

April 27, 2016

TO: Members of the MAG Standard Specifications and Details Committee

FROM: Jim Badowich, City of Avondale, Chair

SUBJECT: MEETING NOTIFICATION AND TRANSMITTAL OF TENTATIVE AGENDA

Wednesday, May 4, 2016 at 1:30 p.m.
MAG Office, Suite 200 (Second Floor), Ironwood Room
302 North 1st Avenue, Phoenix

A meeting of the MAG Specifications and Details Committee has been scheduled for the time and place noted above. Members of the MAG Specifications and Details Committee may attend the meeting either in person, by videoconference or by telephone conference call. If you have any questions regarding the meeting, please contact Committee Chair Jim Badowich at 623-333-4222 or Gordon Tyus, MAG staff at 602-254-6300.

In 1996, the Regional Council approved a simple majority quorum for all MAG advisory committees. If the MAG Specifications and Details Committee does not meet the quorum requirement, no action can be taken. Attendance at the meeting is strongly encouraged.

Pursuant to Title II of the Americans with Disabilities Act (ADA), MAG does not discriminate on the basis of disability in admissions to or participation in its public meetings. Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contacting Gordon Tyus at the MAG office. Requests should be made as early as possible to allow time to arrange the accommodation.

It is requested (not required) that written comments on active cases be prepared in advance for distribution at the meeting.

MAG Standard Specifications and Details Committee
TENTATIVE AGENDA
May 4, 2016

COMMITTEE ACTION REQUESTED

1. Call to Order and Introductions
Introductions

2. Call to the Audience
An opportunity is provided to the public to address the MAG Specifications and Details Committee on items that are not on the agenda that are within the jurisdiction of MAG, or non-action agenda items that are on the agenda for discussion or information only. Citizens will be requested not to exceed a three minute time period for their comments. A total of 15 minutes will be provided for the Call to the Audience agenda item, unless the committee requests an exception to this limit. Please note that those wishing to comment on agenda items posted for action will be provided the opportunity at the time the item is heard.

3. Approval of April 6, 2016, Meeting Minutes

2. Information.

3. **Review and approve minutes of the April 6, 2016 meeting.**

Carry Forward Cases from 2015

4. Case 15-13: Revisions to Section 725
Add text to Section 725.6 to identify what to include in a concrete mix design submittal.

4. Information and discussion.
Sponsor: Jeff Hearne, Concrete WG
Updated

New Cases for 2016

5. Case 16-01: Misc. Corrections
A. Revise Table 310-1 by deleting "or gradation deficiency" from the Deficiency column for Type IV.
B. Correct arrow placement on Detail 507: Encased Concrete Pipe
C. Add bullets back into Table 608-2 to make sure item 3. Surface Survey is included in medium and large projects.

5. Information and discussion
Sponsors: Bob Herz, MCDOT
Arvid Veidmark, AZUCA

- | | |
|---|--|
| <p>6. <u>Case 16-02: Certificates of Compliance and Analysis</u>
Add requirements for certificate of compliance and certificate of analysis. Add Section 106.2.1 Certificate of Compliance, add Section 106.2.2 Certificate of Analysis, and modify Section 717.2.1.2 Crumb Rubber.</p> | <p>6. Information and discussion
Sponsor: Bob Herz, MCDOT</p> |
| <p>7. <u>Case 16-05: DUAL CURB RAMPS.</u>
New Details 236-1, 236-2, 237-1, 237-2 and revise Section 340.3.9 Tolerances.</p> | <p>7. Information and discussion
Sponsor: Warren White, Chandler
<i>Updated</i></p> |
| <p>8. <u>Case 16-06: Update Section 727 STEEL REINFORCEMENT.</u>
Replace withdrawn ASTM A82 and A185 with ASTM A1064.</p> | <p>8. Information, discussion and possible action
Sponsor: Bob Herz, MCDOT</p> |
| <p>9. <u>Case 16-07: Update Section 415 FLEXIBLE METAL GUARDRAIL.</u>
Add Atmospheric Corrosion Resistance Low-Alloy Steel (COR-TEN steel) to the Material portion of Section 415 Flexible Metal Guardrail.</p> | <p>9. Information, discussion and possible action
Sponsor: Bob Herz, MCDOT
<i>Updated</i></p> |
| <p>10. <u>Case 16-08 Valve Stem Extension Detail.</u>
Separate Valve box Installation and Grade Adjustment. Revise Detail 391-2 to remove Valve Stem extension drawing. Create new Detail 393 for the Valve Stem Extension.</p> | <p>10. Information and discussion
Sponsor: Craig Sharp, Buckeye
<i>New</i></p> |
| <p>11. <u>Case 16-09: Revisions to Section 710.</u>
Remove low volume Gyratory and Marshall mixes.</p> | <p>11. Information and discussion
Sponsor: Greg Groneberg, Asphalt WG
<i>New</i></p> |
| <p>12. <u>New and Potential Cases.</u>
New sponsored cases, ASTM corrections, other potential cases.</p> | <p>12. Information and discussion</p> |

General Discussion

13. Working Group Reports

13. Information and discussion.

- Curb Ramp WG Chair: Warren White
04/18/2016 Meeting
- Water/Sewer WG Chair: Jim Badowich
04/19/2016 Meeting
- Asphalt, Materials and Concrete WGs
04/21/2016 Meeting
Chairs: Greg Groneberg, Brian Gallimore
and Jeff Hearne
- Outside ROW Chair: Peter Kandaris

14. General Discussion

14. Information and discussion.

15. Request for Future Agenda Items

15. Information and discussion.

Adjournment

MEETING MINUTES FROM THE
MARICOPA ASSOCIATION OF GOVERNMENTS
STANDARD SPECIFICATIONS AND DETAILS COMMITTEE

April 6, 2016

Maricopa Association of Governments Office, Ironwood Room
302 North First Avenue
Phoenix, Arizona

AGENCY MEMBERS

Jim Badowich, Avondale, Chair	Lance Webb, Mesa
Caig Sharp, Buckeye	* Dan Nissen, Peoria
Warren White, Chandler, Vice Chair	Robert Duvall, Phoenix (Streets)
* Nick Russo	Jami Erickson, Phoenix (Water)
* Wayne Costa, Florence	Roy Herrington, Scottsdale (proxy)
Tom Kaczmarowski, Glendale	David Mobley, Surprise
* Tom Condit, Gilbert	Tom Wilhite, Tempe
Rob Godwin, Goodyear (proxy)	Jonathan Sorrell, Valley Metro
Ed Williams, MCDOT (proxy)	* Gregory Arrington, Youngtown

ADVISORY MEMBERS

Greg Groneberg, ARPA	Brian Gallimore, AGC
Jeff Hearne, ARPA	Peter Kandaris, Independent (audio)
* Arvid Veidmark, AZUCA	Paul R. Nebeker, Independent
Tom Brennan, AZUCA	Christina Buckle, SRP

MAG ADMINISTRATIVE STAFF

Gordon Tyus

* Members not attending or represented by proxy.

GUESTS/VISITORS

Jim Anderson, Olson Precast Arizona
Troy McGahey, New Horizon Sales

1. Call to Order

Chair Jim Badowich called the meeting to order at 1:36 p.m.

Mr. Badowich asked the proxies and new members introduced themselves. Rob Duvall will be the new streets representative for Phoenix. Jonathan Sorrell is the new representative for Valley Metro, Roy Herrington was filling in for Rod Ramos of Scottsdale, Rob Godwin was representing Goodyear and Ed Williams was substituting for Bob Herz of Maricopa County.

2. Call to the Audience

Chair Badowich announced the call to the audience. No members of the audience wished to speak.

3. Approval of Minutes

The members reviewed the April 2, 2016 meeting minutes. Mr. Badowich asked if there were any changes. He noted a typo in the spelling of his name under item 15.

Craig Sharp moved to accept the minutes with the correction as noted above. Tom Wilhite seconded the motion. A voice vote of all ayes and no nays was recorded.

Carry Forward 2015 Cases

4. Case 15-05: Revise Section 616 Reclaimed Water Line Construction and Add New Reclaimed Valve Box Detail.

Warren White provided a revised case submission in the agenda packet. There were just minor changes to the detail. The number would be changed to 271 instead of 270-2 to avoid confusion with existing Detail 270. It also removed the text of “letters to be submitted...” This note was also removed from Detail 270 to be consistent. The revision to Section 616 was just to reference Detail 271.

Jami Erickson was concerned that the corners of the square box may be cause the surrounding concrete to be susceptible to cracking. Mr. White said that the proposed detail still has the round concrete collar hence they have not had that problem in Chandler. Rob Godwin asked if the depth of the skirt could be increased to reduce the problem of lids popping out. Warren White said this issue was discussed in the working group, but thinks it should be part of a different case. Mr. Badowich agreed, and said the skirt depth is an issue with round boxes and lids as well. Paul Nebeker stated that in Colorado, where he is doing some work now, they use square boxes for everything.

Craig Sharp said that the boxes as currently manufactured do not have a machine finish, as noted on the detail, where the lids rest. Troy McGahey, of New Horizon Sales, verified this. Warren White asked if the machining notes should then be removed from Detail 270 as well. A

consensus of members agreed. Craig Sharp moved to accept the case with the changes discussed. Ed Williams seconded the motion. Warren White summarized the final changes including removing the machined surface notes on Details 270 and 271. Jim Badowich called for a roll call vote. The motion passed: 10 yes, 0 no, 2 abstain, 5 not present.

5. Case 15-13: Add text to Section 725.6 to Identify what to Include in a Concrete Mix Design Submittal.

Sponsor Jeff Hearne said there was nothing new to report.

New Cases for 2016

6. Case 16-01: Miscellaneous Corrections.

Chair Badowich asked if there were any new submissions. None were presented.

7. Case 16-02: Add Section 106.2.1 Certificate of Compliance, add Section 106.2.2 Certificate of Analysis, and modify Section 717.2.1.2 Crumb Rubber.

Ed Williams said that Bob Herz told him that discussions with the Asphalt/Materials Working Group were ongoing. Mr. Badowich said they could get a summary of the working group's discussions later in the meeting.

8. Case 16-03: Revision to Detail 251 RETURN TYPE DRIVEWAYS to adjust concrete thickness and concrete class for commercial and industrial driveways to match requirements shown on Detail 250.

Chair Badowich said this case was on the agenda for a possible vote. Ed Williams asked for comments on the case. Tom Wilhite said cross section A-A shows 6" thick concrete for the curb but only 5" for the driveway. He said Tempe uses 9" thick concrete across the band in their Detail T-319. He also said Tempe has different minimum driveway widths. Although they usually do not allow return-type drives except in special circumstances, he was just letting the committee know of Tempe's differences. Jim Badowich said Avondale also has their own detail, but thought the changes suggested for the MAG detail would be good for those that do use it. Ed Williams moved to accept the case as presented. Warren White seconded the motion. Chair Badowich called for a roll call vote. The motion passed: 12 yes, 0 no, 0 abstain, 5 not present.

9. Case 16-04: Adjustment to Section 340.2.1 for withdrawn ASTM C1028 reference.

Ed Williams asked for comments on the case. Seeing no additional comments he moved to vote on Case 16-04 as presented. Warren White seconded the motion. Chair Badowich called for a roll call vote. The motion passed: 12 yes, 0 no, 0 abstain, 5 not present.

10. Case 16-05: Dual Curb Ramps. New Details 236-1, 236-2, 237-1, 237-2 and revise Section 340.3.9 Tolerances.

Warren White provided an updated copy of the case at the meeting. It updated Section 340.3.9 based on feedback from the committee and working group. The details were all updated to remove the semi-isometric view and redrawn to scale. Hatch patterns were added and most comments from the previous Curb Ramp Working Group meeting were incorporated. He said he also reviewed supplemental details from Tempe, Scottsdale, Phoenix and Chandler. The details also added roll curb transitions.

For Section 340.3.9, Mr. White said the third paragraph allowing a 1/2" tolerance was struck since this large of an allowance could cause the ramps to be out of ADA compliance. The last paragraph was added to list the ADA slope requirements, and includes sidewalk slopes.

Detail 236-1 added a note for concrete thickness to be 6" at arterials and 4" at locals. There was a good discussion on the preferred thickness of the concrete. Jim Badowich said he would prefer 9". Roy Herrington said Scottsdale had a problem with 4" thick wings being broken when trucks drove over them, and now Scottsdale requires thicker ramps and wings. Craig Sharp said it is a problem, and landscaping company trucks often drive over the ramps. He would like the thickness to be 9" for arterials and 6" for local streets. Mr. Badowich agreed even though the ramps are not intended for traffic. Roy Herrington had questions about payment limits on transitions from 6" to 4" thickness, but Craig Sharp said in the current specs it is not measured as a separate pay item. Rob Godwin said he has seen signs that warned of fines for driving on the sidewalks, but Jim Badowich said he would prefer to be proactive rather than reactive.

Mr. Godwin also suggested having specs on making repairs. Tom Wilhite proposed adding construction joints so that if one ramp is damaged both don't have to be rebuilt. He gave an example in Tempe of potholing that went through a ramp when locating utilities on a project, requiring it to be rebuilt. Warren White said Chandler had a detail that he could share. Mr. Wilhite also noticed that Detail 236-2 was missing the A-A Section cutting plane line, and also thought it would be more consistent to choose using fractions or decimals, but not both as done in the section view. (Example: 1 1/2% and 8.33%) Mr. White understood the point and agreed 1.5% would be more consistent.

Jeff Hearne suggested rather than changing the thickness of the concrete, you could move from Class B concrete to Class A or higher. He thought the durability could be improved this way, and gave examples of the compressive and flex strength differences. Rob Godwin noted driveways are currently using Class A.

Roy Herrington said they often have engineers design the ramps for the specific location, because the position of the ramps is determined by the intersection, crosswalks, poles, etc. He suggested adding a control point so that the ramps can be defined with relative dimensions. Jim Badowich referenced note 5 which allows agencies to adjust the location of the ramps as needed. Mr. Herrington said they use the center of the ramp at the back of the curb as the

control point on their designs. Warren White said this could be discussed further at the working group meeting.

