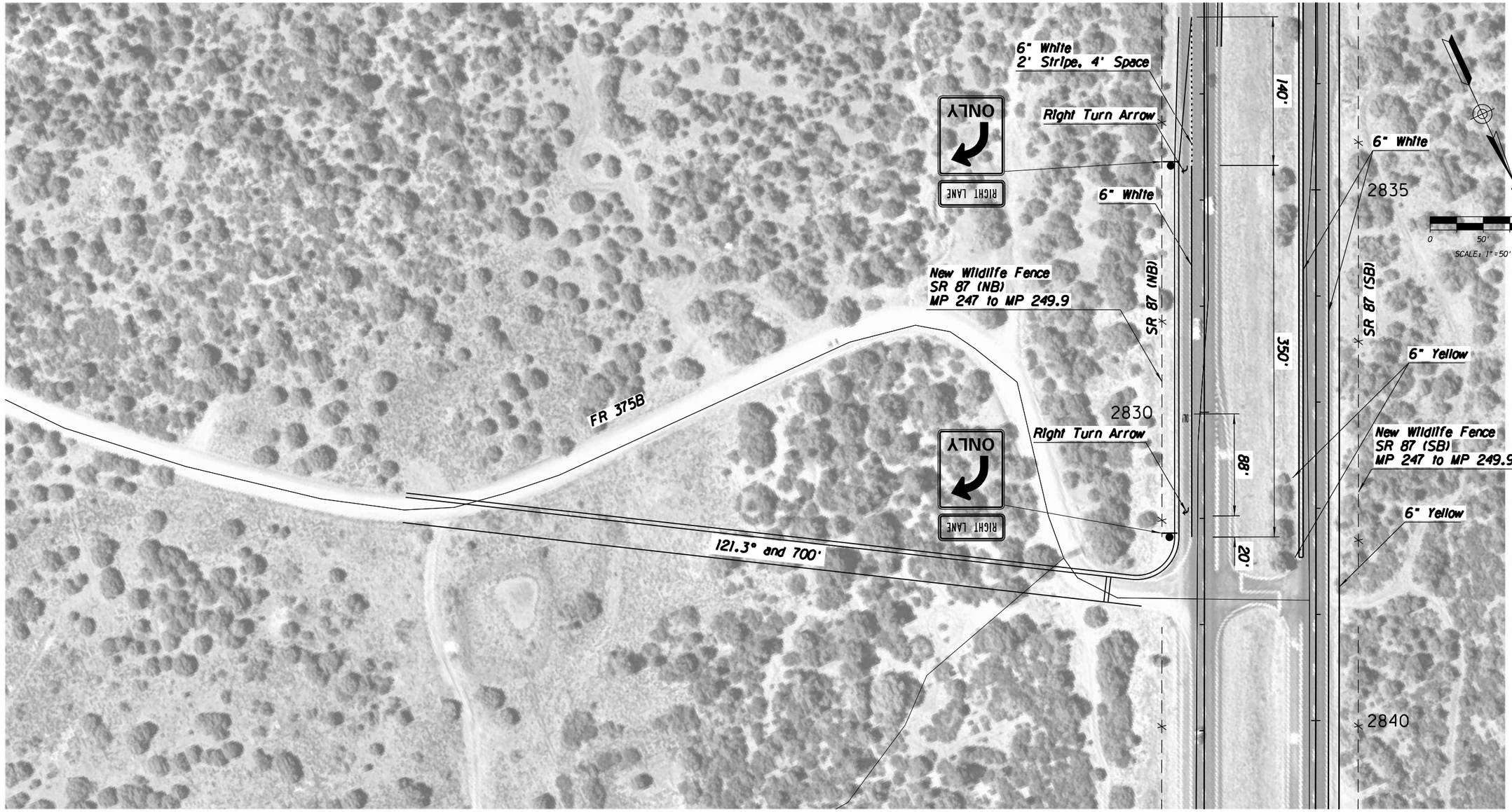
DWG NO. 5.7-01

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 247 TO 249

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. 7.3-01 |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

# PACKAGE PROJECT 12 – NORTHBOUND IMPROVEMENTS (MP 247-250)

**ADOT SR 87 Corridor Development Study**

**PRELIMINARY SCOPING REPORT**

| GENERAL PROJECT INFORMATION | |
|---|---|
| **Date**: 8/20/2019 | **ADOT Project Manager:** |
| **Project Name:** Northbound Improvements (MP 247-250) | |
| **City/Town:** N/A | **County:** Gila |
| **COG/MPO:** CAG | **ADOT District:** Northcentral |
| **Primary Route/Street:** SR 87 | |
| **Beginning Limit:** 247 | |
| **End Limit:** 250 | |
| **Project Length:** 3 Miles | |
| **Right of Way Ownership(s)** (where proposed project would occur): *(check all that apply)*<br>☐City/Town ☐County ☒ADOT ☐Private ☐Federal ☐Tribal ☐Other | |
| **Adjacent Land Ownership(s):** *(Check all that apply)*<br>☐City/Town ☒County ☐ADOT ☒Private ☒Federal ☐Tribal ☐Other | |

| PROJECT NEED |
|---|
| This location has experienced a high number of accidents involving wildlife, there are also sight distance and grade issues at several intersections. |

| PROJECT PURPOSE | | | |
|---|---|---|---|
| What is the Primary Purpose of the Project? | ☐Preservation | ☒Modernization | ☐Expansion |
| Prevent wildlife-involved crashes by adding wildlife fencing, signage, and an overpass, address sight distance issues at intersections through side street realignments and turn lane improvements. | | | |

| PROJECT RISKS | |
|---|---|
| Check any risks identified that may impact the project's scope, schedule, or budget: | |
| ☐Access/Traffic Control/Detour Issues | ☐Right-of-Way |
| ☐Constructability/Construction Window Issues | ☐Environmental |
| ☐Stakeholder Issues | ☐Utilities |
| ☐Structures & Geotech | ☐Other: |
| **Risk Description:** *(if a box is checked above, briefly explain the risk)*<br>Click or tap here to enter text. | |

| POTENTIAL FUNDING SOURCE(S) | | | | |
|---|---|---|---|---|
| Anticipated Project Design/Construction Funding Type: *(Check all that applied)* | ☐STBG | ☐TAP | ☒HSIP | ☒State |
| | ☐Local | ☐Private | ☐Tribal | ☐Other |

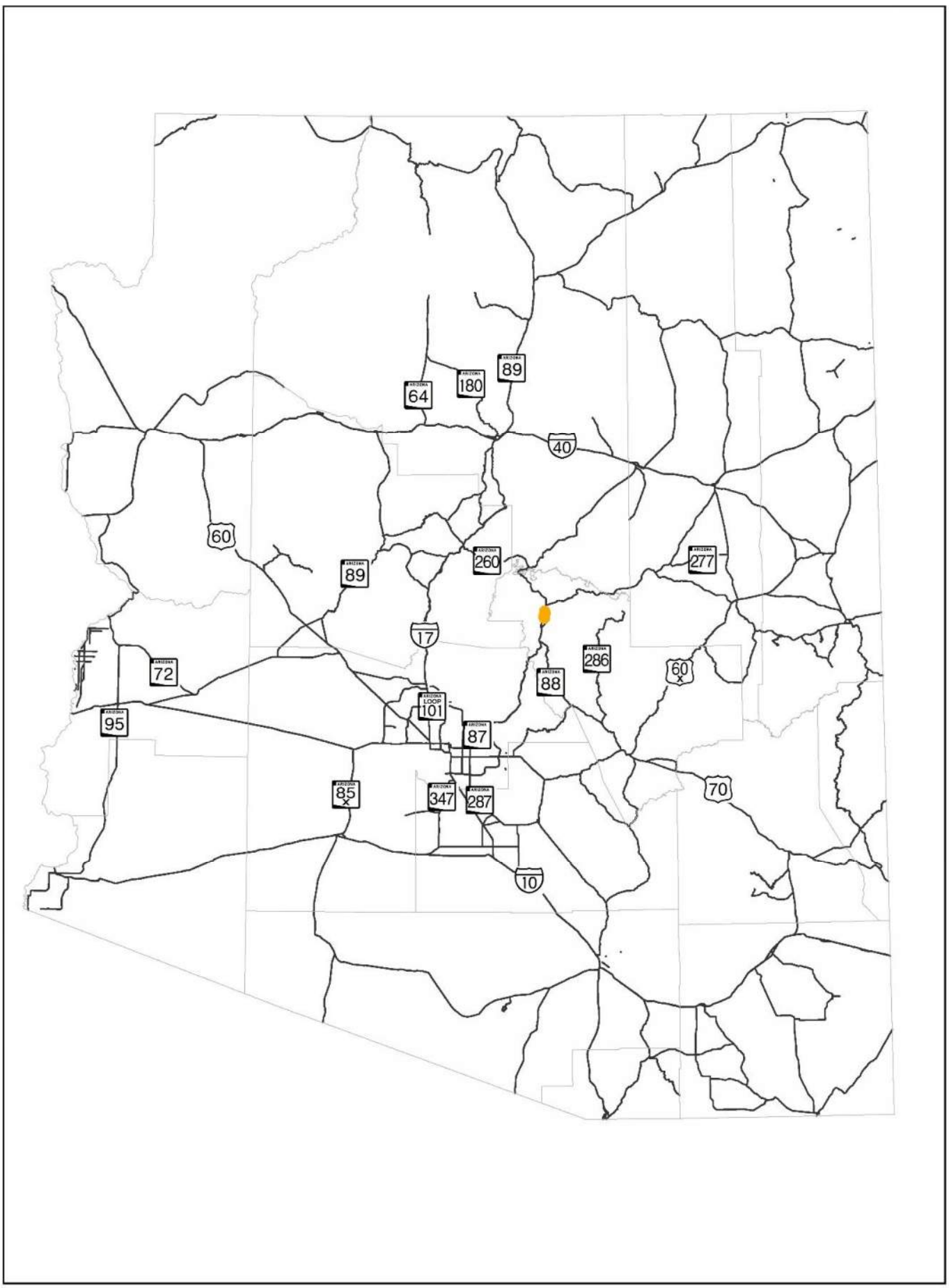
| COST ESTIMATE | | | |
|---|---|---|---|
| Design<br>$578,840.00 | Right-of-Way<br>$0.00 | Construction<br>$5,209,560.00 | Total<br>$5,788,400.00 |

