

Arizona Department
of Transportation



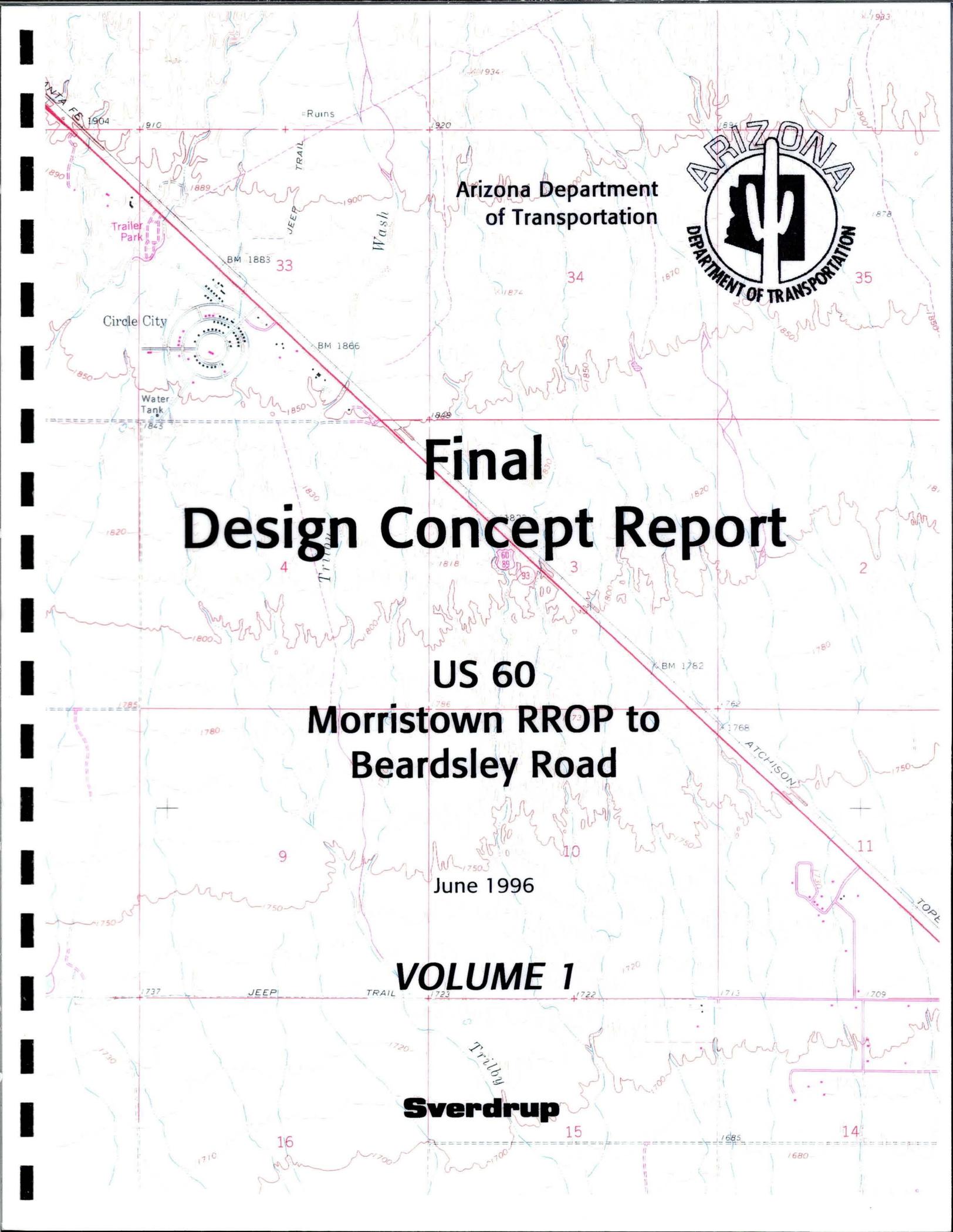
Final Design Concept Report

US 60
Morristown RROP to
Beardsley Road

June 1996

VOLUME 1

Sverdrup



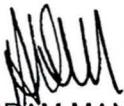
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INTERMODAL TRANSPORTATION DIVISION

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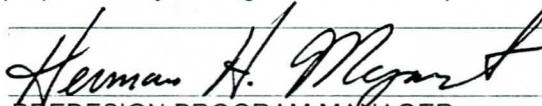
FROM: HERMAN MOZART 
PREDESIGN PROGRAM MANAGEMENT SECTION, 050P

SUBJECT: DESIGN MEMORANDUM

Project 60 MA 121 H362301C / STP - 022-2()
MORRISTOWN RROP-BEARDSLEY RD
WICKENBURG-PHOENIX HIGHWAY
US 60

This memorandum is prepared pursuant to Section 3.3 of the ADOT Action Plan for Federal-Aid Highway projects. The proposed major design features for this project are described in the attached Final Design Concept Report.

Your concurrence/approval or comments on the proposed major design features is requested.

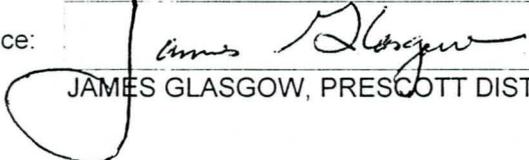

PREDESIGN PROGRAM MANAGER

HHM/dlm

Attachment(s)

cc: Environmental Planning Section, 619E
Roadway Design, 615E

Comments:

Concurrence:  7-3-96
JAMES GLASGOW, PRESCOTT DISTRICT, P800 Date

Concurrence:  7/10/96
LARRY DOESCHER, PROJECT MANAGER, Date
SPMS, 614E

Approved:  7-11-96
JOHN LOUIS, ASSISTANT STATE ENGINEER - Date
ROADWAY, 611E

FINAL DESIGN CONCEPT REPORT

FEDERAL PROJECT NO. STP-022-2-955
TRACS NO. 060 MA 121H 3623 01 L
WICKENBURG-PHOENIX HIGHWAY
MORRISTOWN RROP-BEARDSLEY ROAD
US 60

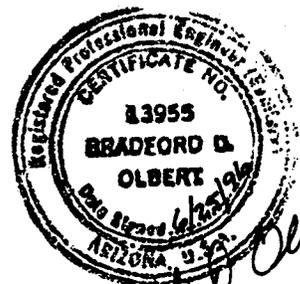
Prescott District-Maricopa County

June 1996

VOLUME 1

Prepared for:
ARIZONA DEPARTMENT OF TRANSPORTATION

Prepared by:
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Bradford D. Olbert

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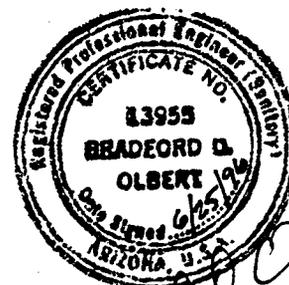
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Executive Summary

This Final Location/Design Concept Report (L/DCR) presents the results of an investigation of alternatives for improving US 60 between Morrystown and Beardsley Road consistent with the State Highway System plan. The L/DCR is submitted in accordance with Contract No. 94-03 between the Arizona Department of Transportation (ADOT) and Sverdrup Civil, Inc. (Sverdrup).

The studies have involved both agency and public participation. Agency and public scoping meetings, a public information meeting and a public hearing have been conducted.

The purpose of the L/DCR is to develop and evaluate alternatives for improvement of US 60 to enhance safety and operational characteristics, meet capacity requirements, and select an alternative. This Final L/DCR recommends specific improvements and provides a phased implementation plan identifying near-term and long-range improvement projects.

Project No. 060 MA 121 H 3623 01 L, Federal Project No. STP-022-2-955, US 60—Morrystown Railroad Overpass (RROP) to Beardsley Road, is described as a "Corridor Study." This study was listed in the 1994-1998 Five-Year Highway Construction Program as Item No. 146.

The original project milepost (MP) limits were MP 121.9 to MP 137.0. However, the beginning of the project has been adjusted to coincide with the end of the four-lane divided rural section [F-FG-022-2-504] at MP 123.44 near the Morrystown RROP, and the end of the project has been adjusted to coincide with the beginning of the recently constructed four-lane divided urban section [STP-022-2(36)] at MP 138.83, located just southeast of the connection of Loop 303 with US 60.

US 60 within the study limits is the last section of two-lane road between Wickenburg and Phoenix. Traffic projections indicate that volumes will increase from 11,500 vehicles per day (vpd) to 27,800 vpd near the southeast end of the project by design year 2020. Commercial traffic resulting from the North American Free Trade Agreement (NAFTA) is expected to increase, but the traffic projections do not include increases due to NAFTA since the impact has not been determined.

This study analyzes the traffic needs within the project limits, including an evaluation of the existing design, traffic volumes, and accidents. Traffic projections through the design year have been developed and agency and public participation obtained to define the transportation needs of the route. Alternatives for improving the highway to meet current criteria for safety, capacity, and operational characteristics through the design year have been developed and evaluated. The evaluation includes right-of-way requirements, provisions for limiting access points between the highway and adjacent properties, cost, impact on affected properties, constructibility, traffic control, and drainage. An Environmental Assessment (EA) was prepared concurrently with this study that provided the necessary environmental and socio-economic impact evaluations to use in the alternative selection process.

The scoping process and traffic and accident analyses have demonstrated that a four-lane facility will meet transportation requirements through design year 2020. Alternatives identified include incorporating the existing roadway as one direction of travel and reconstruction of the entire roadway on a new alignment within the corridor. Median widths included 46-, 60-, and 84-foot alternatives plus a narrow median and five-lane alternatives in the Wittmann area. A divided highway bypass of the Wittmann area was also identified. A total of ten alternatives were identified including the "Do-Nothing" alternative. Six of the ten alternatives were investigated and discontinued from consideration. Of the alternatives considered for further study, additional alternatives were developed by combining alternatives.

Alternatives studied and further evaluated are:

- **Alternative A1**—Four-lane divided highway with an 84-foot median utilizing the existing roadway for westbound traffic.
- **Alternative A2**—Four-lane divided highway with a 60-foot median utilizing the existing roadway for westbound traffic.
- **Alternative A1-A2**—Combines A1 outside the Wittmann area with A2 through the Wittmann area.
- **Alternative A1-A9**—Combines A1 outside the Wittmann area with A9, which is a bypass of Wittmann.
- **Alternative A2-A9**—Combines A2 outside the Wittmann area with A9, which is a bypass of Wittmann.

The analysis of these five alternatives along with the "Do-Nothing" alternative is presented in Table 4-1, Alternatives Matrix, in the report. **Alternative A2** is the selected alternative for the improvement of US 60 within the study area. The EA has been approved by ADOT and FHWA, and a Finding of No Significant Impact has been signed by FHWA.

Current programming for this section of US 60, as shown in the 1997-2001 ADOT Five-Year Highway Construction Program, is as follows:

- MP 122.0 to MP 129.0, Morristown OP - Wittmann. Identified as Mill and replace AC in travel lanes only of the 4 lane divided section. Place AR- ACFC (26' wide) through this section. Overlay the existing 2 lane section full width (40') with AC & AR-ACFC. Shoulders shall receive a fog coat. Grooving will be applied. Programmed amount is \$2,009,000. Scheduled for FY 1997-1998.
- MP 123.4 to MP 138.8, Morristown RR0P - Beardsley Road. Identified as R/W Plans, Appraisals, Acquisition, Relocation and Demolition. Programmed amount is \$5,000,000. Scheduled for FY 1998-1999.
- MP 123.4 to MP 138.8, Morristown RR0P - Beardsley Road. Identified as Utility Relocation. Programmed amount is \$1,430,000. Scheduled for FY 1998-1999.

- MP 123.4 to MP 127.7, Morristown RROP - Dove Valley Road. Identified as Ultimate Improvement #4: Design (Roadway). Programmed amount is \$730,000. Scheduled for FY 2001-2002.
- MP 127.6, MP 126.3 - MP 129.7, MP 130.9 - MP 131.0, MP 134.1, Identified as Remedial Improvements: Pavement striping. Programmed amount is \$76,000. Scheduled for FY 1997-1998.
- MP 127.8 to MP 131.4, Dove Valley Road - 203rd Ave (West). Identified as Ultimate Improvement #3: Design (Roadway). Programmed amount is \$700,000. Scheduled for FY 2000-2001.
- MP 127.8 to MP 131.4, Dove Valley Road - 203rd Ave (West). Identified as Ultimate Improvement #3: Construct Roadway. Programmed amount is \$9,760,000. Scheduled for FY 2001-2002.
- MP 131.4 to MP 136.9, 203rd Ave (West) - Deer Valley Road. Identified as Ultimate Improvement #2: Design (Roadway). Programmed amount is \$780,000. Scheduled for FY 1999-2000.
- MP 131.4 to MP 136.9, 203rd Ave (West) - Deer Valley Road. Identified as Ultimate Improvement #2: Construct Roadway. Programmed amount is \$10,370,000. Scheduled for FY 2000-2001.
- MP 136.9 to MP 138.8, Deer Valley Road - Beardsley Road. Identified as Ultimate Improvement #1: Design (Roadway). Programmed amount is \$350,000. Scheduled for FY 1997-1998.
- MP 136.9 to MP 138.8, Deer Valley Road - Beardsley Road. Identified as Ultimate Improvement #1: Construct Roadway. Programmed amount is \$3,500,000. Scheduled for FY 1999-2000.

Recommended adjustments to the above programming for the Five-Year Highway Construction Program include the following:

Interim Improvement - MP 122.0 to MP 129.0, Morristown OP to Wittmann

Change description of work for existing 2 lane section to "Overlay the existing 2 lane section full width (40') with AC (2.5") & travel lanes (26') with ACFC (0.5"). Grooving will be applied".
Decrease program amount to \$1,350,000.

Ultimate Improvement No. 2 - MP 131.4 to MP 136.9, 203rd Avenue (West) to Deer Valley Road
Increase program amount for construction to \$10,590,000.

Ultimate Improvement No. 3 - MP 127.8 to MP 131.4, Dove Valley Road to 203rd Avenue (West)
Increase program amount for construction to \$9,980,000.

Ultimate Improvement No. 4 - MP 123.4 to MP 127.7, Morristown RROP to Dove Valley Road
Program roadway construction for \$9,150,000.

1. Introduction

1.1 Foreword

This Final Location/Design Concept Report (L/DCR) is submitted in accordance with Contract No. 94-03 between the Arizona Department of Transportation (ADOT) and Sverdrup Civil, Inc. The report presents the results of an investigation of alternatives for improving US 60 between Morristown and Beardsley Road. A Final Environmental Assessment has also been prepared which is summarized elsewhere in this report.

The studies have involved both agency and public participation with both public and agency scoping meetings, a public information meeting and a public hearing having been conducted.

Figure 1-1 shows the location of the study. Figure 1-2 shows the limits of the study route, beginning at the end of the existing four-lane roadway at Milepost (MP) 123.44 near the Morristown Railroad Overpass (RROP) and extending southeasterly approximately 15.4 miles to MP 138.83 just east of the connection to Loop 303 with US 60. The project is located in Maricopa County and within the ADOT Prescott District.

The purpose of the L/DCR is to develop and evaluate alternatives for improvement of US 60 between Morristown and Beardsley Road to enhance safety and operational characteristics and meet capacity requirements. This Final L/DCR recommends specific improvements and provides a phased implementation plan identifying near-term and long-range improvement projects.

Mapping used for this study was developed from high elevation aerial photography flown in August 1986. The mapping information was obtained from the Flood Control District of Maricopa County.

The following reports were developed as part of this study, and the results incorporated into the Design Concept Report and the Environmental Assessment.

- Traffic and Accident Analysis
- AASHTO Design Criteria Report
- Utility Report
- Alternatives Selection Report
- Initial Drainage Report
- Preliminary Initial Site Assessment Report
- Air Quality Report
- Preliminary Noise Study Report
- Assessment of Cultural Resources
- Implementation Report

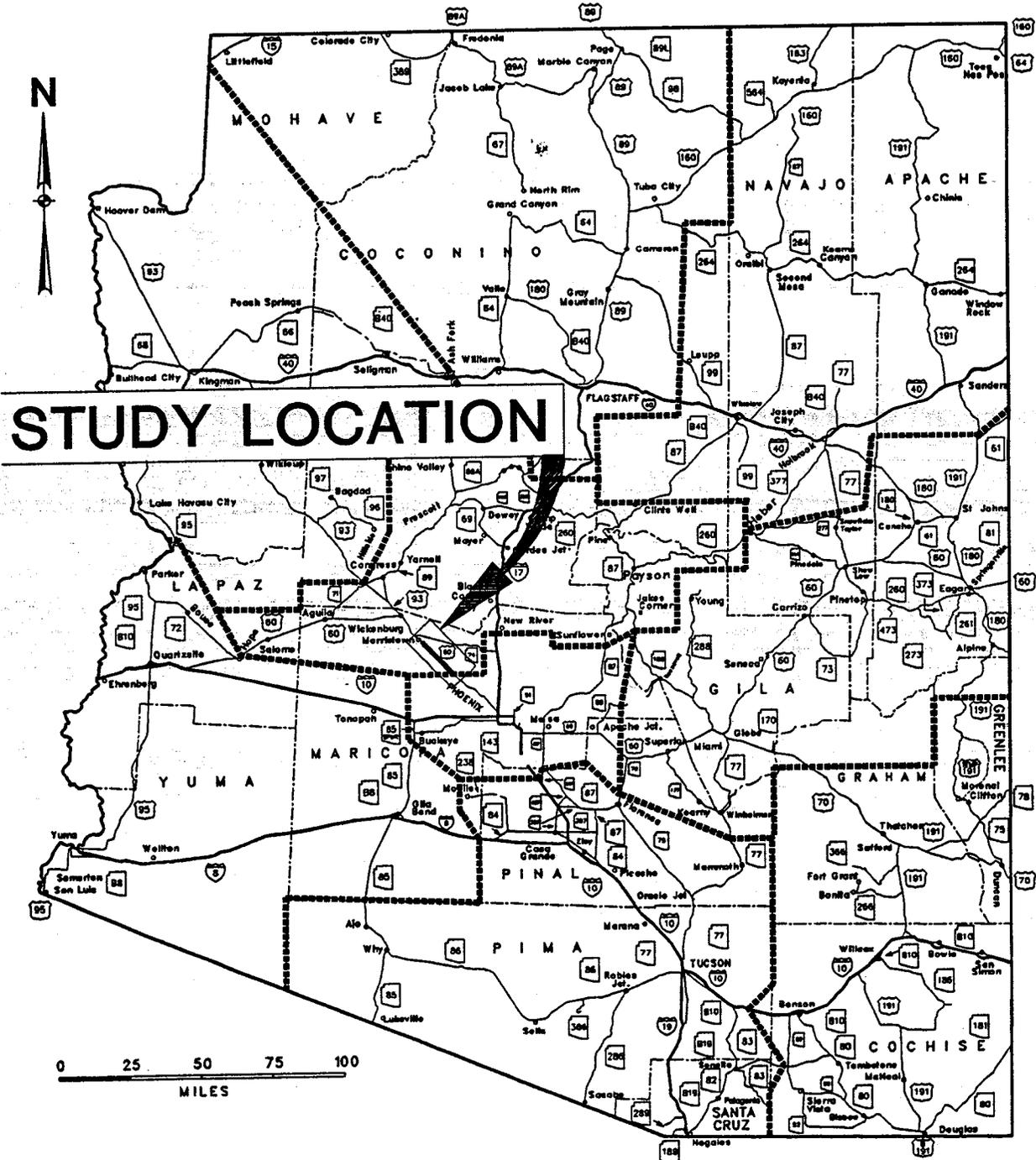


Figure 1-1. Study Location

1.2 Need for the Project

US 60 is classified as a principal rural arterial on the Surface Transportation System and provides the most direct route between the Phoenix metropolitan area and Wickenburg/Kingman/Laughlin/Las Vegas destinations. This route has been designated as one of the likely routes for commercial traffic resulting from the North American Free Trade Agreement (NAFTA). The highway also serves commuter traffic between small residential communities along the route and the Phoenix area as well as commuters from the Phoenix area to nearby vehicle test track facilities for Toyota and Chrysler. The Phoenix urbanized area has expanded northwesterly, and current development ends near the southeasterly end of this study project. Anticipated expansion will cause traffic volumes on this two-lane highway to increase significantly over the next 25 years. Commercial traffic resulting from NAFTA is expected to increase also, although it is not yet possible to assign projected volumes to the increased traffic that NAFTA will generate.

The 15-mile section of two-lane roadway that is the focus of this study is the last section of two-lane road between Wickenburg and Phoenix. Current traffic volumes vary from 7,800 vehicles per day (vpd) west of the Wittmann area to 11,500 vpd at the east end of the project near Loop 303. The Transportation and Planning Office of the Maricopa Association of Governments (MAG) has projected that traffic volumes near Loop 303 will increase to 27,800 average daily traffic (ADT) by the design year 2020. A capacity analysis has been made as part of this study that indicates US 60 is currently operating at level of service (LOS) D from the east end of the project to Happy Valley Road, and LOS C from Happy Valley Road through the Wittmann-Circle City area to the west end of the project.

Public and agency meetings conducted for this study have identified the following concerns by the highway users:

- Passing opportunities are minimal because of heavy traffic.
- Local users frequently drive with their headlights on to be more visible to oncoming traffic.
- Slower traffic frequently uses the paved shoulder as a traffic lane to allow faster traffic to pass.
- The Department of Public Safety reported that accidents that occur are frequently more severe than would be expected because of high speeds.
- Local users indicated that access to US 60 is difficult during rush hour traffic.

The level terrain and long sight distance encourages driving at high speeds. A speed monitoring report, prepared by ADOT Traffic Studies, showed that approximately 80 percent of the drivers exceeded the 55 mph speed limit west of Deer Valley Road.

1.3 Description of the Project

1.3.1 Project Limits

Project No. 060 MA 121 H 3623 01 L, Federal Project No. STP-022-2-955, US 60—Morristown Railroad Overpass (RROP) to Beardsley Road, was described as a “Corridor Study.” This project was listed in the 1994–1998 Five-Year Highway Construction Program as Item No. 146. As a result of this study, eleven projects have been programmed into the 1997-2001 Five-Year Highway Construction Program (see Section 7.2 for current programming).

The original project milepost limits were MP 121.9 to MP 137.0. However, the beginning of the project has been adjusted to coincide with the end of the four-lane divided rural section [F-FG-022-2-504] at MP 123.44 near the Morristown RROP, and the end of the project has been adjusted to coincide with the beginning of the recently constructed four-lane divided urban section [STP-022-2(36)] at MP 138.83, located just southeast of the connection of Loop 303 with US 60.

1.3.2 History of the Project Route

Transportation between Wickenburg and Phoenix during the late 1800s consisted of wagons and stagecoach service. By 1895, a rail line was constructed that followed a direct route between Wickenburg and Peoria along the current railroad alignment. Telegraph and telephone lines utilized the same route, and by 1917 an unimproved road paralleled the railroad along the present corridor of US 60. The communities of Morristown and Wittmann which were formerly known as Hot Springs Junction and Nadaburg, were also established. By 1937, the roadway had a bituminous surface. The roadway was reconstructed in the early 1940s with bridges and culverts for wash crossings. This was the only paved route between Phoenix and Flagstaff until the 1950s. US 60 between Wickenburg and the beginning of this study near Morristown was improved to a four-lane roadway in 1966. The last section of four-lane roadway from Phoenix to the east end of this study, 1/4 mile east of Loop 303, was completed in 1993.

1.3.3 Scope of the Project

This study analyzes the traffic needs within the limits, including an evaluation of the existing design, traffic volumes, and accidents. Traffic projections through the design year have been developed and agency and public participation obtained to define the transportation needs of the route. Alternatives for improving the highway to meet current criteria for safety, capacity, and operational characteristics through the design year have been developed and evaluated. The evaluation includes right-of-way requirements, provisions for limiting access points between the highway and adjacent properties, cost, impact on affected properties, constructibility, traffic control, and drainage. An EA was prepared concurrently with this study that provided the necessary environmental and socio-economic impact evaluations to use in the alternative selection process. A phased implementation plan was prepared to identify near-term and long-term improvement projects necessary to complete the selected alternative.

1.4 Project Objectives

The project study team established a number of project objectives at the onset of the project and developed the criteria to be used in evaluating and comparing the design concept alternatives. The process involved obtaining input from the public as well as from representatives of governmental agencies.

The L/DCR for US 60 was initiated with a field review on January 19, 1994, which was attended by ADOT representatives of Statewide Project Management, Pre-Design, Right-of-Way, Traffic, Environmental Planning, and Prescott District; Federal Highway Administration; and Sverdrup. The purpose of the field review was to acquaint the attendees with the project and obtain input for use in developing the study.

Public and agency scoping meetings were held to obtain information from residents, business people, and public agency representatives regarding the existing highway and the surrounding area to assist in determining significant issues to be addressed in the L/DCR and Environmental Documents. The Agency Scoping Meeting was held January 27, 1994, at Sverdrup's Phoenix office, and the Public Scoping Meeting was held January 27, 1994, at the Nadaburg School in Wittmann, Arizona.

The following issues and concerns were identified:

- **Right-of-Way (R/W)**
 - Make maximum use of existing R/W.
 - Consider widening onto Railroad R/W.
 - Widening R/W to the south will require acquisition of several existing businesses.
 - R/W width should accommodate frontage roads where they are required and utilities throughout the length of the project.
- **Access to US 60**
 - Access is to be maintained to existing railroad grade crossings.
 - Access to US 60 from properties on the south side should be coordinated between the local jurisdiction and ADOT.
 - Frontage roads will be necessary to consolidate access points from multiple properties and local roads into crossroad access points and median cross-overs spaced approximately 1/2 mile apart.
- **Pedestrian Separation Structure**—Replacement of the pedestrian separation structure in Wittmann may require signalization or a new separation structure.
- **Traffic Projections**
 - Should recognize changes in land use.
 - Should consider the effects of NAFTA.
 - The need for future traffic signals should be considered.

- **Safety**
 - Accident rate is high due to excessive speeds.
 - Divided highway should be considered to improve safety.
 - School children have to cross US 60 enroute to school.
 - Pedestrian separation is used only when a school crossing guard is present.
 - Skewed intersections with local roads should be improved.
 - Grade separation should be considered at Center Street for school bus and pedestrian safety.
 - Accommodation of bicyclists should be considered since US 60 is designated as a bicycle corridor.

- **Roadway Design**
 - Consider use of the existing roadway for both interim and long-range improvements.
 - Improve vertical alignment to meet current criteria.
 - Vertical alignment may have to be raised at railroad grade crossings.
 - Minimum median width for divided highway alternatives should be 46 feet.
 - A five-lane section should be evaluated through Wittmann.

- **Drainage**
 - Drainage facilities should be designed to current standards.
 - Encroachments into washes should be minimized.
 - Recently constructed box culvert improvements should be incorporated into the new highway.

- **Wittmann Water Supply**—A well that supplies much of the water for Wittmann is located near the existing R/W. Widening the R/W may require relocation of the well.

- **Environmental**
 - Corps of Engineers Section 401 and 404 permits will be required.
 - NPDES permits will be required.
 - Washes are used extensively by wildlife. Culverts should be large enough to accommodate wildlife.
 - Increased noise may affect adjacent land uses.
 - Archaeological, biological, and hazardous material surveys will be required.

As a result of the scoping meetings, the following project objectives were established as criteria in evaluating and comparing the design concept alternatives:

- **Capacity**—The roadway must accommodate the projected design year 2020 traffic volume of 27,800 ADT at a minimum LOS C.

- **Safety**—The recommended alternative must incorporate current design guidelines for a desirable mainline design speed of 70 mph for new and reconstructed roadway. A minimum design speed of 60 mph is required for the existing roadway to remain.

- **Right-of-Way (R/W)**—The R/W corridor must accommodate the US 60 roadway and frontage roads and provide width for utility lines inside the R/W adjacent to private property.
- **Access**—Access to adjacent property will be provided either directly to the highway or indirectly via frontage roads or county roads. No properties will be landlocked.

Access will be reconstructed to properties currently having a driveway. Access will be permitted to properties that do not have a driveway.

Public road intersections with US 60 will be spaced not less than 1/2-mile apart. Median crossovers will be placed at each public road intersection.

Existing driveways less than 1/4-mile apart will be permitted direct access to US 60 where the frequency of driveways does not warrant a frontage road. Movements will be restricted to right-in/right-out. New driveways should be either more than 1/4-mile apart or served by a frontage road.

- **Constructibility and Maintenance of Traffic**—Traffic will be maintained on US 60 during construction. Access to adjacent properties will be maintained with minimum inconvenience. Traffic will be separated from construction activities to the extent necessary to preserve safety and convenience for the traveling public and to allow efficient, cost-effective construction.
- **Drainage**—The hydrology of the drainage areas and the hydraulic capacity of the existing bridges and culverts under the AT&SF railroad along the corridor will be analyzed. Condition surveys will be developed to determine the suitability of existing drainage structures on US 60, and recommendations for retaining or replacing them will be made. Sizes of drainage facilities on new roadways will be developed based on the 50-year design storm. Existing backwater conditions will be established and maintained or improved with the proposed facilities. Culvert discharge will be returned to the existing drainage channels.
- **Earthwork**—The amount of borrow required will be estimated.
- **Utilities**—Utilities impacted by each alternative will be identified and potential conflicts analyzed.
- **Social, Economic, and Environmental Factors**—The environmental impact of each alternative will be determined including the feasibility of mitigating impacts.

1.5 Characteristics of the Corridor

The US 60 corridor between Morristown and Phoenix is oriented in a northwest to southeast direction. The AT&SF Railroad is located adjacent to and parallel with US 60 and shares a common right-of-way line on the north side of US 60. Within the project limits, existing County road intersections with US 60 cross the railroad via grade crossings at Center Street in Wittmann, at 203rd Avenue, and at 163rd Avenue. A future grade crossing will be constructed at the Loop 303 intersection near the east end of the project. Existing maintenance road crossings are located both east and west of the CAP Canal and west of the Beardsley Canal where the canals cross US 60 and the AT&SF Railroad.

The majority of the area adjacent to the existing roadway is undisturbed, vacant land, with developed parcels in isolated locations along the south side of US 60. Small concentrations of commercial businesses are located between the interim Loop 303/US 60 intersection and the McMicken Floodway, and along the unincorporated communities of Wittmann and Circle City. Local industry is limited to the Chrysler Proving Grounds, which is located approximately 2 miles north of US 60, off of 203rd Avenue. Occasional residential dwelling units occur along the south side for the length of the project. Concentrations of residential buildings are located south of Happy Valley Road in the City of Surprise, and in the unincorporated communities of Wittmann and Circle City. Although little construction activity has taken place, much of the land adjacent to the south side of US 60 has been subdivided into smaller lots. Over 300 lots exist within the limits of the project. Most of the lots (approximately 210) have a range of depth from 90 to 330 feet. Of the more than 300 lots, approximately one-quarter of them have structures within 150 feet of the existing R/W line. Approximately half of the structures are located within the Wittmann area.

The terrain is nearly level with the land sloping to the south at a rate of just less than one percent. Drainage typically flows from north to south through the project area. The AT&SF railroad embankment, located approximately 100 feet north of the US 60 R/W, acts as a barrier to runoff from the north. Runoff concentrates at bridges and culverts to pass under the railroad and continues on through culverts and bridges under US 60. Existing Box culverts with timber tops were recently replaced with new concrete box culverts (Summer 1994). At the east end of the project, the McMicken Floodway provides for the primary passage of floodwaters out of this basin.

Previous projects constructed within the improvement section are identified below including the project number, beginning and ending mileposts, construction date, and a brief description.

| Project No. | Begin MP | End MP | Constr. Date | Description |
|--------------------|----------|--------|--------------|--|
| FA-76(3) | 123.2 | 129.1 | 1940 | 40' B.M. Roadway |
| SNFA-84-A(4) | 129.1 | 136.7 | 1942 | 40' B.M. Roadway |
| SNFA-84-A(3) | 136.7 | 143.7 | 1944 | 40' B.M. Roadway |
| Non F-84-A(53) | 132.3 | - | 1953 | Box Culvert |
| Non F-022-2-2(60)C | 128.0 | 138.0 | 1960 | Overlay |
| Non F-022-2-504 | 121.1 | 128.0 | 1961 | Overlay |
| F-022-2-510 | 118.0 | 138.0 | 1969 | Overlay |
| F-022-2-923 | 128.9 | - | 1971 | Bridge Repair |
| F-022-2-925 | 138.0 | 146.2 | 1971 | ACFC |
| F-022-2-514 | 124.0 | 127.7 | 1982 | Safety, Box, and Pipe Culvert Extensions |
| F-022-2-516 | 128.9 | - | 1985 | Drainage Structure |
| F-022-2-950 | 128.7 | - | 1986 | Pedestrian Overpass |
| F-022-2-542 | 121.9 | 138.0 | 1994 | Fencing |
| STP-022-2(35) | 129.6 | 136.5 | 1994 | Bridge and Box Culvert Replacement |

The vertical alignment of existing US 60 from MP 123.7 to MP 138.7 has 62 vertical curves with lengths varying from 200 feet to 1,000 feet. The existing speeds, stopping sight distances, and associated mileposts for each of the vertical curves are shown in Appendix A.

The existing R/W for US 60 is 150 feet wide adjacent to the AT&SF Railroad R/W for most of the project length. An additional 20 feet of R/W was purchased from AT&SF Railroad from MP 138.83 to MP 138.53. The 20-foot wide strip tapers from 20 feet at MP 138.53 to 0 feet at MP 138.38. The additional R/W was purchased for roadside drainage purposes for the recently completed project STP-022-2(36). From MP 129.7 to MP 130.4 and from MP 130.8 to MP 131.0, the existing R/W widens to 205 feet. The additional R/W was dedicated in the Churchill South Subdivision. At MP 128.65, just north of Center Street and south of the US 60 roadway pavement in Wittmann, the ADOT R/W surrounds a reserved well site. The parcel (502-45-164A) is 25 feet by 25 feet. From MP 121.9 to MP 123.8, the existing R/W varies to accommodate the existing four-lane divided section.

The property adjacent to the north side of US 60 is owned by the AT&SF Railroad. The AT&SF Railroad R/W is 200 feet wide, 100 feet each side of the center of the mainline track, excepting the above-mentioned R/W purchase.

A listing of the parcels that are owned by local and federal governments adjacent to the south side of US 60 include:

**Table 1-1
LOCAL AND FEDERAL GOVERNMENT PARCELS**

| Government Entity | Location by Milepost (MP) | Comment |
|---|---------------------------|-------------------------------|
| State of Arizona (Arizona Land Department) | 123.80 | Vacant Land |
| State of Arizona (Arizona Land Department) | 125.4-125.7 | Vacant Land |
| State of Arizona (Arizona Land Department) | 126.1-126.9 | Vacant Land |
| United States of America | 127.0-127.4 | Vacant Land |
| United States of America | 131.3-131.5 | Vacant Land |
| United States of America | 131.7-132.4 | Central Arizona Project Canal |
| Maricopa County Highway Department | 135.45 | Access to Happy Valley Road |
| Maricopa County Municipal Water Conservation District 1 | 136.85 | Vacant Land |
| Maricopa County Municipal Water Conservation District 1 | 137.4-137.55 | Vacant Land |
| Maricopa County Flood Control District | 138.0-138.1 | McMicken Dam Outlet Channel |
| Arizona Department of Transportation | 138.3-138.6 | US 60/Loop 303 Interchange |

Future development along US 60, within Maricopa County jurisdiction, will be controlled by the Wickenburg Highway Scenic Corridor Plan adopted by the Maricopa County. The Scenic Corridor Plan established a Zoning District which encompasses lands within 2 miles of the edge of the R/W of both sides of US 60. The Scenic Corridor Plan begins at Wickenburg, extends east through this corridor study, and ends at Bell Road.

2. Traffic and Accident Data

2.1. Traffic Analysis

2.1.1 Existing Conditions

The existing roadway between the Morristown RROP and Sun City West encompasses a 15-mile section of US 60 that can generally be described as a two-lane rural highway. However, US 60 is a four-lane divided highway west of MP 123.44 and east of MP 138.83. There are approximately two dozen intersections along the route, with over half of them occurring in the Wittmann and Circle City areas. Because US 60 runs on the diagonal (a northwest-to-southeast orientation) and the cross-roads follow a north-south/east-west orientation, many of the intersections do not form right-angle intersections.

At some locations, US 60 has been widened to provide separate turn lanes. The following table provides a summary of the physical characteristics of the major intersections within the project limits:

| Cross-Street | MP | EB RT | EB LT | WB RT | WB LT | Type |
|-------------------|--------|-------|-------|-------|-------|----------------|
| London Road | 124.55 | X | | | X | 3-Leg |
| Center Street | 128.66 | | | | | 4-Leg |
| 203rd Avenue | 130.92 | | | | | 4-Leg (offset) |
| Patton Road | 132.50 | X | | | X | 3-Leg |
| Jomax Road | 134.12 | X | | | | 3-Leg |
| Happy Valley Road | 135.59 | | | | X | 3-Leg |
| Deer Valley Road | 137.00 | X | | | X | 3-Leg |
| 163rd Avenue | 137.90 | | X | X | | 3-Leg |
| Loop 303 | 138.63 | X | | | X | 3-Leg |

All cross-streets are controlled by stop signs; there are no existing signalized intersections within the project limits. Detailed signal warrant studies were recently conducted by ADOT's Traffic Studies Section for the Loop 303 and Center Street intersections. None of the 11 warrants specified in the Manual on Uniform Traffic Control Devices (MUTCD) were close to being satisfied at either location, and therefore, traffic signal installations were not recommended.

A pedestrian bridge over US 60, located approximately 150 feet east of Center Street in Wittmann, is a prominent feature of the corridor.

The posted speed limit on US 60 is 55 miles per hour (mph), except for a short section in the vicinity of Wittmann, which is posted at 45 mph.

2.1.2 Traffic Data

The existing traffic volume on US 60 is approximately 11,500 vpd near the east end of the corridor, in the vicinity of Loop 303 and gradually decreases to approximately 7,800 vpd at the west end of the project. These estimates are based on 24-hour counts conducted by ADOT at selected intersections in January and February of 1994. Figure 2-1 shows the estimated traffic volumes on US 60 and the major cross-streets as derived from the ADOT counts.

ADOT's Transportation Planning Division (TPD) provided the following traffic factors for US 60, for use in this corridor study:

| | | |
|--------------------------|-----|-----|
| Design Hour Factor | K = | 9% |
| Directional Distribution | D = | 55% |
| Truck Factor | T = | 5% |

Speed data were also collected along with the traffic count at Deer Valley Road. The posted 55-mph speed limit on US 60 is being exceeded by approximately 80 percent of all drivers. The average speed recorded was 59 mph, and the 85th percentile speed was 64 mph. These values apply to both eastbound and westbound vehicles.

2.1.3 Level of Service Analysis—Existing Conditions

A capacity analysis of the existing roadway was conducted using the "operational analysis" methodology for rural highways prescribed in Chapter 8 of the 1985 Highway Capacity Manual (HCM). This technique is used to measure the operational performance of a two-lane highway under either existing traffic and roadway conditions, or projected conditions. "Level of Service" (LOS) is a concept used to describe the traffic flow. A scale of "A" to "F" is used, with LOS A representing optimum flow conditions and LOS F representing heavily congested flow with traffic demand exceeding roadway capacity. LOS C is generally considered to be the minimum acceptable level when designing rural highways.

Due to the volume of 11,500 vpd (recorded in the vicinity of Loop 303), the results of the capacity analysis indicate that US 60 is currently operating at LOS D. However, because volumes are considerably lower at the west end of the project, a higher level of service (LOS C) is experienced in the Circle City-Wittmann area.

Detailed capacity analyses were conducted for these six critical intersections located within the study area:

- US 60/Center Street,
- US 60/Patton Road,
- US 60/Happy Valley Road,
- US 60/Deer Valley Road,
- US 60/163rd Avenue, and
- US 60/Loop 303.

Twenty-four hour approach volumes as well as turning movement counts were provided for the peak hour at each of these locations. Both A.M. peak hour and P.M. peak hour turning movement counts were available, from the recent signal warrant studies, for the US 60/Center Street and US 60/Loop 303 intersections.

The intersection capacity analyses were conducted using the methodology prescribed in Chapter 8 of the 1985 Highway Capacity Manual. This procedure is based on the use of gaps in the major traffic stream by vehicles entering or crossing through that stream. The HCM methodology focuses on certain critical traffic movements—right turns, through movements, and left turns from the minor street onto the major street, as well as left turns from the major onto the minor street. The amount of “conflicting traffic” and the capacity of gaps in the major street traffic flow to accommodate these movements are analyzed for each movement separately. The “reserve capacity” is calculated by subtracting the traffic demand from the available capacity. The resulting level of service for that particular movement is then found by consulting the following table:

| Reserve Capacity | LOS | Expected Delay to Minor Street Traffic |
|------------------|-----|--|
| 400 or more | A | Little or no delay |
| 300-399 | B | Short delays |
| 200-299 | C | Average delays |
| 100-199 | D | Long delays |
| 0-99 | E | Very long delays |
| Less than 0 | F | Extreme delays |

The results of the intersection capacity analyses indicate that the left-turn movement from both Loop 303 and 163rd Avenue onto US 60 experience long traffic delays (LOS D) during both the A.M. and P.M. peak hours. The delays are caused by the relatively high volume of traffic on US 60 at the east end of the study area which reduces the number of gaps of sufficient duration to make left turns safely. However, the number of vehicles wishing to make the left turn from Loop 303 and 163rd Avenue during peak periods is extremely low (30-50 vehicles per hour), and no serious operational problems are created. Other critical movements (left turns from US 60 onto Loop 303 or 163rd Avenue and right turns from the minor streets) are operating at LOS A.

All critical movements at the four remaining intersections (Center Street, Patton Road, Happy Valley Road, and Deer Valley Road) are currently operating at LOS C or better during peak hours.

2.1.4. Design Year Traffic Projections

Traffic volumes are expected to increase substantially as the Phoenix urbanized area continues to grow. For the purposes of this analysis, 2020 was chosen as the design year. Since the earliest construction funding for US 60 in ADOT’s Tentative Five-Year Highway Construction Program is in FY 2000, selecting the year 2020 is consistent with the normal highway planning practice of designing for a 20-year life span.

The Maricopa Association of Governments (MAG) has developed detailed computer models that forecast future travel demand in the region, based on projections of population, employment, and other demographic variables. Because the eastern end of the project area coincides with the boundary of MAG's Urban Planning Area, MAG was able to provide the following projections of average daily traffic volumes (ADTs) on US 60, in the vicinity of Loop 303, from its modeling program:

| Design Year | Forecast ADTs |
|-------------|---------------|
| 2010 | 19,000 |
| 2015 | 25,700 |
| 2020 | 27,800 |

The increase from approximately 11,500 vpd in 1994 to 27,800 vpd in the year 2020 represents a 240 percent increase.

MAG also provided estimates of 2020 traffic volumes on Loop 303 and 163rd Avenue, since these roadways are within the MAG Urban Planning Area. If Loop 303 is completed to I-17 as currently planned, it is expected to carry approximately 9,000 vpd north of US 60 and 7,000 vpd south of US 60 in the year 2020. Traffic volumes on 163rd Avenue are expected to be approximately 2,000 vpd by the year 2020. Projections are not available for the remainder of the study area.

Utilizing the MAG projections and the ADOT traffic data, estimates of peak-hour traffic volumes for the six critical intersections within the study area were derived by applying expansion factors to 1994 traffic volumes. The resulting traffic projections are presented in Figure 2-2 on page 17.

2.1.5 Level of Service Analysis—Future Conditions

The roadway capacity analysis for US 60 was repeated, this time using the projected design year volumes but assuming no improvements would be made to the existing two-lane facility. Under this "no build" scenario, US 60 would be operating at LOS F by the year 2020. The projected volume greatly exceeds the capacity of a two-lane roadway.

The four-lane facility being planned for US 60 with this project could comfortably accommodate the projected travel demand. The results of the capacity analyses indicate that the improved roadway would operate at LOS B or better during the peak hour. Since the existing roadway will be utilized for the westbound lanes, a design speed of 60 mph was used in the capacity analysis. The existing vertical alignment of the roadway provides a minimum design speed of 60 mph. It should also be noted that this "worst case" result applies most directly to the eastern end of the project, where the projected design volumes would occur. Roadway performance would gradually improve as you travel toward the western end of the study area, where lower volumes are expected.

The capacity analyses of the six critical intersections were also repeated, using the projected 2020 volumes. In conducting these analyses, it was assumed that US 60 would be widened to provide two travel lanes in each direction plus a separate left-turn lane, but no changes would be made to the existing cross-sections on all cross-streets.

During the peak hour, traffic on Center Street will be experiencing extreme delays (LOS F). Although the widening of Center Street to provide separate left-turn lanes would reduce delays for vehicles wishing to turn right, this would have no impact on vehicles wishing to turn left onto US 60. The heavy volume of traffic on US 60 does not provide sufficient gaps to enable these drivers to make left turns safely and conveniently. The number of left turns is not expected to be high (only 50 vehicles during the P.M. peak hour), so vehicle-delay may not be a major problem. The widening of US 60 would require the removal of the existing pedestrian overpass (located approximately 150 feet east of Center Street), since it is not wide enough to accommodate four future travel lanes on US 60, and building a replacement structure with the necessary span would be cost-prohibitive. Even though a traffic signal at the US 60/Center Street intersection is not warranted by vehicular volumes, signalization will be needed to provide a safe at-grade crossing for the school children currently using the overpass. The signal will also provide better access for school buses during peak hour traffic. A signal warrant study based on projected traffic volumes at the opening of the four-lane roadway is recommended since the consolidation of turning movements may result in vehicular warrants being met.

Vehicles wishing to turn left onto US 60 are also expected to experience poor levels of service (LOS D or LOS E) at Patton Road, Deer Valley Road, and 163rd Avenues, but once again, the projected minor-street volumes are very low. At Happy Valley Road, not only the minor street traffic, but also vehicles making the left turn from US 60 onto Happy Valley Road, will experience unacceptable delays (LOS D or worse).

Although the intersection of Loop 303 and US 60 was analyzed as an unsignalized intersection, traffic signal control (at a minimum) will clearly be needed to accommodate the projected intersecting volumes when Loop 303 is extended to the north. MAG's long-range plan is to ultimately develop a grade-separated interchange at that location.

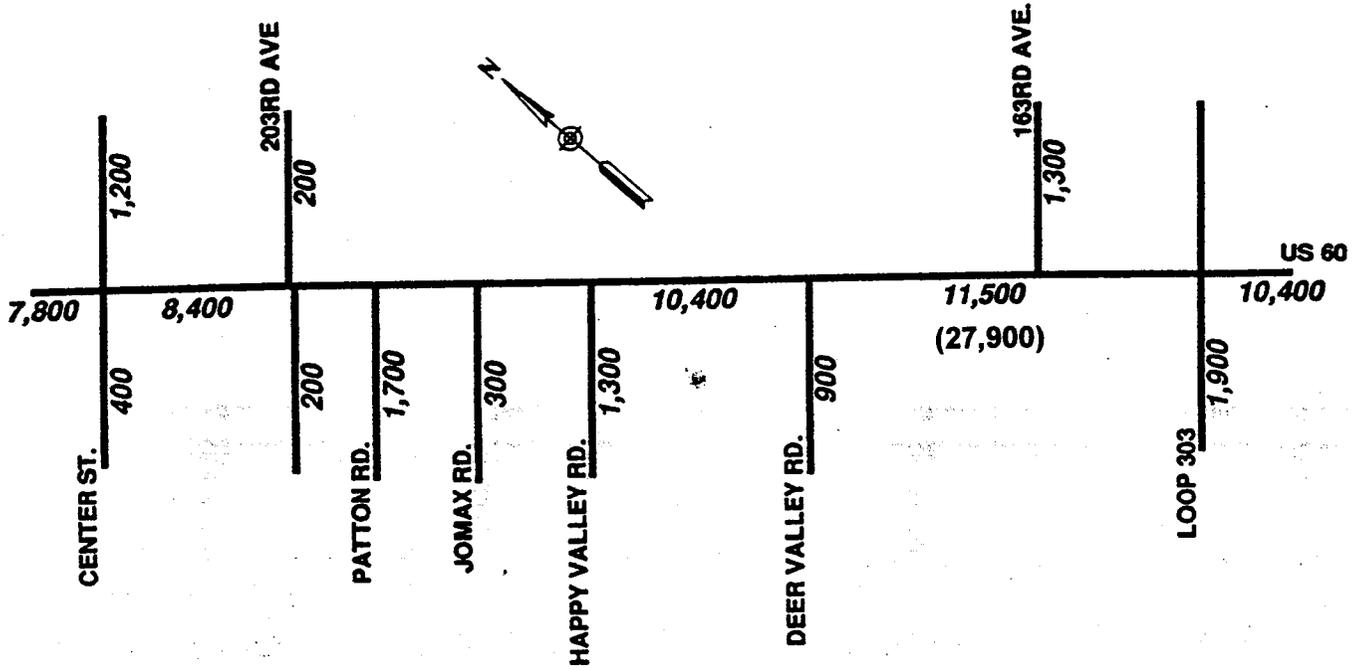


Figure 2-1. Traffic Volumes—1994

Note: The traffic volume shown in parenthesis is the projected volume for the design year 2020.