Mr. White also talked about the table that was added to allow different curb heights. He said these defaults would change if different ramp slopes are used. For example, the 6" curb would produce a 6' ramp if using the maximum 8.33% allowable slope, but if the slope were 8%, the ramp would increase to 6.25'. Mr. Herrington asked why not use the 1/12 slope instead of 8.33%? Some members noted that the electronic levels give the slope in decimal format. Mr. Godwin suggested the option of adding a conversion table.

Tom Brennan asked about the use of the curb option rather than a wing on Detail 236-2. He was concerned that it may create a tripping hazard that could lead to litigation. Warren White said this curb type ramp was allowed under the proposed standards, but agreed it could be an issue. He noted it also caused the sidewalk to constrict even more on Detail 237-2.

Jim Badowich encouraged members to come to the working group meeting to give more input and to make sure the ramps are as inclusive of agency requirements as possible.

11. Case 16-06: Update Section 727 Steel Reinforcement to replace withdrawn ASTM A82 and A185 with ASTM A1064.

Bob Herz prepared a new case that was provided in the packet. Ed Williams summarized its purpose as follows: "Adjust ASTM references. ASTM A82 and ASTM A185 have been withdrawn and replaced by ASTM A1064. Delete referenced ASTM B670 (Standard Specification for Precipitation-Hardening Nickel Alloy (UNS N07718) Plate, Sheet, and Strip for High-Temperature Service), it is spurious and does not apply."

Gordon Tyus said that while researching ASTM standards, A82 and A185 were replaced by A1064. Jim Badowich said he noticed it also added the text "Reinforcing steel shall be furnished in the sizes, shapes, and lengths shown on the plans." This apparently was done so reference to B670 could be deleted. Seeing that the case was fairly straight-forward, Mr. Badowich proposed a possible vote on the case at the next meeting.

12. Case 16-07: Add Atmospheric Corrosion Resistance Low-Alloy Steel (COR-TEN steel) to the Material portion of Section 415 Flexible Metal Guardrail.

Bob Herz prepared a new case that was provided in the packet. Ed Williams summarized its purpose as follows: "Add Atmospheric Corrosion Resistance Low-Alloy Steel (COR-TEN steel) to the Material portion of Section 415 Flexible Metal Guardrail." Mr. Williams said they have had requests to use this material.

Peter Kandarlis noted that COR-TEN is a registered trademark and suggested calling it "weathering steel" instead. He did a Google search and found that it is used and available. Mr. Williams said he thinks it is often used in national forests. Roy Herrington suggested checking with ADOT. He thinks they may have specs for it. Mr. Kandarlis confirmed that the material falls under AASHTO M180.

Mr. Badowich suggested Mr. Williams check with Mr. Herz to see if this also could be up for a possible vote at the next meeting.

13. New or Potential Cases.

Chair Badowich asked if there were any new or potential cases. Ed Williams passed out a detail that Maricopa County developed for Temporary Site Access. He explained the problem they had with track-out with the current system, and by using asphalt paving they reduced the problem as part of a dust-abatement program. Tom Wilhite asked if it was used for erosion control as part of a BMP plan. He said Tempe adopted a detail from Maricopa County Flood Control District. Mr. Williams was not aware of it being used for that purpose. Jim Badowich said MAG typically does not include temporary details, and suggested it may be an option for the planned outside right-of-way document. Paul Nebeker thought the PVC pipe would be better placed in the corner in the curb detail rather than slightly away from it. Mr. Badowich said he was not sure he wanted to set a precedent of including a temporary detail.

Warren White said he has a potential new case updating details 310-314 and 320 for meter boxes and lids. He said cast iron lids are no longer being used, so details 310-314 need to be updated to allow for steel and other materials such as polymers. He said there are also errors in the table on Detail 320 and references to update. He said he is working with industry representatives (including several in the audience) and will be discussing at the next Water/Sewer Working Group meeting.

Craig Sharp said he is working on a case to modify the valve key in Detail 391-2.

Greg Groneberg said they plan to submit revisions to Section 710 to remove low volume mixes since all the current mixes meet the high volume standard.

14. Working Group Reports

Chair Badowich asked for reports from the working group chairs.

a. **Curb Ramp Working Group**

Warren White said most of what was discussed during the meeting was covered during the discussion on Case 16-05, and that the notes were included in the packet. He asked Roy Herrington to send him info on the control points discussed earlier.

The next meeting is scheduled for Monday, April 18th at 1:30 in the MAG office.

b. **Water/Sewer Issues Working Group**

Jim Badowich said a representative from Oldcastle gave a presentation on meter box specifications, which created more questions. As mentioned earlier, Warren White has volunteered to prepare a case to update the details. Mr. Badowich said they want to have a 1/8" allowance so that lids are interchangeable, but to keep the #1, 2, 3 and 4 boxes at the same dimensions. The group also wants to allow other materials such as polymer

concrete and rotocast (HDPE boxes). He said they are also looking at pedestrian rated and traffic rated boxes. Traffic rated ones are needed when boxes have to be placed in driveways for example, but there are different rating levels to be considered. Industry representatives have agreed to help update the details.

Mr. Badowich hoped that Rob Godwin would be able to help make updates to the testing Section 611. Mr. Godwin said he would help.

Mr. Badowich said one contractor brought up discussions on the separation needed for reclaimed water lines. The contractor felt MAG's current standards were more stringent than needed. Jami Erickson said Phoenix has different standards for sewer and storm drain lines. (For example, the line can be slurried rather than encased.) Paul Nebeker said it doesn't make sense to dig deep to place small reclaimed waterlines just to get separation from existing lines. MAG currently does not address reclaimed water separately. Ms. Ericson suggested referring to existing ARS statutes. Rob Godwin also brought up the issue of raw water which is not potable or reclaimed. Jim Badowich said they will be looking into the matter further at the working group meeting.

Finally, he said they discussed the issue of asbestos in manholes. Tom Kaczmarowski said the county has rescheduled a meeting to give clarification on the issue to April 18th at 1:30.

Mr. Badowich said the next meeting of the working group is scheduled for Tuesday, April 19th, at 1:30 in the MAG office.

c. **Asphalt, Materials and Concrete Working Groups**

Jeff Hearne said the notes of the meeting are in the packet. The group discussed Case 16-02 Certificates of Compliance, but the wording is still being worked on. The group has a list of ASTM references that they are working to resolve and plan to produce a case or cases soon.

As mentioned earlier, a case on Section 710 regarding high volume and low volume mixes is planned. The group discussed the bike lane green paint, but since the specs currently are conditionally approved, they felt it was premature to continue work on it. Mr. Badowich said it is being used more and may need to be revisited.

Mr. Hearne said they had a presentation about a cold in place pavement recycling system. The gentlemen thought they needed a spec in MAG, but Mr. Hearne thought the timing may not be right. They had some interest from Coconino and Yavapai counties to use this process, but until there is a demand in Maricopa County for the spec, it was probably premature. Jim Badowich said we may want to let ADOT vet it. Mr. Hearne said the group would look at it if they prepared a specification.

He also said Don Cornelison is looking to add terminal blend option to Section 325.

Greg Groneberg said his is also looking at a question regarding Section 310 test methods for specific gravity in the rock correction procedure.

Mr. Hearne reminded the group about the material, asphalt and concrete plants tour next week. He said about 25 people have signed up for the April 13th bus tour but there is room for about 20 more. For safety reasons the tour will remain on the bus and take about three hours.

The next meeting of the joint Asphalt/Materials and Concrete Working Groups is scheduled for Thursday, April 21st at noon. The meetings will be held in the ARPA office, 916 W Adams Street, Phoenix.

d. **Outside ROW Working Group**

Peter Kandararis said he is planning to attend working group meetings this month to get help on items. Jim Badowich suggested making backflow specs a priority.

15. General Discussion

Jim Badowich reminded the group that since MAG has made a lot of changes to the specs in the past several years, agencies may need to update the references in their supplements to match the new MAG specs. Warren White said in reviewing their cover sheets, many of the notes needed to be updated. Paul Nebeker said there are references to MAG specs that now longer exist. Jim Badowich suggested members get with the people working on their supplements and in their CIP to make updates as needed.

16. Future Agenda Items

Chair Badowich asked the committee for any possible future agenda items. None were announced.

17. Adjournment

Seeing no further business, chair Badowich adjourned the meeting at 3:30 p.m.

2016 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

(Updated information can be found on the website: <http://www.azmag.gov/Projects/Project.asp?CMSID=1055&CMSID2=7154>)

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
	CARRY FORWARD CASES FROM 2015						
15-05	Case 15-05: Proposed Revisions to Section 616 Reclaimed Water Line Construction and NEW Reclaimed Valve Box detail 270-2. Update Detail 270-1.	Chandler	Warren White	03/04/2015 04/06/2016	Voted: 04/06/2016	10 0 2	Yes No Abstain
15-10	Case 15-10: Add subsection 321.10.5.3 "Rehabilitation Work" into the MAG Specifications.	Materials WG	Brain Gallimore	06/03/2015 07/23/2015	Withdrawn 02/03/2016	0 0 0	Yes No Abstain
15-13	Case 15-13: Add text to Section 725.6 to identify what to include in a concrete mix design submittal.	Concrete WG	Jeff Hearne	06/03/2015 04/21/2016		0 0 0	Yes No Abstain
	NEW CASES FOR 2016						
16-01	Case 16-01: Miscellaneous Corrections: A. Revise Table 310-1 by deleting "or gradation deficiency" from the Deficiency column for Type IV. B. Correct arrow placement on Detail 507: Encased Concrete Pipe C. Add bullets back into Table 608-2 to make sure Item 3. Surface Survey is included in medium and large projects.	MCDOT	Bob Herz, Arvid Veidmark	01/06/2016 03/02/2016		0 0 0	Yes No Abstain
16-02	Case 16-02: Add requirements for certificate of compliance and certificate of analysis. Add Section 106.2.1 Certificate of Compliance, add Section 106.2.2 Certificate of Analysis, and modify Section 717.2.1.2 Crumb Rubber.	MCDOT	Bob Herz	01/06/2016		0 0 0	Yes No Abstain
16-03	Case 16-03: Revision to Detail 251 RETURN TYPE DRIVEWAYS. Adjust concrete thickness and concrete class for commercial and industrial driveways to match requirements shown on Detail 250.	MCDOT	Bob Herz	01/06/2016 02/04/2016	Voted: 04/06/2016	12 0 0	Yes No Abstain
16-04	Case 16-04: Review and adjust Section 340.2.1 for withdrawn ASTM C1028 reference.	MCDOT	Bob Herz	02/03/2016 02/04/2016	Voted: 04/06/2016	12 0 0	Yes No Abstain

2016 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

(Updated information can be found on the website: <http://www.azmag.gov/Projects/Project.asp?CMSID=1055&CMSID2=7154>)

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE
16-05	Case 16-05: Dual Curb Ramps. New Details 236-1, 236-2, 237-1, 237-2 and revise Section 340.3.9 Tolerances.	Chandler/ Curb Ramp WG	Warren White	03/02/2016 04/19/2016		0 Yes 0 No 0 Abstain
16-06	Case 16-06: Update Section 727 Steel Reinforcement to replace withdrawn ASTM A82 and A185 with ASTM A1064.	MCDOT	Bob Herz	04/06/2016	Scheduled: 05/04/2016	0 Yes 0 No 0 Abstain
16-07	Case 16-07: Add Atmospheric Corrosion Resistance Low-Alloy Steel (COR-TEN steel) to the Material portion of Section 415 Flexible Metal Guardrail.	MCDOT	Bob Herz	04/06/2016 04/26/2016	Scheduled: 05/04/2016	0 Yes 0 No 0 Abstain
16-08	Case 16-08: Separate Valve box Installation and Grade Adjustment. Revise Detail 391-2 to remove Valve Stem extension drawing. Create new Detail 393 for the Valve Stem Extension.	Buckeye Water/Sewer WG	Craig Sharp	05/04/2016		0 Yes 0 No 0 Abstain
16-09	Case 16-09: Revisions to Section 710 to remove low volume Gyratory and Marshall mixes.	Asphalt WG	Greg Groneberg	05/04/2016		0 Yes 0 No 0 Abstain

725.6 MIX DESIGN PROPORTIONING:

A concrete mix design carrying the producer's designated mix number for each type of concrete being furnished under these specifications shall be submitted to the Engineer at least once each year for approval. Each design shall utilize the proper proportioning of ingredients to produce a concrete mix that is homogeneous and sufficiently workable to provide a consistent and durable concrete product that meets the specified compressive strength and other properties as required by the application.

A concrete mix design submittal shall include the mix identification number and the applicable proportions, weights, and quantities of individual materials incorporated into the mix including the size and source of concrete aggregates, the type and source of cement and fly ash or SCM, and the brand and designation of chemical admixtures or other additives.

