

July 28, 2015

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, August 5, 2015 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
August 5, 2015

COMMITTEE ACTION REQUESTED

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

2. Information.

3. Approval of July 1, 2015, Meeting Minutes

3. **Review and approve minutes of the July 1, 2015 meeting.**

Carry Forward Cases from 2015

4. Case 14-03: Updates to Guardrail Details
Revisions to Section 415 and/or inclusion of MCDOT guardrail details.
5. Case 14-06: Revisions to Section 718 Preservative Seal for Asphalt Concrete
Update specifications for current preservative seal products.
6. Case 14-12: Proposed Revisions to Sections 336, 321.10.3, 601.2.7 and Detail 200-1
Add pavement removal criteria to prevent full depth pavement cuts from being located within a lane wheel path.
7. Case 14-17: Create New Section 322
Provide specifications for Asphalt Stamping - materials and methods.

4. Information and discussion.
Sponsor: Bob Herz, MCDOT

5. Information and discussion.
Sponsor: Jeff Benedict, Asphalt Working Group
Updated

6. **Information, discussion and possible action.**
Sponsor: Bob Herz, MCDOT

7. Information and discussion.
Sponsor: Brian Gallimore, Materials WG
Updated

New Cases for 2015

- | | |
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| 8. <u>Case 15-01: Misc. Corrections</u>
A. Add omitted text to Section 735.1.
Text was approved by Case 14-07 and merged into Case 13-15.
B. Revise "OA" to Quality Assurance and "OC" to Quality Control in Section 710.
C. Update notes in Detail 225.
D. Correction of titles and section view on Detail 270.
E. Remove a conflict between specification Section 206 and Section 601.
F. Replace 'Section 712' with 'Section 718' in the third paragraph of Section 334.3. | 8. Information and discussion.
Sponsor: Bob Herz, MCDOT
<i>Updated</i> |
| 9. <u>Case 15-03: Revise Section 601.4.5 Trench Final Backfill Placement</u>
Revise Section 601.4.5 trench final backfill placement requirements.. | 9. Information and discussion.
Sponsor: Bob Herz, MCDOT
<i>Updated</i> |
| 10. <u>Case 15-05: Proposed Revisions to Section 616</u>
Update reclaimed water line construction specifications and create NEW Reclaimed Valve Box detail. | 10. Information and discussion.
Sponsor: Warren White, Chandler |
| 11. <u>Case 15-07: Revisions to Section 342 Decorative Pavement Concrete Paving Stone or Brick and Update Detail 225.</u>
Revisions to Concrete Paver Standards for Non-Traveled Surfaces. | 11. Information and discussion.
Sponsor: Warren White, Chandler
<i>Updated</i> |
| 12. <u>Case 15-09: Revisions to Section 321</u>
Miscellaneous revisions to Section 321:
PLACEMENT AND CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT | 12. Information and discussion.
Sponsor: Jeff Benedict, Asphalt Working Group
<i>Updated</i> |
| 13. <u>Case 15-10: Revisions to Section 321</u>
Add subsection 321.10.5.3 "Rehabilitation Work" into the MAG Specifications. | 13. Information and discussion.
Sponsor: Brian Gallimore, Materials WG
<i>Updated</i> |
| 14. <u>Case 15-11: Revisions to Section 717</u>
Incorporate revisions to Section 717, "Mix Design Requirements" into the MAG Specifications. | 14. Information and discussion.
Sponsor: Jeff Benedict, Asphalt Working Group
<i>Updated</i> |

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| 15. <u>Case 15-12: New Section 608</u>
Introduce New Section 608 HORIZONTAL DIRECTIONAL DRILLING. | 15. Presentation, information, and discussion
Sponsor: Arvid Veidmark, Water/Sewer WG
<i>Updated</i> |
| 16. <u>Case 15-13: Revisions to Section 725</u>
Add text to Section 725.6 to identify what to include in a concrete mix design submittal. | 16. Information and discussion.
Sponsor: Jeff Hearne, Concrete Working Group |
| 17. <u>Case 15-14: Revisions to Sections 321 and 325</u>
Revise Sections 321 and 325 to coordinate overlay work requirements. | 17. Information and discussion.
Sponsor: Bob Herz, MCDOT
<i>Updated</i> |

General Discussion

- | | |
|---|---|
| 18. <u>Working Group Reports</u> | 18. Information and discussion.

Curb Ramp WG Chair: Warren White
07/13/2015 Meeting.

Water/Sewer Chair: Jim Badowich
07/16/2015 Meeting

Asphalt Chair: Jeff Benedict
Materials Chair: Brian Gallimore
Concrete Chair: Jeff Hearne
07/23/2015 Meeting

Outside ROW Chair: Peter Kandaris |
| 19. <u>General Discussion</u>
- Discussion about MAG specifications supporting sustainable development

- Process for selecting new chair/vice chair | 19. Information and discussion. |
| 20. <u>Request for Future Agenda Items</u> | 20. Information and discussion. |

Adjournment

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

July 1, 2015

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

AGENCY MEMBERS

Jim Badowich, Avondale, Vice Chair	Lance Webb, Mesa (proxy)
Craig Sharp, Buckeye	Dan Nissen, Peoria
Jason Richardson, Chandler (proxy)	Rob Duvall, Phoenix (Streets) (proxy)
Ruben Aguilar, El Mirage	Jami Erickson, Phoenix (Water)
* Wayne Costa, Florence	* Rod Ramos, Scottsdale
Tom Condit, Gilbert	David Mobley, Surprise (proxy)
Mark Ivanich, Glendale	Tom Wilhite, Tempe, Chair
* Tom Vassallo, Goodyear	* Harvey Estrada, Valley Metro
Bob Herz, MCDOT	Gregory Arrington, Youngtown

ADVISORY MEMBERS

Jeff Benedict, ARPA	Jeff Hearne, ARPA
* Arvid Veidmark, AZUCA	Peter Kandarlis, Independent (audio)
* Mike Sanders, AZUCA	* Paul R. Nebeker, Independent
Brian Gallimore, AGC	Jacob Rodriguez, SRP
Greg Groneberg, AGC	

MAG ADMINISTRATIVE STAFF

Gordon Tyus

* Members not attending or represented by proxy.

GUESTS/VISITORS

Michael Stall, Cox Communications

1. Call to Order

Chair Tom Wilhite called the meeting to order at 1:33 p.m.

Mr. Wilhite introduced Dave Mobley who was filling in for Kristin Tytler of Surprise, Jason Richardson, filling in for Warren White of Chandler and Rob Duvall, substituting for Melody Moss of Phoenix.

2. Call to the Audience

Michael Stall of Cox Communication submitted a card to speak on Case 15-12. He agreed to speak on the issue when the case was heard.

3. Approval of Minutes

The members reviewed the June 3, 2015 meeting minutes. Craig Sharp moved to accept the minutes as written. Dan Nissen seconded the motion. A voice vote of all ayes and no nays was recorded.

Carry Forward 2014 Cases

4. Case 14-03: Updates to Guardrail Details – Revisions to Section 415 and/or include Guardrail Details.

Bob Herz said MCDOT is currently working on the details, and has redlined them. He hopes to have details to submit at the next meeting.

5. Case 14-06: Revisions to Section 718 Preservative Seal for Asphalt Concrete.

Jeff Benedict said nothing has changed since the last meeting. He said they were still looking for an alternate test for the viscosity for the one test currently using Krieb units. He said they tried using the Brookfield testing method but had variable results as the material's viscosity climbs over time. They are still looking for another test because the current test cannot be done in Arizona. Bob Herz said formatting changes to the table also need to be made. Mr. Benedict said he would work on a final version for the next meeting.

6. Case 14-12: Proposed Revisions to Sections 336, 321.10.3, 601.2.7, 601.2.10 and Detail 200-1.

Add pavement removal criteria to prevent full depth pavement cuts from being located within a lane wheel path and to prevent creation of narrow pavement edge strips. Bob Herz said the

only change to this case was a spelling correction on Note 9 of Detail 200-1. This was handed out at the meeting. He asked for any questions or comments. Seeing none, he proposed to vote on the case at the next meeting.

7. Case 14-17: Create New Section 322 - Asphalt Stamping.

Greg Groneberg said a new version was not ready for this meeting, but he did describe some of the changes that were discussed during the working group meeting. The title of the section would be changed to “Decorative Asphalt” since the coloring process can be done separate from the stamping process. He also received more info on specifications for the clear coat section. The spec will also make the clear coat optional, not mandatory. He said there was also discussion about language stating it be “tire mark resistant.” There was a concern that this was open to interpretation as to whether it meant no tire marks at all, or traffic resistance, etc. Mr. Groneberg asked the committee for their thoughts, but no one had a good alternative.

Mr. Herz had several comments on the indented portion of Section 322.1 regarding the qualifications of the contractor. He felt this put an undue restriction on new companies resulting in reduced competition. He also noted that it focused on the stamping aspect of the work, but would not be applicable for the surface coloring portion of the specification. He thought that this should be a performance spec and wants it to be deleted. Brian Gallimore described reasons why you would want experienced contractors doing this type of specialized work and problems they’ve had in the past. Craig Sharp asked about someone starting a new company that had experience with a previous company. Bob Herz gave as an example an experienced out-of-state company that wanted to begin work in Arizona. Jeff Hearn said they had a certification requirement in the draft pervious concrete spec since for specialty work you want contractors that are experienced. Mr. Herz also discussed the requirements of the supervisor and asked why both were required. Mr. Gallimore said these requirements came from the existing specifications used by Gilbert and Scottsdale. Mr. Herz suggested that these qualification requirements should be part of the special provisions for a project and not in the MAG specifications.

Mark Ivanich asked how inspectors can know when the job is done correctly and what happens if it isn’t. Brian Gallimore said you can check things such as the stamping depth, and if done incorrectly it is repaved and redone.