| RECOMMENDED PROJECT DELIVERY |
|---|
| **Delivery:** ☐Design-Bid-Build ☐Design-Build ☒Other: |
| **Design Program Year:** Click or tap here to enter text. |
| **Construction Program Year:** Click or tap here to enter text. |

| ATTACHMENTS |
| --- |
| 1. Project Scope of Work<br>2. State Location Map<br>3. Project Vicinity Map<br>4. Itemized Cost Estimates<br>5. Conceptual Design Plans |

| ATTACHMENT 1: SCOPE OF WORK |
| --- |
| *(Provide a detailed breakdown of the project's scope of work using bullet form)*<br>• Install wildlife Fencing and wildlife warning signage, and add a wildlife crossing overpass (MP 247-249.9)<br>• Construct northbound inside acceleration lane at Oxbow Trail (MP 248.4)<br>• Realign FR 375B east of SR 87 (MP 248.6)<br>• Construct northbound right-turn lane at FR 375B (MP 248.6)<br>• Construct northbound right-turn lane and outside acceleration lane at Gibson Ranch Road (MP 249) |

ATTACHMENT 2: STATE LOCATION MAP



ATTACHMENT 4: PROJECT VICINITY MAP


| Project Element | Map No. | Begin MP | End MP | Cost | Element Justification |
|---|---|---|---|---|---|
| 1. Install wildlife fencing and wildlife warning signage, and add a wildlife crossing overpass | 99 | 247 | 249.9 | $4,166,000 | 34 crashes in this segment involved wildlife in the crash analysis. |
| 2. NB inside acceleration lane at Oxbow Trail | 103 | 248.4 | 248.4 | $581,800 | Provide an acceleration lane to allow vehicles to accelerate and merge into traffic to avoid the sight distance and grade issues in the SR 87 median. |
| 3. Realign FR 375B | 104 | 248.6 | 248.6 | $247,900 | Remove sight distance and grade issues at the intersection of SR 87 and FR 375B. |
| 4. NB right-turn lane at FR 375B | 106 | 248.6 | 248.6 | $110,800 | Provide turn/deceleration lane where it does not currently exist. |
| 5. NB right-turn lane and outside acceleration lane at Gibson Ranch Road | 109 | 249 | 249 | $681,941 | Provide turn/deceleration lane where it does not currently exist. |
| | | | Total: | $5,788,400 | |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**103. Northbound inside accel lane at Oxbow Trl (MP 248.4)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 320 | $20.00 | $6,400 |
| 2020201 | SAW CUTTING | L.FT. | 1,440 | $2.50 | $3,600 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 1,280 | $10.00 | $12,800 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 1,014 | $60.00 | $60,840 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 768 | $160.00 | $122,880 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 62 | $120.00 | $7,440 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $1,440.00 | $1,440 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 1,440 | $1.50 | $2,160 |
| | | | | **Roadway Construction Subtotal** | **$231,060** |
| | Unidentified Item Allowance (15%) | | | | $ 34,659 |
| | | | | **Subtotal** | **$265,719** |
| | Water Supply/Dust Palliative (3%) | | | | $ 7,972 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 39,858 |
| | Erosion Control (1%) | | | | $ 2,658 |
| | Contractor Quality Control (2%) | | | | $ 5,315 |
| | Construction Surveying And Layout (2%) | | | | $ 5,315 |
| | | | | **Other Item Subtotal** | **$326,837** |
| | Mobilization (12%) | | | | $ 39,221 |
| | | | | **Construction Subtotal** | **$ 366,058** |
| | Engineering Design (10%) | | | | $ 36,606 |
| | Construction Engineering and Contingencies (20%) | | | | $ 73,212 |
| | Indirect Cost Allocation (10.02%) | | | | $ 36,680 |
| | | | | **Construction Total** | **$ 512,556** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**104. Realign FR 375B to take out sharp curvature (MP 248.6)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 23 | $35.00 | $805 |
| 2020201 | SAW CUTTING | L.FT. | 100 | $2.50 | $250 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 90 | $10.00 | $900 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 645 | $120.00 | $77,400 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 109 | $160.00 | $17,440 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 10 | $120.00 | $1,200 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $100.00 | $100 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 100 | $1.50 | $150 |
| | | | **Roadway Construction Subtotal** | | **$111,745** |
| | Unidentified Item Allowance (15%) | | | | $ 16,762 |
| | | | | **Subtotal** | **$128,507** |
| | Water Supply/Dust Palliative (3%) | | | | $ 3,856 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 19,277 |
| | Erosion Control (1%) | | | | $ 1,286 |
| | Contractor Quality Control (2%) | | | | $ 2,571 |
| | Construction Surveying And Layout (2%) | | | | $ 2,571 |
| | | | | **Other Item Subtotal** | **$158,068** |
| | Mobilization (12%) | | | | $ 18,969 |
| | | | | **Construction Subtotal** | **$ 177,037** |
| | Engineering Design (10%) | | | | $ 17,704 |
| | Construction Engineering and Contingencies (20%) | | | | $ 35,408 |
| | Indirect Cost Allocation (10.02%) | | | | $ 17,740 |
| | | | | **Construction Total** | **$ 247,889** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**106. Northbound right-turn lane at FR 375B (MP 248.6)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 23 | $35.00 | $805 |
| 2020201 | SAW CUTTING | L.FT. | 200 | $2.50 | $500 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 300 | $10.00 | $3,000 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 97 | $120.00 | $11,640 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 63 | $160.00 | $10,080 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 5 | $120.00 | $600 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $200.00 | $200 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9050001 | GUARD RAIL, W-BEAM, SINGLE FACE | L.FT. | 200 | $30.00 | $6,000 |
| 9050026 | GUARD RAIL TERMINAL (TANGENT TYPE) | EACH | 1 | $2,500.00 | $2,500 |
| 9050036 | GUARD RAIL, ANCHOR ASSEMBLY | EACH | 1 | $800.00 | $800 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 200 | $1.50 | $300 |
| | | | **Roadway Construction Subtotal** | | **$49,925** |
| | Unidentified Item Allowance (15%) | | | | $ 7,489 |
| | | | | **Subtotal** | **$57,414** |
| | Water Supply/Dust Palliative (3%) | | | | $ 1,723 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 8,613 |
| | Erosion Control (1%) | | | | $ 575 |
| | Contractor Quality Control (2%) | | | | $ 1,149 |
| | Construction Surveying And Layout (2%) | | | | $ 1,149 |
| | | | | **Other Item Subtotal** | **$70,623** |
| | Mobilization (12%) | | | | $ 8,475 |
| | | | | **Construction Subtotal** | **$ 79,098** |
| | Engineering Design (10%) | | | | $ 7,910 |
| | Construction Engineering and Contingencies (20%) | | | | $ 15,820 |
| | Indirect Cost Allocation (10.02%) | | | | $ 7,926 |
| | | | | **Construction Total** | **$ 110,754** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

