



Project Assessment Report for
**CHILDREN'S MUSEUM OF
PHOENIX AND ARIZONA
SCIENCE CENTER**
Pedestrian & Bicycle Bridge

Prepared For:
Maricopa Association of Governments
and
City of Phoenix

February 2013

Prepared By:
Olsson Associates
7250 North 16th Street
Suite 210
Phoenix, AZ 85020
602.748.1000



In association with

Baker



PROJECT ASSESSMENT

TABLE OF CONTENTS

1.0 PROJECT INFORMATION	1
2.0 BACKGROUND DATA	1
3.0 PROJECT SCOPE	11
4.0 CONCEPTS	13
5.0 CONCEPTION COMPARISON	29
6.0 COST ESTIMATE	31

FIGURES

FIGURE 1 – VICINITY MAP	2
FIGURE 2 – LOCATION MAP	3
FIGURE 3 – HERITAGE SQUARE SITE MAP	5
FIGURE 4 – TRAFFIC CIRCULATION MAP	7
FIGURE 5 – EXISTING 7TH STREET SECTION	8
FIGURE 6 – HISTORIC PRESERVATION ZONING MAP	19

TABLES

Table 1 – Peak Hour Volume On 7Th Street For Aug/Sept 2010 (In Thousands)
Table 2 – Pedestrian / Bicycle Volume Study
Table 3 – Collision Statistics 2008 – 2010
Table 4 – Measure Gap Analysis
Table 5 – Concept Comparative Matrix

EXHIBITS

Exhibit 01 – Study Area Map with Traffic Data
Exhibit 02 – Bridge Overpass
Exhibit 03 – Bridge Overpass Rendering
Exhibit 04 – Bridge Overpass Rendering – Revised
Exhibit 05 – Underpass
Exhibit 06 – Mid Block Stage Crossing
Exhibit 07 – Mid Block Stage Crossing – Revised
Exhibit 08 – Mid Block Stage Crossing Rendering

APPENDICIES

Appendix A – Traffic Study
Appendix B – Involvement Matirx
Appendix C – Meeting Materials
Appendix D – Preliminary Plans



1.0 PROJECT INFORMATION (LOCATION, DESCRIPTION, MAP)

The project study area is within the 7th Street corridor between Washington Street and Van Buren Street within the City of Phoenix downtown area. The area is within the historic Heritage Square which provides the City of Phoenix with a series of museums in a historic park setting. The project area is in walking distance of the City of Phoenix Civic Center and the downtown stadium district which includes the US Airways Arena and Chase Field. The addition of light rail along Washington and Jefferson streets has added to the downtown multi-modal transportation corridor.

This project assessment report shall present and evaluate alternatives for pedestrian/bicycle improvements of 7th Street linking the Children's Museum of Phoenix to the Arizona Science Center. The underlining goal of the project is to increase pedestrian/bicycle safety when crossing 7th Street to promote connectivity within the downtown area.

The following vicinity map (Figure 1) and site location map (Figure 2) provides the project location and adjacent area.



2.0 BACKGROUND DATA INCLUDING THE NEED FOR THE PROJECT

The City of Phoenix was awarded a MAG Design Assistance Grant to complete a Project Assessment Report addressing pedestrian/bicycle improvements for 7th Street linking the Children's Museum of Phoenix to the Arizona Science Center.

The project benefits include:

- Providing improved pedestrian access across a high volume seven lane arterial street within downtown Phoenix.
- Providing connectivity from the Children's Museum of Phoenix to the Arizona Science Center.
- Providing connectivity to other downtown venues including Heritage Square, Phoenix Convention Center, Chase Field and ASU Downtown.
- Benefit low income population due to the area household demographics who rely on mass transit / rail to commute.



Areas of Interest

The proposed project area is 7th Street between Van Buren Street and Washington Street which is situated within the City of Phoenix downtown area. The Children's Museum of Phoenix is located at the southeast corner of the 7th Street and Van Buren Street intersection. The Arizona Science Center is located at the northwest corner of the 7th Street and Washington Street intersection within Heritage Square. The Washington and Jefferson street corridors include light rail service Other points of interest and area landmarks include:

- Arizona State University Downtown Campus is located on the southwest corner of the intersection of 7th Street and Van Buren Street.
- The University of Arizona College of Medicine is located on the northwest corner of the intersection of 7th Street and Van Buren Street.
- The Arizona Center is located approximately ¼ mile west of 7th Street on Van Buren Street.
- Chase Field and US Airway Arena are located south of Jefferson Street between 1st Street and 7th Street.
- The Phoenix Convention Center is located west of Heritage Square on 3rd Street and Washington Street.



VICINITY MAP

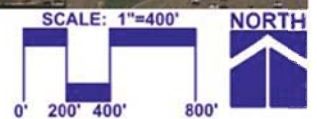


FIGURE 1



SITE LOCATION MAP

FIGURE 2



Heritage Square

Heritage Square is a City of Phoenix Park located at the southwest corner of 7th Street and Monroe Street serves as a cultural landmark which includes historic homes, buildings, restaurants and museums. Heritage Square is the location of the Rosson House Museum as well as a collection of restored historic houses and buildings. The park hosts several festivals and special events throughout the year. Please refer to Figure 3 for a map of Heritage Square, areas of interest within the park include the following:



1. The Rosson House is a Victorian style house originally build in 1895. It was purchased by the City of Phoenix in 1974 and completely restored and is open for guided tours.
2. Forest Burgess Carriage House serves as the Rosson House Ticket Office.
3. Duplex House built in 1923 houses the Parks and Recreation Department - Heritage & Science Park offices
4. Stevens House is a one-story brick house built in 1901 and is the location of the Arizona Doll and Toy Museum.
5. Steven-Haustgen House, constructed in 1901 as a rental property now serves as the Hands on Heritage House Education Center.
6. The Bouvier-Teeter House houses the award winning Asian influenced Nobuo restaurant.
7. The Silva House is a historic home from 1900 which houses a traditional English pub restaurant called the Rose and Crown.
8. The Carriage House is located at the center of the square and is home to the Artlink Heritage Square Gallery which showcases contemporary art works from local up and coming and established artists.
9. The Lath House Pavilion at the southwest corner of 7th Street and Monroe was completed in 1980 and serves as an outdoor community space.
10. The Thomas House built in 1909 was moved to the square in 1980 to save the home from being demolished. Bar Bianco wine bar currently inhabits the house.
11. The Baird Machine Shop is located at the southwest corner of Adams and 7th Street. It was originally constructed in 1929 as a commercial building and is home to Pizzeria Bianco.
12. The Arizona Science Center is situated along the southern edge of Heritage Square at the northwest corner of 7th Street and Washington Street.
13. The Phoenix Museum of History is located along the Heritage Square western boundary.
14. Heritage Garage is a parking structure located on the southwest corner of 6th Street and Monroe Street.
15. The Children's Museum of Phoenix is not located in Heritage Square, but is located in the historic Monroe School Building on the east side of 7th Street just south of Van Buren Street.

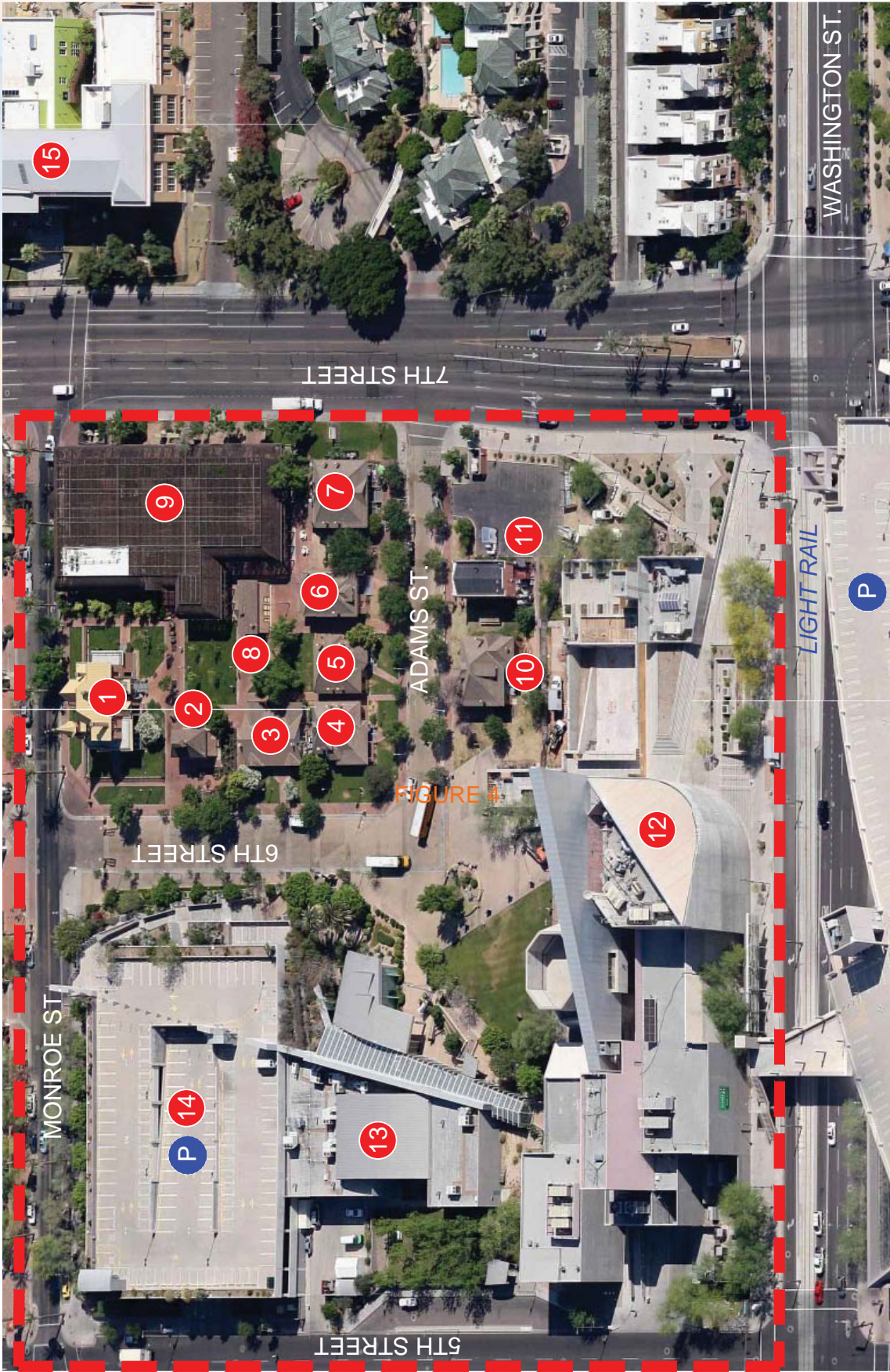


FIGURE 3

HERITAGE SQUARE SITE MAP

- | | | |
|----------------------------------|----------------------------|--|
| 1. ROSSON HOUSE | 7. SILVA HOUSE | 13. PHOENIX MUSEUM OF HISTORY |
| 2. FOREST BURGESS CARRIAGE HOUSE | 8. CARRIAGE HOUSE | 14. HERITAGE GARAGE |
| 3. DUPLEX HOUSE | 9. LATH HOUSE PAVILION | 15. CHILDREN'S MUSEUM OF PHOENIX (MONROE SCHOOL) |
| 4. STEVENS HOUSE | 10. THOMAS HOUSE | |
| 5. STEVENS-HAUSTGEN HOUSE | 11. BAIRD MACHINE SHOP | |
| 6. BOUVIER - TEETER HOUSE | 12. ARIZONA SCIENCE CENTER | |

Traffic Configuration

The current 7th Street traffic configuration includes two signalized street crossings at the intersections of Van Buren Street and Washington Street. An unsignalized painted crosswalk over eight traffic lanes is located at the intersection of Monroe Street providing a direct crossing area between the Children's Museum and Heritage Square. Figure 4 provides a map denoting existing distances between crossing along 7th Street as well as the crossing types and locations.



Transportation Modes

Several modes of transportation including pedestrians, bicyclists, cars, buses and light rail have been observed along the 7th Street corridor between Van Buren and Washington. Light Rail has 28 stations and 20 miles of rail within the metro Phoenix area which include lines on Washington Street and Jefferson Street. Metro Light Rail estimated a daily ridership of 43,310 people in 2012. Light Rail Stations within the area include:

- Station/Stop 14 - 3rd Street & Jefferson
- Station/Stop 15 - 12th Street & Jefferson
- Station/Stop 30 - 12th Street & Washington
- Station/Stop 31 - 3rd Street & Washington

The City of Phoenix Metro bus service has two existing bus stops along 7th Street. The first bus bay is located along the west side of 7th Street just south of Van Buren Street providing southbound bus service. The second bus bay is located along the east side of 7th Street just north of Washington Street providing northbound bus service.

The City of Phoenix has a network of bicycle lanes, boulevards, paths and routes throughout the downtown area. Surrounding bikeways include:

- Fillmore Street which is a bicycle boulevard spanning from 5th Avenue to 20th Street. The Fillmore bicycle boulevard provides connections to bicycle lanes on 5th Avenue, 20th Street and Roosevelt Street.
- A bicycle route has been designated on 11th Street from Jefferson Street extending north to Morehead Street which connects to bicycle lanes on 12th Street.

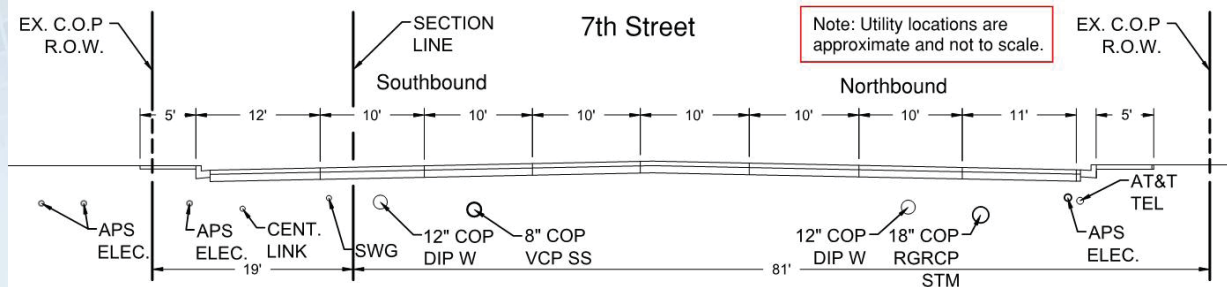
7th Street from Washington to Van Buren does not have dedicated striped bicycle lanes. These streets have a mixture of attached and detached concrete sidewalks along each side of the streets which range between 5 feet and 8 feet in width. Figure 5 provides a typical section of 7th Street.





FIGURE 4

Figure 5: Existing 7th Street Typical Section Looking North



Facility Stakeholder Input

A project coordination meeting has held with representatives from the Children’s Museum of Phoenix, Arizona Science Center, City of Phoenix and consulting team to introduce the project, discuss historic uses and current usage. This meeting also captured stakeholder input from the Children’s Museum of Phoenix and Arizona Science Center to further define the approach for the traffic data collection and analysis.



The Children’s Museum of Phoenix and the Arizona Science Center are separate museums that do not currently share or offer joint memberships between facilities. Families support both institutions, but the current condition of the economy coupled with the increased opportunities to capture entertainment dollars has seen families choosing one membership per year between the two facilities. Both facilities have had dialog in regards to membership exchanges on certain weekends to allow members of one museum the opportunity to visit and experience the other facility.

The facilities target separate age ranges for membership. The Children’s Museum visitors age range is 0 to 10 years of age while the Science Center has an age range of 10 to adulthood.

Saturday and Sundays tend to be busier days by the general public for both museums. The Children’s Museum sees a higher age range on the weekends. Families with children tend to visit the museums from 12pm to 3pm on the weekends.

School field trip and summer camps make visits to each facility during weekdays. The facilities do not see shared trips during school field trips and summer camps. The schools and camps logistically can only handle one location per day field trip. The spring time is the busier season for field trips for both facilities. Typically up to 50 buses during the week can visit. The Children’s Museum of Phoenix during late march had 37 buses scheduled which was considered to be a medium rate for the spring.



Traffic Data

A traffic study was completed by Baker for this project and can be found in the appendix of this report. The following traffic information has been summarized from this traffic study. The following traffic information has been analyzed and studied for this project assessment. Please refer to Exhibit 1.

- Existing average daily traffic (ADT) vehicular counts on 7th Street between Van Buren Street and Washington Street.
- Peak hour pedestrian and bicycle counts at the intersection of 7th Street and Van Buren Street and the intersection of 7th Street and Monroe Street.
- Collision data for 7th Street between Van Buren Street and Washington Street from 2008 to 2010 was provided by the City of Phoenix.
- A Vehicle Gap study was completed measuring the time between vehicles along 7th Street between Van Buren Street and Washington Street.



Photo No. 1 - NWC of Adams St. & 7th Street - Looking North



Photo No. 2 - Adams St. looking West Arizona Science Museum



Photo No. 3 - Children's Museum of Phoenix from Adams St. - North East



Photo No. 4 - Children's Museum Parking Lot - South of Van Buren St.



Photo No. 5 - Lath House walkway North of Adams St. - Looking North



Photo No. 6 - Lath House - Utilities



Table 1: Peak Hour Volumes on 7th Street for Aug/Sept 2010

Segment of 7th Street	Time Period	Northbound	Southbound	Total
Between Roosevelt St. & Van Buren Street	8:00 AM	1,011.5	2,042.5	3,054.0
	1:00 PM	1,386.0	1,357.5	2,743.5
	5:00 PM	1,520.5	1,688.5	3,209.0
Between Van Buren St. & Washington Street	7:00 AM	1,192.7	1,068.0	2,260.7
	12:00 PM	1,049.7	1,046.3	2,096.0
	5:00 PM	1,210.7	1,376.3	2,587.0

Table 3: Collision Statistics 2008-2010

Year	Injury Severity			Collision Type				Time of Day		Total
	Fatals	Injuries	Property Damage Only	Angle	Bike	Rear End	Side-Swipe	Day	Night	
2008	0	0	4	0	0	1	3	3	1	4
2009	0	2	4	1	1	2	2	4	2	6
2010	0	0	0	0	0	0	0	0	0	0

Table 2: Pedestrian / Bicycle Volumes Summary

Intersection	Leg Crossed	Total 3 Hour Period	Peak Hour	Pedestrian Volume (per hour)
7th Street & Van Buren St.	North	185	11:15AM	82
	South	166		55
	East	55		19
	West	68		34
7th Street & Monroe St.	South	10	11:45AM	4
	West	42		24
Jay Walkers Crossing Monroe St & Wash. St	N/A	23	12:00PM	14



Photo No. 7 - Lath House Looking West from Children's Museum of Phoenix



Photo No. 8 - 7th St. Looking North from Children's Museum of Phoenix



Photo No. 9 - AZ Science Museum from 6th St. - Heritage Square



Photo No. 10 - Phoenix Museum of History from 6th St. - Heritage Square



Photo No. 11 - Heritage Square Looking East from Heritage Parking Structure



Photo No. 12 - Heritage Square South

The traffic volume data for 7th Street between Van Buren Street and Washington Street was provided by the City of Phoenix and is listed in Table 1 below. Table 1 provides the morning, afternoon and evening peak hour volumes for both northbound and southbound traffic along 7th Street from August and September of 2010.

Segment of 7th Street	Time Period	Northbound	Southbound	Total
Between Roosevelt St. & Van Buren Street	8:00 AM	1,011.5	2,042.5	3,054.0
	1:00 PM	1,386.0	1,357.5	2,743.5
	5:00 PM	1,520.5	1,688.5	3,209.0
Between Van Buren St. & Washington Street	7:00 AM	1,192.7	1,068.0	2,260.7
	12:00 PM	1,049.7	1,046.3	2,096.0
	5:00 PM	1,210.7	1,376.3	2,587.0

The bicycle and pedestrian volume counts were collected for this project assessment on April 12th, 2012 at the intersections of 7th Street & Van Buren Street and 7th Street & Monroe Street. The pedestrian & bicycle volume counts and number of jaywalkers were collected between the hours of 10:30 AM and 1:30 PM. The collection time was determined by field observation and peak visiting hours for the Children's Museum of Phoenix and the Arizona Science Center. Table 2 below provides a summary of the peak hour pedestrian & bicycle volumes.

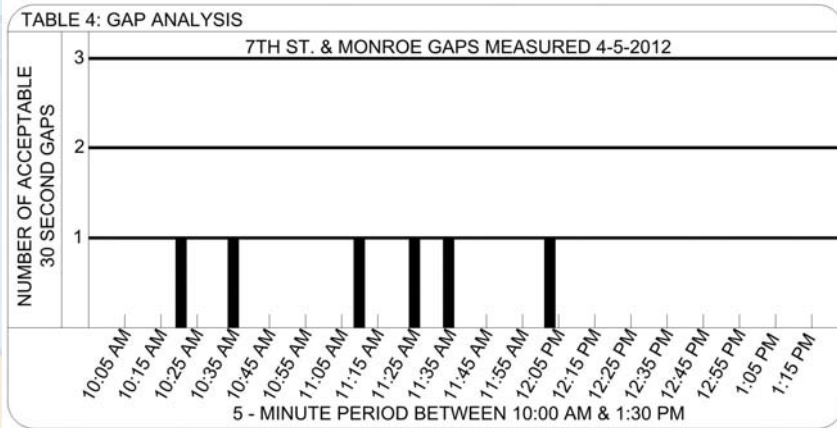
Intersection	Leg Crossed	Total 3 Hour Period	Peak Hour	Pedestrian Volume (per hour)
7th Street & Van Buren St.	North	185	11:15AM	82
	South	166		55
	East	55		19
	West	68		34
7th Street & Monroe St.	South	10	11:45AM	4
	West	42		24
Jaywalkers Crossing Monroe St & Wash. St	N/A	23	12:00PM	14

The City of Phoenix Street Transportation Department provided collision data for 7th Street between Van Buren Street and Washington Street for the years from 2008 to 2010. This data does not include any collision/accident data at either the 7th Street/Van Buren Street & 7th Street/Washington Street intersection.

Year	Injury Severity			Collision Type				Time of Day		Total
	Fatals	Injuries	Property Damage Only	Angle	Bike	Rear End	Side-Swipe	Day	Night	
2008	0	0	4	0	0	1	3	3	1	4
2009	0	2	4	1	1	2	2	4	2	6
2010	0	0	0	0	0	0	0	0	0	0

Baker utilized the 2009 edition of the Manual on Uniform Traffic Control Devices, to calculate the minimum required safe gap in traffic to cross 7th Street at Monroe Street to be 30 seconds.

The following Table 4 provides the measured gap analysis at 7th Street and Monroe Street conducted by Baker on April 5th, 2012. The study concludes the existing unsignalized crossing at Monroe Street is insufficient as the traffic volume on 7th Street does allow adequate gapping in traffic to safely cross the eight lanes.



Traffic Data & Analysis Conclusion:

The traffic data collection and analysis utilized a facility stakeholder meeting with the Children’s Museum and Arizona Science Center to determine the visitor peak usage as well as answer logistic and circulation questions. The peak hour traffic data, pedestrian & bicycle data and collision information provided in this project assessment coupled with the area connectivity and resulting gap analysis demonstrates the existing eight lane painted crosswalk at 7th Street and Monroe is not a safe crossing option between Heritage Square and the Children’s Museum.

3.0 PROJECT SCOPE

The scope of work for this project is to complete a project assessment study evaluating crossing alternatives for 7th Street linking the Children’s Museum of Phoenix to the Arizona Science Center; obtain preliminary engineering including 15% design plans with cost estimates for the three alternatives; and obtain preliminary project area information including utility, right of way and environmental impacts.

The project assessment study shall consider three proposed crossing alternatives for the project area:

- Concept A: Grade Separated Bridge Overpass crossing of 7th Street
- Concept B: Below Grade Underpass crossing of 7th Street
- Concept C: At Grade Two Stage Mid Block crossing of 7th Street

Traffic Analysis:

A traffic report has been completed and has been included in the appendix of this project assessment. The traffic analysis utilized traffic volume data and accident data collected from the City of Phoenix. This data was used to determine the peak hour and volume of vehicular traffic on 7th Street and the peak period and volume of pedestrian traffic crossing 7th Street. The traffic analysis also evaluated the accident data to determine trending between vehicles and pedestrians. Traffic data collection also included a review of the gaps in vehicular traffic on 7th Street to determine if the gaps are long enough and frequent enough to allow safe crossing opportunities for the peak volume of pedestrians.

Utility Information:

Mapping and utility infrastructure information was provided by the City of Phoenix. A CD with the project mapping and utility information in tiff or pdf format can be found in the appendix of this report. A topographical survey of the project area was not provided or completed for this project assessment report.

Key Project Stakeholders:

An involvement matrix has been provided in the appendix of this project assessment identifying the Agency, Technical, Adjacent Public Stakeholders.

Project Meetings:

The project included the following stakeholder meetings:

Project Meeting No. 1: Work Session Meeting with the Agency/Technical Stakeholders to introduce the project and develop the initial project scope and schedule which included the City of Phoenix, MAG, and Consulting Team.

Project Meeting No. 2: Project Introduction Meeting with the Children's Museum of Phoenix, Arizona Science Center, City of Phoenix and Consulting Team to introduce the project, discuss history and current usage.

The project also included two public meetings which were held at the Lath House in Heritage Square.

Public Meeting No. 1: The purpose of public meeting no. 1 was to introduce the project assessment assignment, study area and obtain public comments from the presentation of the initial 7th Street crossing concepts.

The following four graphics were provided at the meeting as 30"x42" project boards

- Study Area Board - Provided the Study Area along with Traffic Study information which included: Peak Hour Volumes for 7th Street, Pedestrian / Bicycle Volume, Collision Statistics
- Bridge Overpass Board_- Provided six overpass configurations with bridge structure & ramp sections
- Underpass Board - Provided the underpass concept with sections and required existing utility relocations
- Two Stage Mid Block Crossing Board - Provided the multi-stage at-grade crossing with pedestrian refuge area and an example of an existing crossing at 32nd Avenue & Van Buren Street

Public Meeting No. 2: The purpose of public meeting no. 2 was to present the refined concept alternatives based on the public meeting no. 1 comments and input.

The following six graphics were provided at the meeting as 30"x42" project boards

- Study Area Board - Provided the Study Area along with Traffic Study information which included: Peak Hour Volumes for 7th Street, Pedestrian / Bicycle Volume, Collision Statistics
- Bridge Overpass Board - Provided six overpass configurations with bridge structure & ramp sections
- Underpass Board - Provided the underpass concept with sections and existing utility relocation
- Two Stage Mid Block Crossing Board - Provided the multi-stage crossing ramp with existing crossing at 32nd Avenue & Van Buren Street
- Bridge Rendering Concept Board - Provided a perspective and rendered view of the bridge overpass.
- Two Stage Mid Block Crossing Rendering Concept Board - Provided a perspective and rendered view of the multi-stage crossing

Project Assessment Report

This project assessment report provides a summary of the information collected and analysis performed. The report summarizes the analysis process and methodology of collecting feedback. It also provides project background, traffic analysis, three concept alternatives, documents the public meetings and provides preliminary 15% conceptual plans.

4.0 THE CONCEPTS

Concept A Grade Separation Bridge crossing of 7th Street

The Bridge Overpass concept developed several bridge alignment alternatives prior to the first public meeting. The bridge design shall be designed in accordance with the AASHTO LRFD Bridge Design Specifications (AASHTO LRFD), 5th Edition and the AASHTO Guide Specifications for the Design of Pedestrian Bridges (AASHTO Guide Specifications) 2009 Edition.

Please refer to the following Exhibit 2 “Overpass Exhibit”

Abutment & Bridge Alignment

The design team evaluated six initial bridge crossing alignments of 7th Street with pedestrian ramp configurations. Opportunities for the bridge alignment and abutment locations are limited due to lack of existing right of way, historic structures, and open space. The east abutment is proposed in an open area south of the Children’s Museum parking lot driveway outside the existing City of Phoenix 7th Street right of way. The proposed west abutment location is also limited by the existing Lath House and existing utility infrastructure. The proposed west abutment is located outside the existing City of Phoenix 7th Street right of way. The bridge crossing concept is located at the midpoint of 7th Street between Van Buren Street and Washington Street.

Ramp Layout

The AASHTO required height of bridge is approximately 18 ft (16’-6” Vehicular Clearance) which requires 18 ft high pedestrian ramp connections on each end. The ramp layout evaluated a 10 ft wide ramp and a 5 ft wide ramp. The pedestrian ramp options also evaluated the point of access to the ramps. The ideal access to the bridge ramps is along 7th Street from the east & west sidewalks within the City right of way. The options also evaluated terminating the ramp along the west side into the Heritage Square area just south of the Lath House.

East Side Pedestrian Ramps

10 ft Wide Ramp East Side of 7th Street - Children’s Museum of Phoenix

The 10 ft wide ramp along the west side of 7th Street utilizes a double switch back layout requiring a 158 ft of length to meet ADA requirements. This ramp option utilizes a maximum allowable 8.33% slope along the ramp with a flat 10 ft landing pad every 30 ft. This ramp layout extends approximately 90 ft into the existing Children’s Museum staff parking lot eliminating 10 to 12 staff parking spaces. Alignments No. 1 & 3 utilize this ramp layout. This option would require area outside the City of Phoenix 7th Street right of way.



5 ft Wide Ramp East Side of 7th Street - Children’s Museum of Phoenix

The 5 ft wide ramp along the west side of 7th Street utilizes a quadruple switch back layout requiring 90 ft of length to meet ADA requirements. This ramp utilizes a slope of 7.50% slope along the ramp with a flat 10 ft landing pad every 30 ft of ramp. This ramp layout would extend approximately 40 ft into the existing Children’s Museum staff parking lot eliminating 4 to 5 staff parking spaces. The 5 ft wide ramp options are shown in Alignments 2, 4, 5 & 6. This option would require placement outside the City of Phoenix 7th Street right of way.

West Side Pedestrian Ramps

10ft Wide Ramp West Side of 7th Street - Lath House

The west side ramp location has two options for a 10 ft wide ramp along the south frontage of the historic corner house (Alignment No. 1) and north frontage of the Lath House (Alignment No. 3). This option would require area outside the City of Phoenix 7th Street right of way.

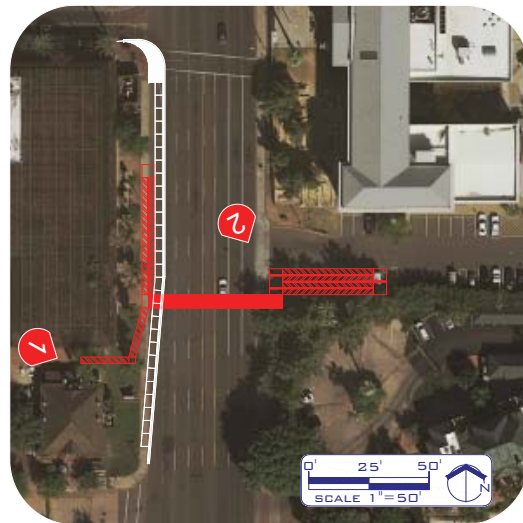
5 ft Wide Ramp West Side of 7th Street - Lath House



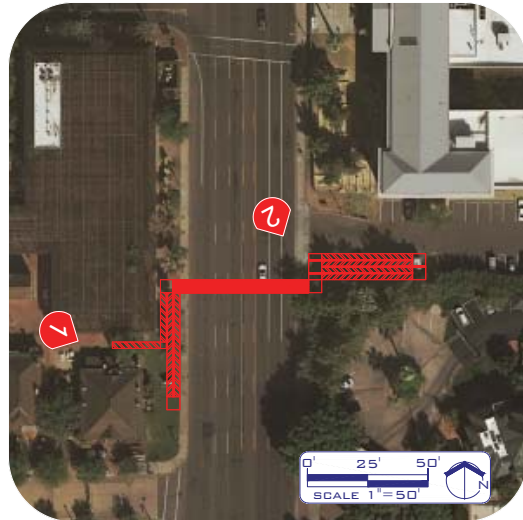
ALIGNMENT NO. 1 - 10' WIDE RAMP



ALIGNMENT NO. 3 - 10' WIDE RAMP



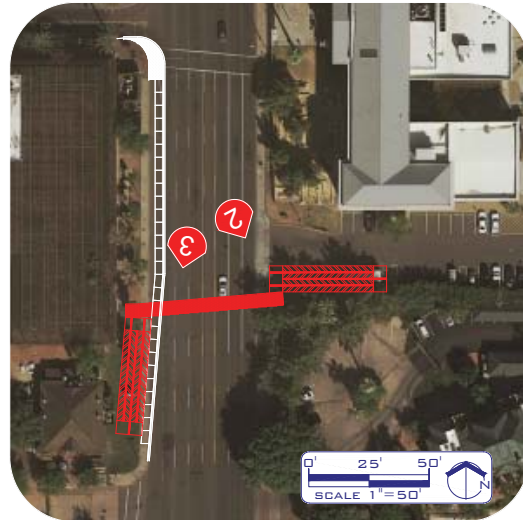
ALIGNMENT NO. 5 - 5' WIDE RAMP



ALIGNMENT NO. 2 - 5' WIDE RAMP



ALIGNMENT NO. 4 - 5' WIDE RAMP



ALIGNMENT NO. 6 - 5' WIDE RAMP

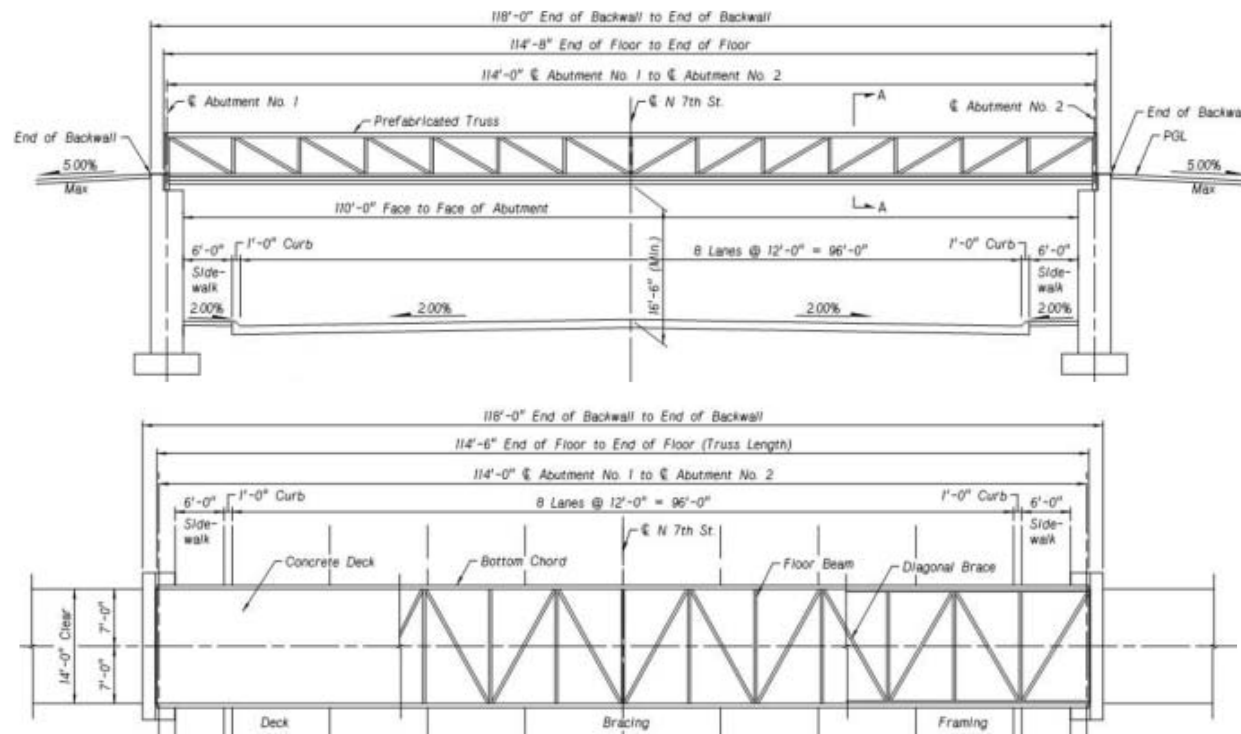


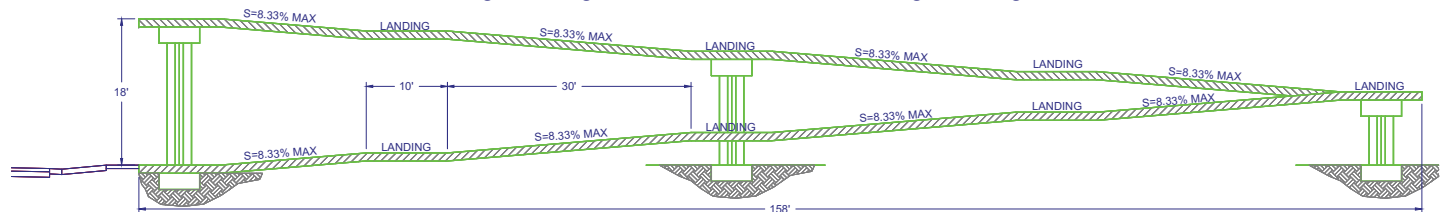
Photo No. 1 - Lath House Connection



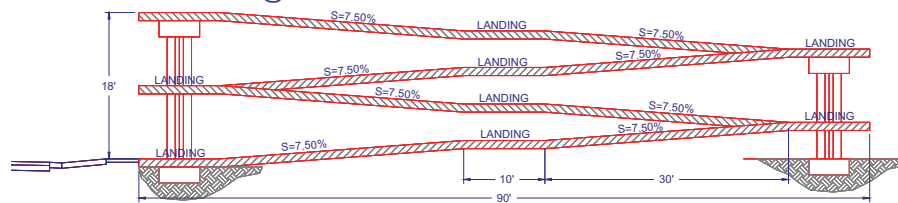
Photo No. 2 Children's Museum Driveway Bridge Landing Connection



Photo No. 3 - Lath House - Bridge Landing Connection



10' WIDE RAMP WIDTH @ 8.33% - 18' HT



5' WIDE RAMP WIDTH @ 7.50% - 18' HT

EXHIBIT 02



The west side ramp location has four options for a 5 ft wide ramp, all of which would require area outside the City of Phoenix 7th Street right of way:

- Alignment No. 2 - Terminating into Heritage Square between the Lath House and the Historic Corner House.
- Alignment No. 4 - Access from the west sidewalk along 7th Street along the north side of the bridge along the east side of the Lath House.
- Alignment No. 5 - Combination north and south ramp switchback ending in Heritage Square between the Lath House and the Historic Corner House.



