

Final Design Concept Report

I-10, Fairway Drive Traffic Interchange

In Maricopa County, Arizona

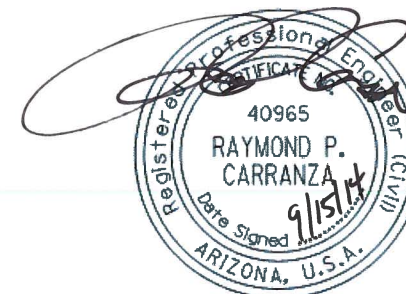
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EXECUTIVE SUMMARY

The Arizona Department of Transportation (ADOT) is the sponsor of a proposed action, the construction and operation of a new service traffic interchange (TI) at Interstate 10 (I-10) and Fairway Drive located at approximately milepost 130.7 in the western Phoenix metropolitan area in the city of Avondale in Maricopa County, Arizona. ADOT is working in close consultation with the Federal Highway Administration (FHWA), the lead federal agency, to develop a categorical exclusion, a design concept report, and change of access report for the proposed action.

In November 2003, the Maricopa Association of Governments (MAG) Regional Council unanimously adopted the *Regional Transportation Plan* (RTP), providing a broad, integrated vision for Maricopa County's transportation system through 2026. In November 2004, county voters approved Proposition 400, which extended a ½ cent sales tax for an additional 20 years to fund the RTP's multimodal program of improvements, including a service TI at El Mirage Road (now referred to as Fairway Drive) and I-10. The original RTP included \$17.3 million for the project in Phase IV (fiscal years 2021 to 2026) of the RTP program.

The latest published RTP (MAG 2014) includes \$20.3 million for the I-10 and Fairway Drive service TI using federal, State, and Proposition 400 funding sources. The funding for construction is programed in the Group 2 planning period (fiscal years 2019 to 2026). The project is currently identified in the MAG Transportation Improvement Program and the ADOT 2015-2019 Five-year Transportation Facilities Construction Program for design and right-of-way funding in fiscal year 2015.

Although funding for construction of the TI is currently programmed in Plan Group 2, the City of Avondale anticipates advancing the TI's design and construction to an earlier fiscal year to meet the needs of ongoing and planned developments in the area (City of Avondale 2012a).

ALTERNATIVES DEVELOPMENT AND SCREENING

This report describes how alternative TI configurations were developed and evaluated. The project team's screening process led to the initial identification of the Preferred Alternative. The Preferred Alternative was identified based on an evaluation of geometric design criteria, traffic operational characteristics, environmental impacts, ability to meet driver expectancy, project costs, and agency support. Public agencies that have been involved with the project include ADOT, FHWA, MAG, Maricopa County Department of Transportation, Flood Control District of Maricopa County, and the City of Avondale.

The study team has identified Alternative 1 as the Preferred Alternative. This recommendation is supported by local agency stakeholders and the public. Section 3.0, Evaluation of Alternatives, summarizes the process and issues considered in making this recommendation.

SCOPE OF WORK

Construction of the proposed Fairway Drive TI would include the following elements:

- Build exit and entrance ramps connecting Fairway Drive to eastbound and westbound I-10.

- Widen I-10 to add EB and WB auxiliary lanes connecting entrance and exit ramps between Dysart Road, Fairway Drive, and Avondale Boulevard. It should be noted that auxiliary lanes are already constructed east of the Dysart Road TI on the I-10 bridge over the Agua Fria River.
- Build a new 235-foot-long, two-span bridge over I-10. The existing four general purpose lanes and a high-occupancy vehicle lane in each direction would pass under the proposed structure. The bridge span was set to accommodate one additional general purpose lane in each direction in the future.
- Install retaining walls adjacent to the freeway entrance and exit ramps as needed.
- Build drainage inlets, pipes, culverts, and basins.
- Install traffic signals at ramp terminal intersections.
- Install pavement markings and signs for Fairway Drive and for I-10.
- Add roadway lighting at the proposed ramp and TI areas.
- Acquire approximately 14 acres of new right-of-way from six properties.
- Implement access control south of the TI.
- South of the proposed Fairway TI, the widening of Fairway drive, extension of Garfield Street, reconstruction of the Garfield/Fairway intersection, drainage improvements, traffic signals, pavement marking and signing, and lighting is not included in this scope of work.

PROGRAMMED AND ESTIMATED COST

The estimate of probable project costs for constructing the proposed TI is \$20 million (2013 dollars). This estimate includes \$14.7 million for construction, \$904,000 for design, \$2.5 million for right-of-way, and \$1.7 million in indirect cost. As previously noted, the Arizona Transportation Board has approved \$1.9 million funding in the current 5-year Transportation Facilities Construction Program (2015-2019) to begin final design and right-of-way procurement. Construction funding of \$18.4 million is programmed in Group 2 of the RTP (2019 to 2026).

the latest published RTP (MAG 2014) includes \$20.3 million for the I-10 and Fairway Drive service TI, and the funding for construction is in Plan Group 2 of the RTP (2019 to 2026). Design and right-of-way has funding for fiscal year 2015 as identified in the MAG Transportation Improvement Program and the ADOT 2015-2019 Five-year Transportation Facilities Construction Program. Given the City of Avondale's plan to advance the project, advertisement of the project for construction is anticipated to be advanced to FY 2016 pending regional council approval.

1.0 INTRODUCTION

1.1 PROJECT LOCATION

Figure 1.1 illustrates the Interstate 10 (I-10) and Fairway Drive service traffic interchange (TI) study area. The proposed TI is located within the context of the Phoenix metropolitan area arterial street system, which was developed along a grid of north-to-south and east-to-west 1-mile section lines. The proposed TI would be located at the intersection of I-10 and the section line along the Fairway Drive alignment, 1 mile east and west of Dysart Road and Avondale Boulevard, respectively. To the north, El Mirage Road ends at Indian School Road (2.5 miles north of I-10), where it is intercepted by the Agua Fria River. To the south, El Mirage Road ends at Buckeye Road (1.5 miles south of I-10), where it is blocked by Coldwater Springs Golf Course. Fairway Drive (which shares the same section line as El Mirage Road) originates north of Buckeye Road within the Coldwater Springs Golf Course development and extends from Coldwater Springs Boulevard north past Van Buren Street and ends on the southern side of I-10.

I-10 crosses the United States in a west-to-east direction, beginning in Southern California and ending in Florida. As it passes through Arizona, I-10 is the heaviest traveled route for intrastate and interstate passenger and truck traffic. In the study area, it provides a vital transportation corridor for commuters traveling to and from downtown Phoenix.

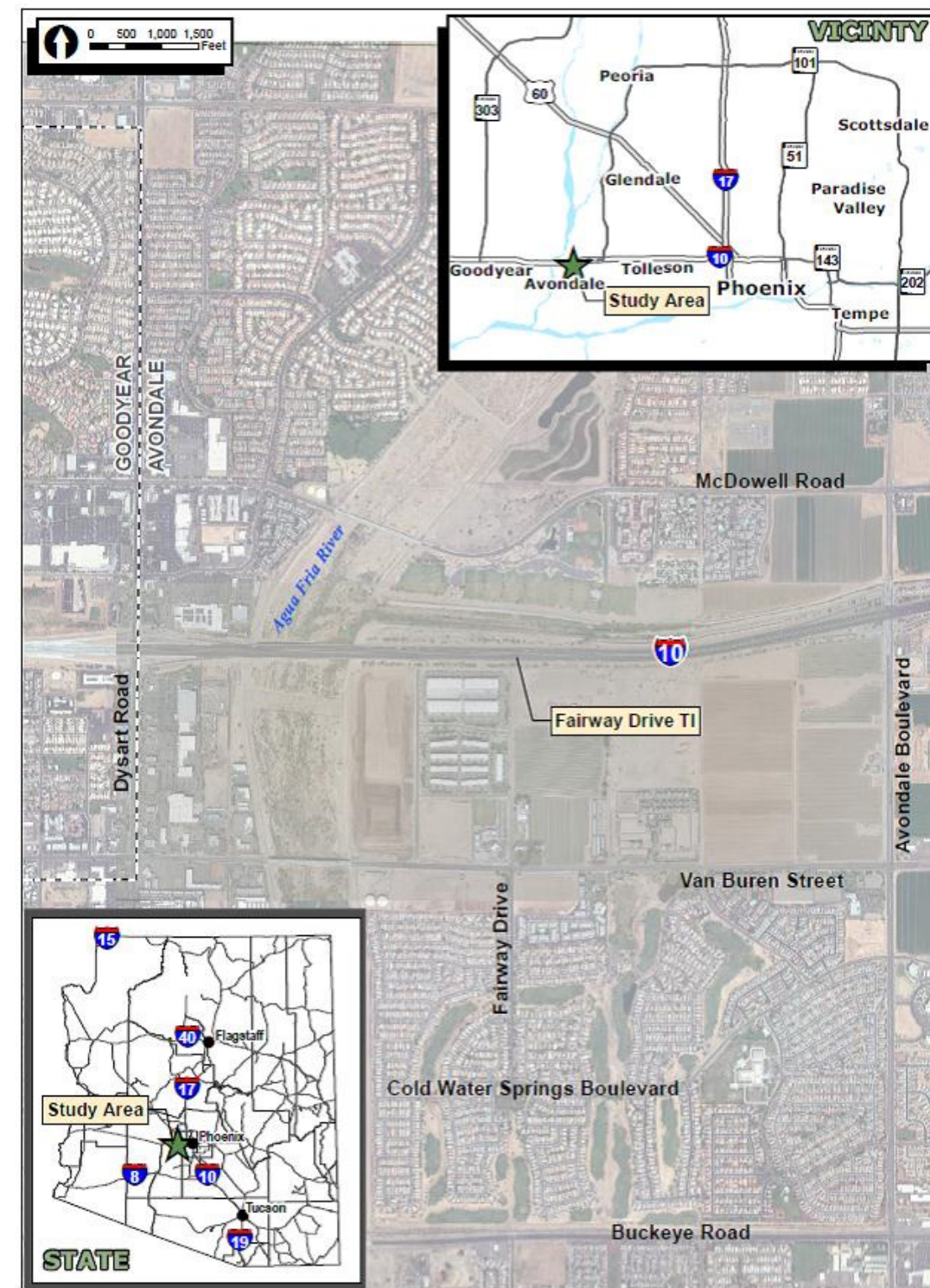
Access to I-10 is currently provided with diamond interchanges at Dysart Road (1 mile west of Fairway Drive) and Avondale Boulevard (1 mile east of Fairway Drive). I-10 crosses over Dysart Road and Avondale Boulevard on grade-separated structures. I-10 also crosses over the Agua Fria River between Dysart Road and Fairway Drive on a grade-separated structure.

1.2 PROJECT BACKGROUND

In November 2003, the Maricopa Association of Governments (MAG) Regional Council unanimously adopted the *Regional Transportation Plan (RTP)*, providing a broad, integrated vision for Maricopa County's transportation system through 2026. In November 2004, county voters approved Proposition 400, which extended a ½ cent sales tax for an additional 20 years to fund the RTP's multimodal program of improvements, including a service TI at El Mirage Road (now referred to as Fairway Drive) and I-10. The original RTP included \$17.3 million for the project in Phase IV (fiscal years 2021 to 2026) of the RTP program. The latest published RTP (MAG 2014) includes \$20.3 million for the I-10 and Fairway Drive service TI using federal, State, and Proposition 400 sources. The funding for construction is programmed in the Group 2 planning period (fiscal years 2019 to 2026). The project is currently identified in the MAG Transportation Improvement Program and the ADOT 2015-2019 Five-year Transportation Facilities Construction Program for design and right-of-way funding in fiscal year 2015.

Although funding for construction of the TI is currently programmed in Phase IV, the City of Avondale anticipates advancing the TI's design and construction to an earlier fiscal year to meet the needs of ongoing and planned developments in the area (City of Avondale 2012a).

Figure 1.1 – Project location and vicinity



1.2 PURPOSE AND NEED FOR THE PROJECT

Providing a connection between I-10 and Fairway Drive is needed to:

- support economic development – facilitate access to higher-intensity land uses planned in the study area, including regional commercial, industrial, and office uses – land uses that benefit from efficient connections to the regional transportation network
- support local and regional governmental plans and provide system linkage – fulfill the vision of local and regional plans that identify a link between I-10 and Fairway Drive
- provide additional capacity – reduce the traffic burden – especially from heavy trucks that are expected in adjacent areas – on existing TIs with I-10 west and east of Fairway Drive

1.3 CHARACTERISTICS OF THE CORRIDOR

The study area for the proposed project is defined by McDowell Road to the north, Van Buren Street to the south, Dysart Road to the west, and Avondale Boulevard to the east. All are offset approximately 1 mile from the intersection of Fairway Drive and I-10. Within the study area, Dysart Road is the boundary between the Goodyear (to the west) and Avondale (to the east). The proposed project is within the city limits of Avondale.

The existing Fairway Drive is a two-lane road that travels in a north-to-south direction along a section line in the western Phoenix metropolitan area. Fairway Drive begins at Coldwater Springs Boulevard and heads north to Van Buren Street. North of Van Buren Street, Fairway Drive continues ½ mile north and ends at a cul-de-sac just south of I-10.

Fairway Drive has been identified as a collector road in local, county, and regional plans. As such, the proposed service TI would provide an important link in the transportation network and encourage truck traffic to use Fairway Drive.

The construction of I-10 in the study area dates back to the late 1970s and early 1980s. Construction has been ongoing in the study area over the last few years to add capacity. I-10 now has four 12-foot-wide general purpose lanes, a 12-foot-wide high-occupancy vehicle (HOV) lane with a 4-foot-wide buffer, a 12-foot-wide inside shoulder, and a 10-foot-wide outside shoulder in each direction. The travel lanes and shoulders are Portland cement concrete pavement (PCCP) with an asphalt rubber-asphaltic concrete friction course (AR-ACFC) overlay. Concrete median barrier separates the two directions of travel. The posted speed limit in the area is 65 miles per hour (mph). In the study area, I-10 is elevated approximately 15 feet above surrounding terrain.

Land Use

The Agua Fria River channel is the predominant topographic feature in the study area. The river crosses the study area generally north-to-south between Dysart Road and Fairway Drive. 500 kilovolt (kV), 345 kV and 230 kV overhead electric transmission lines generally follow the Agua Fria River through the study area.

On the western side of the river, existing land use in the study area is a mix of residential and commercial uses. The Avondale Friendship Park Sports Complex is located east of the river north of I-10 next to the Crystal Springs residential development.

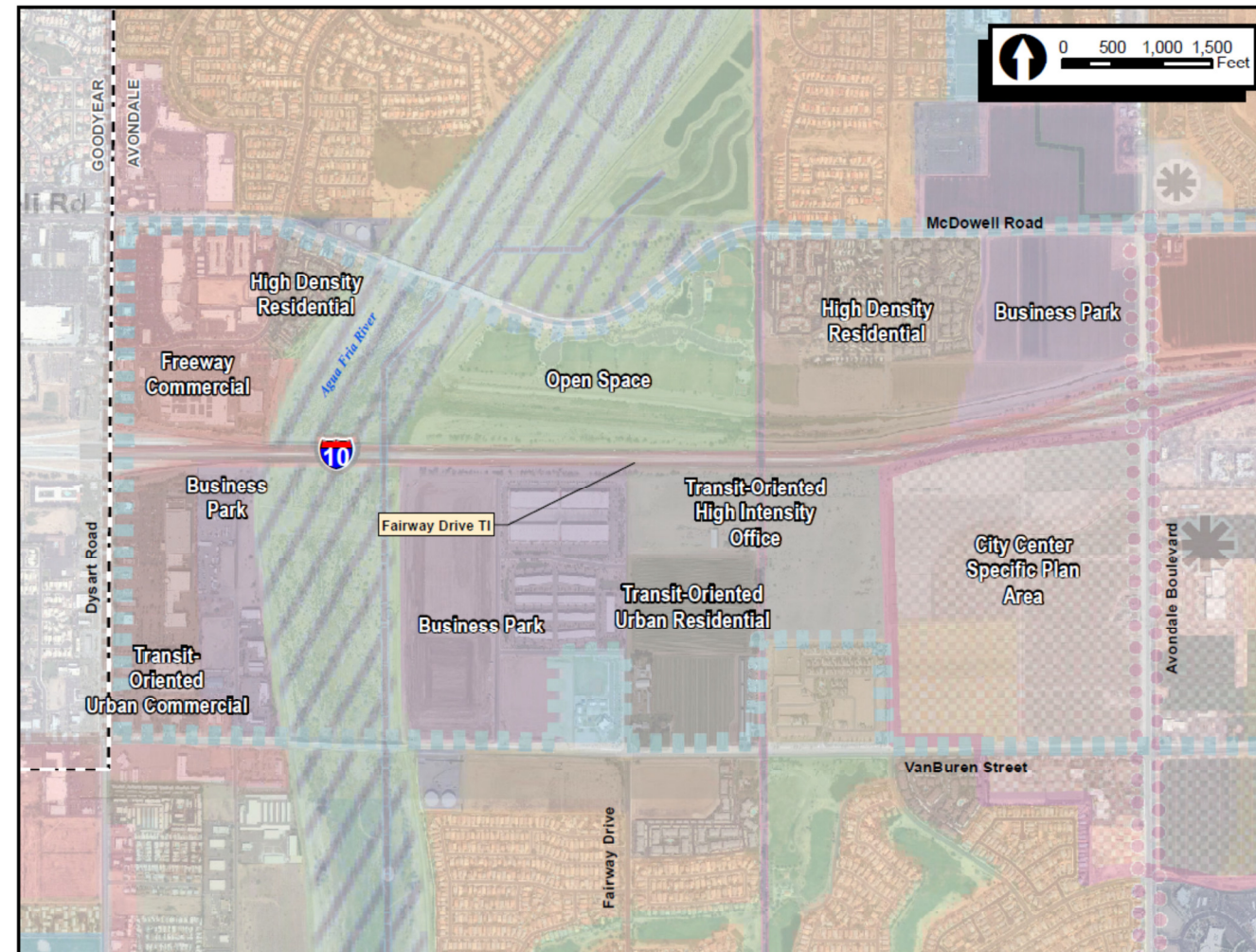
Figure 1.2 – Existing land uses, 2013



Growth in the study area is occurring south of I-10 along Fairway Drive. The Avondale Commerce Center is an existing industrial park. The proposed Coldwater Depot and the new Legacy Traditional School, also known as the West Valley Charter School, are also located in the Fairway Drive corridor. Figure 1.2 shows the existing study area land use.

Future land uses shown in the City of Avondale *General Plan 2030* (City of Avondale 2012b) include urban residential transit-oriented development, professional office, and business park uses (see Figure 1.3). A portion of the planned City of Avondale City Center is also located in the study area south of I-10 along Avondale Boulevard. North of I-10, the *General Plan 2030* identifies a future business park in addition to existing commercial, residential, and open space uses.

Figure 1.3 – City of Avondale General Plan 2030 land uses



Roadway Network

The existing roadway network in the study area, shown in Figure 1.4, includes I-10 and a grid of arterial streets located on section lines. The arterial streets considered in the study area include:

- Dysart Road is a north-to-south major arterial street that defines the boundary between the cities of Goodyear and Avondale. North and south of I-10, Dysart Road has three lanes in each direction. Major commercial and retail development is located along Dysart Road in the area of I-10.
- Fairway Drive is a north-to-south, two-lane road that runs from just south of I-10 south into a residential development south of Van Buren Street. A signalized intersection is located at Fairway Drive and Van Buren Street.
- Avondale Boulevard is a north-to-south major arterial street that serves as the primary entrance into Avondale. North and south of I-10, Avondale Boulevard has three lanes in each direction. Major commercial and retail development is located along Avondale Boulevard in the area of I-10.

- Van Buren Street is an east-to-west major arterial street that runs parallel to I-10 approximately 0.5 mile to the south. Within the study area, Van Buren Street has two lanes in each direction (including the bridge over the Agua Fria River).
- McDowell Road is an east-to-west major arterial street that runs parallel to I-10 approximately 0.5 mile to the north. Within the study area, McDowell Road has two lanes in each direction (including the bridge over the Agua Fria River).

The Arizona Department of Transportation (ADOT) completed I-10 improvements (general purpose and HOV lane widening) between February 2008 and December 2009. There are no current plans to widen I-10 in the area of Fairway Drive. However, previous planning studies have identified a long-term need for another general purpose lane in each direction (ADOT 2006). Table 1.1 lists previous I-10 construction projects in the study area.

Figure 1.4 – Existing road network

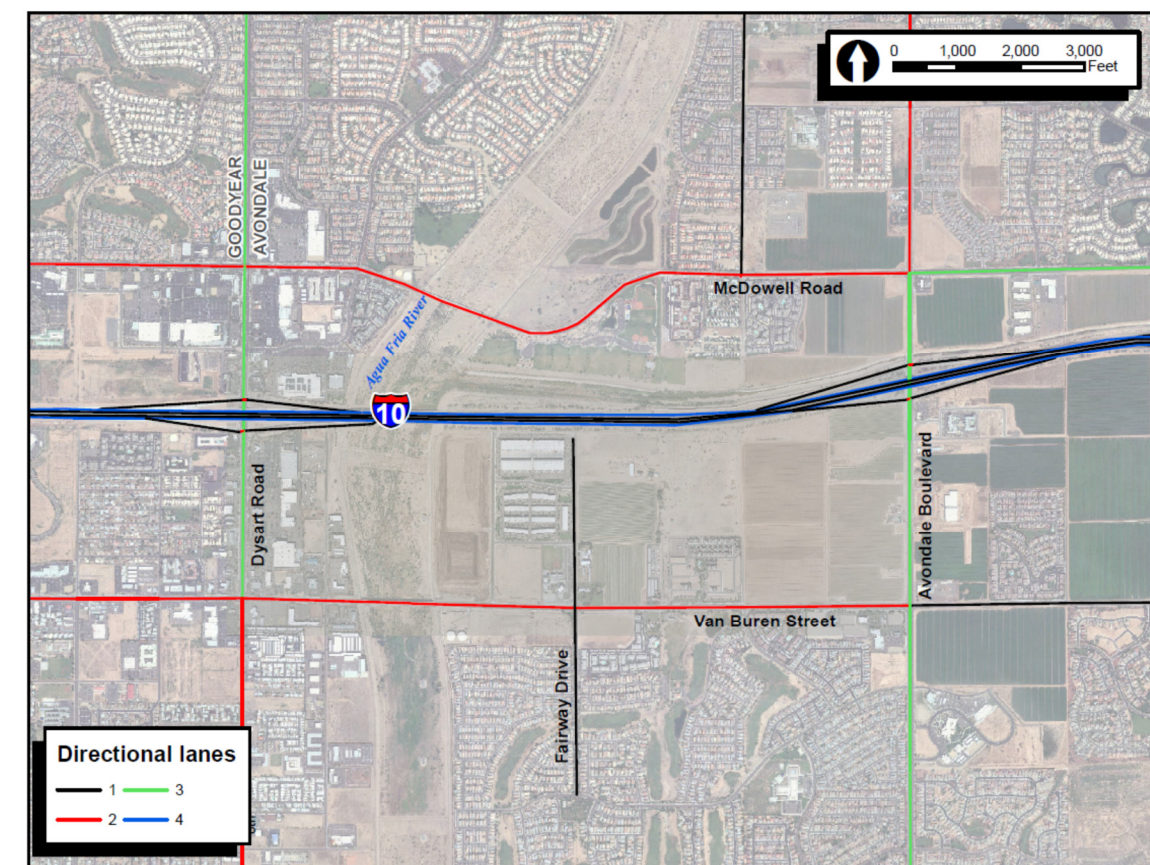


Table 1.1 – Previous I-10 construction projects

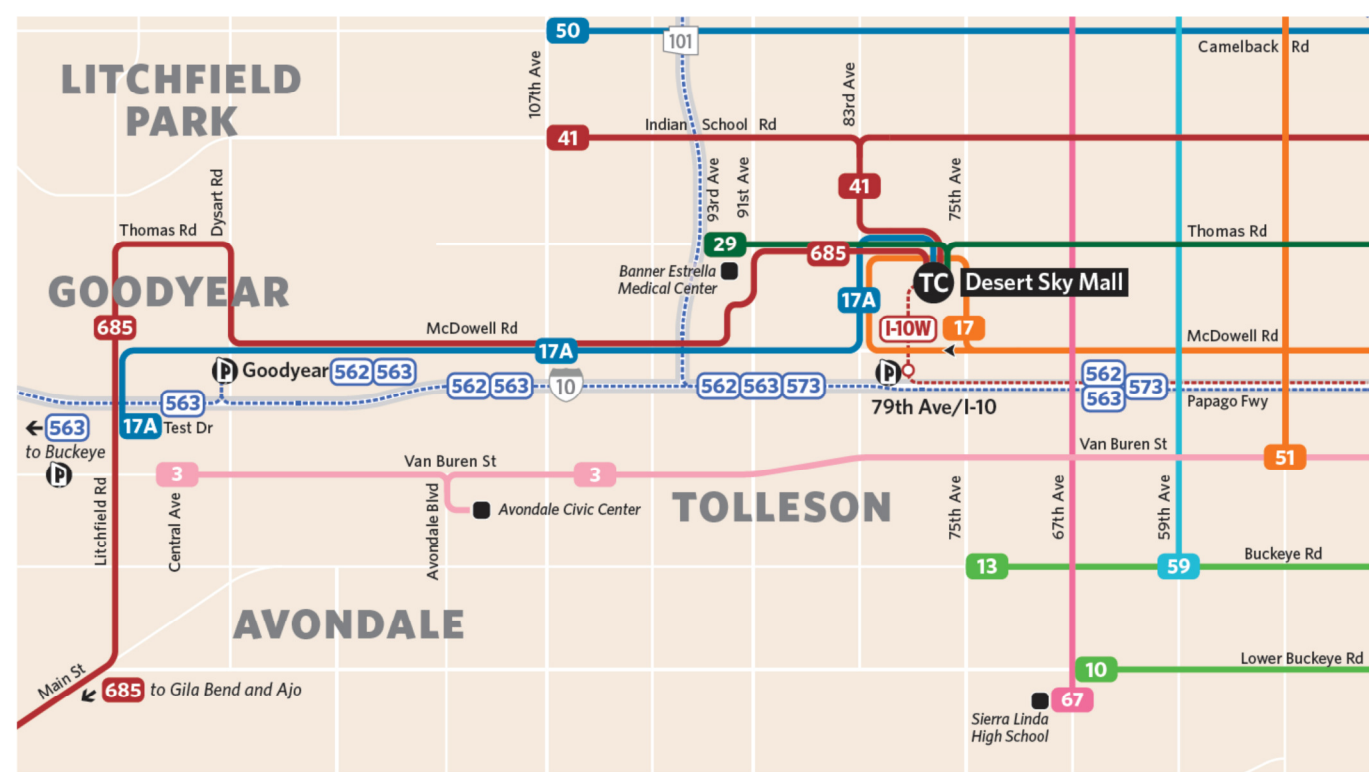
Project number	Begin	End	Type	As-built year
I-10-2(75)	Agua Fria River	115th Avenue	Grade and drain	1984
I-10-2(84)	Dysart Road	99th Avenue	Paving	1990
IM-010-B(201)N	Sarival Avenue	SR 101L	Median widening	2010
010-B(208)	Avondale Boulevard	Avondale Boulevard	TI improvements	2010
010-B(202)A	Sarival Avenue	Dysart Road	Outside widening	2011

Notes: SR = State Route, TI = traffic interchange

Transit Facilities and Routes

A number of transit routes pass through the study area along McDowell Road, I-10, and Van Buren Street. A park-and-ride lot is located just west of Dysart Road on the northern side of I-10. An excerpt from the regional transit service map is presented in Figure 1.5. Additional description of each route that runs within and around the study area is provided below.

Figure 1.5 – Existing transit routes



Source: Reproduced from Valley Metro (2013)

- Route 3 – Local service that runs along Van Buren Street within the study area. The route begins 0.5 mile west of Dysart Road and runs to the Avondale Civic Center southeast of Avondale Boulevard and Van Buren Street. From the Civic Center, the route continues east to downtown Phoenix.

Route 17A – Local service that runs along McDowell Road within the study area. The route begins just south of I-10 on Litchfield Road and ends at the Desert Sky Mall transit center.

- Route 562 – Express service that travels along I-10 through the study area. The route originates at the Goodyear park-and-ride lot north of I-10 and west of Dysart Road and ends at the downtown Phoenix transit center.
- Route 563 – Express service that travels along I-10 through the study area. The route originates in Buckeye and ends at the downtown Phoenix transit center.
- Route 685 – Rural connector that begins in Ajo (near the Arizona-Mexico border) and extends through Gila Bend, ending at the Desert Sky Mall transit center on 79th Avenue and McDowell Road. Within the study area, the route runs along McDowell Road.

Interchanges

In the general proximity of Fairway Drive, access to I-10 is provided at all major north-to-south arterial streets at 1-mile spacing. This includes Litchfield Road (2 miles west), Dysart Road (1 mile west), and Avondale Boulevard (1 mile east). Each TI provides access in all directions from a diamond-type configuration. Between 107th Avenue and 99th Avenue, a split diamond configuration is provided (2 miles east). The ramp terminal intersections at each TI are controlled by signals. Auxiliary lanes are provided between successive TIs. East of Dysart Road and west of Avondale Boulevard, acceleration and deceleration lanes are provided for ramps. I-10 passes over each of the crossroads on grade-separated structures.

The nearest major freeway-to-freeway TI is the Loop 101 (Agua Fria Freeway) and I-10 connection 3 miles east of Fairway Drive. A new freeway-to-freeway TI is currently under construction 6 miles west of Fairway Drive. It will connect Loop 303 to I-10.

Utilities

An existing private well is located immediately adjacent to Fairway Drive and is summarized in Table 1.2. A number of utilities also cross I-10 east and west of Fairway Drive; they are summarized in Table 1.3. The existing utilities have been identified based on information from AZ Blue Stake, as-built information, and previous I-10 studies. Contacts for the utility companies include:

- Arizona Public Service (Bobby Garza, baldemar.garza@aps.com, 602-361-6840)
- CenturyLink (Brett Beaty, bbeaty@centurylink.com, 480-798-4574)
- City of Avondale (Mike Ruggles, 623-764-2515)
- Cox Communications (Gwendalyn Garcia, 623-328-4073)
- Southwest Gas (Andy Lugo, 602-484-5345)
- Salt River Project-Distribution (Allen Garrison, 602-499-5322)
- Salt River Project-Transmission (Elijah Labandi, elijah.labandi@srp.net, 602-236-3794)
- Western Area Power Administration (Matt Mueller, 02-605-2498)

Table 1.2 – Utilities along Fairway Drive

Owner	Type	Location
Private	Well site	Northeast of the existing Garfield Road and Fairway Drive intersection

Table 1.3 – Utilities crossing I-10

Owner	Type	Location
CenturyLink	Abandoned underground telephone	Crosses I-10 along west side of Fairway Drive
	Underground telephone	Crosses I-10 along 119th Avenue
City of Avondale	Water/24-inch sewer	Crosses I-10 just west of 119th Avenue
Salt River Project/Arizona Public Service	Overhead 230 kV	Crosses I-10 just east of Fairway Drive
	Overhead 69 kV	Crosses I-10 at 119th Avenue
	Underground 12 kV	Crosses I-10 at 119th Avenue
Western Area Power Administration	Overhead 230 kV	Crosses I-10 just east of Fairway Drive
Tucson Electric Power	Overhead 345 kV	Crosses I-10 along Agua Fria River
Arizona Public Service	Overhead 230 kV	Crosses I-10 along Agua Fria River

Note: kV = kilovolt

Drainage

Existing On-site Conditions for I-10

Within the study area, the I-10 horizontal alignment contains straight sections that are crowned at the median edge (with a 2 percent transverse slope) and curved sections that are superelevated. On-site drainage along the straight sections sheet flows outward to the ADOT right-of-way. Approximately 0.7 mile east of Fairway Drive, the I-10 alignment is superelevated for the curve.

Previously, I-10 had an open median with area inlets for drainage. As a result of the I-10 widening in recent years, the median was closed and half barrier was added to the median centerline, along with curb and gutter to the pavement edge. A new system of inlets and storm drain pipes was added to drain the superelevated pavement section. Additionally, a series of curb cuts and spillways was added to the northern gutter flow line. The developing spillway runoff is routed along the northern sound wall through a ditch and discharged through 30-inch corrugated metal pipes (CMPs) due north to the Papago Diversion Channel, which runs parallel to the I-10 alignment. Captured flow continues due west and outlets to the Agua Fria River. ADOT catch basins (Standard Details C-15.90 and C-15.91) are used to capture drainage. The curb cuts and spillways are treated with rock riprap.

Existing On-site Conditions for Fairway Drive

Fairway Drive is a two-lane road, half street construction with a one-way slope. The western edge of pavement features a typical 6-inch vertical curb (MAG Standard Detail Type A) and gutter section, while the eastern edge has no edge treatment. Eastern on-site flows are allowed to sheet off the pavement section and follow existing drainage patterns. Discharge concentrating along the southbound travel lane is controlled by scuppers and valley gutters for flow conveyance. The existing scuppers outlet to a series of basins along the existing commercial developments in the area. MAG Standard Detail Concrete Scupper 206 is used to capture stormwater.

Existing Off-site Conditions

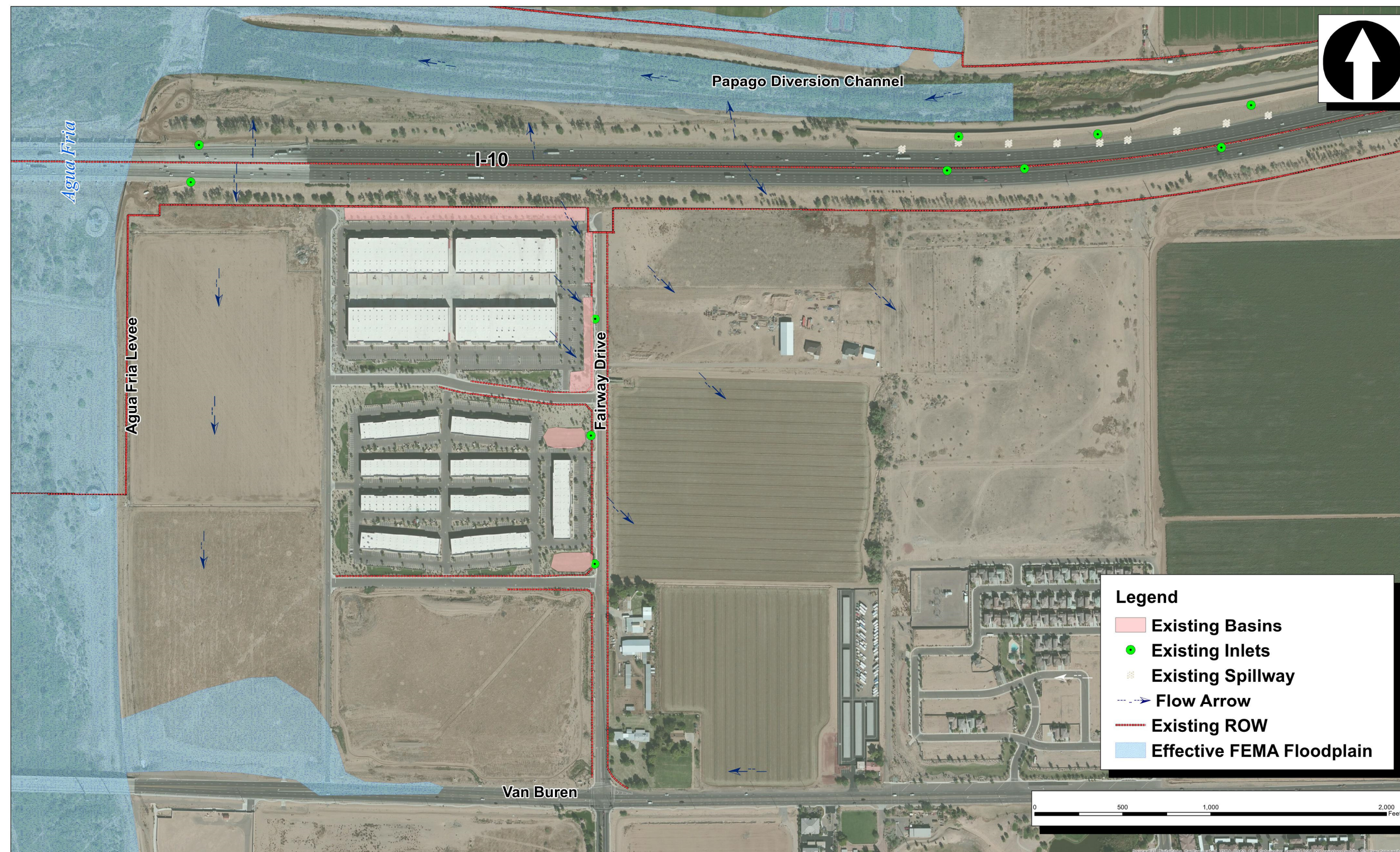
North of I-10, the general topography within the study area slopes toward the south to southwest. South of I-10, the topography has a gradual southern to southeastern slope. The interstate embankment forms a barrier prohibiting cross flows from north to south. To control the concentrated discharge along the northern embankment, a regional channel was developed – the Papago Diversion Channel. The western most limits of the channel are denoted in a Federal Emergency Management Agency floodplain map for the Agua Fria River (Flood Insurance Rate Map Panel Number 04013C2080J). The effective floodplain is Zone AE. Depicted flood limits are most likely attributable to the backwater effect created at the I-10/Agua Fria River crossing.

South of I-10 and west of the proposed Fairway Drive, drainage flows primarily due south, with contours east of Fairway Drive sloping to the southeast. The eastern overbank of the Agua Fria River is protected with a U.S. Army Corps of Engineers-designed levee traversing due south. The land uses within the region are primarily commercial and industrial.

South of I-10 and east of the proposed Fairway Drive, drainage flows in a southeast direction. The land uses are primarily open land and agricultural.

A general overview of existing drainage flow patterns and effective floodplain limits are shown in Figure 1.6.

Figure 1.6 – Existing drainage conditions



Notes: ROW = right-of-way, FEMA = Federal Emergency Management Agency

Right-of-Way

The existing right-of-way width along I-10 is between 600 and 1,100 feet in the area around Fairway Drive. There is 75 feet of existing right-of-way along Fairway Drive. The existing right-of-way is shown in Figure 1.6.

Structures

Three existing bridges are in the study area: Dysart Road TI overpass, Agua Fria River bridge, and Avondale Boulevard TI overpass. Dual bridges at each site were built—the Dysart Road and Agua Fria River bridges in 1978 and the Avondale Boulevard overpass bridge in 1981. In 2007, the bridges were widened to the median side at each site. In 2009, the Agua Fria River bridges were widened to the outside on both sides. Median barriers separate east- and westbound traffic. Table 1.4 summarizes the existing bridges in the study area.

Table 1.4 – Existing bridges

Bridge name	Structure no.	Superstructure type	Spans	Length	Width	Roadway width (one direction)
Dysart Rd TI overpass	1723	CIP PT Box Girder	1	163 feet	204 feet, 10 inches	99 feet, 5 inches
Agua Fria River bridge	1852	Precast I Girder	20	1,502 feet	183 feet, 2 inches	88 feet, 5 inches
Avondale Boulevard TI overpass	1856	CIP PT Box Girder	1	152 feet, 7 inches	173 feet, 1 inch	83 feet, 5 inches

Notes: CIP = cast in place, PT = post tension, TI = traffic interchange

Signs, Lights, and Freeway Management System Facilities

Current signs along the I-10 corridor between Dysart Road and Avondale Boulevard consist of miscellaneous regulatory, warning, and guide signs, along with advance signs for the diamond TIs at Avondale Boulevard in the eastbound direction and Dysart Road in the westbound direction.

Freeway lighting is located along I-10 within the study area. ADOT Type U-69 high-mast poles are mounted on the median barrier and spaced at 325- to 375-foot intervals. The addition of a TI at Fairway Drive may require an adjustment of one or two of the median-mounted poles to accommodate the median bridge pier. In addition, lights will need to be added to provide adequate lighting levels for the ramps and crossroad.

No freeway management system (FMS) facilities are currently located within the study corridor. Underground FMS conduit (3 feet, 3 inches) terminates from the west on the western side of the Agua Fria River Bridge and from the east within the Loop 101 (Agua Fria Freeway) system TI. Existing traffic counting loops are located on eastbound and westbound I-10 at Station 6904+00± (700 feet east of the proposed TI). There is currently an ADOT project underway that will install FMS facilities within the study corridor. The ADOT 2014-2018 *Five-Year Transportation Facilities Construction Program* has identified construction in FY 2016. A Project Assessment is currently underway with final design anticipated in FY 2014. The location of work is from Dysart Road to 83rd Avenue but may extend further west to Litchfield Road.

Geotechnical Conditions

Available geotechnical data used to develop preliminary recommendations are based on information obtained from ADOT as-built construction documents, laboratory test data from representative samples in the study area obtained through the ADOT Materials Group (Pavement Management Section), and recently performed geotechnical investigations adjacent to the study area. No intrusive (drilling or sampling) geotechnical investigations were performed for the study.

Geotechnical Conditions

The study area is situated within the West Salt River Valley subbasin, which encompasses the western portion of the greater Phoenix metropolitan area and includes Phoenix, Glendale, Peoria, Avondale, Goodyear, Litchfield Park, and Tolleson. The subbasin is bounded to the north by the Hedgepeth Hills and the Hieroglyphic Mountains, to the east by the Phoenix Mountains, Papago Buttes, and Union Hills, to the south by the South Mountains and the Sierra Estrella, and to the west by the White Tank Mountains. The subbasin boundary extends downstream of the confluence of the Salt and Gila Rivers in the vicinity of Buckeye, north-northwest of the northern end of the Sierra Estrella and south-southeast of the southern end of the White Tank Mountains. The West Salt River Valley subbasin is characterized by a broad and gently sloping alluvial plain underlain by up to several thousand feet of alluvium. It is bisected by several streams, including the Salt and Gila Rivers, Agua Fria River, New River, and Skunk Creek.

The West Salt River Valley subbasin is underlain by a sequence of basin-fill material deposits, generally divided into three primary units as follows:

- **Lower Alluvial Unit:** This unit overlies and is in contact with the bedrock of the valley floor, and consists of well-consolidated sediments. This unit is described by Brown and Pool (1989) as the lower conglomerate unit.
- **Middle Alluvial Unit:** This unit overlies the Lower Conglomerate Unit and consists primarily of weakly consolidated sand and gravel at the basin margins, to mudstones and evaporates near the basin center. This unit is described by Brown and Pool (1989) as the middle silt and clay unit.
- **Upper Alluvial Unit:** This unit is made up of channel, floodplain, and alluvial-fan deposits, consisting primarily of sand and gravel, interbedded with lesser amounts of clay and silt. It is, in general, unconsolidated. This unit is locally coarser-grained along drainages, in particular along the Salt and Gila Rivers. The upper alluvial unit is estimated to range in thickness from less than 200 feet at the margins of the basin to about 400 feet near the confluence of the Salt and Gila Rivers (Brown and Pool 1989).

The surface geology for the study area is described by Demsey (1989) as young alluvium from the Holocene to the latest Pleistocene age with surfaces underlain by well-sorted (poorly graded) sand and silt, with local occurrences of fine gravels. Locally, the alluvial deposits can be coarser. The Agua Fria River deposits, to the west of the study area, are described as recently active channel deposits consisting primarily of silt, sand, and fine gravel. To the east of the study area, the surface deposits are described as alluvium of the early middle to middle Pleistocene age and include silt, sand, and fine gravel to large cobbles.

Geologic Setting

Depth to groundwater within the project area varies from a few feet within and adjacent to major drainages during flow events, to over a hundred feet below the existing ground surface. Depth to groundwater in the area for 1997 to 1998 and 2002 to 2003 (Rascona 2003) ranged from about 60 feet near the Agua Fria River to about 115 feet within the preponderance of the study area, corresponding to groundwater table elevations ranging from about 870 to 920 feet.

Ground Subsidence and Earth Fissures

Ground subsidence maps from the Arizona Department of Water Resources (2013) indicate that the study area is located outside of the West Valley zone of land subsidence. Ground subsidence and associated earth fissures should not be a concern in design and construction.

Soil Shrink/Swell Potential

Published maps for the greater Phoenix area showing areas of potential shrink- or swell-prone soils (Natural Resources Conservation Service 2002) indicate a relatively narrow band or zone of soils of high shrink/swell potential that intersects I-10 in the study area. This zone is located at about 1 mile east of the Agua Fria River and just west of 115th Avenue, which is within the study area. It is recommended that the preliminary design phase for the project include sufficient geotechnical investigation to permit characterization of the extent, characteristics, and potential impacts on design of these potentially unsuitable soils.

Subsurface Geotechnical Profile

Deep subsurface geotechnical information (greater than about 20 to 25 feet in depth) was not available for the proposed I-10 and Fairway Drive TI. However, geotechnical information obtained from the I-10 median and outside widening projects and the I-10 and Avondale Boulevard TI improvement project was reviewed. Available geotechnical data in the study area vicinity includes deep borings at the Agua Fria River bridge, shallow pavement borings within the I-10 median embankment fill through the study area, 20-foot-deep borings for the existing sound wall on the northern side of I-10 (which extends to the east toward Avondale Boulevard), and deep wall and bridge borings at the Avondale Boulevard TI.

Based on the limited available data, existing I-10 fill embankment soils consist primarily of silty to clayey sands, with occasional to trace amounts of gravel and occasional cobbles. These soils are typically non-plastic to medium plasticity, slightly moist, and firm to very firm or medium dense to dense.

The nearest borings for the existing sound wall were performed approximately 1,100 feet east of the I-10 and Fairway Drive TI. These borings were performed to depths of 20 feet below existing grade and encountered interbedded, granular to fine-grained soils consisting of a mixture of silty to clayey sands, sandy silt and clay, and sandy gravel. These soils are typically dry to moist, uncemented to weakly cemented, and medium dense to very dense or stiff to very stiff.

Deep borings at the eastern bank of the I-10 bridge over the Agua Fria River encountered primarily granular soils. The upper 20 to 25 feet (below existing grade) consists of sand with silt, a trace to some gravel, and occasional to a trace cobbles, and are medium dense to very dense. Below this upper layer, to depths of about 60 to 65 feet below existing grade, the soils consist of gravel with silt and sand, a trace to some cobbles, and are very dense. Below this gravel layer are silty sands with a trace to some gravel, and dense to very dense.

Deep borings at the I-10 and Avondale Boulevard TI encountered a mixture of granular and fine-grained soils in both the existing I-10 embankment fill and native soils. The existing embankment fill

consists of clayey to silty sand and sandy clay, with no to some gravel, non-plastic to medium plasticity, medium dense to very dense, and moderately firm to hard. The native soils are composed of interbedded granular to fine-grained soils. The upper 20 to 30 feet (from original grade) of native soils consist of silty to clayey sand and sandy clay, with no to some gravel, moderately firm to hard, and medium dense to very dense.

Below this upper layer, the gravel content generally increases and consists of gravel with sand, silt or clay, sand with silt, and clayey to silty sand, with varying amounts of gravel and possible cobbles and boulders, and dense to very dense or hard.

Existing Roadway Subgrade

Information regarding the existing roadway subgrade characteristics was provided by the ADOT Pavement Management Section and was obtained from previous geotechnical investigations. Based on this information, pavement subgrade soils are anticipated to consist primarily of silty to clayey sands and sandy clays. Correlated R-values for these soils vary over a wide range, from 16 to 92. Laboratory-tested R-values ranged from 36 to 78. The *Pavement Design Summary Report* for the I-10 median widening project (ADOT 2007) recommended a design R-value of 39 for I-10 between Dysart Road and Avondale Boulevard.

A majority of the proposed pavement for the new I-10 ramps at Fairway Drive will be constructed on new embankment. Satisfactory long-term performance of the ramp pavements will be contingent on the use of acceptable embankment fill materials and proper embankment construction.

A preliminary estimated design R-value for the project pavements will be provided by ADOT Materials Group during final design.

Existing Pavement Sections

Information regarding the existing pavement structural sections was obtained from as-built plans and was provided by ADOT's Pavement Management Section. Refer to Table 1.5 for a summary of the existing I-10 pavement structural sections. Based on the pavement history table of the Pavement Management System data obtained from ADOT, the existing I-10 main line PCCP sections between Loop 101 and Dysart Road consist of 10 inches of PCCP over 5 inches of aggregate base (AB). The *Pavement Design Summary Report* for the I-10 median widening project (ADOT 2007) recommended a pavement section consisting of 15 inches of doweled PCCP over 4 inches of AB with a 1-inch AR-ACFC surface.

Table 1.5 – Summary of existing I-10 pavement structural sections

Description	Existing pavement section			Total thickness (inches)
	AB (inches)	PCCP (inches)	AR-ACFC (inches)	
Inside shoulder	4	15	1	19+1
Travel lanes	4	15	1	19+1
Outside shoulder	4	15	1	19+1

AB = aggregate base, AR-ACFC = asphalt rubber – asphaltic concrete friction course, PCCP = Portland cement concrete pavement

2.0 TRAFFIC CONDITIONS

The following sections provide information related to conditions that exist in the base year and the design year of evaluation for the proposed TI.

2.1 EXISTING CONDITIONS

Previous Studies and Related Materials

The study team reviewed a number of studies and related materials to help document the existing conditions. A list is provided below, and excerpts of important items from the documents are summarized in the following sections.

- *Southwest Area Transportation Study* (MAG 2003a)
- *Regional Transportation Plan* (MAG 2003b)
- *City of Avondale Transportation Plan Update* (City of Avondale 2012a)
- *City of Avondale General Plan 2030* (City of Avondale 2012b)
- Traffic impact studies:
 - Avondale Commerce Center (City of Avondale 2007a)
 - Coldwater Apartments (City of Avondale 2005)
 - Coldwater Depot (City of Avondale 2012c)
 - Coldwater Springs (City of Avondale 1997)
 - Coldwater Springs Promenade (City of Avondale 2007b)
 - West Valley Charter School (City of Avondale 2011)

Southwest Area Transportation Study

The *Southwest Area Transportation Study* was one of several background studies conducted by MAG in support of the RTP. The study provided a stand-alone transportation blueprint for the southwestern portion of Maricopa County, including all or part of Avondale, Buckeye, Gila Bend, Goodyear, Litchfield Park, Phoenix, Tolleson, and unincorporated areas of Maricopa County. The study identified El Mirage Road (now Fairway Drive) as one of the new TIs needed along I-10 to meet travel demand generated by expected development. All of the proposed improvements from the study were carried forward as candidates to be included in the RTP.

Regional Transportation Plan

In November 2003, the MAG Regional Council unanimously adopted the new RTP, providing a broad, integrated vision for the transportation system in Maricopa County through 2026. In November 2004, county voters approved Proposition 400, which extended the ½ cent sales tax for 20 years to fund the RTP's multimodal program. The RTP is updated regularly based on changes in projects and revenue forecasts. The latest update includes \$20.3 million for a new service TI at Fairway Drive and I-10. The funding is programmed during the fourth phase of the RTP program, between fiscal years 2021 and 2026.

City of Avondale Transportation Plan Update

The *Transportation Plan Update* was developed to reflect the changing socioeconomic conditions of the community and identify the City's transportation needs for 2030. The multimodal plan includes recommendations for short-, medium-, and long-range investments in the City's transportation infrastructure. The Fairway Drive TI project is discussed throughout the report and, in particular, in the following sections:

- The section, Programmed and Planned Improvements, states "A new interchange at I-10 and Fairway Drive was originally scheduled for completion within Phase IV of the RTP, but due to collaborative efforts a full-diamond interchange is now anticipated in 2015."
- The section, Recommended Roadway Improvement Projects, states: "El Mirage Road (Fairway Drive) – I-10 Interchange to Van Buren Street - In anticipation of the accelerated programming/construction of the full diamond interchange at El Mirage Road/Fairway Drive and I-10, this segment that would provide access to/from the interchange and Corporate Drive/Van Buren Street needs a cross-section with four total through lanes established by 2016 (or concurrent with interchange work). Similarly, the Corporate Drive/Roosevelt Street connection to/from Avondale Boulevard to the east would need to be viable."
- The section, Street Plan Recommendations, states: "Support current Arizona Department of Transportation process to establish the full diamond interchange at I-10 and El Mirage Road (Fairway Drive) by a planned horizon year of 2015."
- And finally, the section, Recommendations (Near Term, 1-10 years), includes: "El Mirage Road/Fairway Drive – prepare this roadway for providing four total through lanes in support of (or in parallel with) the accelerated construction planning for the full diamond interchange at I-10. Similarly, the Corporate Drive/Roosevelt Street connection to/from Avondale Boulevard to the east will need to be viable. The I-10/Fairway TI is currently identified in the City's CIP listing for 2015." The construction of the Fairway Drive is scheduled for 2017 in the proposed Avondale CIP for 2015-25.

Other noteworthy items from the *Transportation Plan Update* considered in this report include:

- After construction of the proposed TI, the path from I-10 to Dysart Road using Fairway Drive and Van Buren Street is recommended as an official truck route.
- A "Possible High Capacity Transit" corridor connecting I-10 and Dysart Road to 99th Avenue and Thomas Road would cross through the study area. At Fairway Drive, the corridor would be located approximately along the Garfield Street alignment.
- Fairway Drive north of Van Buren Street is identified as a low priority for bicycle lanes.

City of Avondale General Plan 2030

Avondale's *General Plan 2030* provides a vision to guide growth and development in Avondale through 2030. This plan addresses the link between public health and the built environment. It explores concepts such as adding pedestrian and bike paths to encourage nonmotorized travel, creating transit hubs and ensuring close access to transit, and adding and maintaining parks and open space. The plan includes guidance on land use, economic vitality, housing, sustainable development, open space, and quality of life. The land use element shows that the area around the proposed Fairway Drive TI will include the proposed City Center as well as a mix of residential, transit-oriented, commercial, and



industrial development. The circulation element includes a streets classification map that identifies the proposed Fairway Drive TI.

Traffic Impact Studies

Several developers have prepared traffic impact studies for the City of Avondale for developments within the Fairway Drive TI study area. These studies identify the improvements needed to accommodate traffic both at site driveways and at adjacent intersections on the local road network. The Coldwater Depot traffic impact study identifies commercial truck trip generation and notes that the distribution of commercial truck trips will change with the opening of the proposed Fairway Drive TI.

Avondale Commerce Center Traffic Impact Analysis

The Avondale Commerce Center is a commercial/mixed-use development located on the northwestern corner of Van Buren Street and El Mirage Road. This 80-acre commercial site is bounded by Van Buren Street to the south, Fairway Drive to the east, I-10 to the north, and undeveloped agricultural parcels to the west. Initially prepared in 2004, the traffic impact analysis was updated in 2005. A traffic impact analysis for Phase III was prepared in 2007. The updates were needed because of changes to the site layout, land uses, and background traffic conditions. These studies assessed the impact of site traffic on the local circulation system. Site traffic was estimated using Institute of Transportation Engineers trip rates and did not specifically address commercial vehicle traffic. These studies included recommendations for a traffic signal warrant study at Van Buren Street and 127th Avenue, protected-permissive left turn signal phasing at the Fairway Drive and Van Buren Street intersection, and site access improvements.

Coldwater Apartments Traffic Impact Analysis

Coldwater Apartments is a 301-unit apartment complex located near the southeastern corner of Van Buren Street and Fairway Drive in Avondale. The traffic impact analysis was prepared in 2005. This study recommended adding a traffic signal at the Van Buren Street and Fairway Drive intersection.

Coldwater Depot Traffic Impact Analysis`

Coldwater Depot is a proposed warehouse distribution facility located on the northwestern corner of Van Buren Street and 127th Avenue. This traffic impact analysis prepared for the City of Avondale in 2012 evaluated potential impacts of commercial truck traffic on the transportation system. At build out, the distribution center is expected to generate over 1,100 truck trips per weekday. This study recommends a traffic signal at 127th Avenue and Van Buren Street to accommodate site traffic. The study also noted that the proposed Fairway Drive TI will alter trip distribution patterns to and from the warehouse, reducing the overall impacts of the facility on the local road network. While this study noted that Coldwater Depot trucks would access I-10 using the proposed Fairway Drive TI, it did not identify the impact of commercial trucks on traffic operations.

Coldwater Springs Traffic Impact Analysis

Coldwater Springs is a 560-acre residential development located between Van Buren Street on the north, Buckeye Road on the south, 115th Avenue on the east, and the Agua Fria River on the west. The land use is primarily single-family residential with some high-density residential and includes a golf course, school, and some commercial uses. The 1997 report recommended roadway sections for internal streets and proposed lane configurations for study area intersections.

Coldwater Springs Promenade Traffic Impact Analysis

Located on the southwestern corner of Avondale Boulevard and Van Buren Street, Coldwater Springs Promenade is a 24-acre commercial development. Prepared in 2007, the traffic impact study recommended a traffic signal on Van Buren Street to accommodate site traffic. The study also recommended monitoring the West Links Drive and Van Buren Street intersection to determine whether a traffic signal is warranted after the site opens. Additional turn lanes were recommended at the Avondale Boulevard and Van Buren Street intersection.

West Valley Charter School Traffic Impact Analysis

The West Valley Charter School is located on the northwestern corner of Van Buren Street and Fairway Drive. Its 2011 traffic impact study provided recommendations for site traffic circulation. At the Van Buren Street and Fairway Drive intersection, the study recommended that northbound and southbound left turn phasing should be implemented. The study also recommended the turn lane storage lengths at the Van Buren Street and Fairway Drive intersection.

Demographics

Socioeconomic projections for Maricopa County are developed by combining projections for over 150 regional analysis zones (RAZs), small geographic areas based on jurisdictional boundaries. The RAZs are subdivided into traffic analysis zones (TAZs) to develop transportation generation data. By reviewing the RAZ and TAZ data, growth trends can be evaluated.

Avondale's population is projected to grow by 78 percent through 2035, and employment is expected to more than double. Avondale's population growth areas are primarily located south of the study area. However, much of the city's projected employment growth is anticipated along the I-10 corridor.

The entire study area is located within a single RAZ (273) and encompasses four TAZs (267, 271, 272, and 268) (see Figure 2.1). The existing and projected population and employment statistics for these zones are presented in Table 2.1. Within the RAZ, population is expected to grow by 59 percent through 2035. Employment, on the other hand, is expected to jump by 224 percent. Growth in travel and the demand for the proposed Fairway Drive TI will be driven in large part by commercial and industrial development in TAZ 272.