Bob Herz asked about the text that stated “mock-ups may be required.” He wanted to know how it would be paid for. Jim Badowich said they had mock-ups done for one of their jobs and the cost was incidental to the cost of the project. Jeff Benedict agreed that it typically was and gave an example of a logo. Tom Wilhite agreed with Bob Herz that any mock-ups should be paid for and addressed in the measurement section. Mr. Herz also thought the requirements described during the “on-site prebid meeting” would be covered under the current Section 102.4.

Craig Sharp asked why, for the surfacing coat, it specified to have four passes and a thickness. Mr. Groneberg thought the four passes was to ensure the material was not applied too thickly, but agreed that it would be better to use the manufacturers recommended application method.

Finally, Mr. Groneberg said he found no similar specs in the Greenbook, but was still investigating if Los Angeles has their own specification. He said he would take these comments back and make revisions.

New Cases for 2015

8. Case 15-01: Miscellaneous Corrections A-E.

D. Change title to Detail 270. Bob Herz handed out a change to Detail 270 to change the title to GRADE ADJUSTMENT. He also suggested changing the note referring to “8” CONCRETE PIPE” TO “8” RISER PIPE” since the riser pipe can also be made of plastic. Mark Ivanich clarified what he suggested for a title at the last meeting – not to shorten the title to “GRADE ADJUSTMENT” but just move it to the front so the title was “GRADE ADJUSTMENT FOR FRAME AND COVER.” Mr. Herz said he would make the changes. There also seemed to be concurrence to revise the grade adjustment detail to show adjustment configuration for unpaved areas, the same as depicted in Detail 291.

E. Correct reference for manhole backfill requirements. Bob Herz provided a new correction to eliminate conflicting specifications for manhole backfill requirements contained in Sections 206 and 601. The requirements in Section 206 are to remain. Adjustments were to remove the last sentence of the first paragraph of Section 601.2.6 the paragraph is meant to address excavation, not backfilling. Also changed is the reference in Section 625.3.1 for backfilling of manholes to reference Section 206 rather than 601, since the manhole is a structure and Section 601 is for backfilling trenches. The second page of the handout highlights the reasoning for why the change should be made.

9. Case 15-03: Revise Section 601.4.5 Trench Final Backfill.

Bob Herz said, based on comments, he changed “will” to “shall” and added that native material shall have a plasticity index not exceeding 15. This was added to make sure poor native soils were not used. Brian Gallimore commented that he didn’t have a problem with the requirement for native soils 2’ below the pavement, but did see a problem with deep and wide trenches, where if the native material doesn’t meet the requirement, a huge amount of fill would need to be brought in, making it much more expensive. Jim Badowich said granular material may be used instead of native. Mr. Herz said there currently is no limitation on native material. He suggested requiring only the top several feet to meet the PI of 15. There was discussion on how much to allow and how far below finished grade. He said the county wants to use native if possible but wants it to be good material.

Craig Sharp said Buckeye had a problem with native materials that caused a \$30,000 change order. Brian Gallimore stated that if you have to haul in material it is much more expensive. He said the specs are used on the private side as well. Bob Herz said expansive soils may need to be treated (with lime as an example) before the subgrade is laid down. Jim Badowich suggested that the case be discussed further at the next working group meeting. Bob Herz asked if cities only use AB in streets. Mark Ivanich said that for deeper trenches they do use native material.

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

Warren White was not present; however, Jason Richardson said a detail from Neenah Foundry was provided as an example of the square box. Mr. Richardson asked if the committee thought the label on the lid should be changed from “RECLAIMED” to “NONPOTABLE.” Jim Badowich said the nonpotable label allowed more uses. Bob Herz noted the Neenah detail did not have machined surfaces and thought if they were not necessary it should be removed from the MAG detail. Mr. Ivanich asked about the concrete collar. He was assured that it would be on the MAG detail, and that the Neenah detail was just for manufacturing the box.

11. Case 15-07: Revisions to Concrete Paver Standards for Non-Traveled Surfaces, Detail 225 and Section 342.

Jason Richardson said he had nothing to add for the case. Bob Herz said in Section 342.3.1 Subgrade, the subgrade needs tolerances depending on whether it is for AB or concrete, and they should reference Section 301 or Section 310 as appropriate. Mr. Herz said if provided a copy of the Word document for Section 342 he would provide suggested revisions.

12. Case 15-09: Revisions to Section 321 Placement and Construction of Asphalt Concrete Pavement.

Jeff Benedict and Bob Herz indicated that some changes are to be incorporated into the draft from the working group meeting. Don Cornelison is working on revisions but didn't get them back in time for the meeting.

13. Case 15-10: Add Subsection 321.10.5.3 “Rehabilitation Work” into the MAG Specifications.

Brian Gallimore said there currently are no changes, but there was discussion at the working group meeting on whether or not the change is needed because cities should repair the base before repaving, but he added, this does not always happen on maintenance jobs. One issue discussed is whether contractors would use this as an excuse as to why they did not get compaction. If the contractor does not get compaction how can he prove that the base caused the problem? Bob Herz said it needs a good definition of rehabilitation work, and when it will

apply. Brian Gallimore said it was for anything not new construction. The case would be discussed further at the next working group meeting.

14. Case 15-11: Incorporate revisions to Section 717, “Mix Design Requirements” into the MAG Specifications.

Greg Groneberg said he received comments from the County. He has set up a meeting with John Shi at Maricopa County to go over the changes and expects changes to the table.

15. Case 15-12: New Section 608 HORIZONTAL DIRECTIONAL DRILLING.

Arvid Veidmark was not present at the meeting to give an update. Mr. Michael Stall of Cox Communications provided suggested changes to the proposed specification. He asked that a new Section 608.4.10 be added that would move the last sentence from the current 608.4.8.9 along with the bullet points for “Rod/joint number” and “Pitch, roll and clock-face.” The rationale was that for small jobs these items created unneeded and expensive reporting requirements. Jim Badowich said he would take these comments back for review at the July 16 water/sewer working group meeting.

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

Jeff Hearne said there were no changes, but that there was some discussion about changing the aggregate variation from 5% to 10%. He said he was putting together some examples on when this may come to play and will present them at the next working group meeting. If agreement on this change can't be reached, it may come out and the case may focus solely on the mix design submittal requirements.

17. Case 15-14: Revise Sections 321 and 325 to coordinate overlay work requirements.

Bob Herz provided a revised handout to Case 15-14 at the meeting. The proposed change was to “Eliminate the 10% overrun penalty for pavements less than 2.5 inches in thickness.” His reasoning was that the standard paving tolerance for thickness of ¼ inch if on the high side would cause an overrun which exceeds the maximum 10% allowed, would not be detrimental to the pavement and the Contractor should not be penalized. Jeff Benedict said they discussed issues with a safety edge or thickened edge when done with an overlay. Brian Gallimore said people in the field have a problem calculating pavement quantities. He said there are also problems with the plan quantity versus how much is required, and the initial plans estimates often are also wrong. He noted as an example that Phoenix measures what the contractor has used. He also said that for safety edges the trench is not exactly 5” and the process used to make the safety edge often uses more material. Jim Badowich asked how it was paid. Mr. Herz said they pay per tonnage. Craig Sharp asked why the safety edge is not paid for by linear foot.

Mr. Gallimore agreed with this method, but Mr. Herz noted that the safety edge is created at the same time as the overlay paving so the asphalt tonnage would include the safety edge. Mr. Gallimore said they would continue reviewing it at the next working group meeting.

18. Working Group Reports

Chair Wilhite asked for reports from the working group chairs.

a. **Curb Ramp Working Group**

The initial meeting of the group was held July 8 at 1:00. Bob Herz said notes from the meeting were provided in the packet. Gordon Tyus said in the notes there is a link to the meeting page where the presentation by Brandon Forrey and the existing city supplements have been posted. The next meeting is scheduled for July 13 at 1:00 in the MAG Cottonwood room.

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

Jim Badowich said the group met June 18, 2015. Arvid Veidmark was not present so there was not much discussion on Section 608. Mr. Badowich noted that the new proposed Detail 201 removed the existing Type C repair for concrete, and asked if anyone had a problem with it. Mr. Herz said it was removed because specification section 340 requires joint-to-joint replacement and joints in portland cement concrete pavement are not to be arbitrarily modified. He also discussed the detail showing a 6" milling offset to eliminate full depth vertical pavement cuts.

Mr. Badowich said they also discussed water testing and flushing requirements, and are reviewing the minimum orifice for flushing. He asked if members cared about the flushing methods when it still had to pass the tests. Mr. Herz said you also want enough velocity to flush out small rocks that can damage valves. Mr. Badowich discussed types of valves needed to meter the flushing and also noted problems draining the city water tanks if too much flushing is used. He said they were looking to update valve boxes to allow polymer concrete. Finally the group recommended that the Outside ROW document focus on backflow prevention details. The next Water/Sewer Working Group meeting is planned for July 16, 2015 at 1:30 p.m. at the MAG office.

c. **Asphalt/Materials Working Groups**

Jeff Benedict said he will review updates to Section 321 and have the changes ready for the agenda packet since the meeting is scheduled more than a week before the committee meeting. The next meeting is scheduled for July 23, 2015 at the APRA offices.

d. **Concrete Working Group**

Jeff Hearne said he discussed Section 725 and the draft pervious concrete specs. He passed out the park-and-ride pervious concrete specs used by Glendale. He said he was trying to get involvement from industry to help produce the new section. The next meeting will follow the Asphalt/Materials Working Group on July 23.

e. **Outside ROW Working Group**

Peter Kandarlis was not present, but Mr. Benedict said that he attended the asphalt working group meeting, and they will provide time between asphalt and concrete in future meetings.

19. General Discussion

Tom Wilhite said he was meeting with Anne Reichman from the ASU Global Institute of Sustainability. They are interested in the MAG process and how “green” construction and materials could become MAG specification. The meeting is Thursday, July 2, 2015 at 2:30 at the MAG offices. He invited members who may be interested to also attend.

Gordon Tyus said he was approached by other MAG staff members on specs and details related issues. One was to add details to MAG for bus shelters, location, and pads, and to ensure ADA compatibility. Another was from the MAG Bicycle Committee on what MAG grate details should be used that are “bicycle safe.” Rob Duvall said he could send Phoenix’s detail.

