

March 27, 2013

TO: Members of the MAG Standard Specifications and Details Committee

FROM: Tom Wilhite, City of Tempe, Chair

SUBJECT: MEETING NOTIFICATION AND TRANSMITTAL OF TENTATIVE AGENDA

Wednesday, April 3, 2013 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 Tom Wilhite at 480-350-2921 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**  
**April 3, 2013**

**COMMITTEE ACTION REQUESTED**

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| <p>1. <u>Call to Order and Introductions</u></p> <p>2. <u>Call to the Audience</u><br/>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.</p> <p>3. <u>Approval of March 6, 2013, Meeting Minutes</u></p> | <p>2. Information.</p> <p>3. <b>Review and approve minutes of the March 6, 2013 meeting.</b></p> |
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**Cases Carried Forward from 2012**

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| <p>4. <u>Case 12-12:</u><br/>New Section 789: Steel Reinforced Polyethylene Pipe (SRPE)</p> | <p>4. Information and discussion.<br/>Sponsor: Rod Ramos, Scottsdale<br/><i>(Updated.)</i></p> |
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**New Cases for 2013**

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| <p>5. <u>Case 13-01 Miscellaneous Corrections:</u><br/>A. Revise title of Section 324<br/>B. Section 505.6.3.3 (4) Typing error correction<br/>C. Section 735.4 (D) Delete reference to AASHTO M-315<br/>D. Correction to Detail 501-5<br/>E. Correct typo in Section 311 Title<br/>F. Remove reference to Section 702.4 in Subsection 795.8.4 Decomposed Granite<br/>G. Revise Section 107.4 to change the Arizona Revised Statue reference 41-846 to 41-865.<br/>H. Remove the word "AND" in the title of Section 725 so it reads "PORTLAND CEMENT CONCRETE"<br/>I. Section 108.8 Correction: Change "or" to "and" in first line.</p> | <p>5. Information and discussion.<br/>Sponsors: Bob Herz, Maricopa County<br/>Peter Kandaris, DGA<br/><i>(New item I.)</i></p> |
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6. Case 13-02:  
Revision to Section 337 CRACK SEALING to obtain compatibility with Maricopa County Requirements.
  7. Case 13-03:  
Revision to Section 321.8.6 Asphalt Concrete Overlay to obtain uniformity with Maricopa County requirements.
  8. Case 13-04:  
Revision to Detail 120 SURVEY MARKER.
  9. Case 13-05:  
New Section 740 Polypropylene Pipe and Fittings for Gravity Storm Drain and Sanitary Sewer.
  10. Case 13-06:  
Modify Part 600 title to include Storm Drain.
  11. Case 13-07:  
Revisions to Detail 201 ASPHALT PAVEMENT EDGE DETAILS. Correct miscellaneous errors and change the Type B thickened edge depth dimension from "8 inch minimum" to "8 inches".
  12. Case 13-08:  
Revision to Section 321.8.8 Thickened Edge. Eliminate references to 'base course' to clarify the surface being referenced.
  13. Case 13-09:  
Revision to Section 321 Asphalt Penalty Tables based on City of Mesa Supplements.
  14. Case 13-10:  
Revision to Section 301.7 (Subgrade Preparation) MEASUREMENT
  15. New and Potential Cases for 2013:
6. Information and discussion.  
Sponsor: Bob Herz, Maricopa County  
*(See February packet for last revision.)*
  7. Information, discussion and possible action.  
Sponsor: Bob Herz, Maricopa County
  8. Information, discussion and possible action.  
Sponsor: Bob Herz, Maricopa County  
*(Updated Detail 120 included.  
See February packet for full case submittal.)*
  9. Information and discussion.  
Sponsor: Warren White, Chandler
  10. Information and discussion.  
Sponsor: Jami Erickson
  11. Information and discussion.  
Sponsor: Bob Herz, Maricopa County  
*(New case.)*
  12. Information and discussion.  
Sponsor: Bob Herz, Maricopa County  
*(New case.)*
  13. Information and discussion.  
Sponsor: Bob Draper, City of Mesa  
*(New case.)*
  14. Information and discussion.  
Sponsor: Bob Herz, Maricopa County  
*(New case.)*
  15. Information and discussion.

**General Discussion**

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| 16. <u>Working Group Reports</u>           | 16. Information and discussion.<br><br>Water/Sewer Chair: Jim Badowich, Avondale<br>Asphalt Chair: Jeff Benedict<br>Materials Chair: Brian Gallimore<br>Concrete Chair: Jeff Hearne<br>Outside ROW: Peter Kandaris |
| 17. <u>General Discussion</u>              | 17. Information and discussion.  |
| 18. <u>Request for Future Agenda Items</u> | 18. Information and discussion.  |

Adjournment

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

March 6, 2013

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

AGENCY MEMBERS

Jim Badowich, Avondale	* Javier Setovich, Peoria
Craig Sharp, Buckeye (proxy)	Syd Anderson, Phoenix (St. Trans.)
Warren White, Chandler	Jami Erickson, Phoenix (Water)
* Antonio Hernandez, El Mirage	Rodney Ramos, Scottsdale
Tom Condit, Gilbert	Jason Mahkovtz, Surprise
* Mark Ivanich, Glendale	Tom Wilhite, Tempe, Chair
* Troy Tobiasson, Goodyear	Harvey Estrada, Valley Metro
Bob Herz, MCDOT	* Jim Fox, Youngtown
Bob Draper, Mesa	

ADVISORY MEMBERS

Jeff Benedict, ARPA	Jeff Hearne, ARPA
Tony Braun, NUCA	Peter Kandaris, Independent
Bill Davis, NUCA (proxy)	Paul R. Nebeker, Independent
Brian Gallimore, AGC	Jacob Rodriguez, SRP
Adrian Green, AGC	

MAG ADMINISTRATIVE STAFF

Gordon Tyus

\* Members not attending or represented by proxy.

GUESTS/VISITORS

Mike Hook, ACPA  
John Kanzleamar, Contech

1. Call to Order

Chairman Thomas Wilhite called the meeting to order at 1:33 p.m.

2. Call to the Audience

Chairman Wilhite opened the call to the audience. No members of the audience requested to speak.

3. Approval of Minutes

The members reviewed the February 6, 2013 meeting minutes. Mr. Herz introduced a motion to accept the minutes as written. Rod Ramos seconded the motion. A voice vote of all ayes and no nays was recorded.

4. Wildlife Crossing Mitigation Measures Presentation

Scott Sprague of the Arizona Game and Fish Department provided a short presentation on highway-related mitigation projects to allow wildlife to safely cross transportation infrastructure. His presentation provided examples of measures to help protect wildlife ecosystems, reduce vehicle accidents and improve safety, and meet federal requirements for protected species such as the desert tortoise.

Some examples provided during the presentation included: using fencing to keep animals off the roads, and designing crossing areas either at grade for low traffic areas, underneath through culverts, or using an overpass. Details showing types of fencing, cattle guards, and other details were provided including a wildlife ramp to allow animals an area to safely get off the roadway. In one case a 97% reduction in vehicle accidents with wildlife was shown when fencing was used.

Bob Herz asked which animals were of concern in Maricopa County. Mr. Sprague said there were big-horn sheep, mule deer, mountain lions, and a few bears as well as the desert tortoise.

Rod Ramos asked if there were design guidelines available. Mr. Sprague said there were guidelines for fencing, bridges and culverts available (he brought a few copies on CD) as well as information from a Pima County research report. He also described Habimaps, an online mapping tool for locating animal habitats in Arizona. He noted that the desert tortoise was the only federally protected species in Maricopa County. He showed a slide with a short fence to direct the tortoises to a culvert as a sample mitigation measure.

Jim Badowich asked if they worked with ADOT. Mr. Sprague said ADOT was a big partner and that they have become more interested in wildlife especially with regards to safety and liability issues.

Chair Wilhite thanked him for his presentation.

## **Review of 2012 Carry Forward Cases**

### **5. Case 12-12: Steel Reinforced Polyethylene Pipe**

*Add new Section 739 for Steel Reinforced Polyethylene (SRPE) Pipe.* Sponsor Rod Ramos handed out a new version of Section 739 based on comments received through the committee and water/sewer working group meetings. The handout included a copy of existing Section 738 to use as a comparison and show how the new specification was modeled on it. Mr. Ramos said although trenching and installation specs are still being revised by the working group, he believed the material specification could go ahead as planned and use the existing installation specifications in the meantime.

Bob Herz noted the difference between the ASTM minimum pressure rating for joints of 10.8 psi compared to the material spec of 15 psi. John Kanzleamar of Contech said this pipe could meet a higher rating. Mr. Herz suggested changing the spec to the minimum so that it was not specific to a particular brand or manufacturer. Jim Badowich asked if it could be used for irrigation and Mr. Kanzleamar said that it could and often is. Bob Draper said he suggested removing the reference to “low pressure” because it was vague and undefined. Rod Ramos said the engineers would look at the material characteristics and decide if an application was appropriate.

Tom Wilhite asked if SRPE could be used to repair flood irrigation pipe and also asked about coupling it to existing pipes. Mr. Kanzleamar said that custom couplings are available depending on the type of pipe. Bill Davis said you must use a water stop with concrete pipe transitions. He noted that Section 739.2.4 references the water stop. Mr. Wilhite also asked about the required cover material. John Kanzleamar said it can depend on whether there is a live load or not. Typically a minimum of 12” to the bottom of pavement is required, but this was a design issue.

Jim Badowich commented that the proposed spec allows a maximum pipe diameter of 120” – currently the same as HDPE, but that ADOT currently only allows up to 60”. AASHTO also only has approved up to 60”, although the ASTM spec is at 120”. Rod Ramos said agencies can always limit the size if they want. Jim Badowich said the trench table widths being revised in Section 603 will show up to 120”. He said the spec may need to be updated to reference installation specs in 610, 615 and 618. Mr. Kanzleamar suggested referencing 603 and updating 603 to reference the other installation specs as appropriate.

## **New 2012 Cases**

### **6. Case 13-01 A-G: Miscellaneous Corrections**

Three new corrections were added to the case.

*F) Delete non-existent reference located within Section 795 Landscape Material.*

Bob Herz submitted this update which was provided in the packet. In the revision to the materials section in the 2012 revision, decomposed granite was removed. This case removes the reference to old section.

*G) Revise Section 107.4 to change the Arizona Revised Statue reference 41-846 to 41-865.*

Mr. Herz handed out another correction relating to Section 107.4 Archaeological Reports. His research showed the correct reference should be to ARS 41-865.

*H) Remove the word “AND” in the title of Section 725 so it reads “PORTLAND CEMENT CONCRETE”*

Jeff Herne noticed this error, and a handout was provided during the meeting. Since Mr. Herz previously handed out an update, the letter “H” was assigned to this case.

7. Case 13-02: Revision to Section 337 CRACK SEALING

*Obtain compatibility with Maricopa County requirements.* Bob Herz handed out a new update with his changes highlighted in yellow. One of the issues brought up was the change in the range for crack sizes back to 1/4” – 1” rather than the proposed change of 1/8” to 1-1/2”. Instead he added language that for 1/4” cracks, the contractor would continue sealing the crack down to 1/8” in size, and would notify the engineer of any cracks greater than 1”. He also highlighted the difference between MCDOTs viscosity heating requirement of 380 degrees F rather than the existing 400 degrees F. Since the material is applied at 380 degrees, MCDOT believes the testing should be done at the same temperature. Jeff Benedict said the Asphalt working group recommended keeping the existing temperature. Mr. Herz said a disadvantage is that the material may cost more from the manufacturer, but the advantage is you would know it will work at the temperature at which the material is being applied. Finally, Mr. Herz said Section 337.7 Measurement was updated to list several methods to allow the agency to pick the method of payment they preferred.

8. Case 13-03: Revision to Section 321.8.6 ASPHALT CONCRETE OVERLAY

*Obtain compatibility with Maricopa County requirements.* Bob Herz handed out a new update with his changes highlighted in yellow. He said he addressed the issue of when tack coating is used for dust control. Brian Gallimore brought up the issue of adjustments to manholes including pre-lowering them before milling for the overlay. He pointed out that this is the section where adjustments are called out and suggested to add update it while the case was open. Mr. Herz asked Mr. Gallimore to submit language he would like to include.

9. Case 13-04: Revision to Detail 120 SURVEY MARKER

*Revise detail to prevent installation of survey markers that do not comply with requirements of state law.* Bob Herz presented an updated Detail 120: Survey Marker based on feedback from the previous meeting. The chamfer was removed from the Type B detail, and Note 7 was added to describe when the chamfer was needed. Note 8 added that the year must also be stamped on the cap. Jim Badowich described an example of placing the marker in the medium where it would not match the asphalt/base materials that were shown on the detail. Mr. Herz said the Type B detail illustrates a typical installation, but does not specifically call out the asphalt or

base materials specifically. Tom Wilhite said Tempe uses and would like to keep the Type C option. Mr. Herz proposed voting on the case next month.

10. Case 13-05: New Section 740 Polypropylene Pipe and Fittings for Gravity Storm Drain and Sanitary Sewer

*Propose new material section for Polypropylene Pipe material.* Warren White said the proposed polypropylene pipe material is on a similar path as the proposed Section 379 SRPE case. While the working group is continuing to make updates to the trenching and installation specification, the materials spec can be reviewed and updated as necessary to be in sync. Bill Davis said they were continuing rewriting the flexible pipe sections in the working group, but would be happy to take any questions about the proposed pipe material.

Bob Herz asked why the thermoplastic welding was deleted in one section but not another. Mr. Davis said he would review it. Paul Nebeker began a short discussion on thermal welding applications of different types of plastic pipe materials. There was also some discussion on the differences of corrugated, solid wall and smooth exterior types of plastic pipe.

11. Case 13-06: Change Title of Part 600 to Include Storm Drain

*Update Title of Part 600.* Jami Erickson of Phoenix presented this change to allow them to remove it from their supplement. Members suggested adding Irrigation to the list to make it even more complete. The consensus of the committee was to make this a separate case rather than add it to the miscellaneous corrections case.

12. Potential Cases for 2013

Warren White asked if anyone was considering using PVC for water mains that were not under the street. Several members questioned whether we should consider PVC material at all. Others suggested that it may be appropriate for the Outside ROW group to review. Scottsdale, Mesa and Phoenix do not allow PVC pipe. Jim Badowich said you can't use mechanical joints on PVC because it places pressure points on it, so support must be provided by thrust blocks. Peter Kandarlis said it is used for irrigation purposes.

Another issue brought up was whether Asbestos-cement water pipe (ACP) should be included in MAG since it is no longer available. One thought was to leave it for maintenance only, especially information for connection and removal procedures. Craig Sharp said Flagstaff requires removal all the way back to a coupling for repairs. It was also proposed to remove Section 752 Asbestos-cement Water Pipe and Fittings from the MAG standards. Valley Metro and Phoenix have removed it from their specifications. Harvey Estrada of Valley Metro agreed to sponsor a case regarding ACP.

Peter Kandarlis said he planned to sponsor a case updating the curb, sidewalk and gutter specs.

Jim Badowich said the polywrap dimensions table needed to be updated and said a case to revise them should be coming soon from the water/sewer group.

### 13. Working Group Reports

Chairman Wilhite asked for reports from the working groups. He asked the working group chairs to provide him a paragraph on the topics of the next working group meetings, so he could send a timely email notice.