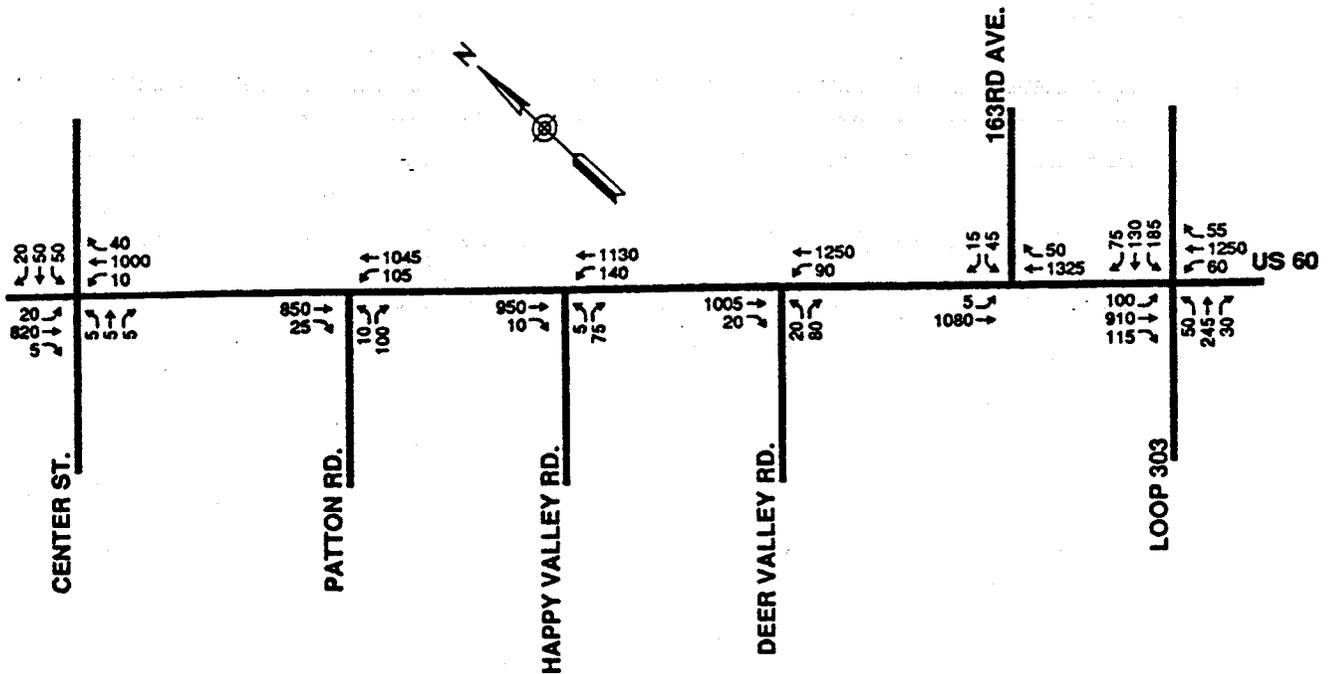


Figure 2-2. Peak Hour Traffic Projections*—2020

*Projections are based on information provided by MAG and ADOT.

Potential Bypass

As various alternate designs for the improvement of US 60 were developed and evaluated, concerns began to arise that the need to accommodate existing and future roadside development in the Wittmann area would jeopardize the ability to provide a high-speed, high-capacity facility. Right-of-way constraints and property access issues in the existing corridor pose serious obstacles to achieving desired roadway design standards. An urban type facility with a 50-mph design speed and one or more traffic signals is not consistent with the vision of a major transportation corridor. As a result of these discussions, the feasibility of building a bypass around Wittmann was investigated. Under this design alternative, a four-lane expressway section would be provided on the south side of the community, diverting from the existing US 60 alignment just west of Dove Valley Road and re-entering just east of 211th Avenue. Between these two termini, the existing US 60 facility would remain as a business route for local circulation and access.

A half-diamond interchange accommodating travel to and from the east would be provided for the bypass at 211th Avenue. A portion of the existing US 60 alignment could serve as the westbound off-ramp at that location, but an eastbound on-ramp would have to be built from 211th Avenue.

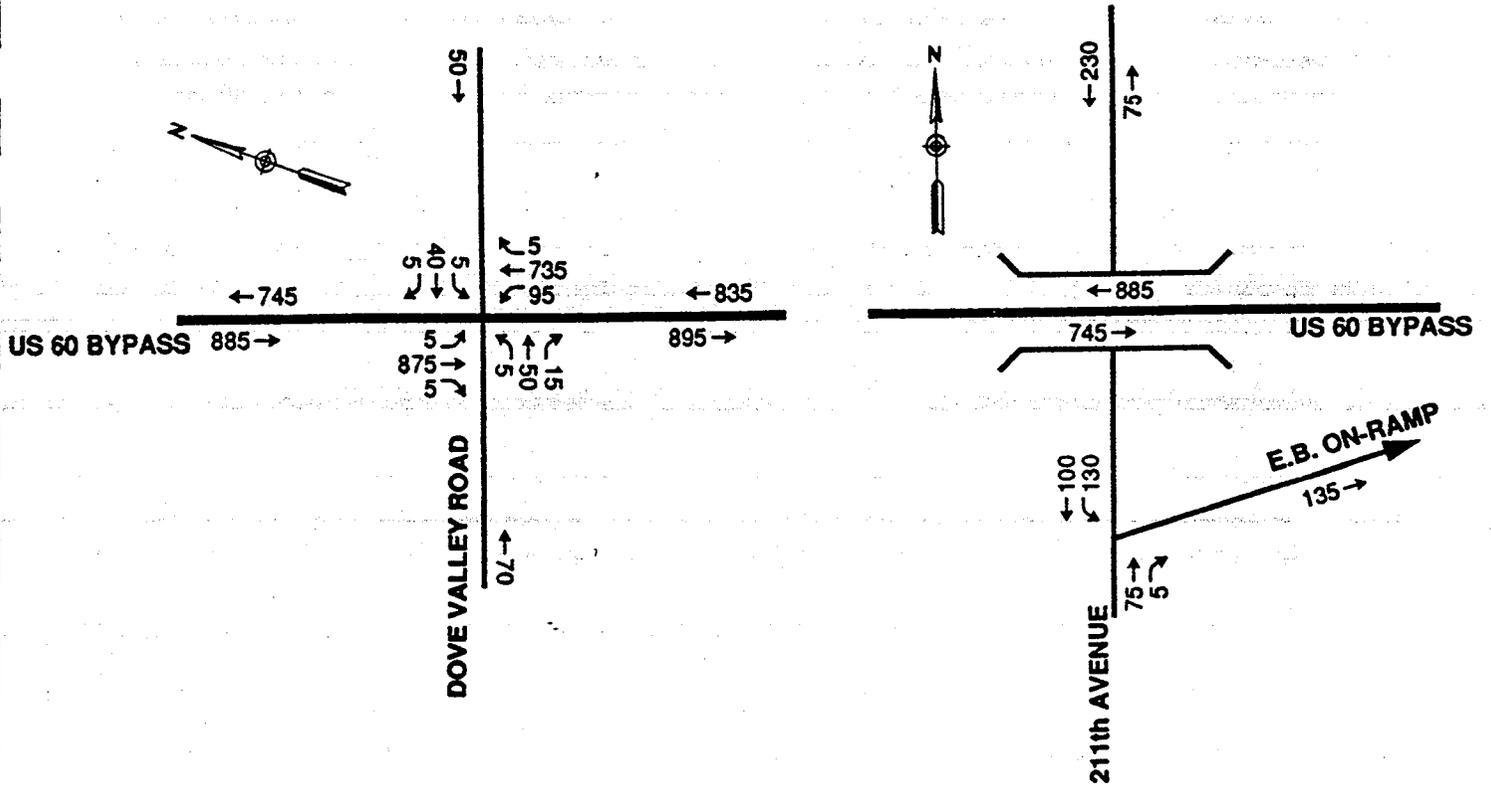
Eastbound traffic on US 60 wishing to go into Wittmann would have to exit the bypass at an at-grade intersection with Dove Valley Road. This intersection would also provide an opportunity for westbound traffic with a destination in the Wittmann area to exit the bypass (although most of these motorists would be expected to use the 211th Avenue interchange discussed above). Local traffic would be able to get on the bypass traveling in either the eastbound or westbound direction at Dove Valley Road.

There is no information available on the specific origins and destinations of vehicles traveling US 60 in the Wittmann area. Therefore, it is difficult to predict, with any degree of certainty, how future traffic patterns would be affected with construction of a bypass. However, in order to provide some sense of the potential traffic impact, a capacity analysis of the two proposed bypass access points—based on certain assumptions regarding future traffic volumes—was prepared.

In preparing this analysis, it was assumed that 90 percent of all through traffic on US 60 would divert to the bypass, with the remaining 10 percent taking the business route (existing US 60) through Wittmann in order to purchase gas, food, etc., or for other reasons. Eastbound traffic taking the business route would exit the bypass at Dove Valley Road and re-enter at 211th Avenue, as this would be the shortest and most direct route available. Similarly, westbound traffic taking the business route would stay on the existing US 60 alignment all the way through town. It was further assumed that 80 percent of all locally generated traffic entering and leaving the community (that is, traffic generated by Wittmann residents) would be traveling to and from the east and would be most likely to use the 211th Avenue interchange to access US 60. Twenty percent of this locally generated traffic would be traveling to and from the west and would be most likely to enter and exit US 60 on the west side of town. (This 80/20 split is based on a review of existing travel patterns and reflects the importance of the Phoenix metropolitan area in providing employment and retail opportunities, medical care, and other services for Wittmann residents.) Figure 2-3 shows peak hour volumes at the Bypass Access points.

West Side of Wittmann

East Side of Wittmann



Schematic Drawing Only - Not to Scale

Figure 2-3. Peak Hour Volumes at Bypass Access Points—2020

Capacity analyses, based on these projected volumes and the HCM methodology, were performed for these two critical locations. In these analyses, it was assumed that both 211th Avenue and Dove Valley Road would remain as two-lane local roads. The results indicate that the eastern access point would operate at LOS A as an unsignalized intersection. The only roadway improvement necessary would be the addition of a southbound left-turn lane on 211th Avenue for traffic wishing to turn onto the eastbound on-ramp. A minimum storage distance of 100 feet would be required to accommodate the projected peak-hour turning volume.

At the western access point, several critical movements would operate at unacceptable levels of service. Due to the high volumes and high speeds on the US 60 bypass, Dove Valley Road traffic wishing to cross or turn left onto the bypass would experience extremely long delays (LOS F), but these volumes are expected to be relatively minor (less than 50 vph). Eastbound traffic on the bypass wishing to exit at Dove Valley Road would experience long delays (LOS D); approximately 95 vehicles are expected to make this left turn during the P.M. peak hour.

The results of the capacity analysis indicate that acceptable levels of service may not be possible for all movements if the US 60 bypass/Dove Valley Road intersection is operated under a two-way stop condition. Traffic signal control might be appropriate at some future date, but given the projected volumes, signalization would clearly not be warranted for many, many years.

Based on the preceding analysis, separate left-turn lanes would be included for both directions of travel on the bypass at the Dove Valley Road intersection; a minimum storage distance of 100 feet would be required. No other roadway improvements are recommended at this time. If, however, major development occurs in the Wittmann area and Dove Valley Road becomes a major cross street, traffic signal control or a grade-separated crossing may need to be considered.

Further evaluation of the By Pass alternative resulted in it being dropped from consideration (see section 4.6.3).

2.1.6 Conclusions

From the capacity analyses, it was determined that US 60 is currently operating at LOS D—at least in the most heavily traveled southeastern portion of the study area. Safety, capacity, and operational problems will worsen, because traffic volumes are expected to grow by 240 percent over the next 25 years, and the existing two-lane facility cannot accommodate this level of traffic demand. However, the proposed four-lane facility will provide an acceptable level of service (LOS B) in the design year 2020.

After reviewing the existing and projected peak-hour turning movements, the capacity analyses, and accident experience, it is recommended that left-turn storage be provided at all major cross-streets. Although the projected turning movements do not appear to warrant traffic signal control at any of the intersections studied, the removal of the existing pedestrian overpass will require the installation of a signal at Center Street in order to provide a safe at-grade crossing for school children.

In "A Policy on Geometric Design of Highways and Streets," the American Association of State Highway and Transportation Officials (AASHTO) states that the required storage length for separate turn lanes at unsignalized intersections may be calculated by multiplying the number of turning vehicles expected to arrive during a two-minute period by 25 feet per vehicle, although at least 50 feet (enough to accommodate two vehicles) should always be provided. Using this approach, the following minimum storage requirements were determined for each critical intersection:

| Intersection | Eastbound | | Westbound | |
|-------------------|--------------------------|---------------------|--------------------------|---------------------|
| | Maximum Left Turn Volume | Storage Requirement | Maximum Left Turn Volume | Storage Requirement |
| Center Street | 20 | 50 ft* | 10 | 50 ft* |
| Patton Road | NA | NA | 105 | 90 ft* |
| Happy Valley Road | NA | NA | 140 | 115 ft |
| Deer Valley Road | NA | NA | 90 | 75 ft* |
| 163rd Avenue | 5 | 50 ft* | NA | NA |
| Loop 303 | 100 | 85 ft* | 105 | 50 ft* |

*The AASHTO methodology results in a storage requirement smaller than ADOT's minimum standard of 100 feet, so the ADOT standard should prevail.

As indicated above, ADOT has adopted roadway design standards that require a minimum left-turn storage distance of 100 feet on the State highway system. When the storage requirements calculated on the basis of projected design volumes are less than this minimum, the ADOT standard should be followed.

With the notable exception of the US 60/Loop 303 intersection, there does not appear to be any need for separate right-turn lanes on US 60 at any of the intersections analyzed in this study. Separate right-turn lanes for both eastbound and westbound traffic should be provided at the US 60/Loop 303 intersection, with minimum storage lengths of 100 feet. The need for deceleration and/or right-turn lanes at major intersections should always be reviewed as the owners of adjacent properties bring forward specific development plans, however.

When developing more detailed designs for the improvement of US 60, opportunities to realign portions of the cross streets to eliminate existing offset intersections or to improve intersection geometrics by providing a right-angle crossing should be taken wherever possible.

Improvements to the east end of the study area, where the most rapid growth is occurring and the traffic volumes are at their highest levels, should receive a high priority. The Wittmann area should also receive early attention due to its accident history; it would also be beneficial to institute an access control plan now before additional development occurs. A five-lane cross-section with one or more traffic signals and numerous driveways, which may be the most feasible design through Wittmann, is not consistent with ADOT's objective of providing a high-speed, high-capacity travel facility.

2.2 Accident Analysis

2.2.1 Source of Data

Accident data were provided by ADOT's Traffic Studies Branch. A summary of the accident history gathered for the five year period from January 1, 1990, and December 31, 1994, is presented here:

2.2.2 Accident Data

Table 2-1
ACCIDENTS BY SEVERITY

| Accident Severity | Number of Accidents by Year | | | | | | |
|------------------------------|-----------------------------|-----------|-----------|-----------|-----------|------------|-------------|
| | 1990 | 1991 | 1992 | 1993 | 1994 | Total | Average |
| Property Damage Only (PDO) | 14 | 15 | 15 | 21 | 15 | 80 | 16.0 |
| Non-Fatal Injury | 11 | 15 | 16 | 17 | 14 | 73 | 14.6 |
| Fatal Injury | 0 | 0 | 1 | 3 | 1 | 5 | 1.0 |
| Total | 25 | 30 | 32 | 41 | 30 | 158 | 31.6 |
| Number PDO Vehicles | 23 | 20 | 22 | 30 | 19 | 114 | 22.8 |
| Number of Non-Fatal Injuries | 21 | 37 | 28 | 30 | 26 | 142 | 28.4 |
| Number of Fatal Injuries | 0 | 0 | 1 | 3 | 1 | 5 | 1.0 |

Table 2-2
ACCIDENTS BY TYPES

| Accident Type | Number of Accidents by Year | | | | | | |
|--------------------------|-----------------------------|-----------|-----------|-----------|-----------|------------|-------------|
| | 1990 | 1991 | 1992 | 1993 | 1994 | Total | Average |
| Run off Road | 1 | 4 | 3 | 5 | 1 | 14 | 2.8 |
| Hit Fixed Object | 2 | 2 | 3 | 4 | 3 | 14 | 2.8 |
| Overturned | 7 | 3 | 3 | 7 | 1 | 21 | 4.2 |
| Non-Collision | 2 | 3 | 1 | 2 | 1 | 9 | 1.8 |
| Hit on Roadway | | | | | | | |
| Animal | 0 | 3 | 3 | 3 | 7 | 16 | 3.2 |
| Object on Road | 1 | 1 | 2 | 1 | 3 | 8 | 1.6 |
| Hit Pedestrian/Bicycle | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Hit Other Vehicle | | | | | | | |
| Head-on | 0 | 1 | 1 | 3 | 1 | 6 | 1.2 |
| Rear-End | 5 | 3 | 7 | 5 | 5 | 25 | 5.0 |
| Sideswipe, Same Dir. | 1 | 4 | 2 | 5 | 2 | 14 | 2.8 |
| Sideswipe, Opp. Dir. | 2 | 2 | 1 | 4 | 1 | 10 | 2.0 |
| Angle Collision | 1 | 2 | 2 | 0 | 0 | 5 | 1.0 |
| Left-Turn | 1 | 0 | 1 | 1 | 3 | 6 | 1.2 |
| Backing | 1 | 0 | 1 | 0 | 0 | 2 | 0.4 |
| Other | 1 | 2 | 2 | 1 | 2 | 8 | 1.6 |
| TOTAL | 25 | 30 | 32 | 41 | 30 | 158 | 31.6 |

2.2.3 Review of Accident Data

A preliminary accident evaluation of the US 60 corridor was prepared by ADOT's Traffic Studies Branch in February 1995. A total of 158 accidents were reported during a five-year period—five involving fatalities, 73 involving non-fatal injuries, and 80 involving property damage only. The most common accidents were rear-end collisions (25), overturning accidents (21), and hit animal accidents (16). Ten of the rear-end accidents involved vehicles colliding with other vehicles waiting to make left turns from US 60 onto a cross street; six of these occurred in the Wittmann area.

The purpose of the evaluation was to determine if the reported accidents had any correlation to the safety of traffic operations in the study area. The ADOT staff recommended that the following roadway improvements be considered during this corridor study.

- Installing shoulder rumble strips and reflectorized raised pavement markers to help reduce the frequency of run-off-road accidents and nighttime accidents.
- Adding a two-way left-turn lane in the developed area of Wittmann (MP 128.5 to MP 129.4) to help reduce the frequency of rear-end and left-turn accidents.
- Investigate the need for an eastbound right-turn lane on US 60 at Crozier Road.

3. AASHTO Controlling Design Criteria

3.1 Introduction

The existing design features of US 60 between MP 123.4 and MP 138.8 have been examined and evaluated relative to the AASHTO Controlling Design Criteria outlined in the 1990 edition of "A Policy on Geometric Design of Highways and Streets," commonly referred to as the AASHTO "Green Book." Other publications used as reference materials for the evaluation are ADOT's "Guide for Highway Geometric Design" (1986 edition) and the "Procedural Guide for Review of the AASHTO Controlling Design Criteria on Existing ADOT Roadways." A complete presentation of the data and evaluation is contained in the March 1994 report, AASHTO Controlling Design Criteria Report, US 60, Wickenburg-Phoenix Highway, Morristown RROP-Beardsley Road, TRACS No. 060 MA 121 H 3623 01 L, Federal Project No. STP-022-2-955.

Non-conforming AASHTO design elements that will be upgraded as a part of this project include the following:

- **Vertical Alignment, Stopping Sight Distance**—The stopping sight distance for the existing roadway was analyzed for a 60 mph design speed. Only one vertical curve (at MP 129.0) fell below the required minimum stopping sight distance. The existing speeds, stopping sight distances, and associated mileposts for each of the vertical curves are shown in Appendix A.
- **Structural Capacity**—The following three existing bridges do not meet the AASHTO recommended minimum structural capacity of HS 20:

Structure No. 255, MP 125.20, Structural Capacity HS 15

Structure No. 272, MP 128.98, Structural Capacity HS 16

Structure No. 472, MP 138.09, Structural Capacity HS 16

A summary of the AASHTO Controlling Design Criteria Report evaluation follows:

Lane Width and Shoulder Widths

| Item | Existing Width (ft) (two-way roadway) | AASHTO Recommended Width (ft) (one-way roadway) | Proposed Width (ft) (one-way roadway) |
|------------------|--|--|--|
| Lane Width | 12 | 12 | 12 |
| Shoulder Width: | | | |
| Outside | 8 | 8 | 10 |
| Inside | NA | 3 | 4 |
| New Bridges | NA | 8* | 10* |
| Approach | 8 | 8 | 10* |
| Existing Bridges | Varies 8.9' to 10.2' | 8 | Varies 8.9' to 10.2' |
| Approach | 8 | 8 | 10 |

*Bridge and approach shoulder widths include 2-foot shy distance from edge of shoulder to face of barrier.

Vertical Alignment and Stopping Sight Distance

| Item | Existing (ft) | AASHTO Recommended (ft) | Proposed* (ft) |
|--------------------------|---------------|-------------------------|----------------|
| Stopping Sight Distance: | | | |
| Vertical Curves | | | |
| WB | 611-2,000+ | 650 | >650 and >850 |
| EB | N/A | 850 | >850 |

*The existing WB roadway to remain in place will meet AASHTO requirements for 60 mph. Portions of the WB roadway being reconstructed will meet requirements for 70 mph.

Horizontal Alignment and Stopping Sight Distance

| Item | Existing | AASHTO Recommended | Proposed |
|---------------------------------|----------|--------------------|----------|
| Stopping Sight Distance: | | | |
| First Horizontal Curve | | | |
| EB (PI MP 123.8) | 650+ ft | 650+ ft | 850+ ft |
| WB (PI MP 123.5) | 650+ ft | 650+ ft | 850+ ft |
| Second Horizontal Curve | | | |
| EB (PI MP 127.8) | N/A | 850+ ft | 850+ ft |
| Third Horizontal Curve | | | |
| EB (PI MP 127.9) | N/A | 850+ ft | 850+ ft |
| Fourth Horizontal Curve | | | |
| EB (PI MP 130.1) | N/A | 850+ ft | 850+ ft |
| Fifth Horizontal Curve | | | |
| EB (PI MP 130.2) | N/A | 850+ ft | 850+ ft |
| Sixth Horizontal Curve | | | |
| EB (PI MP 138.3) | N/A | 850+ ft | 850+ ft |
| WB (PI MP 138.3) | N/A | 850+ ft | 850+ ft |
| Seventh Horizontal Curve | | | |
| EB (PI MP 138.5) | N/A | 850+ ft | 850+ ft |
| WB (PI MP 138.5) | N/A | 850+ ft | 850+ ft |
| Superelevation: | | | |
| First Horizontal Curve | | | |
| EB (PI MP 123.8) | 0.015'/' | RC* | RC* |
| WB (PI MP 123.5) | 0.015'/' | RC* | RC* |
| Second Horizontal Curve | | | |
| EB (PI MP 127.8) | N/A | NC** | NC |
| Third Horizontal Curve | | | |
| EB (PI MP 127.9) | N/A | NC | NC |
| Fourth Horizontal Curve | | | |
| EB (PI MP 130.1) | N/A | NC | NC |
| Fifth Horizontal Curve | | | |
| EB (PI MP 130.2) | N/A | NC | NC |
| Sixth Horizontal Curve | | | |
| EB (PI MP 138.3) | N/A | NC | NC |
| WB (PI MP 138.3) | N/A | NC | NC |
| Seventh Horizontal Curve | | | |
| EB (PI MP 138.5) | N/A | NC | NC |
| WB (PI MP 138.5) | N/A | NC | NC |

*RC – Remove adverse crown, superelevate at normal crown slope.

**NC – Normal crown section.

Design Speeds

This section of US 60 is classified as a principal rural arterial. Design speeds for rural arterials generally range from 60 to 70 mph in level terrain. A desirable design speed of 70 mph was selected for new and reconstructed roadway sections. However, a minimum design speed of 60 mph is required for an existing roadway to remain in place. Approximately 10 percent of the existing vertical curves are rated at a design speed less than 70 mph. Only one vertical curve does not exceed the 60 mph design speed. The vertical curve with a design speed that is less than 60 mph will be reconstructed to exceed 70 mph. Otherwise the design speeds are adequate.

Grades

| Item | Existing | AASHTO Recommended | Proposed |
|---------------|----------|--------------------|----------|
| Maximum Grade | 1.9% | 3% | 2.6% |

Cross Slopes

| Item | Existing | AASHTO Recommended | Proposed |
|--------------|----------|---------------------|----------|
| Cross Slopes | 1.5% | Between 1.5% and 3% | 2.0% |

Vertical Clearance

| Item | Existing (ft) | AASHTO Recommended (ft) | Proposed (ft) |
|--------------------|---------------|-------------------------|-------------------------|
| Vertical Clearance | 17'-8" | 17'-0" | Structure to be removed |

Bridge Structures

| Item | Existing | AASHTO Recommended for Bridges to Remain | Proposed |
|---|--|--|-------------------|
| Structure No. 255 (MP 125.20) Trilby Wash Bridge | | | |
| Clear Width (curb to curb) | 44.0 ft | 28.0 ft | 44.0 ft |
| Rail Type and Strength | Std. Conc. Barrier ADOT Std. B-21.18 Strength Adequate | ADOT Std. B-21.18 | ADOT Std. B-21.18 |
| Structural Capacity of Bridge | HS 15 | HS 20 | HS 20* |
| Structure No. 272 (MP 128.98) Wittmann Wash Bridge | | | |
| Clear Width (curb to curb) | 44.4 ft | 28.0 ft | 44.4 ft |
| Rail Type and Strength | Std. Conc. Barrier ADOT Std. B-21.18 Strength Adequate | ADOT Std. B-21.18 | ADOT Std. B-21.18 |
| Structural Capacity of Bridge | HS 16 | HS 20 | HS 20* |
| Structure No. 1404 (MP 131.90) CAP Canal Bridge | | | |
| Clear Width (curb to curb) | 44.3 ft | 28.0 ft | 44.3 ft |
| Rail Type and Strength | Std. Conc. Barrier ADOT Std. B-21.18 Strength Adequate | ADOT Std. B-21.18 | ADOT Std. B-21.18 |
| Structural Capacity of Bridge | HS 20 | HS 20 | HS 20 |
| Structure No. 472 (MP 138.09) McMicken Dam Outlet Bridge | | | |
| Clear Width (curb to curb) | 41.8 ft | 28.0 ft | 41.8 ft |
| Rail Type and Strength | Std. Conc. Barrier ADOT Std. B-21.18 Strength Adequate | ADOT Std. B-21.18 | ADOT Std. B-21.18 |
| Structural Capacity of Bridge | HS 16 | HS 20 | HS 20* |

*Structural capacity of existing bridges will increase to HS 20 by milling off asphalt overlay material to depth sufficient to achieve desired capacity.

4. Design Concept Alternatives

4.1 Introduction

The improvement of US 60 will involve improvements to increase capacity, enhance safety, and improve operational characteristics. The scoping process and the traffic and accident analysis have demonstrated that a four-lane facility will be required to meet transportation needs through design year 2020. A four-lane roadway is also consistent with the existing US 60 roadways adjacent to the beginning and end of this project. The existing US 60 corridor is the most direct route through the study area since it is essentially a single tangent alignment for the entire length, with the exception of horizontal curves at the beginning of project to match existing alignment. The highway corridor is contiguous with the AT&SF railroad corridor, thus consolidating regional transportation into a single corridor. Development along the existing corridor is minimal except through the community of Wittmann. All of the design alternatives utilize the existing US 60 corridor except at Wittmann an alternative was identified that bypasses the developed commercial area to evaluate advantages and disadvantages of a new location in that section.

Alternatives identified include incorporating the existing roadway as one direction of travel; reconstruction of the entire roadway on new alignment within the corridor; narrow median; and five-lane alternatives in the Wittmann area; divided roadways with 46-, 60-, and 84-foot medians; and a divided highway bypass of Wittmann. Ten alternatives were developed including the "Do Nothing" alternative. It was recognized that the recommended alternative may be a combination of two or more of the ten alternatives studied.

4.2 Alternatives

Each of the first four alternatives (Alternatives A1-A4) described below are utilized for the total project length. It is anticipated that frontage roads are needed for approximately one-half of the project length.

4.2.1 Alternative A1

This alternative utilizes the existing lanes for the future westbound (WB) lanes except the profile will be raised at railroad crossings located at Center Street, 203rd Avenue, and Loop 303; and the entire existing roadway will be milled and overlaid. New eastbound (EB) lanes will be constructed on the south side of existing US 60, separated from the WB lanes by an 84-foot wide median for the entire length except for transitions at the beginning and end to match existing four-lane divided roadways. A frontage road will be constructed on the south side where required to control access from adjacent properties to US 60. For this alternative, an additional 134 to 136.5 feet of R/W will be required on the south side of US 60. This alternative is similar to the typical section of US 60 located immediately west of this project.

4.2.2 Alternative A2

Alternative A2 utilizes the existing lanes for the future WB lanes except the profile will be raised at railroad crossings located at Center Street, 203rd Avenue, and Loop 303; and the entire existing roadway will be milled and overlaid. New EB lanes will be constructed on the south side of US 60, separated from the WB lanes by a 60-foot wide median for the entire length except for transitions at the beginning and end to match existing four-lane divided roadways. A frontage road will be constructed on the south side where required to control access from adjacent properties to US 60. For this alternative, an additional 110 to 112.5 feet of R/W will be required for most of the south side of US 60.

4.2.3 Alternative A3

Alternative A3 utilizes the existing lanes for the future WB lanes except the profile will be raised at railroad crossings located at Center Street, 203rd Avenue, and Loop 303; and the entire existing roadway will be milled and overlaid. New EB lanes will be constructed on the south side of US 60, separated from the WB lanes by a 46-foot median except for a transition to match the existing four-lane divided highway at the beginning of project. A frontage road will be constructed on the south side where required to control access from adjacent properties to US 60. For this alternative, an additional 96 to 98.5 feet of R/W will be required on the south side of US 60. This alternative is similar to the typical section of US 60 immediately east of this project.

4.2.4 Alternative A4

This alternative constructs a new rural four-lane divided roadway with a 60-foot wide median for the entire length except for transitions to match the existing four-lane divided roadway at the beginning and end of the project. Railroad R/W is utilized as much as possible in order to minimize or reduce the R/W required from private property on the south side. A frontage road will be constructed on the south side where required to control access from adjacent properties to US 60. For this alternative, an additional 72 feet of R/W will be required on the south side of US 60. Fifty feet of R/W will be needed from the railroad.

The following alternatives (Alternatives A5-A9) are limited to the community of Wittmann, MP 128.3 to MP 129.6.

4.2.5 Alternative A5

Alternative A5 constructs a new rural four-lane divided roadway, with a 30-foot wide median. The railroad R/W is utilized as much as possible in order to minimize the R/W take from private property on the south side. A frontage road will be constructed on the south side to control access from adjacent properties to US 60. The median ditch would be paved to keep water out of the structural section. An additional 42 feet of R/W will be required on the south side of US 60. Fifty feet of R/W will be needed from the railroad. New double bridges will be constructed over Wittmann Wash.

4.2.6 Alternative A6

This alternative constructs a new five-lane roadway with a 12-foot wide center turn lane to the north of the existing roadway. The south side of the roadway incorporates an urban 16-foot outside lane with curb and gutter. The north side incorporates a rural 10-foot shoulder. The 12-foot center turn lane used with the urban curb and gutter would allow left-turn movements only at designated locations. A frontage road will be constructed on the south side to control access from adjacent properties to US 60. The railroad R/W is utilized as much as possible and the roadway median area reduced in width so that no R/W is taken from private property on the south side. Additional R/W will be required for radius returns at side street connections to the frontage road. Fifty feet of R/W will be needed from the railroad. A new bridge will be constructed over Wittmann Wash.

4.2.7 Alternative A7

This alternative constructs a new rural four-lane roadway with a paved 16-foot wide center median to the north of the existing roadway. The center median would allow left-turn movements. A frontage road will be constructed on the south side to control access from adjacent properties to US 60. The railroad R/W is utilized as much as possible to minimize the R/W taken from private property on the south side (similar to Alternative A6). Additional R/W will be required for radius returns at side street connections to the frontage road. Fifty feet of R/W will be needed from the railroad. A new bridge will be constructed over Wittmann Wash.

4.2.8 Alternative A8

Alternative A8 constructs a new urban four-lane roadway with a 16-foot wide center turn lane, 10-foot shoulders, and curb and gutter to the south of the existing roadway. The center turn lane would allow left-turn movements only at designated locations. No frontage road is used. Curb cuts would be permitted to provide access to US 60. No R/W will be required for this alternative. The WB lanes would be aligned with the existing two-lane roadway to the west to retain the existing bridge over Wittmann Wash. A parallel bridge would be constructed for the EB lanes.

4.2.9 Alternative A9

This alternative constructs a 3-mile bypass around the Wittmann area utilizing a rural four-lane divided roadway with an 84-foot median width. A new 300-foot wide R/W corridor will be purchased from private property owners. Access to US 60 from Wittmann will be at Dove Valley Road and 211th Avenue. New double bridges will be constructed over Wittmann Wash.

Alternative A9 begins at MP 127.65, EB and WB Station 314+50, near the west end of Wittmann and curves to the right via a $1^{\circ}30'$ curve having a delta of $45^{\circ}11'20''$. The alignment then curves to the left with a $1^{\circ}30'$ curve beginning at MP 128.59 (Station 364+12.34) with a delta of $88^{\circ}55'59.6''$. At MP 130.14 (Station 447+13.11), the alignment again curves to the right via a $1^{\circ}30'$ curve with a delta of $40^{\circ}38'42.6''$, ending at Station 478+71.05 where it rejoins Alternative A1 at MP 130.30, Station 456+00 ahead. The profile of A9 is 1 foot to 8 foot above existing ground except the profile is raised to provide grade separations at Crozier Road, vicinity of MP 129.15 (Station 394+20), and at 211th Avenue, vicinity of MP 130.22 (Station 451+50).

4.2.10 Alternative A10

This alternative is the no-build alternative. No new construction will be done within the project limits. Normal scheduled maintenance activities will be continued.

4.3 Design Concept Alternatives Considered and Discontinued

Alternatives A3 through A8 were investigated and discontinued from consideration for reasons presented in the following paragraphs. Typical sections for all the alternatives have been included in Appendix B.

4.3.1 Alternative A3

The 46-foot median width for Alternative A3 does not provide distance between the roadways to accommodate different profiles for the two roadways. Options available with the 46-foot median are as follows:

- Modify the profile of the existing roadway to meet the 70 mph design of the new roadway and the higher profile required by current bridge design practices at the Wittmann Wash and McMicken Floodway. This would result in reconstruction of much of the existing roadway, substantially increasing the construction cost.
- Design the profile of the new roadway to the same grades as the existing roadway. This would require designing the new roadway to 60 mph design speed rather than 70 mph as currently planned and would require bridges to be designed with less depth than dictated by current design practices. The result would be a new roadway designed to outdated standards.
- Utilize steep slopes and/or retaining walls in the median to accommodate the different grades. The location of median crossovers would be restricted to areas where the adjacent roadways are near the same elevation. Retaining walls or steep median slopes would require traffic barrier for extensive lengths. Restrictions in the location of median crossovers would restrict access to adjacent areas.

The impact of R/W requirements for Alternative A3 is similar to the impact of R/W for wider median alternatives because most of the property improvements are located immediately adjacent to the existing R/W line.

All of the options available with the 46-foot median are unacceptable since alternatives without the design compromises are available.

4.3.2 Alternative A4

The horizontal alignment for Alternative A4 is moved toward the AT&SF Railroad utilizing 50 feet of railroad R/W that may be available. This alignment requires that new roadways be constructed for both eastbound and westbound travel. The existing roadway could be used for traffic during construction of one of the directional roadways but would have to be removed during construction of the second

directional roadway. Construction cost for the corridor would be increased by approximately \$8 million. Approximately 72 feet of new R/W would be required on the south side of the existing R/W which would result in taking the majority of existing businesses along the highway and would impact adjacent properties very nearly as much as Alternatives A1 and A2.

4.3.3 Alternative A5

Alternative A5 was developed for consideration in the Wittmann area to minimize the impact to businesses located along the existing R/W on the south side of US 60. The horizontal alignment is shifted toward the AT&SF railroad utilizing 50 feet of railroad R/W that may be available. As with Alternative A4, this alignment requires that new roadways be constructed for both eastbound and westbound lanes, and construction cost is significantly higher than alternatives that utilize the existing roadway. Although the intent of this alternative is to reduce impact on adjacent businesses, 42 feet of new R/W is required. Therefore, virtually all the businesses adjacent to the existing R/W will be acquired. The 30-foot wide median is narrower than ADOT standards for rural divided highways and does not provide enough width for unpaved drainage ditches. Median drainage would be via a paved median ditch flowing to inlets connected to cross-culverts.

4.3.4 Alternatives A6 and A7

Alternatives A6 and A7 are similar alternatives developed for consideration through the Wittmann area. Both alternatives utilize 50 feet of railroad R/W. The width of the typical sections are minimized by reducing the median width to a 12-foot continuous turning lane for Alternative A6 and a 16-foot paved median for Alternative A7. Both Alternatives A6 and A7 include a 28-foot wide frontage road on the south side of US 60 to provide access to adjacent properties.

Both Alternatives A6 and A7 require complete reconstruction of the highway through Wittmann because the alignment is offset from the existing roadway. Therefore, the construction cost is higher than alternatives that use the existing roadway. No additional R/W is required on the south side of US 60.

The turning lane/narrow median configuration is not consistent with the rural typical section of the remainder of the highway in the study area or the existing typical sections adjacent to the beginning and end of the study area nor would it be consistent with the Wickenburg Highway Scenic Corridor concept developed by the Maricopa County Department of Planning and Development in 1991. The narrow median configuration will not accommodate future expansion of the roadway, if necessary, to serve increased traffic demand beyond the 2020 design year.

Although Alternatives A6 and A7 do not require additional R/W along the existing business properties on the south side of US 60, the actual operation of the businesses would be impacted because most of the commercial buildings are constructed with their frontage immediately adjacent to existing R/W and the unused highway R/W provides most of the parking area for the businesses. Construction of the frontage roads within 20 feet of the existing R/W line will eliminate most of the available parking area. Public input from the Public Scoping Meeting and the Public Information Meeting indicate most business operators/owners would prefer to be taken in total than to lose their parking without compensation.

4.3.5 Alternative A8

Alternative A8 was developed for consideration through the Wittmann area as an alternative that contains the entire widened roadway within existing R/W. The typical section is an urban roadway with curb and gutter, 10-foot shoulders, and a 16-foot turning lane/paved median. Frontage roads are not included. Widening required for the new roadway is to the south side of the existing road. The entire roadway has to be reconstructed. Therefore, the construction cost is higher than alternatives that use the existing roadway.

The turning lane/narrow median configuration is not consistent with the rural typical section of the remainder of the highway in the study area or the existing typical sections adjacent to the beginning and end of the study area nor would it be consistent with the Wickenburg Highway Scenic Corridor concept developed by the Maricopa County Department of Planning and Development in 1991. The narrow median configuration will not accommodate future expansion of the roadway, if necessary, to serve increased traffic demand beyond the 2020 design year. Access to adjacent properties would have to be accommodated by direct access to US 60. The property adjacent to US 60 for the length of Alternative A8 is comprised of numerous ownerships which would result in a large number of driveways which would increase conflicts between through traffic and turning traffic and would present the potential for increased accidents and reduced operating speed on US 60. The profile of US 60 in this area would be several feet above existing ground which would make direct access from the small commercial properties adjacent to US 60 impractical. The roadway embankment would catch at the existing R/W line which would eliminate all parking from many of the businesses. From input received at the Public Scoping Meeting and the Public Information Meeting, this alternative would be unacceptable to the Wittmann community.

4.4 Design Concept Alternatives Studied

Alternatives A1, A2, and A9 have been developed in detail based on project objectives outlined in Section 1.4, using the design controls listed in Section 5.1, and the typical sections contained in Appendix C. Alternative A9, which is the bypass of Wittmann, is shown as being combined with Alternative A1. Alternative A1 will be used for the length of the project outside the Wittmann area. A second combined alternative is Alternative A2 being used with Alternative A9. Alternative A2 is used outside the Wittmann area, and Alternative A9 bypasses the Wittmann area. A third combined alternative has been developed which consists of Alternative A2 through the Wittmann area and Alternative A1 for the length of the project outside the Wittmann area. The developed alternatives (A1, A2, A1-A2, and A1-A9) are presented in plan and profile sheets in Section 8 and Appendix D. The plan and profile sheets for Alternative A2-A9, which is similar to Alternative A1-A9, were not included in Appendix D.

4.5 Evaluation of Alternatives

4.5.1 Project Evaluation Factors

An evaluation was made of each design concept alternative developed in detail based on the project objectives described in Section 1.4. The evaluation factors as they pertain to each alternative are described in the following narrative. A summary of the evaluation is presented in Table 4-1.

- **Capacity:** Alternatives A1, A2, A1-A2, A1-A9, and A2-A9 all provide four through traffic lanes. Access to US 60 is limited through the use of frontage roads. Cooperation between ADOT and the local jurisdictions will be necessary to require future development to include interior road systems that will have access to US 60 at approximately 1/2-mile intervals. A level-of-service analysis has shown the level of service for the alternatives to be the same. LOS A will be obtained through year 2000, and LOS B will be obtained through design year 2020.
- **Safety:**
 - **Design Speed:** Alternatives A1, A2, and combined A1-A2 will meet the requirements for a 70 mph design speed for the new eastbound roadway and for all segments of the existing roadway that will be reconstructed. Segments of existing US 60 that will be incorporated into the project meet AASHTO requirements for a 60 mph design speed. Combined Alternatives A1-A9 and A2-A9 will improve the design speed for the westbound roadway through Wittmann to 70 mph. Outside Wittmann, the segments of existing US 60 incorporated into the project will meet requirements for a 60 mph design speed.
 - **Median Width:** Alternatives A1 and A1-A9 incorporate an 84-foot median. Alternative A2 incorporates a 60-foot median; Alternative A2-A9 has a 60-foot median outside the Wittmann area and an 84-foot median through Wittmann; and Alternative A1-A2 has an 84-foot median outside the Wittmann area and a 60-foot median through Wittmann. Both the 84-foot and 60-foot medians provide adequate width for an out-of-control vehicle to recover before reaching opposing traffic. The 84-foot median provides an additional margin of safety for errant vehicle recovery.

Future signalization of intersections with a 60-foot median width can be designed using conventional signal layout. The 84-foot median width requires additional signal poles located within the median area. Signalization for the 60-foot median is more desirable than for the 84-foot median because there are fewer obstacles located within the R/W.
 - **School Pedestrian Traffic at Center Street:** Alternatives A1, A2, and A1-A2 require the removal of the existing pedestrian separation structure at Center Street. The existing structure is too narrow for the proposed typical sections to pass under. Pedestrian movement across US 60 at Center Street will be accommodated by pedestrian phases in a traffic signal system planned for the intersection (subject to meeting signal warrants).

Alternatives A1-A9 and A2-A9 which bypass the Wittmann commercial area will allow the existing pedestrian bridge to remain and will reduce through traffic on existing US 60 by moving through traffic to the bypass route.
- **Right-of-Way (R/W):** New R/W required for Alternatives A1, A2, and A1-A2 consists of strip takings along the south side of the existing R/W and several small drainage easements. Alternative A2 requires approximately 40 acres less R/W than Alternative A1 or A1-A2. Since most of the improvements along the corridor are located immediately adjacent to the existing R/W line, the impact of R/W take is nearly the same for these alternatives, and all improvements located

adjacent to the existing R/W will be taken. However, there is a significant difference at the northwest corner of the intersection of US 60 and Center Street in Wittmann. A water well that supplies most of the domestic water for Wittmann is located on this parcel. Alternative A1 requires taking the well because new roadway is located over it. Alternatives A2 and A1-A2 would allow the well to remain and continue in service because the well is located outside the recovery area. Water storage tanks, pumps and piping will be relocated while the well remains in its current location.

Alternatives A1-A9 and A2-A9 will increase the R/W requirements within the Wittmann area by approximately 85 acres. The businesses located adjacent to the existing R/W through Wittmann will not be taken by either of these alternatives.

- **Access:** Access to adjacent properties north of US 60 is physically restricted by the AT&SF Railroad. Public railroad grade crossings exist at Center Street, 203rd Avenue, and 163rd Avenue. An additional grade crossing is planned at Loop 303 that will be in place before this project is implemented. Three private railroad grade crossings exist near stations 137+00, 419+00, and 635+00. Grade crossings for two maintenance roads at the Central Arizona Project Canal also exist. Access to the north of US 60 will be provided at these locations for all alternatives. Access across the railroad within the limits of Alternative A9 exists only at Center Street. Existing US 60 at the intersection with Center Street remains unchanged with Alternative A9, and the Center Street railroad crossing will remain as it is.

Alternatives A1, A2, and A1-A2 will provide access between US 60 and adjacent properties to the south via frontage roads where the land is subdivided into small ownerships that have access only to US 60. Large parcels of land that require access at not less than 1/4-mile spacing will be allowed, by permit, to have access directly onto US 60. These direct access points will be right-in/right-out only unless they can be located to coincide with a median crossover. Parcels with access to local roads or streets will not be granted direct access to US 60.

The new R/W requirements for Alternatives A1, A2, and A1-A2 result in the same access impacts to adjacent properties.

Alternatives A1-A9 and A2-A9 provide access as described for Alternatives A1 and A2 except in the Wittmann area. Alternatives A1-A9 and A2-A9 will provide access to US 60 in the Wittmann area at Dove Valley Road and 211th Avenue only. Direct access between US 60 and adjacent properties will not be allowed. Existing US 60 through Wittmann will remain in service as a local road, and access to it from adjacent properties will remain unchanged from the current condition.

- **Railroad Crossings:** The profile of US 60 will be raised at three railroad crossings (Center Street, 203rd Avenue and Loop 303) for Alternatives A1, A2 and A1-A2. For Alternatives A1-A9 and A2-A9 the profile of US 60 will be raised at two railroad crossings (203rd Avenue and Loop 303). The railroad profile is higher than US 60 at each of these crossings. The existing crossroad profiles (Center Street and 203rd Avenue) while marginally adequate for the existing traffic, would be unsatisfactory for the long term as traffic volumes increase on both US 60 and the

crossroads. The limited opportunity for railroad crossings virtually assures that development north of the railroad will use the existing crossings to access US 60.

Retaining the existing profile of US 60 at the three railroad crossings would require the profile of the new eastbound roadway to be lowered to fit the existing roadway. This would "lock-in" the profile of the crossroads since revising the profiles of both the eastbound and westbound US 60 in the future when traffic volumes and operational issues, such as signalized intersections, render the grade differential between the railroad and US 60 unacceptable, will be much more costly and will disrupt traffic to a greater extent.

Coordination with MCDOT has indicated that the profile of Loop 303 north of US 60 will adversely impact adjacent businesses if the grade of US 60 remains where it is. Additional dialogue between ADOT and MCDOT may lead to agreements for cost sharing since the County will benefit from raising the grade of US 60.

- **Constructibility and Maintenance of Traffic:** Constructibility and maintenance of traffic will be relatively easy for all five alternatives. The new eastbound roadway for Alternatives A1, A2, and A1-A2 can be constructed while traffic remains on existing US 60. A temporary connection will be required at the west end of the project to connect the new eastbound roadway to the existing roadway to the west. The existing transition from four lanes to two lanes at the east end of the project has been constructed to allow connection of the new eastbound roadway. Phase construction will require a temporary connection at the east end during each change in phase to move traffic from the existing roadway to the new roadway while the existing roadway is upgraded. The westbound traffic on the new roadway can be shifted to the existing roadway when vertical alignment improvements and the milling and overlay are completed.

Access to adjacent properties and local roads will be maintained during construction for Alternatives A1, A2, and A1-A2. The constructibility for these alternatives is the same.