Lance Webb of Mesa asked about promoting the Low Impact Development (LID) toolbox concepts and ideas. He said it created a rating system for grading a project and included some details.

20. Future Agenda Items

Tom Wilhite asked if there were any future agenda items the committee wanted to add. Mr. Tyus asked about presentations such as on Pervious Concrete. Mr. Hearne said he planned to provide one in January of next year. Dan Nisson asked about the presentation on horizontal directional drilling that Arvid Veidmark agreed to give. Mr. Tyus agreed that he volunteered to provide a presentation at the August meeting. Mr. Wilhite said to add it to the next agenda.

21. Adjournment:

Seeing no further business the meeting was adjourned at 3:28 p.m.

2015 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

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

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
	CARRY FORWARD CASES FROM 2014						
14-03	Case 14-03: Updates to Guardrail Details. Revisions to Section 415 and/or inclusion of MCDOT guardrail details.	MCDOT	Bob Herz	01/08/2014		0 0 0	Yes No Abstain
14-06	Case 14-06: Revisions to Section 718 Preservative Seal for Asphalt Concrete, and Section 334.	Asphalt WG	Jeff Benedict	02/05/2014 07/23/2015		0 0 0	Yes No Abstain
14-12	Case 14-12: Proposed revisions to Sections 336, 321.10.3, 601.2.7 and Detail 200-1 and 200-2. Add pavement removal criteria to prevent full depth pavement cuts from being located within a lane wheel path and to prevent creation of narrow pavement edge strips.	MCDOT	Bob Herz	06/04/2014 05/18/2015	08/05/2015	0 0 0	Yes No Abstain
14-17	Case 14-17: Create New Section 322 Asphalt Stamping. Provide specifications for materials and methods.	Materials WG	Brian Gallimore	07/09/2014 07/23/2015		0 0 0	Yes No Abstain
	NEW CASES FOR 2015						
15-01	<p>Case 15-01: Miscellaneous Corrections:</p> <p>A. Add omitted text to Section 735.1. Text was approved by Case 14-07 and merged into Case 13-15. Both cases were approved in 2014.</p> <p>B. Revise "OA" to Quality Assurance and "OC" to Quality Control in Section 710.</p> <p>C. Update notes in Detail 225.</p> <p>D. Correct Titles in Detail 270. Update section view.</p> <p>E. Remove a conflict between specification Section 206 and Section 601.</p> <p>F. Replace 'Section 712' with 'Section 718' in the third paragraph of Section 334.3.</p>	MCDOT	Bob Herz	02/05/2014 07/09/2015		0 0 0	Yes No Abstain

2015 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

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CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
15-02	Case 15-02: Adjust Fence Requirements to Reference ASTM F1043. Revise Section 772, Table 771-1 and Detail 145.	MCDOT	Bob Herz	01/07/2015	03/04/2015	15 0 1	Yes No Abstain
15-03	Case 15-03: Revise Section 601.4.5 trench final backfill placement requirements.	MCDOT	Bob Herz	02/04/2015 07/16/2015		0 0 0	Yes No Abstain
15-04	Case 15-04: Revise Section 602 Trenchless Installation of Steel Casing. Update ASTM references for casing material and add minimum casing wall thickness.	Water/Sewer WG	Arvid Veidmark	02/04/2015 02/24/2015	04/08/2015	13 0 0	Yes No Abstain
15-05	Case 15-05: Proposed Revisions to Section 616 Reclaimed Water Line Construction and NEW Reclaimed Valve Box detail.	Chandler	Warren White	03/04/2015 06/24/2015		0 0 0	Yes No Abstain
15-06	Case 15-06: Delete 744 ABS TRUSS PIPE AND FITTINGS.	MCDOT	Bob Herz	03/04/2015	05/06/2015	12 0 0	Yes No Abstain
15-07	Case 15-07: Revisions to Concrete Paver Standards for Non-Traveled Surfaces, Section 342 and Detail 225.	Chandler	Warren White	03/04/2015 07/23/2015		0 0 0	Yes No Abstain
15-08	Case 15-08: Revisions to clarify Table 710-4 to eliminate misinterpretation of Criteria 8.	MCDOT	Bob Herz	04/08/2015	06/03/2015	14 0 0	Yes No Abstain
15-09	Case 15-09: Miscellaneous revisions to Section 321: PLACEMENT AND CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT.	Asphalt WG	Jeff Benedict	04/22/2015 06/02/2015		0 0 0	Yes No Abstain
15-10	Case 15-10: Add subsection 321.10.5.3 "Rehabilitation Work" into the MAG Specifications.	Materials WG	Brain Gallimore	06/03/2015 07/23/2015		0 0 0	Yes No Abstain
15-11	Case 15-11: Incorporate revisions to Section 717, "Mix Design Requirements" into the MAG Specifications.	Asphalt WG	Jeff Benedict	06/03/2015 07/09/2015		0 0 0	Yes No Abstain

2015 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

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CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE
15-12	Case 15-12: New Section 608 HORIZONTAL DIRECTIONAL DRILLING.	Water/Sewer WG	Arvid Veidmark	06/03/2015 07/17/2015		0 Yes 0 No 0 Abstain
15-13	Case 15-13: Add text to Section 725.6 to identify what to include in a concrete mix design submittal.	Concrete WG	Jeff Hearne	06/03/2015		0 Yes 0 No 0 Abstain
15-14	Case 15-14: Revise Sections 321 and 325 to coordinate overlay work requirements.	MCDOT	Bob Herz	06/03/2015 07/14/2015		0 Yes 0 No 0 Abstain

Case 14-06 “Preservative seal for Asphalt” Section 718

The case involves adding an additional product “TRMSS” and modifying and updating Table 718-1. The old version had tests in the wrong column for the wrong product.

Changes to the table type **C** involve discarding the Krebs viscosity and replacing it with a Brookfield viscosity.

Changes to the notes at the end of Table 718-1 were cleaned up with the revisions. The ASTM tests were updated and checked for accuracy.

Improper notes and asterisk were removed from the table.

Type “E” is added to section 334 “Preservative seal for Asphalt Concrete”

7-23-2015

PRESERVATIVE SEAL and SEALCOATING FOR ASPHALT CONCRETE

718.1 GENERAL

Asphalt Concrete preservative seal shall be one of the following types or equal, with typical application rates. Sealcoating material shall meet the requirements of section 718.3

TYPE A - Asphalt rejuvenating agent shall be an emulsion composed of a petroleum resin oil base uniformly emulsified with water. Each supplier must submit a certified statement from the asphalt rejuvenator manufacturer showing that the asphalt rejuvenating emulsion conforms to the required physical and chemical requirements. They also must provide documentation of tests that determine the acceptable range of application of the product. Typical application rates are 0.07 to 0.18 gallons per square yard.

TYPE B - Petroleum Hydrocarbon emulsion. Applied at 0.05 to 0.20 gallons per square yard, diluted.

TYPE C - Tire modified surface sealer (TRMSS) or equal not diluted, and applied at a rate of 0.10 to 0.20 gallons per square yard.

TYPE D - Acrylic polymer modified emulsion Diluted to the manufacture's recommendation and applied at a rate of 0.08 to 0.20 gallons per square yard.

TYPE E - Polymer modified rejuvenating emulsion. (PMRE) Diluted to the manufacture's recommendation and applied at a rate of 0.08 to 0.20 gallons per square yard.

718.2 TEST METHODS AND REQUIREMENTS PRESERVATIVE SEAL

Preservative seal for asphalt concrete material, shall meet type A, B, C, D or E on Table 718-1 by certification from the manufacturer.

Tests shall be performed by AMRL accredited laboratory, accredited in the specified test being performed.

PRESERVATIVE SEAL SPECIFICATIONS						
Properties	Method	Type-A	Type-B	Type-C	Type-D	Type-E
Saybolt Viscosity @77°F (sfs)	ASTM D244	15-40	25-150	200-2000 Cp <small>(Note 1)</small>	15-40	50-150
Sieve test %	ASTM D244	0.1 max	0.1 max	0.1 max	0.1 max	0.1 max
Storage Stability, 24 hours, %	ASTM D244					1.0 max
Settlement test, 5 days, %	ASTM D244		2.0 max		5.0 max	
Test on residue by:		ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Distillation To 177°C
Residue Content, %	ASTM D244	60 min	62 min	30 min	53 min	65 min
Oil Distillate, % by volume	ASTM D244					0.5 max
Flash point <small>(Note 2)</small> °F	ASTM D92	400°F	450°F	450°F	450°F	
Softening point, °F	ASTM D5			140 min.	130 min	
Viscosity <small>(Note 3)</small> , 60C, Poise	ASTM D2171					5000 max
Elastic Recovery <small>(Note 4)</small> , 10C, %	AASHTO T301					50 min

TABLE 718-1

PRESERVATIVE SEAL SPECIFICATIONS

Properties	Method	Type-A	Type-B	Type-C	Type-D	Type-E
Test on residue by:		ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Distillation To 177°C
Ductility, 25C, 5 cm/min, cm	ASTM D1113				20 min	
Penetration, 25C, 100g/5 sec, dmm	ASTM D5				20-80	
Penetration, 4C, 200g/60 sec, dmm	ASTM D5					20-70
Kinematic Viscosity, 140°F, cSt	ASTM D2170	100-200	1,000-9,500			
Accelerated Weathering test (Note 5)	ASTM D4799				Plant certification within 12 months	
Test on		Evaporative Residue	Evaporative Residue			Rejuvenating Agent Base
Asphaltenes, % w	ASTM D2006	1.0 max	10.0 Max.			1.0 max
Maltene Dist. Ratio (PC+A ₁)/(A ₂ +S)	ASTM D2006	0.3-0.6	0.2-1.4			
PC/S Ratio ⁴⁵ (Note 4)	ASTM D2006	0.5 min	0.5 min.			
Saturated Hydrocarbons, % (note 4)	ASTM D2006	28 max	28 max.			30 max
Kinematic Viscosity, 140°F, cSt	ASTM D2170					50-175
Flash point °F	ASTM D92					375 min
Test on residue from RTFO:	ASTM D2872					Rejuvenating Agent Base
Mass Change, %	ASTM D2872					6.5 max
Kinematic Viscosity, 140°F, cSt	ASTM D2170					Report
Kinematic Viscosity, Ratio (Note 6)						3.0 max

Notes:

1. Brookfield viscosity using spindle #27 (ASTM D4402) test temperature at 140°F. ~~Sample temperatures equilibrate the sample for a minimum of for a maximum of 20 minutes. Sample test run time a minimum maximum of 5 minutes. Sample will be in the Brookfield viscosity tube a minimum five minutes.~~
2. Flash point on residue may be waived by the engineer during production sampling and testing provided manufacturer submits results performed in the previous 12 months in compliance.
3. Viscosity in poise may be determined using AASHTO T315 by converting the Complex Dynamic Shear Viscosity to Viscosity in poise.
4. Elastic Recovery molds shall have straight sides as shown in Fig. 1 of AASHTO T301
5. Other Accelerated Weathering test procedures may be presented for acceptance by the engineer prior to project start. These results shall be provided at no additional cost to the agency.
6. Kinematic Viscosity Ratio will be determined by dividing the viscosity of the material after RTFO aging by the original viscosity.