- Alignment No. 6 - Access from the west sidewalk along 7th Street along the south side of the bridge and the east side of the Historic Corner House.

Public Meeting No. 1:

Public meeting no. 1 was held on Thursday, July 19th, 2012 at the Lath House in Heritage Square. This meeting introduced the preliminary bridge overpass concepts to the public for discussion and comment. The public meeting no. 1 meeting minutes can be found in the appendix of this project assessment.

Public Meeting No. 1 Comments regarding the Bridge Overpass included:

- “It is important to understand the Heritage Square and Rosson House is a cultural center.”
- “The Heritage Square area is Historic and within the City of Phoenix Historic Preservation zoning.”
- “Why can’t pedestrians and bicyclists use the existing signal at Washington or Van Buren?”
- “The Children’s Museum building is within the Historic Monroe School and is located within the City of Phoenix Historic Preservation Zoning.”
- “If the bridge concept moves forward the project would need to be a landmark bridge.”
- “A bridge project in this historic area needs to include the City Arts and Culture commission and incorporate an artist for design.”
- “Festivals and fencing due to alcohol use makes it difficult to take the ramp into the heritage park at the Lath House Pavilion.”
- “The bridge ramp configurations would take up considerable staff parking area south of the Children’s Museum building. The museum cannot lose any more parking especially in the staff area.”
- “The Children’s Museum like a bridge concept with an elevator instead of ramps.”
- “Bicycle users should be crossing at the Van Buren or Washington Street signalized intersection.”
- “The liability drops to zero with the pedestrian bridge overpass.”
- “The safest, direct crossing involves a bridge from Adams Street to the Children’s Museum south driveway area.”
- “Angled Bridge Alignment across 7th Street is preferred.”
- “Need to be careful with site visibility triangles through the elevator locations.”
- “Personnel from the Children’s Museum and Rosson House view the preferred option to be a bridge with artist involvement utilizing elevators to minimize site impacts to both Heritage Square and the Children’s Museum from the ramp platforms.”

Comments and Feedback regarding the Bridge Overpass from the City of Phoenix:

“Could alignment 5 be used but widened to the 10 foot ramp width. There is concern as well as not concealing the existing historic home on the N/W corner of 7th & Heritage Square behind the ramp. If we could activate the walkway behind the house such as shown in alignment 5 that would be more ideal. It’s

been requested as well to look at providing a circular stair at the base of each column as a second option if not wanting to use the accessible ramp.”

“Is there potential for the bridge to tie into the 2nd floor of the Children’s Museum? This would skew the bridge more to the north on the east side. Also allowing additional points of access to better utilize it.”

The bridge concepts showing the bridge landing within Heritage Square would require Parks Board approval.

There is a need to determine if the project is to be an office of Arts and Culture project.

The bridge concept needs to consider operations and maintenance costs as the owner will be the City of Phoenix. Need to determine how maintenance and operations will be funded by the City.

Comments and Feedback regarding the Bridge Overpass from the City of Phoenix Historical Preservation Officer:

“Option 5 for the bridge options is preferred over other options (such as 1, 2 and 6) that impact the view of the historic home. As for tying into the actual museum structure, that may be a problem as it (Monroe School) has landmark designation. The State Historic Preservation Office, SHPO, also has an easement on the property and may not be supportive due to impacts on the historic structure.”

Concept Refinement based off Public Meeting No. 1, City of Phoenix and SHPO Comments.

Please refer to the following Exhibit 3 “Overpass Rendering Exhibit”

Public Meeting No. 2:

Public meeting no. 2 was held on Thursday, October 25th, 2012 at the Lath House in Heritage Square. This meeting presented refined bridge overpass concepts based on the discussion and comments from public meeting no. 1. Public meeting minutes can be found in the appendix of this project assessment.

Angled Bridge Alignment

“The previous bridge concepts presented a straight bridge alignment from the area south of the Children’s Museum driveway on 7th Street to the open Lath House landing area.”

The refined bridge alignment incorporates an angled alignment from the area south of the Children’s Museum driveway to the area between the Lath House and the historic corner house north of Adams Street.

Elevators and spiral staircases in lieu of the long ramps

“The previous bridge concepts included several ramp configurations in which all layouts resulted in significant reduction of staff parking areas south of the Children’s Museum building. The State Historic Preservation Office also provided comments in regards to the ramp configurations blocking the view of the Children’s Museum and the Lath House. Both the Heritage Square area and the Children’s Museum (Monroe School) are within historic preservation zoning.”

The refined bridge concept includes a spiral staircase and elevators instead of ramps.

Artistic Involvement for the Bridge Overpass

“A bridge project in this historic area needs to include the City Arts and Culture commission and incorporate an artist for design.”

The refined bridge concept included an artistic elements within the bridge design based off the recent accent fencing installation along the Children’s Museum 7th Street frontage.

Public Meeting No. 2 Comments regarding the Bridge Overpass included:

- “Arizona Science Museum, added that he understands and supports council members vision to connect the facilities. The Arizona Science Center believes the at grade crossing is ‘not acceptable’ due to safety concerns. The Arizona Science Center will only support the bridge.”



BRIDGE RENDERING PROJECT AREA PERSPECTIVE - SOUTHWEST



PROJECT STUDY AREA - PLAN VIEW



VIEW NEAR NWC ADAMS AND 7TH ST. LOOKING NORTHEAST



STREET LEVEL NEAR SWC OF MONROE & 7TH ST. LOOKING SOUTH

- “Children’s Museum of Phoenix, supports the Arizona Science Center comment and does not want children in a median in the middle of 7th Street. The bridge is the only safe option.”
- “The historic society would need to be included if the project moves forward.”
- “The City of Phoenix would own and maintain the bridge.”
- “Museum representatives added that they appreciated the project team hearing the comments from the first public meeting and incorporating them into the revised concepts for the second public meeting.”

Comments and Feedback regarding the Bridge Overpass from the State Historic Preservation Office:

“The Children’s Museum site and Heritage Square areas are both within historic preservation easements and zoning. Vertical elements from the bridge which block the existing historical buildings within the historic preservation easement are not allowed. The State Historic Preservation Office feels the best alternative would be to add traffic signals at both Adams Street and Monroe Street. The third concept in this project assessment report provides further analysis regarding traffic signals and beacons. Figure 6 provides a map with the historic preservation zoning limits.”

Concept Refinement based off City of Phoenix Historical Preservation and SHPO Comments:

The bridge overpass concept included an additional revision based on the comments from the State Historic Preservation Office. The east bridge abutment is located further south beyond the Children’s Museum driveway and onto the frontage of the Renaissance Park Condominiums property. This alignment would require additional City of Phoenix right of way.

The west bridge abutment is still within the historic preservation easement which is located within the existing parking lot at the southwest corner of 7th Street and Adams Street. This alignment would require the loss of two parking spaces within the existing parking lot and the relocation of the existing trash enclosure. Please refer to the following Exhibit 4 “Updated Overpass Rendering Exhibit”



HISTORIC PRESERVATION ZONING MAP

FIGURE 4



BRIDGE RENDERING PROJECT AREA PERSPECTIVE - SOUTHWEST



PROJECT STUDY AREA - PLAN VIEW



VIEW NEAR NWC ADAMS AND 7TH ST. LOOKING NORTHEAST



STREET LEVEL NEAR SWC OF MONROE & 7TH ST. LOOKING SOUTH

Concept B Below Grade Underpass crossing of 7th Street:

The underpass layout requires a minimum 12 ft depth below the existing 7th Street which results in a below grade ramp length of 201 ft with maximum allowable 8.33% slope along the ramp requiring a flat 10 ft landing pad every 30ft of ramp. Raising 7th Street to decrease the depth of the underpass was evaluated, but deemed unfeasible due to existing driveway locations and the proximity of the building frontages along the east and west sides of 7th Street.

Please refer to the following Exhibit 5 “Underpass Exhibit”

The underpass crossing location was situated on the north side of the southern driveway along the Children’s Museum frontage and the center point of the Lath House due to the ramp layout for the below grade access to the crossing.

Several key wet and dry utilities are located within 7th Street and the construction of a below grade underpass will require a number of significant utility relocations.

The following list of utility companies have utility infrastructure within the project study area:

UTILITY CONTACT LIST			
Utility Company	Utility Type	Utility Company	Utility Type
APS	Electrical	AGL	Fiber
AT&T	Telephone	SRP Water	Water
		SRP Water	
City of Phoenix	Water	Engineering	Bridge
City of Phoenix	Sanitary Sewer	SRP Transmission	Electrical
City of Phoenix	Storm Drain	SRP Communication	Fiber
	Telephone,		
MCI	Fiber	SRP FHV	Electrical
Metropolitan Fiber Systems	Fiber	Century Link	Telephone, Fiber
Level 3	Fiber	Southwest Gas	Natural Gas
XO Communications	Fiber	Cox Communications	CATV
AGL	Telephone	Cox Communications	Fiber

Public Meeting No. 1:

Public meeting no. 1 was held on Thursday, July 19th, 2012 at the Lath House in Heritage Square. This meeting introduced the preliminary underpass crossing concept to the public for discussion and comment. The public meeting no. 1 meeting minutes can be found in the appendix of this project assessment.

Public Meeting No. 1 Comments regarding the underpass included:

- “The underpass is not a good option in this area due to homeless and it’s not child safe. The perception of safety is important. Concern about the starting location and impact to surrounding structures. Some of the historic buildings on the west side could be damaged from construction activity.”
- “An underpass only works with a controlled access and if it terminates in a secured area, otherwise it turns into a public bathroom.”
- “In terms of advancing concept development the team should eliminate the underpass option at this point.”

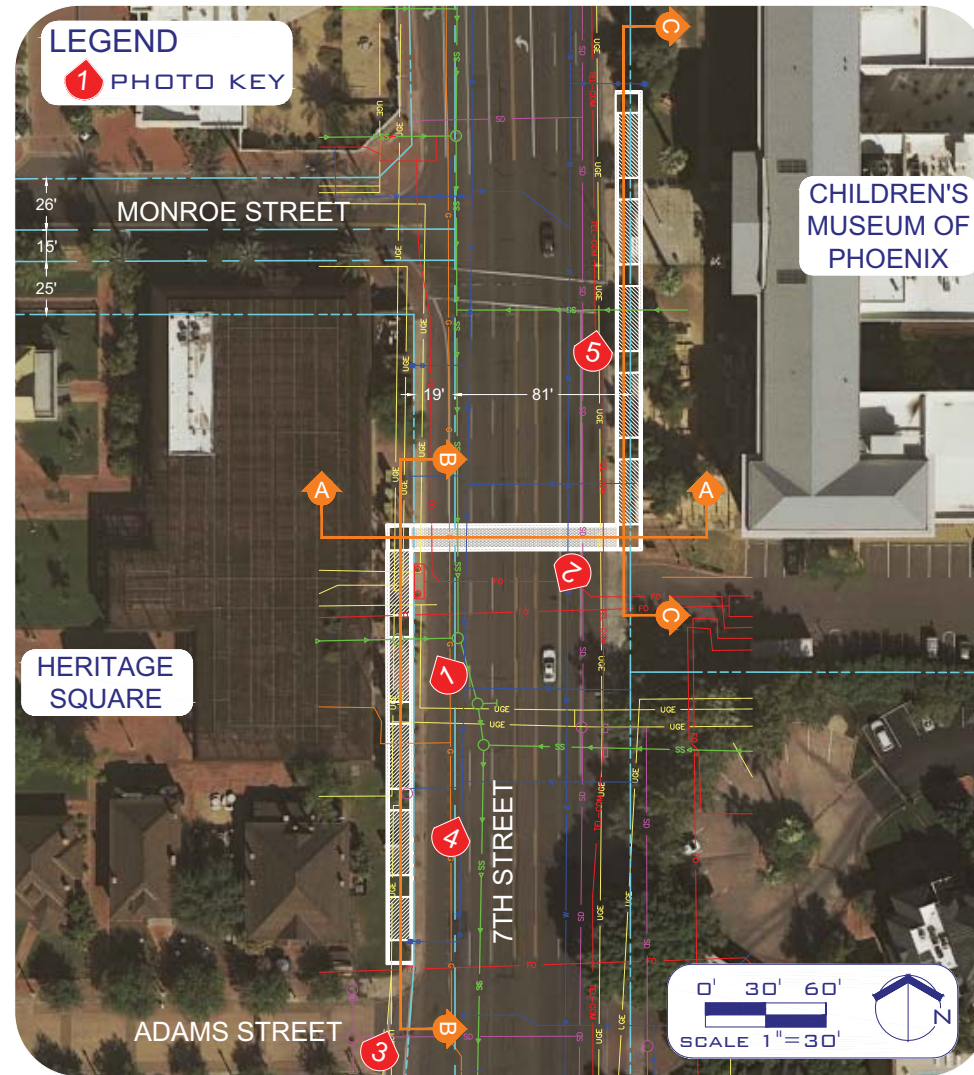
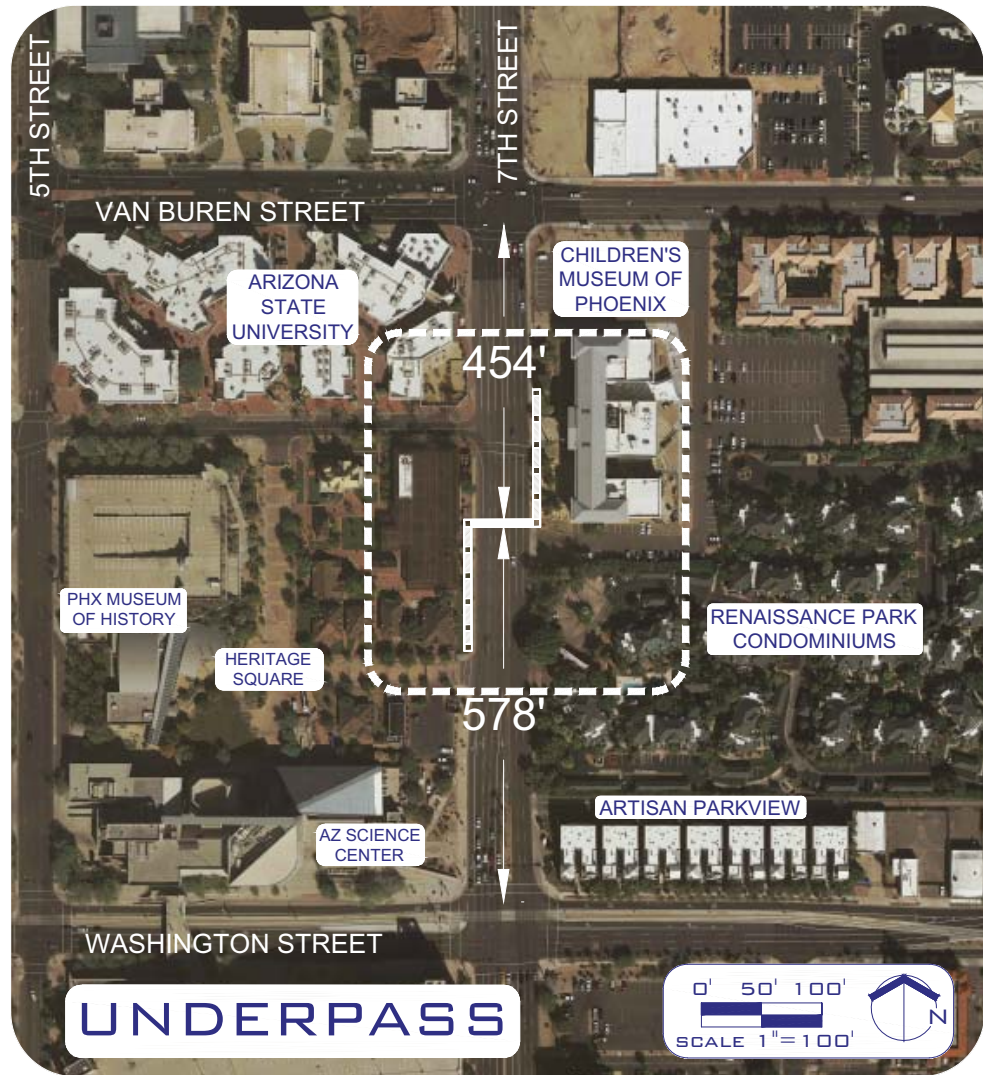


Photo No. 1 - 7th Street West Sidewalk Looking North West



Photo No. 2 - 7th Street West Sidewalk Looking South West



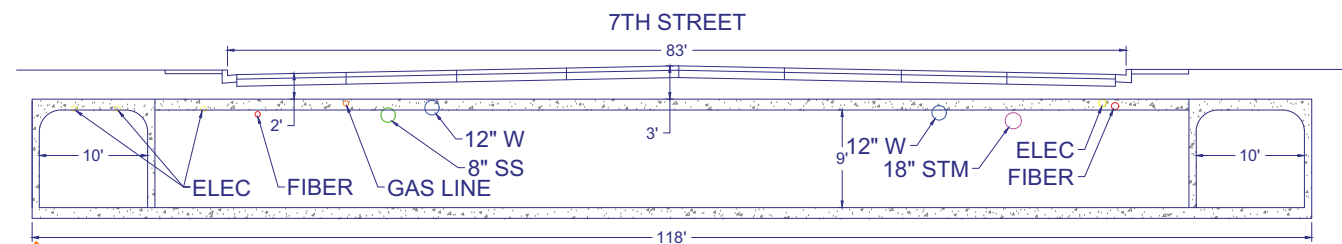
Photo No. 3 - Adams Street Looking North East



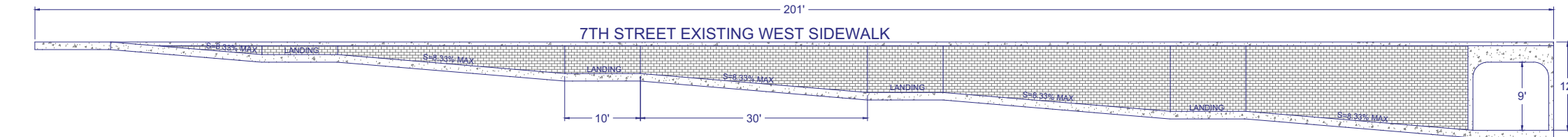
Photo No. 4 - 7th Street East Sidewalk Looking North East



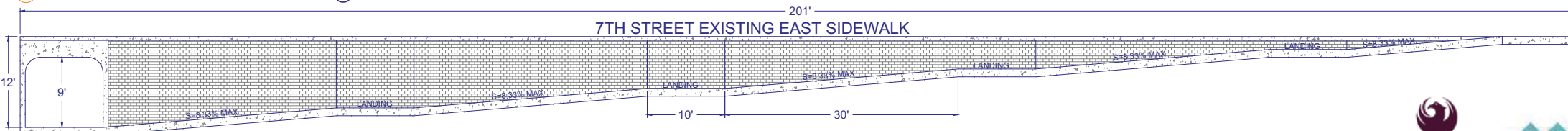
Photo No. 5 - 7th Street East Sidewalk Looking North from Existing SW Ramp



SECTION A-A: PEDESTRIAN UNDERPASS BENEATH 7TH STREET



SECTION B-B: 10' WIDE RAMP WIDTH @ 8.33% - 12' DEPTH



SECTION C-C: 10' WIDE RAMP WIDTH @ 8.33% - 12' DEPTH

UTILITIES			
Utility Owner	Utility Type	Utility Owner	Utility Type
AT&T	TEL / FIBER	COX	COAXIAL / FIBER
MCI	TEL / FIBER	CENTURY LINK	TEL / FIBER
MFS	FIBER	SW GAS	NATURAL GAS
COP	WATER	LEVEL 3	FIBER
COP	SAN. SEWER	AGL	FIBER
COP	STORM DRAIN	XO	FIBER
COP	TRAFFIC	APS	UNDG ELEC



EXHIBIT 05

Public Meeting No. 2:

Public meeting no. 2 was held on Thursday, October 25th, 2012 at the Lath House in Heritage Square. Further refined underground crossing concepts were not presented based on the discussion and comments from public meeting no. 1. Public meeting minutes can be found in the appendix of this project assessment.

Comments and Feedback regarding the underpass from the City of Phoenix:

“What about considering an option to raising Monroe Street and dip 7th Street instead of a underground crossing.”

Monroe Street really cannot be raised due to the existing driveways on the north and south sides at ASU and Heritage Square. Thus the majority of grade change would need to be with 7th Street. Lowering the street profile of 7th Street would require significant retaining walls along the west and east sides of 7th Street as well as major utility relocation. The vertical curve would be limited by the horizontal distance to the major street intersections of 7th & Washington Street and 7th & Van Buren Street. The location of several existing driveways along the east and west sides of 7th Street would provide difficulty in how vehicular access would be maintained from 7th Street.

Concept C At Grade Crossing of 7th Street:

Traffic and pedestrian volumes were collected for the intersection of 7th Street and Monroe Street as part of the Data Collection Report completed in June of 2012. The Data Collection Report included a field visit and gap analysis to determine if the existing marked crosswalk at Monroe Street crossing 7th Street provided adequate gaps in traffic for pedestrians to safely cross 7th Street. The analysis concluded there were an insufficient number of acceptable gaps in traffic for a pedestrian to safely cross 7th Street.

Multiple countermeasures can be applied to an intersection to increase the safety for pedestrians crossing a street, including traffic signals, pedestrian hybrid beacons or two stage midblock crossings. The following sections will discuss these countermeasures and their applicability to the intersection of 7th Street and Monroe Street.



Traffic Signals

The Manual on Traffic Control Devices (MUTCD) includes traffic signal warrants that must be evaluated in order to justify the recommendation to install a traffic signal at a specific intersection. To justify a traffic signal at either Adams Street or Monroe Street, the pedestrian volumes must be 107 pedestrians per hour or more crossing the major street. Based on the pedestrian volumes obtained for the Data Collection Report, 24 pedestrians cross in the peak hour. Therefore, it is unlikely for a traffic signal to be warranted on 7th Street at Monroe Street and at Adams Street based on pedestrian volumes.

Furthermore, signal spacing is typically ½ to ¼ mile for vehicle progression reasons. While some arterials in the vicinity of 7th Street and Monroe Street have similar spacing of traffic signals, there are differentiators that set them apart from the 7th Street arterial. For example, Jefferson Street has signals spaced approximately 400 feet apart. However, the difference between 7th Street and Jefferson Street is that Jefferson Street has one way traffic that carries 1/3 of the traffic that 7th Street does.

Pedestrian Hybrid Beacon

A Pedestrian hybrid beacon may be considered at locations that do not meet traffic signal warrants. A pedestrian hybrid beacon, also known as HAWK signal, is a special type of signal used to control traffic at unsignalized intersections to assist pedestrians crossing a street at a marked crosswalk. The 2009 edition of the MUTCD provides the standards and guidance on the design of HAWK signals. The MUTCD states

Midblock crosswalks shall not be signalized if they are located within 300 feet from the nearest traffic control signal, unless the proposed traffic control will not restrict the progressive movement of traffic.

With the high volume of vehicular traffic on 7th Street and the distance between the Monroe Street midblock crossing and Van Buren Street, a HAWK signal is not recommended. A HAWK signal would likely restrict traffic flow on 7th Street and cause backups to the intersection of Van Buren Street.

Two Stage Midblock Crossing

The two stage midblock concept provides a staggered crossing of 7th Street with a middle refuge island with 3 ft high iron fencing. MUTCD, Section 3B.18 provides specific guidance about where a new crosswalk should not be installed across an uncontrolled approach on roads with 4 or more lanes and speeds of over 40 mph without countermeasures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence. One countermeasure is a two stage midblock crossing that has a pedestrian refuge area in the center lane with raised curb and has a staggered crosswalk. The pedestrian refuge area allows pedestrians to find an adequate gap in one direction of traffic at a time, as the pedestrians are able to stop, if necessary, in the median area and wait for an adequate gap in the other direction of traffic before crossing the second half of the street. According to the MUTCD the two stage crossing should not be installed within 600 feet of a signalized intersection.



Please refer to the following Exhibit 6 “Two Stage Midblock Crossing Exhibit”

Public Meeting No. 1:

Public meeting no. 1 was held on Thursday, July 19th, 2012 at the Lath House in Heritage Square. This meeting introduced a preliminary two stage midblock crossing concept to the public for discussion and comment. The public meeting no. 1 meeting minutes can be found in the appendix of this project assessment.

Public Meeting No. 1 Comments regarding the Two Stage Midblock Crossing included:

- “Why can’t people cross at the Van Buren or Washington street signalized crosswalks.” To which the group discussed how people want the most direct route to get from point A to point B.
- “The mid block option is concerning due to the maze to get through and the preferred location would be at Adams. The goal is to make it easy for people.”
- “How buses would be able to interact with the two staged midblock crossing.”
- “Need to plan ramps for double wide and double length strollers.”
- “Would like to see the crossing moved to the south to be located at the grass area south of the Children’s Museum driveway entrance on 7th Street.”
- “Cannot eliminate the stripped out/right turn lane south of Monroe to Adams Street.” Participants agreed they have seen accidents and stacking in this right turn lane.

Concept Refinement based off Public Meeting No. 1

Please refer to the following Exhibit 7 “Revised Two Stage Midblock Crossing Exhibit”

Pavement lane width reduction

The initial two stage midblock crossing looked at eliminating the western excess street lane that is currently striped out and turns into the right turn lane for Adams Street to cut down on the gap crossing time. The comment was made at the first public meeting that traffic turning right onto Adams Street to enter into Heritage Square backs up quite often during special events. The Pizzeria Bianco parking lot also causes this right hand turn lane to back up along 7th Street as well.

The refined concept maintains the additional western lane. The refuge area helps break up the gap crossing time as collected with the traffic analysis.

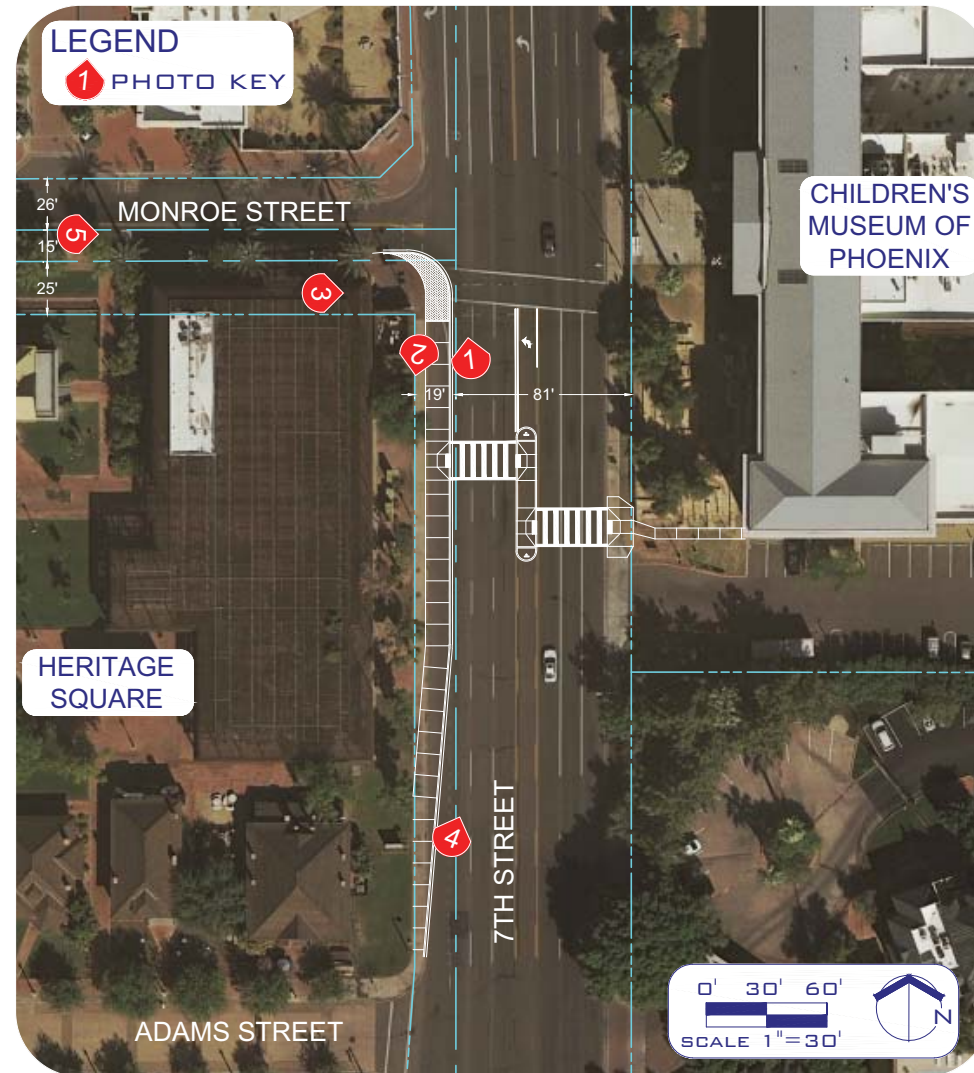


Photo No. 1 - 7th Street West Sidewalk Looking North



Photo No. 2 - 7th Street West Sidewalk Looking South



Photo No. 3 - Monroe Street Looking North East



Photo No. 4 - 7th Street East Sidewalk Looking North East



Photo No. 5 - Monroe South Sidewalk Looking East



Photo No. 6 - Multi-stage Staggered Crossing at Van Buren St. Looking North East



Photo No. 7 - Multi-stage Staggered Crossing at Van Buren St. Looking North West



Photo No. 8 - Signage at the Enclosed Refuge Area.



Photo No. 9 - Bicycle User Entering Crossing at Van Buren St & 32nd Ave



Photo No. 10 - Bicycle User Exiting Crossing at Van Buren St. & 32nd Ave



Multi-stage Crossing at Van Buren St. Between 33rd and 32nd Ave



Multi-stage Crossing Enlarged View

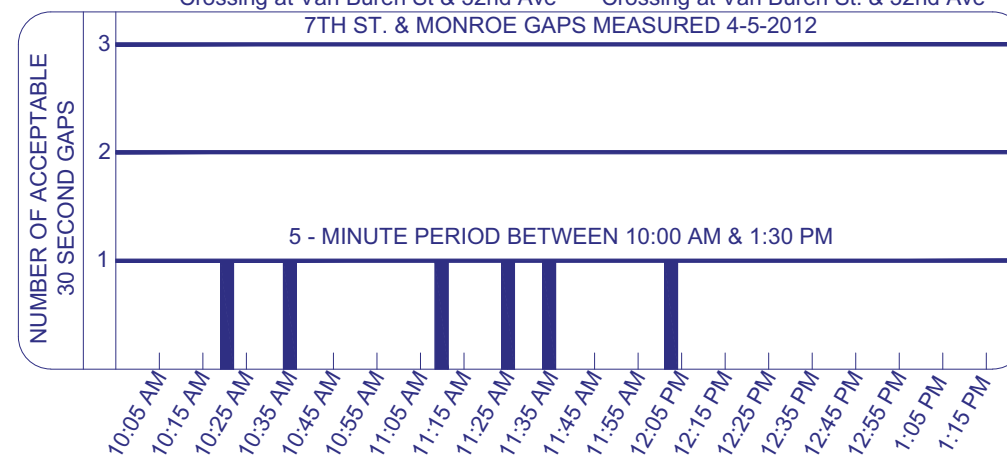


EXHIBIT 06



Shifting the mid block to the south

The initial mid block staggered crossing alignment was located on the north side of the Children's Museum south driveway on 7th Street. The west crossing from the refuge area lined up near the northern Lath House open landing area.

The refined concept shifts the mid block staggered crossing to the south locating the east ramp south of the Children's Museum driveway on 7th Street. The west crossing from the refuge area now lines up with the southern Lath House open landing area.

Please refer to the following Exhibit 8 "Two Stage Midblock Crossing Rendering Exhibit"

Public Meeting No. 2:

Public meeting no. 2 was held on Thursday, October 25th, 2012 at the Lath House in Heritage Square. This meeting presented a refined two stage midblock crossing concept based on the discussion and comments from public meeting no. 1. Public meeting minutes can be found in the appendix of this project assessment.

Public Meeting No. 2 Comments regarding the Two Stage Midblock Crossing included:

"The Arizona Science Center believes the at grade crossing is "not acceptable" due to safety concerns."