Figure 2.1 – Traffic analysis zones

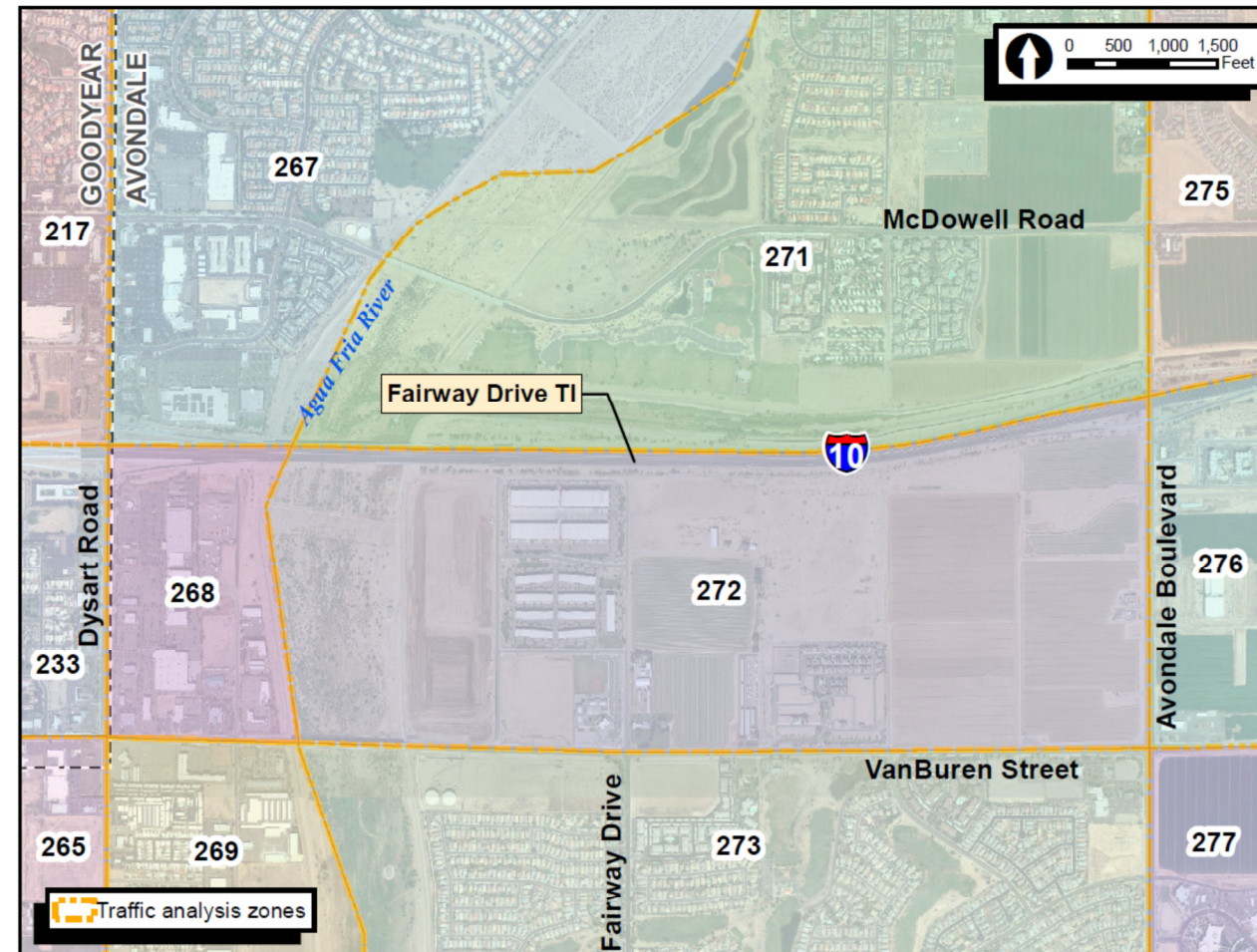


Table 2.1 – Projected population and employment growth in study area

Area	Population			Employment		
	2010	2035	% increase	2010	2035	% increase
TAZ 267	5,762	6,230	8	636	988	55
TAZ 271	4,205	10,798	157	198	1,027	419
TAZ 272	234	3,289	1,305	59	5,033	8,430
TAZ 268	0	0	0	668	1,221	83
RAZ 273	54,175	86,165	59	11,392	36,951	224
Avondale	77,911	138,667	78	14,064	45,273	222
Maricopa County	3,824,056	5,776,251	51	1,706,407	2,892,148	69

Source: Maricopa Association of Governments (2013a)

Existing Traffic Volumes

Regional and local agencies periodically count traffic on the roads they operate and maintain. Traffic along I-10 is reported annually by ADOT. Historic traffic counts along I-10 are presented in Table 2.2 for the period between 2007 and 2011. The traffic count trend along this portion of I-10 experienced a significant drop in travel in response to the national recession that began in 2007. While traffic levels have begun to rise, they are not near the same level as they were in 2007.

Table 2.2 – Historic traffic counts for I-10

Location	Average annual daily traffic				
	2007	2008	2009	2010	2011
Litchfield Road to Dysart Road	141,000	135,000	100,000	101,000	103,000
Dysart Road to Avondale Boulevard	152,000	146,000	120,000	121,000	125,000
Avondale Boulevard to 107th Avenue	180,000	172,000	130,000	131,000	135,000

Source: ADOT (2011a)

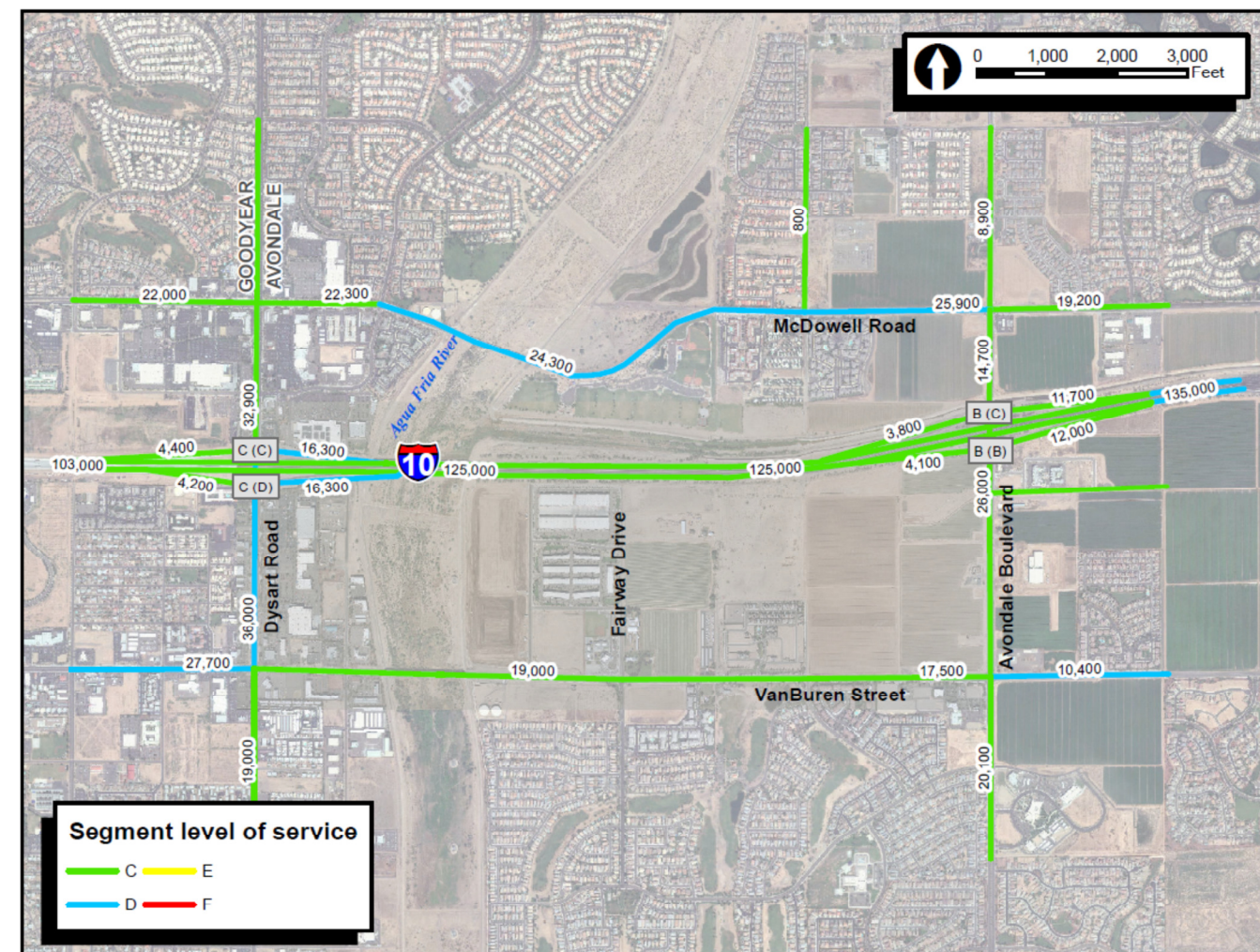
The most recent (2011) weekday traffic volumes on study area roads available from ADOT and the City of Avondale are presented in Figure 2.2. In the study area, I-10 carries between 135,000 and 103,000 vehicles per day (vpd). The local roads, including Dysart Road and Avondale Boulevard, carry traffic volumes up to 36,000 vpd. The percentage of trucks (T factor) on I-10 from the traffic count data for 2010 was 7.1 percent. The directional distribution of traffic (D factor) was 53 percent, and daily traffic occurring in the peak hour (K factor) was 9 percent.

Operational Performance

This section presents the results of the traffic operational analysis for the I-10 main line, TI ramp intersections, and arterial street segments. The performance for each facility is presented as level of service (LOS), a qualitative description of the operating performance of an intersection or roadway segment using a report-card approach to describing traffic conditions, with an “A” describing free flow traffic conditions with minimal delays and an “F” describing excessive delays resulting from heavy traffic congestion. The methodology for determining the LOS is from the *Highway Capacity Manual* (HCM) (Transportation Research Board 2010). The HCM uses multiple measures of effectiveness, such as density, volume-to-capacity ratio, speed, and delay to determine the LOS ratings. The files used to conduct the traffic analysis are provided in traffic report (2013c) prepared for this project. LOS D is defined as the acceptable level for intersections and road segments for this analysis.

Road segment LOS shown in Figure 2.2 is based on the Florida Department of Transportation’s 2009 *Quality/Level of Service Handbook* refined by the observed K factor for the Phoenix region. This analysis uses a reference table that provides LOS volume thresholds by density of traffic signals per mile, roadway characteristics, and number of through lanes. The volume thresholds are presented in traffic report.

Figure 2.2 – Average daily traffic and level of service, 2011



Note: AM (PM) peak-hour intersection level of service is shown in boxes.
Sources: ADOT (2011a), City of Avondale (2011b)

A SYNCHRO model was developed for weekday morning (AM) and evening (PM) peak hours for the Dysart Road, Fairway Drive, and Avondale Boulevard TIs to conduct the LOS analysis. SYNCHRO is a microsimulation program based on methods described in the HCM to evaluate traffic operations on road systems.

Peak-hour traffic volumes, K factors, intersection lane configurations, and free-flow speeds were coded into the SYNCHRO models. Traffic signal timing and phasing were optimized for this analysis. The intersection LOS was determined based on the average vehicle delay. The LOS thresholds are provided in the traffic report. Table 2.3 summarizes the estimated AM and PM peak-hour intersection delays. Under 2011 traffic conditions, the study intersections all function at LOS D or better. While the overall intersections operate at LOS D or better, there are individual movements of concern. During the PM peak hour at Dysart Road and I-10, the northbound left turn and southbound left turn operate at LOS F and E, respectively.

Table 2.3 – Intersection level of service, 2011

Intersection	Average control delay (seconds)	Level of service
Dysart Road at I-10 eastbound ramp	24.1 (38.8)	C (D)
Dysart Road at I-10 westbound ramp	25.9 (30.9)	C (C)
Avondale Boulevard at I-10 eastbound ramp	18.8 (20.0)	B (B)
Avondale Boulevard at I-10 westbound ramp	19.5 (25.1)	B (C)

Notes: Level of service for signalized intersections is based on average control delay per vehicle, according to the *Highway Capacity Manual* (Transportation Research Board 2010). Results are presented for AM (PM) peak hours.

Safety Conditions

A crash analysis was conducted for I-10 from west of Dysart Road (milepost 129.4) to east of Avondale Boulevard (milepost 132.1) within Avondale to identify crash rates, patterns, and trends. The most recent 5-year period of crash data was obtained from the ADOT Traffic Records Section for between January 1, 2007, and December 31, 2011.

This 2-mile-long stretch of freeway has full access TIs at Dysart Road and Avondale Boulevard. ADOT completed freeway improvements (general purpose and HOV lane widening) between February 2008 and December 2009. The construction work affected the daily traffic flow as well as the number of crashes during the stated period.

The crash data indicated a total of 1,269 crashes involving 2,597 vehicles in the 5-year analysis period, of which 815 (64 percent) crashes occurred along the I-10 main line, including entrance and exit ramps. There were 450 (35 percent) crashes at the two TIs and 4 (less than 1 percent) crashes at unreported locations. Table 2.4 summarizes the 5-year crash data for I-10 and the two TIs in the study area.

Table 2.4 – I-10 main line crash summary

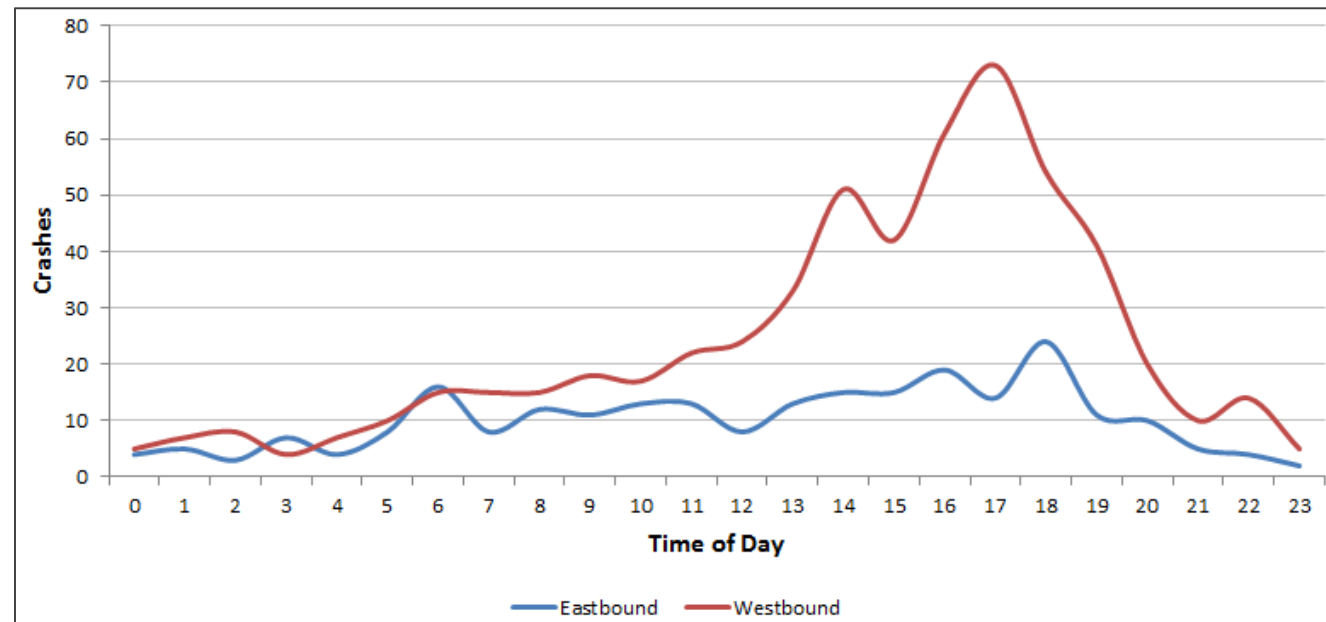
Direction	2007	2008	2009	2010	2011	Total
I-10 main line						
Eastbound	53	73	44	45	29	244
Westbound	144	102	67	125	133	571
I-10 main line total	197	175	111	170	162	815
TIs						
Dysart Road north ramp intersection	42	27	27	42	53	191
Dysart Road south ramp intersection	21	19	9	21	21	91
Avondale Boulevard north ramp intersection	23	19	18	21	16	97
Avondale Boulevard south ramp intersection	13	16	12	18	12	71
TIs total	99	81	66	102	102	450
Unknown/unreported	1	1	0	0	2	4
Total (main line + TI)	297	257	177	272	266	1,269

Note: Crash data were analyzed for the period between January 1, 2007, and December 31, 2011.
Source: ADOT (2013b)

The analysis shows that crashes on the I-10 main line were, overall, steady, except for a significant drop in 2009. Because of construction work in 2009, the posted speed limit was reduced and enforced by camera. Restrictions in the construction activity zone could be a contributing factor to the reduced number of crashes in 2009.

Other notable observations include: (1) the number of crashes on westbound I-10 was substantially higher than on eastbound I-10, and (2) the number of crashes at the north intersection at Dysart Road was more than double the number of crashes at any of the other TI intersections. The higher number of crashes in the westbound direction is a result of higher afternoon westbound traffic volumes. Figure 2.3 shows the diurnal variation of the number of crashes by direction by time of day on the I-10 main line within the study area.

Figure 2.3 – I-10 main line crashes, by direction and time of day



The crash severity by injury type is summarized in Table 2.5. The fatal, injury, and property-damage-only crashes represent less than 1 percent, 29 percent, and 70 percent of the total crashes, respectively.

Table 2.5 – I-10 main line crash severity summary

Direction	Fatal	Injury	Property damage	Total
I-10 main line				
Eastbound	2	77	165	244
Westbound	3	188	380	571
I-10 main line total	5	265	545	815
TIs				
Dysart Road north intersection	0	41	150	191
Dysart Road south intersection	0	16	75	91
Avondale Boulevard north intersection	0	24	73	97
Avondale Boulevard south intersection	0	22	49	71
TIs total	0	103	347	450
Unknown/unreported	0	4	0	4
Total (main line + TI)	5	372	892	1,269
% of total crashes	<1%	29%	70%	100%

Note: Crash data were analyzed for the period between January 1, 2007, and December 31, 2011.
Source: ADOT (2013b)

The crash rate for the I-10 main line was estimated using data presented in Table 2.6. The overall crash rate for the 5-year analysis period was 1.7 per million vehicles miles of travel. This rate of crashes is average when compared with other similar facilities around the region.

Table 2.6 – I-10 crash rate, by year

Item	2007	2008	2009	2010	2011	Average
AADT ^a	152,000	145,700	120,000	121,000	119,600	131,700
Days/Year	365	366	365	365	365	365
Length (miles)	2	2	2	2	2	2
MVMT ^b	111.0	106.4	87.6	88.3	87.3	96.1
Crashes	197	175	111	170	162	163
Crash rate ^c	1.78	1.65	1.27	1.92	1.86	1.70

^a average daily traffic (ADOT 2011a)

^b million vehicle miles traveled, calculated by multiplying AADT, days, and length and dividing by 1,000,000

^c number of crashes per MVMT

As part of this crash analysis, the crash data were categorized by collision manner, first harmful contact, and environmental conditions to determine any recognizable trends (see Table 2.7). The most common types of crashes were rear end crashes along I-10 (502 crashes) and at the TIs (280 crashes).

Table 2.7 – I-10 crashes, by collision manner

Crash type	I-10 main line crashes	TI and other crashes	Total crashes
Single vehicle	147 (11%)	13 (1%)	160 (12%)
Angle	4 (<1%)	43 (3%)	47 (3%)
Left turn	0 (0%)	38 (3%)	38 (3%)
Rear end	502 (40%)	280 (22%)	782 (62%)
Sideswipe	124 (10%)	70 (6%)	194 (16%)
Other/Unknown	38 (3%)	10 (1%)	48 (4%)
Total	815 (64%)	454 (36%)	1,269 (100%)

Notes: Crash data were analyzed for the period between January 1, 2007, and December 31, 2011. TI = traffic interchange.
Source: ADOT (2013b)

The first hazard encountered by an initiating vehicle in a crash is defined as the first harmful contact. The analysis of the first harmful contact is presented in Table 2.8. The most common first harmful contact was with another vehicle (1,079 crashes). The remaining crashes were overturning (10 crashes), noncollision (15 crashes), or collisions with fixed or nonfixed objects (165 crashes).

Table 2.8 – I-10 crashes, by first harmful contact

Crash type	I-10 main line crashes (%)	TI and other crashes (%)	Total crashes (%)
Overturning	10 (1%)	0 (0%)	10 (1%)
Other motor vehicle	650 (51%)	429 (34%)	1079 (85%)
Pedestrian	1 (<1%)	3 (<1%)	4 (<1%)
Pedal cycle	0 (0%)	2 (<1%)	2 (<1%)
Nonfixed object	58 (4%)	5 (<1%)	63 (4%)
Fixed object	96 (8%)	6 (<1%)	102 (8%)
Other/Unreported	0 (0%)	9 (1%)	9 (1%)
Total	815 (64%)	454 (36%)	1,269 (100%)

Notes: Crash data were analyzed for the period between January 1, 2007, and December 31, 2011. TI = traffic interchange.
Source: ADOT (2013b)

Another factor in crashes is the surrounding environmental conditions, which include the daylight and weather conditions. Each of these items was analyzed separately, and the results are presented in Table 2.9. In general, the majority of crashes occurred in daylight (891 crashes) during clear weather (1,176 crashes). Poor environmental conditions do not appear to significantly contribute to I-10 crashes.

Table 2.9 – I-10 crashes, by environmental condition

Conditions	5-year crashes	Percentage of total
Daylight conditions		
Daylight	891	70
Darkness	306	24
Dusk/Dawn	72	6
Weather conditions		
Clear	1,176	93
Cloudy	59	5
Rainy	34	2

Note: Crash data were analyzed for the period between January 1, 2007, and December 31, 2011.
Source: ADOT (2013b)

Based on the crash history for I-10 and the major crossroads, there are no significant existing safety concerns within the influence area. The rate of crashes and types of crashes are indicative of congested conditions along the I-10 main line and at the ramp terminal intersections. However, the rates and types of crashes are typical of the urban freeway main line and TI conditions in the region.

2.2 FUTURE CONDITIONS

Daily Traffic Volumes

This section documents the design year traffic projections used to analyze the future traffic conditions in the study area. The traffic projections are from the 2035 MAG regional travel demand model, TransCAD software platform (MAG 2013b). No significant changes were made to the base model network; therefore, it closely matches the model that has been adopted by the MAG Regional Council and is used for air quality conformity analysis.

The future year analysis considered conditions with Alternative 1 (Build Alternative) and without Alternative 1 (No-Build Alternative). The only difference in the road network between the two alternatives is the ramps connecting I-10 to Fairway Drive.

The following sections provide additional information related to the 2035 traffic projections and how they compare to existing traffic conditions.

Consistent with the projected population and employment growth within Avondale and the area surrounding Fairway Drive and I-10, vehicular travel is expected to continue increasing between now and 2035. Figures 2.4 and 2.5 present the 2035 traffic projections for the future road network with and without the Fairway Drive TI, respectively. Notable observations when comparing the figures to the existing conditions previously presented in Figure 2.2 include:

- Between 2011 and 2035, with or without the proposed TI, traffic volumes on I-10 are projected to increase by approximately 50 to 60 percent.

- Between 2011 and 2035, without the proposed TI, traffic levels entering and exiting I-10 from Avondale Boulevard and Dysart Road would increase by approximately 50 percent. With the proposed TI, the increase would be 40 percent.
- The traffic volumes on roads south of I-10 are projected to experience a greater increase between 2011 and 2035 than roads north of I-10, with or without the proposed TI.

Traffic Projections on Interchange Ramps

An initial step in determining the need for efficient ingress to and egress from I-10 in the vicinity of Fairway Drive consisted of analyzing whether there would be a high demand for such ingress/egress and whether existing options would be at or near capacity in 2035.

Motorists in the area adjacent to Fairway Drive may currently gain access to I-10 from TIs at Litchfield Road, Dysart Road, Avondale Boulevard, and 107th Avenue. Additional access would be provided by the planned TI at Fairway Drive. Table 2.10 presents the projected 2035 traffic volumes for study area and surrounding TI ramps with and without the Fairway Drive TI. Notable observations from Table 2.10 include:

- For the traffic movements to and from the east, the Build Alternative would provide small reductions in traffic levels on the existing Dysart Road and Avondale Boulevard ramps (most significantly on the Avondale Boulevard ramps). The overall travel demand for the movement would remain relatively the same for the No-Build and Build Alternatives.
- For the traffic movements to and from the west, the Build Alternative would reduce traffic levels on the existing Dysart Road, Avondale Boulevard, and 107th Avenue (most significantly on the Avondale Boulevard ramps). The overall demand for the movement would increase over 20 percent for the Build Alternative when compared with the No-Build Alternative.
- The proposed TI would serve a high travel demand going to and from the west, which is opposite of the norm of having higher traffic levels on ramps to and from the east and downtown Phoenix. This supports the fact that the proposed TI would greatly benefit truck traffic destined to the industrial and commercial development in the area that likely originated in California.

Interchange Safety Analysis Tool

The Federal Highway Administration (FHWA) Enhanced Interchange Safety Analysis Tool (ISATe) was used to predict the Build Alternative's safety performance for the proposed I-10 Fairway Drive TI for the period from 2011 to 2030.¹ Key inputs to the safety analysis tool include the road geometric data, historic crash data, historic traffic count data, and traffic forecasts.

Geometric data for the Build Alternative were based on initial 15% engineering design. ADOT's traffic count data and crash data for the 5-year period between 2007 and 2011 was used for existing conditions. Traffic forecasts from 2030 were based on MAG's 2035 travel demand forecasts for I-10.

For the Build Alternative, the I-10 main line was studied as two segments: from east of the Dysart Road TI to east of Fairway Drive (before the I-10 main line starts to curve) and from the beginning to the end of the horizontal curve east of Fairway Drive. The ISATe safety performance analysis worksheets are provided in the *I-10, Fairway Drive Traffic Interchange Initial Traffic Report* (2013c).

Under the No-Build Alternative, ISATe estimated a total of 1,049 crashes along the study section of the I-10 main line for the 19-year analysis period. With the proposed Fairway Drive TI, the tool estimated 1,108 total crashes for the same analysis period (1,024 were estimated along I-10, 28 along the proposed ramps, and 56 along the new crossroad). While the analysis showed crashes on the I-10 main line decreasing with construction of the proposed TI, new crashes were predicted at the Fairway Drive TI ramps and ramp terminals. The predicted annual crash rate per million vehicle miles of travel for the I-10 main line was less than 2 for the 19-year analysis period.

¹ While the planning horizon for this study is 2035, the ISATe software limited the analysis to 2030.

Figure 2.4 – Future road network and traffic volumes, No-Build Alternative, 2035

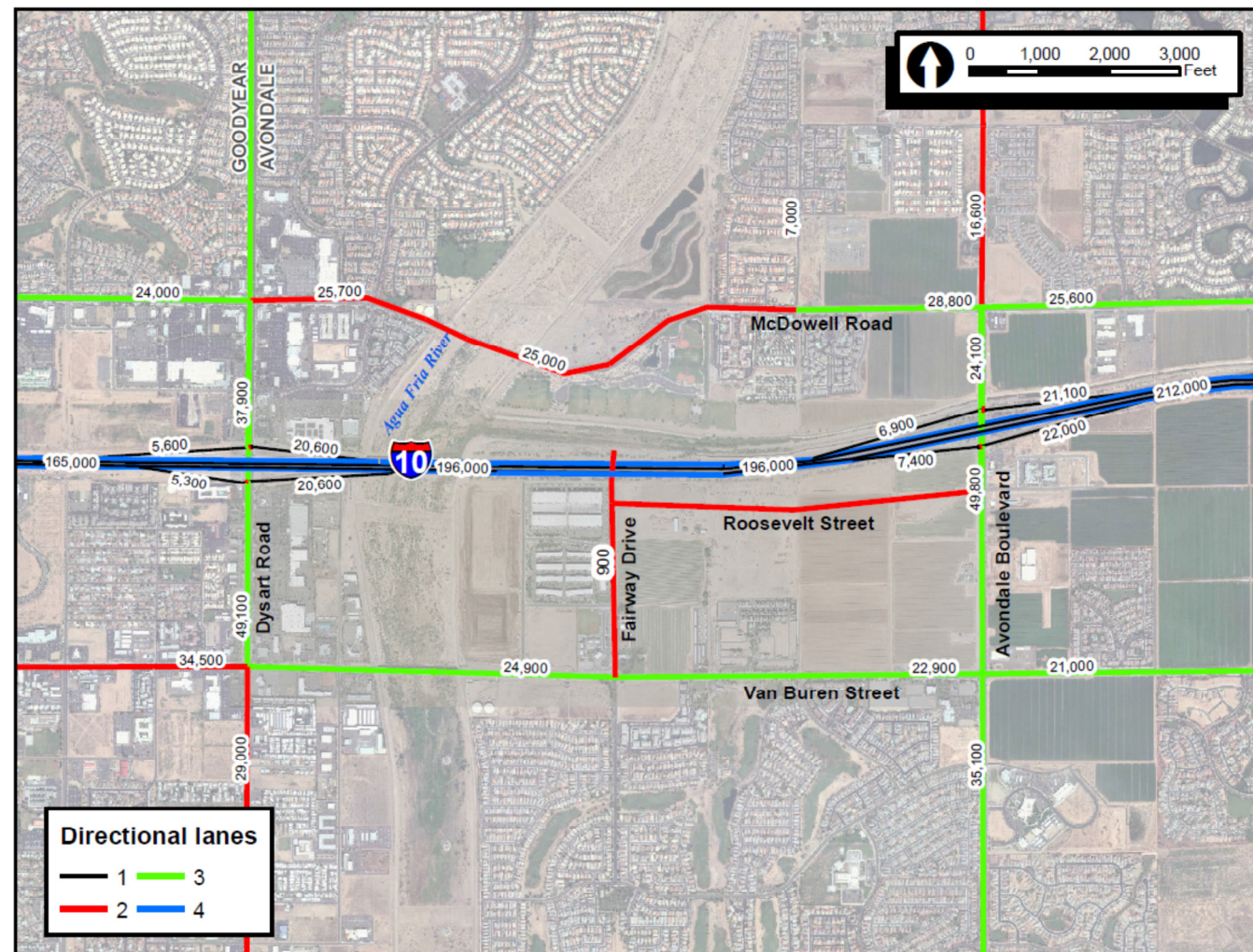


Figure 2.5 – Future road network and daily traffic volumes, Build Alternative, 2035

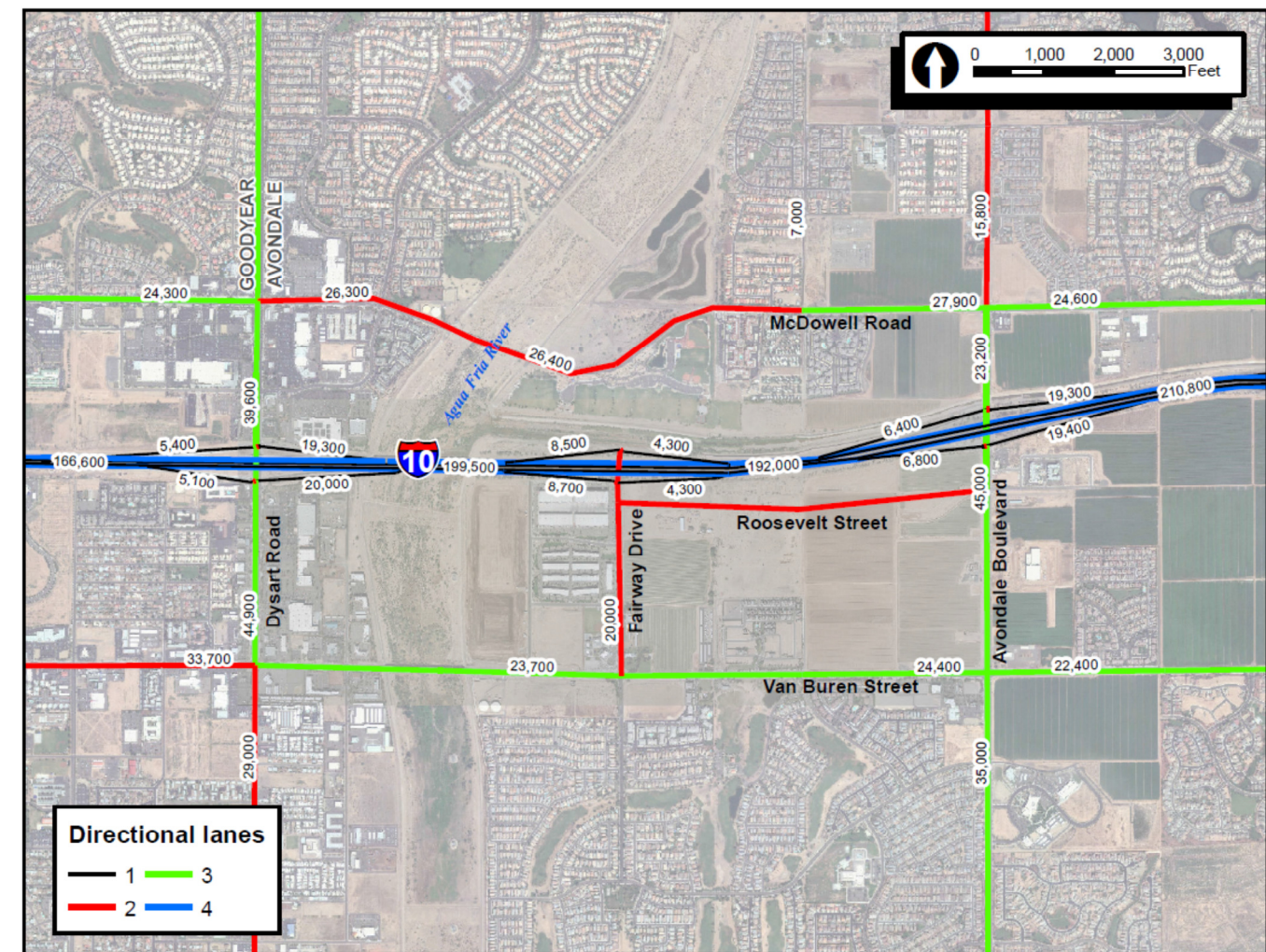


Table 2.10 – Projected daily traffic on study area ramps, 2035

Ramp	Road	Scenario		Change in demand (%)
		No-Build	Build	
To east (on-ramp)	Litchfield Road	8,100	8,200	1.2%
	Dysart Road	20,600	20,000	-2.9%
	Fairway Drive	N/A	4,000	N/A
	Avondale Road	22,000	19,400	-11.8%
	107th Avenue	No east side ramps		
	To east total	50,700	51,600	1.8%
From east (off-ramp)	Litchfield Road	8,500	9,000	5.9%
	Dysart Road	20,600	19,300	-6.3%
	Fairway Drive	N/A	4,300	N/A
	Avondale Road	21,100	19,300	-8.5%
	107th Avenue	No east side ramps		
	From east total	50,200	51,900	3.4%
To west (on-ramp)	Litchfield Road	11,800	11,600	-1.7%
	Dysart Road	5,600	5,400	-3.6%
	Fairway Drive	N/A	8,500	N/A
	Avondale Road	6,900	6,400	-7.2%
	107th Avenue	6,400	6,000	-6.3%
	To west total	30,700	37,900	23.5%
From west (off-ramp)	Litchfield Road	11,300	10,500	-7.1%
	Dysart Road	5,300	5,100	-3.8%
	Fairway Drive	N/A	8,700	N/A
	Avondale Road	7,400	6,800	-8.1%
	107th Avenue	6,200	5,800	-6.5%
	From west total	30,200	36,900	22.2%
Total all ramps	Litchfield Road	39,700	39,300	-1.0%
	Dysart Road	52,100	49,800	-4.4%
	Fairway Drive	N/A	25,500	N/A
	Avondale Road	57,400	51,900	-9.6%
	107th Avenue	12,800	11,800	-7.8%

Note: N/A = not applicable because not present in scenario
Source: MAG (2013b)

Traffic Distribution on Arterial Streets and Freeways

Table 2.11 shows how the traffic distribution in and around the study area will change in 2035 with and without the proposed TI. Notable observations regarding the trip distribution include:

- The primary benefit of the Build Alternative is the reduction in travel between I-10 and Van Buren Street on Dysart Road and Avondale Boulevard.
- Other smaller variations, plus and minus, were observed on other study area roads.

Table 2.11 – Projected daily traffic volumes on study area roads, 2035

Road	Segment	Daily traffic volumes		
		No-Build	Build	% difference
Dysart Road	McDowell Road to I-10	37,900	39,600	+4.5
	I-10 to Van Buren Street	49,100	44,900	-8.6
Fairway Drive	I-10 to Van Buren Street	900	20,000	+2,222.0
	Avondale Boulevard	24,100	23,200	-3.7
McDowell Road	I-10 to Van Buren Street	49,800	45,000	-9.6
	Dysart Road to Rancho Santa Fe	25,700	26,300	+2.3
	Rancho Santa Fe to 119th Avenue	25,000	26,400	+5.6
Van Buren Road	119th Avenue to Avondale Boulevard	28,800	27,900	-3.1
	Dysart Road to Fairway Drive	24,900	23,700	-4.8
	Fairway Drive to Avondale Boulevard	22,900	24,400	+6.6
I-10	Dysart Road to Fairway Drive	196,000	199,500	+1.8
	Fairway Drive to Avondale Boulevard	196,000	192,000	-2.0

Source: MAG (2013b)

Summary of Daily Traffic Projections

Based on the review of existing and projected traffic conditions within the study area and surroundings, the following observations are noted:

- Dysart Road and Avondale Boulevard serve as major transportation corridors into and through Goodyear and Avondale, respectively. The existing and planned commercial and retail developments along each road are major traffic generators, especially for passenger vehicles. Both roads and their TIs with I-10 are built to their maximum and modifications or expansion would be very costly.
- The proposed Fairway Drive TI would provide some relief to these existing roads and TI ramps. This is especially true for the Avondale Boulevard ramps and both roads south of I-10.
- The proposed Fairway Drive TI would serve a large number of trips to and from the west along I-10 – likely representative of heavy vehicles generated by the existing and planned industrial and commercial developments south of I-10.
- The proposed Fairway Drive TI would, therefore, address the primary purpose identified by the City of Avondale for advancing construction: reducing heavy vehicle traffic along Dysart Road and Avondale Boulevard while providing a planned connection to I-10 to support future development in the area.

Design Hour Traffic Projections

The design hour, or peak-hour, traffic projections for the design year, 2035, were obtained directly from the MAG regional travel demand model for the No-Build and Build Alternatives. Additionally, peak-hour traffic projections were developed for the opening year, 2015, by interpolating between the 2011 traffic volumes and the 2035 traffic projections. The design year should be at the 20-year horizon from the construction year. The design year will need to be adjusted and reevaluated if the project is not advanced. The 2015 and 2035 peak-hour traffic projections used in the operational analysis of the No-Build and Build Alternatives are presented in Figures 2.6 to 2.9.

Figure 2.6 – Peak-hour traffic volumes, No-Build Alternative, 2015

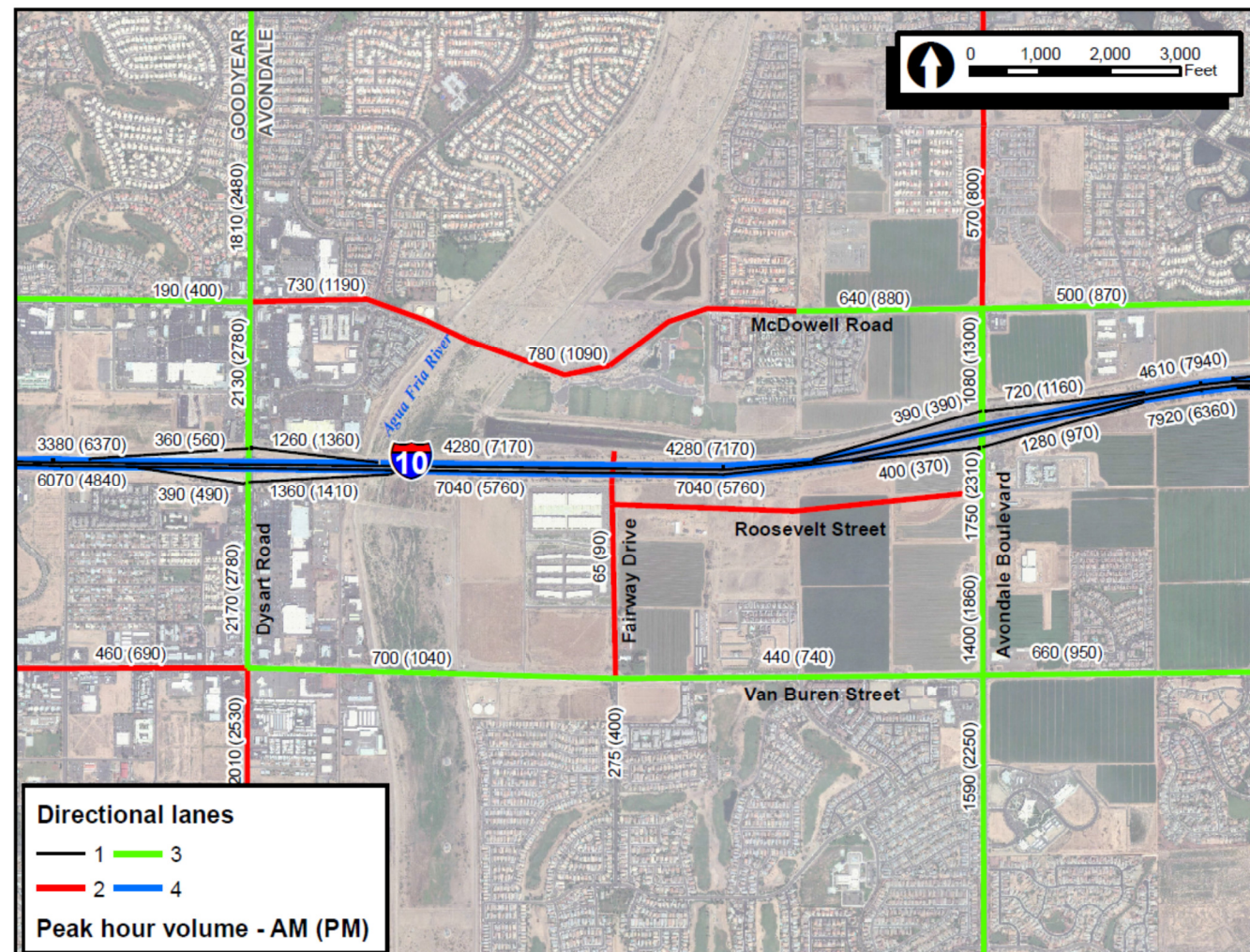


Figure 2.7 – Peak-hour traffic volumes, Build Alternative, 2015

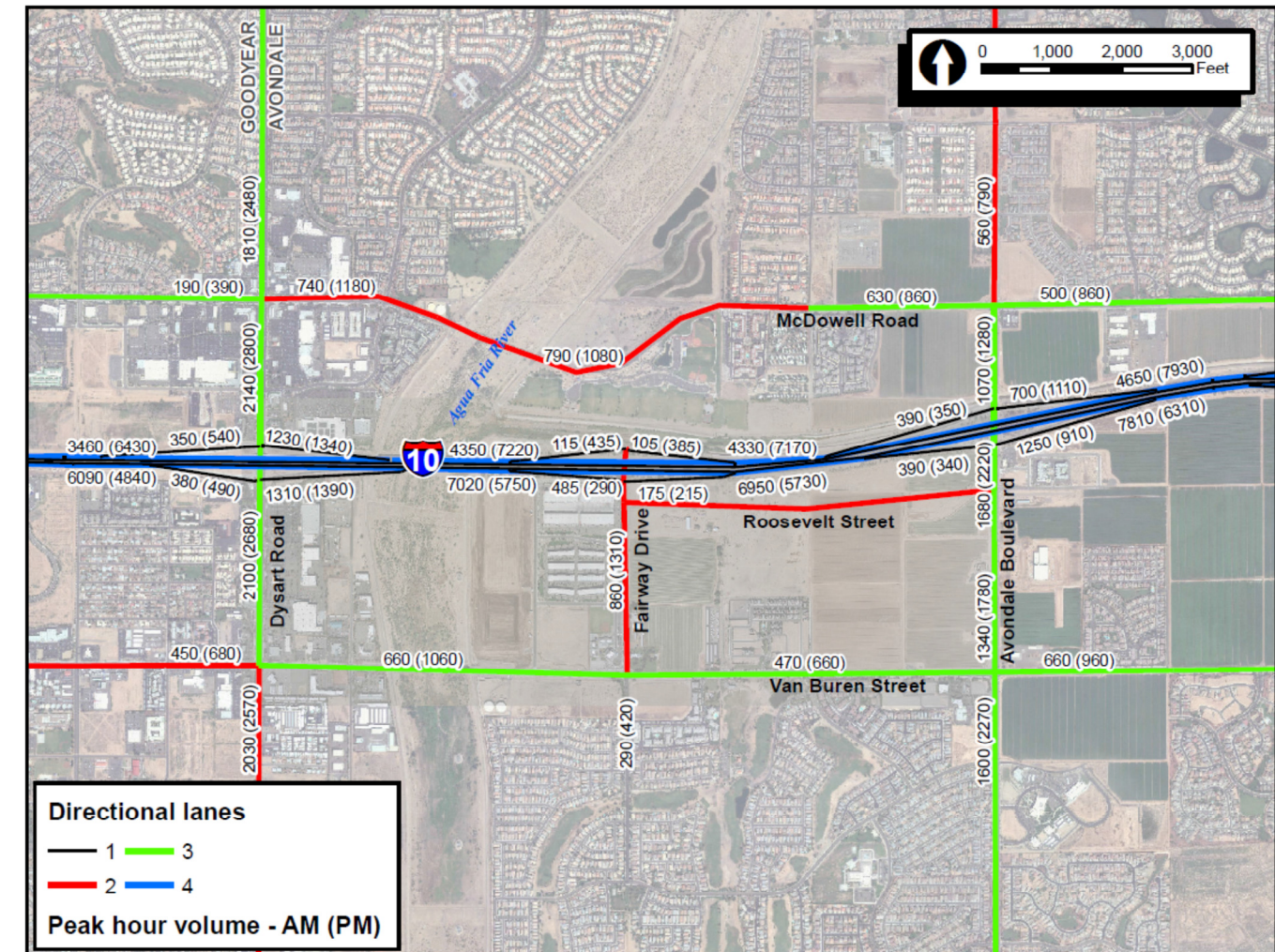
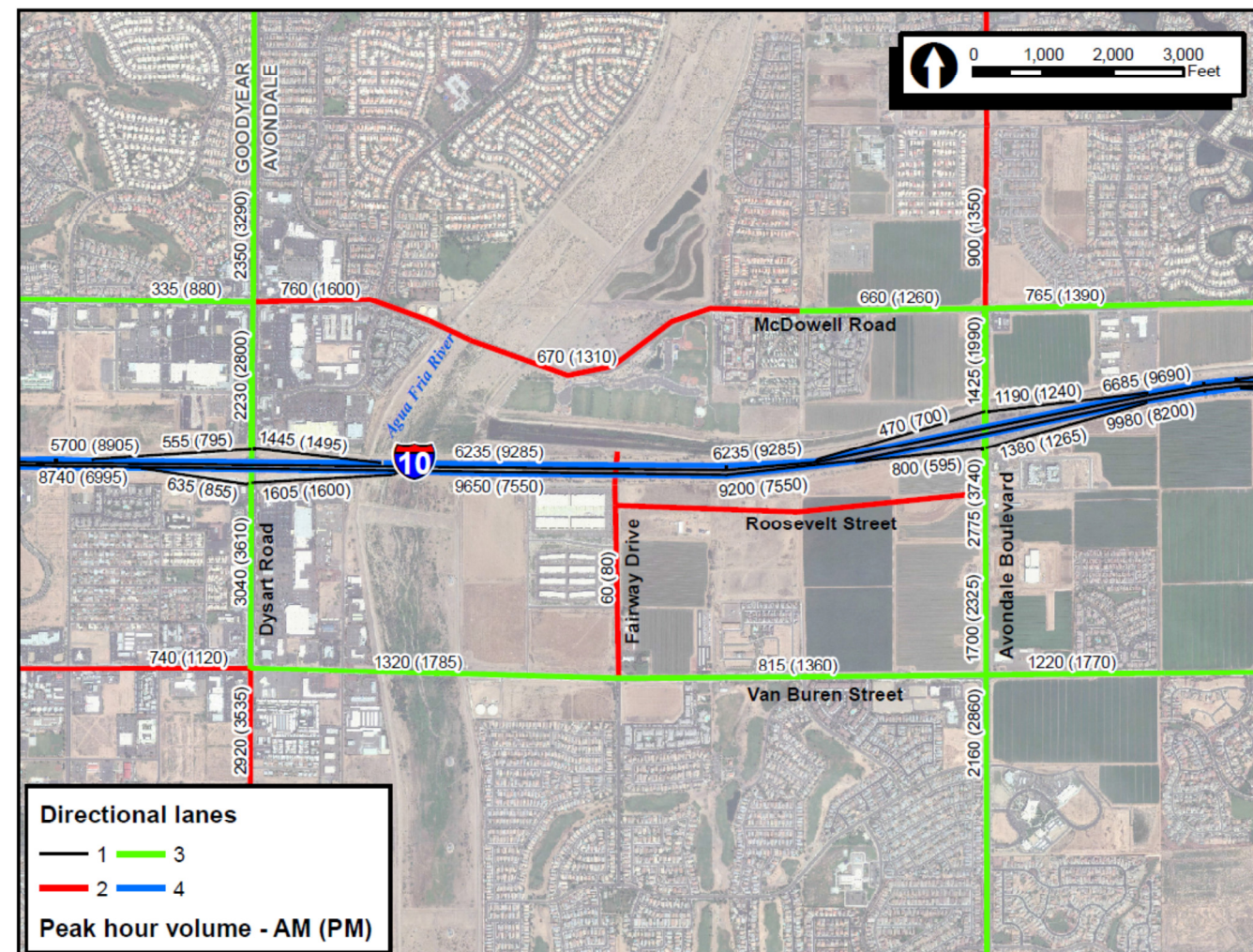


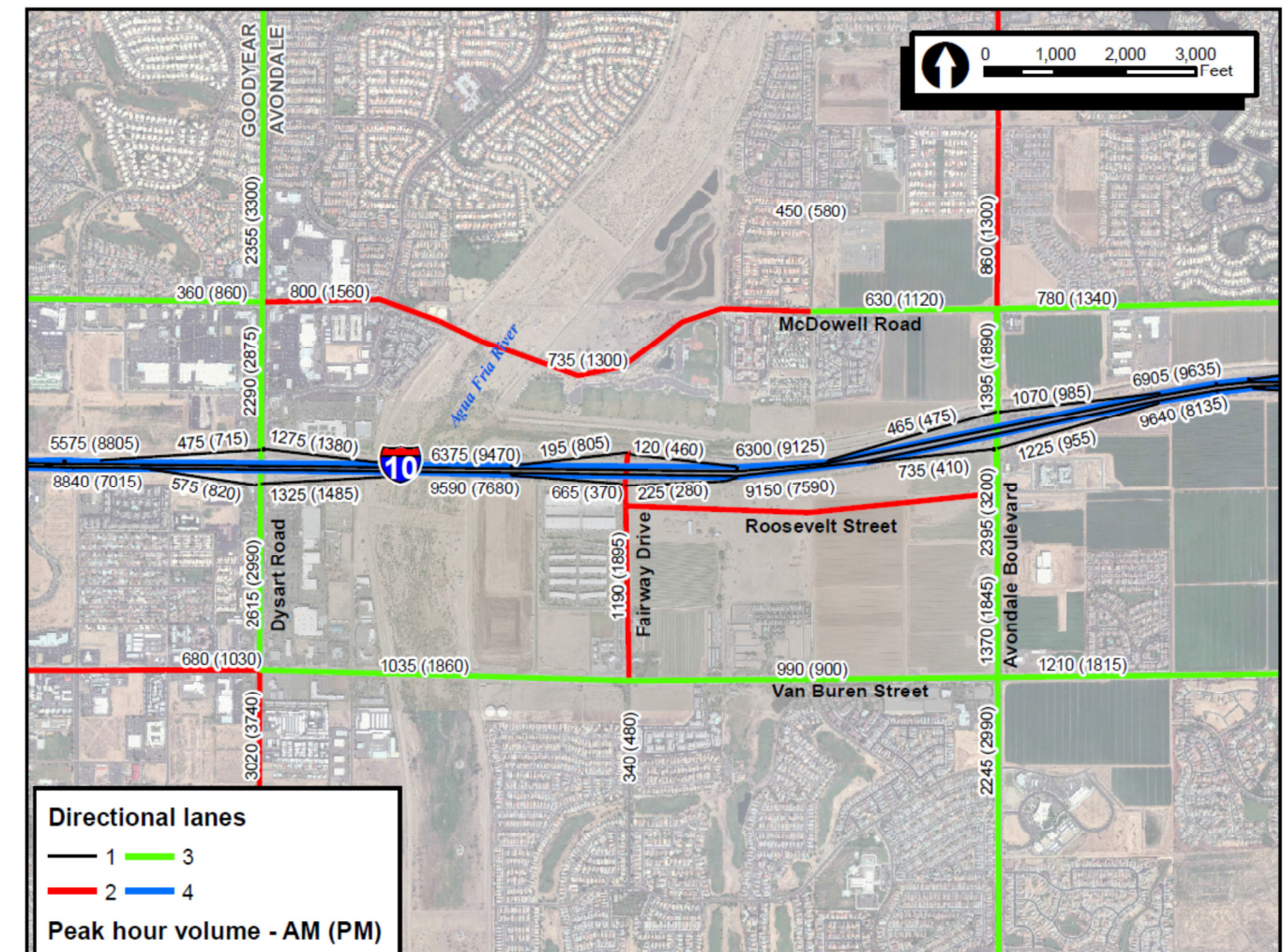
Figure 2.8 – Peak-hour traffic volumes, No-Build Alternative, 2035



Operational Performance

This section presents the operational performance within the influence area for the proposed change of access on I-10. The influence area includes the I-10 main line between Dysart Road and Avondale Boulevard as well as the existing and planned TIs at Dysart Road, Fairway Drive, and Avondale Boulevard. As appropriate, adjacent arterial street intersections were also included in the TI analysis. The evaluation of operational performance includes an analysis of the time period near the opening of the proposed TI (2015) and the design year for the proposed TI (2035) for the No-Build and Build Alternatives. The electronic files for the analysis tools are provided on the attached CD of the *I-10, Fairway Drive Traffic Interchange Traffic Report*.

Figure 2.9 – Peak-hour traffic volumes, Build Alternative, 2035



I-10 Operational Performance

Impacts on performance of the I-10 main line are a major consideration in planning and evaluating the proposed project. The new TI would create a condition with a series of service TIs with 1-mile spacing where the existing conditions feature 2-mile spacing. The main line operational analysis presents the projected LOS on I-10 with and without the Fairway Drive TI. ADOT's guidelines use LOS of D or better as acceptable during the design year (ADOT *Roadway Design Guidelines* Table 103.2A).

Methodology

The main line analysis was conducted using the Highway Capacity Software (HCS+ Version 5.21). The HCS software provides an interface to more easily implement the methodology and procedures from the HCM, a collection of techniques for estimating the capacity and determining the LOS for transportation facilities. HCS uses AM and PM design-hour volumes and a number of road and driver characteristics to determine LOS and other measures of effectiveness.

Some inputs that were constant for each analysis include:

- K factor of 0.95
- T factor of 10 percent on I-10 main line and 10 percent on Fairway Drive ramps
- driver population factor of 1.0 (represents a high level of familiarity with the roads in the area)
- free-flow speed based on the type of road:
 - I-10 main line – 65 mph
 - service TI entrance and exit ramps – 55 mph
- weaving lengths measured from preliminary plans (see Appendix A)

Results for 2015 Conditions

Results of the 2015 HCS LOS analysis are summarized in Table 2.12 for the No-Build and Build Alternatives. Graphical depictions of the results are also presented in Figures 2.10 and 2.11, respectively. Notable observations from the HCS analysis results include:

- In 2015, without the proposed TI, all of I-10 would operate at LOS D or better with the exception of westbound I-10 at the diverge point for the Dysart Road exit ramp.
- With the proposed TI, the weave sections between Dysart Road and Fairway Drive would operate at LOS E or F in the eastbound direction in the morning and in the westbound direction in the evening.

Table 2.12 – I-10 main line level of service, No-Build and Build Alternatives, 2015

Segment type	Location	Peak hour	No-Build level of service	Build level of service
Eastbound				
Basic	I-10 at Dysart Road	AM	C	C
		PM	C	C
Merge*/Weave**	I-10 at Dysart Road entrance ramp	AM	D	E
		PM	D	D
Basic	I-10 at Fairway Drive	AM	D	D
		PM	C	C
Diverge*/Weave**	I-10 at Avondale Boulevard exit ramp	AM	D	D
		PM	C	C
Basic	I-10 at Avondale Boulevard	AM	D	D
		PM	C	C
Westbound				
Basic	I-10 at Avondale Boulevard	AM	B	B
		PM	D	D
Merge*/Weave**	I-10 at Avondale Boulevard entrance ramp	AM	B	B
		PM	D	D
Basic	I-10 at Fairway Drive	AM	C	B
		PM	D	D
Diverge*/Weave**	I-10 at Dysart Road exit ramp	AM	C	C
		PM	E	E
Basic	I-10 at Dysart Road	AM	B	B
		PM	C	C

Notes: LOS worse than D are shown in **bold**; LOS are based on *Highway Capacity Manual* 2010 methodology.