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

Jim Badowich said the group met February 19<sup>th</sup> at 1:30 at the MAG office. (Notes included in packet.) He said the group discussed manhole details and were planning to take out the adjustment detail and move it to the streets (200) area. Revised and new details would include the precast manhole sections, precast base, and cast in place base. He said the group discussed the best place for precast base specifications. Mr. Herz suggested adding it to Section 505 for precast structures. Mr. Badowich handed out a table showing the relationship of pipe types, trenching and installation specifications and what sections the group was working on. He thanked the industry representatives for their work on draft revisions. He hoped to have cases ready in a couple months. Another issue to be addressed by the group was revisions to the testing and flushing sections. The next meeting is scheduled for March 19<sup>th</sup> at 1:30 p.m. in the MAG office.

b. **Asphalt Working Group**

Jeff Benedict said he didn't have anything to add that wasn't discussed earlier other than the next meeting is scheduled for March 21<sup>st</sup> at noon at the ARPA offices. Mr. Wilhite asked if he had a list of issues that would be discussed at the next meeting. Mr. Benedict said he would provide them to him, and also work to plan ahead for additional meetings.

c. **Materials Working Group**

Brian Gallimore said they discussed breaking Section 309 into two separate specifications, one for lime stabilization and one for lime modification, since they were two different processes. He said several manufacturers were planning to attend the next meeting, and asked if the agency members had any issues regarding lime specifications to please attend. The next materials working group meeting will follow the asphalt meeting on March 21<sup>st</sup>.

d. **Concrete Working Groups**

Jeff Hearne said they planned to get Section 340 Curb, Sidewalks and Gutters ready to present as a new case and also planned to continue work revising Section 324 Portland Cement Concrete Street Paving. He also discussed a handout announcing the Arizona Concrete Pavement Tech Day on March 14, 2013. He said ADOT along with FHWA and ACPA would be giving presentations and showing results of a long term pavement performance test. The event included presentations, lunch and a review of the tests in the field.

The next meeting of the working group is scheduled for February 21<sup>st</sup> at ARPA beginning around 1:30 p.m.

e. **Outside Right-of-Way Working Group**

Peter Kandaris said he met on February 26<sup>th</sup> with an industry representative from ADS, and was planning the next meeting for Tuesday, March 26<sup>th</sup> at 1:30 p.m. at the MAG offices. His plan is to review sections of the proposed outside ROW document and update existing MAG sections as required with minor changes. He said he does need help and requested assistance from members. Warren White asked if he received landscaping information. Mr. Kandaris said he did and could work with Mr. Gallimore and the materials group for misc. items such as landscaping not covered by the other working groups.

14. General Discussion

Chairman Wilhite asked for general discussion items. None were voiced by the committee. Mr. Tyus said he had no further updates.

15. Future Agenda Items

Chairman Wilhite asked for general discussion items. None were voiced by the committee.

16. Adjournment:

The chair adjourned the meeting at 3:23 p.m.

## 2013 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

(Updated information can be found on the website: <http://www.azmag.gov/Committees/Committee.asp?CMSID=1055> )

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
	<b>CARRY FORWARD CASES FROM 2012</b>						
12-12	Case 12-12: New Section 789 – Steel Reinforced Polyethylene Pipe (SRPE)	Scottsdale	Rod Ramos	07/11/2012 03/11/2013		0 0 0	Yes No Abstain
	<b>NEW CASES FOR 2013</b>						
13-01	<b>Case 13-01: Miscellaneous Corrections:</b> A. Revise title of Section 324 B. Section 505.6.3.3 (4) Typing error correction C. Section 735.4 (D) Delete obsolete reference to AASHTO M-315 D. Correction to Detail 501-5 E. Correct typo in Section 311 Title F. Remove reference to Section 702.4 in Subsection 795.8.4 Decomposed Granite G. Revise Section 107.4 to change the Arizona Revised Statue reference 41-846 to 41-865. H. Remove the word “AND” in the title of Section 725 so it reads “PORTLAND CEMENT CONCRETE” I. Section 108.8 Correction: Change “or” to “and” in first line.	MCDOT	Bob Herz Peter Kandaris Jeff Hearne	01/02/2012 03/18/2013		0 0 0	Yes No Abstain
13-02	Case 13-02: Revision to Section 337 CRACK SEALING to obtain compatibility with Maricopa County requirements.	MCDOT	Bob Herz	01/02/2012 03/06/2013		0 0 0	Yes No Abstain
13-03	Case 13-03: Revision to Section 321.8.6 Asphalt Concrete Overlay to obtain uniformity with Maricopa County requirements.	MCDOT	Bob Herz	02/06/2013 03/06/2013	Scheduled for: 04/03/2013	0 0 0	Yes No Abstain
13-04	Case 13-04: Revision to Detail 120 SURVEY MARKER.	MCDOT	Bob Herz	02/06/2013 03/22/2013	Scheduled for: 04/03/2013	0 0 0	Yes No Abstain
13-05	Case 13-05: New Section 740 Polypropylene Pipe and Fittings for Gravity Storm Drain and Sanitary Sewer.	Chandler	Warren White	02/06/2013		0 0 0	Yes No Abstain

## 2013 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

(Updated information can be found on the website: <http://www.azmag.gov/Committees/Committee.asp?CMSID=1055> )

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE
13-06	Case 13-06: Modify Part 600 title to include Storm Drain.	Phoenix	Jami Erickson	03/06/2013		0 Yes 0 No 0 Abstain
13-07	Case 13-07: Revisions to Detail 201 ASPHALT PAVEMENT EDGE DETAILS. Correct miscellaneous errors and change the Type B thickened edge depth dimension from "8 inch minimum" to "8 inches".	MCDOT	Bob Herz	04/03/2013		0 Yes 0 No 0 Abstain
13-08	Case 13-08: Revision to Section 321.8.8 Thickened Edge. Eliminate references to 'base course' to clarify the surface being referenced.	MCDOT	Bob Herz	04/03/2013		0 Yes 0 No 0 Abstain
13-09	Case 13-09: Revision to Section 321 Asphalt Penalty Tables based on City of Mesa Supplements.	Mesa	Bob Draper	04/03/2013		0 Yes 0 No 0 Abstain
13-10	Case 13-10: Revised Section 301.7 (Subgrade Preparation) MEASUREMENT	MCDOT	Bob Herz	04/03/2013		0 Yes 0 No 0 Abstain

**STEEL REINFORCED POLYETHYLENE PIPE & FITTINGS FOR STORM DRAIN, SANITARY SEWER & IRRIGATION****739.1 GENERAL:**

This specification covers the requirements of Steel Reinforced Polyethylene Pipe (SRPE) pipe manufactured per ASTM F2562 for storm drains, irrigation and sanitary sewer systems. When noted on the plans or in the special provisions, storm drains, irrigation and sanitary sewers may be constructed using SRPE pipe. The SRPE pipe will be of the sizes 24 inch diameter through 120 inch diameter. Trench excavation, backfilling and compaction for this flexible pipe shall be in accordance with Section 603. **Construction and installation shall be in accordance with Section 615 for storm drain and irrigation water and Section 618 for sanitary sewers.**

The size and stiffness class of the SRPE pipe per ASTM F2562 to be furnished shall be specified by the Engineer and shown on the plans or in the project specifications.

**739.2 MATERIALS:**

**739.2.1 Base Steel Materials:** Continuous high strength galvanized ribs shall be cold rolled steel meeting the requirements of either ASTM A1008 or ASTM A1011 with minimum yield strength of 80,000 psi. Steel ribs shall be completely encased within the HDPE profile.

**739.2.2 HDPE Material Composition:** SRPE pipe HDPE material and fittings shall, in accordance with ASTM 2562, be made from HDPE plastic compound meeting the minimum requirements of cell classification 335464C or higher cell classification, in accordance with ASTM D3350.

**739.2.3 Gaskets:** Rubber gaskets shall be manufactured from a natural rubber, synthetic elastomer or a blend of both and shall comply in all respects with the physical requirements in ASTM F477.

**739.2.4 Water Stops:** Water stops shall be manufactured from a natural or synthetic rubber and shall conform to the requirements of ASTM C923. The water stop shall have expansion rings, a tension band, or a take-up device used for mechanically compressing the water stop against the pipe.

**739.2.5 Thermal Welding Material:** The material used for thermally welding the pipe material shall be compatible with the base material.

**739.2.6 Lubricant:** The lubricant used for assembly shall comply with manufacturer's recommendations and have no detrimental effect on the gasket or pipe.

**739.2.7 Other Materials:** Materials other than those specified above shall comply with ASTM F2562.

**739.3 JOINING SYSTEMS:**

**738.3.1 Gasket Type:** Steel reinforced bell and spigot joints for the piping system and fittings shall consist of an integrally formed bell and spigot gasketed joint. The joint shall be designed so that when assembled, the elastomeric gasket is compressed radially on the pipe or fitting bell to form a water tight seal. The joint shall be designed so to prevent displacement of the gasket from the joint during assembly and when in service. The elastomeric gasket shall meet the provision of ASTM F477. Gasketed watertight pipe joints shall meet a laboratory test pressure of ~~15.0~~ 10.8 psi when tested in accordance with ASTM D3212.

All pipes shall have a home mark on the spigot end to indicate proper penetration when the joint is made.

The bell and spigot configurations for the fittings shall be compatible to those used for the pipe.

Joints shall provide a seal against exfiltration and infiltration. All surfaces of the joint upon which the gasket may bear, shall be smooth and free of any imperfections, which would adversely affect seal ability. The assembly of the gasketed joints shall be in accordance with the pipe manufacturer's recommendations.

## SECTION 739 (Proposed)

**739.3.2 Thermal Weld Type:** Electro fusion joints, when specified, shall utilize plain ended pipe welded together by internal pressure testable couplers. The internal couplers shall have a minimum wall thickness equal to or greater than the pipe wall thickness as defined in pipe specification, ASTM F2562. The assembly of the welded joints shall be in accordance with the manufacturer's recommendations. Electro fusion watertight pipe joints shall meet a laboratory test pressure of ~~30.0~~ 10.8 psi when tested in accordance with ASTM D3212.

For applications demanding higher joint performance, consult with the pipe manufacturer for their specific joint tightness ratings and capabilities.

### **739.4 FITTINGS:**

Fittings for SRPE pipe may include tees, elbows, manhole adapter rings, plugs, caps, adapters and increasers. Fittings shall be joined by gasket type or thermal weld type joints in accordance with Subsection [739.3](#).

A clamp gasket or approved method shall be provided at manhole entry or connection to reduce infiltration and exfiltration. Where precast manholes are used, entrance holes must be large enough to allow for proper grouting around the manhole gasket. A non-shrink grout shall be used for grouting.

### **739.5 CERTIFICATION:**

The manufacturer shall furnish an affidavit (certification) that all materials delivered shall comply with the requirements of ASTM F2562.

### **739.6 DIMENSIONS AND TOLERANCES:**

SRPE pipe dimensions shall comply with dimensions given in Table 2 of ASTM F2562. The "inside diameter" of profile wall SRPE pipe shall not deviate from its published inside diameter by more than specified in Section 6.2.3 of ASTM F2562.

### **739.7 MARKINGS:**

Markings on pipe shall be per ASTM F2562. These markings shall be clearly shown on the pipe at intervals of approximately 12 feet and include but not limited to the following: the manufacturer's name or trademark, nominal size, the specification designation, plant designation code, date of manufacture or an appropriate code. All fittings shall be marked with the designation number of the specification and with the manufacturer's identification symbol.

### **739.8 CARE OF PIPE AND MATERIALS:**

All pipe and materials shall be manufactured, handled, loaded, shipped and unloaded in such a manner as to be undamaged and in sound condition, in the completed work. Particular effort shall be exercised to protect the ends of the pipe. Repairs on damaged pipe shall be made to the satisfaction of the Engineer otherwise they shall not be used in the work and shall be replaced with an equal pipe or special in an acceptance condition. At all times, rubber gaskets shall be covered in a factory applied protective wrap or stored in a cool, dark place until ready for use.

*- End of Section -*



**MARICOPA COUNTY**  
*Department of Transportation*

MEMORANDUM

**Date:** March 18, 2013

**To:** MAG Specifications and Details Committee

**From:** Robert Herz, MCDOT Representative

**Subject:** Section 108.8 Correction

**Case 13-01 I**

**PURPOSE:** Change “or” to “and”.

**REVISION:**

**108.8 GUARANTEE AND WARRANTY PROVISIONS:**

The Contractor shall guarantee the work against defective workmanship ~~or~~ and materials for a period of one year from the date of its final acceptance under the contract, ordinary wear and tear and unusual abuse or neglect excepted.



**MARICOPA COUNTY**  
*Department of Transportation*

**MEMORANDUM**

**Date:** January 23, 2013

**To:** MAG Specifications and Details Committee

**From:** Robert Herz, MCDOT Representative

**Subject:** Revision to Section 321.8.6 Asphalt Concrete Overlay **Case 13-03**

**PURPOSE:** Obtain uniformity with Maricopa County requirements.

**REVISIONS:**

- Removed mix design restrictions from the specification. Asphalt overlay mix design requirements should be identified by project contract documents not within a general construction specification.
- Pavement repair was made a separate pay item. Since pavement removal and patching is a separate operation and since pavement repair requirements can vary greatly between different overlay projects, the repair of pavement defects should be a separate pay item, it should be a project cost not an overlay cost.
- Revised the pavement surface preparation items to have surface cleaning as a separately identified requirement immediately preceding the tack coat requirements.
- Added the requirement for shoulder adjustment when overlaying uncurbed roadways.

**CHANGES since the last submittal are HIGHLIGHTED IN YELLOW**

**321.8.6 Asphalt Concrete Overlay:** Asphalt concrete overlay consists of the placing and compacting plant mix asphalt concrete over existing pavement. The mix design and thickness of the overlay shall be as shown on the plans or as specified in the special provisions.

Except when the existing asphalt surface is to be preheated and remixed, pavement surfaces shall be prepared as follows:

- (a) Areas designated for pavement repair by the contract documents (which may include severely raveled areas, severely cracked areas, over-asphalted areas, and other defects) shall be cut out and replaced. Pavement repairs shall be completed and approved before placing asphalt concrete overlay. **(Deleted Sentence)**
- (b) Before placing asphalt concrete overlay, milling shall be done as shown on the plans or specified in the special provisions and shall be in accordance with Section 317.
- (c) After pavement repairs and milling have been completed the entire surface shall be cleaned with a power broom.
- (d) After surfaces have been prepared to the satisfaction of the Engineer, they shall receive a tack coat per Section 321.4. Traffic will not be permitted to travel over surfaces which have received a tack coat, **except when tack coat is applied to milled surfaces in compliance with section 317.2 for dust control purposes.** When the overlay is to extend onto a concrete gutter, the gutter shall be thoroughly cleaned of loose dust and cement particles and shall be tack coated.

Asphalt concrete overlay shall be placed as specified in Section 321.8.1 and compacted as specified in Section 321.8.4. The surface smoothness shall meet the tolerances specified in Section 321.8.5.

Manholes and tops of valve boxes, clean-outs and other existing structures shall be adjusted to set flush with the finished surface of the new paving. During adjustment if pavement or base materials are removed or disturbed, they shall be replaced with approved materials installed in a manner acceptable to the Engineer.

On roads without curb and gutter, the existing unpaved shoulder elevation shall be adjusted by the Contractor to match the elevation at the edge of the new overlay and slope away from the new pavement surface at a rate that the existing quantity of shoulder material will allow. Shoulder material shall be compacted to a minimum of 95% of maximum density, determined in accordance with section 301.3. Shoulder adjustment to match the new pavement surface elevation shall not be measured. The cost of shoulder adjustment shall be included in the price paid for the asphalt concrete overlay or other related pay items. When the Engineer determines an insufficient amount of material is available for shoulder adjustment, the Engineer may require the Contractor to provide additional material. Acceptable material for shoulders includes the existing shoulder material, millings, untreated base materials, or a granular material approved by the Engineer. Engineer requested imported material for shoulder adjustment is not included in the price paid for the asphalt concrete overlay.