"The Children's Museum of Phoenix, supports the Arizona Science Center comment and does not want children in a median in the middle of 7th Street."

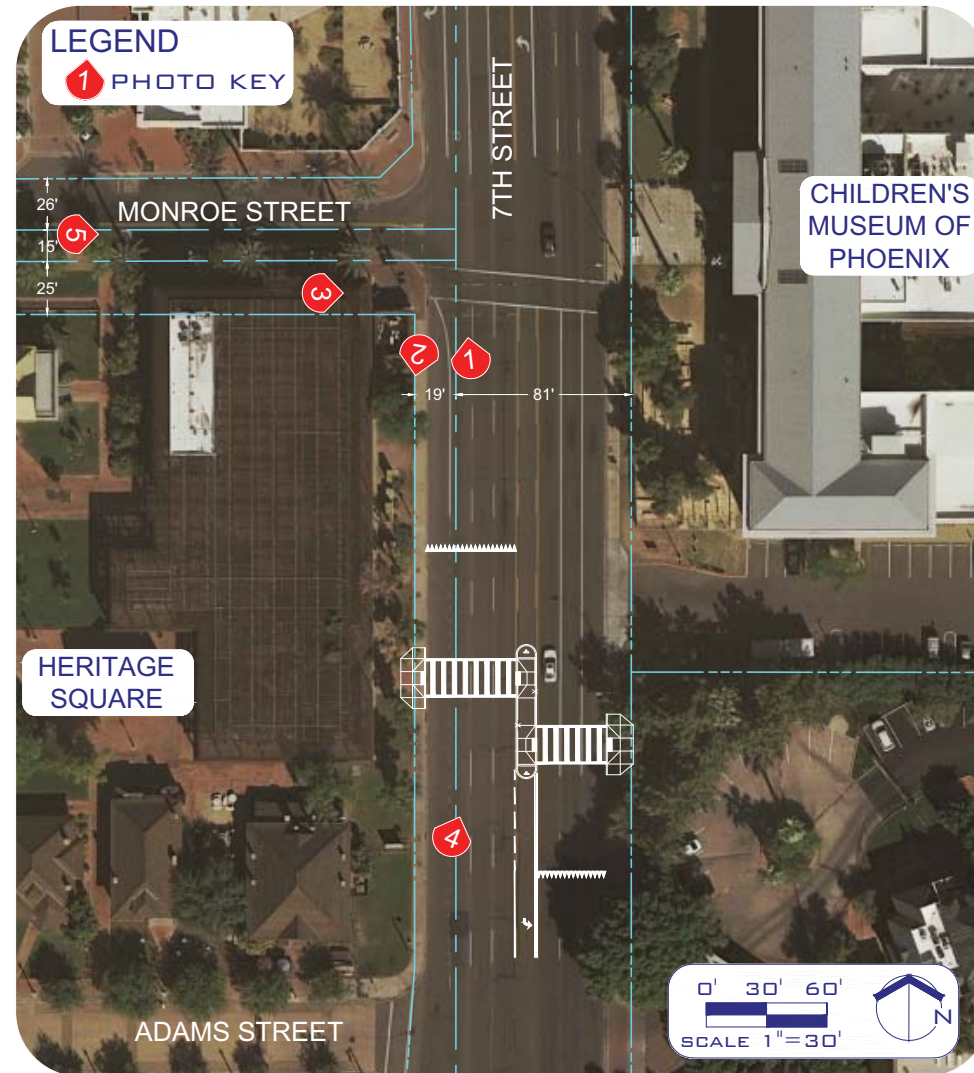


Photo No. 1 - 7th Street West Sidewalk Looking North



Photo No. 2 - 7th Street West Sidewalk Looking South



Photo No. 3 - Monroe Street Looking North East



Photo No. 4 - 7th Street East Sidewalk Looking North East



Photo No. 5 - Monroe South Sidewalk Looking East



Photo No. 6 - Multi-stage Staggered Crossing at Van Buren St. Looking North East



Photo No. 7 - Multi-stage Staggered Crossing at Van Buren St. Looking North West



Photo No. 8 - Signage at the Enclosed Refuge Area.



Photo No. 9 - Bicycle User Entering Crossing at Van Buren St & 32nd Ave



Photo No. 10 - Bicycle User Exiting Crossing at Van Buren St. & 32nd Ave



Multi-stage Crossing at Van Buren St. Between 33rd and 32nd Ave



Multi-stage Crossing Enlarged View

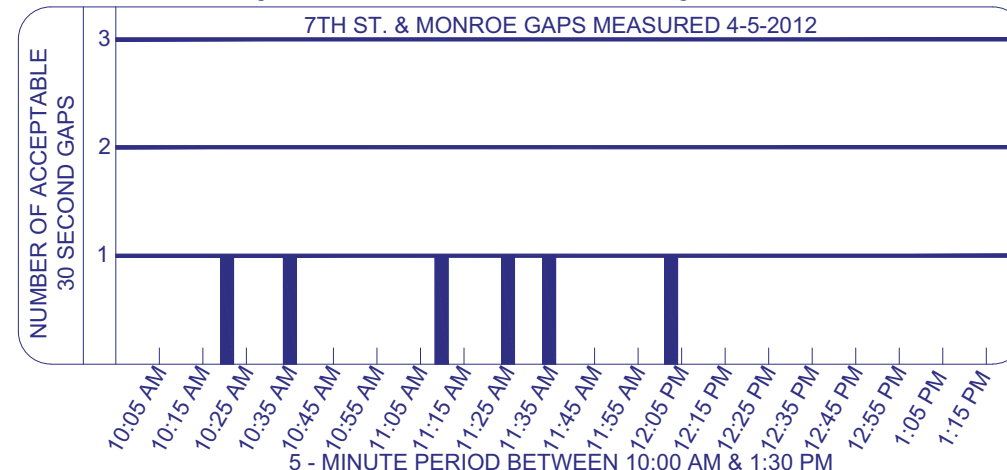


EXHIBIT 07





MID BLOCK RENDERING PROJECT AREA PERSPECTIVE - SOUTHWEST



PROJECT STUDY AREA - PLAN VIEW



VIEW NEAR NWC ADAMS AND 7TH ST. LOOKING NORTHEAST



STREET LEVEL NEAR SWC OF MONROE & 7TH ST. LOOKING SOUTH

5.0 CONCEPT COMPARISON:

The following list of metrics has been developed to compare the three concept alternatives:

- Safety
- At Grade Crossing
- Grade Separated Crossing
- Bicycle Friendly Crossing
- Cost
- Utility Relocations
- Purchase of Right of Way
- Maintenance & Operations
- Children’s Museum of Phoenix Endorsement
- Arizona Science Center Endorsement

The table below provides an matrix comparing metrics among the three concepts.

Children’s Museum of Phoenix & Arizona Science Center Pedestrian & Bicycle Bridge										
Table 5: Concept Comparative Matrix										
	Safety	At Grade Crossing	Grade Separated Crossing	Bicycle Friendly Crossing	Cost	Utility Relocations	Purchase of Additional Right of Way	Maintenance & Operations	Children’s Museum of Phx Endorsement	Arizona Science Center Endorsement
1 Bridge Overpass	High	No	Yes	Low	High	Moderate	Yes	High	X	X
2 Underpass	Moderate	No	Yes	Low	High	High	Yes	High		
3 Staggered Mid Block Crossing	Low	Yes	No	Moderate	Low	Low	No	Low		

Safety: The Bridge Overpass with elevators was viewed as the safest concept from the two public meetings as this option provides a grade separated crossing where pedestrians can be seen. The Underpass is also a grade separated crossing, but the level of safety is a concern as pedestrian use is not viewable from the street. The staggered mid block crossing is an at grade, non-signalized crossing which does not separate pedestrian use from vehicular movements.

Bicycle Friendly Crossing: None of the concepts are particularly bicycle friendly. The bridge would require the bicyclist to dismount and utilize the elevator to get up to the bridge. The underpass would require the cyclist to dismount and walk their bicycle down and up the underpass ramp. The at grade, non-signalized staggered mid block crossing does not allow a direct signalized crossing as the existing signalized intersections at Van Buren and Washington.

Cost: Itemized cost estimates based off the initial 15% conceptual plans for the three concepts have been provided and are located in the next section of this report. The estimate costs for the three concepts are as follows:

- Bridge Overpass Concept (15% Concept Estimate): \$6.8 Million
- Underpass Concept (15% Concept Estimate): \$7.6 Million
- Mid Block Staggered Crossing (15% Concept Estimate): \$150 Thousand

Utility Relocations: The underpass concept has the highest impact to existing infrastructure requiring the relocation of several existing utilities within 7th Street. The bridge overpass would require some utility relocation, but not nearly as the impact required for the underpass. The bridge overpass concept requires parking adjustments at the parking lot located on the north east corner of 7th Street and Adams. The at grade staggered mid block crossing has the least amount of utility disturbance within 7th Street.

Purchase of Additional Right of Way: Both the underpass and the bridge overpass concepts require the purchase of additional City right of way along the east and west sides of 7th Street. The bridge overpass concept requires the addition of an area approximately 36'x24' on the west side of 7th Street near the existing parking lot located on the north east corner of 7th Street and Adams. The east side of 7th Street requires an additional area of right of way approximately 18'x24' within the Renaissance Park Condominiums frontage just south of the Children's Museum of Phoenix driveway on 7th Street.

The underpass concept requires an additional 10' of right of way west of 7th Street along the proposed underpass ramp which parallels 7th Street for approximately 200'. The underpass ramp located on the east side of 7th Street requires an additional 6' of right of way for a length of approximately 200'.

The at grade staggered mid block ramp crossing is located within the 7th Street right of way and does not require any additional right of way.

Maintenance and Operations: The City of Phoenix would be responsible for O&M costs associated with both the bridge overpass and the underpass concepts. The City would be responsible for maintaining and operating the improvements including upkeep with graffiti / vandalism as well as the added infrastructure of light fixtures and the elevators for the bridge. The at grade staggered mid block ramp crossing would have minor street maintenance, but is considerable lower than the bridge overpass and underpass concepts.

6.0 COST ESTIMATES

CITY OF PHOENIX

OLSSON ASSOCIATES

Pedestrian Bridge - 7th Street	<i>Opinion of Probable Cost</i>	2/25/2013
<i>City of Phoenix</i>	<i>7th Street between Washington St. & Van Buren St.</i>	

CONSTRUCTION ACTIVITIES				
Description	Quantity	Unit	Unit Cost	Total
Mobilization / Demobilization	1	LS	\$ 350,000.00	\$ 350,000.00
Construction Surveying & Layout	1	LS	\$ 30,000.00	\$ 30,000.00
Traffic Control	1	LS	\$ 50,000.00	\$ 50,000.00
Stormwater Pollution Prevention Plan	1	LS	\$ 25,000.00	\$ 25,000.00
Temporary Construction Fencing	1	LS	\$ 15,000.00	\$ 15,000.00
Structural Excavation	2,200	CY	\$ 50.00	\$ 110,000.00
Structural Backfill	2,200	CY	\$ 32.00	\$ 70,400.00
Sawcut & Remove AC Pavement	250	SY	\$ 35.00	\$ 8,750.00
Subgrade Prep	150	SY	\$ 30.00	\$ 4,500.00
Concrete Slab	1,250	SF	\$ 11.00	\$ 13,750.00
Bridge Lighting, Complete - trenching, backfill, conduits, control units, wiring poles, fixtures, service connections	1	LS	\$ 350,000.00	\$ 350,000.00
Bridge Concrete, Class 'S', 4,500 PSI	300	CY	\$ 750.00	\$ 225,000.00
Steel Reinforcement	35,000	LB	\$ 1.50	\$ 52,500.00
Structural Steel	300,000	LB	\$ 7.50	\$ 2,250,000.00
Bridge, Expanded Metal Mesh, Steel Framing with Grafitti Repellent Architectural Complete	1	LS	\$ 100,000.00	\$ 100,000.00
Bridge, cables and connecting Hardware	1	LS	\$ 90,000.00	\$ 90,000.00
Handrail for Stairwells	250	LF	\$ 150.00	\$ 37,500.00
Elevator	2	EA	\$ 55,000.00	\$ 110,000.00
Elevator Building	2	EA	\$ 250,000.00	\$ 500,000.00
Concrete Driveway	500	SF	\$ 11.00	\$ 5,500.00
Concrete Curb & Gutter as per MAG Std. Dtl. 220	100	LF	\$ 50.00	\$ 5,000.00
Asphalt Concrete with ABC as per City of Phoenix Specifications	150	SY	\$ 70.00	\$ 10,500.00
Water Service Replacement	1	EA	\$ 2,500.00	\$ 2,500.00
Relocate Existing Water Meter Box and Cover	1	EA	\$ 1,500.00	\$ 1,500.00
Southwest Gas Line Relocation	1	LS	\$ 12,500.00	\$ 12,500.00
APS Electrical Relocation	1	LS	\$ 12,500.00	\$ 12,500.00
Century Link Telephone Relocation	1	LS	\$ 12,500.00	\$ 12,500.00
Century Link Fiber Optical Relocation	1	LS	\$ 12,500.00	\$ 12,500.00

Grand Total	
	Subtotal \$ 4,417,400.00
25%	Admin Costs \$ 1,104,350.00
	Final Design Services (Consultant) \$ 700,000.00
Utility Coordination / Project Management / Procurement etc.	Design Admin Costs \$ 100,000.00
	Environmental Services \$ 25,000.00
	Right of Way \$ 25,000.00
	P.I.O. \$ 20,000.00
	Permits (Elevator) \$ 20,000.00
NOTE: 1. This information is not intended for use in ordering of equipment or materials, the contractor is responsible for determining if additional contingency factors should be applied for preliminary cost basis. This information and actual project equipment quantities and/ or construction costs may differ.	10% Contingency \$ 441,740.00
	Grand Total \$ 6,853,490.00

Pedestrian Underpass - 7th Street	Opinion of Probable Cost
<i>City of Phoenix</i>	<i>7th Street between Washington St. & Van Buren St.</i>
	<i>2/25/2013</i>

CONSTRUCTION ACTIVITIES				
Description	Quantity	Unit	Unit Cost	Total
Mobilization / Demobilization	1	LS	\$ 500,000.00	\$ 500,000.00
Traffic Control	1	LS	\$ 100,000.00	\$ 100,000.00
Construction Surveying & Layout	1	LS	\$ 30,000.00	\$ 30,000.00
Stormwater Pollution Prevention Plan	1	LS	\$ 25,000.00	\$ 25,000.00
Temporary Construction Fencing	1	LS	\$ 20,000.00	\$ 20,000.00
Structural Excavation	4,800	CY	\$ 150.00	\$ 720,000.00
Structural Backfill	4,800	CY	\$ 80.00	\$ 384,000.00
Sawcut & Remove AC Pavement	1,380	SY	\$ 22.00	\$ 30,360.00
Subgrade Prep	750	SY	\$ 12.00	\$ 9,000.00
Concrete Slab, Class 'S', 3,500 PSI with Reinforcement	6,500	SF	\$ 45.00	\$ 292,500.00
Concrete Roof, Class 'S', 4,500 PSI with Reinforcement	6,500	SF	\$ 55.00	\$ 357,500.00
Underpass Lighting, Complete - trenching, backfill, conduits, control units, wiring poles, fixtures, service connections	1	LS	\$ 400,000.00	\$ 400,000.00
Retaining Walls - 12 ft w/ Concrete Footer Complete	1,250	LF	\$ 950.00	\$ 1,187,500.00
Handrail for Stairwells	800	LF	\$ 150.00	\$ 120,000.00
Concrete Driveway	500	SF	\$ 20.00	\$ 10,000.00
Concrete Sidewalk Replacement	2,250	SF	\$ 6.00	\$ 13,500.00
Concrete Curb & Gutter as per MAG Std. Dtl. 220	500	LF	\$ 22.00	\$ 11,000.00
Asphalt Concrete with ABC as per City of Phoenix Specifications	1,380	SY	\$ 80.00	\$ 110,400.00
8-inch VCP Sanitary Sewer Line Removal and Relocation	400	LF	\$ 120.00	\$ 48,000.00
12-inch DIP Water Line Removal and Relocation	400	LF	\$ 120.00	\$ 48,000.00
18-inch RGRCP Storm Drain Removal and Relocation	350	LF	\$ 175.00	\$ 61,250.00
Water Service Replacement	1	LS	\$ 25,000.00	\$ 25,000.00
Relocate Existing Water Meter Box and Cover	1	LS	\$ 10,000.00	\$ 10,000.00
Unforeseen Utility Relocation Allowance	1	LS	\$ 250,000.00	\$ 250,000.00
Southwest Gas Line Relocation	1	LS	\$ 25,000.00	\$ 25,000.00
APS Electrical Relocation	1	LS	\$ 75,000.00	\$ 75,000.00
Century Link Fiber Optical Relocation	1	LS	\$ 75,000.00	\$ 75,000.00

Grand Total

			Subtotal	\$ 4,938,010.00					
	25%		Admin Costs	\$ 1,234,502.50					
			Final Design Services (Consultant)	\$ 800,000.00					
			Design Admin Costs	\$ 100,000.00					
			Environmental Services	\$ 25,000.00					
			Right of Way	\$ 25,000.00					
			P.I.O.	\$ 20,000.00					
	10%		Contingency	\$ 493,801.00					
			Grand Total	\$ 7,636,313.50					

NOTE:
 1. This information is not intended for use in ordering of equipment or materials, the contractor is responsible for determining if additional contingency factors should be applied for preliminary cost basis. This information and actual project equipment quantities and/ or construction costs may differ.

Mid Block Staggered Crossing - 7th Street	<i>Opinion of Probable Cost</i>	2/25/2013
<i>City of Phoenix</i>	<i>7th Street between Washington St. & Van Buren St.</i>	

CONSTRUCTION ACTIVITIES

Description	Quantity	Unit	Unit Cost	Total
Mobilization / Demobilization	1	LS	\$ 10,000.00	\$ 10,000.00
Construction Surveying & Layout	1	LS	\$ 5,000.00	\$ 5,000.00
Stormwater Pollution Prevention Plan	1	LS	\$ 6,000.00	\$ 6,000.00
Temporary Construction Fencing	1	LS	\$ 10,000.00	\$ 10,000.00
Traffic Control	1	LS	\$ 15,000.00	\$ 15,000.00
Sawcut & Remove Concrete Pavement	750	SF	\$ 8.00	\$ 6,000.00
Sawcut & Remove AC Pavement	1,072	SF	\$ 10.00	\$ 10,720.00
Sawcut & Remove Concrete Curb	68	LF	\$ 8.00	\$ 544.00
Concrete Curb & Gutter as per MAG Std. Dtl. 220	70	LF	\$ 22.00	\$ 1,540.00
Concrete Curb & Gutter as per MAG Std. Dtl. 220, Inverted Gutter Pan	135	LF	\$ 22.00	\$ 2,970.00
Asphalt Concrete with ABC as per City of Phoenix Specifications	300	SF	\$ 22.00	\$ 6,600.00
Concrete Sidewalk as per C.O.P. Std. Dtl. P1230	1,300	SF	\$ 6.00	\$ 7,800.00
Concrete Sidewalk Ramp as per C.O.P. Std. Dtl. P1241-1	2	EA	\$ 750.00	\$ 1,500.00
Concrete Sidewalk Ramp as per C.O.P. Std. Dtl. P1241-2	2	EA	\$ 750.00	\$ 1,500.00
Install Traffic Sign and Post with Concrete Footing	2	EA	\$ 250.00	\$ 500.00
Traffic Signs	1	LS	\$ 500.00	\$ 500.00
Wrought Iron Fencing	80	LF	\$ 100.00	\$ 8,000.00
Pavement Striping	1	LS	\$ 3,000.00	\$ 3,000.00

Grand Total

		Subtotal	\$ 97,174.00
	25%	Admin Costs	\$ 24,293.50
		Final Design Services (Consultant)	\$ 16,000.00
		Design Admin Costs	\$ 3,000.00
NOTE: 1. This information is not intended for use in ordering of equipment or materials, the contractor is responsible for determining if additional contingency factors should be applied for preliminary cost basis. This information and actual project equipment quantities and/ or construction costs may differ.	10%	Contingency	\$ 9,717.40
		Grand Total	\$ 150,184.90

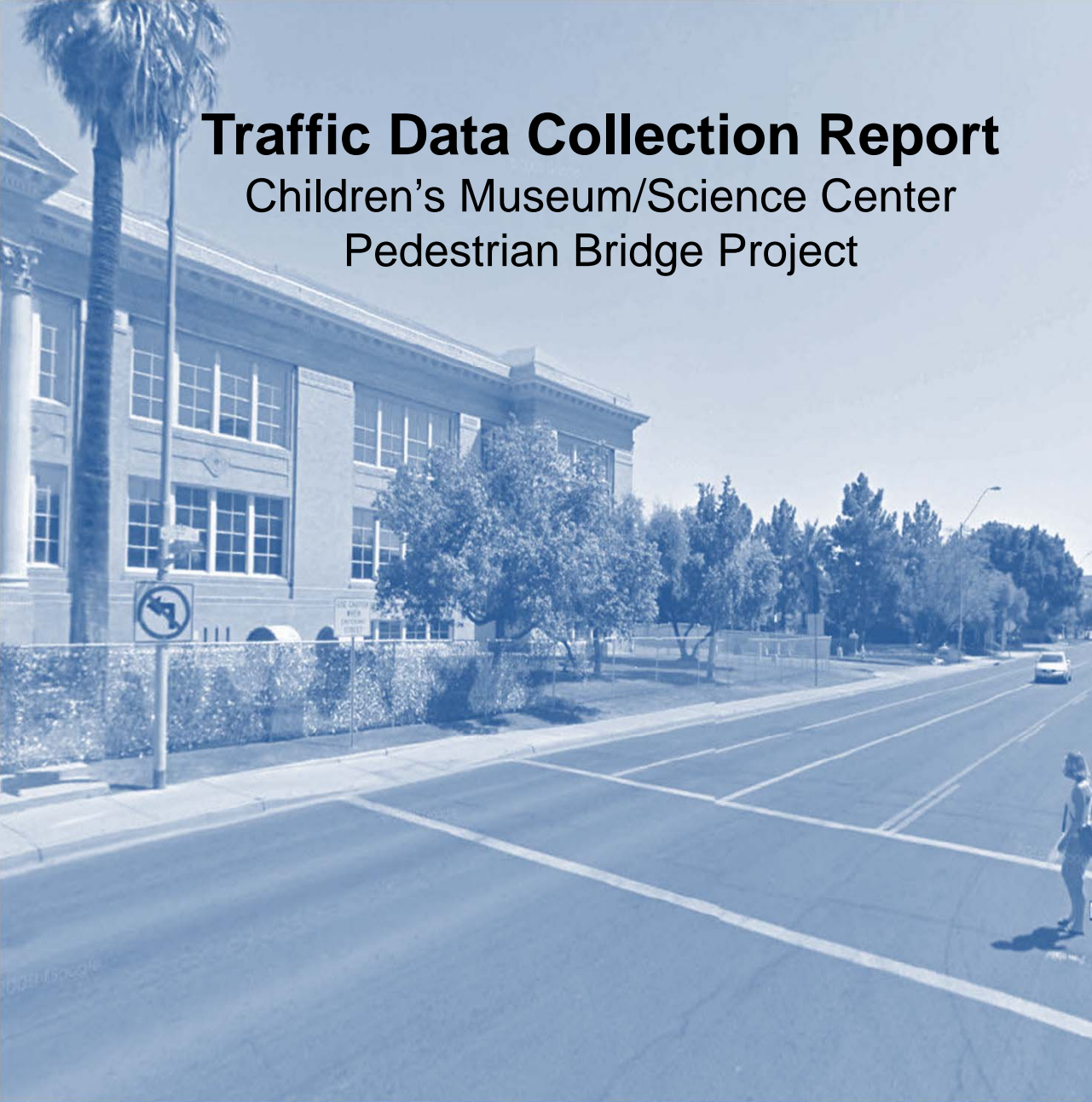


APPENDIX A: Traffic Study

Traffic Data Collection Report

Children's Museum/Science Center Pedestrian Bridge Project

June 2012



Prepared for:



City of Phoenix

Prepared by

Baker

Michael Baker Jr., Inc.
Phoenix, Arizona



Table of Contents

I. Introduction.....3
II. Description of Surrounding Roadway Network3
III. Existing Vehicular Traffic Volumes4
IV. Pedestrian/Bicycle Counts.....5
V. Collision Data5
VI. Stakeholder Information7
VII. Gaps in Vehicular Traffic on 7th Street near Monroe Street8

List of Figures

Figure 1: Location Map.....4
Figure 2: Collision Summary Diagram.....7
Figure 3: Summary of Gaps Measured on 7th Street at Monroe Street9

List of Tables

Table 1: Peak Hour Volumes on 7th Street for Aug/Sept 20105
Table 2: Pedestrian/Bicycle Volumes Summary.....5
Table 3: Table 3: Collision Statistics 2008-20106
Table 4: Hours of Operation & Admission Fees8

List of Appendices

2010 Daily Traffic Count Summaries..... A
2012 Pedestrian Volumes B
Segment Collision Data Summary C
Gaps Measured..... D

I. Introduction

The purpose of this report is to supplement the Project Assessment Report addressing pedestrian/bicycle improvements on 7th Street linking the Children’s Museum of Phoenix of Phoenix and the Arizona Science Center. This report documents the analysis of the data collected and the stakeholder input for the Children’s Museum of Phoenix / Science Center Pedestrian Bridge Project. The following data was collected:

1. Existing average daily traffic (ADT) vehicular counts on 7th Street between Van Buren Street and Washington Street.
2. Peak hour pedestrian and bicycle counts at the intersection of 7th Street and Van Buren Street and the intersection of 7th Street and Monroe Street.
3. Collision Data for 7th Street between Van Buren Street and Washington Street for the last three years.
4. Information on pedestrian activities from Children’s Museum of Phoenix and Science Center staff.
5. Vehicle gap information on 7th Street between Van Buren Street and Washington Street.

II. Description of Surrounding Roadway Network

The proposed project area is 7th Street between Van Buren Street and Washington Street. The area surrounding the proposed project location is an urban area. The Children’s Museum of Phoenix is located at the southeast corner of the intersection of 7th Street and Van Buren Street. The Arizona Science Center is located at the northwest corner of the intersection of 7th Street and Washington Street. Arizona State University Downtown Campus is located on the southwest corner of the intersection of 7th Street and Van Buren Street. The University of Arizona College of Medicine is located on the northwest corner of the intersection of 7th Street and Van Buren Street. The Arizona Center is located approximately ¼ mile west of 7th Street on Van Buren Street.

The Valley Metro Light Rail runs along Washington Street and has a station at 12th Street and Washington Street. Valley Metro also has two bus stops on 7th Street between Van Buren Street and Washington Street and multiple stops along Van Buren in the vicinity of the proposed project.

Figure 1 is a location map showing the aerial view of the project area.

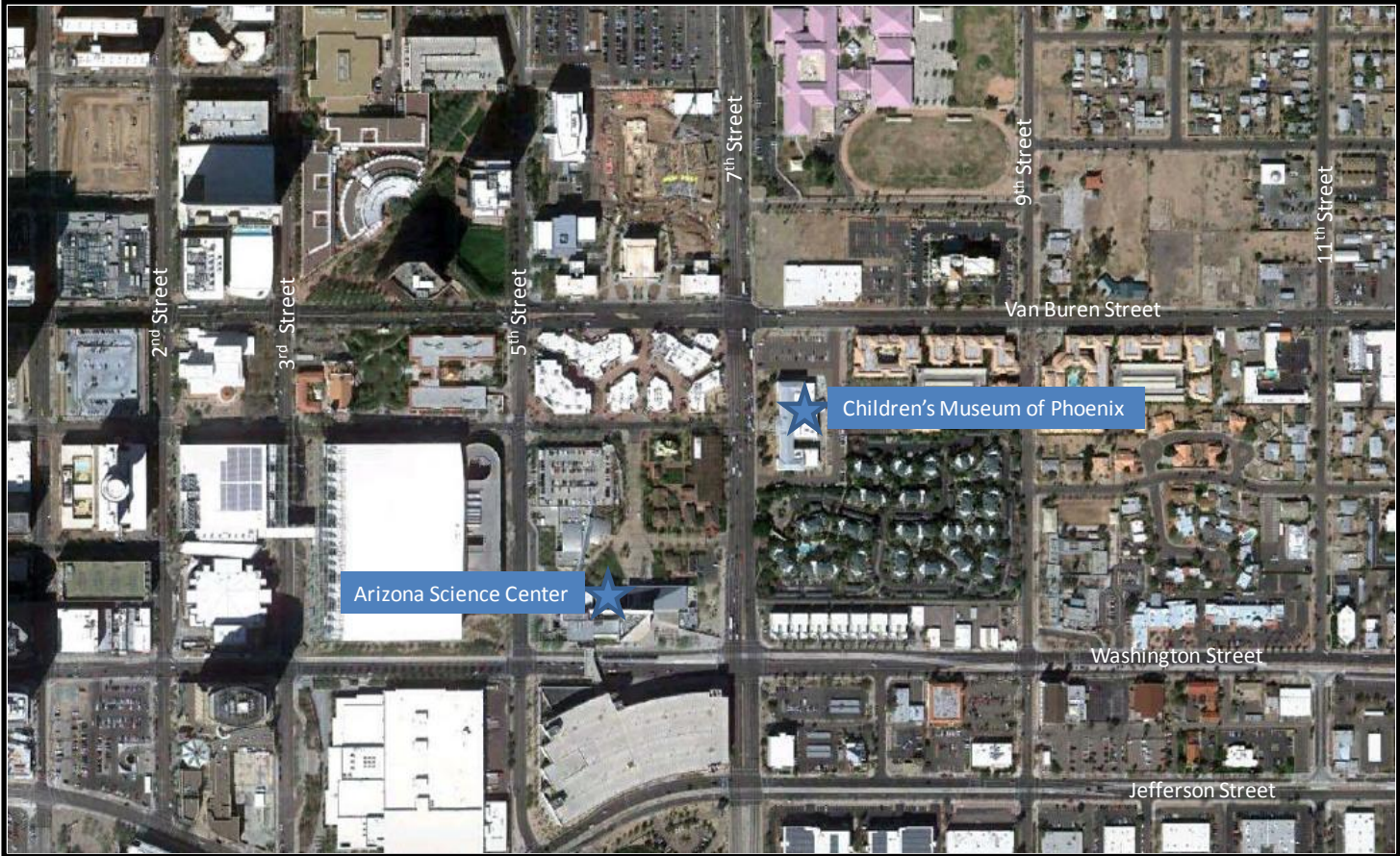


Figure 1: Location Map

III. Existing Vehicular Traffic Volumes

The City of Phoenix provided the most current traffic volumes available for the segments of 7th Street between Roosevelt Street and Van Buren Street and between Van Buren Street and Washington Street. The traffic volumes were from August and September of 2010 and included 72 hours of data. The average amount of traffic for each direction was documented for a 24 hour period resulting in the average daily traffic (ADT) volume. The traffic volumes are included as **Appendix A** to this report. **Table 1** summarizes the morning, midday and evening peak hour volumes on 7th Street.

Table 1: Peak Hour Volumes on 7th Street for Aug/Sept 2010

Segment of 7th Street	Time Period	Northbound	Southbound	Total
Between Roosevelt St & Van Buren Street	8:00 AM	1,011.5	2,042.5	3,054.0
	1:00 PM (Midday)	1,386.0	1,357.5	2,743.5
	5:00 PM	1,520.5	1,688.5	3,209.0
Between Van Buren Street & Washington Street	7:00 AM	1,192.7	1,068.0	2,260.7
	12:00 PM (Midday)	1,049.7	1,046.3	2,096.0
	5:00 PM	1,210.7	1,376.3	2,587.0

IV. Pedestrian/Bicycle Counts

Traffic Research and Analysis (TRA) collected pedestrian and bicycle counts at the intersections of 7th Street and Van Buren Street and 7th Street and Monroe Street on Thursday, April 12th, 2012. The counts were collected between the hours of 10:30 AM and 1:30 PM based on field observations and peak visiting hours for the Children’s Museum of Phoenix and the Arizona Science Center. TRA also collected the number of Jay-Walkers crossing 7th Street between Monroe Street and Washington Street. **Table 2** summarizes the peak hour pedestrian (including bicycles) volumes. The complete 3-hour data sheets for the pedestrian volumes are included in **Appendix B**.

Table 2: Pedestrian/Bicycle Volumes Summary

Intersection	Leg Crossed	Total 3 Hour Period	Peak Hour	Pedestrian Volume (per hour)
7th St & Van Buren St	North	185	11:15 AM	82
	South	166		55
	East	55		19
	West	68		34
7th St & Monroe St	South	10	11:45 AM	4
	West	42		24
Jay-walkers crossing 7th St between Monroe St & Washington St	NA	23	12:00 PM	14

V. Collision Data

The City of Phoenix Street Transportation Department, Safety & Neighborhood Traffic Section provided a collision summary for the segment of 7th Street between Van Buren Street and Washington Street. The collision summary included collisions between the years of 2008 and 2010. Collisions related to the intersections of 7th Street/Van Buren Street and

7th Street/Washington Street are not included in the summary. Intersection related collisions are defined as collisions within 150 feet of the intersection.

There were a total of 10 collisions between 2008 and 2010 with the statistics shown in **Table 3**.

Table 3: Table 3: Collision Statistics 2008-2010

Year	Injury Severity			Collision Type				Light Condition		Total
	Fatals	Injuries	Property Damage Only	Angle	Bike	Rear End	Side-swipe	Light	Dark	
2008	0	0	4	0	0	1	3	3	1	4
2009	0	2	4	1	1	2	2	4	2	6
2010	0	0	0	0	0	0	0	0	0	0

In the three years that collision data was provided for, there was one collision between a vehicle and a bicycle near the intersection of Monroe Street and 7th Street resulting in serious injury, one rear-end collision resulting in a possible injury, and eight non-injury collisions.

Figure 2 depicts the location and type of collision recorded between the years of 2008 and 2010.



Figure 2: Collision Summary Diagram

Collision data was not provided for 2011 or 2012. The complete Segment Collision Data Summary provided by the City of Phoenix is included in **Appendix C**.

VI. Stakeholder Information

A meeting was held on March 27th with representatives from the Children’s Museum of Phoenix, Arizona Science Center, and City of Phoenix. Information related to the operation of the two facilities was obtained in the meeting and is summarized in **Table 4** and the following list.