* Segment type for No-Build Alternative; ** Segment type for Build Alternative

Figure 2.10 – I-10 main line level of service, No-Build Alternative, 2015

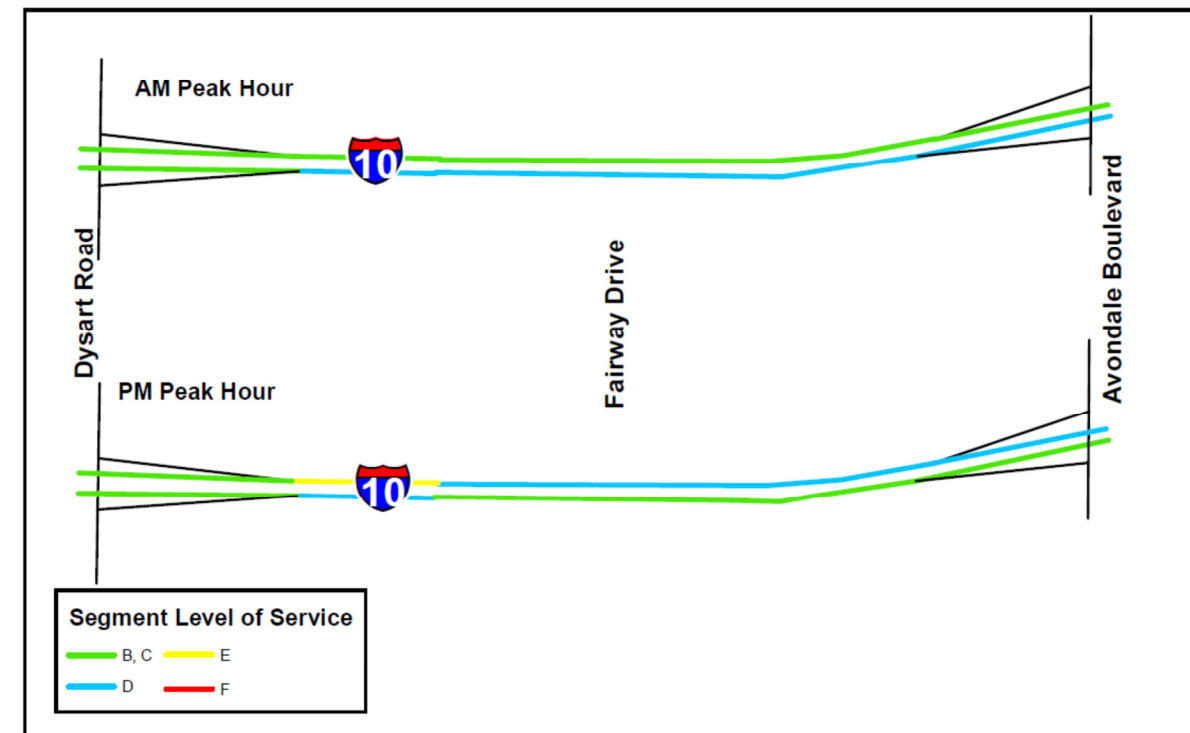
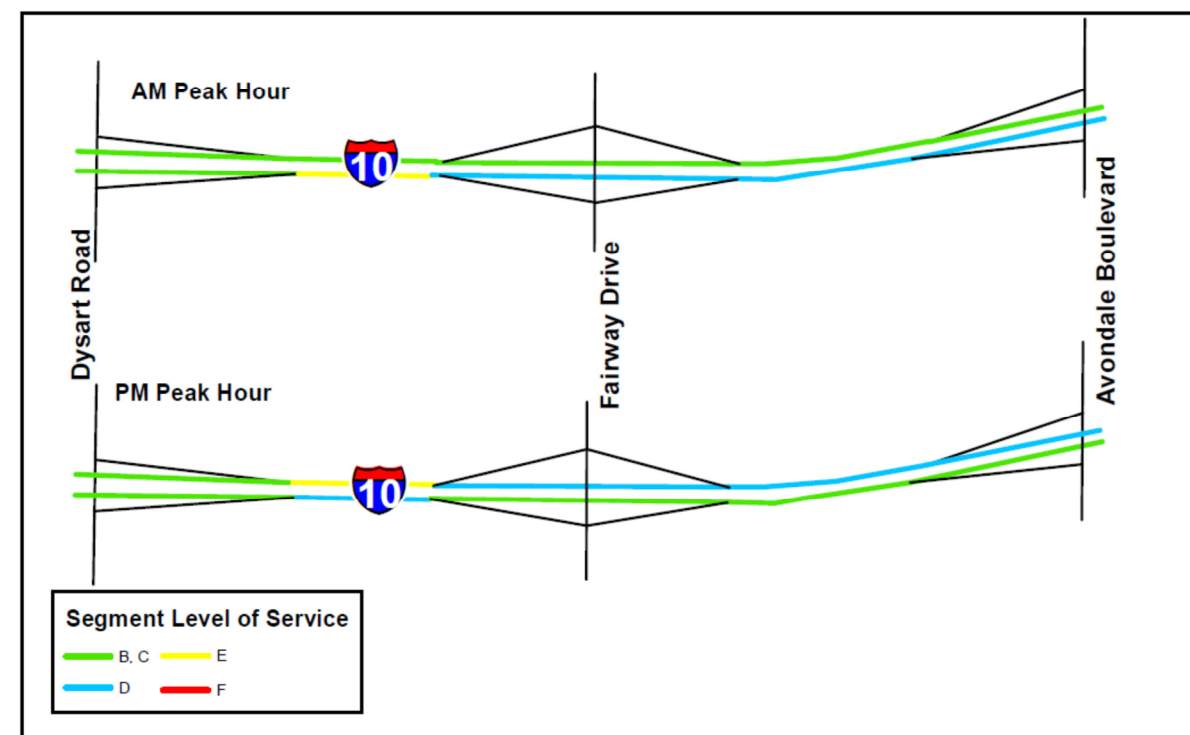


Figure 2.11 – I-10 main line level of service, Build Alternative, 2015



Results for 2035 Conditions

Results of the 2035 HCS LOS analysis are summarized in Table 2.13 for the No-Build and Build Alternatives. Graphical depictions of the results are also presented in Figures 2.12 and 2.13, respectively. Notable observations from the HCS analysis results include:

- In 2035, without the proposed TI, eastbound I-10 would almost entirely operate at LOS E or F during the AM and PM peak hours. Westbound I-10 would operate at LOS E or F during the PM peak hour.
- In 2035, with the proposed TI, eastbound I-10 would almost entirely operate at LOS E or F during the AM and PM peak hours. Westbound I-10 would operate at LOS E or F during the PM peak hour. In the AM peak hour, the section between Fairway Drive and Dysart Road would operate at LOS E.

Table 2.13 – I-10 main line level of service, No-Build and Build Alternatives, 2035

Segment type	Location	Peak hour	No-Build level of service	Build level of service
Eastbound				
Basic	I-10 at Dysart Road	AM	E	E
		PM	D	D
Merge*/Weave**	I-10 at Dysart Road entrance ramp	AM	F	F
		PM	E	E
Basic	I-10 at Fairway Drive	AM	F	F
		PM	E	D
Diverge*/Weave**	I-10 at Avondale Boulevard exit ramp	AM	E	E
		PM	D	D
Basic	I-10 at Avondale Boulevard	AM	F	E
		PM	D	D
Westbound				
Basic	I-10 at Avondale Boulevard	AM	C	C
		PM	E	F
Merge*/Weave**	I-10 at Avondale Boulevard entrance ramp	AM	C	C
		PM	F	E
Basic	I-10 at Fairway Drive	AM	C	D
		PM	F	F
Diverge*/Weave**	I-10 at Dysart Road exit ramp	AM	D	E
		PM	F	F
Basic	I-10 at Dysart Road	AM	C	C
		PM	D	E

Notes: LOS worse than D are shown in **bold**; LOS are based on *Highway Capacity Manual* 2010 methodology.

* Segment type for No-Build Alternative; ** Segment type for Build Alternative

Figure 2.12 – I-10 main line level of service, No-Build Alternative, 2035

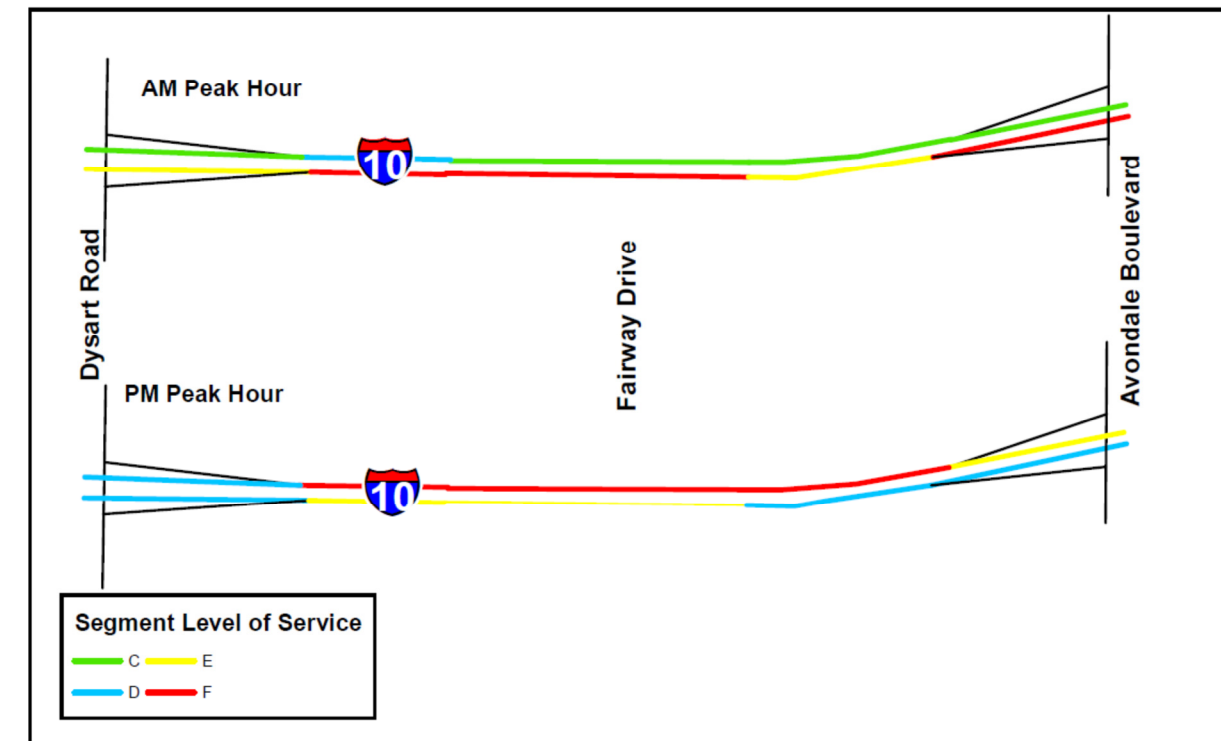
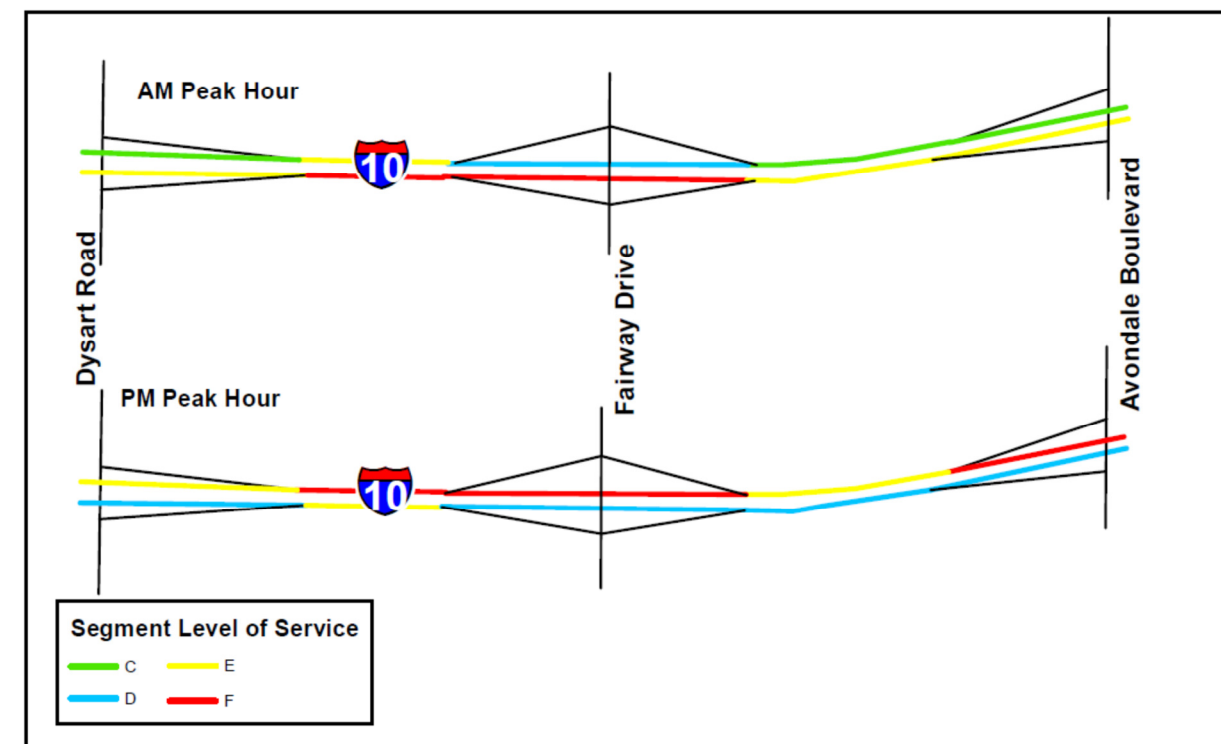


Figure 2.13 – I-10 main line level of service, Build Alternative, 2035





I-10 Operational Performance Summary

Overall, the traffic operations along I-10 would be relatively similar in 2015 and 2035 with or without the proposed TI. In 2015, there would be primarily LOS C and D operations, with some isolated areas where additional congestion would be expected. In 2035, the section of I-10 within the study area would be heavily congested, with the majority of segments operating at LOS E or F. Approximately 1,200 heavy trucks per day would use Fairway Drive instead of Dysart Road and Avondale Boulevard.

Fairway Drive Operational Performance

The traffic operational analysis included the major aspects associated with the proposed TI at Fairway Drive and I-10. Operations at the TI ramp terminal intersections are presented in Table 2.14. The segment LOS for Fairway Drive between I-10 and Van Buren Street is presented in Table 2.15. The intersection LOS at Fairway Drive and Van Buren Street is presented in Table 2.16. As appropriate, the No-Build Alternative operational analysis is provided for comparison. In each case, the analysis for 2015 and 2035 resulted in acceptable levels of service – LOS C or better.

Table 2.14 – Interchange level of service, Fairway Drive, 2015 and 2035

		2015		2035	
Performance measure		AM	PM	AM	PM
South signal	Interchange LOS	A	B	A	B
	Average delay per vehicle (seconds)	5.7	11.2	8	17.8
North signal	Interchange LOS	A	A	B	B
	Average delay per vehicle (seconds)	6.5	5.8	11.2	11.7

Notes: AM = morning, LOS = level of service, PM = evening

Table 2.15 – Segment level of service, Fairway Drive, 2015 and 2035

Road	Segment	2015		2035	
		No-Build	Build	No-Build	Build
Fairway Drive	I-10 to Van Buren Street	C	C	C	C

Notes: Level of service was derived using the Florida Department of Transportation's 2009 Quality/Level of Service Handbook, refined by the observed K factor in the Phoenix region.

Table 2.16 – Intersection level of service, Fairway Drive and Van Buren Street, 2015 and 2035

		No-Build		Build	
Performance measure		AM	PM	AM	PM
2015	Interchange LOS	B	B	B	B
	Average delay per vehicle (seconds)	16.1	15.7	16.4	18.4
2035	Interchange LOS	C	C	C	C
	Average delay per vehicle (seconds)	22.3	19.1	23.9	24.4

Notes: AM = morning, LOS = level of service, PM = evening

Dysart Road Operational Performance

The operational analysis evaluated the Dysart Road TI in 2015 and 2035 with and without the proposed Fairway Drive TI. Results of the analysis are presented in Table 2.17. In 2015, the Dysart Road TI would operate relatively the same with or without the Fairway Drive TI. In 2035, however, the Dysart Road TI would perform better with the Fairway Drive TI in place.

The operational analysis of Dysart Road north and south of I-10 provided similar results as the TI analysis. As shown in Table 2.18, south of I-10 in 2035, Dysart Road would perform better with the Fairway Drive TI in place. Otherwise, operations with and without the proposed TI would be the same.

Table 2.17 – Interchange level of service, Dysart Road, 2015 and 2035

			No-Build		Build	
Performance measure			AM	PM	AM	PM
2015	South signal	Interchange LOS	C	D	C	D
		Average delay per vehicle (seconds)	27.2	44.5	26.0	45.0
	North signal	Interchange LOS	C	D	C	D
		Average delay per vehicle (seconds)	31.8	41.2	29.3	39.8
2035	South signal	Interchange LOS	D	E	D	D
		Average delay per vehicle (seconds)	46.3	59.7	36.0	54.2
	North signal	Interchange LOS	D	F	C	E
		Average delay per vehicle (seconds)	47.4	81.5	33.4	66.6

Notes: AM = morning, LOS = level of service, PM = evening

Table 2.18 – Segment level of service, Dysart Road, 2015 and 2035

Road	Segment	2015		2035	
		No-Build	Build	No-Build	Build
Dysart Road	McDowell Road to I-10	D	D	D	D
	I-10 to Van Buren Street	D	D	F	E

Notes: Level of service was derived using the Florida Department of Transportation's 2009 Quality/Level of Service Handbook, refined by the observed K factor in the Phoenix region; LOS worse than D is shown in **bold**.

Avondale Boulevard Operational Performance

The operational analysis evaluated the Avondale Boulevard TI in 2015 and 2035 with and without the proposed Fairway Drive TI. Results of the analysis are presented in Table 2.19. In 2015 and 2035, the Avondale Boulevard TI is projected to operate at LOS C with or without the Fairway Drive TI. While the LOS is the same for conditions with and without the proposed TI, the average delay per vehicle would typically be better with the proposed TI than without.

The operational analysis of Avondale Boulevard north and south of I-10 is shown in Table 2.20. South of I-10 in 2035, Avondale Boulevard would perform better with the Fairway Drive TI in place. Otherwise, the operations with and without the proposed TI would be the same.

Table 2.19 – Interchange level of service, Avondale Boulevard, 2015 and 2035

Performance measure			No-Build		Build	
			AM	PM	AM	PM
2015	South signal	Interchange LOS	C	C	C	C
		Average delay per vehicle (seconds)	21.2	20.2	20.7	21.0
	North signal	Interchange LOS	C	C	C	C
		Average delay per vehicle (seconds)	22.8	30.5	22.6	26.8
2035	South signal	Interchange LOS	C	C	C	C
		Average delay per vehicle (seconds)	31.6	27.0	26.9	26.7
	North signal	Interchange LOS	C	C	C	C
		Average delay per vehicle (seconds)	30.3	34.0	25.8	31.0

Notes: AM = morning, LOS = level of service, PM = evening

Table 2.20 – Segment level of service, Avondale Boulevard, 2015 and 2035

Road	Segment	2015		2035	
		No-Build	Build	No-Build	Build
Avondale Boulevard	McDowell Road to I-10	C	C	C	C
	I-10 to Van Buren Street	D	D	F	E

Notes: Level of service was derived using the Florida Department of Transportation's 2009 *Quality/Level of Service Handbook*, refined by the observed K factor in the Phoenix region; LOS worse than D is shown in **bold**.

Summary of Operational Performance

The operational analysis for the I-10 main line Build Alternative for 2015 indicates that the weave sections would operate a LOS E or F compared with the No-Build Alternative, which would operate at LOS D or better. The new TI would result in a series of service TIs with 1-mile spacing, where the existing conditions feature spacing of 2 miles. In 2035, I-10 would almost entirely operate at LOS E or F during the AM and PM peak hours. The operational analysis for the Dysart Road TI in 2015 showed that it would operate relatively the same with or without the Fairway Drive TI. In 2035, the Dysart Road TI would perform better with the Fairway Drive TI in place. The operational analysis for the Avondale Boulevard TI in 2015 showed that it would operate at LOS C with or without the Fairway Drive TI. In 2035, the Avondale Boulevard TI would perform better with the Fairway Drive TI in place.

3.0 EVALUATION OF ALTERNATIVES

This section presents information related to the development and screening of alternatives and concludes with discussion of the selection of a Preferred Alternative. This section presents the information available and used at the time of selection. Since that time, elements of the Preferred Alternative have been further developed; therefore, values presented in Section 4.0, Major Design Features of the Preferred Alternative, may not match those presented in this section.

3.1 EVALUATION CRITERIA

A multidisciplinary set of criteria was used to evaluate the TI alternatives. Performance of each alternative was determined with respect to:

- **Community Expectations** – General expectations of the public for the corridor. Assumes that drivers are anticipating a standard four-legged diamond TI that is consistent with the majority of the TIs in the corridor.
- **Traffic Volumes** – The ability for the TI type to provide additional capacity and reduce traffic burden on adjacent TIs.
- **Route Continuity** – How easily vehicles that have exited the freeway can return to I-10 through the proposed TI.
- **Alignment** – Roadway alignment and its relationship to site conditions.
- **Interstate Traffic Service** –TI traffic weaving to and from the proposed auxiliary lanes and the impacts of that weaving on the highway’s through traffic.
- **Local Circulation** – Connectivity north and south of the proposed TI to a major arterial street.
- **Right-Of-Way** – Overall impact area attributable to TI and associated roadway work.
- **Structures** – Retaining wall and bridge structures.
- **Environmental** – Potential environmental elements that may need to be addressed in design.
- **Cost** – Relative cost based on structures, right-of-way area, new roads, and ramps.

3.2 ALTERNATIVES CONSIDERED

The process of developing alternatives began by considering an array of build alternatives that would address the need for the project. The Build Alternative includes the construction and operation of a new full-access TI at Fairway Drive and I-10. A wide range of TI types and configurations were considered for this alternative. Major considerations in the development of the alternatives include:

- I-10 is bordered to the north by the ADOT drainage channel also known as the Papago Diversion Channel, which outfalls to the Agua Fria River.
- North of ADOT’s Papago Diversion Channel along the Fairway Drive alignment is Friendship Park, a resource afforded protection under Section 4(f) of the Department of Transportation Act. This study included an examination of the feasibility of and need for connecting the TI to roads north of I-10.
- Near Fairway Drive, I-10 is elevated approximately 10 to 15 feet above the adjacent land.

- The Agua Fria River is located approximately ½ mile west of Fairway Drive.
- Industrial warehouses were recently constructed and others are currently under construction in the area just south of I-10 and just west of Fairway Drive.
- The City of Avondale has a major commercial development (City Center West and City Center East) planned along Avondale Boulevard just south of I-10.
- FCDMC plans to construct a regional stormwater channel through the study area just north of Van Buren Street.

In all, ten alternatives were developed for study. The alternatives varied in location, ramp configuration, and local access connectivity. Six of the alternatives connected to I-10 just east of the Fairway Drive alignment and four alternatives connected at approximately 119th Avenue (0.5 mile east of Fairway Drive). The 119th Avenue alternatives were developed to better facilitate a connection north of I-10 (avoiding Friendship Park).

The alternatives considered are listed in Table 3.1. Descriptions, including maps with conceptual drawings, of each alternative are presented in Appendix D.

Table 3.1 – Build alternatives, Phase 1

Fairway Drive alternatives		119th Avenue alternatives	
Alternative 1	Diamond	Alternative 7	Braided Diamond
Alternative 2	Diamond with At-Grade Ramps	Alternative 8	Frontage Road with Embedded Ramps
Alternative 3	Southwest Quadrant Cloverleaf	Alternative 9	Southwest Quadrant Cloverleaf
Alternative 4	Southeast Quadrant Cloverleaf	Alternative 10	Hybrid-Braided Diamond/Southwest Cloverleaf
Alternative 5	Semi/Full Directional System Ramps		
Alternative 6	Hybrid-Southwest Cloverleaf/Semi Directional Ramps		

The Fairway Drive alternatives were developed to provide access to existing and planned development south of I-10 and west of Fairway Drive. The first two Fairway Drive alternatives, Diamond (Alternative 1) and Diamond with At-Grade Ramps (Alternative 2) would both provide a minimal footprint while maximizing spacing between adjacent TIs.

The next two alternatives at Fairway Drive—Southwest Quadrant Cloverleaf (Alternative 3) and Southeast Quadrant Cloverleaf (Alternative 4)—were considered to take advantage of adjacent open land south of I-10 and east of Fairway Drive.

The last two alternatives at Fairway Drive—Semi/Full Directional System Ramps (Alternative 5) and Hybrid-Southwest Quadrant Cloverleaf/Semi Directional Ramps (Alternative 6)—were considered as options that provided free-flow traffic movements.

The 119th Avenue alternatives were developed to provide access to the planned City of Avondale City Center south of I-10, with a potential connection to the north of I-10. Given the proximity of the adjacent Avondale Boulevard TI to the east, the 119th Avenue alternatives considered four alternatives. Braided

Diamond (Alternative 7) and Frontage Road with Embedded Ramps (Alternative 8) addressed the short weave between 119th Avenue and Avondale Boulevard.

The next alternative at 119th Avenue, Southwest Quadrant Cloverleaf (Alternative 9), was considered to take advantage of adjacent open land west of 119th Avenue and increase the weaving distance for eastbound vehicles travelling on I-10 between 119th Avenue and Avondale Boulevard.

The last alternative at 119th Avenue, Hybrid-Braided Diamond/Southwest Cloverleaf (Alternative 10), was considered as an alternative that combined the benefits of the braided and the cloverleaf alternative.

North Connection Evaluation

Because of the location of the ADOT drainage channel and Friendship Park [a resource afforded protection under Section 4(f)], an initial step in the alternatives development process was to evaluate the feasibility of and the need for extending Fairway Drive north of I-10 with a connection to McDowell Road. A detailed analysis comparing traffic operations and traffic distributions was completed for two scenarios: (1) Fairway Drive TI South Connection, and (2) Fairway Drive TI North and South Connection.

The traffic operational analysis is presented in the *I-10, Fairway Drive Traffic Interchange Initial Interstate Access Change Request* (2013c). The analysis showed that there is little benefit, from a traffic operational standpoint, to extending Fairway Drive north of I-10. The primary benefit of the proposed TI (reducing traffic, especially heavy trucks, at adjacent TIs and along parallel arterial streets) is accomplished with the south connection.

While it would be feasible to build a connection north of I-10, it would require additional structures and subsequent increased footprint for structures over the ADOT drainage channel. This connection was not envisioned in the RTP budget for the project. Additionally, the new road would add traffic in the vicinity of existing residential developments that were not configured anticipating this connection. Therefore, the local agency and neighboring communities did not support the north connection.

3.3 ALTERNATIVES DEVELOPMENT AND SCREENING, PHASE 1

This section presents the initial screening results for the alternative TI concepts considered for the I-10 and Fairway Drive TI. The screening process was based on a combination of evaluation criteria, site constraints, and traffic conditions at I-10 and Fairway Drive. The Phase 1 screening resulted in the removal of eight alternatives from further study. A screening matrix is provided in Appendix D. The TIs eliminated and the reasons for their elimination are described in the following section.

Alternatives Eliminated from Further Study

Alternative 3 (Southwest Quadrant Cloverleaf) and Alternative 4 (Southeast Quadrant Cloverleaf)

Because of their similar nature, these two alternatives were considered together. Notable reasons for their elimination from further consideration include:

- A partial cloverleaf using the southwest quadrant is not desirable because it would create a short weave for westbound I-10 vehicles heading to Fairway Drive.
- A longer bridge structure over I-10 would be needed, increasing construction duration.
- This type of TI would require more right-of-way than other alternatives carried forward.

Alternative 5 (Semi/Full Directional System Ramps) and Alternative 6 (Hybrid-Southwest Cloverleaf/Semi Directional Ramps)

Because of their similar nature, these two alternatives were considered together. Notable reasons for their elimination from further consideration include:

- The length required for flyover ramps would create a short weave between adjacent TIs.
- Impacts on the existing ADOT drainage channel north of I-10 and industrial development south of I-10 would be undesirable.
- This type of TI would require more right-of-way than other alternatives carried forward.

Alternative 7 (Braided Diamond), Alternative 8 (Frontage Road with Embedded Ramps), Alternative 9 (Southwest Quadrant Cloverleaf), and Alternative 10 (Hybrid-Braided Diamond/Southwest Cloverleaf)

One of the main features of the 119th Avenue alternatives is the potential for connectivity to the north. It is for this reason that Alternatives 7, 8, 9, and 10 were considered together. The City of Avondale has indicated that making a connection to the north would affect the residential complex north of I-10. The City has indicated that its previous studies showed that traffic volumes would not support a connection to the north. Spanning the existing ADOT drainage channel is also not supported by local agencies. A proposed TI at 119th Avenue is not included in the RTP and would require a plan amendment. Based on these considerations, Alternatives 7, 8, 9, and 10 were eliminated from further study.

In summary, the primary issues that led to elimination of Alternatives 3 through 10 were:

- Increased area of impact (right-of-way) when compared with Alternatives 1 and 2.
- Short weave sections between successive entrance and exit ramps at Dysart Road and/or Avondale Boulevard.
- Increased right-of-way footprint for additional structures and/or right-of-way acquisition.

In addition, all of the 119th Avenue alternatives were eliminated based on undesirable issues identified in the North Connector Evaluation documented in the *I-10, Fairway Drive Traffic Interchange Initial Interstate Access Change Request*. The city of Avondale also expressed their desire to avoid mixing truck traffic adjacent to the City Center development.

Alternatives Carried Forward for Further Study

The two remaining build alternatives (listed below) and the No-Build Alternative were carried forward for detailed study.

- Alternative 1 (Diamond)
- Alternative 2 (Diamond with At-Grade Ramps)

Plan view schematics of each TI alternative carried forward are presented in Figures 3.1 and 3.2.

Figure 3.1 – Alternative 1 (Diamond)

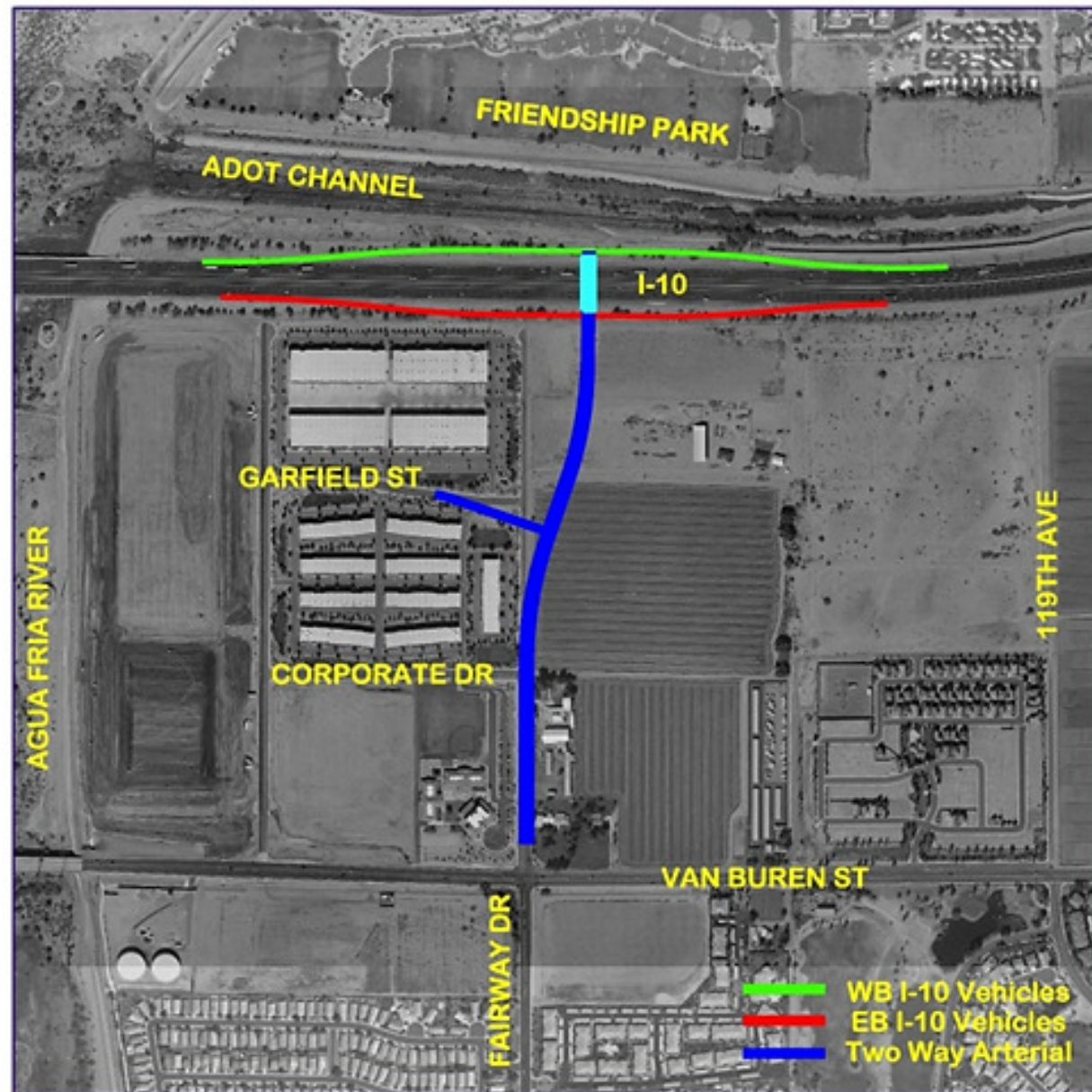
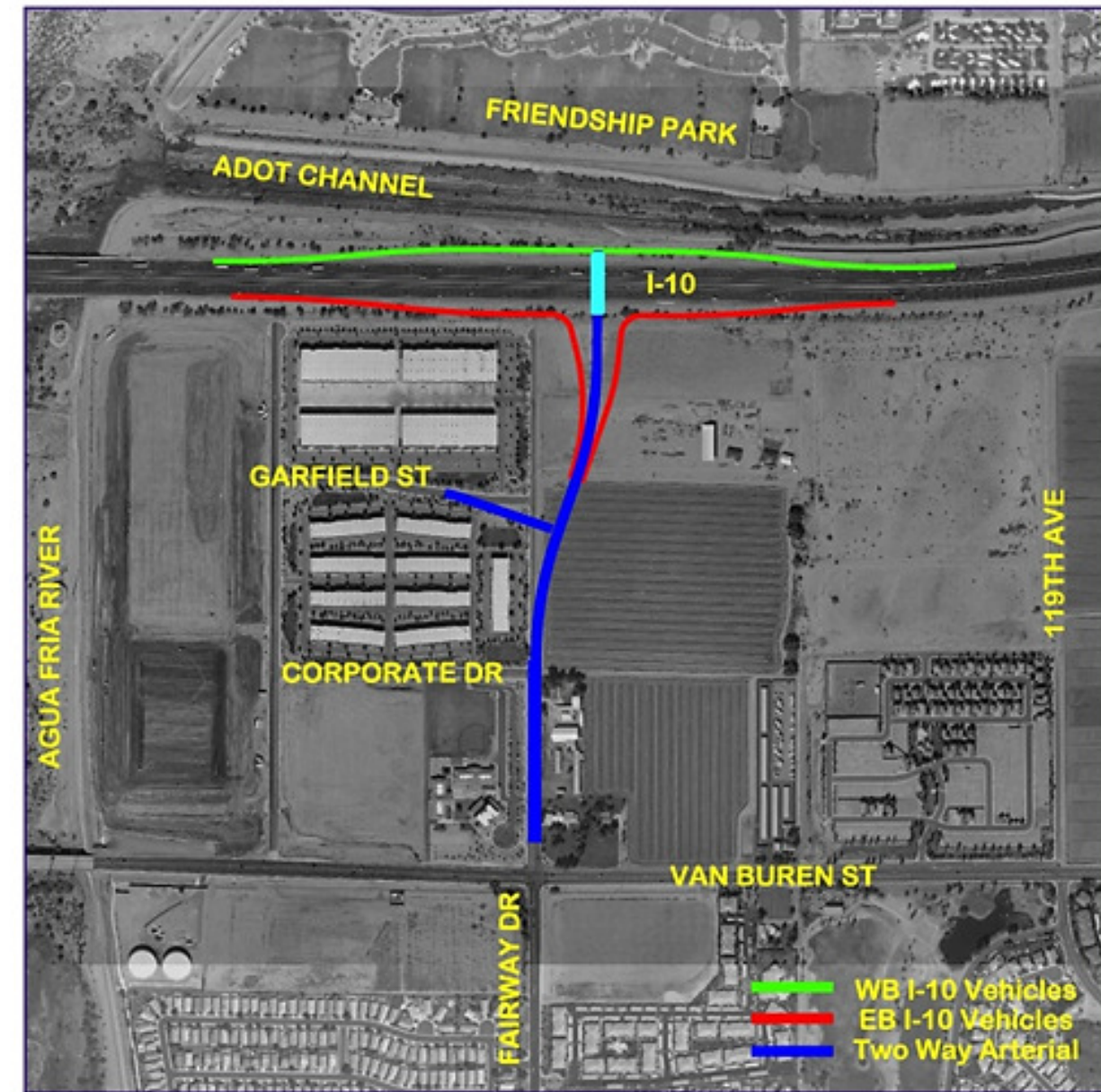


Figure 3.2 – Alternative 2 (Diamond with At-Grade Ramps)



3.4 ALTERNATIVES DEVELOPMENT AND SCREENING, PHASE 2

This section presents results of the evaluation of Alternatives 1 and 2 and the No-Build Alternative. The evaluation considered their technical merits and environmental impacts and compared them against the evaluation criteria.

Traffic Operations

The traffic operational analysis evaluated the ability of each TI alternative to efficiently move traffic in the design year of 2035. Alternatives 1 and 2 would provide the same access points and serve the same operational movements. As a result, each alternative would attract the same level of traffic and would result in the same trip distributions on all of the study area road segments. Therefore, there is no difference between the two alternatives with respect to traffic operational performance on I-10, at the adjacent Dysart Road and Avondale Boulevard TIs, or on other roads such as Dysart Road, Van Buren Street, and Avondale Boulevard.

The only difference between Alternatives 1 and 2 is that the south intersection at the Fairway Drive TI would be eliminated by design for Alternative 2. The overall network performance and TI performance of each alternative is summarized for the AM and PM peak hour in Table 3.2. While Alternative 2 would reduce the average delay at the TI given the free-flow conditions for the eastbound entrance and exit ramps, the overall LOS for both alternatives would fall within acceptable ranges for this type of facility.

Table 3.2 – Summary of intersection performance, Alternatives 1 and 2

Intersection name	Alternative 1		Alternative 2	
	Delay (seconds)	LOS	Delay (seconds)	LOS
Fairway Drive – north ramp intersection	17.1 (29.0)	B (C)	14.3 (32.0)	B (C)
Fairway Drive – south ramp intersection	26.9 (14.1)	C (B)	no intersection present	

Notes: Information is presented for AM (PM) peak hour. LOS = level of service.

Signalization

The signal design for each alternative is similar at the TI's north intersection. The north intersection would need a two-phase actuated traffic signal to control westbound exit ramp and northbound Fairway Drive left-turn traffic. For the TI's south intersection, Alternative 1 would need a two-phase actuated traffic signal to control northbound through, southbound through, and southbound left-turn Fairway Drive movements and eastbound exit ramp traffic. For Alternative 2, the south intersection was eliminated by design. For the alternatives, phasing and signal timing between the TI signals is critical to avoid vehicle queuing on the two-lane bridge over I-10. The Fairway Drive and Garfield Street intersection requires a two-phase actuated traffic signal control to control northbound/southbound Fairway Drive traffic and westbound Garfield Street traffic. Without the TI, the signalization of the Fairway Drive and Garfield Street intersection would occur at some time in the future when traffic volumes warrant the change.

Lighting

Alternatives 1 and 2 would need similar levels of new lighting. The proposed TI would entail a revision of the I-10 main line lighting scheme. The most likely conversion would include adding six to eight 100-foot high-mast poles between the main line and the entrance and exit ramps. Underdeck lighting

beneath the Fairway Drive structure over I-10 would be needed. Type G or Type I pole mount luminaires may be added at ramp merge and diverge gore areas to provide a desired level of lighting for the TI area. For Alternative 2, additional pole mount luminaires may be added to ramp structures south of I-10 to obtain a desired level of lighting as the ramps connect to Fairway Drive.

Lighting along Fairway Drive would be implemented either through median-mounted poles or side-mounted poles based on available space and city of Avondale preference.

Without the TI, lighting may be added to Fairway Drive with other projects as development in the area of Fairway Drive and I-10 continues.

Circulation

Route Continuity

At the TI, each build alternative presents different travel paths and restrictions relating to turning vehicles and vehicles that have exited I-10 and wish to reenter I-10 in the opposite or same direction. These considerations are summarized in Table 3.3.

Table 3.3 – Route continuity

Alternative	Return movement to I-10 in opposite direction	Return movement to I-10 in same direction
Alternative 1	Yes	Yes
Alternative 2	No	No (eastbound), Yes (westbound)

Access to Van Buren Street and Adjacent Properties

Both Alternatives 1 and 2 would provide direct access to Van Buren Street through Fairway Drive. Direct access to adjacent properties would be provided only south of the proposed TI for both alternatives.

Without the TI, there would be no direct access from I-10 to Van Buren Street through Fairway Drive. Existing access from Fairway Drive to adjacent properties would remain without the TI.

Pedestrian and Bicycle Travel

The pedestrian and bicycle circulation for each alternative is similar. Pedestrians and bicyclists would be prohibited north of Garfield Street along Fairway Drive since Fairway Drive does not continue north of I-10. The City of Avondale has plans to provide a bike/pedestrian connectivity between the Fairway Drive and Aqua Fria River Trail with a trail head planned at Friendship Park and street access at Van Buren Street. Alternatives 1 and 2 would have no impact on the Aqua Fria River Trail.

Right-of-Way

Alternatives 1 and 2 would require new right-of-way for construction of the proposed TI. The amount and types of takes are presented in Table 3.4. The right-of-way impacts are directly related to the subsequent discussion of environmental impacts and cost. Without the TI, no new right-of-way would be needed and no displacements would occur.

Table 3.4 – Right-of-way requirements

Alternative	New right-of-way (acres)	Residential takes	Commercial takes
Alternative 1	12.1	4 partial	2 partial
Alternative 2	12.0	4 partial	3 partial

Utilities

Both build alternatives would cross under the existing 230 kV Salt River Project/Western Area Power Administration overhead power lines that cross I-10 east of Fairway Drive. A portion of the eastbound on-ramp and westbound exit ramp would need to be constructed under the overhead power lines and these utilities would be protected in place during construction. At the mid-mile section between Fairway Drive and Avondale Boulevard, the 69 kV Salt River Project/Arizona Public Service overhead power lines and a 12 kV Salt River Project underground line would not directly be affected by the build alternatives.

Without the TI, no utility relocations or impacts would occur.

Structures

Alternatives 1 and 2 are assumed to use a two-span precast American Association of State Highway and Transportation Officials (AASHTO) girder for the bridge structure. A cast-in-place structure was not considered given the need to provide full vertical clearance during construction when using false work over I-10. This would require a higher roadway profile for Fairway Drive. Two types of substructures at the abutments could be considered – a full-height wall abutment and an abutment on cap beam columns and drilled shafts with a mechanically stabilized earth (MSE) wall placed behind the abutment to support the roadway embankment. The bridge would accommodate one additional lane in each direction on I-10.

Drainage

Similar facilities to handle off- and on-site drainage would be provided for both build alternatives. The existing ADOT drainage channel, also known as the Papago Diversion Channel, along the north side of I-10 would not be affected. The off- and on-site drainage would be captured by inlets along I-10, the new ramps, and Fairway Drive and would be conveyed to small retention basins adjacent to the new TI. Potential impacts to the future Flood Control District box culvert crossing north of Van Buren Street would be similar for both alternatives.

No drainage improvements on I-10 would be required in the No-Build Alternative.

I-10 Main Line

No adjustments to the existing I-10 profile would be required for both build alternatives. Modifications to the existing I-10 would include adding auxiliary lanes to I-10 for the Fairway Drive entrance and exit ramps. Advanced signs would be needed for both alternatives.

The No-Build Alternative would not result in any direct I-10 main line impacts.

Environmental

A preliminary review of potential environmental impacts related to air quality, biology, cultural and historic resources, environmental justice and Title VI populations, hazardous materials, land use and socioeconomics, noise, Section 4(f) resources, floodplains, and water resources indicated that a finding of no significant impacts would be likely under the two build alternatives. The No-Build Alternative would not result in any direct environmental impacts, but additional congestion at adjacent TIs could have negative consequences related to air quality.

Probable Cost

The cost of each action alternative was developed using similar assumptions related to unit cost of materials. The major construction items, earthwork, pavement, structures, traffic and drainage were designed consistent with the descriptions provided in the previous sections. The construction and design cost, right-of-way cost, and total cost for each action alternative are presented in Table 3.5.

Table 3.5 – Cost (2013 dollars), interchange alternatives

Alternative	Construction and design cost	Right-of-way cost	Total cost
Alternative 1 TI	\$19,300,000	\$910,000	\$20,210,000
Alternative 2 TI	\$15,600,000	\$850,000	\$16,450,000

Note: TI = traffic interchange

Selection of the Preferred Alternative

Phase 2 of the alternatives development and screening process focused on a comparative analysis between Alternatives 1 and 2 and the No-Build Alternative. To support this comparison, additional detailed study was performed for each alternative. Preliminary plan sets with horizontal and vertical geometry were developed to increase the accuracy of cost estimates and to fully develop the area of impact for each alternative. A detailed discussion of the alternatives, including an evaluation matrix, is presented in Appendix E.

Under the No-Build Alternative, none of the improvements identified in the local and regional governmental plans would be implemented to provide a system linkage. No additional freeway access would be provided to support higher-intensity land uses planned in the study area. The Dysart Road and Avondale Boulevard TIs would become increasingly congested over time without the Fairway Drive TI available to distribute traffic over this segment of I-10.

A summary of the screening results is presented in Table 3.6. Notable observations from the table include:

- Alternatives 1 and 2 show no differences with respect to traffic operational performance.
- Alternative 1 is a standard diamond TI similar to most TIs along I-10, providing consistency to local and out-of-town travelers. The diamond TI design allows travel through the interchange to continue in the same direction along I-10 and allows errant vehicles to complete a U-turn to reverse direction along I-10. This benefits emergency response, traffic incident management, and driver expectancy.
- Alternative 2 eliminates the south interchange intersection and keeps traffic on the eastbound entrance and exit ramps at-grade. The modified diamond design requires less retaining wall, and the eliminated signal slightly improves traffic operational performance. Alternative 2 does not allow

out-of-town travelers to complete a U-turn to reverse direction along I-10 or continue in the same direction through the interchange.

The study team determined that because Alternative 1 provides driver expectancy and route continuity benefits when compared with Alternative 2, Alternative 1 should be carried forward as the Preferred Alternative. Appendix E includes meeting notes and materials presented to the study team during the alternatives development and screening process.

Table 3.6 – Screening summary, Alternatives 1 and 2

Evaluation category	Screening criteria	Alternative		Data supports
		1	2	
Traffic Operations	Main line traffic operations comparable to no-build?	Yes	Yes	Neutral
	Avondale Boulevard and Dysart Road operations improved?	Yes	Yes	Neutral
	Reduces truck traffic on adjacent arterial streets?	Yes	Yes	Neutral
	Design consistent with interchanges along I-10, supporting driver expectancy?	Yes	No	Alternative 1
Circulation	Provides route continuity at the interchange (through movements and U-turn movements)?	Yes	No	Alternative 1
Right-of-way	Avoids full takes of commercial properties?	Yes	Yes	Neutral
Utilities	Avoids major utility relocations?	Yes	Yes	Neutral
Structures	Provides grade separation of I-10 with adequate width for projected traffic?	Yes	Yes	Neutral
Drainage	Avoids impacts on existing I-10 drainage channel?	Yes	Yes	Neutral
Roadway	Avoids I-10 profile modifications?	Yes	Yes	Neutral
	Allows eastbound vehicles (exiting or entering) to remain at-grade?	No	Yes	Alternative 2
	Meets geometric design requirements?	Yes	Yes	Neutral
Environmental	Avoids major environmental issues?	Yes	Yes	Neutral
Probable Cost	Less than <i>Regional Transportation Plan</i> budget of \$20.3 million?	Yes	Yes	Neutral



4.0 MAJOR DESIGN FEATURES OF THE PREFERRED ALTERNATIVE

This section describes the design controls and design features for the Preferred Alternative for I-10, Fairway Drive, and the service TI ramps within the study limits. The Preferred Alternative’s major design features are depicted in Figure 4.1 and are described in detail in the following sections.

4.1 DESIGN CRITERIA

The notable design criteria for I-10, service TI ramps, and Fairway Drive are presented in Tables 4.1 and 4.2. Auxiliary lanes would be included between the adjacent entrance and exit ramps. The design of the auxiliary lanes would follow the *“Interim” Auxiliary Lane Design Guidelines* (ADOT 1996)

Table 4.1 – Design controls for I-10

Item description	Design control
Design year	2035
Design speed	65 mph
Superelevation	Match existing (0.06 ft/ft maximum)
Cross slope	Match existing (2.0%)
Lane width	12 feet
Shoulder width (median and outside)	12 feet
Maximum horizontal curve	3 degrees, 27 minutes
Maximum gradient	3%
Taper rate	65:1
Slope standards (cut and fill slopes)	Varies, 3:1 maximum
Minimum vertical clearance (highway structure)	16 feet 6 inches

Table 4.2 – Design controls for service TI ramps

Item description	Design control
Design year	2035
Design speed for nose of gore (exit ramps)	60 mph
Design speed for nose of gore (entrance ramps)	55 mph
Design speed for ramp body	50 mph
Design speed for ramp terminal	35 mph
Superelevation	0.06 ft/ft maximum
Lane width:	12 feet
Pavement width (exit ramp)	22 feet, plus 2 feet offset to barrier
Pavement width (entrance ramp)	28 feet, plus 2 feet offset to barrier
Maximum horizontal curve	6 degree, 53 minutes
Maximum gradient	+4.0%, –5.0%
Slope standards (cut and fill slopes)	Varies, 3:1 maximum

4.2 I-10 MAIN LINE

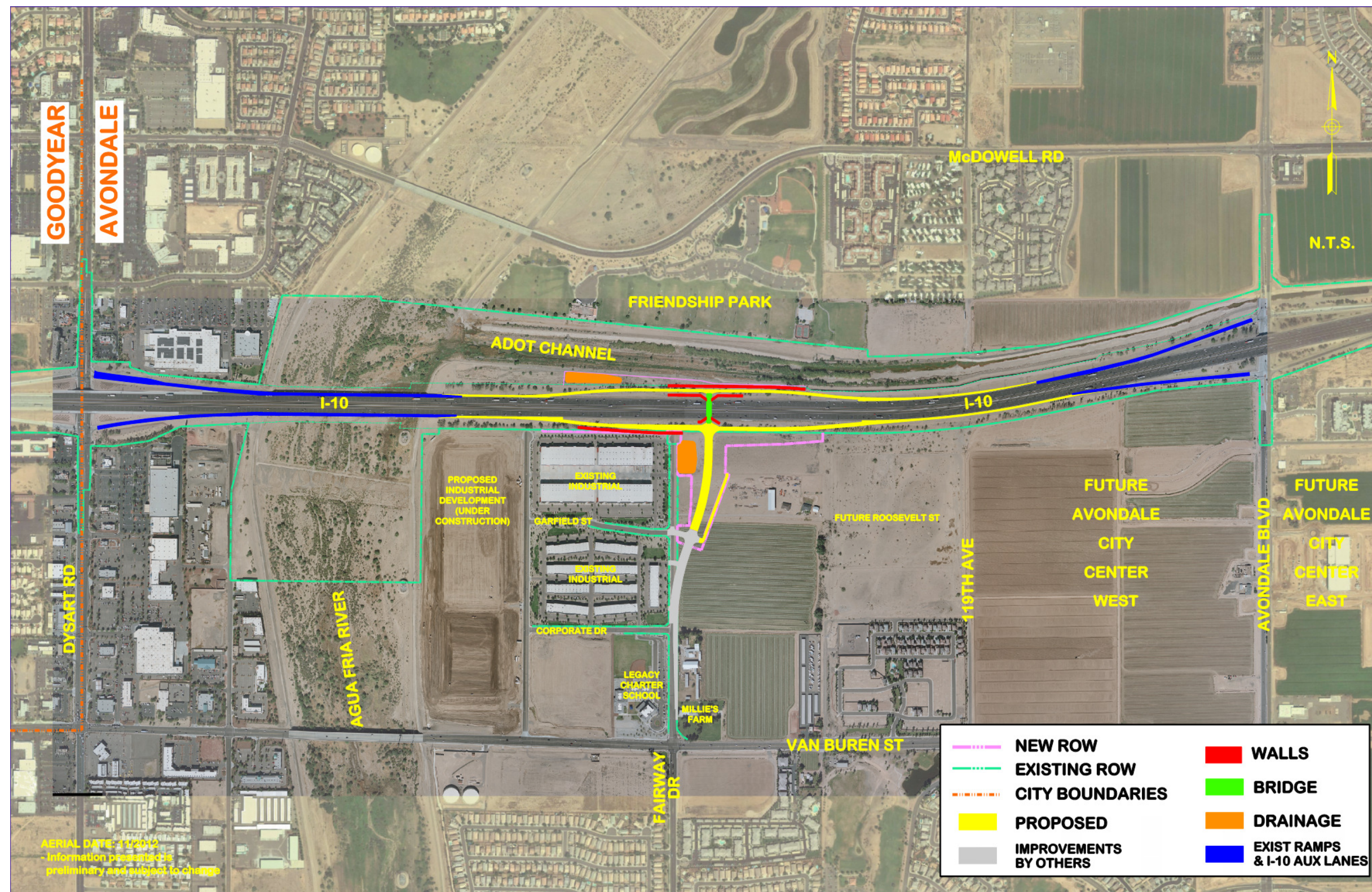
The Preferred Alternative was developed to provide the capacity needed for the projected 2035 travel demand and to conform to current geometric design criteria and design practice. This alternative was also developed with consideration of a future general-purpose lane project on I-10 that has not been identified in the RTP, but has been studied and identified as a long term need. The Preferred Alternative plans are included in Appendix A.

The Fairway Drive TI would be a full TI with new ramp connections between Fairway Drive and I-10. The locations of retaining walls, storm drains, ramp infield grading, roadway shoulders, and other improvements included in this project would consider the I-10 facility with one additional general purpose lane in each direction.

On I-10, an auxiliary lane extending to the Fairway Drive exit ramp will connect to an existing auxiliary lane. The exit ramp (one lane) would be designed as a single-lane ramp from the auxiliary lane with turn lanes at the TI. The Fairway Drive entrance ramp would be configured to transition into an auxiliary lane extending to the Avondale Boulevard exit ramp. The entrance ramp would be designed as a two-lane dual metered ramp that transitions to a one-lane entrance ramp into the auxiliary lane.

On I-10, the westbound Avondale Boulevard entrance ramp would be reconfigured at I-10 with a parallel entrance configuration that transitions into an auxiliary lane extending to the Fairway Drive exit ramp. The exit ramp (one lane) would be designed as a single-lane ramp from the auxiliary lane. The WB Fairway Drive entrance ramp would be designed as a one-lane ramp with a parallel entrance configuration that transitions into an auxiliary lane extending to the existing auxiliary lane on the Agua Fria River bridge for the Dysart Road exit ramp.

Figure 4.1 – Preferred Alternative



Note: ROW = right-of-way



4.3 FAIRWAY DRIVE TRAFFIC INTERCHANGE

Freeway and Ramps

The Fairway Drive TI is recommended to be a full diamond TI as depicted in Appendix A.

The proposed Fairway Drive underpass would provide a two-lane roadway within the ramp intersections that would include a 14-foot-wide lane in each direction of travel. A striped median would be provided between the lanes, and bridge deck will provide enough width for placement of a future sidewalk on the bridge. Approaching the TI from the south, the four-lane roadway section on Fairway Drive would transition to a two-lane roadway section. North of the TI, no connection would be made to the north. North of the Garfield Street intersection, sidewalks would not be provided because Fairway Drive does not continue north of I-10. The city of Avondale has plans to provide a pedestrian bridge approximately 500 feet west of the proposed TI. The future pedestrian bridge would span over the I-10 Papago drainage channel. Design consideration for connectivity to the future pedestrian bridge from the proposed TI was not incorporated into the TI. Coordination with the city of Avondale, design of the pedestrian bridge and connectivity to the TI will be determined during final design.

The eastbound exit ramp would consist of a single-lane exit from an auxiliary lane flaring to three lanes near the crossroad. A retaining wall would be constructed along the eastbound exit ramp in the southwest quadrant of the TI to reduce the amount of new right-of-way needed from existing commercial properties. The eastbound entrance ramp would transition from two lanes on the ramp to a single-lane entrance into an auxiliary lane.

The westbound exit ramp would consist of a single-lane exit from an auxiliary lane and would remain as a single lane near the crossroad. The westbound entrance ramp would be a single lane on the ramp to a single-lane entrance into an auxiliary lane. The westbound exit and entrance ramps would have walls to avoid encroaching on the ADOT drainage channel, as well as the I-10 mainline.

The proposed Fairway Drive horizontal alignment generally follows the section line, but shifts to the east of the section line north of Corporate Drive. The alignment shift allows for embankment slopes to be used (in lieu of retaining walls), avoiding impacts on the existing access road to the west. Impacts on the existing private well site were avoided through this horizontal alignment shift. The vertical alignment would be elevated to connect to the Fairway Drive underpass at a maximum 4 percent grade. The grade for Fairway Drive was established to assist heavy trucks approaching the proposed TI.

Fairway Drive would generally be constructed with embankment slopes on the southwest and southeast quadrants of the TI.

Between Van Buren Street and Garfield Street, The city of Avondale will design and construct the portion of Fairway Drive that will connect to the TI.

4.4 ACCESS CONTROL

Access to and from Interstate highways is overseen by FHWA. Because the proposed entrance and exit ramps would constitute a change of access, an Interstate Access Modification Request documenting the purpose and traffic-related impacts of the project will be submitted to FHWA. The physical control of access would be accomplished using fencing placed at the new right-of-way line along the new ramps and drainage basins that would tie into existing fencing along the I-10 main line.