A full set of tests shall be performed by as specified by the special provisions in the undiluted condition. These tests and any other specified will be performed at the contractor's expense.

Only residue by evaporation shall be run on diluted samples. Specification limits should be diluted rate times minimum residual value of concentrate.

Comment [RTH1]: Is this to reference both notes 4 and 5?

Comment [WR2]: Remove the "45" artifact from old MAG spec

Comment [WR3]: Remove the note 4, artifact from old MAG spec

Comment [RTH4]: Why is an AASHTO test method being referenced for an ASTM test method?

Comment [WR5]: Remove the "note4" leave in the "S" for saturates, artifact from old MAG spec.

Comment [RTH6]: Is this to reference both notes 4 and 5?

Comment [RTH7]: Why is an AASHTO test method being referenced for an ASTM test method?

Comment [RTH8]: Note 4 is referenced for test Method ASTM D2006 as well as AASHTO T301. Why is it required for the ASTM method?

Comment [WR9]: The note to remain as is, and is only for AASHTO T 301

718.3 TEST METHODS AND REQUIREMENTS SEALCOATING

Sealcoating material for asphalt concrete pavement, shall be a concentrate product “ready to use” from the manufacturer. No product dilution will be allowed at the project site during application. Sealcoating shall consist of two applications across full width of pavement surface. Edge application treatment shall also be two separate coats. Each applied coat shall be at the following minimum application rates. First coat shall be applied at a minimum application rate of 0.15 gallons per square yard, followed by a second coat applied at a minimum rate of 0.15 gallons per square yard. Application rate for each coat, above the minimum, shall be adjusted to meet the pavement surface conditions.

Material, applied as Sealcoating, shall meet the requirements on table 718.2 by certification from the manufacturer.

Tests shall be performed by AMRL accredited laboratory.

TABLE 718.2		
SEALCOATING SPECIFICATIONS		
Properties * (note 2)	Method	Specification
Weight per Gallon, 25C, lbs/gal	ASTM D2939.07	10.0 min
Residue Content by Evaporation, %	ASTM D2939.08	50 min
Asphalt Content by Weight, %	ASTM D2939.21	17 min
Wet Track Abrasion Test ^(Note-1) , 1 hour, grams/sq. ft.	ASTM D3910	15 max
Wet Track Abrasion Test ^(Note-1) , 6 day, grams/sq. ft.	ASTM D3910	15 max

Comment [RTH10]: Why is there an asterisk?

Comment [RTH11]: Note 2 does not exist for this Table.

Comment [WR12]: The asterisk and note 2 are copied from the previous table, and should be deleted

Notes

1. Wet track abrasion patties shall be produced by two applications of sealcoat material dried to constant weight between each coat.

- End of Section -

PRESERVATIVE SEAL FOR ASPHALT CONCRETE

718.1 GENERAL

Asphalt Concrete preservative seal shall be one of the following types or equal, with typical application rates. Sealcoating material shall meet the requirements of section 718.3

TYPE A - Asphalt rejuvenating agent shall be an emulsion composed of a petroleum resin oil base uniformly emulsified with water. Each supplier must submit a certified statement from the asphalt rejuvenator manufacturer showing that the asphalt rejuvenating emulsion conforms to the required physical and chemical requirements. They also must provide documentation of tests that determine the acceptable range of application of the product. Typical application rates are 0.07 to 0.18 gallons per square yard.

TYPE B - Petroleum Hydrocarbon emulsion. Applied at 0.05 to 0.20 gallons per square yard, diluted.

TYPE C - Tire modified surface sealer (TRMSS) or equal not diluted, and applied at a rate of 0.10 to 0.20 gallons per square yard.

TYPE D - Acrylic polymer modified emulsion Diluted to the manufacture's recommendation and applied at a rate of 0.08 to 0.20 gallons per square yard.

TYPE E - Polymer modified rejuvenating emulsion. (PMRE) Diluted to the manufacture's recommendation and applied at a rate of 0.08 to 0.20 gallons per square yard.

718.2 TEST METHODS AND REQUIREMENTS PRESERVATIVE SEAL

Preservative seal for asphalt concrete material, shall meet type A, B, C, D or E on Table [718-1](#) by certification from the manufacturer.

Tests shall be performed by AMRL accredited laboratory, accredited in the specified test being performed.

TABLE 718-1						
PRESERVATIVE SEAL SPECIFICATIONS						
Properties	Method	Type-A	Type-B	Type-C	Type-D	Type-E
Saybolt Viscosity @77°F (sfs)	ASTM D244	15-40	25-150	200-2000 Cp <small>(Note 1)</small>	15-40	50-150
Sieve test %	ASTM D244	0.1 max	0.1 max	0.1 max	0.1 max	0.1 max
Storage Stability, 24 hours, %	ASTM D244					1.0 max
Settlement test, 5 days, %	ASTM D244		2.0 max		5.0 max	
Test on residue by:		ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Distillation To 177°C
Residue Content, %	ASTM D244	60 min	62 min	30 min	53 min	65 min
Oil Distillate, % by volume	ASTM D244					0.5 max
Flash point <small>(Note 2)</small> °F	ASTM D92	400°F	450°F	450°F	450°F	
Softening point, °F	ASTM D5			140 min.	130 min	
Viscosity <small>(Note 3)</small> , 60C, Poise	ASTM D2171					5000 max
Elastic Recovery <small>(Note 4)</small> , 10C, %	AASHTO T301					50 min

TABLE 718-1						
PRESERVATIVE SEAL SPECIFICATIONS						
Properties	Method	Type-A	Type-B	Type-C	Type-D	Type-E
Test on residue by:		ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Distillation To 177°C
Ductility, 25C, 5 cm/min, cm	ASTM D113			.	20 min	
Penetration, 25C, 100g/5 sec, dmm	ASTM D5				20-80	
Penetration, 4C, 200g/60 sec, dmm	ASTM D5					20-70
Kinematic Viscosity, 140°F, cSt	ASTM D2170	100-200	1,000-9,500			
Accelerated Weathering test (Note 5)	ASTM D4799				Plant certification within 12 months	
Test on		Evaporative Residue	Evaporative Residue			Rejuvenating Agent Base
Asphaltenes, % w	ASTM D2006	1.0 max	10.0 Max.			1.0 max
Maltene Dist. Ratio (PC+A ₁)/(A ₂ +S)	ASTM D2006	0.3-0.6	0.2-1.4			
PC/S Ratio ⁴⁵ (Note 4)	ASTM D2006	0.5 min	0.5 min.			
Saturated Hydrocarbons, S ⁵ (note 4)	ASTM D2006	28 max	28 max.			30 max
Kinematic Viscosity, 140°F, cSt	ASTM D2170					50-175
Flash point °F	ASTM D92					375 min
Test on residue from RTFO:	ASTM D2872					Rejuvenating Agent Base
Mass Change, %	ASTM D2872					6.5 max
Kinematic Viscosity, 140°F, cSt	ASTM D2170					Report
Kinematic Viscosity, Ratio (Note 6)						3.0 max

Notes:

1. Brookfield viscosity using spindle #27 (ASTM D4402) test temperature at 140°F. Temperatures equilibrate the sample for a minimum of 20 minutes. Sample test run time a minimum of 5 minutes. Sample will be in the Brookfield viscosity tube a minimum five minutes.
2. Flash point on residue may be waived by the engineer during production sampling and testing provided manufacturer submits results performed in the previous 12 months in compliance.
3. Viscosity in poise may be determined using AASHTO T315 by converting the Complex Dynamic Shear Viscosity to Viscosity in poise.
4. Elastic Recovery molds shall have straight sides as shown in Fig. 1 of AASHTO T301
5. Other Accelerated Weathering test procedures may be presented for acceptance by the engineer prior to project start. These results shall be provided at no additional cost to the agency.
6. Kinematic Viscosity Ratio will be determined by dividing the viscosity of the material after RTFO aging by the original viscosity.

A full set of tests shall be performed by as specified by the special provisions in the undiluted condition. These tests and any other specified will be performed at the contractor's expense.

Only residue by evaporation shall be run on diluted samples. Specification limits should be diluted rate times minimum residual value of concentrate.

SECTION 334

PRESERVATIVE SEAL FOR ASPHALT CONCRETE

334.1 DESCRIPTION:

The asphalt concrete preservative seal shall be composed of an emulsified asphalt or asphalt rejuvenate, or an asphalt sealant to preserve the asphalt concrete pavement.

Preservative seals are applicable for asphalt pavements as directed on the plans, special provisions, or the Engineer.