Table 4: Hours of Operation & Admission Fees

Museum	Museum Hours		General Admission Fees					Additional Fees for Exhibits			
	Days	Hours	Members	Non-Members				Members		Non-Members	
				Adults	Children < 1 year old	Children 1-3 years old	Children 3-17 years old	Adults	Children 3-17 years old	Adults	Children 3-17 years old
Children's Museum	Tuesday - Sunday	9AM - 4PM	Free	\$ 11.00	Free	\$ 11.00	\$ 11.00	NA	NA	NA	NA
AZ Science Center	Monday - Sunday	10AM - 5 PM	Free	\$ 14.00	Free	Free	\$ 11.00	\$ 6.00	\$ 5.00	\$ 8.00	\$ 7.00

Other information obtained during the stakeholder meeting included:

- Peak hour period of each facility occurs between 10:00 AM and 3:00 PM
- Weekends for both facilities are busier than the weekdays
- Both facilities advise patrons to cross at Van Buren Street if traveling between facilities
- Currently, very few, if any of patrons use both facilities the same day
- Science Center visitors age range from 10-Adulthood
- Children’s Museum of Phoenix patrons normally range in age from 0-10 years old
- Both facilities are open to more interaction between the two facilities

VII. Gaps in Vehicular Traffic on 7th Street near Monroe Street

The minimum safe gap in traffic has been determined through the procedures and data contained within the Institute of Transportation Engineer’s (ITE) *Manual of Transportation Engineering Studies*. This document provides the following equation to calculate the safe gap in traffic:

$$G = \frac{W}{S} + (N - 1) H + R$$

where

- G = minimum safe gap in traffic, seconds
- W = crossing distance or width of roadway, feet
- S = walking speed, ft/sec
- N = predominant number of row (group size)
- H = time headway between rows, seconds
- R = pedestrian startup time, seconds

From the pedestrian data described in **Section IV** for the intersection of 7th Street and Monroe Street, the 85th percentile group size is 2 pedestrians.

Commonly assumed values for *H* and *R* are 2 and 3 seconds respectively. Based on the 2009 edition of the *Manual on Uniform Traffic Control Devices*, the walking speed, *W*, of the pedestrian is 3.5 feet per second and the distance to cross 7th Street at Monroe Street is 87 feet. Therefore, the minimum safe gap in traffic to cross 7th Street at Monroe Street is calculated to be 30 seconds.

Baker measured gaps in vehicular traffic on 7th Street at the Monroe Street midblock crosswalk on Thursday, April 5th, 2012. The gaps were measured between 10:00 AM and 1:30 PM. **Appendix D** contains the gap data collected. **Figure 3** summarizes the number of acceptable gaps in traffic on 7th Street at Monroe Street.

Gaps Measured on Thursday 4/5/2012

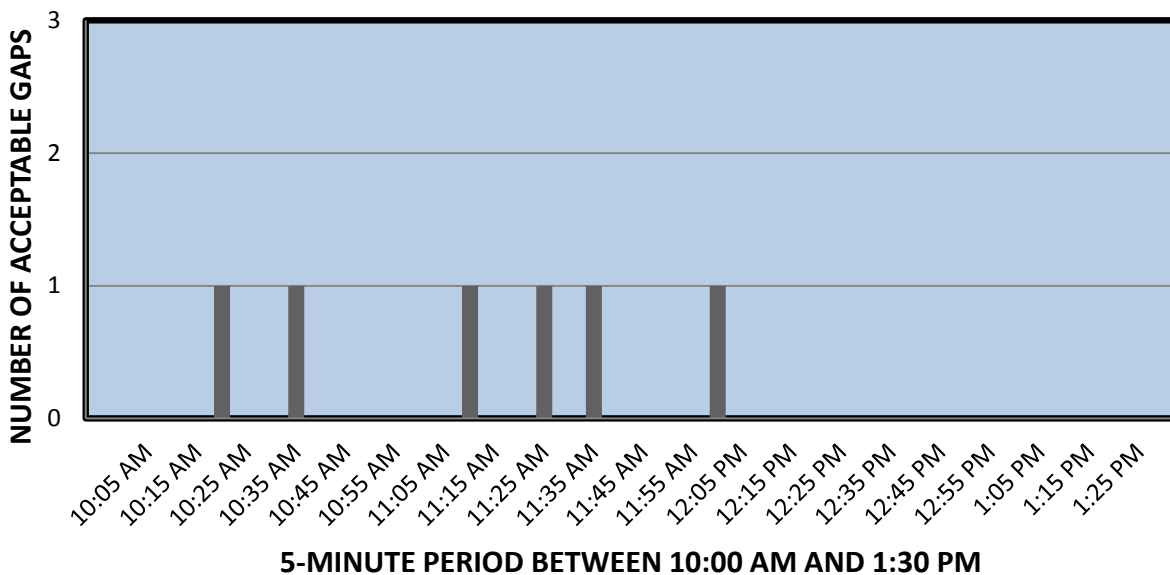


Figure 3: Summary of Gaps Measured on 7th Street at Monroe Street

The chart in **Figure 3** shows that there were only six acceptable gaps in traffic during the 3½ hours the gaps were measured. The six acceptable gaps occurred on average, every 20 minutes with no acceptable gaps after 12:00 PM.

While pedestrians have a midblock, marked crosswalk to cross 7th Street at Monroe Street, with the low frequency of acceptable gaps in traffic, pedestrians are not likely to use the marked midblock crosswalk at Monroe Street. Therefore, it is assumed that a large portion of pedestrians cross at the signalized intersection at Van Buren Street or Washington Street instead of the midblock crosswalk at Monroe Street.

APPENDIX A

TRAFFIC COUNTS SUMMARIES

Baker

Michael Baker Jr., Inc.
Phoenix, Arizona

City of Phoenix Traffic Count Summary

Study ID: 8679
Study Status: Posted

Location : On 7TH ST Between ROOSEVELT ST And VAN BUREN ST

Placed @ :

Study Start : N: Sep 22, 2010, S: Sep 22, 2010

Study Length : 72 hours

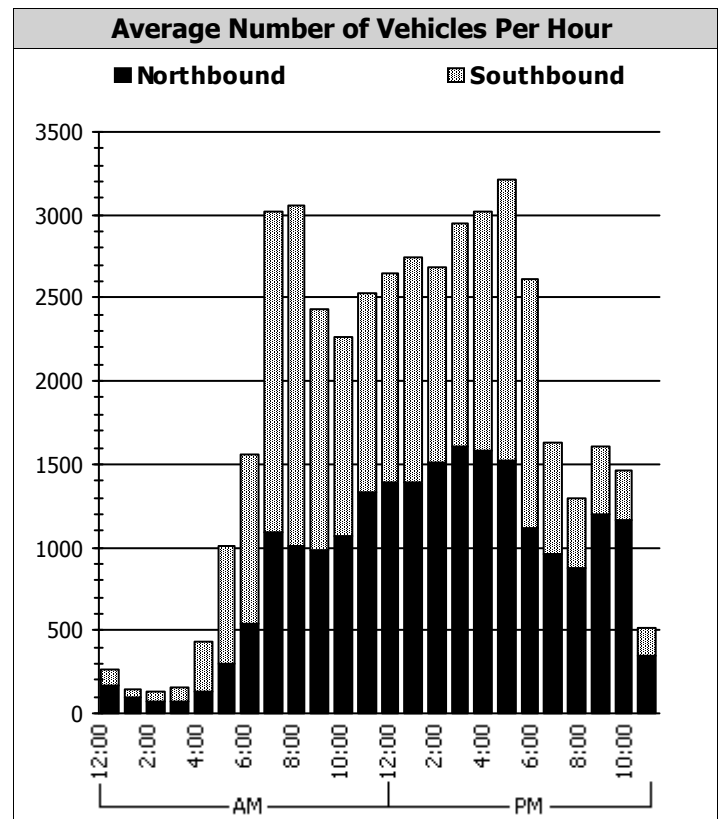
Neighborhood :

Project Status :

Average Amount of Traffic				
Begin	North	South	Total	Avg. Speed
12:00am	163.0	99.0	262.0	*
01:00	94.0	54.5	148.5	*
02:00	70.0	65.0	135.0	*
03:00	69.0	86.3	155.3	*
04:00	130.7	305.3	436.0	*
05:00	297.0	709.0	1006.0	*
06:00	533.5	1023.5	1557.0	*
07:00	1087.5	1928.0	3015.5	*
08:00	1011.5	2042.5	3054.0	*
09:00	984.0	1454.5	2438.5	*
10:00	1062.0	1204.0	2266.0	*
11:00	1332.5	1202.0	2534.5	*
12:00pm	1388.0	1259.0	2647.0	*
01:00	1386.0	1357.5	2743.5	*
02:00	1511.0	1169.5	2680.5	*
03:00	1605.5	1347.5	2953.0	*
04:00	1578.5	1442.0	3020.5	*
05:00	1520.5	1688.5	3209.0	*
06:00	1116.0	1500.5	2616.5	*
07:00	953.0	676.0	1629.0	*
08:00	880.0	411.5	1291.5	*
09:00	1202.0	407.5	1609.5	*
10:00	1162.0	300.5	1462.5	*
11:00	353.5	162.5	516.0	*
Daily Total	21490.7	21896.1	43386.8	

* No Speed Analysis Data Available for this Location

No Speed
Data Available



City of Phoenix Traffic Count Summary

Study ID: 8586
Study Status: Posted

Location : On 7TH ST Between VAN BUREN ST And WASHINGTON ST

Placed @ :

Study Start : N: Aug 30, 2010, S: Aug 30, 2010

Study Length : 72 hours

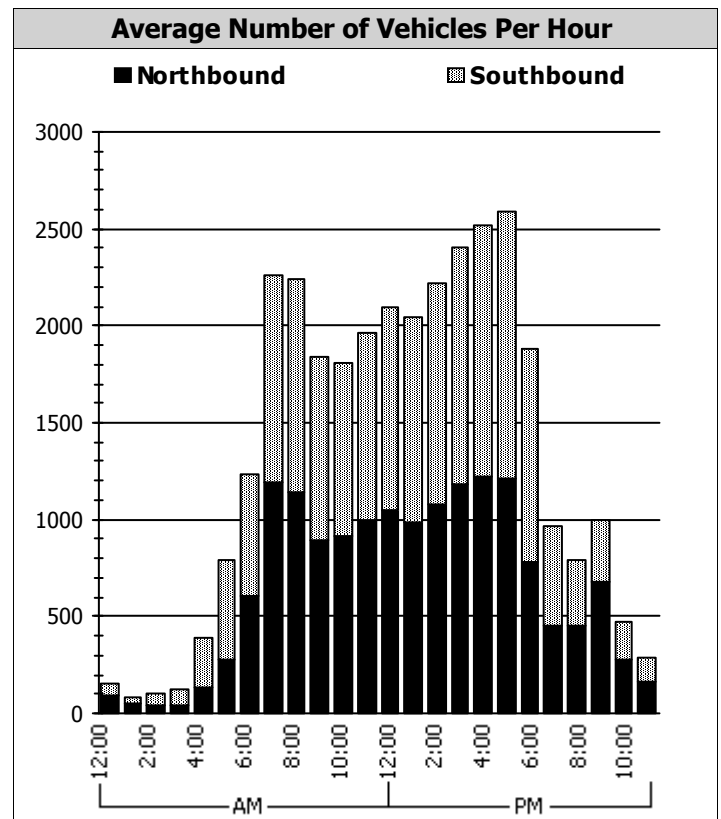
Neighborhood :

Project Status :

Average Amount of Traffic				
Begin	North	South	Total	Avg. Speed
12:00am	89.0	66.0	155.0	*
01:00	49.5	37.5	87.0	*
02:00	39.5	63.5	103.0	*
03:00	46.0	80.5	126.5	*
04:00	133.0	256.5	389.5	*
05:00	280.0	509.3	789.3	*
06:00	601.3	636.7	1238.0	*
07:00	1192.7	1068.0	2260.7	*
08:00	1141.0	1100.7	2241.7	*
09:00	895.3	947.0	1842.3	*
10:00	909.7	897.3	1807.0	*
11:00	995.0	964.3	1959.3	*
12:00pm	1049.7	1046.3	2096.0	*
01:00	988.3	1059.3	2047.6	*
02:00	1081.7	1133.3	2215.0	*
03:00	1186.0	1223.0	2409.0	*
04:00	1217.7	1303.0	2520.7	*
05:00	1210.7	1376.3	2587.0	*
06:00	776.3	1107.3	1883.6	*
07:00	453.3	517.0	970.3	*
08:00	451.0	343.0	794.0	*
09:00	681.7	318.3	1000.0	*
10:00	275.0	196.0	471.0	*
11:00	166.7	117.0	283.7	*
Daily Total	15910.1	16367.1	32277.2	

* No Speed Analysis Data Available for this Location

No Speed
Data Available



APPENDIX B

PEDESTRIAN VOLUMES COLLECTED
4/12/12 – 10:30 AM TO 1:30 PM

Baker

Michael Baker Jr., Inc.
Phoenix, Arizona

7th Street & Van Buren St							
Time	# in Group	Pedstrians	Bicyclists	Child held by adult	Leg Crossed	Direction of Travel	Comments
10:30	2	2			S	WB	
10:30	1	1			W	NB	
10:31	2	2			N	EB	
10:33	1	1			N	EB	
10:35	3	3			S	WB	
10:37	1	1			N	WB	
10:37	1	1			W	SB	
10:39	1	1			S	EB	
10:39	1		1		N	WB	
10:39	2	2			N	EB	
10:39	1		1		N	EB	
10:40	1	1			E	NB	
10:40	2	2			E	NB	
10:40	1	1			N	EB	
10:40	1		1		N	EB	
10:41	2	2			S	EB	
10:41	1	1			S	EB	
10:42	3	3			E	NB	
10:45	1	1			S	WB	
10:45	3	3			S	WB	
10:45	3	3			N	WB	
10:46	4	4			S	WB	
10:46	3	3			S	EB	
10:46	2	2			N	WB	
10:47	3	3			N	WB	
10:48	1	1			S	WB	
10:48	3	3			W	SB	
10:48	1	1			N	WB	
10:50	1	1			E	SB	
10:50	1		1		N	WB	
10:52	5	5			S	WB	
10:52	4	4			N	EB	

10:53	3	2		1	S	EB	
10:53	4	3		1	W	SB	
10:53	1	1			N	EB	
10:54	1		1		S	EB	
10:54	1		1		N	EB	
10:56	2	2			N	EB	
10:56	2	2			W	NB	
10:57	1	1			E	SB	
10:57	2	2			N	WB	
10:57	3	3			N	EB	
10:58	1	1			N	WB	
11:00	1	1			S	EB	
11:00	5	5			S	WB	
11:00	1	1			E	SB	
11:02	3	3			S	WB	
11:02	1	1			E	SB	
11:02	1	1			N	WB	
11:03	1	1			S	WB	
11:04	1	1			N	WB	
11:04	1	1			W	SB	
11:05	1	1			N	WB	
11:06	1	1			N	WB	
11:09	3	3			S	WB	
11:11	2	2			E	NB	
11:11	1	1			E	SB	
11:12	2	2			S	WB	
11:12	2	2			E	SB	
11:12	2	2			S	WB	
11:12	3	3			N	WB	
11:13	1	1			N	WB	
11:17	1		1		N	WB	
11:17	1	1			N	EB	
11:18	1	1			S	EB	
11:20	1	1			N	EB	WHEELCHAIR
11:22	4	4			N	WB	

11:22	1	1		N	EB	
11:23	1	1		E	SB	
11:23	1	1		N	EB	
11:24	1	1		S	WB	
11:25	3	2	1	S	WB	
11:25	3	3		N	WB	
11:26	2	2		E	SB	
11:26	2	2		W	NB	
11:27	1	1		E	SB	
11:27	6	6		W	NB	
11:27	4	4		N	EB	
11:27	4	4		N	WB	
11:28	1	1		S	WB	
11:28	1	1		S	WB	
11:28	3		3	N	WB	
11:28	4	4		W	SB	
11:29	1	1		W	SB	
11:29	1		1	W	SB	
11:30	1	1		S	EB	
11:30	7	7		N	WB	
11:30	1	1		N	EB	
11:31	1	1		S	WB	
11:32	1	1		S	WB	
11:33	1	1		S	EB	
11:34	2	2		S	WB	
11:35	1	1		N	WB	
11:37	3	3		N	WB	
11:37	1	1		W	SB	
11:38	2	2		N	WB	
11:39	2	2		W	SB	
11:40	1	1		N	EB	
11:41	1		1	E	NB	
11:41	1	1		S	EB	
11:42	2	2		E	SB	
11:42	2	2		N	WB	

Name: Van Buren/7th StreetDate: 4/12/12

Traffic Research & Analysis, Inc.

11:42	4	4		N	WB	
11:43	3	3		S	WB	
11:44	1		1	E	SB	
11:44	1		1	E	SB	
11:44	2		2	S	WB	
11:44	1		1	N	WB	
11:44	1	1		W	NB	
11:47	5	4	1	S	WB	
11:47	2	2		N	EB	
11:47	1	1		N	WB	
11:48	1		1	E	SB	
11:50	2	2		N	EB	
11:50	1	1		N	WB	
11:51	2	2		E	NB	
11:51	1	1		W	SB	
11:52	1	1		E	SB	
11:52	1	1		N	EB	
11:52	1		1	W	SB	
11:53	9	9		S	EB	
11:53	2	2		W	NB	
11:53	4	4		N	WB	
11:53	1	1		N	EB	
11:54	3	3		S	EB	
11:54	2	2		S	EB	
11:54	2	2		W	NB	
11:54	2	2		W	SB	
11:55	2	2		S	EB	
11:55	1	1		N	WB	
11:56	1	1		E	NB	
11:56	5	5		S	EB	
11:56	2	2		W	SB	
11:57	1		1	S	WB	
11:58	1	1		W	NB	
11:58	2	2		N	WB	
11:58	1	1		N	EB	

12:00	1		1	S	EB	
12:00	2	2		N	WB	
12:00	1	1		N	EB	
12:02	1	1		E	SB	
12:02	1	1		W	NB	
12:03	2	2		S	WB	
12:03	2	2		N	EB	
12:04	2	2		W	NB	
12:05	1	1		E	SB	
12:05	1	1		E	SB	
12:05	3	3		N	EB	
12:05	1	1		N	EB	
12:06	1	1		S	WB	
12:06	1	1		S	EB	
12:06	1	1		W	SB	
12:07	3	3		N	WB	
12:08	1		1	S	EB	
12:08	2	2		N	EB	
12:08	1	1		N	EB	
12:09	1	1		E	SB	
12:11	1		1	E	NB	
12:11	1	1		S	WB	
12:11	1	1		W	NB	
12:12	1	1		S	WB	
12:12	3	3		N	WB	
12:12	1	1		N	EB	
12:14	1	1		S	EB	
12:14	1		1	N	EB	
12:14	1	1		N	WB	
12:17	1	1		S	WB	
12:17	1	1		N	EB	
12:18	2	2		S	EB	
12:18	1	1		N	EB	
12:19	1		1	W	NB	
12:20	1		1	S	EB	

12:20	1		1	N	EB	
12:21	2	2		S	EB	
12:22	2	2		N	WB	
12:22	1	1		N	EB	
12:23	2	2		W	NB	
12:23	1	1		N	EB	
12:24	1	1		E	NB	
12:25	2	2		E	SB	
12:25	2	2		S	WB	
12:25	1	1		S	EB	
12:26	1	1		W	SB	
12:27	3	2	1	S	EB	
12:27	1	1		N	WB	
12:28	1	1		E	NB	
12:28	1	1		E	NB	
12:28	3	3		N	WB	
12:29	3	2	1	S	EB	
12:29	3	2	1	S	EB	
12:29	2	2		S	NB	
12:30	2	2		S	WB	
12:30	1	1		S	EB	
12:33	8	8		S	WB	
12:35	1	1		N	EB	
12:35	1		1	N	WB	
12:37	1	1		N	EB	
12:38	1	1		S	WB	
12:40	1	1		S	EB	
12:40	1	1		S	EB	
12:40	2	1	1	N	EB	
12:41	2	2		E	NB	
12:41	6	6		S	EB	
12:42	3	3		N	WB	
12:46	1	1		S	EB	
12:46	2		2	N	WB	
12:47	1	1		E	NB	

12:48	8	8		N	WB	
12:50	1	1		S	WB	
12:50	1	1		N	WB	
12:51	1		1	S	EB	
12:51	1	1		W	SB	
12:52	1	1		E	NB	
12:52	1	1		E	SB	
12:52	1	1		N	EB	
12:53	2	2		N	EB	
12:53	1	1		N	WB	
12:54	2	2		S	WB	
12:54	1	1		S	EB	
12:54	2	2		W	NB	
12:55	2	2		E	SB	
12:55	1	1		N	WB	
12:56	2	2		S	WB	
12:57	2	2		N	WB	
12:57	1	1		N	EB	
12:58	2	2		S	EB	WHEELCHAIR
12:59	1	1		E	NB	
12:59	5	5		N	WB	
12:59	1	1		W	NB	
13:02	3	3		W	NB	
13:04	2	2		S	WB	
13:05	1		1	S	WB	
13:05	1	1		E	NB	
13:06	1	1		W	SB	
13:06	1	1		W	NB	
13:08	1	1		W	NB	
13:08	1	1		W	SB	
13:09	1	1		W	SB	
13:10	1	1		S	EB	
13:10	2	2		N	WB	
13:13	2	2		N	WB	
13:15	1	1		S	WB	

Name: Van Buren/7th StreetDate: 4/12/12

Traffic Research & Analysis, Inc.

13:15	2	2		N	EB	
13:16	1	1		W	NB	
13:17	1	1		S	WB	
13:17	1	1		N	EB	
13:20	2	2		S	EB	
13:20	1	1		S	WB	
13:20	1	1		E	NB	
13:22	2	2		S	EB	
13:22	1	1		E	SB	
13:22	2	2		E	NB	
13:22	1	1		N	WB	
13:23	1	1		S	EB	
13:23	2	2		E	SB	
13:23	4	4		N	EB	
13:24	1	1		E	NB	
13:25	1	1		S	EB	
13:25	4	4		N	WB	
13:26	2	2		W	SB	
13:26	1	1		W	NB	
13:27	1		1	S	WB	
13:28	1	1		W	NB	
13:28	1	1		N	WB	
13:28	1	1		N	EB	
13:29	1	1		W	SB	

Name: Monroe/7th StreetDate: 4/12/12

Traffic Research & Analysis, Inc.

7th Street & Monroe St							
Time	# in Group	Pedstrians	Bicyclists	Child held by adult	Leg Crossed	Direction of Travel	Comments
10:33	1	1			S	WB	
10:34	1	1			W	NB	
10:39	3	3			W	SB	
10:45	2	2			S	EB	
10:50	1	1			W	NB	
10:52	3	3			W	SB	
10:53	2	2			S	WB	
10:53	1	1			W	SB	
11:05	1	1			W	SB	
11:10	1	1			W	SB	
11:27	1	1			W	SB	
11:33	1	1			W	SB	
11:43	2	2			W	SB	
11:46	1	1			W	NB	
11:47	1		1		W	NB	
11:50	2	2			W	SB	
11:50	1		1		W	SB	
11:55	1		1		S	EB	
11:57	1	1			W	SB	
12:03	1	1			W	NB	
12:05	2	2			W	NB	
12:09	1	1			W	SB	
12:15	1	1			W	SB	
12:16	1	1			W	SB	
12:21	1		1		W	NB	
12:24	2	2			W	NB	
12:27	1	1			S	WB	
12:30	2	2			S	WB	Baby in carriage
12:34	1	1			W	NB	
12:40	1	1			W	SB	
12:41	1	1			W	SB	
12:41	1	1			W	NB	

Name: Monroe/7th Street

Date: 4/12/12

Traffic Research & Analysis, Inc.

12:41	5	5			W	NB	
12:55	1	1			W	SB	
13:08	1	1			W	SB	
13:13	1	1			S	EB	
13:25	1	1			W	NB	

APPENDIX C

SEGMENT COLLISION DATA SUMMARY

Baker

Michael Baker Jr., Inc.
Phoenix, Arizona



City of Phoenix
Street Transportation Department
Safety & Neighborhood Traffic Section
Segment Collision Data Summary

Location: 7th St; Van Buren St - Washington St

Study Period: 2008 - 2010

#	Date	Time	Light	Collision Type	Intersection (Xn)	Dir./Dist. from Xn	Vehicle 1			Vehicle 2			Injury Severity	Comments
							Dir of Travel	Action	Violation	Dir of Travel	Action	Violation		
1	2/13/2008	2:51 PM	Light	Sideswipe	Monroe St	N-24'	N	Changing Lanes	Inattention	N	Stopped	None	None	
2	2/22/2008	2:04 PM	Light	Rear End	Monroe St	S-220'	S	Straight	Inattention	S	Stopped	None	None	
3	6/19/2008	12:15 PM	Light	Sideswipe	Washington St	N-225'	S	Changing Lanes	Other	S	Straight	None	None	
4	12/10/2008	6:14 PM	Dark	Sideswipe	Washington St	N-220'	S	Changing Lanes	Unsafe Lane Change	S	Straight	None	None	
5	2/10/2009	7:44 PM	Dark	Bike	Monroe St	S-15'	E	Other	Other	N	Straight	Other	Serious	Veh1 - Bike
6	2/25/2009	8:56 PM	Dark	Rear End	Washington St	N-151'	S	Straight	Inattention	S	Stopped	None	Possible	
7	3/11/2009	8:56 AM	Light	Sideswipe	Monroe St	0'	S	Straight	Other	S	Changing Lanes	Other	None	
8	7/21/2009	5:15 PM	Light	Sideswipe	Van Buren St	S-204'	N	Straight	Unknown	N	Stopped	None	None	
9	8/27/2009	4:39 PM	Light	Angle	Monroe St	0'	W	Left Turn	Failed to Yield	N	Straight	None	None	
10	11/16/2009	12:27 PM	Light	Rear End	Monroe St	N-145'	S	Straight	Inattention	S	Stopped	None	None	

Notes:

Only crashes within the segment are included in this summary, crashes within 150' of the terminal intersections are NOT included.

Data Sources:

2008-2010 ADOT SDM Database

Year	Injury Severity			Collision Type				Vehicle 1 Violation					Total
	Fatals	Injuries	PDO	Angle	Bike	Rear End	Sideswipe	Failed to Yield	Inattention	Other	Unknown	Unsafe Lane Change	
2008	-	-	4	-	-	1	3	-	2	1	-	1	4
2009	-	2	4	1	1	2	2	1	2	2	1	-	6
2010	-	-	-	-	-	-	-	-	-	-	-	-	0
Annual Average	0.00	0.67	2.67	0.33	0.33	1.00	1.67	0.33	1.33	1.00	0.33	0.33	3.33



APPENDIX D

GAPS MEASURED

Baker

Michael Baker Jr., Inc.
Phoenix, Arizona

Data Collection: 7th Street between Van Buren St Washington St

Date: 4/5/2012

Time: 10:00 am - 1:30 pm

Time	Gap (sec)	Time	Gap (sec)	Time	Gap (sec)
10:11 AM	28.0	10:59 AM	17.3	12:04 PM	35.7
10:12 AM	14.7	11:01 AM	13.0	12:06 PM	14.8
10:13 AM	10.1	11:05 AM	17.0	12:12 PM	19.3
10:13 AM	15.7	11:05 AM	23.0	12:18 PM	14.4
10:16 AM	10.8	11:06 AM	11.0	12:19 PM	12.3
10:16 AM	27.9	11:06 AM	19.5	12:20 PM	20.7
10:17 AM	11.8	11:07 AM	12.4	12:22 PM	22.9
10:17 AM	18.8	11:10 AM	13.4	12:24 PM	12.5
10:18 AM	10.7	11:12 AM	33.5	12:26 PM	17.7
10:19 AM	10.5	11:14 AM	13.5	12:29 PM	17.1
10:20 AM	10.0	11:14 AM	13.3	12:31 PM	24.9
10:21 AM	25.3	11:18 AM	14.0	12:31 PM	21.1
10:22 AM	15.7	11:20 AM	19.3	12:38 PM	14.9
10:23 AM	40.8	11:26 AM	13.8	12:46 PM	17.4
10:24 AM	11.2	11:27 AM	31.4	12:49 PM	20.8
10:27 AM	13.8	11:28 AM	23.6	12:50 PM	16.8
10:28 AM	16.2	11:31 AM	12.8	12:51 PM	17.9
10:29 AM	14.2	11:33 AM	16.0	12:54 PM	13.1
10:32 AM	13.5	11:35 AM	35.4	1:00 AM	17.0
10:33 AM	24.9	11:37 AM	18.9	1:01 AM	23.0
10:34 AM	15.8	11:39 AM	28.4	1:03 AM	12.9
10:36 AM	20.8	11:46 AM	12.9	1:04 AM	19.5
10:39 AM	31.1	11:47 AM	12.9	1:06 AM	26.1
10:41 AM	10.8	11:48 AM	13.3	1:07 AM	22.7
10:43 AM	12.4	11:52 AM	16.0	1:09 AM	13.8
10:45 AM	12.7	11:53 AM	12.2	1:09 AM	19.1
10:47 AM	16.6	11:55 AM	14.8	1:11 AM	13.4
10:49 AM	12.2	11:58 AM	17.5	1:16 AM	23.8
10:51 AM	24.7	11:59 AM	13.0	1:22 AM	15.2
10:54 AM	17.0	12:01 PM	13.5	1:23 AM	15.0
10:56 AM	17.8	12:02 PM	12.5		

Manual of Transportation Engineering Studies

H. Douglas Robertson, Ph.D., P.E., Editor
Joseph E. Hummer, Ph.D, P.E., Assistant Editor
Donna C. Nelson, Ph.D, P.E., Assistant Editor

Institute of Transportation Engineers

TABLE 13-3
Range Factors for 2-hour Predictions (percent)

Pedestrian Volume Level	Count Interval (min)			
	5	10	15	30
0-500	42	32	24	22
>500	24	25	23	19

Source: Mingo et al., 1988a, Table 2.

TABLE 13-4
Range Factors for 3-hour Predictions (percent)

Pedestrian Volume Level	Count Interval (min)			
	5	10	15	30
0-500	35	37	34	26
>500	32	27	24	22

Source: Mingo et al., 1988a, Table 3.

Walking speeds typically range from 2.5 to 6.5 feet per second. The *Manual on Uniform Traffic Control Devices* (MUTCD) assumes a normal walking speed to be 4.0 feet per second, but also suggests adjustments in warrant criteria when the "predominant" walking speed is less than 3.5 feet per second (USDOT, 1988). Analysts should conduct walking speed studies where a significant number of pedestrians walk at a slower or faster pace than 4.0 feet per second.

The study should be performed at the location of interest under the conditions of interest. One or more observers may be used based on how much the conditions vary over time and the number of classes of data desired. The observers should be positioned where they have a clear field of view and do not distract passing pedestrians. Observers mark a measured distance along the path traveled by the pedestrians and then simply time individual pedestrians through the speed trap. A sample of 100 observations is generally adequate. Analyze the data by first calculating each individual average walking speed by dividing the trap distance by the observed time, then classifying the observed speeds, and finally plotting the cumulative percentage of observations by class. This will produce a cumulative speed curve from which values of various speed percentiles may be derived. The 15th percentile speed is a generally accepted value to use in timing signals for pedestrians (Kell, 1991).

GAP STUDIES

Purpose and Application

Gap studies refer to the determination of the number of available gaps in traffic passing a point that are of adequate length to permit pedestrians to cross. In this context a *gap* is defined as the time that elapses from when the rear of a vehicle passes a point on a roadway until the front of the next arriving vehicle (from either direction) passes the same point. Gaps are normally expressed in units of seconds.

Gap studies consist of measuring the predominant pedestrian group size, determining the length of a minimum adequate gap, measuring the gap sizes in the traffic stream, and determining the sufficiency of adequate gaps. The principal application of the study results is in analyzing roadway crossings by pedestrians to determine appropriate traffic controls and safety improvements. The results of gap studies are used in traffic signal warrant analyses and school crossing studies. In addition to the techniques described be-

TABLE 13-5
Range Factors for 4-hour Predictions (percent)

Pedestrian Volume Level	Count Interval (min)			
	5	10	15	30
0-750	34	30	29	26
>750	33	27	26	21

Source: Mingo et al., 1988a, Table 4.

low, the procedures for determining gap acceptance characteristics for drivers of vehicles entering or crossing roadways described in Chapter 5 may be applied to pedestrian gap acceptance studies.

Measuring Predominant Group Size

Pedestrians waiting to cross a roadway will generally arrange themselves in rows one behind the other. Group size is comprised of row width and number of rows. When the group starts to cross, they enter the roadway (step off the curb) with approximately 2 seconds of headway between rows. Since the factor of interest is the amount of time it takes the entire group to enter the crossing, it is only necessary to determine the predominant number of rows waiting to cross at the time crossings begin. Thus group size is represented by the number of rows entering the crossing. The width of the rows and the total number of pedestrians in the group are inconsequential.

Distinguishing distinct rows may be somewhat difficult at first. With some training and experience, however, observers manage easily. A sample of 30 to 50 groups is usually sufficient to establish the group size (i.e., number of rows per group). This measurement should be made during the time and under the conditions of interest for the gap study. One observer is required for each crossing point to be sampled. The crossing point for the heaviest direction of pedestrian flow should be the one sampled. The observer should be unobtrusively positioned perpendicular to the crossing and parallel to the roadway with a clear view of the crossing point.

The top portion of the field sheet shown in Figure 13-5 may be used to record the sampling of number of rows. Observe each group as they enter the crossing. Place a tick mark in the tally column corresponding to the number of rows in the group. Stragglers are not included. Groups will form naturally when gaps are inadequate to accommodate random arrivals. When the group sampling period is complete, count the tally marks and record the frequency of each corresponding group size in the total column. The sum of the total column will be the total number of groups sampled. Enter the cumulative totals for each group size in the cumulative column as shown in Figure 13-5. The 85th percentile group size is generally used to define the predominant number of rows. Therefore, in the computation column of the field sheet, multiply the number of groups by 0.85 to calculate the 85th percentile group size (i.e., number of rows). If desired, another percentile may be used. Enter the result in the space for the predominant number of rows, N . This value is used in the calculation of the minimum adequate gap.

In the example shown in Figure 13-5, a total of 38 groups of pedestrians were observed. The 85th percentile of this sample is 32.3, which corresponds to groups containing five rows. Appendix G contains a blank form like that shown in Figure 13-5 suitable for copying.

Determining the Minimum Adequate Gap

A minimum *adequate gap* is defined as the time (in seconds) for one or a group of pedestrians to perceive and react to the traffic situation and cross the roadway from a point of safety on one side to a point of safety on the other (Pline, 1992). This minimum safe

GAP STUDY FIELD SHEET

Group Size Survey Location EAST BLVD AT DILWORTH
 Date 7/23 Time: From 8:15 am TO 9:00 am
 Crossing Distance 48 ft Walking Speed 3.5 ft/sec

No. of Rows	Tally	Total	Cumulative
1	III	3	3
2	IIII IIII	9	12
3	IIII IIII I	11	23
4	IIII III	8	31
5	IIII	4	35
6	III	3	38
7			

$N = 0.85 \times 38 = 32.3$ or 5 rows $H = 2$ sec $R = 3$ sec

Minimum Acceptable Gap, $G' = W/S + (N-1)H + R = 25$ sec

Available Gap Survey Date 7/24
 Time: From 8:15 am To 9:00 am Duration 45 min

Gap (sec)	Tally	Total
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25	IIII	4
26	IIII IIII II	12
27	IIII I	6
28	IIII IIII	9
29	IIII	4
30	IIII	5
31		0
32	II	2
33		0
34	IIII	4
35	I	1
36	III	3
37		0
38	I	1
39		
40		

Discard gaps less than 25 sec

Total Adequate Gaps 51

Figure 13-5 Sample field sheet for a gap study.

crossing time (gap in traffic) is a function of crossing distance, walking speed, predominant number of rows in the group, time headway between rows, and the group startup time. This relationship is shown in the following equation:

$$G = \frac{W}{S} + (N - 1)H + R \quad (13-2)$$

where

- G = minimum safe gap in traffic, seconds
- W = crossing distance or width of roadway, feet
- S = walking speed, ft/sec
- N = predominant number of rows (group size)
- H = time headway between rows, seconds
- R = pedestrian startup time, seconds

Commonly assumed values for some of these variables include

- $S = 4.0$ or 3.5 ft/sec
- $H = 2$ sec
- $R = 3$ sec

From the data in Figure 13-5:

$$G = \frac{48}{3.5} + (5 - 1)2 + 3 = 24.7 \text{ sec}$$

The result is normally rounded to the nearest second. In this case, the minimum gap in traffic that would allow the safe crossing of the 85th percentile group size is 25 seconds. If the roadway to be crossed is divided such that the median provides a safe haven for the pedestrians crossing, a minimum adequate gap would be determined for each half of the crossing.