Access control along Fairway Drive adjacent to the TI ramp terminals would be implemented through a combined effort of ADOT and the City of Avondale. Current ADOT policy is to acquire access control

along the crossroad at service TIs for at least 300 feet beyond the ramp terminal radius return. Access control along Fairway Drive was set at greater than 800 feet.

4.5 RIGHT-OF-WAY

The proposed right-of-way requirements are shown on the Preferred Alternative plans in Appendix A. The total estimated right-of-way needed for this alternative is approximately 14.02 acres. Potential easement locations and limits will be determined during final design.

4.6 DRAINAGE

Analysis Criteria

The drainage evaluation was based on requirements in Chapter 600 of the ADOT *Roadway Design Guidelines*. Notable items include:

- As presented in Table 603.2B, the pavement drainage systems shall be designed for a 50-year storm frequency at depressed road locations. For nondepressed roads, the storm drain system shall be designed for a 10-year frequency.
- Depressed road criteria apply to any road with ponded depth (ignoring any drainage system) in excess of 30 inches. In this case, the storm drain systems shall be designed such that the hydraulic grade line is a minimum of 6 inches below top of grate.
- As presented on Table 603.2C, allowable spread on all roads shall not exceed the road gutter width, shoulder, and/or distress lane. On roads with more than one lane in each direction, the spread may encroach on one half of the adjacent lane for a 10-year storm frequency.
- The allowable spread should meet the criteria given in Table 603.2C; one-lane ramps shall have a 12-foot unponded width. Allowable spread on two-lane ramps shall not exceed the road gutter width, shoulder, and one half of the adjacent lane for a 10-year storm frequency.
- Allowable ponding depth on highways shall not exceed the curb height for a 10-year storm frequency.
- The capacity of detention basins and ditches that are parallel to the road and serve to convey road drainage should be designed to meet the requirements of the 10-year storm frequency. Detention basins and ditches that intercept off-site flows should be designed for a 50-year storm frequency except where other conditions require a greater storm frequency.
- The 100-year storm frequency would also be checked to ensure that properties adjacent to the freeway right-of-way would not be adversely affected.
- Federal Emergency Management Agency and local jurisdiction regulations would be followed for floodplain development.
- Retention basin side slopes would be a minimum of 6:1.

EXISTING STUDIES AND MODELS

Several existing studies have been performed in and around the study area. Descriptions of each study are provided below:

- *Durango Area Drainage Master Plan*, September 2005, prepared by Dibble and Associates for FCDMC. This plan determined conceptual designs to reduce flooding in the area between the Agua Fria River and 47th Avenue. Several channels, basins, and a storm drain were proposed. A

HEC-1 model was created for the existing conditions, as well as one for the proposed drainage improvements.

- *Draft Candidate Assessment Report Durango Regional Conveyance Channel*, December 2005, prepared by Aspen Consulting Engineers for FCDMC. This report updated the drainage master plan described above and advanced the design of the Durango Regional Conveyance Channel and the Sunland Channel. The updated plan for the Durango Regional Conveyance Channel removed the channel in Phoenix, relocated the 91st Avenue Basin to 99th Avenue, and placed box culverts under 91st Avenue, 99th Avenue, and 107th Avenue to connect existing retention basins. The HEC-1 model was updated for the proposed drainage improvements. Conceptual design plans were created for the proposed regional basins and channels.
- *Agua Fria Watercourse Master Plan*, November 2001, prepared by Kimley-Horn and Associates for FCDMC. The HEC-1 model for the Agua Fria River was obtained from FCDMC. This model was originally prepared and adopted as part of the Agua Fria River Watercourse Master Plan by FCDMC in 2001.
- *Design Concept Report for the Van Buren Street Channel 99th Avenue to Agua Fria River – 10 year Solution*, August 2013, prepared by Sunrise Engineering. This design concept report (DCR)-level report developed a regional drainage channel north of Van Buren Street, crossing under Fairway Drive. Flows originally documented in the *Durango Area Drainage Master Plan* were revised with detailed mapping and analysis. Report details plans for a regional, multiuse channel discharging through the existing levee.

ON-SITE DRAINAGE

On-Site Drainage Design (I-10)

As previously discussed in Section 1.3, the I-10 roadway in this area is a typical urban freeway section without curb and gutter to capture stormwater. With the exception of two deck drains at the eastern abutments of the Agua Fria River bridge, developing discharge is allowed to sheet off the pavement edge and follow existing contour patterns north and south of the alignment. Approximately 0.7 mile east of the Agua Fria River crossing, the I-10 alignment is superelevated toward the north. As a result of the I-10 widening, half barrier was added to the median and curb and gutter to the pavement edge of the superelevated area. Further modifications to the freeway section included new inlets, storm drain, and curb cuts with spillways.

An urban freeway section with curb and gutter is proposed for the study area and was used for the on-site analysis along the I-10 corridor. The road cross section has normal crown geometry, except in areas of superelevation, allowing runoff to flow toward the outside curb. Along the straight, normal crown portion of the I-10 alignment, a series of catch basins and storm drain systems would be used to collect drainage flows. Two trunklines paralleling the alignment would route flows to discharge pipes extending both north and south.

ADOT Standard C-15.91, C-15.92, and C-15.80 catch basins would be used to intercept flows along the main line and ramps.

Collected stormwater would be discharged to outfall locations both north and south of the I-10 main line. The northern outfall is sized to treat first-flush volumes and outlet into the existing Papago Diversion Channel immediately north of the ADOT right-of-way limits. Discharging into the facility would require coordination with FCDMC to regulate flows and water quality. The southern outfall is a permanent retention facility located on the southwest quadrant of the Fairway Drive TI. The facility is

sized to hold the 100-year design storm volumes with the required ADOT design standards' freeboard maintained.

Within the superelevated portion of the I-10 alignment the westbound spillway locations are to be maintained. Flows would be routed to the existing outfalls, which include 30-inch pipes crossing the existing sound wall. The project would not affect the existing storm drain and inlets farther east of the project and, therefore, would be maintained as currently developed.

OFF-SITE DRAINAGE

Off-Site Drainage Design (I-10)

Off-site discharge north of the project would be captured by the existing Papago Diversion Channel and discharged directly into the Agua Fria River. Runoff from the proposed fill slopes and surrounding ADOT right-of-way would be allowed to sheet flow off site and directly into the Papago Diversion Channel as well. Existing flow patterns would be maintained for proposed conditions.

South of I-10 main line there are no additional off-site flows draining directly into ADOT right-of-way limits. The existing conditions flow patterns would be maintained and fill slope runoff would be allowed to sheet flow off. A v-ditch would parallel the fill slope and convey stormwater to the proposed retention facility.

Recommendations

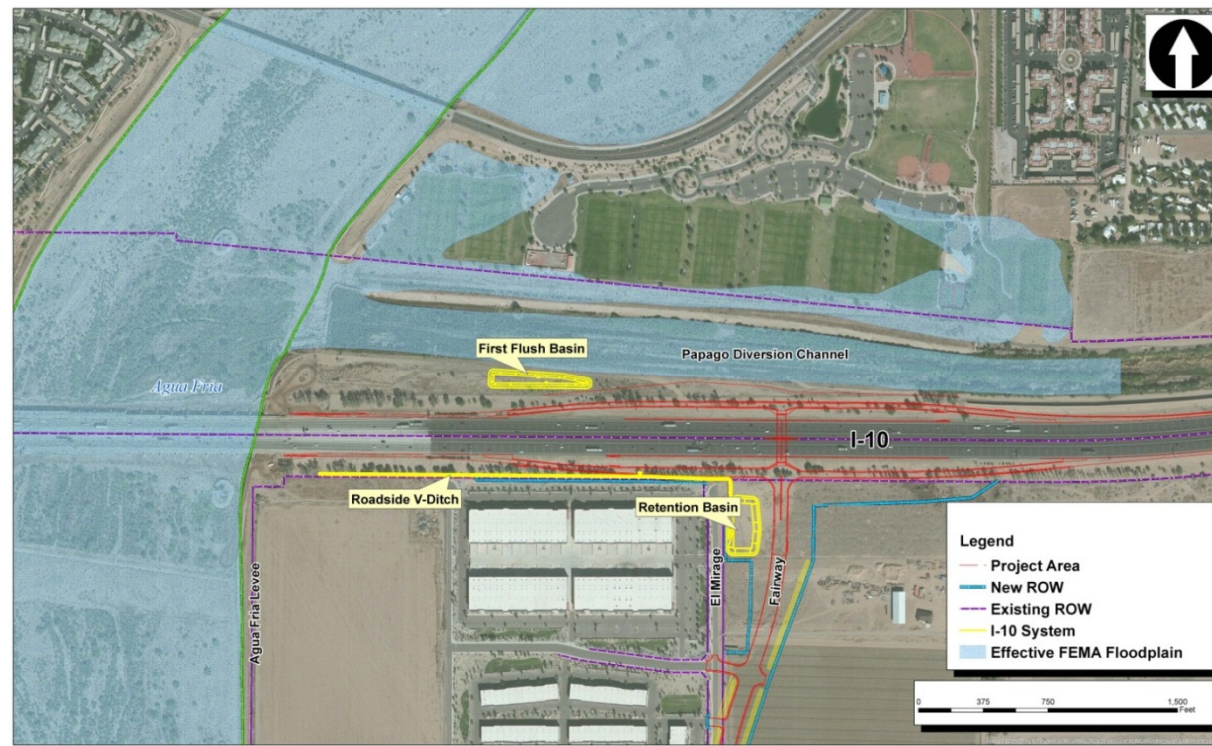
It should be noted that FCDMC is developing a regional flood control channel along Van Buren Street. The channel is designed to collect concentrated discharge developing along Van Buren Street from east of 105th Avenue to the Agua Fria River. Once this system is in place, it could provide an ultimate outfall for the southern drainage system and upgrade the retention facility to a detention facility with an outfall pipe spanning the 900-foot length of Fairway Drive while tying into the regional channel.

The infrastructure needed for the on-site drainage system would be determined during final design. The following describes site-specific considerations:

- Given the lack of permanent outfalls south of I-10, a permanent retention facility is needed to drain a portion of the main line. Calculations indicate that approximately 3.3 acre-feet of storage is needed to handle 100-year storm flows. The volume includes first-flush volumes for water quality.

Major drainage design features of the Preferred Alternative are depicted in Figures 4.2.

Figure 4.2 – Proposed I-10 drainage system



4.7 EARTHWORK

The proposed TI project—including the I-10 main line, ramps, crossroad, and drainage basins—was modeled to determine earthwork quantities. The major elements and associated quantities include:

- drainage excavation for basins – 8,200 cubic yards
- roadway excavation for I-10, ramps, and crossroad – 2,600 cubic yards
- roadway embankment for I-10, ramps, and crossroad – 400,600 cubic yards

Approximately 385,500 cubic yards of embankment material would need to be imported. The city of Avondale currently has a project in the planning and design stages that will construct a drainage channel just north of Van Buren Street. Coordination with the City to utilize potential borrow source should be conducted during final design.

4.8 TRAFFIC DESIGN

The following sections describe the proposed concepts for guide signs, pavement marking, lighting, FMS, and traffic signals. The traffic design concepts were developed based on guidelines from the following documents:

- *Manual on Uniform Traffic Control Devices* (FHWA 2009)
- *Arizona Supplement to the Manual on Uniform Traffic Control Devices* (ADOT 2009a)
- *ADOT Traffic Signals and Lighting Standard Drawings* (ADOT 2010b, with updates)
- *ADOT Signing and Marking Standard Drawings* (ADOT 2010a, with updates)

- *ADOT's Manual of Approved Signs* (ADOT 2011c, with updates)
- *ADOT Freeway Management Systems Design Guidelines* (ADOT 2009b, with updates)
- *ADOT Traffic Engineering Policies, Guides and Procedures* (ADOT 2003, with updates)
- *City of Avondale's General Engineering Requirements Manual* (City of Avondale 2008a)
- *City of Avondale's Supplement to MAG Uniform Standard Specifications and Details for Public Works Construction* (City of Avondale 2008b)

During final design, coordination would continue with any current design and construction projects underway within this corridor.

SIGNS AND PAVEMENT MARKINGS

Changes to signs along I-10 would include adding three new advance overhead guide signs for both the eastbound and westbound TI exits to Fairway Drive. In addition, median-mounted interchange sequence guide signs would be added or revised to account for the introduction of the new TI. Various other ground-mounted guide and warning signs would be revised or relocated to accommodate the new TI and the introduction of auxiliary lanes between Fairway Drive and the Dysart Road and Avondale Boulevard TIs.

Several existing interchange sequence guide signs would be converted from right shoulder mount to median-mount locations. This includes median locations at Station 6919+85 and Station 6972+30, where existing foundations have already been installed within the median barrier for future use.

Various overhead and ground-mounted guide signs will be added for the northbound approach of Fairway Drive to the TI with I-10.

Pavement marking will consist primarily of new striping for the entrance and exit ramps and crossroad of the new TI. Some stripe obliteration and re-striping would be needed along I-10 for conversion of the auxiliary lanes and the exit and entrance ramp additions.

LIGHTING

Freeway lighting currently exists along I-10 within the study area. Type U-69 high mast poles are mounted on the median barrier and spaced at 325- to 375-foot intervals. The addition of a TI at Fairway Drive may require an adjustment of the existing median-mounted poles at Station 6895+60± and/or Station 6899+00± to accommodate the median bridge pier.

In addition, lights would be added to provide adequate lighting levels for the ramps and crossroad. In addition to the luminaires that are a part of the TI traffic signal system, a combination of Type G and/or Type H aluminum poles spaced along the ramps and remaining crossroad would provide adequate lighting levels for the TI. Some of the foundations for these poles may need to be included within the design of the bridge structure and retaining walls.

FREEWAY MANAGEMENT SYSTEM

The future ADOT FMS project, identified for construction in 2016, should provide for the addition of three 3-inch underground conduits for the FMS trunk line along the northern and southern side right-of-way/access control lines of I-10 throughout the project length. This should include all pull boxes and conduit stub-outs to cross the southern leg of Fairway Drive. The Fairway TI project will provide a crosslink between the northern and southern side conduit runs, either through an underground bore or

conduits through the new bridge. At the time of this study, the FMS project is currently in the project assessment stage. Coordination with both projects is on-going and will be required during final design.

All underground infrastructure (that is, conduit, pull boxes, preformed loops) to provide for future ramp metering of the eastbound and/or westbound on-ramps for Fairway Drive should be installed with the Fairway Drive TI project.

The location of the existing counting loops along the I-10 main line at Station 6904+00± should be evaluated, in coordination with the ADOT Multimodal Planning Division (Traffic Monitoring Team), to determine whether loops should remain in place at the current location or be abandoned in favor of a revised location.

The future intelligent transportation system needs of the City of Avondale should be evaluated during final design to allow placement of appropriate conduits along Fairway Drive and to provide for the City's integration with the traffic signal installation and the ADOT FMS system.

SIGNALIZATION

Traffic signals at the TI would be designed in accordance with the *ADOT Traffic Signals and Lighting Standard Drawings* (ADOT 2010b).

The TI would operate with various signal pole combinations at the two TI ramps. The signals would operate from one controller in three phases, with additional phase overlaps as needed.

No conceptual traffic signal design is currently shown.

4.9 CONSTRUCTION SEQUENCING

This section discusses the potential construction sequencing plans for the proposed TI. A description of each construction phase is included in Table 4.3. The ramps and TI area could be used to detour I-10 traffic during short overnight closures to complete the bridge construction across I-10, including placement of precast girders and pouring concrete for the deck and barriers. Detailed construction sequencing plans would be developed during final design.

Table 4.3 – Construction phasing

Construction Phase	Work Description
Phase 1	Construction of I-10 median bridge pier; median signing; guide signs
Phase 2	Construction of auxiliary lanes; entrance and exit ramps; retaining walls; drainage facilities
Phase 3	Construction of Fairway Drive bridge; abutments
Phase 4	Construction of Fairway Drive within access control limits

4.10 MAINTENANCE OF TRAFFIC

Traffic would be managed through detailed traffic control plans and procedures and guidelines specified in Part VI of the *Manual of Uniform Traffic Control Devices*, 2009 Version, and by the *Arizona Supplement to the Manual of Uniform Traffic Control Devices*. The final construction phasing and traffic control plans would be developed during final design.

I-10 STRUCTURE

All the existing travel lanes on I-10 would remain open to traffic most of the time during construction. Temporary concrete barriers should be used for protection while constructing bridge piers, abutments, and sign structures adjacent to the travel lane. However, limited weekend and night closures of one or more travel lanes may be needed to facilitate construction of the bridge across I-10, including precast girder placement and deck pours.

RAMPS AND MAIN LINE WIDENING

The ramps and main line widening could occur with the temporary closure of the I-10 outside shoulders. Temporary concrete barriers should be used for protection while construction occurs adjacent to the I-10 travel lanes.

4.11 UTILITIES

The proposed TI construction, which includes ramps, auxiliary lanes, and structures across I-10, would not require the relocation of any overhead utilities; these utilities would be protected in place during construction. A 24-inch pipe sleeve is proposed adjacent to the existing well site. The pipe sleeve can provide a connection to the existing well if required. Utility relocation plans would be developed according to the *Policy for Accommodating Utilities on Highway Rights-of-Way* (ADOT 2009c) during final design. Utility companies would be provided with the preliminary design plans (see Appendix A) to identify any utilities that need to be relocated and/or adjusted prior to construction.

4.12 STRUCTURES

Retaining Walls

Embankment fills were utilized as much as possible for the I-10 ramps and Fairway Drive approaches to the proposed bridge. The proposed roadway grades would be a maximum of approximately 32 feet above existing grade. Retaining walls are proposed where right-of-way or other constraints limit the embankment footprint. Both full-height walls and walls constructed on embankments are included in the preliminary design. Preliminary retaining wall limits are shown on the plans as follows:

- Wall 1 is on the northern side of the I-10 westbound entrance and exit ramps (northern side of I-10) and has a maximum height of approximately 18 feet on a 10-foot-high embankment.
- Walls 2 and 3 are on the southern side of the I-10 westbound entrance and exit ramps (northern side of I-10) and have a maximum height of approximately 12 feet on an 18-foot-high embankment.
- Wall 4 is located on the southern side of the I-10 eastbound exit ramp (southern side of I-10) and has a maximum wall height of approximately 28 feet.
- Walls 5 and 6 are adjacent to the southern bridge abutment (southern side of I-10) and have a maximum wall height of approximately 28 feet.

All embankment slope ratios are set at 3:1. Potential retaining wall types to be considered for final design include MSE and conventional cast-in-place (CIP) cantilever walls.

The nearby existing sound wall borings indicate favorable support conditions for retaining walls and embankments founded on the near-surface soils; however, subsurface information is not available for the specific site area. Overexcavation and re-compaction or replacement of the upper few feet of soil

(below existing grade) may be needed if loose or soft native soils or existing fill are encountered below the subgrade elevation of embankments and retaining walls.

Fairway Drive Underpass

To provide access from Fairway Drive to and from westbound I-10, a new two-span bridge is proposed. The new Fairway Drive underpass would be built to accommodate the future widening of I-10 by one lane in each direction. The structure would have two spans of 115 feet each for a total structure length of 235 feet measured from the back of each abutment backwall. The width of the bridge would consist of one 14-foot travel lane in each direction, a 10-foot striped median, and two 1-foot, 5-inch F shape concrete barriers. The total width of the bridge would be 58 feet, 0 inches. The face of the abutments would be 37.5 feet from the edge of the existing I-10 travel lane.

The two concrete structure types commonly used in Arizona are a post-tensioned CIP box girder and a precast AASHTO I-girder. Both structure types are common throughout the Phoenix area and are economically comparable. The CIP box girder has distinct disadvantages when both structure options are compared for constructability over I-10:

- A CIP box girder superstructure would need to be constructed on falsework over I-10. This falsework would need to be relatively deep to span all of the I-10 travel lanes in one direction and high enough to provide the full vertical clearance during construction. This would negatively affect Fairway Drive by raising the profile grade significantly. There would be several closures of I-10 for falsework erection, removal, and concrete pours.
- The AASHTO I-girder superstructure can be erected quickly with minimal impacts to I-10 traffic. The precast girder option would have shorter construction duration, with the girders being fabricated at the same time as the substructure work is being performed on site. It also has less formwork required for deck construction. Temporary closures of I-10 would be needed for the girder erection and the deck pour, but these closures would be of shorter duration than with the CIP box girder.

Because of the CIP girder option’s construction disadvantages and impacts to the Fairway Drive profile grade, the only structure type considered would be an AASHTO concrete I-girder. The superstructure would consist of AASHTO Type V modified girders with a superstructure depth of approximately 6 feet, 3 inches.

The substructure at the pier would consist of two blade columns supported on large-diameter drilled shafts. At the abutments, drilled shafts or spread footings could be considered for the substructure design in two different configurations. The first configuration would be a full-height wall abutment supported on a spread footing or two rows of drilled shafts. The second configuration would be a cap beam supported by a single row of columns and drilled shafts. For this configuration, an MSE wall would be placed behind the abutment to support the approach roadway embankment. This type of abutment has been used successfully at several bridges, including the Jomax Road bridge over Interstate 17. The type of abutment to be used would depend on the retaining wall type selected for the elevated ramps. For the purpose of this DCR, a full-height abutment type has been assumed.

4.13 PAVEMENT AND GEOTECHNICAL

The nearby, existing sound wall borings indicate favorable support conditions for spread footings founded on the near-surface soils; however, subsurface information is not available at the specific bridge location. Deep borings from the Agua Fria River and Avondale Boulevard TI bridges indicate

that primarily medium-dense to very-dense granular soils would be encountered with increasing gravel content with depth. Drilled shafts should achieve good axial and lateral loading capacities if similar soil conditions are encountered. The boring logs indicated cobbles and boulders, which may preclude the construction of drilled shafts less than 4 feet in diameter. Groundwater is not anticipated, but could be encountered if deep shafts (greater than about 100 feet) are needed.

ADOT Materials Group developed the recommended pavement structural sections. The pavement structural sections proposed for the construction project include:

Table 4.4 – Summary of proposed I-10 pavement structural sections

Description	AB-2 (inches)	PCCP (doweled) (inches)	PCCP (plain jointed) (inches)	AC-EP (3/4") (Spec. Mix) (inches)	AR-ACFC (inches)	FOG COAT
Auxiliary Lane & Shoulder	4	15			1	
Ramps/Crossroad	4		11		1	

AB = aggregate base, AR-ACFC = asphalt rubber – asphaltic concrete friction course, PCCP = Portland cement concrete pavement

During final design, a geotechnical report would be developed to analyze the existing ground and embankment material properties as well as the projected traffic for the TI. The final pavement design would be developed in accordance with current ADOT Pavement Design Section guidance.

4.14 LANDSCAPING AND AESTHETICS

Landscaping is a standard feature of ADOT’s regional freeways. In consultation with the local agencies and neighboring communities, ADOT would develop a theme for aesthetic treatments applied to bridges and other freeway structures to help them blend into the surroundings. ADOT has expanded its palette of acceptable wall treatments to include thematic emblems or symbols and, in some cases, more than one color. ADOT Roadside Development staff would design the aesthetic treatments based on community input.

4.15 DESIGN EXCEPTIONS

A design exception is anticipated for the reduced inside HOV shoulder width. With the construction of the Fairway Drive bridge piers, the shoulders would be reduced from 12 feet to 10 feet. The minimum continuous usable width of paved inside shoulder for this segment shall be 10 feet and 12 feet desirable with truck traffic (DDHV > 250) (ADOT *Roadway Design Guidelines* Table 302.4).

4.16 IMPLEMENTATION

The TI construction will need to be coordinated with the Fairway Drive widening and connection to the TI. The city of Avondale will be responsible for developing the design and construction of the Fairway Drive widening and connection to the TI. ADOT will be responsible for the design and construction of the TI. Both projects have the potential of having independent construction schedules. The possible build scenarios are as follows:

- Scenario 1: ADOT builds first with no connection to Fairway Drive
- Scenario 2: The City builds first with no connection to I-10
- Scenario 3: ADOT and the City builds concurrently or consecutively the TI and Fairway Drive connection

Scenario 3 is the preferred scenario. The final designer shall coordinate with the City to ensure both projects can be designed and constructed concurrently.

5.0 ESTIMATE OF PROBABLE COSTS

The estimate of probable project costs for constructing the proposed TI is \$19.1 million (2013 dollars). This estimate includes \$14.7 million for construction, \$904,000 for design, and \$1.7 million for right-of-way. The Estimated Engineering Construction Cost report is presented in Appendix C. Table 5.1 summarizes the total cost by major element.

Table 5.1 – Estimate of probable cost for the TI (2013 dollars)

Item description	Cost
Earthwork	\$2,879,080.00
Base and surface treatment (paving)	\$1,054,147.00
Drainage	\$582,576.00
Structures	\$1,268,998.00
Traffic (signing, striping, signals, lighting)	\$1,631,616.00
Roadside development (landscape/aesthetics)	\$330,000.00
Incidentals	\$3,484,630.00
Subtotal A	\$11,231,000.00
Unidentified items (15% of Subtotal A)	\$1,685,000.00
Subtotal B (Subtotal A + unidentified items)	\$12,916,000.00
Construction engineering (10% of Subtotal B)	\$1,162,000.00
Construction contingencies (5% of Subtotal B)	\$646,000.00
Total estimated construction cost	\$14,724,000.00
Design (7% of Subtotal B)	\$904,000.00
Right-of-way	\$1,732,391
Subtotal other project costs	\$2,636,000
Indirect Cost Allocation (10.39% of Total Construction and other project cost)	\$1,804,000
Total estimated project cost	\$19,164,000

Unit cost information from recent ADOT construction projects was used to develop the estimate of probable cost.

6.0 SOCIAL, ECONOMIC, AND ENVIRONMENTAL CONSIDERATIONS

Based on the anticipated scope of work, ADOT and FHWA have determined that a categorical exclusion (CE) is the appropriate level of National Environmental Policy Act documentation. The categorical exclusion was approved by FHWA on September 9, 2014.

7.0 REFERENCES

Arizona Department of Transportation (ADOT). 1996. *Interim Auxiliary Lane Design Guidelines*.

— — —. 2003. *ADOT Traffic Engineering Policies, Guides and Procedures*. With updates.

— — —. 2006. *Interstate 10 (Papago) Median Widening, Final Design Concept Report, SR 85 to SR 303L and SR 303L to SR 101L*.

— — —. 2007. *Pavement Design Summary Report, Ehrenberg-Phoenix Highway (I-10) Median Widening, Sarival Avenue to SR-101L*. March.

— — —. 2009a. *Arizona Supplement to the Manual on Uniform Traffic Control Devices*.

— — —. 2009b. *ADOT Freeway Management Systems Design Guidelines*. Transportation Technology Group. May. With updates.

— — —. 2009c. *Policy for Accommodating Utilities on Highway Rights-of-Way*. Utility and Railroad Engineering Section.

— — —. 2010a. *ADOT Signing and Marking Standard Drawings*. Phoenix. October.

— — —. 2010b. *ADOT Traffic Signals and Lighting Standard Drawings*. March.

— — —. 2011a. *Historical Traffic Counts*.

— — —. 2011b. *Interstate 10, Perryville Road Traffic Interchange Change of Access Report*.

— — —. 2011c. *Manual of Approved Signs*. With updates.

— — —. 2012. *Roadway Design Guidelines*. May. With updates.

— — —. 2013a. *2014–2018 Five-Year Transportation Facilities Construction Program*.

— — —. 2013b. *Traffic Safety Division Crash History Data*.

— — —. 2013c. *Interstate 10, Fairway Drive Traffic Interchange Traffic Report*.

Arizona Department of Water Resources. 2013. “West Valley Land Subsidence Feature Map.” <www.azwater.gov/AzDWR/Hydrology/Geophysics/WestValleySubsidence.htm> (accessed September 19, 2013).

City of Avondale. 1997. *Coldwater Springs Traffic Impact Analysis*.

— — —. 2005. *Coldwater Apartments Traffic Impact Analysis*.

— — —. 2007a. *Avondale Commerce Center Traffic Impact Analysis*.

— — —. 2007b. *Coldwater Springs Promenade Traffic Impact Analysis*.

— — —. 2008a. *General Engineering Requirements Manual*.

— — —. 2008b. *Supplement to MAG Uniform Standard Specifications and Details for Public Works Construction*.

— — —. 2011a. *West Valley Charter School Traffic Impact Analysis*.

— — —. 2011b. *Annual Daily Traffic Flow Map*.

— — —. 2012a. *Transportation Plan Update*.

— — —. 2012b. *General Plan 2030*.

— — —. 2012c. *Coldwater Depot Traffic Impact Analysis*.

Federal Highway Administration (FHWA). 2009. *Manual on Uniform Traffic Control Devices*. May.

Flood Control District of Maricopa County (FCDMC). 2001. *Agua Fria Watercourse Master Plan*. November.

— — —. 2005a. *Durango Area Drainage Master Plan*. September.

— — —. 2005b. *Draft Candidate Assessment Report Durango Regional Conveyance Channel*. December.

— — —. 2013. *Design Concept Report for the Van Buren Street Channel 99th Avenue to Agua Fria River – 10 year Solution*. August.

Florida Department of Transportation. 2009. *Quality/Level of Service Handbook*.

Maricopa Association of Governments (MAG). 2003a. *Southwest Area Transportation Study*. Phoenix.

— — —. 2003b. *Regional Transportation Plan*. Phoenix.

— — —. 2010a. *Transportation Improvement Program Fiscal Year 2011 to 2015*. Phoenix.

— — —. 2013a. *Socioeconomic Projections of Population, Housing, and Employment by Municipal Planning Area and Regional Analysis Zone*. Phoenix.

— — —. 2013b. *Regional Travel Demand Model Results and Analysis*.

— — —. 2013c. *Draft Transportation Improvement Program Fiscal Year 2014 to 2018*. Phoenix.

— — —. 2014. *Regional Transportation Plan 2035*. Phoenix.

Natural Resources Conservation Service. 2002. “Soil Shrink/Swell Potential, Greater Phoenix Area.” <www.az.usda.gov>. Map updated January 11, 2002.

Transportation Research Board. 2000. *Highway Capacity Manual*. Washington, D.C.

— — —. 2010. *Highway Capacity Manual*. Washington, D.C.

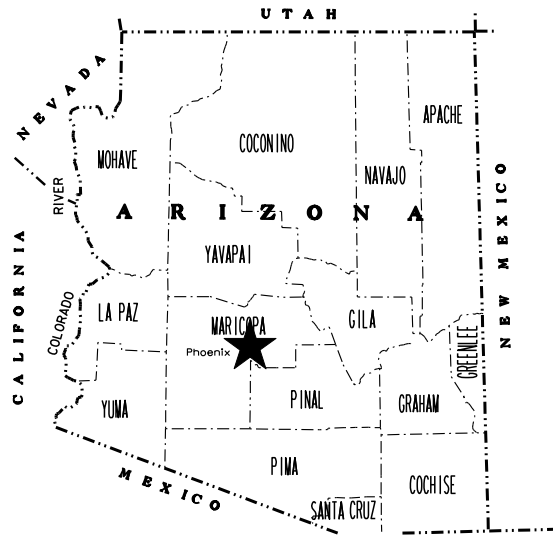
Valley Metro. 2013. “System Map.” <www.valleymetro.org/planning_your_trip/system_map> (accessed September 9, 2013).



APPENDIX A – PREFERRED ALTERNATIVE PLANS

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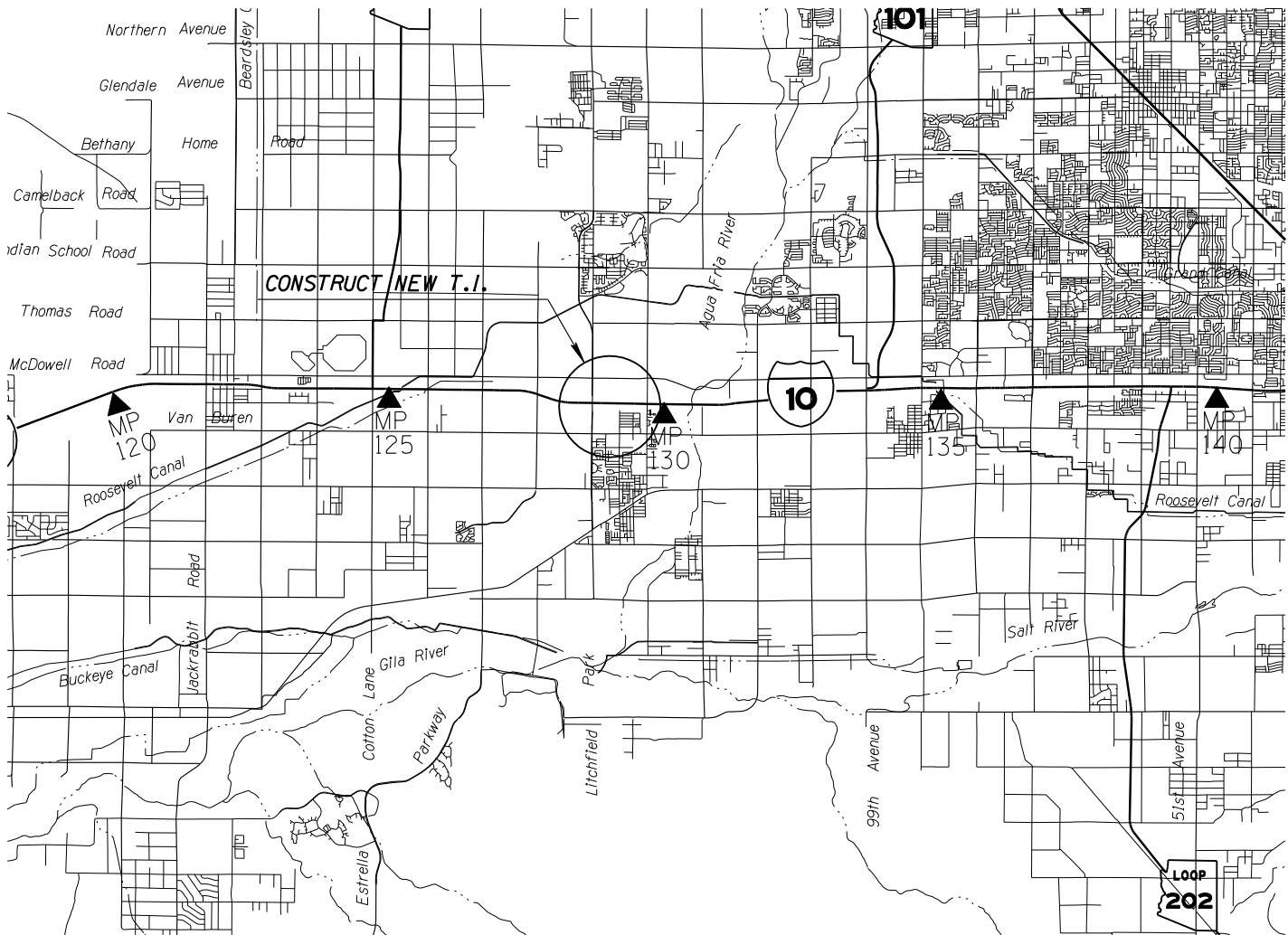
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STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
PROJECT PLANS

ADOT

STATE HIGHWAY
EHRENBERG-PHOENIX HIGHWAY
INTERSTATE 10



ALTERNATIVE 1
I-10 / FAIRWAY DRIVE T.I.
PROJECT NO. 010 MA 131 H8587 01 L
FEDERAL AID NO. 010-B(211)T

PREFERRED ALTERNATIVE

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
JENNIFER TOTH, P.E., STATE ENGINEER

AS BUILT DATA	AS BUILT DATE	OF
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DATE-

LOCATION-

REVISIONS-

FINISHED PLANS-

SURVEY NO.

DATE-

LOCATION-

REVISIONS-

FINISHED PLANS-

SURVEY NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	2	33	
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INDEX OF DRAWINGS

SHEET NO.	DWG. NO.	SHEET TITLE
<u>GENERAL</u>		
1		Face Sheet
2	G-01.01	Index of Drawings
3-6	G-02.01 to G-02.04	Typical Sections
<u>ROADWAY</u>		
7-9	C-01.01 to C-01.03	Geometric Sheets
10	C-02.01	Key Map
11-17	C-02.02 to C-02.08	Mainline Plan Sheets
18-20	C-03.01 to C-03.03	Ramp Profile Sheets

SHEET NO.	DWG. NO.	SHEET TITLE
<u>STRUCTURES</u>		
21	S-01.01	Structure Plan & Elevation Sheet
<u>TRAFFIC</u>		
22-33	T-01.01 to T-01.12	Guide Signing and Pavement Marking Plans

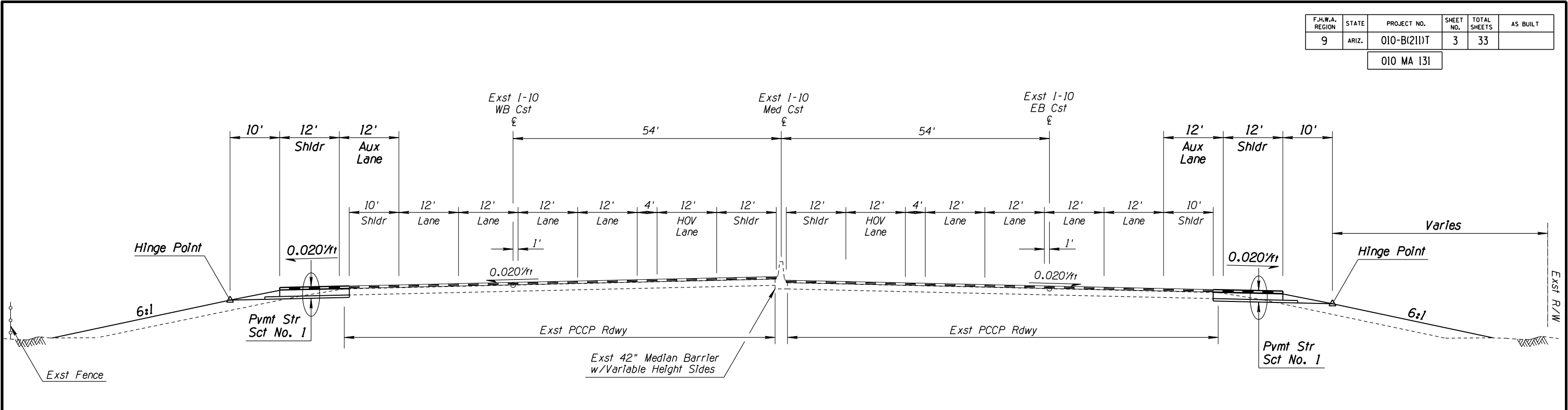
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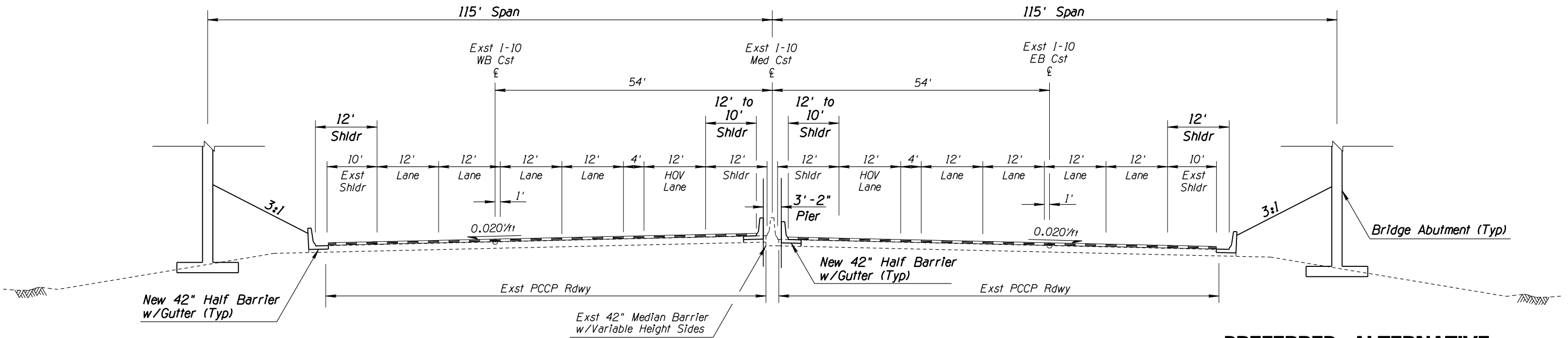
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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	3	33	

010 MA 131



TYPICAL SECTION
I-10 West of Fairway Drive T1



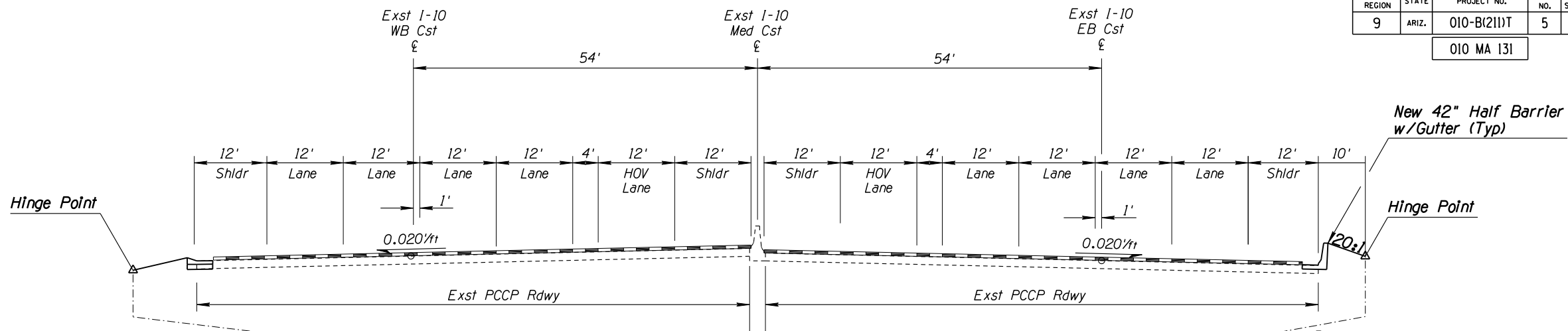
TYPICAL SECTION
I-10 Mainline At Fairway Drive Underpass

PREFERRED ALTERNATIVE

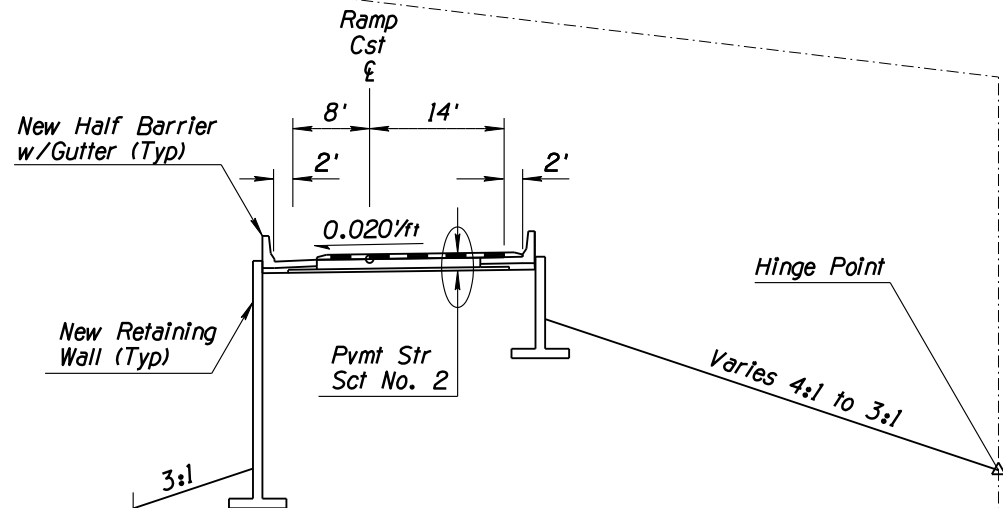
DESIGN	RK	DATE	09/14	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING
DRAWN	CADD	DATE	09/14		
CHECKED	RW	DATE	09/14		
DR Call BLUE STAKE CENTER two working days before you dig. 602-263-1100 Within Maricopa County AZ 85004 1-800-STAKE-IT (182-5348)				TYPICAL SECTIONS	
ROUTE		LOCATION		I-10 / FAIRWAY DRIVE T.I.	
TRACS NO. H8587 OIL				010-B(211)T	
				DWG NO. G-02.01	
				OF	

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

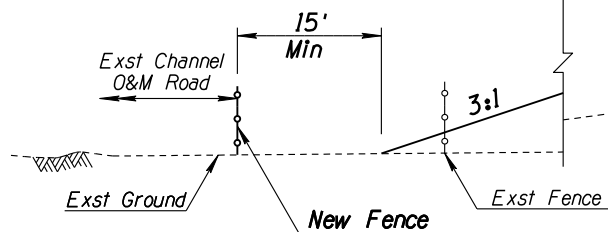
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	5	33	
010 MA 131					



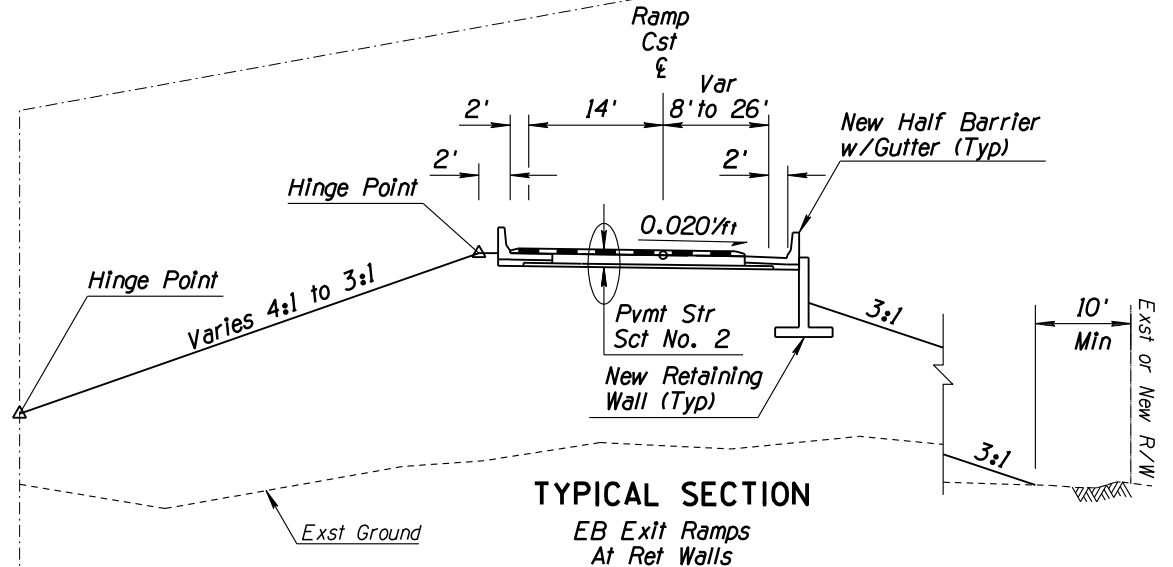
TYPICAL SECTION
I-10 At Ramps



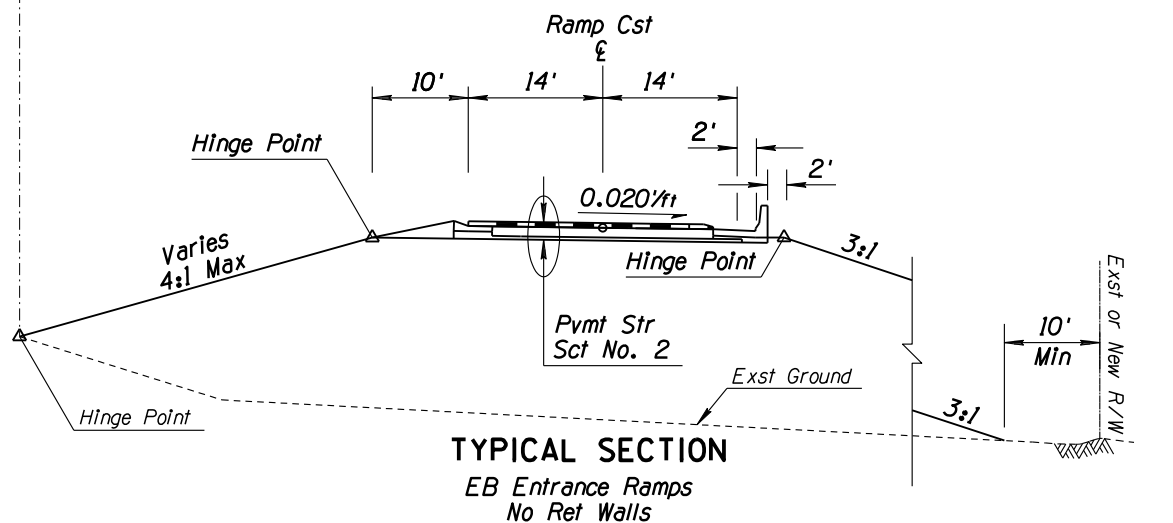
TYPICAL SECTION
WB Exit and Entrance Ramps
At Ret Walls



TYPICAL SECTION
WB Exit and Entrance Ramps
No Ret Walls



TYPICAL SECTION
EB Exit Ramps
At Ret Walls



TYPICAL SECTION
EB Entrance Ramps
No Ret Walls

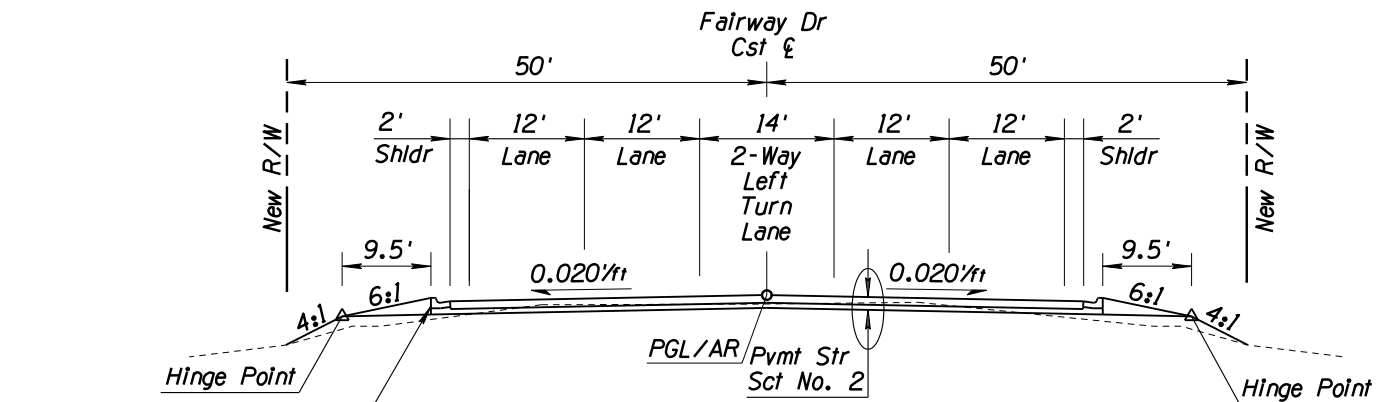
PREFERRED ALTERNATIVE

DESIGN	NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING
RK		09/14		
CADD		09/14		
RW		09/14		
TYPICAL SECTIONS				
ROUTE	LOCATION	I-10 / FAIRWAY DRIVE T.I.		
I-10				
TRACS NO. H8587 OIL		010-B(211)T		DWG NO. G-02.03 OF

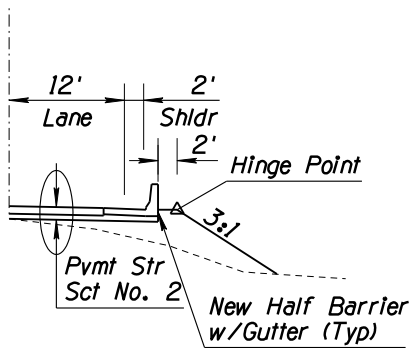
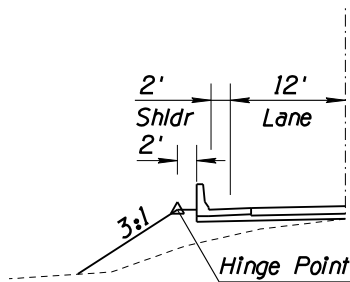


DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO. DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO.