**321.13 PAYMENT:**

The asphalt concrete measured as provided above will be paid for at the contract price per ton or square yard, as adjusted per Section 321.10, which price shall be full compensation for the item complete, as herein described and specified.

Payment for tack coat will be by the ton diluted, based on the rate of application, as directed by the Engineer.

No payment will be made for any overrun in quantity of asphalt concrete in excess of 10 percent based on actual field measurement of area covered, design thickness, and the mix design unit weight. The calculations and payment for overrun will be by individual pay item. To compensate or adjust for a thickness deficiency in an underlying asphalt concrete course, the Engineer may authorize a quantity increase in excess of 10 percent for a subsequent asphalt concrete course. In such cases, the quantity in excess of 10 percent will be paid for at the lowest unit price.

Agency required repairs of existing pavement prior to roadway overlay operations will be paid for as a separate pay item.

Except as otherwise specified no separate payment will be made for work necessary to construct miscellaneous items or surfaces of asphalt concrete.

### **Redlined Strikeout Version:**

**321.8.6 Asphalt Concrete Overlay:** Asphalt concrete overlay consists of the placing and compacting plant mix asphalt concrete over existing ~~asphalt concrete paving~~pavement. The mix design and thickness of the overlay shall be as shown on the plans or as specified in the special provisions. ~~Preliminary preparation of existing surfaces will be required except when accomplished by the Contracting Agency, and it is so stipulated in the special provisions. With the exception of those which have been preheated and remixed only, existing surfaces shall receive a tack coat.~~

~~Asphalt concrete mix aggregate gradation and percentage of asphalt binder shall be in accordance with Section 710 using a 1/2 inch Marshall Low Traffic asphalt concrete mix designation for overlay more than one and one half inch in thickness and a 3/8 inch Marshall Low Traffic asphalt concrete mix designation for overlay one and one half inch or less in thickness, unless otherwise shown or specified in the special provisions.~~

Except when ~~they have been~~the existing asphalt surface is to be preheated and remixed, pavement surfaces shall be prepared as follows:

(a) ~~Before placing asphalt concrete overlay, Areas designated for pavement repair by the contract documents (which may include severely raveled areas, severely or cracked areas, that are depressed more than 3/4 inch from the adjoining pavement shall be cut out and patched at least 48 hours prior to the resurfacing operation. over-asphalted areas, and other defects) or rough high spots shall be cut out and replaced. Pavement repairs shall be either milled or cut out and patched completed and approved before placing asphalt concrete overlay. Large shrinkage cracks shall be filled with asphalt sealing compound acceptable to the Engineer. The entire surface shall be cleaned with a power broom. Raveled areas that do not require removing shall be cleaned by hand brooming. The above are incidental, and the cost thereof shall be included in the bid items.~~

(b) Before placing asphalt concrete overlay, milling shall be done as shown on the plans or specified in the special provisions and shall be in accordance with Section 317.

(c) After pavement repairs and milling have been completed the entire surface shall be cleaned with a power broom.

~~(ed)~~ After surfaces have been prepared to the satisfaction of the Engineer, they shall receive a tack coat per Section 321.4. Traffic will not be permitted to travel over surfaces which have received a tack coat, except when tack coat is applied to milled surfaces in compliance with section 317.2 for dust control purposes. When the overlay is to extend onto ~~the a~~ concrete gutter, the gutter shall be thoroughly cleaned of loose dust and cement particles and shall be tack coated.

Asphalt concrete overlay shall be placed as specified in Section 321.8.1 and compacted as specified in Section 321.8.4. The surface smoothness shall meet the tolerances specified in Section 321.8.5.

Manholes and tops of valve boxes, clean-outs and other existing structures shall be built up and the frames adjusted to set flush with the finished surface of the new paving, and tops of valve boxes, clean-outs and other existing structures shall be adjusted to finish grade. In the event the base course and original pavingDuring adjustment if pavement or base materials have beenare removed or disturbed ~~in order to build up the manhole,~~ they shall be replaced with approved materials which shall be thoroughly compactedinstalled in a manner acceptable to the Engineer. ~~The asphalt concrete around the manhole frame shall be completed and made flush with the adjacent overlay.~~

On roads without curb and gutter, the existing unpaved shoulder elevation shall be adjusted by the Contractor to match the elevation at the edge of the new overlay and slope away from the new pavement surface at a rate that the existing quantity of shoulder material will allow. Shoulder material shall be compacted to a minimum of 95% of maximum density, determined in accordance with section 301.3. Shoulder adjustment to match the new pavement surface elevation shall not be measured. The cost of shoulder adjustment shall be included in the price paid for the asphalt concrete overlay or other related pay items. When the Engineer determines an insufficient amount of material is available for shoulder adjustment, the Engineer may require the Contractor to provide additional material. Acceptable material for shoulders includes the existing shoulder material, millings, untreated base materials, or a granular material approved by the Engineer. Engineer requested imported material for shoulder adjustment is not included in the price paid for the asphalt concrete overlay.

### **321.13 PAYMENT:**

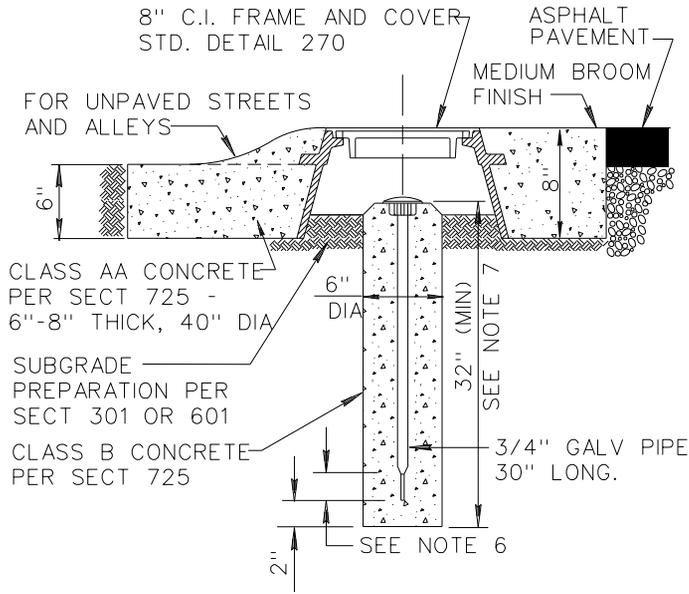
The asphalt concrete measured as provided above will be paid for at the contract price per ton or square yard, as adjusted per Section 321.10, which price shall be full compensation for the item complete, as herein described and specified.

Payment for tack coat will be by the ton diluted, based on the rate of application, as directed by the Engineer.

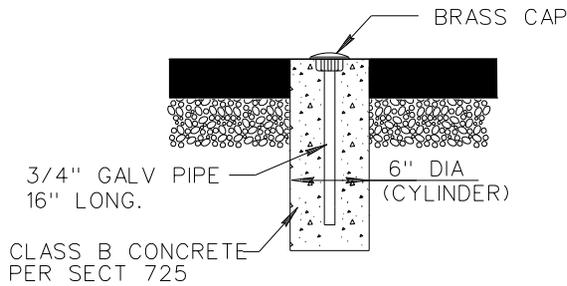
No payment will be made for any overrun in quantity of asphalt concrete in excess of 10 percent based on actual field measurement of area covered, design thickness, and the mix design unit weight. The calculations and payment for overrun will be by individual pay item. To compensate or adjust for a thickness deficiency in an underlying asphalt concrete course, the Engineer may authorize a quantity increase in excess of 10 percent for a subsequent asphalt concrete course. In such cases, the quantity in excess of 10 percent will be paid for at the lowest unit price.

Agency required repairs of existing pavement prior to roadway overlay operations will be paid for as a separate pay item.

Except as otherwise specified ~~in the special provisions~~, no separate payment will be made for work necessary to construct miscellaneous items or surfaces of asphalt concrete.



**TYPE 'A'**  
(WITH FRAME)

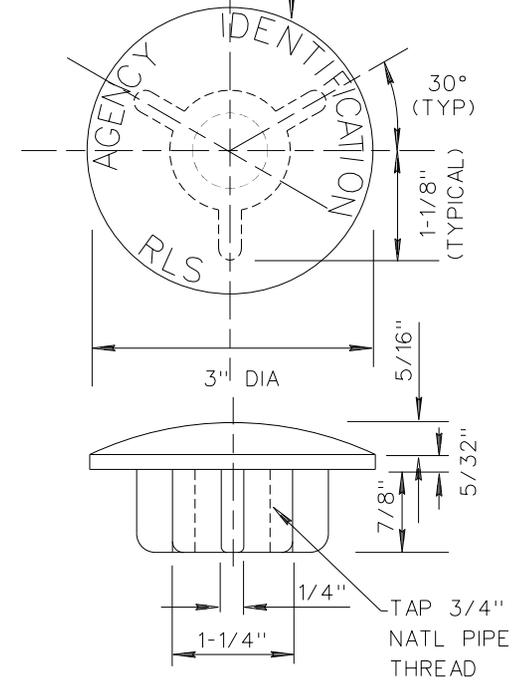


**TYPE 'B'**  
(WITHOUT FRAME)

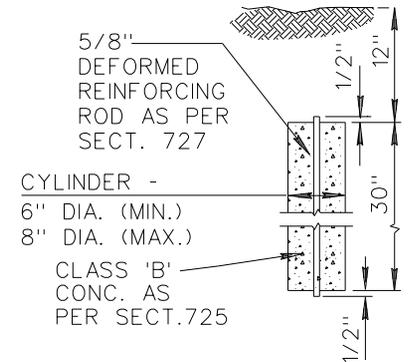
**NOTES:**

1. TYPE 'A' TO BE USED AT INTERSECTIONS OF MAJOR STREETS & COLLECTOR STREETS, SECTION CORNERS, SECTION 1/4 CORNERS, CENTER OF SECTIONS, AND AT OTHER POINTS AS SHOWN ON PLANS.
2. TYPE 'B' TO BE USED (EXCEPT WHERE TYPE 'A' IS SPECIFIED) AT INTERSECTION OF STREET CENTERLINES, PC'S, PT'S AND PI'S OF CURVES, SECTION 1/16 CORNERS, SUBDIVISION CORNERS, CHANGE IN ALIGNMENT OF SUBDIVISION BOUNDARIES, AND AT OTHER POINTS AS SHOWN ON PLANS.
3. TYPE 'C' TO BE USED AT CORNERS OF AND CHANGE IN ALIGNMENT OF SUBDIVISION BOUNDARIES WHERE CORNERS OR CHANGES IN ALIGNMENT FALL OUTSIDE OF PAVED AREAS OR UNPAVED ALLEYS AND STREETS.
4. CAP TO BE CONSTRUCTED OF RED BRASS OR BRONZE.
5. LETTERS TO BE APPROX. 1/32" WIDE & 1/32" DEEP.
6. FLATTENING THE BOTTOM 2" OF THE GALVANIZED PIPE IS OPTIONAL.
7. TOP OF CONCRETE POST IS CHAMFERED 3/4" EXCEPT WHEN SET FLUSH WITH PAVEMENT.
8. THE CAP SHALL SHOW THE POINT SURVEYED BY A PUNCH MARK OR SCRIBED CROSS AND THE CAP SHALL BE STAMPED WITH THE YEAR AND THE REGISTERED LAND SURVEYOR'S (RLS) REGISTRATION NUMBER.
9. WHEN APPLICABLE, THE CAP SHALL BE STAMPED WITH THE APPROPRIATE PUBLIC LAND MARKING PER CURRENT MANUAL OF INSTRUCTIONS FOR THE SURVEY OF PUBLIC LANDS OF THE UNITED STATES, PREPARED BY THE BUREAU OF LAND MANAGEMENT.
10. SUBMIT TO THE ENGINEER A COPY OF THE RECORDED CORNER RECORD OR RESULTS OF SURVEY TO DOCUMENT COMPLIANCE WITH THE ARIZONA BOARD OF TECHNICAL REGISTRATION REQUIREMENTS.

1/16" BORDER FROM  
EDGE OF CAP TO TOP  
OF 1/4" LETTERING.



**CAP DETAIL**



**TYPE 'C'**

DETAIL NO.

120



STANDARD DETAIL  
ENGLISH

SURVEY MARKER

REVISED

01-01-2014

DETAIL NO.

120



**Chandler • Arizona**  
*Where Values Make The Difference*

**MEMORANDUM**

**Case # 13-05**

**DATE:** April 3rd, 2013

**TO:** MAG Specifications and Details Committee Members

**FROM:** Warren White, City of Chandler Representative

**SUBJECT:** Proposed MAG Section 740, Polypropylene Pipe and Fittings for Gravity Storm Drain and Sanitary Sewer > > April Update

Updated case material based on previous Committee and Working Group meetings. Included is both the redline version (based on Section 738) and clean version for the proposed Section 740. Here are some points that were addressed in this update:

- Changed all Subsections to have 740 Section referenced (as opposed to 738).
- Revised all references to AASHTO MP21-11 to AASHTO M330. AASHTO MP21-11 was a provisional standard. AASHTO has since voted to move to a full standard and has assigned a number (M330). New standard should be published in a month or so.
- Section 740.4 Fittings – changed reference to 740.3 for gasket type.
- Section 740.9 Care of Pipe and Materials – Instead of referencing 736.5 – that language has now been incorporated.
- Added reference to Section 615 and 618 in the General notes.
- Moved 740.2.5 Thermal Welding Material language to under 740.4 Fittings.
- Made consistent with Case # 12-12 for SRPE material

**SECTION 740**  
**POLYPROPYLENE PIPE & FITTINGS FOR STORM DRAIN & SANITARY SEWER**

**740.1 GENERAL:**

This specification covers the requirements of profile wall (both dual wall and triple wall) (Type S or Type D) polypropylene (PP) pipe manufactured per ASTM F2736, ASTM F2764, AASHTO M330 for storm drain and sanitary sewer systems. When noted on the plans or in the special provisions, storm drains, irrigation and sanitary sewers may be constructed using PP pipe. The PP pipe will be of the sizes 12 inch diameter through 60 inch diameter. Construction and installation shall be in accordance with Section 615 for storm drain and irrigation water and Section 618 for sanitary sewers.

The size of the PP pipe to be furnished shall be designed by the Engineer and shown on the plans or in the project specifications.

**740.2 MATERIALS:**

**740.2.1 Base Material Composition:** Profile pipe base material and fittings shall meet polypropylene materials requirements as stated in Section 4, Table 1 of ASTM F2736, Section 5, Table 1 of ASTM F2764 or Section 6, Table 1 AASHTO M330.

**740.2.3 Gaskets:** Rubber gaskets shall be manufactured from a natural rubber, synthetic elastomer or a blend of both and shall comply in all respects with the physical requirements in ASTM F477, unless the project specifies a special gasket, such as nitrile.

**740.2.4 Water Stops:** Water stops shall be manufactured from a natural or synthetic rubber and shall conform to the requirements of ASTM C923. The water stop shall have expansion rings, a tension band, or a take-up device used for mechanically compressing the water stop against the pipe.

**740.2.5 Lubricant:** The lubricant used for assembly shall comply to manufacturer's recommendations and have no detrimental effect on the gasket or pipe.

**738.3 JOINING SYSTEMS:**

**740.3.1 Gasket Type:** Joints for the piping system and fittings shall consist of an integrally formed bell and spigot gasketed joint. The joint shall be designed so that when assembled, the elastomeric gasket located on the spigot is compressed radially on the pipe or fitting bell to form a water tight seal. The joint shall be designed so to prevent displacement of the gasket from the joint during assembly and when in service. The elastomeric gasket shall meet the provision of ASTM F477. Gasketed watertight joints shall meet laboratory test pressure of 10.8psi when tested in accordance with ASTM D3212.