Measuring Gap Sizes

The next part of the field study is to measure the time lengths of the gaps in traffic. This may be done simply with a stopwatch and the bottom portion of the field sheet shown in Figure 13-5. Only the gaps that exceed the minimum adequate gap are of interest; therefore, it is not necessary to record every gap. The observer can develop a "feel" for gaps that are close to or exceed the minimum adequate gap by observing the distance between and speed of vehicles while measuring the gap time. With some experience, the observer will be able to capture the majority of adequate gaps.

Measured gaps are rounded to the nearest second. A tick mark is placed in the tally column corresponding to the measured gap size that equals or exceeds the minimum adequate gap. The tally marks are then totaled for each gap size. The sum of these totals is the number of gaps of sufficient length to accommodate the safe crossing of 85% of the pedestrian groups using the crossing at a day and time and under the conditions similar to those of the study. The example shown in Figure 13-5 indicates that a total of 51 adequate gaps were recorded.

Gaps may also be measured using electronic count boards or hand-held computers in place of the stopwatch and tally sheet. The observation procedure is essentially the same as described above. Internal clocks in the computer record the times. Observers push the appropriate buttons to record gaps in the traffic. The primary advantage with this technique is that computer software reduces the data, thus saving time.

To evaluate the study results, analysts compare the number of gaps equal to or exceeding the minimum adequate gap to the number of minutes the gap measurement study is conducted. The appropriate criteria are then applied to the result. The length of the study depends on the type of application for which the gap study results are being used. For example, warrant 3 in the *Manual on Uniform Traffic Control Devices* (MUTCD) for traffic signals requires that in addition to the stated minimum pedestrian volumes, there shall be fewer than 60 gaps per hour in the traffic stream of adequate length for pedestrians to cross during the same period when the pedestrian volume criterion is satisfied. Another MUTCD criterion states that a traffic signal may be warranted when the number of adequate gaps in the traffic stream when school children are crossing is less than the number of minutes in the same period (USDOT, 1988). If the analyst applied this criterion to the data shown in Figure 13-5, the signal would not be warranted since the number of adequate gaps (51) exceeded the number of minutes in the study (45).

PEDESTRIAN BEHAVIOR STUDIES

Research and development of pedestrian safety countermeasures and design considerations for pedestrian accommodations have prompted studies of observed pedestrian behavior. These studies provide an understanding of the needs of pedestrians and identify the human factors relationships that are critical to the mobility and safety of pedestrians. The studies may be grouped into three general categories: pedestrian/vehicle conflicts, understanding of and compliance with traffic control devices, and exhibited behavior studies. Each type is described briefly below, followed by a description of the generic procedure for conducting these types of studies.

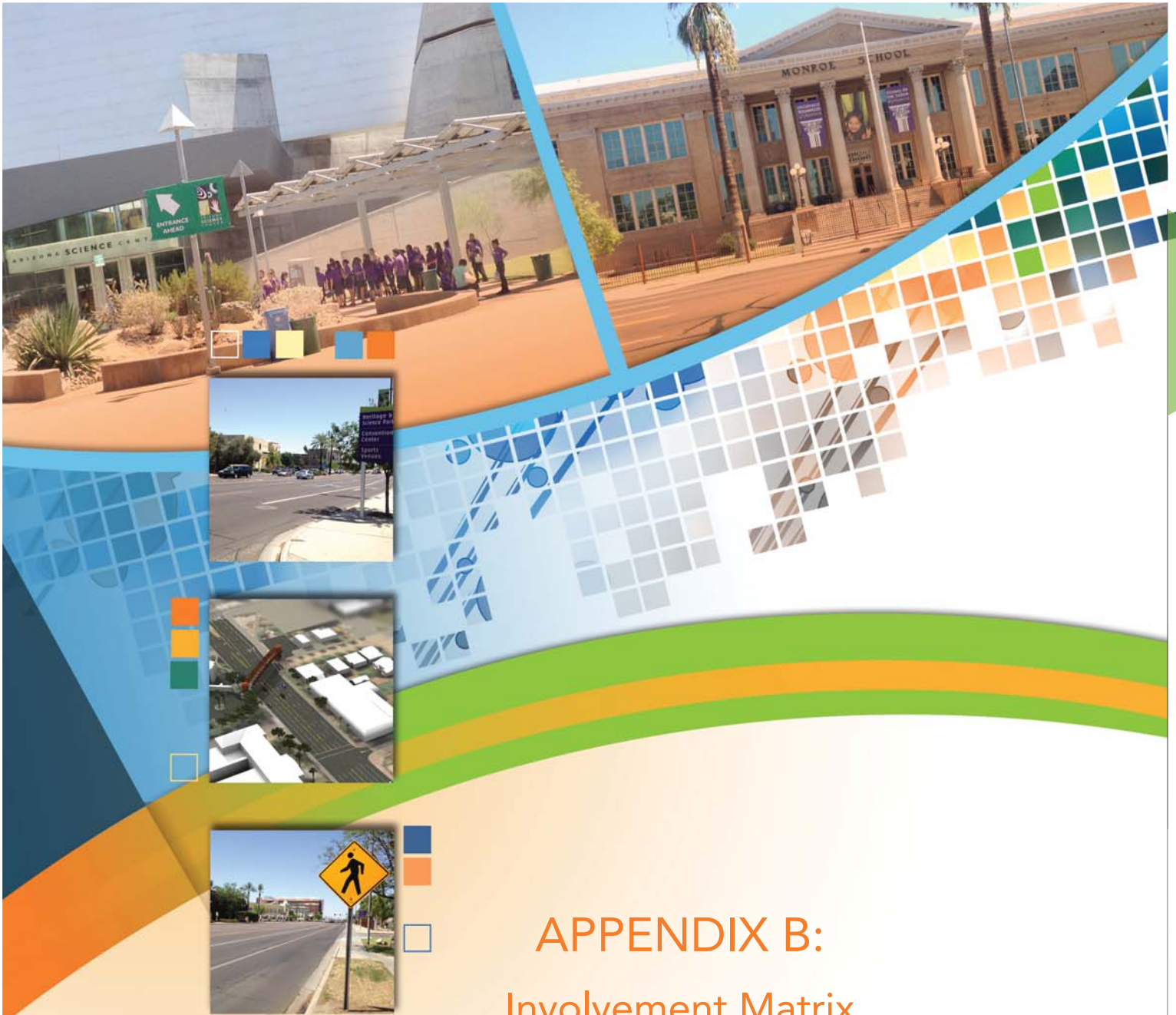
Types of Pedestrian Behavioral Studies

Pedestrian/Vehicle Conflicts

A pedestrian/vehicle conflict occurs when a driver and/or pedestrian has to take some action, such as a change in direction, speed, or both, in order to avoid a collision. Researchers have met with difficulty in establishing a relationship between pedestrian accidents and pedestrian/vehicle conflicts. The existence of a surrogate measure for accidents would allow potentially hazardous situations to be dealt with before accidents occurred. While some evidence of such a relationship has been uncovered, the complexity and relatively rare occurrence of pedestrian accidents has to date prevented a clear result. A recent study devised a method for developing pedestrian/vehicle accident prediction models (Davis et al., 1989). Details for applying this methodology are contained in a user manual available from the Federal Highway Administration (Mingo et al., 1988b). Despite the difficulty in predicting accidents with them, pedestrian/vehicle conflicts are a useful measure of relative differences among pedestrian safety alternatives. A number of studies have used conflicts as a measure of effectiveness for identifying pedestrian safety problems, evaluating traffic control devices, and comparing pedestrian accommodation designs (Robertson, 1977a; Robertson et al., 1977b; Robertson, 1983; Zegeer et al., 1984).

Understanding and Compliance

One simple way to determine pedestrians' understanding of traffic controls devices is to ask them. Engineers have often used surveys to identify pedestrian problems and evaluate alternative control devices (Robertson, 1977b). Appendix B provides guidelines



APPENDIX B: Involvement Matrix

City of Phoenix Bicycle & Pedestrian Bridge

Arizona Children's Museum - Arizona Science Center

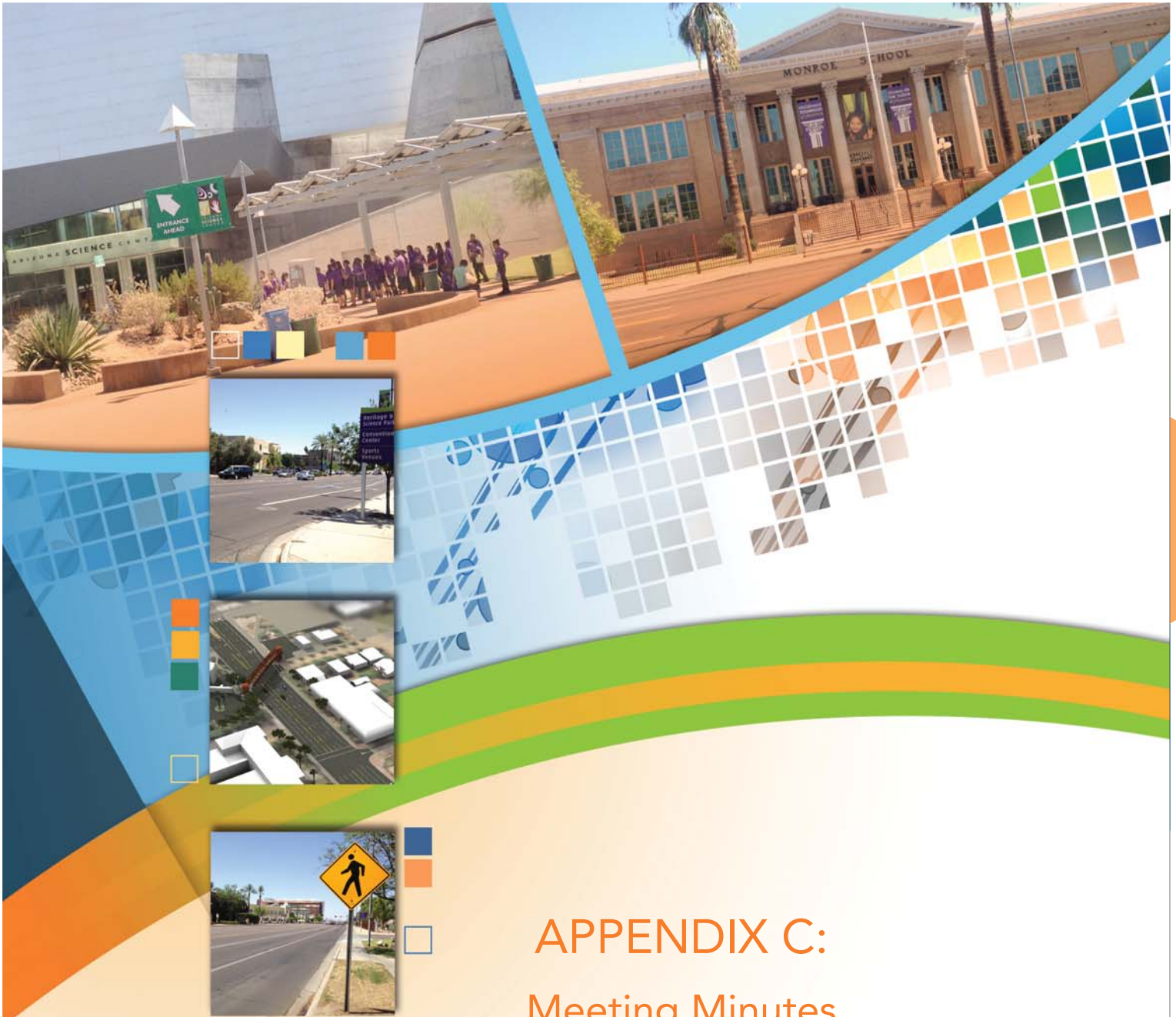
MAG Contract No. 477

Revised: January 25, 2013

INVOLVEMENT MATRIX

Name	Department/ Involvement	Direct	Email
Maricopa Associations of Governments			
Maureen DeCindis	MAG Project Manager	602-452-5073	MDeCindis@azmag.gov
City of Phoenix			
Gail Brinkmann, RLA	COP Streets, Project Manager	602-495-2073	Gail.brinkmann@phoenix.gov
Paul Driver, PE	COP Engineering Supervisor	602-261-8853	Paul.driver@phoenix.gov
Melody Moss, PE	COP Streets	602-262-4055	Melody.moss@phoenix.gov
TJ Penkoff	COP Parks	602-262-7490	Tj.penkoff@phoenix.gov
Tammy Parker	COP Parks		Tammy.parker@phoenix.gov
Steven Vital	COP City Council Assistant		Steven.vital@phoenix.gov
Jeffery Stapelton	COP Mayor's Office - Council Research Analyst		Jeff.stapleton@phoenix.gov
Homaira Parveen	COP Streets Env. Quality Specialist		Homaira.parveen@phoenix.gov
Michelle Dodds	COP Planning Dept - Historic Preservation Officer		Michelle.dodds@phoenix.gov
Katherine Coles	COP Planning & Development - Central City Village Planner		Katherine.coles@phoenix.gov
Chris Kowalsky	COP Streets - Civil Engineer II	602-495-3697	Chris.kowalsky@phoenix.gov
Olsson Associates			
Sean Wozny, PE	Project Manager	480-333-4326	swonzy@olssonassociates.com
Jeff Kratzke, RLA	Project Principal	480-333-4304	jkratzke@olssonassociates.com
Len Swartz, PE	Civil Engineer	480-333-4319	lswartz@olssonassociates.com
Michael Baker			
Natalie Carrick, PE	Traffic Engineer	602-308-8816	Ncarrick@mbakercorp.com
Children's Museum of Phoenix			
Deborah J. Gilpin	President / CEO	602-648-2740	dgilpin@childmusephx.org
Nancy Stice	Director of Exhibits	602-648-2741	nstice@childmusephx.org
Arizona Science Center			
Patrick Weeks	Vice President of Operations	602-716-2070	weeksp@azscience.org
The Renaissance Condominium HOA			
Stacia Fox	Property Manager	480-941-1077	stacia@apm-management.com
The Artisan Parkview Condominium HOA			
No Name	Artisan Parkview Community		artisan@wearevision.com
Sean Newby	Artisan Parkview Community Resident	623 523 7947	seannewby@gmail.com
Janet Klein	Artisan Parkview Community Resident		zackmaxklein@gmail.com
Larry Arrey	Artisan Parkview Community Resident		larry.arrey@cox.net

James Galbraith	Artisan Parkview Community Resident	480 269 8880	James.galbraith@gmail.com
Prasad Bobba	Artisan Parkview Community Resident		prasadxbobba@gmail.com
Camden Copper Square			
Kirsten Jenkins	Camden Copper Square Manager	866-637-2303	kjenkins@camdenliving.com
Arizona State University Downtown Campus			
Dominique LaRoche	Director, Facility Manager Downtown Campus	602 496 1506	Dominique.Laroche@asu.edu
Phoenix Community Alliance			
Don Keuth	Phx Community Alliance - President	602 254-7477 x. 23	don@phoenixcommunityalliance.com
Downtown Phoenix Partnership			
David Roderique	Downtown Phoenix Partnership, President & CEO	602 254-8696	droderique@downtownphx.org



APPENDIX C: Meeting Minutes

Children's & Science Museum Pedestrian Bridge Kick-off Meeting

Meeting Minutes

	Overnight
	Regular Mail
	Hand Delivery
X	E-Mail

TO:	Gail Brinkmann, COP Streets and Transportation Department, PM
FROM:	Sean Wozny Olsson Associates
RE:	AZ Children's & Science Center Pedestrian Bridge
DATE:	March 22, 2012
PROJECT #:	012-0608
LOCATION:	City of Phoenix 1034 E. Madison Street, Gecko Conf. Rm

NOTES:

The purpose of this meeting meet with core team and the Agency Stakeholders to formally begin the project assessment. The team provided a short project background and overview, went over the scope of the project assessment and provided an updated project schedule. Please see the attached Sign-in sheet for a list of the meeting attendees.

1. Introductions:

The meeting began with everyone introducing themselves and their role with the project.

2. Design Team Organization / Primary Responsibilities

The design team consists of the following members:

Sean Wozny, PE, Olsson Associates, Project Manager.
Jeff Kratzke, RLA, Olsson Associates, Project Principal.
Len Swartz, PE, Olsson Associates, Civil Engineer.
Natalie Carrick, PE, Baker, Project Traffic Engineer.

The Agency Stakeholders:

Gail Brinkmann, City of Phoenix Streets and Transportation Department, Project Manager.
Maureen DeCindis, MAG, Project Manager.
Paul Driver, City of Phoenix Streets and Transportation Department
Melody Moss, City of Phoenix
Chris Kowalsky, City of Phoenix Streets and Transportation Department

3. Project Overview

The project area is located in the City of Phoenix Downtown area focusing on the Children's Museum and the Science Museum. The vicinity area includes 7th Street from Washington to Van Buren Street. The end goal beyond this project assessment is to provide a safe crossing of 7th Street within this corridor.

Maureen DeCindis, MAG, asked if any arts funding was available for the project as there might be an opportunity for artist interpretation for an at grade crossing playing off the Children's Museum proximity to the crossing. Gail Brinkmann, COP Street PM, said art funding is not part of the assessment, but a grant could fund art into the future project.

4. Project Scope

The goal is to obtain a project analysis study for a bicycle and pedestrian bridge across 7th Street linking Arizona Children's Museum to Arizona Science Center; obtain preliminary engineering including 15% design, cost estimate; and obtain preliminary assessments including utility, right of way and environmental.

The project analysis shall study three proposed crossing alternatives for the project area:

1. Grade Separation Bridge crossing of 7th Street
2. Below Grade Separation crossing of 7th Street
3. Mid Block at Grade crossing of 7th Street

Chris Kowalsky, City of Phoenix Streets, reiterated that the project assessment document needs to really focus and evaluate the bridge option as Vice Mayor / Councilman Johnson has expressed. Maureen added that the project does not have and will not have Federal Funding.

Maureen reminded the team that both the Children's Museum and the Rosson House are Historic Buildings and the bridge alignment location will need to look at areas that do not block the building. The right of way is tight and will need to look at the bridge landing and ADA access. Paul added that the bridge should look at an elevator since the ROW is a constraint. The bridge cost should include maintenance costs and the elevator cost should be evaluated with the cost of ROW acquisition. The elevator option will need to consider the number of passengers as classroom sizes are around 30 children and they need to be accompanied by a teacher.

Maureen also added that the bridge should be modern and fun and not try and match the historic buildings.

Chris added that the bridge alignment could have a landing south of the Children's Museum driveway and look at tying the landing west of 7th street into the existing sidewalk along side of the Rossen House. Providing a shaded corridor into the Historic Heritage Square area.

The team also added the ability to utilize the painted taper lane along the west side of 7th Street for the bridge alignment landing. This is striped solid from Monroe Street for approximately 125 ft and then is dashed for a right turn lane onto Adams Street. The right turn lane provided for Adams Street is approximately 225 ft. The team should look at the required right hand storage for Adams Street as some of this lane could be used for the bridge landing since the Rossen House and Right of Way is close to 7th Street.

Involvement Matrix

Olsson shall begin to assemble a contact list of key project stakeholders. This development of this list will require input from the Agency Stakeholders. Please email me initial contacts and as the project moves forward we will distribute an involvement matrix to the team to insure we have the current Public Stakeholders as well as the Agency Stakeholders that need to be involved with this project.

Gail said we need to include the adjacent owner's in the project stakeholder meeting.

List of Adjacent Stakeholders:

Neighborhood representatives, adjacent residential and commercial property owners, ASU, Heritage and Science Park, Children's Museum, Renaissance Park Condominium Association, Artisan Parkview Condominium Association and pedestrian/bicycle area users.

Data Analysis

Gail will coordinate the Aerial, Utility and Right of Way Mapping information at the City of Phoenix for the team.

Traffic Analysis

Natalie Carrick, Baker, will be conducting the traffic analysis for the project area. Maureen said it would be critical to get the traffic counts while the elementary schools were in session. The majority of elementary school districts have had or are currently on spring break. The majority of school districts within the Phoenix area end the school year in the last week of May. We would like to set up a meeting with the Children's Museum and Science Center the week of March 26-30, to ask questions in regards to the operations between the two Museums.

- Daily Operations
- Cross traffic between the two Museums
- School Field Trips
- Current Route
- Problems / Issues / Concerns

Paul Driver, City of Phoenix, said the City of Phoenix has good traffic count information for 7th Street, but does not have any count information for Monroe. The City has gaps with all the street lights within the 7th Street corridor between Washington and Van Buren Street. A HAWK signal has been suggested, but pretty sure the distances between the existing lights will not permit. The left turn onto Washington Street from 7th Street does create traffic back up onto 7th Street past Monroe. Paul said Kerry Wilcoxon, City of Phoenix Traffic, would be a good place for Natalie to start in regards to the City traffic data.

Action Items

- Natalie to coordinate and set up a meeting with the Children's Museum and the Science center to discuss traffic and circulation topics prior to starting the traffic data collection.
- Sean to start to develop the initial project involvement matrix with the key project stakeholders. Gail will help provide contact information.
- Gail to coordinate to obtain aerial, utility and Right of Way mapping.

- Stakeholder Meeting Target Dates - the team needs to look at the date for the first stakeholder meeting to set up the location, date, time and invitation to stakeholders.
- Natalie to schedule the Traffic Date Collection work.

**Children's & Science Museum Pedestrian Bridge
Coordination Meeting**

Meeting Minutes

	Overnight
	Regular Mail
	Hand Delivery
X	E-Mail

TO:	Gail Brinkmann, COP Streets and Transportation Department, PM
FROM:	Sean Wozny Olsson Associates
RE:	Children's Museum & Science Center Pedestrian Bridge
DATE:	March 27, 2012
PROJECT #:	012-0608
LOCATION:	Children's Museum of Phoenix Conference Room

NOTES:

The purpose of this meeting was to meet with the Children's Museum of Phoenix and Arizona Science Center representatives to introduce and discuss the project. Natalie Carrick, Traffic Engineer with Baker, also wanted to discuss the approach for the traffic data collection and analysis.

1. Introductions:

The meeting began with everyone introducing themselves and their role with the project.

- Gail Brinkmann, City of Phoenix Project Manager
- Maureen DeCindis, MAG Project Manager (could not attend meeting)
- Debbie Gilpin, Children's Museum Director of Exhibitions
- Nancy Stice, Children's Museum Director of Exhibitions
- Patrick Weeks, Arizona Science Center VP of Operations
- Natalie Carrick, Traffic Engineer - Michael Baker
- Sean Wozny, Project Manager - Olsson Associates

2. Project Overview:

The project area is located in the City of Phoenix Downtown area focusing on the Children's Museum and the Science Museum. The vicinity area includes 7th Street from Washington to Van Buren Street. The end goal beyond this project assessment is to provide a safe crossing of 7th Street within this corridor.

The project assessment report will present three concept alternatives for the crossing of 7th Street:

1. Grade Separation Bridge crossing of 7th Street
2. Below Grade Separation crossing of 7th Street
3. Mid Block at Grade crossing of 7th Street

3. Obtain Pedestrian Information:

Natalie began with the following questions regarding operations, visitor use and pedestrian movement between the Children's Museum and Science Center.

What are the daily operations related to visitors that travel between the Children's Museum and the Science Center?

The Children's Museum and Science Center tend to have a visitor population overlap between kindergarten and 3rd grade, but the Children's Museum's target age range is between zero and ten years which is typically younger than the Science Center visitor.

The Children's Museum and the Science Center do not currently share memberships between facilities. Both facilities do see families that support both institutions, but the current condition of the economy coupled with the increased opportunities to capture entertainment dollars has seen families choosing one membership between the two facilities. Patrick said they typically see a lot of families changing memberships between the two museums each year. Both facilities have had dialog in regards to membership exchanges on certain weekends to allow members of one museum the opportunity to visit and experience the other facility.

People typically want the easiest, most direct route to get from A to B. The Science Center supports joint use opportunities between the two facilities and would like to see safer more efficient options for crossing 7th Street.

The Children's Museum does support cross membership opportunities with the Science Center, however does not see the need to funnel people back and forth between the two facilities. The Children's Museum does acknowledge the existing non-signalized crossing of 7th Street at Monroe is very unsafe and would like to see a signalized or HAWK type device installed.

What are the admission rates for the Museums?

Admission to the Children's Museum for non members is \$11.00, Seniors \$10.00. Children under the age of 1 are free.

Admission to the Arizona Science Center for Adults is \$14.00, Seniors \$12.00 and Children (3-7) \$11.00. Traveling exhibitions include an up-charge ranging from \$3 to \$11 dollars. IMAX 2D, \$8.00, IMAX 3D \$9.00, Planetarium \$8.00 and Sky cycle \$5.00.

How many people (children and chaperones/teachers) are in a typical group?

A School Field Trip is typically 30 to 90 students per visit. The museums do host multiple field trips with several schools during the same day. Usually a teacher has a couple of aids or other teachers, but most of the teachers are responsible for their classroom which is typically 30 students.

What time of day is most congested with visitors crossing between facilities?

Patrick spoke about mid-mornings to early afternoons being a higher usage time for a parent with smaller children in strollers. Families with children visit the museums from 12pm to 3pm on the weekends pretty consistently.

What day has the most visitors crossing between facilities?

Saturday and Sundays tend to be busier days by the General Public for both museums. The Children's Museum sees a higher age range on the weekends.

Is there a path you currently advise visitors to take between the two facilities?

Patrick spoke about how he directs people to the 7th Street and Van Buren Street signalized intersection from the Science Center. He directs people to the main streets because it is easy in regards to directions and it is a signalized crossing which is safer than the current non-signalized mid block crossing at 7th Street and Monroe.

The Children's museum has perimeter fencing along the 7th street frontage with a pedestrian gate located approximately 140 ft from the Van Buren Street & 7th Street intersection.

Are there any events other than school field trips to the Children's Museum or Science Center that cross between the two facilities?

Heritage Square does have weekend events and festivals throughout the year. Sporting events at Chase Field and the US Airways Arena do generate higher traffic and pedestrian volumes. The Children's Museum experiences parking lot issues with non visitors parking in the museum parking lot to attend sporting or downtown events. The City of Phoenix will not allow the Children's Museum to charge and collect revenue for event parking within the museum parking lot. The Children's Museum locks the museum parking lot at the close of business with gates at the driveway entrances, but people drive through the turf area to get out of the lot during afterhours.

Have you noticed any problems related to people crossing or have you received any complaints?

Field Trips: The Children's Museum and Arizona Science Center do not see much shared trip destination use between buildings during school field trips. The schools logistically can only handle one location per day field trip. The spring time is the busier season for field trips for both facilities. Typically they see 50 buses on a Friday, this Friday the Children's Museum has 37 buses scheduled which is considered to be medium this time of year. Even summer camps do one museum in a day trip.

Project Examples

Debbie provided several examples of bridges from Children Museums she researched online. Examples included the Children's Museum in Orlando, Indianapolis, and Las Vegas. Peter added the St Louis Science Center has a bridge crossing the US 40 highway.

Traffic Data Collection

Based on the discussion and input from both the Children's Museum and Science Center the following day and times were established for the traffic data collection:

Middle of the day from 10AM to 3PM during the month of March.

Next Steps

Natalie will be scheduling the traffic data collection effort to occur in late March early April. She will also be coordinating with the City of Phoenix to acquire accident data information.

The project will also include two public meeting to introduce the project and develop input regarding the three crossing concept alternatives that will be included in the project assessment report.

Children's & Science Museum Pedestrian Bridge
Public Meeting No. 1

Meeting Minutes

	Overnight
	Regular Mail
	Hand Delivery
X	E-Mail

TO:	Gail Brinkmann, COP Streets and Transportation Department, PM
FROM:	Sean Wozny Olsson Associates
RE:	AZ Children's & Science Center Pedestrian Bridge
DATE:	July 19th, 2012
PROJECT #:	012-0608
LOCATION:	Heritage Square Lath House North Conference Room

NOTES:

The purpose of this meeting is to introduce the project assessment assignment, study area, and crossing concepts. Olsson provided four 30"x42" project boards with the following information:

- **Study Area Board** - Provided the Study Area along with Traffic Study information which included: Peak Hour Volumes for 7th Street, Pedestrian / Bicycle Volume, Collision Statistics
- **Overpass Board** - Provided six overpass configurations with bridge structure & ramp sections
- **Underpass Board** - Provided the underpass concept with sections and existing utility relocation
- **Multi-Stage Crossing Board** - Provided the multi-stage crossing ramp with existing crossing at 32nd Avenue & Van Buren Street

Introductions:

Gail Brinkmann, City of Phoenix Streets & Transportation Department PM, began the Public Meeting with a short introduction of the project and the design consultant.

Sean Wozny, Olsson Associates PM, introduced the design team which included:

- Len Swartz, Civil Engineer with Olsson Associates
- Natalie Carrick, Traffic Engineer with Baker

Sean provided a short introduction and background regarding the project assessment. The City of Phoenix was awarded a Transportation Grant through Maricopa Association of Governments (MAG) for a project assessment report to evaluate crossing options at 7th Street between Van Buren Street and Washington Street.

Olsson was asked by MAG and the COP to include the evaluation of three crossing options of 7th Street within the project assessment report.

Project Traffic Study:

The project assessment also includes a traffic study which provides analysis of the traffic information collected. Natalie collected the information and provided the Traffic Data Collection Report.

Sean spoke about the traffic data collected along 7th Street within the project area which included:

- The Average Daily Traffic Vehicle counts on 7th Street between Van Buren Street and Washington Street.
- Peak Hour pedestrian and bicycle counts at the intersections of 7th Street & Van Buren Street as well as 7th Street & Monroe Street.
- Collision Data for 7th Street between Van Buren Street and Washington Street for the last three years.
- Information on pedestrian activities from Children's Museum of Phoenix and Science Center Staff.
- Vehicle Gap information on 7th Street between Van Buren Street and Washington Street.

Overpass Concept:

Abutment & Bridge Alignment

The design team evaluated six bridge crossing alignments of 7th Street. The bridge alignment and abutment locations are limited due to lack of existing right of way, historic structures, and open space. The east abutment is located in an open area south of the Children's Museum parking lot driveway. The west abutment location is also limited by the existing Rosson House and existing utility infrastructure. The bridge crossing concept is located at the midpoint of 7th Street between Van Buren Street and Washington Street.

Ramp Layout

The AASHTO required height of bridge is approximately 18 ft (16'-6" Vehicular Clearance) which requires ramp connections on each end. The ramp layout evaluated a 10 ft wide ramp and a 5 ft wide ramp. The ramp options also evaluated the point of access to the ramps. The ideal access to the bridge ramps is along 7th Street from the east & west sidewalks within the City right of way. The options also looked at terminating the ramp along the west side into the Heritage Square area just south of the Lath House.

10 ft Wide Ramp East Side of 7th Street - Children's Museum of Phoenix

The 10 ft wide ramp along the west side of 7th Street utilizes a double switch back layout requiring a 158 ft length to meet ADA requirements. This ramp option utilizes a maximum allowable 8.33% slope along the ramp with a flat 10 ft landing pad every 30 ft of ramp. This ramp layout extends approximately 90 ft into the existing Children's Museum staff parking lot eliminating 10 to 12 staff parking spaces. Alignments No. 1 & 3.

5 ft Wide Ramp East Side of 7th Street - Children's Museum of Phoenix

The 5 ft wide ramp along the west side of 7th Street utilizes a quadruple switch back layout requiring 90 ft length to meet ADA requirements. This ramp utilizes a slope of 7.50% slope along the ramp with a flat 10 ft landing pad every 30 ft of ramp. This ramp layout would extend approximately 40 ft into the existing Children's Museum staff parking lot eliminating 4 to 5 staff parking spaces. The 5 ft wide ramp options are shown in Alignments 2, 4, 5 & 6.

10ft Wide Ramp West Side of 7th Street - Lath House

The west side ramp location has two options for a 10 ft wide ramp along the south frontage of the historic corner house (Alignment No. 1) and north frontage of the Lath House (Alignment No. 3).

5 ft Wide Ramp West Side of 7th Street - Lath House

The west side ramp location has four options for a 5 ft wide ramp:

- Alignment No. 2 - Terminating into Heritage Square between the Lath House and the Historic Corner House.
- Alignment No. 4 - Access from the west sidewalk along 7th Street along the north side of the bridge along the west side of the Lath House Building Frontage.
- Alignment No. 5 - Combination north and south ramp switch back ending into Heritage Square between the Lath House and the Historic Corner House.
- Alignment No. 6 - Access from the west sidewalk along 7th Street along the south side of the bridge and the west side of the Historic Corner House.

Underpass Concept:

The underpass layout requires a minimum 12 ft depth below the existing 7th Street which results in a below grade ramp length of 201 ft with maximum allowable 8.33% slope along the ramp requiring a flat 10 ft landing pad every 30ft of ramp. Raising 7th Street to decrease the depth of the underpass was evaluated, but deemed unfeasible due to existing driveway locations and the building frontages being so close along the east and west sides of 7th Street.

The underpass crossing was situated on the north side of the southern driveway along the Children's Museum frontage and the center point of the Lath House due to the ramp layout for the below grade access to the crossing.

This concept also showed the utilities within 7th Street and requires several utility relocations. A table with the utility owner and type of utility was shown on this concept board.

Mid Block Staged Crossing Concept:

7th Street currently is eight lanes with three lanes north bound, one dual turn lane and three lanes south bound plus one additional southbound right turn stack lane. Based on the 2009 Manual on Uniform Traffic Control Devices, the average walking speed of a pedestrian is 3.5 feet / second and the distance to cross 7th Street at the existing Monroe mid block ramp is 87 ft. This

results in a minimum safe gap of 30 seconds to cross 7th Street. As part of the traffic analysis, Natalie provided a Gap Measured Analysis as part of the traffic data collection report. A table was included on the concept board showing 6 acceptable gaps in traffic during 3 1/2 hours between 10:00am and 1:25pm on Thursday 4/5/2012.

The mid block ramp concept shows a multi-stage staggered crossing with a middle refuge island with 3 ft high iron fencing. The multi-stage staggered crossing is based on having pedestrians walk towards traffic within the refuge island.

Photos of an existing multi-stage staggered crossing of Van Buren Street between 31st Avenue and 33rd Avenue was also included on this board.

Open Discussion & Comments from the Public:

At this point the meeting was opened up to the public for comments and questions.

A question about a High-Intensity Activated Crosswalk (HAWK) Signal was brought up by the group. Natalie explained some of the criteria for HAWKs, specifically the 300' minimum distance to a signal. This was followed up with questions on what the distances actually are from Van Buren and Washington Street to the existing mid block painted crosswalk. The question on why the HAWK can't go "in the middle" was brought up. Natalie discussed some additional criteria to warrant a HAWK.

A question was asked by the group on why people cannot cross at the Van Buren or Washington street signalized crosswalks. To which the group discussed how people want the most direct route to get from point A to point B.