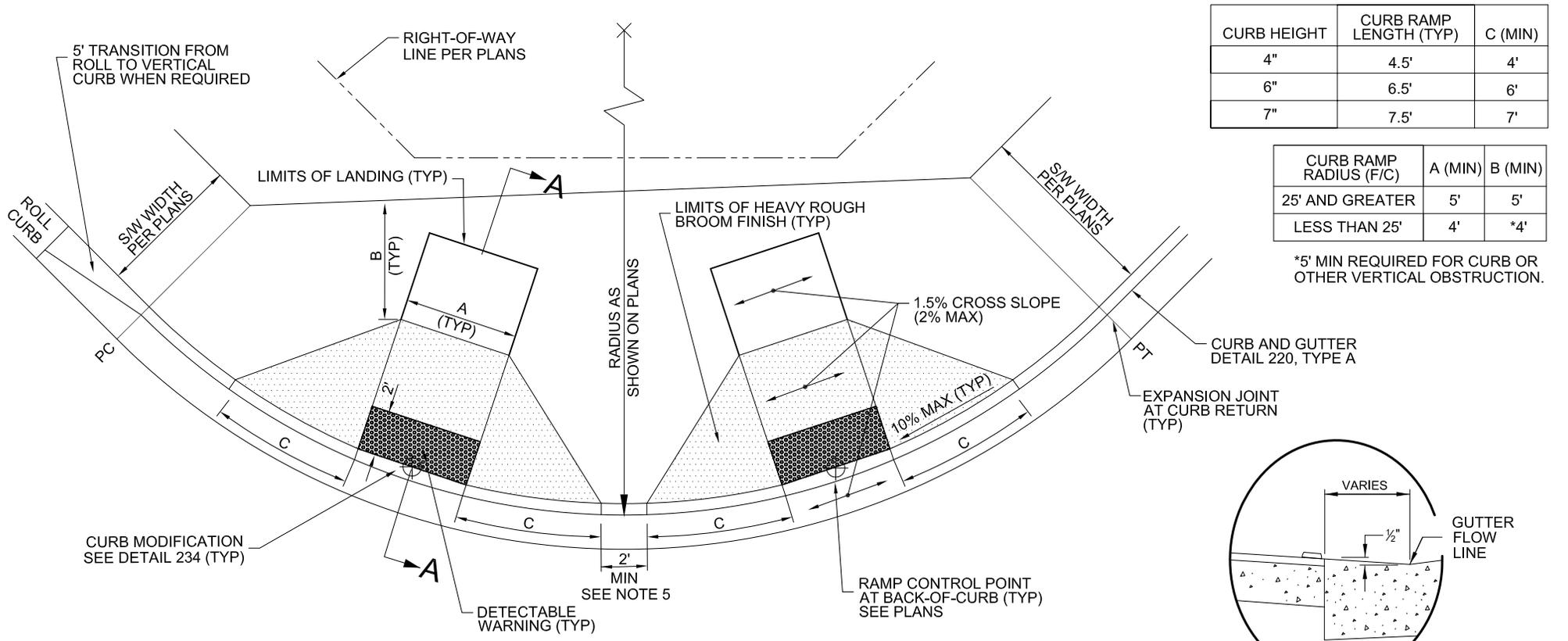
In the event there is a modification to the mix design proportions:

(A) Modifications that do not require a new mix design submittal/approval:

- (1) Modifications which do not result in batch target weights for the fine aggregate or combined coarse aggregates changing by more than 5 percent from the original approved mix design.
- (2) Modifications to the percentage of coarse aggregate fractions that do not change the total coarse aggregate volume.
- (3) Modifications to dosages of chemical or air-entraining admixtures, within the manufacturer's recommendations.
- (4) The incorporation or elimination of chemical admixtures which are listed on the mix design to effect a change in the time-of-set (retarders or accelerators).

(B) Modifications that require a new mix design submittal/approval and may require performance verification:

- (1) Modification to the class of concrete per Table 725-1.
- (2) Modification to the type/class/source of cement, fly ash, natural pozzolan, or silica fume.
- (3) Modification to the percentage of fly ash, natural pozzolan, or silica fume.
- (4) Modification to a coarse aggregate size designation.
- (5) Modification of the type of chemical admixture, or the incorporation or elimination, of an air-entraining admixture.
- (6) Modification of coarse or fine aggregate source.

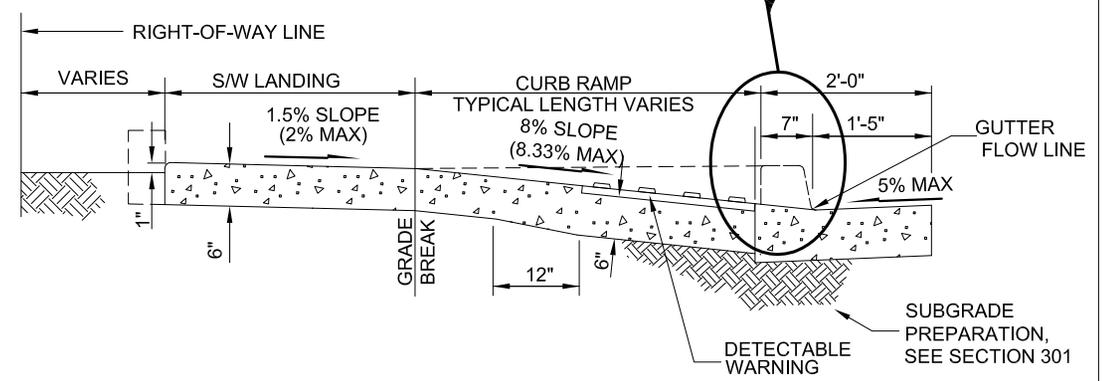


CURB HEIGHT	CURB RAMP LENGTH (TYP)	C (MIN)
4"	4.5'	4'
6"	6.5'	6'
7"	7.5'	7'

CURB RAMP RADIUS (F/C)	A (MIN)	B (MIN)
25' AND GREATER	5'	5'
LESS THAN 25'	4'	*4'

*5' MIN REQUIRED FOR CURB OR OTHER VERTICAL OBSTRUCTION.

- NOTES:**
1. CLASS 'A' CONCRETE PER SECTION 725.
 2. CONSTRUCTION INCLUDING EXPANSION JOINTS AND MAXIMUM SLOPES SHALL CONFORM TO SECTION 340.
 3. SIDEWALK SURFACE TO MATCH 1.5% SLOPE FROM TOP OF CURB.
 4. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.
 5. DISTANCE BETWEEN RAMPS MAY BE ADJUSTED TO IMPROVE CROSSING ALIGNMENT WITH OPPOSING RAMP WHEN ALLOWED BY THE JURISDICTIONAL AGENCY.
 6. SPECIAL DESIGN IS REQUIRED FOR GUTTER GRADES GREATER THAN 2%.



SECTION A-A

DETAIL NO.
236-1

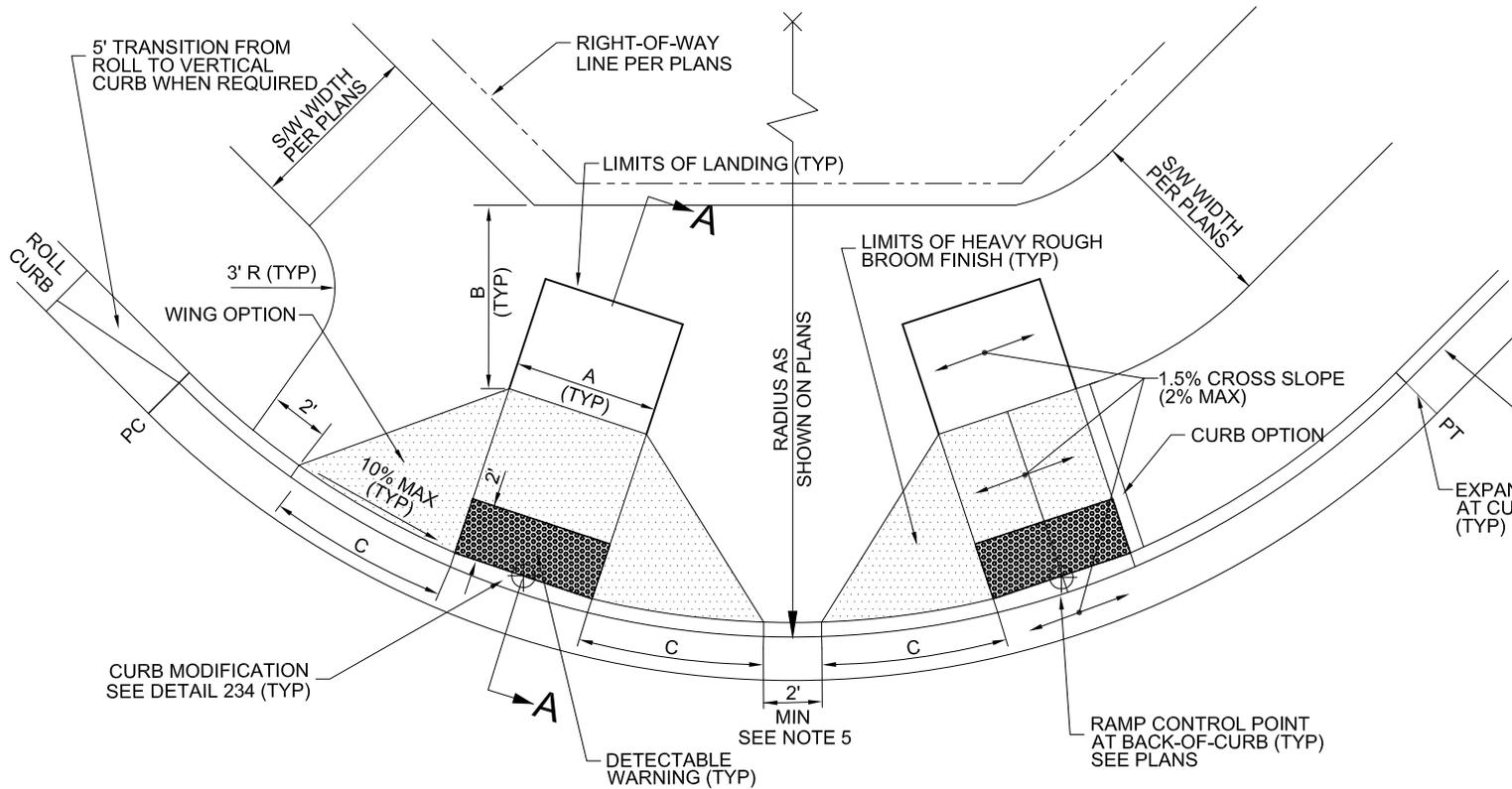


STANDARD DETAIL
ENGLISH

DUAL CURB RAMPS (RADIAL)
ATTACHED SIDEWALK

PROPOSED
01-01-2017

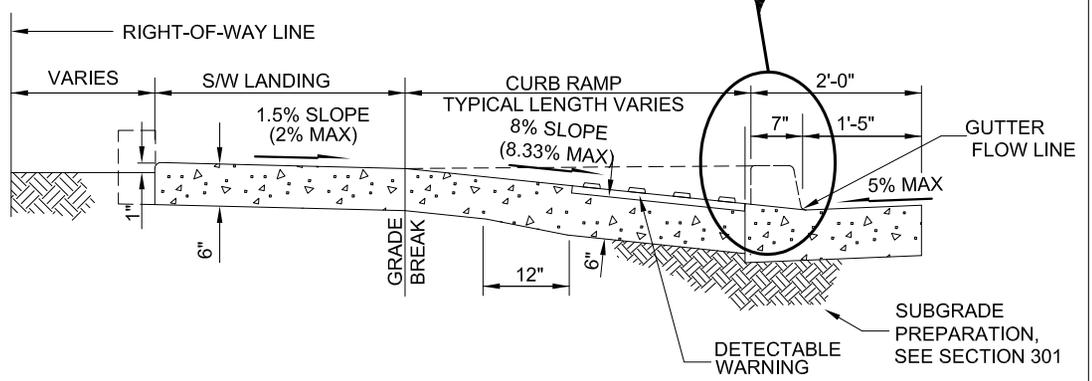
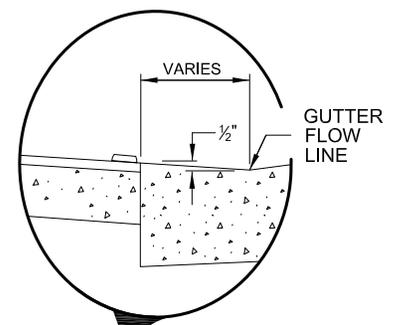
DETAIL NO.
236-1



CURB HEIGHT	CURB RAMP LENGTH (TYP)	C (MIN)
4"	4.5'	4'
6"	6.5'	6'
7"	7.5'	7'

CURB RAMP RADIUS (F/C)	A (MIN)	B (MIN)
25' AND GREATER	5'	5'
LESS THAN 25'	4'	*4'

*5' MIN REQUIRED FOR CURB OR OTHER VERTICAL OBSTRUCTION.



SECTION A-A

NOTES:

1. CLASS 'A' CONCRETE PER SECTION 725.
2. CONSTRUCTION INCLUDING EXPANSION JOINTS AND MAXIMUM SLOPES SHALL CONFORM TO SECTION 340.
3. SIDEWALK SURFACE TO MATCH 1.5% SLOPE FROM TOP OF CURB.
4. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.
5. DISTANCE BETWEEN RAMPS MAY BE ADJUSTED TO IMPROVE CROSSING ALIGNMENT WITH OPPOSING RAMP WHEN ALLOWED BY THE JURISDICTIONAL AGENCY.
6. SPECIAL DESIGN IS REQUIRED FOR GUTTER GRADES GREATER THAN 2%.