**109. Northbound right-turn lane at Gibson Ranch Rd (MP 249)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 23 | $35.00 | $805 |
| 2020201 | SAW CUTTING | L.FT. | 200 | $2.50 | $500 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 300 | $10.00 | $3,000 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 97 | $120.00 | $11,640 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 63 | $160.00 | $10,080 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 5 | $120.00 | $600 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $200.00 | $200 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 200 | $1.50 | $300 |
| | | | **Roadway Construction Subtotal** | | **$40,625** |
| | Unidentified Item Allowance (15%) | | | | $ 6,094 |
| | | | | **Subtotal** | **$46,719** |
| | Water Supply/Dust Palliative (3%) | | | | $ 1,402 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 7,008 |
| | Erosion Control (1%) | | | | $ 468 |
| | Contractor Quality Control (2%) | | | | $ 935 |
| | Construction Surveying And Layout (2%) | | | | $ 935 |
| | | | | **Other Item Subtotal** | **$57,467** |
| | Mobilization (12%) | | | | $ 6,897 |
| | | | | **Construction Subtotal** | **$ 64,364** |
| | Engineering Design (10%) | | | | $ 6,437 |
| | Construction Engineering and Contingencies (20%) | | | | $ 12,873 |
| | Indirect Cost Allocation (10.02%) | | | | $ 6,450 |
| | | | | **Construction Total** | **$ 90,124** |

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**SR87 Corridor Development Study**
**ITEMIZED COST ESTIMATE**

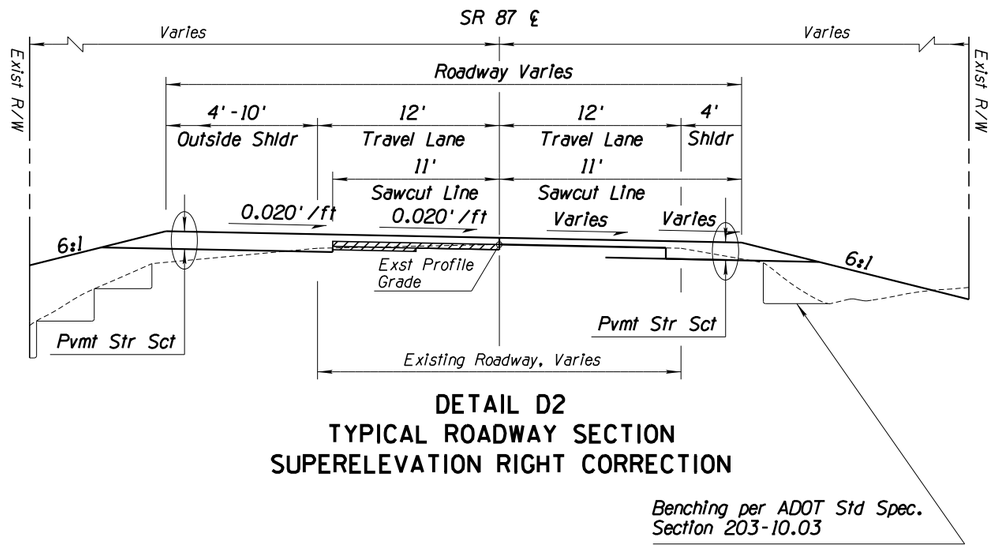
**109. NB outside acceleration lane - Gibson Ranch Road (MP 249)**

| ITEM NO | ITEM DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 2010011 | CLEARING AND GRUBBING | ACRE | 1 | $5,000.00 | $5,000 |
| 2020029 | REMOVAL OF ASPHALTIC CONCRETE PAVEMENT | SQ.YD. | 292 | $20.00 | $5,840 |
| 2020201 | SAW CUTTING | L.FT. | 1,310 | $2.50 | $3,275 |
| 2030301 | ROADWAY EXCAVATION | CU.YD. | 1,170 | $10.00 | $11,700 |
| 3030022 | AGGREGATE BASE, CLASS 2 | CU.YD. | 922 | $120.00 | $110,640 |
| 4090003 | ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL) | TON | 699 | $160.00 | $111,840 |
| 4110001 | ASPHALTIC CONCRETE FRICTION COURSE (MISC.) | TON | 56 | $120.00 | $6,720 |
| 6080101 | MISCELLANEOUS WORK (SIGNS) | L.SUM | 1 | $2,000.00 | $2,000 |
| 7041501 | PAVEMENT MARKINGS | L.SUM | 1 | $1,310.00 | $1,310 |
| 8050003 | SEEDING (CLASS II) | ACRE | 1 | $3,500.00 | $3,500 |
| 9240050 | MISCELLANEOUS WORK (PUBLIC RELATIONS) | L.SUM | 1 | $3,000.00 | $3,000 |
| 9280037 | GROUND-IN RUMBLE STRIP (12 INCH) | L.FT. | 1,310 | $1.50 | $1,965 |
| | | | **Roadway Construction Subtotal** | | **$266,790** |
| | Unidentified Item Allowance (15%) | | | | $ 40,019 |
| | | | | **Subtotal** | **$306,809** |
| | Water Supply/Dust Palliative (3%) | | | | $ 9,205 |
| | Maintenance And Protection Of Traffic (15%) | | | | $ 46,022 |
| | Erosion Control (1%) | | | | $ 3,069 |
| | Contractor Quality Control (2%) | | | | $ 6,137 |
| | Construction Surveying And Layout (2%) | | | | $ 6,137 |
| | | | | **Other Item Subtotal** | **$377,379** |
| | Mobilization (12%) | | | | $ 45,286 |
| | | | | **Construction Subtotal** | **$ 422,665** |
| | Engineering Design (10%) | | | | $ 42,267 |
| | Construction Engineering and Contingencies (20%) | | | | $ 84,533 |
| | Indirect Cost Allocation (10.02%) | | | | $ 42,352 |
| | | | | **Construction Total** | **$ 591,817** |