Nancy Stice, Children's Museum, asked the question if the traffic observation/data collection effort observed the final destinations of the pedestrians crossing 7th Street. Natalie said they did not ask or observe the end destination of the jaywalkers.

Patrick Weeks, Arizona Science Center, would like to strengthen the connection between the Children's Museum and supports co-use between the two facilities.

Donna Reiner, President of the Rosson House Heritage Square Foundation and Guild, was next to speak and provided the following comments regarding the three concepts:

- The overpass is "*horrendous*". It overwhelms the surrounding buildings.
- The underpass is not a good option in this area due to homeless and it's not child safe. The perception of safety is important. She expressed concern about the starting location and impact to surrounding structures. Some of the historic buildings on the west side could be damaged from construction activity.
- Donna likes the crosswalk the best and asked again why we can't squeeze in a HAWK type crossing signal.

Tammy Parker, City of Phoenix Parks and Recreation said the City has concerns about graffiti and maintenance on the bridge.

Tom Walsh, Rosson House Heritage Square Foundation and Guild, added that the project needs to be respectful of the area because it's a "cultural center". Impacts to the area are a concern.

The group had comments regarding the mid block staggered ramp crossing concept and how it shows the elimination of the right turn lane south of Monroe to Adams Street. Participants agreed they have seen accidents and stacking in this right turn lane.

Tom Walsh also added that blocking the right turn lane is a concern as the Heritage Square area utilizes the staking room for the right onto Adams which causes traffic backs up to Monroe during special events within Heritage Square.

Sean Wozny, Olsson Associates, said the mid block concept can look at preserving the right turn lane, however this lane is currently striped to not allow vehicular traffic and staking. The lane area that the mid block concept showed for removal followed the existing striped-out, non-lane area from Monroe to Adams Street.

Donna Reiner asked if the road could be narrowed at Van Buren to slow down traffic.

Tom Walsh thought the at grade crossing is a good option. There is some merit to the overpass but need to look at an elevator. Festivals and fencing due to alcohol use makes it difficult to take the ramp into the park.

Donna Reiner also added that the whole heritage park area is historic.

Patrick Weeks spoke about the underpass and how it only works if it terminates in a secured area, otherwise it turns into a public bathroom. The overpass is his favorite if it has an elevator and he prefers it to go further south. The mid block option is concerning due to the maze to get through and the preferred location would be at Adams. The goal is to make it easy for people. Councilmen Johnson would want to explore the safest and most direct route.

Donna Reiner also added that the project needs to be a landmark like lots of the other great bridges in town. A bridge project in this historic area needs to include the City Arts and Culture commission and incorporate an artist for design. Refer to 35th and Van Buren where there were artists involved with that project. In terms of advancing concept development the team should eliminate the underpass option at this point.

Tammy Parker asked where are people coming from and how does parking work with this?

Patrick Weeks added that kids need unobstructed access and the Mid block is too much of a liability.

Nancy Stice added that the bridge ramp configurations would take up considerable staff parking area south of the museum building. The museum cannot lose any more parking especially in the staff area. Likes a bridge concept with an elevator instead of ramps. A 10' path is too wide for the ramps and bicycle users should be crossing at the Van Buren or Washington Street signalized intersection.

Donna Reiner added that the elevators would need to be clear/see through for safety.

Patrick Weeks clear glass in the summer is too hot unless the elevators have air conditioning.

Tammy Parker asked what was the required bridge clearance? Sean answered 18 ft as per AASHTO.

Nancy Stice added that she was concerned that kids would be too focused on the front yard of the museum instead of watching for traffic for the at grade crossing option.

Patrick Weeks added that the liability drops to zero with the bridge. The safest, direct crossing involves a bridge from Adams Street to the Children's museum south driveway area.

Donna Reiner asked how many additional accidents would result due to the crossing?

Patrick Weeks also posed the question of how buses would interact with the at grade crossing.

Nancy Stice added that we need to plan for double wide and double length strollers. Can it terminate in the grass south of the Children's entrance? Can the drive be narrowed? During the day the drive is gated.

Donna Reiner added we also need to be careful with site visibility triangles through the elevator locations.

Patrick Weeks added the only solution with support is the bridge and the group does not view the mid block crossing to be safe.

Nancy Stice, Tom Walsh, and Donna Reiner all stated the preferred option is for a bridge with artist involvement utilizing elevators to minimize site impacts to both Heritage Square and the Children's Museum from the ramp platforms.

City of Phoenix Comments from Internal Staff prior to the Stakeholder I Meeting:

Chris Kowalsky, CEII, City of Phoenix Street Transportation Department, ph: 602-495-3697

Could alignment 5 be used but widened to the 10 foot ramp width. There is concern as well as not concealing the existing historic home on the N/W corner of 7th & Heritage Square behind the ramp. If we could activate the walkway behind the house such as shown in alignment 5 that would be more ideal. It's been requested as well to look at providing a circular stair at the base of each column as a second option if not wanting to use the accessible ramp.

Is there potential for the bridge to tie into the 2nd floor of the Children's Museum? This would skew the bridge more to the north on the east side. Also allowing additional points of access to better utilize it.

Michelle Dodds, AICP, Acting Historic Preservation Officer, Planning and Development Department, ph: 602-262-7468

Option 5 for the bridge options is preferred over other options (such as 1, 2 and 6) that impact the view of the historic home. As for tying into the actual museum structure, that may be a problem as it (Monroe School) has landmark designation. The SHPO also has an easement on the property and they may not be supportive due to impacts on the historic structure.

Sign In List

<i>name</i>	<i>organization/ responsibilities</i>	<i>Email</i>	<input checked="" type="checkbox"/>
Gail Brinkmann	City of Phoenix Streets Department	<i>Gail.brinkmann@phoenix.gov</i>	✓
Aubree Abril	Reporter with Downtown Devil	<i>alabril@asu.edu</i>	✓
Tom Walsh	Rosson House	<i>Walsh@rossonhousemuseum.org</i>	✓
Tammy Parker	City of Phoenix Parks	<i>Tammy.parker@phoenix.gov</i>	✓
TJ Penkoff	City of Phoenix Parks	<i>TJ.Penkoff@phoenix.gov</i>	✓
Patrick Weeks	Arizona Science Center	<i>weeksp@azscience.org</i>	✓
Nancy Stice	Children's Museum of Phoenix	<i>nstice@childmusephx.org</i>	✓
Mike Lafferty	Lafferty Development	<i>mike@laffertyco.com</i>	✓
William Valencia	ASU College of Public Programs	<i>William.valencia@asu.edu</i>	✓
Sean Wozny	Olsson Associates	<i>swozny@olssonassociates.com</i>	✓
Len Swartz	Olsson Associates	<i>lswartz@olssonassociates.com</i>	✓
Natalie Carrick	Michael Baker	<i>ncarrick@mbakercorp.com</i>	✓

Children's & Science Museum Pedestrian Bridge
Public Meeting No. 2

Meeting Minutes

	Overnight
	Regular Mail
	Hand Delivery
X	E-Mail

TO:	Gail Brinkmann, COP Streets and Transportation Department, PM
FROM:	Sean Wozny Olsson Associates
RE:	AZ Children's & Science Center Pedestrian Bridge
DATE:	October 25, 2012
PROJECT #:	012-0608
LOCATION:	Heritage Square Lath House North Conference Room

NOTES:

The purpose of this second public meeting was to present the refined concept alternatives based on the public meeting no. 1 comments and input. Olsson provided six 30"x42" project boards with the following information:

- **Study Area Board** - Provided the Study Area along with Traffic Study information which included: Peak Hour Volumes for 7th Street, Pedestrian / Bicycle Volume, Collision Statistics
- **Overpass Board** - Provided six overpass configurations with bridge structure & ramp sections
- **Underpass Board** - Provided the underpass concept with sections and existing utility relocation
- **Multi-Stage Crossing Board** - Provided the multi-stage crossing ramp with existing crossing at 32nd Avenue & Van Buren Street
- **Bridge Rendering Concept Board** - Provided a perspective and rendered view of the bridge overpass.
- **Multi-Stage Crossing Rendering Concept Board** - Provided a perspective and rendered view of the multi-stage crossing

Introductions:

Gail Brinkmann, City of Phoenix Streets & Transportation Department PM, began the Public Meeting with a short introduction of the project and the design consultant.

Sean Wozny, Olsson Associates PM, introduced the design team which included:

- Len Swartz, Civil Engineer with Olsson Associates
- Natalie Carrick, Traffic Engineer with Baker

Sean provided a short introduction and background regarding the project assessment. The City of Phoenix was awarded a Transportation Grant through Maricopa Association of Governments (MAG) for a project assessment report to evaluate crossing options at 7th Street between Van Buren Street and Washington Street.

Olsson was asked by MAG and the COP to include the evaluation of three crossing options of 7th Street within the project assessment report.

Sean provided a recap of the first public meeting which included the comments received from the first public meeting with the project team's responses.

Bridge Overpass Concept:

Comments from the first public meeting included:

Angled Bridge Alignment

The previous bridge concepts presented a straight bridge alignment from the area south of the Children's Museum driveway on 7th Street to the open Lath House landing area.

The refined bridge alignment incorporates an angled alignment from the area south of the Children's Museum driveway to the area between the Lath House and the historic corner house north of Adams Street.

Elevators and spiral staircases in lieu of the long ramps

The previous bridge concepts included several ramp configurations in which all layouts resulted in significant reduction of staff parking areas south of the Museum building. The State Historic Preservation Office also provided comments in regards to the ramp configurations blocking the view of the Children's Museum and the Lath House. Both the Heritage Square area and the Children's Museum (Monroe School) are within historic preservation zoning.

The refined bridge concept includes a spiral staircase and elevators instead of ramps.

Artistic Involvement for the Bridge Overpass

A bridge project in this historic area needs to include the City Arts and Culture commission and incorporate an artist for design.

The refined bridge concept included an artistic elements within the bridge design based off the recent accent fencing installation along the Children's Museum 7th Street frontage.

Underpass Concept:

The underpass concept was not further developed based on the following comments from the initial public meeting:

The underpass is not a good option in this area due to homeless and it's not child safe. The perception of safety is important.

Concern about the starting location and impact to surrounding structures. Some of the historic buildings on the west side could be damaged from construction activity.

The underpass only works if it terminates in a secured area, otherwise it turns into a public bathroom.

Concerns with maintenance and security, would require lockable gates with restricted access.

Mid Block Staged Crossing Concept:

Comments from the first public meeting included:

Pavement lane width reduction

The initial mid block staggered crossing looked at eliminating the western excess street lane that is currently striped out and turns into the right turn lane for Adams Street to cut down on the gap crossing time. The comment was made at the first public meeting that traffic turning right onto Adams Street to enter into Heritage Square backs up quite often during special events. The Pizzeria Bianco parking lot also causes this right hand turn lane to back up along 7th Street as well.

The refined concept maintains the additional western lane. The refuge area helps break up the gap crossing time as collected with the traffic analysis.

Shifting the mid block to the south

The initial mid block staggered crossing alignment was located on the north side of the Children's Museum south driveway on 7th Street. The west crossing from the refuge area lined up near the northern Lath House open landing area.

The refined concept shifts the mid block staggered crossing to the south locating the east ramp south of the Children's Museum driveway on 7th Street. The west crossing from the refuge area now lines up with the southern Lath House open landing area.

Open Discussion & Comments from the Public:

At this point the meeting was opened up to the public for comments and questions.

Patrick Weeks, Arizona Science Museum, added that he understands and supports council members vision to connect the facilities. The Arizona Science Center believes the at grade crossing is "not acceptable" due to safety concerns. The Arizona Science Center will only support the bridge.

Nancy Stice, Children's Museum of Phoenix, supports the Arizona Science Center comment and does not want children in a median in the middle of 7th Street. The bridge is the only safe option.

William Valencia, ASU College of Public Programs, Strategic Initiatives, added that the at grade crossing seemed "unattainable". What is the anticipated throughput? Sean answered that the goal is to connect the facilities. Patrick added that bringing two cultural institutions and a historic one together will create more traffic. Safety is the concern as well.

Mike Lafferty, Lafferty Development, asked if the bridge is bike friendly? Sean answered, bikes will likely go to the Van Buren or Washington signalized intersections because the elevator would require dismounting. Mike added a bike crossing of 7th Street is difficult. Why is the City looking at a crossing of 7th Street? Safety? Connection? Sean answered both.

Tom Walsh, Rosson House, currently tells users to go to Van Buren Street to cross 7th Street, but if there was a bridge he would direct people to cross 7th at the bridge. The historic society would need to be included if the project moves forward. The City has included Michelle Dodds, AICP, acting historic preservation officer as well as the State Historic Preservation Office, SHPO.

TJ Penkoff, City of Phoenix Parks, asked who owns and maintains. Gail answered the City would own and maintain the bridge.

William asked if there was data to equate to a pedestrian cost? The data collected is based on accident and traffic data. Tom added that pedestrian usage would increase with a bridge as this is the safest way to cross 7th Street connecting the two institutions.

Patrick asked what was the ballpark cost for the bridge. Gail answered \$7 Million based off of recent City of Phoenix bridge projects.

William asked what is the maintenance cost? He added that the exhibit on the left was an accident map. He asked if we had the data on the accident costs? Will the reduction in accidents and corresponded savings equal or offset the cost of a bridge.

Sean answered with the data collected was traffic data and accident data. Natalie spoke about the traffic data collected along 7th Street within the project area which included:

- The Average Daily Traffic Vehicle counts on 7th Street between Van Buren Street and Washington Street.
- Peak Hour pedestrian and bicycle counts at the intersections of 7th Street & Van Buren Street as well as 7th Street & Monroe Street.
- Collision Data for 7th Street between Van Buren Street and Washington Street for the last three years.
- Information on pedestrian activities from Children's Museum of Phoenix and Science Center Staff.
- Vehicle Gap information on 7th Street between Van Buren Street and Washington Street.

The accident data is collected and provided by ADOT and does not include the medical or lawsuit costs per accident.

William asked if ASU was involved? Gail answered yes, the City has monthly coordination meeting with the ASU and Dominique LaRoche, Director, Facility Manager of the ASU Downtown Campus was invited to both public meetings.

Nancy added that she appreciated the project team hearing the comments from the first public meeting and incorporating them into the revised concepts for the second public meeting.

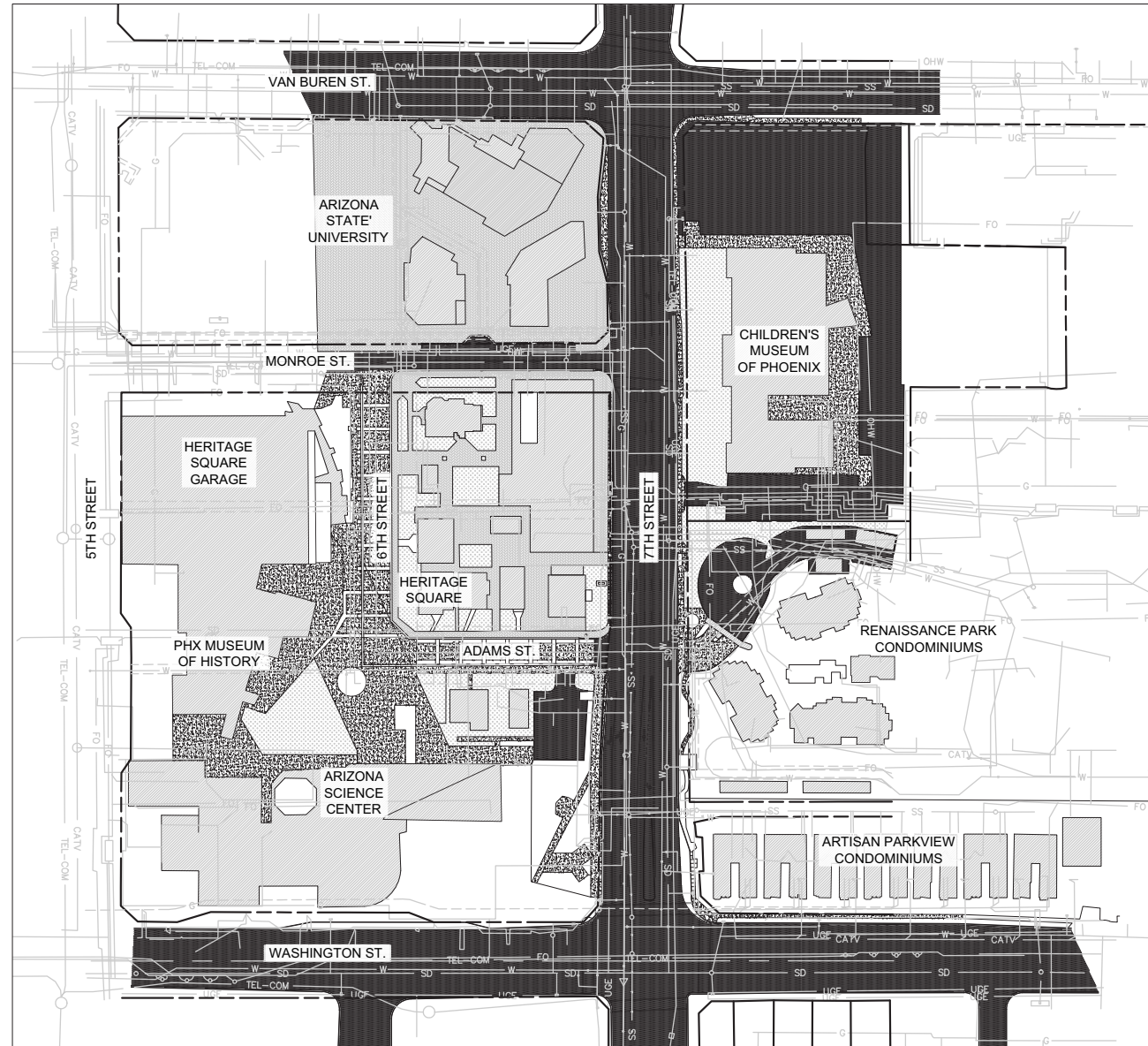
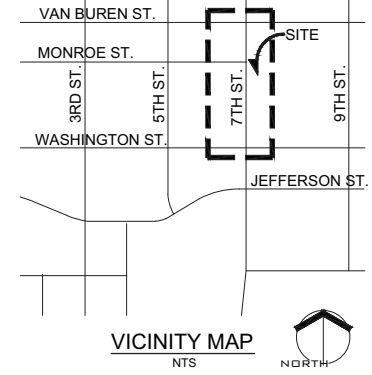
Sign In List

<i>name</i>	<i>organization/ responsibilities</i>	<i>Email</i>	<input checked="" type="checkbox"/>
Gail Brinkmann	City of Phoenix Streets Department	<i>Gail.brinkmann@phoenix.gov</i>	✓
Aubree Abril	Reporter with Downtown Devil	<i>alabril@asu.edu</i>	✓
Tom Walsh	Rosson House	<i>Walsh@rossonhousemuseum.org</i>	✓
Tammy Parker	City of Phoenix Parks	<i>Tammy.parker@phoenix.gov</i>	✓
TJ Penkoff	City of Phoenix Parks	<i>TJ.Penkoff@phoenix.gov</i>	✓
Patrick Weeks	Arizona Science Center	<i>weeksp@azscience.org</i>	✓
Nancy Stice	Children's Museum of Phoenix	<i>nstice@childmusephx.org</i>	✓
Mike Lafferty	Lafferty Development	<i>mike@laffertyco.com</i>	✓
William Valencia	ASU College of Public Programs	<i>William.valencia@asu.edu</i>	✓
Sean Wozny	Olsson Associates	<i>swozny@olssonassociates.com</i>	✓
Len Swartz	Olsson Associates	<i>lswartz@olssonassociates.com</i>	✓
Natalie Carrick	Michael Baker	<i>ncarrick@mbakercorp.com</i>	✓

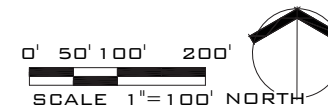


APPENDIX D: Preliminary Plans

CHILDREN'S MUSEUM OF PHOENIX & ARIZONA SCIENCE CENTER 15% CONCEPTUAL DESIGN PLANS BICYCLE & PEDESTRIAN BRIDGE PROJECT ASSESSMENT 7TH STREET - WASHINGTON STREET TO VAN BUREN STREET



SHEET MAP



UTILITY CONTACT LIST	
Utility Company	Utility Type
APS	Electrical
AT&T	Telephone
City of Phoenix	Water
City of Phoenix	Sanitary Sewer
City of Phoenix	Storm Drain
MCI	Telephone, Fiber
Metropolitan Fiber Systems	Fiber
Level 3	Fiber
XO Communications	Fiber
AGL	Telephone, Fiber
SRP Water	Water
SRP Water Engineering	Bridge
SRP Transmission	Electrical
SRP Communication	Fiber
SRP EHV	Electrical
Century Link	Telephone, Fiber
Southwest Gas	Natural Gas
Cox Communications	CATV
Cox Communications	Fiber

LEGEND							
	EXISTING SPOT ELEVATION		RIM ELEVATION		SECTION LINE		TRANSFORMER
	EXISTING CONTOUR		INV. ELEVATION		CENTER LINE		ELECTRIC BOX
	EXISTING INDEX CONTOUR		TOP OF CURB ELEVATION		BOUNDARY LINE		LIGHT
	PROPOSED CONTOUR		PAVEMENT ELEVATION		RIGHT-OF-WAY LINE		CABLE BOX
	PROPOSED INDEX CONTOUR		GUTTER		BRASS CAP IN HANDHOLE (UNO)		CABLE VAULT
	PROPOSED LOW PT. ELEV.		SIDEWALK		BRASS CAP FLUSH (UNO)		TELEPHONE BOX
	PROPOSED HIGH PT. ELEV.		GRADE BREAK		FOUND 1/2" REBAR (UNO)		IRR. MANHOLE
	SLOPE		FINISH FLOOR ELEVATION		PROPERTY CORNER (NOT SET)		GAS MARKER
	DIRECTION OF FLOW		SCUPPER INVERT ELEVATION		FIRE HYDRANT		SIGN
	DRYWELL		FLOWLINE		WATER VALVE		
	EXISTING UTILITY BOX		EXISTING		WATER METER		
	EXISTING LIGHT POLE		EXISTING GROUND ELEVATION		BLOW OFF VALVE		
	EXISTING FENCE		TOP OF WALL		SANITARY SEWER MANHOLE		
	PROPOSED SPOT GRADE ELEVATION		BOTTOM OF WALL		SANITARY SEWER CLEANOUT		
			SHALLOW PERCOLATION TEST		GRADE BREAK		

SHEET INDEX:	
COVER SHEET	SHEET 01
BRIDGE OVERPASS INITIAL ALIGNMENTS 1, 2 & 3	SHEET 02
BRIDGE PLAN - ALIGNMENT NO. 1 & 2 PLAN	SHEET 03
BRIDGE PLAN - ALIGNMENT NO. 3 PLAN	SHEET 04
BRIDGE OVERPASS REFINED ALIGNMENTS 4 & 5	SHEET 05
BRIDGE PLAN - ALIGNMENT NO. 4 PLAN	SHEET 06
BRIDGE PLAN - ALIGNMENT NO. 5 PLAN	SHEET 07
UNDERPASS CONCEPT PLAN	SHEET 08
UNDERPASS PLAN & PROFILE	SHEET 09
MID BLOCK STAGGERED CROSSING OVERVIEW	SHEET 10
MID BLOCK STAGGERED CROSSING PLAN	SHEET 11

DWG: F:\Projects\012-0608\CMD\Final_Plans\012-0608_CS.dwg USER: swozny
 DATE: Jan 16, 2013 5:51am XREFS: 012-0608 BRD 012-0608 PMSBLOCK3
 012-0608 XUTIL Crop 012-0608 XBASE 012-0608 XUTIL

MOLSSON ASSOCIATES

7250 North 168th Street, Suite 210
 Phoenix, AZ 85025-5282
 TEL: 602.748.1000
 FAX: 602.748.1001
 www.oxconsulting.com

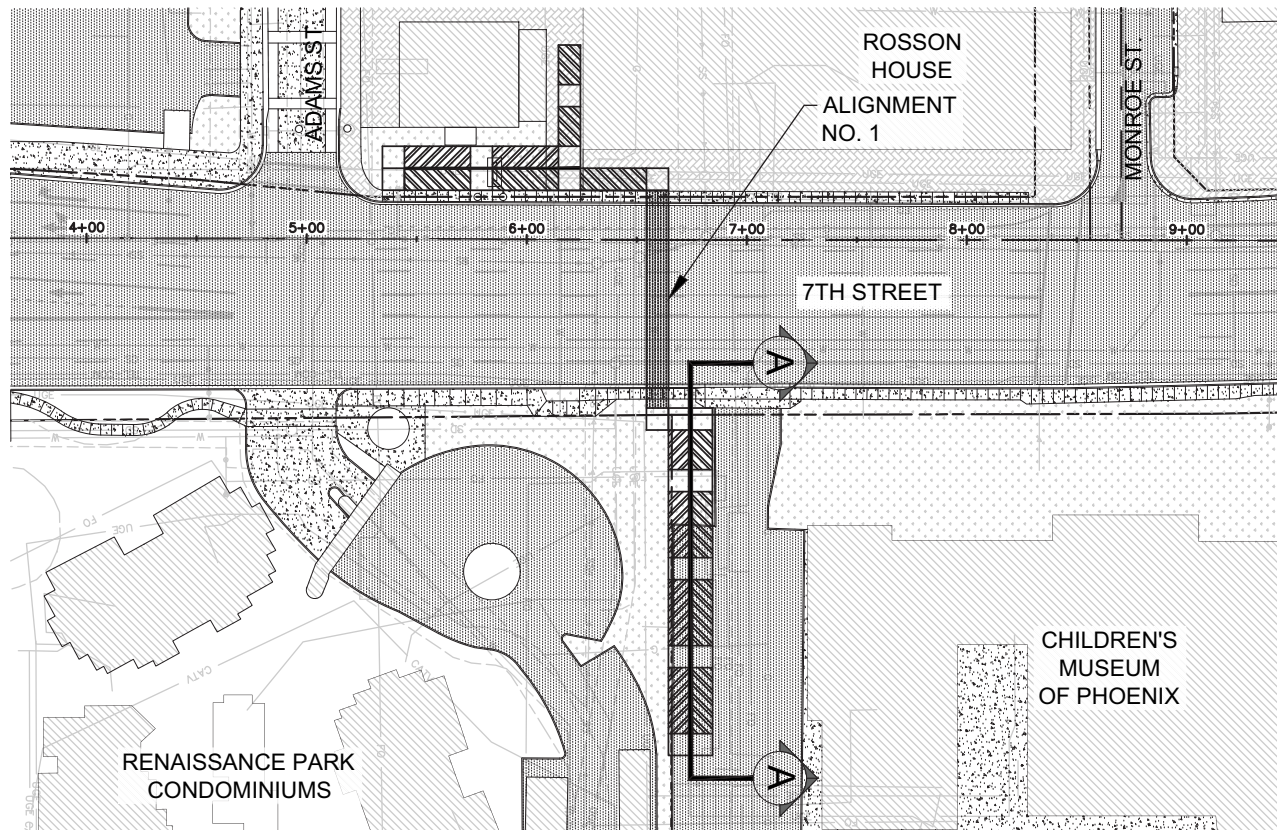
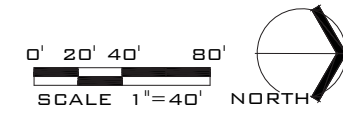
PRELIMINARY
 CONCEPTUAL
 15% PLANS
 NOT FOR
 CONSTRUCTION

REV. NO.	DATE	REVISIONS DESCRIPTION

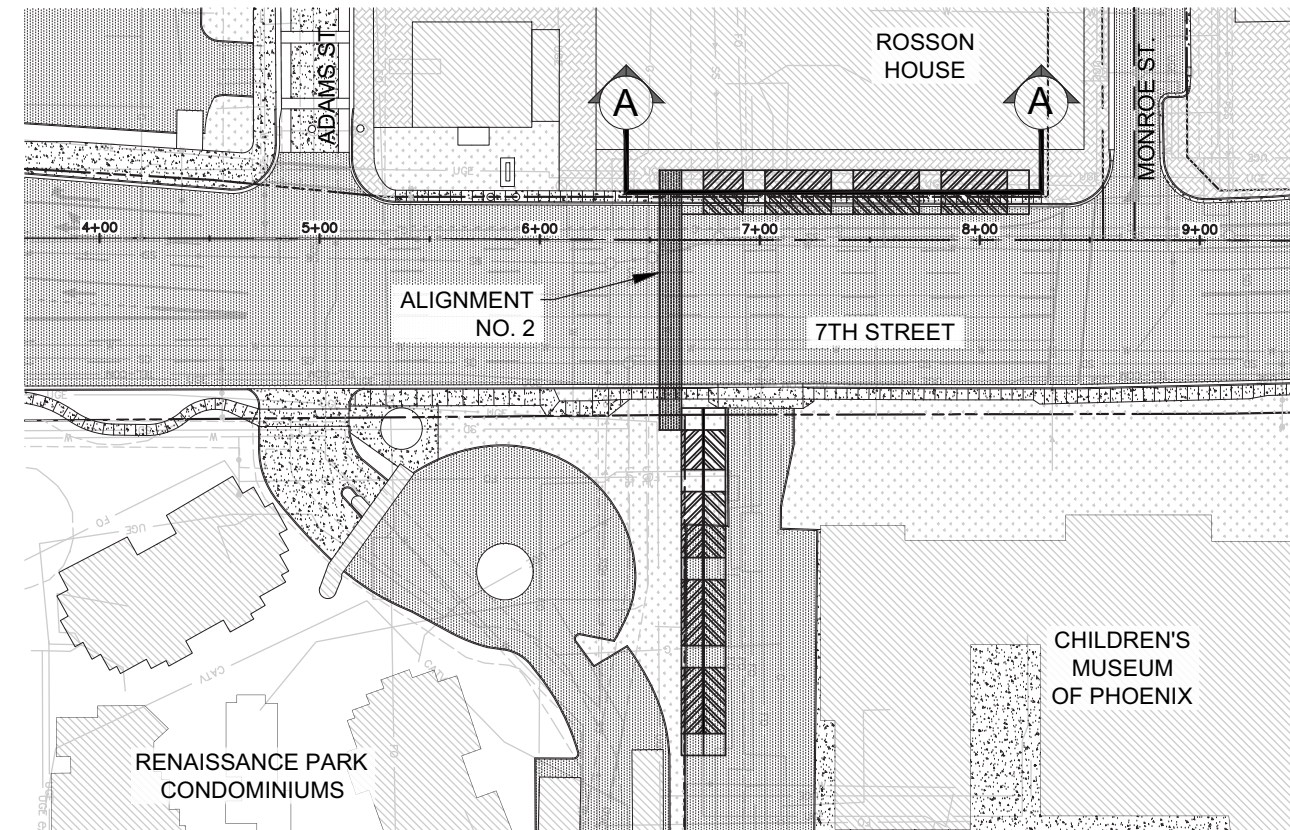
CHILDREN'S MUSEUM / SCIENCE MUSEUM PROJECT ASSESSMENT		MARICOPA ASSOCIATION OF GOVERNMENTS		CONCEPTUAL DESIGN PLANS		PHOENIX, AZ	
drawn by:	EW/SW	checked by:	LS	project no.:	012-0608	date:	12-28-2012
SHEET 01 of 11				2012			



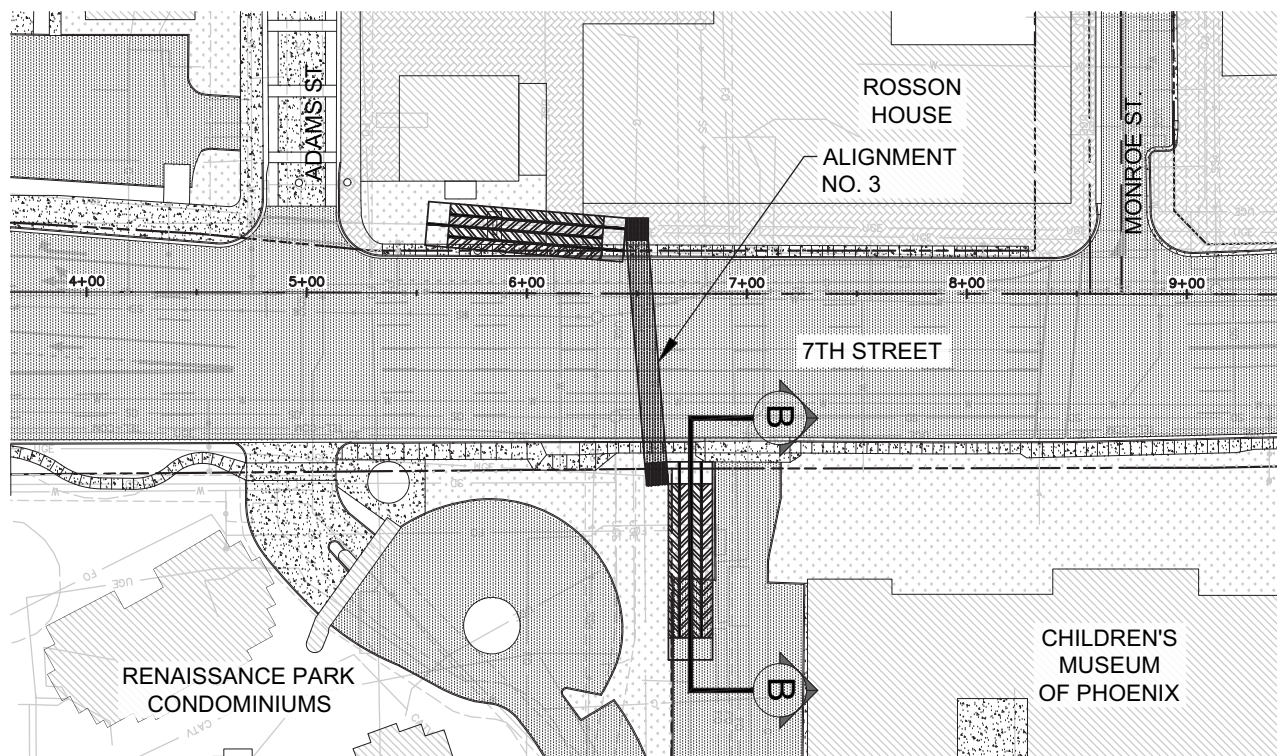
CHILDREN'S MUSEUM OF PHOENIX & ARIZONA SCIENCE CENTER
BRIDGE CONCEPTUAL PLAN
 BICYCLE & PEDESTRIAN BRIDGE PROJECT ASSESSMENT
 7TH STREET - WASHINGTON STREET TO VAN BUREN STREET



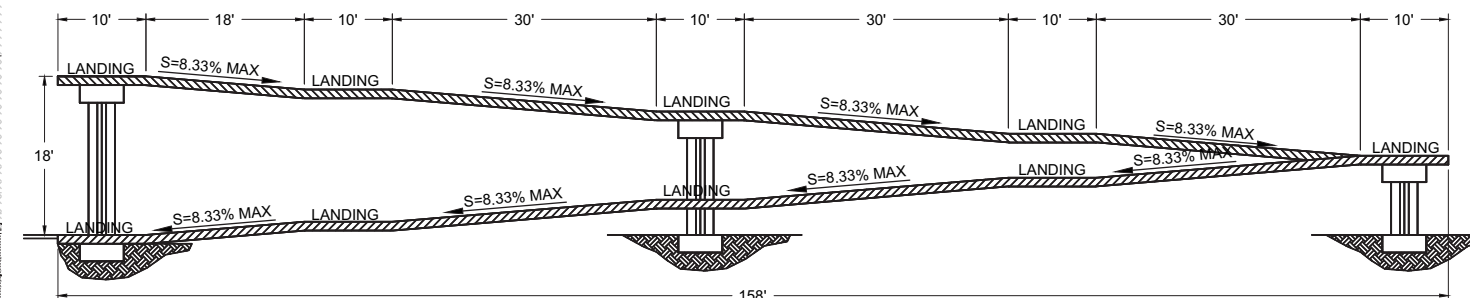
1 BRIDGE ALIGNMENT NO. 1 WITH 10 FT WIDE RAMPS



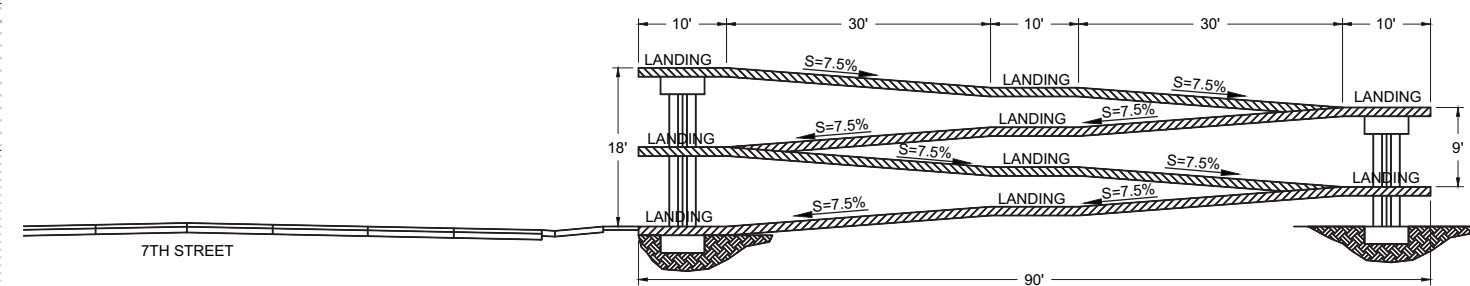
2 BRIDGE ALIGNMENT NO. 2 WITH 10 FT WIDE RAMPS



3 BRIDGE ALIGNMENT NO. 3 WITH 5 FT WIDE RAMPS



A SECTION A-A - 10 FT WIDE DOUBLE SWITCHBACK RAMP
 8.33% MAX RAMP GRADE WITH LANDINGS - 18 FT HEIGHT, 158 FT LENGTH
 SCALE: 1"=10' HORIZ. 1"=10' VERT.