All pipes shall have a home mark on the spigot end to indicate proper penetration when the joint is made.

The bell and spigot configurations for the fittings shall be compatible to those used for the pipe.

Joints shall provide a seal against exfiltration and infiltration. All surfaces of the joint upon which the gasket may bear, shall be smooth and free of any imperfections, which would adversely affect sealability. The assembly of the gasketed joints shall be in accordance with the pipe manufacturer's recommendations.

**740.4 FITTINGS:**

Fittings for PP pipe may include tees, elbows, manhole adapter rings, plugs, caps, adapters and increasers. Fittings shall be joined by gasket type joints in accordance with Subsection 740.3.

The material used for thermally welding the pipe material shall be compatible with the base material.

A clamp gasket or approved method shall be provided at manhole entry or connection to reduce infiltration and exfiltration. Where precast manholes are used, entrance holes must be large enough to allow for proper grouting around the manhole gasket. A non-shrink grout shall be used for grouting.

**740.5 CERTIFICATION:**

The manufacturer shall furnish an affidavit (certification) that all materials delivered shall comply with the requirements of ASTM F2736, ASTM F2764 or AASHTO M330.

**740.6 DIMENSIONS AND TOLERANCES:**

Polypropylene pipe dimensions shall comply with dimensions given in Section 6.2 of ASTM F2736, Section 6.2 of ASTM F2764 or Section 7.2 of AASHTO M330.

**740.7 CLASSIFICATIONS:**

PP pipe (Type S or Type D) shall meet the minimum Pipe Stiffness (PS) requirements of ASTM F2736, ASTM F2764 or AASHTO M330. The PS test shall be conducted in accordance with ASTM D2412 with the exceptions listed in accordance with ASTM F2736, ASTM F2764 and AASHTO M330.

**740.8 MARKINGS:**

Markings on pipe shall be per ASTM F2736, ASTM F2764 or AASHTO M330. These markings shall be clearly shown on the pipe at intervals of approximately 12 feet and include but not limited to the following: the manufacturers name or trademark, nominal size, the specification designation, plant designation code, date of manufacture or an appropriate code. All fittings shall be marked with the designation number of the specification and with the manufacturers identification symbol.

**740.9 CARE OF PIPE AND MATERIALS:**

All pipe and materials shall be manufactured, handled, loaded, shipped and unloaded in such manner as to be undamaged and in sound condition, in the completed work. Particular effort shall be exercised to protect the ends of pipe. Repairs on damaged pipe shall be made to the satisfaction of the Engineer otherwise they shall not be used in the work and shall be replaced with an equal pipe or special in an acceptable condition. At all times rubber gaskets shall be stored in a cool, dark place until ready for use.

*- End of Section -*

**SECTION 740**  
**POLYPROPYLENE PIPE & FITTINGS FOR STORM DRAIN & SANITARY SEWER**

**740.1 GENERAL:**

This specification covers the requirements of profile wall (both dual wall and triple wall) (Type S or Type D) polypropylene (PP) pipe manufactured per ASTM F2736, ASTM F2764, AASHTO M330 for ~~gravity flow, low pressure~~ storm drain and sanitary sewer systems. When noted on the plans or in the special provisions, ~~gravity flow, low pressure~~ storm drains, irrigation and sanitary sewers may be constructed using PP pipe. The PP pipe will be of the sizes 12 inch diameter through 60 inch diameter. ~~For the purpose of this specification, low pressure is defined as the test pressures of 3.5 psi of air or 4 feet of water as specified in Section 615.11. Construction and installation shall be in accordance with Section 615 for storm drain and irrigation water and Section 618 for sanitary sewers.~~

~~All pipe joints shall conform to the controlled pressure lab test of 10.8 psi of air or 25 feet of water as stipulated in ASTM D3212.~~

~~Installation for storm drainage applications shall be per Section 615. For sanitary sewer applications, installation shall be per Section 618.~~

The size of the PP pipe to be furnished shall be designed by the Engineer and shown on the plans or in the project specifications.

**740.2 MATERIALS:**

**740.2.1 Base Material Composition:** Profile pipe base material and fittings shall meet polypropylene materials requirements as stated in Section 4, Table 1 of ASTM F2736, Section 5, Table 1 of ASTM F2764 or Section 6, Table 1 AASHTO M330.

**740.2.3 Gaskets:** Rubber gaskets shall be manufactured from a natural rubber, synthetic elastomer or a blend of both and shall comply in all respects with the physical requirements in ASTM F477, unless the project specifies a special gasket, such as nitrile.

**740.2.4 Water Stops:** Water stops shall be manufactured from a natural or synthetic rubber and shall conform to the requirements of ASTM C923. The water stop shall have expansion rings, a tension band, or a take-up device used for mechanically compressing the water stop against the pipe.

**740.2.5 Lubricant:** The lubricant used for assembly shall comply to manufacturer's recommendations and have no detrimental effect on the gasket or pipe.

**738.3 JOINING SYSTEMS:**

**740.3.1 Gasket Type:** Joints for the piping system and fittings shall consist of an integrally formed bell and spigot gasketed joint. The joint shall be designed so that when assembled, the elastomeric gasket located on the spigot is compressed radially on the pipe or fitting bell to form a water tight seal. The joint shall be designed so to prevent displacement of the gasket from the joint during assembly and when in service. The elastomeric gasket shall meet the provision of ASTM F477. Gasketed watertight joints shall meet laboratory test pressure of 10.8psi when tested in accordance with ASTM D3212.

All pipes shall have a home mark on the spigot end to indicate proper penetration when the joint is made.

The bell and spigot configurations for the fittings shall be compatible to those used for the pipe.

Joints shall provide a seal against exfiltration and infiltration. All surfaces of the joint upon which the gasket may bear, shall be smooth and free of any imperfections, which would adversely affect sealability. The assembly of the gasketed joints shall be in accordance with the pipe manufacturer's recommendations.

#### **740.4 FITTINGS:**

Fittings for PP pipe may include tees, elbows, manhole adapter rings, plugs, caps, adapters and increasers. Fittings shall be joined by gasket type joints in accordance with Subsection 740.3.

The material used for thermally welding the pipe material shall be compatible with the base material.

A clamp gasket or approved method shall be provided at manhole entry or connection to reduce infiltration and exfiltration. Where precast manholes are used, entrance holes must be large enough to allow for proper grouting around the manhole gasket. A non-shrink grout shall be used for grouting.

#### **740.5 CERTIFICATION:**

The manufacturer shall furnish an affidavit (certification) that all materials delivered shall comply with the requirements of ASTM F2736, ASTM F2764 or AASHTO M330.

#### **740.6 DIMENSIONS AND TOLERANCES:**

Polypropylene pipe dimensions shall comply with dimensions given in Section 6.2 of ASTM F2736, Section 6.2 of ASTM F2764 or Section 7.2 of AASHTO M330.

#### **740.7 CLASSIFICATIONS:**

PP pipe (Type S or Type D) shall meet the minimum Pipe Stiffness (PS) requirements of ASTM F2736, ASTM F2764 or AASHTO M330. The PS test shall be conducted in accordance with ASTM D2412 with the exceptions listed in accordance with ASTM F2736, ASTM F2764 and AASHTO M330.

#### **740.8 MARKINGS:**

Markings on pipe shall be per ASTM F2736, ASTM F2764 or AASHTO M330. These markings shall be clearly shown on the pipe at intervals of approximately 12 feet and include but not limited to the following: the manufacturers name or trademark, nominal size, the specification designation, plant designation code, date of manufacture or an appropriate code. All fittings shall be marked with the designation number of the specification and with the manufacturers identification symbol.

#### **740.9 CARE OF PIPE AND MATERIALS:**

All pipe and materials shall be manufactured, handled, loaded, shipped and unloaded in such manner as to be undamaged and in sound condition, in the completed work. Particular effort shall be exercised to protect the ends of pipe. Repairs on damaged pipe shall be made to the satisfaction of the Engineer otherwise they shall not be used in the work and shall be replaced with an equal pipe or special in an acceptable condition. At all times rubber gaskets shall be stored in a cool, dark place until ready for use.

*- End of Section -*



**City of Phoenix**  
Water Services Department

Date: March 4, 2013

Case: 13-06

To: MAG Specification & Details Committee

From : Jami Erickson

**RE: Part 600: Water and Sewer**

Purpose: Modify Part 600 title to include Storm Drain.

Revisions:

**Part 600: ~~WATER AND SEWER~~ WATER, SEWER AND STORM DRAIN**



**MARICOPA COUNTY**  
*Department of Transportation*

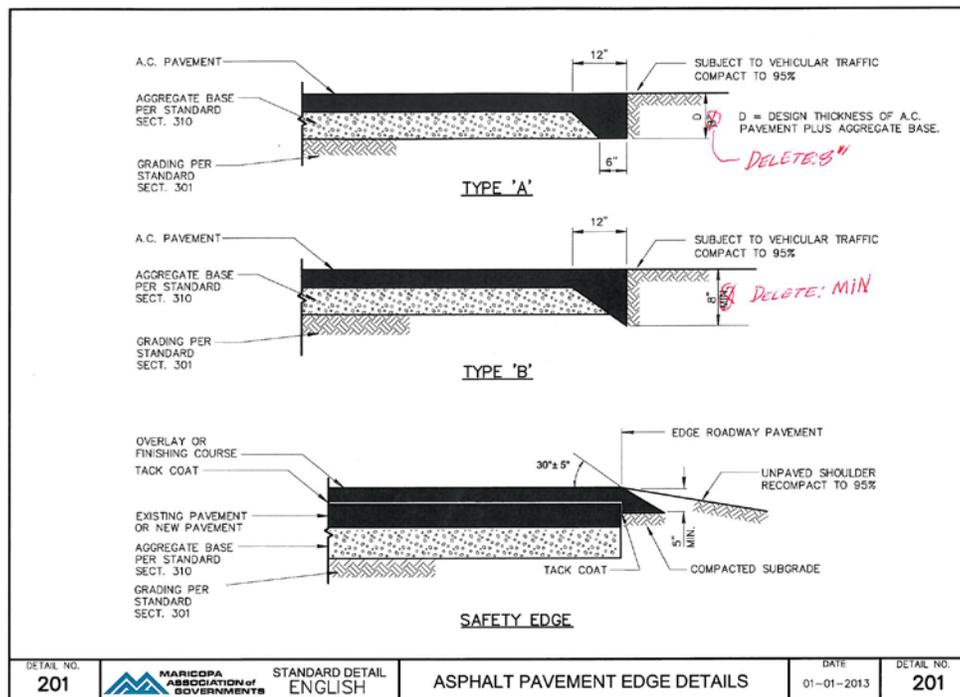
**MEMORANDUM**

**Date:** March 18, 2013  
**To:** MAG Specifications and Details Committee  
**From:** Robert Herz, MCDOT Representative  
**Subject:** Revisions for Detail 201 ASPHALT PAVEMENT Case 13-07  
 EDGE DETAILS

**PURPOSE:** Correct miscellaneous errors and change the Type B thickened edge depth dimension from "8 inch minimum" to "8 inches".

**REVISIONS:**

1. Correct title shown in the index to match the detail title. This is a miscellaneous correction.
2. Type A – Delete an erroneous miscellaneous 8" dimension. This is a miscellaneous correction.
3. Type B – Delete 'MIN.' from the 8" depth shown. This is a change from the existing detail.



100 SERIES: GENERAL INFORMATION			200 SERIES: STREET INFORMATION		
Detail	Revised	Title	Detail	Revised	Title
101	2011	GENERAL INFORMATION	240	2010	VALLEY GUTTER
110-1	2011	PLAN SYMBOLS (SYMBOLS)	250-1	2009	DRIVEWAY ENTRANCES WITH DETACHED SIDEWALK
110-2	2011	PLAN SYMBOLS (LINE TYPES)	250-2	2013 *	DRIVEWAY ENTRANCES WITH SIDEWALK ATTACHED TO CURB
112	1998	DIMENSIONING FOR ROAD IMPROVEMENT PLANS	251	2003	RETURN TYPE DRIVEWAYS
120-1	2001	SURVEY MARKER	252	2005	BUS BAYS
120-2	2007	SURVEY MARKER - FOR UNINCORPORATED AREAS OF THE COUNTY	260	2013 *	ALLEY ENTRANCE (WITH VERTICAL CURB AND GUTTER)
122	2011	PAVEMENT MARKER FOR FIRE HYDRANTS	262	2012	WING TYPE ALLEY ENTRANCE (WITH COMBINED CURB AND GUTTER)
130	2003	BARRICADES	263	2002	WING TYPE ALLEY ENTRANCE (WITH ROLL TYPE CURB AND GUTTER)
131	1998	STREET SIGN BASE	270	2001	FRAME AND COVER (AND GRADE ADJUSTMENTS)
140	2009	BOLLARD	<b>300 SERIES: WATER INFORMATION</b>		
141	2009	HAZARD MARKER	301	1998	BLOCKING FOR WATER GATE AND BUTTERFLY VALVES
145	2011	SAFETY RAIL	302-1	1998	JOINT RESTRAINT WITH TIE RODS (DRAWING)
150	1998	PRECAST SAFETY CURB	302-2	1998	JOINT RESTRAINT WITH TIE RODS (NOTES)
160	2013 *	6' CHAIN LINK FENCE AND GATE	303-1	1998	JOINT RESTRAINT FOR DUCTILE IRON AND POLYETHYLENE WRAPPED DUCTILE IRON WATER PIPES (DRAWING)
<b>200 SERIES: STREET INFORMATION</b>			303-2	1998	JOINT RESTRAINT FOR DUCTILE IRON AND POLYETHYLENE WRAPPED DUCTILE IRON WATER PIPES (TABLES)
Detail	Revised	Title	310	1998	CAST IRON WATER METER BOX COVER NO. 1
200-1	2010	BACKFILL, PAVEMENT AND SURFACE REPLACEMENT	311	1998	CAST IRON WATER METER BOX COVER NO. 2
200-2	2010	BACKFILL, PAVEMENT AND SURFACE REPLACEMENT	312	1998	CAST IRON WATER METER BOX COVER NO. 3
201	2013 *	PAVEMENT SECTION AT TERMINATION	313	1998	CAST IRON WATER METER BOX COVER NO. 4
202	1998	ALLEY DETAILS (PAVED AND UNPAVED)	314	1998	CAST IRON WATER METER BOX COVER NO. 5
203	1998	SCUPPERS	320	1998	CONCRETE WATER METER BOXES
204	1998	EQUIPMENT CROSSING	321	1998	STANDARD WATER METER VAULT
205	2006	PAVED TURNOUTS	340	2002	INSTALLING TAPPING SLEEVES AND VALVES
206-1	2007	CONCRETE SCUPPER	342	1998	CONCRETE PRESSURE PIPE TAPPING SLEEVE
206-2	2007	CONCRETE SCUPPER	345-1	1998	3", 4", 6" WATER METER
206-3	2007	CONCRETE SCUPPER (ISOMETRIC VIEW)	345-2	1998	4", 6" WATER METER WITH ON-SITE HYDRANTS
210	2012	RESIDENTIAL SPEED HUMP	346	1998	FIRE LINE DETECTOR CHECK VAULT
211	1998	STANDARD TRENCH PLATING DETAIL	360-1	2013 *	DRY BARREL FIRE HYDRANT INSTALLATION
212	2012	UTILITY POTHOLE REPAIR	360-2	2013 *	WET BARREL FIRE HYDRANT INSTALLATION
220-1	2007	CURB AND GUTTER TYPES A, B, C AND D	360-3	2013 *	FIRE HYDRANT INSTALLATION DETAILS
220-2	2007	CURB AND GUTTER TYPES E AND E	362	1999	LOCATIONS FOR NEW FIRE HYDRANTS
221	2011	CURB AND GUTTER TRANSITION TYPE A TO TYPE C, INTEGRAL ROLL CURB, GUTTER AND SIDEWALK	370	1998	VERTICAL REALIGNMENT OF WATER MAINS
222	2008	SINGLE CURB - TYPES A, B AND TERMINATION	380	1998	THRUST BLOCKS FOR WATER LINES
223	1998	MEDIAN NOSE TRANSITION	381	1998	ANCHOR BLOCKS FOR VERTICAL BENDS
224	1998	JOINT FOR DRAINAGE INLETS AND MANHOLE COVERS	389	2001	CURB STOP WITH VALVE BOX AND COVER
225	2005	CONCRETE PAVERS	390	1998	CURB STOP WITH FLUSHING PIPE
230	2011	SIDEWALKS	391-1	2001	VALVE BOX INSTALLATION AND GRADE ADJUSTMENT
234	2012	CURB MODIFICATION AT DETECTABLE WARNING	391-2	2001	VALVE BOX INSTALLATION AND GRADE ADJUSTMENT
235-1	2012	CURB RAMPS (TYPE A)	392	2001	DEBRIS CAP INSTALLATION
235-2	2012	CURB RAMPS (TYPE B)	* NEWLY REVISED.		
235-3	2012	CURB RAMPS (TYPE C)			
235-4	2011	CURB RAMPS (TYPE D)			
235-5	2011	CURB RAMPS (TYPE E)			

