

**PROJECT ASSESSMENT
FOR
NORTH VALLEY PARKWAY & SONORAN WASH BRIDGE**

City of Phoenix Project Number: ST85110174-1

JUNE 2021

Prepared for and Approved By:



Prepared By:

TYLININTERNATIONAL

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1.0 INTRODUCTION

1.1 Overview

The primary purpose of this Project Assessment (PA) is to establish a preferred alternative for an all-weather crossing over Sonoran Wash for the extension of North Valley Parkway from Dixileta Drive to Rancho Tierra Drive. In total, the length of the project along the existing North Valley Parkway alignment is approximately 4,000 feet. In general, this PA was written with the assumption that local funds will be used for design and construction of this project.

1.2 Alternatives

The project alternatives considered as part of this PA include all-weather crossings over Sonoran Wash. Alternative A is a short bridge option over the floodway and alternative B is a long bridge option over the floodplain. Alternative 3 is a discussion only (no plans or cost estimate prepared) regarding the possibility of “shifting” either of the Alt A or Alt B concepts northerly to avoid existing City utility infrastructure. A concrete ‘super-box’ culvert option was also briefly considered for the Skunk Creek Wash crossing however was quickly dismissed as discussed later in this report.

2.0 PROJECT INFORMATION

2.1 Location

The project is located along North Valley Parkway and is approximately 4,000 feet in length. The project’s southern boundary is the intersection of Dixileta Drive and North Valley Parkway. The northern boundary is the intersection of Rancho Tierra Drive and North Valley Parkway. Figure 1 – Location Map provides an aerial depiction of the project location.

Currently there are ½ street improvements along the east side of the alignment that provide 1 lane in each direction with a center turn lane. Final striping limits would have to extend up to ½-mile beyond the actual construction limits.

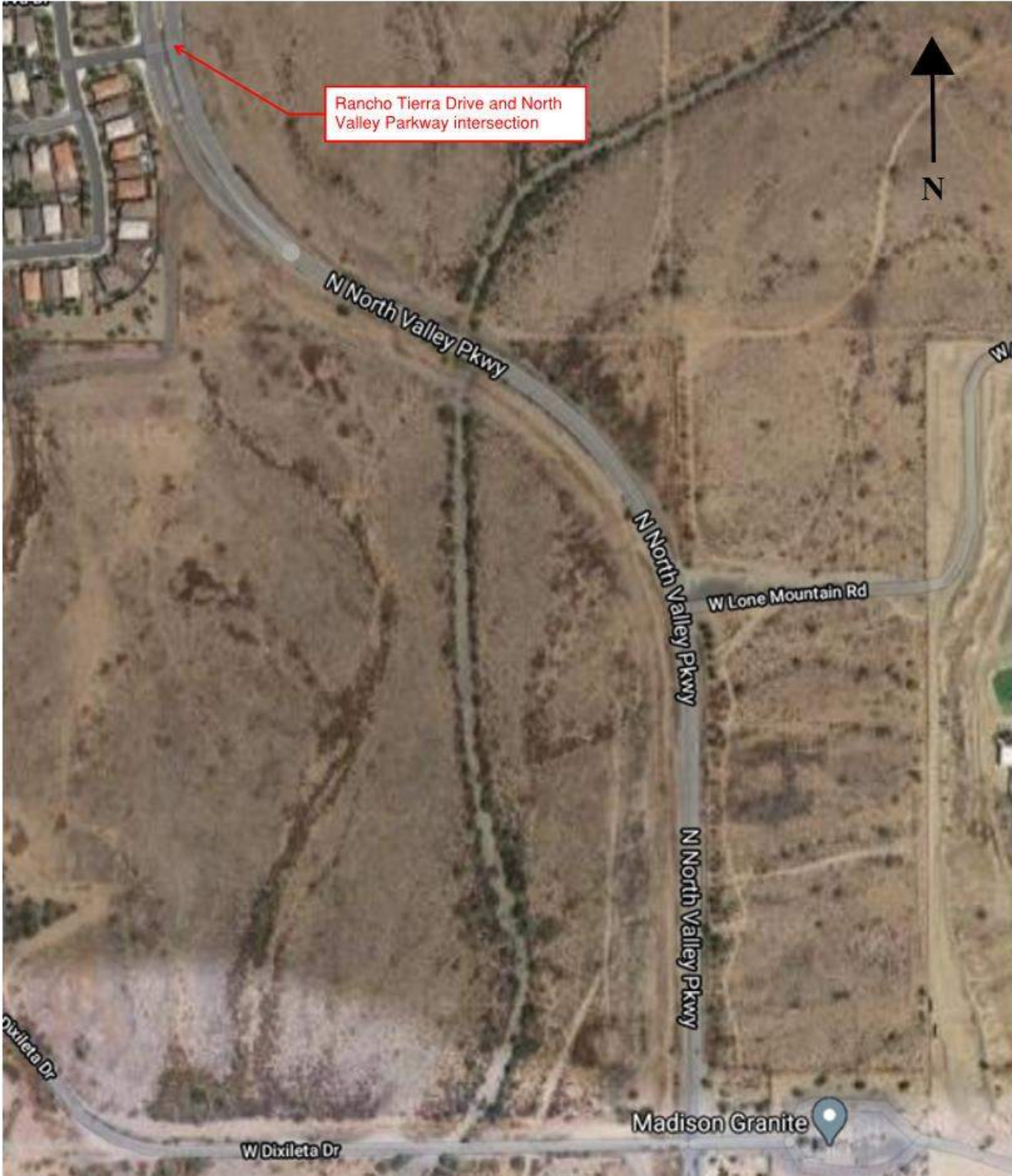


Figure 1 – Project Location

2.2 Existing Utilities

The following table is a list of existing utility companies with facilities located within the project area.

Utility Company	Type	Description	Conflict
APS	Electric	Underground	Yes ¹
CenturyLink	Fiber Optic	UG Conduits	Yes ¹
City of Phoenix	Storm Drain	24", 30", 36" & 48" RCP	No
City of Phoenix	Water	12" & 16" Pipes 54" PCCP Pipe	Yes ¹
City of Phoenix	Sewer	12" & 24" Force Mains 8" & 30"	Yes ²
City of Phoenix	Communications	UG Conduits	No
Cox	Fiber Optic	UG Conduits	No
Southwest Gas	Gas	4" & 6" PE, 8" Steel	Yes ¹

1 – Potential conflict with bridge foundation, 2 – Potential conflict with drainage improvements

2.3 Existing Right-of-Way

The existing right-of-way for North Valley Parkway between Dixileta Drive north to the Mid-Section Line (Montgomery Road alignment) is 70' either side of the roadway centerline. From the mid-section line to just south of Rancho Tierra Dr the existing right-of-way is 30' west and 70' east of the North Valley Parkway centerline. From just south of Rancho Tierra Drive to the north the existing right-of-way is 70' either side of the North Valley Parkway centerline.

2.4 Existing Drainage Conditions

The offsite watershed for Sonoran Wash extends to the northeast into the foothills of the Phoenix Sonoran Preserve. The contributing watershed at the North Valley Parkway crossing is approximately 7 square miles. The watershed was originally studied and a Letter of Map Revision produced by the Flood Control District of Maricopa County (FCD 99-23). Sonoran Wash is tributary to Skunk Creek which joins just downstream of the Central Arizona Project Canal (adjacent to Interstate Highway I-17). The effective hydrologic models identify the 100-year discharge as 9,700 cubic feet per second (cfs) at the crossing location per a completed Letter of Map Revision (LOMR) prepared in December 2011 as part of the 'North Black Canyon Crossing Drainage Evaluation'.

3. PROJECT ALTERNATIVES

Given the significance of flows in Sonoran Wash at this crossing location, an overall drainage evaluation effort was completed to assess the impacts to the physical wash crossing and associated flows for each of the proposed alternatives. The general approach to that modeling effort is described below prior to the discussion of each alternative for the wash crossing.

3.1 Hydrologic Modeling Procedure for Sonoran Wash

To model the impacts of the different bridge alternatives it was first necessary to rerun the effective hydraulic models as described below.

- Effective Model - This is the model in which the effective floodplain and floodway are based upon. The Effective Model was created in HEC-RAS version 2.2.
- Duplicate Effective Model - This is the effective model run with an updated version of HEC-RAS (Version 5.0.7), and then inspected for errors. No errors found.
- Corrected Effective Model - This model is usually created if there is new topography or survey resulting in modified cross sections of the effective model. No new topography exists; therefore, this model was not created.
- Proposed Project Model - Using the Duplicate effective model as a base, this model was developed for two bridge alternatives for the Sonoran Wash crossing (“Short” and “Long”). New cross-sections were added up and downstream of the proposed roadway/bridge alignment and each bridge was modeled. Additionally, each alternative required unique training dikes to channelize flow to the bridge crossings. The table below provides the Water Surface Elevation Result comparison between the Effective and Duplicate Effective models.

Bounding Cross Sections	100-year Discharge [cfs]	Water Surface Elevation (Floodplain)	
		Effective Model [elev.]	Duplicate Effective [elev.]
1.84	9,700	1558.37	1558.37
1.77	9,700	1556.42	1556.42
1.72	9,700	1555.07	1555.07
New Bridge	9,700	-	-
1.65	9,700	1552.86	1552.86
1.56	9,700	1550.07	1550.07

3.2 Alternative A – Structure to Span the Floodway (short bridge)

For this Alternative, the roadway profile can meet the clearance requirements over Sonoran Wash and will extend southerly to a tie in location south of the Dixileta Drive intersection and northerly to a tie in location near the Rancho Tierra Drive intersection. The alignment of Alternative A follows the current right-of-way and centerline for North Valley Parkway. Detailed 15% project plans are included in Appendix A for this alternative.

The proposed structure crossing consists of 3 unequal spans with an overall bridge length of 336'-10". The span length is 110'-7¼" for span 1, 111'-0⅝" for span 2 and 108'-4¼" for span 3. Based on the expansion joint movement rating of 4 inches for a strip seal joint, expansion joints have been located at abutment 1 and abutment 2. The typical section is symmetric about the construction centerline. The typical section at the bridge consists of a 1'-2" outside pedestrian rail, an 8'-6" sidewalk, a 6'-0" bike lane, two 11'-0" lanes, one 12'-0" lane and 24'-0" raised median centered about the construction centerline. The resulting overall bridge width is 123'-4". The 24'-0" raised median width was not reduced for the bridge crossing as part of this Scoping Effort given the proximity of the bridge crossing to both the Madison Granite northerly site access and North Gateway Transfer Station intersections. During the

final design stage of the project, the designer should determine if the median width can be reduced across the bridge structure to potentially reduce the overall bridge width based on revised locations of either of these key adjacent business access points. The deck slab thickness is 8 inches except at the edges where 9 inches is required. For the required spans and geometry, 14 UBT50 precast prestressed I-girders are equally spaced along the bearings. Because of the curved geometry, the overhang, spacing and skew are varied with a maximum perpendicular spacing of 9.05' and a maximum perpendicular overhang of 3.71'.

Each of the 2 piers consists of a 6'-0" wide by 6'-0" deep cap supported by five (5) 4'-0" diameter columns each on an individual 7'-0" diameter drilled shaft. These piers have been designed for 11.1 feet of scour for the 100-year design event.

Each abutment consists of a 1'-0" thick back wall with an approach slab seat and a 6'-0" wide stem supported by a single row of seven (7) 5'-0" diameter drilled shafts. These abutments have been designed for 16 feet of scour for the 500-year design event. A short 5'-0" long wingwall extends beyond the stem so the required retaining walls do not conflict or undermine the abutment. A stacked gabion basket retaining wall is proposed in front of the abutments to protect them from the 100-year flood event.

The proposed roadway alignment along North Valley Parkway would consist of a 40' wide pavement section in each direction providing for 3 lanes and a bicycle lane. Throughout the alignment, a 24' wide curbed median would be provided. For the southernmost 2,000' and northernmost 700' of this alternative, the typical section will include a detached 5' sidewalk separated by an 8' landscape buffer to minimize impacts to existing infrastructure. From approximately Station 30+50 to Station 43+50 for 1,300 feet however, the typical section will transition to provide for an attached sidewalk with retaining wall located behind the sidewalk to minimize right-of-way acquisition and extent of required grading adjacent to existing and future subdivisions in the transitional locations to the bridge structure. This 1,300' section of the existing north bound roadway would be reconstructed to match the bridge profile. The southbound lanes would be constructed for the length of the project between Dixileta Drive to south of the Rancho Tierra Drive. Left turn lanes along North Valley Parkway would be added at existing intersections. Pavement markings limits would extend approximately ½-mile beyond the roadway construction in-order to achieve the desired lane configuration.

The table below provides the Water Surface Elevation Result comparison between the Duplicate Effective and Proposed hydrologic models.

Bounding Cross Sections	100-year Discharge	Corrected Effective¹	Proposed Conditions²	Elevation Change
	[cfs]	[elev.]	[elev.]	[ft]
1.84	9,700	1,558.37	1,558.20	-0.17
1.77	9,700	1,556.42	1,556.83	0.41
1.72	9,700	1,555.07	1,556.27	1.20
1.71	9,700	1,554.90	1,555.89	0.99

1.70 Bridge (U/S)	9,700	-	1,554.49	-
1.70 Bridge (D/S)	9,700	-	1,553.83	-
1.68	9,700	1,553.83	1,553.61	-0.22
1.65	9,700	1,552.86	1,552.86	0.00
1.56	9,700	1,550.07	1,550.07	0.00

Notes: 1) Model includes new x-sections 1.71 and 1.68, 2) Model includes new x-sections 1.71, 1.69 and 3-span bridge

The Work Map in Appendix C provide a graphical depiction of the upstream and downstream impacts to the proposed flows and water surface elevations in Sonoran Wash for Alternative A.

Based upon the results of this alternative a bridge soffit of 1558.5 will provide 4-feet of freeboard to meet City of Phoenix Requirements for conveyance of a 100-year storm. The maximum Sonoran Wash flow depth under the bridge is 9.9 feet and the maximum flow velocity beneath the bridge is 9.2 feet per second. The final design should include the preparation of a Conditional Letter of Map Revision (CLOMR) for review by City of Phoenix and submittal to FEMA. The CLOMR will need to include detailed discussion of proposed maintenance provisions for the proposed channelization structures upstream and downstream of the bridge crossing in Sonoran Wash.

Guide Banks/Training Dikes

Due to the width of the effective floodplain, new guide banks will be required upstream of the new bridge to cause a constriction and force storm water runoff to concentrate in the main wash to pass through the short bridge opening. The contraction of flow approaching the bridge should not exceed a 2:1 ratio and the guide bank should provide a minimum of 3-feet of freeboard and be continuous beyond the edge of the effective floodplain.

On the downstream side, an additional length of guide bank is required to control the expansion of flow back to the nominal wash width. This embankment should specifically protect from backwater effects that could impact the North Valley Parkway roadway embankment.

Given the requirements in the North Black Canyon Specific Plan, any proposed wash armoring including guide banks are required to be natural in look. Therefore, gabion gravity walls are proposed for the Sonoran Wash crossing upstream and downstream of the bridge crossing to meet this requirement. The proposed walls will be laid back at a 1:1 side slope to mirror existing natural conditions for how the Sonoran Wash banks have been excised over time by the flows. Gravity gabion retaining walls will provide the necessary stabilization of the banks. Behind the gravity gabion retaining walls, earthen embankment material will be necessary to create the channelization immediately upstream and downstream of the bridge structure. It may be necessary to utilize riprap on top of the earthen embankment material once geotechnical evaluation is completed and exact material characteristics, specifically the likelihood of erosion, of Sonoran Wash are determined. In the case of dumped/placed riprap the following table applies to rock size and layer thickness.

Scenario	100-year Discharge	Maximum Channel Velocity	Riprap D50	Layer Thickness
	[cfs]	[fps]	[ft]	[ft]
Short Bridge - Upstream	9,700	9.2	1.2	2.4
Short Bridge - Downstream	9,700	9.2	1.2	2.4

Note: Riprap sizing calculations from DDMSW V. 5.6.0 (FCDMC)

Bridge Scour

Given the lack of available geotechnical information for Sonoran Wash, two different approaches to estimating the proposed bridge scour were performed for this study.

The first approach to estimating total scour was prepared using Arizona Department of Water Resources State Standard 5-96 (Level 1 Analysis). This method estimates total scour from generalized equations derived from empirical data combining general and long-term scour based solely upon the 100-year peak discharge. For Sonoran Wash, at the location of interest, the total scour depth is calculated as 11.1 feet.

The second approach utilizes a June 2001 study prepared by JE Fuller Hydrology & Geomorphology, Inc. as part of the *Skunk Creek Watercourse Master Plan* which calculated potential scour at specific locations within the Skunk Creek and Sonoran Wash watersheds. This report acknowledges that no geotechnical data was available for the study area except for limited boring details provided on as-built construction plans for the drainage structures along Carefree Highway and New River Road.

Chapter 5 of the 2001 report addresses general scour among other topics. General Scour (Zgs) is a component of Total Scour (Zt). Specifically, the scour equation is:

$$Z_t = 1.3 * (Z_{gs} + 0.5 * Z_a + Z_{ls} + Z_{lt} + Z_{bs} + Z_{lft})$$

where:

- Zt = Design scour depth, excluding long-term degradation or aggradation (ft)
- Zgs = General scour depth (ft)
- Za = Anti-dune trough depth (ft)
- Zls = Local scour depth (ft)
- Zlt = Long Term scour depth (ft)
- Zbs = Bend scour depth (ft)
- Zlft = Low-flow thalweg depth (ft)
- 1.3 = Safety factor to account for nonuniform flow distribution

For Sonoran Wash, scour estimates are shown in the following table.

Reach	Total Zt [ft]	General Zgs [ft]	Antidune Za [ft]	Bend Angle	Bend Zbs [ft]	Local Zls [ft]	Long- Term Zlt [ft]	Thalweg Zlft [ft]
3	1.9	-0.6	0.8	20.8	0.1	0.0	0.0	1.0
2	1.9	-0.6	0.7	20.8	0.1	0.0	0.0	1.0
1	1.8	-0.5	0.5	20.8	0.1	0.0	0.0	1.0

Notes: Reach 1 is at CAP Canal; the project site falls between Reaches 2 and 3
 Long-Term and Local Scour not included in estimate of total scour

Given the lack of available geotechnical data, the more conservative results from Approach 1 of a total scour depth of 11.1-feet are what the design team has utilized as part of this analysis for total scour.

Bank Protection

Bank protection along Sonoran Wash is a concern, especially on the approaches to North Valley Parkway. The approach banks must be stabilized both up and downstream of to prevent future storm events from eroding and undermining the proposed bridge abutments.

This study looked at various methods to stabilize the wash bank. This study proposes a gabion basket gravity retaining wall along both the east and west banks of Skunk Creek between the abutment piers and the wash. The gabion gravity wall would be installed from the bridge soffit down to scour depth at 1:1 side slope and extend both up and downstream of the bridge for the limits shown in the plans contained in Appendix A of this report. Final design should include a geotechnical investigation of the bank soils and likelihood of erosion to determine the exact limits that the upstream and downstream bank protection should be continued.

Onsite Drainage

The short bridge is designed with a vertical curve at or near the bridge centerline such that onsite runoff will flow from the center to the bridge ends. Storm water runoff on the short bridge would likely reach the bridge ends prior to exceeding spread criteria.

In addition to the project plans included in Appendix A depicting the proposed roadway and bridge alignment for this alternative, Exhibit C includes the Drainage Work Maps for each of the alternatives considered as part of this analysis.

The total estimated construction cost for this alternative is \$22,249,864.

3.3 Alternative B – Structure to Span the Floodplain (Long Bridge)

Due to the required length of the bridge to span the floodplain and the clearance requirements over Sonoran Wash, an alternative following the existing centerline of the North Valley Parkway roadway alignment would have an approximate length of 990’ and width of 123’. This would result in a

significantly higher roadway than the adjacent Sonoran Commons subdivision located immediately to the northwest of the Sonoran Wash crossing. In addition, to facilitate this geometry, the east abutment would have a severe skew angle which would increase costs for design and construction as well as future maintenance.

To mitigate these fatal flaws associated with this geometry, a proposed realignment of North Valley Parkway to facilitate this alternative is shown in Figure 2 and presented in the 15% project plans contained in Appendix A of this analysis. The final layout and geometry for the intersection would be determined during final design.



Figure 2 – North Valley Parkway Realignment for Structure Spanning Floodplain

At the proposed intersection, southbound traffic would have two free right turn lanes to not hinder traffic flow. Northbound traffic would have 3 left turn lanes to help maintain through traffic volumes. The exact geometry and traffic control implementation measures would need to be determined during final design based on planned future development in the area as well as updated City design standards.

The proposed structure consists of 7 spans with span lengths of 114'-9" for span 1 and 116'-0" for the remaining spans for an overall bridge length of 817'-0½". Based on the expansion joint movement rating of 4 inches for a strip seal joint, expansion joints have been located at abutment 1, pier 2, pier 5 and abutment 2. The typical section is symmetric about the construction centerline. The typical section at the bridge consists of a 1'-2" outside pedestrian rail, an 8'-6" sidewalk, a 6'-0" bike lane, two 11'-0" lanes, one 12'-0" lane and a 12'-0" raised median centered about the construction centerline. The resulting overall bridge width is 111'-4". The deck slab thickness is 8 inches except at the edges where 9 inches is required. For the required spans and geometry, 14 UBT50 precast prestressed I-girder are equally spaced

along the bearings. Because of the curved geometry, the overhang, spacing and skew vary with a maximum perpendicular spacing of 9.55' and a maximum perpendicular overhang of 3.42'.

Each of the 6 piers consists of a 6'-0" wide by 6'-0" deep cap supported by five (5) 4'-0" diameter columns each on an individual 7'-0" diameter drilled shaft. These piers have been designed for 11.1 feet of scour for the 100-year design event.

Each abutment consists of a 1'-0" thick backwall with an approach slab seat and a 6'-0" wide stem supported by a single row of seven (7) 5'-0" diameter drilled shafts. These abutments have been designed for 16 feet of scour for the 500-year design event. A short 5'-0" long wingwall extends beyond the stem so the required retaining walls do not conflict or undermine the abutment. A stacked gabion basket retaining wall is proposed in front of the abutments to protect them from the 100-year flood event.

The proposed roadway alignment along North Valley Parkway would consist of a 40'-wide pavement section in each direction providing for 3 lanes and a bicycle lane. For a majority of the alignment, a 24'-wide curbed median would be provided, however this median width would be reduced to 12' across the bridge structure and to 4' at proposed left turn lanes for the new intersection. For the southernmost 2,000' and northernmost 400' of this alternative, the typical section will include a detached 5' sidewalk separated by an 8' landscape buffer to minimize impacts to existing infrastructure. From approximately Station 36+50 to Station 62+50 for 2,600 feet however, the typical section will transition to provide for an attached sidewalk with retaining wall located behind the sidewalk to minimize right-of-way acquisition and extent of required grading adjacent to existing and future subdivisions in the transitional locations to the bridge structure. The proposed intersection located east of the bridge structure would also be elevated and located on retaining wall as part of this alternative. Left turn lanes along North Valley Parkway would be added at existing intersections. Pavement markings limits would extend approximately ½-mile beyond the roadway construction in-order to achieve the desired lane configuration.

The table below provides the Water Surface Elevation Result comparison between the Duplicate Effective and Proposed hydrologic models.

Bounding Cross Sections	100-year	Corrected		Elevation
	Discharge	Effective ¹	Proposed Conditions ²	Change
	[cfs]	[elev.]	[elev.]	[ft]
1.84	9,700	1,558.35	1,558.37	0.02
1.77	9,700	1,556.45	1,556.41	-0.04
1.72	9,700	1,554.77	1,554.94	0.17
1.71	9,700	1,554.72	1,554.77	0.05
Bridge u/s Face	9,700	-	1,554.22	-

Bridge d/s Face	9,700	-	1,553.62	-
1.68	9,700	1,554.26	1,553.36	-0.90
1.65	9,700	1,552.86	1,552.60	-0.26
1.56	9,700	1,550.07	1,550.07	0.00

Notes: 1) Model includes new x-sections 1.71 and 1.68
 2) Model includes new x-sections 1.71, 1.69 and 7-span bridge

The Work Map in Appendix C provide a graphical depiction of the upstream and downstream impacts to the proposed flows and water surface elevations in Sonoran Wash for Alternative B.

Based upon the results of this alternative a bridge soffit of 1558.5 will provide 4-feet of freeboard to meet City of Phoenix Requirements for conveyance of a 100-year storm. The maximum wash flow depth under the bridge is 9.8 feet and the maximum flow velocity beneath the bridge is 6.4 feet per second. The final design should include the preparation of a Conditional Letter of Map Revision (CLOMR) for review by City of Phoenix and submittal to FEMA. The CLOMR will need to include detailed discussion of proposed maintenance provisions for the proposed channelization structures upstream and downstream of the bridge crossing in Sonoran Wash.

Guide Banks/Training Dikes

Though not as extensive as those associated with Alternative A, new guide banks along the east side of Sonoran Wash will be required upstream and downstream of the new bridge crossing to cause a constriction and force storm water runoff to concentrate in the main wash to pass through the long bridge opening. The contraction of flow approaching the bridge should not exceed a 2:1 ratio and the guide bank should provide a minimum of 3-feet of freeboard and be continuous beyond the edge of the effective floodplain.

On the downstream side, an additional length of guide bank is required to control the expansion of flow back to the nominal wash width. This embankment should specifically protect from backwater effects that could impact the North Valley Parkway roadway embankment.

Given the requirements in the North Black Canyon Specific Plan, any proposed wash armoring including guide banks are required to be natural in look. Therefore, gabion gravity walls are proposed for the Sonoran Wash crossing upstream and downstream of the bridge crossing to meet this requirement. The proposed walls will be laid back at a 1:1 side slope to mirror existing natural conditions for how the Sonoran Wash banks have been excised over time by the flows. Gravity gabion retaining walls will provide the necessary stabilization of the banks. Behind the gravity gabion retaining walls, earthen embankment material will be necessary to create the channelization immediately upstream and downstream of the bridge structure. It may be necessary to utilize riprap on top of the earthen embankment material once geotechnical evaluation is completed and exact material characteristics, specifically the likelihood of erosion, of Sonoran Wash are determined. In the case of dumped/placed riprap the following table applies to rock size and layer thickness.

Scenario	100-year Discharge	Maximum Channel Velocity	Riprap D50	Layer Thickness
	[cfs]	[fps]	[ft]	[ft]
Long Bridge - Upstream	9,700	6.9	0.7	1.4
Long Bridge - Downstream	9,700	7.9	0.9	1.8

Bridge Scour

Given the lack of available geotechnical information for Sonoran Wash, two different approaches to estimating the proposed bridge scour were performed for this study.

The first approach to estimating total scour was prepared using Arizona Department of Water Resources State Standard 5-96 (Level 1 Analysis). This method estimates total scour from generalized equations derived from empirical data combining general and long-term scour based solely upon the 100-year peak discharge. For Sonoran Wash, at the location of interest, the total scour depth is calculated as 11.1 feet.

The second approach utilizes a June 2001 study prepared by JE Fuller Hydrology & Geomorphology, Inc. as part of the *Skunk Creek Watercourse Master Plan* which calculated potential scour at specific locations within the Skunk Creek and Sonoran Wash watersheds. This report acknowledges that no geotechnical data was available for the study area except for limited boring details provided on as-built construction plans for the drainage structures along Carefree Highway and New River Road.

Chapter 5 of the 2001 report addresses general scour among other topics. General Scour (Z_g) is a component of Total Scour (Z_t). Specifically, the scour equation is:

$$Z_t = 1.3 * (Z_g + 0.5 * Z_a + Z_l + Z_{lt} + Z_b + Z_{lft})$$

where:

Z_t = Design scour depth, excluding long-term degradation or aggradation (ft)

Z_g = General scour depth (ft)

Z_a = Anti-dune trough depth (ft)

Z_l = Local scour depth (ft)

Z_{lt} = Long Term scour depth (ft)

Z_b = Bend scour depth (ft)

Z_{lft} = Low-flow thalweg depth (ft)

1.3 = Safety factor to account for nonuniform flow distribution

For Sonoran Wash, scour estimates are shown in the following table.

Reach	Total	General	Antidune	Bend	Bend	Local	Long-Term	Thalweg
	Zt	Zgs	Za	Angle	Zbs	Zls	Zlt	Zlft
	[ft]	[ft]	[ft]		[ft]	[ft]	[ft]	[ft]
3	1.9	-0.6	0.8	20.8	0.1	0.0	0.0	1.0
2	1.9	-0.6	0.7	20.8	0.1	0.0	0.0	1.0
1	1.8	-0.5	0.5	20.8	0.1	0.0	0.0	1.0

Notes: Reach 1 is at CAP Canal; the project site falls between Reaches 2 and 3
 Long-Term and Local Scour not included in estimate of total scour

Given the lack of available geotechnical data, the more conservative results from Approach 1 of a total scour depth of 11.1-feet are what the design team has utilized as part of this analysis for total scour.

Bank Protection

Bank protection along Sonoran Wash is a concern, especially on the approaches to North Valley Parkway. The approach banks must be stabilized both up and downstream of to prevent future storm events from eroding and undermining the proposed bridge abutments.

This study looked at various methods to stabilize the wash bank. This study proposes a gabion basket gravity retaining wall along both the east and west banks of Skunk Creek between the abutment piers and the wash. The gabion gravity wall would be installed from the bridge soffit down to scour depth at 1:1 side slope and extend both up and downstream of the bridge for the limits shown in the plans contained in Appendix A of this report. Final design should include a geotechnical investigation of the bank soils and likelihood of erosion to determine the exact limits that the upstream and downstream bank protection should be continued.

Onsite Drainage

The long bridge is designed with a vertical curve at or near the bridge centerline such that onsite runoff will flow from the center to the bridge ends. Storm water runoff on the long bridge would likely require deck drains based on spread criteria analysis based on the length of the bridge structure.

In addition to the project plans included in Appendix A depicting the proposed roadway and bridge alignment for this alternative, Exhibit C includes the Drainage Work Maps for each of the alternatives considered as part of this analysis.

The total estimated construction cost for this alternative is \$30,788,300.

3.4 Alternative C – Structure to Avoid Utility Conflicts (Short or Long Bridge)

This alternative would shift the roadway alignment associated with either of the Alternative A or B crossing options farther north by approximately 275’ as shown in Figure 3 on the next page. This would allow the new roadway and bridge to be constructed without any impacts to existing utility infrastructure

within the North Valley Parkway right-of-way. The existing utilities that would be impacted by alternatives 1 & 2 include a 30" sewer, 54" water, 16" water, 12" water, 8" gas and 6" gas. This alternative would require a significant amount of right-of-way acquisition from adjacent private landowners as well as more extensive modification to the Sonoran Wash.

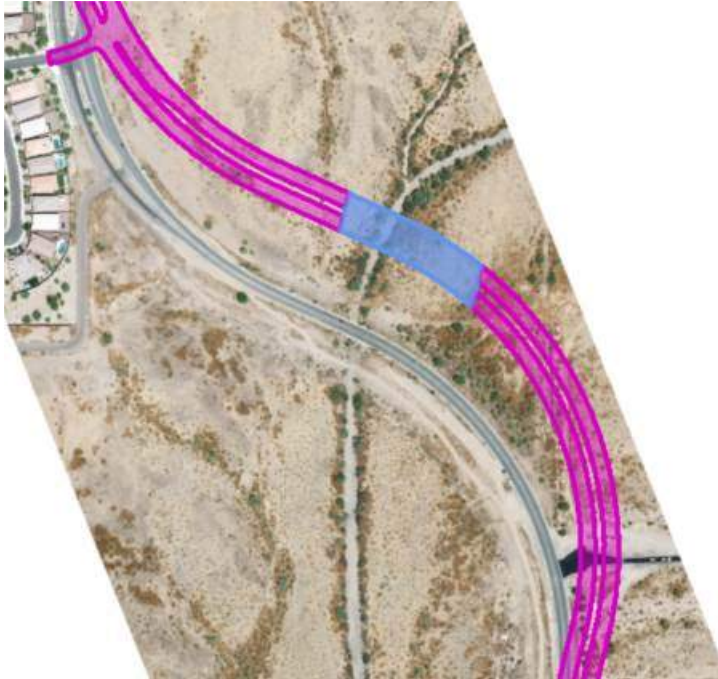


Figure 3 – Alternative C North Valley Parkway Realignment

Alternative C (for either the short or long bridge alternative) is not discussed in the comparison of alternatives in Section 4 given the lack of available information to prepare analysis for this alternative in detail (specifically utility pothole data) and uncertainty associated with this significant of R/W acquisition (would likely result in complete parcels being acquired). Should the City wish to explore this alternative further, additional existing topographic survey information will need to be acquired as well.