334.2 MATERIALS:

The preservative seal shall be one of the following materials as specified by the Engineer:

<u>Type</u>	<u>Description</u>	<u>Material Conformance</u>
A	Rejuvenating emulsion	Section 718
B	Petroleum hydrocarbon emulsion	Section 718
C	“Filled” asphalt sealer such as TRMSS or equal	Section 718
D	Acrylic polymer emulsion	Section 718
E	Polymer modified rejuvenating emulsion (PMRE)	Section 718
Other	Diluted asphalt emulsion, CSS-1 or SS-1h	Section 713

334.3 CONSTRUCTION METHOD:

The material shall be approved by the Engineer in accordance to this specification. The application rates, dilution and curing shall be directed by the Engineer in accordance with this specification.

The contractor shall be responsible to clean the pavement to be treated free of trash, debris, earth or other deleterious substances present in sufficient quality to not interfere with the work to be performed.

The application rate will be based upon a typical surface condition test site with application rate trials to determine the needed rate. All application rates specified in Section [718](#) shall be a diluted 50-50 emulsified asphalt and water, except as recommended by the manufacturer for Type B and C. Any over applied seal will be sanded as directed by the Engineer. Application equipment shall be in accordance with Section [330](#).

Before opening a treated area to traffic, the surface shall be checked for slipperiness and/or tackiness. If the treated portion of the roadway must be opened to traffic prior to the disappearance of slipperiness and/or tackiness, the surface shall be sanded with a minimum of 1 ½ pounds per square yard or as directed by the Engineer. Sand Blotter shall comply with Section [333](#).

334.4 MEASUREMENT:

Preservative seal for asphalt concrete will be measured by the gallon or ton applied.

334.5 PAYMENT:

Payment will be made on the basis of the unit price bid in the proposal. Payment shall be full compensation for preservative seal complete and in place.

- End of Section -



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: June 4, 2014 Revised 2015-05-18
To: MAG Specifications and Details Committee
From: Robert Herz, MCDOT Representative
Subject: Revisions to Sections 336, 321.10.3, 601.2.7, 601.2.10, and **Case 14-12**
Detail 200-1

PURPOSE: Add pavement removal criteria to prevent full depth pavement cuts from being located within a lane wheel path and to prevent creation of narrow pavement edge strips.

REVISIONS:

1. Identified location restrictions for full depth longitudinal joints for asphalt pavement widening and for asphalt pavement trench repairs.
2. Defined vertically offset joint as an alternative for full depth sawed joint.
3. Added pavement removal requirements when replacing existing curb or gutter.
4. Added requirement for asphalt pavement edge replacement to have a safety edge or thickened edge constructed per Detail 201 except when the asphalt edge abuts a concrete curb or gutter.
5. Trenching into portland cement concrete pavement, sidewalk, or other concrete flatwork shall require complete joint to joint replacement of damaged panels. Type C Trench Repair in Detail 200-1 is to be deleted.
6. Adjusted the measurement for trench surface replacement to include extra area required to eliminate narrow edge remnants and to move full depth asphalt cuts outside of defined lane wheel paths.

SECTION 336

PAVEMENT MATCHING AND SURFACING REPLACEMENT

336.1 DESCRIPTION:

This specification identifies requirements for removing and replacing or widening ~~Street and alley~~ pavement and replacing other surfacings within ~~the Contracting Agency's public rights-of-way, removed by construction activities or to be widened or matched in connection with the improvement of Public Works, shall be placed as shown on the plans and applicable standard details, in accordance with this specification and/or the special provisions.~~

Asphalt concrete roadway ~~pavement replacement~~ trench repairs shall be constructed in accordance with Type A, B, or T-Top Trench Repair of Standard Detail 200-1 and as indicated on the plans or in the special provisions.

Trench repairs for unpaved alleys, roadways, and designated future roadway prism shall be constructed in accordance with Type E Trench Repair of Standard Detail 200-1.

Trenching into ~~P~~portland cement concrete pavement, sidewalk, or other concrete flatwork shall require complete joint to joint replacement of damaged panels unless an alternative repair is required by contract documents or is authorized in writing by the Engineer. ~~replacement shall be in accordance with Type C of the Standard Detail 200-1 and as required by Section 324.~~

~~All other~~sSurface replacement in the right-of-way ~~but~~ not in paved roadways shall be constructed in accordance with Type D Trench Repair of Standard Detail 200-1 and as indicated on the plans ~~or in the special provisions.~~

Temporary pavement replacement shall be constructed as required herein.

Asphalt pPavements to be matched by construction of new pavements adjacent to or at the ends of a project shall be milled or saw cut in accordance with these specifications and where shown on the plans.

Pavement and surfacing replacement within ADOT rights-of-way shall be constructed in accordance with their permits and/or specification requirements.

336.2 MATERIALS AND CONSTRUCTION METHODS:

Materials and construction methods used in the replacement of pavement and surfacing shall conform to the requirements of all applicable standard details and specifications, latest revisions.

336.2.1 Pavement Widening or Extensions: Existing pavements which are to be matched by pavement widening or pavement extension shall be trimmed to a neat true line with straight vertical edges free from irregularities with a device specifically designed for this purpose. ~~The minimum depth of cut shall be 1 ½ inches or D/4, whichever is greater.~~

~~The~~ Existing asphalt pavement shall be cut and trimmed after placement of required ABC and just prior to placement of asphalt concrete for pavement widening or extension, and the trimmed edges shall ~~be have painted with a light coating of asphalt cement or emulsified asphalt tack coat applied to the vertical edges~~ immediately prior to constructing the new abutting asphalt concrete pavements. No extra payment shall be provided for these items and all costs incurred in performing this work shall be incidental to the pavement widening or pavement extension.

The location of longitudinal match points shall depend on the type of asphalt joint being constructed (full depth or offset) and the location of the pavement lane striping to be in place at completion of construction. Full depth longitudinal joints shall be located within one foot of a post construction lane line stripe or within the center two feet of a post construction travel lane. The location restriction for full depth longitudinal joints does not apply to multi-layer pavements when a vertically offset joint with the existing pavement is constructed. An acceptable offset joint shall have at least a six-inch horizontal offset with the nearest joint in the underlying asphalt layer. An offset joint may be obtained by edge milling to a depth that meets the minimum lift thickness identified in section 710 for the asphalt surface course to be placed.

The exact point of matching, termination, and overlay may be adjusted in the field, ~~if necessary,~~ by the Engineer or designated representative.

SECTION 336

336.2.2 Pavement to be Removed: Existing asphalt pavement to be removed for trenches or for other underground construction or repairs shall be cut by a device capable of making a neat, straight and smooth cut without damaging adjacent pavement that is not to be removed. The Engineer's decision as to the acceptability of the cutting device and manner of operation shall be final.

In lieu of cutting trenches across driveways, curbs and gutters, sidewalks, alley entrances, and other types of pavements, the Contractor may, when approved by the Engineer, elect to tunnel or bore under such structures and pavements.

When installations are within the street pavement and essentially parallel to the center-line of the street, the Contractor, with approval of the Engineer, may elect to bore or tunnel all or a portion of the installation. In such installations, the seal coat requirements, as discussed in Section 336.2.4, will be modified as follows:

(A) If the pavement cuts (bore pits, recovery pits, etc.) are 300 feet or more apart, the bore or tunneled distance will not be considered as part of the open trench and the seal coat ~~may~~ will not be required.

(B) If the pavement cuts (bore pits, recovery pits, etc.) are less than 300 feet apart, the distance between the cuts will be considered the same as a trench cut and the distance will be added to any trench cut distances.

Pavement removal limits when replacing existing curb or gutter shall be as follows. For curb or gutter replacement adjacent to a designated bike lane or paved shoulder area wider than three feet, the asphalt pavement removal and replacement shall extend to within 6 inches of the travel lane edge stripe. For curb or gutter replacement when no travel lane edge stripe exists, the asphalt pavement match point shall extend two feet or less from the pavement edge into the vehicle travel lane.

Asphalt pavement damaged by the Contractor during trenching or other activities shall be removed after adjacent aggregate base has been placed and compacted and prior to placement of the adjacent permanent pavement. The replacement of the damaged asphalt pavement shall occur at the same time as the permanent pavement replacement is constructed.

336.2.3 Temporary Pavement Replacement: Temporary pavement replacement, as required in Section 601, may be with cold-mix asphalt concrete, with a minimum thickness of 2 inches, using aggregate grading in accordance with Marshall mix design of Section 710. Permanent pavement replacement shall replace temporary repairs within 5 working days after completion of temporary work.

Temporary pavement replacement shall be used in lieu of immediate placement of single course permanent replacement or the first course of two course pavement replacement only on transverse lines such as spur connections to inlets, driveways, road crossings, etc., when required by the Engineer, by utilities or others who subcontract their permanent pavement replacement, under special prior arrangement; or for emergency conditions where it may be required by the Engineer. Temporary pavement replacement shall be placed during the same shift in which the backfill to be covered is completed.

Rolling of the temporary pavement replacement shall conform to the following:

(A) Initial or breakdown rolling shall be followed by rolling with a pneumatic-tired roller. Final compaction and finish rolling shall be done by means of a tandem power roller.

(B) On small areas or where equipment specified above is not available or is impractical, the Engineer will approve the use of small vibrating rollers or vibrating plate type compactors provided comparable compaction is obtained.

The surface of the temporary pavement shall be finished ~~off~~ flush with the adjacent pavement.

336.2.4 Permanent Pavement Replacement and Adjustments:

336.2.4.1 Permanent Asphalt Pavement Replacement: All asphalt pavement replacement shall match gradation and thickness of the existing pavement. ~~Immediately preceding the placement of permanent pavement the density of the base material shall comply with requirements of Table 601-2. Asphalt concrete pavement replacement shall be compacted to the same density specified for asphalt concrete pavements in Section 321. The compacted thickness of all courses shall conform to the recommended thicknesses requirements of Table 710-1.~~

SECTION 336

Unless otherwise noted, **asphalt concrete** pavement replacement shall comply with the following:

(A) Single course pavement replacement shall consist of a 1/2" or 3/4" mix in accordance with Section 710.

(B) The base course(s) of a multi-course pavement replacement shall consist of a 3/4" mix in accordance with Section 710.