*REVISE TITLE TO MATCH DETAIL*

DETAIL NO. <b>100-1</b>		STANDARD DETAIL ENGLISH	<b>INDEX (PAGE 1 OF 2)</b>	REVISED 01-01-2013	DETAIL NO. <b>100-1</b>
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MARICOPA COUNTY  
*Department of Transportation*

MEMORANDUM

**Date:** March 18, 2013  
**To:** MAG Specifications and Details Committee  
**From:** Robert Herz, MCDOT Representative  
**Subject:** Revision to Section 321.8.8 Thickened Edge Case 13-08

**PURPOSE:** Eliminate references to 'base course' to clarify the surface being referenced.

**REVISIONS:**

**321.8.8 Thickened Edge:** Prior to commencing paving operations that require construction of a thickened edge, the Contractor shall submit for the Engineer's approval construction procedures to be used for placement and compaction of the thickened edge.

When the depth of the thickened edge extends two inches or more below the bottom of the asphalt pavement ~~base course~~, the portion below the asphalt pavement base course shall be placed and compacted as a separate construction operation. Construction of the asphalt pavement base course may immediately follow compaction of the lower portion of the thickened edge.

When the depth of the thickened edge extends less than two inches below the bottom of the asphalt pavement ~~base course~~, the portion below the asphalt pavement base course may be placed and compacted with the asphalt pavement base course in a single operation.



Engineering Department

## MEMORANDUM

**DATE:** March 26, 2013

**TO:** MAG Specifications and Details Committee

**FROM:** Bob Draper, City of Mesa Representative

**SUBJECT:** MAG 321 Asphalt Penalties      CASE 13-09

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The asphalt committee has suggested evaluating the current asphalt penalties as listed in MAG 321 and has requested that the City of Mesa amendments be a starting point for discussions. Attached is MAG 321 with the City of Mesa revisions noted for discussion purposes.

**CASE 13-09**  
**SECTION 321 w/ COM Noted**

**PLACEMENT AND CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT**

**321.1 DESCRIPTION:**

This section is to provide specifications for furnishing all materials, mixing at a plant, hauling and placing a mixture of aggregate materials, mineral admixture and asphalt binder to form a pavement course for placement upon a previously prepared base or sub base. All work shall be in accordance with the project specifications, as shown on the approved plans or as directed in writing by the Engineer.

**321.2 MATERIALS AND MANUFACTURE:**

The materials shall conform to Section [710](#) for the type specified. The specific required mix type shall be called out in the contract documents or as directed by the Engineer.

**321.3 WEATHER AND MOISTURE CONDITIONS:**

Asphalt concrete shall be placed only when the surface is dry, and when the atmospheric temperature in the shade is 40 degrees F. (50 degrees F for Asphalt Concrete lift less than 2 inch thick) or above. No asphalt concrete shall be placed when the weather is foggy or rainy, or when the base or sub base on which the material is to be placed is unstable. Asphalt concrete shall be placed only when the Engineer determines that weather conditions are suitable.

**321.4 APPLICATION OF TACK COAT:**

A tack coat shall be applied to all existing and to each new course of asphalt concrete prior to the placing of a succeeding lift of asphalt concrete. The tack coat may be deleted when a succeeding layer of asphalt concrete is being applied over a freshly laid course that has been subjected to very little traffic when approved by the Engineer.

The application of the tack coat shall comply with Section [329](#). The grade of emulsified asphalt shall be SS-1 h ~~or CSS-1 h~~ as specified in Section [713](#).

The same material that is specified above for the tack coat shall be applied to the vertical surfaces of existing pavements, curbs, and gutters, against which asphalt concrete is to be placed.

The surface to be covered may require repair or patching as directed by the Engineer. This shall be addressed in the project specifications prior to the bidding of the project.

**321.5 MIX DESIGN**

The mix design shall be submitted to the Engineer at least five working days prior to the start of asphalt concrete production. Mix designs provided by the agency may be utilized on projects at the Engineer's discretion. The Engineer will review and approve the mix design to assure it contains all of the required information as outlined in Section [710.3.1](#). The target values for gradations, binder contents, and air voids will be established as the accepted Job Mix Formula (JMF) based upon the mix design. Mix designs not containing all of the information will be returned within five working days of receipt of all mix design information, for action and resubmission by the contractor.

Once the mix design has been approved by the agency and the mixing plant selected, the Contractor and/or his supplier shall not change plants nor utilize additional mixing plants without prior approval of the Engineer.

If the contractor elects to change its source of material, the contractor shall furnish the Engineer with a new mix design, which meets the requirements of Section [710](#), as amended by the Project Specifications.

The contractor may make self-directed target changes to the approved mix design within the limits shown below. Requests for self-directed target changes shall be made in writing and acknowledged by the Engineer prior to the start of production of a lot and will remain in effect until such time as any additional changes are implemented. The self-directed target changes must meet the contract requirements for mix design criteria and gradation limits.

**CASE 13-09**  
**SECTION 321 w/ COM Noted**

<b>TABLE 321-1</b>	
<b>ALLOWABLE SELF-DIRECTED TARGET CHANGES</b>	
MEASURED CHARACTERISTICS	ALLOWABLE SELF-DIRECTED TARGET CHANGES
Gradation (Sieve Size)	
3/8 inch	± 4% from mix design target value
No 8	± 4% from mix design target value
No 40	± 2% from mix design target value
No 200	+0.5% from mix design target value
Binder Content	± 0.2% from mix design target value
Effective Air Voids	None

The contractor may propose target changes, other than self-directed changes, to the approved mix design for the approval of the Engineer. The Engineer will determine if the proposed target change will result in mix production that meets the contract requirements for mix design criteria and gradation limits. The target changes will not be retroactive for the purpose of acceptance.

**321.6 MIX PRODUCTION:**

All materials shall be proportioned by weight in a hot mix asphalt plant in the proportions required by the mix design to provide a homogeneous and workable mass. Each hot mix asphalt plant shall be inspected in accordance with the provisions contained in the 'Hot Mix Asphalt Production Facilities' by the Arizona Rock Products Association and shall have a current inspection certificate. All measuring devices shall be calibrated at least annually by a technician licensed by the Arizona Bureau of Weights & Measures. Mixing plants shall conform to the requirements of AASHTO M-156, except as modified herein.

In drum mix plants the mineral admixture shall be added and thoroughly mixed with the mineral aggregate by means of a mechanical mixing device prior to the mineral aggregate and mineral admixture entering the dryer. The moisture content of the combined mineral aggregate shall be a minimum of three percent by weight of the aggregate during the mixing process.

For drum-mix plants, the mineral admixture shall be weighed across a weight belt, or other approved alternative weighing system, with a weight totalizer prior to entry into the mechanical mixing device. The mechanical mixing device shall be a pugmill type mixer that is in good working condition. The rate of the aggregate feed shall not exceed the mixing device's capacity in ton per hour. The mixer shall be constructed to minimize the loss of mineral admixture and shall be located in the aggregate delivery system at a location where the mixed material can be readily inspected. The mixing device shall be capable of effective mixing in the full range of the asphalt concrete production rates.

The hot plant and equipment shall be constructed and operated to prevent loss of mineral admixture through the dust collection system of the plant.

A positive signal system shall be provided and utilized during production whereby the mixing shall automatically be stopped if the mineral admixture is not introduced into the mineral aggregate. The plant will not be permitted to operate unless the signal system is in good working condition.

The introduction of bituminous material shall be controlled by an automated system fully integrated with the controls or the mineral aggregate and mineral admixture. The production of the plant shall be controlled by the rate required to obtain a uniform mixture of all components. Drying and heating shall be accomplished in such a manner as to preclude the mineral admixture from becoming coated with un-spent fuel. The completed asphalt concrete may be held in storage for up to 12 hours in insulated or heated silos, providing the minimum temperature noted herein for placement and compaction is met behind the placement device. If the Engineer determines that there is an excessive amount of heat, heat loss, drain down, segregation and/or oxidation of the mixture due to temporary storage, use of surge bins or storage bins will be discontinued.

The temperature of the asphalt concrete, with unmodified binders, upon discharge from the mixer shall not exceed 335 degrees F. The discharge temperature may be increased on the recommendation of the binder supplier, when approved by the Engineer. If the asphalt concrete is discharged from the mixer into a hopper, the hopper shall be constructed so that segregation of the asphalt concrete will be minimized.

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**321.7 TRANSPORTATION:**

Petroleum distillates or other substances that will have a detrimental effect on the asphalt concrete shall not be used as a release agent.

The beds of all transportation units shall be clean and smooth to allow the free flow of material into the paving machine's hopper.

Tarpaulins shall be furnished on all trucks and used when weather condition warrant, or if directed by the Engineer.

**321.8 PLACEMENT:**

**321.8.1 Placing:** All courses of asphalt concrete shall be placed and finished by means of a self-propelled paving machine equipped with an automatically actuated control system, except under certain conditions or at locations where the Engineer deems the use of a self-propelled paving machine impracticable.

The control system shall control the elevation of the screed at each end by controlling the elevation of one end directly and the other end indirectly either through controlling the transverse slope or alternatively when directed, by controlling the elevation of each end independently.

The control system shall be capable of working with one of the following devices:

- (a) Ski or non-contact device of not less than 30 feet in length, supported throughout its entire length
- (b) Taut stringline or wire set to grade
- (c) Short ski or sonar sensing units from curb control
- (d) Joint matching shoe

Failure of the control system to function properly shall be cause for the suspension of asphalt concrete production. In order to achieve a continuous operation, the speed of the paving machine shall be coordinated with the hot mix plant and transport units.

If the asphalt concrete is dumped from the hauling vehicles directly into the paving machine, care shall be taken to avoid jarring the machine or moving it out of alignment. No vertical load shall be exerted on the paving machine by the truck.

If asphalt concrete is dumped upon the surface being paved and subsequently loaded in the paving machine, the loading equipment shall be self-supporting and shall not exert any vertical load on the paving machine. Substantially all of the asphalt concrete shall be picked up and loaded into the paving machine.

Self-propelled paving machines shall spread the mixture without segregation or tearing, true to line, grade and crown indicated on the Project plans. Pavers shall be equipped with hoppers and augers that will distribute the mixture uniformly in front of an adjustable floating screed. The raising of the hopper wings must be minimized and the paving machine will not be operated when in an empty condition.

Screeds shall include any strike-off device operated by tamping or vibrating action which is effective, without tearing, shoving or gouging the mixture and which produces a course with a uniform texture and density for the full width being paved. Screeds shall be adjustable as to height and crown and shall be equipped with a controlled heating device for use when required. In the case of the screed, auger extensions and vibrators shall be installed wherever the screed is extended more than one (1) foot beyond the end of the base auger or auger extension. However, when placing material against an extremely uneven curb or edge over a short distance, the Engineer may waive the auger extensions and vibrators.

At any place not accessible to the roller, the mixture shall be thoroughly compacted with tampers to provide a uniform and smooth layer over the entire area compacted in this manner.

**321.8.2 Joints:** Transverse joints, before a surface course is placed in contact with a cold transverse construction joint, the cold existing asphalt concrete shall be trimmed to a vertical face for its full depth and exposing a fresh face. After placement and finishing the new asphalt concrete, both sides of the joint shall be dense and the joint shall be smooth and tight. The surface in the area of the joint shall not deviate more than 1/4 inch from a 12-foot straightedge, when tested with the straightedge placed across the joint, parallel to the centerline.

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Longitudinal Joints of each course shall be staggered a minimum of 6 inches with relation to the longitudinal joint of the immediate underlying course cold transverse construction joint, the cold existing asphalt concrete shall be trimmed to a vertical face for its full depth and exposing a fresh face. The fresh face shall be tacked prior to placement of the adjacent course. After placement and finishing the new asphalt concrete, both sides of the joint shall be dense and the joint shall be smooth and tight. The surface in the area of the joint shall not deviate more than ¼ inch from a 12-foot straightedge, when tested with the straightedge placed across the joint, parallel to the centerline. The joint will be tack coated if required by the Engineer.

**321.8.3 Asphalt Leveling Course:** A leveling course shall be used when specified, or as directed in writing by the Engineer, to bring existing pavement to a uniform grade prior to placing an overlay or other course. If a leveling course is being applied on an Asphalt surface, a tack coat shall be applied. The compaction requirements contained in Section [321.10](#) do not apply to leveling courses.

**321.8.4 Compaction; Asphalt Base Course and Surface Course:** It is the contractor's responsibility to perform any desired Quality Control monitoring and/or testing during compaction operations to achieve the required compaction. The temperature of the asphalt concrete immediately behind the laydown machine shall meet the minimum requirements of Table [321-2](#). A probe type electronic thermometer with a current calibration sticker attached will be used to measure the temperature of the asphalt concrete mixture. When measuring the temperature of the mat, the probe shall be inserted at mid-depth and as horizontal as possible to the mat.

<b>TABLE 321-2</b>						
<b>MINIMUM ASPHALT CONCRETE PLACEMENT TEMPERATURE</b>						
Base <sup>(1)</sup> Temp (°F)	Mat Thickness (inches)					
	1/2	3/4	1	1 1/2	2	3 and greater
40 – 50	---	---	310	300	285	275
50 – 60	---	310	300	295	280	270
60 – 70	310	300	290	285	275	265
70 – 80	300	290	285	280	270	265
80 – 90	290	280	270	270	265	260
+90	280	275	265	265	260	255

(1) Base on which mix is to be placed

Asphalt compaction equipment shall be of sufficient size and weight to accomplish the required compaction. All compaction equipment shall be operated and maintained in accordance with the manufacturer's recommendations and the project requirements. During the rolling operation, the speed of the roller shall not exceed 3 miles per hour, unless otherwise approved by the Engineer.

Pneumatic tired compactors shall be equipped with skirt-type devices mounted around the tires so that the temperature of the tires will be maintained during the compaction process.

The Engineer will determine the acceptability of the pavement compaction in accordance with Section [321.10](#).