DETAIL NO.
236-2

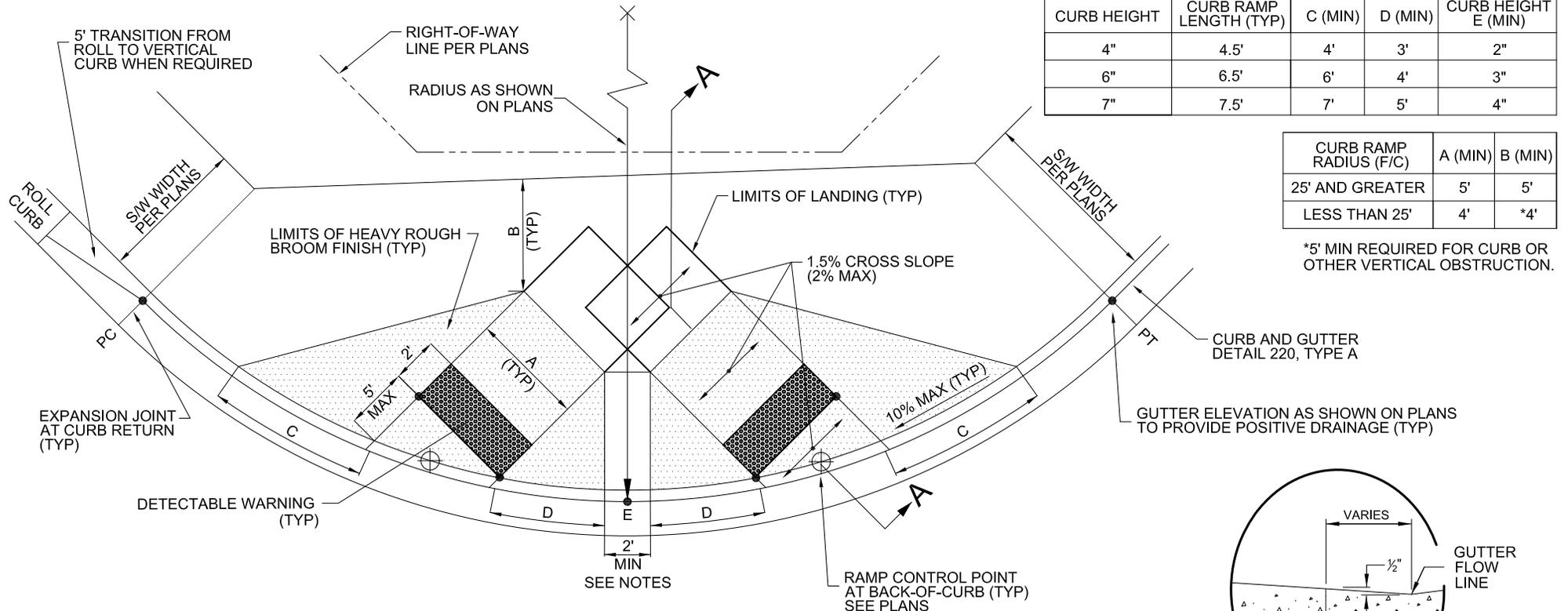


STANDARD DETAIL
ENGLISH

**DUAL CURB RAMPS (RADIAL)
DETACHED SIDEWALK**

PROPOSED
01-01-2017

DETAIL NO.
236-2



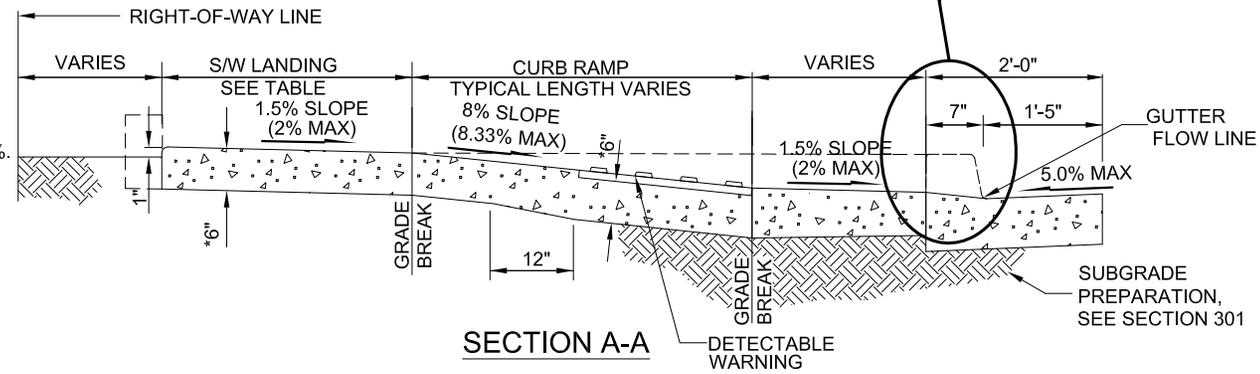
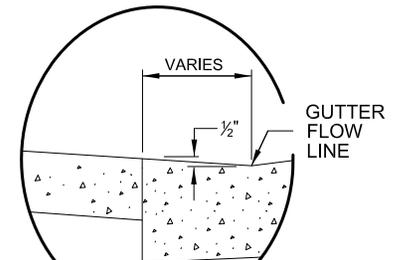
CURB HEIGHT	CURB RAMP LENGTH (TYP)	C (MIN)	D (MIN)	CURB HEIGHT E (MIN)
4"	4.5'	4'	3'	2"
6"	6.5'	6'	4'	3"
7"	7.5'	7'	5'	4"

CURB RAMP RADIUS (F/C)	A (MIN)	B (MIN)
25' AND GREATER	5'	5'
LESS THAN 25'	4'	*4'

*5' MIN REQUIRED FOR CURB OR OTHER VERTICAL OBSTRUCTION.

NOTES:

1. CLASS 'A' CONCRETE PER SECTION 725.
2. CONSTRUCTION INCLUDING EXPANSION JOINTS AND MAXIMUM SLOPES SHALL CONFORM TO SECTION 340.
3. SIDEWALK SURFACE TO MATCH 1.5% SLOPE FROM TOP OF CURB.
4. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.
5. DISTANCE BETWEEN RAMPS MAY BE ADJUSTED TO IMPROVE CROSSING ALIGNMENT WITH OPPOSING RAMP WHEN ALLOWED BY THE JURISDICTIONAL AGENCY.
6. SPECIAL DESIGN IS REQUIRED FOR GUTTER GRADES GREATER THAN 2%.



DETAIL NO.
237-1

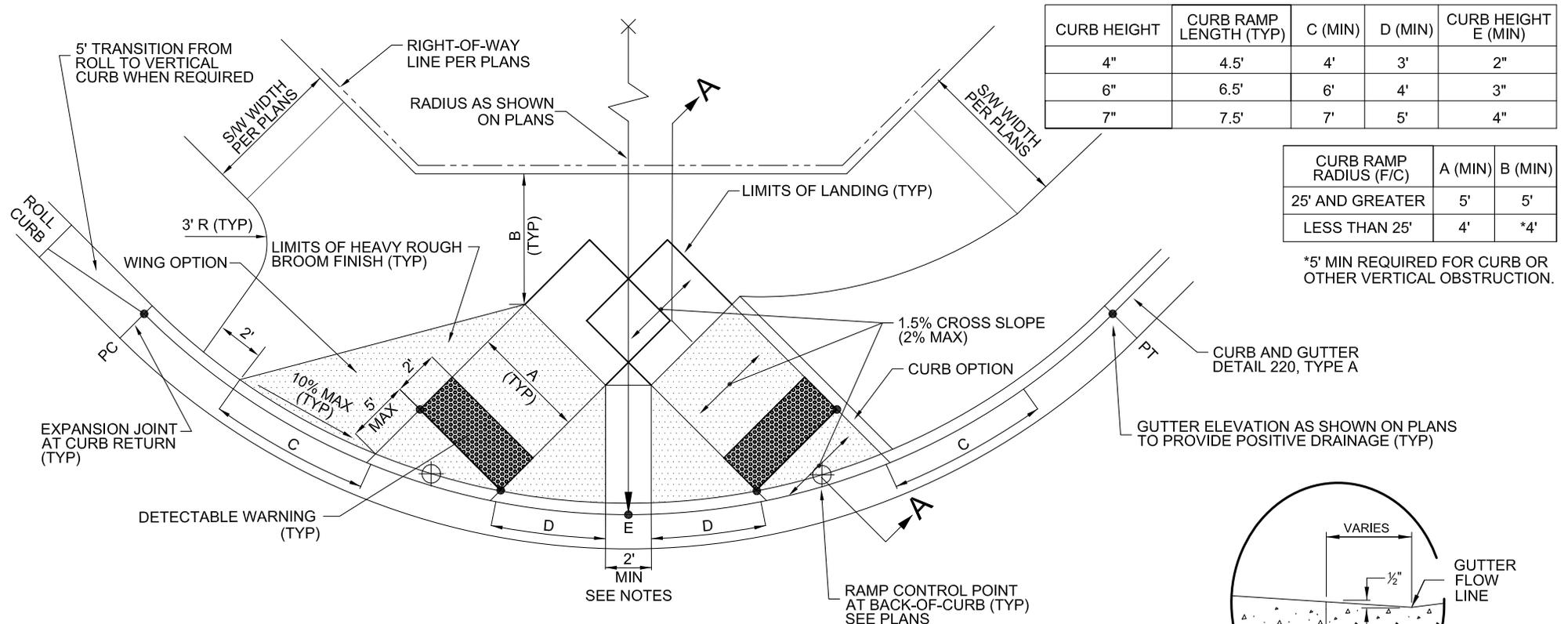


STANDARD DETAIL
ENGLISH

**DUAL CURB RAMPS (DIRECTIONAL)
ATTACHED SIDEWALK**

PROPOSED
01-01-2017

DETAIL NO.
237-1



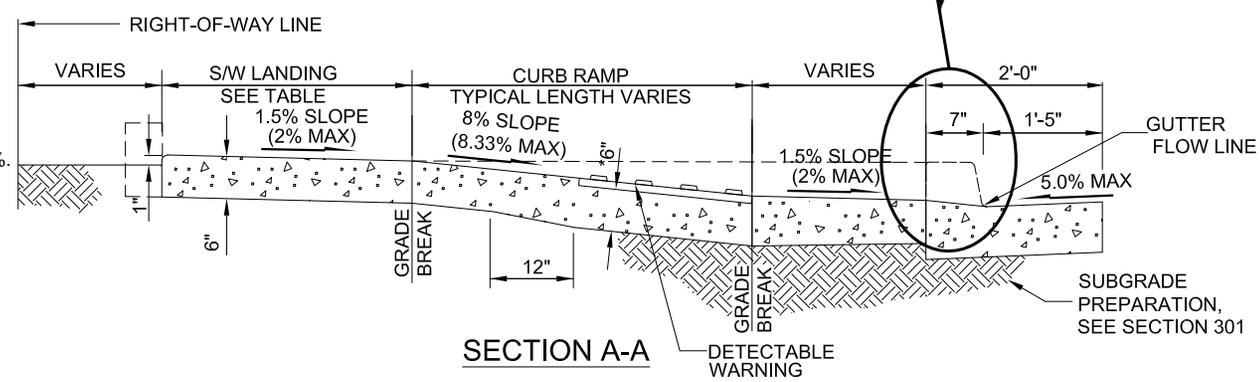
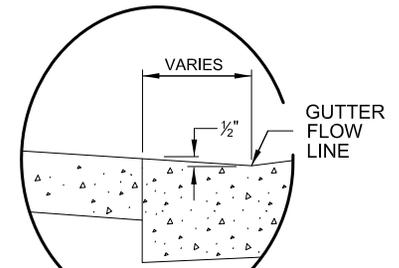
CURB HEIGHT	CURB RAMP LENGTH (TYP)	C (MIN)	D (MIN)	CURB HEIGHT E (MIN)
4"	4.5'	4'	3'	2"
6"	6.5'	6'	4'	3"
7"	7.5'	7'	5'	4"

CURB RAMP RADIUS (F/C)	A (MIN)	B (MIN)
25' AND GREATER	5'	5'
LESS THAN 25'	4'	*4'

*5' MIN REQUIRED FOR CURB OR OTHER VERTICAL OBSTRUCTION.

NOTES:

1. CLASS 'A' CONCRETE PER SECTION 725.
2. CONSTRUCTION INCLUDING EXPANSION JOINTS AND MAXIMUM SLOPES SHALL CONFORM TO SECTION 340.
3. SIDEWALK SURFACE TO MATCH 1.5% SLOPE FROM TOP OF CURB.
4. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.
5. DISTANCE BETWEEN RAMPS MAY BE ADJUSTED TO IMPROVE CROSSING ALIGNMENT WITH OPPOSING RAMP WHEN ALLOWED BY THE JURISDICTIONAL AGENCY.
6. SPECIAL DESIGN IS REQUIRED FOR GUTTER GRADES GREATER THAN 2%.



DETAIL NO.
237-2



STANDARD DETAIL
ENGLISH

**DUAL CURB RAMPS (DIRECTIONAL)
DETTACHED SIDEWALK**

PROPOSED
01-01-2017

DETAIL NO.
237-2



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: March 3, 2016

To: MAG Specifications and Details Committee

From: Robert Herz, MCDOT Representative

Subject: Update to Section 727 Steel Reinforcement

Case 16-06

PURPOSE: Adjust ASTM references. ASTM A82 and ASTM A185 have been withdrawn and replaced by ASTM A1064. Delete referenced ASTM B670 (Standard Specification for Precipitation-Hardening Nickel Alloy (UNS N07718) Plate, Sheet, and Strip for High-Temperature Service), it is spurious and does not apply.

REVISION:

SECTION 727

STEEL REINFORCEMENT

727.1 GENERAL:

The following specifications set forth the requirements for bar reinforcement, wire reinforcement, and wire mesh reinforcement. The reinforcement shall conform accurately to the dimensions and details indicated on the plans or otherwise prescribed and before being placed in any concrete work, shall be thoroughly cleaned of all loose rust, mill scale, mortar, oil, dirt, or coating of any character, which would be likely to destroy, reduce, or impair its proper binding with the concrete.

No reinforcing steel will be accepted under this specification until it has been approved by the Engineer. When required by the Engineer, the Contractor or supplier shall furnish a spot sample taken on the project and notify the Engineer as to when and where they will be available. Such samples shall be furnished at the expense of the Contractor or supplier, but the cost of any testing that may be required will be borne by the Contracting Agency. Samples shall only be taken in the presence of the Engineer. The Contractor shall furnish 3 certified mill test reports or certificates of compliance for each heat or size of steel which can be clearly identified with the lot. When such information has been furnished, placing of the steel will not be held up until results of spot samples have been received. Unless otherwise specified, all reinforcing steel bars shall be deformed intermediate grade 40 billet steel in conformanceing with ASTM A615 ~~and the shapes shall conform with ASTM B670.~~

In testing bar reinforcement, only the theoretical cross-sectional area will be used in all computations.

Reinforcing steel shall be furnished in the sizes, shapes, and lengths shown on the plans. Bending of steel shall conform to the requirements of Section 505.5.2.

The various grades of steel shall not be used interchangeably in structures.

727.2 WIRE REINFORCEMENT:

Wire reinforcement shall in all respects fulfill requirements prescribed in ASTM ~~A82~~ A1064.