(C) The surface course of a multi-course pavement replacement shall consist of a 3/8" or 1/2" mix in accordance with Section 710 to match the existing surface.

(D) Where the base course is to be placed with non-compactive equipment, it shall be immediately rolled with a pneumatic-tired roller.

(E) **Pavement replacement over trenches** ~~where the pavement replacement width trench is 6 feet or more in width~~, all courses shall be placed with self-propelled spreading and compacting equipment. When the **pavement replacement width trench** is from 6 to 8 feet ~~in width~~, self-propelled spreading and compacting equipment shall not be wider than 8 feet.

(F) Placement of the surface course is to be by means which will result in a surface flush with the existing pavement. The pavement replacement surface shall not vary more than 1/4 inch from the lower edge of a straightedge placed across the replacement pavement surface between edges of the existing matched surfaces. When the pavement replacement includes replacement of the roadway crown, the surface smoothness shall comply with requirements of Section 321.

(G) **Pavement replacement extending to the edge of asphalt pavement not abutting concrete shall have a safety edge or thickened edge constructed per Detail 201 as deemed appropriate by the local jurisdiction.**

~~Laying a single course or the base course(s) of the asphalt concrete pavement replacement shall never be more than 600 feet behind the ABC placement for the pavement replacement.~~

~~The trench must be compacted to its required density, and required ABC must be in place and compacted prior to the placement of the asphalt concrete.~~

For **trench cuts, pavement widening, or other partial pavement installations** greater than 300 feet in length the entire area shall ~~then~~ be slurry seal coated in accordance with Section 332 or as otherwise specified. ~~The~~ seal coat shall extend from the edge of pavement or lip of gutter to the street centerline except that on residential streets less than 36 feet face to face of curb ~~or and~~ where the pavement patch straddles the centerline, the entire width of street shall be seal coated.

In lieu of placing the seal coat as required previously, and with approval of the ~~Contracting Agency~~ local jurisdiction, the Contractor may deposit with the ~~Street Maintenance Department Contracting Agency~~ for credit ~~to the Street Maintenance Department~~, a negotiated agreed upon amount. The Street Maintenance Department will incorporate this work into their street maintenance program.

336.2.4.2 Adjustments: When new or existing manholes, valves, survey monuments, clean outs, etc. fall within the limits of the permanent pavement replacement as discussed in this Section, the Contractor shall be responsible for adjusting the various items to the new pavement surface ~~or as directed by the Engineer. This will include but not be limited to slurry and chip seals.~~

The Contractor ~~will~~ shall coordinate with the Engineer and with representatives of the various utilities regarding the adjustment and inspection of the work. The Contractor shall be responsible for obtaining and complying with all specifications, special requirements, and details ~~etc. for of the adjustment of utility company facilities regarding the adjustments.~~ When adjusting the Agency's utilities, survey monuments, etc., the adjustment will comply with these specifications and details.

The work will be done in compliance with OSHA standards and regulations regarding confined space entry. The Contractor shall remove all material attached to the lids and/or covers including that of prior work. The method of removal shall be approved by the Engineer and/or the Utility Representative.

SECTION 336

336.3 TYPES AND LOCATIONS OF ~~PAVEMENT AND TRENCH SURFACEING~~ REPLACEMENT:

~~The trench backfill shall must be in place and compacted to the density its required in Table 601-2 density, and required ABC must be in place and compacted prior to the placement of the asphalt concrete structural section or other surfacing.~~

~~Laying a single course or the base course(s) of the asphalt concrete pavement replacement for trenches shall never be more than 1320 600 feet behind the ABC placement for the pavement replacement.~~

~~Normally, the type of pavement surface replacement and backfill required for trenches shall will be as noted on the plans or special provisions specified in other portions of the contract documents and construction will shall be in accordance with Detail 200-1 and 200-2.- If a trench repair type is not noted on the plans or specified in the special provisions, the following criteria will govern:~~

~~Type A trench repair will be used for utilized on all asphalt concrete paved streets where the excavation is essentially longitudinal or parallel to traffic. Full depth longitudinal joints shall not be located within forty-eight inches (48") of an asphalt pavement edge or within a lane wheel path. The lane wheel path for a traffic lane is the entire lane width except the area within one foot of a traffic lane line stripe and except the center two feet of the lane. The lane wheel path for a designated bike lane is the entire lane width except the area within six inches (6") of a bike lane edge stripe. When the surface match point is located within 48" of an asphalt pavement edge, all asphalt surfacing shall be removed to the asphalt edge, the replacement surfacing shall extend to the asphalt edge. The traffic lane wheel path restrictions for full depth longitudinal joints do not apply for offset joints that provide at least a six-inch horizontal offset between the surface course joint and the joint in the underlying asphalt layer. The depth of the asphalt surface course shall be equal to or greater than the minimum thickness recommended in Table 710-1.~~

~~T-Top trench repair will be utilized on all streets used where the excavation is essentially transverse or not parallel to traffic, including trenches that go through an intersection.~~

~~Type B trench repair may shall only be used to repair transverse trenches if when specified by the local jurisdiction Agency.~~

~~Type C trench repair will be used to repair existing Portland cement concrete pavement.~~

~~Type D trench repair will be utilized used to repair surfaces other than asphalt concrete or P portland cement concrete pavement. When a trench cut is in aggregate surfaced area, t The surfaceing replacement shall be of a like type and depth as the existing material, compacted to the densities required in Section 601. It may also be used when the condition of the existing pavement does not justify construction of Type A, Type B or T-Top trench repair. Prior written approval of the Engineer is required for this condition.~~

~~Where a longitudinal trench is partly in pavement, the pavement shall be replaced to a neat straight line located at the outside limits edge of the existing pavement.; -on a straight line~~

~~Where asphalt pavement replacement extends to an uncurbed asphalt edge, the agency designated edge treatment, as indicated on the plans shown in Detail 201- (Type A, Type B, or Safety Edge) shall be installed. Measurements for payment shall be from the inner limit of pay width allowed below, to the outside edge of the existing pavement as defined herein.~~

~~Where no part of a trench is in a landscaped or graded area outside of pavement, no special surfaceing treatment is required except replacement will only be as indicated by plans or specifications specified where existing surfacing materials have been removed.~~

~~When a trench cut is in aggregate surfaced area, the surfaceing replacement shall be of a like type and depth as the existing material, compacted to the densities required in Section 601.~~

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336.4 MEASUREMENT:

Measurement for ~~payment and surfacing~~ replacement shall be by the square yard, based ~~up~~ on actual field measurement -of the area covered except as noted below.

(A) In computing pay quantities for ~~surface~~ replacement of Types B ~~and~~ ~~E~~ trench repair, the default pay widths will be based on the ~~actual field measured width; however the boundaries of the measurement will not extend further than ½ the distance, either side, from the centerline of the pipe as depicted on~~ dimension calculated from Table 601-1, for the "Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel". The pay width will be adjusted to the minimum required field width when relocation of the pavement match point is due to the remnant requirement or when pavements less than 4" thick are required to be adjusted outside of a wheel path.

(B) In computing pay quantities for ~~surface~~ replacement of a Types T-Top or, Type A, ~~C and D~~ trench repair, ~~pay~~ the default widths will be based on the dimension calculated from ~~actual field measured width, however the boundaries of the measurement will not extend further than ½ the distance plus 12 inches, either side, from the centerline of the pipe as depicted on~~ Table 601-1, for the "Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel" plus 24 inches. The pay width will be adjusted to the minimum required field width when relocation of the pavement match point is due to the remnant requirement or when pavements less than 4" thick are required to be adjusted outside of a wheel path. In all cases, the minimum pay width for ~~replacement Types T-Top, or Type A and D~~ surface replacement shall be 48 inches.

(C) In computing pay quantities of surface replacement for Type D trench repair, pay widths will be based on the dimension calculated from Table 601-1 for the "Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel". In all cases, the minimum pay width for Type D surface replacement shall be 48 inches.

~~(CD)~~ Where a longitudinal trench is partly in asphalt pavement, ~~computations of~~ pay quantities shall ~~be based on~~ not exceed ~~the~~ actual pavement replacement quantities. The measurement shall be the area as allowed for the respective Type A or Type B trench repair limited to that portion located within the existing pavement. ~~limitations specified above.~~ The minimum 48 inch pay width for the Type A pavement replacement does not apply when the trench is partially in pavement.

~~(DE)~~ The length of pavement and surfacing replacement shall be measured through any manhole, valve box, or other structure constructed in the pipe line, and any pavement or surface replacement and/or seal treatment in excess of the ~~above pay~~ trench ~~repair~~ widths shall be considered and included in the bid item for such structure.

~~(EF)~~ Any pavement replacement in excess of the specified pay widths necessitated by the installation of valves, tapping sleeves and valves, valve by-passes, and concrete thrust blocks shall be included in the bid price for these items.

~~(FG)~~ ~~When special provisions allow deviations from the trench widths specified in Section 601, the above allowed pay widths for pavement replacement may be altered where so specified.~~

~~(G)~~ Measurement of pavement and surfacing replacement shall be made along the finished surface ~~excluding any extra replacement required due to Contractor caused damage. -of the ground to the nearest foot, and~~ The measured quantity shall be computed to the nearest square yard.

(H) No separate measurement or payment will be made for the required construction of a Detail 201 edge treatment.

336.5 PAYMENT:

Direct payment for pavement or ~~other surfacing~~ replacement will be made for replacement over all pipe trench cuts except as otherwise ~~allowed~~ noted in the special provisions. Payment for ~~surface~~ replacements over other work shall be included in the cost of constructing that work, ~~in accordance with the applicable standard details and specifications.~~

Payment for temporary pavement replacement shall be included in the cost of the pipe.

Payment for pavement replacement shall include the replacement cost of any existing pavement markings that have been ~~degraded~~, obscured, obliterated or removed ~~by underground trench construction or repairs.~~

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When a Contractor has the option of jacking and/or boring or open cut construction, and elects to construct a pipeline by the jacking and/or boring method, ~~he~~ the Contractor will be paid for the replacement of such items of work as pavement, curb and gutter, sidewalk, driveway, and alley entrances, as allowed for open cut construction.