Since Alternatives A1-A9 and A2-A9 combine Alternatives A1 and A2 outside the Wittmann area with Alternative A9 through Wittmann, constructibility and maintenance of traffic outside the Wittmann area is the same as for Alternatives A1 and A2. Through the Wittmann area, the roadway will be constructed entirely on new alignment. Traffic will be maintained on existing US 60 during construction. Connections between the new alignment through Wittmann and the existing alignment east and west of Wittmann will require minimal disruption to traffic. Traffic will be maintained on Dove Valley Road, Crozier Road, and 211th Avenue during construction of the overpass structures.

- **Drainage:** Drainage facilities were sized based on ADOT criteria to pass the 50-year storm. Flow from the culverts would discharge into the original wash channel. Drainage facilities required for Alternatives A1, A2, and A1-A2 are the same except for the length of the drainage structures through the median area. Alternative A1 has a median width of 84 feet while Alternative A2 has a 60-foot median. The location and direction of the downstream waterways requires that several culverts under the existing roadway be replaced to realign them with the existing drainage channels. Existing CMP pipe culverts installed under the original roadway, constructed in the

early 1940's, will be replaced. Alternative A1-A2 involves only one drainage structure within the Wittmann area where the 60-foot median is used. Therefore Alternatives A1 and A1-A2 are virtually the same relative to drainage facilities.

Drainage for Alternatives A1-A9 and A2-A9 requires the addition of three pipe culverts, two multiple barrel CBCs, one 10-foot x 6-foot CBC, and new twin bridges over Wittmann Wash.

Drainage work for Alternative A2 is less costly than Alternatives A1, A1-A2, A1-A9, or A2-A9.

Earthwork: The proposed grade line for all alternatives is above the elevation of existing ground. The slope of existing ground is generally uniform throughout the study limits which does not offer the opportunity to balance excavation and embankment requirements. All alternatives require borrow material. Alternatives A1, A2, and A1-A2 which follow the existing alignment for their full length require approximately 600,000 cubic yards of borrow material. Alternatives A1-A9 and A2-A9 which incorporate the bypass of Wittmann require approximately 1,650,000 cubic yards of borrow material.

Utilities: The following utilities are located within the study area:

- Arizona Public Service
- Southwest Gas
- US West
- MCI
- West End Water Company
- Maricopa Water District
- Central Arizona Water Conservation District
- Flood Control District of Maricopa County
- Atchison Topeka & Santa Fe Railroad

The alternative improvements will affect each utility as outlined below:

- **Arizona Public Service (APS)**—APS facilities affected by Alternatives A1, A2, and A1-A2 include the following:

The existing overhead 69 kV power transmission line that parallels US 60 inside the south edge of the existing R/W, west of the Beardsley Canal, would need to be relocated because the power pole locations conflict with the new EB lanes. Existing overhead 230 kV transmission lines cross US 60 near the Beardsley Canal. The clearance between the EB lanes and the sag point for the power transmission lines would need to be checked. Several existing 12 kV lines cross US 60 that would require adjusting. They are located at Happy Valley Road, 203rd Avenue (east and west), Center Street, and at Dove Valley Road.

APS facilities affected by Alternatives A1-A9 and A2-A9 include the following:

Alternatives A1-A9 and A2-A9 bypass alignments would reduce the length of 69 kV line to be replaced by approximately 11,400 feet. However, several 12 kV lines located on 211th Avenue, Lone Mountain Road, and Dove Valley Road would require relocation at the highway crossings. In addition, an overhead 69 kV line along Crozier Road at Lone Mountain Road would require relocation at the overpass location.

- **Southwest Gas (SWG)**—SWG facilities affected by Alternatives A1, A2, and A1-A2 include the following:

The existing 6-inch high pressure natural gas line that parallels US 60 approximately 6 to 10 feet inside the south edge of the existing R/W, for the entire length of the project, would need to be relocated because the gas line location would conflict with the new EB lanes. A 2-inch gas line crosses US 60 at Center Street. This line would need adjusting to reconnect to the 6-inch gas line.

SWG facilities affected by Alternatives A1-A9 and A2-A9 include the following:

Alternatives A1-A9 and A2-A9 bypass alignments would reduce the length of 6-inch gas line to be replaced by Alternatives A1 and A2 by approximately 11,400 feet. No additional gas facilities are affected.

- **US West (USW)**—USW facilities affected by Alternatives A1, A2, and A1-A2 include the following:

The existing underground telephone line(s) that parallel US 60 are located approximately 14 to 30 feet inside the south edge of the existing R/W, for the entire length of the project. The number of underground lines varies from one to four. The telephone lines would need to be relocated because the telephone line locations conflict with the new EB lanes. In addition, a telephone switching facility located east of Circle City will need to be relocated because the building location conflicts with the new EB lanes.

USW facilities affected by Alternatives A1-A9 and A2-A9 include the following:

USW facilities affected by Alternatives A1-A9 and A2-A9 include underground telephone lines on 211th Avenue and Birdsong Avenue (Dove Valley Road), and overhead cable that parallels US 60 approximately 900 feet south of the highway and west of Crozier Road. Either of the bypass alternatives would reduce the length of telephone line to be relocated through the Wittmann area by Alternatives A1 and A2 by approximately 11,400 feet. A telephone switching facility located east of Circle City will need to be relocated because the building location conflicts with the new EB lanes.

- **MCI**—MCI facilities affected by Alternatives A1, A2, and A1-A2 include the following:

The existing underground fiber optic cable that parallels US 60 approximately 2 feet inside the south edge of the existing R/W would need to be relocated because the cable location conflicts with the new EB lanes. The cable enters ADOT R/W at 193rd Avenue and exits at the Beardsley Canal.

Since the MCI facilities are located to the east of the bypass alternatives, no additional MCI facilities would be affected by Alternatives A1-A9 or A2-A9.

- **West End Water Company**—Facilities affected by Alternatives A1, A2, and A1-A2 include the following:

A 6-inch water line that crosses US 60 along the west side of Center Street may require replacement. Another water line (2-inch) which parallels US 60 approximately 4 feet inside the south edge of the existing R/W for approximately 3,500 feet conflicts with the new EB lanes. The line is located within the R/W from approximately 400 feet east of South Ash (in Wittmann) to 211th Street. Other facilities that will be affected are located on a lot north of and adjacent to Center Street and south of the US 60 R/W. Facilities include a well site (550 feet deep, producing 120 gpm), two water storage tanks, three booster pumps, piping, equipment yard, and structures that house the well and pumping equipment.

Facilities affected by Alternatives A1-A9 and A2-A9 include the following:

Alternatives A1-A9 and A2-A9 would avoid the West End Water Company water facilities; however, the following existing water lines would be affected: a service line that is located parallel to and east of 211th Avenue; a 4-inch water line located midway between Crozier Road and 211th Avenue; a 6-inch water line that is located on Lone Mountain Road; and a 1-1/2-inch water line that is located midway between Lone Mountain Road and Dove Valley Road.

- **Maricopa Water District**—Facilities affected by Alternatives A1, A2, and A1-A2 include the following:

A concrete lateral ditch located immediately outside of the existing south R/W line would conflict with the proposed EB lanes. This ditch would be affected west of the interim Loop 303 connection for approximately 1,400 feet. The Beardsley Canal would also conflict with the proposed location of the EB lanes. A bridge crossing would be required for the EB lanes.

Since the Maricopa Water District facilities are located to the east of the bypass alternatives, no additional facilities would be affected by Alternative A1-A9 or A2-A9.

- **Central Arizona Water Conservation District (CAP)**—Facilities affected by Alternatives A1, A2, and A1-A2 include the following:

The CAP Canal would conflict with the proposed location of the EB lanes. A bridge crossing would be required.

Since the District facilities are located to the south of the bypass alternatives, no additional facilities would be affected by Alternative A1-A9 or A2-A9.

- **Flood Control District of Maricopa County (FCDMC)**—Facilities affected by Alternatives A1, A2, and A1-A2 include the following:

The McMicken Floodway would conflict with the proposed location of the EB lanes. A bridge crossing would be required.

Since the FCDMC facilities are located to the east of the bypass alternatives, no additional facilities would be affected by Alternative A1-A9 or A2-A9.

- **Atchison Topeka & Santa Fe Railroad (AF&SF)**—Facilities affected by Alternatives A1, A2, and A1-A2 include the following:

Improvements would be made to the railroad crossings at: Center Street, 203rd Avenue, and interim Loop 303. Drainage improvements on railroad property would be needed near MP 124.8 (across from Circle City).

Facilities affected by Alternatives A1-A9 and A2-A9 include the following:

Alternatives A1-A9 and A2-A9 would be similar to Alternatives A1, A2, and A1-A2 except that improvements to Center Street would not be necessary.

- **Social, Economic and Environmental Factors:**

- **Social and Economic Considerations**—Alternatives A1, A2, A1-A2, A1-A9, and A2-A9 will all have positive impacts on community services, i.e., police, fire, and emergency services, due to the increased capacity resulting from expansion of US 60 from two to four lanes and the ability to respond more quickly. The four-lane roadway will also enhance roadway safety.

Alternatives A1, A2, and A1-A2 will require that the existing pedestrian overpass in Wittmann be removed. It will be replaced by a traffic signal at the intersection of US 60 and Center Street to provide a safe crossing for school buses and pedestrians. Construction of the signal is subject to meeting warrants. Alternatives A1-A9 and A2-A9 will not affect the existing pedestrian overpass or the intersection of US 60 and Center Street. However, the traffic through the intersection will be reduced by the removal of US 60 through traffic to the bypass.

Alternatives A1, A2, and A1-A2 will displace 25 commercial properties plus 19 billboards and approximately 25 mobile homes. Alternative A1 will displace 24 single family residences, and Alternatives A2 and A1-A2 will displace 23 residences. Alternatives A1-A9 and A2-A9 displace 10 commercial properties plus 17 billboards, approximately 25 mobile homes, and 8 single family residences. The public information meeting elicited comments from business owners that their businesses will decline if the bypass is constructed because traffic would be rerouted around the community. A large percentage of the business owners preferred being displaced rather than being bypassed because the relocation program offers a chance for economic survival.

Additional displacements common to all alternatives being considered include a US West Communications switchgear substation, the Circle City Rest Home, and the fire/rescue station at the east end of Wittmann.

- **Land Use**—None of the alternatives being considered will significantly alter current development patterns on future land use.
- **Hazardous Materials**—Eleven parcels were identified that contained, or formerly contained, underground or above-ground storage tanks and/or large storage drums that could contain or previously contained hazardous materials such as petroleum or cleaning agents.

Alternatives A1, A2, and A1-A2 will require the displacement of facilities and structures at these 11 sites. Five of the 11 sites are recommended for additional investigation.

Alternatives A1-A9 and A2-A9 bypass five of the 11 sites. Three of the six sites displaced by these alternatives are recommended for additional investigation. Within the A9 alignment, one property contained improperly disposed asphaltic material which would have to be removed and properly disposed of.

- **Cultural Resources**—Thirteen archaeological sites and 13 historic structures were identified within the study area. All of the archaeological sites are disturbed by all of the alternatives being considered. Alternatives A1-A9 and A2-A9 avoid seven historic structures located adjacent to US 60 in Wittmann.
- **Section 404 and Floodplain Considerations**—For study purposes, it has been assumed that all washes requiring drainage structures with a minimum opening of 48 inches will require a Section 404 permit.

Alternatives A1, A2, and A1-A2 will require Section 404 Nationwide Permits at 27 washes. Alternatives A1-A9 and A2-A9 will require five additional permits because of culverts added on the bypass route.

- **Threatened and Endangered Species**—None of the alternatives being considered adversely affect any federal or state-listed threatened, endangered, or candidate species.
- **Wildlife Habitat**—Alternatives A1, A2, and A1-A2 each affect 165 acres of upland habitat immediately south of US 60. Alternatives A1-A9 and A2-A9 affect an additional 70 acres because of the bypass alignment.

Alternatives A1 and A1-A2 will affect 4.7 acres of riparian habitat; Alternative A2 will affect 3.5 acres of riparian habitat; Alternative A1-A9 will affect 5.6 acres of riparian habitat; and Alternative A2-A9 will affect 4.3 acres of riparian habitat.

- **Air Quality**—The entire project area is located within the nonattainment area for PM₁₀ and the eastern ½ mile of the project is located within the nonattainment area for CO and O₃. However, none of the alternatives being considered will impair the air quality in the study area because the future land use will remain rural, without any major pollutant contributors, and the traffic level of service will be LOS B or better. Temporary deterioration of air quality will occur during construction.
- **Water Quality**—For all of the alternatives being considered, erosion from cut/fill slopes, bridge construction and culvert extensions may cause excessive sedimentation that might degrade downstream water quality. Protective measures will need to be developed to minimize these effects as well as adverse effects to riparian habitat.
- **Noise**—A noise analysis conducted for this study identified 46 Category B receptors outside the proposed R/W for the project, that are close enough that the noise levels will exceed criteria. Alternatives A1, A2, and A1-A2 affect the noise level at 39 of the receptors. Alternatives A1-A9 and A2-A9 affect the noise level at 26 of the receptors. Mitigation of the noise impact by construction of noise walls will be considered.
- **Visual Impacts**—Alternatives A1, A2, and A1-A2 will not present a major visual intrusion into the surrounding landscape because these alternatives provide the additional lanes immediately adjacent to the existing roadway at the same general elevation. Alternatives A1-A9 and A2-A9 introduce a new divided highway on the southwest side of Wittmann that will include two highway overpasses of local streets. The bypass alternatives will result in physical and visual intrusion into this portion of the project area.

• **Cost:** The estimate construction cost of each alternative shows Alternative A2 costing approximately \$42,200,000. Alternatives A1 and A1-A2 are virtually the same cost; that is approximately \$42,800,000. Alternatives A1-A9 and A2-A9 are also virtually the same cost; that is approximately \$57,000,000.

4.6 Conclusions

An analysis of the alternatives under consideration was made using the discussion developed in Section 4.5 and the evaluation comparisons shown in Table 4-1. The majority of the evaluation factors are very similar for the alternatives being considered. The following summarizes the factors used in making the alternative recommendation.

4.6.1 No-Build vs. Build Alternatives

The No-Build alternative involves no cost, no improvement to the highway, and no change to the environmental features. Since the No-Build alternative does not fulfill the goal of improving the safety, capacity, and operational characteristics of the highway, it is not an acceptable alternative. Therefore, the No-Build alternative is not recommended.

4.6.2 Comparison of Alternatives A1 and A2 Outside the Wittmann Area

The basic difference between Alternatives A1 and A2 is that A1 has an 84-foot median and A2 has a 60-foot median. The 84-foot median provides greater flexibility in setting the profile of the new eastbound roadway since greater vertical differences between the existing and new roadways can be accommodated. The extra median width requires longer drainage structures to be constructed under the roadway and median. The 84-foot median also offers an additional margin of safety for opposing traffic as compared to the 60-foot median. The 60-foot wide median is preferred over the 84-wide median at intersections where signalization may be needed in the future. If additional lanes are required beyond the 2020 design year, the 84-foot median provides more room for the necessary construction with minimal impact to the median configuration. Alternative A1 requires approximately 40 acres more R/W than that required for A2.

Alternative A2 is recommended for the project outside the Wittmann area (Station 96+00 to 322+00± and Station 447+00± to 905+50). A2 was selected because A2 requires less R/W, will be easier to signalize at intersections in the future, and the alternative costs less than the other alternatives.

4.6.3 Comparison of Alternatives A1, A2, and A9 Through the Wittmann Area

Alternatives A1 and A2 require the acquisition of new R/W on the south side of US 60 which will displace the existing businesses located adjacent to the existing R/W through Wittmann, require the removal of the pedestrian overpass near Center Street, and require a traffic signal at the Center Street intersection. Alternative A9 was developed to provide a bypass of existing US 60 via a new alignment to the southwest of the existing highway. Alternative A9 would require substantially more new R/W and would impose the relocated highway in an area that is currently small ownerships with very little development.

At the public information meeting in Wittmann, the bypass route was strongly opposed. Most of the business owners would prefer to be displaced than to lose business because traffic bypasses them. They indicate that the relocation program would give them a better chance of economic survival. Alternative A9 will cost \$14,000,000 more than Alternative A1 or A2 through Wittmann.

Some of the advantages that Alternative A2 has over A1 for the rest of the study area are also present in Wittmann. The profile of the eastbound and westbound roadways is approximately the same because the railroad grade crossing at Center Street requires reconstruction of the existing roadway through most of Wittmann. The 60-foot wide median is preferred over the 84-wide median at the Center Street intersection where signalization is needed. The significant advantage to Alternative A2 through Wittmann is that the existing well located on the northwest corner of Center Street and US 60 can remain in service through an agreement that may be negotiated with the owner of the Water Company. The well could not remain in service with Alternative A1.

Alternative A2 is recommended for the project through the Wittmann area (Station 322+00± to 447+00±).

**Table 4-1
ALTERNATIVES MATRIX
US 60 — MORRISTOWN RROP TO BEARDSLEY ROAD**

| Criteria | Alternative A1 | Alternative A2 | Alternative A1-A2 | Alternative A1-A9 | Alternative A2-A9 | Alternative "Do Nothing" |
|--|--|--|--|---|---|---|
| Alternatives Description | Construct EB Lanes with 84'-wide Median and Frontage Rd on South, Mill and Overlay WB Lanes. | Construct EB Lanes with 60'-wide Median and Frontage Rd on South, Mill and Overlay WB Lanes. | Construct EB Lanes with 84'-wide Median and Frontage Rd on South, Mill and Overlay WB Lanes, 60'-wide Median Section in Wittmann. | Construct EB Lanes with 84'-wide Median and Frontage Rd on South, Mill and Overlay WB Lanes, 84'-wide Median Section for bypass of the Wittmann area. | Construct EB Lanes with 60'-wide Median and Frontage Rd on South, Mill and Overlay WB Lanes, 84'-wide Median Section for bypass of the Wittmann area. | Existing two-lane roadway remains as is. |
| Capacity 1993 - 7,800 ADT 2000 - 12,500 ADT 2020 - 27,800 ADT | Level-of-Service (LOS) A A B | Level-of-Service (LOS) A A B | Level-of-Service (LOS) A A B | Level-of-Service (LOS) A A B | Level-of-Service (LOS) A A B | Level-of-Service (LOS) D to C D F |
| Safety | <u>Design Speed</u> EB - 70 mph WB Existing - 60 mph (min.) WB Reconstructed - 70 mph <u>Median Width</u> 84-foot <u>School Ped. Traffic at Center St.</u> Pedestrian Overpass will be removed. Traffic Signal at Center Street will accommodate Pedestrian movements when warranted. | <u>Design Speed</u> EB - 70 mph WB Existing - 60 mph (min.) WB Reconstructed - 70 mph <u>Median Width</u> 60-foot <u>School Ped. Traffic at Center St.</u> Pedestrian Overpass will be removed. Traffic Signal at Center Street will accommodate Pedestrian movements when warranted. | <u>Design Speed</u> EB - 70 mph WB Existing - 60 mph (min.) WB Reconstructed - 70 mph <u>Median Width</u> 84-foot (MP 123.4-127.8, 130.1-138.2) 60-foot (MP 127.8-130.1) <u>School Ped. Traffic at Center St.</u> Pedestrian Overpass will be removed. Traffic Signal at Center Street will accommodate Pedestrian movements when warranted. | <u>Design Speed</u> EB - 70 mph WB Existing - 60 mph (min.) WB Reconstructed - 70 mph <u>Median Width</u> 84-foot <u>School Ped. Traffic at Center St.</u> Pedestrian Overpass will remain. Traffic load on existing US 60 will be reduced by moving through traffic onto the bypass around the Wittmann area. | <u>Design Speed</u> EB - 70 mph WB Existing - 60 mph (min.) WB Reconstructed - 70 mph <u>Median Width</u> 60-foot (MP 123.4-127.8, 130.3-138.2) 84-foot (MP 127.8-130.3) <u>School Ped. Traffic at Center St.</u> Pedestrian Overpass will remain. Traffic load on existing US 60 will be reduced by moving through traffic onto the bypass around the Wittmann area. | <u>Design Speed</u> Existing - 59 mph (min.) <u>Median Width</u> No Median <u>School Ped. Traffic at Center St.</u> Pedestrian Overpass will remain. |
| Right-of-Way | <u>Area (Acres)</u> <u>No. of Parcels</u> | <u>Area (Acres)</u> <u>No. of Parcels</u> | <u>Area (Acres)</u> <u>No. of Parcels</u> | <u>Area (Acres)</u> <u>No. of Parcels</u> | <u>Area (Acres)</u> <u>No. of Parcels</u> | <u>Area (Acres)</u> <u>No. of Parcels</u> |
| Government | 44 10 | 33 10 | 44 10 | 44 10 | 37 10 | Not required |
| Private | 174 330 | 137 329 | 168 330 | 253 228 | 213 228 | Not required |
| Total | 218 340 | 170 339 | 212 340 | 297 238 | 257 238 | Not required |
| Access | Access North of US 60 is limited by AT&SF RR. Existing crossings to the north will be maintained. Access South of US 60 will be via frontage roads or by permit with right-in/right-out for larger parcels until a frontage road can be constructed. Parcels with access to a local road will not be granted direct access to US 60. | Access North of US 60 is limited by AT&SF RR. Existing crossings to the north will be maintained. Access South of US 60 will be via frontage roads or by permit with right-in/right-out for larger parcels until a frontage road can be constructed. Parcels with access to a local road will not be granted direct access to US 60. | Access North of US 60 is limited by AT&SF RR. Existing crossings to the north will be maintained. Access South of US 60 will be via frontage roads or by permit with right-in/right-out for larger parcels until a frontage road can be constructed. Parcels with access to a local road will not be granted direct access to US 60. | Access North of US 60 is limited by AT&SF RR. Existing crossings to the north will be maintained. Access South of US 60 will be via frontage roads or by permit with right-in/right-out for larger parcels until a frontage road can be constructed. Parcels with access to a local road will not be granted direct access to US 60. Access to bypass will be at Dove Valley Rd and 211th Ave only. Access by permit on bypass will not be allowed. | Access North of US 60 is limited by AT&SF RR. Existing crossings to the north will be maintained. Access South of US 60 will be via frontage roads or by permit with right-in/right-out for larger parcels until a frontage road can be constructed. Parcels with access to a local road will not be granted direct access to US 60. Access to bypass will be at Dove Valley Rd and 211th Ave only. Access by permit on bypass will not be allowed. | Access North of US 60 is limited by AT&SF RR. Existing crossings to the north will be maintained. Access South of US 60 will continue to be by permit. |

**Table 4-1
ALTERNATIVES MATRIX
US 60 — MORRISTOWN RROP TO BEARDSLEY ROAD**

| Criteria | Alternative A1 | Alternative A2 | Alternative A1-A2 | Alternative A1-A9 | Alternative A2-A9 | Alternative "Do Nothing" |
|---|--|--|--|--|--|---|
| Constructibility and Maintenance of Traffic | New EB lanes constructed while traffic remains on existing US 60. Temporary connections needed at both ends of project to shift traffic to new EB roadway to upgrade existing roadway. When vertical improvements and the milling and overlay have been constructed on the existing roadway, then westbound traffic is shifted back to existing roadway. | New EB lanes constructed while traffic remains on existing US 60. Temporary connections needed at both ends of project to shift traffic to new EB roadway to upgrade existing roadway. When vertical improvements and the milling and overlay have been constructed on the existing roadway, then westbound traffic is shifted back to existing roadway. | New EB lanes constructed while traffic remains on existing US 60. Temporary connections needed at both ends of project to shift traffic to new EB roadway to upgrade existing roadway. When vertical improvements and the milling and overlay have been constructed on the existing roadway, then westbound traffic is shifted back to existing roadway. | New EB lanes constructed while traffic remains on existing US 60. Temporary connection needed only at beginning of project to the existing EB lanes to the west. Connection to EB lanes to the exists. Traffic shifts to new EB roadway when vertical improvements and the milling and overlay are constructed on the existing roadway. Bypass will be constructed on new alignment. Traffic will be maintained on existing US 60, Dove Valley Road, Crozier Street, and 211th Avenue. | New EB lanes constructed while traffic remains on existing US 60. Temporary connection needed only at beginning of project to the existing EB lanes to the west. Connection to EB lanes to the exists. Traffic shifts to new EB roadway when vertical improvements and the milling and overlay are constructed on the existing roadway. Bypass will be constructed on new alignment. Traffic will be maintained on existing US 60, Dove Valley Road, Crozier Street, and 211th Avenue. | No construction activity. |
| Drainage | Most of the existing box and pipe culverts that can be extended must be extended through the median area. Several culverts replaced to reduce the amount of downstream rechannelization. | Existing box and pipe culverts that can be extended must be extended through the median area. Several culverts replaced to reduce the amount of downstream rechannelization. | Drainage work is nearly identical to drainage work on Alternative A1. | Drainage work outside the bypass is identical to drainage work on Alternative A1. Additional culverts required to handle drainage from Wittmann area. New twin bridges needed over Wittmann Wash. | Drainage work outside the bypass is identical to drainage work on Alternative A2. Additional culverts required to handle drainage from Wittmann area. New twin bridges needed over Wittmann Wash. | No changes to existing drainage facilities. |
| Earthwork Quantities | <u>Borrow</u> 610,000 CYd | <u>Borrow</u> 600,000 CYd | <u>Borrow</u> 610,000 CYd | <u>Borrow</u> 1,670,000 CYd | <u>Borrow</u> 1,630,000 CYd | <u>Borrow</u> None |
| Utilities | Extensive relocation of existing power, telephone, gas, and fiber optic telecom. lines located within the south edge of ADOT R/W. Telephone switching station, and potable water well located outside ADOT R/W will need to be relocated. | Extensive relocation of existing power, telephone, gas, and fiber optic telecom. lines located within the south edge of ADOT R/W. Telephone switching station located outside ADOT R/W will need to be relocated. Potable water well may remain, but ancillary equipment will need to be relocated. | Extensive relocation of existing power, telephone, gas, and fiber optic telecom. lines located within the south edge of ADOT R/W. Telephone switching station located outside ADOT R/W will need to be relocated. Potable water well may remain, but ancillary equipment will need to be relocated. | Extensive relocation of existing power, telephone, gas, and fiber optic telecom. lines located within the south edge of ADOT R/W. Telephone switching station located outside ADOT R/W will need to be relocated. Utilities located along US 60 in Wittmann will be avoided by the bypass. However, additional water lines, telephone cable, and power transmission lines will be affected. | Extensive relocation of existing power, telephone, gas, and fiber optic telecom. lines located within the south edge of ADOT R/W. Telephone switching station located outside ADOT R/W will need to be relocated. Utilities located along US 60 in Wittmann will be avoided by the bypass. However, additional water lines, telephone cable, and power transmission lines will be affected. | No changes to existing utilities. |

**Table 4-1
ALTERNATIVES MATRIX
US 60 — MORRISTOWN RROP TO BEARDSLEY ROAD**

| Criteria | Alternative A1 | Alternative A2 | Alternative A1-A2 | Alternative A1-A9 | Alternative A2-A9 | Alternative "Do Nothing" |
|--|--|--|---|---|---|--|
| Social, Economic and Environmental Factors | <p><u>Social and Economic Considerations</u> Community service (i.e., police, fire, and emergency) response times are improved due to increased roadway capacity. Traffic signal at Center Street will replace pedestrian overpass to provide safe crossing for school buses and pedestrians when warranted. Properties displaced include: 25 commercial businesses 25 mobile homes 24 single family residences 19 billboards Other significant items displaced are: Rest home in Circle City Fire/Rescue station US West switching station Commercial businesses prefer being displaced rather than bypassed by A9.</p> <p><u>Land Use</u> Little change in development patterns.</p> <p><u>Hazardous Materials</u> Eleven parcels identified that contained or formerly contained hazardous materials. Five of the eleven sites are recommended for additional investigation.</p> <p><u>Cultural Resources</u> 13 archaeological and 13 historic sites disturbed by alternative A1.</p> <p><u>Section 404 and Floodplain Considerations</u> Will require nationwide permits at 23 wash locations.</p> <p><u>NPDES</u> Will require NPDES permit.</p> | <p><u>Social and Economic Considerations</u> Community service (i.e., police, fire, and emergency) response times are improved due to increased roadway capacity. Traffic signal at Center Street will replace pedestrian overpass to provide safe crossing for school buses and pedestrians when warranted. Properties displaced include: 25 commercial businesses 25 mobile homes 23 single family residences 19 billboards Other significant items displaced are: Rest home in Circle City Fire/Rescue station US West switching station Commercial businesses prefer being displaced rather than bypassed by A9.</p> <p><u>Land Use</u> Little change in development patterns.</p> <p><u>Hazardous Materials</u> Eleven parcels identified that contained or formerly contained hazardous materials. Five of the eleven sites are recommended for additional investigation.</p> <p><u>Cultural Resources</u> 13 archaeological and 13 historic sites disturbed by alternative A2.</p> <p><u>Section 404 and Floodplain Considerations</u> Will require nationwide permits at 23 wash locations.</p> <p><u>NPDES</u> Will require NPDES permit.</p> | <p><u>Social and Economic Considerations</u> Community service (i.e., police, fire, and emergency) response times are improved due to increased roadway capacity. Traffic signal at Center Street will replace pedestrian overpass to provide safe crossing for school buses and pedestrians when warranted. Properties displaced include: 25 commercial businesses 25 mobile homes 23 single family residences 19 billboards Other significant items displaced are: Rest home in Circle City Fire/Rescue station US West switching station Commercial businesses prefer being displaced rather than bypassed by A9.</p> <p><u>Land Use</u> Little change in development patterns.</p> <p><u>Hazardous Materials</u> Eleven parcels identified that contained or formerly contained hazardous materials. Five of the eleven sites are recommended for additional investigation.</p> <p><u>Cultural Resources</u> 13 archaeological and 13 historic sites disturbed by alternative A1-A2.</p> <p><u>Section 404 and Floodplain Considerations</u> Will require nationwide permits at 23 wash locations.</p> <p><u>NPDES</u> Will require NPDES permit.</p> | <p><u>Social and Economic Considerations</u> Community service (i.e., police, fire, and emergency) response times are improved due to increased roadway capacity. Pedestrian overpass to remain. Through traffic on existing US 60 in Wittmann will decrease by moving traffic to bypass route. Properties displaced include: 20 commercial businesses 25 mobile homes 8 single family residences 17 billboards Other significant items displaced are: Rest home in Circle City Fire/Rescue station US West switching station Commercial businesses prefer being displaced rather than bypassed by A9.</p> <p><u>Land Use</u> Little change in development patterns.</p> <p><u>Hazardous Materials</u> Six parcels identified that contained or formerly contained hazardous materials. Three of the six sites are recommended for additional investigation.</p> <p><u>Cultural Resources</u> 13 archaeological and 6 historic sites disturbed by alternative A1-A9.</p> <p><u>Section 404 and Floodplain Considerations</u> Will require nationwide permits at 23 wash locations.</p> <p><u>NPDES</u> Will require NPDES permit.</p> | <p><u>Social and Economic Considerations</u> Community service (i.e., police, fire, and emergency) response times are improved due to increased roadway capacity. Pedestrian overpass to remain. Through traffic on existing US 60 in Wittmann will decrease by moving traffic to bypass route. Properties displaced include: 20 commercial businesses 25 mobile homes 8 single family residences 17 billboards Other significant items displaced are: Rest home in Circle City Fire/Rescue station US West switching station Commercial businesses prefer being displaced rather than bypassed by A9.</p> <p><u>Land Use</u> Little change in development patterns.</p> <p><u>Hazardous Materials</u> Six parcels identified that contained or formerly contained hazardous materials. Three of the six sites are recommended for additional investigation.</p> <p><u>Cultural Resources</u> 13 archaeological and 6 historic sites disturbed by alternative A2-A9.</p> <p><u>Section 404 and Floodplain Considerations</u> Will require nationwide permits at 23 wash locations.</p> <p><u>NPDES</u> Will require NPDES permit.</p> | <p><u>Social and Economic Considerations</u> Community service (i.e., police, fire, and emergency) response times will decrease due to increased roadway capacity. No changes to other environmental features.</p> |

**Table 4-1
ALTERNATIVES MATRIX
US 60 — MORRISTOWN RROP TO BEARDSLEY ROAD**

| Criteria | Alternative A1 | Alternative A2 | Alternative A1-A2 | Alternative A1-A9 | Alternative A2-A9 | Alternative "Do Nothing" |
|--|--|--|--|--|--|---|
| Social, Economic and Environmental Factors | <p><u>Threatened and Endangered Species</u> No adverse affects on any federal or stated listed threatened, endangered, or candidate species.</p> <p><u>Wildlife Habitat</u> Affects 165 acres of upland habitat located immediately south of US 60. Alternative A1 will affect 4.7 acres of riparian habitat.</p> <p><u>Water Quality</u> Protective measures will need to be developed to minimize excessive sedimentation that might degrade downstream water quality as well as adverse effects to riparian habitat.</p> <p><u>Air Quality</u> Alternative A1 will not impair the air quality because future land use will remain rural, and LOS of improvements are C or better. Temporary deterioration of air quality will occur during construction.</p> <p><u>Noise</u> Noise analysis identified 46 Category B receptors that are close enough to be affected by the proposed alternative. Noise levels at 39 receptors were affected enough that mitigation by construction of noise walls will be considered.</p> <p><u>Visual Impact</u> Additional lanes are located near the existing roadway and at the same general elevation. Alternative will not present a major visual intrusion into the surrounding landscape.</p> | <p><u>Threatened and Endangered Species</u> No adverse affects on any federal or stated listed threatened, endangered, or candidate species.</p> <p><u>Wildlife Habitat</u> Affects 165 acres of upland habitat located immediately south of US 60. Alternative A2 will affect 3.5 acres of riparian habitat.</p> <p><u>Water Quality</u> Protective measures will need to be developed to minimize excessive sedimentation that might degrade downstream water quality as well as adverse effects to riparian habitat.</p> <p><u>Air Quality</u> Alternative A2 will not impair the air quality because future land use will remain rural, and LOS of improvements are C or better. Temporary deterioration of air quality will occur during construction.</p> <p><u>Noise</u> Noise analysis identified 46 Category B receptors that are close enough to be affected by the proposed alternative. Noise levels at 39 receptors were affected enough that mitigation by construction of noise walls will be considered.</p> <p><u>Visual Impact</u> Additional lanes are located near the existing roadway and at the same general elevation. Alternative will not present a major visual intrusion into the surrounding landscape.</p> | <p><u>Threatened and Endangered Species</u> No adverse affects on any federal or stated listed threatened, endangered, or candidate species.</p> <p><u>Wildlife Habitat</u> Affects 165 acres of upland habitat located immediately south of US 60. Alternative A1-A2 will affect 4.7 acres of riparian habitat.</p> <p><u>Water Quality</u> Protective measures will need to be developed to minimize excessive sedimentation that might degrade downstream water quality as well as adverse effects to riparian habitat.</p> <p><u>Air Quality</u> Alternative A1-A2 will not impair the air quality because future land use will remain rural, and LOS of improvements are C or better. Temporary deterioration of air quality will occur during construction.</p> <p><u>Noise</u> Noise analysis identified 46 Category B receptors that are close enough to be affected by the proposed alternative. Noise levels at 39 receptors were affected enough that mitigation by construction of noise walls will be considered.</p> <p><u>Visual Impact</u> Additional lanes are located near the existing roadway and at the same general elevation. Alternative will not present a major visual intrusion into the surrounding landscape.</p> | <p><u>Threatened and Endangered Species</u> No adverse affects on any federal or stated listed threatened, endangered, or candidate species.</p> <p><u>Wildlife Habitat</u> Affects 235 acres of upland habitat located immediately south of US 60. Alternative A1-A9 will affect 5.6 acres of riparian habitat.</p> <p><u>Water Quality</u> Protective measures will need to be developed to minimize excessive sedimentation that might degrade downstream water quality as well as adverse effects to riparian habitat.</p> <p><u>Air Quality</u> Alternative A1-A9 will not impair the air quality because future land use will remain rural, and LOS of improvements are C or better. Temporary deterioration of air quality will occur during construction.</p> <p><u>Noise</u> Noise analysis identified 46 Category B receptors that are close enough to be affected by the proposed alternative. Noise levels at 26 receptors were affected enough that mitigation by construction of noise walls will be considered.</p> <p><u>Visual Impact</u> Alternative introduces new divided highway on the southwest side of Wittmann that will include two highway overpasses of local streets. The bypass will result in physical and visual intrusion into this portion of the project area. The remaining portions of the project are similar to Alternatives A1, A2, and A1-A2.</p> | <p><u>Threatened and Endangered Species</u> No adverse affects on any federal or stated listed threatened, endangered, or candidate species.</p> <p><u>Wildlife Habitat</u> Affects 235 acres of upland habitat located immediately south of US 60. Alternative A2-A9 will affect 4.3 acres of riparian habitat.</p> <p><u>Water Quality</u> Protective measures will need to be developed to minimize excessive sedimentation that might degrade downstream water quality as well as adverse effects to riparian habitat.</p> <p><u>Air Quality</u> Alternative A2-A9 will not impair the air quality because future land use will remain rural, and LOS of improvements are C or better. Temporary deterioration of air quality will occur during construction.</p> <p><u>Noise</u> Noise analysis identified 46 Category B receptors that are close enough to be affected by the proposed alternative. Noise levels at 26 receptors were affected enough that mitigation by construction of noise walls will be considered.</p> <p><u>Visual Impact</u> Alternative introduces new divided highway on the southwest side of Wittmann that will include two highway overpasses of local streets. The bypass will result in physical and visual intrusion into this portion of the project area. The remaining portions of the project are similar to Alternatives A1, A2, and A1-A2.</p> | No changes to other environmental features. |
| Construction Cost * | 33,600,000 | 33,190,000 | 33,520,000 | 48,700,000 | 48,140,000 | No additional cost |
| Design Cost | 2,620,000 | 2,560,000 | 2,620,000 | 3,790,000 | 3,740,000 | |
| Utility Relocation | 1,430,000 | 1,430,000 | 1,430,000 | 1,490,000 | 1,490,000 | |
| R/W Cost ** | 5,160,000 | 5,000,000 | 5,160,000 | 3,400,000 | 3,240,000 | |
| TOTAL COST | \$42,810,000 | \$42,180,000 | \$42,730,000 | \$57,380,000 | \$56,610,000 | |

* Includes cost of realigning side streets. Does not include Remedial or Interim Improvements.

** Includes cost of relocation.

5. Major Design Features of the Recommended Alternative

5.1 Introduction

Information in this section addresses only the recommended Alternative A2.

5.2 Design Controls

- **Project Design Year:** 2020
- **Design Speed** (Mainline, min. 60 mph, desirable 70 mph):
 - New eastbound roadway and reconstructed segments of the westbound roadway design speed: 70 mph.
 - Segments of the existing westbound roadway incorporated into the final project meet requirements for a 60 mph design speed.
 - Frontage roads design speed: 45 mph.
 - Realigned local road connections design speed: 30 mph.
- **Typical Sections** (see Figure 8-1):
 - US 60-R1 (ADOT D-Standards, four-lane divided):

| | |
|------------------|--|
| Lane Width: | 12 feet |
| Shoulder Width: | 10 feet outside shoulder 4 feet inside shoulder |
| New Bridges: | Shoulder width plus 2 feet to face of barrier |
| Number of Lanes: | Two lanes each direction |
| Median Width: | 60 feet |
 - Frontage Roads:

| | |
|------------------|---|
| Lane Width: | 12 feet |
| Shoulder Width: | 4 feet, 2 feet paved and 2 feet unpaved |
| Number of Lanes: | One lane each direction |
- **Slope Criteria:** US 60 EB and WB, ADOT Standard C-02.20
Frontage and Local Roads, ADOT Standard C-02.30
- **Maximum Grade:** 3%
- **Maximum Curvature, Degrees:** 3°-30'

- **Maximum Superelevation:** 0.10 ft/ft
- **Access Control:** Access will be controlled by permit, by frontage roads, and by cooperative agreement between ADOT and the local jurisdiction (either Maricopa County or the City of Surprise).
- **Median Crossovers:** Median crossovers are provided at existing local street intersections and at approximate 1/2-mile intervals between intersections to accommodate "U" turns for right-in/right-out turnouts.
- **Right-of-Way Width:** Varies from 215 feet to 262.5 feet.
- **Guardrail:** Guardrail will be provided at bridge ends per ADOT criteria. Slope flattening at culvert locations will make guardrail unnecessary for the westbound lanes.

5.3 Horizontal and Vertical Alignment

5.3.1 US 60 Alignment

The horizontal and vertical alignment was established as closely as possible to the existing alignment to maximize the use of the existing roadway. This objective is particularly important in order to:

- Use the existing roadway during construction of the widened section;
- Maintain access to adjoining properties;
- Minimize environmental impacts by reducing the overall construction area; and
- Maximize the economy of the proposed improvements.

The horizontal alignment of the westbound roadway utilizes the alignment of existing US 60 for the full length of the project. The alignment is a tangent for the full length of the project except for a $0^{\circ}30'$ curve to the right at the beginning of the project, two reversing $0^{\circ}01'$ angle points; one at MP 129.16 (Station 394+50.00) and one at MP 129.84 (Station 430+50.98) and a transition to meet the existing roadway through two reversing $0^{\circ}15'$ curves beginning at MP 138.30 (Station 877+10.91) to MP 138.54 (Station 889+95.49).

The horizontal alignment of the eastbound roadway transitions from the existing eastbound roadway through a $0^{\circ}30'$ curve beginning at MP 123.50 (Station 99+25.17) to MP 123.69 (Station 109+11.19) where it is parallel and 84 feet right of the centerline of the westbound roadway. The 84-foot centerline-to-centerline separation continues to a transition to meet the existing roadway through reversing $0^{\circ}15'$ curves beginning at MP 138.33 (Station 878+75.89) to MP 138.64 (Station 895+34.38).

The westbound lanes use the existing profile from the beginning of project at MP 123.44 (Station 96+00) to MP 128.32 (Station 349+81) where the westbound roadway is reconstructed on a new profile to MP 129.02 (Station 387+31) to raise the grade of US 60 westbound at the intersection with Center Street to match the railroad grade crossing. From MP 129.02 (Station 387+31) to MP 130.58 (Station 470+50) the existing westbound profile is used. From MP 130.58 (Station 470+50) to MP 131.19 (Station 502+00), the westbound roadway is reconstructed on a new profile to raise the grade at the intersection with 203rd Avenue to match the railroad grade crossing. From MP 131.19 (Station 502+00) to MP 138.41 (Station 883+00), the existing westbound is used. From MP 138.41 (Station 883+00) to MP 138.76 (Station 901+50), the westbound roadway is reconstructed to match the existing roadway at the end of the project. Segments of the existing roadway used as the westbound roadway will be milled and overlaid with asphalt pavement.

The eastbound roadway is constructed on a new profile for the entire project length. The eastbound profile generally follows the westbound profile except as necessary to achieve a 70 mph design speed and to meet bridge profile requirements over washes at Trilby Wash, Wittmann Wash, the CAP Canal, the Beardsley Canal, and the McMicken Floodway.

5.3.2 Frontage Roads

Frontage roads, where required, will be constructed parallel and 86 feet right, centerline to centerline, of the eastbound roadway. The profile will be placed near the elevation of existing ground to provide moderate grades between the frontage roads and adjacent properties. Drainage between the mainline EB lanes and the frontage roads will be conveyed to the nearest cross drainage structure using a v-ditch section.

5.3.3 Realigned Local Roads

The following local roads will be realigned to intersect US 60 at right angles:

- Dove Valley Road (vic. US 60, MP 128.12, Sta. 339+20)
- South Pine Street (vic. US 60, MP 128.45, Sta. 356+60)
- 211th Avenue (vic. US 60, MP 129.79, Sta. 427+80)
- 203rd Avenue and Bradley Road (vic. US 60, MP 131.04, Sta. 494+00, to MP 131.19, Sta. 501+70)
- Jomax Road (vic. US 60, MP 133.91, Sta. 645+50)
- Happy Valley Road and Citrus Road (vic. US 60, MP 135.24, Sta. 715+70)

The cost for roadway construction and R/W for realigned local roads is shown to be paid for by ADOT until Intergovernmental Agreements have been agreed to with the appropriate local jurisdiction (either Maricopa County or the City of Surprise).

5.4 Access

Control of access is recommended along US 60 to enhance traffic operations and safety and to preclude uncontrolled future access and strip development. Coordination and cooperation between the City of Surprise, Maricopa County, and ADOT will be necessary to identify and implement the most appropriate access control measures for this section of US 60.

Access to the north side of the highway is limited by the AT&SF Railroad to three existing county road intersections, which cross the railroad via grade crossings, two maintenance road crossings at the CAP Canal and three private road crossings. Access at these railroad grade crossings will be maintained.

Access to the south side of the highway will be controlled by ADOT's permit process, by Maricopa County's property development requirements, and by construction of frontage roads where required.

5.4.1 Frontage Roads

It is desirable that the frontage roads will be constructed as part of the project where existing access points are spaced closer than 1/4 mile, or where existing properties are dependent on access to US 60 and access to each property would result in driveways spaced less than 1/4 mile apart even though driveways do not currently exist. Properties that have access to a local road or street will not be granted direct access to US 60. Properties that are subdivided during or developed after this project is constructed will be required to develop internal road systems or frontage roads that will connect to US 60 through established access points.

5.4.2 Local Roads

Local roads that currently connect to US 60 will be connected to the new highway. However, in the Wittmann area, local road connections to US 60 will be made only at Dove Valley Road (realigned), Crozier Street (realigned through Pine Street), Center Street, Poplar Street, and 211th Avenue. Other existing local roads between Dove Valley Road and 211th Avenue will be cut off at the new R/W line and access to US 60 will be through existing local roads. Local road connections will be reconstructed where necessary to intersect with US 60 at right angles. It is recommended that ADOT and the local agencies enter into Intergovernmental Agreements to establish responsibilities for the realignment of local roads.

5.4.3 Turnouts

Direct connection between US 60 and adjacent properties where the spacing between turnouts will be approximately 1/4 mile, will be allowed. Turnouts will provide right-in/right-out access only unless the turnout is located to coincide with median crossovers which will be located at all local road intersections and at approximate 1/2-mile intervals if local road intersections are not required. Preliminary discussions were beginning on the location of a new fire station in the vicinity of the crossover at MP 123.54. The final location of this crossover relative to the fire station and turnouts to adjacent properties should be studied during the final design.

5.5 Right-of-Way

The existing highway right-of-way (R/W) is 150 feet wide within most of the study area and abuts the southerly R/W limit of the AT&SF Railroad. The AT&SF R/W is 200 feet wide in which the mainline track is centered. Between MP 138.53 and MP 138.83, an additional 20-foot wide parcel was recently acquired from the railroad in order to construct permanent drainage improvements along the highway. The existing roadway R/W widens to 205 feet in the area between MP 129.7 and MP 130.4 and between MP 130.8 and MP 131.0. At the western end of the study area (i.e., MP 121.9 to MP 123.8), the R/W has a variable width to accommodate the existing four-lane divided highway.

Approximately 97 percent of the properties (>300 parcels) along the south side of the highway are privately owned. The remainder of the land on this side of US 60 is owned and/or managed by local, state, and federal agencies. The Flood Control District of Maricopa County is responsible for the McMicken Floodway, the Central Arizona Project Canal is owned and maintained by the U.S. Government, and the State of Arizona (State Land Department) owns several sections of land northwest of Wittmann. See Table 1-1 for additional information on government-owned parcels.

Alternative A2 will require new R/W on the south side of the existing R/W for the full length of the project. From the beginning of the project (MP 123.44) to Wittmann at MP 125.23, the width of new R/W is 112.5 feet except for a tapering width from 0 feet to 112.5 feet at the beginning of the project. From MP 125.23 to MP 128.9, the width of new R/W is 90 feet. From MP 128.62 to MP 128.64, the width of the new R/W narrows to 75 feet to accommodate the relocation of the West End Water Company. From MP 128.9 to MP 129.16, the width of new R/W is 112.5 feet. From MP 129.16 to MP 129.84, the width of new R/W varies from 112.5 feet to 110 feet because of a shift in the roadway centerline. From MP 129.84 to MP 138.1, the width of new R/W is 110 feet. The R/W width varies from 110 feet to 80 feet from MP 138.1 to MP 138.4 because of the narrower median at the end of the project. In Section 9.0, Table 9-1 lists each parcel showing the County Assessor's parcel number, Township/Range/Section number, approximate location (by Milepost) along US 60, name of the parcel owner, and the estimated new R/W and drainage easements required for Alternative A2. Table 9-1 is followed by a Concept R/W Strip Map to show the approximate R/W take. R/W requirements for the realigned local roads have not been included in the R/W estimate.