727.3 ~~WELDED WIRE MESH~~ REINFORCEMENT:

Mesh reinforcements shall conform to ASTM-A195 A1064. The ~~gage of the wire~~ size number and the ~~dimension of the mesh~~ wire spacing will be specified in the special provisions or shown on the plans. The welded wire mesh reinforcement shall be so constructed as to retain its original shape and form during necessary handling. The effective cross-sectional area of the metal shall be equal to that specified or indicated on the plans.

727.4 WIRE TIES:

Wire for ties shall be black, annealed, not lighter than 16 gage.

- End of Section -

Reference Information:



Designation: B670 – 07 (Reapproved 2013)

Standard Specification for Precipitation-Hardening Nickel Alloy (UNS N07718) Plate, Sheet, and Strip for High-Temperature Service¹

This standard is issued under the fixed designation B670; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers rolled precipitation hardenable nickel alloy (N07718)* plate, sheet, and strip in the annealed condition (temper).

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to become familiar with all hazards including those identified in the appropriate Material Safety Data Sheet (MSDS) for this product/material as provided by the manufacturer, to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

B637 Specification for Precipitation-Hardening and Cold Worked Nickel Alloy Bars, Forgings, and Forging Stock for Moderate or High Temperature Service

B906 Specification for General Requirements for Flat-Rolled Nickel and Nickel Alloys Plate, Sheet, and Strip

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E139 Test Methods for Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials

3. Terminology

3.1 *Description of Terms Specific to This Standard*—The terms given in **Table 1** shall apply.

4. General Requirements

4.1 Material furnished under this specification shall conform to the applicable requirements of Specification **B90** unless otherwise provided herein.

5. Ordering Information

5.1 It is the responsibility of the purchaser to specify a requirements that are necessary for material ordered to this specification. Examples of such requirements include, but are not limited to, the following:

5.1.1 *Alloy*—Name or UNS number (see **Table 2**).

5.1.2 *ASTM designation*, including year of issue.

5.1.3 *Condition*—See **7.1** and **Appendix X1**.

5.1.4 *Finish*—Specification **B906** or **Appendix X1**.

5.1.5 *Dimensions*—Thickness, width, and length.

5.1.6 *Quantity*:

5.1.7 *Optional Requirements*:

5.1.7.1 *Sheet and Strip*—Whether to be furnished in coil, in cut straight lengths, or in random straight lengths.

5.1.7.2 *Strip*—Whether to be furnished with commercial sli edge, square edge, or round edge.

5.1.7.3 *Plate*—Whether to be furnished specially flattened (see **8.7**); also how plate is to be cut (see **8.2.1** and **8.3.2**).

5.1.8 *Fabrication Details*—Not mandatory but helpful to the manufacturer:

5.1.8.1 *Welding or Brazing*—Process to be employed.

5.1.8.2 *Plate*—Whether material is to be hot-formed.

5.1.9 *Certification*—State if certification or a report of test results is required (see Specification **B906**).

5.1.10 *Samples for Product (Check) Analysis*—Whether samples should be furnished (see **6.2**).

5.1.11 *Purchaser Inspection*—If the purchaser wishes to witness the tests or inspection of material at the place of manufacture, the purchase order must so state indicating which

¹ This specification is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.07 on Refined Nickel and Cobalt and Their Alloys.

Current edition approved Feb. 1, 2013. Published February 2013. Originally approved in 1972. Last previous edition approved in 2007 as B670 – 07. DOI: 10.1520/B0670-07R13.

* New designation established in accordance with ASTM E527 and SAE J1086, Practice for Numbering Metals and Alloys (UNS).

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM*

ASTM A185/A185M-07 (Withdrawn Version)

Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete (Withdrawn 2013)

Withdrawn Standard:  A185/A185M-07 | Developed by Subcommittee: A01.05

WITHDRAWN, REPLACED BY [A1064/A1064M](#)

Format	Pages	
 PDF Version	6	DOWNLOAD PDF

1. Scope

1.1 This specification covers welded wire reinforcement to be used for the reinforcement of concrete.

Note 1

Welded wire for concrete reinforcement has been described by various terms: welded wire fabric, WWF, fabric, and mesh. The wire reinforcement industry prefers the term "welded wire reinforcement" (WWR) as being more representative of the range of products being manufactured. Therefore, the term "welded wire fabric" has been replaced with the term "welded wire reinforcement" in this specification and in related specifications.

1.2 The values stated in SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard. (Within the text the inch-pound units are shown in brackets.)

ASTM A82/A82M-07 (Withdrawn Version)

Standard Specification for Steel Wire, Plain, for Concrete Reinforcement (Withdrawn 2013)

Withdrawn Standard:  A82/A82M-07 | Developed by Subcommittee: A01.05

WITHDRAWN, REPLACED BY [A1064/A1064M](#)

Format	Pages	
 PDF Version	4	DOWNLOAD PDF

1. Scope

1.1 This specification covers cold-drawn steel wire, as-drawn or galvanized, to be used as such, or in fabricated form, for the reinforcement of concrete, in sizes not less than 2.03 mm [0.080 in.] nominal diameter.

1.2 Supplement S1 describes high-strength wire, which shall be furnished when specifically ordered. It shall be permissible to furnish high-strength wire in place of regular wire if mutually agreed to by the purchaser and the manufacturer.

1.3 The values stated in SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard (The inch-pound units are shown in brackets except in Table 6.)



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: March 28, 2016

Revised 4/26/2016

To: MAG Specifications and Details Committee

From: Robert Herz, MCDOT Representative

Subject: Update to Section 415 Flexible Metal Guardrail

Case 16-07

PURPOSE: Add Atmospheric Corrosion Resistance Low-Alloy Steel (COR-TEN steel) to the Materials portion of Section 415 Flexible Metal Guardrail.

REVISION:

SECTION 415

FLEXIBLE METAL GUARDRAIL

415.1 DESCRIPTION:

The work under this section shall consist of furnishing all materials, constructing new guardrail, and delineating guardrail sections at the locations shown on the plans.

Guard rail end treatments shall be as specified on the plans or special provisions.

415.2 MATERIALS:

The rail elements, bolts, nuts and other fittings shall conform to the specifications of AASHTO M 180, except as modified in this section. The rail metal shall conform to AASHTO M 180, Type I, Class A and in addition to the requirements of AASHTO M 180, shall withstand a cold bend, without cracking of 180 degrees around a mandrel of a diameter equal to 2 1/2 times the thickness of the plate.

Guardrail specified to be constructed with weathering steel (sometimes called Corten steel) shall conform to the requirements of AASHTO M 180, Type IV, Class B and use ASTM A588 steel.

Three certified copies of mill test reports of each heat from which the rail element is formed shall be furnished to the Engineer.

All materials shall be new, except as otherwise noted on the plans or special provisions.

Railing Parts furnished under these specifications shall be interchangeable with similar parts regardless of source. All surfaces of guardrail elements that are exposed to traffic shall present a uniform, pleasing appearance and shall be free of scars, stains or corrosion.

Nails shall be 16 penny common galvanized.

Bolts shall have shoulders shaped to prevent the bolts from turning.

Unless otherwise specified the rail elements, terminal sections, bolts, nuts, and other fittings shall be galvanized in accordance with Section 771. Where galvanizing has been damaged, the coating shall be repaired in accordance with Section 771.

Guardrail reflector tabs shall be either 3003-H14 Aluminum strip 0.063 ± 0.004 inches thick, or steel strip 0.078 ± 0.008 inches thick galvanized in accordance with ASTM A653 coating designation G 90. The reflector material shall be high-reflectivity sheeting, either silver-white or yellow and shall conform to the requirements of Arizona State Department of Transportation Standard Specifications for Road and Bridge Construction. Adhesive for sheeting attachment to the metal tab shall be of the type and quality recommended by the sheeting manufacturer. Reflector tabs shall conform to the Reflector Tab Detail of Maricopa County Department of Transportation Standard Detail 3002.

Timber for posts and blocks shall be rough sawn (unplanned) or S4S with the nominal dimensions indicated. Any species or group of woods graded in accordance with the requirements for Timber and Posts of the Western Wood Products Association may be used. Timber shall be No. 1 or better, and the stress grade shall be as follows:

6" by 8" Post and Block	1200 psi
8" by 8" Post and Block	900 psi
10" by 10" Post and Block	900 psi

When the plans show guardrail systems using 8" by 8" timber posts and blocks, the Contractor may use 8 1/4" nominal size posts and blocks with a stress grade of 825 pounds per square inch.

At the time of installation, the dimensions of timber posts and blocks shall vary no more than plus or minus 1/2" from the nominal dimensions as specified on the project plans. The size tolerance of rough sawn block in the direction of the bolt holes shall vary no more than plus or minus 3/8".

All timber shall have a preservative treatment as per the requirements of AASHTO M 133.

Structural steel shapes shall conform to the requirements of ASTM A36 and be galvanized in conformance with the appropriate requirements of AASHTO M 111. Dimensions shall meet the dimensional requirements of the American Institute of Steel Construction.

Steel tubes shall conform to the material requirements of ASTM A500 or A501 and be galvanized in conformance with the requirements of AASHTO M 180, Type 1.

415.3 CONSTRUCTION REQUIREMENTS:



CITY OF BUCKEYE
Engineering Department

Case Number: 16-08

Date: April 25, 2016

To: MAG Specifications and Details Committee

From: Craig Sharp

RE: Separate Valve box Installation and Grade Adjustment

Purpose These should be two separate sections

Revision to Detail 391-2 to remove Valve Stem extension drawing

Create new Detail 393 for the valve stem extension.

Please find attached new drawing of valve stem extension.

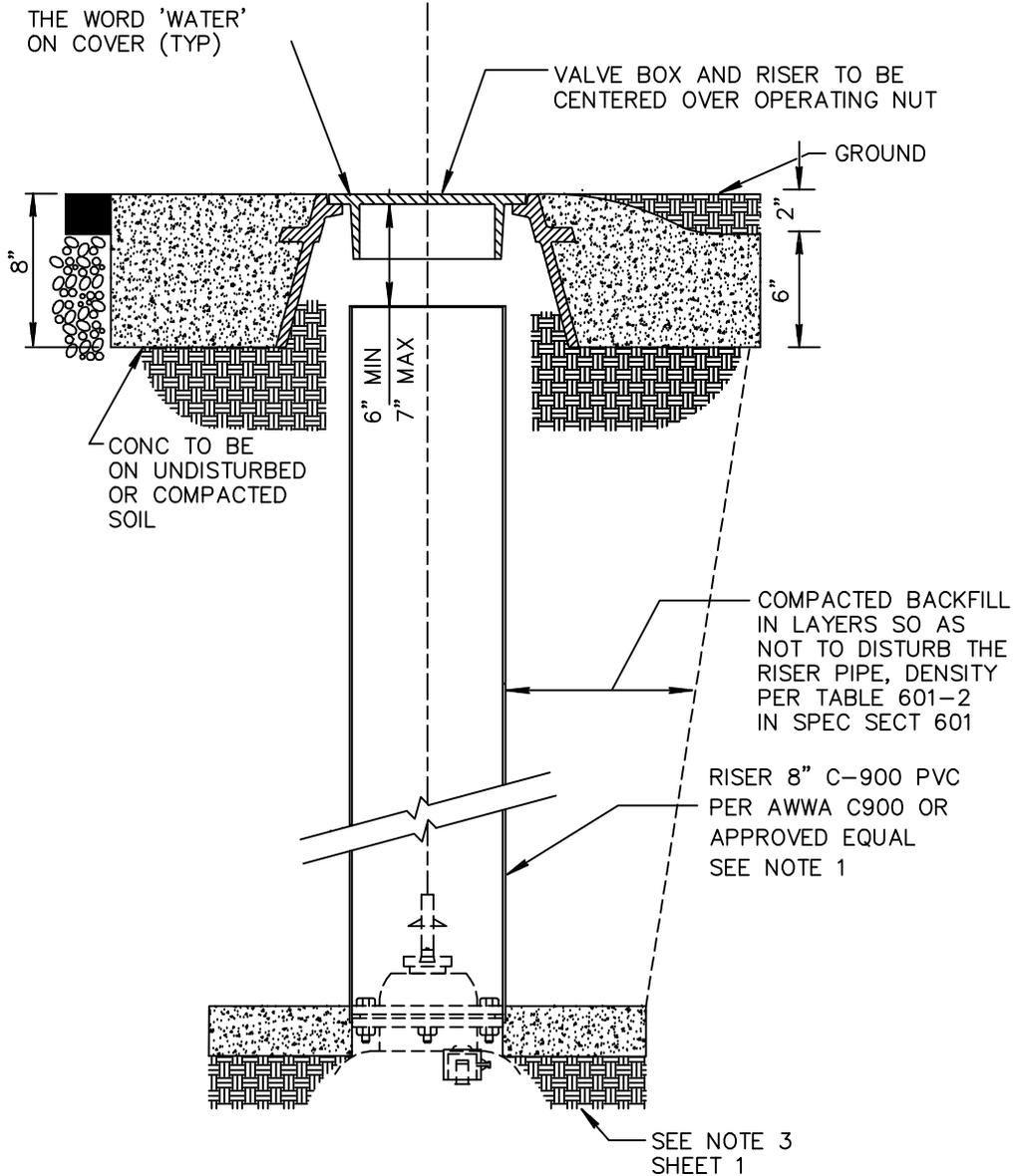
Revisions:

Updated – April 25, 2016

NOTES:

1. IF TWO OR MORE SECTIONS OF PIPE ARE USED TO MAKE THE VALVE BOX RISER, THEY SHALL BE COUPLED OR BONDED TO FORM DEBRIS-TIGHT JOINTS.
2. ALL CONCRETE SHALL BE MAG CLASS 'AA' CONCRETE PER SECTION 725 WITH RADIAL SCORED JOINTS AND MEDIUM BROOM FINISH.
3. CONCRETE COLLAR TO HAVE BE 40" SQUARE OR ROUND.
4. VALVE BOX SHALL BE CENTERED AROUND THE OPERATING NUT.