**321.8.5 Smoothness:** The completed surfacing shall be thoroughly compacted, smooth and true to grade and cross-section and free from ruts, humps, depressions or irregularities. An acceptable surface shall not vary more than one-fourth (¼) inch from the lower edge of a 12-foot straightedge when the straightedge is placed parallel to the centerline of the roadway.

**321.8.6 Asphalt Concrete Overlay:** Asphalt concrete overlay consists of the placing and compacting plant mix asphalt concrete over existing asphalt concrete paving. The thickness of the overlay shall be as shown on the plans or as specified in the special provisions. Preliminary preparation of existing surfaces will be required except when accomplished by the Contracting Agency, and it is so stipulated in the special provisions. With the exception of those which have been preheated and remixed only, existing surfaces shall receive a tack coat.

Asphalt concrete mix aggregate gradation and percentage of asphalt binder shall be in accordance with Section [710](#) using a 1/2-inch Marshall-Low Traffic asphalt concrete mix designation for overlay more than one and one-half inch in thickness and a 3/8-inch Marshall-Low Traffic asphalt concrete mix designation for overlay one and one-half inch or less in thickness, unless otherwise shown or specified in the special provisions.

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Except when they have been preheated and remixed, pavement surfaces shall be prepared as follows:

(a) Before placing asphalt concrete overlay, severely raveled areas or cracked areas that are depressed more than 3/4-inch from the adjoining pavement shall be cut out and patched at least 48 hours prior to the resurfacing operation. Over-asphalted areas or rough high spots shall be either milled or cut out and patched. Large shrinkage cracks shall be filled with asphalt sealing compound acceptable to the Engineer. The entire surface shall be cleaned with a power broom. Raveled areas that do not require removing shall be cleaned by hand brooming. The above are incidental, and the cost thereof shall be included in the bid items.

(b) Before placing asphalt concrete overlay, milling shall be done as shown on the plans or specified in the special provisions and shall be in accordance with Section [317](#).

(c) After surfaces have been prepared to the satisfaction of the Engineer, they shall receive a tack coat per Section [321.4](#). Traffic will not be permitted to travel over surfaces which have received a tack coat. When the overlay is to extend onto the concrete gutter, the gutter shall be thoroughly cleaned of loose dust and cement particles and shall be tack coated.

Asphalt concrete overlay shall be placed as specified in Section [321.8.1](#) and compacted as specified in Section [321.8.4](#). The surface smoothness shall meet the tolerances specified in Section [321.8.5](#).

Manholes shall be built up and the frames set flush with the finished surface of the new paving, and tops of valve boxes, clean-outs and other existing structures shall be adjusted to finish grade. In the event the base course and original paving have been removed or disturbed in order to build up the manhole, they shall be replaced with approved materials which shall be thoroughly compacted. The asphalt concrete around the manhole frame shall be completed and made flush with the adjacent overlay.

**321.8.7 Pavement Fabric Interlayer:** Pavement fabric interlayer shall be used only when specified on the plans or in the specifications.

Pavement fabric interlayer shall be in accordance with Table [796-1](#) and be the class designated on the plans or in the specifications.

Asphalt binder coat used to bond the fabric to the pavement shall be paving asphalt PG 70-10 asphalt cement conforming to the requirements of Section [711](#). The application and distributing equipment for the asphalt binder shall conform to the requirements of Section [330](#). The asphalt binder coat shall be uniformly spray applied to the prepared pavement surface at the rate of 0.20 gallons per square yard for Class B fabric or at the rate of 0.25 gallons per square yard for Class A fabric. Some underlying surfaces may require a higher or lower application rate. A test strip may be necessary to determine the proper application rate. The width of liquid asphalt cement application shall be the fabric width, plus six inches.

Neither the asphalt binder coat or fabric interlayer shall be placed when weather conditions, in the opinion of the Engineer, are not suitable. The asphalt binder and fabric interlayer shall only be placed when the pavement is dry, the ambient air temperature is 50 degrees F and rising, and pavement temperature is 40 degrees F and rising.

Equipment for placing the fabric shall be mechanized and capable of handling full rolls of fabric. The equipment shall be able to lay the fabric smoothly to maximize pavement contact and remove air bubbles. Stiff bristle brooms shall be used to smooth the fabric. The equipment used to place the fabric shall be in good working order and is subject to approval by the Engineer.

Pavement fabric interlayer shall not be placed if the in-place binder is hotter than 325 degrees F or has cooled to 180 degrees F or below (as determined by non-contact thermometer).

Pavement fabric interlayer shall be placed onto the asphaltic binder with the heat bonded side up with a minimum amount of wrinkling or folding. Remaining wrinkles or folds 1-inch and larger shall be removed or slit and shingle-lapped in the direction of paving. Burning or torching of wrinkles is not allowed. Fabric shall overlap three to six inches to insure full closure of the joint. Transverse joints shall be shingle-lapped in the direction of paving to prevent edge pickup by the paver. A second application of hand-placed asphalt binder may be required at laps and repairs as determined by the Engineer to ensure proper binding of the narrow double fabric layer.

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All areas where fabric has been placed shall be paved with asphaltic concrete during the same workshift. Placement of the asphaltic concrete shall closely follow fabric lay down. The temperature of the asphaltic concrete immediately behind the laydown machine shall not exceed 325 degrees F. In the event that the asphalt binder coat bleeds through the fabric causing construction problems before the overlay is placed, the affected areas shall be sanded with a sand blotter in compliance with Section [333](#). Excess sand shall be removed before beginning the paving operation. In the event of rainfall prior to the placement of the asphaltic concrete, the fabric shall be allowed to dry before the asphalt concrete is placed.

Turning of the paving machine or of other vehicles on the fabric shall be gradual and kept to a minimum to avoid damage to the fabric. Should equipment tires stick to the fabric during pavement operations, small quantities of paving asphalt concrete shall be broadcast on the fabric to prevent pick-up. Decrease of binder rate in order to minimize pick-up on tires is not allowed.

**321.8.8 Thickened Edge:** Prior to commencing paving operations that require construction of a thickened edge, the Contractor shall submit for the Engineer's approval construction procedures to be used for placement and compaction of the thickened edge.

When the depth of the thickened edge extends two inches or more below the bottom of the asphalt pavement base course, the portion below the base course shall be placed and compacted as a separate construction operation. Construction of the base course may immediately follow compaction of the lower portion of the thickened edge.

When the depth of the thickened edge extends less than two inches below the bottom of the asphalt pavement base course, the portion below the base course may be placed and compacted with the base course in a single operation.

**321.8.9 Safety Edge:** The finished safety edge slope shall be planar forming a  $30^{\circ} \pm 5^{\circ}$  angle with the adjacent roadway surface and extend a minimum of five inches (5") below the roadway pavement's finished surface.

The safety edge shall be constructed with the top or final paving lift of a new pavement or overlay using a device that is mounted to or is a part of the screed portion of the laydown machine. The safety edge device shall be capable of constraining the asphalt concrete material to increase density of the extruded profile by reducing the volume. A conventional single strike-off plate is not acceptable. Compaction obtained from the extruded safety edge shall be acceptable when the extruded shape conforms to the specified shape.

During laydown operations if the extruded safety edge does not conform to the specified shape, the Contractor shall take immediate actions to correct the deficiency and to repair all non-compliant sections of safety edge. The Contractor shall stop paving operations until corrections to the laydown operation have been made and resumption of paving is approved by the Engineer or his designated representative.

### 321.9 QUALITY CONTROL:

It is the contractor's responsibility to perform Quality Control monitoring and/or testing during asphalt concrete production to achieve the required compaction and to perform Quality Control monitoring and/or testing during asphalt concrete production to achieve the required mix properties. The Engineer may obtain samples of any portion of any material at any point of the operations for his own use. Also, the Engineer may order the use of any drying, proportioning and mixing equipment or the handling of any material discontinued which, in his/her opinion, fails to produce a satisfactory mixture.

The asphalt concrete produced shall conform to the requirements of the production tolerances established in section [321.10](#). When the asphalt concrete does not conform to the production tolerances, it shall be reported to the Engineer, and corrective quality control measures shall be implemented, or production shall cease immediately at no additional cost to the contracting Agency or Engineer.

### 321.10 ACCEPTANCE:

**321.10.1 Acceptance Criteria:** Unless otherwise specified, asphalt concrete will be divided into lots for the purpose of acceptance. A lot shall be considered to be one day's production. When the quantity of asphalt concrete placed in a day exceeds 500 tons but is less than 2000 tons, the lot shall be divided into 500 ton sublots or fraction thereof. Where the quantity of asphalt concrete placed in a day exceeds 2000 tons, the day's production will be divided into four (4) approximately equal sublots. A minimum of one sample will be obtained from each lot. Tests used to determine acceptance will be performed by the Engineer or a laboratory employed by the Engineer. In either case the laboratory shall be accredited

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by the AASHTO Accreditation Program (AAP), for the tests being performed. The acceptance laboratory will take representative samples of the asphalt

concrete from each subplot to allow for gradation, binder content, air voids, pavement thickness and compaction of base and surface course. Each subplot will be accepted based upon the test data from the sample(s) from that subplot. All acceptance samples shall be taken using random locations or times designated by the Engineer in accordance with ASTM D3665.

**321.10.2 Gradation, Binder Content and Air Voids:** The acceptance laboratory will take a sample of the asphalt concrete in accordance with the requirements of Section 2 or 4 of Arizona Test Methods 104 or AASHTO T-168 from each subplot. The minimum weight of the sample shall be 45 pounds. Asphalt binder content and gradation shall be determined in accordance with AASHTO T-308 using the ignition furnace for each subplot. The acceptance laboratory is responsible for obtaining the necessary materials and performing an ignition furnace calibration as outlined in AASHTO T-308 for each asphalt concrete mixture utilized on the project. The correction factor used for each test shall be clearly indicated on the report. The bulk density for Marshall Mix designs shall be tested in accordance with AASHTO T-245. The bulk density for Gyratory mix designs shall be determined in accordance with AASHTO T-312. The maximum theoretical density shall be determined in accordance with the requirements of AASHTO T-209 including fan drying per AASHTO T209 Section 15. Effective voids of the laboratory compacted specimens will be determined at a minimum of once per lot in accordance with the requirements of AASHTO T-269. Should the testing for effective air voids not meet the “Full Payment” or “No Corrective Action” requirements of Table [321-5](#), additional testing for laboratory air voids on the remaining sublots will be performed as necessary to determine the extent of the deficiency. Acceptance testing results will be furnished to the contractor and the supplier within five working days of receipt of samples by the acceptance laboratory.

During production, the allowable deviations from the mix design gradation targets are listed in the tables below. The allowable production tolerances may fall outside of the mix design gradation bands.

<b>TABLE 321-3A</b>				
<b>GRADATION ACCEPTANCE LIMITS FOR MARSHALL MIXES</b>				
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix	Base Mix
1 inch	---	---	---	±7%
3/4 inch	---	---	±7%	±6%
1/2 inch	---	±7%	---	---
3/8 inch	±7%	±6%	±6%	±6%
No. 8	±6%	±6%	±6%	±6%
No. 40	±4%	±4%	±4%	±4%
No. 200	±2%	±2%	±2%	±2%

<b>TABLE 321-3B</b>			
<b>GRADATION ACCEPTANCE LIMITS FOR GYRATORY MIXES</b>			
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix
3/4 inch	---	---	±7%
1/2 inch	---	±7%	±6%
3/8 inch	±7%	±6%	---
No. 8	±6%	±6%	±6%
No. 40	±4%	±4%	±4%
No. 200	±2%	±2%	±2%

If the results from a single acceptance sample fall outside of the acceptance limits in Table [321-3A](#) or [321-3B](#) as applicable, a second sample shall be taken and if the second acceptance sample is also outside of the acceptance limits the Contractor shall cease production of asphalt concrete. Production shall not begin again until calibration test results verify that adjustments made to materials or proportions yield a gradation that falls within acceptance limits in Table [321-3A](#) or [321-3B](#) as applicable.

If the asphalt binder content is within ± 0.40% of the mix design target value, the asphalt concrete will be paid for at the contract unit price. If the asphalt binder content deviates by more than ± 0.40% from the mix design target value, the

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deficient area will be evaluated within the subplot by coring at maximum intervals of 100 feet from the deficient sample. The asphalt content of the original deficient sample will be averaged with the asphalt binder content of the cores taken for re-evaluation to determine compliance with the acceptance requirements. If the resulting average of the asphalt binder content deviates by more than  $\pm$

0.40% from the mix design target value, then Table 321-4 shall apply to the subplot. Additional cores may be required to define the limits of the deficient area, and shall not be used for re-evaluating acceptance.

<b>TABLE 321-4</b>		
<b>ASPHALT BINDER CONTENT ACCEPTANCE AND PENALTIES</b>		
<b>Deviation from that permitted</b>	<b>When the contracting agency is the owner: Payment Reduction (\$ per ton of asphalt concrete)</b>	<b>When the contracting agency is not the owner (i.e. permits): Corrective Action</b>
Over 0.0 to 0.1% points	\$2.00	EA (see 321.10.6)
Over 0.1 to 0.2% points	\$6.00	EA (see 321.10.6)
Over 0.2% points	Removal* or EA per 321.10.6	Removal* or EA per 321.10.6

**MESA TABLE 321-4**  
**ASPHALT BINDER CONTENT ACCEPTANCE AND PENALTIES**

<u>Deviation from that permitted</u>	<u>Corrective Action and Payment Reduction (\$ per ton of Asphalt Concrete)</u>
<u>Over 0.0 to 0.1% points</u>	<u>\$4.00</u>
<u>Over 0.1 to 0.2% points</u>	<u>\$10.00</u>
<u>Over 0.2% points</u>	<u>Removal</u>

If the laboratory air voids fall within a range of 2.8% to 6.2%, the asphalt concrete will be paid for at the contract unit price. If the laboratory air voids are outside of this range, the deficient area will be evaluated within the subplot by coring at maximum

intervals of 100 feet from the deficient sample. The laboratory air voids of the original deficient sample will be averaged with the laboratory air voids obtained from each of the cores taken for re-evaluation to determine compliance with the acceptance requirements. If the resulting average of the laboratory air voids is outside the indicated range, then Table 321-5 shall apply to the subplot. Additional cores may be required to define the limits of the deficient area, and shall not be used for re-evaluating acceptance. The minimum limits of corrective action shall include the affected area but no less than one city block or 660 feet. The Contractor shall remove any areas of bleeding, but in no case less than the specified roller width, as directed by the Engineer, and replace the affected material with new material meeting the specification requirements for the mix type involved. This shall be done, any time within the one (1) year warranty until the bleeding has been corrected, at no additional cost to the City. Should the stability of the mix be affected by the excess asphalt cement to such an extent that the pavement is displaced under normal traffic load, within the one (1) year warranty; the areas affected shall be removed and replaced with new material, at no additional cost to the City. The criteria for determining stability of the mix shall be 3/8-inch movement or more of the asphalt (rutting or shoving) measured with a 10-foot straight edge in any direction.