5.6 Drainage

5.6.1 Existing Conditions

Storm runoff crossing US 60 between the Morristown RRDP (MP 121.90) and McMicken Floodway (MP 138.09) generally flows from north to south. The total drainage basin area north of US 60 along this segment is approximately 115 square miles. The major drainage basins located within this region are: Iona Wash (8 square miles), Trilby Wash (16 square miles), and Wittmann Wash (9 square miles). Ground elevations vary from 4,300 feet in the Wickenburg and Hieroglyphic Mountains to 1,325 feet at the McMicken Floodway. The drainage area covers a wide range of slopes from mountainous areas with slopes greater than 10 percent to alluvial fans with slopes of 1.5 to 10 percent to flat desert regions with slopes ranging from 1.5 to 0.6 percent. Peak flows reaching US 60 are controlled by the AT&SF railroad embankment, located approximately 100 feet north of the US 60 R/W. The railroad embankment acts as

a barrier or dam to the runoff. Runoff is released through culverts and timber pile bridges. Runoff passing under the railroad flows through culverts and bridges under US 60 and into the McMicken Dam. At the south end of the project, the McMicken Dam outlet channel provides for the passage of flood waters out of the dam and discharge into the Agua Fria River.

5.6.2 Vegetation

This region is located in the upper Sonoran desert zone. The primary foliage found in the drainage sub-basins located in the foothills and mountainous areas are: desert holly, catclaw, mountain palo verde, ocotillo, saguaro, and prickly pear cactus. The vegetative cover density ranged from 20 to 45 percent.

Common plants found in the lower desert sub-basins areas are: mesquite, ironwood, palo verde, creosote, catclaw, and numerous varieties of cacti species. The vegetative cover density ranged from 20 to 40 percent. Mesquite, palo verde, desert broom, and acacia heavily vegetate the banks of washes.

5.6.3 Existing Culverts and Bridges

Existing cross drainage structures on US 60 include corrugated metal pipes (20), reinforced concrete box culverts (20), and small short span bridges (5). Many of the existing cross drainage structures were constructed to minimize the length of the culvert. Rechannelization of washes was needed to direct flows under the roadway. Most of the culverts and bridges were placed during the roadway construction in the early 1940s. The McMicken outlet channel bridge was built in 1956. The Central Arizona Project canal bridge was built in 1978. Fifteen of the box and pipe culverts were recently reconstructed (1994). The construction work replaced 13 box culverts with timber tops and extended two concrete box culverts, between MP 129.57 to MP 137.50. ADOT requested that all pipe culverts constructed in the early 1940s be replaced during the roadway widening.

5.6.4 Hydrology and Hydraulics

Two drainage studies were previously completed that encompassed all of or a portion of the study corridor. In 1989, the Flood Control District of Maricopa County (FCDMC) prepared the "Wittmann Area Drainage Master Study" (ADMS) that encompassed the entire study area. ADOT prepared a drainage report that covered a portion of the study area from MP 129.57 to MP 137.50. The report is entitled "Wittmann-Beardsley US 60 Bridge Replacement," TRACS No. H 2725 01 C, Project No. BRF-022-2(35), May 1993. The ADOT drainage report covered all of the culverts on US 60 located south of the Central Arizona Project (CAP) Canal. A drainage report was prepared for this US 60 Design Concept Study that covered the drainage area north of the CAP Canal.

Hydrology

USGS mapping, ADOT mapping, and FCDMC mapping of the corridor were used to delineate drainage basin boundaries. The ADOT Highway Drainage Design Manual was used to develop the hydrologic model. For drainage basins larger than 160 acres, the 50-year and 100-year rainfall frequencies were modeled in HEC-1 to determine the peak runoff at desired concentration points (railroad culverts and bridges). For drainage basins smaller than 160 acres, the Rational Method was used to determine the peak runoff for the 50-year and 100-year storm.

Hydraulics

All of the existing US 60 culverts within the study area, north of the CAP canal, were analyzed for size adequacy using the existing culverts, existing roadway elevations, and the peak runoff flows (determined by HEC-1 or Rational Method) for input into HY-8 culvert analysis software. The "Allowable Headwater" (AHW) for each roadway culvert was determined from existing roadway and culvert elevations (AHW = Edge of Pavement Elev. - 0.25 feet - Culvert Invert Elev.). Culverts where the computed headwater (HW) exceeded the AHW were deemed "inadequate." Culverts where the HW was less than AHW were adequate.

Preliminary culvert sizes were computed for those culverts determined to be inadequate. The ADOT drainage report was used to size culverts south of the CAP Canal. Table 5-1 summarizes the following information: culvert milepost, existing (old) culvert station, new culvert station, existing culvert size, proposed culvert size (where appropriate), and peak flows (Q50 and Q100) for each drainage structure.

Table 5-1
SUMMARY—HYDROLOGY AND REQUIRED DRAINAGE STRUCTURES

| Milepost (MP) | Old Culv. Station (a) | New Culv. Station (a) | Existing Culvert Size | Proposed Culvert Size | Q50 (b) (cfs) | Q100 (b) (cfs) |
|---------------|-----------------------|-----------------------|-------------------------|-----------------------|---------------|----------------|
| 123.70 | 1526 +16 | 108 +65 | (1) 6' x 5' x 118' CBC | No Change | 244 | 265 |
| 123.75 | 1535 +35 | 117 +84 | 1 x 24" x 64' CMP | 1 x 30" CMP | 22 | 24 |
| 123.78 | 1537 +78 | 120 +27 | (1) 6' x 6' x 52.5' CBC | No Change | 174 | 176 |
| 123.80 | 1541 +08 | 123 +57 | 1 x 36" x 68' CMP | No Change | 67 | 98 |
| 124.00 | 1243 +12 | 128 +69 | 1 x 30" x 50' CMP | No Change | 37 | 37 |
| 124.03 | 1236 +15 | 135 +66 | 1 x 36" x 52' CMP | 1 x 48" CMP | 100 | 100 |
| 124.30 | 1232 +67 | 139 +14 | (1) 6' x 5' x 56' CBC | (1) 8' x 5' CBC | 220 | 224 |
| 124.40 | 1221 +20 | 150 +61 | 1 x 24" x 48' CMP | Flows to 158+53 | 15 | 17 |
| 124.65 | 1213 +28 | 158 +53 | (1) 6' x 6' x 48' CBC | (2) 6' x 6' CBC | 380 | 480 |
| 124.80 | 1210 +50 | 161 +31 | 1 x 36" x 52' CMP | Flows to 158+53 | N/A | N/A |
| 124.90 | 1200 +94 | 170 +87 | 1 x 24" x 50' CMP | Flows to 175+08 | 30 | 30 |
| 125.05 | 1196 +73 | 175 +08 | 1 x 36" x 52' CMP | 2 x 48" CMP | 83 | 88 |
| 125.18 | 1187 +50 | 184 +20 | Bridge - Trilby Wash | No Change | 9,350 | 10,400 |
| 125.34 | 1181 +43 | 190 +38 | 1 x 36" x 72' CMP | No Change | 65 | 67 |
| 125.45 | 1174 +93 | 196 +88 | 1 x 36" x 58' CMP | No Change | 76 | 78 |
| 125.60 | 1170 +93 | 200 +88 | 1 x 24" x 50' CMP | 1 x 36" CMP | 4 | 4 |
| 125.80 | 1154 +85 | 216 +96 | (1) 6' x 5' x 56' CBC | No Change | 170 | 180 |
| 126.00 | 1146 +27 | 225 +54 | (1) 6' x 3' x 62' CBC | (2) 10' x 4' CBC | 350 | 390 |
| 126.10 | 1138 +49 | 233 +32 | (1) 10' x 6' x 50' CBC | No Change | 320 | 330 |
| 126.35 | 1125 +93 | 245 +88 | 1 x 36" x 56' CMP | 1 x 48" CMP | 114 | 116 |
| 126.55 | 1116 +30 | 255 +51 | 1 x 36" x 54' CMP | 2 x 36" CMP | 68 | 69 |
| 126.60 | 1110 +76 | 261 +05 | (1) 6' x 5' x 56' CBC | No Change | 190 | 200 |
| 126.95 | 1094 +85 | 276 +96 | (2) 10' x 6' x 44' CBC | No Change | 670 | 710 |
| 127.10 | 1084 +18 | 287 +63 | 1 x 24" x 50' CMP | No Change | 26 | 28 |
| 127.50 | 1066 +18 | 305 +63 | (8) 10' x 6' x 44' CBC | No Change | 2,790 | 3,530 |

| Milepost (MP) | Old Culv. Station (a) | New Culv. Station (a) | Existing Culvert Size | Proposed Culvert Size | Q50 (b) (cfs) | Q100 (b) (cfs) |
|---------------|-----------------------|-----------------------|-------------------------------|-----------------------|---------------|----------------|
| 127.90 | 1046 +57 | 325 +24 | (6) 10' x 5' x 49' CBC | No Change | 1,050 | 1,210 |
| 128.96 | 992 +00 | 384 +00 | Bridge - Wittmann Wash | No Change | 3,700 | 4,050 |
| 129.57 | 1301 +52 | 416 +98 | (1) 8' x 5' x 86' CBC | (2) 8' x 5' CBC | 1180 | 1500 |
| 130.03 | 1277 +40 | 441 +10 | 2 x(28" x 20")x 102' CMP Arch | 1 x 36" CMP | 124 | 127 |
| 131.47 | 1201 +72 | 516 +78 | 1 x 24" x 94' CMP | No Change | 14 | 17 |
| 131.77 | 1186 +97 | 531 +53 | (6) 10' x 4' x 122' CBC | (10) 10' x 4' CBC | 3,080 | 3,250 |
| 131.77 | 1186 +97 | 531 +53 EB | N/A | (10) 10' x 4' CBC | 3,080 | 3,250 |
| 131.90 | 1175 +70 | 542 +80 | Bridge - CAP Canal | No Change | N/A | N/A |
| 132.09 | 1169 +20 | 549 +30 | 1 x 24" x 94' CMP | No Change | 3 * | 4 * |
| 132.24 | 1162 +08 | 556 +42 | 1 x 48" x 100' CMP | No Change | 82 * | 91 * |
| 132.62 | 1141 +41 | 577 +09 | (3) 10' x 3' x 86' CBC | No Change | 500 * | 501 * |
| 133.47 | 1095 +94 | 622 +56 | (2) 10' x 5' x 90' CBC | No Change | 500 * | 503 * |
| 133.95 | 1071 +02 | 647 +48 | (5) 8' x 3' x 100' CBC | No Change | 308 * | 371 * |
| 134.24 | 1055 +86 | 662 +64 | 3 x 36" x 96' CMP | No Change | 122 * | 132 * |
| 134.67 | 1032 +86 | 685 +64 | 1 x 24" x 94' CMP | No Change | 13 * | 14 * |
| 135.33 | 998 +20 | 720 +30 | (4) 10' x 4' x 100' CBC | No Change | 1,023 * | 1,059 * |
| 136.50 | 936 +89 | 781 +61 | (3) 8' x 3' x 100' CBC | No Change | 612 * | 733 * |
| 136.80 | 920 +82 | 797 +68 | (3) 10' x 4' x 86' CBC | No Change | 63 * | 71 * |
| 137.51 | 883 +20 | 835 +30 | (1) 6' x 3' x 86' CBC | No Change | 12 * | 13 * |
| 138.02 | 856 +03 | 862 +20 | Bridge - Beardsley Canal | No Change | N/A | N/A |
| 138.09 | 852 +03 | 866 +20 | Bridge - McMicken Floodway | No Change | N/A | N/A |

(a) Station is WB unless otherwise noted.

(b) Peak runoff values from ADOT drainage report (Project No. BRF-022-2(35)) are indicated with an asterisk.

5.7 Section 404 of the Clean Water Act

Coordination with the U.S. Army Corps of Engineers (COE) during project design will be necessary to ascertain the need for any nationwide or individual permits required under Section 404 of the Clean Water Act. Any deposition of fill material or excavation waterward of the ordinary high-water mark will require a permit. Construction activities that will require permits include, but are not limited to, bridge pier construction; culvert installations, replacements, and/or extensions requiring excavation and placement of fill material; and roadway embankment widenings. The most likely impact associated with these activities will be the displacement of riparian and/or wildlife habitat.

The COE has identified all washes that will require a Section 404 permit from the COE due to the deposition of fill material or excavation waterward of the ordinary high water mark. The most likely impact associated with these activities will be the displacement of riparian habitat in the larger washes, such as Trilby Wash and Wittmann Wash. As a result, nationwide Section 404 general permits (No. 14)

will be required at 20 washes where the estimated disturbance area will be less than 0.33 acres. Bridge/culvert installations that exceed 0.33 acres at three wash locations will require Nationwide Permit No. 26 and possibly Section 401 water quality certifications from the Arizona Department of Environmental Quality (ADEQ). The following Table 5-2 lists the washes that should fall under the COE jurisdiction.

Since over 5 acres of land will be affected by this project, an NPDES permit will be required.

Table 5-2
CORPS OF ENGINEERS
JURISDICTIONAL WASHES

| Milepost (MP) | Old Station ^(a) | New Station ^(a) | Description | NGP ^(b) Number |
|---------------|----------------------------|----------------------------|-------------------------|---------------------------|
| 123.70 | 1526+16 | 108+65 | Circle City Area Wash 7 | 14 |
| 123.78 | 1537+78 | 120+27 | Circle City Area Wash 6 | 14 |
| 124.03 | 1541+08 | 123+57 | Circle City Area Wash 5 | 14 |
| 124.26 | 1236+15 | 135+66 | Circle City Area Wash 4 | 14 |
| 124.33 | 1232+67 | 139+14 | Circle City Area Wash 3 | 14 |
| 124.69 | 1213+28 | 158+53 | Circle City Area Wash 1 | 14 |
| 125.18 | 1187+50 | 184+20 | Trilby Wash | 26 |
| 125.30 | 1181+43 | 190+38 | Unnamed Wash | 14 |
| 125.80 | 1154+85 | 216+96 | Unnamed Wash | 14 |
| 126.00 | 1146+27 | 225+54 | Unnamed Wash | 14 |
| 126.10 | 1138+49 | 233+32 | Unnamed Wash | 14 |
| 126.60 | 1110+76 | 261+05 | Unnamed Wash | 14 |
| 126.95 | 1094+85 | 276+96 | Unnamed Wash | 14 |
| 127.50 | 1066+18 | 305+63 | Unnamed Wash | 14 |
| 127.90 | 1046+57 | 325+24 | Unnamed Wash | 26 |
| 128.96 | 992+00 | 384+00 | Wittmann Wash | 26 |
| 129.57 | 1301+52 | 416+98 | Unnamed Wash | 14 |
| 131.77 | 1186+97 | 531+53 | Unnamed Wash | 14 |
| 132.24 | 1162+08 | 556+42 | Unnamed Wash | 14 |
| 132.62 | 1141+41 | 577+09 | 1 East | 14 |
| 133.47 | 1095+94 | 622+56 | 2 East | 14 |
| 133.95 | 1071+02 | 647+48 | Unnamed Wash | 14 |
| 135.33 | 998+20 | 720+30 | 4 East | 14 |

^(a)Station is WB unless otherwise noted.

^(b)Section 404 Nationwide General Permit (NGP)

5.8 Floodplain Considerations

A detailed floodplain analysis has been prepared by the Federal Emergency Management Agency (FEMA) for the length of the project. The mapping prepared by FEMA has been shown in Appendix F. Three zones have been designated on the mapping. They are: Zone A which is defined as areas of 100-year flooding with no base flood elevations determined; Zone AE which is defined as areas of 100-year flooding with base flood elevations determined; and Zone X which is defined as areas determined to be outside the 500-year floodplain.

5.9 Earthwork

A Geotechnical & Geological Reconnaissance Report has been prepared for this study by AGRA Earth and Environmental based on a research review of available information and a geologic reconnaissance and mapping of the study area. Data from the report are included herein.

5.9.1 Geology

The study area lies within the Basin and Range Physiographic Province. This province is characterized by elongated northwest-southeast trending mountain ranges separated by broad basins. This physiography results from extensive normal faulting which began in late-Tertiary times (Menges, 1984). The mountain ranges consist of bedrock ranging in age from Precambrian to Tertiary, and represents the uplifted structural blocks which are bounded by the normal faults. The basins generally are filled with Tertiary to Quaternary volcanic, lacustrine, and alluvial sediments, and are an expression of the intervening structural subsidence between the uplifted mountain blocks.

The project site is located in the floor of the upper end of the West Salt River Valley Sub-basin of the Phoenix Active Management Area. The geologic units exposed in the vicinity of the site consist of alluvial basin fill deposits. The alluvial basin fill deposits are bordered by bedrock in the Hieroglyphic Mountains to the northeast, the Vulture Mountains to the northwest, and the White Tank Mountains to the south. This sub-basin is further bordered by alluvial deposits within the upper portion of the Hassayampa Area to the west. The Hassayampa Area is separated from the West Salt River Valley Sub-basin along a surface water divide.

5.9.2 Site Conditions

The natural ground surface along the alignment slopes gently downward to the south and southeast with numerous small drainages crossing the alignment. Vegetation in the area consists of sparse to moderate growth of trees, small shrubs, and native grasses.

The geologic units exposed along the US 60 alignment include Tertiary to Quaternary age alluvial plain and alluvial fan deposits which are dissected and overlain by recent narrow stream channel deposits. The discussions presented herein are based on observed surface exposures. Due to the intertonguing nature and gradational contacts of the unconsolidated deposits, future subsurface exploration, excavations and site grading may reveal local variations to the conditions described herein.

Alluvial Plain Deposits

The alluvial plain deposits are exposed over a limited area along the eastern end of the alignment from Beardsley Road to just south of the McMicken Dam outlet crossing. The alluvial plain material consists of a lenticular deposit of silty sand, sandy clay, and clayey sand. The silty sand unit is comprised primarily of fine-grained sand with some gravel. The unit is considered weakly lime cemented, low in plasticity, and brown. The moisture content of this unit is estimated to be low. The soil density is estimated to range from loose to medium dense at the surface and probably increases to medium dense to dense with depth.

The sandy clay and clayey sand units include fine- to medium-grained sand. The deposits are weakly lime cemented, moderately firm to very firm, medium in plasticity, and brown. The clayey sand unit contains some gravel and considerable amounts of silt.

Alluvial Fan Deposits

The alluvial fan deposit is extensively exposed along the alignment north of McMicken Dam Outlet Channel (MDOC). The deposit intertongues with the alluvial plain deposit near MDOC and is dissected and overlain with localized coarse-grained stream channel material in the drainage bottoms. The alluvial fan deposits exposed in the site area consist of an intertonguing and lenticular deposit of sand and gravel units which contain variable amounts of fine-grained material. The lithology of the alluvial fan deposit generally is more coarse-grained in the upgradient direction to the northwest.

The sand unit generally is exposed southeast of Wittmann and is comprised primarily of fine-grained silty to clayey and some gravelly lenses with occasional small cobbles. The unit is medium dense to dense, typically slightly moist, weakly lime cemented, low to medium in plasticity, and light brown to brown.

The gravel unit is exposed northwest of Wittmann to the Morristown RROP area and consists primarily of silty gravel, with some to considerable silty sand lenses and occasional small cobbles. Exposures of this unit generally are dense to very dense, slightly moist, low in plasticity and brown. The particles are poorly graded and subangular to subrounded in shape. The deposit contains some clay lenses and the cementation varies from weakly to strongly lime cemented. The degree of cementation exposed at the surface generally increases to the northwest. Some local strongly lime cemented lenses were exposed as discontinuous and irregularly shaped ridge camps between drainages.

Stream Channel Deposits

The stream channel deposits primarily occur in the drainage channels that traverse and overlie the alluvial fan deposit. These deposits are comprised of sandy gravel interbedded with some sand lenses and occasional small cobbles. The deposits generally are loose and slightly moist with the moisture content possibly increasing with depth. Exposures of the sandy gravel unit indicate poorly graded subrounded gravel and medium to coarse-grained, non-plastic, light-gray sand. The sand lenses are predominantly fine-grained, non-plastic, and light brown.

5.9.3 Profile for Alternative A2

The profile for Alternative A2 generally follows the existing ground and is located above the flow line of drainage channels to facilitate construction of drainage structures. The existing roadway is used as the westbound lanes and changes to the profile are used to raise the grade of the existing roadway at the intersections of crossroads that cross the AT&SF Railroad. The eastbound profile is located generally above existing ground resulting in the need for borrow material to construct the westbound grade changes and the eastbound roadway for the full length of the project.

Earthwork computations utilized aerial mapping, dated 10/06/86, that was obtained from Maricopa County in the form of a three-dimensional computer model. Approximately 530,000 cubic yards of borrow material will be required to construct the project.

5.9.4 Potential Borrow Areas

Five potential borrow sources, either indicated in the ADOT material site inventory list or were apparent on topographic maps of the area, were visually inspected during the reconnaissance of the project area. The sources included in this reconnaissance effort are located in Maricopa County, Arizona, and discussed below are as follows:

- Section 33, T4N, R2W
- Sections 31 and 32, T4N, R2W
- Section 19, T6N, R3W
- Section 30, T6N, R3W
- Section 16, T6N, R3W
- Wickenburg Concrete Borrow Pit

Section 33

The area located in Section 33, T4N, R2W, is in a relatively flat, low lying area adjacent to the Trilby Wash Detention Basin located approximately 3 miles southwest of the south end of the alignment. The actual borrow pit was not evident during this reconnaissance effort. The geologic units exposed in this area are alluvial fan deposits which primarily consist of fine-grained silty sand with some gravel. The material in the deposit is of low plasticity to non-plastic and brown. Some sandy gravel lenses were exposed in the area and in the localized drainage channels.

Sections 31 and 32

The potential borrow source located in Sections 31 and 32, of T4N, R2W, is in an area adjacent to local bedrock knobs in the White Tank Mountains located approximately 4 to 5 miles southwest of the south end of the alignment. An existing pit was not observed. The geologic units exposed in this area include granite and gneiss bedrock overlain by alluvial/colluvial deposits. The material in the area is part of an alluvial fan deposit which grades to a colluvial deposit toward the granitic knobs. The alluvial fan deposit consists of silty sand grading to a coarser grained silty to occasionally clayey gravel colluvial sequence near the flanks of the bedrock exposures. Some cobbles and boulders occur in both unconsolidated deposits.

Section 19

The existing borrow pit located in Section 19, of T6N, R3W, is located adjacent to an abandoned landfill, about 1/4 mile east of US 60 at the north end of the alignment. The geologic units exposed in the pit consist of an alluvial fan deposit of interbedded sand, gravel, and silt which varies from low to medium in plasticity. These deposits appear moderately lime cemented below 11.5 feet. The gravels exposed in the upper 5 to 8 feet are generally five-grained. The units exposed below 5 to 8 feet are composed of well-graded gravels with occasional cobbles.

Section 30

The existing borrow pit located in Section 30 of T6N, R3W, approximately 1/4 mile west of the RROP consists of two large shallow excavations. The material exposed in this area consists of an alluvial fan deposit similar to that exposed in Section 19. The material consists primarily of locally cemented silty gravels with an occasional small cobble.

Section 16

The borrow area located in Section 16, of T6N, R3W, approximately 1.5 miles northeast of the RROP, consists of a large shallow excavation adjacent to an active drainage channel. The geologic unit exposed in this area includes an alluvial fan deposit and stream channel deposit. The material in the alluvial fan deposit is moderately to strongly cemented and consists of silty to occasionally clayey gravels. The material exposed in the stream channel consists of loose sandy gravel. The gravels are poorly graded in the fan deposit and well graded in the stream channel deposit.

Wickenburg Concrete Pit

The Wickenburg Concrete borrow pit is located approximately 3 miles northwest of the Morristown RROP. The material exposed in this area consists of loose sand and sandy gravel in the drainages and primarily moderately cemented silty gravel and sand in the ridges. Some sand stockpiles were observed in the drainage areas.

5.9.5 Analysis and Recommendations

Materials

The alluvial fan and plain deposits exposed along the roadway alignment generally are acceptable as foundation material for a pavement section of the proposed roadway. The soils are considered adequate to provide reliable support of pavement if appropriate drainage measures are implemented. Most of the soils along the alignment can be considered moisture sensitive to varying degrees, in that excessive vertical movement will occur upon significant moisture increases. Thus, good site drainage and moisture protection measures are considered important to the long-term performance of the roadway.

It appears that the near-surface deposits can be excavated using standard excavating equipment such as scrapers and backhoes. Some ripping may be required in the more cemented and coarse-grained alluvial fan deposits exposed in the northern end of the alignment. It is expected that the soils can be ripped with a D8 Caterpillar dozer with a single ripper shank.

The materials observed in the potential borrow areas consist of silty sands and gravels with localized clay, cobbles, and cemented zones. The materials generally are acceptable for use as roadway fills with exception of Sections 31 and 32 which contain considerable oversized material (cobbles and boulders). In addition, the materials in Section 19 are located adjacent to the landfill which could limit development of an aggregate source. Some of these borrow sources in the area of the alignment may not be efficiently located relative to the project. Thus, new borrow sources could be located and evaluated. The materials exposed along the proposed majority of the alignment consist of non-expansive material with stable characteristics and appear to be suitable for use as roadway fill. Thus, borrow ditches developed alongside the roadway could generate suitable material if this is an acceptable borrow method.

Drainage Crossings

Where bridges are required, deep foundations will probably be necessary for support of the bridge. The near-surface soils in and near the stream channels are not considered suitable to provide satisfactory long-term support of heavy bridge loads.

Typical cast-in-place concrete culverts will perform adequately in the drainages, from a foundation standpoint. No special site grading or other preparation for construction generally is needed. Cutoff aprons structurally connected to the culverts and extending to the depth of scour at minimum, should be constructed on the downstream ends of the culverts.

5.10 Constructibility and Traffic Control

Maintenance of traffic on US 60 during construction is necessary at all times because satisfactory alternative routes are not available. The recommended alternative (A2) will allow construction of the new eastbound roadway while traffic is maintained on the existing roadway. Access to US 60 from adjacent properties and crossroads south of the corridor will be maintained during construction by requirements contained in the contract documents. Minimum disruption to traffic at the beginning and end of construction segments will be expected. Temporary connections will be required in the contract documents to assure that the contractor provides satisfactory detours and traffic control.

When the eastbound roadway is complete, two-way traffic will be shifted from the existing roadway while segments to be reconstructed and the milling and overlay are completed. Access will be maintained to crossroads providing grade crossings over the AT&SF Railroad. Drainage structures that are to be constructed across the existing roadway will be stage constructed to maintain traffic on the existing roadway.

5.11 Intersections

Intersections within the study limits will be addressed as follows:

London Road—MP 124.76 (Sta. 162+30±); existing London Road is on a 5° skew; realign to 90°; south side only; left-turn lane at median crossover.

Happy Lane—MP 127.61 (Sta. 312+55±); right angle; south side only; left-turn lane at median crossover.

Dove Valley Road—Currently ties into Crozier Road south of existing US 60. Will be realigned to intersect with US 60 at MP 128.12 (Sta. 339+20±). Right angle; south side only; left-turn lane at median crossover.

Crozier Road—Existing roadway intersects US 60 at MP 128.33 (Sta. 350+50±) at an approximate skew of 46°; will be realigned to intersect US 60 at the location of the existing intersection of South Pine Street, MP 128.45 (Sta. 356+50±). Existing Crozier Road will be terminated at the south R/W line of US 60; right angle; south side only; no left-turn lane at median crossover.

South Pine Street—Will be replaced with relocated Crozier Road.

South Oak Street—Will be terminated at the south R/W line of US 60.

South Maple Street—Will be terminated at the south R/W line of US 60.

Center Street—MP 128.65 (Sta. 367+30±); existing US 60 will be reconstructed to raise the profile to match the railroad grade; left turn lanes will be provided on US 60 for both legs of Center Street. Center Street will be realigned slightly to remove an offset at the intersection with US 60; Center Street will also be widened to provide three traffic lanes at the intersection. The intersection will be signalized and will include pedestrian phases. The existing pedestrian overcrossing structure will be removed.

South Vine Street—Will be terminated at the south R/W line of US 60.

South Walnut Street—Will be terminated at the south R/W line of US 60.

South Poplar Street—MP 128.86 (Sta. 378+60±); the profile of EB US 60 will be constructed to match the proposed bridge over the Wittmann Wash, existing South Poplar Street connection to US 60 will be reconstructed to match US 60. Access will be limited to right-in/right-out movements. A median crossover will not be provided.

South Ash Street—Will be terminated at the south R/W line of US 60.

MP 129.26 (Sta. 400+00)—A new intersection will be constructed to provide access from US 60 to a new frontage road on the south side of US 60. A left-turn lane will be constructed at the median crossover.

211th Avenue—Existing roadway intersects US 60 at MP 129.7 (Sta. 422+50±); will be realigned to intersect US 60 at MP 129.79 (Sta. 427+80). Existing 211th Avenue will be terminated at the south R/W line of US 60; left-turn lane at median crossover.

Montgomery Road—MP 130.29 (Sta. 455+20±); a new intersection will be constructed to provide access to US 60 from a new frontage road on the south side of US 60. The intersection is located where Montgomery Road is platted to intersect US 60. A left-turn lane will be provided at the median crossover.

203rd Avenue (north side of US 60)—MP 130.89 (Sta. 487+10±); existing US 60 will be reconstructed to raise the profile to match the railroad grade; 203rd Avenue will be reconstructed across the railroad tracks; a left-turn lane will be provided on US 60 at the median crossover.

203rd Avenue (south side of US 60)—Existing 203rd Avenue intersects US 60 at MP 131.02 (Sta. 493+10±), with a skew angle of approximately 46°. 203rd Avenue will be realigned to intersect US 60 at a right angle at MP 131.19 (Sta. 501+80±). Bradley Road will be realigned to tie into realigned 203rd Avenue, and a new frontage road will tie into Bradley Road to provide access to parcels fronting on US 60. A left-turn lane will be provided at the US 60 median crossover.

Patton Road—MP 132.47 (Sta. 569+30±); right angle; south side only; left-turn lane at median crossover.

193rd Avenue—MP 132.80 (Sta. 587+05±); right angle; south side only; provide access to US 60 from frontage road; tie into existing dirt road; left-turn lane at median crossover.

MP 133.15 (Sta. 605+60±)—A new intersection will be constructed to provide access from US 60 to a new frontage road on the south side of US 60. The intersection is located to match a platted street R/W. A left-turn lane will be constructed at the median crossover.

Jomax Road—Existing Jomax Road intersects existing US 60 on the south at MP 134.11 (Sta. 656+00±) at a skew of approximately 44°. Jomax Road will be realigned to intersect US 60 at a right angle at MP 133.91 (Sta. 645+50). A left-turn lane will be provided at the US 60 median crossover.

Happy Valley Road—Existing Happy Valley Road intersects existing US 60 on the south at MP 135.40 (Sta. 724+00±) at a skew of approximately 44°. Happy Valley Road will be realigned to intersect US 60 at a right angle at MP 135.24 (Sta. 715+70±). A left-turn lane will be provided at the US 60 median crossover.

Citrus Road—Existing Citrus Road intersects Happy Valley Road south of existing US 60. Citrus Road will be realigned to intersect Happy Valley Road at a right angle 250 feet south of US 60.

Norwich Drive—A new intersection will be constructed at MP 136.10 (Sta. 761+00±) where Norwich Drive is platted on the south side of US 60. The intersection will provide access to US 60 from a new frontage road and will tie into an unimproved road providing access to several parcels south of US 60. A left-turn lane will be provided at the median crossover.

Deer Valley Road—MP 136.99 (Sta. 808+20±); right angle; south side only; left-turn lane at median crossover.

163rd Avenue—MP 137.89 (Sta. 855+60±); 10° skew; existing 163rd Avenue crosses the AT&SF Railroad at grade on the north side of US 60. The existing crossing will be retained at the existing 10° skew angle. 163rd Avenue will provide access to a new frontage road on the south side of US 60 and will terminate at the US 60 R/W line. The 10° skew fits the street R/W owned by Maricopa County on the south side of US 60 and fits existing 163rd Avenue as realigned on the north side of US 60. Left-turn lanes will be provided at the US 60 median crossover.

MP 138.19 (Sta. 871+30)—A new intersection will be constructed on the south side of US 60 only to provide access to US 60 from a new frontage road. Access will be limited to right-in/right-out movements. A median crossover will not be provided.

Loop 303—Loop 303 now intersects US 60 on the south side only at MP 138.62 (Sta. 894+00±). Maricopa County is proposing to relocate the intersection westerly 150 feet and extend Loop 303 north of US 60 with a grade crossing of the AT&SF Railroad. Relocated Loop 303 may be complete prior to reconstruction and widening of US 60. The profile of the relocated crossroad should be coordinated between ADOT and Maricopa County to minimize any reconstruction effort when US 60 is widened.

5.12 Utilities

Contact was made with all known utility companies within the study limits requesting utility information and an indication of possible conflicts. The recommended alternative will affect each utility as outlined below:

Arizona Public Service—The existing overhead 69 kV power transmission line that parallels US 60 inside the south edge of the existing R/W, west of the Beardsley Canal, would need to be relocated because the power pole locations conflict with the new EB lanes. An aerial easement will be needed over the West End Water Company parcel located in Wittmann. Existing overhead 230 kV transmission lines cross US 60 near the Beardsley Canal. Adequate clearance between the EB lanes and the sag point for the power transmission lines would need to be verified with APS. Several existing 12 kV lines cross US 60 that would require adjusting. They are located at Happy Valley Road, 203rd Avenue (east and west), Center Street, and at Dove Valley Road.

Southwest Gas—The existing 6-inch high pressure natural gas line that parallels US 60 approximately 6 to 10 feet inside the south edge of the existing R/W, for the entire length of the project, would need to be relocated because the gas line location would conflict with the new EB lanes. A 2-inch gas line crosses US 60 at Center Street. This line would need adjusting to reconnect to the 6-inch gas line. Near Center Street in Wittmann, the 6-inch gas line should be relocated into the south side alley to avoid the West End Water Company facilities.

US West—The existing underground telephone line(s) that parallel US 60 are located approximately 14 to 30 feet inside the south edge of the existing R/W, for the entire length of the project. The number of underground lines varies from one to four. The telephone lines would need to be relocated because the telephone line locations conflict with the new EB lanes. Near Center Street in Wittmann, the underground lines should be relocated into the south side alley to avoid the West End Water Company facilities.

MCI—The existing underground fiber optic cable that parallels US 60 approximately 2 feet inside the south edge of the existing R/W would need to be relocated because the cable location conflicts with the new EB lanes. The cable enters ADOT R/W at 193rd Avenue and exits at the Beardsley Canal.

West End Water Company—A 6-inch water line that crosses US 60 along the west side of Center Street may require replacement. Another water line (2-inch) that parallels US 60 approximately 4 feet inside the south edge of the existing R/W for approximately 3,500 feet conflicts with the new EB lanes and will need to be relocated. The line is located approximately 400 feet east of South Ash (in Wittmann) to 211th Street. Other facilities that will be affected are located on a lot north of and adjacent to Center Street and south of the US 60 R/W. Facilities include a well site (550 feet deep, producing 120 gpm), two water storage tanks, three booster pumps, piping, equipment yard, and structures that house the well and pumping equipment. It is recommended that the well site remain in its present location and that the parcel be realigned parallel with US 60.

Maricopa Water District—A concrete lateral ditch located immediately outside of the existing south R/W line would conflict with the proposed EB lanes. This ditch would be affected west of the interim Loop 303 connection for approximately 1,400 feet. The Beardsley Canal would also conflict with the proposed location of the EB lanes. A bridge crossing would be required.

Central Arizona Water Conservation District (CAP)—The CAP Canal would conflict with the proposed location of the EB lanes. A bridge crossing would be required.

Flood Control District of Maricopa County—The McMicken Floodway would conflict with the proposed location of the EB lanes. A bridge crossing would be required.

AT&SF Railroad—Improvements would be made to the railroad crossings at: Center Street, 203rd Avenue, and interim Loop 303. Drainage improvements on railroad property would be needed near MP 124.8 (across from Circle City).

5.13 Bridges

Four existing bridges at MP 125.20, 128.98, 131.90, and 138.09 will remain in service for the new westbound roadway. New bridges constructed for the new eastbound roadway will be 45'-2" wide (out-to-out) providing two 12-foot traffic lanes, a 6-foot inside shoulder, a 12-foot outside shoulder, and concrete bridge barriers per ADOT Standard B-21.18.

Milepost 125.20: Trilby Wash Bridge

The existing bridge is a 174-foot 7-span continuous slab bridge supported by wall-type piers and spread footing foundations. Pier scour is prevented by a scour protection slab with cut-off walls at the upstream and downstream ends. Aside from extensive cracking of the existing asphalt overlay, no immediate maintenance is required. The existing 4" asphalt concrete overlay will be stripped and replaced with a new overlay, not to exceed 2" in thickness.

The new (eastbound) structure is estimated to be 225 feet in length to provide adequate freeboard for the 50-year flow. Current scour design criteria will likely require deep foundations, thus favoring fewer substructure units and longer spans than achievable with a continuous slab superstructure. Accordingly, a 3-span continuous precast-prestressed concrete girder bridge is recommended. Additional HEC-1 and HEC-2 analysis of the proposed bridge and channel improvements is required at the final design stage. The impact of the channel/bridge modifications needs to be evaluated.

Milepost 128.98: Wittmann Wash Bridge

The existing bridge is a 108-foot 3-span concrete T-beam structure supported by wall-type piers and spread footing foundations. The existing 5" asphalt overlay will be stripped and replaced with a new overlay, not to exceed 4" in thickness at the roadway crown.

The new (eastbound) structure is estimated to be 290 feet in length to provide adequate freeboard for the 50-year flow. Since the anticipated flow velocity of 4.5 feet per second causes slight scour potential, relatively shallow foundations may be feasible for the new bridge, thus favoring a short-span superstructure type with numerous substructure units. Accordingly, an 8-span continuous slab bridge is recommended. Additional HEC-1, HEC-2 and sediment transport analysis of the proposed bridge and channel improvements is required at the final design stage. The impact of the channel/bridge modifications needs to be evaluated.

Milepost 131.90: CAP Canal Bridge

The existing bridge is an 83-foot simple span precast-prestressed concrete girder structure with spread footing foundations. The deck has no overlay, and none is anticipated.

The new (eastbound) structure is estimated to be 85 feet in length, approximately the same as the existing bridge. The superstructure and foundations are recommended to be similar to the existing structure, i.e., precast-prestressed concrete girders and spread footing foundations.

Milepost 138.09: McMicken Floodway Bridge

The existing bridge is a 112-foot 4-span continuous slab structure with steel H-pile foundations. The existing 4" asphalt overlay will be stripped and replaced with a new overlay, not to exceed 2" in thickness.

The new (eastbound) structure is estimated to be 115 feet in length, approximately the same as the existing bridge. Current scour design criteria will likely require drilled shaft foundations for intermediate piers, thus favoring fewer substructure units and longer spans than achievable with a continuous slab superstructure. Accordingly, precast-prestressed concrete girders are the recommended superstructure type, with either a simple span or 2-span layout. Both options will require raising the roadway profile grade to obtain the same freeboard as the existing bridge. The simple span layout would likely be less expensive to construct but would require raising the profile grade more than would the 2-span layout.

5.14 Pavement Design

The pavement sections used in determining quantities and cost estimates were obtained from ADOT's Materials Section.

- US 60
 - Eastbound roadway and reconstructed westbound roadway— $\frac{1}{2}$ inch ACFC and 7 $\frac{1}{2}$ inches AC over 6 inches of AB.
 - Westbound roadway remaining in place—Mill 2 inches AC and overlay with 4 inches AC and $\frac{1}{2}$ inch ACFC.
- Frontage Roads and Crossroads
 - 4 inches AC over 10 inches AB

5.15 Other Design Considerations

5.15.1 Project Coordination

- MCDOT is planning to reconstruct Loop 303 at its intersection with US 60. ADOT and MCDOT should commit to a schedule of construction that would assure construction of US 60 and the Loop 303 intersection concurrently. Consideration should be given to an IGA to accomplish construction of the intersection under a single contract. See section 7.12 for required programming.
- ADOT should consider entering into Memoranda of Understanding with Maricopa County and the City of Surprise to establish access criteria and establish review and approval procedures for access requests by land owners adjacent to US 60.
- The location of frontage roads, turn-outs, median crossovers, and turn lanes should be coordinated

with Maricopa County and the City of Surprise. The intent to turn frontage roads over to the appropriate local agency should be agreed to prior to construction.

- ADOT should consider entering into Intergovernmental Agreements with Maricopa County and the City of Surprise to establish responsibilities for the realignment of local roads.
- The structural capacity of the existing bridge over the Beardsley Canal should be evaluated before extending the existing structure.
- A current traffic projection and a LOS analysis of the 163rd Avenue to Loop 303 segment of US 60 should be prepared during final design. Proposed lane configurations should be verified.
- A current signal warrant study of the intersection of Center Street and US 60 should be prepared during final design. The warrant study should consider combining the side streets of Wittmann at Center Street and the pedestrian traffic currently using the pedestrian separation structure. The design of a signal at Center Street should proceed when warranted.
- R/W acquisition should be scheduled to provide time and opportunity for utilities to relocate throughout the corridor rather than for each construction segment.

5.15.2 Construction Plans

All construction plans must be prepared in metric.

5.16 Environmental Impact Mitigation Measures

The Environmental Assessment (EA) has been approved by ADOT and FHWA, and a Finding of No Significant Impact has been signed by FHWA. Additional coordination is required with the Corps of Engineers, Arizona Department of Environmental Quality (ADEQ), and the State Historic Preservation Officer (SHPO) during final design. The following items are to be addressed prior to the completion of final design of each construction project.

- Nationwide General Permits (NGP) will be required from the Corps under Section 404 of the Clean Water Act. A NGP No. 14 will be required at 20 washes, and a NPG No. 26 will be needed at each of the following three locations:
 - MP 127.90, Station 325+24, Unnamed Wash
 - MP 128.96, Station 384+00, Wittmann Wash
 - MP 125.18, Station 184+20, Trilby Wash
- Section 401 water quality certifications will be required from ADEQ at NPG No. 26 locations.
- Final SHPO clearance is required regarding the acceptable completion of all cultural resource mitigation measures prior to the awarding of all construction contracts.

- The entire project is located within the PM₁₀ nonattainment area. ADOT is implementing Reasonable Available Control Measures (RACMs) to mitigate the PM₁₀ problems at this time. If the U.S. Environmental Protection Agency implements regulations for addressing and mitigating PM₁₀ pollution in nonattainment areas within the project limits prior to the completion of final design, a revised air quality analysis will be required to determine what mitigation measures will be necessary to offset the pollutant levels anticipated from the project.
- For displacement of commercial or residential property, ADOT will implement a right-of-way acquisition and relocation program in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (Public Law 91.646), as amended (Public Law 100-17).
- If previously unidentified hazardous materials are encountered during construction, work will stop at that location, and the contractor will immediately contact the ADOT Environmental Planning and ADOT Safety Sections to arrange for proper treatment of the materials.
- Subsurface testing and data recovery programs will be implemented at all National Register eligible archaeological sites in order to extract as much data as possible to offset the disturbance to these sites by the proposed action. For eligible historic structures displaced by the project, each structure will be photographed and a descriptive narrative will be prepared and submitted to the State Historic Preservation Officer (SHPO) in accordance with the standards of the Historic American Engineering Record, National Park Service. If previously unidentified cultural resources are uncovered during construction, work will cease at that location, and ADOT Environmental Planning Section will be contacted immediately (255-8641) to arrange proper treatment of these resources.
- An erosion control plan and a stormwater pollutant prevention plan will be prepared to reduce erosion and prevent other pollutants from entering any streams within the project limits.
- Because the proposed action will result in increased noise levels that approach or exceed the 67 dBA noise abatement criterion established by the Federal Highway Administration, or will exceed ambient noise levels by more than 15 dBA, sound barriers will be constructed inside the highway right-of-way line, where practical, while maintaining access to sensitive receptors along US 60.
- Temporary air quality and noise impacts due to construction activities will be minimized through adherence to Section 107.14 of ADOT's Standard Specifications.
- Minor delays and access disruptions during construction will be minimized through the implementation of a detailed maintenance-of-traffic plan to ensure traffic flow and property access are maintained.
- Coordination with utility companies will continue during final design of the selected alternative to minimize disruptions associated with utility conflicts and relocations.

6. Itemized Cost Estimate

Detailed cost estimates were prepared for each of the design concept alternatives. Unit prices were based on recent ADOT bid results.

The basis for the quantity estimates and unit prices is as follows:

- **Clearing and Grubbing per Acre**—Construction area quantities were computed during the design development. An average price of \$1,000/acre was used based on previous bid prices statewide.
- **Removal of Structures and Obstructions per Lump Sum**—Quantities were based on anticipated removals (i.e., existing box and pipe culverts, pedestrian overpass, fencing, etc.).
- **Removal of Asphaltic Concrete per Square Yard**—Asphaltic Concrete removal was itemized separately and not included in the Roadway Excavation item. Quantity is based on the area of existing pavement removed.
- **Drainage Excavation per Cubic Yard**—Quantities were estimated at locations of significant channel excavation (i.e., Trilby Wash, Wittmann Wash, etc.).
- **Roadway Excavation per Cubic Yard**—Quantities were provided as part of the InRoads computer output using the appropriate typical section and section intervals. Mapping for the project was provided by the Flood Control District of Maricopa County.
- **Borrow**—Quantities were estimated using the InRoads computer output for fill required, applying a 10 percent shrink factor and deducting the roadway and drainage excavation quantities. Mapping for the project was provided by the Flood Control District of Maricopa County.
- **Structural Roadway Section**—For estimating purposes on this project, ADOT Materials Section recommended ½ inch ACFC and 7 ½ inches of AC over 6 inches of AB for new or reconstructed sections of US 60. The frontage road and side roads should have a minimum section of 4 inches of AC over 10 inches of AB. The unit price for AC was broken down into Asphalt Cement (AC-40), Asphaltic Concrete, Mineral Admixture, Bituminous Tack Coat, and Apply Bituminous Tack Coat.
- **Mill**—Those sections of westbound US 60 that will not be reconstructed will be reconditioned to handle the design year 2020 traffic loads. For estimating purposes on this project, ADOT Materials Section recommended milling 2 inches of existing AC and overlay with 4 inches of AC and ½ inches of ACFC.

- **Pipe Culverts per Linear Foot**—Pipe sizes and locations were derived from the Hydrology Report (December 1994) prepared for this project. Lengths were measured between the cut/fill lines as plotted on the plan/profile sheets (see Table 5-1 and Appendix D). Quantities for headwalls are included under the items for structural concrete and reinforcing steel.
- **Reinforced Concrete Box Culverts**—RCBC sizes and locations were derived from the Hydrology Report (December 1994) prepared for this project. Lengths were measured between the cut/fill lines as plotted on the plan/profile sheets (see Table 5-1 and Appendix D). Quantities are shown as structural concrete per cubic yard and reinforcing steel per pound (including inlet and outlet sections).
- **Bridges per Square Foot**—Quantities were based on width and length of structure determined for each site.
- **Noise Walls**—Quantities were based on height and length of structure determined by the noise analysis for each alternative.
- **Rail Bank Protection**—Quantities were estimated on approximate design locations for bank protection.
- **Guardrail per Linear Foot**—Quantities were based on approximate design locations for guardrail as required by fill height. Guardrail Extender Terminal quantities were based on design locations as required for new bridge structures.
- **Fencing per Linear Foot**—Quantities were based on parallel fencing on the south side of the roadway for Alternatives A1 and A2. Quantities were based on parallel fencing on both sides of the roadway for Alternative A9.
- **Revegetation per Mile**—The quantities for Revegetation were based on seeding the cut and fill surfaces the length of the project.
- **Signing and Pavement Marking**—Quantities for raised pavement markers and thermoplastic striping were estimated using the MUTCD recommendations for a four-lane divided roadway. An average cost per mile for signing was based on prior ADOT projects.
- **Maintenance and Protection of Traffic** (percent of construction cost)—The percentage used was varied depending on the anticipated difficulty of maintaining through the construction zone, need for construction staging to accommodate traffic, and need for detours.
- **Erosion Control** (percent of construction cost)—Mitigation costs are required for erosion control measures during construction.

- **Utility Relocation**—Utilities requiring relocation work include: water, gas, power, telecommunication lines, and irrigation.

Prior rights for the utilities have not been determined. It appears that both the Maricopa Water District (Beardsley Canal) and the railroad (AT&SF) have prior rights based on highway plans prepared in the 1940s. Both facilities existed prior to construction of the existing highway. Other utilities (power, telephone, gas and water) were not present in the highway plans and thus do not appear to have prior rights except outside ADOT R/W.