- End of Section -

SECTION 336

PAVEMENT MATCHING AND SURFACING REPLACEMENT

336.1 DESCRIPTION:

This specification identifies requirements for removing and replacing or widening pavement and replacing other surfacings within public rights-of-way.

Asphalt concrete roadway trench repairs shall be constructed in accordance with Type A, B, or T-Top Trench Repair of Standard Detail 200-1 and as indicated on the plans or in the special provisions.

Trench repairs for unpaved alleys, roadways, and designated future roadway prism shall be constructed in accordance with Type E Trench Repair of Standard Detail 200-1.

Trenching into portland cement concrete pavement, sidewalk, or other concrete flatwork shall require complete joint to joint replacement of damaged panels unless an alternative repair is required by contract documents or is authorized in writing by the Engineer.

Surface replacement in the right-of-way not in paved roadways shall be constructed in accordance with Type D Trench Repair of Standard Detail 200-1 and as indicated on the plans or in the special provisions.

Temporary pavement replacement shall be constructed as required herein.

Asphalt pavements to be matched by construction of new pavements adjacent to or at the ends of a project shall be milled or saw cut in accordance with these specifications and where shown on the plans.

Pavement and surfacing replacement within ADOT rights-of-way shall be constructed in accordance with their permits and/or specification requirements.

336.2 MATERIALS AND CONSTRUCTION METHODS:

Materials and construction methods used in the replacement of pavement and surfacing shall conform to the requirements of all applicable standard details and specifications, latest revisions.

336.2.1 Pavement Widening or Extensions: Existing pavements which are to be matched by pavement widening or pavement extension shall be trimmed to a neat true line with straight vertical edges free from irregularities with a device specifically designed for this purpose.

Existing asphalt pavement shall be cut and trimmed after placement of required ABC and just prior to placement of asphalt concrete for pavement widening or extension, and the trimmed edges shall have tack coat applied to the vertical edges immediately prior to constructing the new abutting asphalt concrete pavement. No extra payment shall be provided for these items and all costs incurred in performing this work shall be incidental to the pavement widening or extension.

The location of longitudinal match points shall depend on the type of asphalt joint being constructed (full depth or offset) and the location of the pavement lane striping to be in place at completion of construction. Full depth longitudinal joints shall be located within one foot of a post construction lane line stripe or within the center two feet of a post construction travel lane. The location restriction for full depth longitudinal joints does not apply to multi-layer pavements when a vertically offset joint with the existing pavement is constructed. An acceptable offset joint shall have at least a six-inch horizontal offset with the nearest joint in the underlying asphalt layer. An offset joint may be obtained by edge milling to a depth that meets the minimum lift thickness identified in section 710 for the asphalt surface course to be placed.

The exact point of matching, termination, and overlay may be adjusted in the field by the Engineer or designated representative.

336.2.2 Pavement to be Removed: Existing asphalt pavement to be removed for trenches or for other underground construction or repairs shall be cut by a device capable of making a neat, straight and smooth cut without damaging adjacent pavement that is not to be removed. The Engineer's decision as to the acceptability of the cutting device and manner of operation shall be final.

SECTION 336

In lieu of cutting trenches across driveways, curbs and gutters, sidewalks, alley entrances, and other types of pavements, the Contractor may, when approved by the Engineer, elect to tunnel or bore under such structures and pavements.

When installations are within the street pavement and essentially parallel to the centerline of the street, the Contractor, with approval of the Engineer, may elect to bore or tunnel all or a portion of the installation. In such installations, the seal coat requirements, as discussed in Section 336.2.4, will be modified as follows:

(A) If the pavement cuts (bore pits, recovery pits, etc.) are 300 feet or more apart, the bore or tunneled distance will not be considered as part of the open trench and the seal coat will not be required.

(B) If the pavement cuts (bore pits, recovery pits, etc.) are less than 300 feet apart, the distance between the cuts will be considered the same as a trench cut and the distance will be added to any trench cut distances.

Pavement removal limits when replacing existing curb or gutter shall be as follows. For curb or gutter replacement adjacent to a designated bike lane or paved shoulder area wider than three feet, the asphalt pavement removal and replacement shall extend to within 6 inches of the travel lane edge stripe. For curb or gutter replacement when no travel lane edge stripe exists, the asphalt pavement match point shall extend two feet or less from the pavement edge into the vehicle travel lane.

Asphalt pavement damaged by the Contractor during trenching or other activities shall be removed after adjacent aggregate base has been placed and compacted and prior to placement of the adjacent permanent pavement. The replacement of the damage asphalt pavement shall occur at the same time as the permanent pavement replacement is constructed.

336.2.3 Temporary Pavement Replacement: Temporary pavement replacement, as required in Section 601, may be with cold-mix asphalt concrete, with a minimum thickness of 2 inches, using aggregate grading in accordance with Marshall mix design of Section 710. Permanent pavement replacement shall replace temporary repairs within 5 working days after completion of temporary work.

Temporary pavement replacement shall be used in lieu of immediate placement of single course permanent replacement or the first course of two course pavement replacement only on transverse lines such as spur connections to inlets, driveways, road crossings, etc., when required by the Engineer, by utilities or others who subcontract their permanent pavement replacement, under special prior arrangement; or for emergency conditions where it may be required by the Engineer. Temporary pavement replacement shall be placed during the same shift in which the backfill to be covered is completed.

Rolling of the temporary pavement replacement shall conform to the following:

(A) Initial or breakdown rolling shall be followed by rolling with a pneumatic-tired roller. Final compaction and finish rolling shall be done by means of a tandem power roller.

(B) On small areas or where equipment specified above is not available or is impractical, the Engineer will approve the use of small vibrating rollers or vibrating plate type compactors provided comparable compaction is obtained.

The surface of the temporary pavement shall be finished flush with the adjacent pavement.

336.2.4 Permanent Pavement Replacement and Adjustments:

336.2.4.1 Permanent Asphalt Pavement Replacement: All asphalt pavement replacement shall match gradation and thickness of the existing pavement. Immediately preceding the placement of permanent pavement the density of the base material shall comply with requirements of Table 601-2. Asphalt concrete pavement shall be compacted to the same density specified in Section 321. The compacted thickness of all courses shall conform to the recommended thicknesses of Table 710-1.

Unless otherwise noted, asphalt concrete pavement replacement shall comply with the following:

(A) Single course pavement replacement shall consist of a 1/2" or 3/4" mix in accordance with Section 710.

(B) The base course(s) of a multi-course pavement replacement shall consist of a 3/4" mix in accordance with Section 710.

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(C) The surface course of a multi-course pavement replacement shall consist of a 3/8" or 1/2" mix in accordance with Section 710 to match the existing surface.

(D) Where the base course is to be placed with non-compactive equipment, it shall be immediately rolled with a pneumatic-tired roller.

(E) Pavement replacement over trenches where the pavement replacement width is 6 feet or more, all courses shall be placed with self-propelled spreading and compacting equipment. When the pavement replacement width is from 6 to 8 feet, self-propelled spreading and compacting equipment shall not be wider than 8 feet.

(F) Placement of the surface course is to be by means which will result in a surface flush with the existing pavement. The pavement replacement surface shall not vary more than 1/4 inch from the lower edge of a straightedge placed across the replacement pavement surface between edges of the existing matched surfaces. When the pavement replacement includes replacement of the roadway crown, the surface smoothness shall comply with requirements of Section 321.

(G) Pavement replacement extending to the edge of asphalt pavement not abutting concrete shall have a safety edge or thickened edge constructed per Detail 201 as deemed appropriate by the local jurisdiction.

For trench cuts, pavement widening, or other partial pavement installations greater than 300 feet in length the entire area shall be slurry seal coated in accordance with Section 332 or as otherwise specified. The seal coat shall extend from the edge of pavement or lip of gutter to the street centerline except that on residential streets less than 36 feet face to face of curb and where the pavement patch straddles the centerline, the entire width of street shall be seal coated.

In lieu of placing the seal coat as required previously, and with approval of the local jurisdiction, the Contractor may deposit with the Street Maintenance Department for credit, a negotiated agreed upon amount. The Street Maintenance Department will incorporate this work into their street maintenance program.

336.2.4.2 Adjustments: When new or existing manholes, valves, survey monuments, clean outs, etc. fall within the limits of the permanent pavement replacement as discussed in this Section, the Contractor shall be responsible for adjusting the various items to the new pavement surface. The Contractor shall coordinate with the Engineer and with representatives of the various utilities regarding the adjustment and inspection of the work. The Contractor shall be responsible for obtaining and complying with all specifications, special requirements, and details for the adjustment of utility company facilities. When adjusting the Agency's utilities, survey monuments, etc., the adjustment will comply with these specifications and details.

The work will be done in compliance with OSHA standards and regulations regarding confined space entry. The Contractor shall remove all material attached to the lids and/or covers including that of prior work. The method of removal shall be approved by the Engineer and/or the Utility Representative.

336.3 TYPES AND LOCATIONS OF TRENCH SURFACE REPLACEMENT:

Trench backfill shall be in place and compacted to the density required in Table 601-2 prior to the placement of the asphalt concrete structural section or other surfacing.

Laying a single course or the base course(s) of the asphalt concrete pavement replacement for trenches shall never be more than 1320 feet behind the ABC placement for the pavement replacement.

Type of surface replacement required for trenches shall be as noted on the plans or special provisions and construction shall be in accordance with Detail 200-1 and 200-2. If a trench repair type is not noted on the plans or specified in the special provisions, the following criteria will govern:

Type A trench repair will be used for all asphalt concrete paved streets where the excavation is essentially longitudinal or parallel to traffic. Full depth longitudinal joints shall not be located within forty-eight inches (48") of an asphalt pavement edge or within a lane wheel path. The lane wheel path for a traffic lane is the entire lane width except the area within one foot of a traffic lane line stripe and except the center two feet of the lane. The lane wheel path for a designated bike lane is the entire lane width except the area within six inches (6") of a bike lane edge stripe. When the surface match point is located within 48" of an asphalt

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pavement edge, all asphalt surfacing shall be removed to the asphalt edge, the replacement surfacing shall extend to the asphalt edge. The traffic lane wheel path restrictions for full depth longitudinal joints do not apply for offset joints that provide at least a six-inch horizontal offset between the surface course joint and the joint in the underlying asphalt layer. The depth of the asphalt surface course shall be equal to or greater than the minimum thickness recommended in Table 710-1.