8" CI FRAME
AND COVER AS PER
DETAIL 270



DRAFT

391-2



STANDARD DETAIL
ENGLISH

VALVE BOX INSTALLATION
AND GRADE ADJUSTMENT

REVISED
DRAFT
01-01-2015

DETAIL NO.
391-2

SECTION 710

ASPHALT CONCRETE

710.1 GENERAL:

Asphalt concrete shall be a mixture of asphalt cement and mineral aggregates. Mineral admixture shall be included in the mixture when required by the mix design or by the Engineer. Asphalt concrete shall be produced in accordance with Section [321](#).

The designation for asphalt concrete mixes shall be based on the nominal maximum aggregate size of the mix. The applicable mix designations are 3/8 inch, 1/2 inch, and 3/4 inch, ~~and Base (1") mix.~~

~~Each mix shall be designed using Marshall or Gyratory compaction methods. Either Gyratory or Marshall Mixes may be used for low or high traffic conditions, as determined by the agency. Low traffic conditions are conditions where the asphalt mix will be subject to low volume and low weight vehicle usage. Examples of this condition are residential streets, most parking lots and residential minor collector streets. High traffic conditions are conditions where the asphalt mix will be subject to high volume and/or heavy weight vehicle usage as found on major collector, arterial and commercial streets. Street classifications (i.e. minor collector and major collector) shall be determined by the specifying agency.~~

The following table (Table [710-1](#)) displays the recommended lift thickness for various asphalt concrete mix designations found within Section [710](#). Please note that these recommended lift thicknesses are minimums based on each mix designation's "Nominal Aggregate Size" and the relative coarseness of its gradation. The compacted thickness of layers placed shall not exceed 150% of the Minimum Lift Thickness of Table [710-1](#) except as otherwise provided in the plans and specifications, or if approved in writing by the Engineer.

TABLE 710-1		
RECOMMENDED MINIMUM LIFT THICKNESS FOR ASPHALT CONCRETE MIXES		
Asphalt Concrete Mix Designation (inches)	Minimum Lift Thickness Marshall Mixes	Minimum Lift Thickness Gyratory Mixes
3/8"	1.0 inches	1.5 inches
1/2"	1.5 inches	2.0 inches
3/4"	2.5 inches	3.0 inches
Base	3.0 inches	n/a

710.2 MATERIAL:

710.2.1 Asphalt Binder: The asphalt binder specified in this section has been developed for use in desert climate conditions. When used in other climates, consideration should be given to adjustments in the asphalt binder selection. The asphalt binder shall be Performance Grade Asphalt conforming to the requirements of Section [711](#) for PG 70-10, unless otherwise approved by the Engineer or specified differently in the plans or special provisions.

710.2.2 Aggregate: Coarse and Fine aggregates shall conform to the applicable requirements of this section. Coarse mineral aggregate shall consist of crushed gravel, crushed rock, or other approved inert material with similar characteristics, or a combination thereof, conforming to the requirements of these specifications.

Coarse aggregate for hot mix asphalt is material retained on or above the No. 4 sieve and Fine aggregate is material passing the No. 4 sieve. Aggregates shall be relatively free of deleterious materials, clay balls, and adhering films or other material that prevent coating with the asphalt binder. Coarse and Fine aggregates shall conform to the following requirements when tested in accordance with the applicable test methods.

SECTION 710

TABLE 710-2		
COARSE/FINE AGGREGATE REQUIREMENTS		
Characteristics	Test Method	Low Traffic High Traffic
Fractured Faces, % (Coarse Aggregate Only)	Arizona 212	75, 1 or more 85, 1 or more 80, 2 or more
Uncompacted Voids, % Min.	AASHTO T-304, Method A	42 45
Flat & Elongated Pieces, % 5:1 Ratio	ASTM D4791	10.0 Max. 10.0 Max.
Sand Equivalent, %	AASHTO T-176	50 Min. 50 Min.
Plasticity Index	AASHTO T-90	Non-plastic Non-plastic
L.A. Abrasion, %Loss	AASHTO T-96	9 max. @ 100 Rev. 40 max. @ 500 Rev. 9 max. @ 100 Rev. 40 max. @ 500 Rev.
Combined Bulk Specific Gravity	AI MS-2/SP-2	2.35 – 2.85 2.35 – 2.85
Combined Water Absorption	AI MS-2/SP-2	0 – 2.5% 0 – 2.5%

Tests on aggregates used in asphalt concrete outlined above, shall be performed on materials furnished for mix design purposes and composited to the mix design gradation.

Blend sand (naturally occurring or crushed fines) shall be clean, hard and sound material which will readily accept asphalt binder coating. The blend sand grading shall be such that, when it is mixed with the other mineral aggregates, the combined product shall meet the requirements of Table [710-2](#).

The natural sand shall not exceed 20 percent for the Marshall mixes and 15 percent for the Gyratory mixes by weight of the total aggregate for a mix.

710.2.3 Reclaimed Asphalt Pavement (RAP): When allowed by the Engineer, Reclaimed Asphalt Pavement (RAP), as defined in Section [701.5](#), may be used in asphalt concrete provided all requirements of Section [710](#) are met. References to use of RAP in Section [710](#) apply only if RAP is used as part of the mixture.

When RAP is used in asphalt concrete, it shall be of a consistent gradation, asphalt content, and properties. When RAP is fed into the plant, the maximum RAP particle size shall not exceed 1 1/2 in. The percentage of asphalt in the RAP shall be established in the mix design. The percentage of RAP binder shall be established in the mix design.

When RAP is used in base and intermediate courses, the amount of RAP aggregate and RAP binder should not exceed 30% contribution; Surface courses should be limited to 20% RAP aggregate and RAP binder contribution.

In addition to the requirements of Section [710.3.1](#), the job mix formula shall indicate the percent of asphalt RAP and the percent and performance grade of virgin (added) asphalt binder.

When less than or equal to 15% RAP binder is used by weight of total binder in the mix, the added virgin binder shall meet the requirements for PG 70-10 as shown in Section [711](#). When greater than 15% RAP is used by weight of the total binder in the

SECTION 710

mix, the added virgin binder will be dropped one grade for low and high temperature properties to a PG 64-16, unless testing indicates that the blend of the recovered RAP binder and virgin binder meets the requirements for PG 70-10 as shown in Section [711](#). The virgin asphalt binder shall not be more than one standard asphalt material grades different than the specified mix design binder grade.

710.2.4 Mineral Admixture: Mineral admixture when used as an anti-stripping agent in asphalt concrete shall conform to the requirements of AASHTO M-17. Mineral admixture used in asphalt concrete shall be dry hydrated lime, conforming to the requirements of ASTM [C1097](#) or Portland cement conforming to ASTM [C150](#) Type II or ASTM [C595](#) Type IP. The amount of hydrated lime or Portland cement used shall be determined by the mix design. The minimum mineral admixture content within a mix will be 1.00 percent, by weight of total aggregate.

SECTION 710

710.3 MIX DESIGN REQUIREMENTS:

710.3.1 General: The mix design for asphalt concrete shall be prepared by a laboratory that is accredited through the AASHTO Accreditation Program (AAP) in Hot Mix Asphalt Aggregates and Hot Mix Asphalt. The laboratory shall be under the direct supervision of a Civil Engineer, registered by the State of Arizona, and who is listed by ADOT as a “Qualified Asphaltic Concrete Mix Design Engineer” within ADOT’s latest list of approved laboratories. The latest list of approved laboratories is available on ADOT’s web page www.azdot.gov. The date of the design shall not be older than one year from the date of submittal, unless supportive documentation is provided and approved by the Engineer.

The mix design report shall include the following elements as a minimum.

- (1) The name and address of the testing organization and the person responsible for the mix design report.
- (2) The mix plant identification and/or location, as well as the supplier or producer name.
- (3) A description of all products that are incorporated in the asphalt concrete along with the sources of all products, including admixtures and asphalt binder, and their method of introduction.
- (4) The supplier and grade of asphalt binder, the source and type of mineral aggregate, and the percentage of asphalt binder and mineral admixture used.
- (5) The percentage of RAP and RAP Binder being contributed to the total mix shall be included in the mix design report.
- (6) The mix design report shall state whether Gyrotory or Marshall ~~shall state the traffic condition (low or high traffic)~~ and size designation.
- (7) The results of all testing, determinations, etc., such as: specific gravity and gradation of each component, water absorption, sand equivalent, loss on abrasion, fractured coarse aggregate particles, Tensile Strength Ratio (ASTM [D4867](#)), Marshall stability and flow, asphalt absorption, percent air voids, voids in mineral aggregate, and bulk density. Historical abrasion values may be supplied on existing sources. The submittal should include a plot of the gradation on the Federal Highway Administration’s 0.45 Power Gradation Chart, plots of the compaction curves and the results of moisture sensitivity testing.
- (8) The laboratory mixing and compaction temperature ranges for the supplier and grade of asphalt binder used within the mix design.
- (9) A specific recommendation for design asphalt binder content and any limiting conditions that may be associated with the use of the design, such as minimum percentages of crushed or washed fine aggregate.
- (10) The supplier’s product code, the laboratory Engineer’s seal (signed and dated), and the date the design was performed.
- (11) If a Warm Mix Technology or additive is used; the following shall be included:
 - Technology type and supporting manufacturer information; including instructions pertaining to laboratory mixture temperatures and curing.
 - Amount (%) of additive (technology) used in the mixture.
 - Attached copy of the ADOT approved product list, showing additive/technology
 - Minimum plant production temperature shall not fall below manufacturer’s recommendation.
 - Minimum field compaction temperature shall be identified.
 - Identify any special mixing or compaction temperatures or special methods to be used when conducting Quality Assurance or Quality Control testing of field collected samples. Example: if the field collected samples of warm mix asphalt can be treated as conventional hot asphalt mix, provide the equivalent conventional hot asphalt mix compaction temperature.

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The mix design shall be submitted to the Agency or Engineer by the Contractor/Supplier for which it was developed as part of his project submittals. Once the mix design has been approved by the agency or Engineer, the Contractor and/or his supplier shall not change plants nor use additional mixing plants without prior approval of the Engineer. Any changes in the plant operation, the producer's pit, the asphalt binder, including modifiers in the asphalt binder, or any other item that will cause an adjustment in the mix, shall be justification for a new mix design to be submitted.

710.3.2 Mix Design Criteria: The mix design shall be performed by one of two methods, Marshall Mix Design or Gyratory Mix Design. The method shall be specified on the plans, special provisions, or by the Engineer. A minimum of 4 points will be used to establish the mix design results. The oven aging period for both Marshall and Gyratory mix design samples shall be 2 hours.

710.3.2.1 Marshall Mix Design: The Marshall Mix Design shall be performed in accordance with the requirements of the latest edition of the Asphalt Institute's Manual, MS-2 "Mix Design Methods for Asphalt Concrete." The mix shall use the compactive effort of 75 blows per side of specimen. The mix shall comply with the criteria in Table [710-3](#).

TABLE 710-3				
MARSHALL MIX DESIGN CRITERIA				
Criteria	Requirements			Designated Test Method
	3/8" Mix	1/2" Mix	3/4" Mix Base Mix	
1. Voids in Mineral Aggregate: %, min	15.0	14.0	13.0 12.0	AI MS-2
2. Effective Voids: %, Range	4.0±0.2	4.0 ±0.2	4.0 ±0.2 4.0 ±0.2	AI MS-2
3. Absorbed asphalt: %, Range*	0-1.0	0-1.0	0-1.0 0-1.0	AI MS-2
4. Dust to Eff. Asphalt Ratio, Range **	0.6-1.4	0.6-1.4	0.6-1.4 0.6-1.4	AI MS-2
5. Tensile Strength Ratio: % Min.	65	65	65 65	ASTM D4867
6. Dry Tensile Strength: psi, Min.	100	100	100 100	ASTM D4867
7. Stability: pounds, Minimum	2,000	2,500	2,500 3,000	AASHTO T-245
8. Flow: 0.01-inch, Range	8-16	8-16	8-16 8-16	AASHTO T-245
9. Mineral Aggregate Grading Limits				AASHTO T-27
Percent Passing with Admix				
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix Base Mix	
1-1/4 inch			100	
1 inch			100 90-100	
3/4 inch		100	90 – 100 85-95	
1/2 inch	100	85 – 100	--- —	
3/8 inch	90-100	62 – 85	62 – 77 57-72	

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No. 8	45-60	40 – 50	35 – 47 33-43
No. 40	10-22	10 – 20	10 – 20 9-18
No. 200	2.0 – 10.0	2.0 – 10.0	2.0 – 8.0 1.0 – 7.0

* Unless otherwise approved by the Engineer.

** The ratio of the mix design composite gradation target for the No. 200 sieve, including admixture, to the effective asphalt content shall be within the indicated range.

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710.3.2.2 Gyratory Mix Design: Gyratory Mix Designs shall be performed in accordance with the requirements of latest edition of the Asphalt Institute’s SP-2 manual. Mix design laboratory compacted specimens shall be prepared using a gyratory compactor in accordance with AASHTO T-312.

The mix design shall be formulated in a manner described for volumetric mix designs in the current edition of the Asphalt Institute Manual SP-2, except the number of trial blend gradations necessary will be determined by the mix design laboratory. Duplicate gyratory samples shall be prepared at a minimum of four (4) binder contents to select the recommended binder content. The gyratory specimens shall be compacted to 160 gyrations. Volumetric data for the design number of gyrations, N_{des} , and the initial number of gyrations, N_{ini} , are then back calculated based on the bulk specific gravity, G_{mb} , of the N_{max} specimens and the height data generated during the compaction process of those same specimens.

TABLE 710-4		
Number of Gyration		
	Low Traffic	High Traffic
N_{ini}	7 8	
N_{des}	75 100	
N_{max}	115 160	

~~For Low traffic designs, volumetric data for 115 gyrations, N_{max} for Low Traffic designs, is also back calculated from the specimens compacted to 160 gyrations.~~

The corrected density of the specimens shall be less than 89.0 percent of maximum theoretical density at N_{ini} . The corrected density of the specimens shall be less than 98.0 percent of maximum theoretical density at N_{max} . The Gyratory mix shall comply with the criteria in Table [710-5](#).