- **Right-of-Way**—R/W cost based on an estimate of the market value provided by ADOT February 1995.
- **Realignment of Side Streets**—An estimate for the cost of reconstructing side streets that require realignment to provide right angle intersections. Estimate includes construction, R/W, utility relocation and design costs.

A summary of the costs associated with each alternative is presented in Table 6-1. A detailed cost estimate for recommended Alternative A2 is presented following Table 6-1. Detailed cost estimates for the other four alternatives can be found in Appendix B.

**Table 6-1
COST ESTIMATE SUMMARY**

| Alternative | Construction * (\$) | Design (\$) | Utility Relocation (\$) | Right-of-Way** (\$) | Total (\$) |
|-------------|---------------------------|------------------|-------------------------------|------------------------|-------------------|
| A1 | 33,600,000 | 2,620,000 | 1,430,000 | 5,160,000 | 42,810,000 |
| A2 | 33,190,000 | 2,560,000 | 1,430,000 | 5,000,000 | 42,180,000 |
| A1-A2 | 33,520,000 | 2,620,000 | 1,430,000 | 5,160,000 | 42,730,000 |
| A1-A9 | 48,700,000 | 3,790,000 | 1,490,000 | 3,400,000 | 57,380,000 |
| A2-A9 | 48,140,000 | 3,740,000 | 1,490,000 | 3,240,000 | 56,610,000 |

*Includes cost of realigning side streets.

**Includes cost of relocation.

Project No.: 060 MA 121 H 3623 01 L
 Location: US 60, Morristown RROP to Beardsley Road
 Route: US 60

DATE: 15-Jun-96

ALIGNMENT A2
 MP 123.44 to MP 138.83

| ITEM | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|---------|-----------|------------|-------------------|
| Clearing and Grubbing | Acre | 220 | 1,000 | 220,000 |
| Removal of Structures & Obstructions | L.Sum | 1 | 134,000 | 134,000 |
| Removal of Asphaltic Concrete Pavement | Sq. Yd. | 78,560 | 1 | 78,600 |
| Drainage Excavation | Cu. Yd. | 20,350 | 5 | 101,800 |
| Roadway Excavation | Cu. Yd. | 20,600 | 5 | 103,000 |
| Borrow | Cu. Yd. | 596,000 | 5 | 2,980,000 |
| Aggregate Base Course | Cu. Yd. | 123,500 | 15 | 1,852,500 |
| Asphaltic Cement (AC-40) | Ton | 14,950 | 150 | 2,242,500 |
| Bituminous Tack Coat | Ton | 349 | 150 | 52,350 |
| Apply Bituminous Tack Coat | Hour | 697 | 100 | 69,700 |
| Asphaltic Concrete Friction Course (1/2-inch) | Ton | 14,525 | 19 | 276,000 |
| Asphaltic Concrete | Ton | 281,600 | 17 | 4,787,200 |
| Mineral Admixture | Ton | 5,625 | 90 | 506,250 |
| Mill (Westbound Lanes) | Sq. Yd. | 349,790 | 1 | 349,800 |
| Pipe Culvert (48" CMP) | L.F. | 1,020 | 75 | 76,500 |
| Pipe Culvert (36" CMP) | L.F. | 1,730 | 60 | 103,800 |
| Pipe Culvert (30" CMP) | L.F. | 480 | 45 | 21,600 |
| Pipe Culvert (24" CMP) | L.F. | 420 | 35 | 14,700 |
| Bridge Structures | Sq. Ft. | 24,150 | 55 | 1,328,300 |
| Noise Walls | Sq. Ft. | 98,080 | 15 | 1,471,200 |
| Structural Concrete (Box Culv. & Pipe Culv. Hdwl) | Cu. Yd. | 8,398 | 225 | 1,889,550 |
| Structural Steel (Box Culv. & Pipe Culv. Hdwl) | Lb. | 1,195,700 | 0.45 | 538,100 |
| Rail Bank Protection, Type 5 (Std. C-17.20) | L.F. | 2,850 | 250 | 712,500 |
| Guardrail, W-Beam Single Face | L.F. | 6,200 | 10 | 62,000 |
| Guard Rail Extruder Terminal | Ea. | 16 | 3,000 | 48,000 |
| Signalization (Center Street, Wittmann) | L.Sum | 1 | 100,000 | 100,000 |
| Barbed Wire Fencing | L.F. | 69,400 | 2 | 138,800 |
| Revegetation | Mile | 15 | 15,000 | 229,500 |
| Signing | Mile | 15 | 25,000 | 382,500 |
| Thermoplastic Striping | L.F. | 376,000 | 0.40 | 150,400 |
| SUBTOTAL | | | | 21,021,000 |
| Railroad Flagmen | | | | 50,000 |
| Construction Surveying and Layout (1%) | | | | 210,000 |
| Furnish Water Supply & Dust Palliative (2%) | | | | 420,000 |
| Maintenance and Protection of Traffic (8%) | | | | 1,682,000 |
| Mobilization (6%) | | | | 1,261,000 |
| Quality Control (2%) | | | | 420,000 |
| Erosion Control (1%) | | | | 210,000 |
| Construction Engineering and Contingencies (30%) | | | | 6,306,000 |
| CONSTRUCTION TOTAL | | | | 31,580,000 |
| Design | | | | 2,560,000 |
| Right-of-Way, Easements and Relocation | | | | 5,000,000 |
| Realignment of Side Streets | | | | 1,610,000 |
| Utility Relocation | | | | 1,430,000 |
| SUBTOTAL | | | | 10,600,000 |
| TOTAL PROGRAM COST | | | | 42,180,000 |

7. Implementation Plan for the Selected Alternative

7.1 General

This section presents a phased implementation plan identifying near-term and long-range improvement projects for improving US 60 between Morristown and Beardsley Road.

The purpose is to:

- Recommend near-term and long-range improvement projects for US 60 between Morristown and Beardsley Road to enhance safety and operational characteristics and meet capacity requirements.
- Identify funding needs and scheduling for each of the projects for programming purposes.
- Identify Issues that must be resolved prior to construction (right-of-way, utility, environmental clearance and Intergovernmental Agreements (IGAs)).

7.2 Current Programming

Current programming for this section of US 60 is as follows:

- MP 122.0 to MP 129.0, Morristown OP - Wittmann. Identified as Mill and replace AC in travel lanes only of the 4 lane divided section. Place AR- ACFC (26' wide) through this section. Overlay the existing 2 lane section full width (40') with AC & AR-ACFC. Shoulders shall receive a fog coat. Grooving will be applied. Programmed amount is \$2,009,000. Scheduled for FY 1997-1998.
- MP 123.4 to MP 138.8, Morristown RROP - Beardsley Road. Identified as R/W Plans, Appraisals, Acquisition, Relocation and Demolition. Programmed amount is \$5,000,000. Scheduled for FY 1998-1999.
- MP 123.4 to MP 138.8, Morristown RROP - Beardsley Road. Identified as Utility Relocation. Programmed amount is \$1,430,000. Scheduled for FY 1998-1999.
- MP 123.4 to MP 127.7, Morristown RROP - Dove Valley Road. Identified as Ultimate Improvement #4: Design (Roadway). Programmed amount is \$730,000. Scheduled for FY 2001-2002.
- MP 127.6, MP 126.3 - MP 129.7, MP 130.9 - MP 131.0, MP 134.1, Identified as Remedial Improvements: Pavement striping. Programmed amount is \$76,000. Scheduled for FY 1997-1998.

- MP 127.8 to MP 131.4, Dove Valley Road - 203rd Ave (West). Identified as Ultimate Improvement #3: Design (Roadway). Programmed amount is \$700,000. Scheduled for FY 2000-2001.
- MP 127.8 to MP 131.4, Dove Valley Road - 203rd Ave (West). Identified as Ultimate Improvement #3: Construct Roadway. Programmed amount is \$9,760,000. Scheduled for FY 2001-2002.
- MP 131.4 to MP 136.9, 203rd Ave (West) - Deer Valley Road. Identified as Ultimate Improvement #2: Design (Roadway). Programmed amount is \$780,000. Scheduled for FY 1999-2000.
- MP 131.4 to MP 136.9, 203rd Ave (West) - Deer Valley Road. Identified as Ultimate Improvement #2: Construct Roadway. Programmed amount is \$10,370,000. Scheduled for FY 2000-2001.
- MP 136.9 to MP 138.8, Deer Valley Road - Beardsley Road. Identified as Ultimate Improvement #1: Design (Roadway). Programmed amount is \$350,000. Scheduled for FY 1997-1998.
- MP 136.9 to MP 138.8, Deer Valley Road - Beardsley Road. Identified as Ultimate Improvement #1: Construct Roadway. Programmed amount is \$3,500,000. Scheduled for FY 1999-2000.

7.3 Proposed Improvements

The proposed improvements for US 60 can be divided into three categories. They are:

Remedial Projects - includes projects that will address existing operational problems which will be addressed as soon as funding becomes available. Remedial Facility Projects will not extend the life of the existing highway.

Interim Projects - includes projects that will extend the useful life of the existing facility, and safety improvement projects.

Ultimate Projects - includes projects that will develop the corridor to provide a roadway meeting the transportation needs through the design year.

7.4 Remedial Improvements

Striping for Left-Turn Lanes (MP 127.6, MP 128.3 to MP 129.7, MP 130.9 to MP 131.0, and MP 134.1) - Left-turns onto side streets from US 60 are becoming increasingly more difficult with increased traffic volumes. The left-turn bays/lanes will provide refuge areas that are needed to separate turning traffic from through traffic. Locations needing restriping for left-turn lanes are: Happy Lane, the Wittmann area which includes Crozier Road and 211th Avenue, 203rd Avenue (east and west), and Jomax Road. The locations for the remedial improvements proposed for US 60 have been illustrated on Figure 7-1. Construction of this project has been scheduled for FY 1997-98 (see Section 7.2). See Section 7.10 for a breakdown of the project cost estimate.

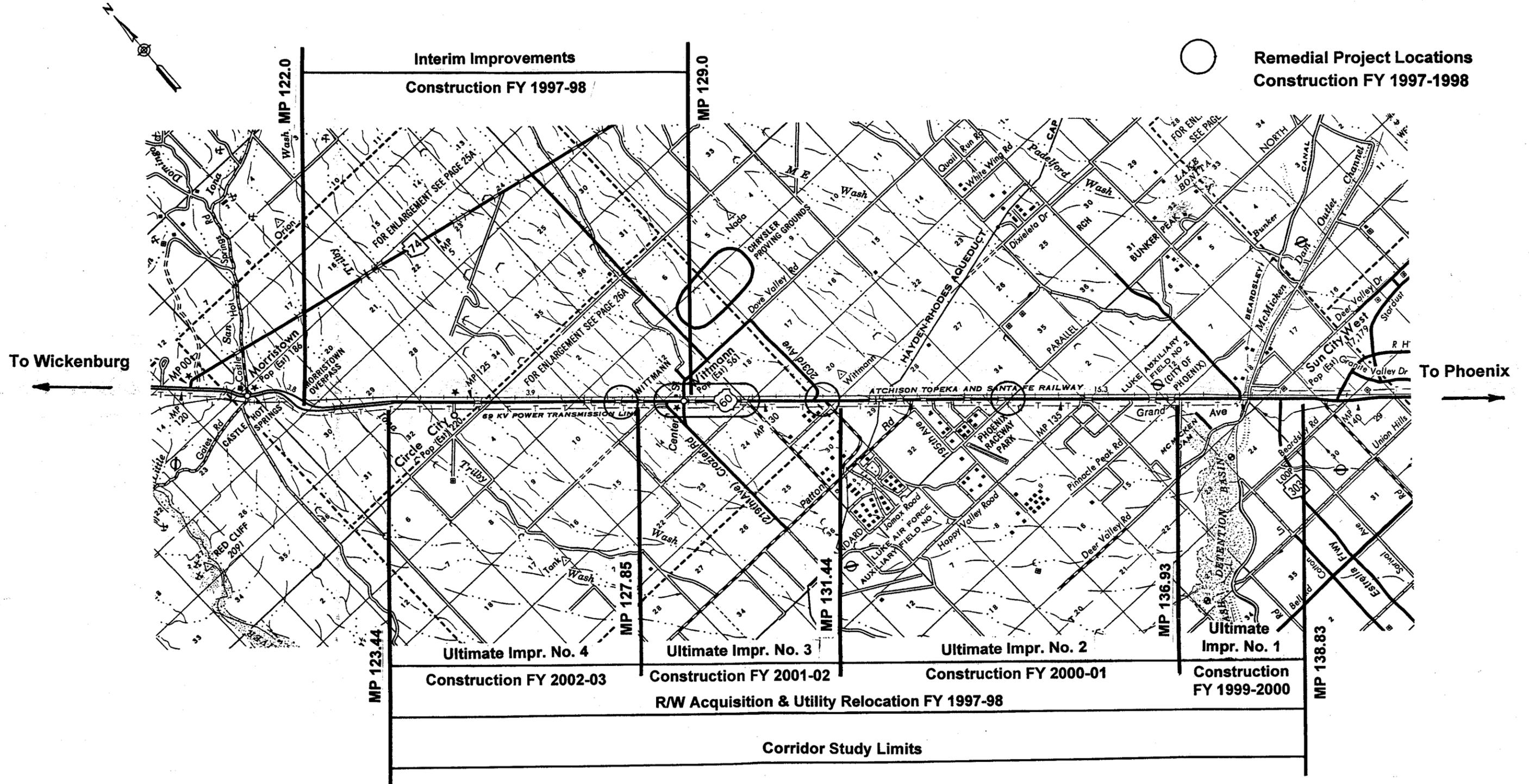


Figure 7 - 1
Proposed Improvements

7.5 Interim Improvements

Morristown RROP to Wittmann (MP 122.0 to MP 129.0) - This is a pavement preservation project to overlay existing US 60 with 2½-inches of AC and ½-inch of ACFC. This interim improvement is needed to preserve the pavement in advance of ultimate improvements. Bridges over Trilby and Wittmann Washes will require all of the present AC pavement to be milled off. The overlay on bridges will be restricted to a depth that will retain HS 20 structural capacity for bridges. The limits for the interim improvement proposed for US 60 have been illustrated on Figure 7-1.

This section was tentatively scheduled for a 3" mill and overlay plus ACFC. However, as part of the ultimate facility existing pipe culverts and selected box culverts will be replaced. The interim improvements will provide an adequate roadway surface until the drainage structures are replaced and the final milling and paving is done as part of the ultimate construction.

Construction of this project has been scheduled for FY 1997-98 (see Section 7.2). See Section 7.10 for a breakdown of the project cost estimate.

7.6 Ultimate Improvements

R/W Acquisition - Morristown RROP to Beardsley Road (MP 123.44 to MP 138.83) - Major utilities (gas, power, telecommunications and telephone) parallel the south edge of the R/W for the length of the corridor. These utilities overlap all of the proposed ultimate projects. Acquisition of new R/W should be scheduled to provide time and opportunity for utilities to relocate throughout the corridor rather than for each construction segment. The priority of acquisition should be from the corridor's east end to the west, corresponding with the construction sequence of the ultimate projects. Consideration should also be given for early negotiations involving the relocation of facilities for the West End Water Company in Wittmann. The water facilities must remain in service during the relocation effort. This project has been scheduled for FY 1998-99 (see Section 7.2). See Section 7.12 for bar graphs illustrating the time line of activities for R/W plans, appraisals, acquisition, relocation and demolition.

Utility Relocation - Morristown RROP to Beardsley Road (MP 123.44 to MP 138.83) - Utility facilities inside ADOT R/W requiring relocation/adjustments include: underground gas and telephone facilities for the length of the project; APS has a 69 kV power transmission line located on the south side of US 60 from MP 123.5 to 138.0 and several 12kV service lines and poles; MCI has an underground fiber optic cable located on the south side of US 60 from MP 132.9 to 138.0; the West End Water Company has water lines in the Wittmann area; the Maricopa Water District has an irrigation canal crossing at MP 138.0 that requires coordination for a bridge crossing.

Utility facilities outside ADOT R/W requiring relocation/coordination include service lines for power, telephone, and gas. MCI has a fiber optic cable run located along the Beardsley Canal and 193rd Avenue that requires relocation. Reconstruction of the railroad crossings at Center Street in Wittmann, 203rd Avenue and Loop 303 will require coordination with AT&SF. The West End Water Company in Wittmann has water storage tanks, pumps and water transmission facilities requiring relocation. US West has a telephone switching building located east of Circle City requiring relocation.

Prior rights for the utilities have not been determined. It appears that both the Maricopa Water District (Beardsley Canal) and the railroad (AT&SF) have prior rights based on highway plans prepared in the 1940s. Both facilities existed prior to construction of the existing highway. Other utilities (power, telephone, gas) were not present in the highway plans and thus do not appear to have prior rights except outside ADOT R/W. This project has been scheduled for FY 1998-99 (see Section 7.2). See Section 7.12 for bar graphs illustrating the time line of activities for utility relocations.

Ultimate Improvement No. 1 - Deer Valley Road to Beardsley Road (MP 136.93 to MP 138.83) - Construct two new eastbound lanes from Deer Valley Road to the existing eastbound lanes located east of Loop 303 including bridges over the McMicken Floodway and the Beardsley Canal. The existing road will be used as the westbound lanes from MP 136.93 (Station 805+00) to MP 138.41 (Station 883+00). The existing roadway surface will be milled and overlaid with AC and ACFC. From MP 138.41 (Station 883+00) to MP 138.76 (Station 901+50), the existing roadway will be reconstructed to match the existing westbound lanes at the east end of the project and to raise the grade of US 60 to match the railroad grade at the Loop 303 intersection. The limits for this improvement have been illustrated on Figure 7-1.

The project will be coordinated with Maricopa County Department of Transportation (MCDOT) who are planning to reconstruct the intersection of Loop 303 and provide a railroad crossing over the AT&SF Railroad. Short term traffic projections by MCDOT show the Loop 303 intersection will meet warrants for signalization. An IGA with MCDOT is needed to identify the limits of each agency's responsibility at the intersection with Loop 303.

The project limits were selected to deal with the highest traffic volumes along this corridor, 10,400 to 11,500 vpd (see Figure 2-1). The project matches with the existing four-lane divided section at the east end. The proposed four-lane divided facility will be extended to the west beyond the intersection with Deer Valley Road. Deer Valley Road is the principal access to a regional solid waste landfill facility located to the west of US 60. The landfill is a destination point for heavy truck traffic. This section of US 60 is currently operating at LOS D.

Roadway design will begin in FY 1997-98. Roadway construction will begin in the second half of FY 1999-2000. See Section 7.12 for bar graphs illustrating the time line of activities for design, R/W and utility relocations, and roadway construction. See Section 7.10 for a breakdown of the project cost estimate.

Ultimate Improvement No. 2 - 203rd Avenue (East) to Deer Valley Road (MP 131.44 to MP 136.93) - Construct two new eastbound lanes starting 1300 feet east of the 203rd Avenue Intersection (east) to the end of the first ultimate facility project near the Deer Valley Road Intersection. The project will include reconstruction of two intersections (Jomax Road and Happy Valley Road). Work will include a new bridge for the eastbound lanes over the Central Arizona Project canal and several large box culverts and pipe culverts will be extended at wash crossings. The existing roadway will be used as the westbound lanes from MP 131.44 (Station 515+00) to MP 136.93 (Station 805+00) and will be milled and overlaid with AC and ACFC. The limits for this improvement have been illustrated on Figure 7-1. Two roadways (Happy Valley Road and Jomax Road) will need to be realigned so that the intersections

are 90 degrees to US 60. In addition, Citrus Road will be realigned to connect with Happy Valley Road. IGA's will be needed with MCDOT and the City of Surprise to identify the work to be done and the limits of each agency's responsibility with the realignment of the roadways. The IGA's should be prepared before FY 1999-2000 so that the scope for the design work can be finalized and construction started by FY 2000-2001.

The project limits were selected to deal with the next highest traffic volumes along this corridor, 8,400 to 10,400 vpd (see Figure 2-1). The project matches with Ultimate Improvement No. 1 at the east end. The west end stops just prior to 203rd Avenue. The existing roadway west of this project through 203rd Avenue will be reconstructed to fit the railroad grade at the 203rd Avenue railroad grade crossing. The section of US 60 from Deer Valley Road to Happy Valley Road is currently operating at LOS D. The remaining portion is operating at LOS C, but is projected to reach LOS D when construction is scheduled.

Roadway design will begin in FY 1999-2000. Roadway construction will begin in the second half of FY 2000-2001. See Section 7.12 for bar graphs illustrating the time line of activities for design, R/W, utility relocations, and roadway construction. See Section 7.10 for a breakdown of the project cost estimate.

Ultimate Improvement No. 3 - Dove Valley Road to 203rd Avenue (MP 127.85 to MP 131.44) - Construct two new eastbound lanes starting 1,500 feet west of Dove Valley Road to the end of the second ultimate improvement project near the 203rd Avenue (East) Intersection. The project will include reconstruction of three intersections and the AT&SF Railroad crossing with signalization (if warranted) at Center Street in Wittmann. Work will include new bridges for the eastbound lanes over the Wittmann Wash and box culverts at two wash crossings will be extended. The existing road will be used as the westbound lanes from MP 127.85 (Station 325+00) to MP 128.32 (Station 349+81) and from MP 129.02 (Station 387+31) to MP 130.58 (Station 470+50). The roadway surface will be milled and overlaid with AC and ACFC. The existing roadway will be reconstructed, from MP 128.32 (Station 349+81) to MP 129.02 (Station 387+31) and from MP 130.58 (Station 470+50) to MP 131.19 (Station 502+00), to raise US 60 at the Center Street and 203rd Avenue intersections to improve the roadway profile for the railroad crossing. A signal warrant study should be prepared at the time of design to determine if signalization at Center Street is warranted. Three roadways (Dove Valley Road, Crozier Road and 211th Avenue) will be realigned so that the intersections are 90 degrees to US 60. In addition, Center Street will be realigned north of US 60 to eliminate the offset with Center Street to the south of US 60. An IGA will be needed with MCDOT to identify the work to be done and the limits of each agency's responsibility concerning the realignment of the roadways. The IGA should be prepared before FY 2000-2001 so that the scope for the design work can be finalized and construction started by FY 2001-2002.

The project limits were selected to deal with improvements to the Wittmann area. The project matches with Ultimate Improvement No. 2 at the east end. The west end stops beyond improvements to Dove Valley Road. Significant turning movements exist at Center Street in Wittmann. This section of US 60 is currently operating at LOS C. Traffic volumes range between 7,800 to 8,400 vpd. It is anticipated that traffic volumes will reach 10,400 vpd by the year 2001, resulting in an LOS D.

Roadway design will begin in FY 2000-2001. Roadway construction will begin in the second half of FY 2001-02. See Section 7.12 for bar graphs illustrating the time line of activities for design, R/W, utility relocations, and roadway construction. See Section 7.10 for a breakdown of the project cost estimate.

Ultimate Improvement No. 4 - Morristown RROP to Dove Valley Road (MP 123.44 to MP 127.85) Construct two new eastbound lanes from the east end of the existing 4-lane divided roadway located 1.5 miles east of the Morristown RROP to the end of the third ultimate improvement project near the Dove Valley Road intersection. The project will include a new bridge for the eastbound lanes over the Trilby Wash. The existing road will be used as the westbound lanes from MP 123.44 (Station 96+00) to MP 127.85 (Station 325+00) and will be milled and overlaid with AC and ACFC. Existing pipe culverts and selected box culverts will be replaced prior to the final milling and overlay.

This project matches with Ultimate Improvement No. 3 at the east end and the existing four-lane divided roadway to the west. This section of US 60 is currently operating at LOS C. Current traffic volumes are 7,800 vpd. It is estimated that traffic volumes will reach 10,400 vpd by the year 2001, resulting in an LOS D.

Roadway design will begin in FY 2001-02. Roadway construction will begin in the second half of FY 2002-03. See Section 7.12 for bar graphs illustrating the time line of activities for design, R/W, utility relocations, and roadway construction. See Section 7.10 for a breakdown of the project cost estimate.

The proposed improvement projects have been summarized below in Table 7-1 and are illustrated in Figure 7-1.

**Table 7-1
PROPOSED IMPROVEMENTS**

| Improvement Project | Description | Mileposts | 1997-2001 Five Year Construction Program Status |
|----------------------------|---------------------------------------|--|--|
| Remedial Improvement | Restripe Pavement for Left-Turn Lanes | 127.6, 128.3-129.7, 130.9-131.0, and 134.1 | FY 1997-98 |
| Interim Improvement | Morristown RROP to Wittmann | 122.0 to 129.0 | FY 1997-98 |
| R/W Acquisition | Morristown RROP to Beardsley Road | 123.44 to 138.83 | FY 1998-99 |
| Utility Relocation | Morristown RROP to Beardsley Road | 123.44 to 138.83 | FY 1998-99 |
| Ultimate Improvement No. 1 | Deer Valley Road to Beardsley Road | 136.93 to 138.83 | FY 1999-2000 |

| Improvement Project | Description | Mileposts | 1997-2001 Five Year Construction Program Status |
|----------------------------|---|------------------|---|
| Ultimate Improvement No. 2 | 203rd Avenue (West) to Deer Valley Road | 131.44 to 136.93 | FY 2000-2001 |
| Ultimate Improvement No. 3 | Dove Valley Road to 203rd Avenue (West) | 127.85 to 131.44 | FY 2001-2002 |
| Ultimate Improvement No. 4 | Morristown RROP to Dove Valley Road | 123.44 to 127.85 | Not Programmed |

7.7 Project Timing

The minimum Level-of-Service (LOS) that is acceptable is LOS C. Below this level, turning movements onto US 60 can expect long traffic delays. ADOT policy requires a minimum LOS of C or better in the design year. The timing for each project is discussed below:

7.8 Trigger Events

Remedial Improvement - Striping for Left-Turn Lanes (MP 127.6, MP 128.3 to MP 129.7, MP 130.9 to MP 131.0, and MP 134.1) - These spot locations on US 60 are currently operating at LOS C (ADT = 8,400 - 7,800 vpd). Left-turns lanes were recommended by ADOT Traffic Studies to reduce the frequency of rear-end and left-turn accidents.

Interim Improvement - Morristown RROP to Wittmann (MP 122.0 to MP 129.0) - This section of US 60 is currently operating at LOS C (ADT = 7,800 vpd). The programmed project is a pavement preservation project that will extend the useful life of the existing facility. Project structural section was provided by the Pavement Design Section to provide the useful life to correspond with timing of the Ultimate Improvement Projects.

R/W Acquisition - Morristown RROP to Beardsley Road (MP 123.44 to MP 138.83) - R/W acquisition for entire corridor needed to provide time and opportunity for utilities to relocate.

Utility Relocation - Morristown RROP to Beardsley Road (MP 123.44 to MP 138.83) - Utility relocation scheduled for entire corridor to allow timely construction of the four ultimate improvements.

Ultimate Improvement No. 1 - Deer Valley Road to Beardsley Road (MP 136.93 to MP 138.83) - This section of US 60 is currently operating at LOS D (ADT = 10,400-11,500 vpd). MCDOT is planning to realign Loop 303 at US 60. Work by MCDOT includes a crossing of the AT&SF railroad and

signalization at the intersection of US 60 and Loop 303. This section of US 60 should be programmed for construction to coincide with the MCDOT project. Coordination will avoid reconstruction of improvements constructed by MCDOT and reduce the cost of maintenance of traffic by accomplishing both the US 60 construction and the Loop 303 County construction at the same time.

Ultimate Improvement No. 2 - 203rd Avenue (East) to Deer Valley Road (MP 131.44 to MP 136.93) - This section of US 60 is currently operating between LOS C and D (ADT = 8,400+ to 10,400 vpd). The western portions of the roadway currently not operating at LOS D are projected to decline to LOS D by the programmed year of construction (FY 2000-2001).

Ultimate Improvement No. 3 - Dove Valley Road to 203rd Avenue (MP 127.85 to MP 131.44) - This section of US 60 is currently operating at LOS C (ADT = 7,800-8,400 vpd). Based on MAG traffic projections, the annual growth rate of this section of US 60 is approximately 3.5%. At this growth rate the time period to reach LOS D will be 6 to 7 years. The traffic on US 60 should be monitored to determine if the actual growth rate (is/or is not) matching the anticipated growth rate. The recommended construction year (FY 2001-02) is based on the LOS declining to LOS D.

Ultimate Improvement No. 4 - Morristown RROP to Dove Valley Road (MP 123.44 to MP 127.85) This section of US 60 is currently operating at LOS C (ADT = 7,800). Based on MAG traffic projections, the annual growth rate of this section of US 60 is approximately 3.5%. At this growth rate the time period to reach LOS D will be 7 years. The traffic on US 60 should be monitored to determine if the actual growth rate (is/or is not) matching the anticipated growth rate. The recommended construction year (FY 2002-03) is based on the LOS declining to LOS D.

7.9 Construction Phasing Considerations

Ultimate Improvement No. 1 - Deer Valley Road to Beardsley Road (MP 136.93 to MP 138.83) will be coordinated with Maricopa County Department of Transportation's (MCDOT) improvements to reconstruct and signalize the intersection of US 60 and Loop 303.

MCDOT reconstruction work on intersection of Loop 303 and US 60 is experiencing delays with their railroad reviews and is anticipating the construction will be delayed to FY 1997-98.

All four of the ultimate improvements will require borrow material. The approximate borrow amounts are :

- Ultimate Improvement No. 1 - 70,000 cubic yards
- Ultimate Improvement No. 2 - 211,000 cubic yards
- Ultimate Improvement No. 3 - 173,000 cubic yards
- Ultimate Improvement No. 4 - 142,000 cubic yards

Maintenance of traffic on US 60 during construction is necessary at all times because satisfactory alternative routes are not available. All of the proposed ultimate facility improvements will allow construction of the new eastbound roadway while traffic is maintained on the existing roadway. Access

to US 60 from adjacent properties and crossroads south of the corridor will be maintained during construction by requirements contained in the contract documents. Minimum disruption to traffic at the beginning and end of construction segments will be expected. Temporary connections will be required in the contract documents to assure that the contractor provides satisfactory detours and traffic control per ADOT's Traffic Control Manual.

When the eastbound roadway is complete, two-way traffic will be shifted from the existing roadway to the newly built eastbound lanes while segments to be reconstructed and the milling and overlay are completed. Access will be maintained to crossroads providing grade crossings over the AT&SF Railroad. Drainage structures that are to be constructed across the existing roadway will require staged construction to maintain traffic on the existing roadway.

7.10 Project Cost Estimates

A summary of the costs associated with each project has been presented in Table 7-2. Detailed cost estimates for each project are presented following Table 7-2.

Table 7-2
COST ESTIMATE SUMMARY

| Project | Construction (\$) | Design (\$) | Utility Relocation (\$) | Right-of-Way** (\$) | Total Project Cost (\$) |
|----------------------|-------------------|-------------|-------------------------|---------------------|-------------------------|
| Remedial Impr. | 76,000 | 0 | 0 | 0 | 76,000 |
| Interim Impr. | 1,350,000 | 0 | 0 | 0 | 1,350,000 |
| R/W Acquisition | 0 | 0 | 0 | 5,000,000 | 5,000,000 |
| Utility Relocation | 0 | 0 | 1,430,000 | 0 | 1,430,000 |
| Ultimate Impr. No. 1 | 3,500,000 | 350,000 | 0 | 0 | 3,850,000 |
| Ultimate Impr. No. 2 | 10,590,000* | 780,000 | 0 | 0 | 11,370,000 |
| Ultimate Impr. No. 3 | 9,980,000* | 700,000 | 0 | 0 | 10,680,000 |
| Ultimate Impr. No. 4 | 9,150,000 | 730,000 | 0 | 0 | 9,880,000 |

* Includes cost of realigning side streets.

** Includes cost of relocation.

Project No.: 060 MA 121 H 3623 01 L
 Location: US 60, Morristown RROP to Beardsley Road
 Route: US 60

DATE: 15-Jun-96

ALIGNMENT A2, Remedial Improvements

| ITEM | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|--|-------|----------|------------|---------------|
| Obliterate Existing Striping | L.F. | 28,600 | 0.50 | 14,300 |
| Signing | L.Sum | 1 | 5,000 | 5,000 |
| Thermoplastic Striping | L.F. | 65,000 | 0.50 | 32,500 |
| SUBTOTAL | | | | 52,000 |
| Construction Surveying and Layout (1%) | | | | 500 |
| Maintenance and Protection of Traffic (10%) | | | | 5,200 |
| Mobilization (6%) | | | | 3,100 |
| Construction Engineering and Contingencies (30%) | | | | 15,600 |
| CONSTRUCTION TOTAL | | | | 76,000 |
| Right-of-Way | | | | 0 |
| Utility Relocation | | | | 0 |
| SUBTOTAL | | | | 0 |
| TOTAL PROGRAM COST | | | | 76,000 |

Project No.: 060 MA 121 H 3623 01 L
 Location: US 60, Morristown RROP to Beardsley Road
 Route: US 60

DATE: 15-Jun-96

ALIGNMENT A2, Interim Improvements
 MP 122.0 to MP 129.0

| ITEM | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|--------|----------|------------|------------------|
| Clearing and Grubbing | Acre | 0 | 1,000 | 0 |
| Removal of Structures & Obstructions | L.Sum | 0 | 0 | 0 |
| Removal of Asphaltic Concrete Pavement | Sq.Yd. | 0 | 1 | 0 |
| Drainage Excavation | Cu.Yd. | 0 | 5 | 0 |
| Roadway Excavation | Cu.Yd. | 0 | 5 | 0 |
| Borrow | Cu.Yd. | 0 | 5 | 0 |
| Aggregate Base Course | Cu.Yd. | 0 | 15 | 0 |
| Asphaltic Cement (AC-40) | Ton | 1,630 | 150 | 244,500 |
| Bituminous Tack Coat | Ton | 52 | 150 | 7,800 |
| Apply Bituminous Tack Coat | Hour | 104 | 100 | 10,400 |
| Asphaltic Concrete Friction Course (1/2-inch) | Ton | 3,810 | 19 | 72,390 |
| Asphaltic Concrete | Ton | 28,070 | 17 | 477,190 |
| Mineral Admixture | Ton | 600 | 90 | 54,000 |
| Mill (Westbound Lanes) | Sq.Yd. | 3,200 | 2 | 6,400 |
| Pipe Culvert (48" CMP) | L.F. | 0 | 75 | 0 |
| Pipe Culvert (36" CMP) | L.F. | 0 | 60 | 0 |
| Pipe Culvert (30" CMP) | L.F. | 0 | 45 | 0 |
| Pipe Culvert (24" CMP) | L.F. | 0 | 35 | 0 |
| Bridge Structures | Sq.Ft. | 0 | 55 | 0 |
| Noise Walls | Sq.Ft. | 0 | 15 | 0 |
| Structural Concrete (Box Culv. & Pipe Culv. Hdwl) | Cu.Yd. | 0 | 225 | 0 |
| Structural Steel (Box Culv. & Pipe Culv. Hdwl) | Lb. | 0 | 0.45 | 0 |
| Rail Bank Protection, Type 5 (Std. C-17.20) | L.F. | 0 | 250 | 0 |
| Guardrail, W-Beam Single Face | L.F. | 0 | 10 | 0 |
| Guard Rail Extruder Terminal | Ea. | 0 | 3,000 | 0 |
| Barbed Wire Fencing | L.F. | 0 | 2 | 0 |
| Revegetation | Mile | 0 | 15,000 | 0 |
| Signing | Mile | 0 | 25,000 | 0 |
| Thermoplastic Striping | L.F. | 118,000 | 0.40 | 47,200 |
| SUBTOTAL | | | | 920,000 |
| Railroad Flagmen | | | | 0 |
| Construction Surveying and Layout (0%) | | | | 0 |
| Furnish Water Supply & Dust Palliative (0%) | | | | 0 |
| Maintenance and Protection of Traffic (8%) | | | | 73,600 |
| Mobilization (6%) | | | | 55,200 |
| Quality Control (2%) | | | | 18,400 |
| Erosion Control (1%) | | | | 9,200 |
| Construction Engineering and Contingencies (30%) | | | | 276,000 |
| CONSTRUCTION TOTAL | | | | 1,350,000 |
| Design (0% - By ADOT) | | | | 0 |
| Realignment of Side Streets | | | | 0 |
| Utility Relocation | | | | 0 |
| SUBTOTAL | | | | 0 |
| TOTAL PROGRAM COST | | | | 1,350,000 |

Project No.: 060 MA 121 H 3623 01 L
 Location: US 60, Morristown RROP to Beardsley Road
 Route: US 60

DATE: 15-Jun-96

ALIGNMENT A2, Ultimate Improvement No. 1
 MP 136.93 to MP 138.83

| ITEM | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|--------|----------|------------|------------------|
| Clearing and Grubbing | Acre | 26 | 1,000 | 26,000 |
| Removal of Structures & Obstructions | Sq.Yd. | 1 | 10,000 | 10,000 |
| Removal of Asphaltic Concrete Pavement | Sq.Yd. | 15,500 | 1 | 15,500 |
| Drainage Excavation | Cu.Yd. | 500 | 5 | 2,500 |
| Roadway Excavation | Cu.Yd. | 5,200 | 5 | 26,000 |
| Borrow | Cu.Yd. | 70,000 | 5 | 350,000 |
| Aggregate Base Course | Cu.Yd. | 19,600 | 15 | 294,000 |
| Asphaltic Cement (AC-40) | Ton | 2,000 | 150 | 300,000 |
| Bituminous Tack Coat | Ton | 44 | 150 | 6,600 |
| Apply Bituminous Tack Coat | Hour | 88 | 100 | 8,800 |
| Asphaltic Concrete Friction Course (1/2-inch) | Ton | 1,975 | 19 | 37,500 |
| Asphaltic Concrete | Ton | 37,700 | 17 | 640,900 |
| Mineral Admixture | Ton | 755 | 90 | 67,950 |
| Mill (Westbound Lanes) | Sq.Yd. | 34,670 | 1 | 34,700 |
| Pipe Culvert (48" CMP) | L.F. | 0 | 75 | 0 |
| Pipe Culvert (36" CMP) | L.F. | 0 | 60 | 0 |
| Pipe Culvert (30" CMP) | L.F. | 0 | 45 | 0 |
| Pipe Culvert (24" CMP) | L.F. | 0 | 35 | 0 |
| Bridge Structures | Sq.Ft. | 5,670 | 55 | 311,850 |
| Noise Walls | Sq.Ft. | 0 | 15 | 0 |
| Structural Concrete (Box Culv. & Pipe Culv. Hdwl) | Cu.Yd. | 108 | 225 | 24,300 |
| Structural Steel (Box Culv. & Pipe Culv. Hdwl) | Lb. | 14,700 | 0.45 | 6,600 |
| Rail Bank Protection, Type 5 (Std. C-17.20) | L.F. | 50 | 250 | 12,500 |
| Guardrail, W-Beam Single Face | L.F. | 2,600 | 10 | 26,000 |
| Guard Rail Extruder Terminal | Ea. | 4 | 3,000 | 12,000 |
| Barbed Wire Fencing | L.F. | 5,500 | 2 | 11,000 |
| Revegetation | Mile | 1.9 | 15,000 | 28,500 |
| Signing | Mile | 1.9 | 25,000 | 47,500 |
| Thermoplastic Striping | L.F. | 50,000 | 0.40 | 20,000 |
| SUBTOTAL | | | | 2,321,000 |
| Railroad Flagmen | | | | 0 |
| Construction Surveying and Layout (1%) | | | | 23,200 |
| Furnish Water Supply & Dust Palliative (2%) | | | | 46,400 |
| Maintenance and Protection of Traffic (8%) | | | | 185,700 |
| Mobilization (6%) | | | | 139,300 |
| Quality Control (2%) | | | | 46,400 |
| Erosion Control (1%) | | | | 23,200 |
| Construction Engineering and Contingencies (30%) | | | | 696,300 |
| CONSTRUCTION TOTAL | | | | 3,500,000 |
| Design (10%) | | | | 350,000 |
| Realignment of Side Streets | | | | 0 |
| SUBTOTAL | | | | 350,000 |
| TOTAL PROGRAM COST | | | | 3,850,000 |

Project No.: 060 MA 121 H 3623 01 L

DATE: 15-Jun-96

Location: US 60, Morristown RROP to Beardsley Road

Route: US 60

ALIGNMENT A2, Ultimate Improvement No. 2
MP 131.44 to MP 136.93

| ITEM | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|--------|----------|------------|------------------|
| Clearing and Grubbing | Acre | 79 | 1,000 | 79,000 |
| Removal of Structures & Obstructions | L.Sum | 1 | 30,000 | 30,000 |
| Removal of Asphaltic Concrete Pavement | Sq.Yd. | 8,000 | 1 | 8,000 |
| Drainage Excavation | Cu.Yd. | 1,650 | 5 | 8,300 |
| Roadway Excavation | Cu.Yd. | 1,900 | 5 | 9,500 |
| Borrow | Cu.Yd. | 211,000 | 5 | 1,055,000 |
| Aggregate Base Course | Cu.Yd. | 43,400 | 15 | 651,000 |
| Asphaltic Cement (AC-40) | Ton | 5,150 | 150 | 772,500 |
| Bituminous Tack Coat | Ton | 128 | 150 | 19,200 |
| Apply Bituminous Tack Coat | Hour | 256 | 100 | 25,600 |
| Asphaltic Concrete Friction Course (1/2-inch) | Ton | 5,150 | 19 | 97,900 |
| Asphaltic Concrete | Ton | 96,800 | 17 | 1,645,600 |
| Mineral Admixture | Ton | 1,936 | 90 | 174,200 |
| Mill (Westbound Lanes) | Sq.Yd. | 128,900 | 1 | 128,900 |
| Pipe Culvert (48" CMP) | L.F. | 110 | 75 | 8,300 |
| Pipe Culvert (36" CMP) | L.F. | 250 | 60 | 15,000 |
| Pipe Culvert (30" CMP) | L.F. | 0 | 45 | 0 |
| Pipe Culvert (24" CMP) | L.F. | 260 | 35 | 9,100 |
| Bridge Structures | Sq.Ft. | 3,570 | 55 | 196,400 |
| Noise Walls | Sq.Ft. | 0 | 15 | 0 |
| Structural Concrete (Box Culv. & Pipe Culv. Hdwl) | Cu.Yd. | 4,160 | 225 | 936,000 |
| Structural Steel (Box Culv. & Pipe Culv. Hdwl) | Lb. | 605,000 | 0.45 | 272,250 |
| Rail Bank Protection, Type 5 (Std. C-17.20) | L.F. | 750 | 250 | 187,500 |
| Guardrail, W-Beam Single Face | L.F. | 1,200 | 10 | 12,000 |
| Guard Rail Extruder Terminal | Ea. | 4 | 3,000 | 12,000 |
| Barbed Wire Fencing | L.F. | 28,500 | 2 | 57,000 |
| Revegetation | Mile | 5.5 | 15,000 | 82,500 |
| Signing | Mile | 5.5 | 25,000 | 137,500 |
| Thermoplastic Striping | L.F. | 137,000 | 0.40 | 54,800 |
| SUBTOTAL | | | | 6,685,000 |

| | |
|--|-------------------|
| Railroad Flagmen | 0 |
| Construction Surveying and Layout (1%) | 66,900 |
| Furnish Water Supply & Dust Palliative (2%) | 133,700 |
| Maintenance and Protection of Traffic (8%) | 534,800 |
| Mobilization (6%) | 401,100 |
| Quality Control (2%) | 133,700 |
| Erosion Control (1%) | 66,900 |
| Construction Engineering and Contingencies (30%) | 2,005,500 |
| CONSTRUCTION TOTAL | |
| | 10,030,000 |

| | |
|-----------------------------|------------------|
| Design (8%) | 780,000 |
| Realignment of Side Streets | 560,000 |
| SUBTOTAL | |
| | 1,340,000 |

TOTAL PROGRAM COST 11,370,000

Project No.: 060 MA 121 H 3623 01 L

DATE: 15-Jun-96

Location: US 60, Morristown RROP to Beardsley Road

Route: US 60

ALIGNMENT A2, Ultimate Improvement No. 3
MP 127.85 to MP 131.44

| ITEM | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|--|--------|----------|------------|-------------------|
| Clearing and Grubbing | Acre | 53 | 1,000 | 53,000 |
| Removal of Structures & Obstructions | L.Sum | 1 | 50,000 | 50,000 |
| Removal of Asphaltic Concrete Pavement | Sq.Yd. | 42,360 | 1 | 42,400 |
| Drainage Excavation | Cu.Yd. | 6,800 | 5 | 34,000 |
| Roadway Excavation | Cu.Yd. | 1,300 | 5 | 6,500 |
| Borrow | Cu.Yd. | 173,000 | 5 | 865,000 |
| Aggregate Base Course | Cu.Yd. | 34,600 | 15 | 519,000 |
| Asphaltic Cement (AC-40) | Ton | 4,050 | 150 | 607,500 |
| Bituminous Tack Coat | Ton | 100 | 150 | 15,000 |
| Apply Bituminous Tack Coat | Hour | 200 | 100 | 20,000 |
| Asphaltic Concrete Friction Course (1/2-inch) | Ton | 3,480 | 19 | 66,100 |
| Asphaltic Concrete | Ton | 76,800 | 17 | 1,305,600 |
| Mineral Admixture | Ton | 1,524 | 90 | 137,200 |
| Mill (Westbound Lanes) | Sq.Yd. | 84,440 | 1 | 84,400 |
| Pipe Culvert (48" CMP) | L.F. | 0 | 75 | 0 |
| Pipe Culvert (36" CMP) | L.F. | 240 | 60 | 14,400 |
| Pipe Culvert (30" CMP) | L.F. | 0 | 45 | 0 |
| Pipe Culvert (24" CMP) | L.F. | 0 | 35 | 0 |
| Bridge Structures | Sq.Ft. | 6,090 | 55 | 335,000 |
| Noise Walls | Sq.Ft. | 53,440 | 15 | 801,600 |
| Structural Concrete (Box Culv. & Pipe Culv. Hdw) | Cu.Yd. | 1,070 | 225 | 240,750 |
| Structural Steel (Box Culv. & Pipe Culv. Hdw) | Lb. | 156,000 | 0.45 | 70,200 |
| Rail Bank Protection, Type 5 (Std. C-17.20) | L.F. | 1,300 | 250 | 325,000 |
| Guardrail, W-Beam Single Face | L.F. | 1,200 | 10 | 12,000 |
| Guard Rail Extruder Terminal | Ea. | 4 | 3,000 | 12,000 |
| Signalization (Center Street, Wittmann) | L.Sum | 1 | 100,000 | 100,000 |
| Barbed Wire Fencing | L.F. | 12,700 | 2 | 25,400 |
| Revegetation | Mile | 3.6 | 15,000 | 54,000 |
| Signing | Mile | 3.6 | 25,000 | 90,000 |
| Thermoplastic Striping | L.F. | 81,000 | 0.40 | 32,400 |
| SUBTOTAL | | | | 5,918,000 |
| Railroad Flagmen | | | | 50,000 |
| Construction Surveying and Layout (1%) | | | | 59,200 |
| Furnish Water Supply & Dust Palliative (2%) | | | | 118,400 |
| Maintenance and Protection of Traffic (8%) | | | | 473,400 |
| Mobilization (6%) | | | | 355,100 |
| Quality Control (2%) | | | | 118,400 |
| Erosion Control (1%) | | | | 59,200 |
| Construction Engineering and Contingencies (30%) | | | | 1,775,400 |
| CONSTRUCTION TOTAL | | | | 8,930,000 |
| Design (8%) | | | | 700,000 |
| Realignment of Side Streets | | | | 1,050,000 |
| SUBTOTAL | | | | 1,750,000 |
| TOTAL PROGRAM COST | | | | 10,680,000 |

Project No.: 060 MA 121 H 3623 01 L
 Location: US 60, Morristown RROP to Beardsley Road
 Route: US 60

DATE: 15-Jun-96

ALIGNMENT A2, Ultimate Improvement No. 4
 MP 123.44 to MP 127.85

| ITEM | UNIT | QUANTITY | UNIT PRICE | AMOUNT |
|---|--------|----------|------------|------------------|
| Clearing and Grubbing | Acre | 62 | 1,000 | 62,000 |
| Removal of Structures & Obstructions | L.Sum | 1 | 44,000 | 44,000 |
| Removal of Asphaltic Concrete Pavement | Sq.Yd. | 12,700 | 1 | 12,700 |
| Drainage Excavation | Cu.Yd. | 11,400 | 5 | 57,000 |
| Roadway Excavation | Cu.Yd. | 12,200 | 5 | 61,000 |
| Borrow | Cu.Yd. | 142,000 | 5 | 710,000 |
| Aggregate Base Course | Cu.Yd. | 25,900 | 15 | 388,500 |
| Asphaltic Cement (AC-40) | Ton | 3,750 | 150 | 562,500 |
| Bituminous Tack Coat | Ton | 77 | 150 | 11,600 |
| Apply Bituminous Tack Coat | Hour | 153 | 100 | 15,300 |
| Asphaltic Concrete Friction Course (1/2-inch) | Ton | 3,920 | 19 | 74,500 |
| Asphaltic Concrete | Ton | 70,300 | 17 | 1,195,100 |
| Mineral Admixture | Ton | 1,410 | 90 | 126,900 |
| Mill (Westbound Lanes) | Sq.Yd. | 101,780 | 1 | 101,800 |
| Pipe Culvert (48" CMP) | L.F. | 910 | 75 | 68,300 |
| Pipe Culvert (36" CMP) | L.F. | 1,240 | 60 | 74,400 |
| Pipe Culvert (30" CMP) | L.F. | 480 | 45 | 21,600 |
| Pipe Culvert (24" CMP) | L.F. | 160 | 35 | 5,600 |
| Bridge Structures | Sq.Ft. | 8,820 | 55 | 485,100 |
| Noise Walls | Sq.Ft. | 44,640 | 15 | 669,600 |
| Structural Concrete (Box Culv. & Pipe Culv. Hdwl) | Cu.Yd. | 3,060 | 225 | 688,500 |
| Structural Steel (Box Culv. & Pipe Culv. Hdwl) | Lb. | 420,000 | 0.45 | 189,000 |
| Rail Bank Protection, Type 5 (Std. C-17.20) | L.F. | 750 | 250 | 187,500 |
| Guardrail, W-Beam Single Face | L.F. | 1,200 | 10 | 12,000 |
| Guard Rail Extruder Terminal | Ea. | 4 | 3,000 | 12,000 |
| Barbed Wire Fencing | L.F. | 22,700 | 2 | 45,400 |
| Revegetation | Mile | 4.3 | 15,000 | 64,500 |
| Signing | Mile | 4.3 | 25,000 | 107,500 |
| Thermoplastic Striping | L.F. | 108,000 | 0.40 | 43,200 |
| SUBTOTAL | | | | 6,097,000 |
| Railroad Flagmen | | | | 0 |
| Construction Surveying and Layout (1%) | | | | 61,000 |
| Furnish Water Supply & Dust Palliative (2%) | | | | 121,900 |
| Maintenance and Protection of Traffic (8%) | | | | 487,800 |
| Mobilization (6%) | | | | 365,800 |
| Quality Control (2%) | | | | 121,900 |
| Erosion Control (1%) | | | | 61,000 |
| Construction Engineering and Contingencies (30%) | | | | 1,829,100 |
| CONSTRUCTION TOTAL | | | | 9,150,000 |
| Design (8%) | | | | 730,000 |
| Realignment of Side Streets | | | | 0 |
| SUBTOTAL | | | | 730,000 |
| TOTAL PROGRAM COST | | | | 9,880,000 |

7.11 Recommended Programming Changes

Interim Improvement - Morristown RROP to 203rd Avenue

Change description of work for existing 2 lane section to "Overlay the existing 2 lane section full width (40') with AC (2.5") & travel lanes (26') with ACFC (0.5)". Grooving will be applied". Decrease funding to \$1,350,000.