3.5 Alternative D – Concrete ‘Super-Box’ Culvert Structure

A preliminary analysis was completed to size a concrete ‘super-box’ culvert structure that could pass the Sonoran Wash flows discussed earlier in this report. The resultant ‘super-box’ structure would consist of a 5-barrel 12’x12’ concrete box culvert embedded to a depth of 12” in combination with an 8-barrel 12’x6’ concrete box culvert embedded to a depth of approximately 12”. The ‘super-box’ would be approximately 110’ in total length along the Sonoran Wash alignment and designed with a 1.0% approximate bottom slope to pass flows beneath the roadway.

The advantages of the ‘super-box’ over a bridge crossing is the ability to lower the roadway profile approaching Sonoran Wash from the north and south as well as savings in total construction cost (total cost would be between 60% and 80% of the Alternative A Short Bridge Alternative).

The disadvantages of the ‘super-box’ relative to a bridge crossing are they are very maintenance intensive as they have a propensity to plug frequently especially in waterways with flows on the magnitude of Sonoran Wash (9,700 cfs for the 100-year event). They also result in significant impacts upstream and downstream of the roadway crossing to the water surface elevations in the floodplain which could adversely impact the ability for adjacent development (both existing and proposed) in the immediate vicinity of Sonoran Wash. Furthermore, to protect the ‘super-box’ itself from erosion and scour impacts, either a grade control structure or the entirety of the upstream and downstream box culvert apron (along with each of the super-box inner walls) would have to be constructed to scour depth. In addition to having major permanent impacts to Sonoran Wash (Section 404 Individual Permit will be required) these are significant increases to the project cost which heavily nullify the cost savings advantage the option would hope to present.

For the disadvantages of the ‘super-box’ cited above, this option was not carried forward for further evaluation.

4. SUMMARY

4.1 Alternative Comparison

The table below provides a side by side comparison of the Alternatives.

ALTERNATIVE COMPARISON		
	Alternative A – Short	Alternative B - Long
Bridge Spanning Feature	Flood Way	Flood Plain
Bridge Length/# Spans	337’/3	817’/7
Bridge Width	123’	111’
Cross Slope	Varies	Varies
New ROW Required	No	Yes - Major
TCE Required	Yes	Yes
Phased Construction Required	Yes	Yes
Major Utility Relocations	Yes	Yes
Construction Cost	\$22,249,864	\$30,788,300
Maintenance Cost	Comparable with Alt 2	Comparable with Alt 1
Advantages	<ul style="list-style-type: none"> • Lower Construction Costs • No R/W Required • Lower Maintenance Costs associated with Concrete Bridge Deck Length • Maintains Current Roadway Alignment 	<ul style="list-style-type: none"> • Less Sonoran Wash Reconstruction Required • Lower Maintenance Costs associated with Sonoran Wash Bank Protection • Greater Level of Flood Protection Provided
Disadvantages	<ul style="list-style-type: none"> • More Extensive Sonoran Wash 	<ul style="list-style-type: none"> • Higher Construction Costs

	<p>Channelization Required</p> <ul style="list-style-type: none"> • Level of Flood Protection Provided less than Alternative 2 (meets City/FCD standard requirements) 	<ul style="list-style-type: none"> • R/W Acquisition Required • Alteration of Roadway Alignment • Elevated Intersection • Intersection Potentially Impactful to Traffic Operations
--	--	--

4.2 Preferred Alternative

Based on adequate drainage protection being provided, minimal modifications to the existing roadway alignment, no right-of-way acquisition required and lower construction cost; **Alternative A short bridge crossing spanning the floodway is the recommended alternative for this project.** The freeboard provided to the Sonoran Wash water surface is anticipated to meet the City’s minimum requirement of 4’ once bank protection and channelization of the Sonoran Wash upstream and downstream of the crossing is completed.

4.3 Development Requirements

Conflicts with utilities are anticipated; the City of Phoenix and final design Consultant will have to investigate further during final design once below ground information is obtained to confirm depth and exact locations. Based on a review of the existing as-built data and utility record maps, the utility facilities presented in Section 2.2 have an equal likelihood of impact associated with both alternatives so separate discussion per alternative is not provided relative to utilities.

The major potential impact relative to utility infrastructure are City of Phoenix owned water and sewer force main, distribution and transmission lines in this area of North Phoenix. Heavy coordination will need to occur during final design with the City of Phoenix’s Water Services Department. Major consideration will have to be given to any required outage of any of these facilities and temporary bypass type of infrastructure will likely be required if relocations are determined to be necessary. Any major utility infrastructure will also need to have scour protection measures verified and potentially designed if not already in place at the Sonoran Wash crossing. Depending on the extent of resultant impact, Alternative 3 discussed earlier in this analysis may warrant further consideration to avoid utility conflicts.

The proposed vertical profile modification along North Valley Parkway is one of the controlling factors in the project’s design. The profile and associated infrastructure have been designed in such a manner to minimize/eliminate any adverse impacts to the in-place residential parcels and businesses located along the alignment. Where the roadway profile begins to deviate from the existing roadway’s vertical alignment, retaining wall facilities are proposed to minimize any grading impact and right-of-way acquisition. Appropriate traffic rated barricade is also proposed along both sides of the roadway to mitigate against errant vehicles potentially going over the resultant drop-off in these portions of the alignment.

Based on survey data obtained during the scoping phase of the project, there does not appear to be any ADA issues associated with the roadway and sidewalk grades. Where sidewalk is proposed for replacement, grades will be confirmed during final design to ensure full compliance with ADA standards. Driveways will also be designed in a manner that an accessible ADA compliant route is provided along the back of the driveway in accordance with City standard driveway details.

Closed portions of North Valley Parkway can be utilized for staging areas during construction.

Public notification will be required in advance of any work being done. Emergency services and the media will be notified of the construction schedule.

The City's North Black Canyon Specific Plan will also have to be adhered to during final design related to design of the channelization materials for the upstream and downstream impacts to Sonoran Wash.

The construction season is anticipated to be year-round.

The estimated design duration is 15 months (inclusive of the USACE Section 404 permitting process) and the estimated construction duration is 300 calendar days.

Given the project is not federally funded, a NEPA level environmental clearance is not anticipated to be required. However, because the area of disturbance includes a significant amount of undisturbed land, cultural resources and hazardous materials analysis should be completed as part of the final design phase of the project. This includes monitoring of any drill holes during design (Geotech/Potholing) as well as potential monitoring of drilled shaft work during construction. It is anticipated that City of Phoenix staff will lead these efforts.

Due to the nature of the project area and proximity to the Sonoran Preserve, a biological investigation to ensure no impact to existing endangered species or known wildlife should also be completed.

Finally, the final design of the project will have to include Section 404 permitting with the USACE for the impacts to Sonoran Wash. It is not anticipated that the proposed permanent improvements to the wash bottom will exceed the 0.5-acre threshold triggering the Individual project permitting process. This will need to be confirmed during final design; however it is anticipated that a Nationwide Section 404 permit will be able to be obtained to be compliant with USACE Section 404 requirements.

APPENDIX A – 15% PLANS FOR SHORT AND LONG BRIDGE ALTERNATIVES

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

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PA
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OR RECORDING

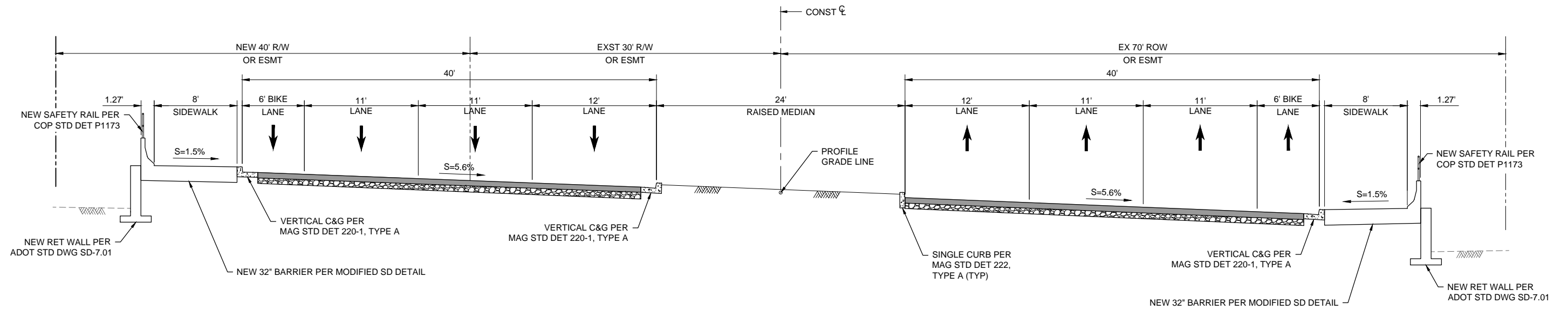
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T.Y. LIN INTERNATIONAL T.Y. LIN INTERNATIONAL
engineers | planners | scientists CONSULTING ENGINEER
DES: RH,DR DR: DR CK: JB DATE: 6/21

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TYPICAL SECTION 3
SECTION CUT AT STA 42+00
LOOKING UPSTATION

ALTERNATIVE A

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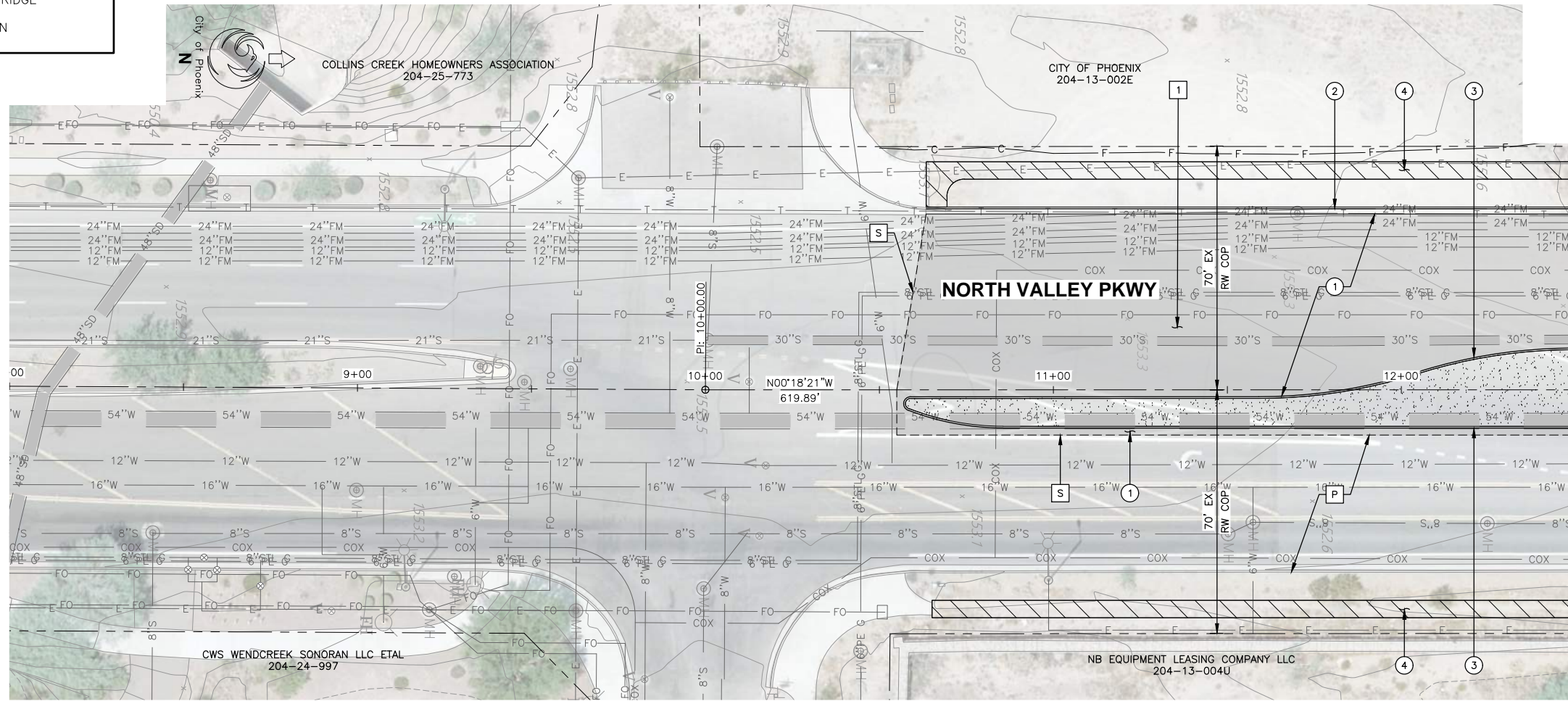
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CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

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DATE: 6/21	DATE: 6/21	DATE: 6/21	A-02	X	.

SCALE: NO SCALE

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NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION



MATCH LINE STA 12+50.00
SEE SHEET A-04

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OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
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T.Y. LIN INTERNATIONAL engineers planners scientists			T.Y. LIN INTERNATIONAL CONSULTING ENGINEER		
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P	PROTECT IN PLACE				
S	SAWCUT AND MATCH EXISTING				

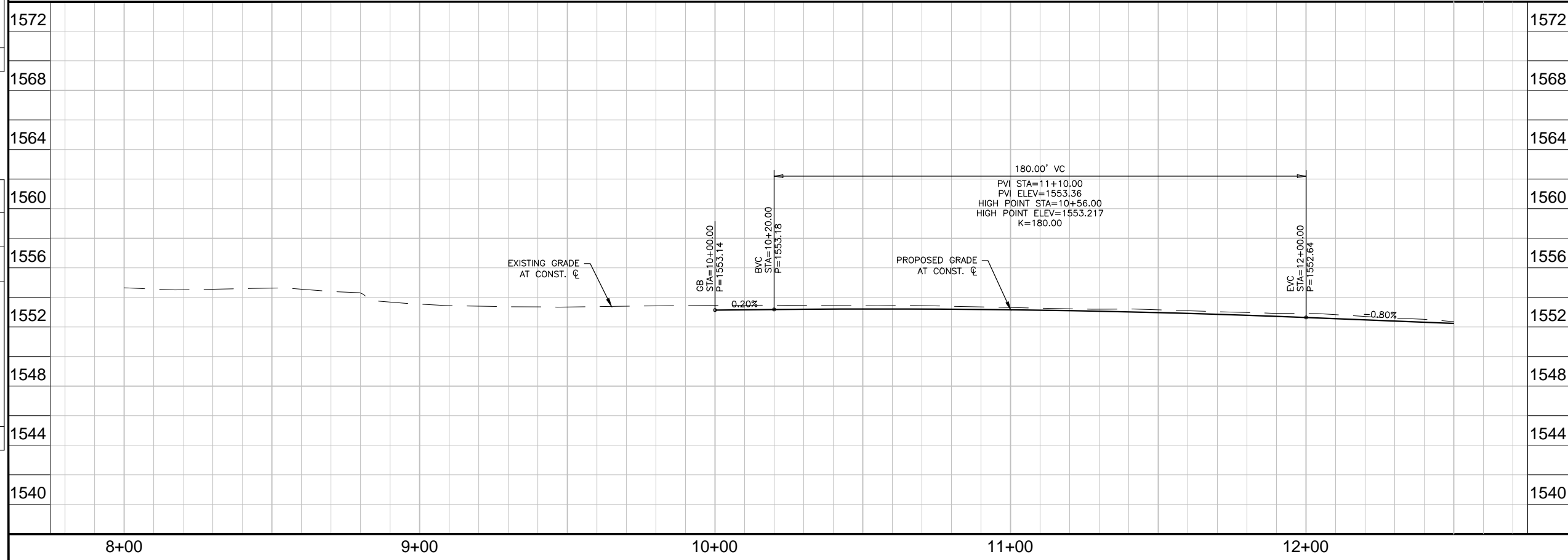
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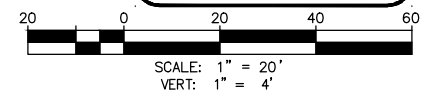
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ALTERNATIVE A



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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

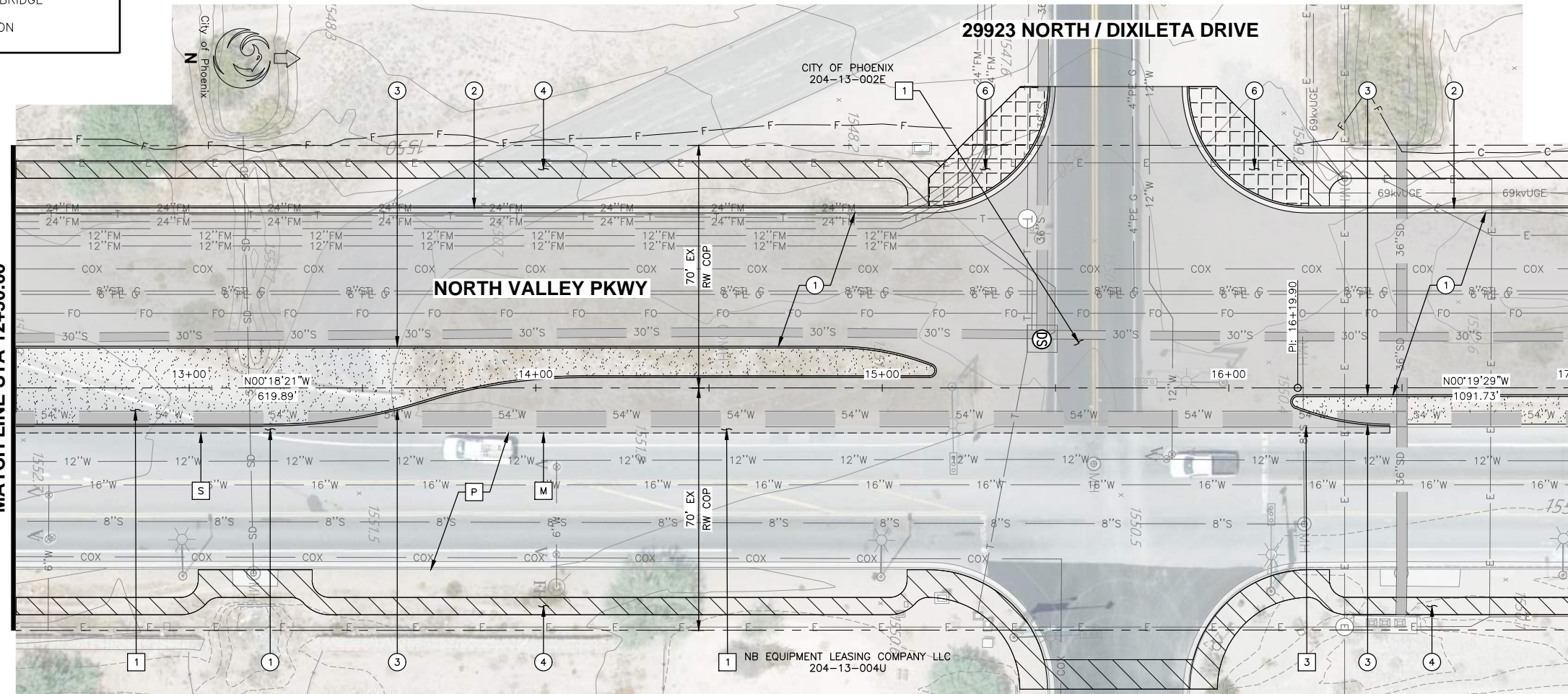
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NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

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OR RECORDING

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engineers planners scientists		CONSULTING ENGINEER		CONSULTING ENGINEER	
DES: RH,DR	DR: DR	CK: JB	DATE: 6/21		



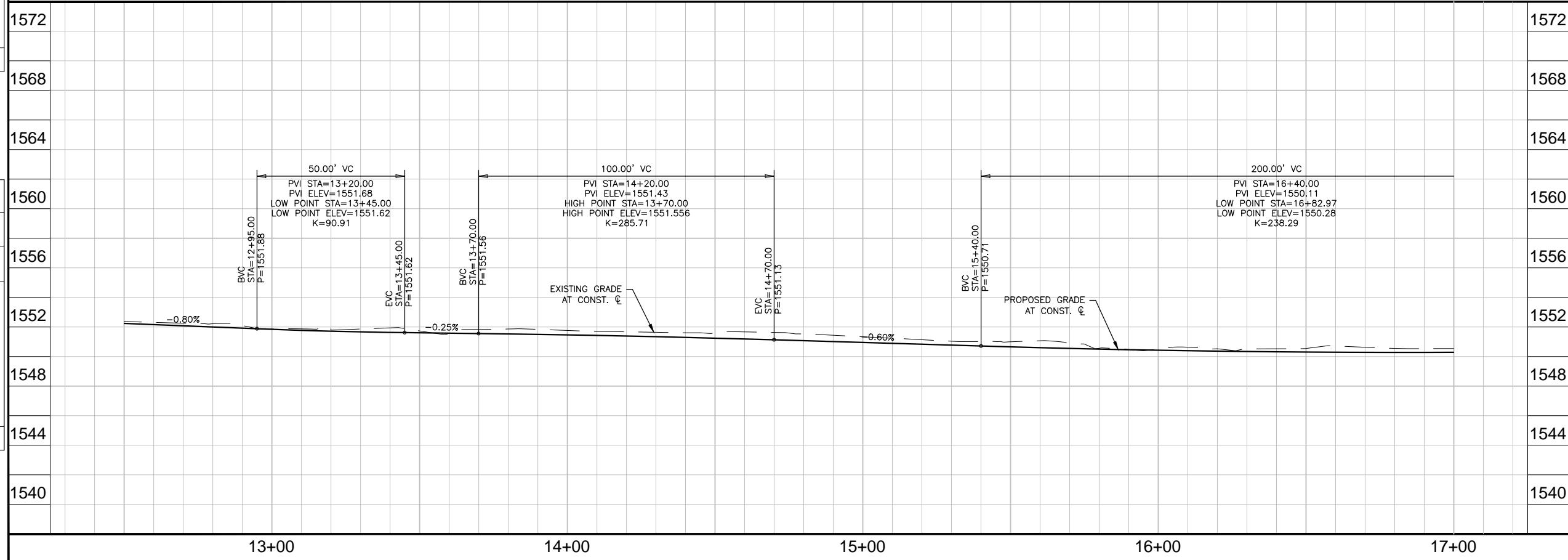
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MATCH LINE STA 12+50.00

MATCH LINE STA 17+00.00
SEE SHEET A-05

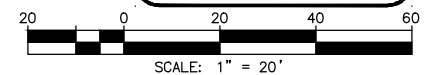
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4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	4,838
6	CONCRETE SIDEWALK RAMP PER COP STD DET P1235 OR P1236	SF	1,168

MADISON GRANITE SUPPLIES (MAIN SITE ACCESS)



ALTERNATIVE A



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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

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CITY OF PHOENIX			

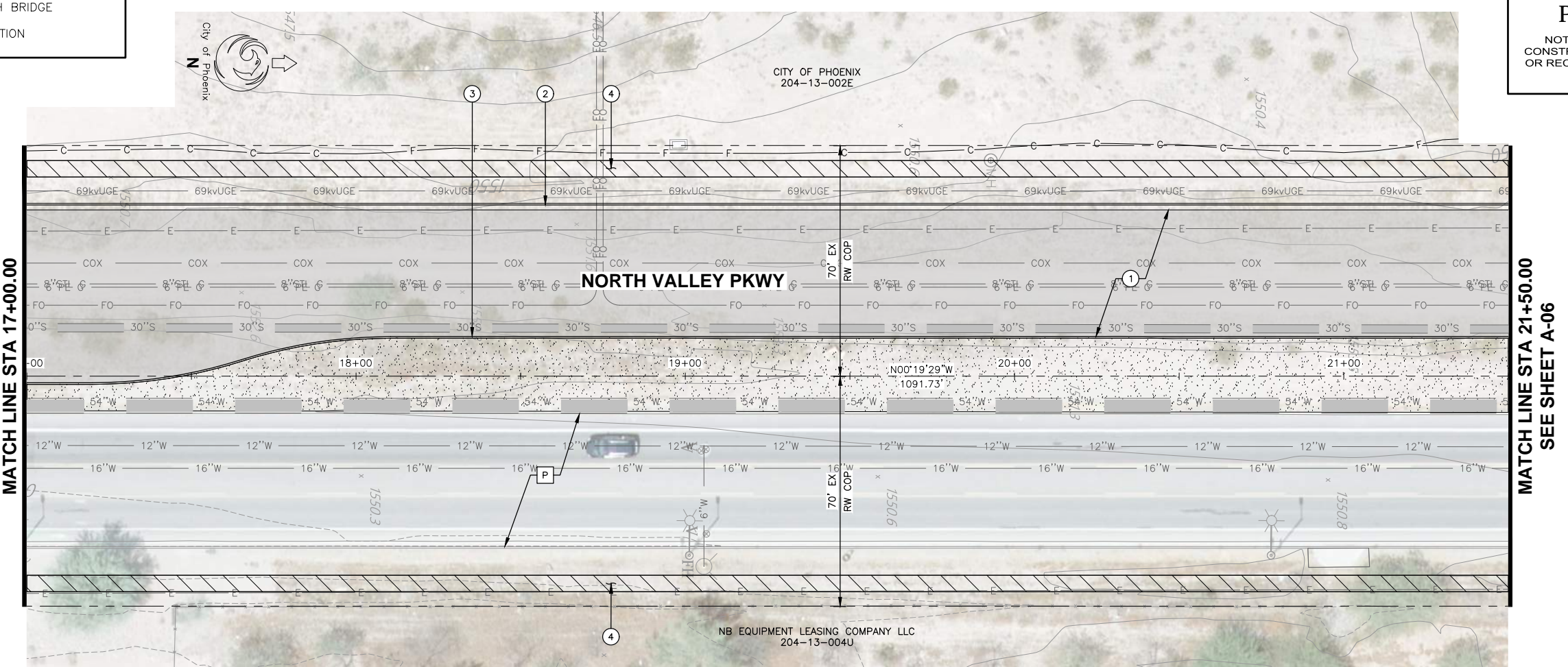
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NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

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OR RECORDING

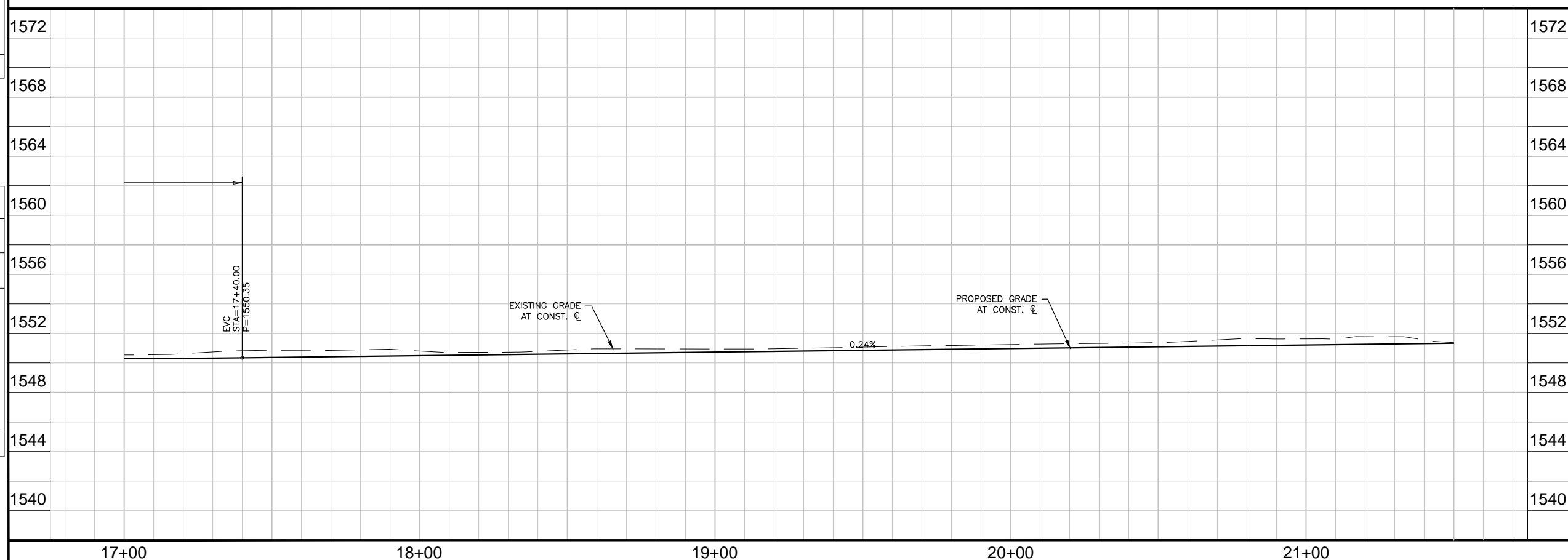
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③	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	452
④	CONCRETE SIDEWALK PER COP STD DET P1230	SF	4,500



ALTERNATIVE A

Call at least two full working days before you begin excavation.

ARIZONA 811
Arizona Blue Stake, Inc.

Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

SCALE: 1" = 20'
VERT: 1" = 4'

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PLAN & PROFILE
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
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 Dennis R. Ray
 T.Y. Lin Staff

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

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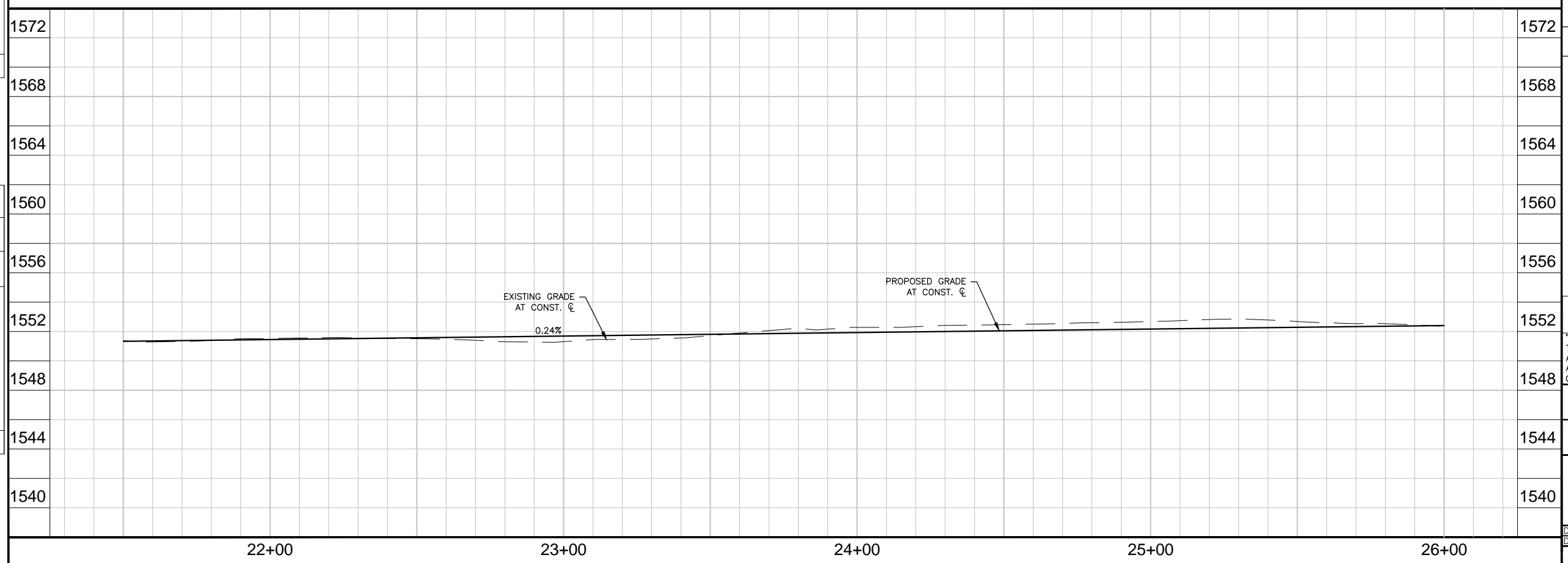
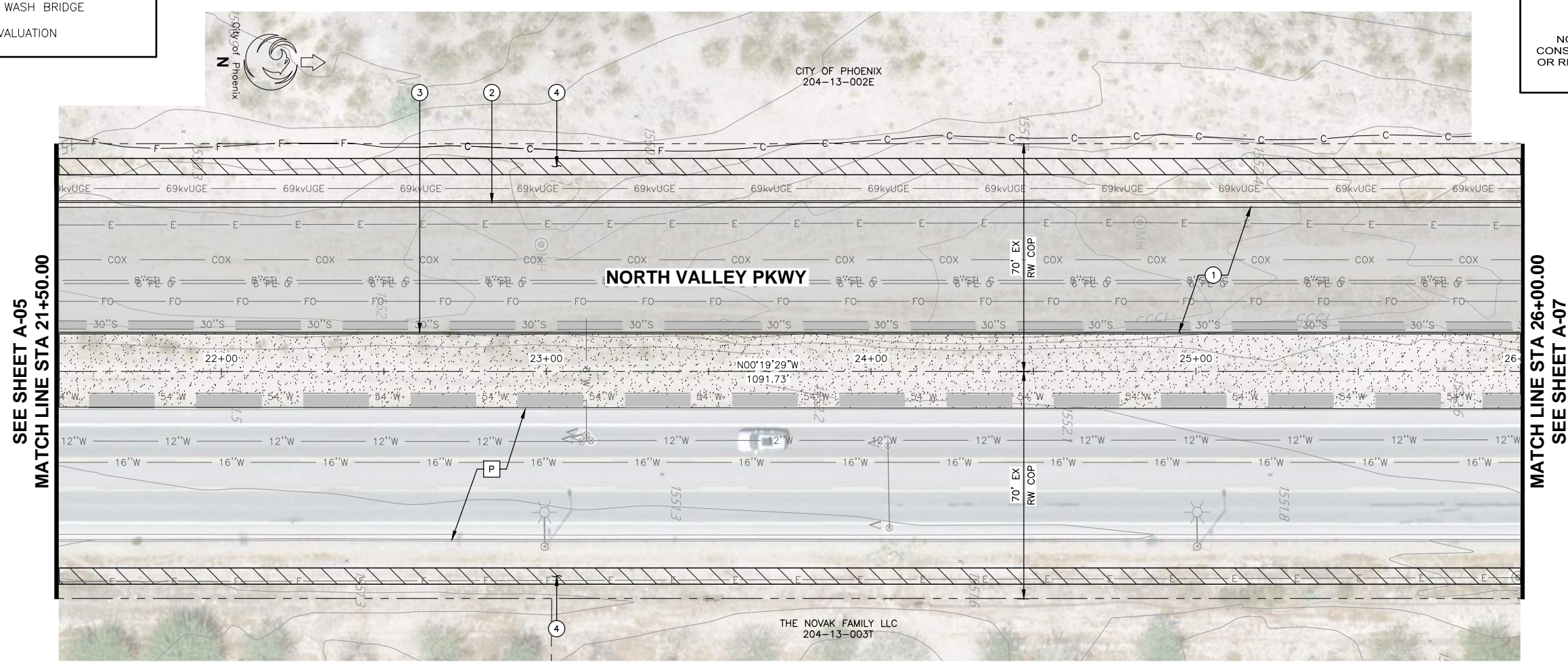
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T.Y. LIN INTERNATIONAL
engineers | planners | scientists
CONSULTING ENGINEER

DES: RH,DR DR: DR CK: JB DATE: 6/21

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 P PROTECT IN PLACE
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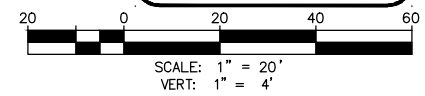
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3	SINGLE CURB PER MAG STD. DET. 222, TYPE 'A'	LF	450
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	4,500

ALTERNATIVE A



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NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

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SCALE: 1" = 20'

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

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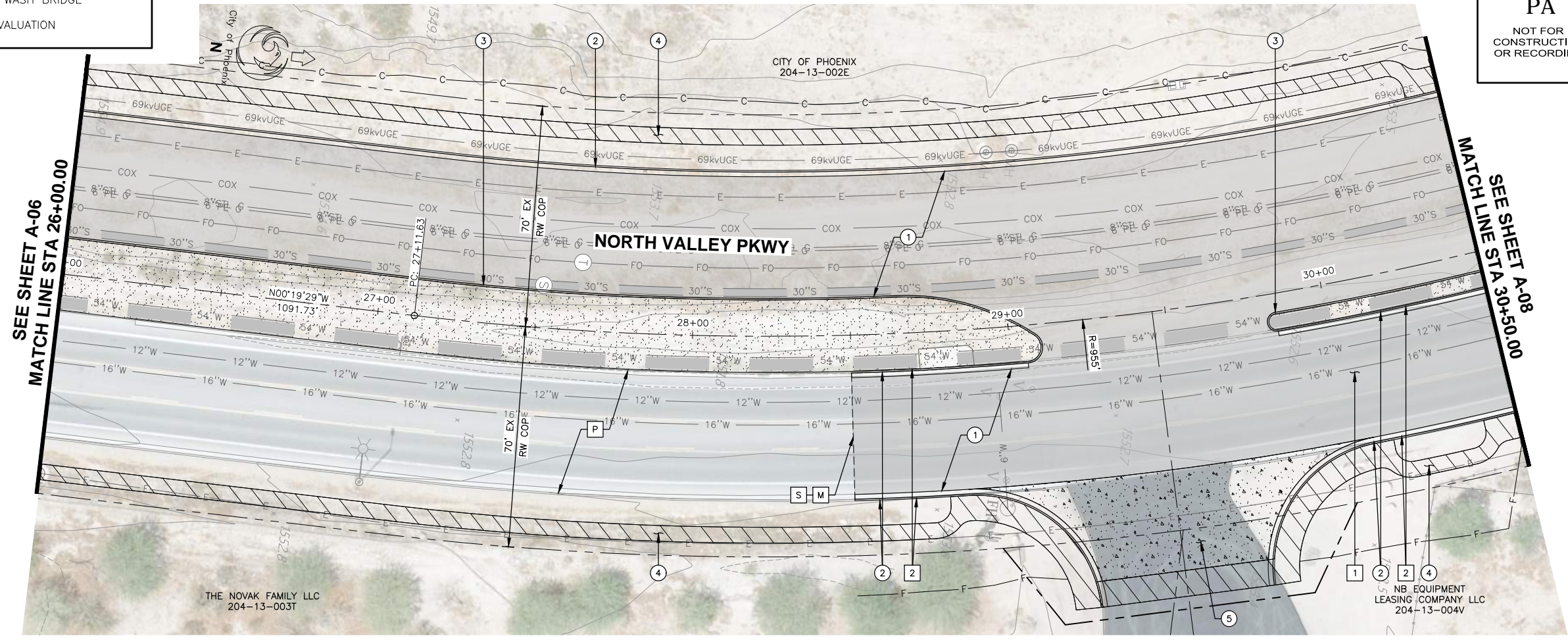
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engineers | planners | scientists CONSULTING ENGINEER
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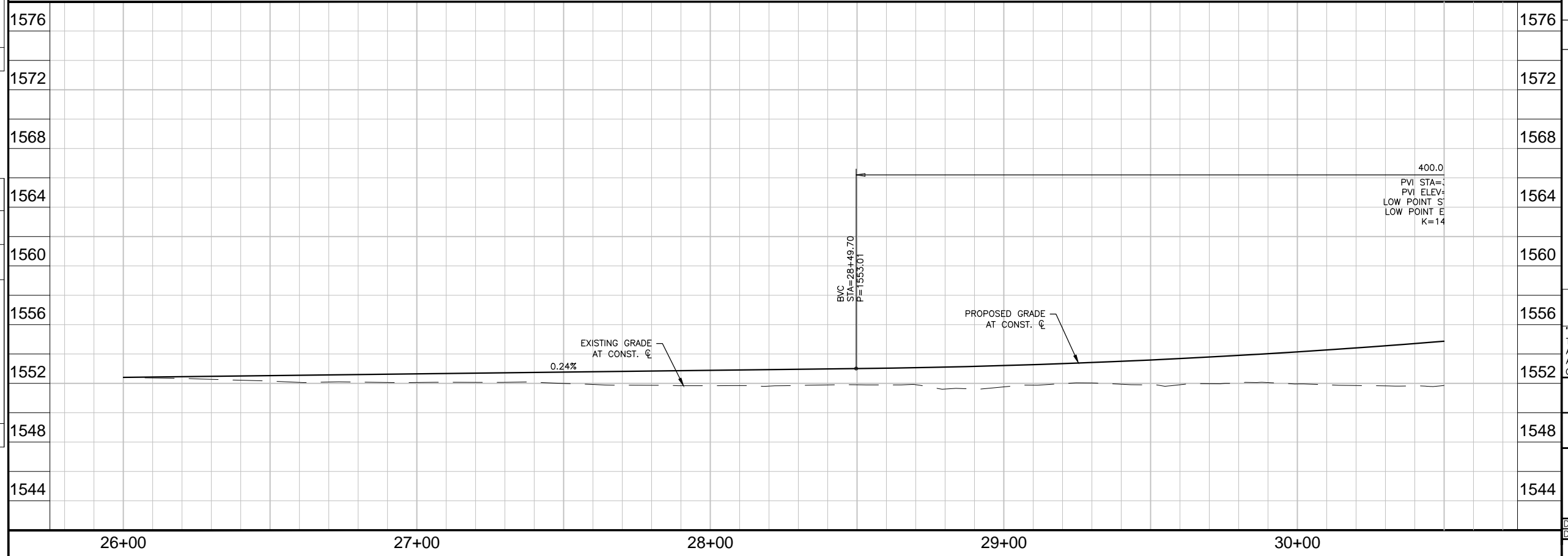
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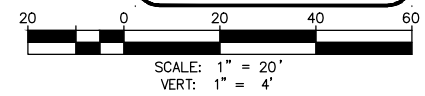
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5	CONCRETE DRIVEWAY PER COP STD DET P1243 (9" THICK)	SF	2,321



MADISON GRANITE SUPPLIES (N'LY SITE ACCESS)



ALTERNATIVE A



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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH, DR	CK: JB	SHEET NO:	TOTAL SHEETS:	AS BUILT:
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NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

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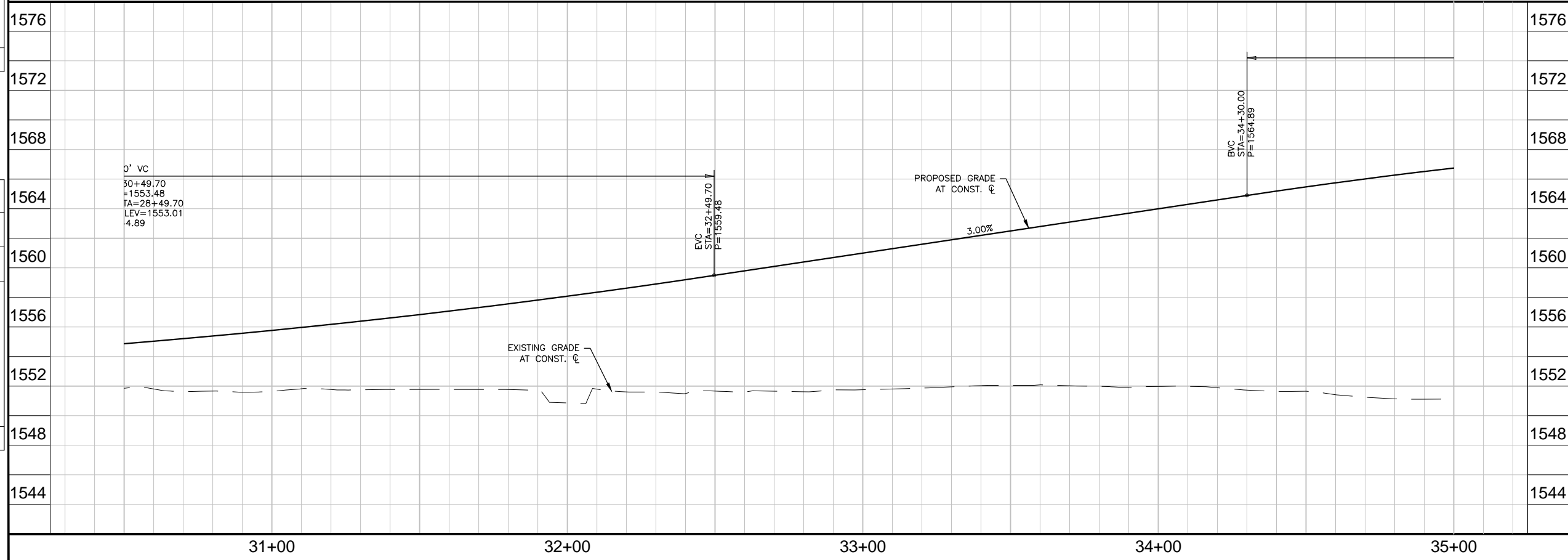
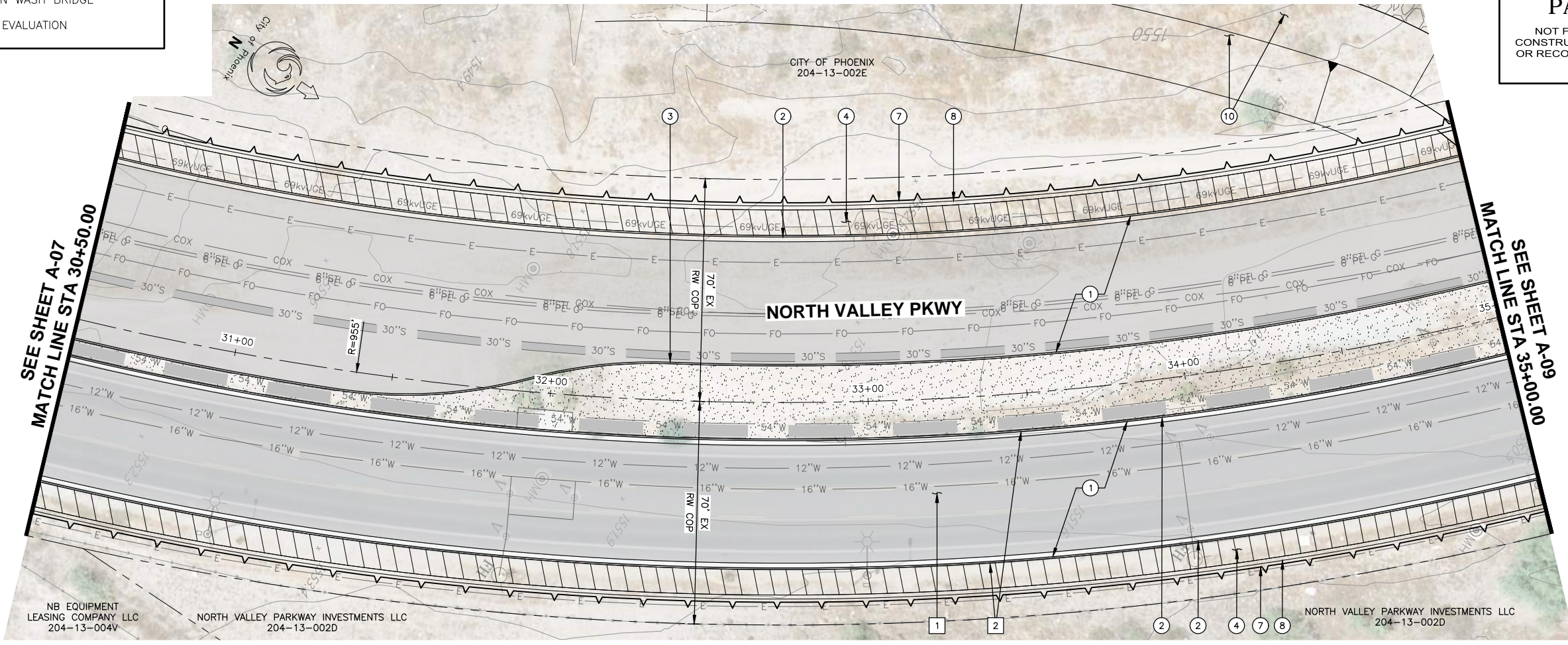
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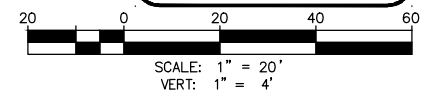
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3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	449
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	7,196
7	CONCRETE RETAINING WALL PER ADOT SD 7.01	LF	900
8	32" CONCRETE HALF BARRIER PER ADOT C-10.72	LF	900
10	DRAINAGE SLOPE ARMORING FOR BANK PROTECTION - SEE SHEET A-15	-	-



ALTERNATIVE A



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STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH, DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	A-08	X	

SCALE: 1" = 20'

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

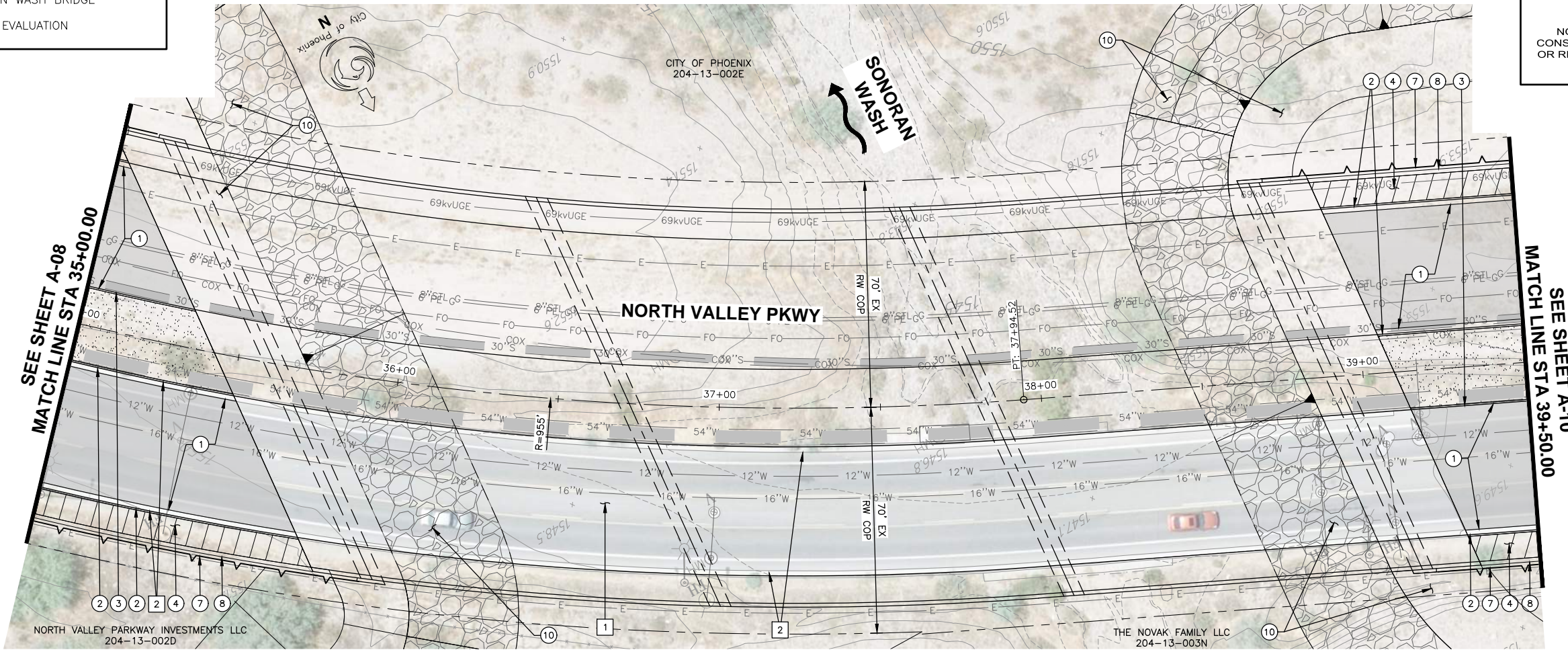
PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			

T.Y. LIN INTERNATIONAL
engineers | planners | scientists
CONSULTING ENGINEER

DES: RH,DR DR: DR CK: JB DATE: 6/21

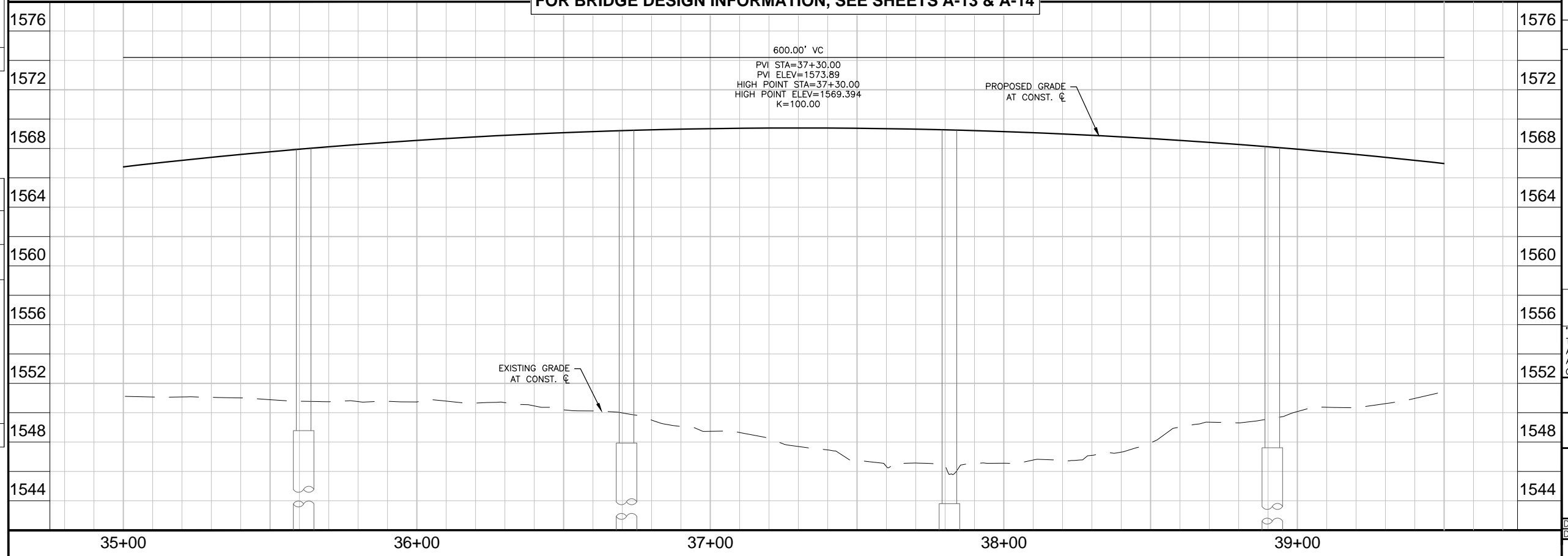
M MATCH EXISTING
P PROTECT IN PLACE
S SAWCUT AND MATCH EXISTING



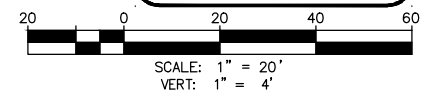
NO.	DESCRIPTION	UNIT	QTY.
1	REMOVE EXISTING PAVEMENT	SY	1,891
2	EXISTING CONCRETE CURB & GUTTER	LF	878

NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACUTAL PVMT SECTION TBD IN FINAL DESIGN	SY	690
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	257
3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	69
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	1,618
7	CONCRETE RETAINING WALL PER ADOT SD 7.01	LF	220
8	32" CONCRETE HALF BARRIER PER ADOT C-10.72	LF	169
10	DRAINAGE SLOPE ARMORING FOR BANK PROTECTION - SEE SHEET A-15	-	-

FOR BRIDGE DESIGN INFORMATION, SEE SHEETS A-13 & A-14



ALTERNATIVE A



CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING ELEVATIONS FOR ALL UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS.
PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX.

PLAN & PROFILE
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS:	AS BUILT:
DATE: 6/21	DATE: 6/21	DATE: 6/21	A-09	X	.

SCALE: 1" = 20'

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

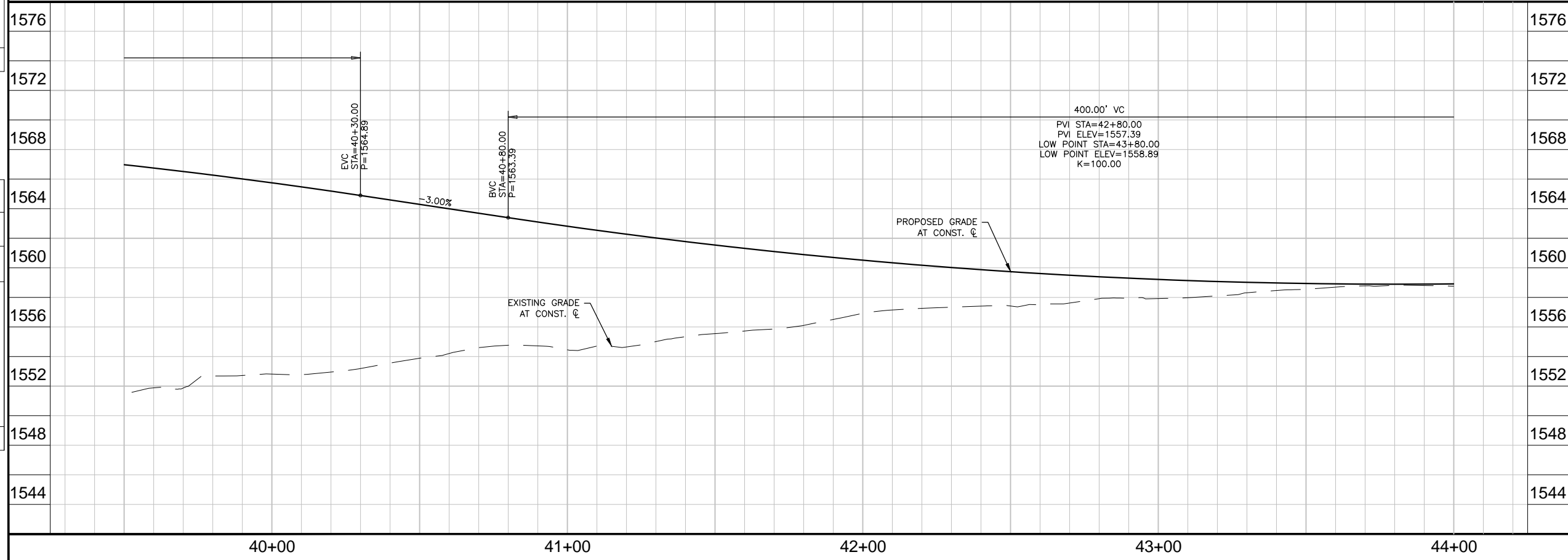
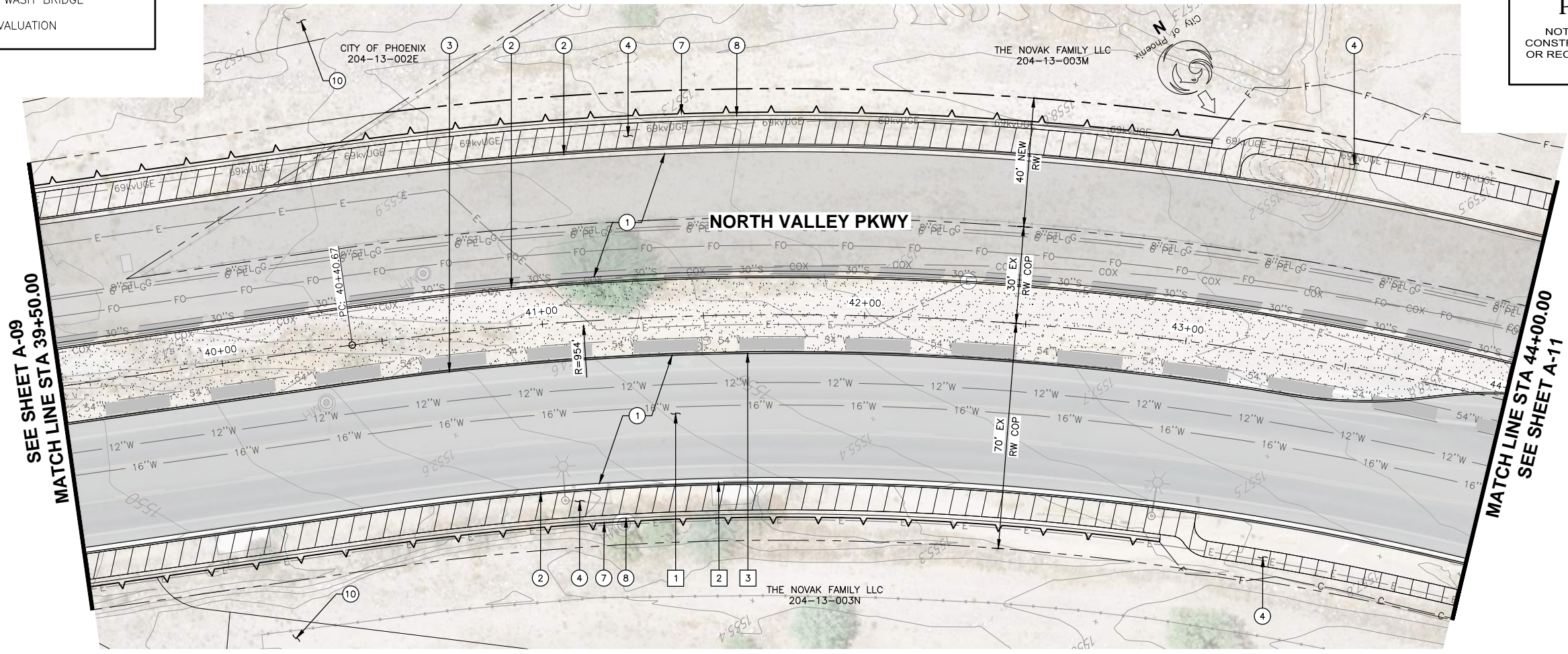
F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			

TY LIN INTERNATIONAL T.Y.LIN INTERNATIONAL
engineers | planners | scientists CONSULTING ENGINEER
DES: RH,DR DR: DR CK: JB DATE: 6/21

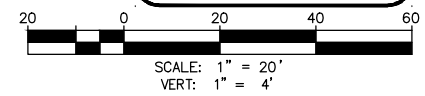
M MATCH EXISTING
P PROTECT IN PLACE
S SAWCUT AND MATCH EXISTING

REMOVALS			
NO.	DESCRIPTION	UNIT	QTY.
1	REMOVE EXISTING PAVEMENT	SY	1,994
2	EXISTING CONCRETE CURB & GUTTER	LF	430
3	EXISTING CONCRETE SINGLE CURB	LF	332

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACUTAL PVMT SECTION TBD IN FINAL DESIGN	SY	3,813
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	1,355
3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	448
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	6,610
7	CONCRETE RETAINING WALL PER ADOT SD 7.01	LF	700
8	32" CONCRETE HALF BARRIER PER ADOT C-10.72	LF	700
10	DRAINAGE SLOPE ARMORING FOR BANK PROTECTION - SEE SHEET A-15	-	-



ALTERNATIVE A



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PLAN & PROFILE
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS:	AS BUILT:
DATE: 6/21	DATE: 6/21	DATE: 6/21	A-10	X	.