TABLE 710-5				
GYRATORY MIX DESIGN CRITERIA				
Criteria	Requirements			Designated Test
	3/8" Mix	1/2" Mix	3/4" Mix	Method
1. Voids in Mineral Aggregate: %, Min.	15.0	14.0	13.0	AI SP-2
2. Effective Voids: %, Range	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2	AI SP-2
3. Absorbed Asphalt: %, Range *	0 - 1.0	0 - 1.0	0 - 1.0	AI SP-2
4. Dust to Eff. Asphalt Ratio, Range **	0.6 – 1.4	0.6 – 1.4	0.6 – 1.4	AI SP-2
5. Tensile Strength Ratio: %, Min.	75	75	75	ASTM D4867
6. Dry Tensile Strength: psi, Min.	75	75	75	ASTM D4867
7. Mineral Aggregate Grading Limits				AASHTO T-27
	Percent Passing with Admix			
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix	
1 inch			100	
3/4 inch		100	90-100	
1/2 inch	100	90-100	43-89	
3/8 inch	90-100	53-89	-	
No. 8	32-47	29-40	24-36	
No. 40	2-24	3-20	3-18	
No. 200	2.0-8.0	2.0-7.5	2.0-6.5	

* Unless otherwise approved by the Engineer.

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** The ratio of the mix design composite gradation target for the No. 200 sieve, including admixture, to the effective asphalt content shall be within the indicated range.

710.3.2.3 Moisture Sensitivity Testing: Moisture sensitivity testing will be performed in accordance with ASTM [D4867](#) for both Marshall and Gyratory mix designs, without the freeze/thaw cycles. The minimum required Tensile Strength Ratio is indicated in the tables above.

- End of Section -

SECTION 710

ASPHALT CONCRETE

710.1 GENERAL:

Asphalt concrete shall be a mixture of asphalt cement and mineral aggregates. Mineral admixture shall be included in the mixture when required by the mix design or by the Engineer. Asphalt concrete shall be produced in accordance with Section [321](#).

The designation for asphalt concrete mixes shall be based on the nominal maximum aggregate size of the mix. The applicable mix designations are 3/8 inch, 1/2 inch, and 3/4 inch.

The following table (Table [710-1](#)) displays the recommended lift thickness for various asphalt concrete mix designations found within Section [710](#). Please note that these recommended lift thicknesses are minimums based on each mix designation's "Nominal Aggregate Size" and the relative coarseness of its gradation. The compacted thickness of layers placed shall not exceed 150% of the Minimum Lift Thickness of Table [710-1](#) except as otherwise provided in the plans and specifications, or if approved in writing by the Engineer.

TABLE 710-1		
RECOMMENDED MINIMUM LIFT THICKNESS FOR ASPHALT CONCRETE MIXES		
Asphalt Concrete Mix Designation (inches)	Minimum Lift Thickness Marshall Mixes	Minimum Lift Thickness Gyratory Mixes
3/8"	1.0 inches	1.5 inches
1/2"	1.5 inches	2.0 inches
3/4"	2.5 inches	3.0 inches

710.2 MATERIAL:

710.2.1 Asphalt Binder: The asphalt binder specified in this section has been developed for use in desert climate conditions. When used in other climates, consideration should be given to adjustments in the asphalt binder selection. The asphalt binder shall be Performance Grade Asphalt conforming to the requirements of Section [711](#) for PG 70-10, unless otherwise approved by the Engineer or specified differently in the plans or special provisions.

710.2.2 Aggregate: Coarse and Fine aggregates shall conform to the applicable requirements of this section. Coarse mineral aggregate shall consist of crushed gravel, crushed rock, or other approved inert material with similar characteristics, or a combination thereof, conforming to the requirements of these specifications.

Coarse aggregate for hot mix asphalt is material retained on or above the No. 4 sieve and Fine aggregate is material passing the No. 4 sieve. Aggregates shall be relatively free of deleterious materials, clay balls, and adhering films or other material that prevent coating with the asphalt binder. Coarse and Fine aggregates shall conform to the following requirements when tested in accordance with the applicable test methods.

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TABLE 710-2		
COARSE/FINE AGGREGATE REQUIREMENTS		
Characteristics	Test Method	
Fractured Faces, % (Coarse Aggregate Only)	Arizona 212	85, 1 or more 80, 2 or more
Uncompacted Voids, % Min.	AASHTO T-304, Method A	45
Flat & Elongated Pieces, % 5:1 Ratio	ASTM D4791	10.0 Max.
Sand Equivalent, %	AASHTO T-176	50 Min.
Plasticity Index	AASHTO T-90	Non-plastic
L.A. Abrasion, % Loss	AASHTO T-96	9 max. @ 100 Rev. 40 max. @ 500 Rev.
Combined Bulk Specific Gravity	AI MS-2/SP-2	2.35 – 2.85
Combined Water Absorption	AI MS-2/SP-2	0 – 2.5%

Tests on aggregates used in asphalt concrete outlined above, shall be performed on materials furnished for mix design purposes and composited to the mix design gradation.

Blend sand (naturally occurring or crushed fines) shall be clean, hard and sound material which will readily accept asphalt binder coating. The blend sand grading shall be such that, when it is mixed with the other mineral aggregates, the combined product shall meet the requirements of Table [710-2](#).

The natural sand shall not exceed 20 percent for the Marshall mixes and 15 percent for the Gyrotory mixes by weight of the total aggregate for a mix.

710.2.3 Reclaimed Asphalt Pavement (RAP): When allowed by the Engineer, Reclaimed Asphalt Pavement (RAP), as defined in Section [701.5](#), may be used in asphalt concrete provided all requirements of Section [710](#) are met. References to use of RAP in Section [710](#) apply only if RAP is used as part of the mixture.

When RAP is used in asphalt concrete, it shall be of a consistent gradation, asphalt content, and properties. When RAP is fed into the plant, the maximum RAP particle size shall not exceed 1 1/2 in. The percentage of asphalt in the RAP shall be established in the mix design. The percentage of RAP binder shall be established in the mix design.

When RAP is used in base and intermediate courses, the amount of RAP aggregate and RAP binder should not exceed 30% contribution; Surface courses should be limited to 20% RAP aggregate and RAP binder contribution.

In addition to the requirements of Section [710.3.1](#), the job mix formula shall indicate the percent of asphalt RAP and the percent and performance grade of virgin (added) asphalt binder.

When less than or equal to 15% RAP binder is used by weight of total binder in the mix, the added virgin binder shall meet the requirements for PG 70-10 as shown in Section [711](#). When greater than 15% RAP is used by weight of the total binder in the mix, the added virgin binder will be dropped one grade for low and high temperature properties to a PG 64-16, unless testing indicates that the blend of the recovered RAP binder and virgin binder meets the requirements for PG 70-10 as shown in Section [711](#). The virgin asphalt binder shall not be more than one standard asphalt material grades different than the specified mix design binder grade.

710.2.4 Mineral Admixture: Mineral admixture when used as an anti-stripping agent in asphalt concrete shall conform to the requirements of AASHTO M-17. Mineral admixture used in asphalt concrete shall be dry hydrated lime, conforming to the requirements of ASTM [C1097](#) or Portland cement conforming to ASTM [C150](#) Type II or ASTM [C595](#) Type IP. The amount of hydrated lime or Portland cement used shall be determined by the mix design. The minimum mineral admixture content within a mix will be 1.00 percent, by weight of total aggregate.

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710.3 MIX DESIGN REQUIREMENTS:

710.3.1 General: The mix design for asphalt concrete shall be prepared by a laboratory that is accredited through the AASHTO Accreditation Program (AAP) in Hot Mix Asphalt Aggregates and Hot Mix Asphalt. The laboratory shall be under the direct supervision of a Civil Engineer, registered by the State of Arizona, and who is listed by ADOT as a “Qualified Asphaltic Concrete Mix Design Engineer” within ADOT’s latest list of approved laboratories. The latest list of approved laboratories is available on ADOT’s web page www.azdot.gov. The date of the design shall not be older than one year from the date of submittal, unless supportive documentation is provided and approved by the Engineer.

The mix design report shall include the following elements as a minimum.

- (1) The name and address of the testing organization and the person responsible for the mix design report.
- (2) The mix plant identification and/or location, as well as the supplier or producer name.
- (3) A description of all products that are incorporated in the asphalt concrete along with the sources of all products, including admixtures and asphalt binder, and their method of introduction.
- (4) The supplier and grade of asphalt binder, the source and type of mineral aggregate, and the percentage of asphalt binder and mineral admixture used.
- (5) The percentage of RAP and RAP Binder being contributed to the total mix shall be included in the mix design report.
- (6) The mix design report [shall state](#) whether Gyration or Marshall and size designation.
- (7) The results of all testing, determinations, etc., such as: specific gravity and gradation of each component, water absorption, sand equivalent, loss on abrasion, fractured coarse aggregate particles, Tensile Strength Ratio (ASTM [D4867](#)), Marshall stability and flow, asphalt absorption, percent air voids, voids in mineral aggregate, and bulk density. Historical abrasion values may be supplied on existing sources. The submittal should include a plot of the gradation on the Federal Highway Administration’s 0.45 Power Gradation Chart, plots of the compaction curves and the results of moisture sensitivity testing.
- (8) The laboratory mixing and compaction temperature ranges for the supplier and grade of asphalt binder used within the mix design.
- (9) A specific recommendation for design asphalt binder content and any limiting conditions that may be associated with the use of the design, such as minimum percentages of crushed or washed fine aggregate.
- (10) The supplier’s product code, the laboratory Engineer’s seal (signed and dated), and the date the design was performed.
- (11) If a Warm Mix Technology or additive is used; the following shall be included:
 - Technology type and supporting manufacturer information; including instructions pertaining to laboratory mixture temperatures and curing.
 - Amount (%) of additive (technology) used in the mixture.
 - Attached copy of the ADOT approved product list, showing additive/technology
 - Minimum plant production temperature shall not fall below manufacturer’s recommendation.
 - Minimum field compaction temperature shall be identified.
 - Identify any special mixing or compaction temperatures or special methods to be used when conducting Quality Assurance or Quality Control testing of field collected samples. Example: if the field collected samples of warm mix asphalt can be treated as conventional hot asphalt mix, provide the equivalent conventional hot asphalt mix compaction temperature.

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shall not change plants nor use additional mixing plants without prior approval of the Engineer. Any changes in the plant operation, the producer's pit, the asphalt binder, including modifiers in the asphalt binder, or any other item that will cause an adjustment in the mix, shall be justification for a new mix design to be submitted.

710.3.2 Mix Design Criteria: The mix design shall be performed by one of two methods, Marshall Mix Design or Gyrotory Mix Design. The method shall be specified on the plans, special provisions, or by the Engineer. A minimum of 4 points will be used to establish the mix design results. The oven aging period for both Marshall and Gyrotory mix design samples shall be 2 hours.

710.3.2.1 Marshall Mix Design: The Marshall Mix Design shall be performed in accordance with the requirements of the latest edition of the Asphalt Institute's Manual, MS-2 "Mix Design Methods for Asphalt Concrete." The mix shall use the compactive effort of 75 blows per side of specimen. The mix shall comply with the criteria in Table [710-3](#).

TABLE 710-3				
MARSHALL MIX DESIGN CRITERIA				
Criteria	Requirements			Designated Test Method
	3/8" Mix	1/2" Mix	3/4" Mix	
1. Voids in Mineral Aggregate: %, min	15.0	14.0	13.0	AI MS-2
2. Effective Voids: %, Range	4.0±0.2	4.0 ±0.2	4.0 ±0.2	AI MS-2
3. Absorbed asphalt: %, Range*	0-1.0	0-1.0	0-1.0	AI MS-2
4. Dust to Eff. Asphalt Ratio, Range **	0.6-1.4	0.6-1.4	0.6-1.4	AI MS-2
5. Tensile Strength Ratio: % Min.	65	65	65	ASTM D4867
6. Dry Tensile Strength: psi, Min.	100	100	100	ASTM D4867
7. Stability: pounds, Minimum	2,000	2,500	2,500	AASHTO T-245
8. Flow: 0.01-inch, Range	8-16	8-16	8-16	AASHTO T-245
9. Mineral Aggregate Grading Limits				AASHTO T-27
	Percent Passing with Admix			
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix	
1-1/4 inch				
1 inch			100	
3/4 inch		100	90 – 100	
1/2 inch	100	85 – 100	---	
3/8 inch	90-100	62 – 85	62 – 77	
No. 8	45-60	40 – 50	35 – 47	
No. 40	10-22	10 – 20	10 – 20	
No. 200	2.0 – 10.0	2.0 – 10.0	2.0 – 8.0	

* Unless otherwise approved by the Engineer.

** The ratio of the mix design composite gradation target for the No. 200 sieve, including admixture, to the effective asphalt content shall be within the indicated range.

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710.3.2.2 Gyratory Mix Design: Gyratory Mix Designs shall be performed in accordance with the requirements of latest edition of the Asphalt Institute's SP-2 manual. Mix design laboratory compacted specimens shall be prepared using a gyratory compactor in accordance with AASHTO T-312.

The mix design shall be formulated in a manner described for volumetric mix designs in the current edition of the Asphalt Institute Manual SP-2, except the number of trial blend gradations necessary will be determined by the mix design laboratory. Duplicate gyratory samples shall be prepared at a minimum of four (4) binder contents to select the recommended binder content. The gyratory specimens shall be compacted to 160 gyrations. Volumetric data for the design number of gyrations, N_{des} , and the initial number of gyrations, N_{ini} , are then back calculated based on the bulk specific gravity, G_{mb} , of the N_{max} specimens and the height data generated during the compaction process of those same specimens.

TABLE 710-4	
Number of Gyrations	
N_{ini}	8
N_{des}	100
N_{max}	160

The corrected density of the specimens shall be less than 89.0 percent of maximum theoretical density at N_{ini} . The corrected density of the specimens shall be less than 98.0 percent of maximum theoretical density at N_{max} . The Gyratory mix shall comply with the criteria in Table [710-5](#).