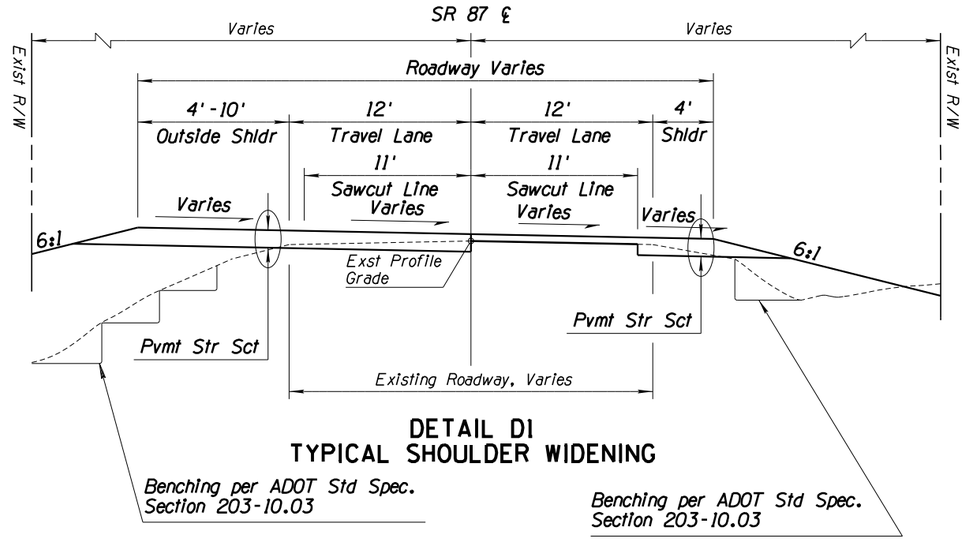
ATTACHMENT 5: PRELIMINARY PLANS

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

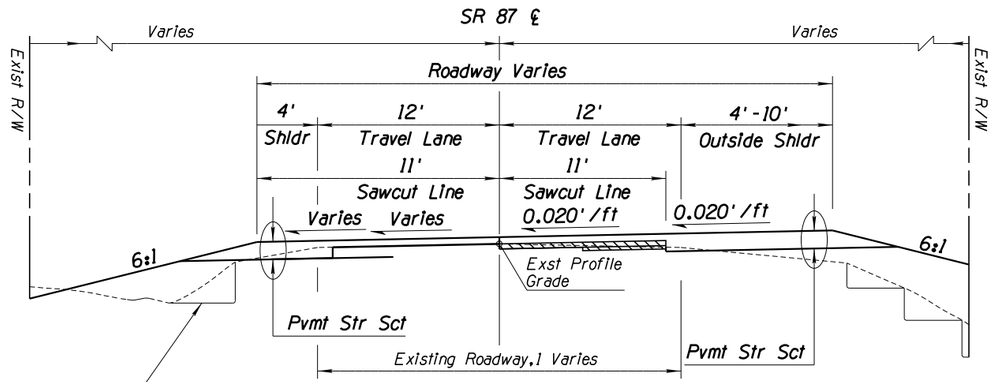
| SR 87 MILE POST STATION | | | |
|---|---|---|---|
| MP NB | STATION | MP SB | STATION |
| 196 | 101+73 | 196 | 101+18 |
| 197 | 155+53 | 197 | 154+02 |
| 198 | 207+69 | 198 | 207+94 |
| 199 | 261+02 | 199 | 259+13 |
| 200 | 314+21 | 200 | 311+72 |
| 201 | 367+73 | 201 | 364+06 |
| 202 | 419+18 | 202 | 417+81 |
| 203 | 471+36 | 203 | 470+65 |
| 204 | 526+28 | 204 | 523+10 |
| 205 | 577+70 | 205 | 575+84 |
| 206 | 630+73 | 206 | 628+30 |
| 207 | 682+81 | 207 | 680+28 |
| 208 | 736+47 | 208 | 734+12 |
| 209 | 788+55 | 209 | 786+62 |
| 210 | 842+08 | 210 | 839+50 |
| 211 | 894+91 | 211 | 890+40 |
| 212 | 942+20 | 212 | 939+42 |
| 213 | 998+65 | 213 | 995+55 |
| 214 | 1051+86 | 214 | 1050+06 |
| 215 | 1105+38 | 215 | 1095+77 |
| 216 | 1158+68 | 216 | 1147+95 |
| 217 | 1213+92 | 217 | 1199+48 |
| 218 | 1268+31 | 218 | 1250+20 |
| 219 | 1318+19 | 219 | 1304+12 |
| 220 | 1374+67 | 220 | 1359+76 |
| 221 | 1427+95 | 221 | 1412+99 |
| 222 | 1480+60 | 222 | 1465+84 |
| 223 | 1533+97 | 223 | 1518+89 |
| 224 | 1584+61 | 224 | 1570+72 |
| 225 | 1639+50 | 225 | 1625+29 |
| 226 | 1689+86 | 226 | 1676+32 |
| 227 | 1740+23 | 227 | 1726+14 |
| 228 | 1792+50 | 228 | 1778+04 |
| 229 | 1845+24 | 229 | 1831+98 |
| 230 | 1898+50 | 230 | 1884+70 |
| 231 | 1949+61 | 231 | 1933+71 |
| 232 | 1999+33 | 232 | 1985+29 |
| 233 | 2047+74 | 233 | 2033+06 |
| 234 | 2101+13 | 234 | 2085+05 |
| 235 | 2154+59 | 235 | 2137+29 |
| 236 | 2207+09 | 236 | 2189+44 |
| 237 | 2259+88 | 237 | 2240+86 |
| 238 | 2311+66 | 238 | 2293+85 |
| 239 | 2364+28 | 239 | 2344+91 |
| 240 | 2416+01 | 240 | 2397+41 |
| 241 | 2467+79 | 241 | 2448+96 |
| 242 | 2518+51 | 242 | 2496+68 |
| 243 | 2571+26 | 243 | 2549+70 |
| 244 | 2620+38 | 244 | 2601+82 |
| 245 | 2677+47 | 245 | 2655+01 |
| 246 | 2729+53 | 246 | 2703+04 |
| 247 | 2741+30 | 247 | 2747+68 |
| 248 | 2794+18 | 248 | 2801+15 |
| 249 | 2847+25 | 249 | 2854+41 |
| 250 | 2899+69 | 250 | 2906+58 |



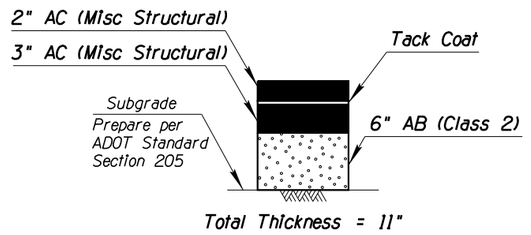

## DETAIL D2
## TYPICAL ROADWAY SECTION SUPERELEVATION RIGHT CORRECTION




## DETAIL D1
## TYPICAL SHOULDER WIDENING




## DETAIL D3
## TYPICAL ROADWAY SECTION SUPERELEVATION LEFT CORRECTION




Total Thickness = 11"

## PAVEMENT STRUCTURAL SECTION

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

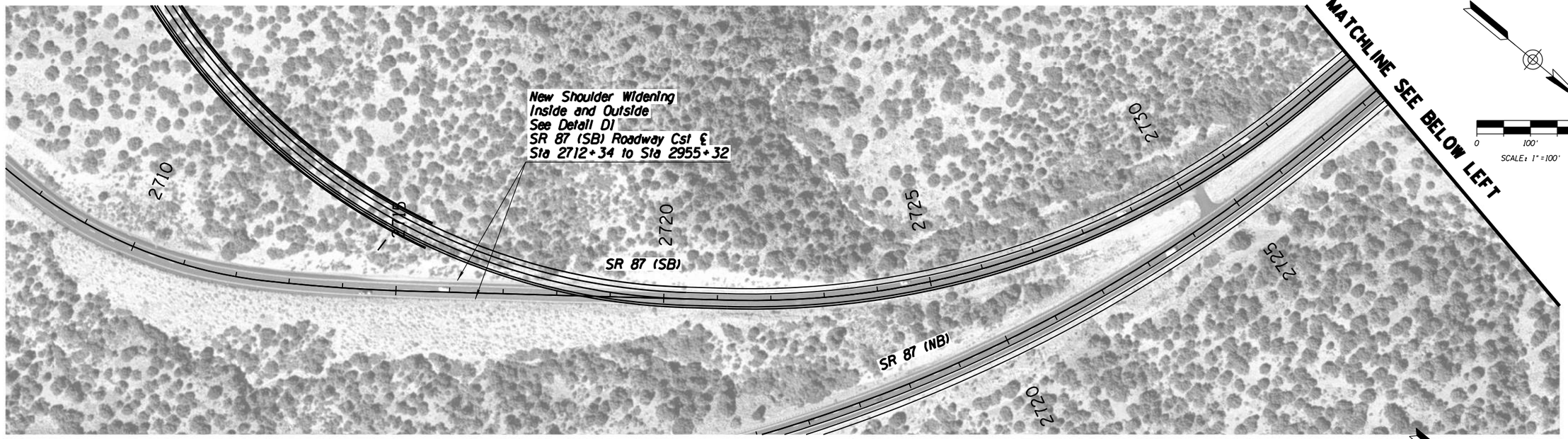
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | ___ OF ___ |