SCALE: 1" = 20'

NO.	DESCRIPTION	REV BY	CHK BY	DATE

City of Phoenix - North Valley Parkway - Sonoran Wash Bridge Evaluation - Alternative A - Plan & Profile.dwg
 Date: 6/21/2021 12:02:56 PM
 User: Dennis Ray

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

NORTH GATEWAY TRANSFER STATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			

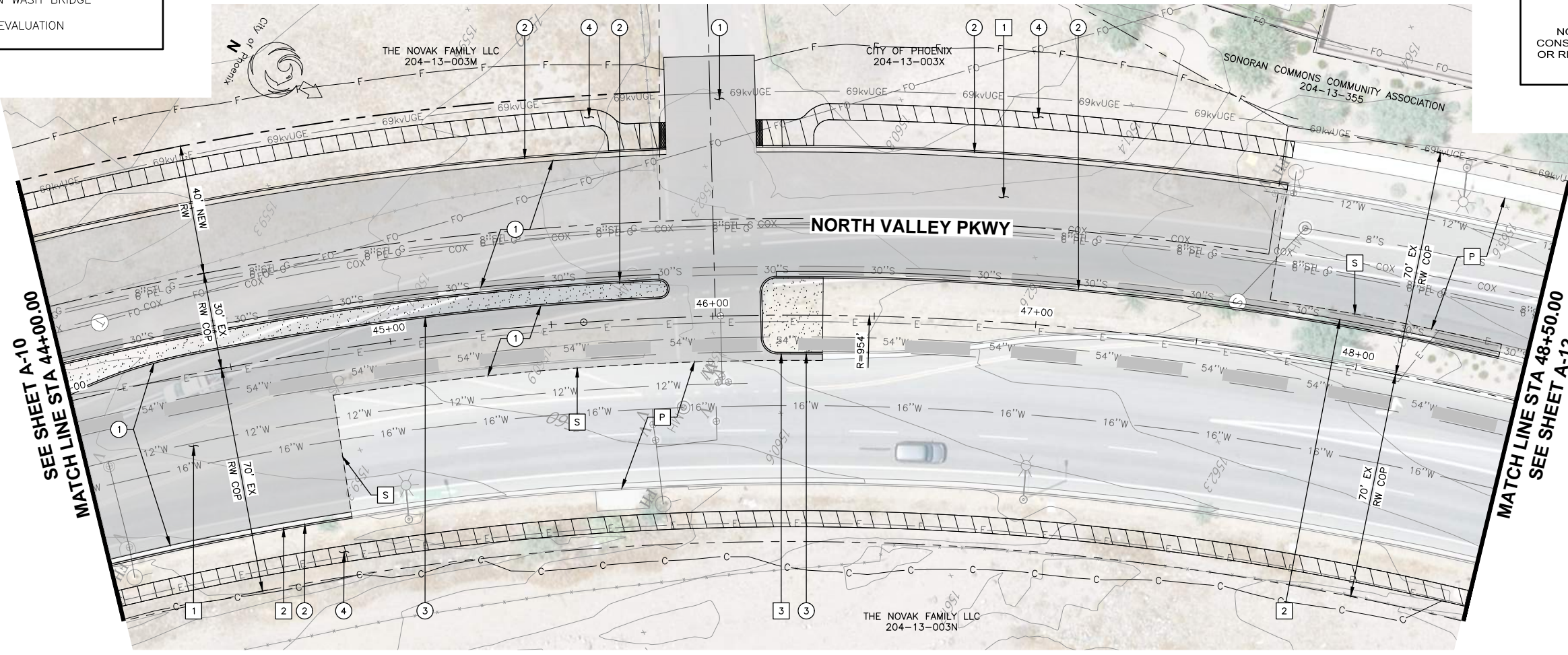
T.Y. LIN INTERNATIONAL
engineers | planners | scientists
CONSULTING ENGINEER

DES: RH, DR DR: DR CK: JB DATE: 6/21

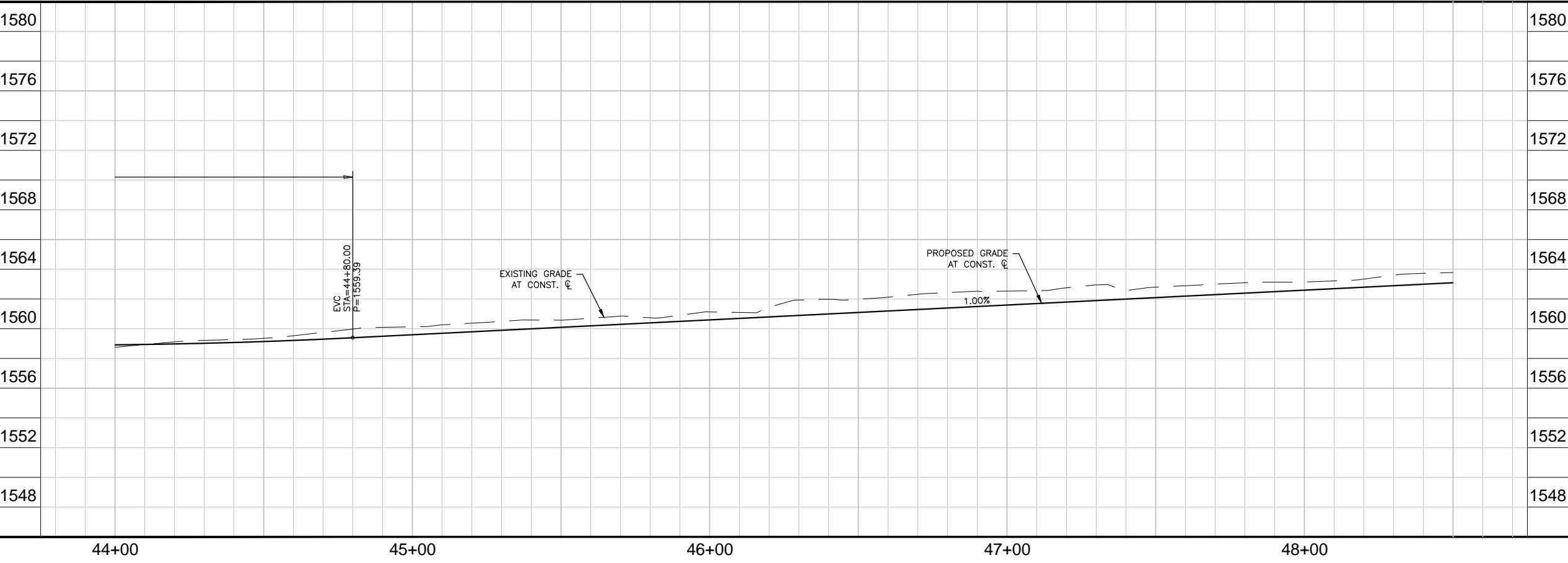
M MATCH EXISTING
P PROTECT IN PLACE
S SAWCUT AND MATCH EXISTING

REMOVALS			
NO.	DESCRIPTION	UNIT	QTY.
1	REMOVE EXISTING PAVEMENT	SY	2,895
2	EXISTING CONCRETE CURB & GUTTER	LF	590
3	EXISTING CONCRETE SINGLE CURB	LF	114

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACUTAL PVMT SECTION TBD IN FINAL DESIGN	SY	2,502
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	850
3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	238
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	4,066



NO.	DESCRIPTION	REV BY	CHK BY	DATE



ALTERNATIVE A

Call at least two full working days before you begin excavation.

ARIZONA 811
Arizona Blue Stake, Inc.

Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

SCALE: 1" = 20'
VERT: 1" = 4'

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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH, DR	CK: JB	SHEET NO:	TOTAL SHEETS:	AS BUILT:
DATE: 6/21	DATE: 6/21	DATE: 6/21	A-11	X	.

SCALE: 1" = 20'

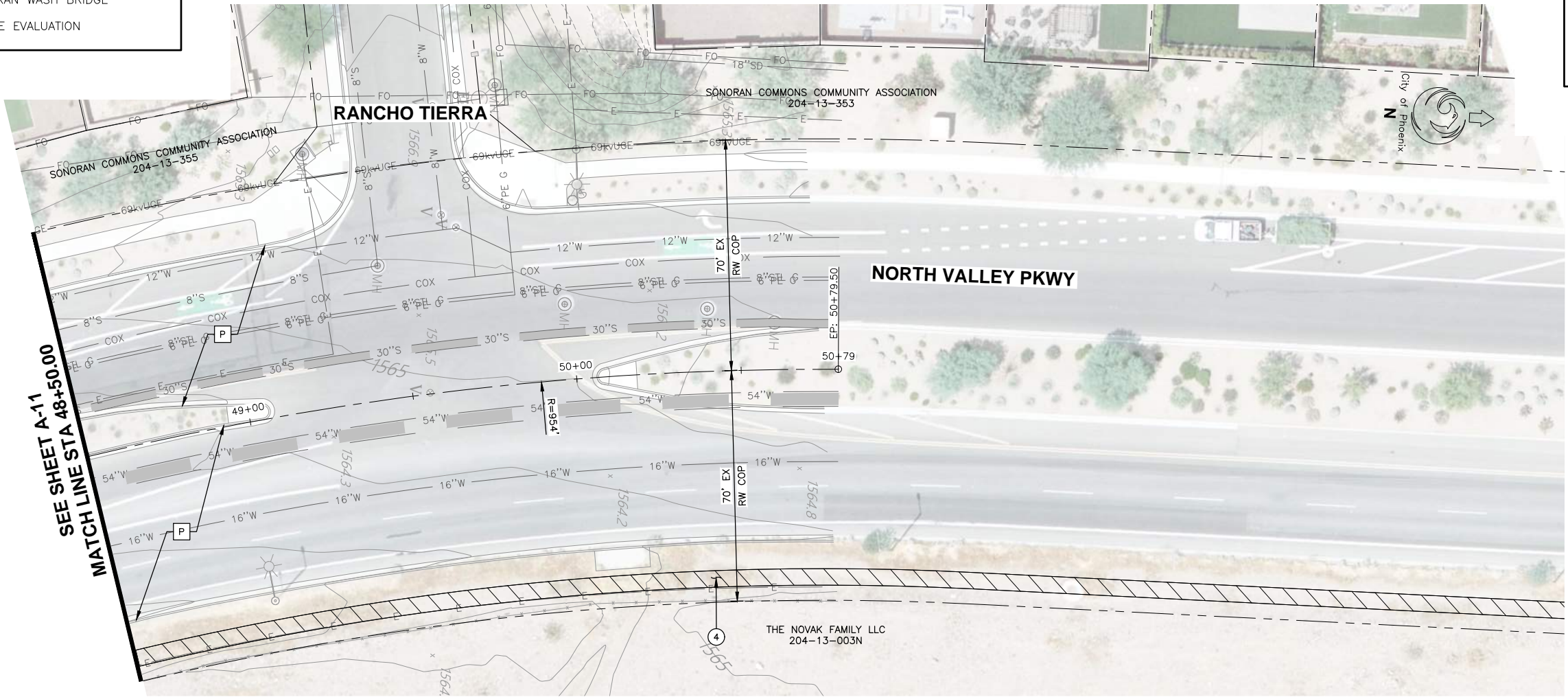
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

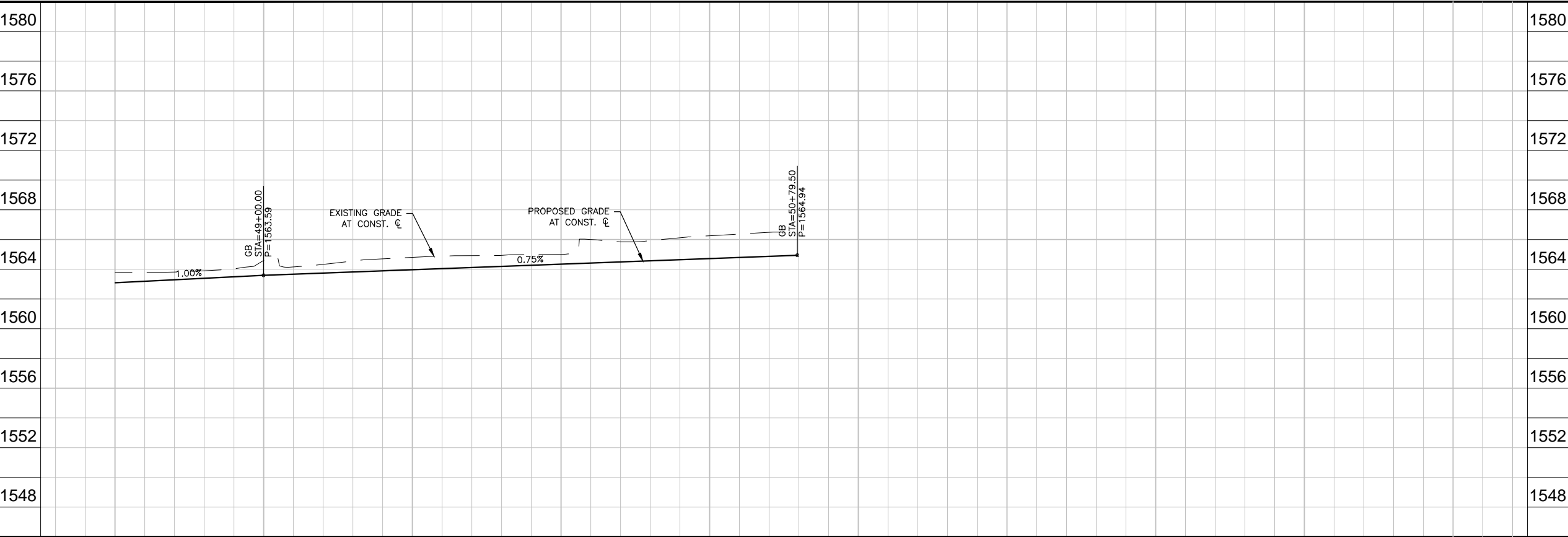
F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.
T.Y. LIN INTERNATIONAL engineers planners scientists			T.Y. LIN INTERNATIONAL CONSULTING ENGINEER		
DES: RH,DR	DR: DR	CK: JB	DATE: 6/21		
M	MATCH EXISTING				
P	PROTECT IN PLACE				
S	SAWCUT AND MATCH EXISTING				

CONSTRUCTION NOTES					
NO.	DESCRIPTION	UNIT	QTY.		
④	CONCRETE SIDEWALK PER COP STD DET P1230	SF	3,331		

CONSTRUCTION NOTES					
NO.	DESCRIPTION	UNIT	QTY.		



REVISION BY CITY OF PHOENIX	
NO.	DESCRIPTION



ALTERNATIVE A

Call at least two full working days before you begin excavation.

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Arizona Blue Stake, Inc.

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In Maricopa County: (602) 263-1100

SCALE: 1" = 20'
VERT: 1" = 4'

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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO: A-12	TOTAL SHEETS: X	AS BUILT: .
DATE: 6/21	DATE: 6/21	DATE: 6/21			

SCALE: 1" = 20'

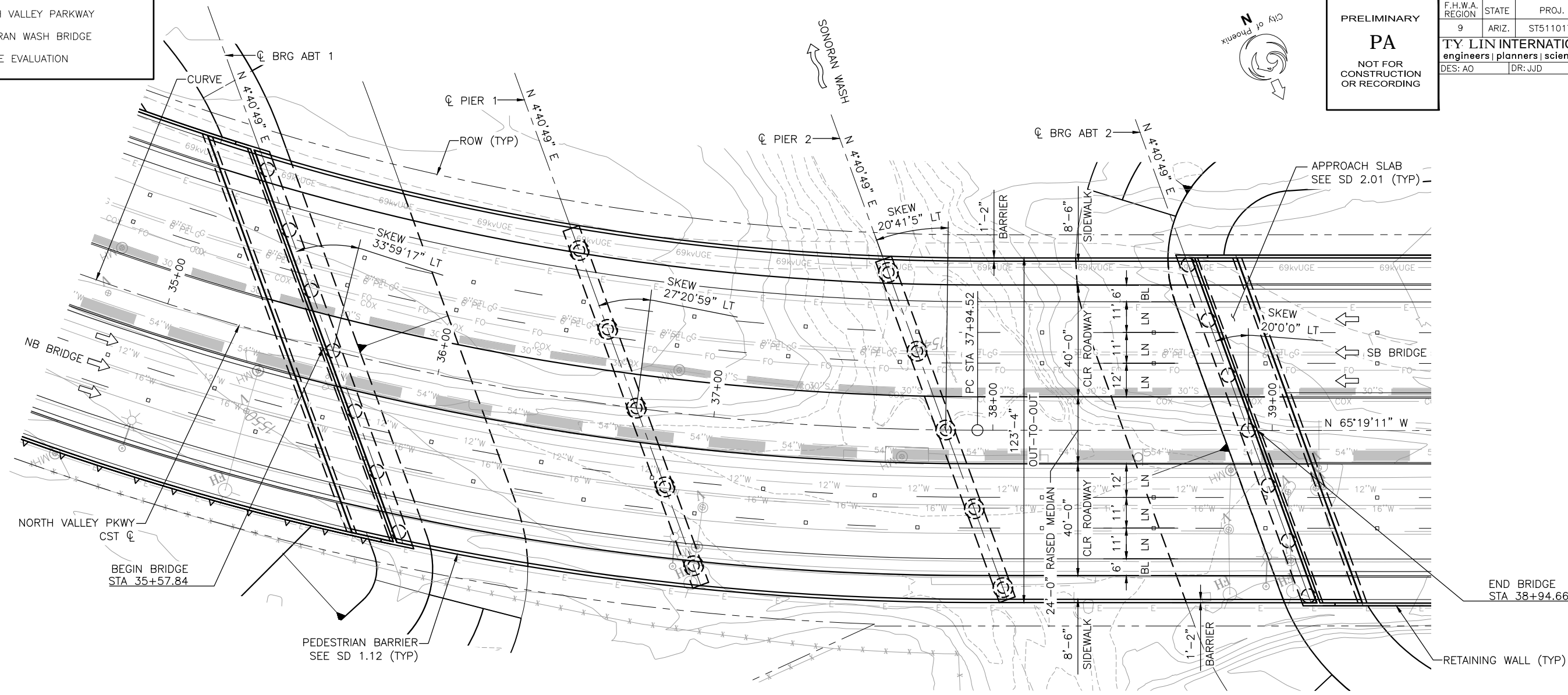
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 Dennis Ray

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

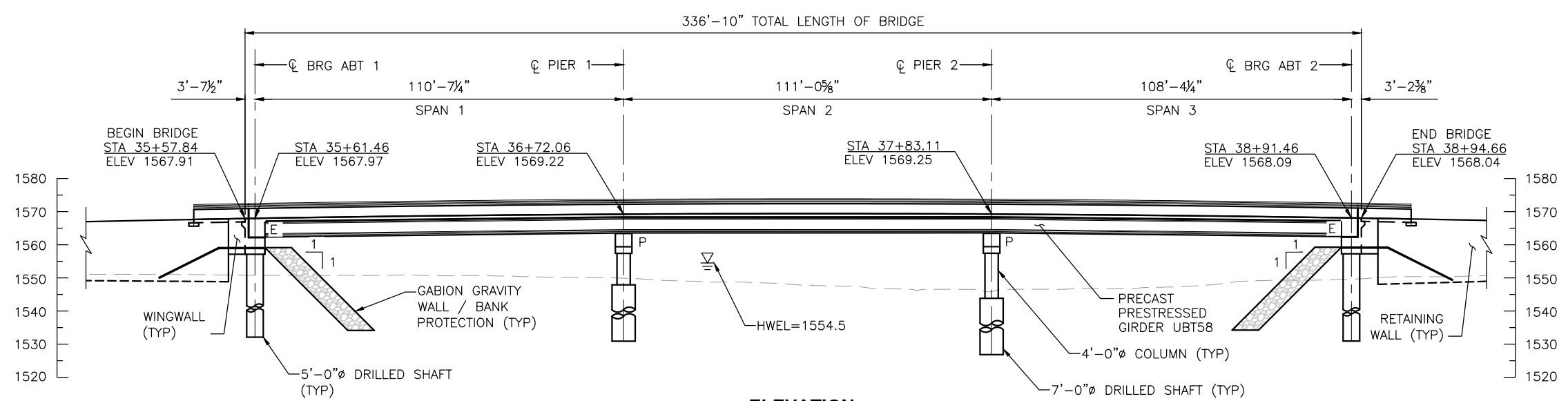
PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.
TY LIN INTERNATIONAL engineers planners scientists			T.Y. LIN INTERNATIONAL CONSULTING ENGINEER		
DES: AO	DR: JJD	CK: JRP	DATE: 6/21		

REVISION BY CITY OF PHOENIX	DESCRIPTION	REV BY	CHK BY	DATE
NO.				
REVISION BY CITY OF PHOENIX	DESCRIPTION	REV BY	CHK BY	DATE
NO.				
REVISION BY CITY OF PHOENIX	DESCRIPTION	REV BY	CHK BY	DATE
NO.				



LOCATION PLAN
3 SPAN PRECAST PRESTRESSED CONCRETE GIRDER BRIDGE
SKEW VARIES
SCALE: 1" = 20'-0"



ELEVATION
(STATIONS AND DIMENSIONS TAKEN ALONG NORTH VALLEY PKWY C)
SCALE: 1" = 20'-0"



ALTERNATIVE A

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

BRIDGE PLAN & ELEVATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

**NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1**

DR: JJD	DES: AO	CK: JRP	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	A-13	X	.
SCALE:					

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NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

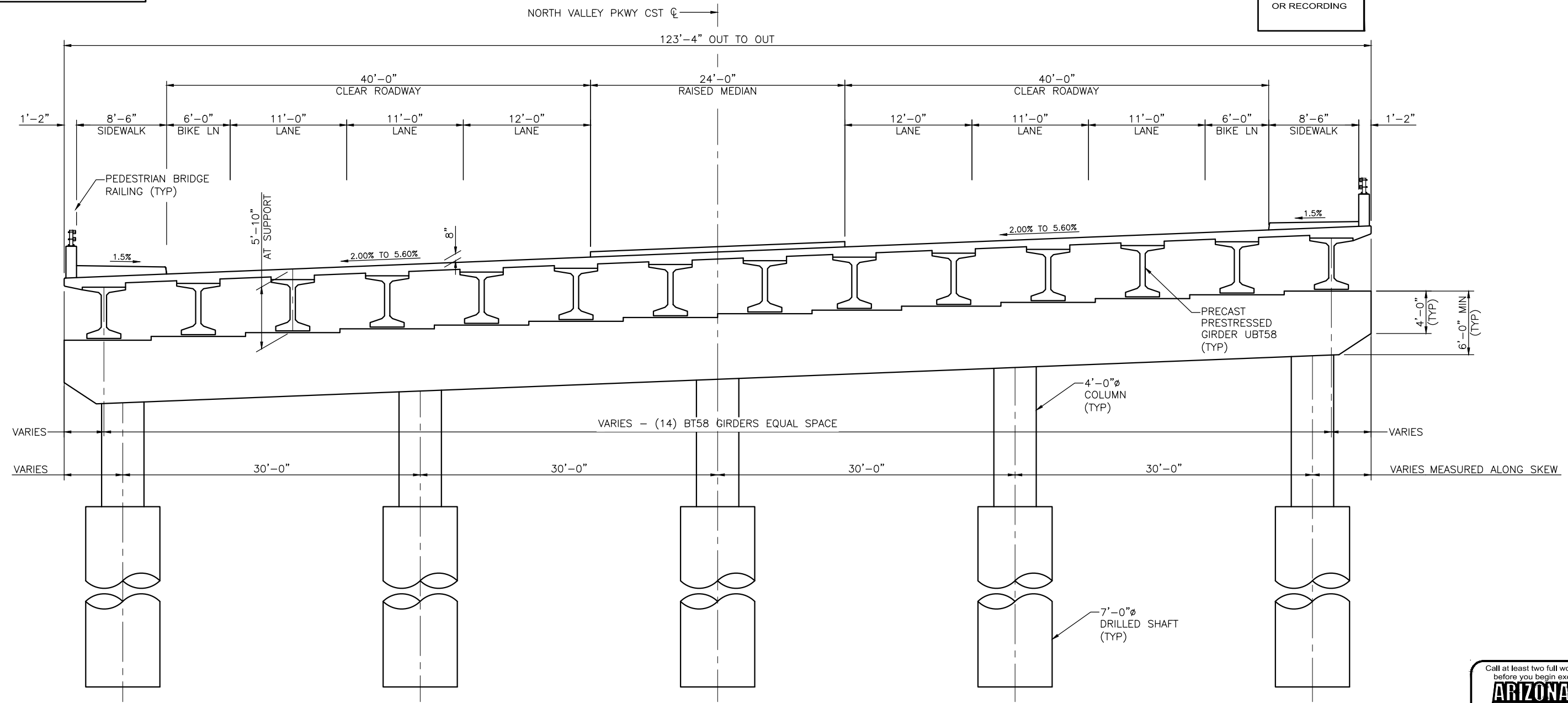
PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.

T.Y. LIN INTERNATIONAL T.Y. LIN INTERNATIONAL
engineers | planners | scientists CONSULTING ENGINEER

DES: AO DR: JJD CK: JRP DATE: 6/21

REVISION BY	DESCRIPTION	NO.	REV BY	CHK BY	DATE
CITY OF PHOENIX					
CITY OF PHOENIX					
CITY OF PHOENIX					



TYPICAL SECTION
(LOOKING UPSTATION)
(DIMENSIONS ARE TAKEN PERPENDICULAR TO THE CST ϕ UNLESS NOTED)
SCALE: 1" = 5'-0"



ALTERNATIVE A

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BRIDGE TYPICAL SECTION
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR:	DES:	CK:	SHEET	TOTAL	AS
JJD	AO	JRP	NO:	SHEETS	BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	A-14	X	.

SCALE: A-14 X .

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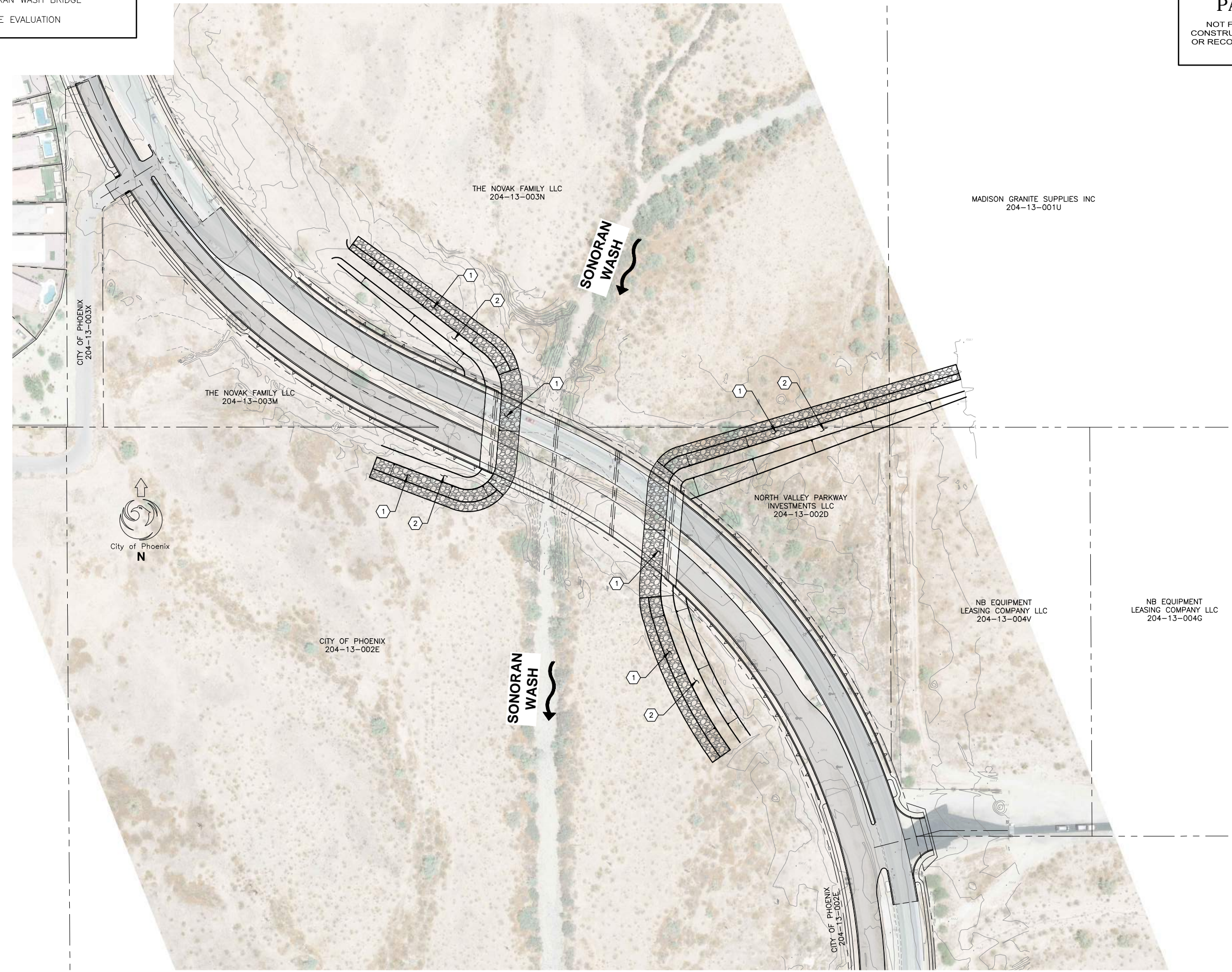
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

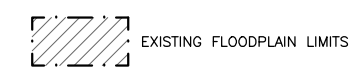
F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.
TY LIN INTERNATIONAL engineers planners scientists			T.Y.LIN INTERNATIONAL CONSULTING ENGINEER		
DES: RH,DR	DR: DR	CK: JB	DATE: 6/21		
M	MATCH EXISTING				
P	PROTECT IN PLACE				
S	SAWCUT AND MATCH EXISTING				

NO.	DESCRIPTION	UNIT	QTY.
1	GABIONS - BANK PROTECTION	CY	30,000
2	EARTHWORK / FILL - BANK PROTECTION	CY	8,878

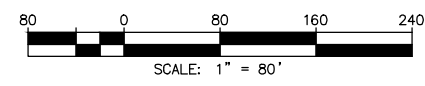
NO.	DESCRIPTION	REV BY	CHK BY	DATE



LEGEND



ALTERNATIVE A



CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING ELEVATIONS FOR ALL UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS.
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BANK PROTECTION
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	A-15	X	.
SCALE:			A-15	X	.

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NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

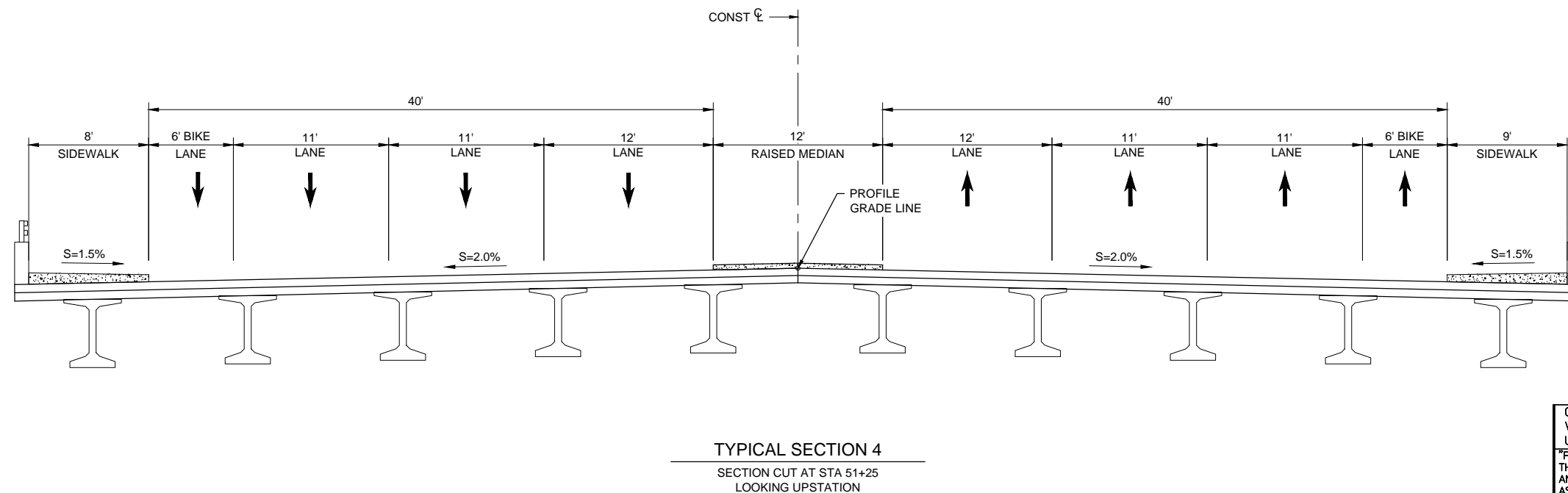
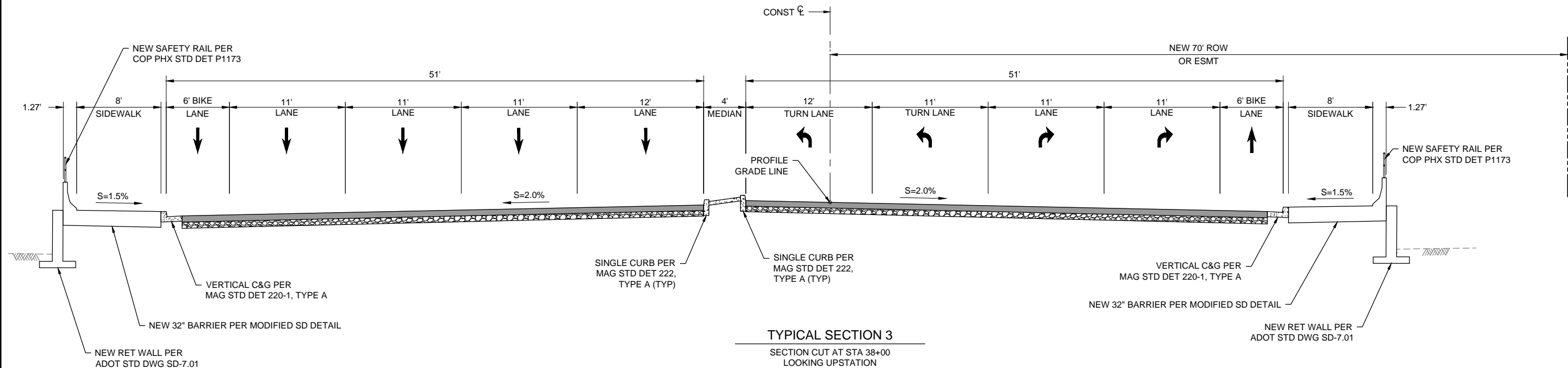
F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.