B SECTION B-B - 5 FT WIDE DOUBLE SWITCHBACK RAMP
 7.5% RAMP GRADE WITH LANDINGS - 18 FT HEIGHT, 90 FT LENGTH
 SCALE: 1"=10' HORIZ. 1"=10' VERT.



PRELIMINARY CONCEPTUAL 15% PLANS NOT FOR CONSTRUCTION

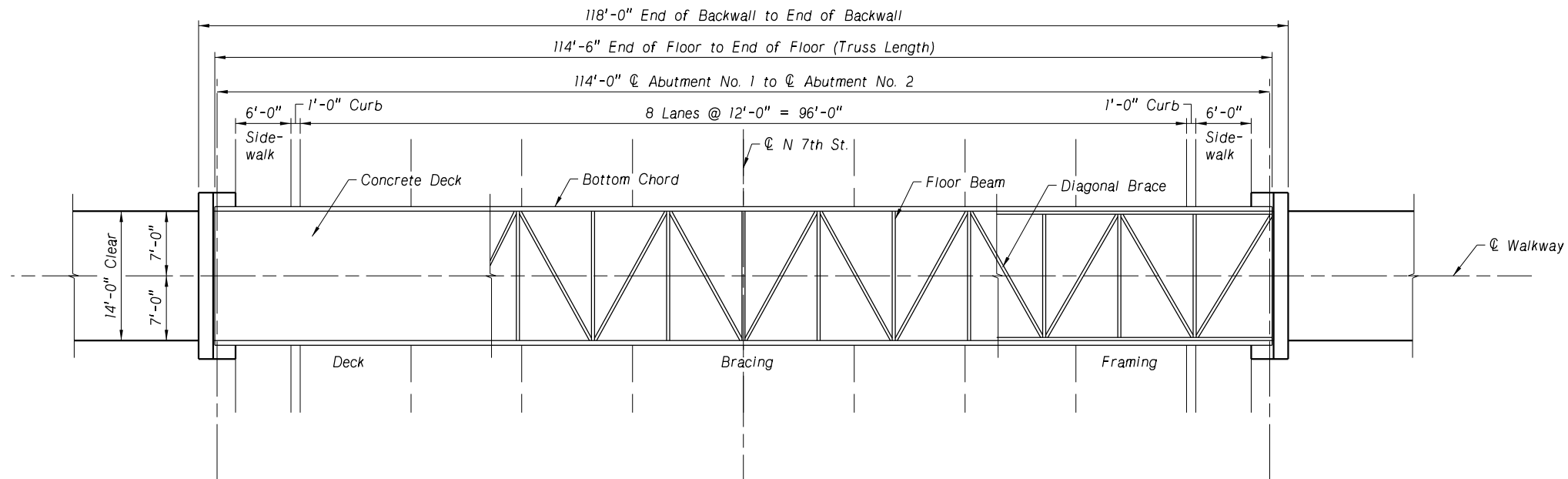
REV. NO.	DATE	REVISIONS DESCRIPTION

CHILDREN'S MUSEUM / SCIENCE MUSEUM
 PROJECT ASSESSMENT
 MARICOPA ASSOCIATION OF GOVERNMENTS
 BRIDGE OVERPASS INITIAL CONCEPTS
 PHOENIX, AZ

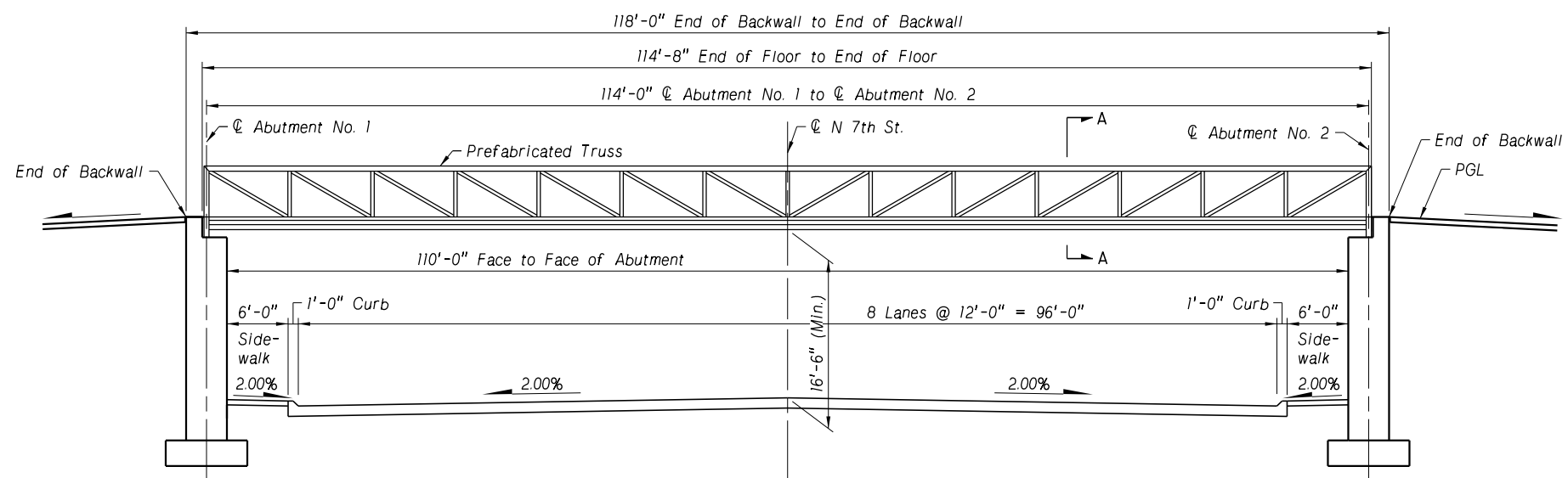
drawn by: _____
 designed by: _____
 checked by: _____
 project no.: 012-0608
 date: 12-28-2012

SHEET 02 of 11

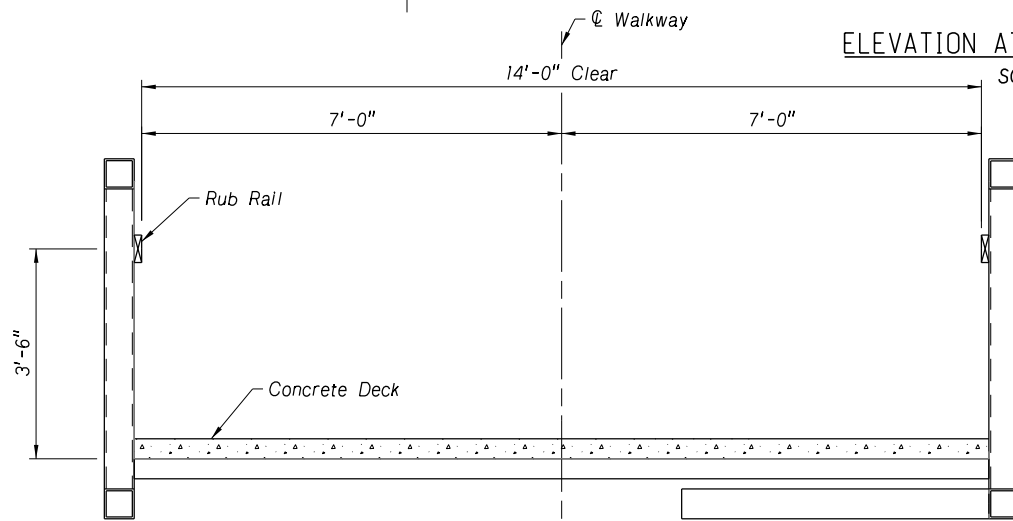
DWG: F:\Projects\012-0608\CMD\Final_Plans\012-0608 BR 01.dwg USER: swozny
 DATE: Jan 16, 2013 5:50am XREFS: 012-0608 BRD 012-0608 XBASE 012-0608 XUTIL 012-0608 PALIGN 012-0608 PALIGN3



PLAN OF BRIDGE
SCALE: 1/8" = 1'-0"



ELEVATION AT CENTERLINE OF BRIDGE
SCALE: 1/8" = 1'-0"



SECTION A-A

PRELIMINARY
CONCEPTUAL
15% PLANS
NOT FOR
CONSTRUCTION

REV. NO.	DATE	REVISIONS DESCRIPTION

PLAN & ELEVATION
ALIGNMENT NO. 1 & 2
CHILDREN'S MUSEUM / SCIENCE MUSEUM
PEDESTRIAN BRIDGE
PHOENIX, AZ
2012

drawn by: BMW
checked by: JBR
approved by: JBR
QA/QC by: SAH
project no.: 012-0608
drawing no.:
date: 7-2-12

PRELIMINARY
CONCEPTUAL
15% PLANS
NOT FOR
CONSTRUCTION

REV. NO.	DATE	REVISIONS DESCRIPTION

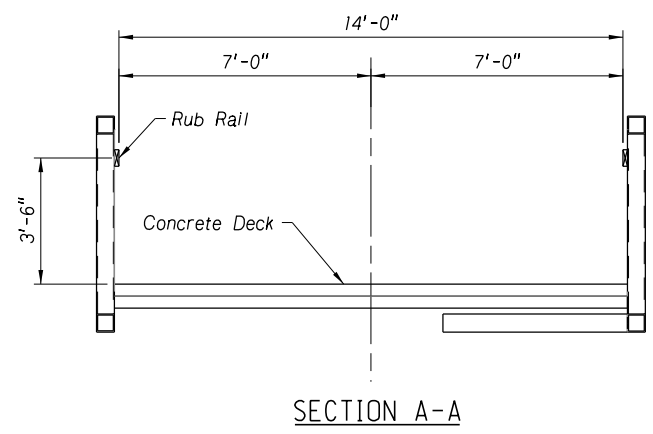
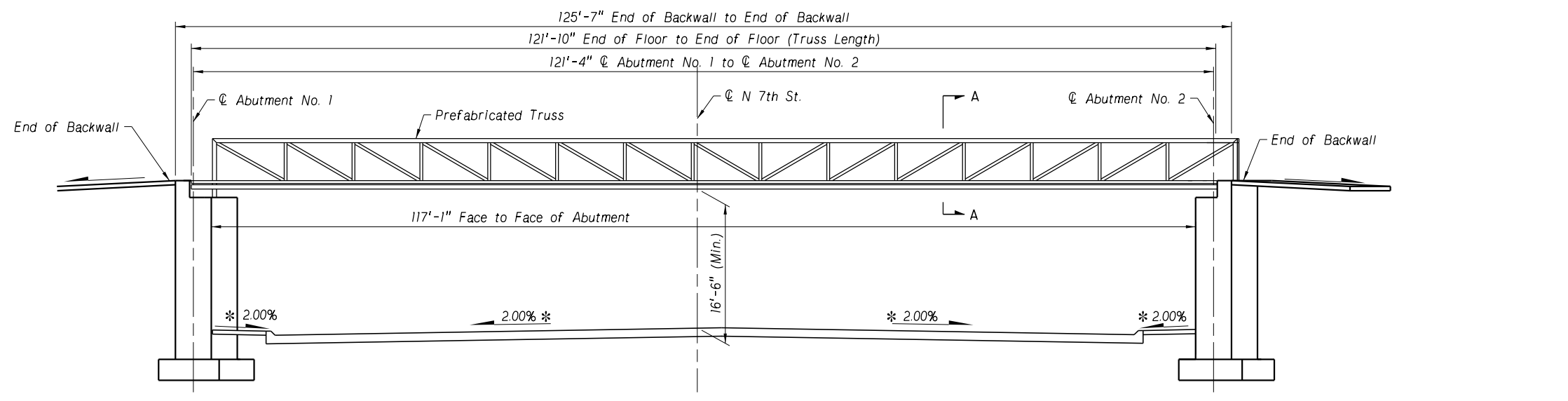
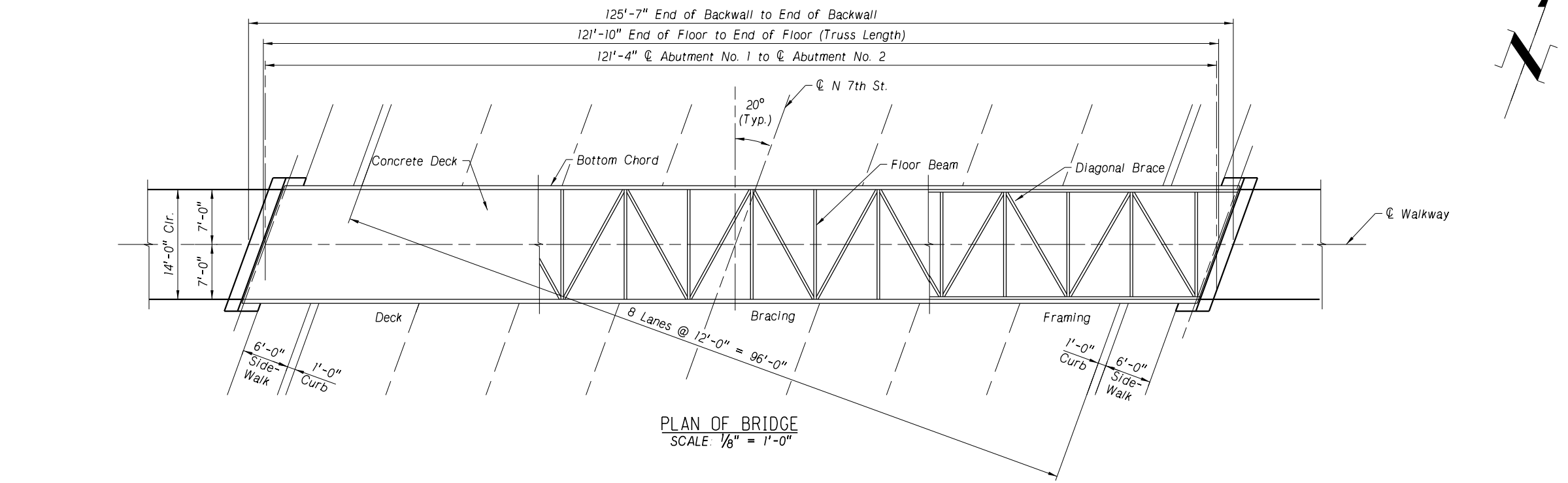
PLAN & ELEVATION
ALIGNMENT NO. 3

CHILDREN'S MUSEUM / SCIENCE MUSEUM
PEDESTRIAN BRIDGE

PHOENIX, AZ

2012

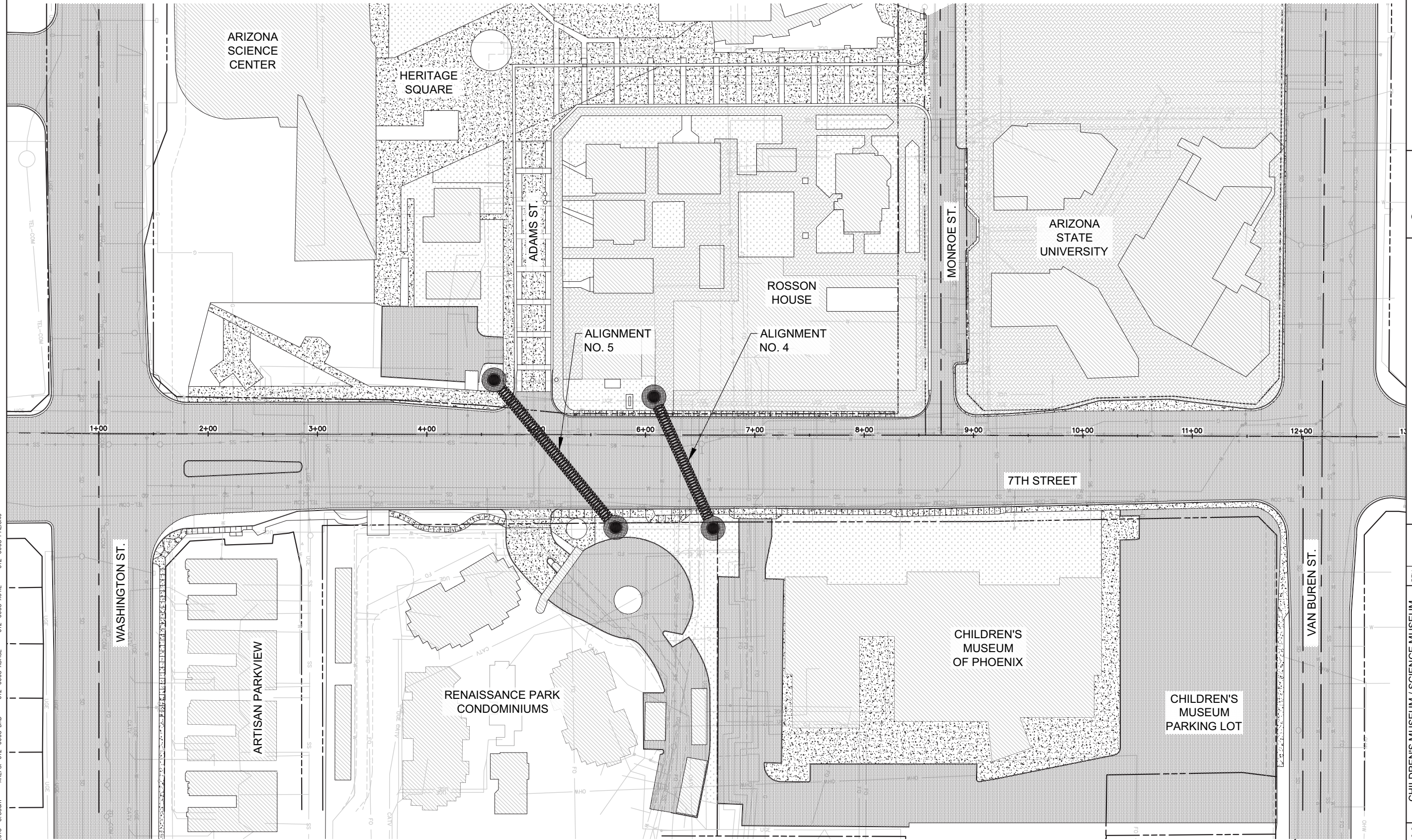
drawn by: BMW
checked by: JBR
approved by: JBR
QA/QC by: SAH
project no.: 012-0608
drawing no.:
date: 7-2-12



CHILDREN'S MUSEUM OF PHOENIX & ARIZONA SCIENCE CENTER BRIDGE CONCEPTUAL PLAN

BICYCLE & PEDESTRIAN BRIDGE PROJECT ASSESSMENT

7TH STREET - WASHINGTON STREET TO VAN BUREN STREET



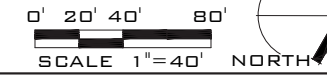
DWG: F:\Projects\012-0608\CMD\Final_Plans\012-0608_BR_02.dwg USER: swozny
 DATE: Jan 16, 2013 5:53am XREFS: 012-0608_BRD 012-0608_XBASE 012-0608_XUTIL 012-0608_PALONG

4

BRIDGE ALIGNMENT NO. 4 WITH ELEVATORS & SPIRAL STAIRCASE

5

BRIDGE ALIGNMENT NO. 5 WITH ELEVATORS & SPIRAL STAIRCASE



MOLSSON ASSOCIATES
 7250 North 16th Street, Suite 210
 Phoenix, AZ 85025-5282
 TEL: 602.748.1000
 FAX: 602.748.1001
 www.oasconsulting.com

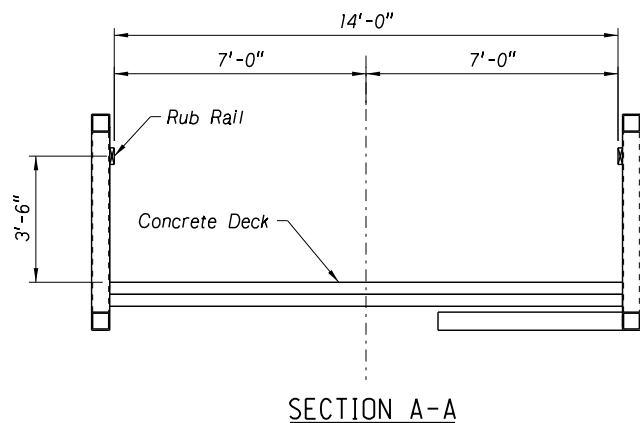
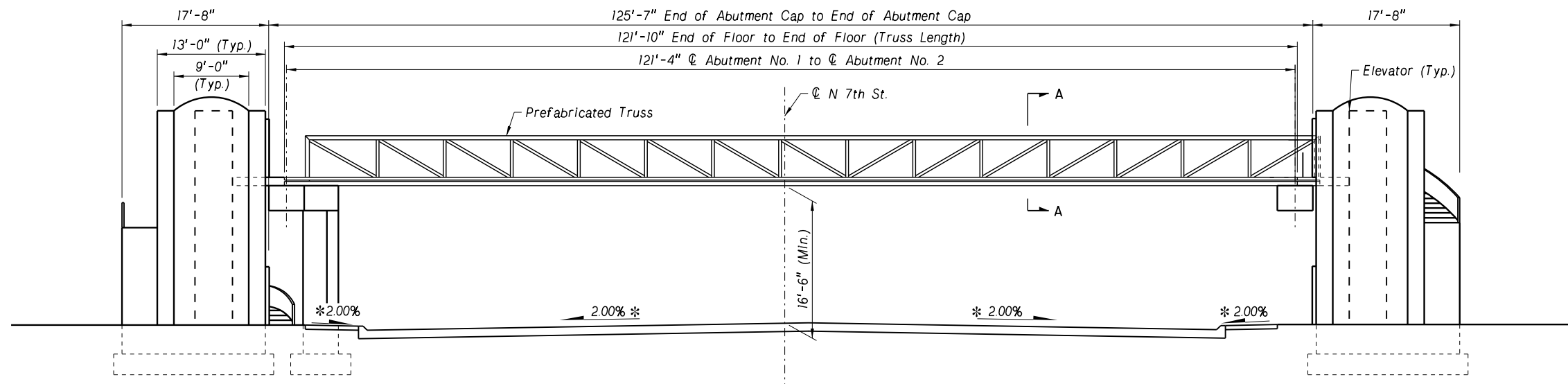
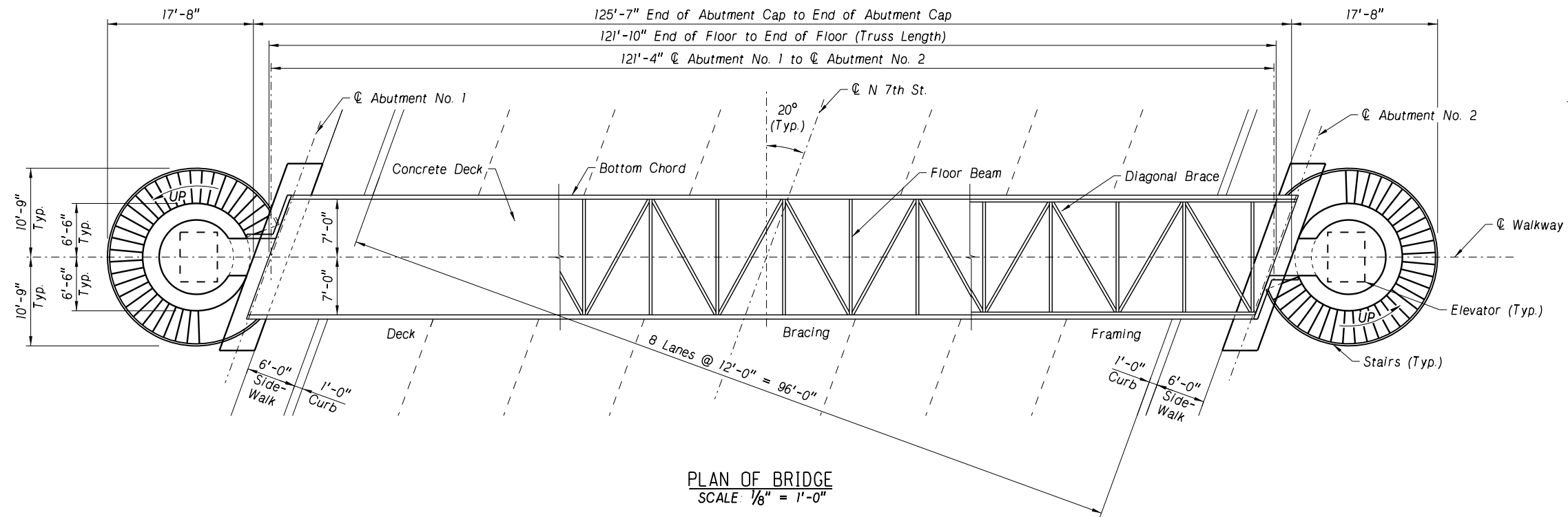
PRELIMINARY
 CONCEPTUAL
 15% PLANS
 NOT FOR
 CONSTRUCTION

REV. NO.	DATE	REVISIONS DESCRIPTION

CHILDREN'S MUSEUM / SCIENCE MUSEUM PROJECT ASSESSMENT MARICOPA ASSOCIATION OF GOVERNMENTS BRIDGE OVERPASS REVISED CONCEPTS	2012
PHOENIX, AZ	2012

drawn by: EW/SW
 designed by: SW
 checked by: LS
 project no.: 012-0608
 date: 12-28-2012

SHEET 05 of 11



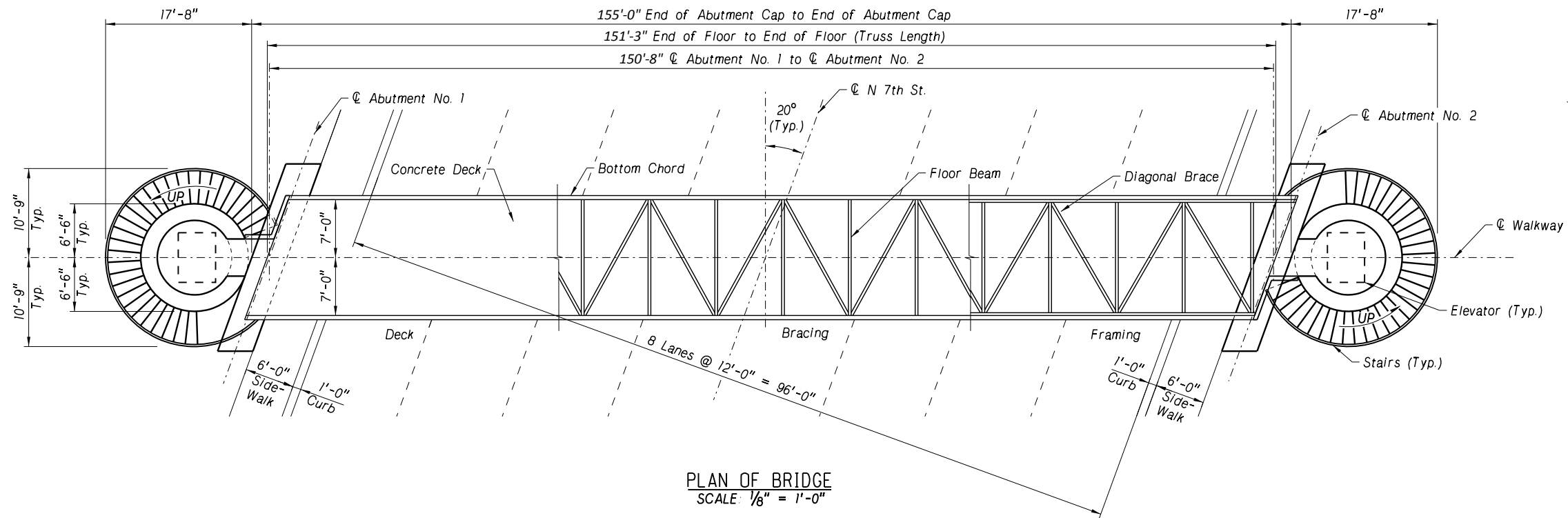
* Slope Perpendicular to Roadway ϕ

PRELIMINARY
CONCEPTUAL
15% PLANS
NOT FOR
CONSTRUCTION

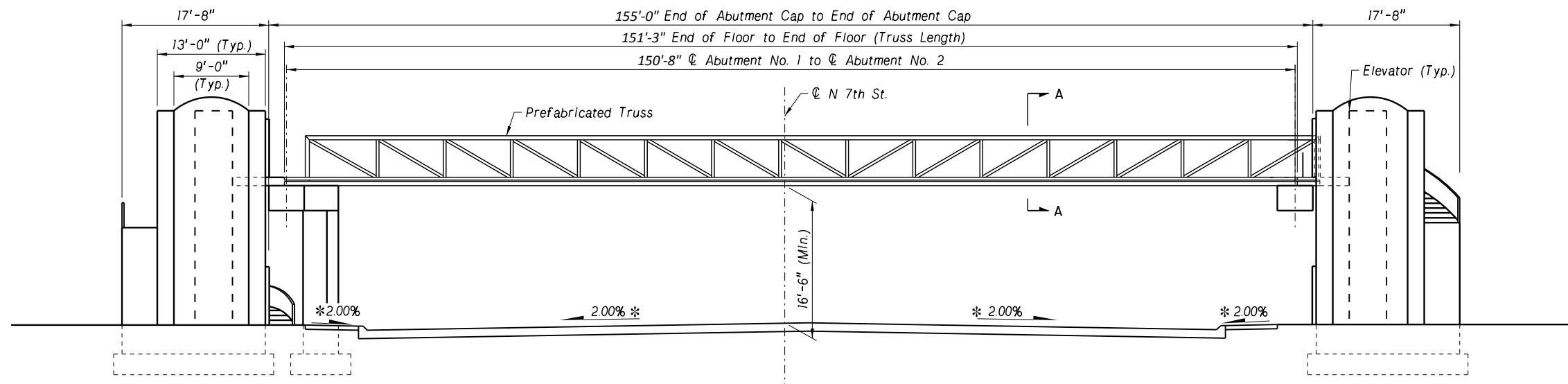
REV. NO.	DATE	REVISIONS DESCRIPTION

PLAN & ELEVATION
ALIGNMENT NO. 4
CHILDREN'S MUSEUM / SCIENCE MUSEUM
PEDESTRIAN BRIDGE
PHOENIX, AZ
2012

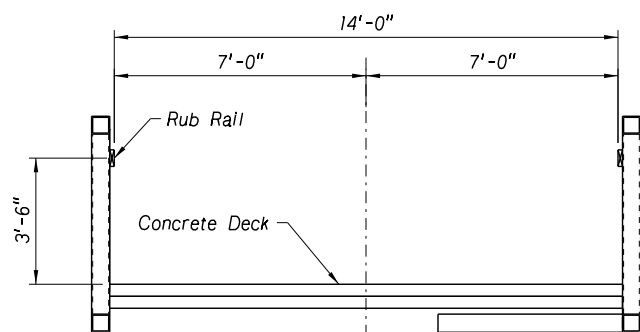
drawn by:	BMW
checked by:	JBR
approved by:	JBR
QA/QC by:	SAH
project no.:	012-0608
drawing no.:	
date:	12-18-12



PLAN OF BRIDGE
SCALE: 1/8" = 1'-0"



ELEVATION AT CENTERLINE OF BRIDGE
SCALE: 1/8" = 1'-0"