Ultimate Improvement No. 2 - 203rd Avenue (East) to Deer Valley Road

Increase program amount to \$10,590,000.

Ultimate Improvement No. 3 - Dove Valley Road to 203rd Avenue (East)

Increase programmed amount of \$9,980,000.

The recommended action for the proposed improvement projects have been summarized below in Table 7-3.

**Table 7-3
RECOMMENDED ACTION**

| Improvement Project | Description | Mileposts | Recommended Action |
|----------------------------|-------------------------------------|------------------|---|
| Interim Improvement | Morristown RROP to Wittmann | 122.0 to 129.0 | • Modify Mill and Replace AC to 2½" AC Overlay with ½" ACFC. |
| Ultimate Improvement No. 2 | 203rd Avenue to Deer Valley Road | 131.44 to 136.93 | • Increase Construction amount to \$10,590,000. |
| Ultimate Improvement No. 3 | Dove Valley Road to 203rd Avenue | 127.85 to 131.44 | • Increase Construction amount to \$9,980,000. |
| Ultimate Improvement No. 4 | Morristown RROP to Dove Valley Road | 123.44 to 127.85 | • Program Construction - FY 2002- 03 with Construction amount of \$9,150,000. |

7.12 Project Schedules

Bar graphs illustrating the time line of activities for design, R/W plans and acquisition, utility relocations, roadway design and construction are presented on the following two pages.

US 60 - Morristown RROP to Beardsley Road Project Schedule (R/W Acquisition & Utility Relocation)

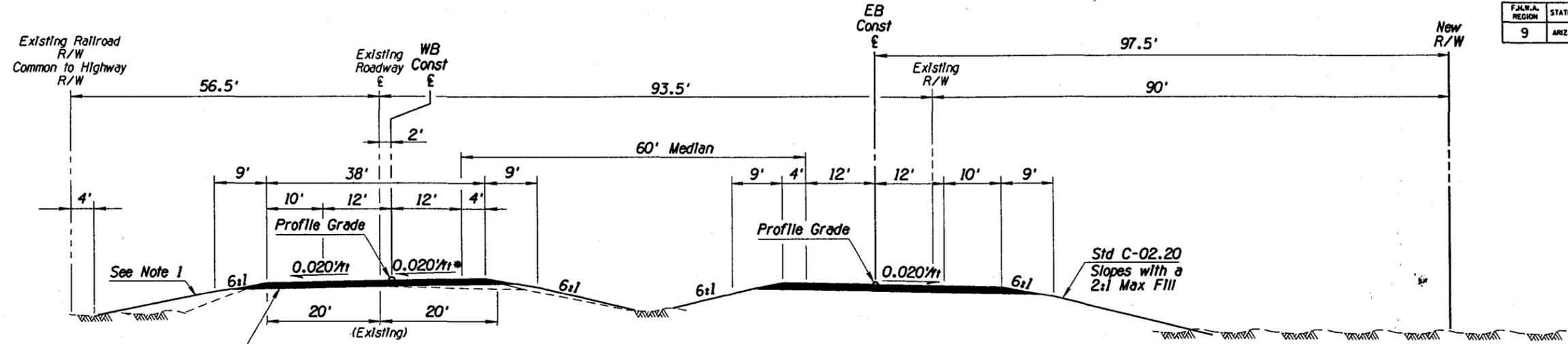
| ID | Task Name | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|----|------------------------------|---|---------------------|---|------|------|------|------|
| 1 | Right-of-Way Plans | [Bar spanning early 1997 to early 1998] | | | | | | |
| 2 | Title Reports | [Bar in early 1997] | | | | | | |
| 3 | Base Maps | [Bar in early 1997] | | | | | | |
| 4 | Legal Descriptions | | [Bar in early 1998] | | | | | |
| 5 | R/W Appraisals | | [Bar in early 1998] | | | | | |
| 6 | Acquire Appraiser | | [Bar in early 1998] | | | | | |
| 7 | Prepare Appraisals | | [Bar in early 1998] | | | | | |
| 8 | Review Appraisals | | [Bar in early 1998] | | | | | |
| 9 | R/W Acquisition | | [Bar in early 1998] | | | | | |
| 10 | Make/Sign Offers | | [Bar in early 1998] | | | | | |
| 11 | Condemnation | | [Bar in early 1998] | | | | | |
| 12 | Relocation | | [Bar in early 1998] | | | | | |
| 13 | R/W Demolition | | | [Bar in early 1999] | | | | |
| 14 | Demolition | | | [Bar in early 1999] | | | | |
| 15 | Haz Mat Testing | | | [Bar in early 1999] | | | | |
| 16 | Haz Mat Abatement | | | [Bar in early 1999] | | | | |
| 17 | Utility Design Development | | [Bar in early 1998] | | | | | |
| 18 | Define Project/Scope | | [Bar in early 1998] | | | | | |
| 19 | Develop Plans | | [Bar in early 1998] | | | | | |
| 20 | Agency Review/ Coord. | | [Bar in early 1998] | | | | | |
| 21 | Utility Easements | | [Bar in early 1998] | | | | | |
| 22 | Utility Material Acquisition | | [Bar in early 1998] | | | | | |
| 23 | Order Spec. Material | | [Bar in early 1998] | | | | | |
| 24 | Relocate Utilities | | | [Bar spanning early 1999 to early 2000] | | | | |
| 25 | Advertise Relocation | | [Bar in early 1998] | | | | | |
| 26 | Award Relocation | | [Bar in early 1998] | | | | | |
| 27 | Construction | | | [Bar in early 1999] | | | | |

US 60 - Morristown RROP to Beardsley Road Project Schedule (Ultimate Projects 1 - 4)

| ID | Task Name | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|----|----------------------|-----------------------------|------|-----------------------------|-----------------------------|-----------------------------|------|---------------|
| 1 | Ultimate Impr. No. 1 | [Bar spanning 1997 to 2000] | | | | | | |
| 2 | Roadway Design | [Bar spanning 1997 to 1998] | | | | | | |
| 3 | Roadway Construction | | | [Bar spanning 1999 to 2000] | | | | |
| 4 | Ultimate Impr. No. 2 | | | [Bar spanning 1999 to 2001] | | | | |
| 5 | Roadway Design | | | [Bar spanning 1999 to 2000] | | | | |
| 6 | Roadway Construction | | | | | [Bar spanning 2001 to 2002] | | |
| 7 | Ultimate Impr. No. 3 | | | | [Bar spanning 2000 to 2002] | | | |
| 8 | Roadway Design | | | | [Bar spanning 2000 to 2001] | | | |
| 9 | Roadway Construction | | | | | [Bar spanning 2001 to 2002] | | |
| 10 | Ultimate Impr. No. 4 | | | | | [Bar spanning 2001 to 2003] | | |
| 11 | Roadway Design | | | | | [Bar spanning 2001 to 2002] | | |
| 12 | Roadway Construction | | | | | | | [Bar in 2003] |

8. Typical Section with Plan and Profile Sheets for the Selected Alternative

| F.A.R.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|-------------------|-------|-------------|-----------|--------------|----------|
| 9 | ARIZ. | | | | |



PROPOSED WB SECTION

PROPOSED EB SECTION

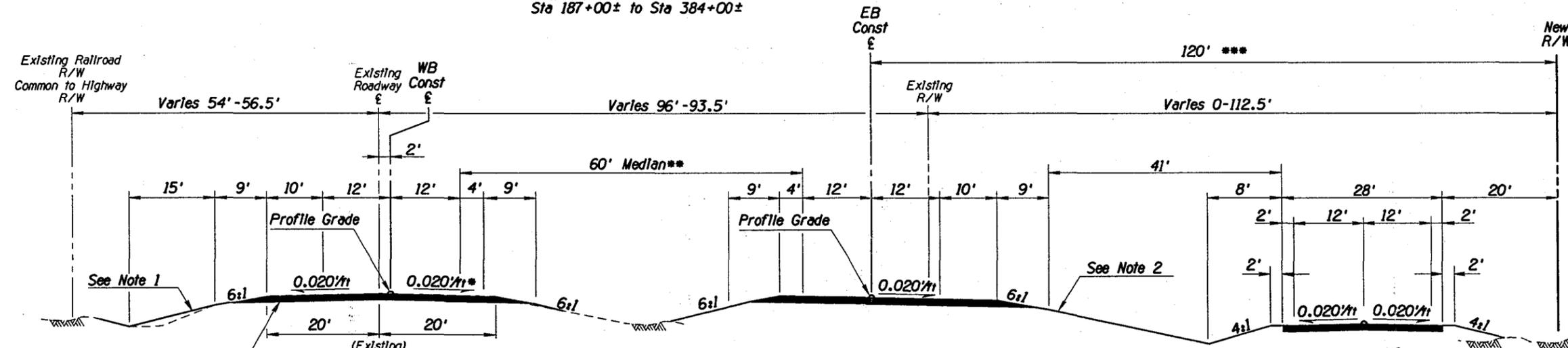
* X-slope varies from normal crown for mill and overlay sections to a continuous 2% cross-slope for reconstructed sections

TYPICAL SECTION
Sta 187+00± to Sta 384+00±

Table 1
Frontage Road

| |
|----------------------|
| Sta 137+00 to 177+50 |
| Sta 400+00 to 455+00 |
| Sta 482+40 to 497+30 |
| Sta 502+00 to 513+00 |
| Sta 569+40 to 645+50 |
| Sta 692+30 to 715+70 |
| Sta 730+70 to 776+00 |
| Sta 803+70 to 861+40 |
| Sta 867+60 to 876+30 |

Frontage Road Assumed Pavement Section
4" AC
10" AB



PROPOSED WB SECTION

PROPOSED EB SECTION

PROPOSED FRONTAGE ROAD

* X-slope varies from normal crown for mill and overlay sections to a continuous 2% cross-slope for reconstructed sections

** Median Width Varies
Sta 96+00 to 109+11; 76' to 60'
Sta 877+10 to 905+50; 60' to 46'

*** Widths Varies
Sta 96+000 to 109+11; 95' to 90'
Sta 893+40± to 905+50; 120' to 40'

TYPICAL SECTION
Sta 96+00± to Sta 187+00±
Sta 384+00± to Sta 905+50

TYPICAL SECTION
(See Table 1)

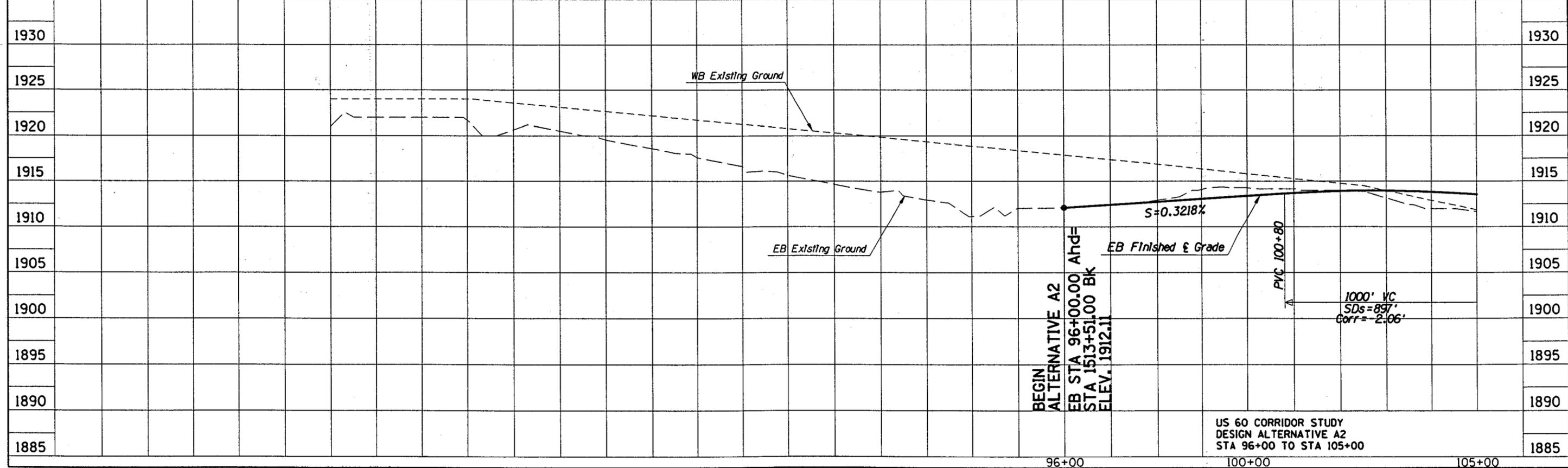
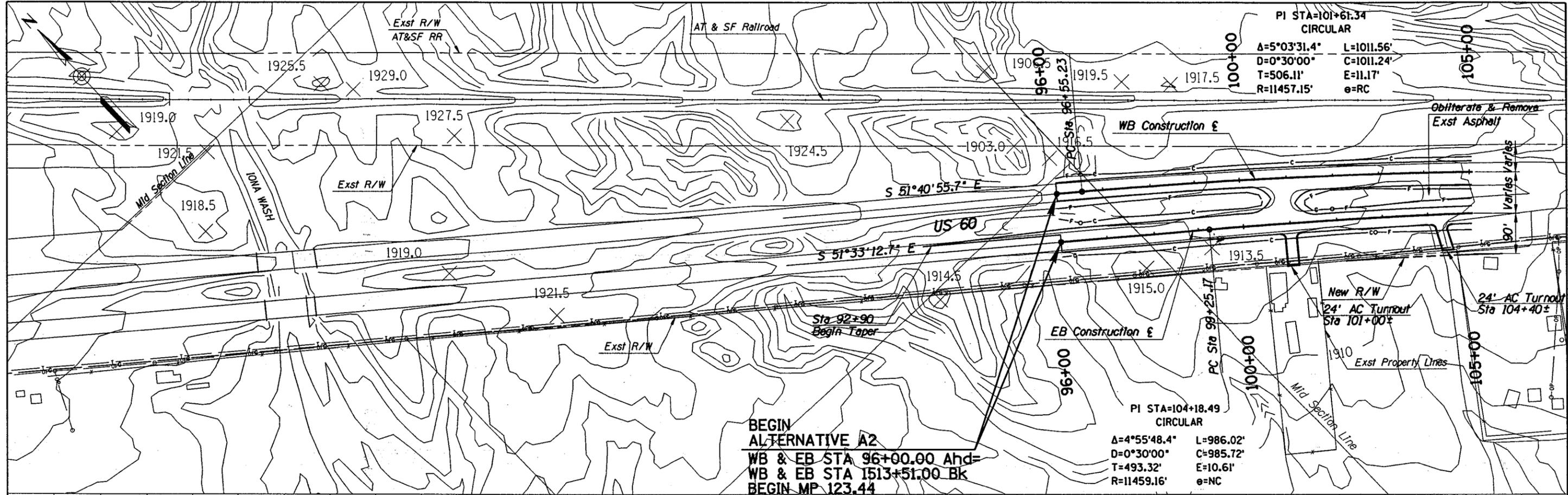
FIGURE 8 - 1
TYPICAL SECTIONS FOR THE
SELECTED ALTERNATIVE

- Notes:**
- For reconstruction of WB Section use Std C-02.20 Slopes Vary, hold to 4 ft. from R/W line. For Mill and overlay of Exst Roadway use Exst slopes
 - For Mainline w/ Frontage Road, slopes vary to form drainage ditch between mainline and frontage road. For Mainline w/o Frontage Road, use Std C-02.20 with a maximum 2:1 fill slope.

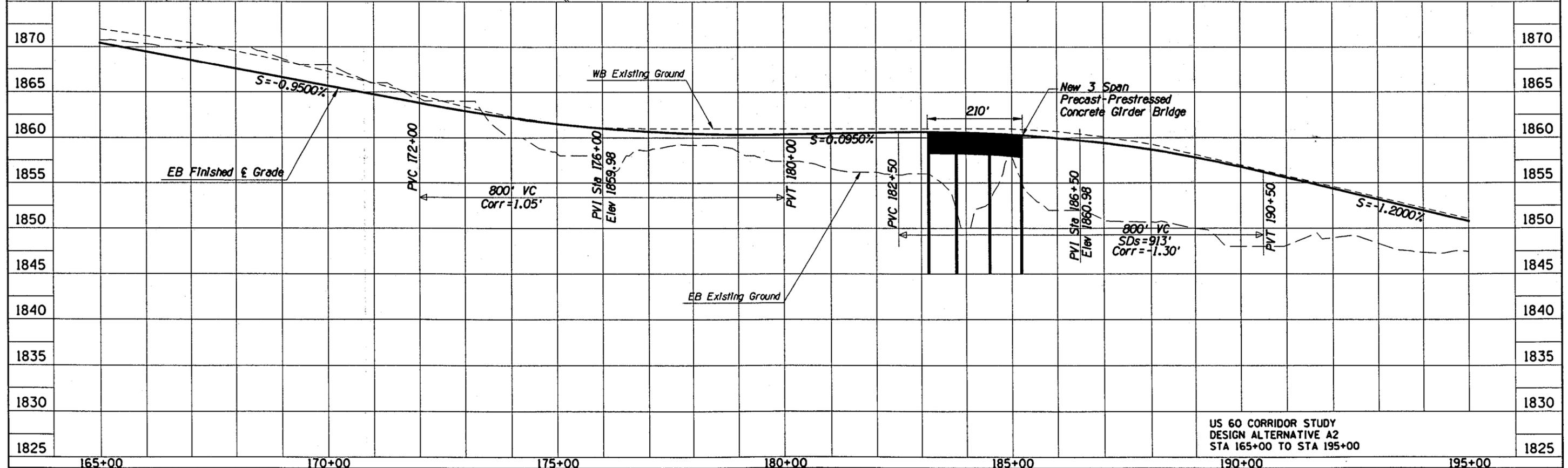
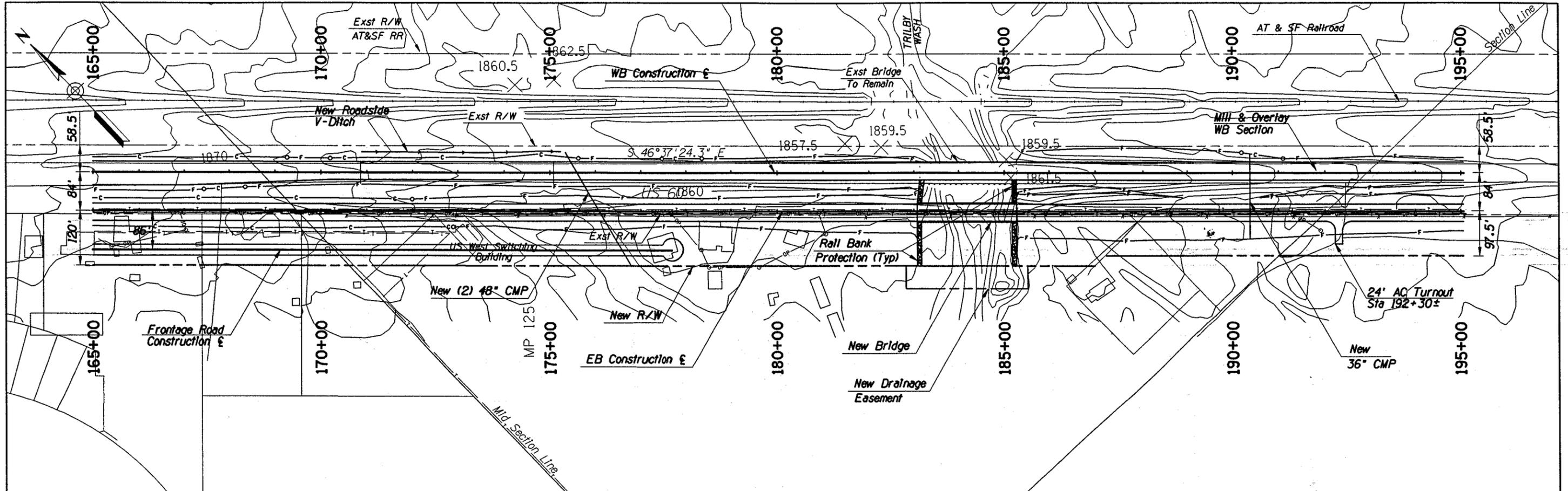
ALTERNATIVE A2

Assumed Pavement Section
1/2" ACFC
7 1/2" AC
6" AB
4" AC (overlay)

| | | | | | |
|-----------------------------|-------|----------|----------------------|---|----------------------|
| DESIGN | BDO | DATE | 2/94 | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION | NOT FOR CONSTRUCTION |
| DRAWN | LAW | DATE | 2/94 | | |
| CHECKED | BSW | DATE | 2/95 | | |
| Sverdrup CORPORATION | | | TYPICAL SECTIONS | | |
| ROUTE | US 60 | LOCATION | US 60 CORRIDOR STUDY | | |
| TRACS NO. | | | | | DATE: SHEET 2 OF 6 |

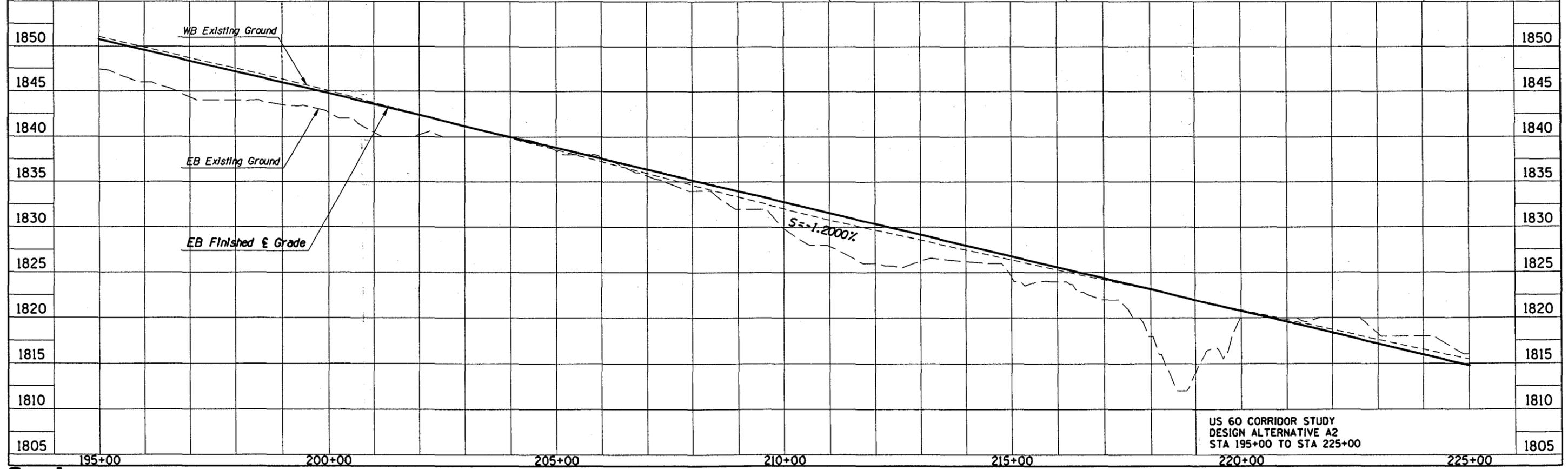
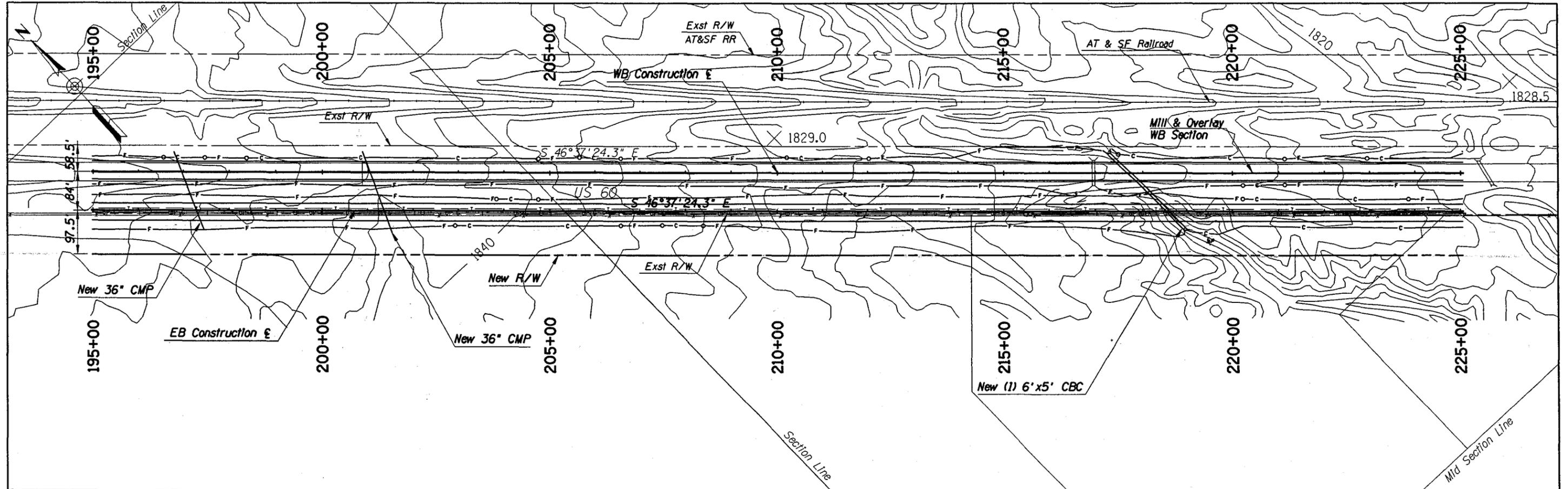


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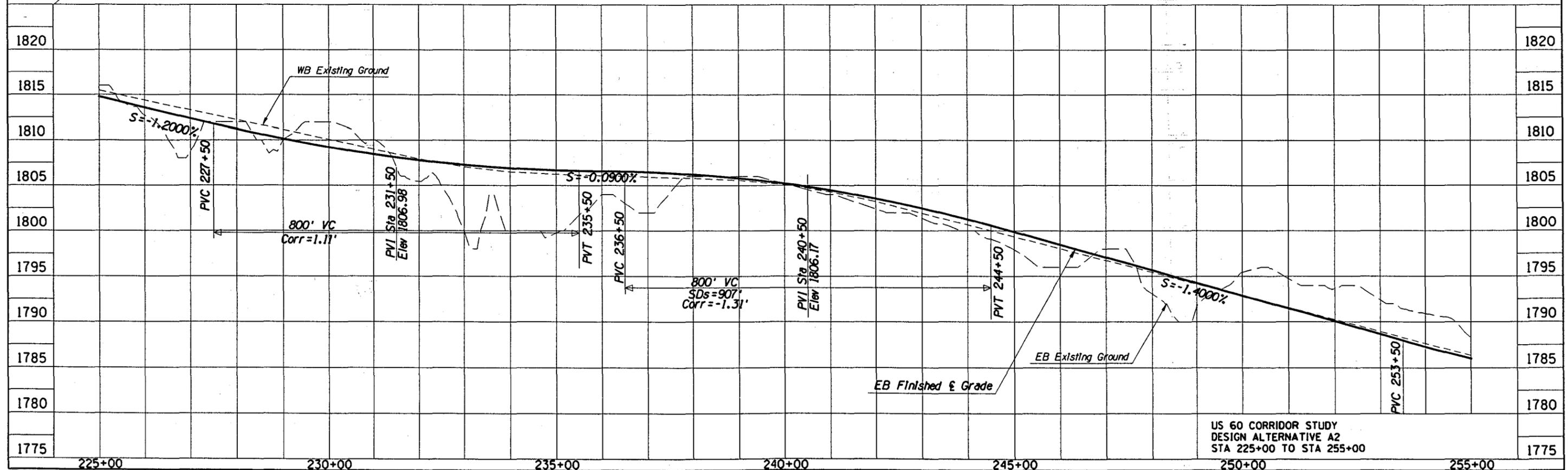
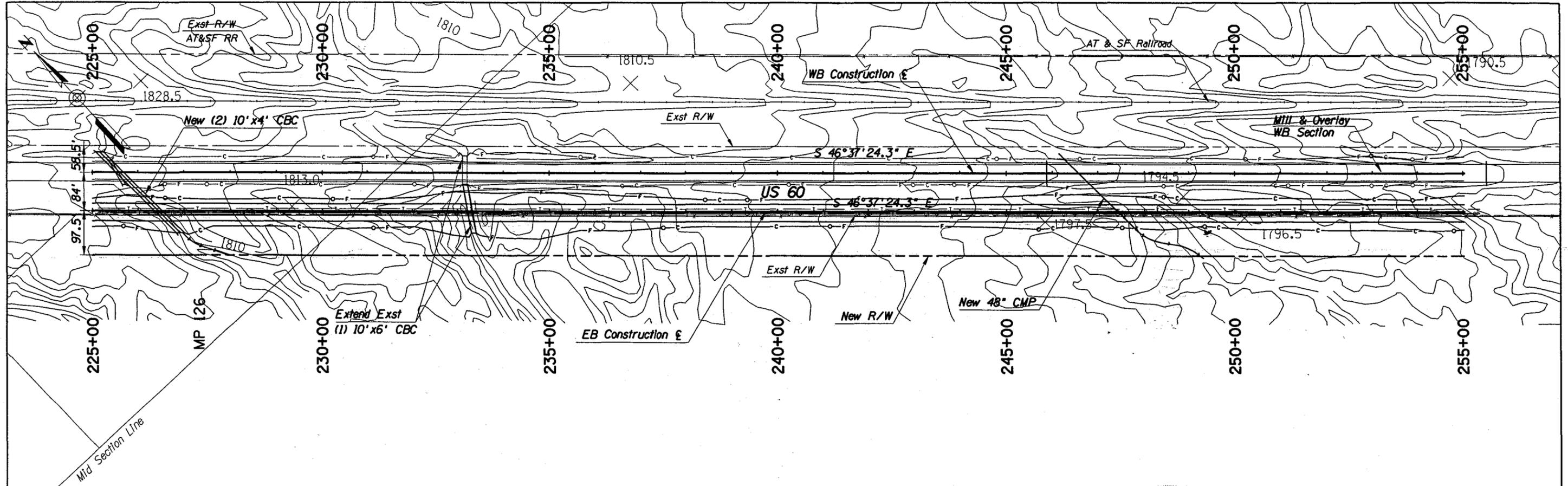
US 60 CORRIDOR STUDY
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 STA 165+00 TO STA 195+00

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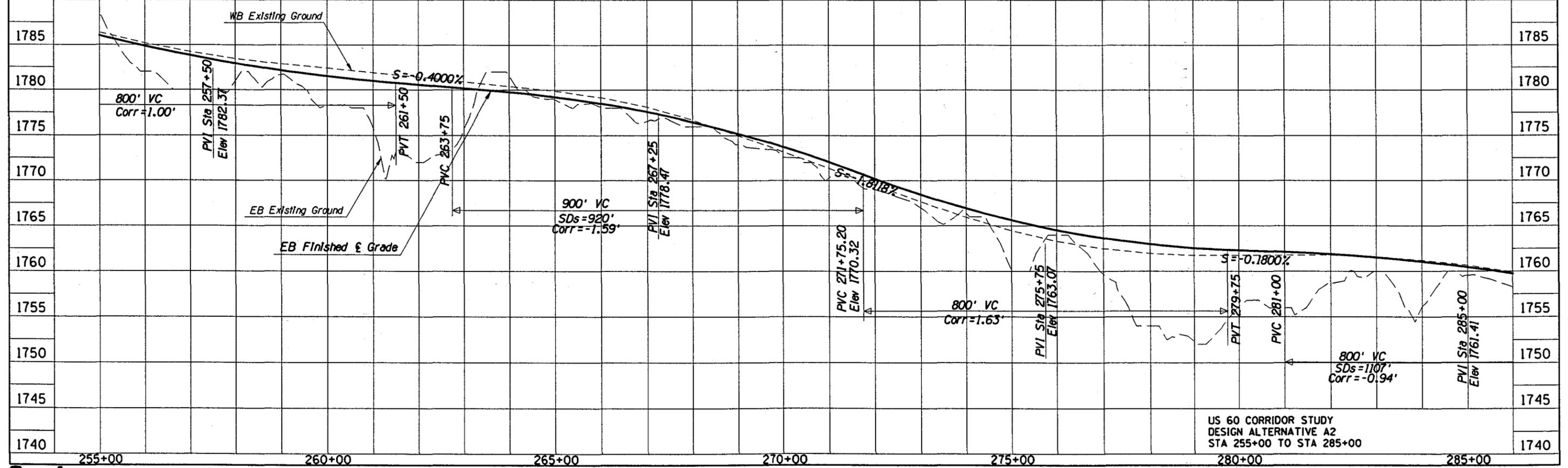
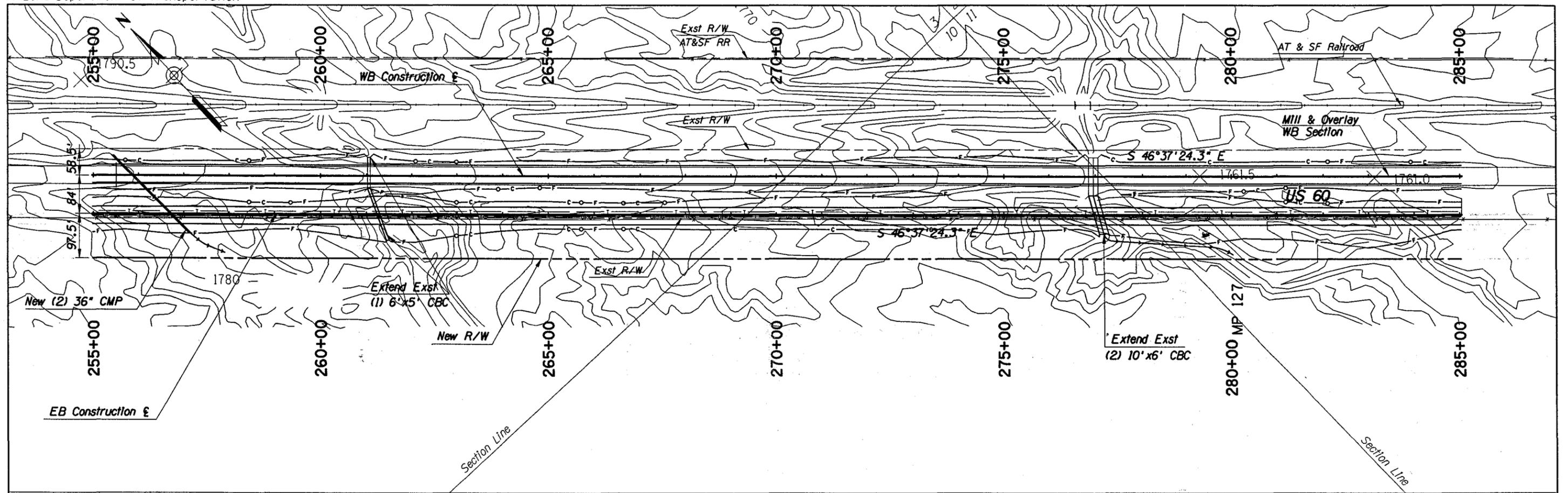
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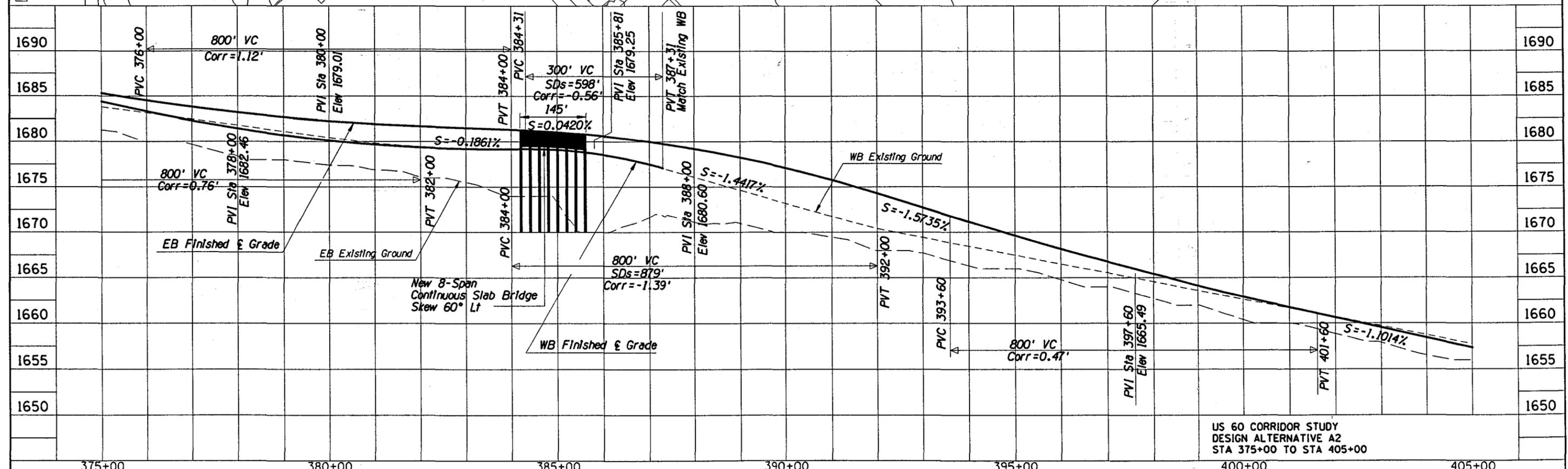
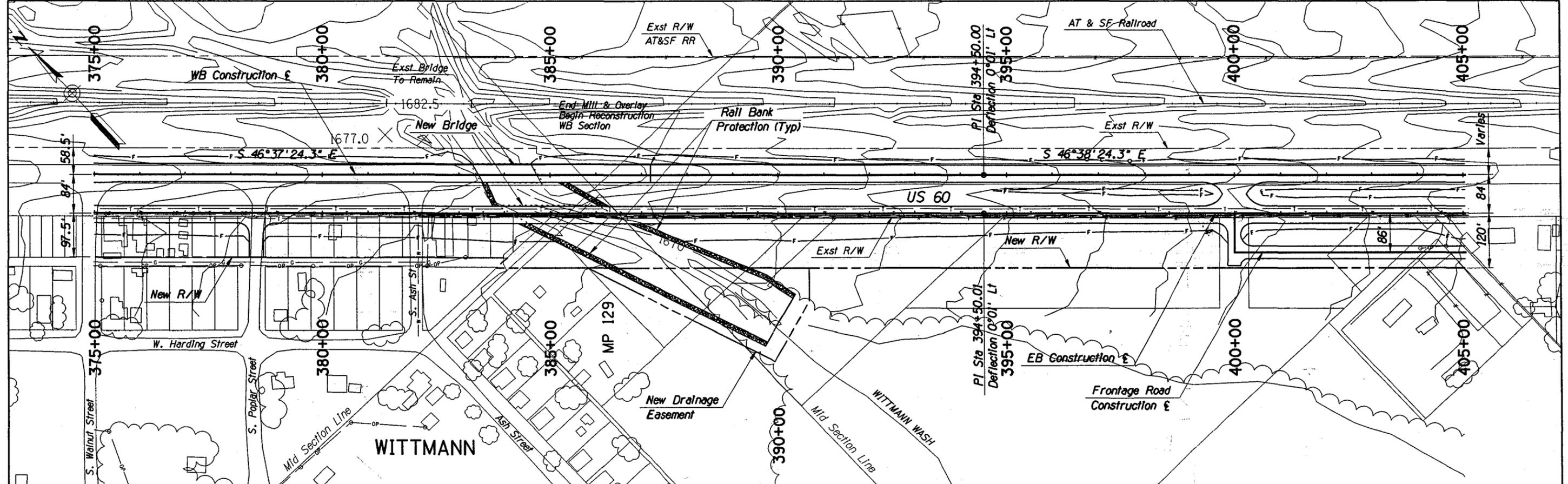
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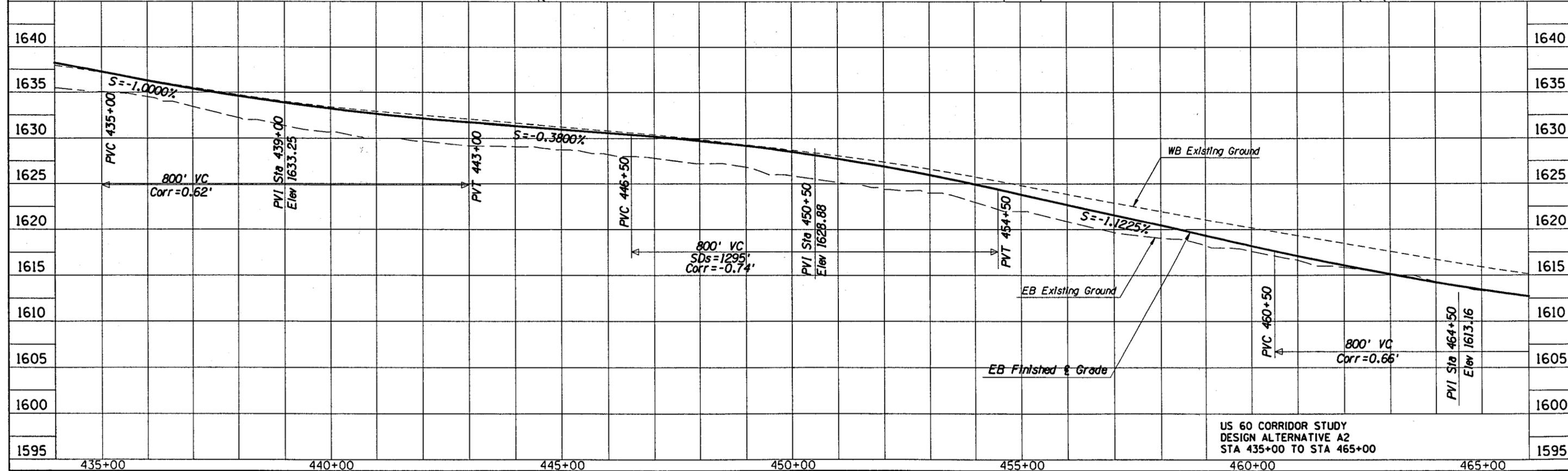
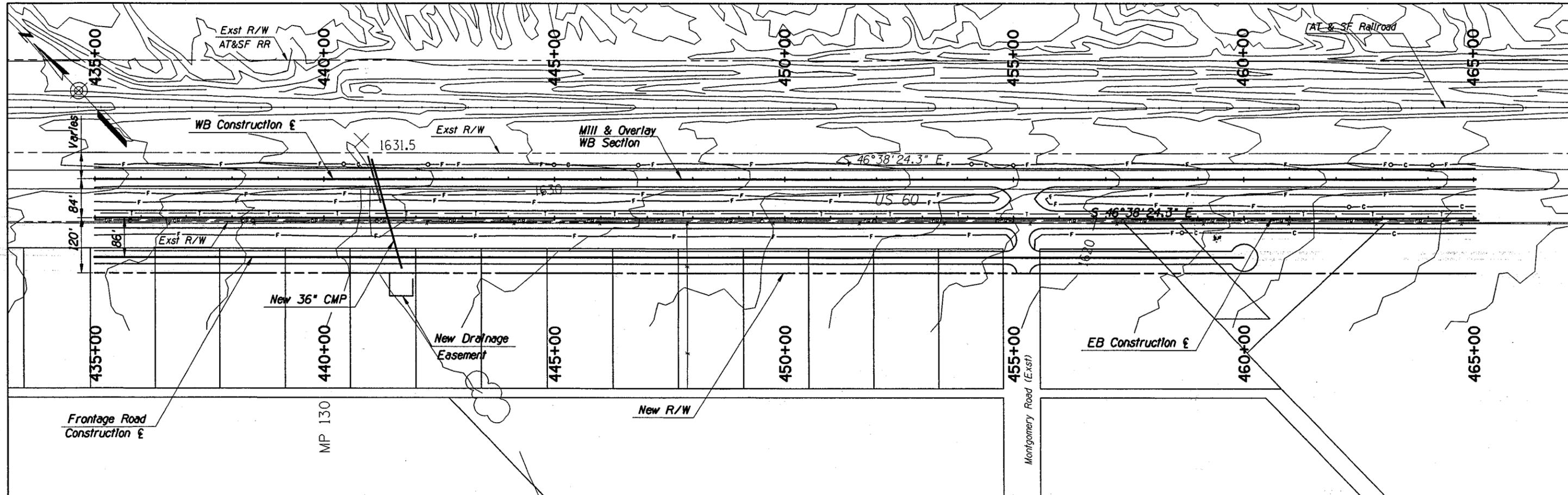
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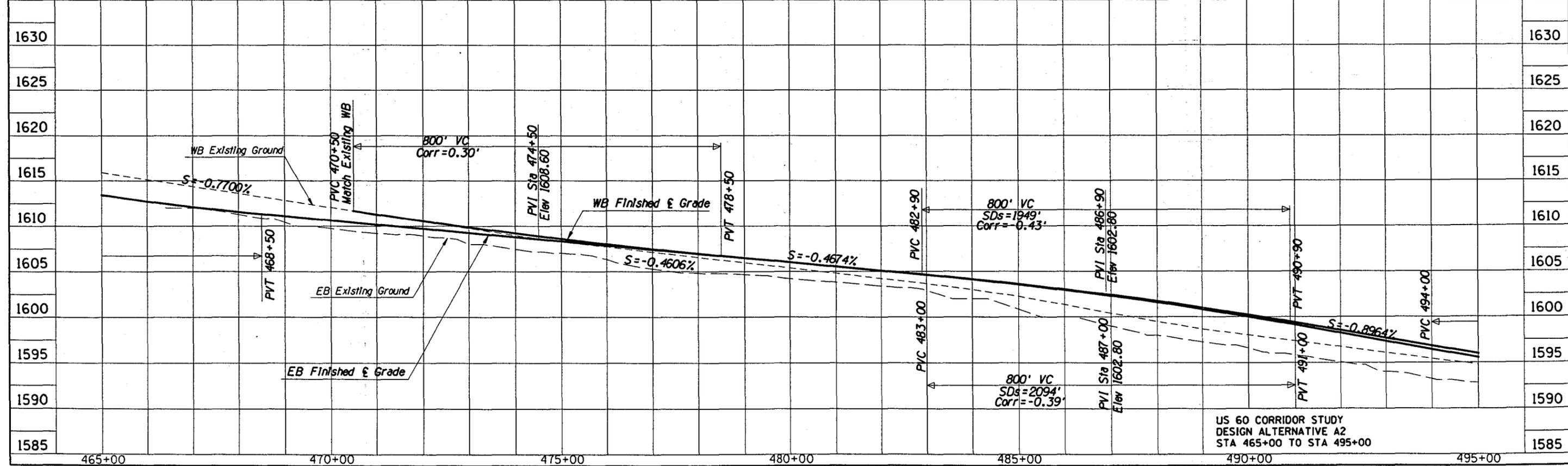
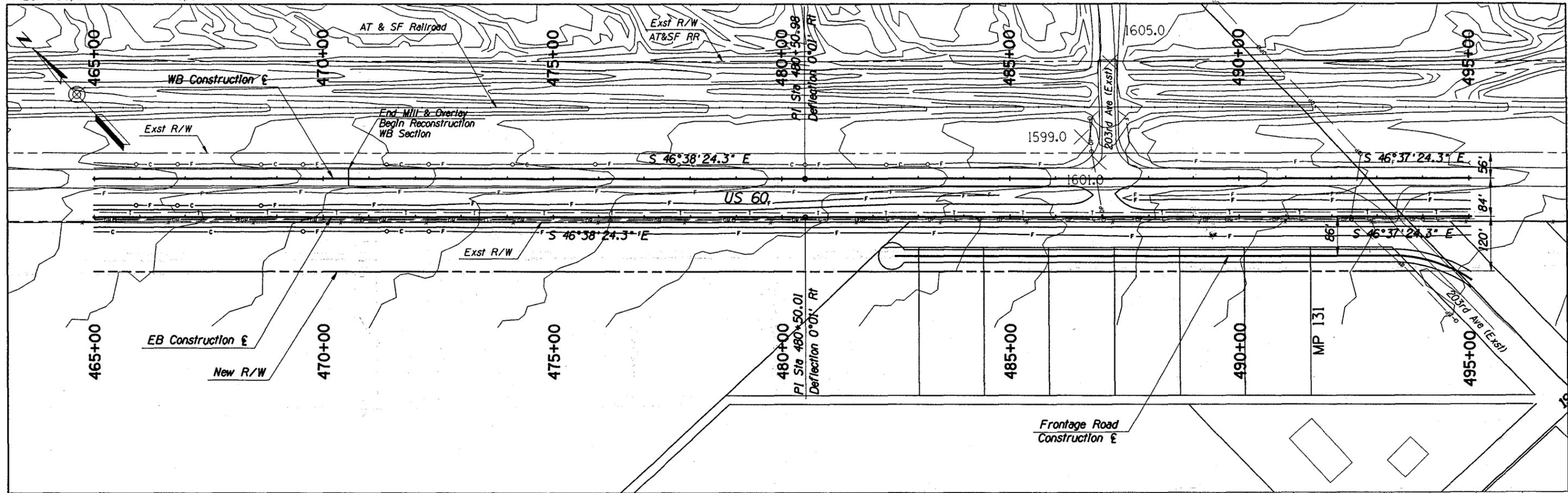
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 STA 375+00 TO STA 405+00