T.Y. LIN INTERNATIONAL T.Y. LIN INTERNATIONAL
engineers | planners | scientists CONSULTING ENGINEER
DES: RH,DR DR: DR CK: JB DATE: 6/21

NO.	DESCRIPTION	REV BY	CHK BY	DATE

NO.	DESCRIPTION	REV BY	CHK BY	DATE

NO.	DESCRIPTION	REV BY	CHK BY	DATE



ALTERNATIVE B

CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING ELEVATIONS FOR ALL UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS.
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TYPICAL SECTIONS					
CITY OF PHOENIX, ARIZONA STREET TRANSPORTATION DEPARTMENT					
NORTH VALLEY PARKWAY SONORAN WASH BRIDGE EVALUATION ST5110174-1					
DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-02	X	.
SCALE: NO SCALE					

T.Y. Lin Int'l scale.ctb
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NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

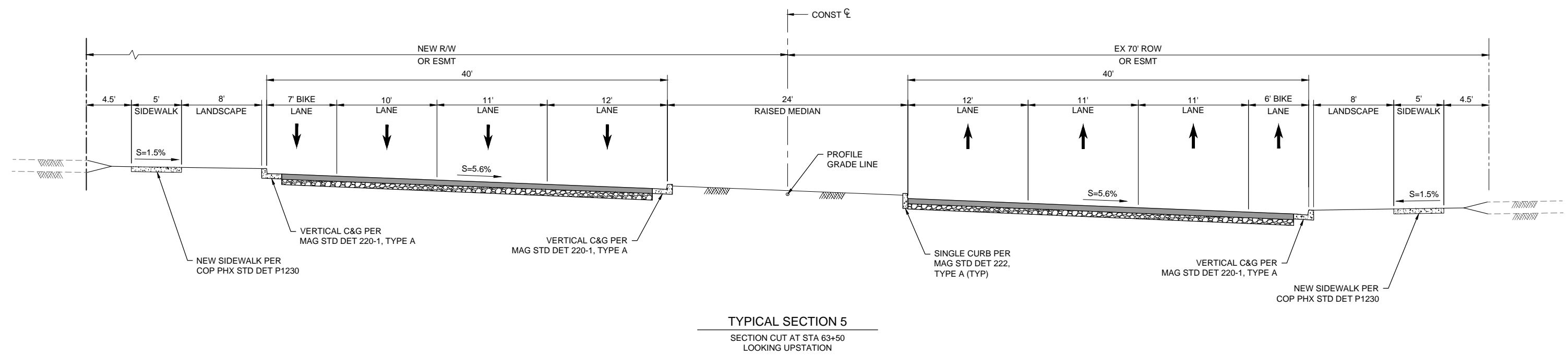
PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.
T.Y. LIN INTERNATIONAL engineers planners scientists			T.Y. LIN INTERNATIONAL CONSULTING ENGINEER		
DES: RH,DR	DR: DR	CK: JB	DATE: 6/21		

NO.	DESCRIPTION	REV BY	CHK BY	DATE

NO.	DESCRIPTION	REV BY	CHK BY	DATE

NO.	DESCRIPTION	REV BY	CHK BY	DATE



TYPICAL SECTION 5
SECTION CUT AT STA 63+50
LOOKING UPSTATION

ALTERNATIVE B

CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING ELEVATIONS FOR ALL UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS.
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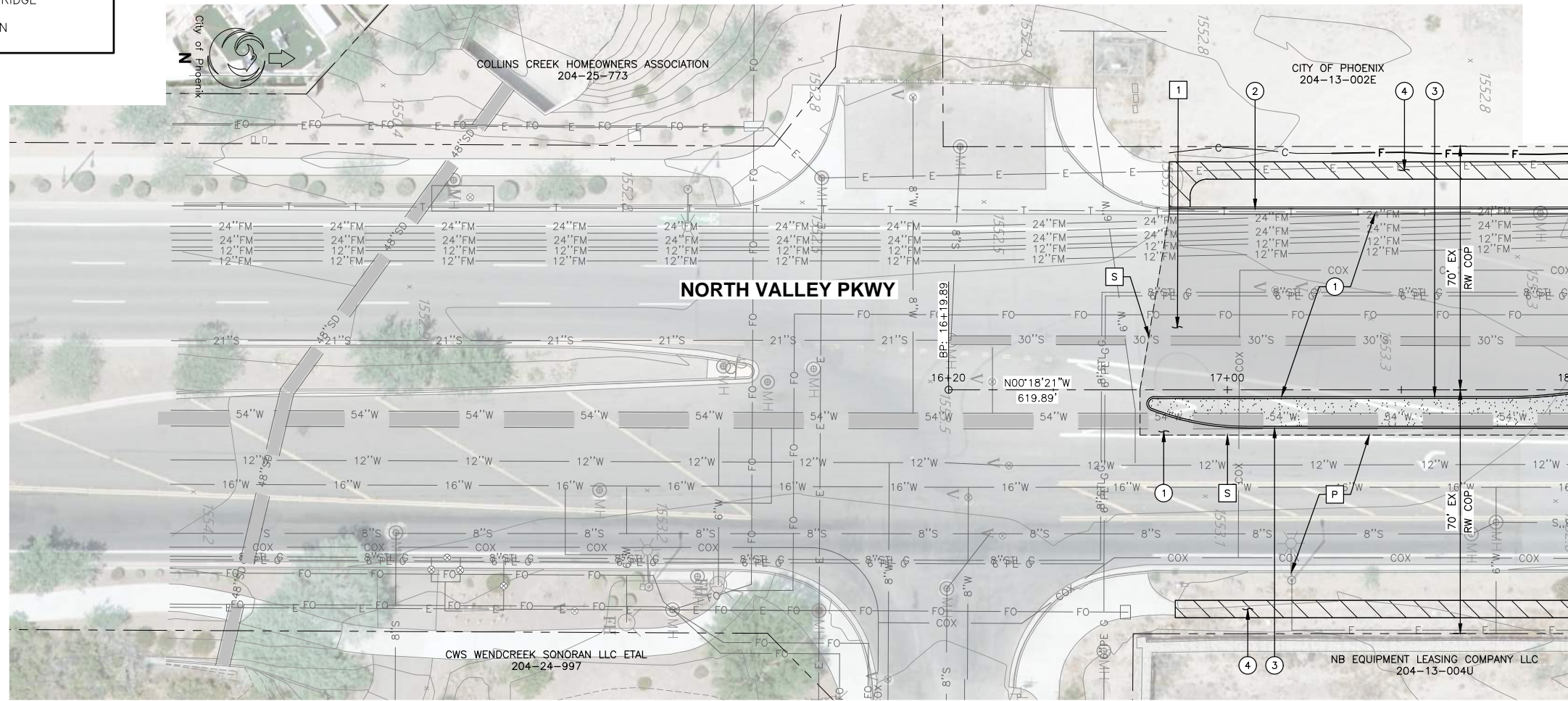
TYPICAL SECTIONS
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	NO:	X	.

SCALE: NO SCALE B-03 X .

T.Y. Lin 11/11/2011 12:05:22 PM P:\Projects\211115\051600_CAD\Drawings\Official\Drawings\ST5110174-1_SC_Long_Typical Sections.dwg

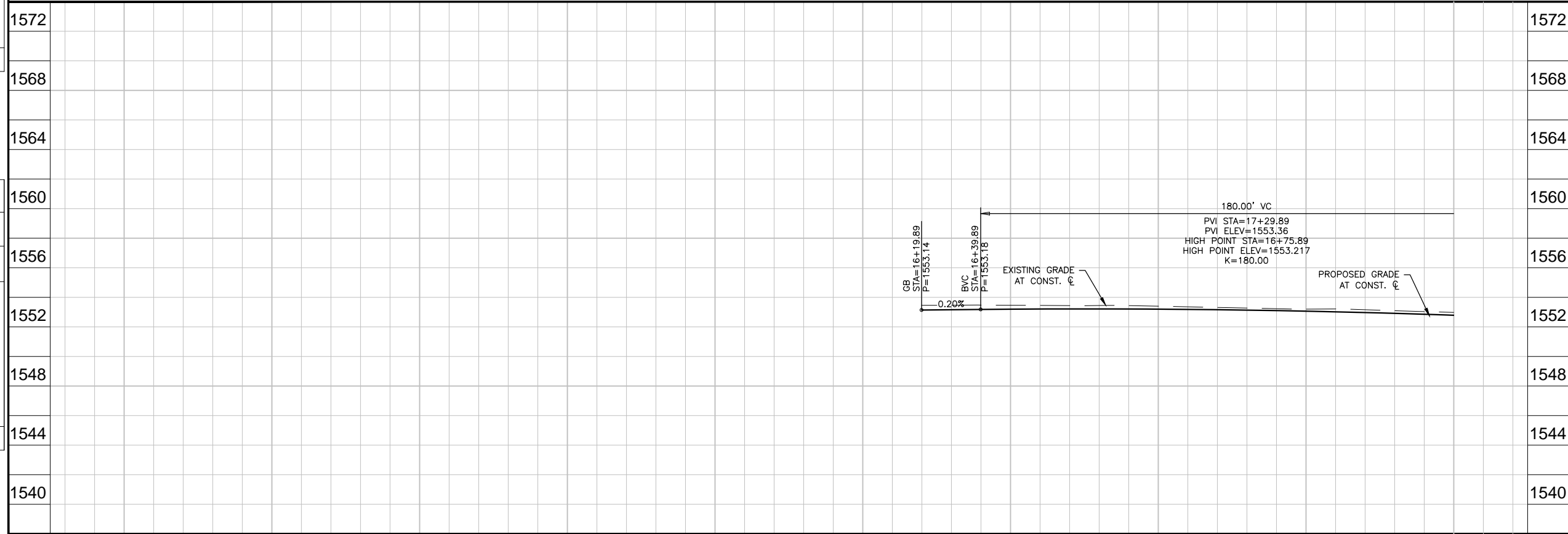
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION



MATCH LINE STA 18+00.00
SEE SHEET B-05

DIXILETA DRIVE

NO.	DESCRIPTION	REV BY	CHK BY	DATE



F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.

PRELIMINARY

PA

NOT FOR CONSTRUCTION OR RECORDING

REMOVALS			
NO.	DESCRIPTION	UNIT	QTY.
1	REMOVE EXISTING PAVEMENT	SY	803

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACTUAL PAVT SECTION TBD IN FINAL DESIGN	SY	741
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	117
3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	249
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	1,212

ALTERNATIVE B

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ARIZONA 811
Arizona Blue Stake, Inc.

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In Maricopa County: (602) 263-1100

SCALE: 1" = 20'
VERT: 1" = 4'

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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

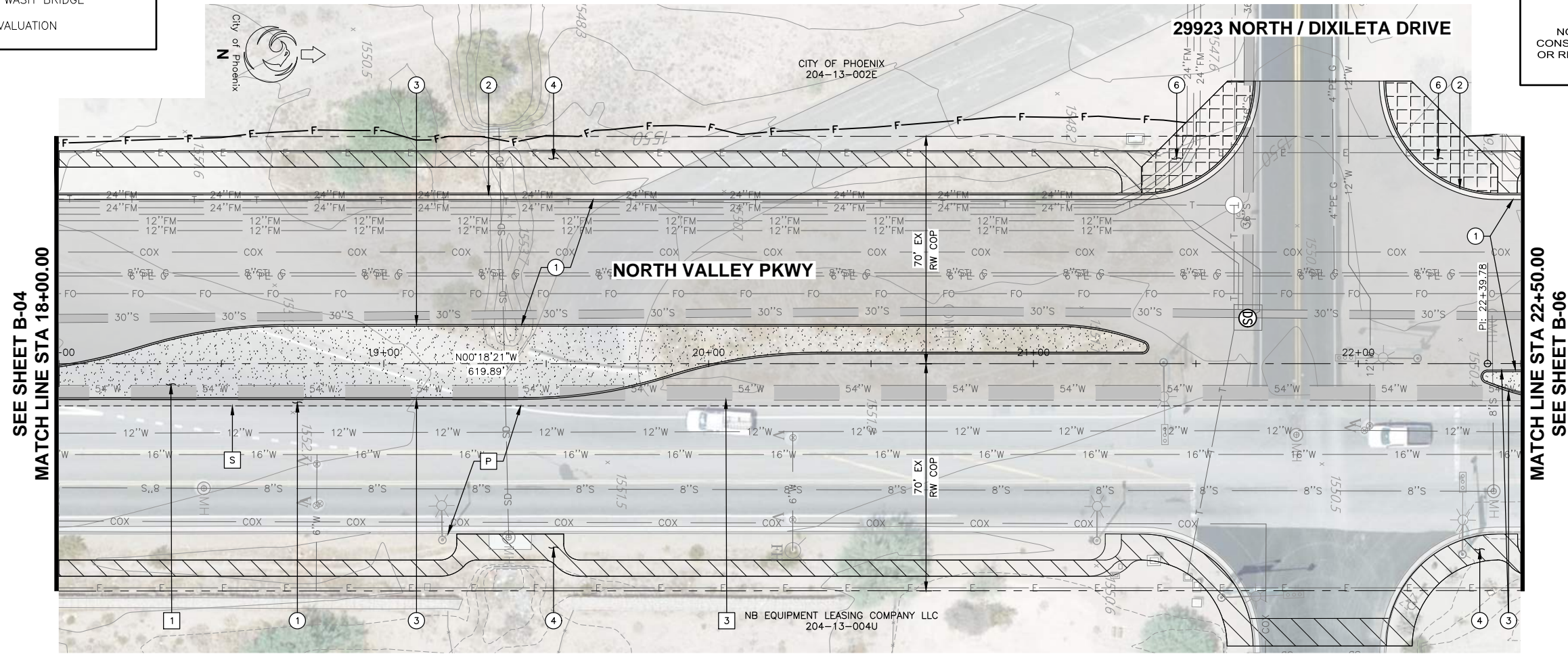
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DATE: 6/21	DATE: 6/21	DATE: 6/21	B-04	X	.

SCALE: 1" = 20'

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			
TY LIN INTERNATIONAL		TY LIN INTERNATIONAL		TY LIN INTERNATIONAL	
engineers planners scientists		CONSULTING ENGINEER		CONSULTING ENGINEER	
DES: RH,DR	DR: DR	CK: JB	DATE: 6/21		



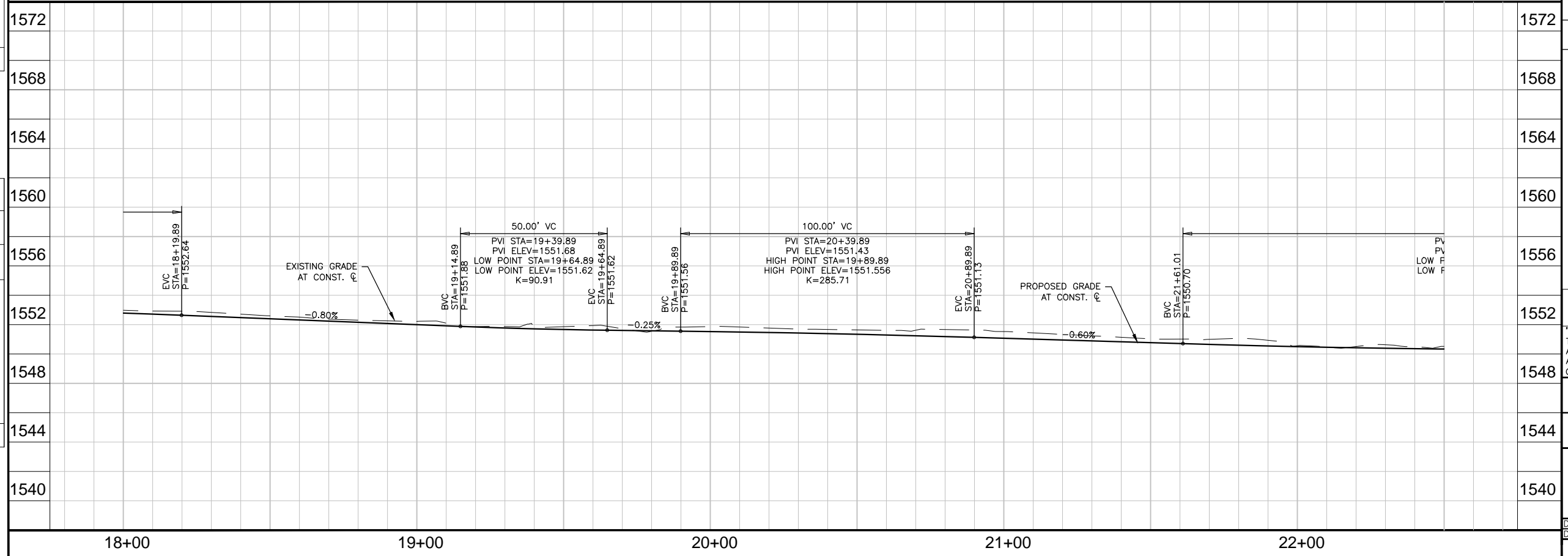
SEE SHEET B-04
MATCH LINE STA 18+00.00

MATCH LINE STA 22+50.00
SEE SHEET B-06

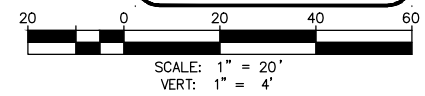
REMOVALS			
NO.	DESCRIPTION	UNIT	QTY.
1	REMOVE EXISTING PAVEMENT	SY	1,197
3	EXISTING CONCRETE SINGLE CURB	LF	55

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACTUAL PVMT SECTION TBD IN FINAL DESIGN	SY	4,937
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE 'A'	LF	450
3	SINGLE CURB PER MAG STD. DET. 222, TYPE 'A'	LF	704
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	4,834
6	CONCRETE SIDEWALK RAMP PER COP STD DET P1235 OR P1236	SF	1,168

MADISON GRANITE SUPPLIES (MAIN SITE ACCESS)



ALTERNATIVE B



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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

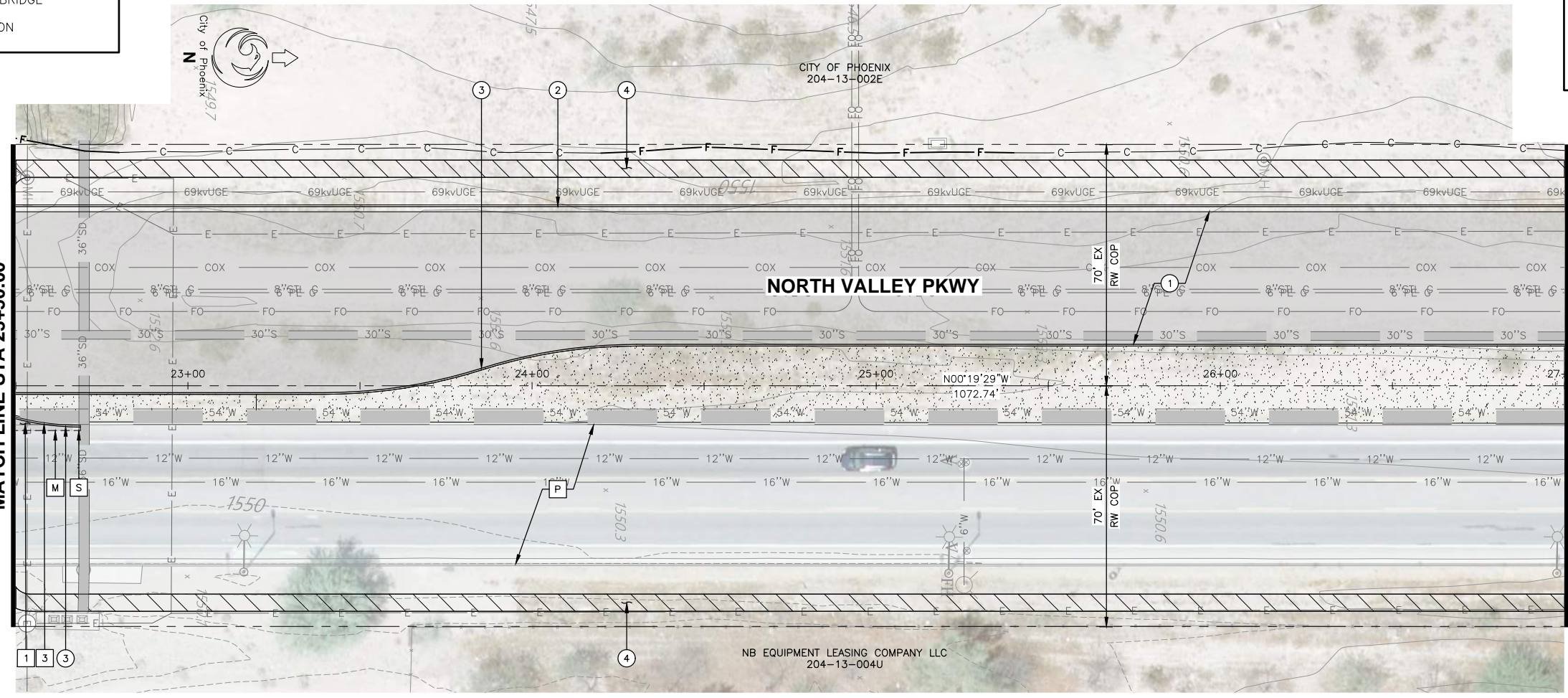
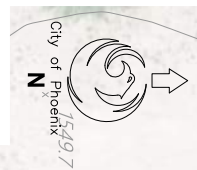
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-05	X	

REVISION BY	DESCRIPTION	NO.	DATE
CITY OF PHOENIX			
CITY OF PHOENIX			
CITY OF PHOENIX			

City of Phoenix
 6/21/2021 12:06:52 PM
 I:\Temp\Projects\221453\51600_CAD\Drawings\Official\Deliv_Files\ST5110174-1_SC_Long Plan & Profile.dwg

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION



SEE SHEET B-05
MATCH LINE STA 23+50.00

MATCH LINE STA 27+00.00
SEE SHEET B-07

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			

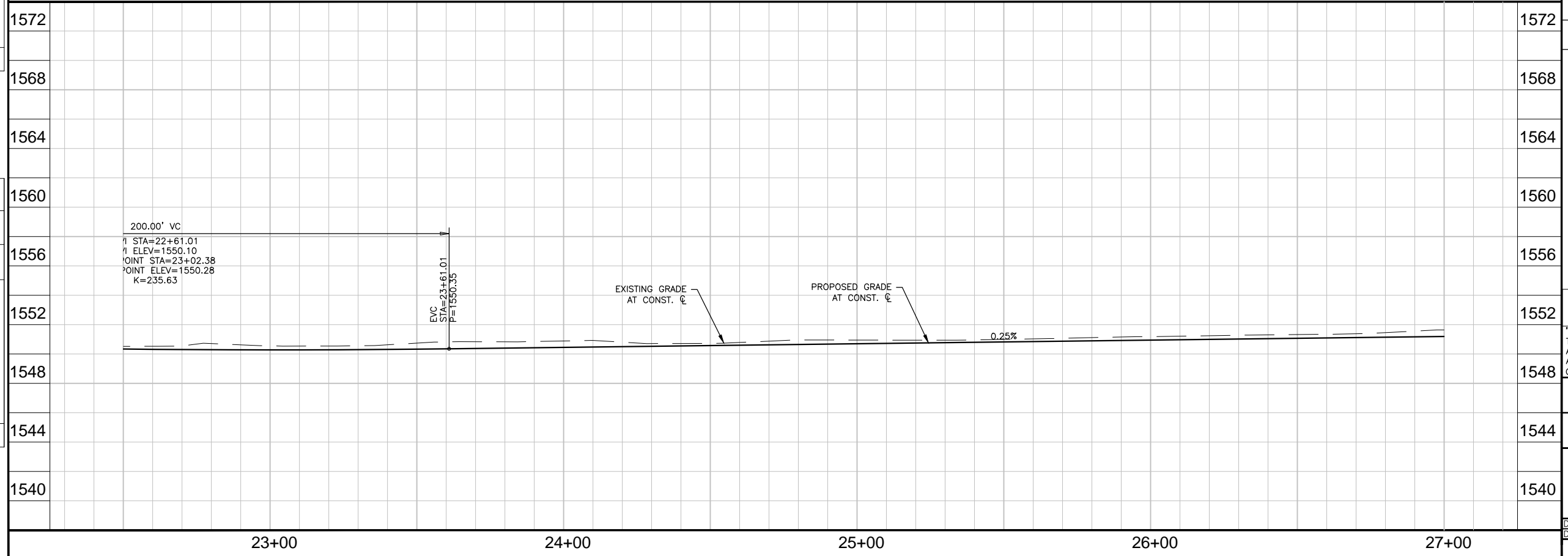
T.Y. LIN INTERNATIONAL
engineers | planners | scientists
T.Y. LIN INTERNATIONAL
CONSULTING ENGINEER
DES: RH, DR DR: DR CK: JB DATE: 6/21

M MATCH EXISTING
P PROTECT IN PLACE
S SAWCUT AND MATCH EXISTING

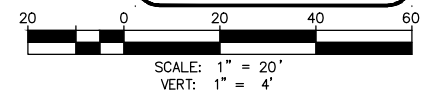
REMOVALS			
NO.	DESCRIPTION	UNIT	QTY.
1	REMOVE EXISTING PAVEMENT	SY	4
3	EXISTING CONCRETE SINGLE CURB	LF	17

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACTUAL PVMT SECTION TBD IN FINAL DESIGN	SY	4,937
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	450
3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	468
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	4,504

NO.	DESCRIPTION	REV BY	CHK BY	DATE



ALTERNATIVE B



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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH, DR	CK: JB	SHEET NO: B-06	TOTAL SHEETS: X	AS BUILT: .
DATE: 6/21	DATE: 6/21	DATE: 6/21			

SCALE: 1" = 20'

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

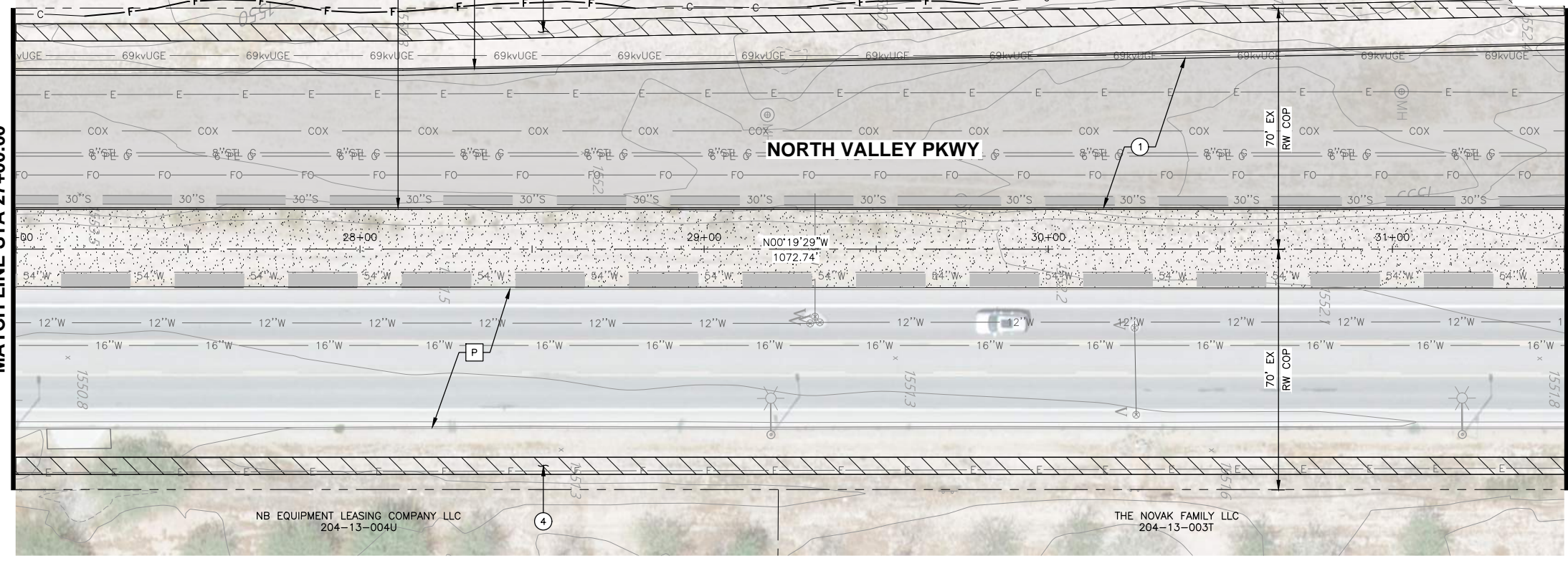


CITY OF PHOENIX
204-13-002E

NB EQUIPMENT LEASING COMPANY LLC
204-13-004U

THE NOVAK FAMILY LLC
204-13-003T

NORTH VALLEY PKWY



SEE SHEET B-06
MATCH LINE STA 27+00.00

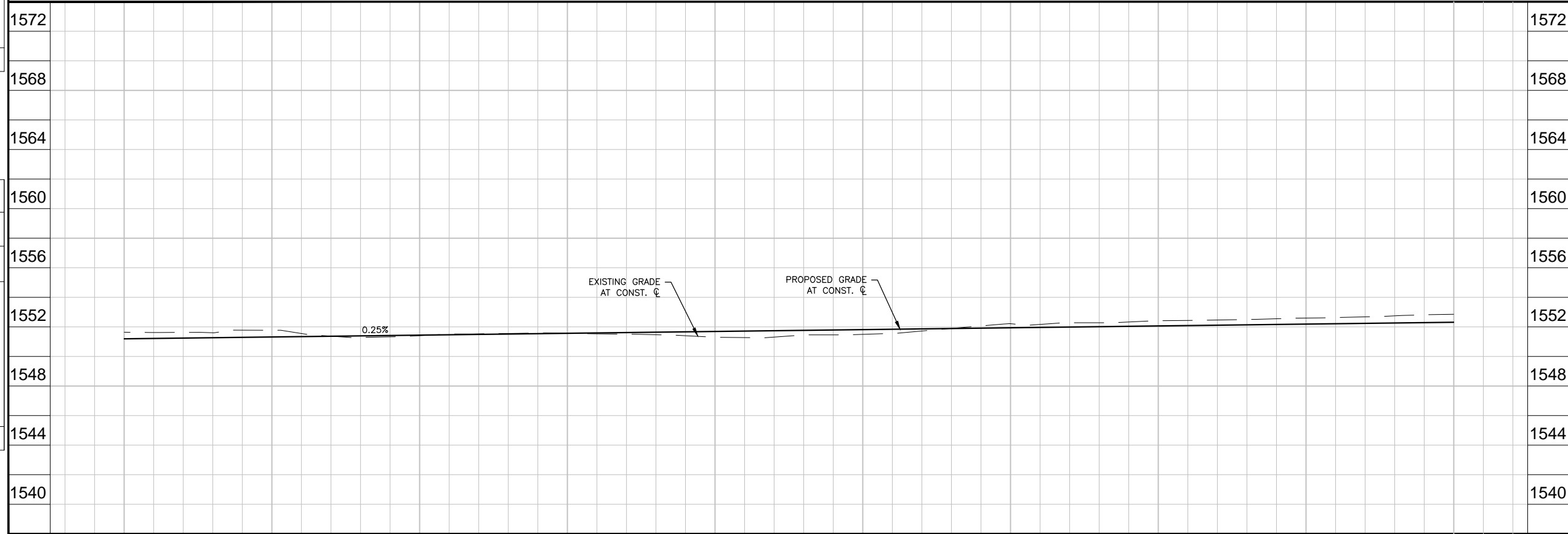
MATCH LINE STA 31+50.00
SEE SHEET B-08

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

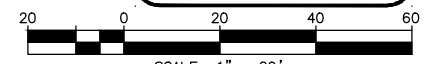
F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.
T.Y. LIN INTERNATIONAL engineers planners scientists			T.Y. LIN INTERNATIONAL CONSULTING ENGINEER		
DES: RH, DR	DR: DR	CK: JB	DATE: 6/21		

REMOVALS			
NO.	DESCRIPTION	UNIT	QTY.
	M MATCH EXISTING		
	P PROTECT IN PLACE		
	S SAWCUT AND MATCH EXISTING		

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACUTAL PVMT SECTION TBD IN FINAL DESIGN	SY	2,111
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	450
3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	450
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	4,501



ALTERNATIVE B



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PLAN & PROFILE
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH, DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-07	X	.