**SECTION 321**

**TABLE 321-5**

<b>LABORATORY VOIDS ACCEPTANCE AND PENALTIES</b>		
Laboratory Air Voids (Measured at N <sub>des</sub> or 75 blows as applicable)	When the contracting agency is the owner: Payment Reduction (\$ per ton of asphalt concrete)	When the contracting agency is not the owner (i.e. permits): Corrective Action
Less than 1.5%	Removal* or EA per 321.10.6	Removal* or EA per 321.10.6
1.5-2.0%	\$2.50	EA (see 321.10.6)
2.1-2.7%	\$1.00	EA (see 321.10.6)
2.8-6.2%	Full Payment	No corrective action
6.3-6.9%	\$1.00	EA (see 321.10.6)
7.0-8.0%	\$2.50	EA (see 321.10.6)
Greater than 8.0%	Removal* or EA per 321.10.6	Removal* or EA per 321.10.6

**MESA TABLE 321-5**  
**LABORATORY VOIDS ACCEPTANCE AND PENALTIES**

<u>Laboratory Air Voids</u> <u>(Measured at Ndes or 75 blows</u> <u>as applicable)</u>	<u>Corrective Action and Payment</u> <u>Reduction</u> <u>(\$ per ton of asphalt concrete)</u>
<u>Less than 1.5%</u>	<u>Removal (min 660 feet)</u>
<u>1.5-2.0%</u>	<u>\$5.00</u>
<u>2.1-2.7%</u>	<u>\$2.00</u>
<u>2.8-6.2%</u>	<u>Full Payment</u>
<u>6.3-6.9%</u>	<u>\$2.00</u>
<u>7.0-8.0%</u>	<u>\$5.00</u>
<u>Greater than 8.0%</u>	<u>Removal (min 660 feet)</u>

If an agency or Engineer is purchasing asphalt concrete directly from a commercial material supplier, the agency or Engineer will use Section [321.10](#), and specifically Tables [321-3A](#) or [321-3B](#) as applicable, [321-4](#) and [321-5](#) from Section [321.10](#), when determining the acceptance of the asphalt concrete with the material supplier.

**321.10.3 Surface Testing:** If directed by the Engineer surface drainage test shall be performed. The completed surfacing shall be thoroughly compacted, smooth and true to grade and cross-section and free from ruts, humps, depressions or irregularities. An acceptable surface shall not vary more than 1/4 inch from the lower edge of a 12-foot straightedge when the straightedge is placed parallel to the centerline of the roadway. The straightedge shall be furnished by the contractor and shall be acceptable to the Engineer.

## SECTION 321

All streets shall be water tested for drainage in the presence of the Engineer or designated representative before final acceptance. Any areas not draining properly shall be corrected to the Engineer's satisfaction at the Contractor's expense. Water for this testing shall be provided and paid for by the Contractor.

When deviations in excess of the above tolerance are found, humps or depressions shall be corrected to meet the specified tolerance, or shall be cut out along neat straight lines and replaced with fresh hot mixture and thoroughly compacted to conform with and bond to the surrounding area. Materials and work necessary to correct such deviations shall be at no additional cost to the Contracting Agency.

**321.10.4 Asphalt Pavement Thickness:** Asphalt Pavement thickness will be determined from cores secured from each subplot for this purpose. Such cores will be taken and measured by the Asphalt Concrete Coring Method. This method can be found at in Section [321.14](#). Each core location will be patched by the party responsible for the testing.

If the pavement thickness is deficient from the target thickness by 0.25 inches or less, it will be paid for at the contract unit price. If the pavement thickness deficiency is greater than 0.25 inches and the contracting agency is not the owner (i.e. permits) the following steps will apply:

- (1) If the thickness deficiency of the pavement exceeds 0.25 inch, the limits of the deficient area will be evaluated by coring at maximum intervals of 100 feet from the deficient core. The thicknesses of the original deficient core will be averaged with the thicknesses of the cores taken from 100 feet on each side of it to determine compliance with the acceptance requirements. If the resulting average thickness deficiency is greater than 0.25 inch, additional cores may be required to define the limits of the deficient area, and shall not be used for re-evaluating acceptance.
- (2) If the pavement thickness from step one above deviates from the target thickness by more than 0.25 inch but not more than 0.50 inch, corrective action will be required. This corrective action will consist of application of a Type II slurry seal coat in accordance to Section [715](#). The Contractor may present an engineering analysis outlining other proposed remedial measures for the consideration of the Engineer. The Engineer will review the engineering analysis and decide within 30 working days whether to accept the proposed remedial measures.
- (3) If the pavement thickness from step one above deviates from the target thickness by more than 0.50 inch, corrective action will be required. The deficient area will be overlaid with no less than 1 inch thick lift, for the full width of the pavement to meet or exceed the designed thickness, with the appropriate end and edge milling, with a mixture approved by the Engineer. The Contractor may present an engineering analysis outlining other proposed remedial measures for the Engineer's consideration. The Engineer will review the engineering analysis and decide within 10 working days whether to accept the proposed remedial measures. If the Engineer chooses to reject the engineering analysis, the indicated overlay will be constructed by the Contractor at no additional cost to the Owner.

If the pavement thickness deficiency is greater than 0.25 inches and the contracting agency is the owner, Table [321-6](#) will apply. Asphalt pavement thickness deficiency greater 0.50 inches shall require the placement of a minimum of 1-inch of additional asphalt at no cost to the owner.

<b>TABLE 321-6</b>	
<b>ASPHALT PAVEMENT THICKNESS PAYMENT REDUCTION</b>	
<b>For Thickness Deficiency of More Than 0.25 inches and less than 0.50 inches</b>	
<b>Specified Pavement Thickness</b>	<b>Reduction in Payment or Corrective Action</b>
Less than 1.5 inches	50%
1.50 inches to 1.99 inches	33%
2.00 inches to 2.49 inches	25%
2.50 inches to 2.99 inches	20%
3.00 inches and over	17%

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### 321.10.5 Density:

#### 321.10.5.1 Pavement 1-1/2 Inches or Less in Nominal Thickness:

Compaction shall consist of a “Rolling Method Procedure” using an established sequence of coverage with specified types of compactors. A pass shall be defined as one movement of a compactor in either direction. Coverage shall be the number of passes as are necessary to cover the entire width being paved.

The rolling sequence, the type of compactor to be used, and the number of coverages required shall be as shown in Table [321-7](#).

<b>TABLE 321-7</b>				
<b>ROLLING SEQUENCE FOR LIFT THICKNESS 1½” OR LESS</b>				
<b>Rolling Sequence</b>	<b>Type of Compactor</b>		<b>No. of Coverages</b>	
	<b>Option No. 1</b>	<b>Option No. 2</b>	<b>Option No.1</b>	<b>Option No. 2</b>
Initial	Static Steel	Vibrating Steel	1	1
Intermediate	Pneumatic Tired	Vibrating Steel	4	2- 4*
Finish	Static Steel	Static Steel	1-3	1-3
* Based on the roller pattern which exhibits the best performance.				

The Contractor shall select the option for compaction and, when pneumatic-tired compactors are used will designate the tire pressure. Steel wheel compactors shall not be used in the vibratory mode for courses of one inch or less in thickness nor when the temperature of the asphaltic concrete falls below 180 degrees F. Initial and intermediate compaction shall be accomplished before the temperature of the asphaltic concrete falls below 200 degrees F.

Compaction will be deemed to be acceptable on the condition that the asphaltic concrete is compacted using the type of compactors specified, ballasted and operated as specified, and with the number of coverages of the compactors as specified.

#### 321.10.5.2 Pavement Greater than 1-1/2 Inches in Nominal Thickness:

Achieving the required compaction is the responsibility of the contractor. The number and types of rollers is the contractor’s responsibility and shall be sufficient to meet these requirements.

In-place air voids shall be determined in accordance with AASHTO T-269 utilizing cores taken from the finished pavement. The maximum theoretical density used in the determination of in-place air voids will be the average value from the acceptance samples determined for the Lot as outlined in [321.10.1](#).

The Engineer will designate one random test location for each subplot and the acceptance laboratory will obtain one core from that location. Regardless of subplot quantities or boundaries, a minimum of one core will be obtained per residential street and a minimum of one core per travel lane for collector and arterial streets. The outside one foot of each pass of the pavement course or any unconfined edge will be excluded from testing. The Engineer may exclude areas from the compaction lot that are not accessible by normal compaction equipment.

The Contractor will provide the traffic control to facilitate any coring operations necessary for compaction acceptance.

Cores will be taken per the Asphalt Concrete Coring Method. This method can be found in Section [321.14](#). Acceptance testing results will be furnished to the contractor within five working days of receipt of samples by the acceptance laboratory.

If the pavement density has in-place voids of 8.0% or less, the asphalt concrete will be paid for at the contract unit price. If the pavement density has in-place voids greater than 8.0%, the deficient area will be evaluated within the subplot by coring at maximum intervals of 100 feet from the deficient core(s). If both cores in a subplot are deficient, 3 to 4 additional cores may be necessary to re-evaluate acceptance. The in-place voids of all the original core(s), whether deficient or acceptable, will be averaged with the in-place voids of the cores taken for re-evaluation to determine compliance with the acceptance requirements. If the average of the in-place voids is greater than 8.0% then Table [321-8](#) shall apply to the subplot. Additional cores may be required to define the limits of the deficient area, and shall not be used for re-evaluating acceptance.

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<b>TABLE 321-8</b>		
<b>PAVEMENT DENSITY PENALTIES</b>		
Limits of In-place Air Voids for lift thicknesses greater than 1.5 inches	When the contracting agency is the owner:  Payment Reduction (\$ per ton of asphalt concrete)	When the contracting agency is not the owner (i.e. permits):  Corrective Action
8.1% to 9.0%	\$4.00	EA
9.1% to 10.0%	\$6.00	EA and Type II Surry Seal
10.1% to 11.0%	Removal* or EA per 321.10.6	Removal* or EA per 321.10.6
Greater than 11.0%	Removal	Removal

\*Notes: The Contractor shall remove and replace the entire subplot that is deficient. Removal for In-place Air Voids greater than 11.0% is not eligible for Section [321.10.6](#).

**MESA TABLE 321-8**  
**PAVEMENT DENSITY PENALTIES**

<u>Limits of In-place Air Voids for lift thicknesses greater than 1.5 inches</u>	<u>Corrective Action and Payment Reduction (\$ per ton of asphalt concrete)</u>
<u>8.1% to 9.0% &amp; 2.9% to 2.0%</u>	<u>\$7.00</u>
<u>9.1% to 10.0% &amp; 1.9% to 1.0%</u>	<u>\$10.00</u>
<u>Greater 10.0% or Less 1.0%</u>	<u>Removal (Min 660 Feet)</u>

Subsection 321.10.6 – Delete this section in its entirety per Mesa.

**321.10.6 Engineering Analysis (EA):** Within 10 working days after receiving notice that a lot or subplot of asphalt concrete is deficient and is found to fall within the “Removal or EA” band per Table(s) [321-4](#), [321-5](#), and/or [321-8](#) the contractor may submit a written proposal (Engineering Analysis) to accept the material in place at the applicable penalties along with possible remediation(s) listed in the “Removal or EA” category. Engineering Analysis can also be proposed for non-removal categories of “Corrective actions” when the contracting agency is not the owner (i.e. permits).

The Engineering Analysis shall contain an analysis of the anticipated performance of the asphalt concrete if left in place. The Engineering Analysis shall also detail the effect of any proposed corrective action to the material(s) in place as it relates to the in-place material’s performance. The Engineering Analysis shall be performed by a professional engineer experienced in asphalt concrete testing and mix designs. If the lot or subplot is submitted for referee testing by the contractor, the ten working days allowed to prepare an engineering will begin upon notification of referee test results.

When an Engineering Analysis recommends that a specific lot or subplot should not be removed, the Engineering Analysis will recommend that the following penalties (Table [321-9](#)) be paid when the contracting agency is the owner, for the specific criteria being reviewed by the EA.

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<b>TABLE 321-9</b>		
<b>ENGINEERING ANALYSIS PENALTIES for REMOVAL* LOTS/SUBLOTS LEFT IN-PLACE</b>		
<b>Acceptance Criteria</b>	<b>Acceptance Limits</b>	<b>Penalty When Contracting Agency is the Owner (\$/Ton)</b>
Asphalt Binder Content	Over 0.2% points from that Permitted	\$9.00
Laboratory Air Voids (Measured at $N_{des}$ or 75 blows as applicable)	Less than 1.5% or Greater Than 8.0%	\$3.75
Limits of In-place Air Voids	10.1% to 11.0%	\$9.00

Within 15 working days, the Engineer will determine whether or not to accept the contractor's proposed Engineering Analysis.



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### Subsection 321.11 – Delete this section in it's entirely per Mesa.

#### **321.11 REFEREE:**

In the event the contractor elects to question the acceptance test results for either asphalt binder content, laboratory air voids, density or a combination thereof for a subplot, the Contractor may make a written request for additional testing of that subplot. Any request for referee testing must describe the contractor's reasons for questioning the validity of the original acceptance results and must clearly describe which set of acceptance tests are in question. The Contractor will engage an independent laboratory (at the Contractor's own expense) who is accredited by AAP in all of the acceptance test methods. The independent laboratory shall be acceptable to the Engineer and shall perform a new set of acceptance tests as required by Section [321.10](#) representing the area or set of tests in question. The results of these determinations will be binding on both the contractor and the agency.

These tests may include asphalt binder content, aggregate gradation, Marshall or Gyratory unit weight, maximum theoretical unit weight, laboratory air voids and in-place air voids (compaction). Samples for referee testing shall come from representative samples obtained from the completed pavement, as directed by the Engineer.

The number of samples taken will be the same as specified in Section [321.10](#). The independent laboratory shall compile the test results and transmit them to both the Engineer and the contractor. The independent laboratory shall include a report signed by an Engineer registered in the State of Arizona, who is experienced in asphalt concrete testing and mix design development. The signed report shall give an opinion that the material evaluated does or does not comply with project specifications, shall clearly describe any deficiencies, and the results will be binding between all parties.

#### **321.12 MEASUREMENT:**

Asphalt concrete pavement will be measured by the ton, or by the square yard, for the mixture actually used as allowed above, which shall include the required quantities of mineral aggregates, asphalt binder, and mineral admixture. Measurement shall include any tonnage used to construct intersections, roadways, streets, or other miscellaneous surfaces indicated on the plans or as directed by the Engineer.

#### **321.13 PAYMENT:**

The asphalt concrete measured as provided above will be paid for at the contract price per ton or square yard, as adjusted per Section [321.10](#), which price shall be full compensation for the item complete, as herein described and specified.

Payment for tack coat will be by the ton diluted, based on the rate of application, as directed by the Engineer.

No payment will be made for any overrun in quantity of asphalt concrete in excess of 10 percent based on actual field measurement of area covered, design thickness, and the mix design unit weight. The calculations and payment for overrun will be by individual pay item. To compensate or adjust for a thickness deficiency in an underlying asphalt concrete course, the Engineer may authorize a quantity increase in excess of 10 percent for a subsequent asphalt concrete course. In such cases, the quantity in excess of 10 percent will be paid for at the lowest unit price.

Except as otherwise specified in the special provisions, no separate payment will be made for work necessary to construct miscellaneous items or surfaces of asphalt concrete.

#### **321.14 ASPHALT CORE METHOD: Core Drilling of Hot Mix Asphalt (HMA) for Specimens of 4" or 6" diameter**

**321.14.1 Scope:** This method is to establish a consistent method of the use of a diamond bit core to recover specimens of 4 or 6 inch diameter for laboratory analysis and testing. The method will require the use of: water, ice (bagged or other suitable type), dry ice, and a water-soap solution to be utilized when coring asphalt rubber concrete. Individuals doing the specimen recovery should be observing all safety regulations from the equipment manufacturer as well as the required job site safety requirements for actions, and required personal protective equipment.