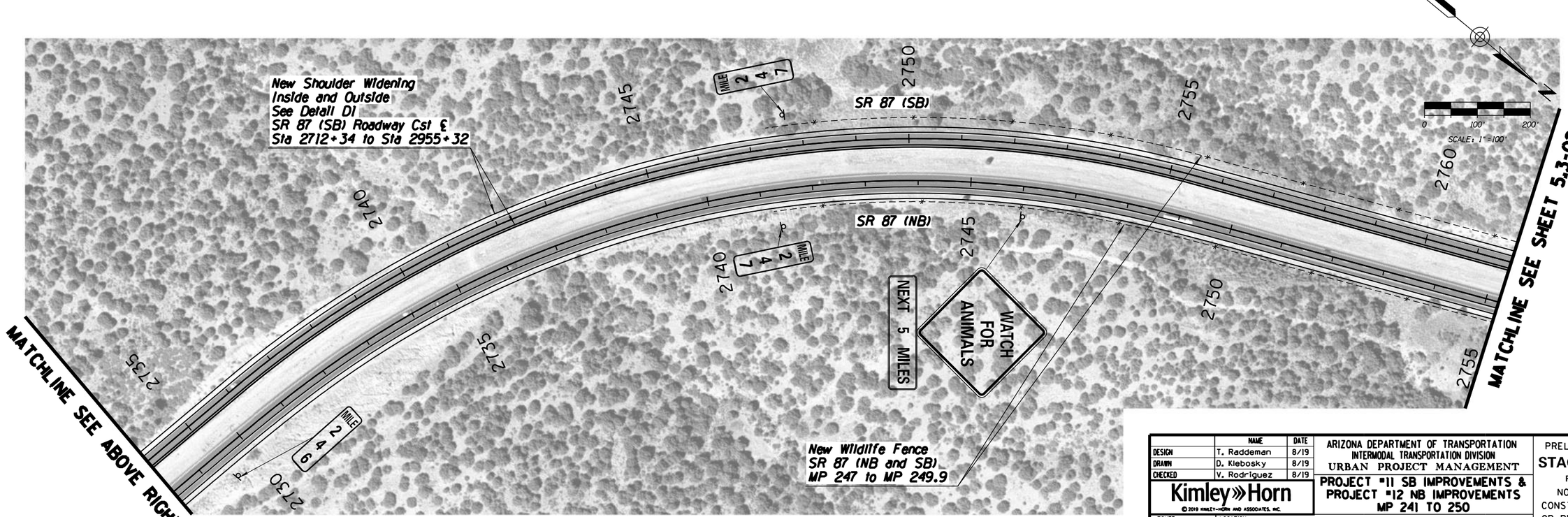
TRACS NO. XXXXX XXX | XXX-X(XXX)X

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

Kimley»Horn


ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | DWG NO. 5.3-01 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

MATCHLINE SEE SHEET 5.3-01

New Shoulder Widening
Inside and Outside
See Detail D1
SR 87 (SB) Roadway Csl ℄
Sta 2712+34 to Sta 2955+32

2765 2770 2775 2780 2785

SR 87 (SB)

SR 87 (NB)

2760 2765 2770 2775 2780

New Wildlife Fence
SR 87 (NB and SB)
MP 247 to MP 249.9

Old Payson Road

OP OP

N

0 100' 200'
SCALE: 1"=100'

MATCHLINE SEE BELOW LEFT

New Shoulder Widening
Inside and Outside
See Detail D1
SR 87 (SB) Roadway Csl ℄
Sta 2712+34 to Sta 2955+32

Right Turn Lane
See Dwg No. 5.4-01

MATCHLINE SEE ABOVE RIGHT

2790 2795 2800 2805 2810 2815

MILE 248

SR 87 (SB)

SR 87 (NB)

2785 2790 2795 2800 2805

MILE 248

New Wildlife Fence
SR 87 (NB and SB)
MP 247 to MP 249.9

0 100' 200'
SCALE: 1"=100'

MATCHLINE SEE SHEET 5.3-03

| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

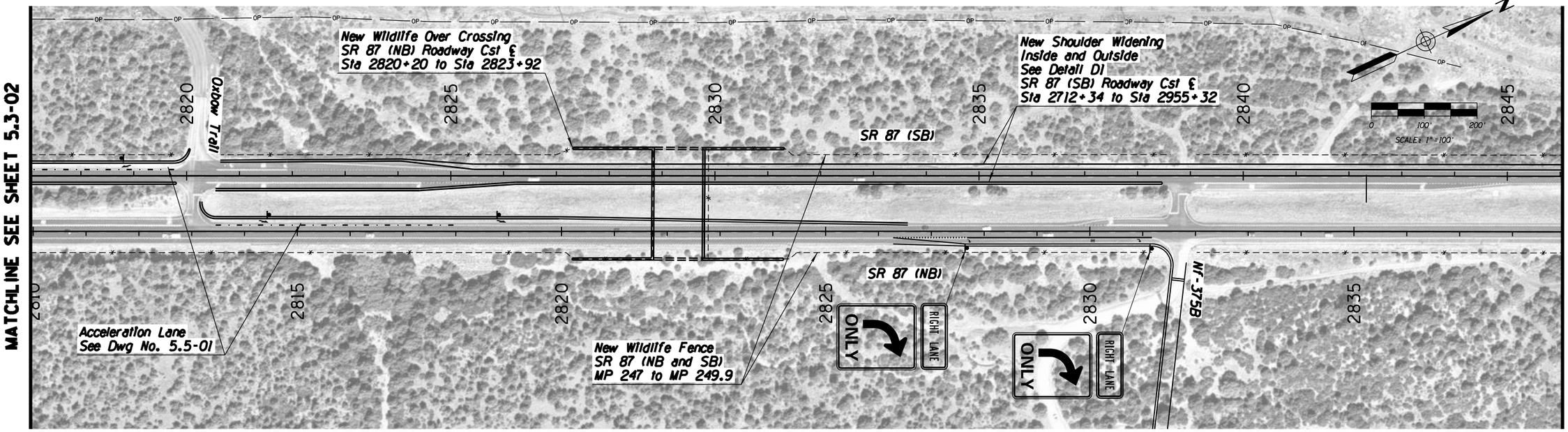
| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