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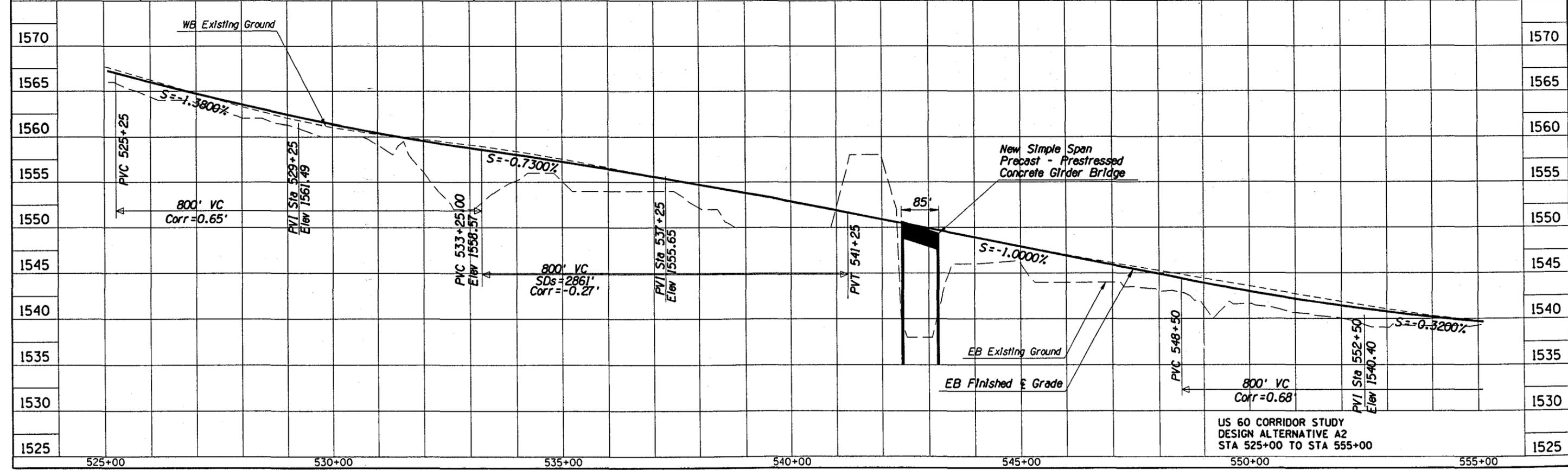
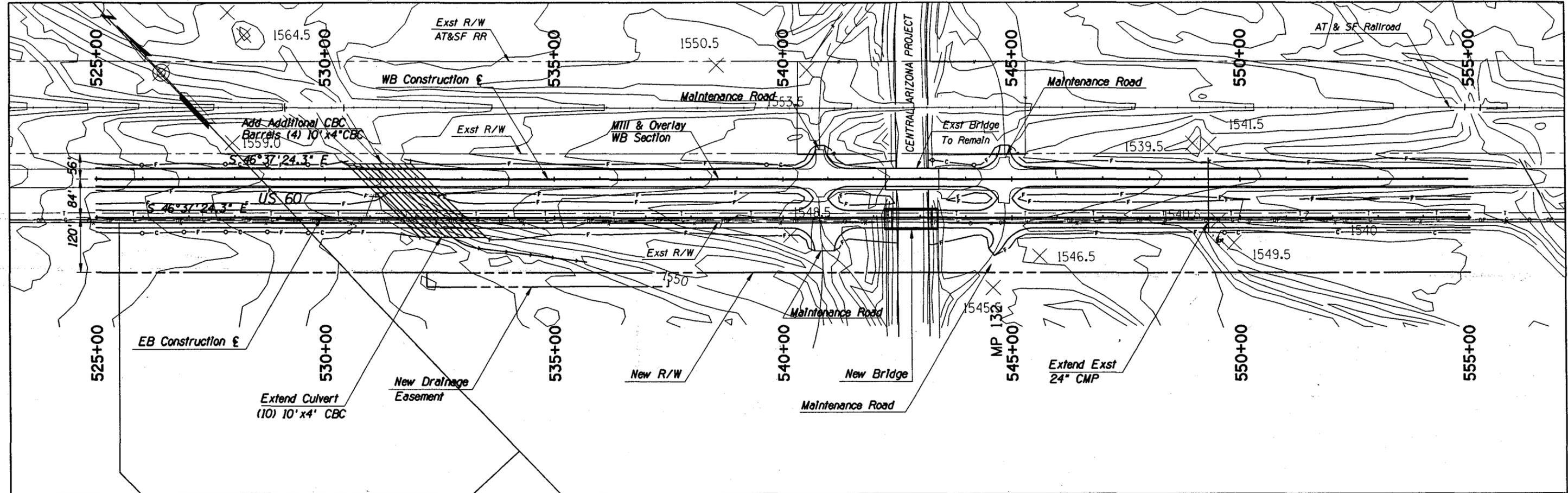
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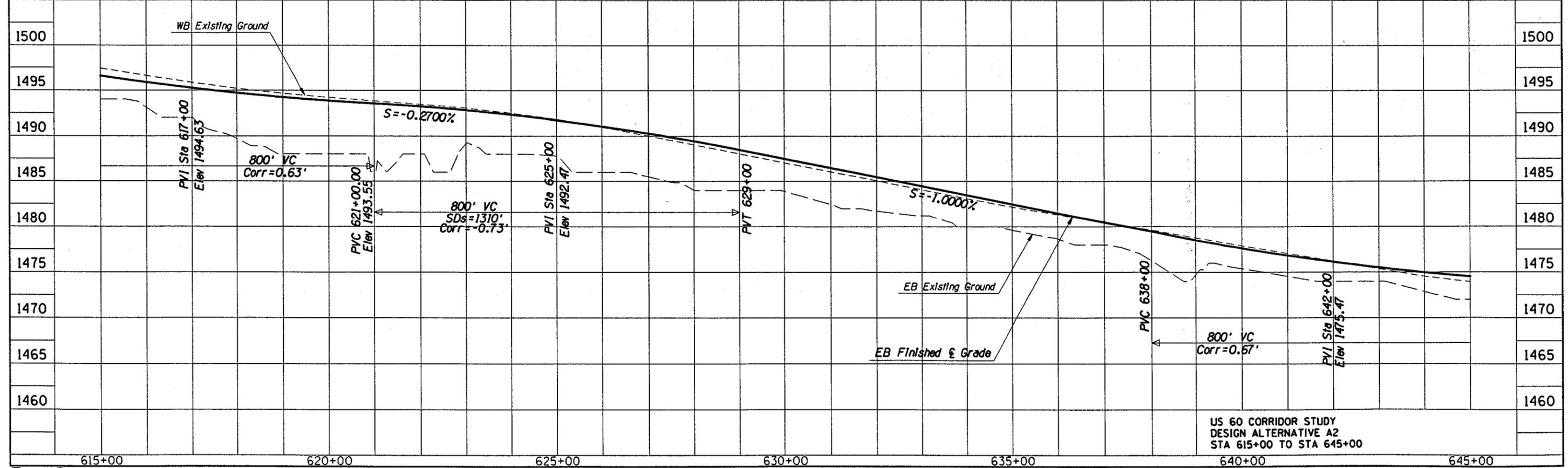
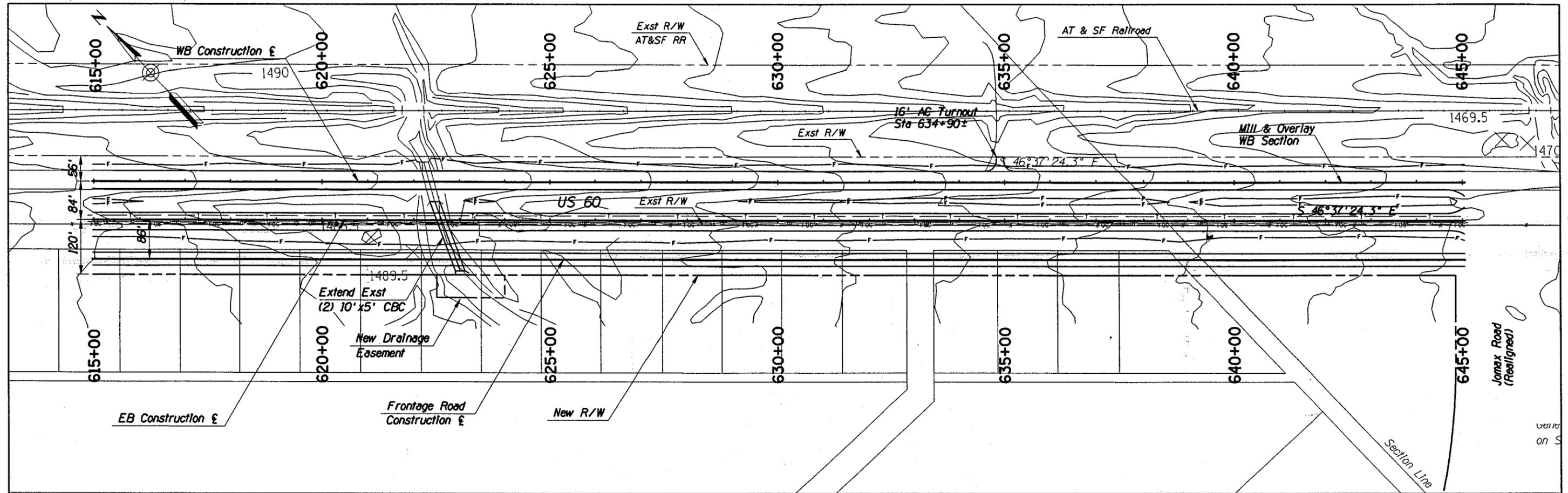
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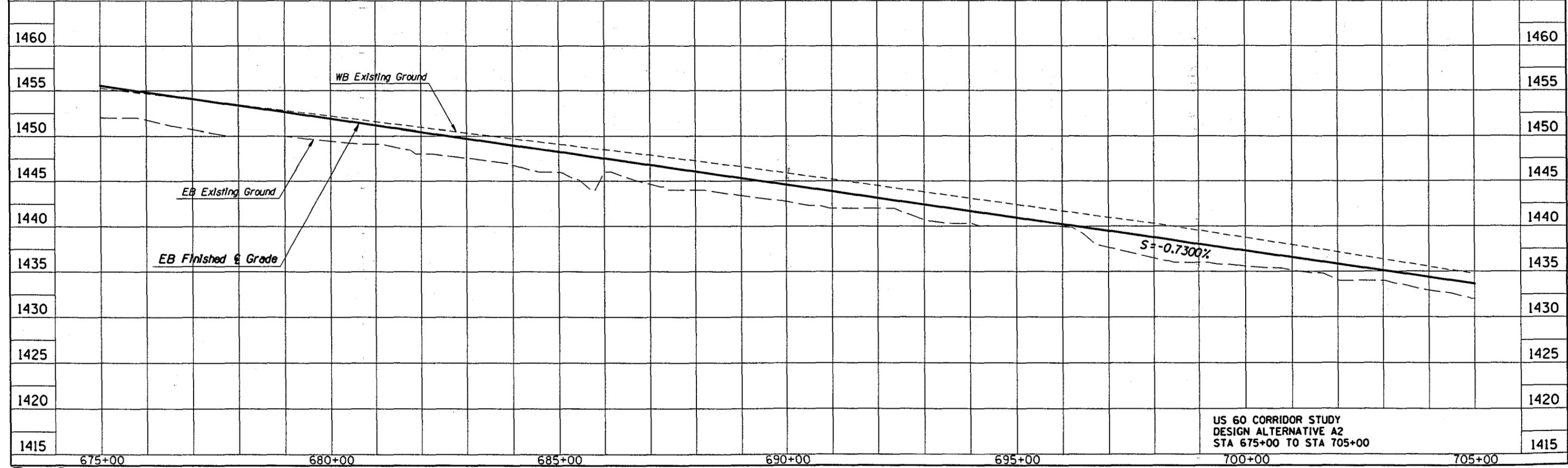
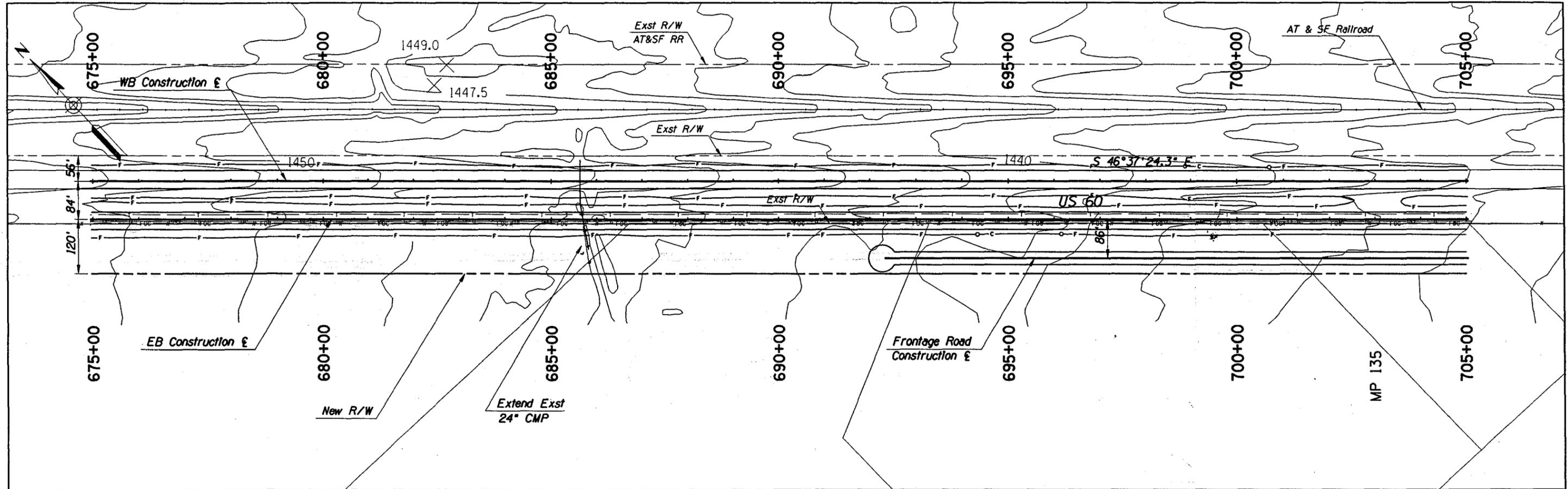
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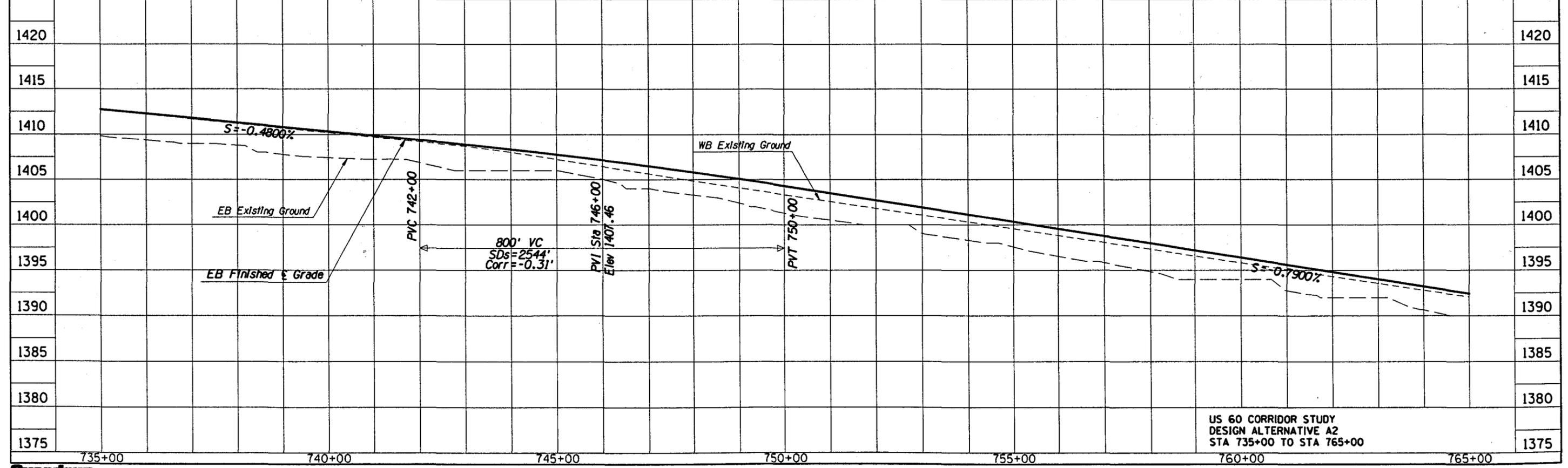
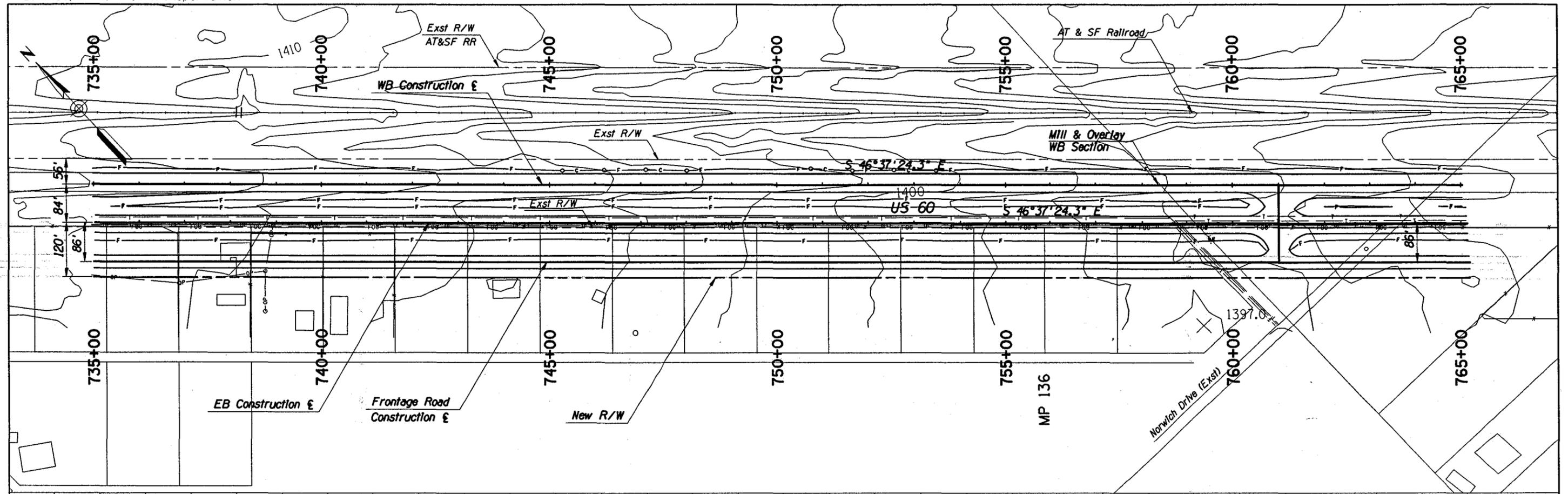
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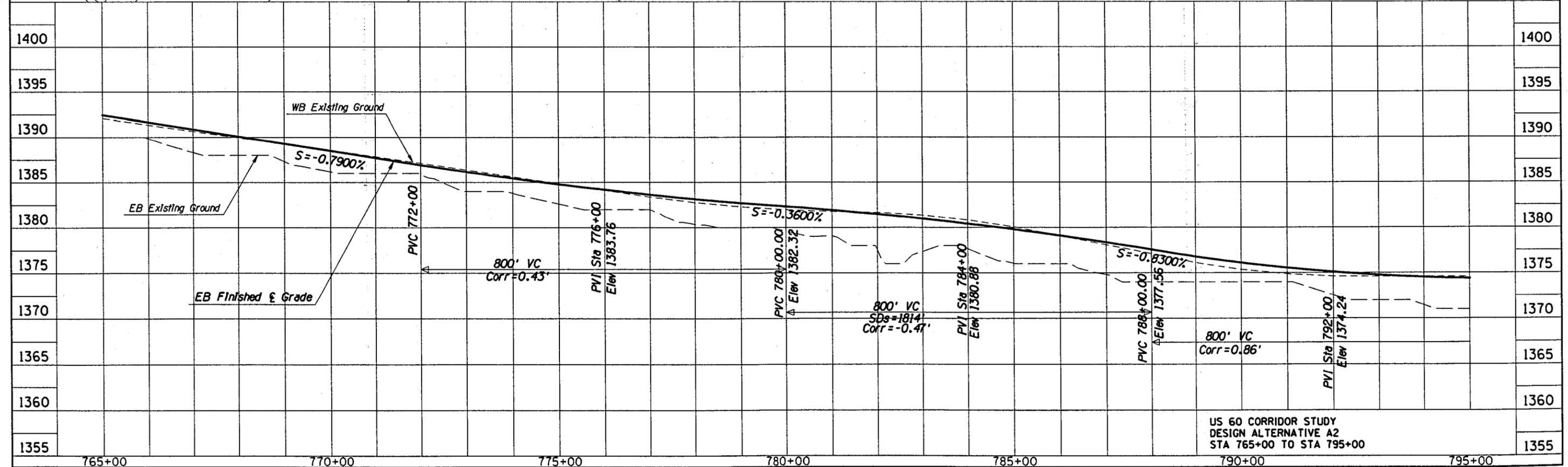
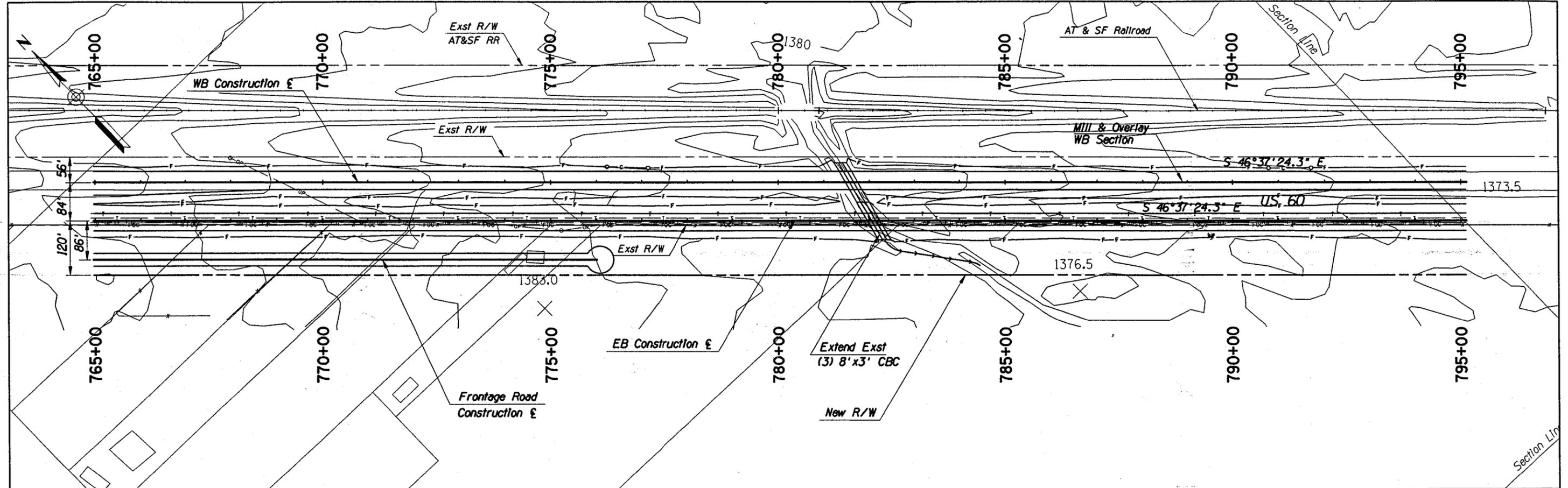
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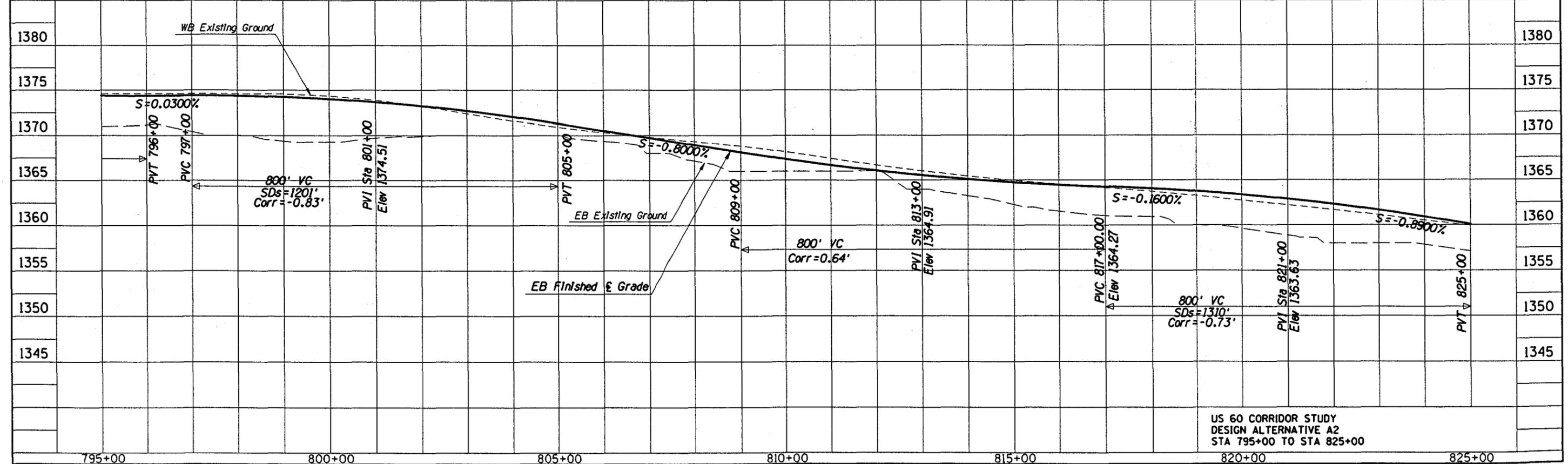
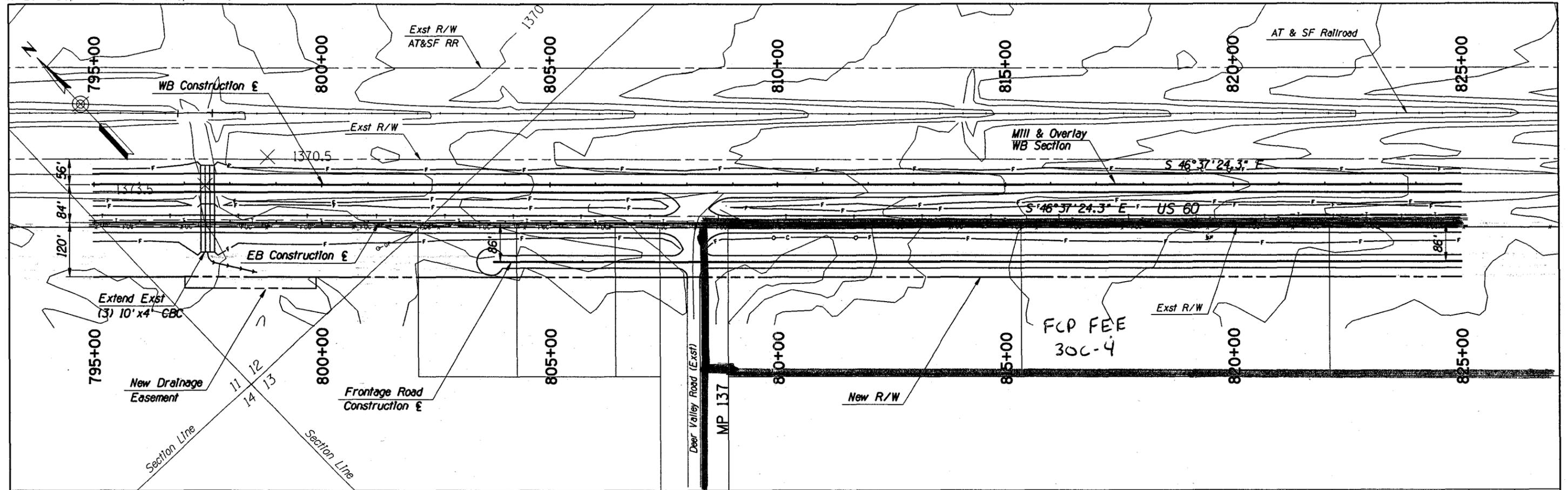
US 60 CORRIDOR STUDY
 DESIGN ALTERNATIVE A2
 STA 735+00 TO STA 765+00

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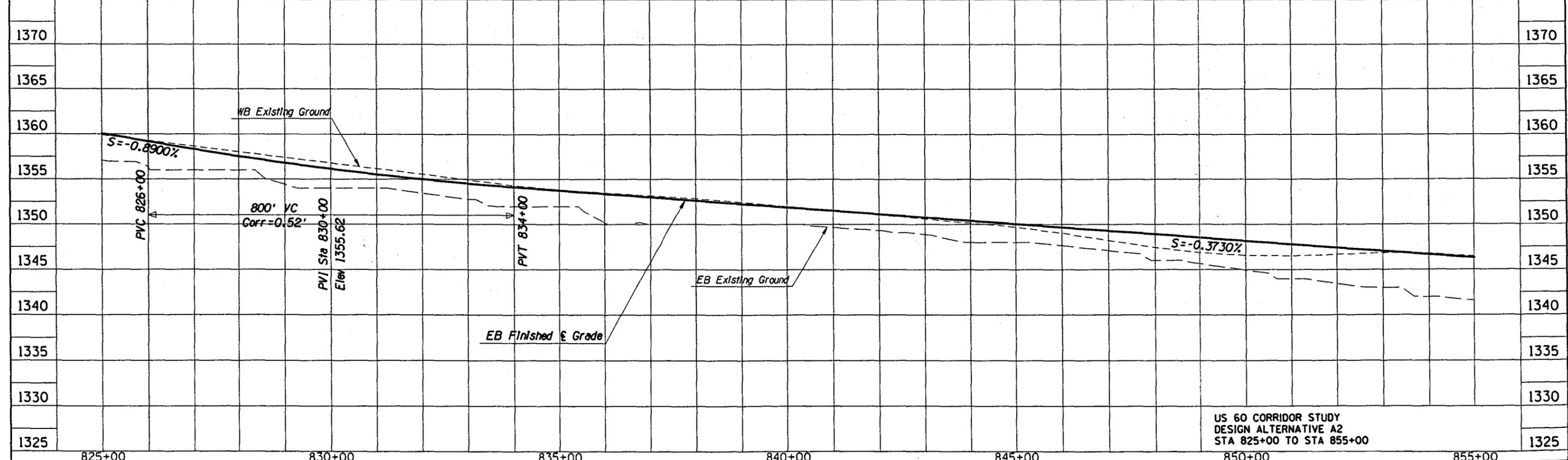
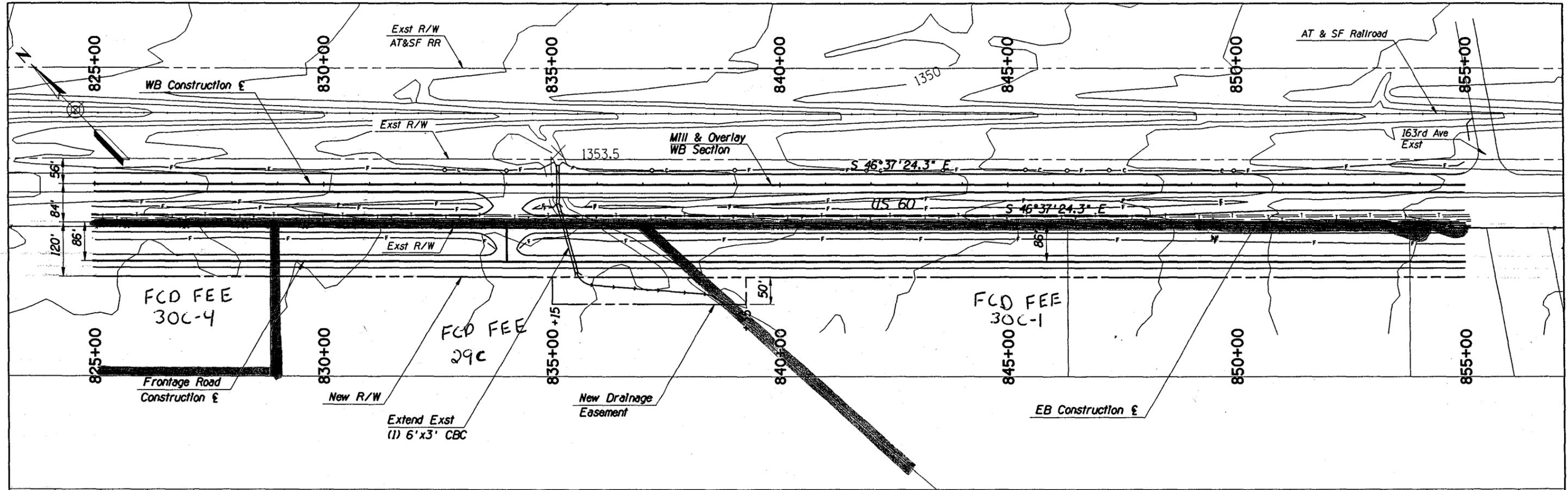
US 60 CORRIDOR STUDY
 DESIGN ALTERNATIVE A2
 STA 765+00 TO STA 795+00

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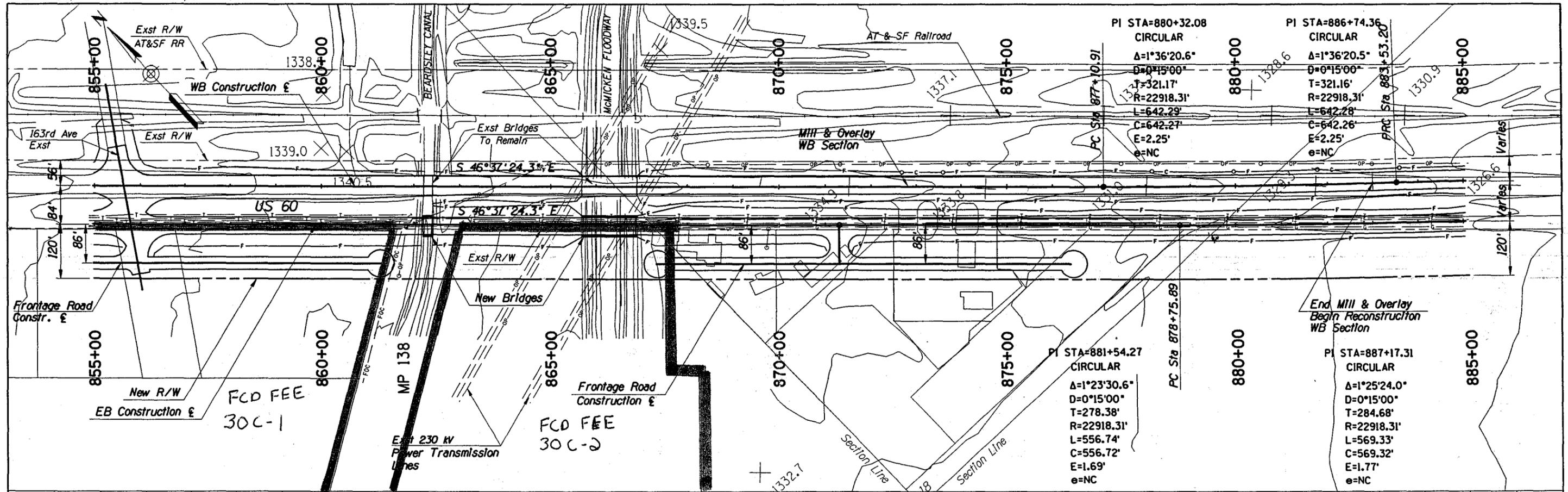
US 60 CORRIDOR STUDY
 DESIGN ALTERNATIVE A2
 STA 795+00 TO STA 825+00

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US 60 CORRIDOR STUDY
 DESIGN ALTERNATIVE A2
 STA 825+00 TO STA 855+00

DATE: 28-May-96 14:22
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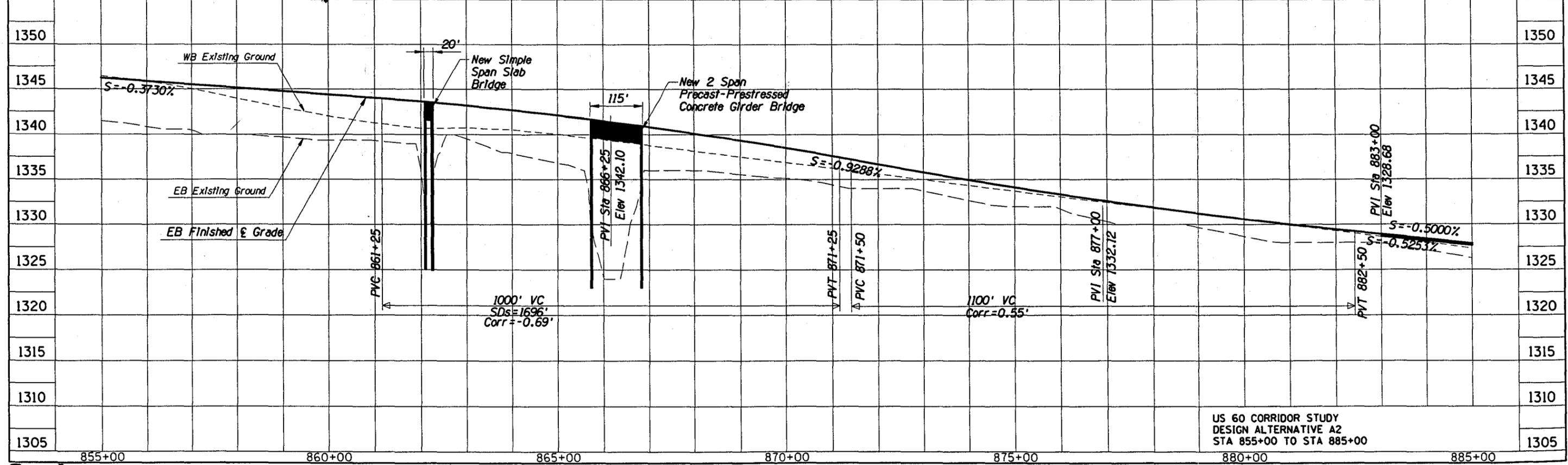


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CIRCULAR
Δ=1°36'20.6"
D=0°15'00"
T=321.17'
R=22918.31'
L=642.29'
C=642.27'
E=2.25'
e=NC

PI STA=886+74.36
CIRCULAR
Δ=1°36'20.5"
D=0°15'00"
T=321.16'
R=22918.31'
L=642.28'
C=642.26'
E=2.25'
e=NC

PI STA=881+54.27
CIRCULAR
Δ=1°23'30.6"
D=0°15'00"
T=278.38'
R=22918.31'
L=556.74'
C=556.72'
E=1.69'
e=NC

PI STA=887+17.31
CIRCULAR
Δ=1°25'24.0"
D=0°15'00"
T=284.68'
R=22918.31'
L=569.33'
C=569.32'
E=1.77'
e=NC



US 60 CORRIDOR STUDY
DESIGN ALTERNATIVE A2
STA 855+00 TO STA 885+00

DATE: 28-Nov-96 14:33
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9. Estimated Right-of-Way for the Selected Alternative

There are over 300 parcels affected by this project. Table 9-1 lists each parcel showing the County Assessor's parcel number, Township/Range/Section number, approximate parcel location (by Milepost) along US 60, name of the parcel owner, and the estimated new R/W and drainage easements required for Alternative A2. Table 9-1 is followed by a Concept R/W Strip Map to show the approximate R/W take. R/W requirements for the realigned local roads have not been included in Table 9-1.