## SECTION 321

**321.14.2 Core Drilling Device:** The core drilling device will be powered by an electrical motor, or by an acceptable gasoline engine. Either device used shall be capable of applying enough effective rotational velocity to secure a drilled specimen. The specimen shall be cored perpendicularly to the surface of pavement, and that the sides of the core are cut in a manner to minimize sample distortion or damage. The machinery utilized for the procedure shall be on a mounted base, have a geared column and carriage that will permit the application of variable pressure to the core head and carriage throughout the entire drilling operation. The carriage and column apparatus shall be securely attached to the base of the apparatus; and the base will be secured with a mechanical fastener or held in place by the body weight of the operator. The core drilling apparatus shall be equipped with a water spindle to allow water to be introduced inside of the drill stem while operating. The cutting edge of the core drill bit shall be of hardened steel or other suitable material with embedded diamond chips in the cutting surface. The core barrel shall be of sufficient diameter to secure a specimen that is a minimum of four or six inches or whichever is prescribed for necessary testing. The core barrel shall not be missing more than one of the teeth used for cutting; if so it shall be discarded and another barrel shall be used. The core barrel shall also be a minimum of two inches longer than the anticipated depth of pavement in accordance with project paving plans.

**321.14.3 Accessory Equipment:** A sufficient supply of ice and dry ice shall be provided to sufficiently cool the pavement prior to securing the samples from the designated areas in the pavement. The ice should also be used to adjust the temperature of the water used to cool the core bit. A water supply (usually a plastic 35 – 55 gal drum) with sufficient hose to introduce the water into and through the spindle of the coring device by gravity feed. The drum should be white or light in color to minimize excessive thermal heating of the water (*for coring of asphalt rubber cores see Note 1*). At no time shall the water utilized in the coring operation exceed 65° F during the coring operation. Ice shall be utilized to ensure the temperature control of the water being introduced during the cutting operation. An ice chest or other suitably insulated container that can maintain a temperature of less than 70° F shall be used to secure the specimens during transport. The container will be equipped with flat shelving that will support the drilled cores throughout the entire specimen dimension during transport back to the testing facility.

Miscellaneous hand tools to remove the drilled specimen from the drill hole or the core barrel taking great care in not disturbing the specimen more than necessary (refer to fig. 1 in ASTM D5361-05).

**321.14.4 Process:** The pavement surface at the time of coring shall not exceed a temperature of 90° F; the pavement shall be conditioned with ice or dry ice to ensure that this requirement is met. Immediately after it has been ensured that the pavement has dropped to the required temperature, core drilling shall begin. The operator will then apply an even and continuous pressure (Note 2) to penetrate through the full depth of the pavement. The operator will concurrently ensure that enough water is moving over the core surface as to adequately remove any and all cuttings that could damage the drilled core. After the pavement thickness has been penetrated the core shall be carefully removed from either the drill hole or the core barrel and be immediately transferred to an ice chest or other suitable container. Each individual core shall be placed on a shelf in the cooler with the exposed side of the specimen facing down, or the “top side” down. If the specimen is a two lift core, the only acceptable means of separating lifts is with a power or other acceptable wet saw type of equipment (conforming to ASTM D5361-05); however, at no time shall cores be split using a mallet and screwdriver or metal straight edge when being tested for bulk density. Perpendicularity of the specimen shall be checked in the field after the specimen has been extracted from the surface. The core operator shall hold the core up to eye level and place the core top side down in a “speed square” or small carpenters square. The specimen placed in the square shall not depart from perpendicular to the axis more than 0.5° (approximately equivalent to 1/16 of an inch in 6 inches). If the specimen is outside of this distance from square it shall be discarded in the field and another sample cored that falls within tolerance. The cores upon arriving at the laboratory for testing shall be carefully cleaned and measured for thickness in accordance with ASTM D3549. A speed square shall be utilized to measure perpendicularity as compared to a 90° degree angle and shall not depart from perpendicular to the axis more than 0.5° (approximately equivalent to 1/16 of an inch in 6 inches). All remaining testing shall be done within the parameters of the current project and / or agency required specification.

- *End of Section* -

\*Note 1 – It should be noted that when the material to be cored is a rubberized asphalt mixture a wetting agent such as liquid dish soap shall be added to the water barrel to hinder the material from sticking or allowing the binder to spread during coring.

\*Note 2 – This refers to pressure exerted on the core barrel and machine during the coring process. Too much pressure can cause damage to the core barrel and the motor; and too little pressure can cause a glazing of the diamonds, reducing cutting efficiency and premature wear of the barrel



**MARICOPA COUNTY**  
*Department of Transportation*

MEMORANDUM

**Date:** March 27, 2013

**To:** MAG Specifications and Details Committee

**From:** Robert Herz, MCDOT Representative

**Subject:** Revised Section 301.7 (Subgrade Preparation) MEASUREMENT

**Case 13-10**

**PURPOSE:** Add subgrade preparation measurement for graded non-surfaced driveways.

**REVISIONS:**

**Proposed Changes:**

**301.7 MEASUREMENT:**

Measurement for Subgrade Preparation will be by the square yard. The area to be measured will be the total accepted area of new asphalt ~~concrete pavement and new portland or Portland~~ concrete pavement (PCCP), including paved shoulders, tapers, ~~and~~ turnouts, and unpaved roadway shoulders. ~~The Subgrade Preparation area measured for new driveway work~~ Measurement will ~~also include the accepted surface area of asphalt pavement, driveways that are paved or are surfaced with~~ aggregate base or select materials, ~~and the vehicle travel area of non-surfaced graded driveways.~~

~~Except for PCCP, the area under portland cement concrete surfaces such as concrete curb and gutter, sidewalk, concrete driveways and driveway entrances, and concrete alley entrances will not be included in the Subgrade Preparation measurement~~ ~~this pay item.~~

Project earthwork quantities for Roadway Excavation, Borrow Excavation, and Fill Construction shall not be separately measured when they are not listed as separate line items on the fee proposal form. In such case, unless otherwise specified, payment for said earthwork items shall be included in the unit price for Subgrade Preparation.

**Proposed Modified Specification in final form:**

**301.7 MEASUREMENT:**

Measurement for Subgrade Preparation will be by the square yard. The area to be measured will be the total accepted area of new asphalt concrete pavement and new portland cement concrete pavement (PCCP), including paved shoulders, tapers, turnouts, and unpaved roadway shoulders. The Subgrade Preparation area measured for new driveway work will include the accepted surface area of asphalt pavement, aggregate base or select materials, and the vehicle travel area of non-surfaced graded driveways.

Except for PCCP, the area under portland cement concrete surfaces such as concrete curb and gutter, sidewalk, concrete driveways and driveway entrances, and concrete alley entrances will not be included in the Subgrade Preparation measurement.

Project earthwork quantities for Roadway Excavation, Borrow Excavation, and Fill Construction shall not be separately measured when they are not listed as separate line items on the fee proposal form. In such case, unless otherwise specified, payment for said earthwork items shall be included in the unit price for Subgrade Preparation.

# Water/Sewer Working Group Meeting

Meeting Notes  
March 19, 2013

## **Opening:**

A meeting of the Specifications and Details Water/Sewer Working Group was called to order by chair Jim Badowich on March 19, 2013, at 1:35 p.m. in the MAG Cholla Room.

## **1. Introductions/Attendance**

Jim Badowich (Avondale), Arturo Chavarria (Hanson), Scott Dahne (Infra-Tect), Jami Erickson (Phoenix), Rob Godwin (Goodyear), Mike Hook (ACPA), John Kanzlemar (Contech), Kelly Kokesh (ADS), Slade Ottney (NUCA), Mike Neill (Infra-Tect), Craig Sharp (Buckeye), Gordon Tyus (MAG), Arvid Veidmark (SSC Boring), Steven K Wolff (Infra-Tect).

## **2. Precast Manhole Specifications**

Jim Badowich said there haven't been any updates since the last meeting.

## **3. Manhole Revisions/Update**

Craig Sharp handed out draft revisions to Section 625 Manhole Construction. His update included removing references to the use of bricks. He also updated Section 755 Brick and Concrete Masonry Units to remove references to "manhole" bricks. Mr. Tyus said that references to steps can also be removed from Section 625, since they are no longer used. Jim Badowich said the revised sentence "Bricks for manholes shall not be used" be changed to make it "manhole construction" since bricks may still be used for adjustments. Jami Erickson said the city of Phoenix has a supplement on it. The group also decided to remove the brick manhole detail from Detail 422 and use it just for adjustments.

## **4. Pipe Bevel Demonstration.**

Three representatives from Infra-Tect gave a demonstration of a new product called Bevel-Sert. This beveled-ring is manufactured from HDPE and is designed to make connections between ends of ductile iron pipe easier and corrosion resistant. Mike Neil described the products use and advantages and also demonstrated how it worked with sample pipe ends. Jami Erickson and Jim Badowich discussed with them how they could work with agencies to test the product in the field. Mr. Tyus told them to review Section 600 to see where it may fit into the water line constructions specifications.

## **5. Pipe Materials and Installation Specifications**

Jim Badowich asked John Kanzlemar to provide an update on the steel-reinforced polyethylene (SRPE) pipe case. (Proposed Section 739) He passed out a revision based on comments provided during the last committee meeting. This included referencing Sections 615 and 618 for installation requirements for irrigation and sanitary sewers. It also changed the test pressure from 15 psi to 10.8 to match the minimum standards of ASTM.

Kelly Kokesh passed out the latest version of Section 740 for Polypropylene pipe. She said it followed a similar layout as the propose Section 739. She hoped the material specifications would be approved separate changes to Sections 603 and other installation specs.

Next the draft Sections 601 and 603 for rigid and flexible pipe (respectively) were discussed. Section 603 simplified the description of flexible pipe types. Mike Hook asked about testing requirements and new tests such as laser testing. Jim Badowich agreed that this could be added as an option in Section 615.11 Testing.

Arturo Chavarria handed out the lasted draft revision to Section 601 for rigid pipe. He said the trench width table had been updated, but also said there were four different types of construction methods in ASTM including one that used only natural fill without compaction which would change trench requirements. Mr. Badowich didn't think the fourth type would be used in MAG. Mr. Tyus suggested referencing the appropriate ASTM standards, excluding the type four method.

Finally the group discussed submitting the changes to 601, 603, 610, 615 and 618 as a case. There was general agreement that the changes should be submitted as a package. Kelly Kokesh said she would talk to Warren White of Chandler as a possible sponsor.

#### **6. Encasement of Water or Sewer Pipe by Jacking or Tunneling Operation**

Arvid Veidmark of SSC Boring proposed changes to Section 602.3 Jacking Operation. He suggested removing the fourth sentence "Once the jacking operation has started, it shall be continued around the clock until the specified limits have been reached." He said this requirement is out-of-date based on today's technology and creates problems submitting bids that consider around the clock work. The work time requirements are job specific. He also took exception to the requirement to grout casings under Section 602.6 Carrier Pipe Placement. Mr. Veidmark provided examples using casing spacers as an option along with a bulkhead seal. Filling the void with pea gravel was also an option. This would allow future changes such as replacing the pipe with a large diameter version in the future if required. Mr. Badowich suggested Mr. Veidmark forwarded him suggested changes for a potential case to update Section 602.

#### **7. Water Testing/Flushing**

Rob Godwin of Goodyear suggested making revisions to the testing and flushing specifications. MAG standards currently are not consistent with AWWA requirements in Section 610.15. He said Section 611 Disinfecting Water Mains also needs to be updated to be more specific. Some changes he suggested were having enough volume for flushing requirements. He also said Goodyear tests HPC's. He noted that the leakage tests according to the AWWA test uses .77 gallon/hour whereas the MAG test uses 1.26 gallon/hour. Mr. Godwin also said he has had problems with contractors not keeping a stead pressure during the tests. Mr. Badowich suggested Mr. Godwin work with Troy Tobiasson at Goodyear and bring suggested revisions to the next meeting.

#### **8. Next Meeting Date**

The next meeting of the Water/Sewer working group is tentatively scheduled for Tuesday, April 23rd at 1:30 p.m. at the MAG office.

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

# MAG Concrete Working Group

Thursday, March 21, 2013, 1:30 pm at the ARPA Offices

## Meeting Notes

### Present:

See attached attendance sheet.

### Discussion:

- 1) MAG Section 340 Draft Revision – Peter Kandaris. We reviewed the last revision and discussed some additional clarification wording to several items – particularly comments by McDOT and Table 340-1. Peter will work with Bob Herz directly to revise before bringing to the MAG Committee for Case introduction.
- 2) Revision of Section 324 on Portland Cement Concrete Paving – Jeff Hearne. We reviewed the current revision to Section 324 with the intent of reducing or eliminating some of the existing wording by using appropriate references to other Sections – primarily Section 725 and utilizing input from ADOT Section 401. One of the items that came up is the need to review and revise Section 729 on Expansion Joint Filler that will be referenced in 324.2.5 due to the inclusion of withdrawn ASTM standards. We will need input from that Industry (Craftco?) to correctly specify current products.
- 3) Peoria/Chandler Potential New Potential Case- Directional Sidewalk Ramp – No progress or input from the Agencies. Bob Draper commented that Mesa may be working on these internally this year and could bring their work to the Working Group. Jeff Hearne will bring this up in the next Standards Committee meeting for discussion as how to proceed.

### Date for Next Meeting:

The next meeting is scheduled for **April 25, 2013 @ 1:30 pm** in the ARPA offices.  
(Following the Asphalt and Materials Working Group meetings)

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

Attendance  
Initials

**MAG Concrete Working Group**

**Thursday, March 21, 2013**

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**Report to MAG Technical committee  
Meeting on February 21<sup>th</sup> 2013 Working Group meeting  
By chairman, Jeff Benedict**

The meeting was called to order at noon on March 21st.

In attendance: Scott Thompson (ATC), Mike Whitman (WTI), Bob Draper (Mesa), Lowell Parkison (Crafco), John Allen (Scottsdale), Phil Feliz (WTI), Jeff Martinez (Cactus Asphalt), Chris Brien, Patrick shields (Palo Verde Const.), Drew Bellon, Don Cornelison, Greg Creaser (Speedie), Syd Anderson (Phoenix), Peter Kandarlis (DGA Consulting), Jeff Hearne (SRMG), Sam Huddleston (AMEC), Bob Herz, John Shi (MCDOT), Adrian Green (Vulcan), Dan Selby (Asphalt Busters) and Gordon Tyus (MAG)

Introductions were made and goals were reviewed.

**Case 13-02** Changes to crack seal specifications were discussed. The working group decided to keep the existing material specification and adopt the all of the remaining changes to the proposed case. The representative from CRAFTCO recommended the current spec, due to its uniform performance, wide spread use, and it's cost effective nature. The group liked the changes to the rest of the document. This will be polled by MCDOT at the regular MAG.

**Case 13-03** Asphalt concrete overlay section 321.8.6 was discussed and no changes were made. It was felt that it is ready for the main group to discuss.

**Case 13-09** A discussion on 321's penalty tables took place and Bob Draper (Mesa) volunteered to bring a case to the next MAG meeting for review and discussion. The draft of the City of Mesa's was reviewed and it was viewed as a good starting point. The group further decided that in lieu of an "engineering analysis" a third party lab evaluation be included.

Polymer modified Asphalt specifications were discussed with Sam Huddleston helping with clarifications. A rough draft was handed out and it was agreed to include it in the regular 711 section of binders. The changes to 711 will be developed and circulated to working group.

Section 325 "rubber overlay" were discussed. Syd will review with Ruben Lally and bring any recommended changes to the working group.

Adjustments to utility frames and covers were discussed. It was agreed that it should stay in section 345 and detail 422 with language to allow for overlay construction. Bob Herz will review.

Warm mix was discussed and it was decided that too many advantages were available to wait for ADOT. Tom Kennedy will develop a draft proposal for review by the working group. Don Cornelison will review the ADOT version.

The meeting was adjourned at 1:20pm.

The next working group meeting will be April 25th 2013 at 12:00 at the ARPA meeting room.