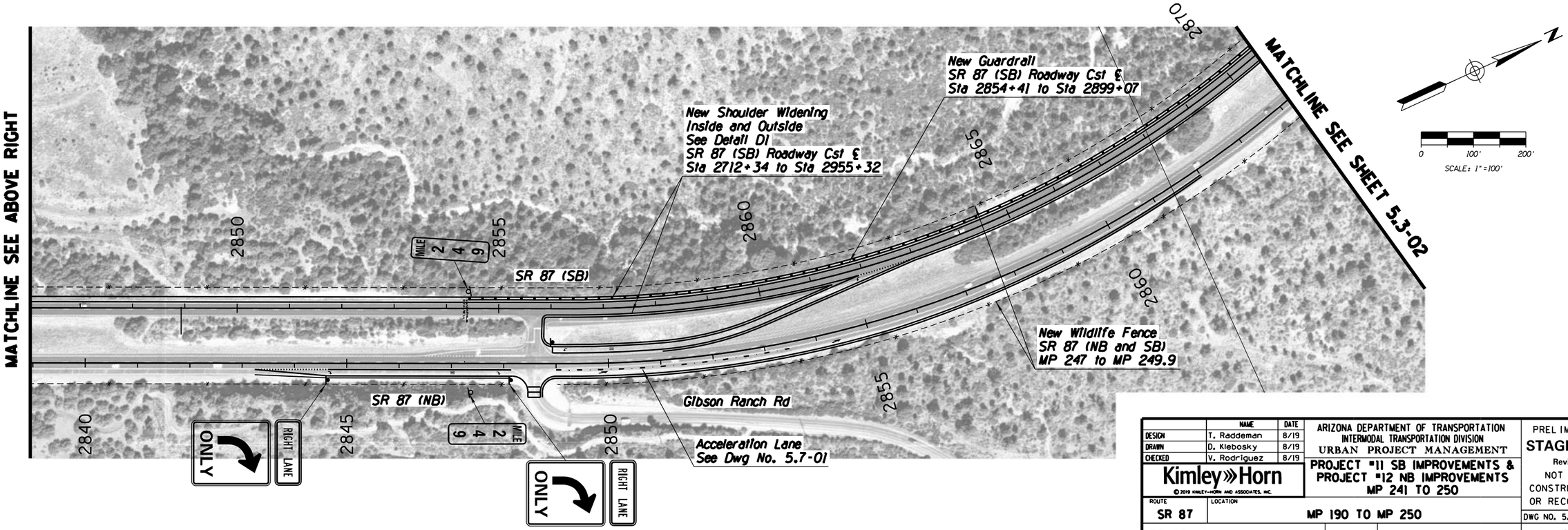
DWG NO. 5.3-02

TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

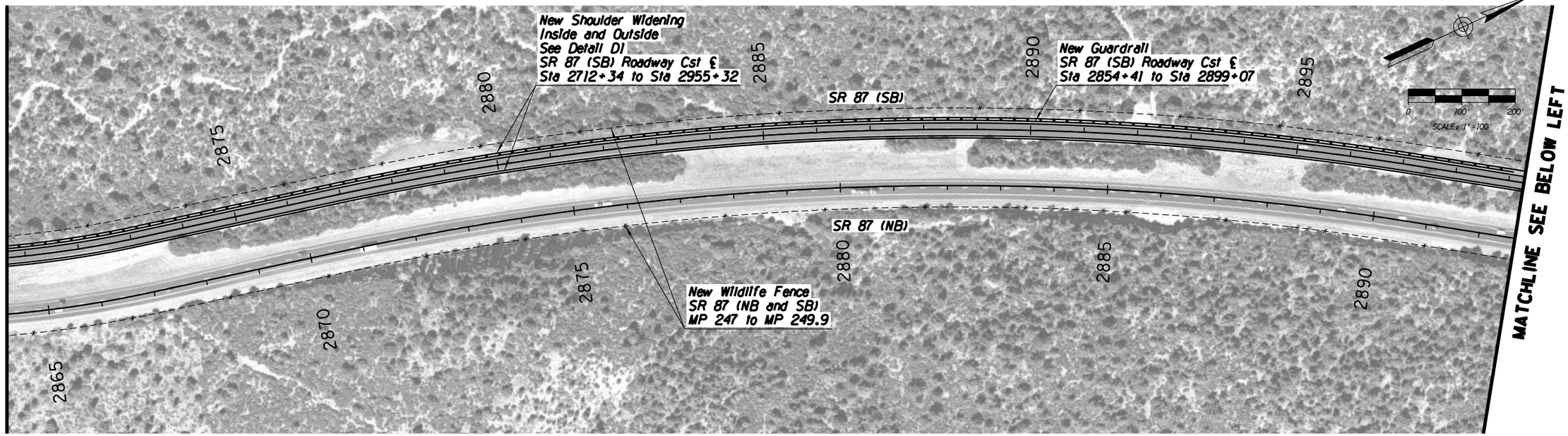
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

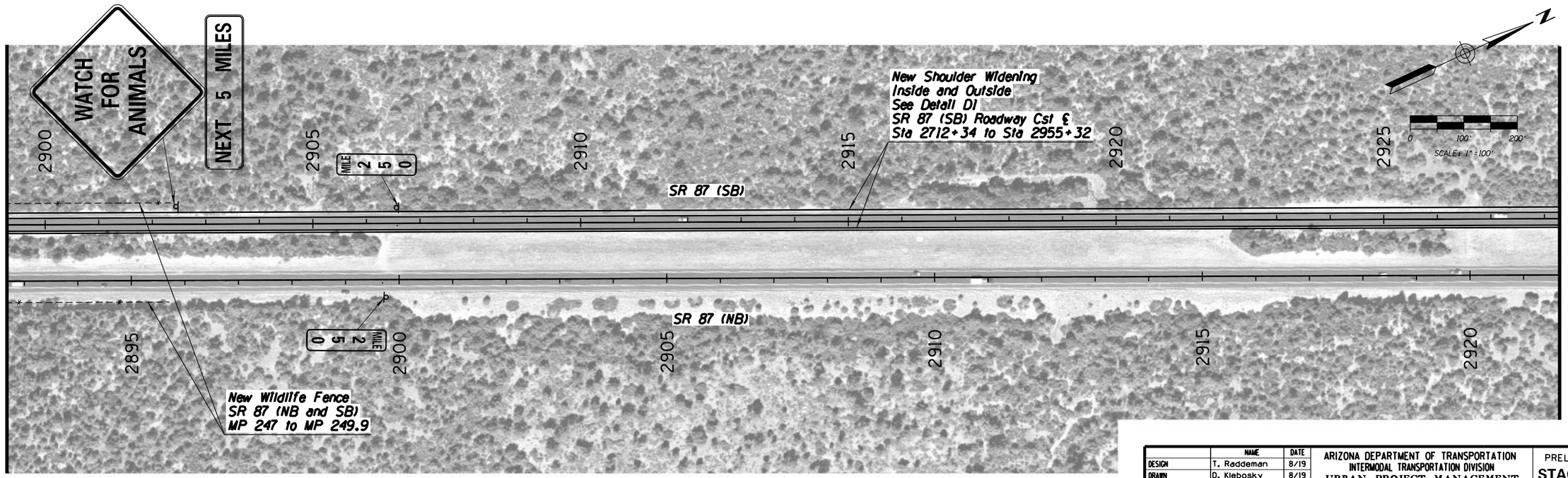
| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 5.3-03 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

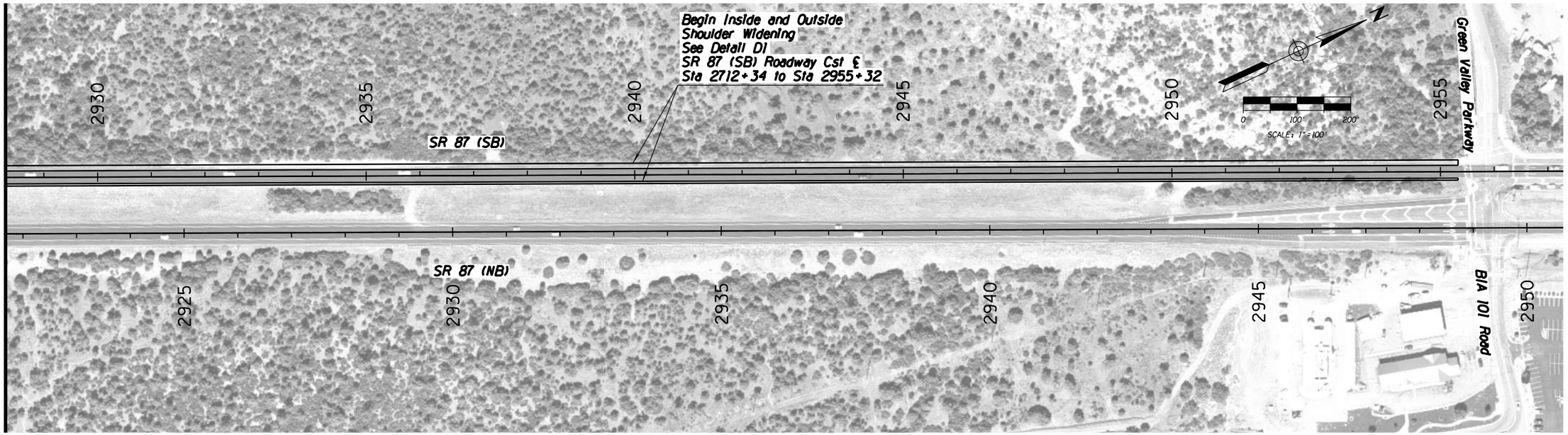
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 5.3-04 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

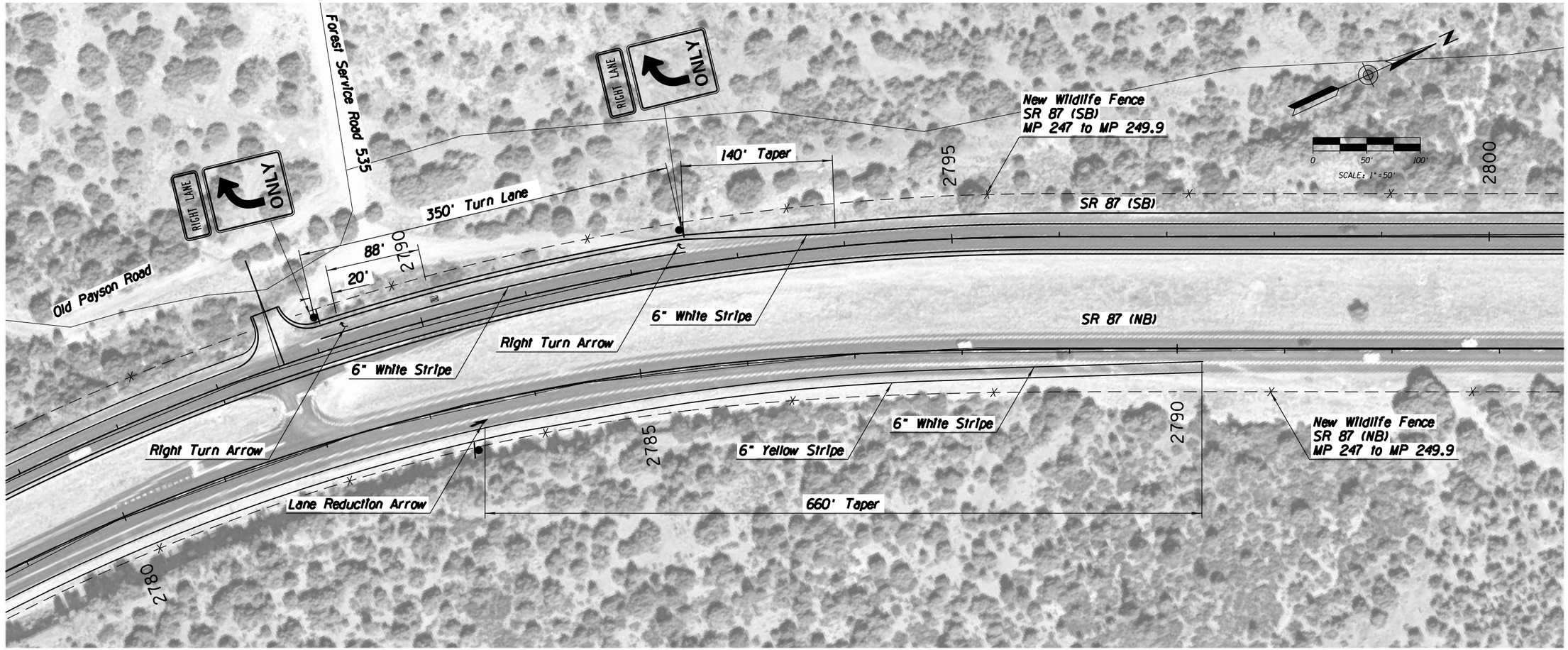
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. 5.3-05 |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT #11 SB IMPROVEMENTS &
PROJECT #12 NB IMPROVEMENTS
MP 241 TO 250