**Table 9-1
ESTIMATED NEW RIGHT-OF-WAY**

| Assessor's No. | Township/ Range/ Section | Approx. US 60 Milepost | Approx. Parcel Size (ac) | Owner's Name | Estimated Land Take Alternative A2 (ac) | Comments |
|----------------|--------------------------|------------------------|--------------------------|------------------|---|-------------------------|
| 503-16-007B | 6N / 3W / 29 | 123.6 | 20.9 | Chattelle | 1.3 | Misc. Impr. |
| 503-16-010 | 6N / 3W / 29 | 123.6 | 2.0 | Chattelle | 0.1 | |
| 503-16-012 | 6N / 3W / 29 | 123.5 | 1.0 | Miller | 0.0 | Grocery Store |
| 503-18- | 6N / 3W / 32 | 123.8 | 590.0 | State of Arizona | 0.6 | Vacant Land |
| 503-18-001B | 6N / 3W / 32 | 123.9 | 12.8 | Spann | 1.2 | Residence |
| 503-18-001D | 6N / 3W / 32 | 124.2 | 7.1 | Moehn | 1.4 | Vacant Land |
| 503-18-001E | 6N / 3W / 32 | 124.0 | 11.9 | Fisher | 1.5 | Residence |
| 503-18-001F | 6N / 3W / 32 | 124.1 | 2.4 | Brinkman | 0.5 | Residence |
| 503-86-005 | 6N / 3W / 33 | 124.9 | 1.6 | Campbell | 0.2 | Vacant Land |
| 503-86-006A | 6N / 3W / 33 | 125.3 | 1.0 | Rowland | 0.2 | Residence |
| 503-86-006C | 6N / 3W / 33 | 125.1 | 31.1 | Oloff | 5.7 | Residence, Misc. Impr. |
| 503-86-007D | 6N / 3W / 33 | 124.75 | 0.6 | Moore | 0.3 | Vacant Land |
| 503-86-007F | 6N / 3W / 33 | 124.75 | 0.4 | Moore | 0.2 | Salvage Lot |
| 503-86-007U | 6N / 3W / 33 | 125.8 | 3.7 | Moore | 0.9 | Restr. / Bar / Misc. |
| 503-86-009D | 6N / 3W / 33 | 124.9 | 0.5 | Taylor | 0.5 | Vacant Land |
| 503-86-009F | 6N / 3W / 33 | 125.3 | 1.0 | Suggs | 0.7 | Vacant Land |
| 503-86-010A | 6N / 3W / 33 | 124.9 | 1.8 | Campbell | 0.6 | Vacant Land |
| 503-86-472 | 6N / 3W / 33 | 124.25 | 10.4 | Clayman | 2.2 | Mobile Homes |
| 503-86-473A | 6N / 3W / 33 | 124.35 | 0.9 | Kalina | 0.5 | Vacant Land |
| 503-86-473B | 6N / 3W / 33 | 124.4 | 0.9 | Judovin | 0.5 | Vacant Land |
| 503-86-474B | 6N / 3W / 33 | 124.45 | 2.2 | Judovin | 1.1 | Vacant Land |
| 503-86-474E | 6N / 3W / 33 | 124.55 | 0.9 | Ordiway | 0.5 | Mobile Homes |
| 503-86-475F | 6N / 3W / 33 | 124.55 | 0.2 | Price | 0.2 | Vacant Land |
| 503-86-475G | 6N / 3W / 33 | 124.7 | 1.7 | Albin | 0.9 | Vacant Land |
| 503-86-475H | 6N / 3W / 33 | 124.6 | 0.9 | Albin | 0.5 | Vacant Land |
| 503-86-475J | 6N / 3W / 33 | 124.6 | 0.7 | Ordiway | 0.4 | Nursing Homes |
| 503-86-932 | 6N / 3W / 33 | 125.0 | 0.1 | Mountain States | 0.1 | Tel. Switching Building |
| 503-29- | 5N / 3W / 4 | 125.5 | 480.0 | State of Arizona | 2.7 | Vacant Land |
| 503-17-019B | 5N / 3W / 3 | 126.0 | 5.0 | Green | 1.2 | Vacant Land |
| 503-17-019E | 5N / 3W / 3 | 125.8 | 17.1 | Seaman | 1.8 | Vacant Land |
| 503-17-019F | 5N / 3W / 3 | 125.7 | 15.0 | Seaman | 1.9 | Vacant Land |
| 503-17- | 5N / 3W / 3 | 126.5 | 480.0 | State of Arizona | 7.9 | Vacant Land |
| 503-17-013A | 5N / 3W / 10 | 126.95 | 155.0 | Kohner Tr. | 2.0 | Vacant Land |
| 503-17-025 | 5N / 3W / 11 | 127.2 | 147.0 | USA | 3.7 | Vacant Land |
| 503-17-004 | 5N / 3W / 11 | 127.45 | 65.2 | Raskins | 2.4 | Vacant Land |

**Table 9-1
ESTIMATED NEW RIGHT-OF-WAY**

| Assessor's No. | Township/ Range/ Section | Approx. US 60 Milepost | Approx. Parcel Size (ac) | Owner's Name | Estimated Land Take Alternative A2 (ac) | Comments |
|----------------|--------------------------|------------------------|--------------------------|---------------|---|------------------|
| 503-17-081 | 5N / 3W / 11 | 127.7 | 0.9 | Hayt | 0.4 | Vacant Land |
| 503-17-082 | 5N / 3W / 11 | 127.6 | 2.2 | Hayt | 0.9 | Vacant Land |
| 503-17-001B | 5N / 3W / 11 | 127.9 | 48.9 | Hayt | 3.7 | Vacant Land |
| 503-17-016B | 5N / 3W / 11 | 128.3 | 0.1 | McHenry | 0.1 | Vacant Land |
| 503-17-016D | 5N / 3W / 11 | 128.25 | 0.7 | McHenry | 0.5 | Vacant Land |
| 503-17-016E | 5N / 3W / 11 | 128.2 | 1.2 | McHenry | 0.5 | Vacant Land |
| 503-17-016F | 5N / 3W / 11 | 128.05 | 4.2 | McHenry | 0.9 | Vacant Land |
| 503-17-016G | 5N / 3W / 11 | 128.1 | 6.4 | McHenry | 0.9 | Vacant Land |
| 503-39-015B | 5N / 3W / 14 | 128.3 | 36.3 | Dailey | 0.8 | Vacant Land |
| 503-44-061A | 5N / 3W / 13 | 128.35 | 0.4 | Halsey | 0.4 | Service Station |
| 503-44-062A | 5N / 3W / 13 | | 0.1 | Bowers | 0.1 | Vacant Land |
| 503-44-063A | 5N / 3W / 13 | | 0.1 | Oloff | 0.1 | Vacant Land |
| 503-44-064A | 5N / 3W / 13 | | 0.1 | Jones | 0.1 | Vacant Land |
| 503-44-065A | 5N / 3W / 13 | | 0.1 | Adams | 0.1 | Vacant Land |
| 503-44-066A | 5N / 3W / 13 | | 0.1 | Dye | 0.1 | Quick Stop Groc. |
| 503-44-067A | 5N / 3W / 13 | | 0.1 | Dye | 0.1 | Misc. |
| 503-44-074A | 5N / 3W / 13 | | 0.1 | Oloff | 0.1 | Vacant Land |
| 503-44-075A | 5N / 3W / 13 | | 0.1 | Oloff | 0.1 | Vacant Land |
| 503-44-076A | 5N / 3W / 13 | 128.45 | 0.1 | Wolverton | 0.1 | Vacant Land |
| 503-44-077A | 5N / 3W / 13 | | 0.1 | Wolverton | 0.1 | Misc. |
| 503-44-078A | 5N / 3W / 13 | | 0.1 | Wolverton | 0.1 | Vacant Land |
| 503-44-079A | 5N / 3W / 13 | | 0.1 | Wolverton | 0.1 | Motels |
| 503-44-086B | 5N / 3W / 13 | | 0.2 | Guzman | 0.2 | Vacant Land |
| 503-44-089A | 5N / 3W / 13 | | 0.1 | Guzman | 0.1 | Vacant Land |
| 503-44-090A | 5N / 3W / 13 | | 0.1 | Guzman | 0.1 | Vacant Land |
| 503-44-091A | 5N / 3W / 13 | | 0.1 | Guzman | 0.1 | Misc. |
| 503-44-092A | 5N / 3W / 13 | 128.55 | 0.1 | Guzman | 0.1 | Service Station |
| 503-44-093A | 5N / 3W / 13 | | 0.1 | Guzman | 0.1 | Misc. Impr. |
| 503-44-094A | 5N / 3W / 13 | | 0.1 | Guzman | 0.1 | Quick Stop Groc. |
| 503-44-095A | 5N / 3W / 13 | | 0.1 | Guzman | 0.1 | Vacant Land |
| 503-44-096A | 5N / 3W / 13 | | 0.1 | Guzman | 0.1 | Vacant Land |
| 503-44-097A | 5N / 3W / 13 | | 0.1 | Guzman | 0.1 | Vacant Land |
| 503-45-001A | 5N / 3W / 13 | | 0.1 | Guzman | 0.1 | Vacant Land |
| 503-45-002A | 5N / 3W / 13 | | 0.1 | Harnish | 0.1 | Vacant Land |
| 503-45-003A | 5N / 3W / 13 | | 0.1 | Zimmerman | 0.1 | Vacant Land |
| 503-45-004A | 5N / 3W / 13 | | 0.1 | Obrien Estate | 0.1 | Vacant Land |
| 503-45-005A | 5N / 3W / 13 | | 0.1 | Obrien Estate | 0.1 | Vacant Land |

**Table 9-1
ESTIMATED NEW RIGHT-OF-WAY**

| Assessor's No. | Township/ Range/ Section | Approx. US 60 Milepost | Approx. Parcel Size (ac) | Owner's Name | Estimated Land Take Alternative A2 (ac) | Comments |
|----------------|--------------------------|------------------------|--------------------------|---------------|---|------------------|
| 503-45-006A | 5N / 3W / 13 | 128.6 | 0.1 | Obrien Estate | 0.1 | Vacant Land |
| 503-45-007A | 5N / 3W / 13 | | 0.1 | Obrien Estate | 0.1 | Vacant Land |
| 503-45-008A | 5N / 3W / 13 | | 0.1 | Obrien Estate | 0.1 | Vacant Land |
| 503-45-009A | 5N / 3W / 13 | | 0.1 | Obrien Estate | 0.1 | Residence |
| 503-45-010A | 5N / 3W / 13 | | 0.1 | Obrien Estate | 0.1 | Vacant Land |
| 503-45-011A | 5N / 3W / 13 | 128.7 | 0.1 | Obrien Estate | 0.1 | Misc. |
| 503-45-164A | 5N / 3W / 13 | | 0.0 | Farber | 0.0 | Vacant Land |
| 503-45-012A | 5N / 3W / 13 | | 0.1 | Campbell | 0.1 | Vacant Land |
| 503-43-060A | 5N / 3W / 13 | | 0.1 | Lee/Swett | 0.1 | Vacant Land |
| 503-43-061A | 5N / 3W / 13 | | 0.1 | Lee/Swett | 0.1 | Vacant Land |
| 503-43-062A | 5N / 3W / 13 | | 0.1 | Lee/Swett | 0.1 | Vacant Land |
| 503-43-063A | 5N / 3W / 13 | 128.7 | 0.1 | LaBelle | 0.1 | Vacant Land |
| 503-43-064A | 5N / 3W / 13 | | 0.1 | LaBelle | 0.1 | Restaurants/Bars |
| 503-43-065A | 5N / 3W / 13 | | 0.1 | LaBelle | 0.1 | Vacant Land |
| 503-43-066A | 5N / 3W / 13 | | 0.1 | Oloff | 0.1 | Vacant Land |
| 503-43-067A | 5N / 3W / 13 | | 0.1 | Oloff | 0.1 | Restaurants/Bars |
| 503-43-068A | 5N / 3W / 13 | 128.75 | 0.1 | Califano | 0.1 | Vacant Land |
| 503-43-069A | 5N / 3W / 13 | | 0.1 | Califano | 0.1 | Vacant Land |
| 503-43-070A | 5N / 3W / 13 | | 0.1 | Califano | 0.1 | Vacant Land |
| 503-43-071A | 5N / 3W / 13 | | 0.1 | Califano | 0.1 | Vacant Land |
| 503-43-080A | 5N / 3W / 13 | | 0.1 | Bastunas | 0.1 | Vacant Land |
| 503-43-081A | 5N / 3W / 13 | | 0.1 | Bastunas | 0.1 | Vacant Land |
| 503-43-082A | 5N / 3W / 13 | 128.75 | 0.1 | Bastunas | 0.1 | Vacant Land |
| 503-43-083A | 5N / 3W / 13 | | 0.1 | Bastunas | 0.1 | Vacant Land |
| 503-43-084A | 5N / 3W / 13 | | 0.1 | Lee | 0.1 | Vacant Land |
| 503-43-085A | 5N / 3W / 13 | | 0.1 | Lee | 0.1 | Vacant Land |
| 503-43-086A | 5N / 3W / 13 | | 0.1 | Savage | 0.1 | Vacant Land |
| 503-43-087A | 5N / 3W / 13 | 128.85 | 0.1 | Savage | 0.1 | Vacant Land |
| 503-43-088A | 5N / 3W / 13 | | 0.1 | Savage | 0.1 | Vacant Land |
| 503-43-089A | 5N / 3W / 13 | | 0.1 | Savage | 0.1 | Vacant Land |
| 503-43-090A | 5N / 3W / 13 | | 0.1 | Dong | 0.1 | Vacant Land |
| 503-43-091A | 5N / 3W / 13 | | 0.1 | Coats | 0.1 | Vacant Land |
| 503-43-098A | 5N / 3W / 13 | 128.85 | 0.1 | Tran | 0.1 | Restaurants/Bars |
| 503-43-099A | 5N / 3W / 13 | | 0.1 | Tran | 0.1 | Motels |
| 503-43-100A | 5N / 3W / 13 | | 0.1 | Tran | 0.1 | Motels |
| 503-43-101A | 5N / 3W / 13 | | 0.1 | Vest | 0.1 | Motels |

**Table 9-1
ESTIMATED NEW RIGHT-OF-WAY**

| Assessor's No. | Township/ Range/ Section | Approx. US 60 Milepost | Approx. Parcel Size (ac) | Owner's Name | Estimated Land Take Alternative A2 (ac) | Comments |
|----------------|--------------------------|------------------------|--------------------------|---------------|---|------------------|
| 503-43-102A | 5N / 3W / 13 | | 0.1 | Bliss | 0.1 | Vacant Land |
| 503-43-103A | 5N / 3W / 13 | | 0.1 | Bliss | 0.1 | Vacant Land |
| 503-43-110A | 5N / 3W / 13 | | 0.1 | White | 0.1 | Vacant Land |
| 503-43-111A | 5N / 3W / 13 | | 0.1 | Gohel | 0.1 | Vacant Land |
| 503-43-112A | 5N / 3W / 13 | 128.9 | 0.1 | Gohel | 0.1 | Restaurants/Bars |
| 503-43-113A | 5N / 3W / 13 | | 0.1 | Gohel | 0.1 | Vacant Land |
| 503-43-114A | 5N / 3W / 13 | | 0.1 | Gohel | 0.1 | Vacant Land |
| 503-43-115A | 5N / 3W / 13 | | 0.1 | Missall | 0.1 | Vacant Land |
| 503-43-122A | 5N / 3W / 13 | | 0.1 | Lee | 0.1 | Restaurants/Bars |
| 503-43-123A | 5N / 3W / 13 | 128.95 | 0.1 | Gohel | 0.1 | Misc. Commercial |
| 503-43-124A | 5N / 3W / 13 | | 0.1 | Fronsman | 0.1 | Vacant Land |
| 503-43-125A | 5N / 3W / 13 | | 0.1 | Birdsong | 0.1 | Vacant Land |
| 503-43-126A | 5N / 3W / 13 | | 0.1 | Martin | 0.1 | Vacant Land |
| 503-40-024A | 5N / 3W / 13 | | 1.6 | Lee | 0.1 | Limited Use |
| 503-41-226A | 5N / 3W / 13 | 128.95 | 0.9 | Hammond | 0.2 | Residence |
| 503-41-227 | 5N / 3W / 13 | 129.0 | 0.9 | Fronsman | 0.3 | Vacant Land |
| 503-40-013B | 5N / 3W / 13 | 129.0 | 0.9 | Gould | 0.7 | Vacant Land |
| 503-40-013E | 5N / 3W / 13 | 129.05 | 0.3 | Ridgeway | 0.2 | Vacant Land |
| 503-40-013F | 5N / 3W / 13 | 129.1 | 3.1 | Shemer | 1.0 | Vacant Land |
| 503-40-020B | 5N / 3W / 13 | 129.2 | 2.7 | Groves | 1.4 | Vacant Land |
| 503-40-020C | 5N / 3W / 13 | 129.2 | 10.8 | Groom | 0.2 | Residence |
| 503-40-020A | 5N / 3W / 13 | 129.3 | 1.0 | Groves | 0.5 | Vacant Land |
| 503-40-034 | 5N / 3W / 13 | 129.3 | 0.5 | Welch | 0.4 | Vacant Land |
| 503-40-020E | 5N / 3W / 13 | 129.35 | 0.0 | Groom | 0.0 | Vacant Land |
| 503-40-016B | 5N / 3W / 13 | 129.35 | 0.5 | Peters | 0.1 | Vacant Land |
| 503-40-017B | 5N / 3W / 13 | 129.35 | 0.4 | Welch | 0.1 | Mobile Homes |
| 503-40-017C | 5N / 3W / 13 | 129.35 | 1.4 | Welch | 0.0 | Residence |
| 503-40-010 | 5N / 3W / 13 | 129.35 | 0.7 | Welch | 0.4 | Service Station |
| 503-40-036B | 5N / 3W / 13 | 129.4 | 0.2 | Lyse | 0.2 | Misc. Commercial |
| 503-40-036A | 5N / 3W / 13 | 129.4 | 0.6 | Lyse | 0.2 | Residence |
| 503-40-008B | 5N / 3W / 13 | 129.4 | 0.6 | Duff | 0.3 | Mobile Homes |
| 503-40-028A | 5N / 3W / 13 | 129.45 | 1.8 | Retty | 0.4 | Residence |
| 503-40-028B | 5N / 3W / 13 | 129.45 | 0.2 | Retty | 0.2 | Quick Stop Groc. |
| 503-40-003A | 5N / 3W / 13 | 129.5 | 0.8 | Retty | 0.2 | Residence |
| 503-40-009A | 5N / 3W / 13 | 129.5 | 1.0 | Bickle/Butler | 0.2 | Residence |
| 503-40-009B | 5N / 3W / 13 | 129.5 | 1.0 | Jackle | 0.2 | Vacant Land |
| 503-40-018D | 5N / 3W / 13 | 129.55 | 0.2 | Edwards | 0.2 | Residence |
| 503-40-018G | 5N / 3W / 13 | 129.55 | 0.2 | Turner | 0.2 | Vacant Land |
| 503-40-039 | 5N / 3W / 13 | 129.55 | 0.3 | Foch | 0.2 | Vacant Land |
| 503-40-040 | 5N / 3W / 13 | 129.6 | 0.4 | Joseph | 0.3 | Vacant Land |

**Table 9-1
ESTIMATED NEW RIGHT-OF-WAY**

| Assessor's No. | Township/ Range/ Section | Approx. US 60 Milepost | Approx. Parcel Size (ac) | Owner's Name | Estimated Land Take Alternative A2 (ac) | Comments |
|----------------|--------------------------|------------------------|--------------------------|------------------------|---|-------------|
| 503-40-041 | 5N / 3W / 13 | 129.6 | 0.2 | Chastain | 0.2 | Vacant Land |
| 503-40-042 | 5N / 3W / 13 | 129.6 | 0.3 | Merritt | 0.2 | Vacant Land |
| 503-40-043 | 5N / 3W / 13 | 129.65 | 0.3 | Marshall | 0.2 | Vacant Land |
| 503-40-044 | 5N / 3W / 13 | 129.65 | 0.3 | Gutkin | 0.2 | Vacant Land |
| 503-40-045 | 5N / 3W / 13 | 129.65 | 0.3 | Gutkin | 0.2 | Vacant Land |
| 503-40-046 | 5N / 3W / 13 | 129.65 | 0.3 | Phx Tel FCU | 0.2 | Vacant Land |
| 503-40-047 | 5N / 3W / 13 | 129.7 | 0.3 | Teague | 0.2 | Vacant Land |
| 503-40-048 | 5N / 3W / 13 | 129.7 | 0.4 | Hollander | 0.2 | Vacant Land |
| 503-48-032 | 5N / 2W / 19 | 129.75 | 1.9 | Retty | 0.1 | Vacant Land |
| 503-48-033 | 5N / 2W / 19 | 129.8 | 1.0 | Retty | 0.1 | Vacant Land |
| 503-48-034 | 5N / 2W / 19 | 129.85 | 1.0 | Barkley | 0.1 | Vacant Land |
| 503-48-035 | 5N / 2W / 19 | 129.9 | 1.0 | First Amer. Trust 7412 | 0.1 | Vacant Land |
| 503-48-036 | 5N / 2W / 19 | 129.9 | 1.0 | First Amer. Trust 7412 | 0.1 | Vacant Land |
| 503-48-037 | 5N / 2W / 19 | 129.9 | 1.0 | First Amer. Trust 7412 | 0.1 | Vacant Land |
| 503-48-038 | 5N / 2W / 19 | 129.95 | 1.0 | First Amer. Trust 7412 | 0.1 | Vacant Land |
| 503-48-039 | 5N / 2W / 19 | 129.95 | 1.0 | Veltri | 0.1 | Vacant Land |
| 503-48-040 | 5N / 2W / 19 | 130.0 | 1.0 | Veltri | 0.1 | Vacant Land |
| 503-48-041 | 5N / 2W / 19 | 130.0 | 1.0 | Veltri | 0.1 | Vacant Land |
| 503-48-042 | 5N / 2W / 19 | 130.05 | 1.0 | Veltri | 0.1 | Vacant Land |
| 503-48-043 | 5N / 2W / 19 | 130.05 | 1.0 | Veltri | 0.1 | Vacant Land |
| 503-48-044 | 5N / 2W / 19 | 130.1 | 1.0 | First Amer. Trust 7412 | 0.1 | Vacant Land |
| 503-48-045 | 5N / 2W / 19 | 130.1 | 1.0 | First Amer. Trust 7412 | 0.1 | Vacant Land |
| 503-48-046 | 5N / 2W / 19 | 130.15 | 1.0 | First Amer. Trust 7412 | 0.1 | Vacant Land |
| 503-48-047 | 5N / 2W / 19 | 130.15 | 1.0 | Duff | 0.1 | Vacant Land |
| 503-48-048 | 5N / 2W / 19 | 130.2 | 1.0 | Duff | 0.1 | Vacant Land |
| 503-48-049 | 5N / 2W / 19 | 130.2 | 1.0 | Duff | 0.1 | Vacant Land |
| 503-48-050 | 5N / 2W / 19 | 130.25 | 1.0 | Duff | 0.1 | Vacant Land |
| 503-48-051 | 5N / 2W / 19 | 130.25 | 1.0 | Duff | 0.1 | Vacant Land |
| 503-48-052 | 5N / 2W / 19 | 130.3 | 2.5 | First Amer. Trust 7412 | 0.2 | Vacant Land |
| 503-48-004 | 5N / 2W / 19 | 130.35 | 0.9 | Caroussos | 0.3 | Vacant Land |
| 503-48-006B | 5N / 2W / 19 | 130.4 | 0.9 | First Amer. Trust 7412 | 0.8 | Vacant Land |
| 503-48-005B | 5N / 2W / 19 | 130.6 | 33.5 | First Amer. Trust 7412 | 4.9 | Vacant Land |
| 503-48-053 | 5N / 2W / 19 | 130.8 | 1.9 | First Amer. Trust 7412 | 0.2 | Vacant Land |
| 503-48-054 | 5N / 2W / 19 | 130.85 | 1.0 | First Amer. Trust 7412 | 0.2 | Vacant Land |
| 503-48-055 | 5N / 2W / 19 | 130.9 | 1.0 | First Amer. Trust 7412 | 0.2 | Vacant Land |
| 503-48-056 | 5N / 2W / 19 | 130.9 | 1.0 | First Amer. Trust 7412 | 0.2 | Vacant Land |
| 503-48-057 | 5N / 2W / 19 | 130.95 | 1.0 | First Amer. Trust 7412 | 0.2 | Vacant Land |
| 503-48-058 | 5N / 2W / 19 | 130.95 | 1.0 | First Amer. Trust 7412 | 0.2 | Vacant Land |
| 503-48-059 | 5N / 2W / 19 | 131.0 | 1.0 | First Amer. Trust 7412 | 0.2 | Vacant Land |
| 503-48-060 | 5N / 2W / 19 | 131.0 | 2.8 | First Amer. Trust 7412 | 0.3 | Vacant Land |

**Table 9-1
ESTIMATED NEW RIGHT-OF-WAY**

| Assessor's No. | Township/ Range/ Section | Approx. US 60 Milepost | Approx. Parcel Size (ac) | Owner's Name | Estimated Land Take Alternative A2 (ac) | Comments |
|----------------|--------------------------|------------------------|--------------------------|-------------------|---|-----------------------|
| 503-48-013A | 5N / 2W / 20 | 131.0 | 0.8 | Anderson | 0.2 | Limited Use |
| 503-48-013B | 5N / 2W / 20 | 131.05 | 1.4 | Sasaki | 0.5 | Vacant Land |
| 503-48-013C | 5N / 2W / 20 | 131.05 | 1.4 | Sasaki | 1.0 | Vacant Land |
| 503-48-021C | 5N / 2W / 29 | 131.1 | 3.6 | Bowlsby | 0.0 | Vacant Land |
| 503-48-021H | 5N / 2W / 29 | 131.2 | 10.8 | Bowlsby | 1.0 | Vacant Land |
| 503-48-021F | 5N / 2W / 29 | 131.2 | 8.8 | Stuckey | 0.9 | Vacant Land |
| 503-48-021E | 5N / 2W / 29 | 131.3 | 9.8 | Williams | 0.9 | Vacant Land |
| 503-48-024 | 5N / 2W / 29 | 131.4, 132 | 356.8 | USA | 11.2 | Central Ariz. Project |
| 503-48-019F | 5N / 2W / 29 | 131.55 | 23.4 | Groves | 1.4 | Vacant Land |
| 503-48-019G | 5N / 2W / 29 | 131.65 | 11.2 | 203rd Ave & Grand | 1.0 | Vacant Land |
| 503-51-027A | 5N / 2W / 28 | 132.5 | 10.1 | Vega | 3.0 | Vacant Land |
| 503-51-028 | 5N / 2W / 33 | 132.6 | 1.5 | Rodzwell | 0.2 | Vacant Land |
| 503-51-029 | 5N / 2W / 33 | 132.65 | 0.8 | Rodzwell | 0.2 | Vacant Land |
| 503-51-030 | 5N / 2W / 33 | 132.7 | 0.8 | Rodzwell | 0.2 | Vacant Land |
| 503-51-031 | 5N / 2W / 33 | 132.8 | 0.8 | Rodzwell | 0.2 | Vacant Land |
| 503-51-032 | 5N / 2W / 33 | 132.8 | 0.8 | Griffen Family | 0.2 | Vacant Land |
| 503-51-033 | 5N / 2W / 33 | 132.8 | 0.8 | Griffen Family | 0.2 | Vacant Land |
| 503-51-034 | 5N / 2W / 33 | 132.8 | 0.8 | Griffen Family | 0.2 | Vacant Land |
| 503-51-035 | 5N / 2W / 33 | 132.85 | 0.8 | Griffen Family | 0.2 | Vacant Land |
| 503-51-036 | 5N / 2W / 33 | 132.85 | 0.8 | Griffen Family | 0.2 | Vacant Land |
| 503-51-037 | 5N / 2W / 33 | 132.9 | 0.8 | Griffen Family | 0.2 | Vacant Land |
| 503-51-038 | 5N / 2W / 33 | 132.95 | 0.8 | Griffen Family | 0.2 | Vacant Land |
| 503-51-039 | 5N / 2W / 33 | 132.95 | 0.8 | Griffen Family | 0.2 | Vacant Land |
| 503-51-040 | 5N / 2W / 33 | 133 | 0.8 | Rodzwell | 0.2 | Vacant Land |
| 503-51-041 | 5N / 2W / 33 | 133 | 0.8 | Rodzwell | 0.2 | Vacant Land |
| 503-51-042 | 5N / 2W / 33 | 133.05 | 0.8 | Rodzwell | 0.2 | Vacant Land |
| 503-51-043 | 5N / 2W / 33 | 133.05 | 0.8 | Rodzwell | 0.2 | Vacant Land |
| 503-51-044 | 5N / 2W / 33 | 133.1 | 0.8 | Rodzwell | 0.2 | Vacant Land |
| 503-51-045 | 5N / 2W / 33 | 133.1 | 0.8 | AZ Coin Exchnge | 0.2 | Vacant Land |
| 503-51-046 | 5N / 2W / 33 | 133.15 | 0.8 | AZ Coin Exchnge | 0.2 | Vacant Land |
| 503-51-047 | 5N / 2W / 33 | 133.2 | 0.8 | AZ Coin Exchnge | 0.2 | Vacant Land |
| 503-51-048 | 5N / 2W / 33 | 133.2 | 0.8 | AZ Coin Exchnge | 0.2 | Vacant Land |
| 503-51-049 | 5N / 2W / 33 | 133.25 | 0.8 | McHenry | 0.2 | Vacant Land |
| 503-51-050 | 5N / 2W / 33 | 133.25 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-051 | 5N / 2W / 33 | 133.3 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |

**Table 9-1
ESTIMATED NEW RIGHT-OF-WAY**

| Assessor's No. | Township/ Range/ Section | Approx. US 60 Milepost | Approx. Parcel Size (ac) | Owner's Name | Estimated Land Take Alternative A2 (ac) | Comments |
|----------------|--------------------------|------------------------|--------------------------|-------------------------|---|---------------------------|
| 503-51-052 | 5N / 2W / 33 | 133.3 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-053 | 5N / 2W / 33 | 133.35 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-054 | 5N / 2W / 33 | 133.35 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-055 | 5N / 2W / 33 | 133.4 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-056 | 5N / 2W / 33 | 133.4 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-057 | 5N / 2W / 33 | 133.45 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-058 | 5N / 2W / 33 | 133.45 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-059 | 5N / 2W / 33 | 133.5 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-060 | 5N / 2W / 33 | 133.5 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-061 | 5N / 2W / 33 | 133.55 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-062 | 5N / 2W / 33 | 133.55 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-063 | 5N / 2W / 33 | 133.6 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-064 | 5N / 2W / 33 | 133.6 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-065 | 5N / 2W / 33 | 133.65 | 0.8 | Costello Ltd. | 0.2 | Vacant Land |
| 503-51-066 | 5N / 2W / 33 | 133.7 | 0.8 | Clayman Family Trust | 0.2 | Vacant Land |
| 503-51-067 | 5N / 2W / 33 | 133.7 | 0.8 | Fishell Screen | 0.2 | Vacant Land |
| 503-51-068 | 5N / 2W / 33 | 133.75 | 0.8 | Fishell Screen | 0.2 | Vacant Land |
| 503-51-069 | 5N / 2W / 33 | 133.8 | 0.8 | Fishell Screen | 0.2 | Vacant Land |
| 503-51-070 | 5N / 2W / 33 | 133.8 | 1.4 | Fishell Screen | 0.1 | Vacant Land |
| 503-51-014C | 5N / 2W / 34 | 133.9 | 12.2 | Zelmanovics Tr. | 2.4 | Vacant Land |
| 503-51-014B | 5N / 2W / 34 | 134.0 | 2.6 | Orear | 1.5 | Vacant Land |
| 503-73-039A | 4N / 2W / 3 | 134.2 | 13.2 | Vega | 3.5 | Residence |
| 503-73-018 | 4N / 2W / 3 | 134.5 | 57.1 | Signore | 4.9 | Vacant Land |
| 503-73-017A | 4N / 2W / 3 | 134.75 | 42.9 | Crown King Prop. | 1.7 | Vacant Land |
| 503-73-040U | 4N / 2W / 3 | 134.9 | 18.1 | Haugen | 2.0 | Vacant Land |
| 503-73-040J | 4N / 2W / 3 | 135.05 | 3.8 | Midas Four Co | 1.1 | Vacant Land |
| 503-73-040K | 4N / 2W / 3 | 135.15 | 4.0 | Soldevere | 1.1 | Vacant Land |
| 503-73-040D | 4N / 2W / 3 | 135.25 | 4.2 | Roman | 1.1 | Vacant Land |
| 503-73-040C | 4N / 2W / 3 | 135.35 | 6.3 | Villagomez | 2.3 | Residence |
| 503-73-011A | 4N / 2W / 2 | 135.45 | 0.2 | Maricopa Co. Hwy. Dept. | 0.2 | Access to Happy Valley Rd |
| 503-72-001 | 4N / 2W / 11 | 135.5 | 1.2 | Terrones Tr. | 0.6 | Vacant Land |
| 503-72-002 | 4N / 2W / 11 | 135.5 | 1.0 | Koppy | 0.4 | Vacant Land |
| 503-72-003 | 4N / 2W / 11 | 135.55 | 1.0 | Koppy | 0.4 | Vacant Land |
| 503-72-004 | 4N / 2W / 11 | 135.6 | 1.0 | Blakely | 0.4 | Vacant Land |
| 503-72-005 | 4N / 2W / 11 | 135.6 | 1.0 | Blakely | 0.4 | Vacant Land |

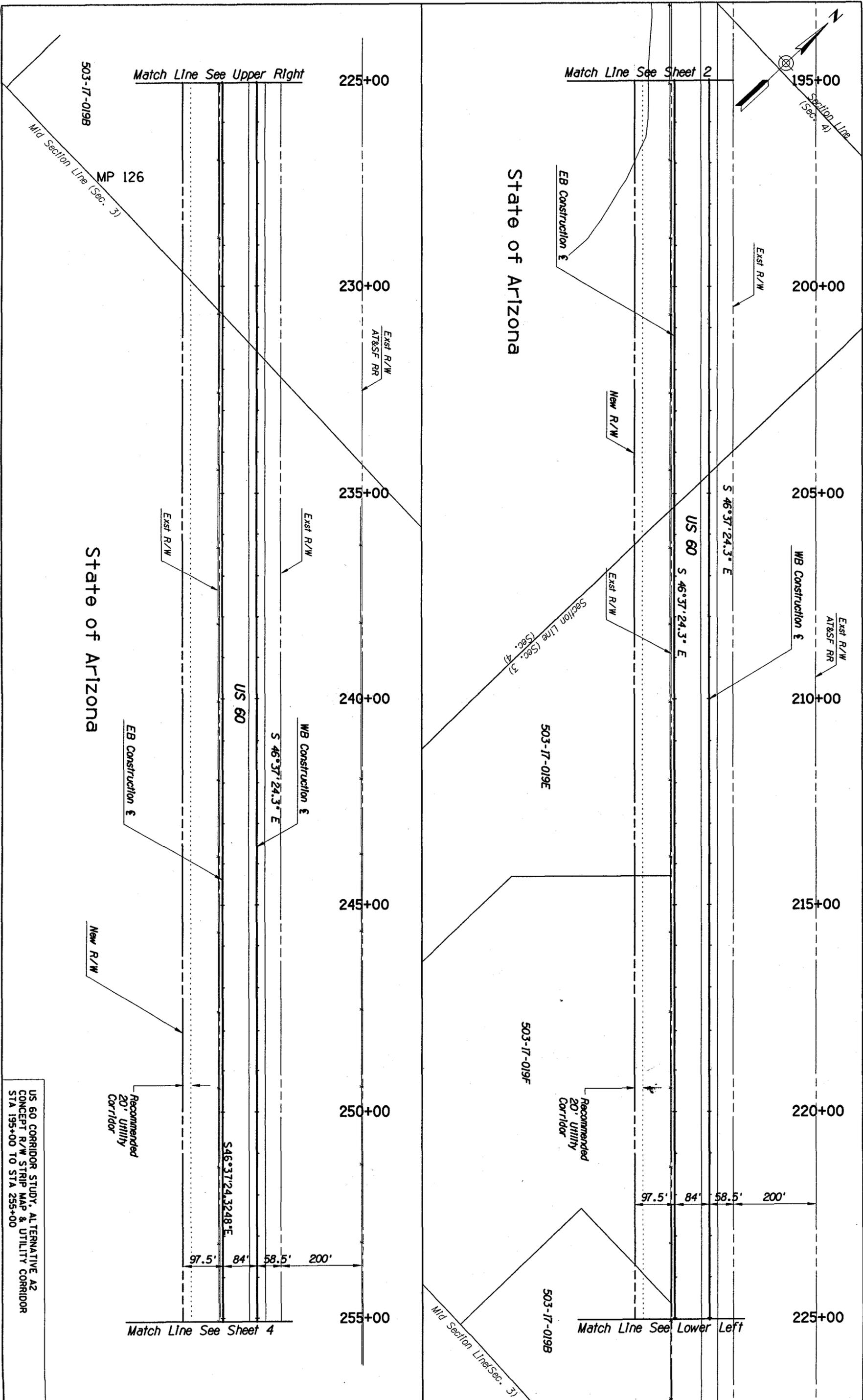
**Table 9-1
ESTIMATED NEW RIGHT-OF-WAY**

| Assessor's No. | Township/ Range/ Section | Approx. US 60 Milepost | Approx. Parcel Size (ac) | Owner's Name | Estimated Land Take Alternative A2 (ac) | Comments |
|----------------|--------------------------------|------------------------------|--------------------------------|---------------------|---|------------------|
| 503-72-006 | 4N / 2W / 11 | 135.65 | 1.0 | Blakely | 0.4 | Misc. Commercial |
| 503-72-007 | 4N / 2W / 11 | 135.7 | 1.0 | Hu | 0.4 | Vacant Land |
| 503-72-008 | 4N / 2W / 11 | 135.7 | 1.0 | Pruett | 0.4 | Quick Stop Groc. |
| 503-72-009 | 4N / 2W / 11 | 135.75 | 1.0 | Madziarek | 0.4 | Misc. Commercial |
| 503-72-010 | 4N / 2W / 11 | 135.75 | 1.0 | Blakely | 0.4 | Warehouses |
| 503-72-011 | 4N / 2W / 11 | 135.8 | 1.0 | Elbing | 0.4 | Vacant Land |
| 503-72-012 | 4N / 2W / 11 | 135.8 | 1.0 | Kitzmiller | 0.4 | Vacant Land |
| 503-72-013 | 4N / 2W / 11 | 135.85 | 1.0 | Terrones Tr. | 0.4 | Vacant Land |
| 503-72-014 | 4N / 2W / 11 | 135.85 | 1.0 | Beardsley Water | 0.4 | Vacant Land |
| 503-72-015 | 4N / 2W / 11 | 135.9 | 1.0 | Cooley | 0.4 | Vacant Land |
| 503-72-016 | 4N / 2W / 11 | 135.9 | 1.0 | Dunn | 0.4 | Vacant Land |
| 503-72-017 | 4N / 2W / 11 | 135.95 | 1.0 | Bauer | 0.4 | Vacant Land |
| 503-72-018 | 4N / 2W / 11 | 135.95 | 1.0 | Bauer | 0.4 | Vacant Land |
| 503-72-019 | 4N / 2W / 11 | 136.0 | 1.0 | Johnson | 0.4 | Vacant Land |
| 503-72-020 | 4N / 2W / 11 | 136.0 | 1.0 | Yee | 0.4 | Vacant Land |
| 503-72-021 | 4N / 2W / 11 | 136.05 | 1.4 | Yee | 0.5 | Vacant Land |
| 503-70-014A | 4N / 2W / 11 | 136.1 | 1.0 | Yee | 0.8 | Vacant Land |
| 503-70-011 | 4N / 2W / 11 | 136.15 | 2.7 | Groves | 1.1 | Vacant Land |
| 503-70-007C | 4N / 2W / 11 | 136.2 | 3.0 | Groves | 0.7 | Vacant Land |
| 503-70-007D | 4N / 2W / 11 | 136.25 | 2.7 | Villagomez | 0.4 | Residence |
| 503-70-007B | 4N / 2W / 11 | 136.3 | 5.0 | Jones | 0.8 | Vacant Land |
| 503-70-005B | 4N / 2W / 11 | 136.35 | 0.9 | Kaufman | 0.2 | Mobile Homes |
| 503-70-005A | 4N / 2W / 11 | 136.4 | 12.9 | Kaufman | 1.6 | Vacant Land |
| 503-70-006 | 4N / 2W / 11 | 136.6 | 68.2 | Burke | 3.6 | Vacant Land |
| 503-73-042 | 4N / 2W / 12 | 136.8 | 2.7 | Wine Tr. | 1.3 | Vacant Land |
| 503-73-029A | 4N / 2W / 13 | 136.85 | 12.3 | Maricopa Co M W C D | 0.2 | Vacant Land |
| 503-73-028J | 4N / 2W / 13 | 136.85 | 1.6 | Gay | 0.6 | Vacant Land |
| 503-73-028Q | 4N / 2W / 13 | 136.9 | 1.6 | Tung | 0.6 | Vacant Land |
| 503-73-028R | 4N / 2W / 13 | 136.95 | 0.7 | Tung | 0.2 | Vacant Land |
| 503-73-028S | 4N / 2W / 13 | 137.05 | 4.9 | Decca Invest. | 1.6 | Vacant Land |
| 503-73-028T | 4N / 2W / 13 | 137.2 | 5.1 | Decca Invest. | 1.7 | Vacant Land |
| 503-73-028U | 4N / 2W / 13 | 137.3 | 5.1 | Sullivan Invest. | 1.7 | Vacant Land |
| 503-73-029B | 4N / 2W / 13 | 137.5 | 7.5 | Maricopa Co M W C D | 2.2 | Vacant Land |
| 503-73-028N | 4N / 2W / 13 | 137.7 | 5.7 | Decca Invest. | 2.3 | Vacant Land |
| 503-73-028P | 4N / 2W / 13 | 137.8 | 5.7 | Avenida Part. | 1.9 | Vacant Land |
| 503-73-028L | 4N / 2W / 13 | 137.95 | 4.8 | Mullan | 1.5 | Vacant Land |
| 503-73-031A | 4N / 2W / 13 | 138.1 | 56.6 | Maricopa Co. FCD | 1.2 | Vacant Land |
| 503-73-028M | 4N / 2W / 13 | 138.15 | 6.4 | Granddeer Part. | 0.1 | Vacant Land |
| 503-57-027 | 4N / 1W / 18 | 138.15 | 0.7 | Brewer | 0.7 | Residence |
| 503-57-029 | 4N / 1W / 18 | 138.2 | 0.6 | Brewer | 0.6 | Misc. Commercial |

**Table 9-1
ESTIMATED NEW RIGHT-OF-WAY**

| Assessor's No. | Township/ Range/ Section | Approx. US 60 Milepost | Approx. Parcel Size (ac) | Owner's Name | Estimated Land Take Alternative A2 (ac) | Comments |
|---------------------------|--------------------------|------------------------|--------------------------|--------------------|---|------------------------|
| 503-57-025S | 4N / 1W / 18 | 138.2 | 1.8 | Cowley Cos. | 0.2 | Vacant Land |
| 503-57-025T | 4N / 1W / 18 | 138.25 | 1.1 | Cowley Cos. | 1.1 | Quick Stop Groc. |
| 503-57-025U | 4N / 1W / 18 | 138.3 | 0.3 | Cowley Cos. | 0.3 | Vacant Land |
| 503-57-025L | 4N / 1W / 18 | 138.3 | 2.3 | Dove Family Tr. | 0.5 | Vacant Land |
| 503-58-001D | 4N / 1W / 19 | 138.5 | 43.6 | ADOT | 3.2 | Vacant Land |
| DRAINAGE EASEMENTS | | | | | | |
| 503-86-480 | 6N / 3W / 33 | 124.9 | 5.2 | AT & SF Railroad | 0.4 | Vacant Land |
| 503-86-006C | 6N / 3W / 33 | 125.1 | 31.1 | Oloff | 0.3 | Residence, Misc. Impr. |
| 503-41-226A | 5N / 3W / 13 | 128.95 | 0.9 | Hammond | 0.0 | Residence |
| 503-41-227 | 5N / 3W / 13 | 129.0 | 0.9 | Fronsmann | 0.4 | Vacant Land |
| 503-40-013B | 5N / 3W / 13 | 129.0 | 0.9 | Gould | 0.2 | Vacant Land |
| 503-40-013E | 5N / 3W / 13 | 129.05 | 0.3 | Ridgeway | 0.2 | Vacant Land |
| 503-40-013F | 5N / 3W / 13 | 129.1 | 3.1 | Shemer | 0.5 | Vacant Land |
| 503-48-042 | 5N / 2W / 19 | 130.05 | 1.0 | Merritt | 0.1 | Vacant Land |
| 503-48-024 | 5N / 2W / 29 | 131.4, 132 | 356.8 | USA | 0.3 | Central Ariz. Project |
| 503-51-027A | 5N / 2W / 28 | 132.5 | 10.1 | Vega | 0.0 | Vacant Land |
| 503-51-059 | 5N / 2W / 33 | 133.5 | 0.8 | Costello Ltd. | 0.1 | Vacant Land |
| 503-51-060 | 5N / 2W / 33 | 133.5 | 0.8 | Costello Ltd. | 0.1 | Vacant Land |
| 503-73-040C | 4N / 2W / 3 | 135.35 | 6.3 | Villagomez | 0.1 | Residence |
| 503-73-029B | 4N / 2W / 13 | 137.5 | 7.5 | Marcopa Co M W C D | 0.3 | Vacant Land |
| 503-73-028N | 4N / 2W / 13 | 137.7 | 5.7 | Decca Invest. | 0.1 | Vacant Land |

Stardrup CORPORATION

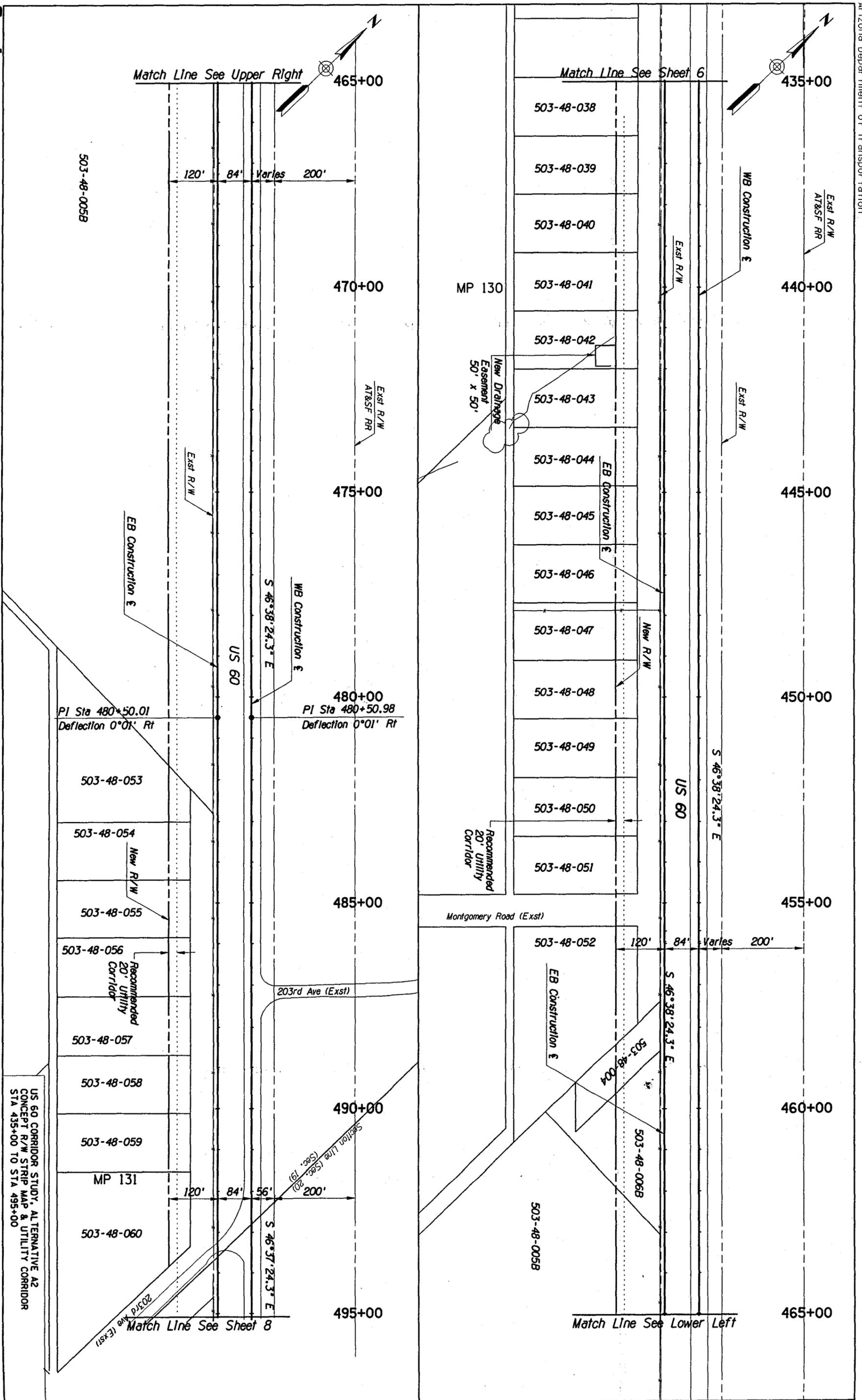


State of ARIZONA

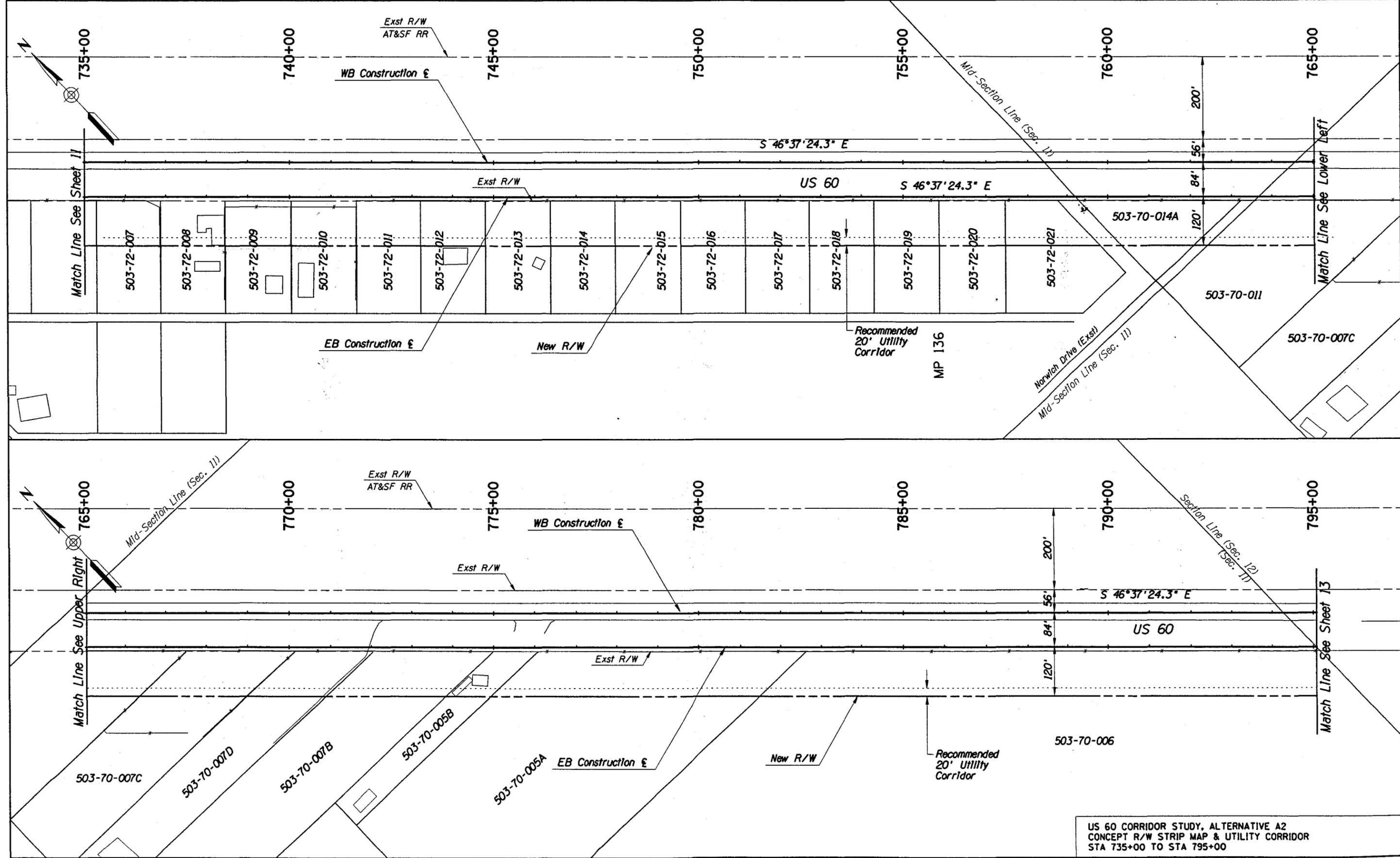
State of ARIZONA

US 60 CORRIDOR STUDY, ALTERNATIVE A2
 CONCEPT R/W STRIP MAP & UTILITY CORRIDOR
 STA 195+00 TO STA 255+00

Sverdrup CORPORATION



US 60 CORRIDOR STUDY, ALTERNATIVE A2
 CONCEPT R/W STRIP MAP & UTILITY CORRIDOR
 STA 435+00 TO STA 495+00



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