SECTION A-A

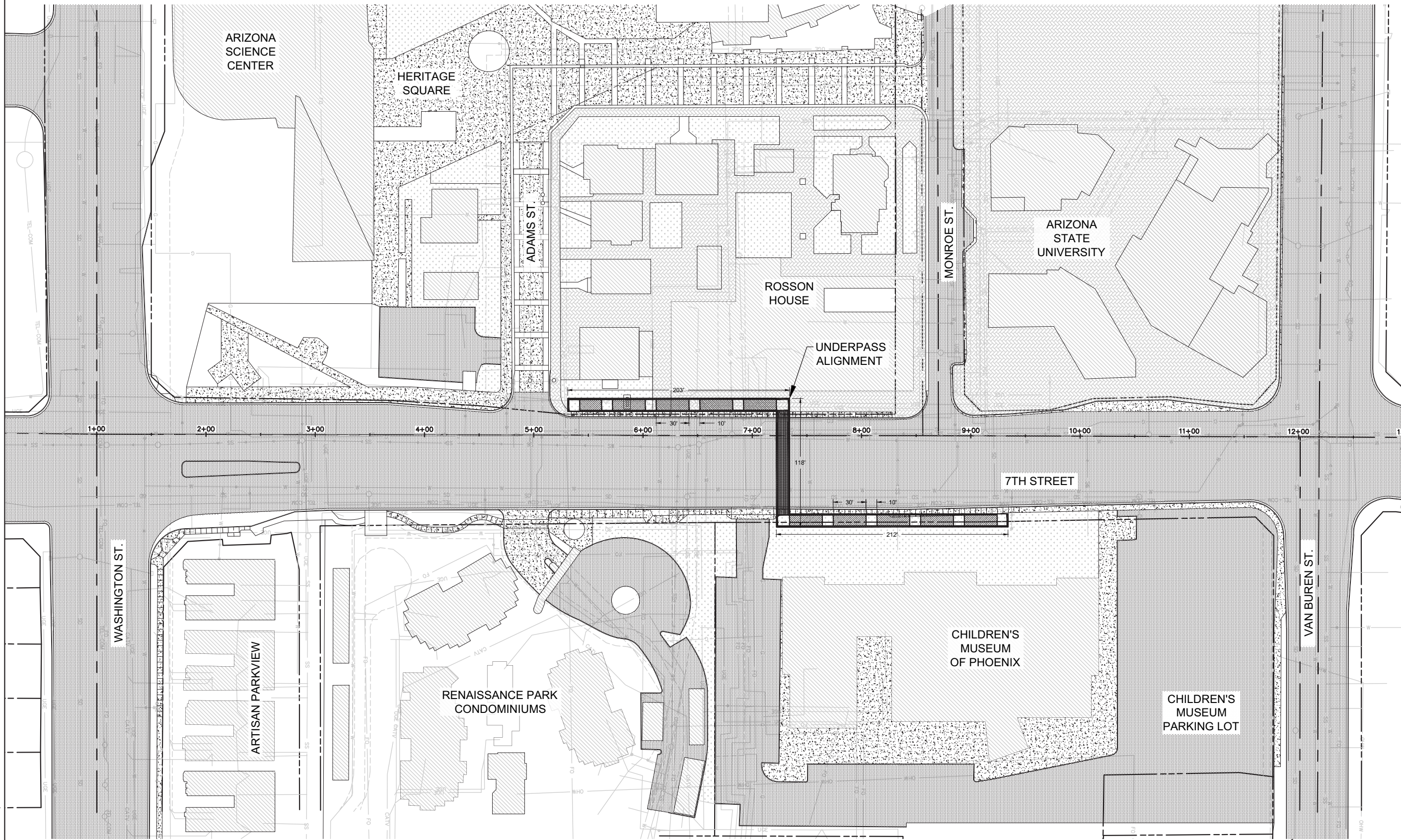
* Slope Perpendicular to Roadway ϕ

REV. NO.	DATE	REVISIONS DESCRIPTION

PLAN & ELEVATION ALIGNMENT NO. 5	2012
CHILDREN'S MUSEUM / SCIENCE MUSEUM PEDESTRIAN BRIDGE	
PHOENIX, AZ	

drawn by:	BMW
checked by:	JBR
approved by:	JBR
QA/QC by:	SAH
project no.:	012-0608
drawing no.:	
date:	12-18-12

CHILDREN'S MUSEUM OF PHOENIX & ARIZONA SCIENCE CENTER UNDERPASS CONCEPTUAL PLAN BICYCLE & PEDESTRIAN BRIDGE PROJECT ASSESSMENT 7TH STREET - WASHINGTON STREET TO VAN BUREN STREET



DWG: F:\Projects\012-0608\CMD\Final_Plans\012-0608 UP 01.dwg USER: swozny
 DATE: Jan 15, 2013 4:40pm XREFS: 012-0608 BRD 012-0608 XBASE 012-0608 XUTIL 012-0608 UNDPASS



**PRELIMINARY
CONCEPTUAL
15% PLANS
NOT FOR
CONSTRUCTION**

REV. NO.	DATE	REVISIONS DESCRIPTION

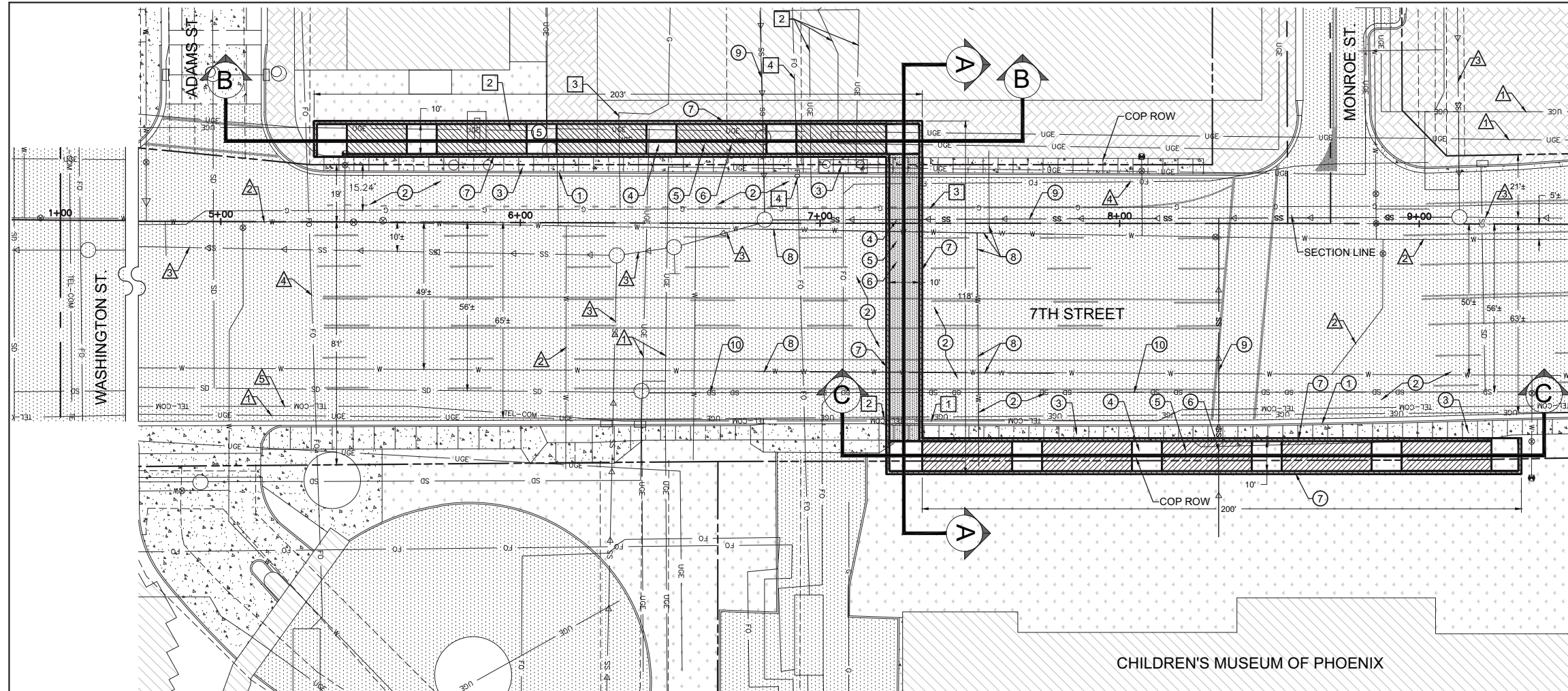
CHILDREN'S MUSEUM / SCIENCE MUSEUM
 PROJECT ASSESSMENT
 MARICOPA ASSOCIATION OF GOVERNMENTS
 UNDERPASS OVERALL PLAN
 PHOENIX, AZ

drawn by: EW/SW
 designed by: SW
 checked by: LS
 project no.: 012-0608
 date: 12-28-2012

SHEET 08 of 11

**MOLSSON
ASSOCIATES**
 7250 North 16th Street, Suite 210
 Phoenix, AZ 85025-5282
 TEL: 602.748.1000
 FAX: 602.748.1001
 www.oaconsulting.com

DWG: F:\Projects\012-0608\CMD\Final_Plans\012-0608 UP 02.dwg USER: swozny
 DATE: Jan 17, 2013 4:51pm XREFS: 012-0608 BRD 012-0608 XBASE 012-0608 UNDPASS 012-0608 XUTIL



CONSTRUCTION KEY NOTES

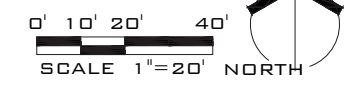
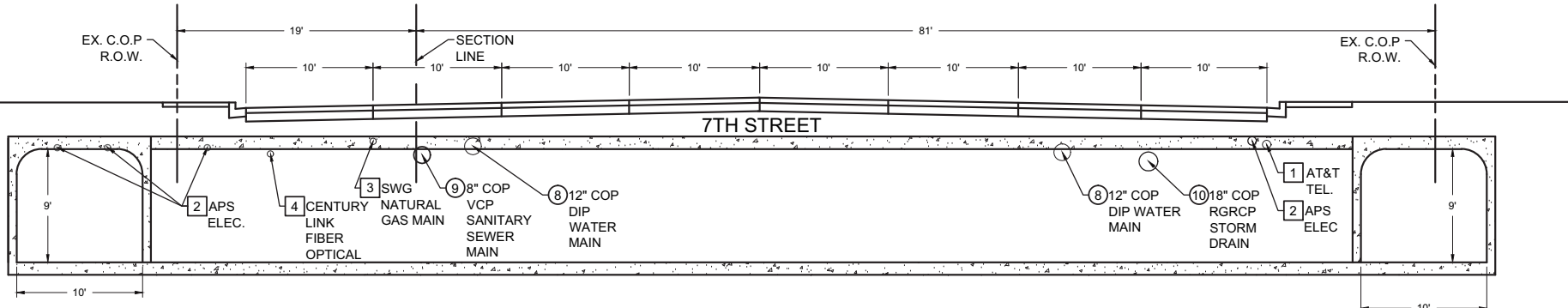
#	DESCRIPTION	QUANTITY
1	CONTRACTOR TO REMOVE AND REPLACE CURB & GUTTER AS PER MAG STD DTL 220, TYPE A.	550 LF
2	CONTRACTOR TO REMOVE AND REPLACE AC PAVEMENT AS PER CITY OF PHOENIX STREET SPECIFICATIONS. AC PAVEMENT SECTION TO BE A TOTAL THICKNESS OF 5-IN. OVER 10-IN. ABC.	1,335 SY
3	CONTRACTOR TO REMOVE AND REPLACE CONC. SIDEWALKS, 8" THICK WITH 10" AB AS PER CITY OF PHOENIX STD. DTL. P1230.	2,250 SF
4	CONTRACTOR TO INSTALL ELECTRICAL CONDUIT AND UNDERPASS LIGHTING	1 LS
5	CONTRACTOR TO CONSTRUCT CONCRETE SLAB 8-INCH THICK.	6,500 SF
6	CONTRACTOR TO CONSTRUCT CONCRETE CAP FOR UNDERPASS ROOF WITH STEEL REINFORCEMENT.	6,500 SF
7	CONTRACTOR TO CONSTRUCT CONCRETE RETAINING WALLS WITH CONCRETE FOOTING AND STEEL REINFORCEMENT.	1,250 LF
8	CONTRACTOR TO RELOCATE & RECONSTRUCT EX. CITY OF PHOENIX 12-INCH DIP WATER MAIN.	200 LF
9	CONTRACTOR TO RELOCATE AND RECONSTRUCT EXISTING CITY OF PHOENIX 8-INCH VCP SANITARY SEWER MAIN.	405 LF
10	CONTRACTOR TO RELOCATE AND RECONSTRUCT EXISTING CITY OF PHOENIX 12-INCH RGRCP STORM SEWER MAIN.	350 LF

UTILITY RELOCATION BY OTHERS

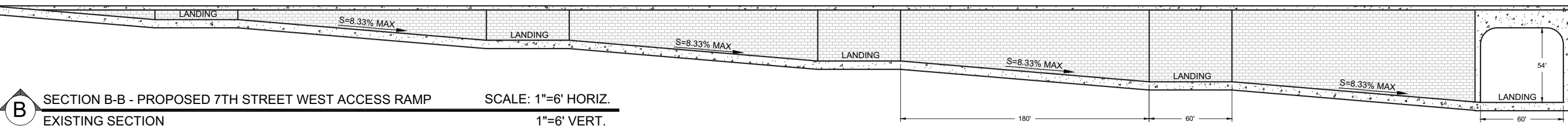
#	DESCRIPTION	QUANTITY
1	AT&T TELEPHONE CONDUIT IN CONCRETE DUCT BANK TO BE RELOCATED PRIOR TO START OF PROJECT BY UTILITY COMPANY OWNER. CITY OF PHOENIX TO PAY FOR UTILITY RELOCATION WORK.	100 LF
2	APS ELECTRICAL CONDUIT IN CONCRETE DUCK BANK TO BE RELOCATED PRIOR TO START OF PROJECT BY UTILITY COMPANY OWNER. CITY OF PHOENIX TO PAY FOR UTILITY RELOCATION WORK.	800 LF
3	SWG NATURAL GAS CONDUIT TO BE RELOCATED PRIOR TO THE START OF PROJECT BY UTILITY COMPANY OWNER. CITY OF PHOENIX TO PAY FOR UTILITY RELOCATION WORK.	100 LF
4	CENTURY LINK FIBER OPTICAL CONDUIT TO BE RELOCATED PRIOR TO THE START OF PROJECT BY UTILITY COMPANY OWNER. CITY OF PHOENIX TO PAY FOR UTILITY RELOCATION WORK.	100 LF

PROTECT IN PLACE KEY NOTES

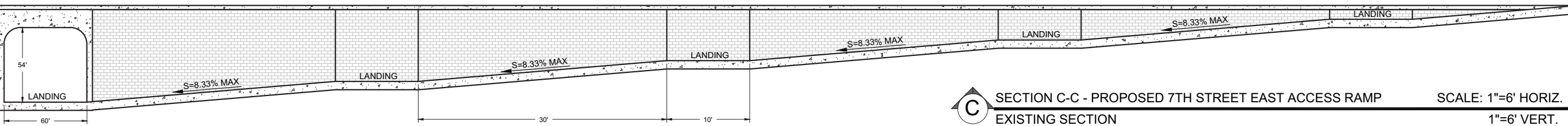
#	PROTECT IN PLACE NOTES
1	EXISTING UNDERGROUND ELECTRICAL TO REMAIN
2	EXISTING CITY OF PHOENIX WATER LINE TO REMAIN
3	EXISTING CITY OF PHOENIX SANITARY SEWER TO REMAIN
4	EXISTING FIBER OPTICAL LINE TO REMAIN
5	EXISTING TELEPHONE CONDUIT TO REMAIN




A SECTION A-A - PROPOSED 7TH STREET UNDERPASS SCALE: 1"=6' HORIZ.
 EXISTING SECTION 1"=6' VERT.



B SECTION B-B - PROPOSED 7TH STREET WEST ACCESS RAMP SCALE: 1"=6' HORIZ.
 EXISTING SECTION 1"=6' VERT.



C SECTION C-C - PROPOSED 7TH STREET EAST ACCESS RAMP SCALE: 1"=6' HORIZ.
 EXISTING SECTION 1"=6' VERT.



7250 North 168th Street, Suite 210
 Phoenix, AZ 85025-5282
 TEL: 602.748.1000
 FAX: 602.748.1001
 www.molsson.com

PRELIMINARY CONCEPTUAL 15% PLANS NOT FOR CONSTRUCTION

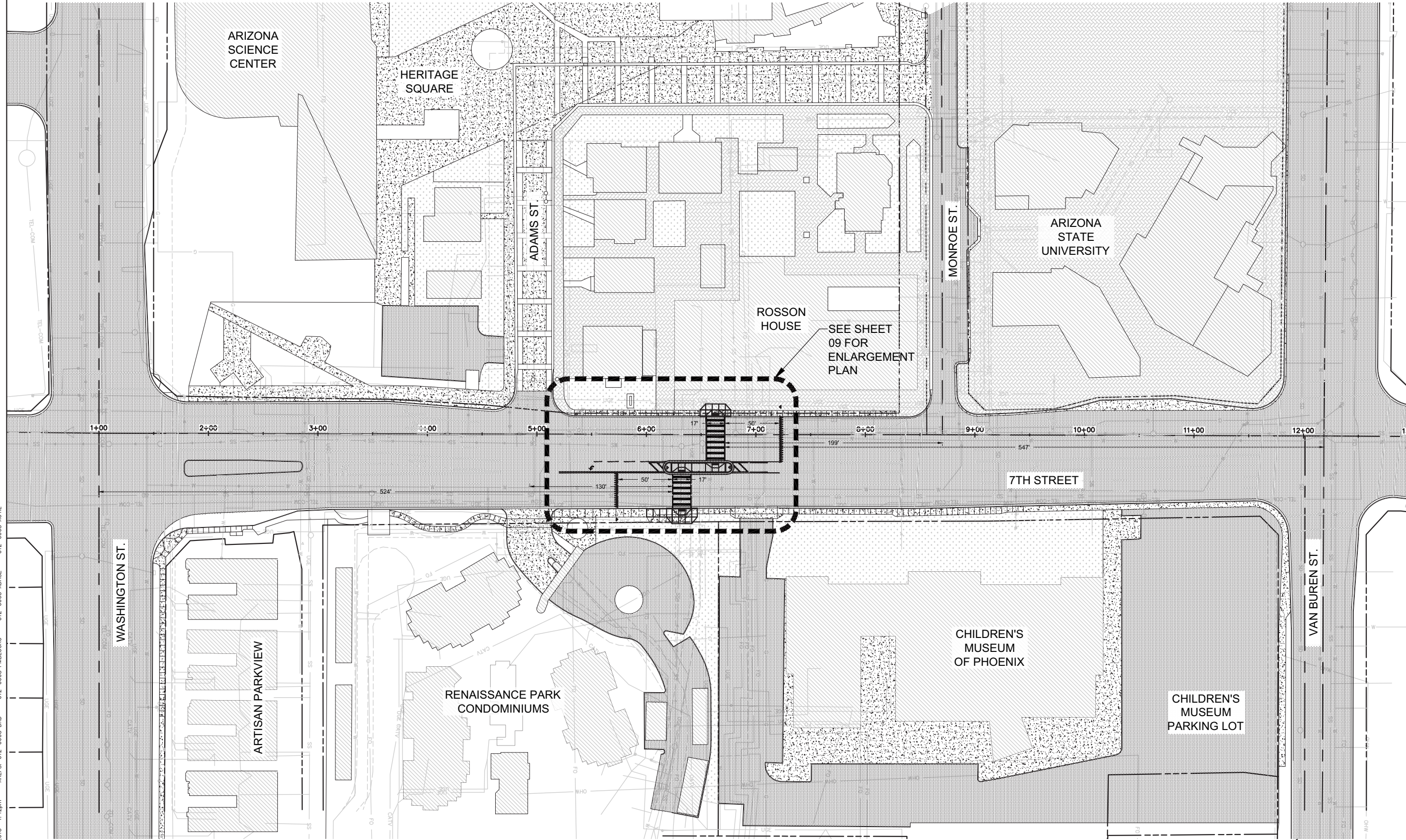
REV. NO.	DATE	REVISIONS DESCRIPTION

CHILDREN'S MUSEUM / SCIENCE MUSEUM PROJECT ASSESSMENT MARICOPA ASSOCIATION OF GOVERNMENTS UNDERPASS PLAN & PROFILE PHOENIX, AZ

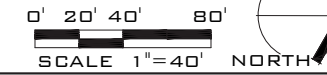
drawn by: EW/SW
 designed by: SW
 checked by: LS
 project no.: 012-0608
 date: 12-28-2012

SHEET 09 of 11

CHILDREN'S MUSEUM OF PHOENIX & ARIZONA SCIENCE CENTER
MID BLOCK STAGGERED CROSSING CONCEPTUAL PLAN
BICYCLE & PEDESTRIAN BRIDGE PROJECT ASSESSMENT
7TH STREET - WASHINGTON STREET TO VAN BUREN STREET



DWG: F:\Projects\012-0608\012-0608\012-0608 MB 02.dwg USER: swozny
 DATE: Jan 15, 2013 4:42pm XREFS: 012-0608 BRD 012-0608 PNBLOCK3 012-0608 XBASE 012-0608 XUTIL



Call at least two full working days before you begin excavation.
ARIZONA 811
 Arizona Blue State, Inc.
 Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
 In Maricopa County: (602) 263-1100

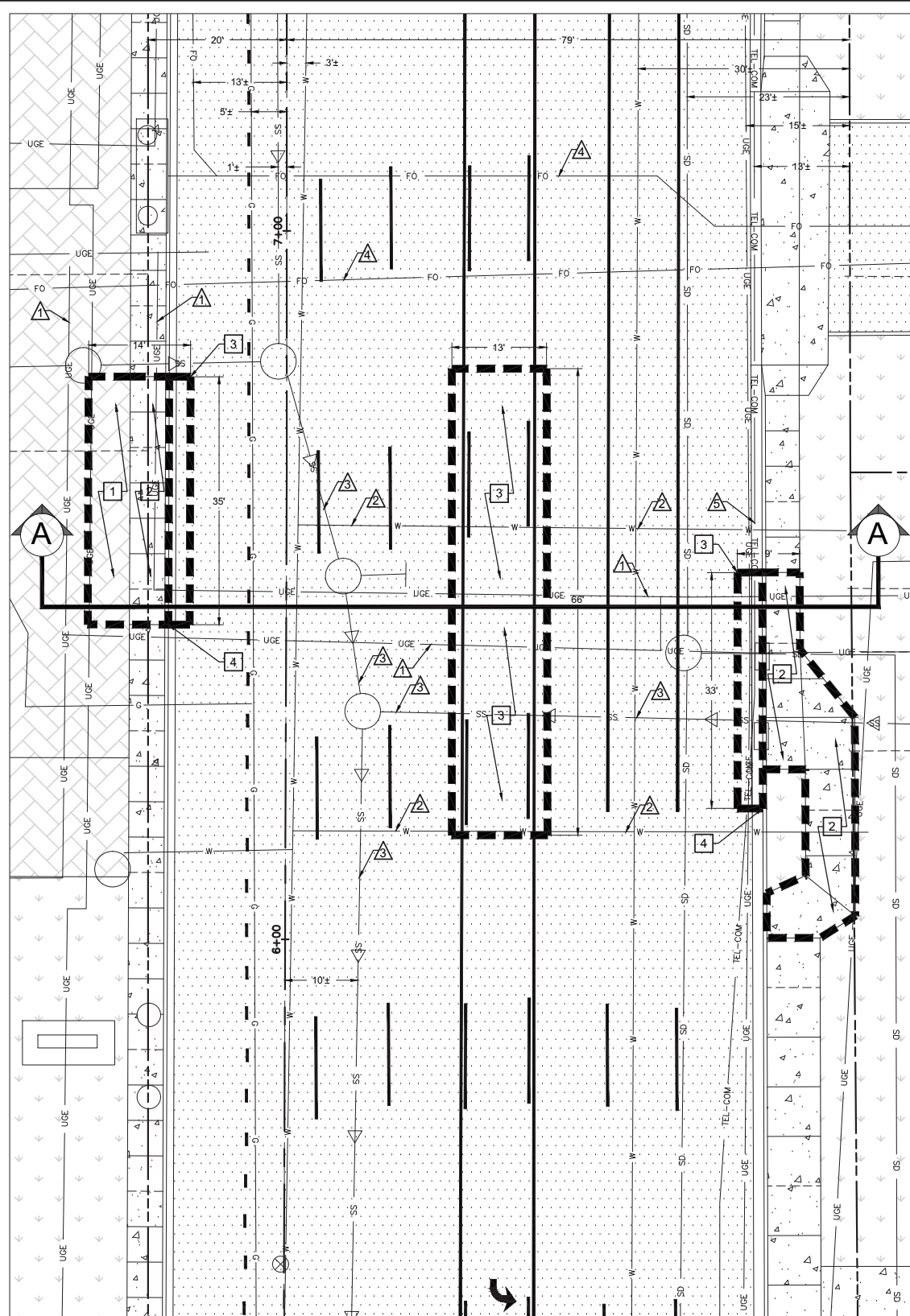
PRELIMINARY
 CONCEPTUAL
 15% PLANS
 NOT FOR
 CONSTRUCTION

REV. NO.	DATE	REVISIONS DESCRIPTION

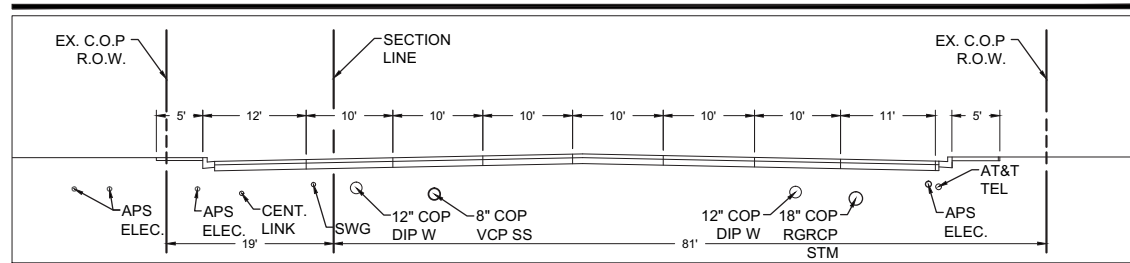
CHILDREN'S MUSEUM / SCIENCE MUSEUM
 PROJECT ASSESSMENT
 MARICOPA ASSOCIATION OF GOVERNMENTS
 MIDBLOCK STAGGERED CROSSING PLAN
 PHOENIX, AZ 2012
 SHEET 10 of 11
 drawn by: EW/SW
 designed by: SW
 checked by: LS
 project no.: 012-0608
 date: 12-28-2012

OLSSON ASSOCIATES
 7260 North 168th Street, Suite 210
 Phoenix, AZ 85025-5282
 TEL: 602.748.1000
 FAX: 602.748.1001
 www.olssonllc.com

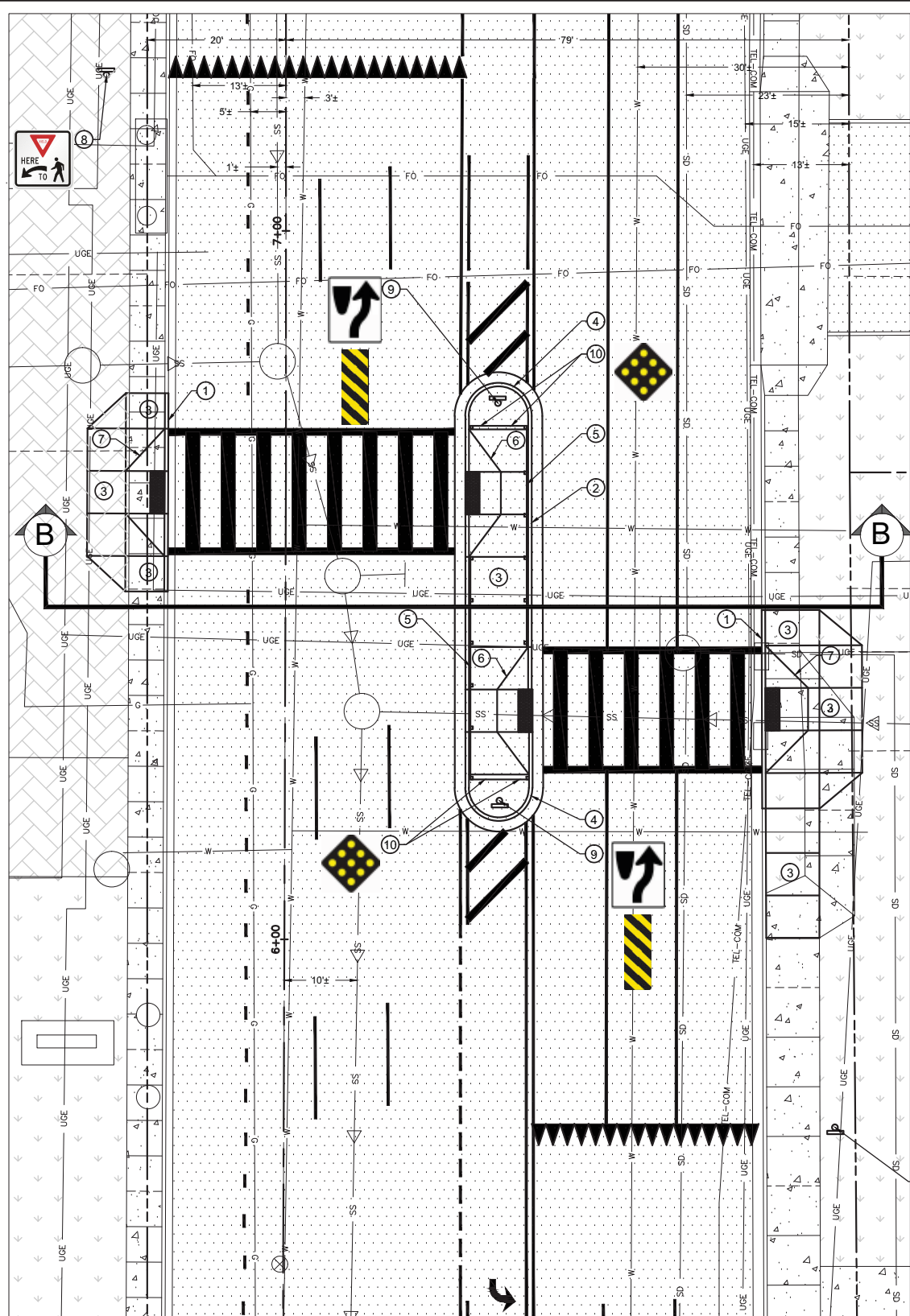
DWG: F:\Projects\012-0608\CMD\Final_Plans\012-0608 MB 03.dwg
 DATE: Jan 17, 2013 4:42pm
 USER: swoczny
 XREFS: 012-0608 PMBLOCK3
 012-0608 XBASE
 012-0608 XUTIL



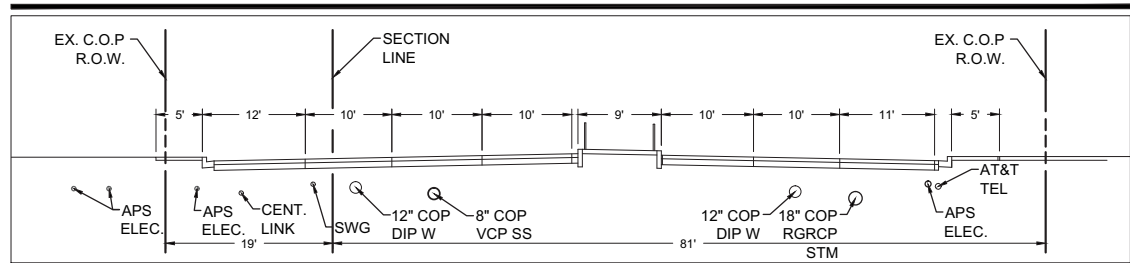
DEMOLITION PLAN - 7TH STREET SCALE: 1"=10' HORIZ.



A SECTION A-A - 7TH STREET SCALE: 1"=10' HORIZ. 1"=1' VERT.



PROPOSED MID BLOCK STAGGERED CROSSING PLAN SCALE: 1"=10' HORIZ.



B SECTION B-B - 7TH STREET SCALE: 1"=10' HORIZ. 1"=1' VERT.

REMOVAL KEY NOTES

#	DESCRIPTION	AMOUNT
1	CONTRACTOR TO REMOVE EXISTING PAVERS, LIMITS AS PER PLAN.	215 SF
2	CONTRACTOR TO REMOVE EXISTING CONCRETE SIDEWALK, LIMITS AS PER PLAN.	750 SF
3	CONTRACTOR TO SAWCUT AND REMOVE EXISTING ASPHALT PAVEMENT, LIMITS AS PER PLAN.	1,072 SF
4	CONTRACTOR TO REMOVE EXISTING CONCRETE CURB AND GUTTER, LIMITS AS PER PLAN.	68 LF
5	CONTRACTOR TO OBLITERATE EXISTING PAVEMENT STRIPING, TYP.	1 LS

CONSTRUCTION KEY NOTES

#	DESCRIPTION	AMOUNT
1	CONSTRUCT CONCRETE CURB & GUTTER AS PER MAG STD DTL 220, TYPE A.	70 LF
2	CONSTRUCT CONC.CURB & GUTTER AS PER MAG STD DTL 220, TYPE A INVERTED PAN.	135 LF
3	CONTRACTOR TO CONSTRUCT CONCRETE SIDEWALK 5" THICK WITH 4" AB AS PER CITY OF PHOENIX STD. DTL. P1230.	1,300 SF
4	CONTRACTOR TO CONSTRUCT CONCRETE MEDIAN NOSE TRANSITION AS PER MAG STD. DTL. 223.	2 EA
5	CONTRACTOR TO INSTALL WROUGHT IRON FENCING (3FT HT.) WITH CONCRETE FOOTINGS. FENCE POSTS TO BE SPACED 6' ON CENTER WITH YELLOW REFLECTIVE TAPE DELINEATOR WRAPPINGS.	80 LF
6	CONTRACTOR TO INSTALL CONCRETE SIDEWALK RAMPS AS PER THE CITY OF PHOENIX STD. DTL P1241-1 WITH TRUNCATED DOMES AS PER C.O.P. STD. DTL. 1232.	2 EA
7	CONTRACTOR TO INSTALL CONCRETE SIDEWALK RAMPS AS PER THE CITY OF PHOENIX STD. DTL P1241-2 WITH TRUNCATED DOMES AS PER C.O.P. STD. DTL. 1232.	2 EA
8	CONTRACTOR TO INSTALL MUTCD R1-5L - YIELD HERE TO PEDESTRIANS SIGN, & POST WITH CONCRETE FOUNDATION AS PER MAG STD DTL. 131, TYPE B.	2 EA
9	CONTRACTOR TO INSTALL MUTCD R4-7 - KEEP RIGHT SIGN, & POST WITH CONCRETE FOUNDATION AS PER MAG STD DTL. 131, TYPE B. CONTRACTOR TO ALSO INSTALL MUTCD OM-3L DELINEATOR SIGN TO POST.	2 EA
10	CONTRACTOR TO INSTALL MUTCD OM1-2 DIAMOND DELINEATOR WARNING SIGNS TO WROUGHT IRON FENCE PICKETS, TWO SIGNS EACH DIRECTIONAL LANE FACING TRAFFIC.	4 EA

PROTECT IN PLACE KEY NOTES

#	PROTECT IN PLACE NOTES
1	EXISTING UNDERGROUND ELECTRICAL TO REMAIN
2	EXISTING CITY OF PHOENIX WATER LINE TO REMAIN
3	EXISTING CITY OF PHOENIX SANITARY SEWER TO REMAIN
4	EXISTING FIBER OPTICAL LINE TO REMAIN
5	EXISTING TELEPHONE CONDUIT TO REMAIN

REVISIONS

REV. NO.	DATE	REVISIONS DESCRIPTION

CHILDREN'S MUSEUM / SCIENCE MUSEUM
 PROJECT ASSESSMENT
 MARICOPA ASSOCIATION OF GOVERNMENTS
 MIDBLOCK STAGGERED CROSSING PLAN
 PHOENIX, AZ

drawn by: EW/SW
 designed by: SW
 checked by: LS
 project no.: 012-0608
 date: 12-28-2012

SCALE 1"=10' NORTH

ARIZONA 311
 Arizona Site, Inc.
 Dial 9-1-1 or 1-800-STAKE-IT (782-5348)
 in Maricopa County (602) 263-1100

SHEET 11 of 11

OLSSON ASSOCIATES
 7250 North 168th Street, Suite 210
 Phoenix, AZ 85026-5282
 TEL 602.748.1000
 FAX 602.748.1001
 www.olsonassociates.com

PRELIMINARY CONCEPTUAL 15% PLANS NOT FOR CONSTRUCTION

REVISIONS

2012