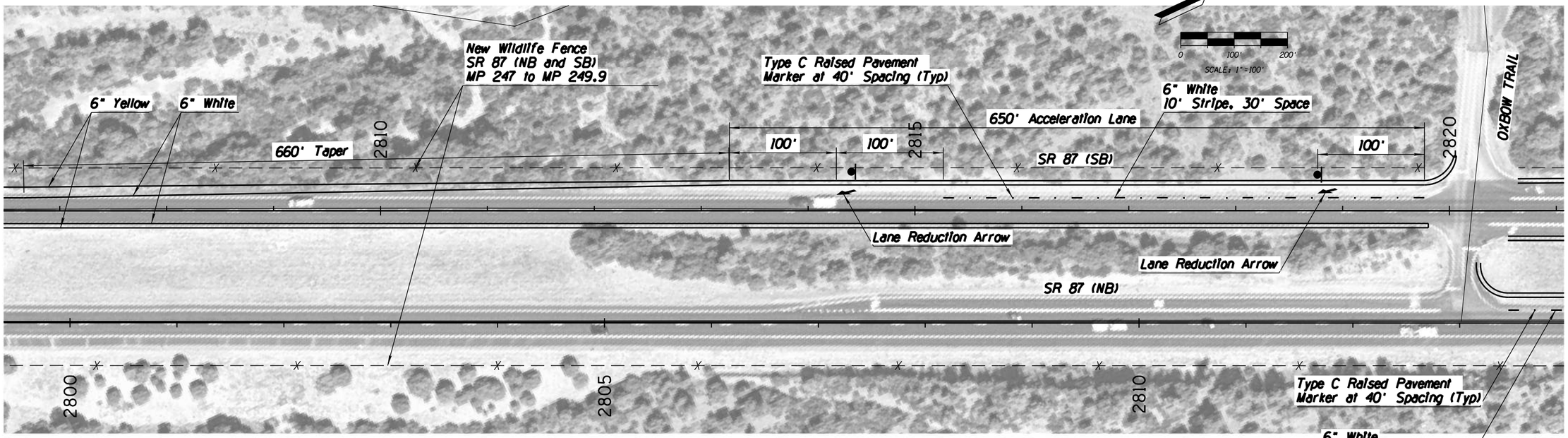
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 5.4-01 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 241 TO 250

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION |
|---|---|
| SR 87 | MP 190 TO MP 250 |

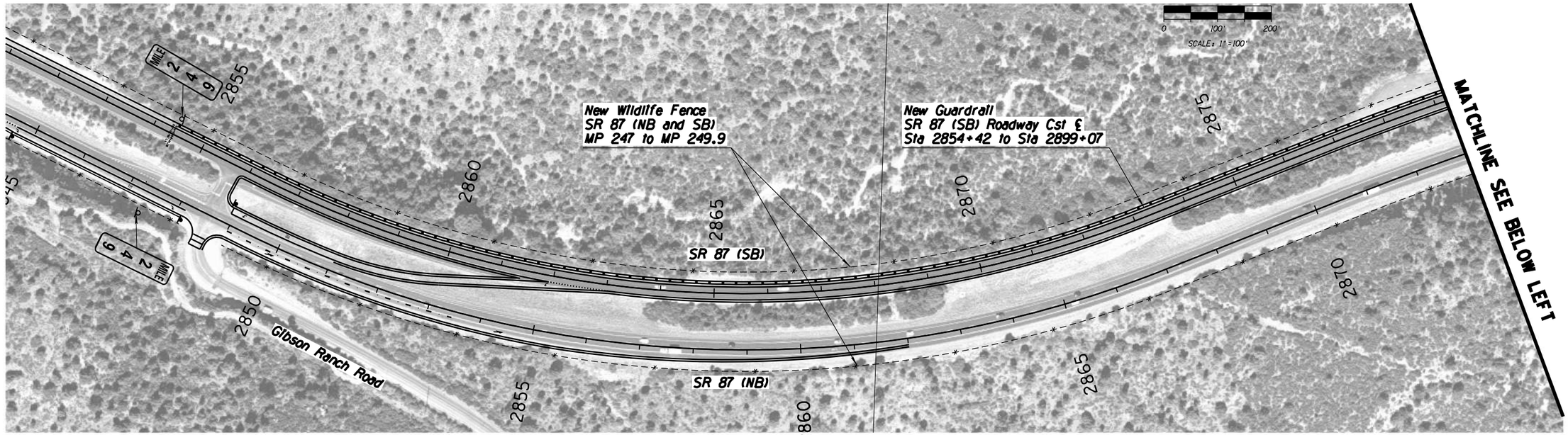
DWG NO. 5.5-01

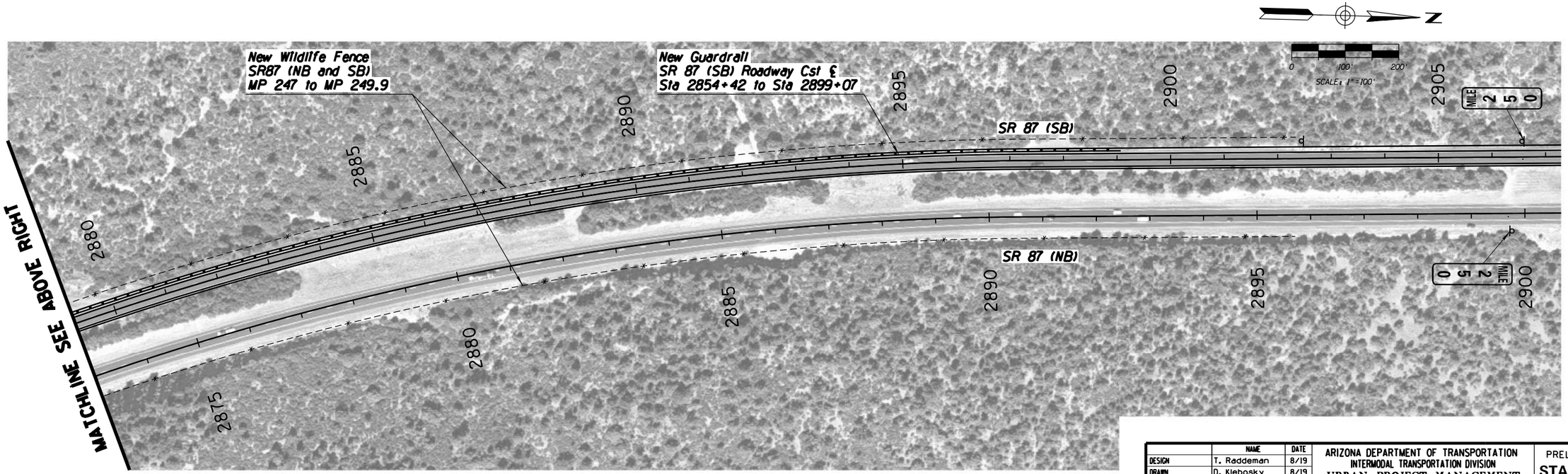
TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