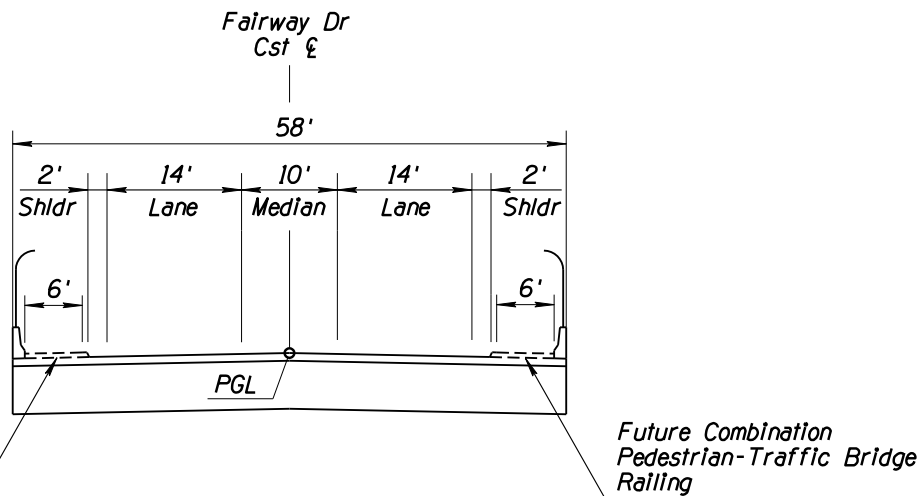
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	6	33	
010 MA 131					



TYPICAL SECTIONS - FAIRWAY DRIVE
Station 28+99.72 to Station 34+31.74




TYPICAL SECTIONS - FAIRWAY DRIVE
Station 34+31.74 to Station 37+31.97



TYPICAL SECTIONS - FAIRWAY DRIVE UNDERPASS

PREFERRED ALTERNATIVE

	NAME		DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING	
DESIGN	RK		09/14			
DRAWN	CADD		09/14			
CHECKED	RW		09/14			
 <div>1001 N.W. 30th & Cambridge Road Suite 100 Tucson, AZ 85705-0011 Tel: 520-527-7700</div>				TYPICAL SECTIONS		
ROUTE		LOCATION		I-10 / FAIRWAY DRIVE T.I.		
I-10				DWG NO. G-02.04		
TRACS NO. H8587 OIL				010-B(211)T		
				___ OF ___		



21 CURVE DATA
PI Sta 8+25.71

Main Curve
 $\Delta=6^{\circ}31'15''$
 $D=1^{\circ}00'08''$
 $R=5717.58'$
 $L=650.72'$
 $T=325.71'$
 $Ext=9.27'$

23 CURVE DATA
PI Sta 14+77.11

Main Curve
 $\Delta=6^{\circ}31'15''$
 $D=1^{\circ}00'00''$
 $R=5729.58'$
 $L=652.08'$
 $T=326.39'$
 $Ext=9.29'$

42 CURVE DATA
PI Sta 11+53.49

Main Curve
 $\Delta=4^{\circ}53'53''$
 $D=1^{\circ}15'00''$
 $R=4583.66'$
 $L=391.84'$
 $T=196.04'$
 $Ext=4.19'$

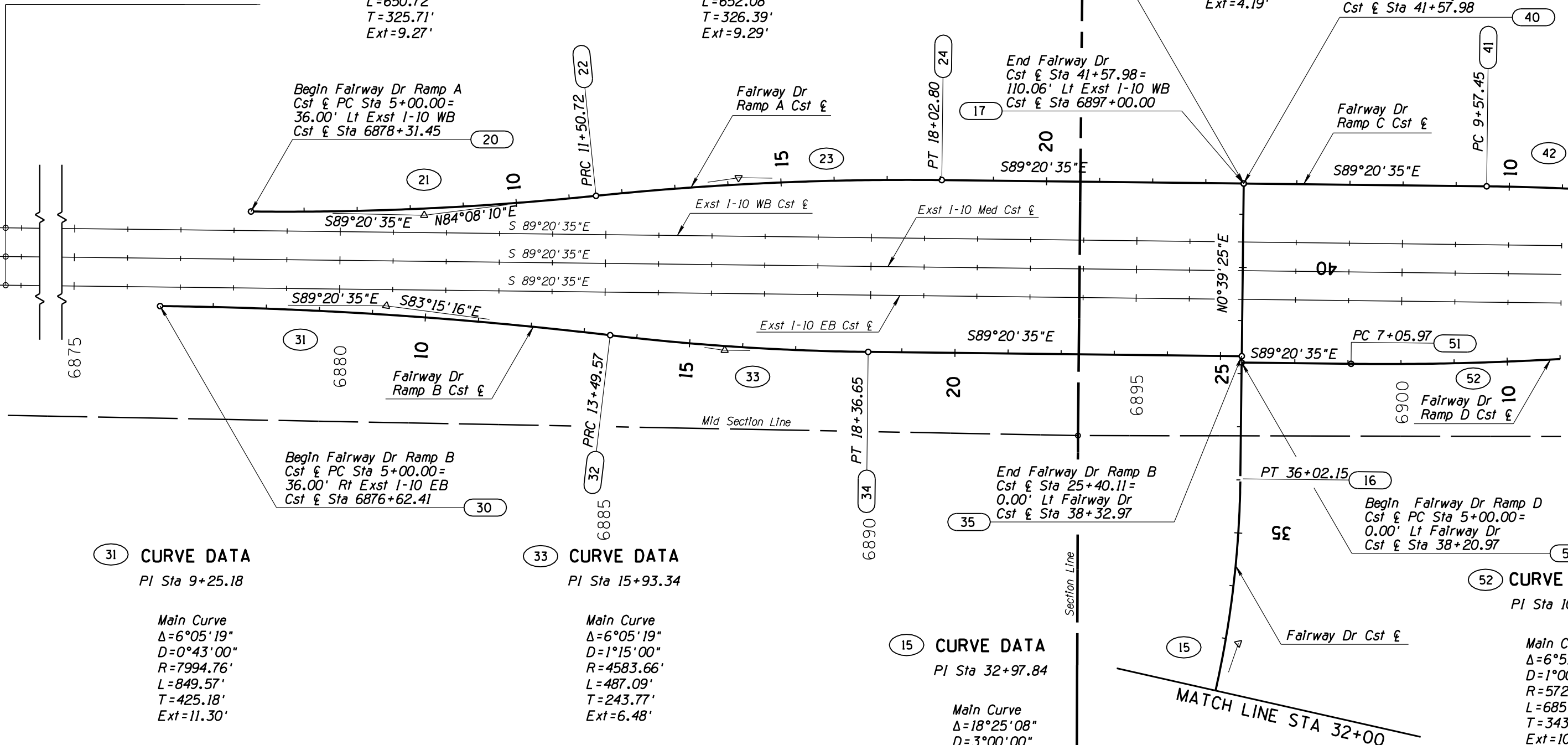
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	7	33	

010 MA 131



EQUATION

Exst I-10 Med Cst & Sta 6769+46.75 Bk =
Exst I-10 EB Cst & Sta 6769+46.39 Bk =
Exst I-10 WB Cst & Sta 6769+46.39 Bk =
Exst I-10 Med, EB & WB Cst &
POT Sta 6769+46.38 Ahd



31 CURVE DATA
PI Sta 9+25.18

Main Curve
 $\Delta=6^{\circ}05'19''$
 $D=0^{\circ}43'00''$
 $R=7994.76'$
 $L=849.57'$
 $T=425.18'$
 $Ext=11.30'$

33 CURVE DATA
PI Sta 15+93.34

Main Curve
 $\Delta=6^{\circ}05'19''$
 $D=1^{\circ}15'00''$
 $R=4583.66'$
 $L=487.09'$
 $T=243.77'$
 $Ext=6.48'$

15 CURVE DATA
PI Sta 32+97.84

Main Curve
 $\Delta=18^{\circ}25'08''$
 $D=3^{\circ}00'00''$
 $R=1909.86'$
 $L=613.96'$
 $T=309.65'$
 $Ext=24.94'$

52 CURVE DATA
PI Sta 10+49.11

Main Curve
 $\Delta=6^{\circ}51'17''$
 $D=1^{\circ}00'00''$
 $R=5729.58'$
 $L=685.47'$
 $T=343.14'$
 $Ext=10.27'$

PREFERRED ALTERNATIVE

DESIGN	NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING
DRAWN	RK	09/14		
CHECKED	CADD	09/14		
	RW	09/14		
ROUTE			LOCATION	DWG NO. C-01.01
I-10			I-10 / FAIRWAY DRIVE T.I.	
TRACS NO. H8587 OIL			010-B(211)T	OF



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

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	8	33	

010 MA 131

42 CURVE DATA
PI Sta 11+53.49

Main Curve
 $\Delta=4^{\circ}53'53''$
 $D=1^{\circ}15'00''$
 $R=4583.66'$
 $L=391.84'$
 $T=196.04'$
 $Ext=4.19'$

45 CURVE DATA
PI Sta 22+09.60

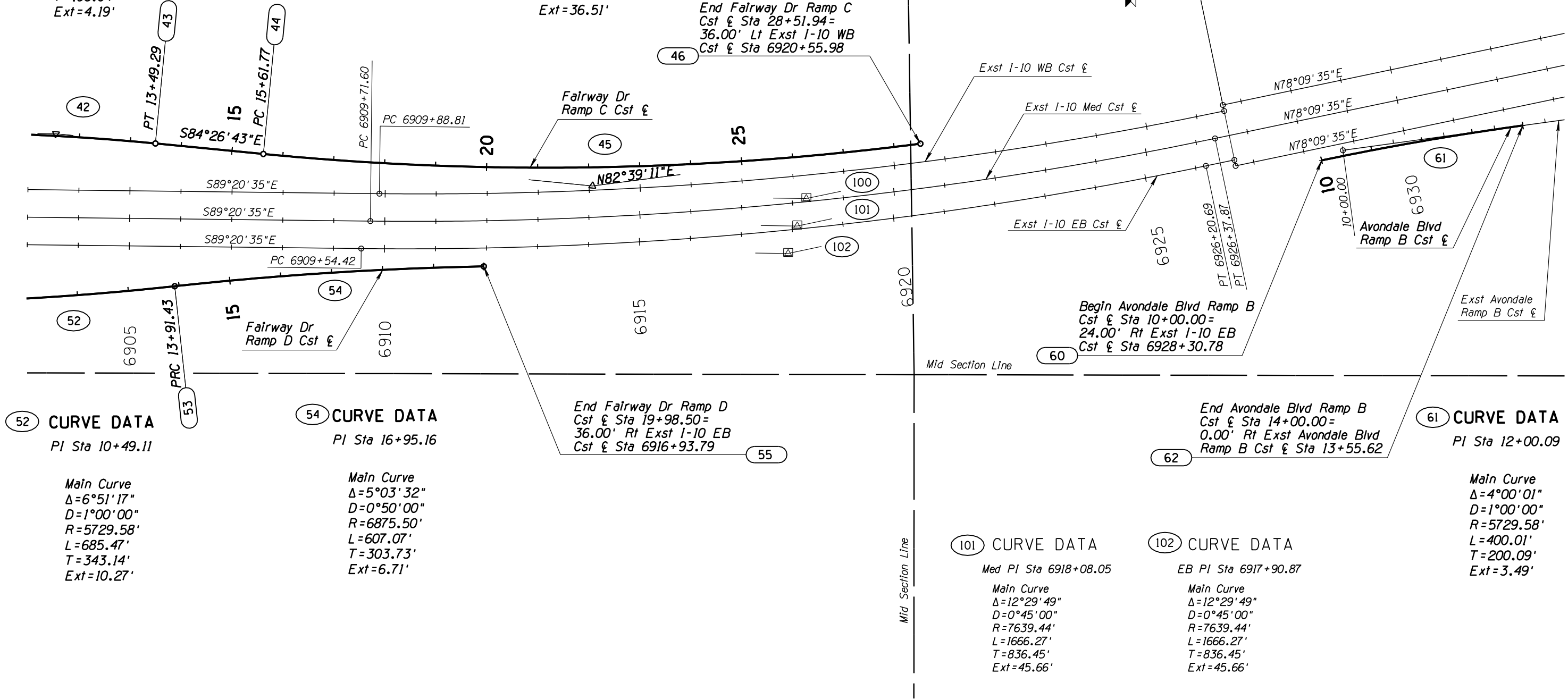
Main Curve
 $\Delta=12^{\circ}54'06''$
 $D=1^{\circ}00'00''$
 $R=5729.58'$
 $L=1290.17'$
 $T=647.83'$
 $Ext=36.51'$

100 CURVE DATA
WB PI Sta 6918+25.26

Main Curve
 $\Delta=12^{\circ}29'49''$
 $D=0^{\circ}45'00''$
 $R=7639.44'$
 $L=1666.27'$
 $T=836.45'$
 $Ext=45.66'$

EQUATION

Exst I-10 Med Cst & Sta 6926+66.34 Bk =
Exst I-10 EB Cst & Sta 6926+77.63 Bk =
Exst I-10 WB Cst & Sta 6926+55.07 Bk =
Exst I-10 Med, EB & WB Cst &
POT Sta 6926+63.71 Ahd



52 CURVE DATA
PI Sta 10+49.11

Main Curve
 $\Delta=6^{\circ}51'17''$
 $D=1^{\circ}00'00''$
 $R=5729.58'$
 $L=685.47'$
 $T=343.14'$
 $Ext=10.27'$

54 CURVE DATA
PI Sta 16+95.16

Main Curve
 $\Delta=5^{\circ}03'32''$
 $D=0^{\circ}50'00''$
 $R=6875.50'$
 $L=607.07'$
 $T=303.73'$
 $Ext=6.71'$

End Fairway Dr Ramp D
Cst & Sta 19+98.50 =
36.00' Rt Exst I-10 EB
Cst & Sta 6916+93.79

101 CURVE DATA
Med PI Sta 6918+08.05

Main Curve
 $\Delta=12^{\circ}29'49''$
 $D=0^{\circ}45'00''$
 $R=7639.44'$
 $L=1666.27'$
 $T=836.45'$
 $Ext=45.66'$


102 CURVE DATA
EB PI Sta 6917+90.87

Main Curve
 $\Delta=12^{\circ}29'49''$
 $D=0^{\circ}45'00''$
 $R=7639.44'$
 $L=1666.27'$
 $T=836.45'$
 $Ext=45.66'$

61 CURVE DATA
PI Sta 12+00.09

Main Curve
 $\Delta=4^{\circ}00'01''$
 $D=1^{\circ}00'00''$
 $R=5729.58'$
 $L=400.01'$
 $T=200.09'$
 $Ext=3.49'$

PREFERRED ALTERNATIVE

DESIGN	RK	DATE	09/14	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING
DRAWN	CADD	DATE	09/14		
CHECKED	RW	DATE	09/14		
				GEOMETRIC SHEET	
ROUTE	I-10			I-10 / FAIRWAY DRIVE T.I.	DWG NO. C-01.02
TRACS NO. H8587 OIL				010-B(211)T	OF

Call BLUE STAKE CENTER two
working days before you dig.
602-263-1100
Within Maricopa County
AZ
1-800-STAKE-IT
(182-5348)

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	9	33	

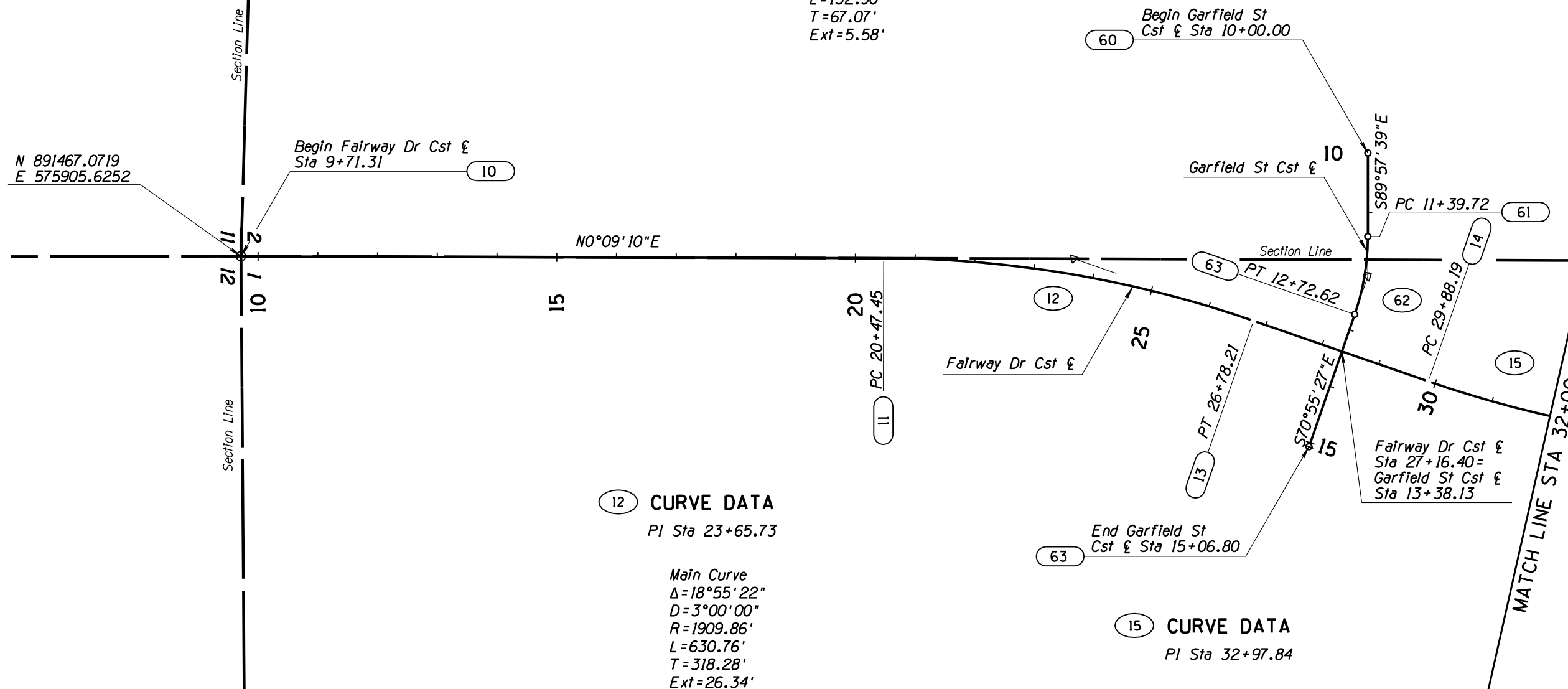
010 MA 131



(62) CURVE DATA

Pl Sta 12+06.79

Main Curve
 $\Delta = 19^{\circ}02'12''$
 $D = 14^{\circ}19'26''$
 $R = 400.00'$
 $L = 132.90'$
 $T = 67.07'$
 $Ext = 5.58'$



12 CURVE DATA

Pl Sta 23+65.73


Main Curve
 $\Delta = 18^\circ 55' 22''$
 $D = 3^\circ 00' 00''$
 $R = 1909.86'$
 $L = 630.76'$
 $T = 318.28'$
 $Ext = 26.34'$

15 CURVE DATA

PI Sta 32+97.84

Main Curve
 $\Delta = 18^\circ 25' 08''$
 $D = 3^\circ 00' 00''$
 $R = 1909.86'$
 $L = 613.96'$
 $T = 309.65'$
 $Ext = 24.94'$

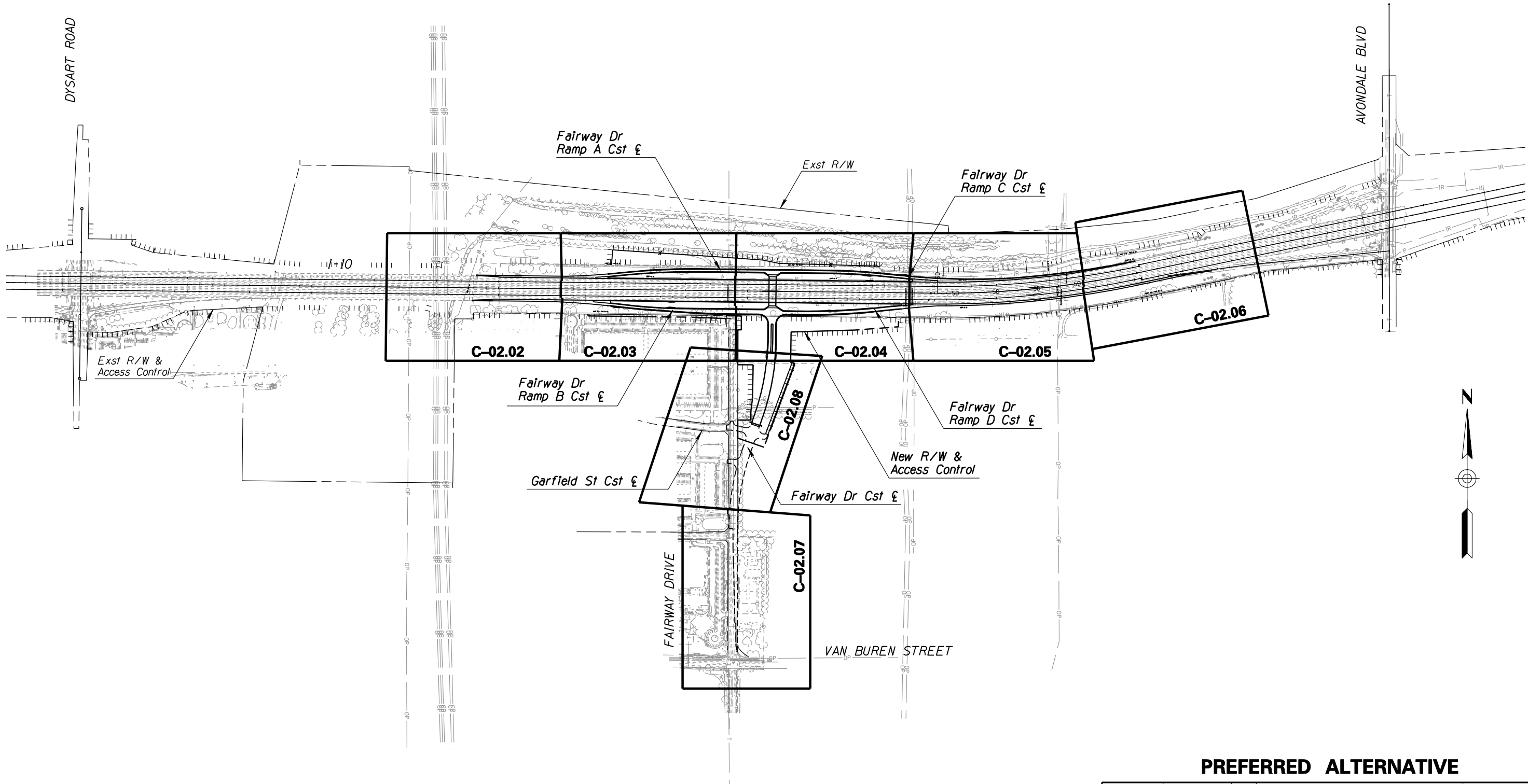
PREFERRED ALTERNATIVE

		NAME		DATE		ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES		PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING			
DESIGN		RK		09/14		GEOMETRIC SHEET					
DRAWN		CADD		09/14							
CHECKED		RW		09/14							
 <div>HDR, INC. 2010 N. GILBERT AVE. SUITE 300 PHOENIX, AZ 85028-0811 TEL: 602.952.0776</div>											
ROUTE		LOCATION									
I-10		I-10 / FAIRWAY DRIVE T.I.								DWG NO. C-01.03	
TRACS NO. H8587 OIL						010-B(211)T		___ OF ___			




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

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	10	33	
010 MA 131					



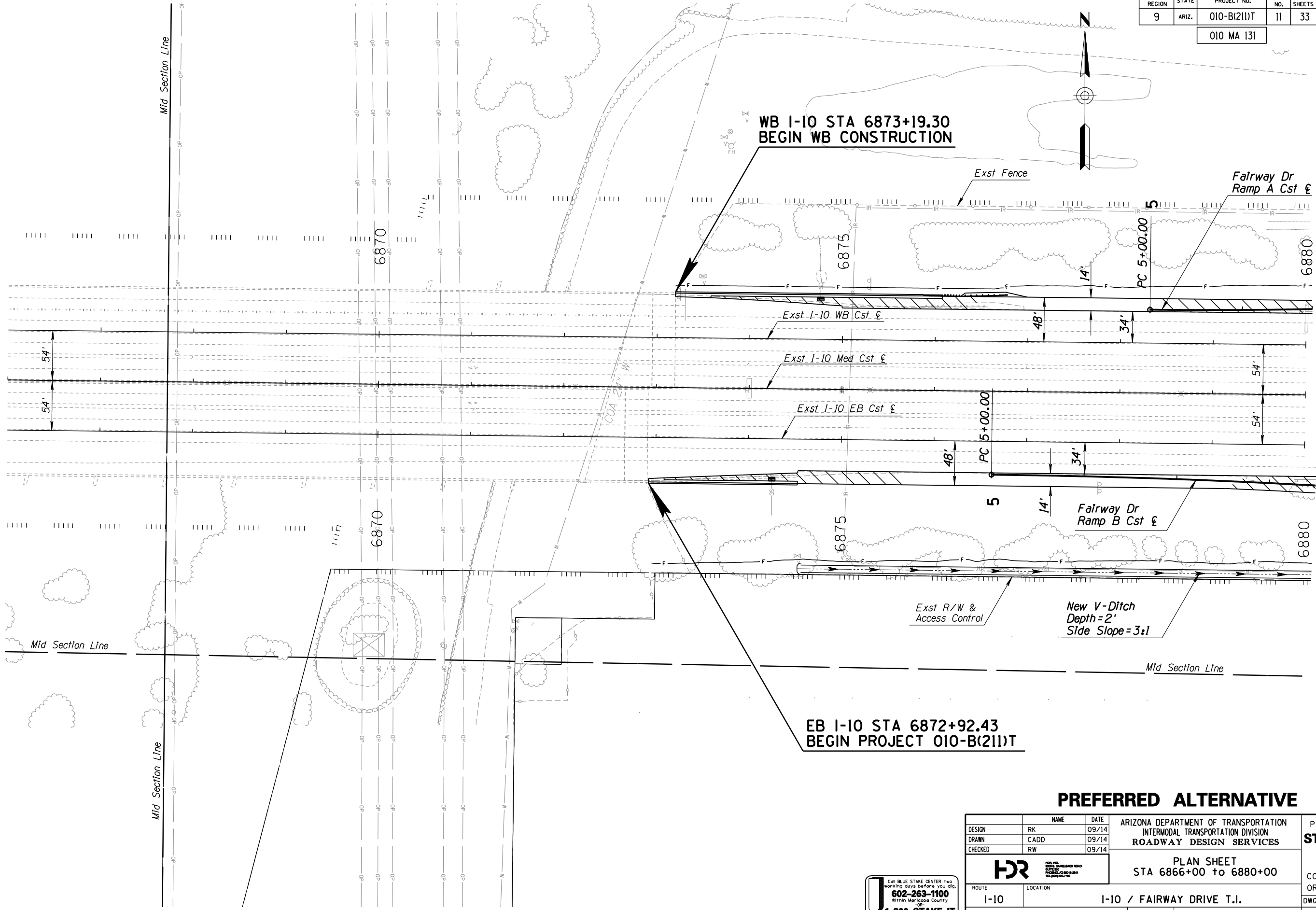
PREFERRED ALTERNATIVE

		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING	
DESIGN	RK		09/14			
DRAWN	CADD		09/14			
CHECKED	RW		09/14			
 <div>HDR, INC. 500 E. CAMELBACK ROAD SUITE 200 PHOENIX, AZ 85012-1811 TEL: 602.452-5788</div>				KEY MAP		
ROUTE		LOCATION		I-10 / FAIRWAY DRIVE T.I.		
I-10						
TRACS NO. H8587 OIL				O10-B(211)T		___ OF ___




F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	11	33	

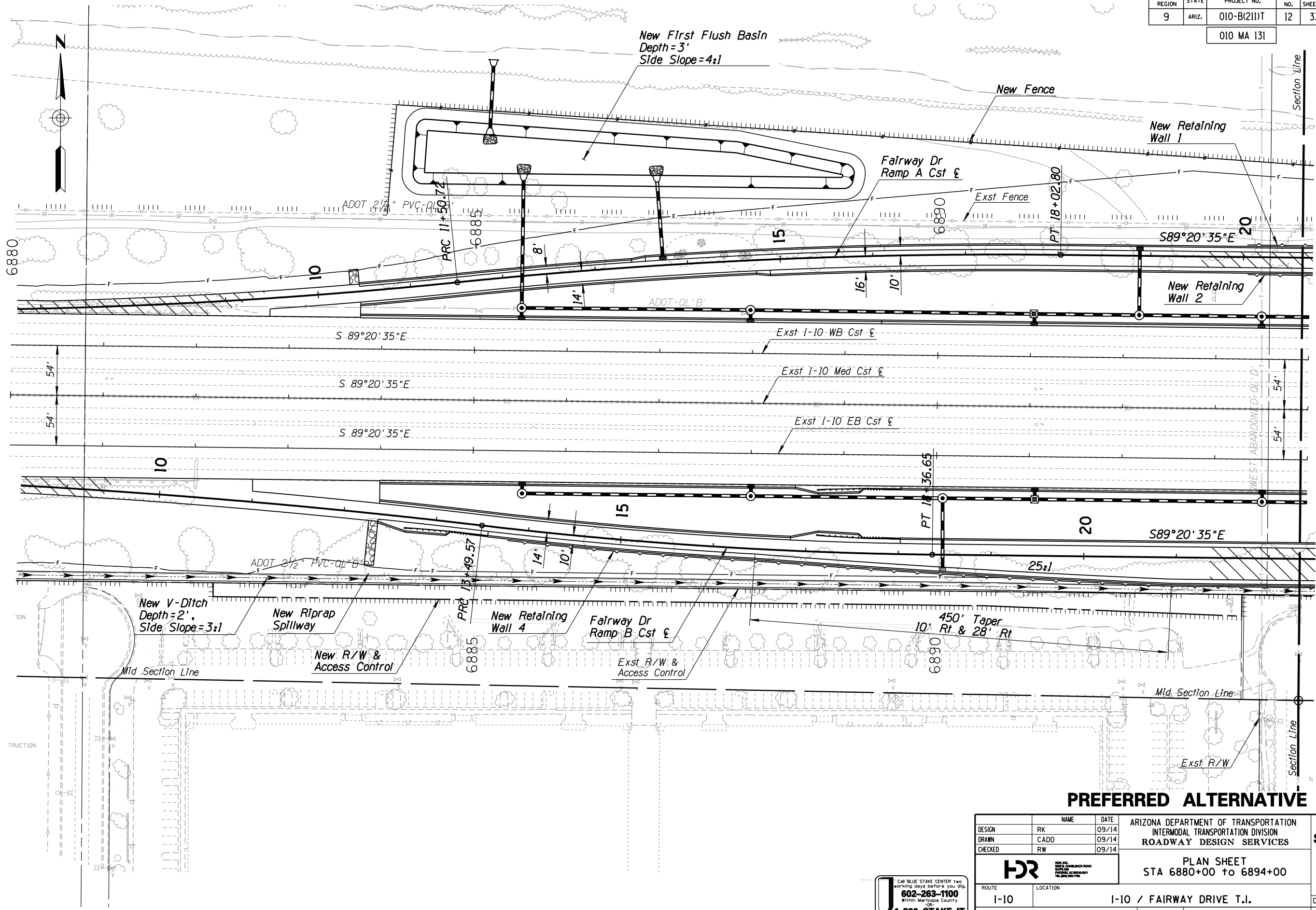
010 MA 131



PREFERRED ALTERNATIVE

		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING DWG NO. C-02.02	
DESIGN	RK		09/14			
DRAWN	CADD		09/14			
CHECKED	RW		09/14			
<div><div>HDR, INC. 5005 E. CAMELBACK ROAD SUITE 200 PHOENIX, AZ 85018-1911 TEL: 602.952-5788</div></div>				PLAN SHEET STA 6866+00 to 6880+00		
ROUTE		LOCATION				
I-10		I-10 / FAIRWAY DRIVE T.I.				
TRACS NO. H8587 OIL			010-B(211)T		___ OF ___	






F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	12	33	

010 MA 131

PREFERRED ALTERNATIVE

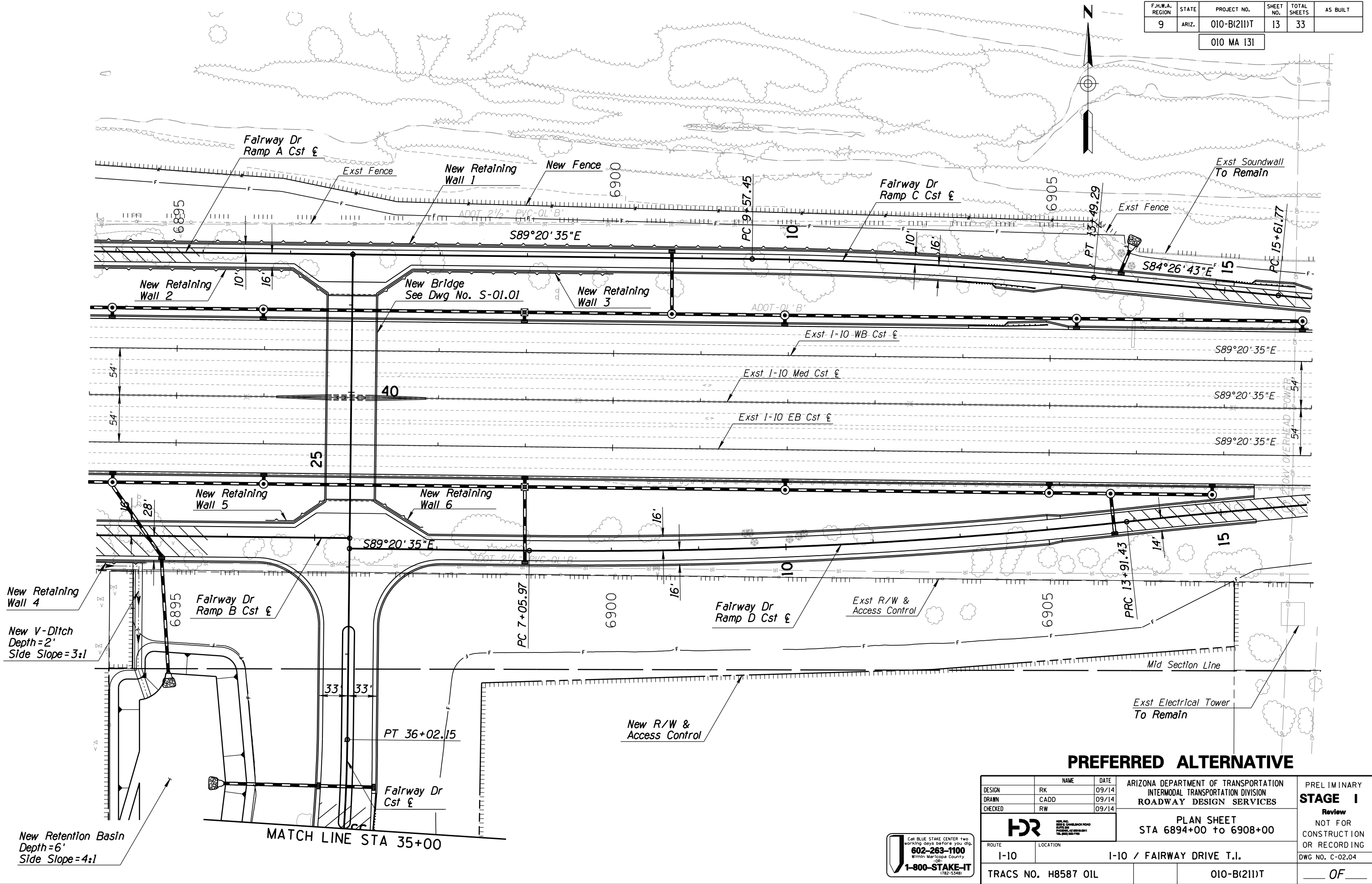
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DESIGN	RK		09/14			
DRAWN	CADD		09/14			
CHECKED	RW		09/14			
<div><div>HDR, INC. 5000 N. GAVELAND ROAD PHOENIX, AZ 85018-1991 TEL: 602.425.7766</div></div>				PLAN SHEET STA 6880+00 to 6894+00		
ROUTE		LOCATION				
I-10		I-10 / FAIRWAY DRIVE T.I.				
TRACS NO. H8587 OIL				010-B(211)T		



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

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	13	33	

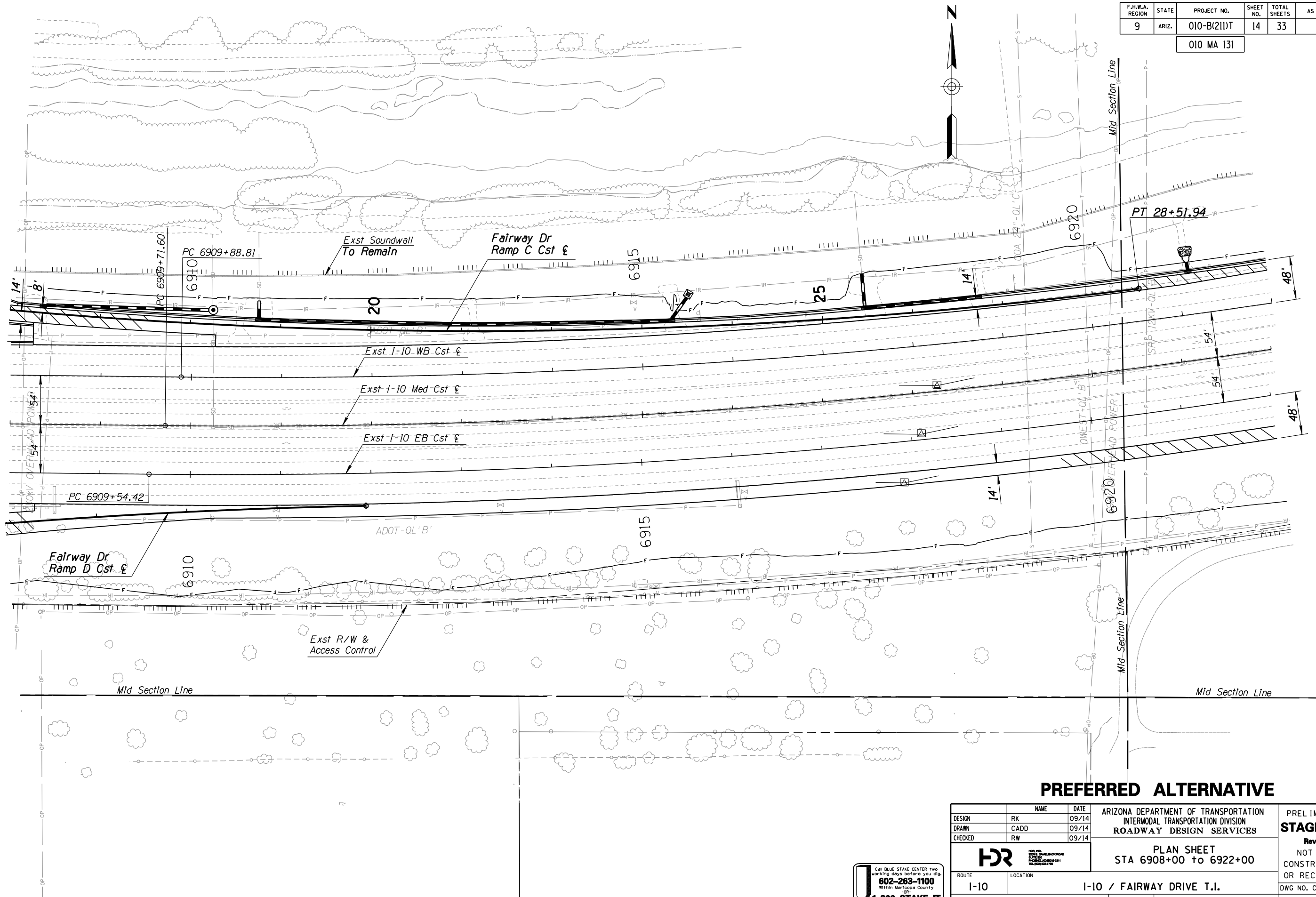
010 MA 131



PREFERRED ALTERNATIVE


DESIGN	RK	DATE	09/14	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING
DRAWN	CADD	DATE	09/14		
CHECKED	RW	DATE	09/14		
PLAN SHEET STA 6894+00 to 6908+00					
ROUTE		LOCATION			
I-10		I-10 / FAIRWAY DRIVE T.I.			
TRACS NO. H8587 OIL				010-B(211)T	
				OF	





F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	14	33	
010 MA 131					

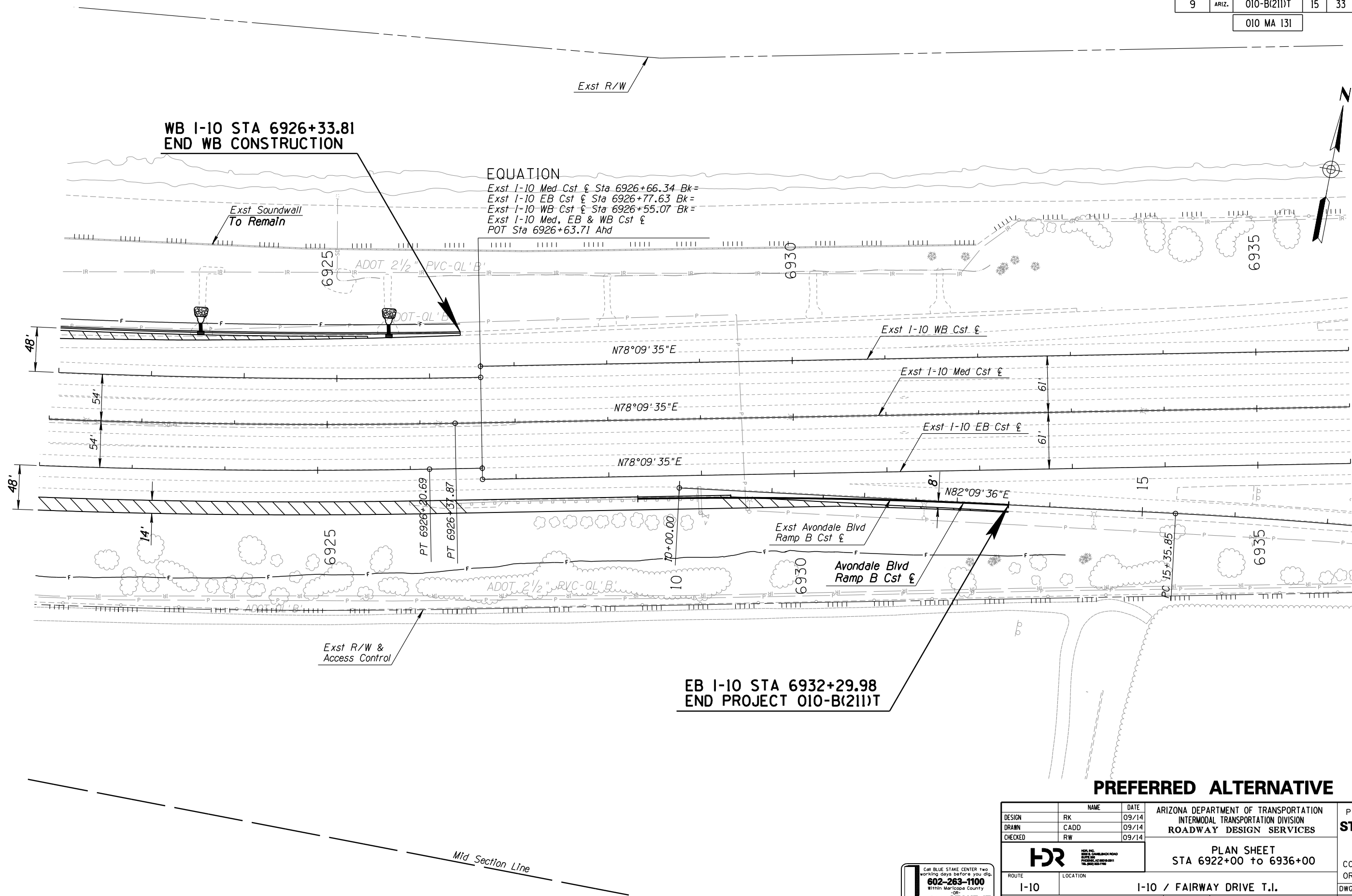
PREFERRED ALTERNATIVE

		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING DWG NO. C-02.05 ___ <i>OF</i> ___	
DESIGN	RK		09/14			
DRAWN	CADD		09/14			
CHECKED	RW		09/14			
<div><div>HDR, INC. 5000 N. CAMPBELL ROAD MESA, AZ 85205-5000 TEL: 602.655-7766</div></div>				PLAN SHEET STA 6908+00 to 6922+00		
ROUTE		LOCATION				
I-10		I-10 / FAIRWAY DRIVE T.I.				
TRACS NO. H8587 OIL				010-B(211)T		



F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	15	33	

010 MA 131



PREFERRED ALTERNATIVE

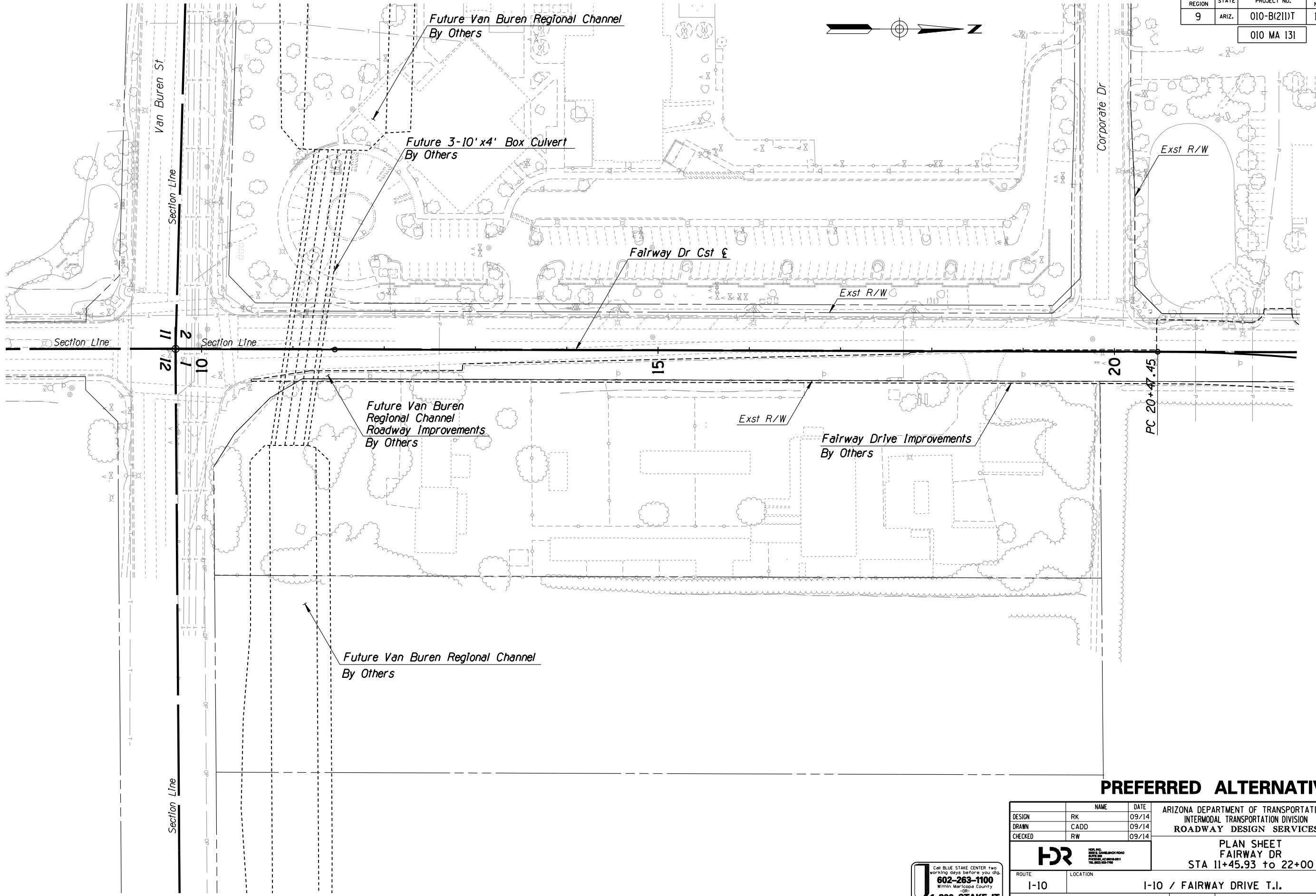
DESIGN	RK	DATE	09/14	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING
DRAWN	CADD	DATE	09/14		
CHECKED	RW	DATE	09/14		
PLAN SHEET STA 6922+00 to 6936+00				DWG NO. C-02.06	
ROUTE		LOCATION		I-10 / FAIRWAY DRIVE T.I.	
I-10				010-B(211)T	
TRACS NO. H8587 OIL				OF	




SURVEY NO. FINISHED PLANS REVISIONS LOCATION DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	16	33	

010 MA 131



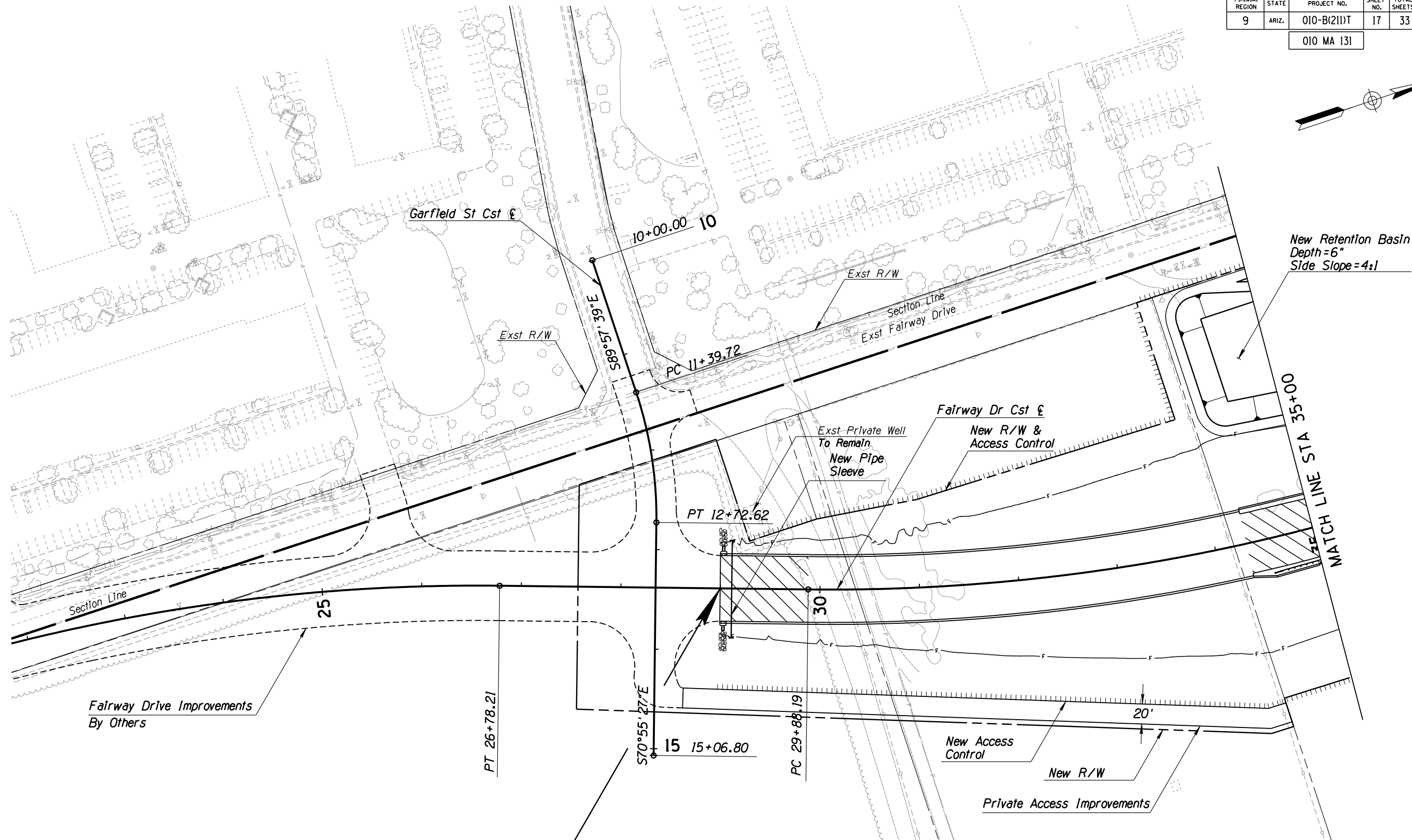
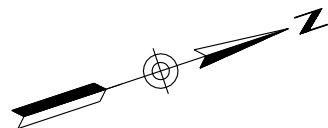
PREFERRED ALTERNATIVE

		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING DWG NO. C-02.07
DESIGN		RK	09/14		
DRAWN		CADD	09/14		
CHECKED		RW	09/14	PLAN SHEET FAIRWAY DR STA 11+45.93 to 22+00	
 HDR, INC. 8001 N. CHANDLER ROAD SUITE 100 CHANDLER, AZ 85226-3911 TEL: 480-455-7700					
ROUTE	LOCATION				
I-10		I-10 / FAIRWAY DRIVE T.I.			
TRACS NO. H8587 OIL			010-B(211)T		___ OF ___




F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	17	33	

010 MA 131



FAIRWAY DRIVE STA 28+99.72
BEGIN PROJECT 010-B(211)T

PREFERRED ALTERNATIVE

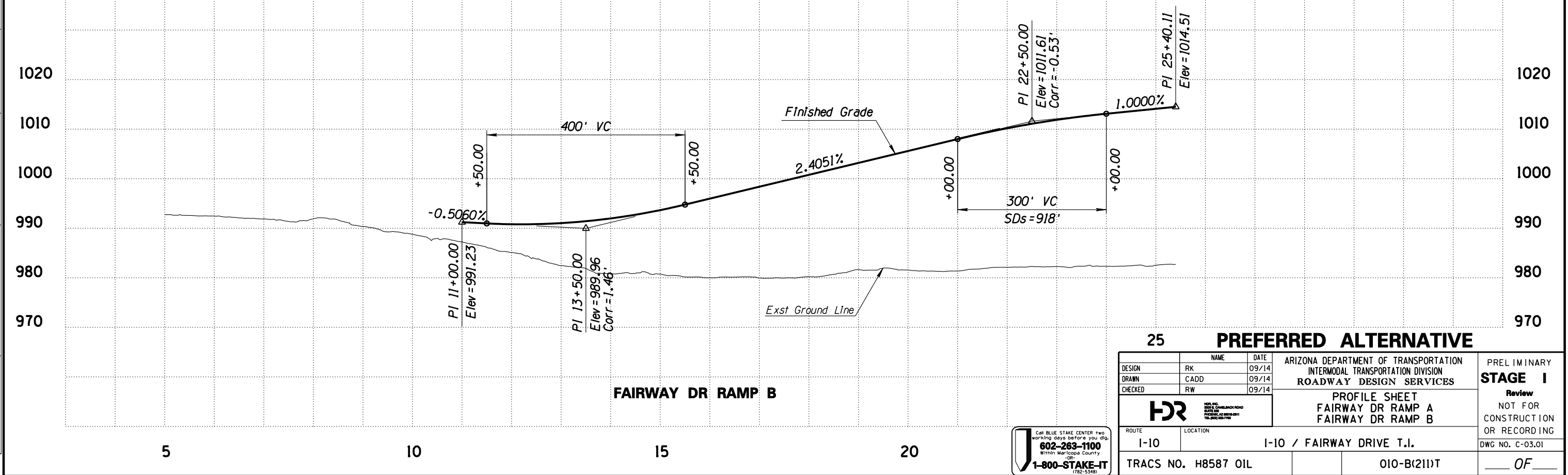
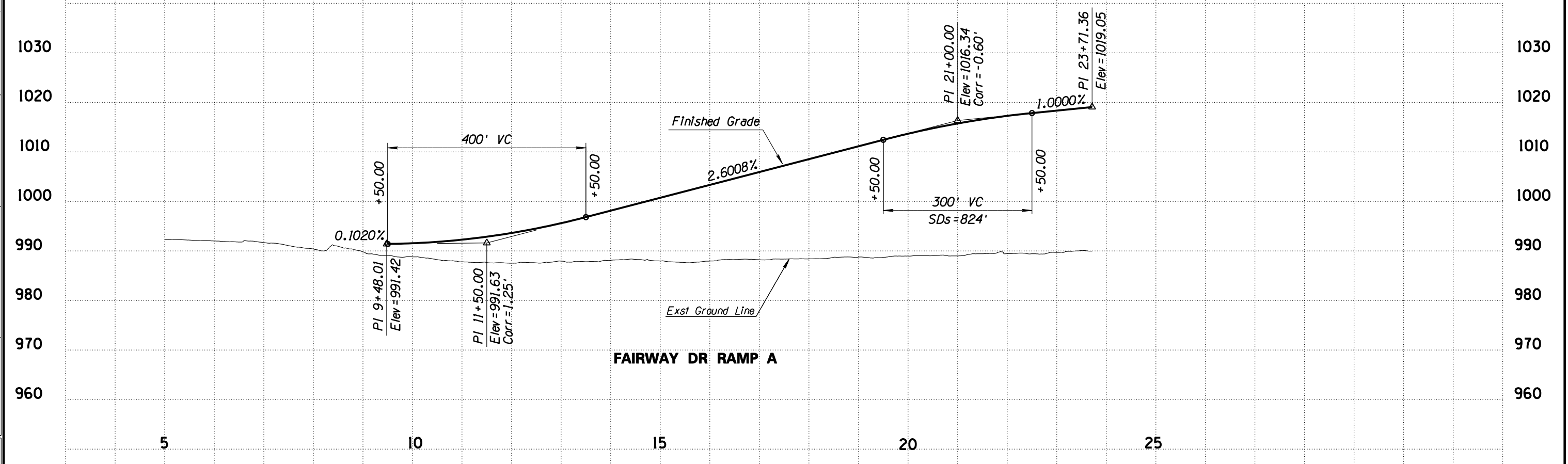
		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING DWG NO. C-02.08
DESIGN		RK	09/14		
DRAWN		CADD	09/14		
CHECKED		RW	09/14		
		<small>HDR, INC. 8001 N. GAVELAND ROAD SUITE 100 PHOENIX, AZ 85028-2811 TEL: 602-452-7700</small>		PLAN SHEET FAIRWAY DR STA 23+00 TO 35+00	
ROUTE		LOCATION			
I-10		I-10 / FAIRWAY DRIVE T.I.			
TRACS NO. H8587 OIL				010-B(211)T	___ OF ___




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

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	18	33	

010 MA 131



25 **PREFERRED ALTERNATIVE**

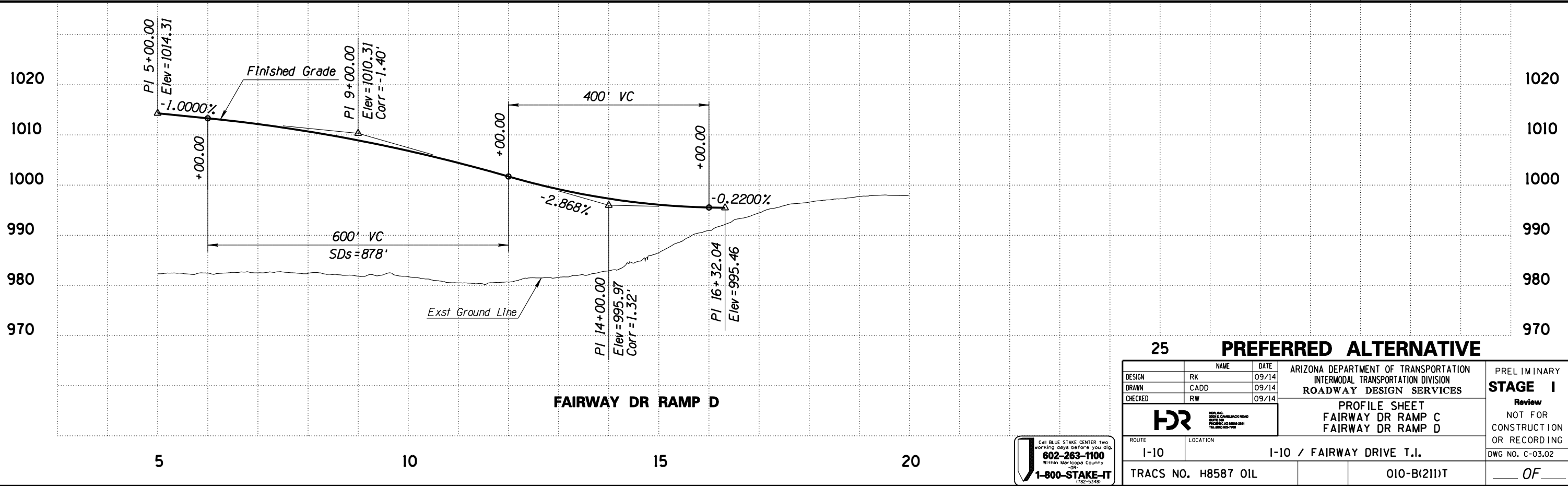
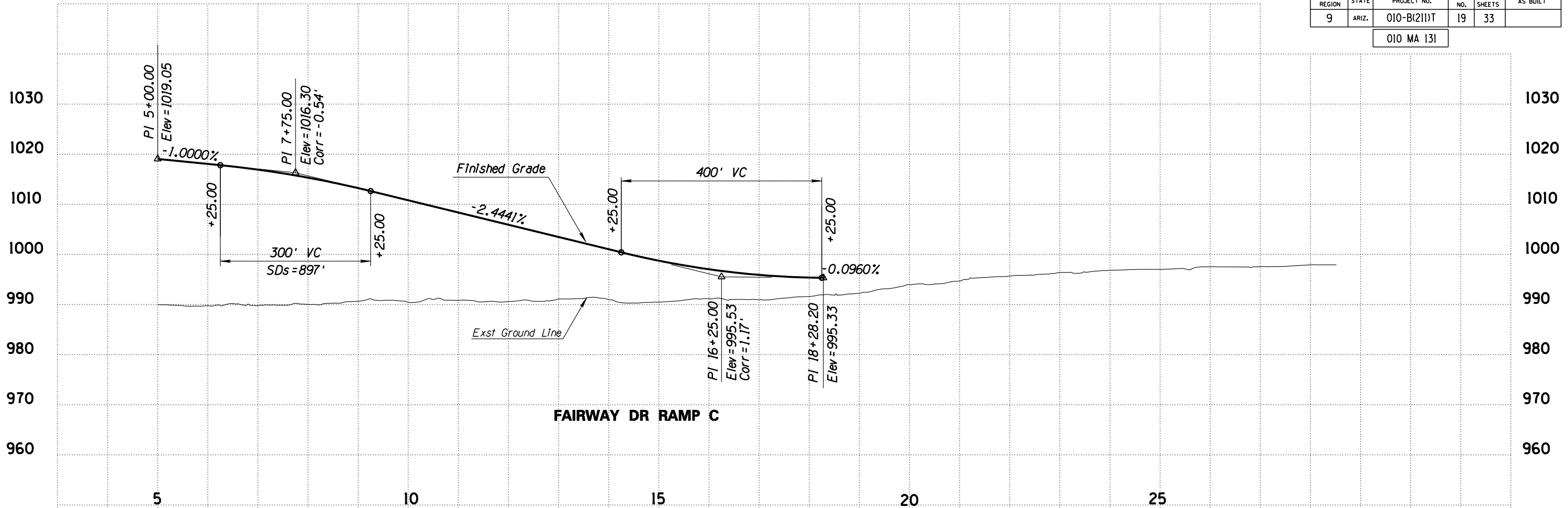
DESIGN	RK	DATE	09/14	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING
DRAWN	CADD	DATE	09/14		
CHECKED	RW	DATE	09/14		
				PROFILE SHEET FAIRWAY DR RAMP A FAIRWAY DR RAMP B	
ROUTE		LOCATION		I-10 / FAIRWAY DRIVE T.I.	
I-10		I-10 / FAIRWAY DRIVE T.I.		DWG NO. C-03.01	
TRACS NO. H8587 OIL				010-B(211)T	
				OF	