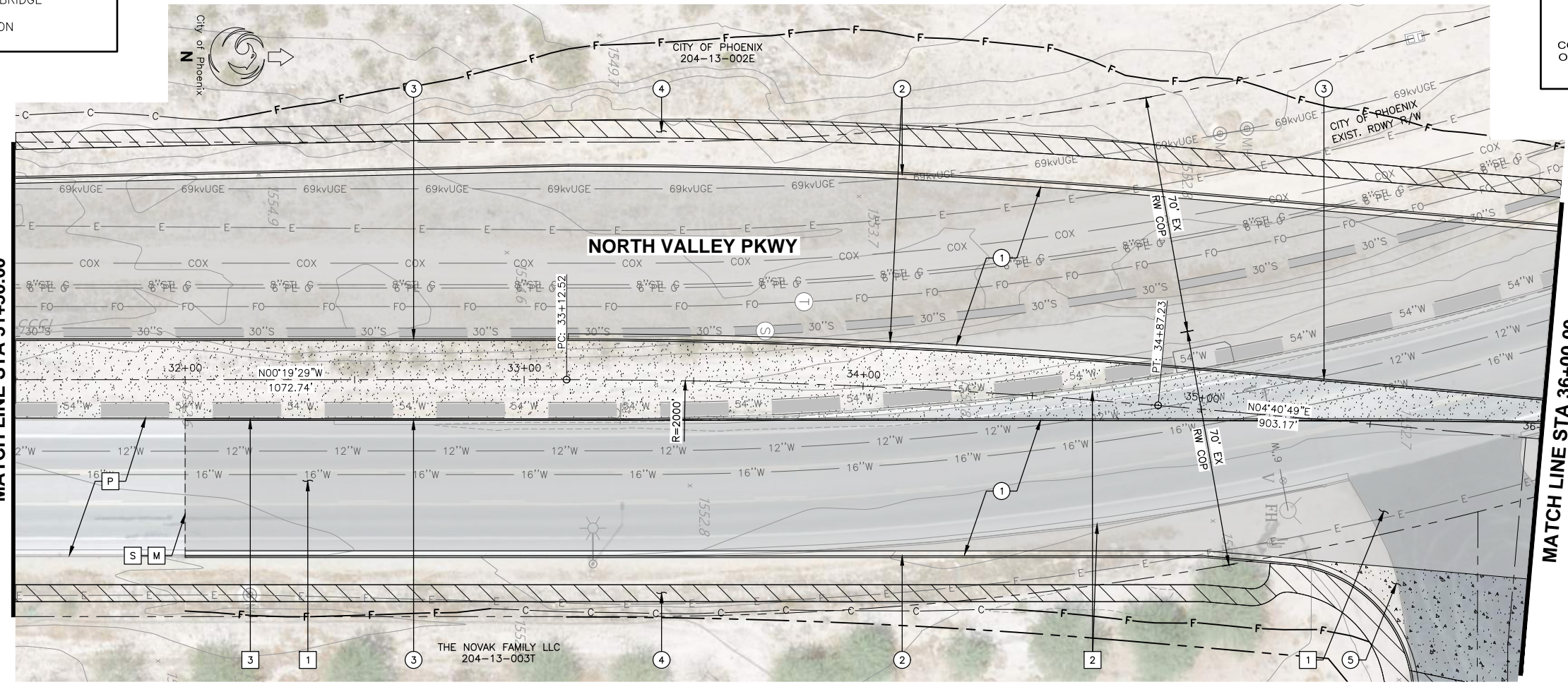
REVISION BY CITY OF PHOENIX	
NO.	DESCRIPTION

6/21/2021 12:01:24 PM Dennis Ray

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			
TY LIN INTERNATIONAL engineers planners scientists			T.Y. LIN INTERNATIONAL CONSULTING ENGINEER		
DES: RH, DR	DR: DR	CK: JB	DATE: 6/21		
M	MATCH EXISTING				
P	PROTECT IN PLACE				
S	SAWCUT AND MATCH EXISTING				

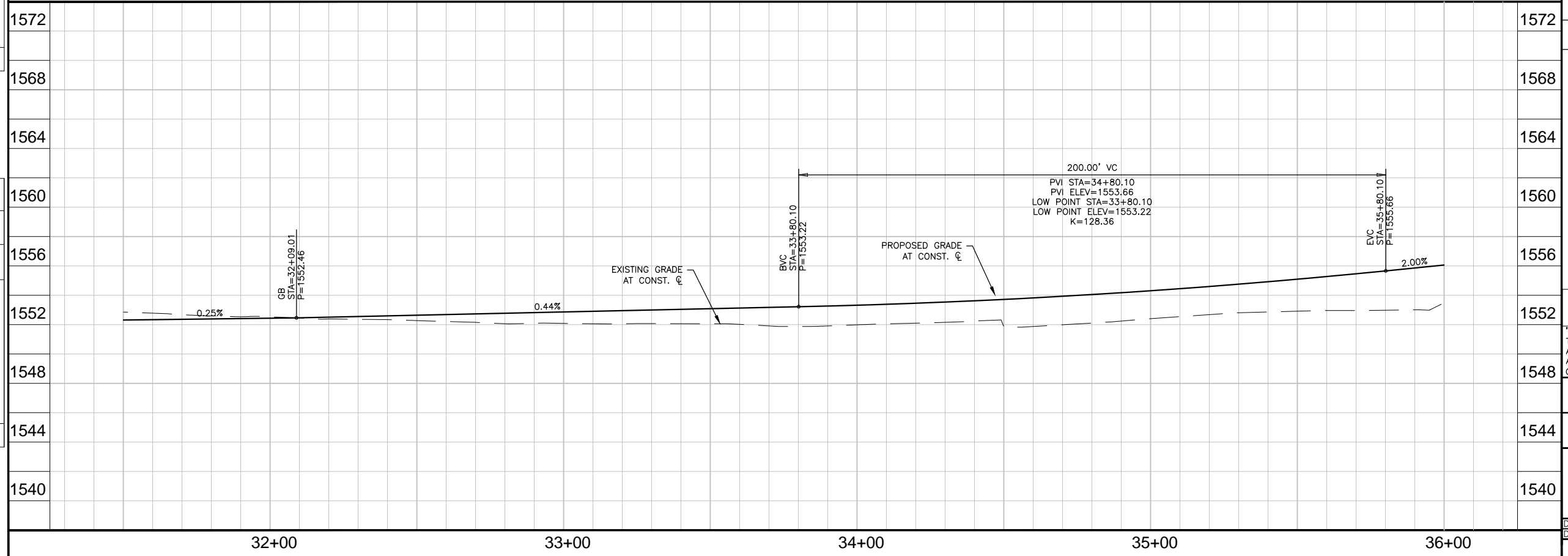


REMOVALS			
NO.	DESCRIPTION	UNIT	QTY.
1	REMOVE EXISTING PAVEMENT	SY	1,689
2	EXISTING CONCRETE CURB & GUTTER	LF	713
3	EXISTING CONCRETE SINGLE CURB	LF	44

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACUTAL PVMT SECTION TBD IN FINAL DESIGN	SY	4,176
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	455
3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	513
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	4,974
5	CONCRETE DRIVEWAY PER COP STD DET P1243 (9" THICK)	SF	1,270

REVISION BY CITY OF PHOENIX	DESCRIPTION	NO.	REV BY	CHK BY	DATE

MADISON GRANITE SUPPLIES (N'LY SITE ACCESS)



ALTERNATIVE B

Call at least two full working days before you begin excavation.

ARIZONA 811
Arizona Blue Stake, Inc.

Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

SCALE: 1" = 20'
VERT: 1" = 4'

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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

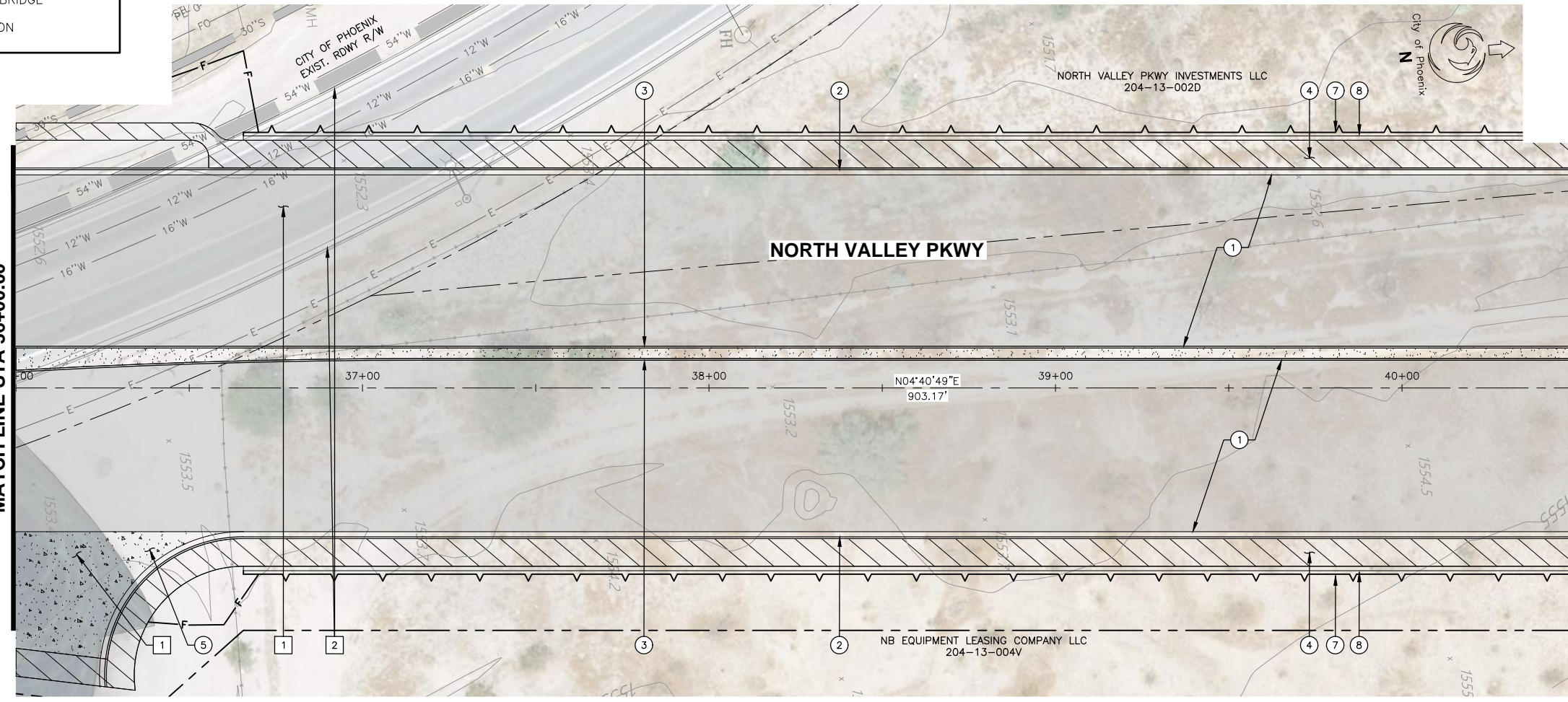
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DATE: 6/21	DATE: 6/21	DATE: 6/21	B-08	X	.

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NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			
TY LIN INTERNATIONAL engineers planners scientists			TY LIN INTERNATIONAL CONSULTING ENGINEER		
DES: RH,DR	DR: DR	CK: JB	DATE: 6/21		
M	MATCH EXISTING				
P	PROTECT IN PLACE				
S	SAWCUT AND MATCH EXISTING				



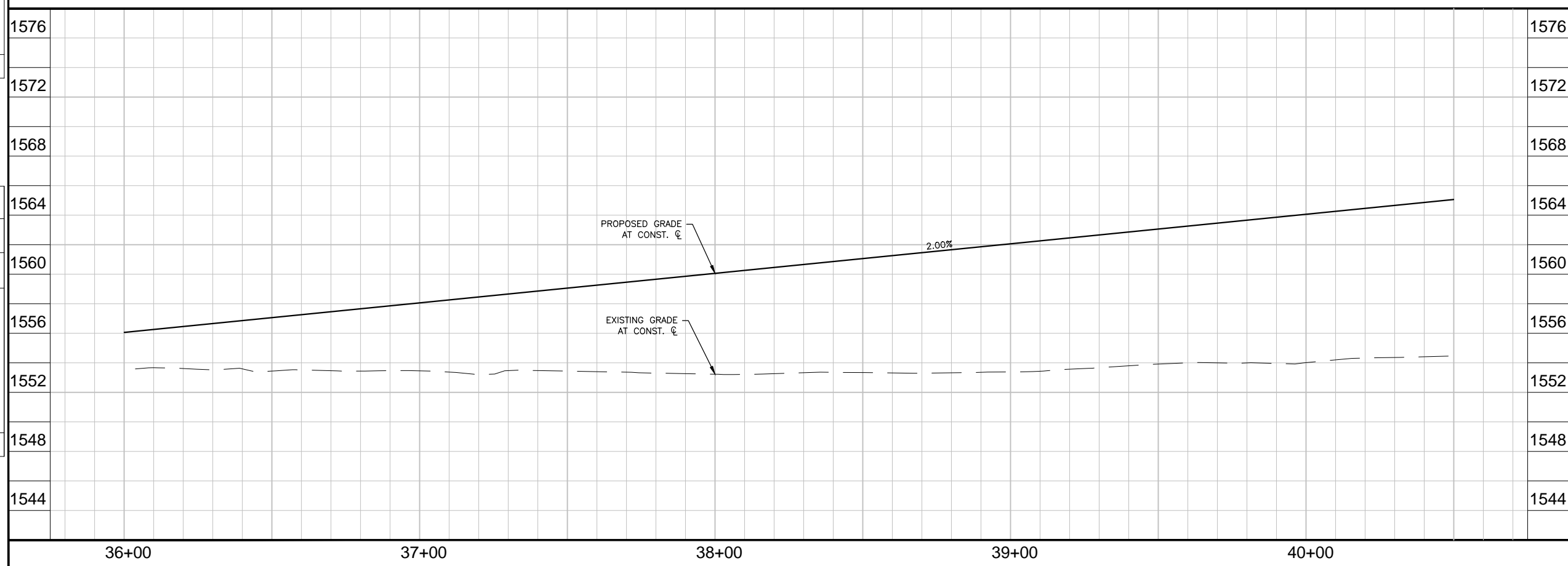
SEE SHEET B-08
MATCH LINE STA 36+00.00

MATCH LINE STA 40+50.00
SEE SHEET B-10

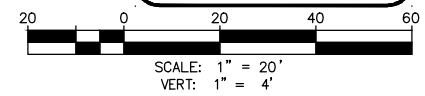
REMOVALS			
NO.	DESCRIPTION	UNIT	QTY.
1	REMOVE EXISTING PAVEMENT	SY	2,225
2	EXISTING CONCRETE CURB & GUTTER	LF	1,083

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACTUAL PVMT SECTION TBD IN FINAL DESIGN	SY	4,936
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	900
3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	900
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	7,208
5	CONCRETE DRIVEWAY PER COP STD DET P1243 (9" THICK)	SF	1,217
7	CONCRETE RETAINING WALL PER ADOT SD 7.01	LF	769
8	32" CONCRETE HALF BARRIER PER ADOT C-10.72	LF	769

MADISON GRANITE SUPPLIES (N'LY SITE ACCESS)



ALTERNATIVE B



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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-09	X	.

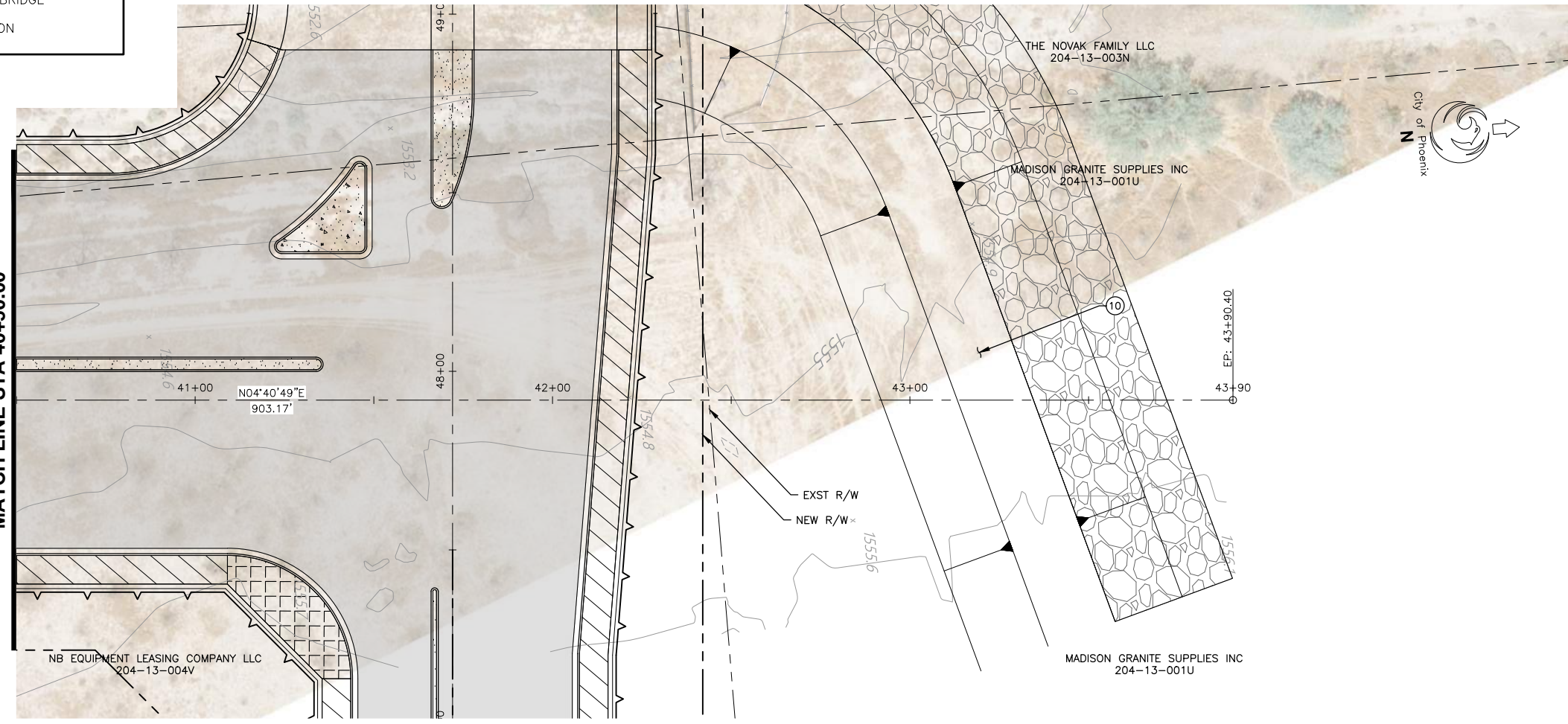
REVISION BY	DESCRIPTION	NO.	DATE
CITY OF PHOENIX			
CITY OF PHOENIX			
CITY OF PHOENIX			

6/21/2021 12:01:58 PM Dennis Ray

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

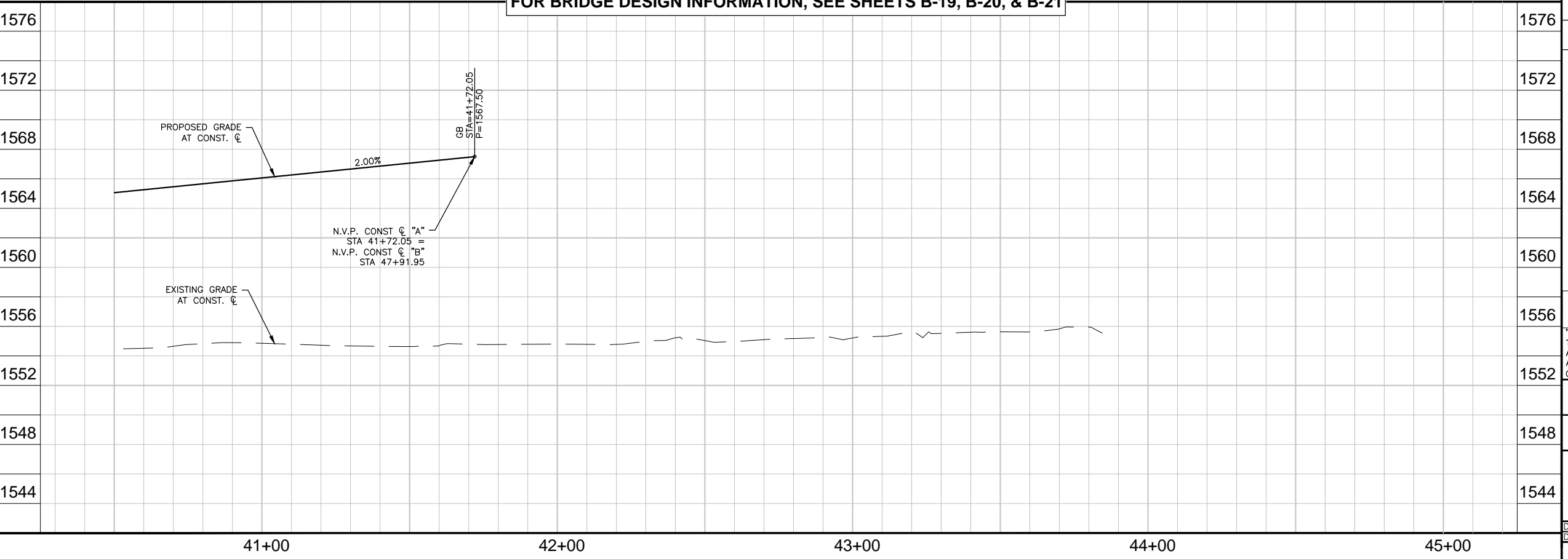
PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			
T.Y. LIN INTERNATIONAL engineers planners scientists			T.Y. LIN INTERNATIONAL CONSULTING ENGINEER		
DES: RH, DR	DR: DR	CK: JB	DATE: 6/21		
M	MATCH EXISTING				
P	PROTECT IN PLACE				
S	SAWCUT AND MATCH EXISTING				



NO.	DESCRIPTION	REV BY	CHK BY	DATE

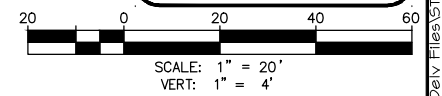
FOR BRIDGE DESIGN INFORMATION, SEE SHEETS B-19, B-20, & B-21



NO.	DESCRIPTION	UNIT	QTY.
	FOR ROADWAY QUANTITIES, SEE SHEET B-12		

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
	FOR ROADWAY QUANTITIES, SEE SHEET B-12		
10	DRAINAGE SLOPE ARMORING FOR BANK PROTECTION - SEE SHEET B-20		

ALTERNATIVE B



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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH, DR	CK: JB	SHEET NO: B-10	TOTAL SHEETS: X	AS BUILT: .
DATE: 6/21	DATE: 6/21	DATE: 6/21			

6/21/2021 12:08:11 PM Dennis Ray T.Y. Lin 8/17/2021

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION



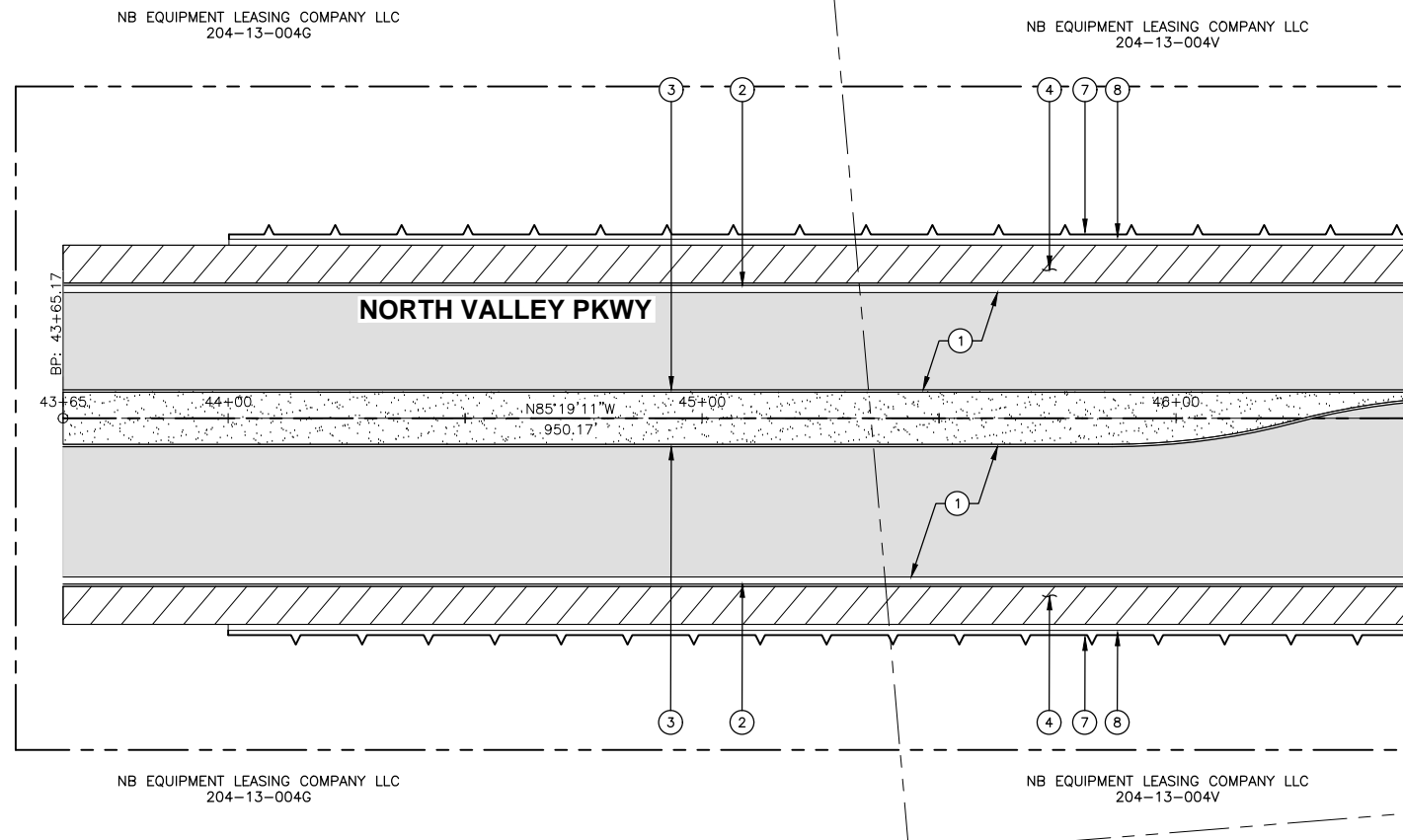
PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.
T.Y. LIN INTERNATIONAL engineers planners scientists			T.Y. LIN INTERNATIONAL CONSULTING ENGINEER		
DES: RH,DR	DR: DR	CK: JB	DATE: 6/21		
M	MATCH EXISTING				
P	PROTECT IN PLACE				
S	SAWCUT AND MATCH EXISTING				

REVISION BY CITY OF PHOENIX	NO.	DESCRIPTION	REV BY	CHK BY	DATE

REVISION BY CITY OF PHOENIX	NO.	DESCRIPTION	REV BY	CHK BY	DATE

REVISION BY CITY OF PHOENIX	NO.	DESCRIPTION	REV BY	CHK BY	DATE



MATCH LINE STA 46+50.00
SEE SHEET B-12

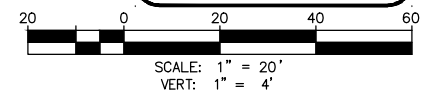
REMOVALS			
NO.	DESCRIPTION	UNIT	QTY.

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACUTAL PVMT SECTION TBD IN FINAL DESIGN	SY	1,548
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	570
3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	570
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	4,558
7	CONCRETE RETAINING WALL PER ADOT SD 7.01	LF	500
8	32" CONCRETE HALF BARRIER PER ADOT C-10.72	LF	500

1576		1576
1572		1572
1568		1568
1564		1564
1560		1560
1556		1556
1552		1552
1548		1548
1544		1544

PROFILE TO BE DEVELOPED DURING FINAL DESIGN IF INTERSECTION LEG IS WARRANTED TO SERVE DEVELOPMENT

ALTERNATIVE B



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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-11	X	.

43+65 44+00 45+00 46+00

SCALE: 1" = 20'

T.Y. Lin 10174-1.dwg 6/21/2021 12:08:35 PM Dennis Ray

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

SEE SHEET B-09
MATCH LINE STA 40+50.00

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.

T.Y. LIN INTERNATIONAL T.Y. LIN INTERNATIONAL
engineers | planners | scientists CONSULTING ENGINEER
DES: RH, DR DR: DR CK: JB DATE: 6/21

M MATCH EXISTING
P PROTECT IN PLACE
S SAWCUT AND MATCH EXISTING

REMOVALS			
NO.	DESCRIPTION	UNIT	QTY.

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
①	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACUTAL PVMT SECTION TBD IN FINAL DESIGN	SY	2,817
②	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	592
③	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	447
④	CONCRETE SIDEWALK PER COP STD DET P1230	SF	3,578
⑥	CONCRETE SIDEWALK RAMP PER COP STD DET P1235 OR P1236	SF	584
⑦	CONCRETE RETAINING WALL PER ADOT SD 7.01	LF	489
⑧	32" CONCRETE HALF BARRIER PER ADOT C-10.72	LF	489
⑨	INSTALL NEW TRAFFIC SIGNAL AND EQUIPMENT	LS	1
⑩	DRAINAGE SLOPE ARMORING FOR BANK PROTECTION - SEE SHEET B-20	-	-

SEE SHEET B-11
MATCH LINE STA 46+50.00

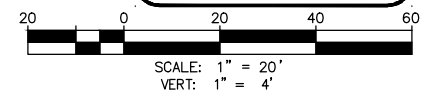
MATCH LINE STA 51+00.00
SEE SHEET B-13



FOR BRIDGE DESIGN INFORMATION, SEE SHEETS B-19, B-20, & B-21



ALTERNATIVE B



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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH, DR	CK: JB	SHEET NO:	TOTAL SHEETS:	AS BUILT:
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-12	X	.

NO.	DESCRIPTION	REV BY	CHK BY	DATE

6/21/2021 12:08:51 PM Perry Ray T.Y. Lin International

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.

TY LIN INTERNATIONAL engineers | planners | scientists
T.Y.LIN INTERNATIONAL CONSULTING ENGINEER

DES: RH,DR DR: DR CK: JB DATE: 6/21

M MATCH EXISTING
P PROTECT IN PLACE
S SAWCUT AND MATCH EXISTING

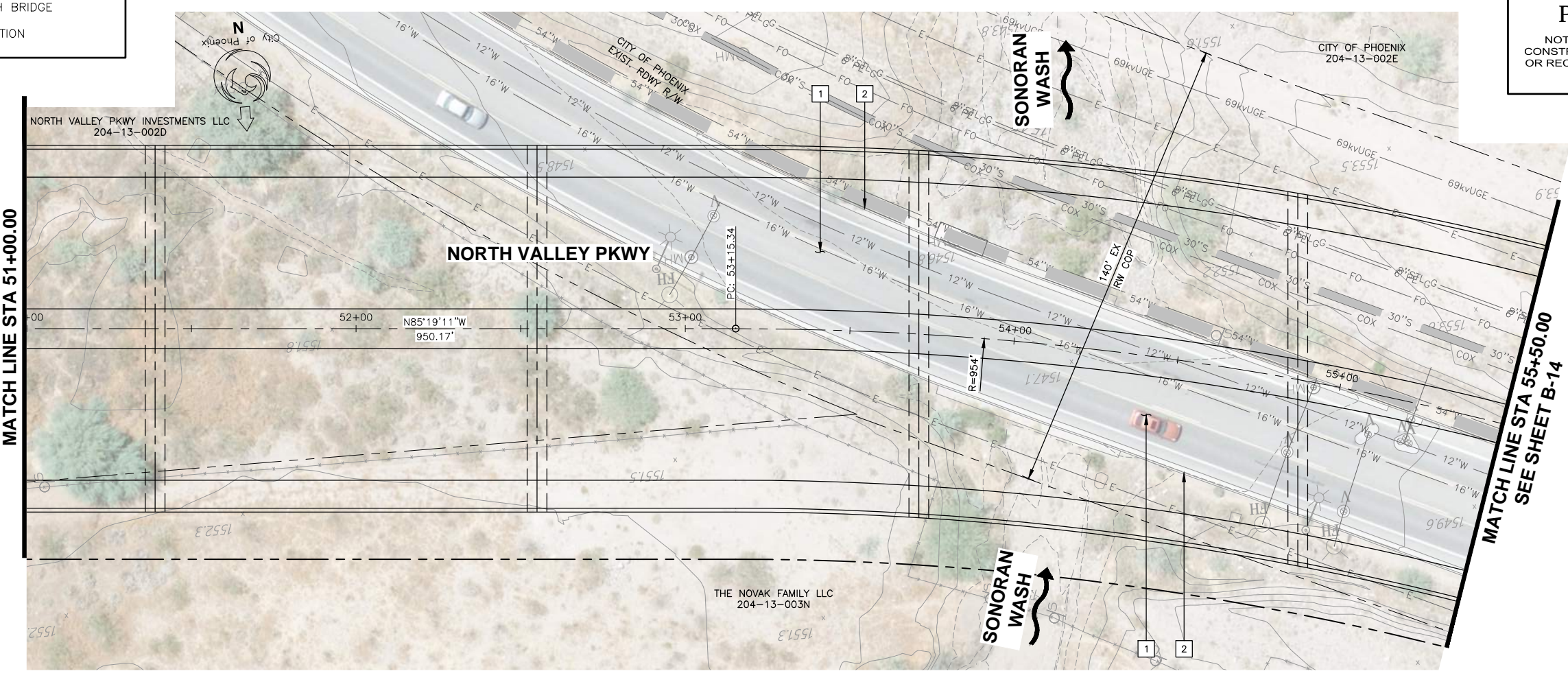
REMOVALS

NO.	DESCRIPTION	UNIT	QTY.
1	REMOVE EXISTING PAVEMENT	SY	1,870
2	EXISTING CONCRETE CURB & GUTTER	LF	876

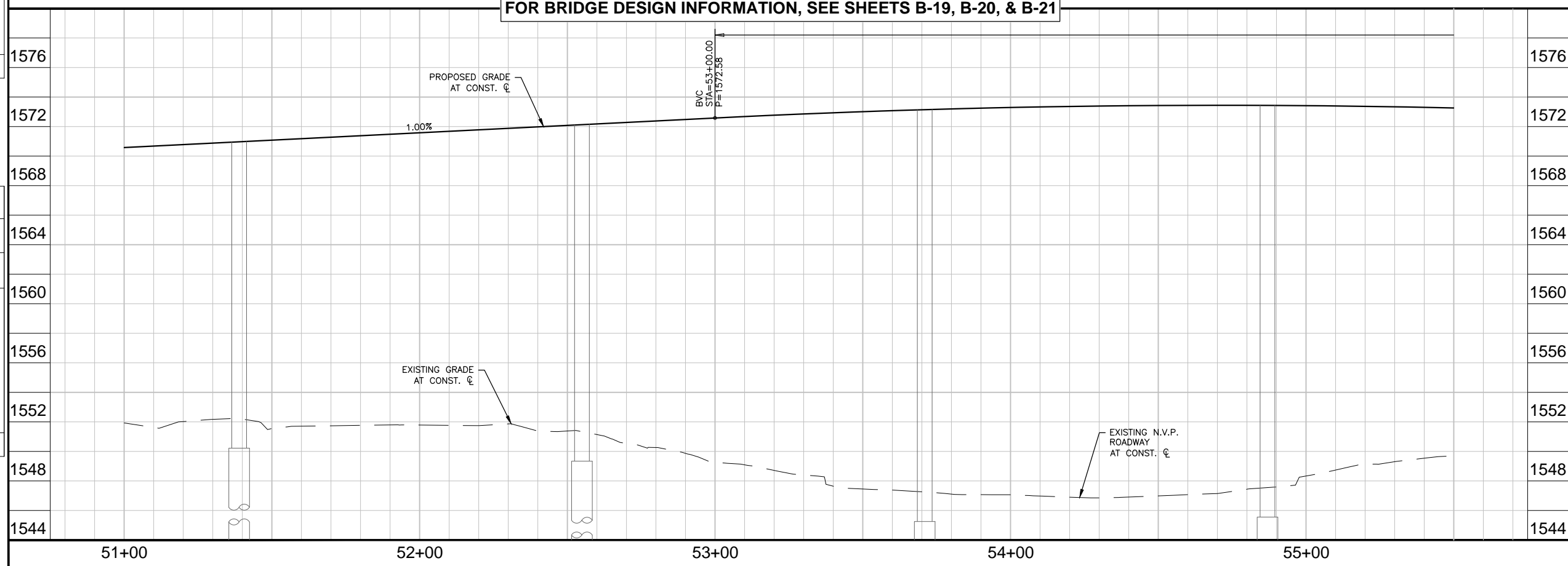
CONSTRUCTION NOTES

NO.	DESCRIPTION	UNIT	QTY.