# MAINLINE SIGN LOCATIONS STA 2408+00 TO STA 2460+00

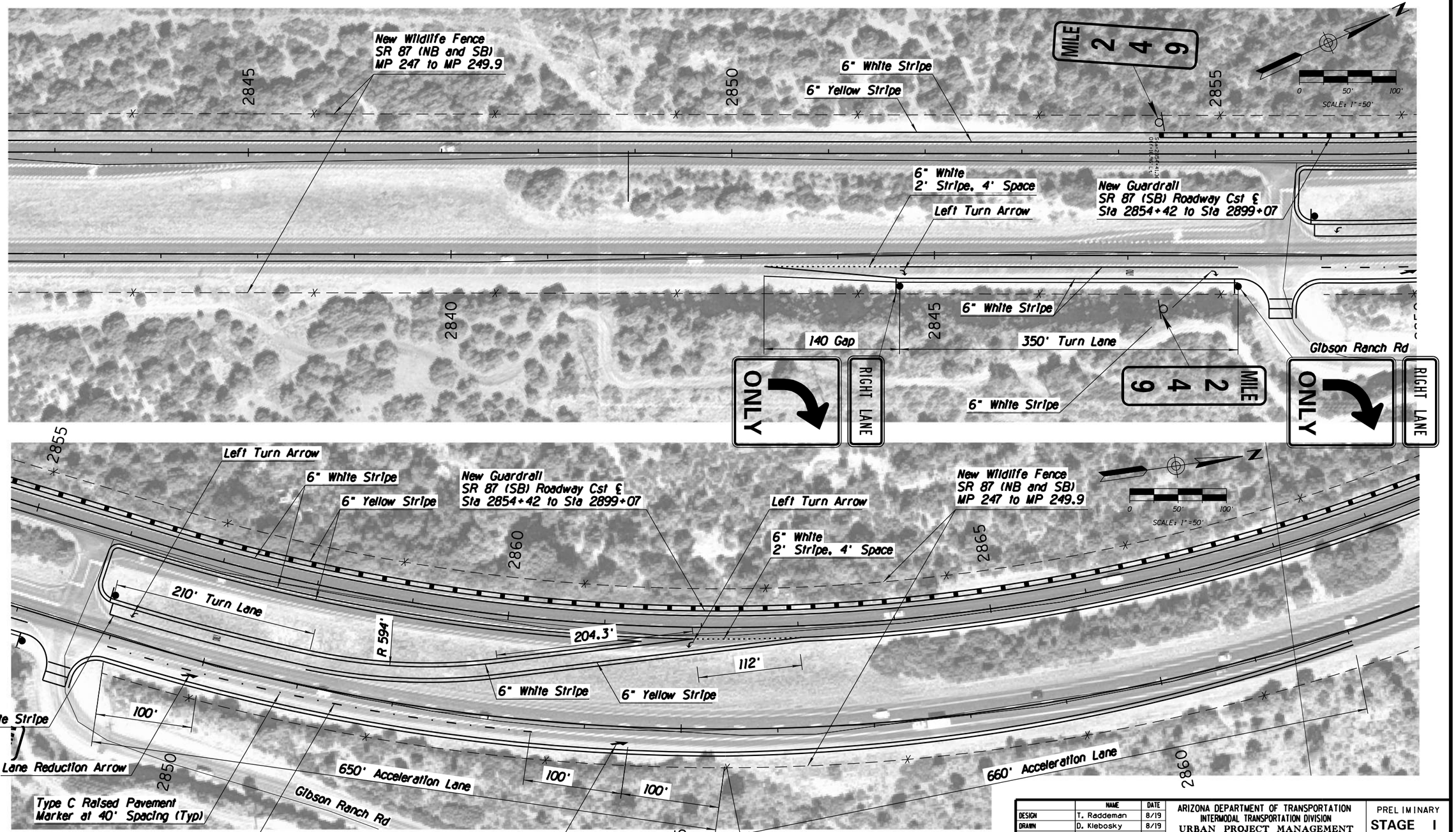
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. 5.6-01 |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVMENTS
MP 241 TO 250

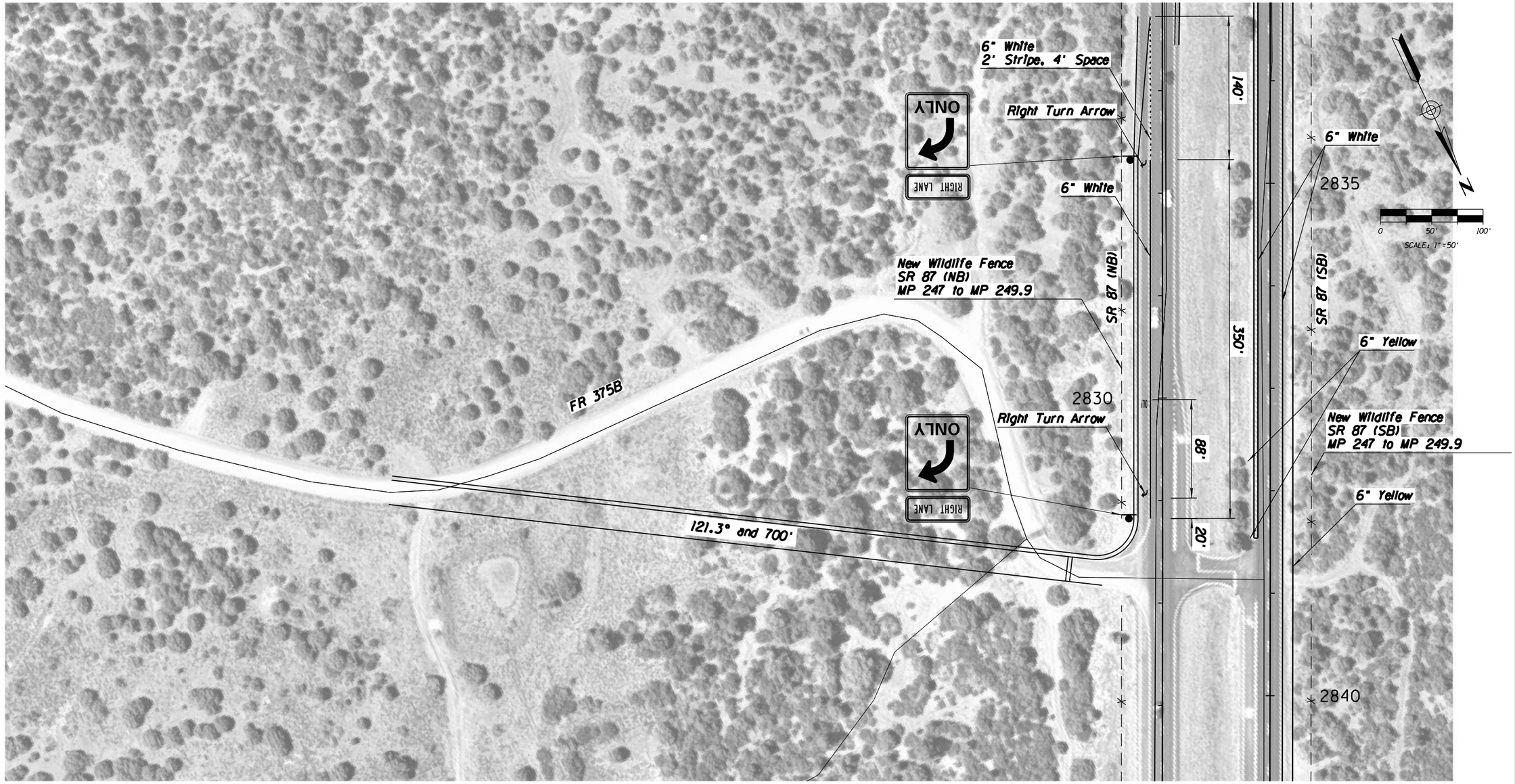
PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. 5.7-01 |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| - | ARIZ. | - | | 59 | |
| | | - | | | |




| | NAME | DATE |
|---|---|---|
| DESIGN | T. Raddeman | 8/19 |
| DRAWN | D. Klebosky | 8/19 |
| CHECKED | V. Rodriguez | 8/19 |

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ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
URBAN PROJECT MANAGEMENT

PROJECT "11 SB IMPROVEMENTS &
PROJECT "12 NB IMPROVEMENTS
MP 247 TO 249

PRELIMINARY
STAGE I
Review
NOT FOR CONSTRUCTION OR RECORDING

| ROUTE | LOCATION | DWG NO. |
|---|---|---|
| SR 87 | MP 190 TO MP 250 | 7.3-01 |
| TRACS NO. XXXXX XXX | XXX-X(XXX)X | ___ OF ___ |

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

$TIME$ $DATE$ $USERNAME$ $FILE$