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

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	19	33	

010 MA 131



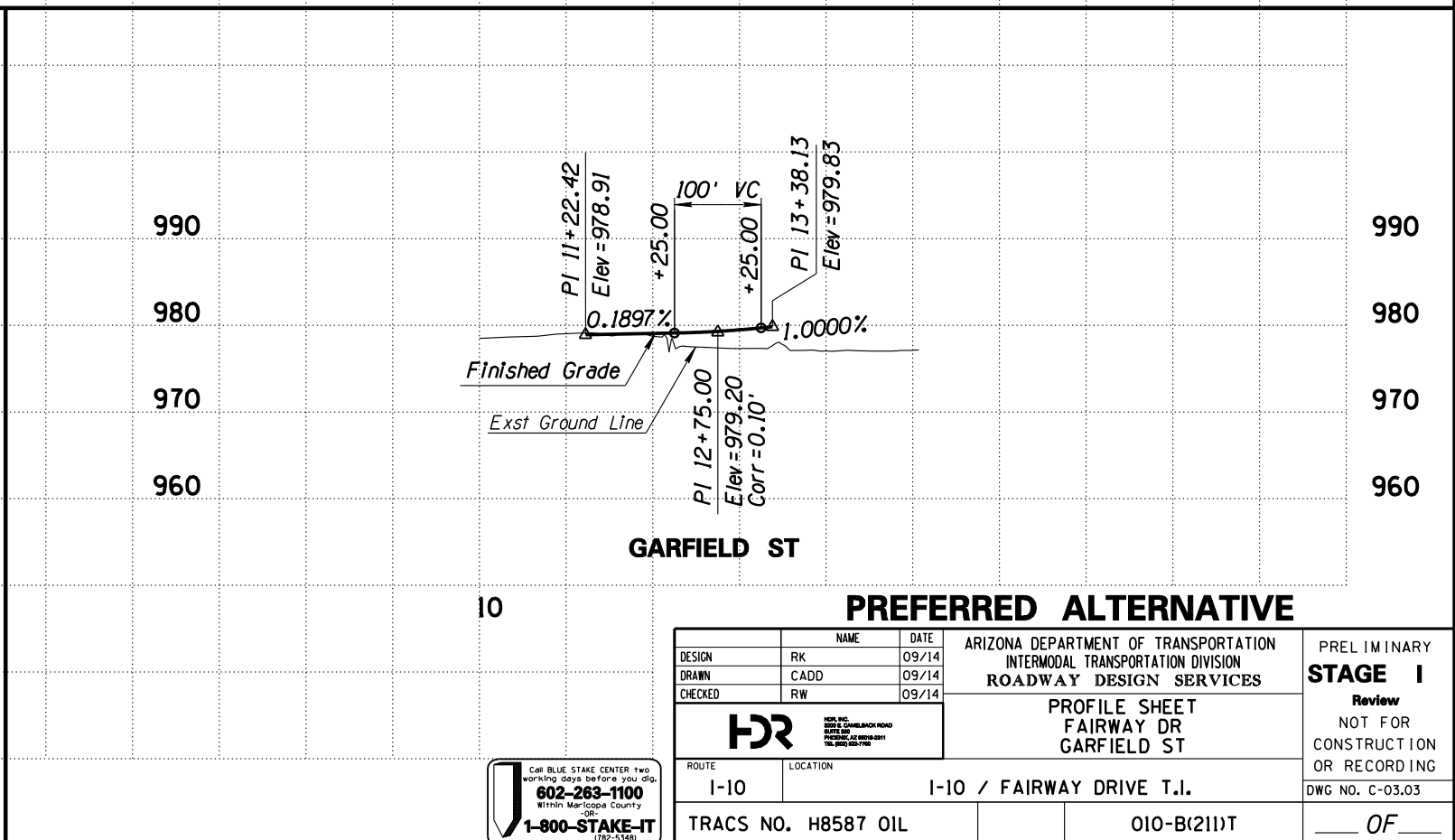
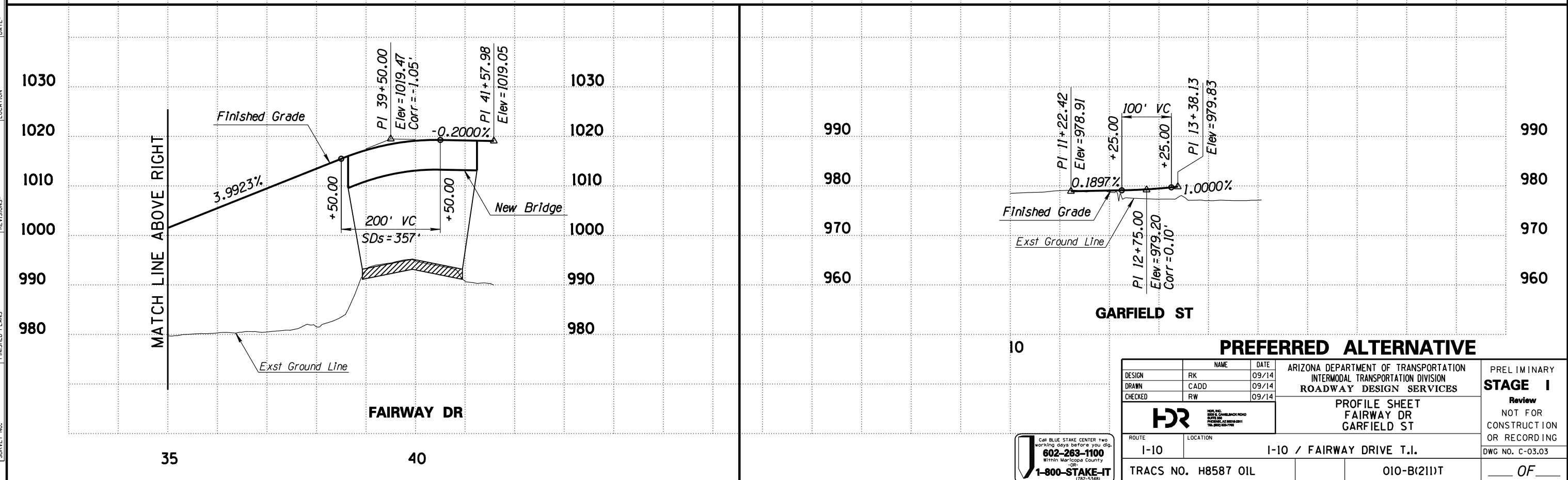
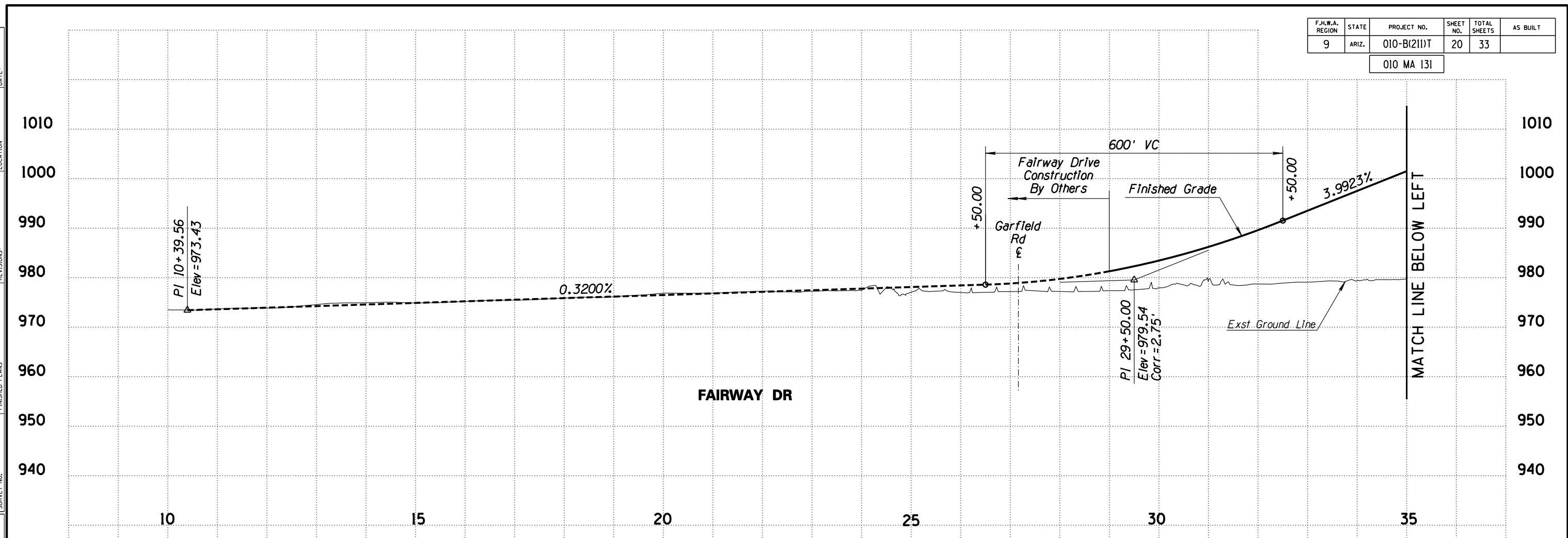
25 **PREFERRED ALTERNATIVE**

DESIGN	RK	DATE	09/14	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING
DRAWN	CADD	DATE	09/14		
CHECKED	RW	DATE	09/14		
				PROFILE SHEET FAIRWAY DR RAMP C FAIRWAY DR RAMP D	
ROUTE	I-10			I-10 / FAIRWAY DRIVE T.I.	
TRACS NO. H8587 OIL				010-B(211)T	
				OF	




F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	20	33	

010 MA 131

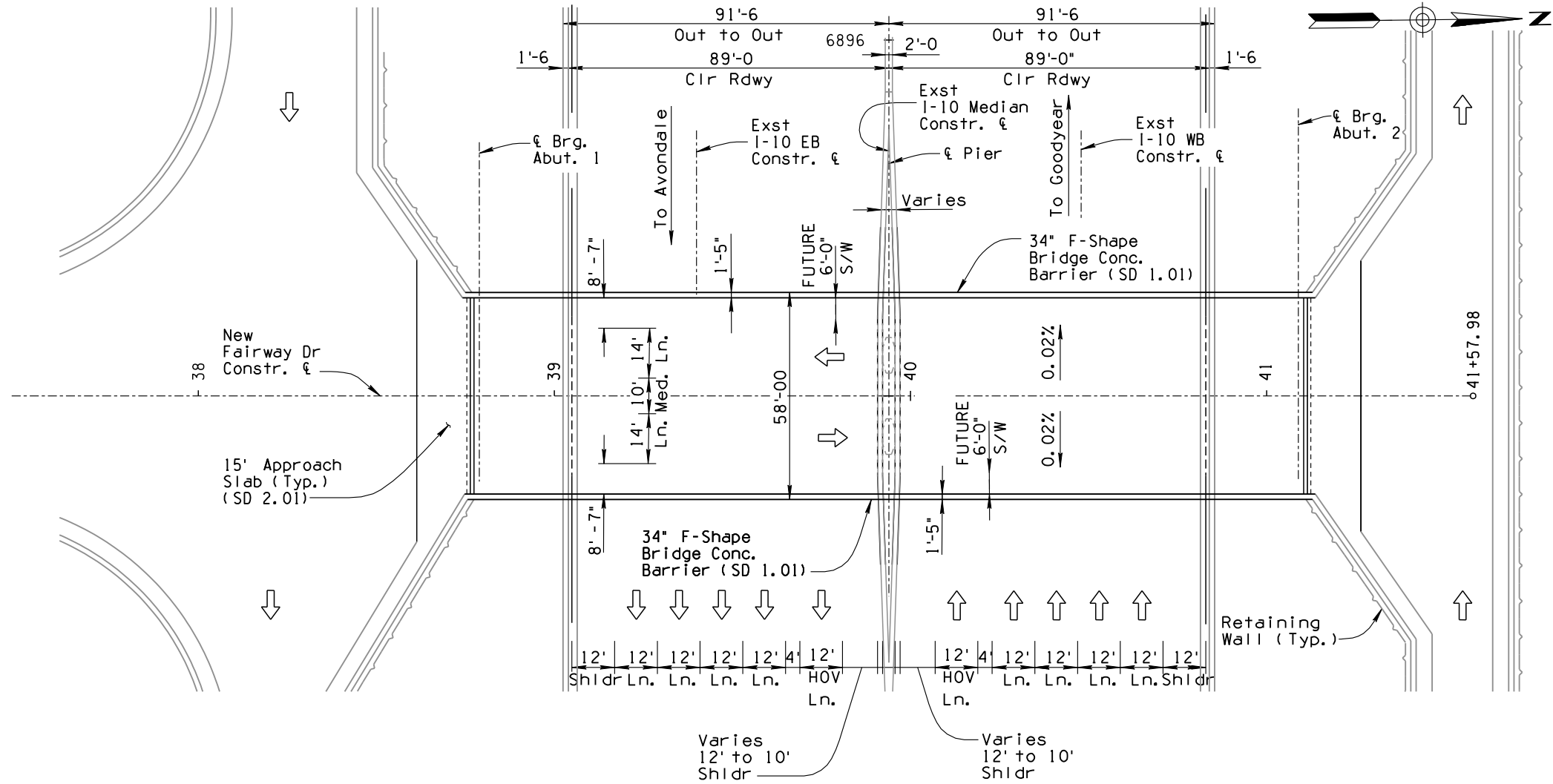


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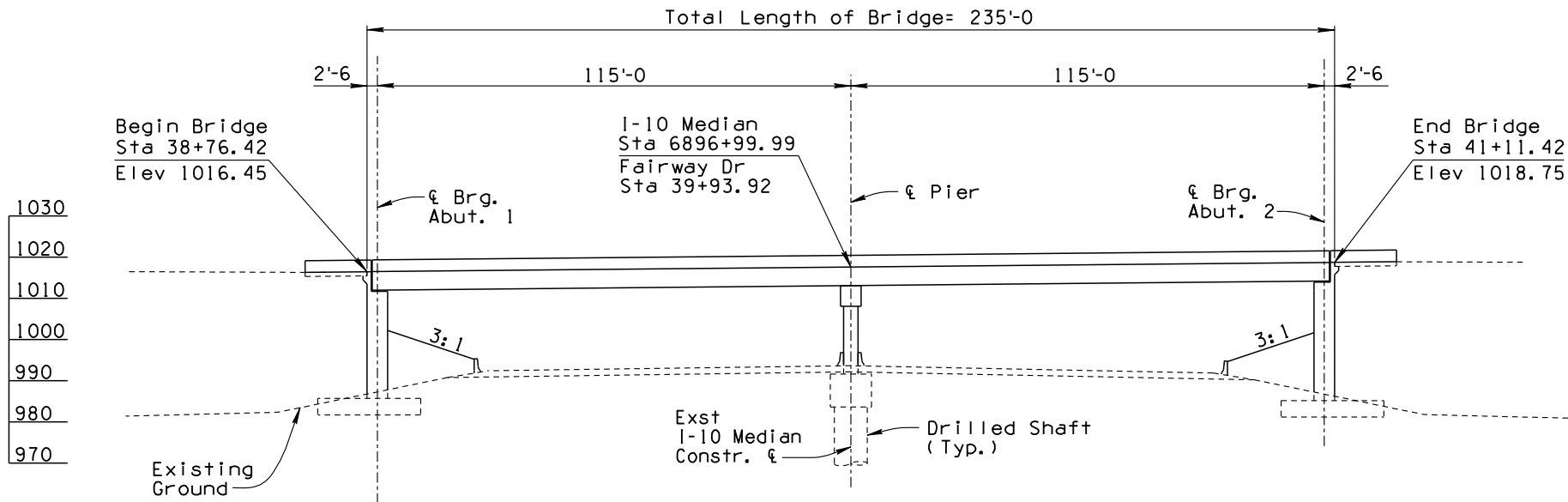
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DESIGN		RK		09/14		PROFILE SHEET FAIRWAY DR GARFIELD ST		DWG NO. C-03.03 ____ OF ____	
DRAWN		CADD		09/14					
CHECKED		RW		09/14					
 HDR, INC. 3000 E. GAVELINCK ROAD CHANDLER, AZ 85226-3811 TEL: 480.240.7700									
ROUTE		LOCATION							
I-10		I-10 / FAIRWAY DRIVE T.I.							
TRACS NO. H8587 OIL				O10-B(211)T					

FILE NAME: c:\pwworking\phx\0290011\011_h8587str01.dgn
PLOT DATE: 9/13/2014
PLOT SCALE: 1:40
PLOT BY: choffman
DATE: 09/13/2014
TIME: 11:03:40 AM
SURVEY NO. 010 MA 131
LOCATION: 010 MA 131
REVISIONS: 010 MA 131

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	21	33	
010 MA 131					




PLAN
Scale: 1"=20'
Skew = 1°00'00" Lt.

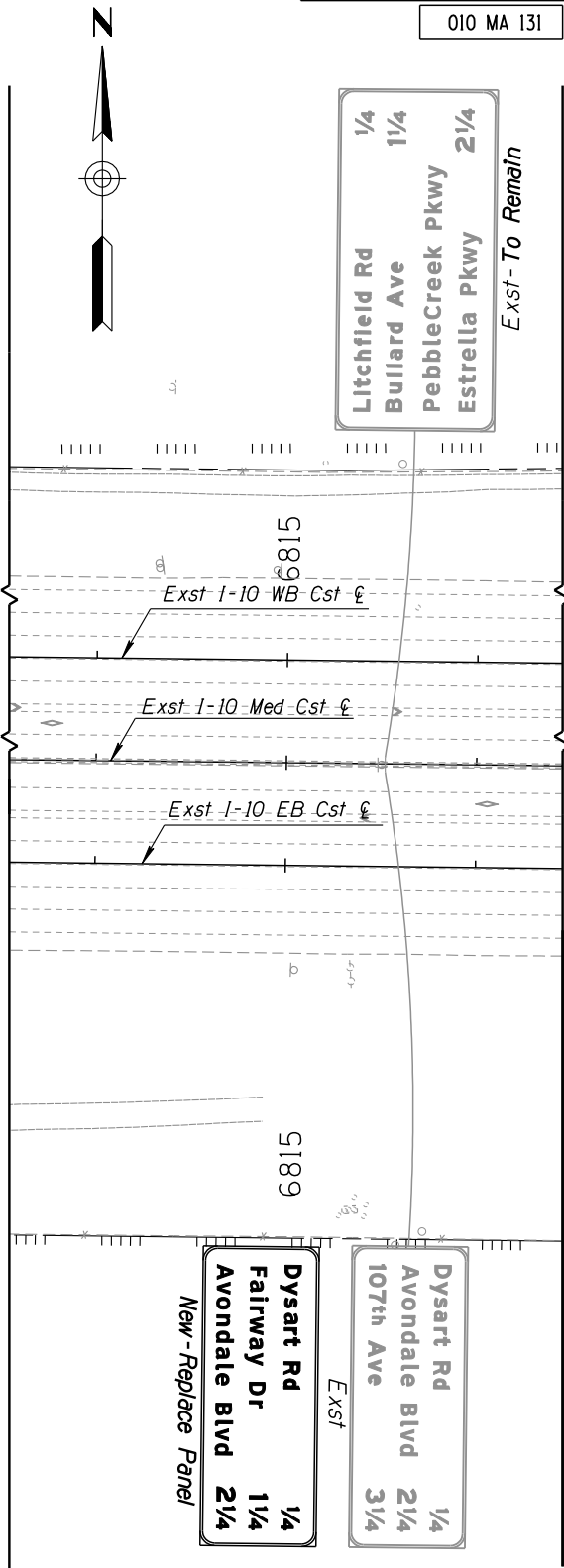
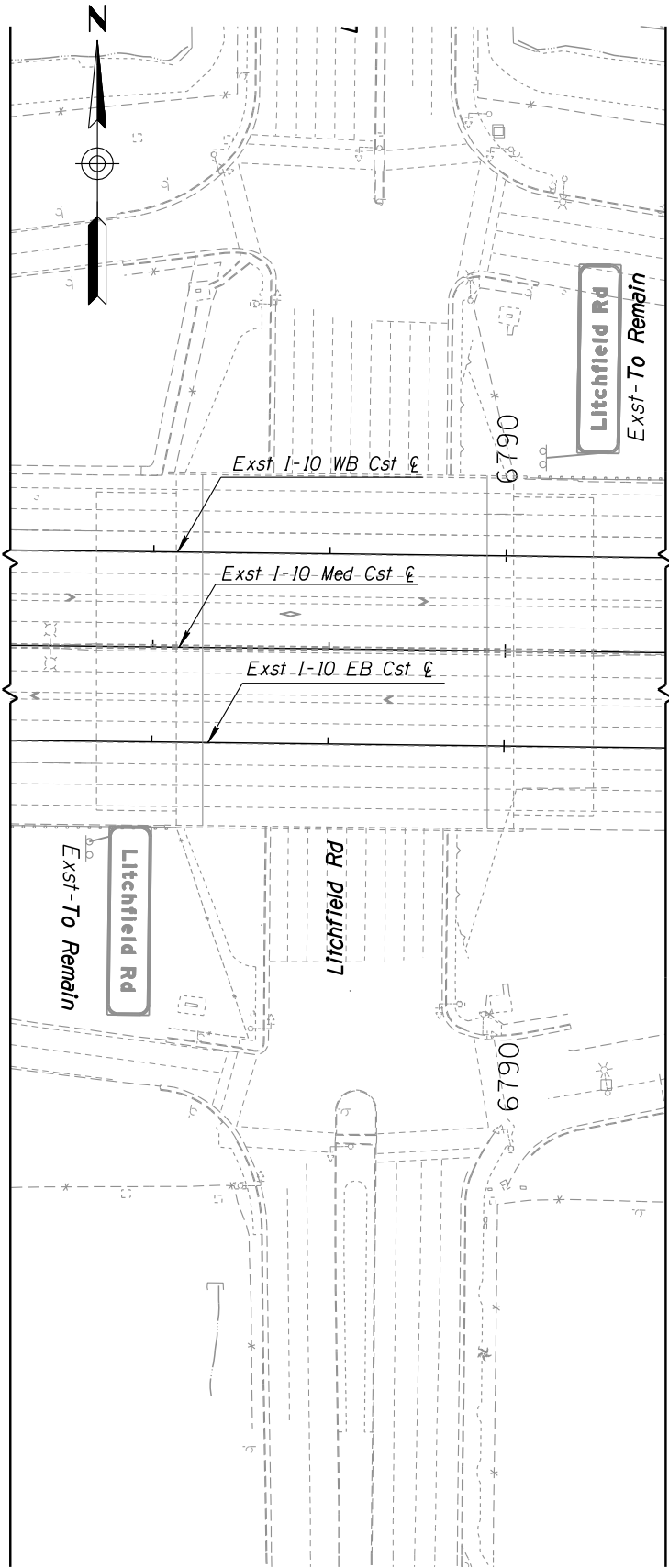
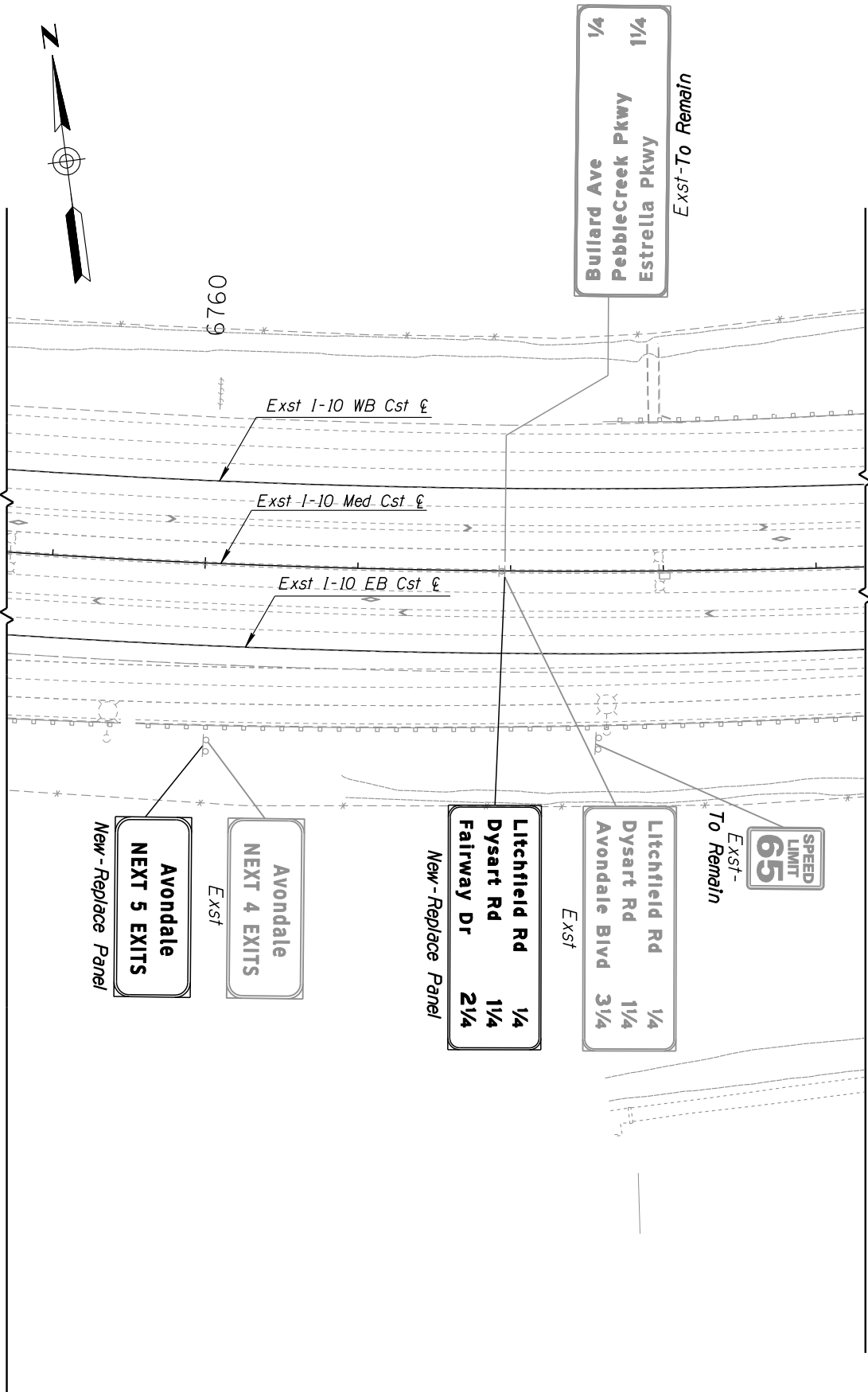


ELEVATION


PREFERRED ALTERNATIVE

		NAME		DATE		ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION BRIDGE GROUP				PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING	
DESIGN		TS		09/14							
DRAWN		CADD		09/14							
CHECKED		KB		09/14		FAIRWAY DRIVE TIUP				DWG NO S-01.01	
<div><div>HDR 3801 S. CAMELBACK ROAD SUITE 100 PHOENIX, AZ 85018-0811 TEL: 602.955.7270</div></div>											
1-10 ROUTE		MILEPOST		STRUCTURE NO.		LOCATION		1-10 / FAIRWAY DRIVE T.I.			
TRACS NO. H8587 OIL						010-B(211)T				___ <i>OF</i> ___	





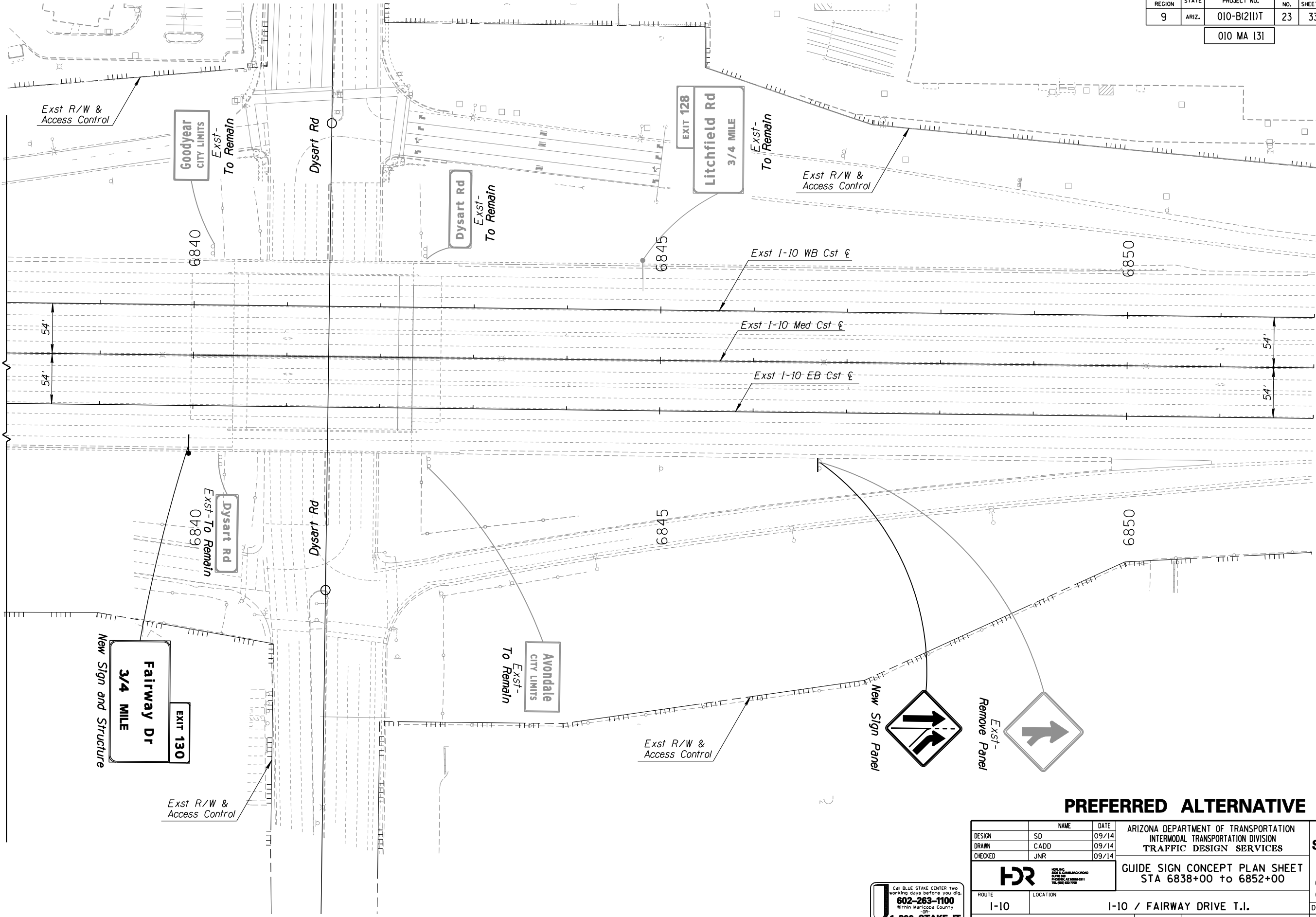
PREFERRED ALTERNATIVE

		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION TRAFFIC DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING DWG NO. T-01.01	
DESIGN		SD	09/14			
DRAWN		CADD	09/14			
CHECKED		JNR	09/14			
		<small>HDR, INC. 3005 N. GAVELBROOK ROAD SUITE 100 PHOENIX, AZ 85028-5911 TEL: 602.998.1700 FAX: 602.998.1701</small>		GUIDE SIGN CONCEPT PLAN SHEET STA 6760+00± to 6816+00±		
ROUTE		LOCATION				
I-10		I-10 / FAIRWAY DRIVE T.I.				
TRACS NO. H8587 OIL			010-B(211)T		___ OF ___	



F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	23	33	

010 MA 131

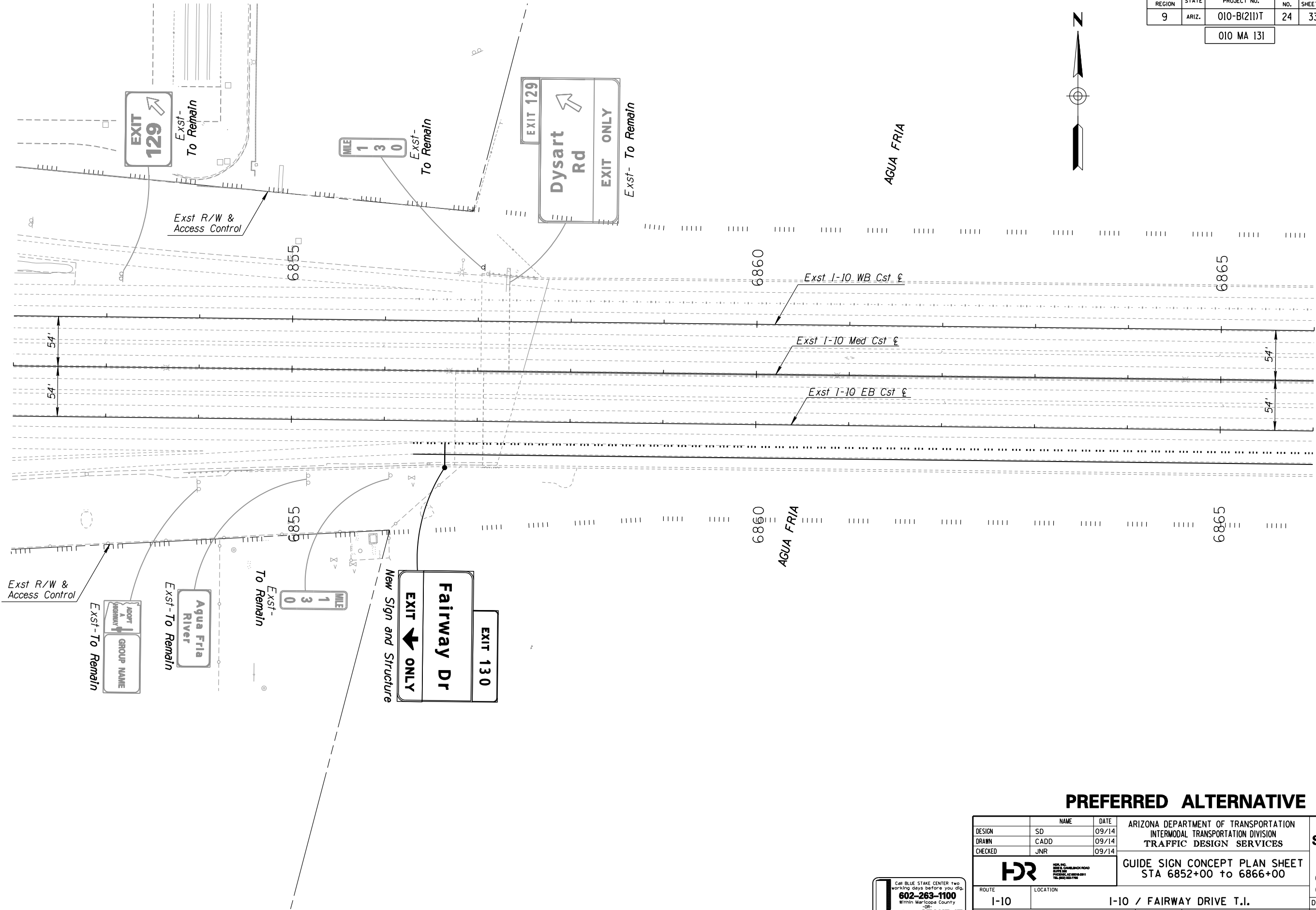


PREFERRED ALTERNATIVE

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CHECKED	JNR		09/14		DWG NO. T-01.02
ROUTE		LOCATION		I-10 / FAIRWAY DRIVE T.I.	
I-10				TRACS NO. H8587 OIL	
				010-B(211)T	
				OF	




F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	24	33	
010 MA 131					

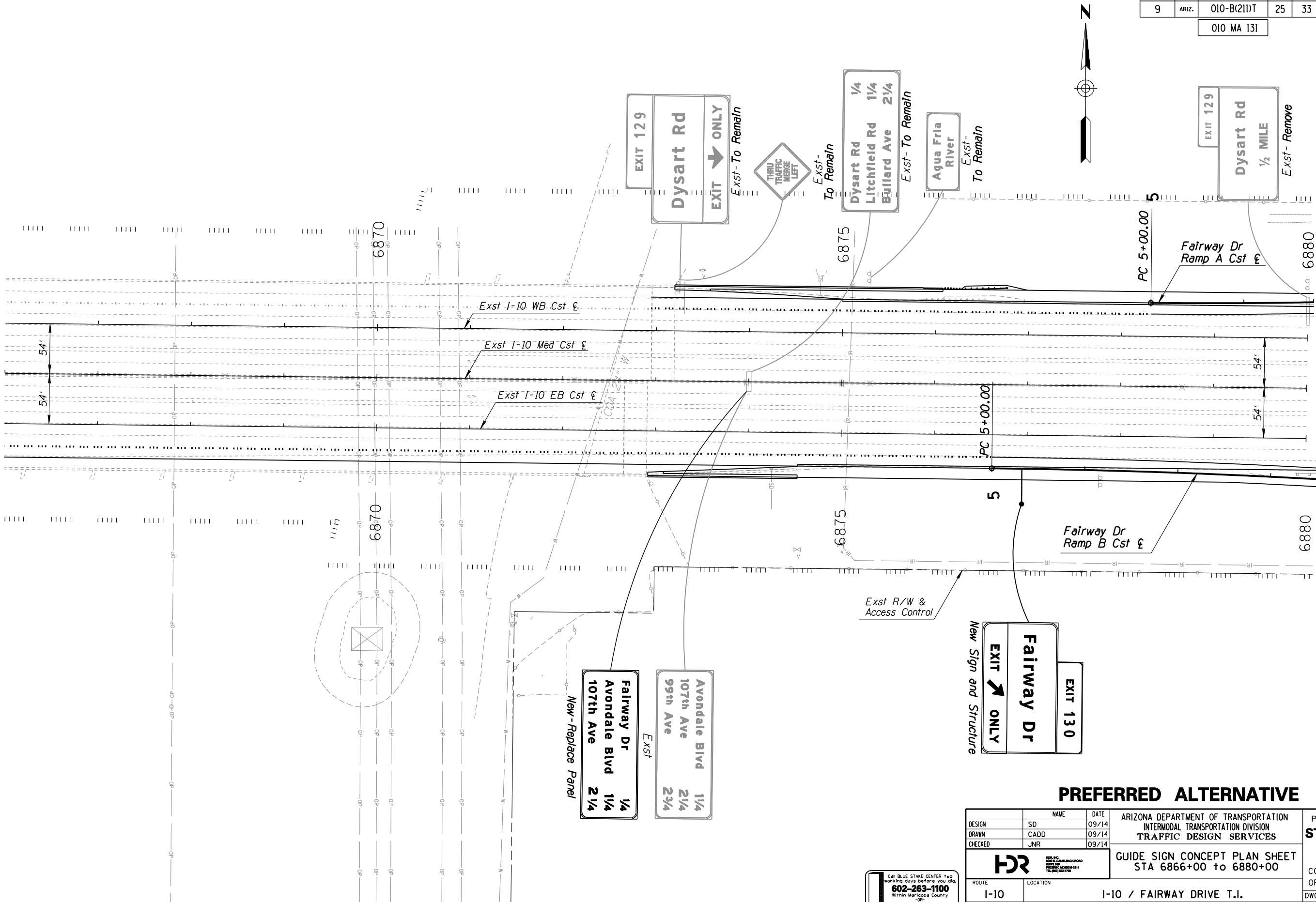


PREFERRED ALTERNATIVE




		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION TRAFFIC DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING
DESIGN	SD		09/14		
DRAWN	CADD		09/14		
CHECKED	JNR		09/14		
<div><div>HDR, INC. 3000 N. CAMELBACK ROAD SUITE 200 PHOENIX, ARIZONA 85018 TEL: 602.552.1700</div></div>				GUIDE SIGN CONCEPT PLAN SHEET STA 6852+00 to 6866+00	
ROUTE		LOCATION			
I-10		I-10 / FAIRWAY DRIVE T.I.			DWG NO. T-01.03
TRACS NO. H8587 OIL			010-B(211)T		___ OF ___

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	25	33	
010 MA 131					



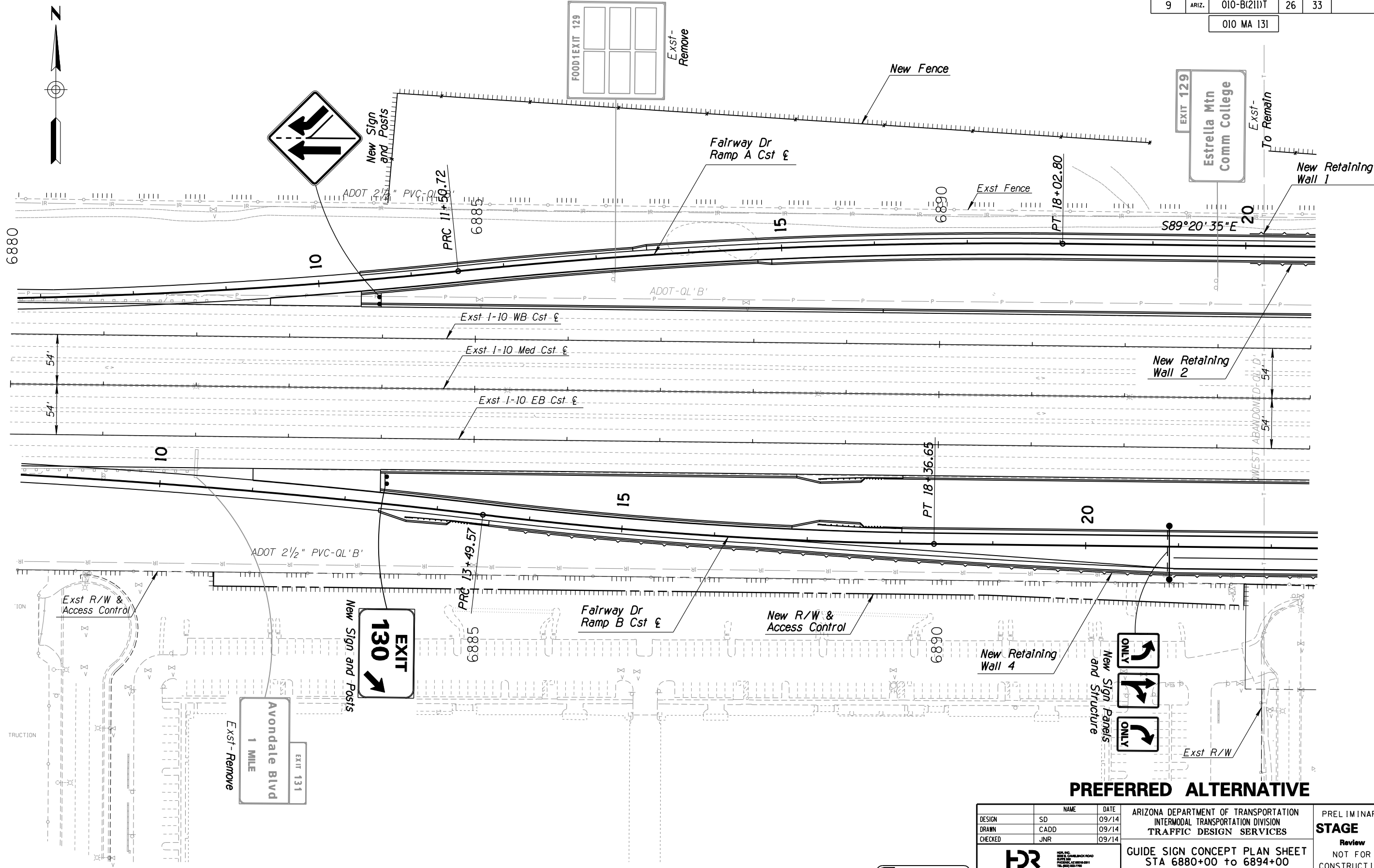
PREFERRED ALTERNATIVE

		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION TRAFFIC DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING	
DESIGN	SD		09/14			
DRAWN	CADD		09/14			
CHECKED	JNR		09/14			
 <div>HDR, INC. 3000 N. GAVELAND ROAD SUITE 200 PHOENIX, AZ 85028-1811 TEL: 602-955-7700</div>				GUIDE SIGN CONCEPT PLAN SHEET STA 6866+00 to 6880+00		
ROUTE		LOCATION		I-10 / FAIRWAY DRIVE T.I.		
I-10						
TRACS NO. H8587 OIL				010-B(211)T	___ OF ___	


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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	26	33	

010 MA 131

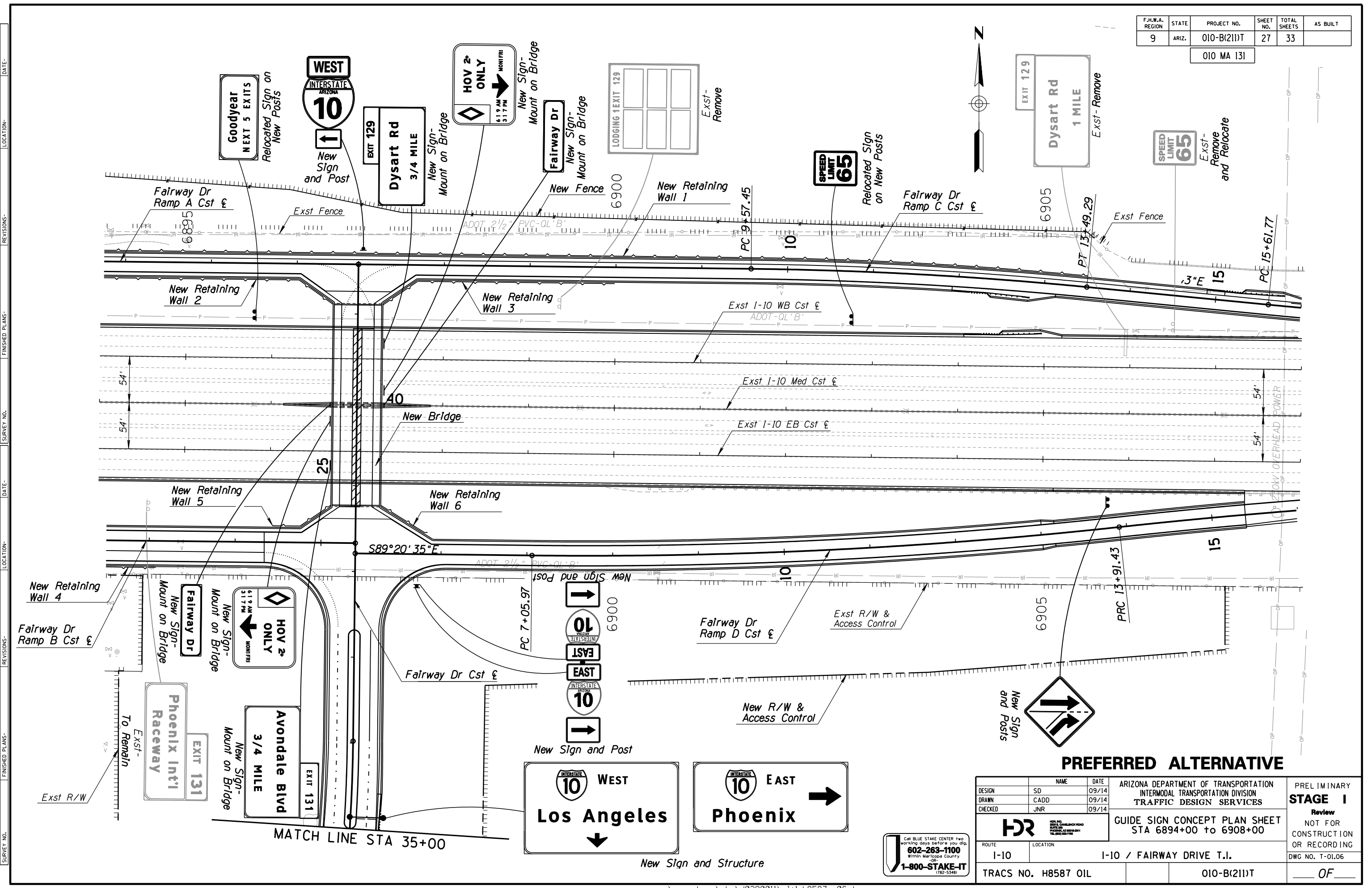


PREFERRED ALTERNATIVE

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DRAWN	CADD	DATE	09/14		
CHECKED	JNR	DATE	09/14		
				GUIDE SIGN CONCEPT PLAN SHEET STA 6880+00 to 6894+00	
ROUTE		LOCATION		I-10 / FAIRWAY DRIVE T.I.	
TRACS NO. H8587 OIL				010-B(211)T	OF

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



F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	27	33	

010 MA 131



EXIT 129
Dysart Rd
1 MILE
Exst- Remove

SPEED LIMIT 65
Exst- Remove and Relocate

INTERSTATE 10 WEST
Los Angeles
↓

INTERSTATE 10 EAST
Phoenix
→

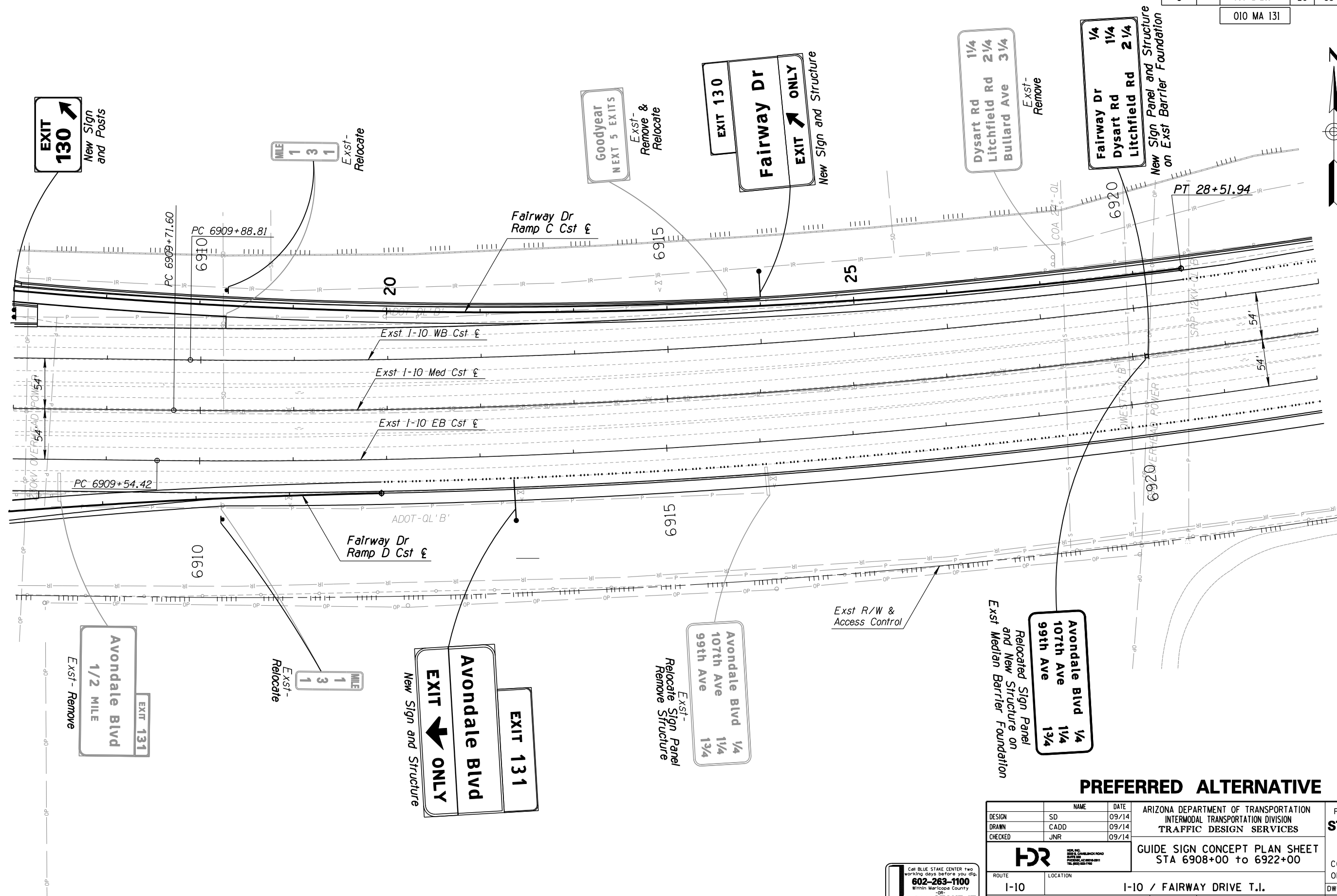
PREFERRED ALTERNATIVE

DESIGN	SD	NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION TRAFFIC DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING
DRAWN	CADD		09/14		
CHECKED	JNR		09/14		
ROUTE		LOCATION		DWG NO. T-01.06	
I-10		I-10 / FAIRWAY DRIVE T.I.			
TRACS NO. H8587 OIL				010-B(211)T	


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1-800-STAKE-IT
(182-5348)

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	28	33	

010 MA 131



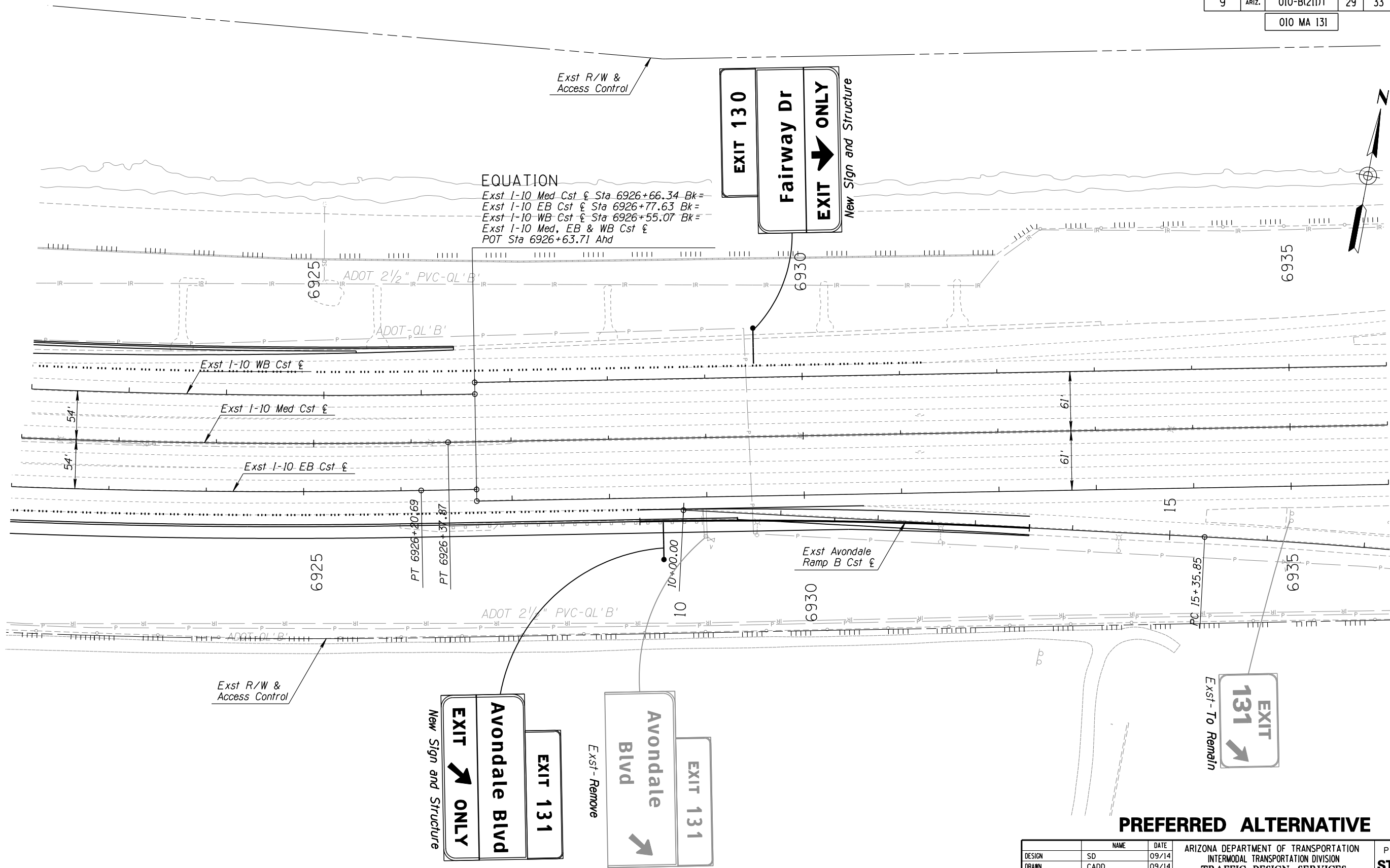
PREFERRED ALTERNATIVE

		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION TRAFFIC DESIGN SERVICES		PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING
DESIGN	SD		09/14			
DRAWN	CADD		09/14			
CHECKED	JNR		09/14			
 <div>HDR, INC. 1001 N. GILCHRIST AVE. SUITE 300 PHOENIX, AZ 85006-0911 (602) 998-7700</div>				GUIDE SIGN CONCEPT PLAN SHEET STA 6908+00 to 6922+00		
ROUTE		LOCATION				
I-10		I-10 / FAIRWAY DRIVE T.J.				DWG NO. T-01.07
TRACS NO. H8587 OIL				OIO-B(211)T	___ OF ___	