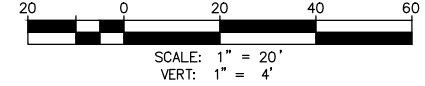
NO.	DESCRIPTION	REV BY	CHK BY	DATE



FOR BRIDGE DESIGN INFORMATION, SEE SHEETS B-19, B-20, & B-21



ALTERNATIVE B



CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING ELEVATIONS FOR ALL UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS.
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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-13	X	.

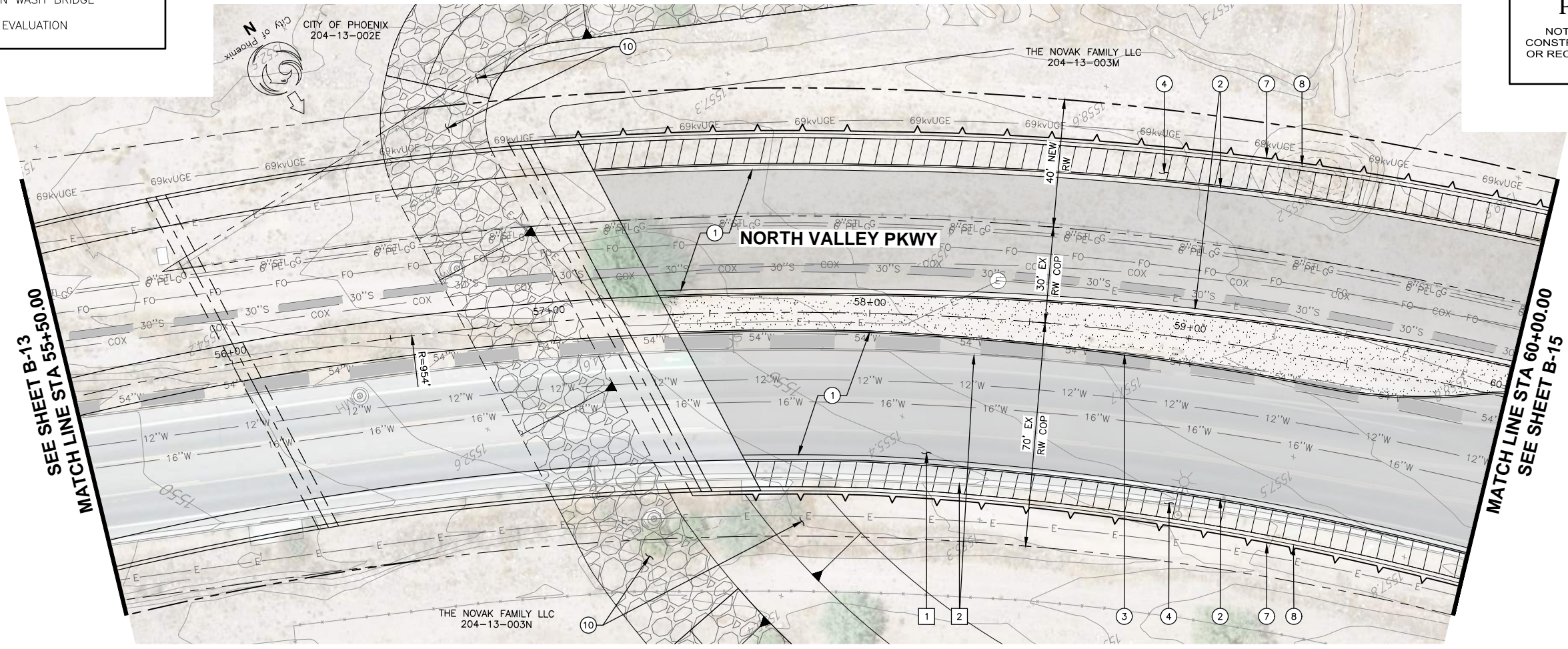
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NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			
TY LIN INTERNATIONAL engineers planners scientists			TY LIN INTERNATIONAL CONSULTING ENGINEER		
DES: RH,DR	DR: DR	CK: JB	DATE: 6/21		
M	MATCH EXISTING				
P	PROTECT IN PLACE				
S	SAWCUT AND MATCH EXISTING				

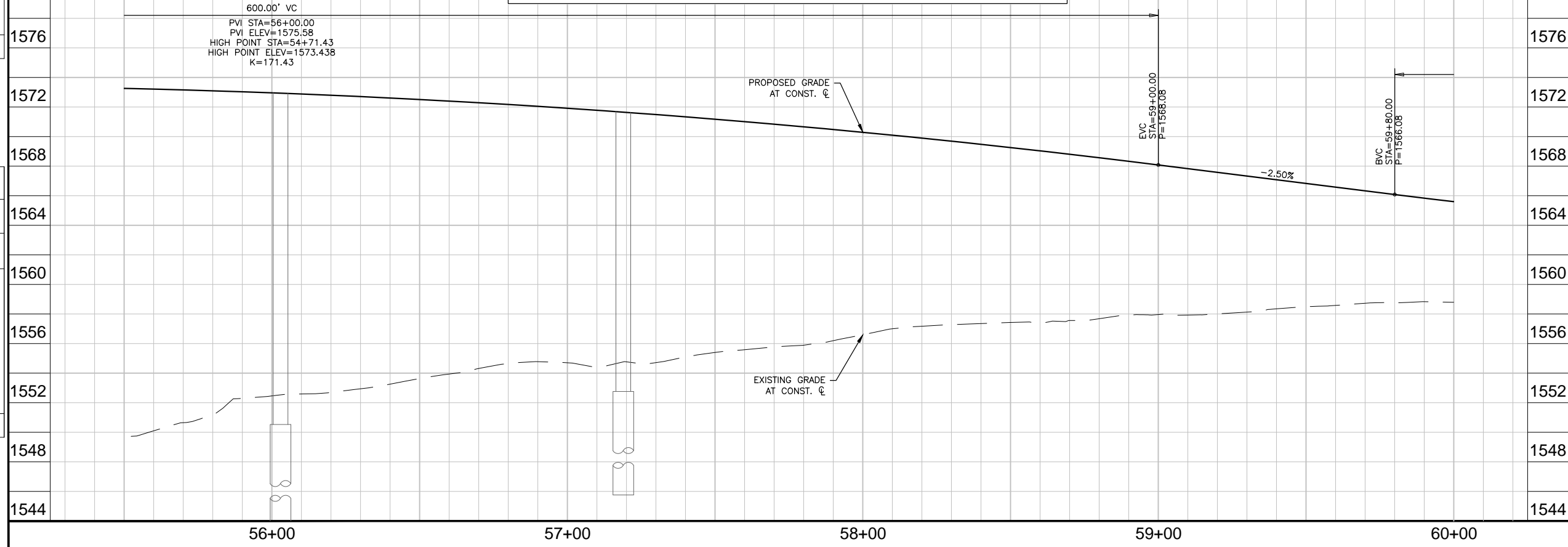


NO.	DESCRIPTION	UNIT	QTY.
1	REMOVE EXISTING PAVEMENT	SY	1,972
2	EXISTING CONCRETE CURB & GUTTER	LF	426
3	EXISTING CONCRETE SINGLE CURB	LF	332

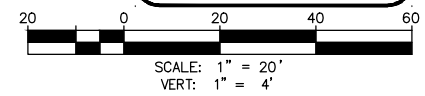
NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACTUAL PVTM SECTION TBD IN FINAL DESIGN	SY	2,224
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	793
3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	259
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	4,202
7	CONCRETE RETAINING WALL PER ADOT SD 7.01	LF	545
8	32" CONCRETE HALF BARRIER PER ADOT C-10.72	LF	545
10	DRAINAGE SLOPE ARMORING FOR BANK PROTECTION - SEE SHEET B-20	-	-

REVISION BY CITY OF PHOENIX	DESCRIPTION	REV BY	CHK BY	DATE

FOR BRIDGE DESIGN INFORMATION, SEE SHEETS B-19, B-20, & B-21



ALTERNATIVE B



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PLAN & PROFILE
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-14	X	.
SCALE: 1" = 20'					

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

NORTH GATEWAY TRANSFER STATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

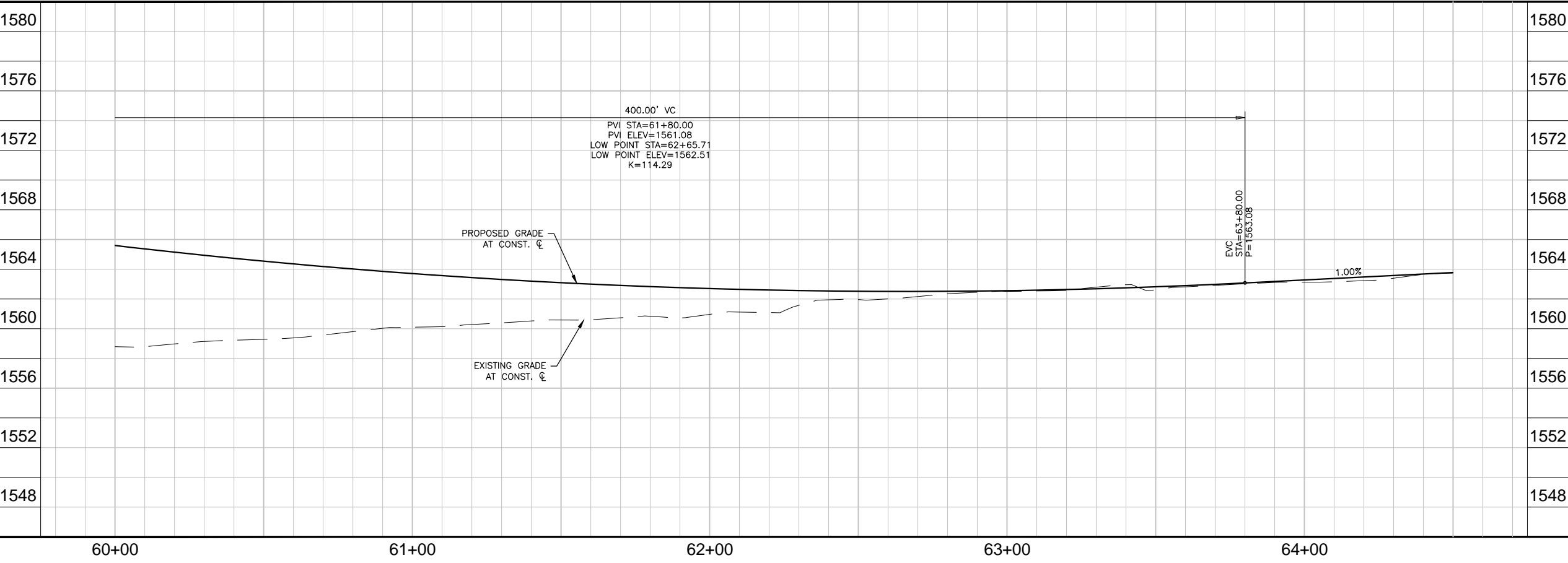
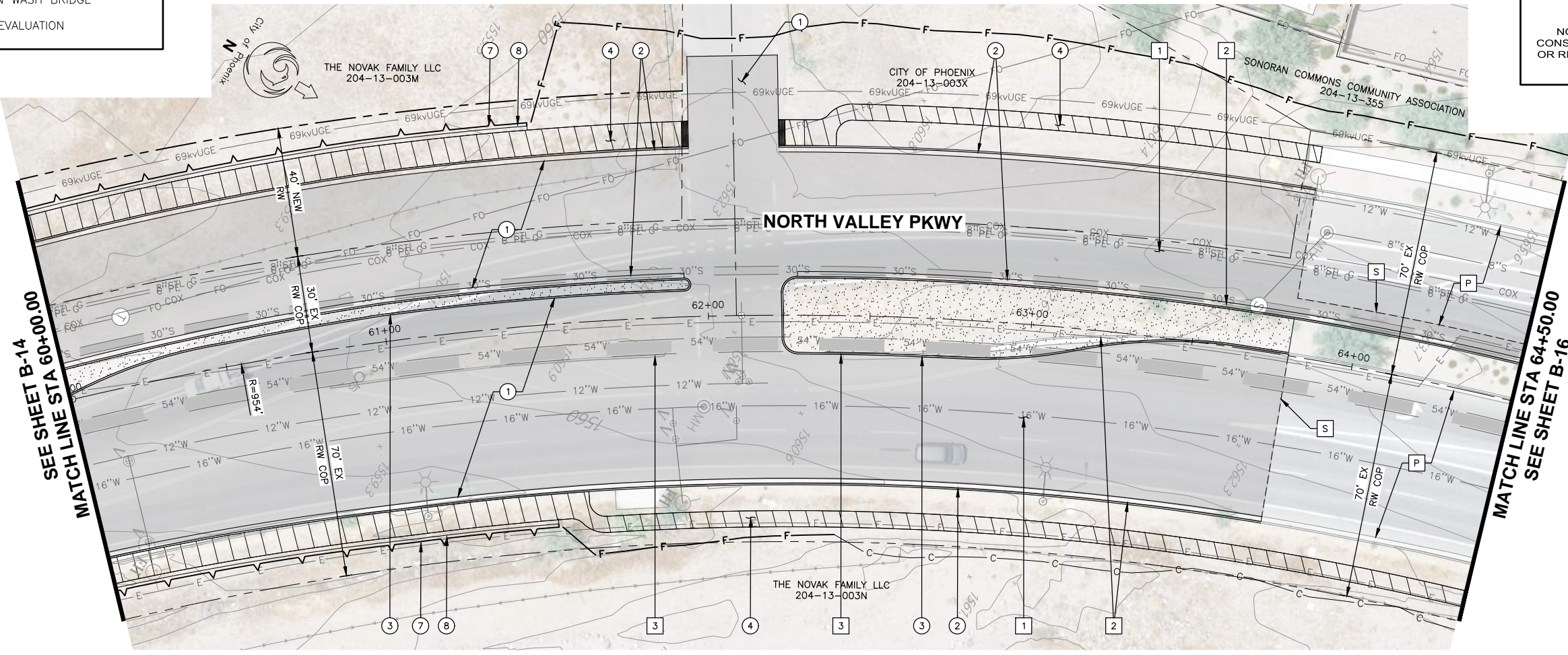
F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			

T.Y. LIN INTERNATIONAL
engineers | planners | scientists
CONSULTING ENGINEER
DES: RH,DR DR: DR CK: JB DATE: 6/21

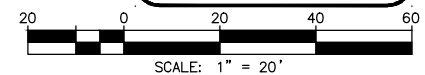
M MATCH EXISTING
P PROTECT IN PLACE
S SAWCUT AND MATCH EXISTING

REMOVALS			
NO.	DESCRIPTION	UNIT	QTY.
1	REMOVE EXISTING PAVEMENT	SY	2,895
2	EXISTING CONCRETE CURB & GUTTER	LF	590
3	EXISTING CONCRETE SINGLE CURB	LF	114

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
1	PAVEMENT SECTION PER TYPICAL SECTIONS. *ACUTAL PVMT SECTION TBD IN FINAL DESIGN	SY	3,890
2	CURB AND GUTTER PER MAG STD. DET. 220-1, TYPE "A"	LF	1,153
3	SINGLE CURB PER MAG STD. DET. 222, TYPE "A"	LF	383
4	CONCRETE SIDEWALK PER COP STD DET P1230	SF	5,118
7	CONCRETE RETAINING WALL PER ADOT SD 7.01	LF	298
8	32" CONCRETE HALF BARRIER PER ADOT C-10.72	LF	298



ALTERNATIVE B



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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-15	X	

SCALE: 1" = 20'

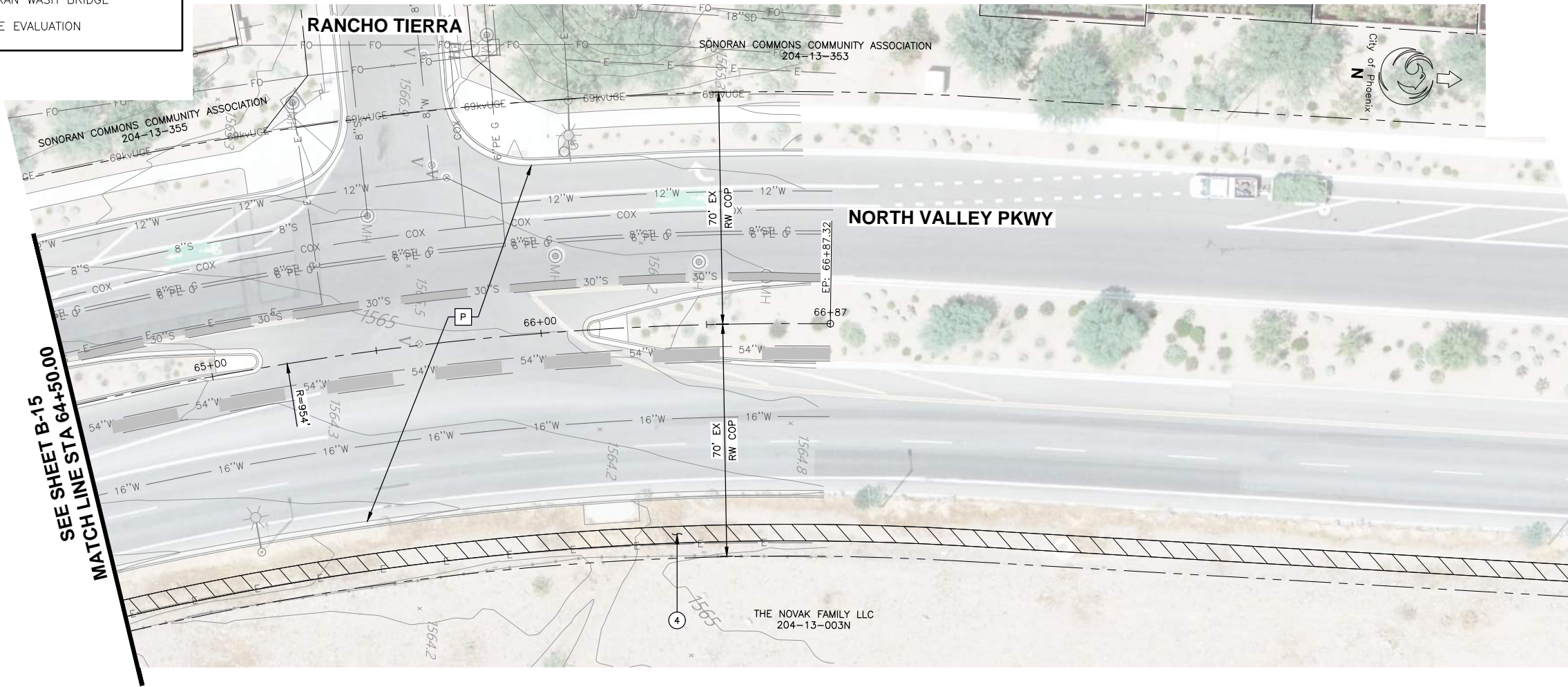
NO.	DESCRIPTION	REV BY	CHK BY	DATE

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Dennis Ray
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NORTH VALLEY PARKWAY
 SONORAN WASH BRIDGE
 BRIDGE EVALUATION

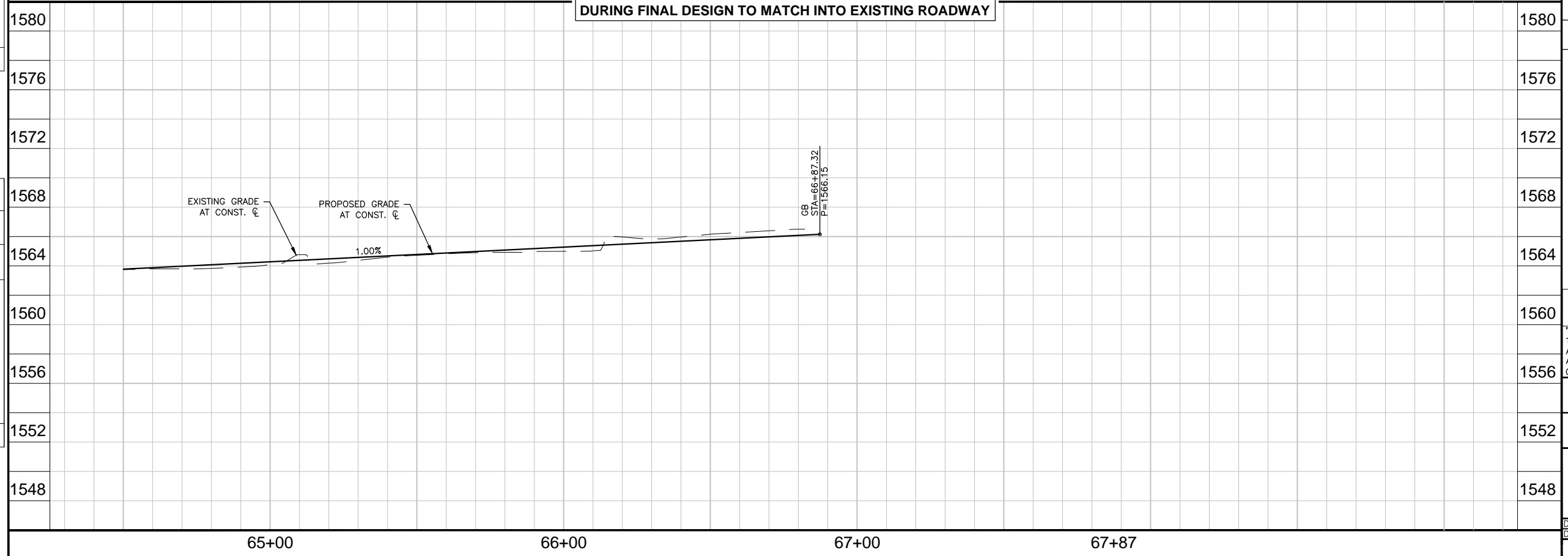
PRELIMINARY
PA
 NOT FOR
 CONSTRUCTION
 OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			
TY LIN INTERNATIONAL engineers planners scientists			TY LIN INTERNATIONAL CONSULTING ENGINEER		
DES: RH, DR	DR: DR	CK: JB	DATE: 6/21		
M	MATCH EXISTING				
P	PROTECT IN PLACE				
S	SAWCUT AND MATCH EXISTING				



SEE SHEET B-15
 MATCH LINE STA 64+50.00

**PROFILE AND ROADWAY LIMITS TO BE DEVELOPED
 DURING FINAL DESIGN TO MATCH INTO EXISTING ROADWAY**



ALTERNATIVE B

Call at least two full working days before you begin excavation.

ARIZONA 811
 Arizona Blue Stake, Inc.

Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
 In Maricopa County: (602) 263-1100

SCALE: 1" = 20'
 VERT: 1" = 4'

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PLAN & PROFILE

CITY OF PHOENIX, ARIZONA
 STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
 SONORAN WASH BRIDGE EVALUATION
 ST5110174-1

DR: DR	DES: RH, DR	CK: JB	SHEET NO:	TOTAL SHEETS:	AS BUILT:
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-16	X	.

SCALE: 1" = 20'

NO.	DESCRIPTION	REV BY	CHK BY	DATE

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 Dennis Ray

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION



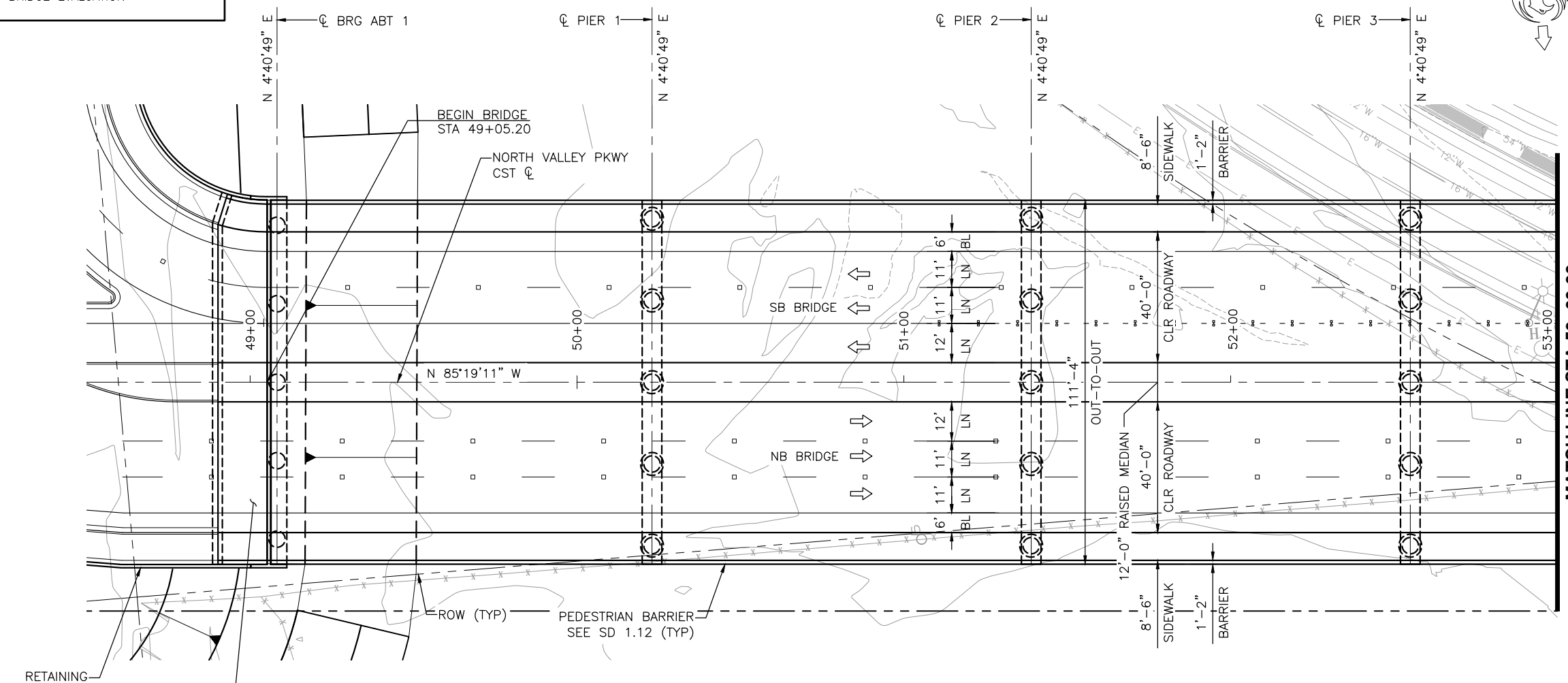
PRELIMINARY
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NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.

T.Y. LIN INTERNATIONAL T.Y. LIN INTERNATIONAL
engineers | planners | scientists CONSULTING ENGINEER

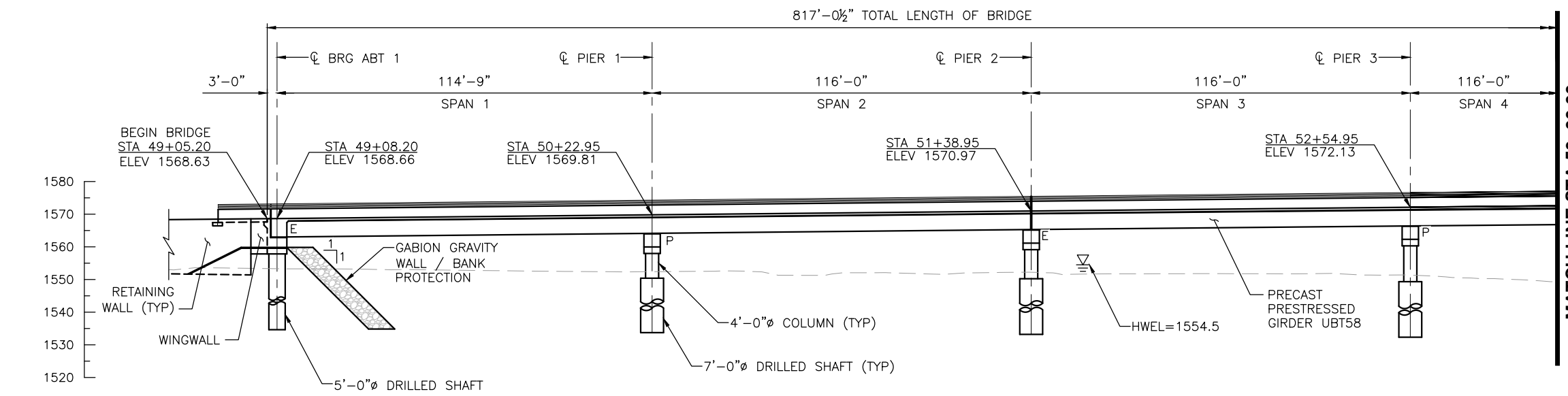
DES: AO DR: JJD CK: JRP DATE: 6/21

REVISION BY	DESCRIPTION	NO.	REV BY	CHK BY	DATE
CITY OF PHOENIX					
CITY OF PHOENIX					
CITY OF PHOENIX					
CITY OF PHOENIX					



LOCATION PLAN
7 SPAN PRECAST PRESTRESSED CONCRETE GIRDER BRIDGE
SKEW VARIES
SCALE: 1" = 20'-0"

MATCH LINE STA 53+00.00
SEE SHEET B-18



ELEVATION
(STATIONS AND DIMENSIONS TAKEN ALONG NORTH VALLEY PKWY ϕ)
SCALE: 1" = 20'-0"

MATCH LINE STA 53+00.00
SEE SHEET B-18

Call at least two full working days before you begin excavation.

ARIZONA 811
Arizona Blue Stake, Inc.

Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

ALTERNATIVE B

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BRIDGE PLAN & ELEVATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR:	DES:	CK:	SHEET	TOTAL	AS
JJD	AO	JRP	NO:	SHEETS	BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-17	X	.