TABLE 710-5				
GYRATORY MIX DESIGN CRITERIA				
Criteria	Requirements			Designated Test
	3/8" Mix	1/2" Mix	3/4" Mix	Method
1. Voids in Mineral Aggregate: %, Min.	15.0	14.0	13.0	AI SP-2
2. Effective Voids: %, Range	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2	AI SP-2
3. Absorbed Asphalt: %, Range *	0 - 1.0	0 - 1.0	0 - 1.0	AI SP-2
4. Dust to Eff. Asphalt Ratio, Range **	0.6 - 1.4	0.6 - 1.4	0.6 - 1.4	AI SP-2
5. Tensile Strength Ratio: %, Min.	75	75	75	ASTM D4867
6. Dry Tensile Strength: psi, Min.	75	75	75	ASTM D4867
7. Mineral Aggregate Grading Limits				AASHTO T-27
	Percent Passing with Admix			
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix	
1 inch			100	
3/4 inch		100	90-100	
1/2 inch	100	90-100	43-89	
3/8 inch	90-100	53-89	-	
No. 8	32-47	29-40	24-36	
No. 40	2-24	3-20	3-18	
No. 200	2.0-8.0	2.0-7.5	2.0-6.5	

* Unless otherwise approved by the Engineer.

** The ratio of the mix design composite gradation target for the No. 200 sieve, including admixture, to the effective asphalt content shall be within the indicated range.

710.3.2.3 Moisture Sensitivity Testing: Moisture sensitivity testing will be performed in accordance with ASTM [D4867](#) for both Marshall and Gyratory mix designs, without the freeze/thaw cycles. The minimum required Tensile Strength Ratio is indicated in the tables above.

- End of Section -

Curb Ramp Working Group Meeting

Meeting Notes
April 18, 2016

Opening:

The meeting of the Specifications and Details Curb Ramp Working Group was called to order by chair Warren White on April 18, 2016, at 1:30 p.m. in the MAG Palo Verde Room.

1. Attendance

Brandon Forrey (Peoria), Brian Gallimore (ARPA), Jeff Hearn (ARPA), Dan Shaffer (Surprise), Craig Sharp (Buckeye), Dan Songer (Gilbert) Gordon Tyus (MAG), Tom Wilhite (Tempe), Warren White (Chandler)

2. Radial Curb Ramp Draft Details (Details 236-1, 236-2)

Warren White opened the meeting and began discussing the details with the thickness issue brought up during the main committee meeting. This issue is to reduce breakage when vehicles drive over the ramps. Options included:

- Increasing the thickness of the concrete
- Adding reinforcement or fiber mesh, or allow contractor to propose alternatives
- Increasing the grade to class A concrete

Concrete thickness: Several agencies use thicker concrete for arterial streets, and the committee recommended increasing the thickness. Some disadvantages include difficulty for retrofits, costs, and controlling cracking. Mr. Gallimore said you'll need deeper control joints for the 9" thick concrete.

Reinforcing rods or fiber mesh: Jeff Hearn said many contractors are using fiber mesh to increase strength. Mr. Wilhite thought this was better than increasing thickness. Steel reinforcement was a problem with retrofits and replacing potholed areas.

Class A concrete: Jeff Hearn said industry prefers using Class A concrete. It provides better workability for extrusions. Brandon Forrey said Peoria uses Class A. Dan Shaffer said Surprise does as well.

After discussion on the pros and cons of all the options the group came to consensus of using a thickness of 6" and the increasing grade of concrete to class A for all curb ramps regardless of the type of street where they are constructed. Making it consistent throughout makes it easier on contractors, and reduces the problem of cracking in the transition of thicknesses. Increasing the grade of concrete will increase the strength currently used for ramps on arterials, and provides the same protection for local streets, which can still have the problem of vehicles driving over the ramps.

Next the group discussed specifying control points on the ramps and using offsets to locate and build them. Samples from the City of Scottsdale and ADOT were provided. Craig Sharp thought description of the control points should be specified in Section 340 as well. Mr. Gallimore noted

that during construction, the stake for the control point location as shown would be removed before the ramps were built, but that wasn't a problem once they were located. The members agreed to add them, but their location (front or back of curb) may need more research.

Mr. White led a discussion on the slope requirements and how they are shown on the section view and minimum ramp length in the table. He wanted more input on providing the maximum slopes, recommended slopes (with built-in tolerance), or both on the details. Many city details show the maximum. Brian Gallimore said if they use the maximum values to build the ramps, then construction tolerances can push the ramps out of compliance with ADA standards. He recommended showing both the max and a preferred slope such as 8%. Mr. Forrey said in practice they have been able to slightly slope the sidewalk down to match the top of the ramp and still meet ADA. The length of the ramps in the table currently is based on the maximum slope, and so they also would need to be revised making them longer if the 8% slope is used. Mr. White said he could add 6" to the ramp length to give more construction tolerance and revising from minimum to typical

The group also discussed transitions from roll curbs to vertical curbs. Mr. Forrey recommended using a 4" to 4" vertical curb instead of going up to 6". There is nothing in the MAG curb ramp detail to not allow this. Craig Sharp said Buckeye has a detail.

Other issues mentioned included: what to do when the wings go outside the curb return on smaller radius corners, placement of construction joints, and updating other MAG details to be consistent with changes made in the dual ramps case.

3. Directional Curb Ramp Draft Details (Detail 237-1, 237-2)

Most of the items discussed during the meeting also apply to the directional ramps.

4. Next Steps

Warren White and Brandon Forrey plan to review and update the details based on feedback provided during the meeting. Other members said they would review options with their agencies.

5. Adjournment

The meeting was adjourned at 3:30 p.m.

Water/Sewer Working Group Meeting

Meeting Notes

April 19, 2016

Opening:

A meeting of the Specifications and Details Water/Sewer Working Group was called to order by chair Jim Badowich on April 19, 2016, at 1:30 p.m. in the MAG Palo Verde Room.

1. Introductions/Attendance

Tony Ayala (Avondale), Jim Badowich (Avondale), Tom Brennan (Utility West), Jami Erickson (Phoenix), Peter Kandarlis, Troy McGahey (New Horizon Sales), Paul Nebeker (Pipe Right Now), Bill Romo (Ferguson), Craig Sharp (Buckeye), Brian Sitarz (Oldcastle), Gordon Tyus (MAG), Arvid Veidmark (SSC Boring).

2. Case 16-01: Misc. Corrections

Jim Badowich asked if anyone had any related blooper cases to discuss. None were announced.

3. Case 15-05: Reclaimed Valve Boxes

Mr. Badowich said the case was approved at the last committee meeting.

4. Section 611: Water/Sewer Testing

Mr. Badowich said he may want to break apart disinfection and chlorination revisions. Tony Ayala said he was working with Avondale's water quality division. Jami Erickson said Phoenix has supplements in these areas. Mr. Badowich suggested using Phoenix and Goodyear specs as a template. Mr. Ayala said Avondale also created a supplement. Mr. Badowich noted some agencies have labs for testing, others contract it out, and he wanted to provide testing options even if not all agencies use them. He also said Rod Godwin of Goodyear has interest in this area. Paul Nebeker said some agencies are metering flushing water both in and out, and questioned metering when coming out. He also said metering affects flow. Ms. Erickson said city of Phoenix projects aren't metered, but contractors have to pay for water if they fail the test. Mr. Badowich said charging contractors for water provides incentive for them to keep the pipe clean during installation. He said MAG should have info on the types of meters, and maybe model it after AWWA requirements, but in a MAG format. Tony Ayala said he would get together with others in Avondale and work on producing a template for further review.

Mr. Badowich said MAG currently doesn't cover de-chlorination. Mr. Nebeker said chlorine typically dissipates quickly here. Jami Erickson said on some jobs they plan to discharge into the sewer, but it is job specific. AWWA has requirements for de-chlorinating flushing water. Ms. Erickson said Phoenix requires a discharge permit, and that sometimes flushing water is discharged into storm drains, but noted you have to be careful if work is being done downstream. ADEQ has a permit requirement also. Mr. Nebeker said developers often discharge into retention basins.

5. Meter Boxes/Vaults

Chair Badowich said Warren White has agreed to sponsor this case and is working with Old Castle. Brian Sitarz said they are working on verifying detail drawings (310-320). He said no one uses cast iron lids so they are revising them to remove references to cast iron and replacing with steel or polymer concrete. Jami Erickson asked about their load rating. Mr. Sitarz said as the presentation showed last month there are several rating methods. They propose using ASTM standards (C857). Mr. Badowich asked about the traffic rated boxes in driveways. Mr. Sitarz said they can design them to whatever load

requirements are needed. Mr. Badowich said he wouldn't want a 20K rated box in a commercial driveway. He thought there should be one traffic-rated box that can handle heavy trucks.

Mr. Badowich passed out copies of Detail 345-1 and 345-2 for 3", 4" and 6" water valves. He said they were having issues with these larger valve vault boxes, and that the box size should be determined after the plumbing requirements are designed. Ms. Erickson said Phoenix uses this detail for larger vaults, but they do the plumbing installation themselves. It was confirmed that most are precast, and some have 4" of crushed rock for the floor. Mr. Sharp said they should have torsion doors, not cast iron. Jim Badowich suggested requiring a shop drawing for the plumbing rather than just specifying the detail. Ms. Erickson said they are also concerned with the confined spaces of this vault. Mr. Ayala said 3" valves are not typically used, and sometimes they use two 2" valves rather than a 4" valve setup. Mr. Badowich thought this could be tackled as a future case.

6. Extra Protection Requirements for Reclaimed Water, Section 616 and Details 404-2, 404-2.

Mr. Nebeker said it was unreasonable to go 6' deep for small reclaimed lines just to maintain MAG separation requirements. Mr. Badowich said it needs to meet the Arizona administrative code, but that the separation is also used for construction maintenance. He said MAG should match state and federal requirements. Sealing in ductile iron or using other sleeving to provide extra protection was an option. Section 610 has alternated methods such as concrete encasement. Arvid Veidmark discussed options in Section 602. He described how it is easier to remove and replace old pipe in casings.

7. Asbestos Testing in Manholes

Mr. Badowich asked if there had been any updates from Maricopa County Air Quality Division on this issue. Mr. Ayala said went to a class on it.

8. Case 16-08: Valve Stem Extension Sleeve

Craig Sharp said he had a new case, and provided draft details that separated the Water Valve Extension (new Detail 392) from the current Detail 391-2 Valve Box Installation and Grade Adjustment. It also shows the sleeve for the valve stem extension. He plans to introduce this as a new case at the next committee meeting.

9. Outside Right-of-Way Items

Peter Kandarlis asked for help from the group on developing and review water/sewer related items for the Outside ROW manual. He gathered and reviewed the agency supplements for backfill preventors. He said there were mainly two types: double check and reduced pressure. He said the options and notes varied and hoped to come to a consensus that could reduce agency supplements. Craig Sharp said he had CAD details to start with and could send them. Mr. Kandarlis said he also had a volunteer to help with the underground storage retention. Mr. Nebeker said it was used a lot. Mr. Kandarlis also asked about specs for reclaimed water lines on site. He wanted to get back on track to produce a draft document and thanked members for assistance.

10. Next Meeting

The next meeting will be at 1:30 on May 17th at the MAG offices.

11. Adjournment

The meeting was adjourned at 3:30 p.m.

MAG Asphalt & Materials Working Groups

Meeting Notes

Thursday, April 21, 2016, 12:00 pm at the ARPA Offices

Present:

See attached attendance sheet. Greg Groneberg and Brian Gallimore chaired this portion of the meeting.

Discussion:

- 1) Case 16-02 Certificates of Compliance/Analysis – Bob Herz
The latest Draft was discussed further and an updated version has been sent to Mr. Herz for review.
- 2) Case 16-09 - MAG Section 710 revisions– Greg Groneberg
Copies with tracked changes as well as a clean copy have been submitted as case 16-09
- 3) Proposed New MAG Section 7XX – Greg Groneberg
Members of the working group along with a few others met as a subcommittee to craft a draft for a new section for polymer modified terminal blended rubberized asphalt (PMRTB). The proposal encompasses all specifications within supplements and project special provisions from across the valley.
- 4) New Business – A discussion on MAG Section 310 was had in reference to language and methods regarding rock correction procedures. Adjoining sections were identified that may be impacted by any change to this section. This will be addressed further at the next meeting. Additionally, a conversation on MAG 321 was had in regard to trench paving and the sampling testing procedures being used in these situations. This will also be further addressed in the next meeting.

Date for Next Meeting

The next meeting is scheduled for **May 19, 2016 @ 12:00 pm** in the ARPA offices.

Anyone who wishes to attend is welcome

MAG Concrete Working Group

Meeting Notes

Thursday, April 21, 2016, 12:00 pm at the ARPA Offices

Present:

See attached attendance sheet.

Discussion:

- 1) Case 15-13 - Revision to Section 725.6 – Jeff Hearne
The current revisions dated 4-14-15 was reviewed along with a separate submittal checklist. The group felt like the verbiage in 725.6 was better than the checklist. The proposed change from 5% to 10% on the limit coarse aggregate revisions not needing a revised mix design submittal was withdrawn. A new revision will be submitted to the Committee for review.
- 2) Copies of the last revisions on new Pervious Concrete Sections 3XX and 7XX were distributed to revive the process of developing these sections. All members were encouraged to get these into the hands of those who might be interested in this work for participation and review.
- 3) Jeff Hearne reported to the Working Group that the Plant Tour on April 13th involving three facilities (Aggregate/Base, Concrete, and Asphalt Production) went very well with over 30 participants. Future tours will be organized for Westside locations.

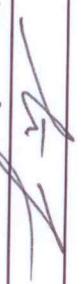
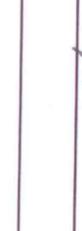
Date for Next Meeting:

The next meeting is scheduled for **May 19, 2016 @ 1:00 pm** in the ARPA offices.

Any and all participants are welcome and encouraged to be involved.

MAG Working Group

Thursday, April 21, 2016

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