F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	29	33	

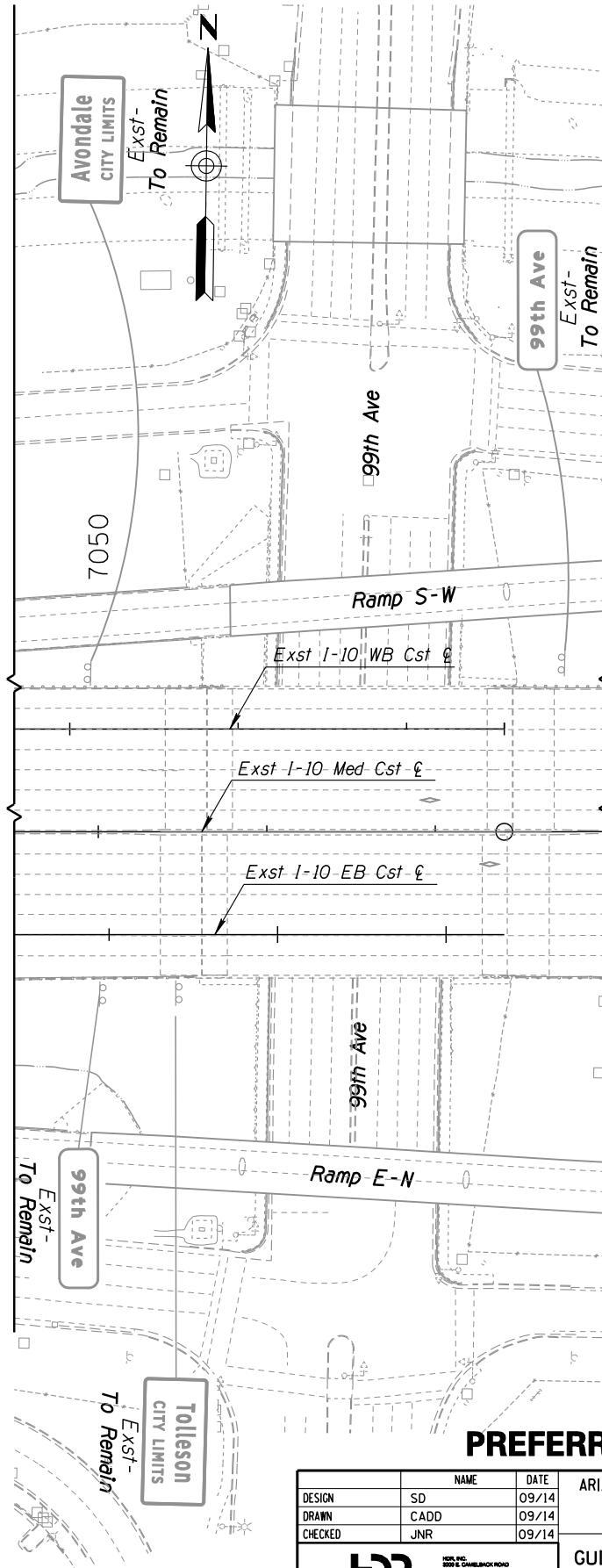
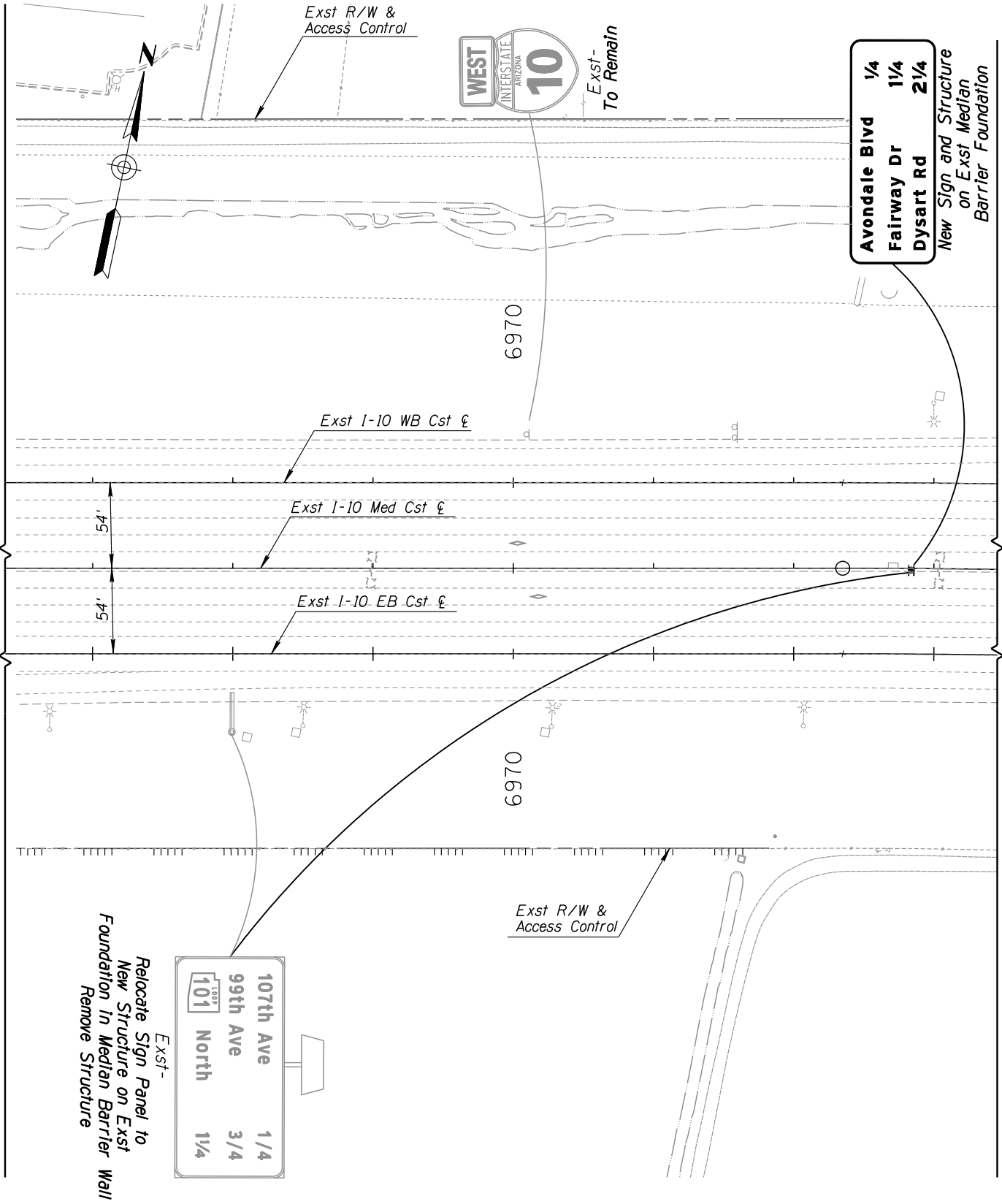
010 MA 131



PREFERRED ALTERNATIVE

		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION TRAFFIC DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING DWG NO. T-01.08 ____ <i>OF</i> ____	
DESIGN	SD		09/14			
DRAWN	CADD		09/14			
CHECKED	JNR		09/14			
 <small>HDR INC. 2001 S. CHANDLER ROAD SUITE 100 PHOENIX, AZ 85026-5811 TEL: 602-998-1700</small>				GUIDE SIGN CONCEPT PLAN SHEET STA 6922+00 to 6936+00		
ROUTE		LOCATION				
I-10		I-10 / FAIRWAY DRIVE T.J.				
TRACS NO. H8587 OIL				010-B(211)T		





F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	31	33	
010 MA 131					

PREFERRED ALTERNATIVE

NAME	DATE
DESIGN SD	09/14
DRAWN CADD	09/14
CHECKED JNR	09/14

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
TRAFFIC DESIGN SERVICES

PRELIMINARY
STAGE I
Review
NOT FOR
CONSTRUCTION
OR RECORDING

GUIDE SIGN CONCEPT PLAN SHEET
STA 6966+00± to 7053+00±

DWG NO. T-01.10

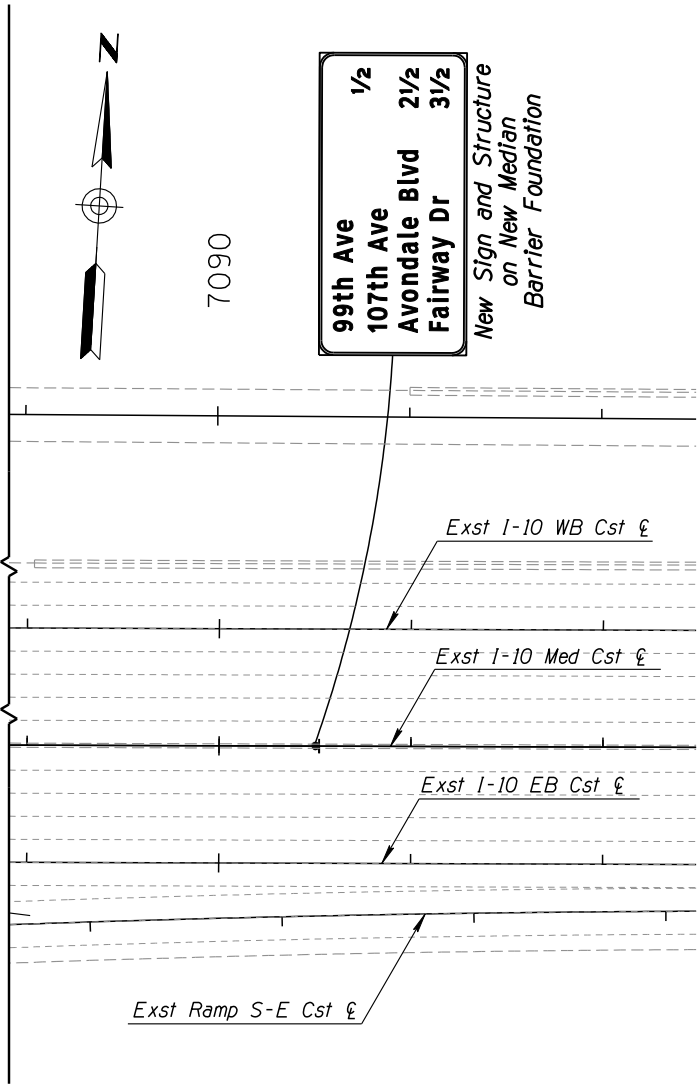
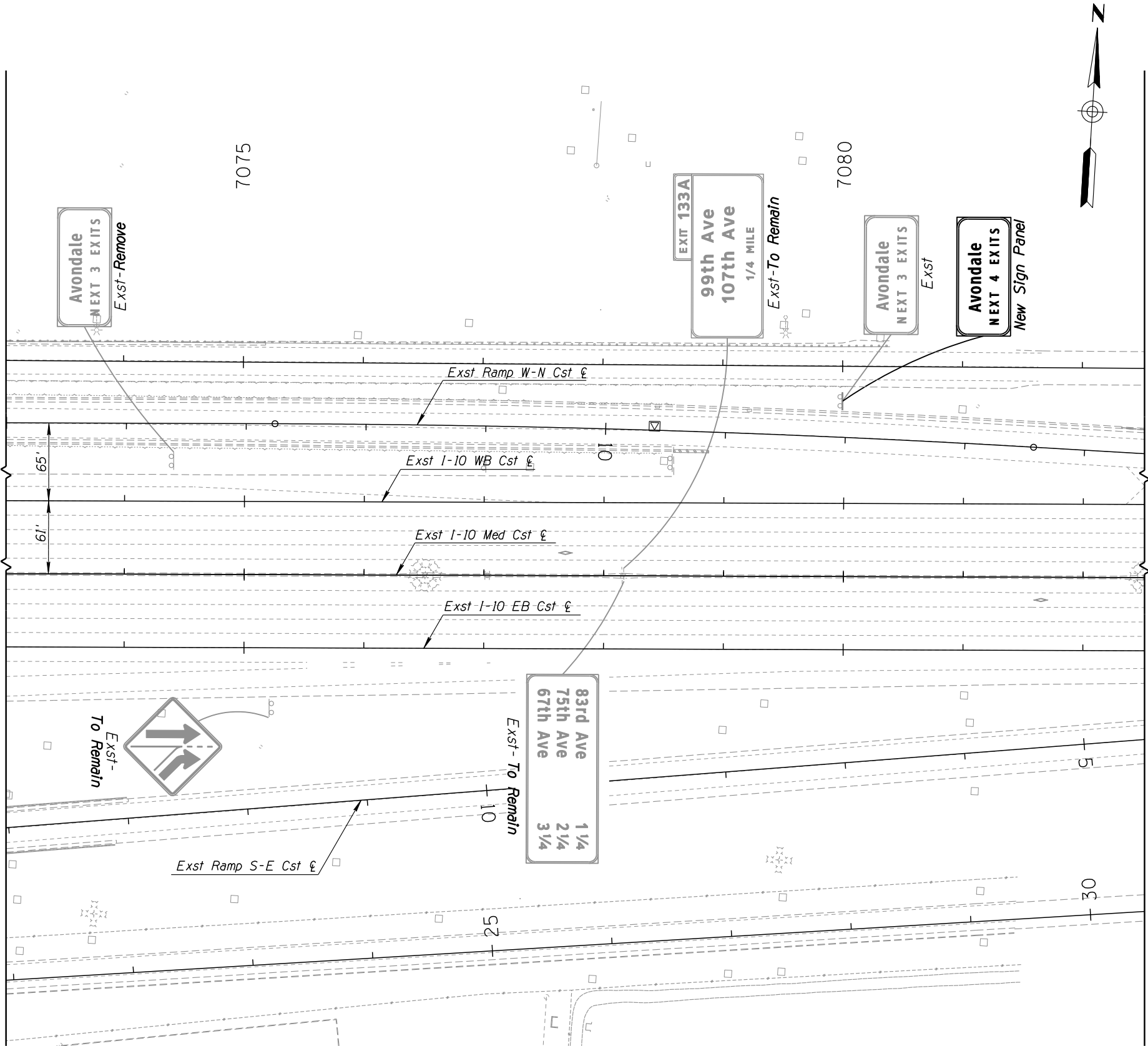
ROUTE I-10 LOCATION I-10 / FAIRWAY DRIVE T.I.

TRACS NO. H8587 OIL


010-B(211)T

OF

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	32	33	
010 MA 131					



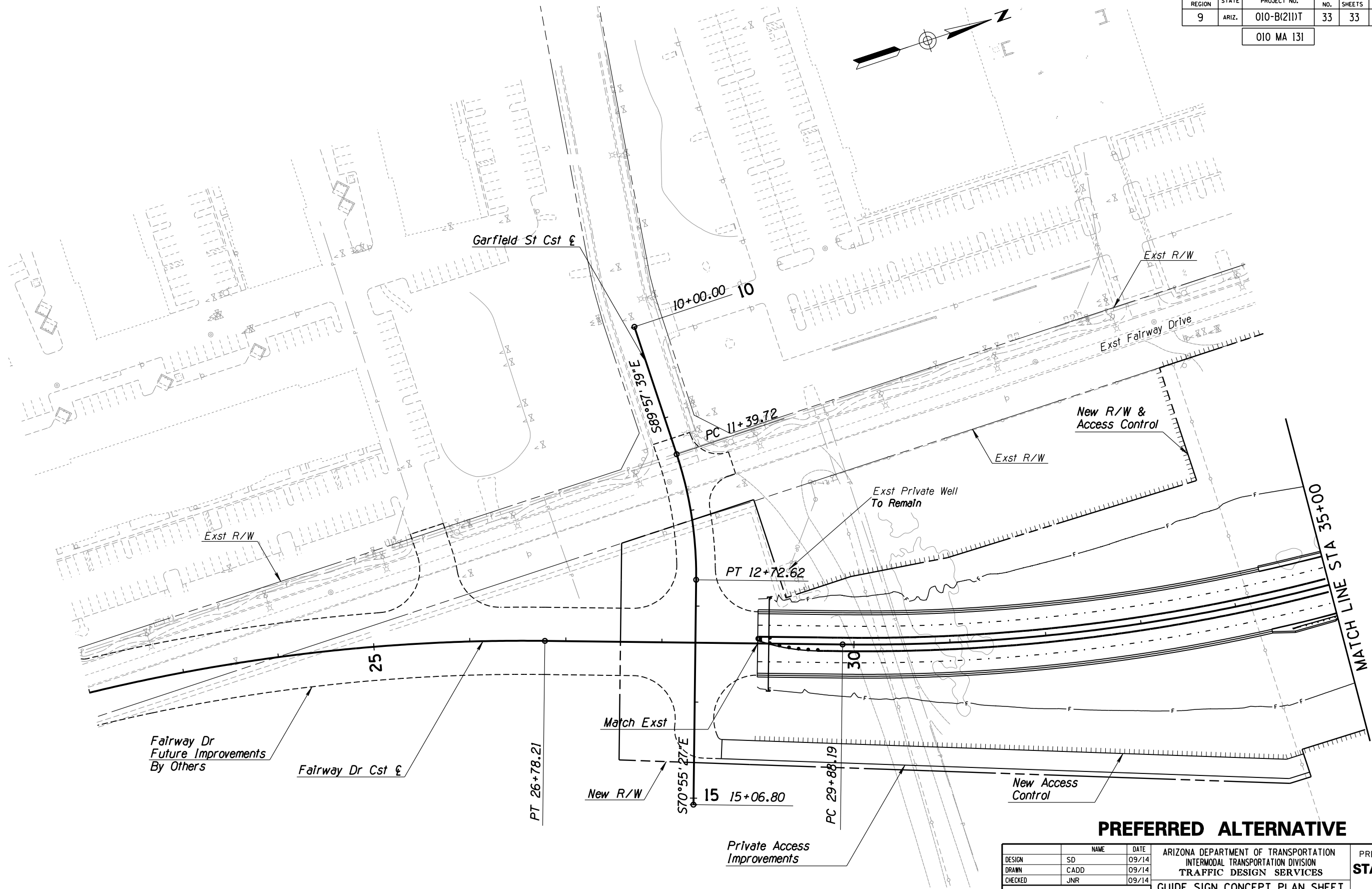
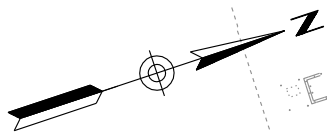
PREFERRED ALTERNATIVE

		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION TRAFFIC DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING DWG NO. T-01.11	
DESIGN	SD		09/14			
DRAWN	CADD		09/14			
CHECKED	JNR		09/14			
 <div>HDR, INC. 8001 N. CHANDLER ROAD SUITE 200 CHANDLER, AZ 85226-2011 TEL: (480) 453-7700</div>				GUIDE SIGN CONCEPT PLAN SHEET STA 7073+00± to 7091+00±		
ROUTE		LOCATION				
I-10		I-10 / FAIRWAY DRIVE T.I.				
TRACS NO. H8587 OIL				010-B(211)T	___ OF ___	




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

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	010-B(211)T	33	33	
010 MA 131					



PREFERRED ALTERNATIVE

		NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION TRAFFIC DESIGN SERVICES	PRELIMINARY STAGE I Review NOT FOR CONSTRUCTION OR RECORDING	
DESIGN	SD		09/14			
DRAWN	CADD		09/14			
CHECKED	JNR		09/14			
<div><div>YOUR LOGO 3000 E. CAMELBACK ROAD SUITE 100 PHOENIX, AZ 85016-1011 TEL: 602.992.0700</div></div>				GUIDE SIGN CONCEPT PLAN SHEET FAIRWAY DR STA 23+00 to 35+00		
ROUTE		LOCATION				
I-10		I-10 / FAIRWAY DRIVE T.I.				DWG NO. T-01.12
TRACS NO. H8587 OIL			010-B(211)T			___ OF ___



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APPENDIX B – SUMMARY OF COMMENTS

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REVIEW COMMENTS AND RESPONSES
I-10 / Fairway Drive (El Mirage) Traffic Interchange Study
TRACS No. H8587 01L
INITIAL DESIGN CONCEPT REPORT

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Initial Disp.	Response	Final Disp.
ADOT Drainage - Dennis Crandall							
1	D. Crandall	1		I have reviewed the Initial Design Concept Report and I do not have any comments.	D	Acknowledged	D
ADOT Environmental - Emily Lester							
2	E. Lester	1		I have no comment for environmental.	D	Acknowledged	D
ADOT Roadway - Glenn Gaelick							
3	G. Gaelick	1	pg i	2.1 Existing Conditions	A	Will revise.	A
4	G. Gaelick	2	pg 1	Scope of Work, 3rd bullet - suggest changing constructing to construct.	A	Widening of Fairway Drive will not be included in this project. 3rd bullet will be deleted.	A
5	G. Gaelick	3	pg 39	6.6 NOISE, 2nd sentence - Suggest "A noise barrier was evaluated for the north residence on the east side of Fairway Drive immediately north of Van Buren.	A	Will revise.	A
6	G. Gaelick	4	Plan Sheet G-2.03	Ramp Cross Slopes shown here seem to be at odds with what is described on pg 30 & Plan Sheets C-1.01 & C-1.02. Please clarify.	A	The ramp cross slopes at the gores are not 2% but meets the 2% breakover criteria between the adjacent mainline and ramp. To clarify, Table 4.2 will be revised to remove the ramp cross slope design control since it varies throughout.	A
7	G. Gaelick	5	Plan Sheet C-2.04	Have radius returns on these sheets been evaluated for WB-67 turning movements?	A	WB-67 turning templates were used at the ramp/crossroad intersections. Exhibits can be provided upon request.	A
8	G. Gaelick	6	Plan Sheets C-2.07 & C-2.08	Have radius returns on these sheets been evaluated for WB-67 turning movements?	D	Radius returns are based on City of Avondale's standard details.	D
9	G. Gaelick	7	Plan Sheet C-2.08	Is the proposed AC structural section adequate for accel/decel through the proposed grade without pumping? There may be value in extending PCCP south.	B	Current design shows the PCCP ending approximately 300' beyond the end of the ramp radius return. Profile grade is 4%. PCCP limits will be extended further south to the access control limit.	A
10	G. Gaelick	8	Appendix C	Unit cost for Borrow - \$7 - This cost seems to be more in line with a continuous scraper operation. Truck hauls, haul distance, and placement could significantly increase the unit cost.	B	The Van Buren drainage corridor project could be a potential borrow source. Current unit cost of borrow will remain unchanged due based on source of borrow assumptions.	D
ADOT Right-of-Way - Reggie Rector							

REVIEW COMMENTS AND RESPONSES
I-10 / Fairway Drive (El Mirage) Traffic Interchange Study
TRACS No. H8587 01L
INITIAL DESIGN CONCEPT REPORT

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Initial Disp.	Response	Final Disp.
11	R. Rector	1	1, 28, & 38	What is included in R/W cost estimate shown? (Land only?)	B	The land required to construct the TI and arterial portion outside of the exiting R/W was included in the estimate. ADOT R/W will provide a cost estimate based on the anticipated full and partial takes for the project and will provide to the study team. The study team will include the R/W cost estimate into the DCR cost estimate.	A
12	R. Rector	2	32	General comment: Sec. 4.5-The addition of TCEs for construction during final design will add to the R/W cost estimate in the future.	D	Acknowledged. The TCE was a conservative estimate based on the level of design.	D
13	R. Rector	3	Key Map - C02.01	Exst R/W Limits & Access Control are not coincident throughout this corridor. N side of I-10 Acc Cont is offset from R/W limits. Same condition at Agua Fria River both sides.	A	Will revise existing access control location on the plans.	A
14	R. Rector	4	C02.02	Access control incorrect at west end of sheet/south side of I-10; Exst AC not shown on N side I-10.	A	Will revise existing access control location on the plans.	A
15	R. Rector	5	C02.02 & C02.03	Is it necessary to have the new V-Ditch top of slope on the S. I-10 Exst R/W line? Will this create maintenance or fencing issues without an offset?	A	The ditch is required to pick up the additional flows generated by the pavement widening. The ditch can be revised to provide a minimum bench width between the Exst R/W line.	A
16	R. Rector	6	C02.03	There does not appear to be a reason for the new R/W shown on S. side of Ramp B Sta18 (+/-) and west??	B	At this level, the new R/W shown provided an environmental footprint that is a conservative area for clearance. The final designer may further reduce the R/W area.	D
17	R. Rector	7	C02.03 & C.02.04	Exst Acc Contr not shown on N. side.	A	Will add existing access control location on the plans.	A
18	R. Rector	8		On south side; Exst ADOT R/W 'pop-out' at El Mirage Rd alignment is not Acc Contr around the perimeter; only parallel to mainline.	A	Will revise existing access control location on the plans.	A
19	R. Rector	9		On north side; Can 'fill' be placed on exst irrigation facility shown without relocation?	B	Existing irrigation is a 2in pvc line and is anticipated to be relocated outside the fill slope.	D
20	R. Rector	10	C02.05	Exst Acc Contr not shown on N. side.	A	Will add existing access control location on the plans.	A
21	R. Rector	11	C02.06	Exst R/W & Access Control are not coincident on N side of I-10. AC is offset from R/W limits.	A	Will revise existing access control location on the plans.	A

REVIEW COMMENTS AND RESPONSES
I-10 / Fairway Drive (El Mirage) Traffic Interchange Study
TRACS No. H8587 01L
INITIAL DESIGN CONCEPT REPORT

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Initial Disp.	Response	Final Disp.
22	R. Rector	12	C02.07	On east side of Fairway Dr, can new drainage feature be maintained with nominal to no clearance at proposed new R/W limits?	A	The new drainage feature for due to the Fairway Drive widening will not be included in the project plans.	A
23	R. Rector	13	C02.07 & C02.08	Curb/Gutter/SW returns near Sta 21+50L & 25+50L (parking lot driveways) need to terminate at exst R/W or new R/W will be required for these features.	A	This portion of the project is not applicable to the Fairway Road TI project and will be removed from the plans.	A
24	R. Rector	14	C02.08	New R/W 'notch' around the existing well site & parallel to east side of Fairway Dr will most likely be acquired due to severance from main parcel. This area 'could' be included in retention basin design.	B/C	The R/W shown in the DCR is what is needed for the project and cleared Environmentally. ADOT to determine whether or not we need to environmentally clear property that we do not need for the project, but that may be ultimately be acquired due to total takes or severance issues. DCR will show the limits of R/W required for the construction of the TI.	D
25	R. Rector	15		"Private Well to remain" site is larger than chain link fenced area at pump & equipment location.	A	The plan sheet will be revised to show the property lines associated with the private well.	A
26	R. Rector	16		Property between Sta 30+25 and 34+10 +/- on east side of Fairway Dr has no access as currently designed. (APN 500-01-008G/Henderson) Please consider redesign to provide access and avoid total acquisition & relocations.	A	Will evaluate providing a turnout.	A
27	R. Rector	17	N/A	Will there be an IGA/JPA for the project?	C	Coordination required as the design progresses.	D
ADOT Traffic - Rados Gluscevic							
28	R. Gluscevic	1	18	The No-Build Alternative has EB and WB volumes of 9710 and 5965 respectively between Dysart Rd and Avondale Blvd. The Build Alternative has EB and WB volumes of 7020 and 4330 respectively between Dysart Rd and Avondale Blvd. If the new Fairway Dr is drawing more traffic to the TI from the adjacent TI's shouldn't there be an increase in traffic on the mainline at these locations?	A	We will review and correct.	A

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29	R. Gluscevic	2	22	"Avondale NEXT 5 EXITS" sign should be replaced and not modified in-place	A	Will comply.	A
30	R. Gluscevic	3	22	EB Sequence sign should be replaced and not modified in-place	A	Will comply.	A
31	R. Gluscevic	4	25	The Fairway Dr exit direction sign in the EB direction will need to be changed and follow the guidance of the 2009 MUTCD.	A	Will comply.	A
32	R. Gluscevic	5	26	Is a third lane necessary on the EB off-ramp? If the ramp is reduced to two lanes an overhead lane assignment structure in not needed.	B/C	Will evaluate traffic analysis and determine minimum lane needs.	A
33	R. Gluscevic	6	27	The overhead crossroad structure should be pushed back closer to STA 35+00.	B/C	Will revise.	A
34	R. Gluscevic	7	28	The Fairway Dr exit direction sign in the WB direction will need to be changed and follow the guidance of the 2009 MUTCD.	A	Will comply.	A
35	R. Gluscevic	8	29	The Avondale Blvd sign will need to be replaced and follow the guidance of the 2009 MUTCD.	A	Will comply.	A
36	R. Gluscevic	9	32	The "Avondale NEXT 3 EXITS" should remain at STA 7080+00.	A	Will comply.	A
37	R. Gluscevic	10	32	"Avondale NEXT 4 EXITS" sign at Approx.. STA 7074+40 should be replaced and not modified in-place	B/C	Will show the sign being replaced in the plans.	A
38	R. Gluscevic	11	33	The M2-101 Junction Sign could be replaced with a route marker assembly using M2-1AZ, M1-1a (10) and M5-101. The number of posts and foundations need would be reduced from 2 to 1.	A	Will comply.	A
39	R. Gluscevic	12	34	No advance overhead guide signs are needed on the crossroad. Please remove.	A	Will comply.	A
ADOT Utilities and Railroad - Kamal Mirtalaei							
40	K. Mirtalaei	1	Any plan sheet showing utility lines	If possible provide callouts for all utility lines (OP, P, IR, W, S,...) to indicate the type/size/capacity and the owner's name.	A	Will provide.	A
City of Avondale - Charles Andrews							

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41	C. Andrews	1	pg 5	Interchanges-full access, but not direct, doesn't this have an effect on the modeling? Does it affect anything else??	A	The reference to "full access" is that access is provided to and from I-10 in both directions (as opposed to half-access only to one direction). Need to clarify in text that 107th Avenue is only half-access to and from the west.	A
42	C. Andrews	2	pg 10	City of Avondale transportation Plan update, 4th bullet. The construction of the Fairway collector is scheduled for 2017 in Avondale proposed CIP for 2015-25	A	Will add.	A
43	C. Andrews	3	pg 10	Use Thru lanes not "through" (Typical all)	D	The use of the word "through" was utilized in a formal report setting.	D
44	C. Andrews	4	pg 15	Hard to believe that introduction of 600 trucks without the Fairway T.I. would have less accidents	A	Comment noted. Analysis tool is based more on conflict points (which the new TI would add) than necessarily vehicle mix.	A
45	C. Andrews	5	pg 16	Please update aerial, Also McDowell from 119th Avenue to Dysart is and will remain a 4 thru lane arterial (no 6 thru-lanes). In addition, Dysart, from Van Buren to MC85 will remain a 4-thru lane arterial -not a 6 (per Avondale's 2012 transportation Plan). This will affect your modeling. Please revise Figures 2.4 & 2.5. For modeling purposes, Van Buren from 107th Avenue to 99th Avenue will be have 4-thru lanes not 6	B	The Figure in the report will be updated to be consistent with the Avondale's 2012 Transportation Plan.	A
46	C. Andrews	6	pg 18	Please update aerial, Also McDowell from 119th Avenue to Dysart is and will remain a 4 thru lane arterial (no 6 thru-lanes). In addition, Dysart, from Van Buren to MC85 will remain a 4-thru lane arterial -not a 6 (per Avondale's 2012 transportation Plan). This will affect your modeling. Please revise Figures 2.6 & 2.7. For modeling purposes, Van Buren from 107th Avenue to 99th Avenue will be have 4-thru lanes not 6	B	The Figure in the report will be updated to be consistent with the Avondale's 2012 Transportation Plan.	A

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47	C. Andrews	7	pg 19	Please update aerial, Also McDowell from 119th Avenue to Dysart is and will remain a 4 thru lane arterial (no 6 thru-lanes). In addition, Dysart, from Van Buren to MC85 will remain a 4-thru lane arterial -not a 6 (per Avondale's 2012 transportation Plan). This will affect your modeling. Please revise Figures 2.6 & 2.7. For modeling purposes, Van Buren from 107th Avenue to 99th Avenue will be have 4-thru lanes not 6	B	The Figure in the report will be updated to be consistent with the Avondale's 2012 Transportation Plan.	A
48	C. Andrews	8	pg 22	I-10 Operational Performance Summary-quotes "600 heavy trucks per day" please provide backup supporting documentation and analysis	A	Source of data is the MAG regional travel demand model; the model provides vehicle classifications (passenger cars, light trucks, heavy trucks) by link	A
49	C. Andrews	9	pg 23	Table 2.20-shouldn't this be "Avondale Boulevard" and not Dysart?	A	Will revise.	A
50	C. Andrews	10	pg 31	table 4.1-Update aerial, show Roosevelt? Show proposed pedestrian bridge(500 feet west of T.I. on the north side crossing the ADOT channel to Friendship Park	B/C	The current aerial is from our aerial survey dated November 2012. Will note location on figure on in DCR text.	A
51	C. Andrews	11	pg 32	(Typical) Underpass, isn't the Fairway T.I. considered an "underpass" I would think it would be considered an "overpass". 1st paragraph is not clear. Fairway is a major collector with 4- thru lanes not 2-confusing. No where along Fairway drive would it be a 1-thru lane configuration except at the ramps?. With the proposed pedestrian bridge we need to re-examine sidewalks on the bridge and the possibility of bringing it down the westbound off-ramp. There is an opportunity to provide sidewalks crossing the bridge and bring it down to the ADOT channel. We need to do this part of the T.I. construction not after.	B/C	1) The bridge designation is based on the location of the principle route relative to the structure. "Underpass" was used In our case since I-10 is under the bridge structure. 2) The 2-thru lanes as described in the 1st paragraph are directional lanes. We will revise text to clarify. 3) Pedestrian access north of the TI was not incorporated into the design. Bridge typical section will be revised to show sidewalks.	A

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52	C. Andrews	12	pg 32	4.6 Drainage. Unless its not possible, the T.I should retain its drainage than incur the costs of piping drainage to the Van Buren Drainage Corridor. Also, depending on the amount of drainage and time of confluence could have a negative impact to the existing design. the City would be responsible for the costs associated with piping the drainage from the T.I. to the channel. A discuss is due on the limits of responsibility.	B/C	The proposed basins north and south of I-10 are sized to retain the TI runoff. The drainage runoff generated from the Fairway Drive portion is on a separate system and drains to the future Van Buren drainage corridor. Further discussion between the Agencies is required.	D
53	C. Andrews	13	pg 34	4.7 Earthwork-There is a good chance that the drainage excavation can be stored for the construction of there T.I.	A	We can make a statement in the report that states that the drainage excavation generated by the Van Buren Drainage Corridor project can potentially be used for embankment material for the construction of the TI.	A
54	C. Andrews	14	pg 38	Table 5.1, please provide complete breakdown	D	Breakdown is provided in Appendix C.	D
55	C. Andrews	15	pg 39	City of Avondale Administers handles its own Floodplain Management	A	Will revise.	A
56	C. Andrews	16	pg 39	the fact that 600-1200 trucks a day driving 2 additional miles (each truck) would be a PM concern	D	Comment noted. This fact is not a factor in 40 C.F.R. § 93.123(b)(1)(i/ii)	D
57	C. Andrews	17	Preliminary Plans-typical sections	Preliminary Plans-typical sections, City's standard is 10-12 feet for sidewalks & bicycles. Preference is not to have a 4-foot striped bike lane next to trucks and cars	B/C	City of Avondale Standard Detail No. A1004 was used for Fairway Drive.	D
58	C. Andrews	18	Preliminary Plans	Let's discuss dedicated right-turn lanes onto Corporate and Roosevelt extension. Grades too steep, volume too high, mix of cars and trucks too high not to have dedicated right-turn lanes with more than ample storage	B/C	Intersection LOS is at an acceptable level without the dedicated right-turn lane. Will coordinate with the City to identify needs for intersection turn lanes and intersection control/signalization along Fairway Drive.	D
59	PG-Avondale	19	pgs 1 & 5	Page 1, Characteristics of the Corridor and Page 5, Interchanges –Fairview Drive is the only section line road between SR 101 and SR 303 without access to I-10, causing local traffic to divert to Avondale Blvd or Dysart Road.	D	Acknowledged. Will add into the text.	D

A-Will Comply B-Consultant to Evaluate C-Client to Evaluate D-No Further Action

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60	PG-Avondale	20	pg 13	Page 13, Operational Performance - Can it be stated that although existing overall LOS is acceptable, some individual movements operate at LOS E/F (PM peak hour at Dysart), providing more evidence for improvement need? I remember reviewing some intersection capacity reports that indicated long SB to WB left turn queues at the Dysart/Van Buren Street intersection and I also believe for the EB to NB left turn movement at the Avondale/Van Buren Street intersection.	A	Yes, we will review the analysis reports by movement and include observations related to movements of concern.	A
61	PG-Avondale	21	pg 14	Page 14, Table 2.7 - Total crashes do not add up for left turns or other/unknown.	A	Will correct.	A
62	PG-Avondale	22	pg 15	Page 15, Daily Traffic Volumes, Bullet #1 – Volumes on I-10 with or without the Fairview TI are projected to increase by approximately 50%...In the traffic report, the percent growth was 57%....can you claim an increase of approximately 55% or 60%?	A	Will clarify.	A
63	PG-Avondale	23	pgs 15 & 16	Page 15/16 – In the modeling process, the location of where the centroid connectors connect to the roadway network will have a high sensitivity to where vehicles route...especially in small study areas. This may be a consideration for why high ramp volumes are noted for the WB On/Off ramps at Fairview as compared to the East.	B	Comment noted. Will review current MAG travel demand model to confirm results. Notable observation will be described in the DCR text. See response to #65.	A

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64	PG-Avondale	24	pgs 16 & 17	Page 16/17 - The EB daily ramp volumes at the Dysart and Avondale TI's appear high. What is the daily capacity of a single lane ramp (8,000 vpdpl)? Does the migration of vehicles to the Fairway TI put the Dysart/Avondale ramps below daily capacity thresholds?	B	The ramp volumes in Table 2.10 are from the MAG model. Ramps serving 20,000 vpd is not unheard of in the MAG region. For another project, 2004 counts for the I-10 EB ON and WB OFF ramps at 35th Avenue and 51st Avenue were around 20,000 vpd. In those cases, the peak hour volumes were around 1,600-1,800 vehicles. The Fairway Drive TI reduces the ramp volumes, but as shown in peak hour analyses, there isn't a significant change in the level of service.	A
65	PG-Avondale	25	Figure 2.5 and Table 2.10	Figure 2.5 and Table 2.10 - With the new Fairway Drive ramps to accommodate 25,000 daily vehicles and the difference between build and no-build only an increase of 16,300 vehicles, where are the additional 8,700 vehicle trips coming from? Reduced arterial volumes? Loop 101? Small reductions throughout the network that can't be attributed to one location? Or has there been an increase in short distance freeway trips (say entering at Fairway exiting at Dysart)? Newly generated trips to/from west as indicated in the report doesn't feel right.	B	It is likely a combination of all of these elements. If the City would like, we can request a "selectlink" analysis (from the MAG model) for the ramp links to help better determine the origins/destinations of the vehicles using the Fairway Drive TI.	A
66	PG-Avondale	26	pg 17	Page 17 – Does the volume along the I-10 frontage road east of 107 th change/reduce (also the Thomas and McDowell road sections between Avondale and Loop 101)? With the introduction of the Fairway TI, traffic that may have used the frontage roads, due to capacity restraint at the Avondale ramps, may now migrate to the Avondale TI because of more capacity that has been made available, improving routing and reducing delays and/or travel times. However I don't believe resulting volumes to be significant.	B	Comment noted. See response to #65.	A

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67	PG-Avondale	27	pg 18	Page 18 – Add legend, XX/XX for AM/PM volumes. The peak hour volumes show significant reduction (over 33%) along Dysart and Avondale south of I-10 for the scenario with the Fairway TI for the 2015 condition as compared to the 2015 without.	A	Will correct.	A
68	PG-Avondale	28	pgs 18 & 19	Page 18/19 – Figures 2.6 and 2.8 appear to display the same volumes, volumes should be verified or its possibly an indication the roads are near capacity. Stray volume designation north of McDowell road in Figure 2.6.	A	Will correct.	A
69	PG-Avondale	29	pgs 18 & 19	Page 18/19 – All Figures. Difficult to make comparisons....looks like future year volumes are the same between scenarios. Volumes should be verified they are correct.	A	Will correct.	A
70	PG-Avondale	30	pgs 20 & 21	Page 20 and 21 - Have the correct volumes been used? If volumes in Figure 2.6-2.8 are incorrect and were substituted directly into the analysis, the analyses may be incorrect...2035 LOS appears to jump levels between build and no-build with volumes nearly the same. Is it possible that small volume fluctuations in traffic at LOS D/E could have large impact to operations, the addition of the Fairway TI would improve operations, maybe not via numbers but route selection, reduced travel time.	B	Will evaluate and confirm.	A

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71	PG-Avondale	31	pg 22	Page 22 – Table 2.14. The average delay and LOS for the Fairway Dr. North signal during both AM and PM peak hours is lower in 2035 than in 2015, is this correct? The impact study identifies the regional RAZ SE data for Avondale is increasing by 78 percent and 222 percent (pop/emp), respectively, between 2015 and 2035 yet LOS conditions along Fairview, Van Buren, Avondale, Dysart do not change significantly. Is the local TAZ near build-out for the 2015 condition (TAZ 267 shows only an 8/55% increase)?	B	Will evaluate and confirm.	A
72	PG-Avondale	32	pg 23	Page 23 – Alternatives Considered – Can you highlight items such as the City Center West project that is planned to have access to Fairway Drive to help alleviate traffic concerns along Avondale outside of the I-10 corridor? Can other arterial level improvements be highlighted with the inclusion of the Fairview TI, such as truck trips from the planned Commerce Center Distribution Center? Have these developments been incorporated into the transportation model and connected appropriately to the network or are we constrained by the “higher level” analysis condition? If local projects have been accelerated for inclusion into the 2015 analysis year, area volumes may be similar between 2015 and 2035. If the projects come on after 2015, a greater volume disparity may be indicated.	B	On page 24, the list of considerations includes the industrial park and City Center West; The modeling relied on the MAG travel demand model for traffic projections; these were completed prior to the most recent update in July 2013; so a limiting factor is how the City of Avondale has expressed the timing of these developments to MAG.	A
73	PG-Avondale	33	pg 30	Page 30. I assume volume warrants dictate the Fairway EB on-ramp as a two-lane ramp and metered although volumes in Figures 2.7 & 2.9 indicate higher single-lane ramp and mainline volumes for the WB on-ramp.	B	Will evaluate need for two-lane ramp with meter for eastbound on-ramp and need for meter on westbound on-ramp.	A

A-Will Comply B-Consultant to Evaluate C-Client to Evaluate D-No Further Action

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74	PG-Avondale	34	pg 32	Page 32 Freeways and Ramps – Is the Fairway EB exit ramp required as a three-lane cross-section at Fairview? I would assume very few left turns and thru movements with the vast majority wanting to turn right (1 left/thru/right, 1 right). Would dual right turn lanes create weaving issues with Garfield Road/Roosevelt intersection about 900 feet south?	B/C	Lane configuration is consistent with other TIs in the area.	D
75	PG-Avondale	35		I agree that 107 th Avenue is a full access TI, but it does not provide direct access. It also does not provide access to/from Loop 101. Avondale Blvd is the first TI west of Loop 101 that provides full/direct access and therefore, likely accommodates more traffic than other area TIs.	A	Will clarify text.	A
76	PG-Avondale	36		I don't understand where the 600 truck number is coming from and don't know crash software well enough to provide comment. However, the Coldwater Depot <u>TIA states 1100 truck trips per weekday</u> are to be generated from the distribution center. It does not appear that any of the safety, intersection, or freeway analysis included a change in truck traffic percentages. Do not know the sensitivity of the software to know if it would make a significant difference. I would assume the introduction of ramp junctions and weave areas may increase overall crash numbers with similar volumes.	A	Will clarify that the reference to 600 trucks is vehicles; which each make an inbound and outbound trip totaling 1100-1200 truck trips per weekday (consistent with the TIA).	A

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77	PG-Avondale	37		Some of the aerals are older than others (Figures 1.3, 1.6, 2.6, 2.8...). Tt doesn't appear that small roadway changes make a significant difference in overall volumes, but they should be changed to reflect proper conditions. I think more significantly is how the centroid connectors are connected to the network and also the ability to modify the TAZ information to show potential, known project developments that are coming on-line in the area. Peak periods volumes should show greater deviations than the daily condition.	B	Will evaluate the lane configurations depicted in the graphics and updating the aerals in graphics. The study did not consider making changes to the MAG model at the TAZ level.	A
78	PG-Avondale	38	pg 22	And has the 600 trucks been included (add/removed where appropriate) in the LOS analyses.	B	Yes, but will confirm.	A
79	PG-Avondale	39	pg 32	Fairway Drive would be a one-lane or two-lane <u>directional</u> roadway. The text write-up for both the freeway and arterial road sections should be revised when describing Fairway Drive.	A	Fairway Drive is a two-lane directional roadway. The Fairway Drive Bridge structure would be a one-lane directional roadway. Will clarify text.	A
80	PG-Avondale	40	Preliminary Plans	A dedicated right turn lane could be considered at Garfield Drive with the truck distribution center being located to the north and west. The existing Fairway Drive north of Corporate is located 100 feet west of this new intersection, which could create issues if outbound trucks are destined to Fairview due to queue and turn path (possibly convert to a 1-way northbound service drive). At Corporate Drive, an existing site driveway is located 140 feet to the north and would be located within the turn lane, this driveway could be closed if a dedicated right is planned. It appears that Corporate or Roosevelt/Garfield may require signalization in the future.	B/C	Intersection LOS is at an acceptable level without the dedicated right-turn lane. Will coordinate with the City to identify needs for intersection turn lanes and intersection control/signalization along Fairway Drive.	D

City of Phoenix - Jami Erickson

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81	J. Erickson	1	General	City of Phoenix has no water or sewer facilities impacted by the project.	D	Acknowledged	D
FHWA - Karen King							
82	K. King	1	Pg 28	Utilities - On page 28 it states "overhead power line may be a potential conflict" but on page 36 it states "these overhead utilities would be protected in place during construction. Please clarify what is intended to be meant by "may be a potential conflict".	A	Will update Sec 4.11 to identify potential conflict as stated on page 28.	A
MCDOT - Tricia Brown							
83	T. Brown	1		The MCDOT Project Management and Construction Division has reviewed the referenced report and has no comments.	D	Acknowledged	D
MAG - Chaun Hill							
84	C. Hill	1	pg 1	Why does the scope of work include widening the existing and constructing a new segment of Fairway Drive down to Van Buren?	B/C	The Fairway Drive widening and connection to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
85	C. Hill	2	pg 1	Street lighting in accordance with City of Avondale's requirements should not be a part of the Traffic Interchange project.	B/C	The Fairway Drive widening and connection to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
86	C. Hill	3	pg 1	The programmed and estimated cost section appears to include the costs for the construction of the arterial street.	B/C	The Fairway Drive widening and connection to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
87	C. Hill	4	pg 3	Fairway Drive has been identified as a collector road in local, county, and regional plans. Is this the current street classification? This is the only place in the document where it is referred to as a collector street. All other references are to the arterial.	A	Current street classification is a Major Collector. We can update the DCR text to change references to "Collector Road Section" with the groups input.	A

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88	C. Hill	5	pg 5	Table 1.2 - Utilities along Fairway Drive may not be applicable to the Fairway Drive TI project.	B/C	The Fairway Drive widening and connection to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
89	C. Hill	6	pg 8	Installation of the FMS facilities in FY16 must be coordinated very closely with the Fairway Drive TI if the TI is moved forward in the program.	A	Comment noted. The current FMS project is in the PA stage. Coordination with both project teams will be on-going as the design progresses.	A
90	C. Hill	7	pg 9	Missing data from ADOT's Pavement management Section need not include Fairway Drive and Garfield Road but the other data needs to be included.	B/C	The Fairway Drive widening and connection to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
91	C. Hill	8	pg 9	The existing pavement sections for Fairway Drive and Garfield Road are not applicable to this project.	B/C	The Fairway Drive widening and connection to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
92	C. Hill	9	pg 10	There are several references to Avondale's programs and plans related to the Fairway Drive interchange being anticipated in FY15. Although this is factual information as related to the DCR the information is speculative and has not been finalized.	A	Comment noted. Funding has not been finalized for FY15.	A
93	C. Hill	10	pg 15	Overall the traffic analysis and conclusions in no way make a very strong case for the installation of this new traffic interchange when it is concluded that the travel demand would remain relatively the same for the No-Build and Build Alternatives.	B	The need for this interchange is not solely predicated on traffic operations; a major focus is not on the total traffic, but the traffic mix (heavy trucks) that this interchange would help address.	A
94	C. Hill	11	pg 15	The last paragraph says the estimated total crashes with the No-Build is 1,049 on I-10 and with the TI the crashes are 1,108 and the next sentence seems to say the analysis showed crashes decreasing. Very confusing to the reader.	A	Will clarify data by presenting the crashes by location for the Build and No-Build Alternatives. The second sentence is specific to location while the first sentence refers to "totals".	A

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95	C. Hill	12	pg 20	The data on this page clearly indicates that the increased weaving on I-10 between Fairway Drive TI and the Dysart Road are deteriorating the performance of I-10 in the AM and PM under the build scenario in 2015.	A	Comment noted.	A
96	C. Hill	13	pg 21	The data presented for 2035 is also less than encouraging that the build scenario is a plausible recommendation with deteriorated service levels.	A	Comment noted.	A
97	C. Hill	14	pg 22	The previous two comments are clarified at the top of page 22 in the opening sentence of the first paragraph.	A	Comment noted.	A
98	C. Hill	15	pg 22	Tables 2.15 and 2.26 are related to the arterial street project and not the traffic interchange project.	B/C	The Fairway Drive widening and connection to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
99	C. Hill	16	pg 23	The summary of the operational performance shows very nominal support or justification for the installation of the Fairway Drive TI.	B	The purpose and need statement is presented on page 3; traffic operations is only part of the overall purpose and even then, the focus is on addressing the heavy truck part of the vehicle mix.	A
100	C. Hill	17	pg 28	Under Utilities, there seems to be a missing word in the next to the last sentence in the first paragraph.	A	Will revise.	A
101	C. Hill	18	pg 28	Table 3.5 should not include the cost of the arterial street portion of the construction as it is not a part of the TI construction project.	B/C	The Fairway Drive widening and connection to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
102	C. Hill	19	pg 30	The Section related to 4.1 Design Criteria refers to Fairway Drive and table 4.3 and is not a part of the TI project.	B/C	The Fairway Drive widening and connection to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A

REVIEW COMMENTS AND RESPONSES
I-10 / Fairway Drive (El Mirage) Traffic Interchange Study
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Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Initial Disp.	Response	Final Disp.
103	C. Hill	20	pg 30	Table 4.3 refers to the design controls for Fairway Drive and are not a part of the project. Table should be removed.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
104	C. Hill	21	pg 32	There is a whole section dedicated to Arterial Road and Intersections that are significantly not a part of this project and should be removed.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
105	C. Hill	22	pg 32	The right-of-way paragraph seems to include several acres of r/w for the arterial street.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
106	C. Hill	23	pg 32	The next to the last paragraph has a misspelling in the opening sentence.	A	Will revise.	A
107	C. Hill	24	pg 33	There are two separate paragraphs referring to on-site and off-site drainage design criteria for Fairway Drive which is not a part of the project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
108	C. Hill	25	pg 34	There is a recommendation related to the need for an IGA between FCDMC and the City of Avondale that is not related to this project.	A	This coordination effort is not part of the project and paragraph will be revised.	A
109	C. Hill	26	pg 34	Figure 4.3 related to the Fairway Drive drainage system is not related to this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
110	C. Hill	27	pg 35	The last paragraph under the Lighting Section is related to Fairway Drive and is not related to this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
111	C. Hill	28	pg 35	The FMS project will require coordination between the projects if built in nearly the same timeframe. The last paragraph under FMS refers to coordination with the City of Avondale.	A	Comment noted.	A

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Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Initial Disp.	Response	Final Disp.
112	C. Hill	29	pg 35	Under the section referring to signalization some may not be a part of this project, should clarify.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
113	C. Hill	30	pg 35	Table 4.4 - Construction Phasing includes a phase 4 for the construction of Fairway Drive which is not a part of this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
114	C. Hill	31	pg 36	There is a paragraph describing the construction of Fairway Drive which is not a part of this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
115	C. Hill	32	pg 36	Under section 4.11 Utilities there is reference to the 12kV electric facilities and telephone relocation for Fairway Drive which is not a part of this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
116	C. Hill	33	pg 36	Under the Retaining Walls there is mention of the embankment fills related to the approaches for Fairway Drive.	A	Correct. Embankment fills were utilized as much as possible. In other areas where there are r/w or other constraints, retaining walls were used. First sentence can be revised to clarify the intent of the section.	A
117	C. Hill	34	pg 37	In table 4.5 there is a structural section provided for Fairway Drive which is not a part of this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
118	C. Hill	35	pg 38	Table 5.1 the Estimate of probable costs includes the arterial street which is not as part of this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
119	C. Hill	36	pg 39	What does modifying the FIRM refer to?	A	Flood Insurance Rate Map (FIRM). Impacts to the floodplain are not anticipated for this project. Will revise the paragraph to clarify.	A

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Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Initial Disp.	Response	Final Disp.
120	C. Hill	37	pg 40	Under section 6.10 are the agency responses to be included in the DCR?	A	The DCR will be coordinated with the CE to include the agency responses.	A
121	C. Hill	38	Appendix A sheet 4	Section no.3 is for Fairway Drive which is not a part of this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
122	C. Hill	39	Appendix A sheet 6	Fairway Drive and Garfield Road are not being constructed with this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
123	C. Hill	40	Appendix A sheet 10	Fairway Drive and Garfield Road are not being constructed with this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
124	C. Hill	41	Appendix A sheets 16 & 17	Fairway Drive is not being constructed with this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
125	C. Hill	42	Appendix A sheet 20	Fairway Drive and Garfield Road are not being constructed with this project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
126	C. Hill	43	Appendix A sheets 33 & 34	Install these signs with the Fairway Drive construction project.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
127	C. Hill	44	Appendix C	The arterial street cost estimate should not be included nor be combined with the Fairway Drive TI cost estimate.	B/C	The Fairway Drive widening and conneciton to the TI is not applicable to the TI project and will be developed by the City. The DCR will be updated to remove this scope of work.	A
128	C. Hill	45	Appendix F	Last paragraph in the first column has a word that needs to be replaced (existing should be exiting).	A	Will revise.	A

A-Will Comply B-Consultant to Evaluate C-Client to Evaluate D-No Further Action

REVIEW COMMENTS AND RESPONSES
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Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Initial Disp.	Response	Final Disp.
129	C. Hill	46	Appendix F	Some of the Phase 2 evaluation criteria should not have included Garfield Road and Fairway Drive information.	B/C	Appendix F is a record of the alternatives development stage prior to the DCR. To clarify that the Fairway Drive improvements is not applicable to the TI project, the following text will be added to the Appendix F introduction - "The work associated with widening Fairway Drive and the connection to the TI project is not included in this DCR. However, during the alternatives development stage, the work associated with the connection between the TI project and Van Buren was taken into consideration at this stage for screening purposes."	A
130	C. Hill	47	Appendix F	Table F.2 Evaluation matrix, Phase 2 includes dollars associated with the design, right-of-way acquisition, and construction of Fairway Drive and Garfield Road and they are not a part of the project.	B/C	Refer to Overall Number 129 response.	A

APPENDIX C – ORDER OF MAGNITUDE PROJECT COST ESTIMATE

ARIZONA DEPARTMENT OF TRANSPORTATION
I-10/FAIRWAY DRIVE TI, ALTERNATIVE 1
CONSTRUCTION COST ESTIMATE SUMMARY

Alternative 1 is a tight diamond interchange. This estimate is for the ADOT freeway portion and does not include the City arterial portion. The southern limit of the ADOT freeway portion was assumed to be 850' south of the EB on/off-ramp curb returns.