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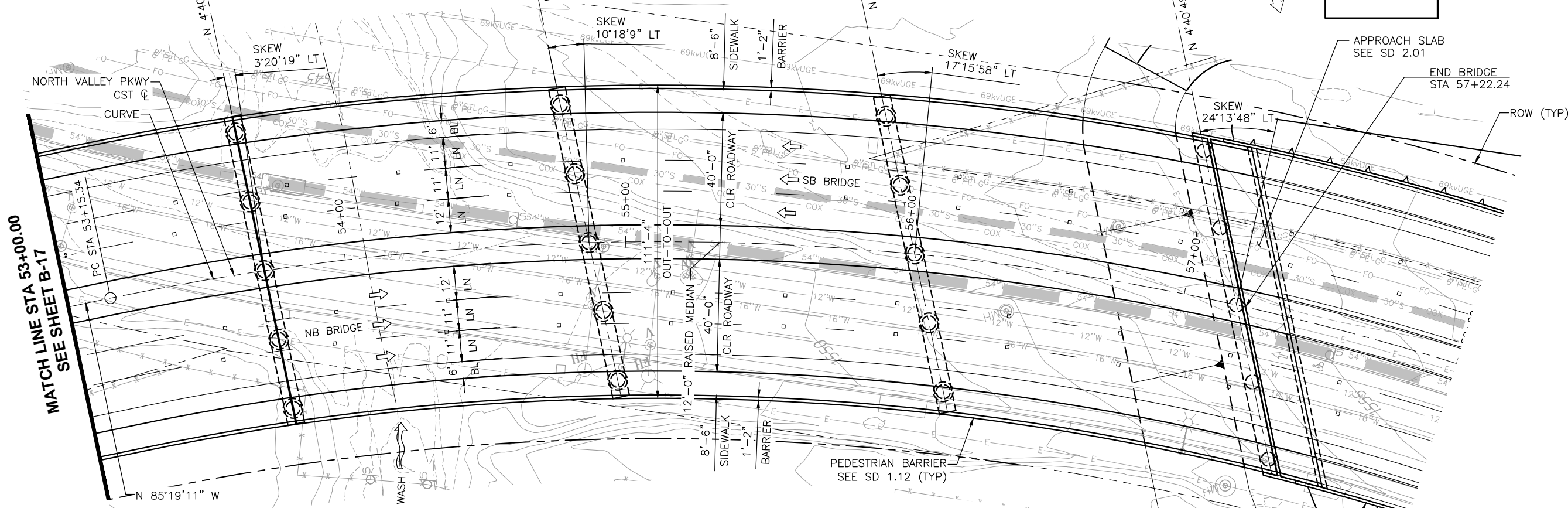
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

PRELIMINARY
PA
NOT FOR
CONSTRUCTION
OR RECORDING

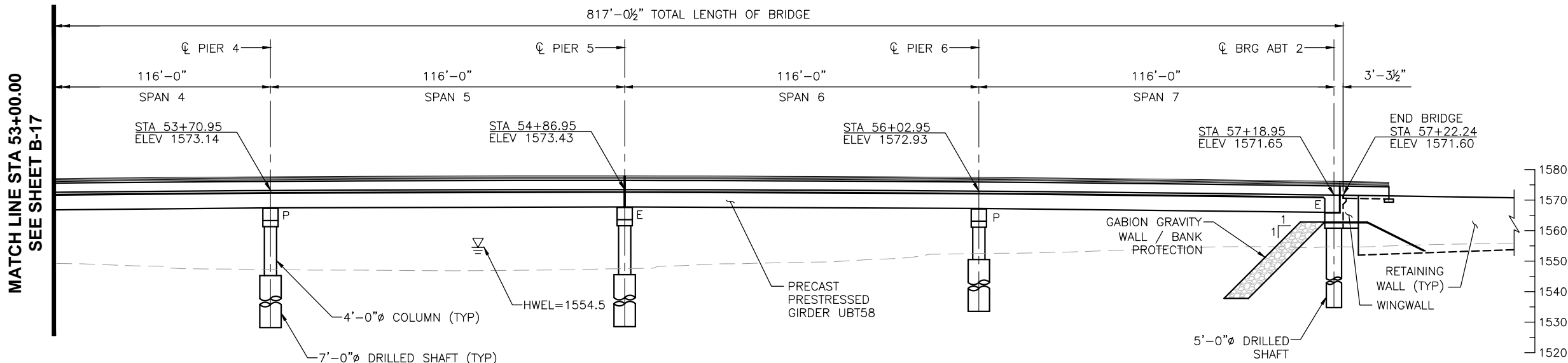
F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1	.	.	.
TY LIN INTERNATIONAL engineers planners scientists			T.Y. LIN INTERNATIONAL CONSULTING ENGINEER		
DES: AO	DR: JJD	CK: JRP	DATE: 6/21		



MATCH LINE STA 53+00.00
SEE SHEET B-17



LOCATION PLAN
7 SPAN PRECAST PRESTRESSED CONCRETE GIRDER BRIDGE
SKEW VARIES
SCALE: 1" = 20'-0"



ELEVATION
(STATIONS AND DIMENSIONS TAKEN ALONG NORTH VALLEY PKWY C)
SCALE: 1" = 20'-0"



ALTERNATIVE B

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BRIDGE PLAN & ELEVATION
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

**NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1**

DR: JJD	DES: AO	CK: JRP	SHEET NO:	TOTAL SHEETS:	AS BUILT:
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-18	X	.
SCALE:					

REVISION BY	DESCRIPTION	NO.	DATE
CITY OF PHOENIX			

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

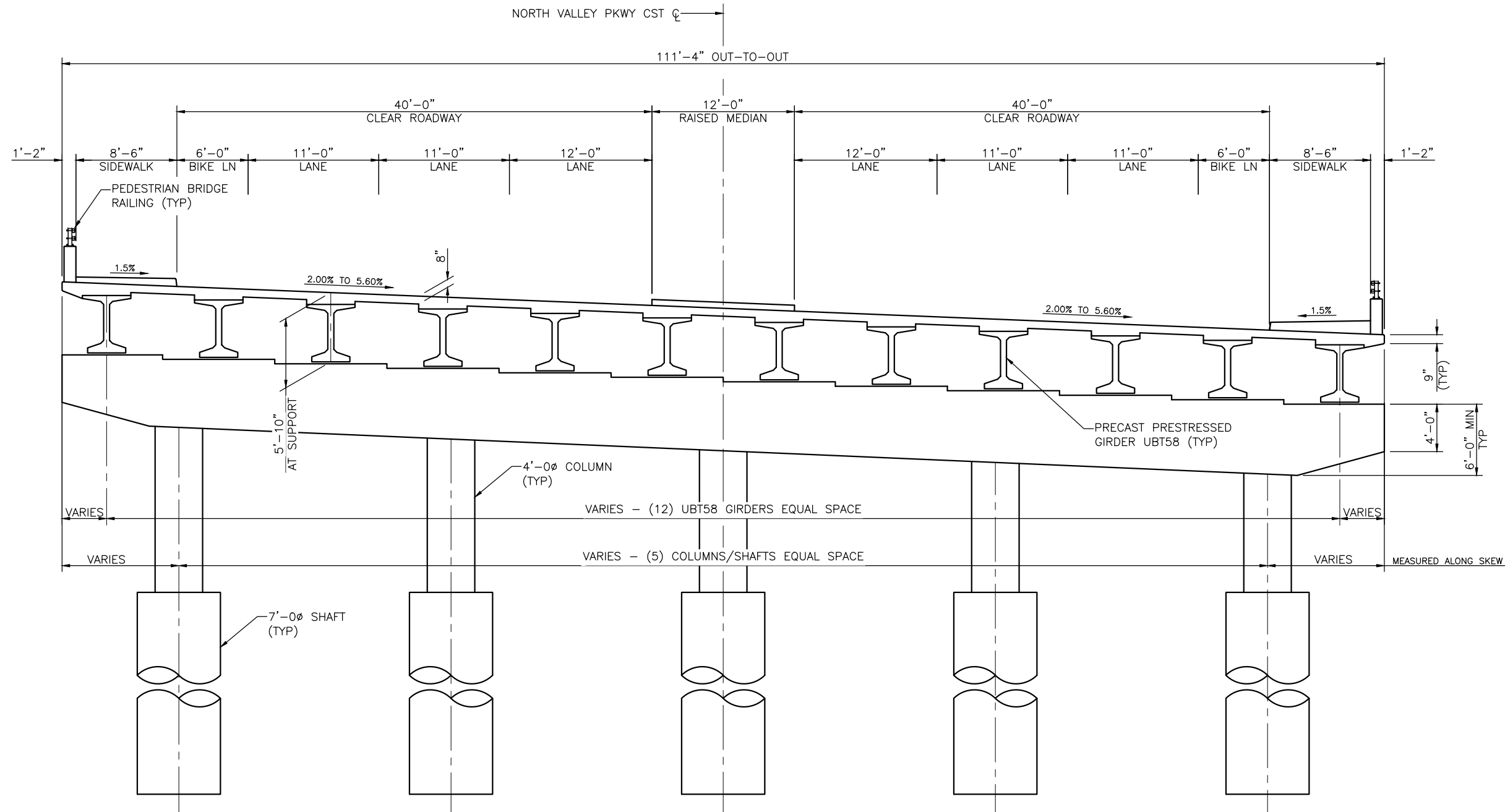
PRELIMINARY

PA

NOT FOR
CONSTRUCTION
OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			
TY LIN INTERNATIONAL engineers planners scientists			T.Y.LIN INTERNATIONAL CONSULTING ENGINEER		
DES: AO	DR: JJD	CK: JRP	DATE: 6/21		

REVISION BY CITY OF PHOENIX	DESCRIPTION	REV BY	CHK BY	DATE
NO.				
REVISION BY CITY OF PHOENIX	DESCRIPTION	REV BY	CHK BY	DATE
NO.				
REVISION BY CITY OF PHOENIX	DESCRIPTION	REV BY	CHK BY	DATE
NO.				



TYPICAL SECTION
(LOOKING UPSTATION)
(DIMENSIONS ARE TAKEN PERPENDICULAR TO THE CST ϕ UNLESS NOTED)
SCALE: 1" = 5'-0"



ALTERNATIVE B

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BRIDGE TYPICAL SECTION
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: JJD	DES: AO	CK: JRP	SHEET NO:	TOTAL SHEETS:	AS BUILT:
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-19	X	.

NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE
BRIDGE EVALUATION

PRELIMINARY
PA
NOT FOR
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OR RECORDING

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST5110174-1			

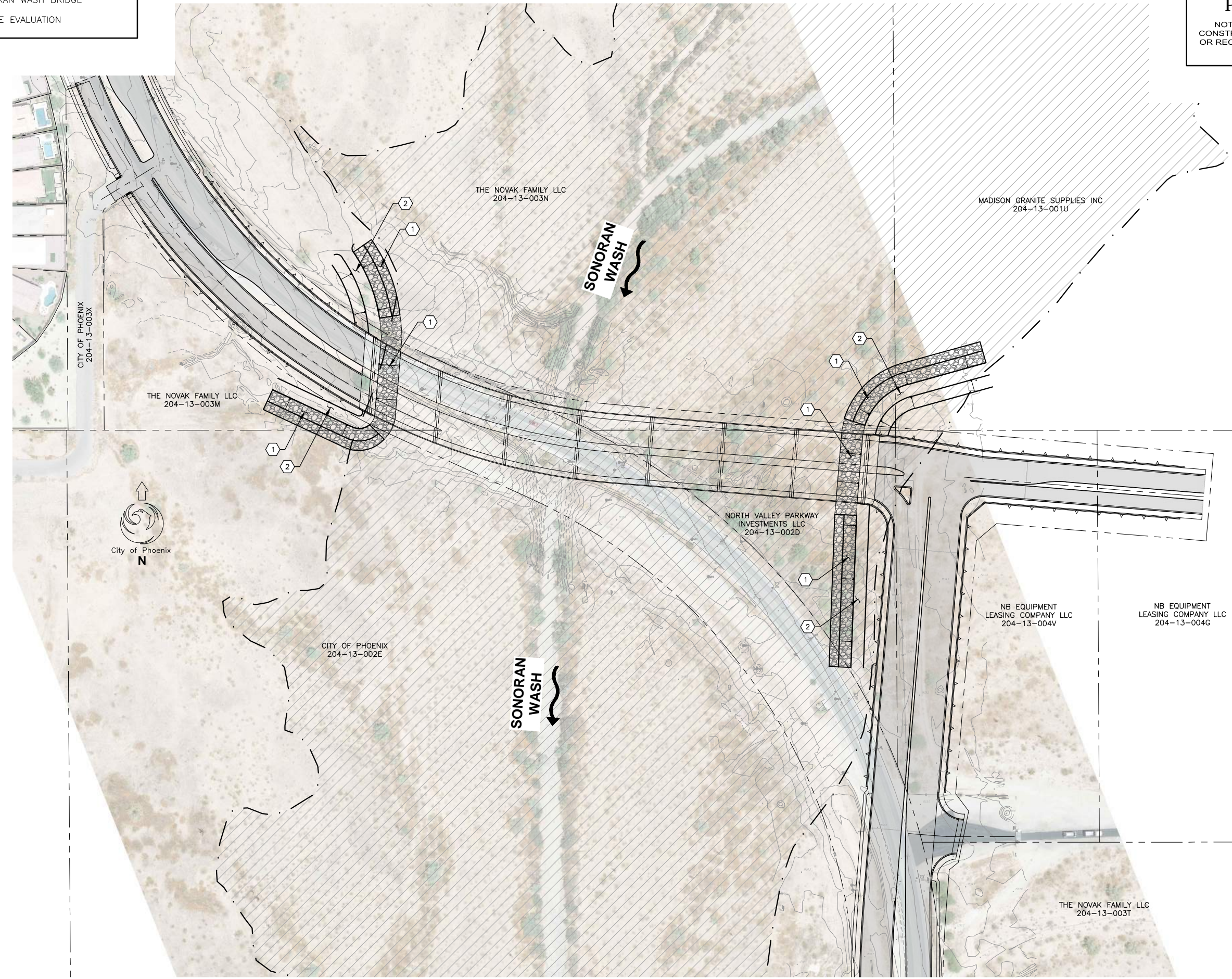
TY LIN INTERNATIONAL
engineers | planners | scientists
T.Y. LIN INTERNATIONAL
CONSULTING ENGINEER

DES: RH,DR DR: DR CK: JB DATE: 6/21

M MATCH EXISTING
P PROTECT IN PLACE
S SAWCUT AND MATCH EXISTING

CONSTRUCTION NOTES			
NO.	DESCRIPTION	UNIT	QTY.
1	GABIONS - BANK PROTECTION	CY	20,150
2	EARTHWORK / FILL - BANK PROTECTION	CY	5,038

REVISION BY CITY OF PHOENIX	DESCRIPTION	NO.	REV BY	CHK BY	DATE

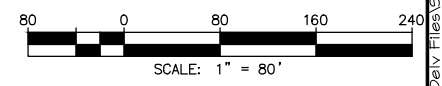


LEGEND



EXISTING FLOODPLAIN LIMITS

ALTERNATIVE B



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BANK PROTECTION
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
NORTH VALLEY PARKWAY
SONORAN WASH BRIDGE EVALUATION
ST5110174-1

DR: DR	DES: RH,DR	CK: JB	SHEET NO:	TOTAL SHEETS	AS BUILT
DATE: 6/21	DATE: 6/21	DATE: 6/21	B-20	X	.

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APPENDIX B –SHORT AND LONG BRIDGE ALTERNATIVE COST ESTIMATES

ALTERNATIVE 1 - SHORT BRIDGE SPANNING FLOODWAY

ST85100174 -1 NORTH VALLEY PARKWAY BRIDGE CROSSING SONORAN WASH

Item Description	Unit of Measure	Quantity	Unit Price or Cost	Sub Total Amount
REMOVE EXISTING ASPHALT PAVEMENT	SY	11,556	\$ 6.00	\$ 69,334
REMOVE EXISTING CONCRETE SINGLE CURB/CURB & GUTTER	LF	3,707	\$ 5.00	\$ 18,535
FILL (BORROW) MATERIAL FOR ROADWAY**	CY	24,000	\$ 12.00	\$ 288,000
FILL (BORROW) MATERIAL FOR DRAINAGE**	CY	8,900	\$ 15.00	\$ 133,500
SUBGRADE PREPARATION	SY	22,048	\$ 12.00	\$ 264,577
NEW PAVEMENT SECTION (ASSUMING 5" AC ON 12" ABC)	SY	22,048	\$ 40.00	\$ 881,924
CONCRETE CURB AND GUTTER	LF	6,116	\$ 14.00	\$ 85,624
CONCRETE SINGLE CURB	LF	3,544	\$ 15.00	\$ 53,160
CONCRETE SIDEWALK (INCL. RAMPS)	SF	45,057	\$ 6.00	\$ 270,342
CONCRETE DRIVEWAY (9" THICK)	SF	2,321	\$ 9.00	\$ 20,889
CONCRETE RETAINING WALL	LF	1,820	\$ 400.00	\$ 728,000
42" CONCRETE HALF BARRIER	LF	1,769	\$ 125.00	\$ 221,125
SAFETY RAIL	LF	1,769	\$ 40.00	\$ 70,760
GABION GRAVITY RETAINING WALL	CY	30,000	\$ 200.00	\$ 6,000,000
CONTRACTOR QUALITY CONTROL	L. SUM	1	\$ 100,000.00	\$ 100,000
CONSTRUCTION SURVEYING AND LAYOUT	L. SUM	1	\$ 50,000.00	\$ 50,000
			SUBTOTAL:	\$ 9,255,771

BRIDGE STRUCTURE ITEMS

Item Description	Unit of Measure	Quantity	Unit Price or Cost	Sub Total Amount
STRUCTURAL CONCRETE (CLASS S) (F'C = 4,500)	CU.YD.	1,318	\$ 470.00	\$ 619,536
STRUCTURAL CONCRETE (CLASS S) (F'C = 3,500)	CU.YD.	1,301	\$ 620.00	\$ 806,390
COMBINATION PEDESTRIAN-TRAFFIC RAILING	L.FT.	728	\$ 600.00	\$ 436,800
APPROACH SLAB	SQ FT	4,212	\$ 24.00	\$ 101,099
REINFORCING STEEL	LB.	652,298	\$ 1.20	\$ 782,757
BT58 PRECAST BEAM	L.FT.	4,515	\$ 350.00	\$ 1,580,250
EXPANSION JOINT	L.FT.	281	\$ 300.00	\$ 84,225
60" DRILLED SHAFT	L.FT.	910	\$ 630.00	\$ 573,300
84" DRILLED SHAFT	L.FT.	750	\$ 1,230.00	\$ 922,500

BRIDGE SUBTOTAL: **\$5,906,857**

TOTAL BRIDGE SQUARE FOOTAGE: 45,347

BRIDGE COST/SF = \$130.26

SUBTOTAL: \$ 15,162,628

SUBTOTAL W/ 4% ESCALATION RATE: \$ 15,769,133

MOBILIZATION	COST	5%		\$ 788,457
TRAFFIC CONTROL & PAVEMENT MARKING	COST	2%		\$ 315,383
EROSION CONTROL	L. SUM	1	\$ 40,000.00	\$ 40,000
PUBLIC RELATIONS	L. SUM	1	\$ 10,000.00	\$ 10,000

SUBTOTAL: \$ 16,922,972

UNACCOUNTED ITEMS	COST	15%	\$2,538,446	\$ 2,538,446
UTILITY RELOCATIONS	L. SUM	1	\$250,000	\$ 250,000
CONSTRUCTION ENGINEERING	COST	10%		\$ 1,692,297
CONSTRUCTION CONTINGENCY	COST	5%		\$ 846,149

TOTAL *: \$ 22,249,864

* Excludes R/W Acquisition Costs

** Unfactored Earthwork Values

ALTERNATIVE 2 - LONG BRIDGE SPANNING FLOODPLAIN

ST85100174 -1 NORTH VALLEY PARKWAY BRIDGE CROSSING SONORAN WASH

Item Description	Unit of Measure	Quantity	Unit Price or Cost	Sub Total Amount
REMOVE EXISTING ASPHALT PAVEMENT	SY	12,655	\$ 6.00	\$ 75,929
REMOVE EXISTING CONCRETE SINGLE CURB/CURB & GUTTER	LF	4,250	\$ 5.00	\$ 21,250
FILL (BORROW) MATERIAL FOR ROADWAY**	CY	28,450	\$ 12.00	\$ 341,400
FILL (BORROW) MATERIAL FOR DRAINAGE**	CY	5,050	\$ 15.00	\$ 75,750
SUBGRADE PREPARATION	SY	32,311	\$ 12.00	\$ 387,732
NEW PAVEMENT SECTION (ASSUMING 5" AC ON 12" ABC)	SY	32,311	\$ 40.00	\$ 1,292,440
CONCRETE CURB AND GUTTER	LF	5,930	\$ 14.00	\$ 83,020
CONCRETE SINGLE CURB	LF	4,943	\$ 15.00	\$ 74,145
CONCRETE SIDEWALK (INCL. RAMPS)	SF	49,809	\$ 6.00	\$ 298,854
CONCRETE DRIVEWAY (9" THICK)	SF	2,487	\$ 9.00	\$ 22,383
CONCRETE RETAINING WALL	LF	2,601	\$ 400.00	\$ 1,040,400
42" CONCRETE HALF BARRIER	LF	2,601	\$ 125.00	\$ 325,125
SAFETY RAIL	LF	2,601	\$ 40.00	\$ 104,040
GABION GRAVITY RETAINING WALL	CY	20,150	\$ 200.00	\$ 4,030,000
NEW TRAFFIC SIGNAL	L. SUM	1	\$ 400,000.00	\$ 400,000
CONTRACTOR QUALITY CONTROL	L. SUM	1	\$ 100,000.00	\$ 100,000
CONSTRUCTION SURVEYING AND LAYOUT	L. SUM	1	\$ 50,000.00	\$ 50,000
			SUBTOTAL:	\$ 8,722,468

BRIDGE STRUCTURE ITEMS

Item Description	Unit of Measure	Quantity	Unit Price or Cost	Sub Total Amount
STRUCTURAL CONCRETE (CLASS S) (F'C = 4,500)	CU.YD.	2,967	\$ 470.00	\$ 1,394,450
STRUCTURAL CONCRETE (CLASS S) (F'C = 3,500)	CU.YD.	2,321	\$ 620.00	\$ 1,438,916
COMBINATION PEDESTRIAN-TRAFFIC RAILING	L.FT.	1,626	\$ 600.00	\$ 975,600
APPROACH SLAB	SQ FT	3,510	\$ 24.00	\$ 84,240
REINFORCING STEEL	LB.	1,352,370	\$ 1.20	\$ 1,622,844
BT58 PRECAST BEAM	L.FT.	9,549	\$ 350.00	\$ 3,342,150
EXPANSION JOINT	L.FT.	448	\$ 300.00	\$ 134,400
60" DRILLED SHAFT	L.FT.	650	\$ 630.00	\$ 409,500
84" DRILLED SHAFT	L.FT.	2,250	\$ 1,230.00	\$ 2,767,500

BRIDGE SUBTOTAL: **\$12,169,599**

TOTAL BRIDGE SQUARE FOOTAGE: 94,332

BRIDGE COST/SF = \$129.01

SUBTOTAL: \$ **20,892,067**

SUBTOTAL W/ 4% ESCALATION RATE: \$ **21,727,750**

MOBILIZATION	COST	5%		\$ 1,086,387
TRAFFIC CONTROL & PAVEMENT MARKING	COST	2%		\$ 434,555
EROSION CONTROL	L. SUM	1	\$ 40,000.00	\$ 40,000
PUBLIC RELATIONS	L. SUM	1	\$ 10,000.00	\$ 10,000

SUBTOTAL: \$ 23,298,692

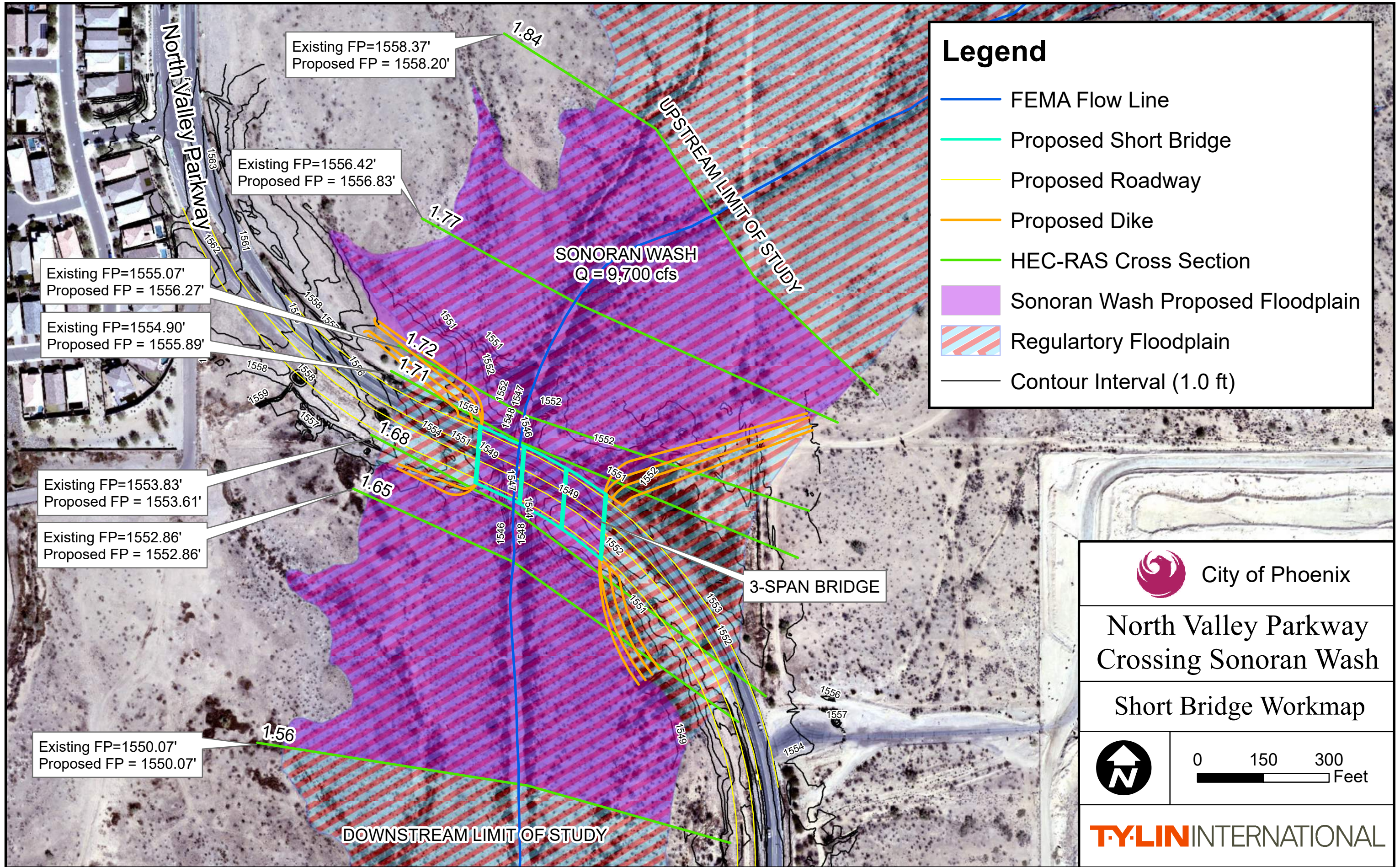
UNACCOUNTED ITEMS	COST	15%	\$3,494,804	\$ 3,494,804
UTILITY RELOCATIONS	L. SUM	1	\$500,000	\$ 500,000
CONSTRUCTION ENGINEERING	COST	10%		\$ 2,329,869
CONSTRUCTION CONTINGENCY	COST	5%		\$ 1,164,935

TOTAL*: \$ 30,788,300

* Excludes R/W Acquisition Costs

** Unfactored Earthwork Values

APPENDIX C –SHORT AND LONG BRIDGE ALTERNATIVES DRAINAGE WORK MAPS



Existing FP=1558.37'
Proposed FP = 1558.20'

Existing FP=1556.42'
Proposed FP = 1556.83'

Existing FP=1555.07'
Proposed FP = 1556.27'

Existing FP=1554.90'
Proposed FP = 1555.89'

Existing FP=1553.83'
Proposed FP = 1553.61'

Existing FP=1552.86'
Proposed FP = 1552.86'

Existing FP=1550.07'
Proposed FP = 1550.07'









SONORAN WASH
Q = 9,700 cfs

3-SPAN BRIDGE

DOWNSTREAM LIMIT OF STUDY

UPSTREAM LIMIT OF STUDY

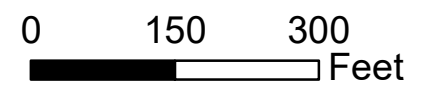
Legend

-  FEMA Flow Line
-  Proposed Short Bridge
-  Proposed Roadway
-  Proposed Dike
-  HEC-RAS Cross Section
-  Sonoran Wash Proposed Floodplain
-  Regulatory Floodplain
-  Contour Interval (1.0 ft)

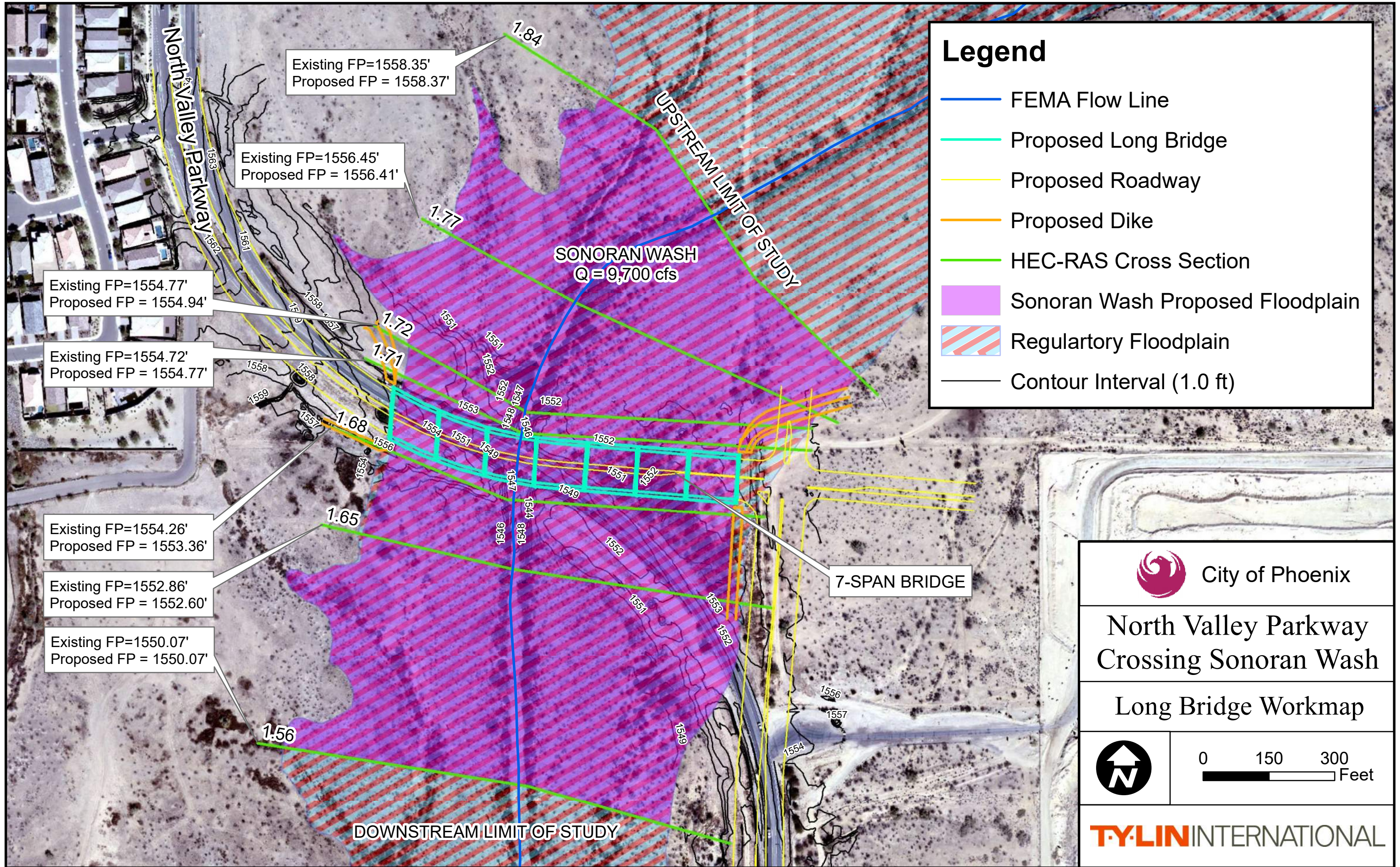


North Valley Parkway Crossing Sonoran Wash

Short Bridge Workmap




TYLIN INTERNATIONAL



Legend

- FEMA Flow Line
- Proposed Long Bridge
- Proposed Roadway
- Proposed Dike
- HEC-RAS Cross Section
- Sonoran Wash Proposed Floodplain
- Regulatory Floodplain
- Contour Interval (1.0 ft)



City of Phoenix

North Valley Parkway Crossing Sonoran Wash

Long Bridge Workmap