I-10		ALTERNATIVE NAME: Alternative 1 (ADOT Freeway Portion)		
Dysart Rd to Avondale Blvd		ESTIMATE SUMMARY LEVEL: Level 1 (Design Concept)		
2 MILES		DATE: October 2013		
TRACS NO.: H8587 01L				
MAJOR ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
EARTHWORK				
CLEARING & REMOVALS	L.SUM	1	\$ 13,125	\$ 13,125
REMOVAL OF MISC. STRUCT & OBSTRUCTIONS	L.SUM	-	\$ -	\$ -
REMOVAL OF PAVEMENT (EXISTING AND DETOURS)	SQ.YD.	-	\$ -	\$ -
REMOVAL OF GUARDRAIL	L.FT.	1,075	\$ 3	\$ 3,225
ROADWAY EXCAVATION	CU.YD.	2,663	\$ 4	\$ 10,652
DRAINAGE EXCAVATION	CU.YD.	8,224	\$ 5	\$ 41,120
BORROW	CU.YD.	385,494	\$ 7	\$ 2,698,458
FURNISH WATER SUPPLY	MILE	0.75	\$ 150,000	\$ 112,500
SUB-TOTAL ITEMS				\$ 2,879,080
UNIDENTIFIED ITEMS	%	1	0%	\$ -
BASE AND SURFACE TREATMENT				
CONCRETE PAVEMENT	SQ.YD.	29,470	\$ 30	\$ 895,522
ASPHALT PAVEMENT	SQ.YD.	-	\$ -	\$ -
OVERLAY	SQ.YD.	29,470	\$ 5	\$ 158,625
SUB-TOTAL ITEMS				\$ 1,054,147
UNIDENTIFIED ITEMS	%	1	0%	\$ -
DRAINAGE				
ON-SITE DRAINAGE	L.SUM	1	\$ 582,576	\$ 582,576
OTHER:	L.SUM	-	\$ -	\$ -
SUB-TOTAL ITEMS				\$ 582,576
UNIDENTIFIED ITEMS	%	1	0%	\$ -
STRUCTURES				
NUMBER OF STRUCTURES: 1	SQ.FT.	15,571	\$ 81	\$ 1,268,998
OTHER:	EACH	-	\$ -	\$ -
SUB-TOTAL ITEMS				\$ 1,268,998
UNIDENTIFIED ITEMS	%	1	0%	\$ -
TRAFFIC ENGINEERING				
TRAFFIC CONTROL (2%)	L.SUM	1	\$ 272,000	\$ 272,000
SIGNING & PAVEMENT MARKING	L.SUM	1	\$ 733,414	\$ 733,414
LIGHTING	L.SUM	1	\$ 246,913	\$ 246,913
TRAFFIC SIGNAL	L.SUM	1	\$ 229,980	\$ 229,980
FREEWAY MANAGEMENT SYSTEM	L.SUM	1	\$ 149,310	\$ 149,310
SUB-TOTAL ITEMS				\$ 1,631,616
UNIDENTIFIED ITEMS	%	1	0%	\$ -
ROADSIDE DEVELOPMENT				
LANDSCAPING	L.SUM	1	\$ 280,000	\$ 280,000
EROSION CONTROL	MILE	1	\$ 50,000	\$ 50,000
UTILITY RELOCATION	MILE	-	\$ 50,000	\$ -
SUB-TOTAL ITEMS				\$ 330,000
UNIDENTIFIED ITEMS	%	1	0%	\$ -
INCIDENTALS				
MOBILIZATION (8%)	L.SUM	1	\$ 1,088,000	\$ 1,088,000
RETAINING WALLS	SQ.FT.	37,880	\$ 35	\$ 1,325,800
SAND BARREL CRASH CUSHIONS	EACH	20	\$ 5,000	\$ 100,000
GUARDRAIL END TERMINAL	EACH	8	\$ 3,500	\$ 28,000
CONCRETE HALF BARRIER	LIN FT	11,567	\$ 40	\$ 462,680
CURB AND GUTTER	LIN FT	7,215	\$ 10	\$ 72,150
SIDEWALK/SIDEWALK RAMPS	SQ.FT.	-	\$ 3	\$ -
CONTRACTOR QUALITY CONTROL (2%)	L.SUM	1	\$ 272,000	\$ 272,000
CONSTRUCTION SURVEYING (1%)	L.SUM	1	\$ 136,000	\$ 136,000
MISCELLANEOUS	L.SUM	-	\$ -	\$ -
SUB-TOTAL ITEMS				\$ 3,484,630
UNIDENTIFIED ITEMS	%	1	0%	\$ -
SUBTOTAL A (ITEMS)				\$11,231,000
UNIDENTIFIED ITEMS (15% OF SUBTOTAL A)				1,685,000
SUBTOTAL B (SUBTOTAL A+UNIDENTIFIED ITEMS)				\$12,916,000
INDIRECT COST ALLOCATION (0% OF SUBTOTAL B)				0
CONSTRUCTION ENGINEERING (9% OF SUBTOTAL B)				1,162,000
CONSTRUCTION CONTINGENCIES (5% OF SUBTOTAL B)				646,000
TOTAL ESTIMATED CONSTRUCTION COST				\$14,724,000
OTHER PROJECT COSTS				
DPS TRAFFIC CONTROL				\$0
PRIOR RIGHT UTILITY RELOCATIONS AND SERVICE AGREEMENTS				\$0
JOINT PROJECT AGREEMENT ITEMS				\$0
BID ITEM PRICE ESCALATION				\$0
CONTRACTOR INCENTIVES				\$0
CONSULTANT DESIGN SERVICES (7% OF SUBTOTAL B)				\$904,000
OTHER (RIGHT-OF-WAY)				\$1,732,391
SUBTOTAL OTHER PROJECT COSTS				\$2,636,000
INDIRECT COST ALLOCATION (10.39% OF TOTAL CONST AND OTHER COST)				1,804,000
TOTAL ESTIMATED PROJECT COST				\$19,164,000

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APPENDIX D – ALTERNATIVES DEVELOPMENT AND SCREENING, PHASE 1

This appendix presents the initial phase of the alternatives development and screening process for the build alternatives. A description of each alternative and a screening matrix are provided in the following sections, respectively. The data presented represents the information available and used at the time of the selection. Since that time, the elements of the preferred alternative have been further developed, therefore, values presented in previous sections may not match those presented in this section.

ALTERNATIVES DEVELOPMENT

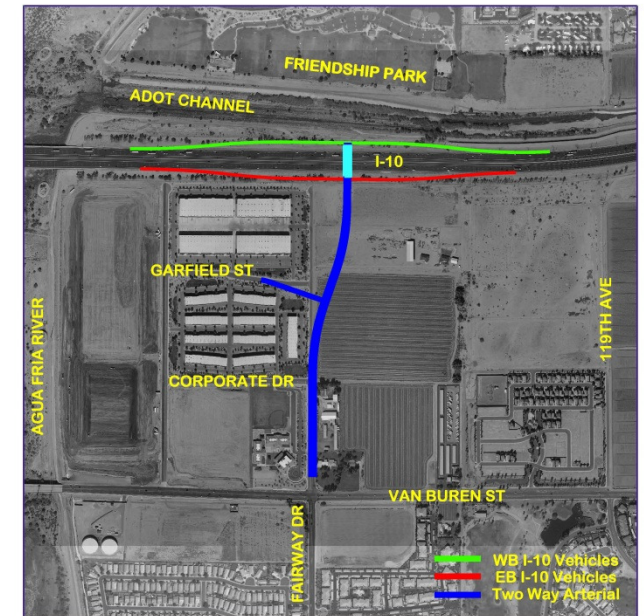
Ten alternatives were developed. The alternatives varied in location, ramp configuration, and local access connectivity. Six of the alternatives connected to I-10 just east of the Fairway Drive alignment and four alternatives connected at approximately 119th Avenue (0.5 mile west of Fairway Drive). Table D.1 lists the alternatives considered, and the following pages include brief descriptions and conceptual layouts of each alternative.

Table D.1 – Build alternatives, Phase 1

Fairway Drive alternatives		119th Avenue alternatives	
Alternative 1	Diamond	Alternative 7	Braided Diamond
Alternative 2	Diamond with At-grade Ramps	Alternative 8	Frontage Road with Embedded Ramps
Alternative 3	Southwest Quadrant Cloverleaf	Alternative 9	Southwest Quadrant Cloverleaf
Alternative 4	Southeast Quadrant Cloverleaf	Alternative 10	Hybrid-Braided Diamond/Southwest Cloverleaf
Alternative 5	Semi/Full Directional System Ramps		
Alternative 6	Hybrid-Southwest Cloverleaf/ Semi Directional Ramps		

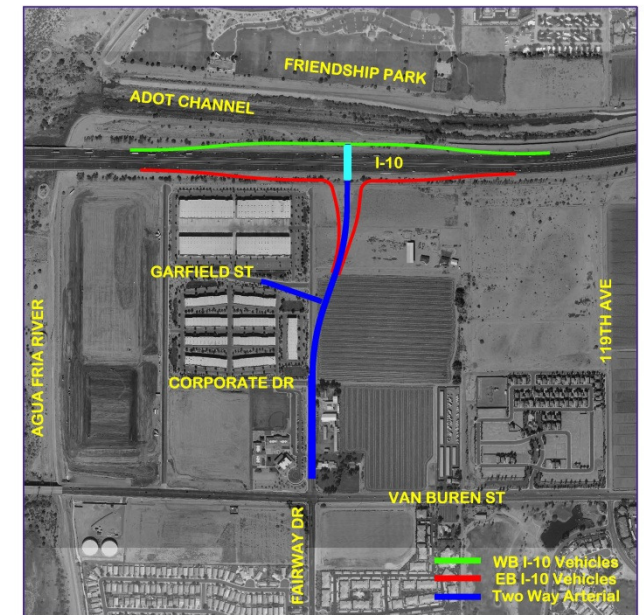
Alternative 1: Diamond

- TI is located approximately 1 mile east and west of Dysart Road and Avondale Boulevard, respectively.
- Other diamond configurations (single-point urban interchange, diverging diamond interchange, etc.) are not precluded.
- Provides direct access to industrial development west of Fairway Drive.
- Access to the future Avondale City Center West and City Center East from I-10 will be at the Avondale Boulevard TI.
- Weaving distance is approximately 2,000 feet between TIs.
- Fairway Drive realigned to take advantage of fill slopes.
- No potential connection north of I-10 because potential impacts to channel, park, and difficult connection to local streets.



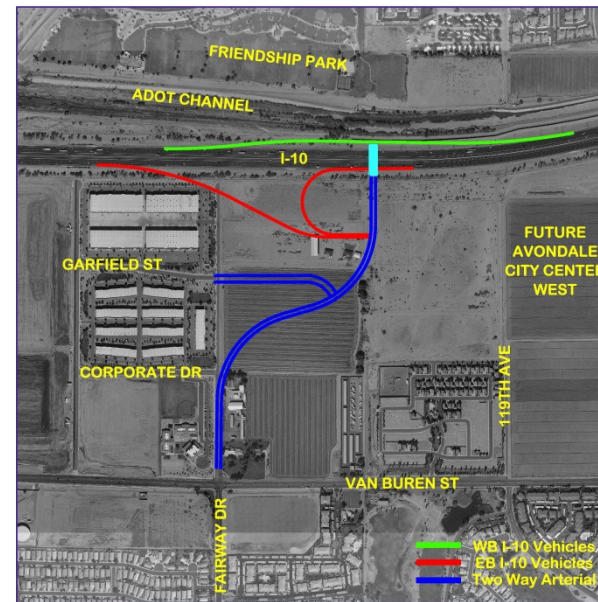
Alternative 2: Diamond with At-Grade Ramps

- Interchange located approximately 1 mile east and west of Dysart Road and Avondale Boulevard, respectively.
- Ramp/crossroad intersection set farther south to reduce walls and cost for the ramp construction.
- Provides direct access to industrial development west of Fairway Drive.
- Access to the future Avondale City Center West and City Center East from I-10 would be at the Avondale Boulevard TI.
- Weaving distance is similar to Alternative 1.
- Fairway Drive realigned to take advantage of fill slopes.
- No potential connection north of I-10 because of potential impacts to channel, park, and difficult connection to local streets.



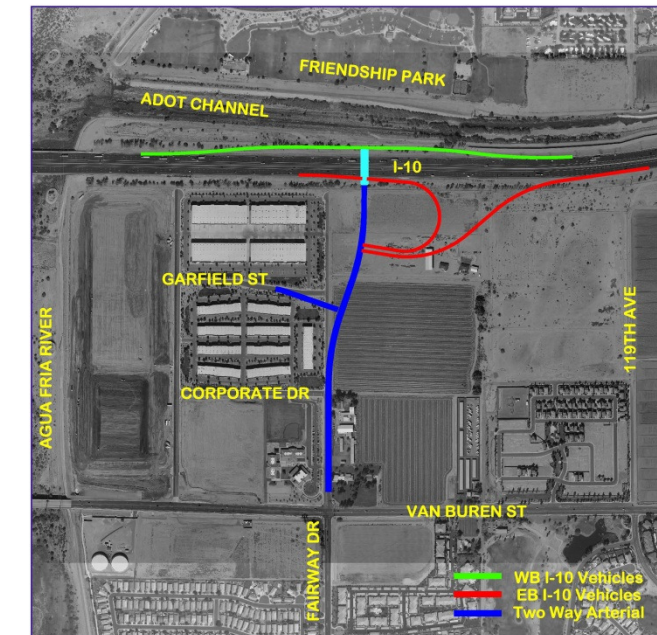
Alternative 3: Southwest Quadrant Cloverleaf

- TI is located approximately 3,800 feet west of Avondale Boulevard and 6,700 feet east of Dysart Road.
- On westbound I-10, a diamond off-ramp would provide access to Fairway Drive. This type of off-ramp provides a short weaving distance (800 feet) between Fairway Drive and Avondale Boulevard.
- For eastbound I-10, a cloverleaf ramp would provide additional weaving distance for vehicles entering eastbound I-10 as compared with a typical diamond TI. Weaving distance is approximately 2,100 feet.
- Access to industrial development west of Fairway Drive would require extension of Garfield Street.
- Access to the future Avondale City Center West and City Center East from I-10 would be at the Avondale Boulevard TI.
- Requires more right-of-way than a typical diamond TI.
- No potential connection north of I-10 because of potential impacts to channel, park, and difficult connection to local streets.



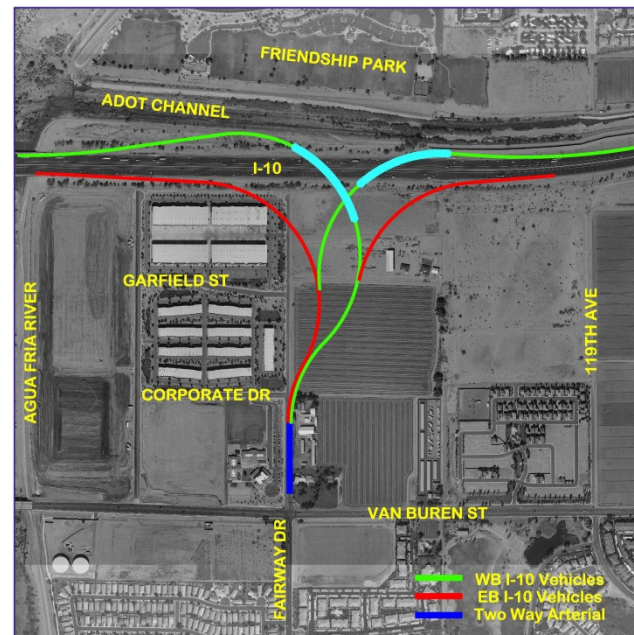
Alternative 4: Southeast Quadrant Cloverleaf

- TI located approximately 1 mile east and west of Dysart Road and Avondale Boulevard, respectively.
- On westbound I-10, a diamond off-ramp would provide access to Fairway Drive. This type of off-ramp provides approximately 2,000 feet of weaving distance between Fairway Drive and Avondale Boulevard and 2,100 feet of weaving between Dysart Road and Fairway Drive.
- For eastbound I-10, a cloverleaf off-ramp would provide access to Fairway Drive from eastbound I-10.
- The on-ramp from Fairway Drive to eastbound I-10 has a weaving distance of approximately 1,100 feet.
- Provides direct access to the industrial development west of Fairway Drive.
- Access to the future Avondale City Center West and City Center East from I-10 would be at the Avondale Boulevard TI.
- No potential connection north of I-10 because of potential impacts to channel, park and difficult connection to local streets.



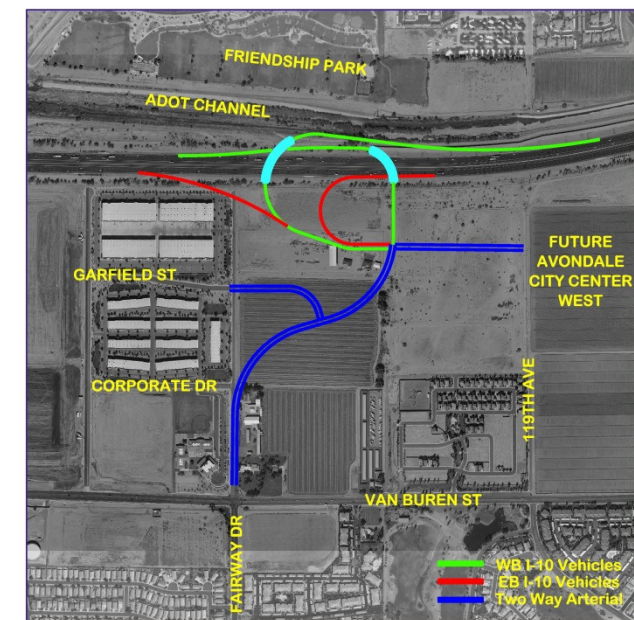
Alternative 5: Semi/Full Directional System Ramps

- Provides free-flow movements.
- Large amount of right-of-way required because the TI would have two levels above I-10.
- Short weave distances attributable to longer ramps required for vertical clearances.
- Potential impacts to ADOT drainage channel north of I-10 and existing industrial development west of Fairway Drive.
- Access to the future Avondale City Center West and City Center East from I-10 would be at the Avondale Boulevard TI.
- No potential connectivity north of I-10.



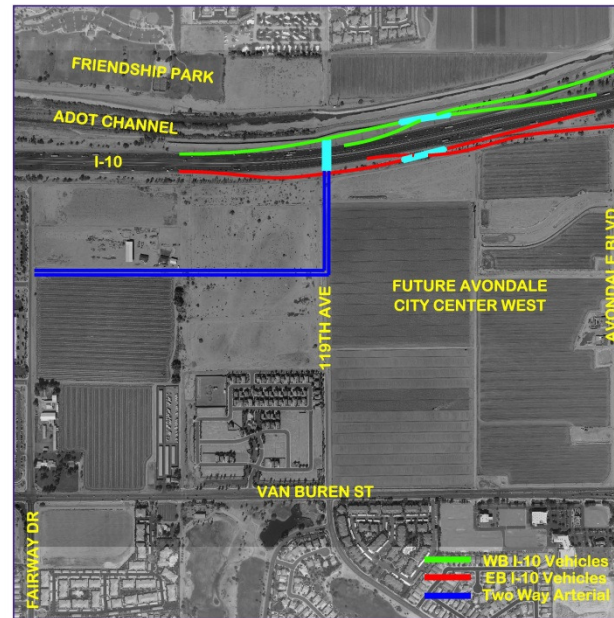
Alternative 6: Hybrid-Southwest Cloverleaf/Semi Directional Ramps

- TI is located approximately 3,800 feet west of Avondale Boulevard and 6,700 feet east of Dysart Road.
- On westbound I-10, an off-ramp would provide access to Fairway Drive. This type of off-ramp provides a short weaving distance (800 feet) between Fairway Drive and Avondale Boulevard.
- For eastbound I-10, a cloverleaf ramp would provide additional weaving distance for vehicles entering eastbound I-10 as compared with a typical diamond TI. Weaving distance is approximately 2,100 feet.
- Free flow for traffic exiting I-10 to the industrial development west of Fairway Drive.
- Access to industrial development west of Fairway Drive would require extension of Garfield Street.
- Access to the future Avondale City Center West and City Center East from I-10 would be at the Avondale Boulevard TI or a connection off of Fairway Drive.
- Requires more right-of-way than a typical diamond TI.
- No potential connection north of I-10.



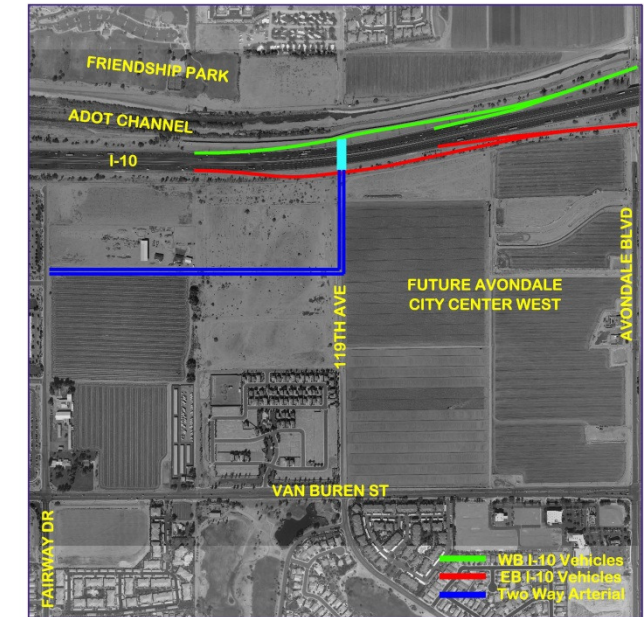
Alternative 7: Braided Diamond

- TI is located approximately 2,600 feet west of Avondale Boulevard and 7,800 feet east of Dysart Road.
- Braiding the ramps between 119th Avenue and Avondale Boulevard eliminates the need for merging and weaving due to the close proximity of the two TIs.
- The westbound I-10 on-ramp and the eastbound I-10 off-ramp at the Avondale Boulevard TI would be reconstructed.
- Access to existing and future industrial development west of Fairway Drive would be provided by constructing a new road that heads south from the 119th Avenue bridge then west along the future Roosevelt Street alignment.
- Access to the future Avondale City Center West and City Center East from I-10 would be at 119th Avenue or the Avondale Boulevard TI.
- Potential connectivity north of I-10.



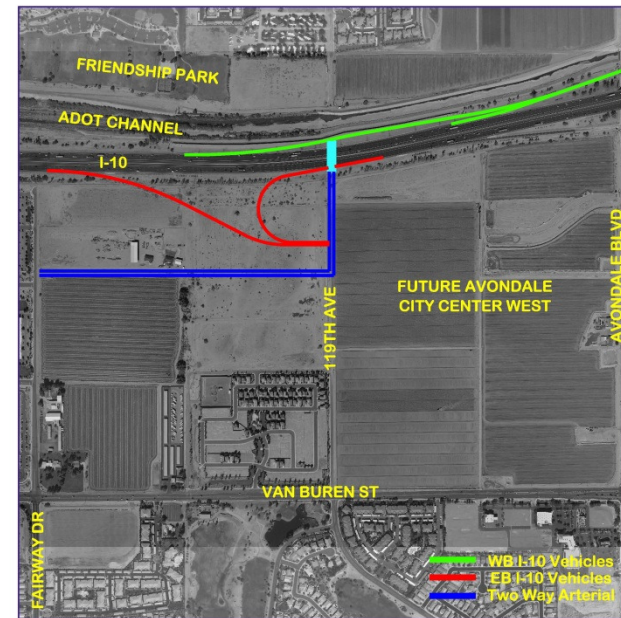
Alternative 8: Frontage Road with Embedded Ramps

- TI is located approximately 2,600 feet west of Avondale Boulevard and 7,800 feet east of Dysart Road.
- A frontage road between 119th Avenue and Avondale Boulevard eliminates the need for merging and weaving due to the close proximity of the two TIs.
- Access to 119th Avenue from I-10 would occur with vehicles exiting westbound I-10 east of Avondale Boulevard and vehicles exiting eastbound I-10 at 119th Avenue.
- Access to I-10 from 119th Avenue would occur with vehicles entering westbound I-10 at 119th Avenue, while vehicles would enter eastbound I-10 east of Avondale Boulevard.
- The Avondale Boulevard TI would still operate as a typical diamond TI.
- Access to the industrial development west of Fairway Drive would be provided by constructing a new road that heads south from the 119th Avenue bridge then west along the future Roosevelt Street alignment.
- Access to the future Avondale City Center West and City Center East from I-10 would be at 119th Avenue or the Avondale Boulevard TI.
- Potential connectivity north of I-10.



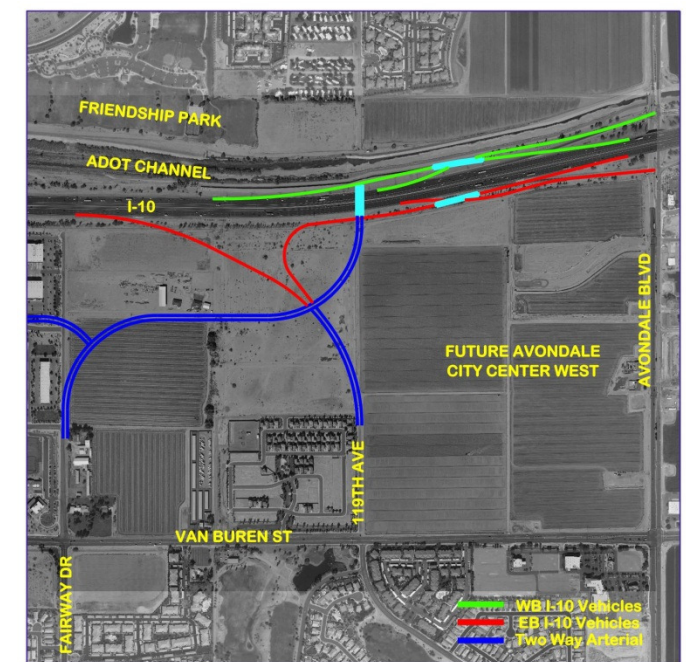
Alternative 9: Southwest Quadrant Cloverleaf

- TI is located approximately 2,600 feet west of Avondale Boulevard and 7,800 feet east of Dysart Road.
- On westbound I-10, a frontage road between 119th Avenue and Avondale Boulevard eliminates the need for merging and weaving due to the close proximity of the two TIs.
- The Avondale Boulevard TI would still operate as a typical diamond TI.
- For eastbound I-10, a cloverleaf ramp would provide additional weaving distance for vehicles entering eastbound I-10 as compared with a typical diamond TI at this location. Weaving distance is approximately 800 feet.
- Access to the industrial development west of Fairway Drive would be provided by constructing a new road south from the 119th Avenue bridge then west along the future Roosevelt Street alignment.
- Access to the future Avondale City Center West and City Center East from I-10 would be at 119th Avenue or the Avondale Boulevard TI.
- Requires more right-of-way than a typical diamond TI.
- Potential connectivity north of I-10.



Alternative 10: Hybrid-Braided Diamond/Southwest Cloverleaf

- TI is located approximately 2,600 feet west of Avondale Boulevard and 7,800 feet east of Dysart Road.
- Braiding the ramps between 119th Avenue and Avondale Boulevard eliminates the need for merging and weaving due to the close proximity of the two TIs.
- The westbound I-10 on-ramp and the eastbound I-10 off-ramp at the Avondale Boulevard TI would be reconstructed.
- Access to the existing and future industrial development west of Fairway Drive would be provided by constructing a new road that heads south from the 119th Avenue bridge then west along the future Roosevelt Street alignment.
- Access to the future Avondale City Center West and City Center East from I-10 would be at 119th Avenue or the Avondale Boulevard TI.
- Potential connectivity north of I-10.





ALTERNATIVES SCREENING MATRIX

Table E.2 provides initial screening information for each of the options considered. The criteria and a general description include:

- Community expectations – General expectations of the public for the corridor. Assumes that drivers are anticipating a standard diamond TI that is consistent with the majority of the TIs within the corridor.
- Traffic volumes – The ability for the TI type to provide additional capacity and reduce traffic burden on adjacent TIs.
- Route continuity – Relates to how vehicles can continue on I-10 through the proposed TI.

- Alignment – Describes roadway alignment, given site conditions.
- Interstate traffic service – Evaluates weaving and impacts on the highway’s through traffic.
- Local circulation – Assessment of connectivity north and south of the proposed TI to a major arterial street.
- Right-of-way – Assessment of overall impact area attributable to TI and associated roadway work.
- Structures – Includes retaining wall and bridge structures.
- Environmental – Potential environmental elements that may need to be addressed in design.
- Cost – Relative cost based on structures, right-of-way area, new roads, and ramp.

Table D.2 – Screening matrix, Phase 1

Table D-2 Screening Matrix, Phase 1										
Criterion	Fairway Drive alternatives						119th avenue alternatives			
	Diamond	Diamond with At-Grade Ramps	Southwest Quadrant Cloverleaf	Southeast Quadrant Cloverleaf	Semi/Full Directional System Ramps	Hybrid-Southwest Cloverleaf/Semi Directional Ramps	Braided Diamond	Frontage Road with Embedded Ramps	Southwest Quadrant Cloverleaf	Hybrid-Braided Diamond/ Southwest Cloverleaf
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8	Alternative 9	Alternative 10
Community expectations	▪Meets drivers' expectations ▪Access to industrial development; extension of Garfield Road	▪Meets drivers' expectations ▪Access to industrial development; extension of Garfield Road	▪Does not meet drivers' expectations ▪Access to industrial development; extension of Garfield Road	▪Does not meet drivers' expectations ▪Access to industrial development; extension of Garfield Road	▪Does not meet drivers' expectations	▪Does not meet drivers' expectations ▪Access to industrial development; extension of Garfield Road ▪Access to City Center	▪Meets drivers' expectations ▪Access to City Center ▪Access to industrial development via 119th and Roosevelt	▪Does not meet drivers' expectations ▪Access to City Center ▪Access to industrial development via 119th and Roosevelt	▪Does not meet drivers' expectations ▪Access to City Center ▪Access to industrial development via 119th and Roosevelt	▪Does not meet drivers' expectations ▪Access to City Center ▪Access to industrial development via 119th and Roosevelt
	▪Traffic volumes reduced at Dysart Road and Avondale Boulevard interchanges	▪Traffic volumes reduced at Dysart Road and Avondale Boulevard interchanges	▪Traffic volumes reduced at Dysart Road and Avondale Boulevard interchanges	▪Traffic volumes reduced at Dysart Road and Avondale Boulevard interchanges	▪Traffic volumes reduced at Dysart Road and Avondale Boulevard interchanges	▪Traffic volumes reduced at Dysart Road and Avondale Boulevard interchanges	▪Traffic volumes reduced at Dysart Road and Avondale Boulevard interchanges	▪Traffic volumes reduced at Dysart Road ▪Traffic volumes not reduced at Avondale Boulevard	▪Traffic volumes reduced at Dysart Road ▪Traffic volumes not reduced at Avondale Boulevard	▪Traffic volumes reduced at Dysart Road and Avondale Boulevard interchanges
Route continuity	▪I-10 traffic can re-enter in same direction ▪Reverse direction via crossroad	▪Westbound I-10 traffic can re-enter in same direction ▪Eastbound I-10 traffic cannot re-enter ▪Cannot reverse direction	▪Westbound I-10 traffic can re-enter in same direction ▪Eastbound I-10 traffic cannot re-enter ▪Reverse direction via crossroad	▪Westbound I-10 traffic can re-enter in same direction ▪Eastbound I-10 traffic cannot re-enter ▪Reverse direction via crossroad	▪I-10 traffic cannot re-enter in same direction ▪Cannot reverse direction	▪Westbound I-10 traffic can re-enter in same direction and cannot reverse direction ▪Eastbound I-10 traffic cannot re-enter and can reverse direction	▪I-10 traffic can re-enter in same direction ▪Reverse direction via crossroad	▪I-10 traffic can re-enter in same direction ▪Reverse direction via crossroad	▪Westbound I-10 traffic can re-enter in same direction ▪Eastbound I-10 traffic cannot re-enter ▪Reverse direction via crossroad	▪Westbound I-10 traffic can re-enter in same direction and reverse direction ▪Eastbound I-10 traffic cannot re-enter and can reverse direction

Note: Green highlights denote favorable alternatives for the specific criterion.

Table D.2 – Screening matrix, Phase 1

Criterion	Fairway Drive alternatives						119th avenue alternatives			
	Diamond	Diamond with At-Grade Ramps	Southwest Quadrant Cloverleaf	Southeast Quadrant Cloverleaf	Semi/Full Directional System Ramps	Hybrid-Southwest Cloverleaf/Semi Directional Ramps	Braided Diamond	Frontage Road with Embedded Ramps	Southwest Quadrant Cloverleaf	Hybrid-Braided Diamond/Southwest Cloverleaf
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8	Alternative 9	Alternative 10
Alignment	Alignment criterion eliminated since all alternatives were developed to meet horizontal and vertical design criteria.									
Interstate traffic service	<ul style="list-style-type: none"> Adequate weave distance 	<ul style="list-style-type: none"> Adequate weave distance 	<ul style="list-style-type: none"> Short weave section 	<ul style="list-style-type: none"> Short weave section 	<ul style="list-style-type: none"> Short weave section 	<ul style="list-style-type: none"> Short weave section 	<ul style="list-style-type: none"> Adequate weave distance Successive on-ramps Potential connectivity north of I-10 No direct connection to Van Buren from 119th 	<ul style="list-style-type: none"> Adequate weave distance Successive on-ramps Potential connectivity north of I-10 No direct connection to Van Buren from 119th 	<ul style="list-style-type: none"> Short weave section Successive on-ramps Potential connectivity north of I-10 No direct connection to Van Buren from 119th 	<ul style="list-style-type: none"> Adequate weave distance Successive on-ramps Potential connectivity north of I-10 No direct connection to Van Buren from 119th
Local circulation	<ul style="list-style-type: none"> No connection north due to potential impacts to Friendship Park Direct connection to Van Buren from Fairway Drive 	<ul style="list-style-type: none"> No connection north due to potential impacts to Friendship Park Direct connection to Van Buren from Fairway Drive 	<ul style="list-style-type: none"> No connection north due to potential impacts to Friendship Park Direct connection to Van Buren from Fairway Drive 	<ul style="list-style-type: none"> No connection north due to potential impacts to Friendship Park Direct connection to Van Buren from Fairway Drive 	<ul style="list-style-type: none"> Alternative does not allow connection to the north Direct connection to Van Buren from Fairway Drive 	<ul style="list-style-type: none"> Alternative does not allow connection to the north Direct connection to Van Buren from Fairway Drive 				
Right-of-way	<ul style="list-style-type: none"> Approximately 8 acres of new right-of-way 	<ul style="list-style-type: none"> Approximately 9 acres of new right-of-way 	<ul style="list-style-type: none"> Approximately 20 acres of new right-of-way Potential displacements 	<ul style="list-style-type: none"> Approximately 20 acres of new right-of-way Potential displacements 	<ul style="list-style-type: none"> Approximately 40 acres of new right-of-way Potential displacements 	<ul style="list-style-type: none"> Approximately 25 acres of new right-of-way Potential displacements 	<ul style="list-style-type: none"> Approximately 8 acres of new right-of-way 	<ul style="list-style-type: none"> Approximately 8 acres of new right-of-way 	<ul style="list-style-type: none"> Approximately 20 acres of new right-of-way Potential displacements 	<ul style="list-style-type: none"> Approximately 26 acres of new right-of-way Potential displacements
Structures	<ul style="list-style-type: none"> Multispan bridge over I-10 Retaining walls between ramps and main line on eastbound and westbound I-10 Retaining wall between ADOT channel and ramps 	<ul style="list-style-type: none"> Multispan bridge over I-10 Retaining walls between ramps and main line on westbound I-10 Retaining wall between ADOT channel and ramps 	<ul style="list-style-type: none"> Multispan bridge over I-10 Retaining walls between ramps and main line on westbound I-10 Retaining wall between ADOT channel and ramps 	<ul style="list-style-type: none"> Multispan bridge over I-10 Retaining walls between ramps and main line on westbound I-10 Retaining wall between ADOT channel and ramps 	<ul style="list-style-type: none"> Potentially two multispan bridges over I-10 Retaining walls along I-10 and flyover ramp approaches 	<ul style="list-style-type: none"> Multispan bridge over I-10 Retaining walls between ramps and main line on westbound I-10 Retaining wall between ADOT channel and ramps 	<ul style="list-style-type: none"> Multispan bridge over I-10 Two bridges over Avondale Boulevard on-and off-ramps Retaining walls between ramps and main line Retaining wall between ADOT channel and ramps 	<ul style="list-style-type: none"> Multispan bridge over I-10 Two bridges over Avondale Boulevard on-and off-ramps Retaining walls between ramps and main line Retaining wall between ADOT channel and ramps 	<ul style="list-style-type: none"> Multispan bridge over I-10 Retaining walls between ramps and main line on westbound I-10 Retaining wall between ADOT channel and ramps 	<ul style="list-style-type: none"> Multispan bridge over I-10 Two bridges over Avondale Boulevard on-and off-ramps Retaining walls between ramps and main line Retaining wall between ADOT channel and ramps
Environmental	<ul style="list-style-type: none"> Noise impacts to Friendship Park 	<ul style="list-style-type: none"> Noise impacts to Friendship Park 	<ul style="list-style-type: none"> Noise impacts to Friendship Park 	<ul style="list-style-type: none"> Noise impacts to Friendship Park 	<ul style="list-style-type: none"> Noise impacts to Friendship Park 	<ul style="list-style-type: none"> Noise impacts to Friendship Park 	<ul style="list-style-type: none"> Less noise impacts to Friendship Park 	<ul style="list-style-type: none"> Less noise impacts to Friendship Park 	<ul style="list-style-type: none"> Less noise impacts to Friendship Park 	<ul style="list-style-type: none"> Less noise impacts to Friendship Park
Cost	\$\$+	\$	\$\$	\$\$	\$\$\$\$	\$\$\$+	\$\$\$	\$\$+	\$\$+	\$\$\$+

Note: Green highlights denote favorable alternatives for the specific criterion.

ALTERNATIVES ELIMINATED FROM DETAILED STUDY

Draft versions of the alternative descriptions and screening matrix were provided to study team members at the March 20, 2013, progress meeting for review and comment. Final versions were provided to the study team at the April 17, 2013, progress meeting for discussion and action. A general summary of the actions taken related to each alternative is provided below.

- Alternative 1 was carried forward for detailed study.
- Alternative 2 was carried forward for detailed study.
- Alternative 3 was eliminated from further study based on:
 - Short weave distances would have a negative impact on I-10 operations.
 - Additional area of impact and right-of-way acquisitions.
 - Additional cost would exceed the project's budget.
- Alternative 4 was eliminated from further study based on:
 - Short weave distances would have a negative impact on I-10 operations.
 - Additional area of impact and right-of-way acquisitions.
 - Additional cost would exceed the project's budget.
- Alternative 5 was eliminated from further study based on:
 - Short weave distances would have a negative impact on I-10 operations.
 - Significant additional area of impact and right-of-way acquisitions.
 - Significant additional cost would exceed the project's budget.
- Alternative 6 was eliminated from further study based on:
 - Short weave distances would have negative impact on I-10 operations.
 - Significant additional area of impact and right-of-way acquisitions.
 - Significant additional cost would exceed the project's budget.
- Alternatives 7, 8, 9, 10 (all that connected to 119th Avenue) were eliminated from further study based on:
 - Undesirable impacts to residential and commercial developments north of I-10 (with north connection to McDowell Road).
 - North connection would not be consistent with local and regional plans.
 - Requires additional roads to connect to commercial and industrial developments in the area of Fairway Drive.
 - Proximity to Avondale Boulevard interchange would be undesirable and would not meet driver expectancy of 1-mile TI spacing.
 - Traffic analysis does not support need for a north connection.

APPENDIX E – ALTERNATIVES DEVELOPMENT AND SCREENING, PHASE 2

Phase 2 of the alternatives development and screening process focused on a comparative analysis between Alternatives 1 and 2. To support this comparison, additional detailed study was performed for each alternative. Preliminary plan sets with horizontal and vertical geometry were developed to increase the precision of the cost estimates and to fully develop the area of impact for each alternative. The work associated with widening Fairway Drive and the connection to the TI project is not included in this DCR. However, during the alternatives development stage, the work associated with the connection between the TI project and Van Buren as taken into consideration at this stage. The data presented represents the information available and used at the time of selection. Since that time, the elements of the preferred alternative have been further developed, therefore, values presented in previous sections may not match those in this section.

Table E.1 summarizes the detailed evaluation matrix presented in Table E.2. An initial draft of Table E.2 was provided to study team members at the May 15, 2013, progress meeting for review and comment. A final version of Table E.2, as well as Table E.1, was provided to study team members at the July 17, 2013, progress meeting. At the July 17 meeting, the study team made a recommendation related to selection of a Preferred Alternative for the project. The following is an excerpt from the meeting notes that highlights the study team discussion and ultimate recommendation.

“The group moved into open discussion of the evaluation criteria and comparison between Alternatives 1 and 2. Notable discussion items included:

- Micah Henry (MAG) noted that although the alternatives are within the RTP budget, there is approximately a \$4 million cost difference (20%) between the two alternatives and Alternative 2 should be shown as superior. He noted that the better circulation along I-10 and driver consistency may not be worth the additional cost for Alternative 1 when considering the overall RTP funding shortfalls. The study team acknowledged the cost difference, but noted that the criterion was whether the alternative could be constructed within the RTP budget and not the difference in cost.
- Tom Deitering (FHWA) agreed with the study team’s recommendation. FHWA feels that driver’s expectancy, consistency of traffic interchanges, and route continuity at the interchange are very important features that should not be compromised due to cost.
- Charles Andrews (City of Avondale) stated that they have no specific preference between the two alternatives. Charles stated that they would align their decision with FHWA’s decision on the preferred alternative.
- The group discussed traffic operational differences. Micah stated that there is a benefit to the traffic operation for Alternative 2 due to the elimination of a traffic signal. Ben Spargo (HDR) stated that the overall level of service of each alternative is C or better and that traffic signal timing could be optimized to improve the traffic operations for Alternative 1. Bob Cook with ADOT Traffic Operations stated that he would prefer a signalized intersection per Alternative 1 for safety reasons.
- The group also discussed the benefits of keeping the eastbound on- and off-ramps at-grade to reduce the grades that truck had to climb. Tom expressed that the ramp grades for Alternative 1 could be considered a benefit since it helps to slow down vehicles exiting the freeway and assists

in accelerating the vehicles for entering the freeway. Ben noted that the negative aspects of trucks climbing the grade northbound along Fairway Drive have been reduced since the grades were flattened on Fairway Drive.

After group discussion, it was agreed that Alternative 1 would be carried forward into the Change of Access Report and DCR as the Preferred Alternative. The study team will continue to look into methods of reducing the overall cost of Alternative 1 as the design progresses.”

Table E.1 – Screening summary, Alternatives 1 and 2

Evaluation category	Screening criteria	Alternative		Data supports
		1	2	
Traffic operations	Main line traffic operations comparable to no-build?	Yes	Yes	Neutral
	Avondale Boulevard and Dysart Road operations improved?	Yes	Yes	Neutral
	Reduce truck traffic on adjacent arterial streets?	Yes	Yes	Neutral
	Design consistent with interchanges along I-10, supporting driver expectancy?	Yes	No	Alternative 1
Circulation	Provides route continuity at the interchange (through movements and U-turn movements)?	Yes	No	
Right-of-way	Avoids full takes of commercial properties?	Yes	Yes	Neutral
Utilities	Avoids major utility relocations?	Yes	Yes	Neutral
Structures	Provides grade separation of I-10 with adequate width for projected traffic?	Yes	Yes	Neutral
Drainage	Avoids impact to existing I-10 drainage channel?	Yes	Yes	Neutral
Roadway	Avoids I-10 profile modifications?	Yes	Yes	Neutral
	Allows eastbound vehicles (exiting or entering) to remain at-grade?	No	Yes	Alternative 2
Environmental	Meets geometric design requirements?	Yes	Yes	Neutral
	Avoids major environmental issues?	Yes	Yes	Neutral
Probable cost	Less than <i>Regional Transportation Plan</i> budget of \$20.3 million?	Yes	Yes	Neutral



Table E.2 – Evaluation matrix, Phase 2

Evaluation criteria	No-Build Alternative	Build alternatives	
		Alternative 1 – Diamond	Alternative 2 – Diamond with At-Grade Ramps
Traffic operations			
I-10 main line LOS (merge, diverge, weave analysis): Traffic volumes used for the analysis were estimated using MAG's 2035 travel demand model projections. HCS 2010 was used to evaluate freeway operations.	<p>Based on the existing lane configuration and no TI at Fairway Drive, the following are the results of the freeway operational analysis:</p> <ul style="list-style-type: none">▪The merge at Dysart Road eastbound on-ramp operates at LOS F in the AM peak and LOS D in the PM peak.▪The diverge at Avondale Boulevard eastbound off-ramp operates at LOS E in the AM peak and LOS D in the PM peak.▪The merge at Avondale Boulevard westbound on-ramp operates at LOS C in the AM peak and LOS F in the PM peak.▪The basic freeway section upstream of Dysart Road westbound off-ramp operates at LOS C in the AM peak and LOS D in the PM peak.	<p>Based on the lane configuration on I-10 main line for the alternatives, weaving is considered to be the critical freeway operational metric. Both alternatives have the same lane configuration on the I-10 main line. The following presents the weaving analysis results for either alternative:</p> <ul style="list-style-type: none">▪ I-10 eastbound between Dysart Road and Fairway Drive: LOS E for both AM and PM peak▪ I-10 eastbound between Fairway Drive and Avondale Boulevard: LOS E and D in AM and PM peak, respectively▪ I-10 westbound between Fairway Drive and Avondale Boulevard: LOS C and E in AM and PM peak, respectively▪ I-10 westbound between Dysart Road and Fairway Drive: LOS E and F in AM and PM peak, respectively	
Interchange LOS at traffic signals: Traffic volumes used for the analysis were estimated using MAG's 2035 travel demand model projections. Synchro 7 was used to determine intersection LOS.	<p>The north intersection at the Dysart Road TI would operate at LOS D (47.7 second delay) and F (>80 second delay) in the AM and PM peak, respectively.</p> <p>The south intersection at the Dysart Road TI would operate at LOS D (46.3 second delay) and E (59.7 second delay) in the AM and PM peak, respectively.</p> <p>The north intersection at the Avondale Boulevard TI would operate at LOS D (39 second delay) and E (79.3 second delay) in the AM and PM peak, respectively.</p> <p>The south intersection at the Avondale Boulevard TI would operate at LOS E (59.7 second delay) and D (49.9 second delay) in the AM and PM peak, respectively.</p>	<p>The north intersection at the Dysart Road TI would operate at LOS C (33.4 second delay) and E (66.6 second delay) in the AM and PM peak, respectively.</p> <p>The south intersection at the Dysart Road TI would operate at LOS D (36 second delay) and D (54.2 second delay) in the AM and PM peak, respectively. Average vehicle delay is improved compared with the No-Build Alternative.</p> <p>The north intersection at the Avondale Boulevard TI would operate at LOS C (29.7 second delay) and LOS D (47.6 second delay) during the AM and PM peak, respectively. The south intersection would operate at LOS D (delay of 45.3 seconds or less) for both AM and PM peak.</p> <p>The north intersection at the Fairway Drive TI would operate at LOS B (17.1 second delay) and LOS C (29 second delay) during the AM and PM peak, respectively. The south intersection would operate at LOS C (26.9 second delay) and LOS B (14.1 second delay) for both AM and PM peak, respectively.</p>	<p>The intersection LOS at Dysart Road and Avondale Boulevard TI would operate the same as Alternative 1. Average vehicle delays at both TIs are improved compared with the No-Build Alternative.</p> <p>The north intersection at the Fairway Drive TI operates at LOS B (14.3 second delay) and LOS C (32 second delay) during the AM and PM peak, respectively. Delay at the north intersection improves slightly in the AM peak but extends slightly in the PM peak compared with Alternative 1. The south intersection is eliminated by design.</p>



Table E.2 – Evaluation matrix, Phase 2

Evaluation criteria	No-Build Alternative	Build alternatives	
		Alternative 1 – Diamond	Alternative 2 – Diamond with At-Grade Ramps
Crossroad intersection LOS: Traffic volumes used for the analysis were estimated using MAG's 2035 travel demand model projections. Synchro 7 was used to determine intersection LOS.	No analysis was conducted.	The intersection of Garfield Street and Fairway Drive operates at LOS B (delay less or equal to 15.4 seconds) during the AM and PM peak.	
Signalization			
Type and number of traffic signals at Fairway Drive ramp/crossroad intersection(s)	No signals	North intersection of TI would require a two-phase actuated traffic signal to control westbound off-ramp and northbound Fairway Drive left-turn traffic.	North intersection of TI would require a two-phase actuated traffic signal to control westbound off-ramp and northbound Fairway Drive left-turn traffic.
		South intersection of TI would require a two-phase actuated traffic signal to control northbound through, southbound through, and southbound left-turn Fairway Drive movements and eastbound off-ramp traffic.	South intersection was eliminated by design.
		Phasing and signal timing between the TI signals is critical to avoid vehicle queuing on the two-lane bridge over I-10.	Phasing and signal timing at the Garfield Street intersection is critical to avoid vehicle queuing on the eastbound off-ramp.
Type and number of traffic signals at Garfield Street	There is no existing traffic signal at this intersection. It currently functions as free flow for north- and southbound Fairway Drive traffic, with stop control for Garfield Street traffic.	Requires two-phase actuated traffic signal control to control northbound/southbound Fairway Drive traffic and westbound Garfield Street traffic.	
Other traffic control options	No signals	Roundabout is another traffic control option that can be considered at the Garfield Street intersection. Analysis will need to be performed to determine whether this option has an acceptable LOS or comparable LOS as a signalized intersection.	Roundabout is another traffic control option that can be considered at the Garfield Street intersection. The southbound queue length with a roundabout at Garfield Street intersection should be closely reviewed with the available distance from eastbound off-ramp merge location for this alternative. Analysis will need to be performed to determine whether this option has an acceptable LOS or comparable LOS as a signalized intersection.
Lighting			
I-10 main line	Existing I-10 main line has median barrier-mounted Type U69 poles with two overhead luminaires at approximately 320 feet spacing.	The proposed TI would require a revision of the main line lighting scheme. The most likely conversion is by adding six to eight 100-foot HM poles between the main line and on- and off-ramp poles. Type G or Type I pole mount luminaires may be added at ramp merge and diverge gore area to provide desired level of lighting for the TI area.	The proposed TI will require a revision of the main line lighting scheme. The most likely conversion is by adding six to eight 100-foot HM poles between the main line and on- and off-ramp poles. Type G or Type I pole mount luminaires may be added at ramp merge and diverge gore area to provide desired level of lighting for the TI area. Type G or Type I pole mount luminaires may be added to ramp structures south of I-10 to obtain desired level of lighting as they connect to Fairway Drive.



Table E.2 – Evaluation matrix, Phase 2

Evaluation criteria	No-Build Alternative	Build alternatives	
		Alternative 1 – Diamond	Alternative 2 – Diamond with At-Grade Ramps
Fairway Drive	Existing Fairway Drive north of Van Buren Street has light poles on the west side of road at approximately 125-foot spacing. South of Van Buren Street has a light pole median mount with two luminaires and staggered light poles on both sides of street at approximately 150-foot spacing.	Some concept of center median-mounted poles based on available space in combination with side-mounted staggered pole should be implemented to provide desired level of roadway lighting.	
		Proposed Fairway Drive signalized intersections at TI and Garfield Street may need luminaires on the signal poles to light the intersection.	
	The existing traffic signal at El Mirage Road and Van Buren Street has luminaires on all four signal poles.		
Circulation			
Route continuity	No direct access to Fairway Drive.	Provides full access at the TI.	Through traffic from eastbound off-ramp to eastbound on-ramp as well as eastbound off-ramp to westbound on-ramp requires median U-turn at the intersection of Garfield Street and Fairway Drive.
Access to Van Buren Street	No direct access to Van Buren Street through Fairway Drive.	Provide direct access to Van Buren Street through Fairway Drive.	
Access to adjacent properties	Existing access from Fairway Drive would remain.	Alternatives provide direct access to adjacent properties only south of the proposed TI.	
Pedestrian circulation	Existing circulation from Fairway Drive would remain.	Since Fairway Drive does not continue north of I-10, pedestrians would be prohibited north of Garfield Street.	
Bicyclist circulation	Existing circulation from Fairway Drive would remain.	Bicyclists would travel with the through vehicle movement. Since Fairway Drive does not continue north of I-10, bicycles would be prohibited north of Garfield Street.	
Aqua Fria River Trail access	Existing access would remain.	No impacts to trail access.	
Right-of-way			
New right-of-way	No impacts	12.1 acres	12.0 acres
Residential acquisitions	No impacts	4 partial	4 partial
Commercial acquisitions	No impacts	2 partial	3 partial
Utilities			
Power transmission lines	No impacts	230 kV Salt River Project/Western Area Power Administration overhead power lines cross I-10 east of Fairway Drive and will not be affected by proposed improvements. 69 kV Salt River Project/Arizona Public Service overhead power lines and a 12 kV Salt River Project underground line cross I-10 at mid-mile section between Fairway Drive and Avondale Boulevard and will not be affected.	
Sanitary sewer	No impacts	No impacts are anticipated to the 24-inch City of Avondale sanitary sewer that crosses I-10 at mid-mile section between Fairway Drive and Avondale Boulevard.	
Others	No impacts	Other utilities such as telephone lines, 12 kV power lines, and irrigation pipes buried under I-10 would remain as-is or be relocated. Telephone, 12 kV distribution power, irrigation lines, and well and water valves/hydrants would be adjusted or relocated along Fairway Drive as needed.	

Table E.2 – Evaluation matrix, Phase 2

Evaluation criteria		Build alternatives	
		Alternative 1 – Diamond	Alternative 2 – Diamond with At-Grade Ramps
Structures			
Existing bridge structures	No existing structures	No existing structures	
		The structure is assumed to be a two-span precast AASHTO girder for a total length of 230 feet.	
New bridge structures	No new bridge structures	<p>A cast-in-place (CIP) structure was not considered because of the need to provide full vertical clearance during construction when using falsework over I-10. This would require a higher roadway profile for Fairway Drive.</p> <p>Two types of substructures at the abutments could be considered: a full-height wall abutment and an abutment on cap beam columns and drilled shafts with a mechanically stabilized earth (MSE) wall placed behind the abutment to support the roadway embankment.</p>	
		<p>Wall 1: I-10 eastbound off-ramp (south side of I-10) Maximum combined wall and embankment height of 18 feet Maximum wall height (wall only) of 28 feet (no embankment)</p> <p>Wall 2: Adjacent to bridge abutment (south side of I-10) Maximum wall height (wall only) of approximately 28 feet (no embankment)</p> <p>Walls 3 and 4: I-10 westbound on- and off-ramps (north side of I-10) Maximum combined heights: <ul style="list-style-type: none"> Wall 3: 9-foot-high wall on 21-foot-high embankment Wall 4: 18-foot-high wall on 10-foot-high embankment Walls 3 and 4 are back-to-back with minimum spacing of about 32 feet. Embankment slopes at 3H:1V. Overexcavation and replacement of upper few feet (depth to be determined) of loose/soft native soils beneath embankment and wall footprints likely would be required to reduce settlement potential, regardless of wall type or configuration. Toe of the Wall 4 embankment is 30 feet (at closest point) from the crest of the adjacent ADOT drainage channel to the north. Embankment and wall stability and performance are not anticipated to be negatively affected by flows in the drainage channel.</p> <p>Potential wall types that can be used are MSE and CIP cantilever walls.</p> <p>MSE walls will require select granular material within the reinforced backfill zone, whereas CIP cantilever retaining walls will require structure backfill behind the walls.</p> <p>When compared with Alternative 2, the construction of the tall retaining walls would be more complex.</p>	<p>Wall 1: not required</p> <p>Wall 2: not required</p> <p>Walls 3 and 4: I-10 westbound on- and off-ramps (north side of I-10). Maximum combined heights: <ul style="list-style-type: none"> Wall 3: 9-foot-high wall on 21-foot-high embankment Wall 4: 18-foot-high wall on 10-foot-high embankment Walls 3 and 4 are back-to-back with minimum spacing of about 32 feet. Embankment slopes at 3H:1V. Overexcavation and replacement of upper few feet (depth to be determined) of loose/soft native soils beneath embankment and wall footprints likely would be required to reduce settlement potential, regardless of wall type or configuration. Toe of the Wall 4 embankment is 30 feet (at closest point) from the crest of the adjacent ADOT drainage channel to the north. Embankment and wall stability and performance are not anticipated to be negatively affected by flows in the drainage channel.</p> <p>Potential wall types that can be used are MSE and CIP cantilever walls.</p> <p>MSE walls will require select granular material within the reinforced backfill zone, whereas CIP cantilever retaining walls will require structure backfill behind the walls.</p> <p>The tall walls for the westbound on- and off-ramps would be similar to Alternative 1, but there are no walls for eastbound on- and off-ramps, which simplifies construction and shortens the construction time frame.</p>



Table E.2 – Evaluation matrix, Phase 2

Evaluation criteria	No-Build Alternative	Build alternatives	
		Alternative 1 – Diamond	Alternative 2 – Diamond with At-Grade Ramps
Drainage			
		Off-site drainage will be coordinated by ADOT and Flood Control District of Maricopa County (FCDMC). Similar facilities would be provided for either alternative. The existing channel north of I-10 would be maintained and provide conveyance for off-site discharge forming north of the project site. The channel would serve a dual purpose as a drainage outfall for on-site drainage collected along the I-10 corridor.	
Off-site	No off-site drainage improvements	Fairway Drive would require roadside ditches to capture off-site discharge and convey discharge to the southern outfall at the proposed FCDMC channel along Van Buren Street. Additional opportunities to drain discharge include the median areas between the on- and off-ramps and I-10. Basins located in this area would serve a dual purpose of removal and mitigation of on-site discharge along with addressing first flush and water quality concerns. The purpose of the roadside channels is to relieve ponding along the western embankment of the proposed alignment.	
On-site	No on-site drainage improvements	Standard ADOT design practices would be followed. Storm drainage pipes would be extended to tie into the existing off-site drainage channel north of I-10.	
I-10 main line			
Profiles	No profile modifications	No adjustments to I-10 profile. Proposed crossroad uses 5.95% profile.	No adjustments to I-10 profile. Proposed crossroad uses 5.95% profile. Eastbound entrance and exit ramps remain at grade.
I-10 modifications	No work on I-10 main line	Addition of auxiliary lanes to I-10 for Fairway Drive on- and off-ramps. Advance signing would be updated for the new exits.	
Constructibility	No construction required	Construction of ramps can occur with minimal impacts to I-10 through traffic. HOV lane closure may be required to construct bridge pier. Placement of girders and bridge deck pours may require closures on I-10.	
Environmental			
Air quality	No new impacts	Analysis would include a quantitative PM ₁₀ hot-spot analysis and a CO hot-spot analysis.	
Biological resources	No new impacts	Biological Review resulted in finding of “no effect.” Burrowing owl preconstruction surveys would be required.	
Cultural resources	No new impacts	Two historic homes are located outside of construction footprint. A Class III survey and consultation with State Historic Preservation Office and tribes would be performed There are no known cultural concerns.	
Environmental justice, Title VI	No new impacts	No concerns noted.	
Hazardous materials	No new impacts	A Preliminary Initial Site Assessment will be conducted. No concerns are anticipated. Lead-based paint sampling for painted structures and asbestos sampling for disturbed concrete would be required.	
Land use, socioeconomics	No new impacts	Approximately 4 acres of farmland would be converted to a transportation use.	
Noise	No new impacts	A noise analysis at Friendship Park and at receivers located at Van Buren Street/Fairway Drive will be completed.	
Section 4(f)	No new impacts	No impacts anticipated but will be evaluated.	
Water resources, floodplains	No new impacts	No U.S. Army Corps of Engineers permitting or Federal Emergency Management Agency involvement is anticipated.	
Agency support			
Agency support	The no-build would not relieve congestion at the adjacent TIs, nor would it help separate truck traffic from the cars at those TIs. This would not be supported by agency stakeholders.	Agency stakeholders would support the consistency of this alternative with other interchanges on I-10. Agency stakeholders may not support the amount of retaining walls required, which would add additional cost.	Agency stakeholders would support the reduction of the amount of walls required due to the eastbound on- and off-ramps staying on grade. Agency stakeholders may not support the lack of through movements on the eastbound off-ramp to the eastbound on-ramp.

Table E.2 – Evaluation matrix, Phase 2

Evaluation criteria	No-Build Alternative	Build alternatives	
		Alternative 1 – Diamond	Alternative 2 – Diamond with At-Grade Ramps
Probable cost			
Right-of-way cost	\$0	\$910,000	\$850,000
Construction and design cost	\$0	\$19,300,000	\$15,600,000
Total cost	\$0	\$20,210,000	\$16,450,000

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APPENDIX F – TRAFFIC AND SAFETY ANALYSIS FILES

Electronic versions of traffic and safety analysis results are available upon request.