T-Top trench repair will be used where the excavation is essentially transverse or not parallel to traffic, including trenches that go through an intersection.

Type B trench repair shall only be used when specified by the local jurisdiction.

Type D trench repair will be used to repair surfaces other than asphalt concrete or portland cement concrete pavement. The surface replacement shall be of a like type and depth as the existing material, compacted to the densities required in Section 601.

Where a longitudinal trench is partly in pavement, the pavement shall be replaced to a neat straight line located at the outer limits of the existing pavement.

Where asphalt pavement replacement extends to an uncurbed asphalt edge, the agency designated edge treatment shown in Detail 201 (Type A, Type B, or Safety Edge) shall be installed.

Where a trench is in a landscaped or graded area outside of pavement, no special surface treatment is required except as indicated by plans or specifications.

336.4 MEASUREMENT:

Measurement for surface replacement shall be by the square yard, based on actual field measurement of the area covered except as noted below.

(A) In computing pay quantities for surface replacement of Type B trench repair, the default pay width will be based on the dimension calculated from Table 601-1 for the "Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel". The pay width will be adjusted to the minimum required field width when relocation of the pavement match point is due to the remnant requirement or when pavements less than 4" thick are required to be adjusted outside of a wheel path.

(B) In computing pay quantities for surface replacement of a T-Top or Type A trench repair, the default width will be based on the dimension calculated from Table 601-1 for the "Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel" plus 24 inches. The pay width will be adjusted to the minimum required field width when relocation of the pavement match point is due to the remnant requirement or when pavements less than 4" thick are required to be adjusted outside of a wheel path. In all cases, the minimum pay width for T-Top or Type A surface replacement shall be 48 inches.

(C) In computing pay quantities of surface replacement for Type D trench repair, pay widths will be based on the dimension calculated from Table 601-1 for the "Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel". In all cases, the minimum pay width for Type D surface replacement shall be 48 inches.

(D) Where a longitudinal trench is partly in asphalt pavement, pay quantities shall not exceed actual pavement replacement quantities. The measurement shall be the area as allowed for the respective Type A or Type B trench repair limited to that portion located within the existing pavement. The minimum 48 inch pay width for the Type A pavement replacement does not apply when the trench is partially in pavement.

(E) The length of pavement and surfacing replacement shall be measured through any manhole, valve box, or other structure constructed in the pipe line, and any pavement or surface replacement and/or seal treatment in excess of the trench repair width shall be considered and included in the bid item for such structure.

(F) Any pavement replacement in excess of the specified pay widths necessitated by the installation of valves, tapping sleeves and valves, valve by-passes, and concrete thrust blocks shall be included in the bid price for these items.

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(G) Measurement of pavement and surfacing replacement shall be made along the finished surface excluding any extra replacement required due to Contractor caused damage. The measured quantity shall be computed to the nearest square yard.

(H) No separate measurement or payment will be made for the required construction of a Detail 201 edge treatment.

336.5 PAYMENT:

Direct payment for pavement or other surface replacement will be made for replacement over all pipe trench cuts except as otherwise noted in the special provisions. Payment for surface replacement over other work shall be included in the cost of constructing that work.

Payment for temporary pavement replacement shall be included in the cost of the pipe.

Payment for pavement replacement shall include the replacement cost of any existing pavement markings that have been degraded, obscured, obliterated or removed.

When a Contractor has the option of jacking and/or boring or open cut construction, and elects to construct a pipeline by the jacking and/or boring method, the Contractor will be paid for the replacement of such items of work as pavement, curb and gutter, sidewalk, driveway, and alley entrances, as allowed for open cut construction.

- End of Section -

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.

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 The defective pavement shall be cut out along neat straight lines~~ or for multiple course pavements the surface course may be milled out, and the removed pavement 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.

When pavement is cut out along neat straight lines, full depth longitudinal joints shall not be located within a lane wheel path or within forty-eight inches (48") of an asphalt pavement edge. Longitudinal joints shall comply with the restrictions for Type A Trench Repairs in Section 336.3.

SECTION 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION

Section 601.2.7 Last Revised 5/18/2015

601.2.7 Pavement and Concrete Cutting and Removal: Where trenchless methods are not used and trenches or other excavations lie within the portland cement concrete section of streets, alleys, driveways, or sidewalks, etc., such concrete shall be completely removed between the closest adjacent joints. sawcut to Removal methods shall produce neat, straight/vertical, true lines in such a manner that the remaining adjoining surface concrete will not be damaged. The minimum depth of cut shall be 1 ½ inches or 1/4 of the thickness, whichever is greater.

Sidewalk, curb, gutter, and other concrete flatwork shall have complete joint to joint replacement of all damaged sections. The construction replacing damaged concrete sections and joints shall be compliant with Section 340.

The existing joint system in portland cement concrete pavement (PCCP) shall be maintained. Reconstruction of PCCP panels and joints shall be in accordance with Section 324.

Initial Asphalt pavement removal shall be clean-cut to be the minimum width required for conduit installation and proper trench compaction. No ripping or rooting will be permitted outside the pavement cut limits of cuts. Surfacing materials removed shall be hauled from the job site immediately, and will not be permitted in the backfill.

Final pavement removal for pavement matching and surface replacement shall occur after the final backfill and the aggregate base material are in place and compacted. Pavement matching and final surface replacement shall be with approved equipment and by approved methods in accordance with the requirements of Section 336.

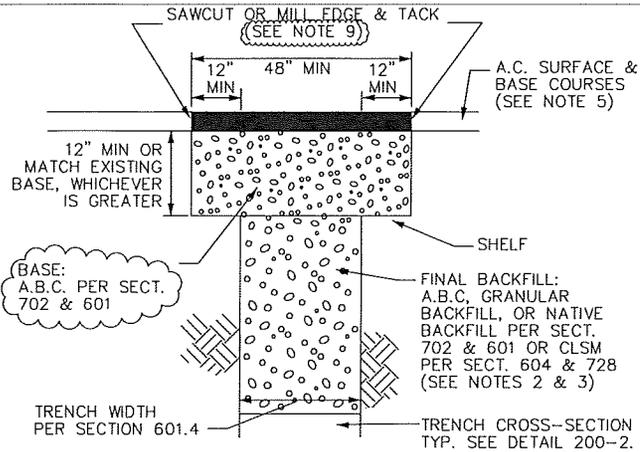
~~No ripping or rooting will be permitted outside limits of cuts. Surfacing materials removed shall be hauled from the job site immediately, and will not be permitted in the backfill.~~

Section 601.2.10 Last Revised 3/19/2015

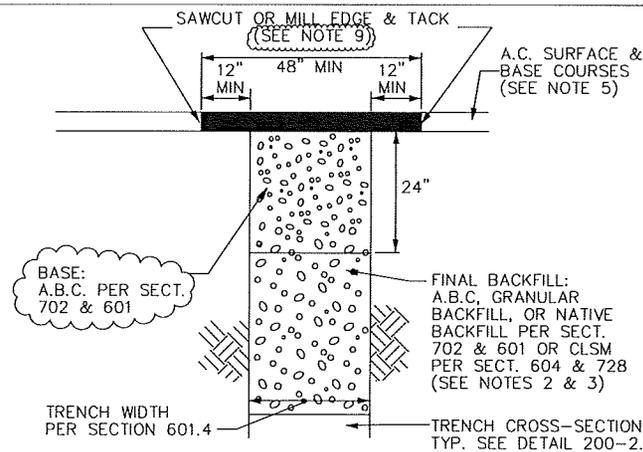
601.2.10 Open Trench: Except where otherwise noted in the special provisions, or approved in writing by the Engineer, the maximum length of open trench, where the construction is in any stage of completion (excavation, pipe laying or backfilling), shall not exceed 1320 feet in the aggregate at any one location.

Any excavated area shall be considered open trench until all ABC for pavement replacement has been placed and compacted. With the approval of the Engineer, pipe laying may be carried on at more than one location, the restrictions on open trench applying to each location. Trenches across streets shall be completely backfilled as soon as possible after pipe laying.

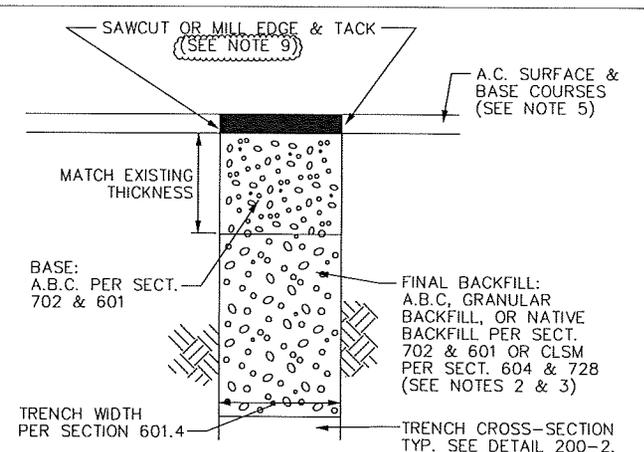
Substantial steel plates with adequate trench bracing shall be used to bridge across trenches at street crossings where trench backfill and temporary patches have not been completed during regular work hours. Steel plates shall be installed in accordance with Detail 211. Safe and convenient passage for pedestrians shall be provided. The Engineer may designate a passage to be provided at any point he deems necessary. Access to hospitals, fire stations and fire hydrants ~~must shall~~ be maintained at all times. Steel plates with adequate trench bracing shall be used to bridge across trenches as needed to provide driveway access to adjacent properties where trench backfill and temporary patches have not been completed during regular work hours.



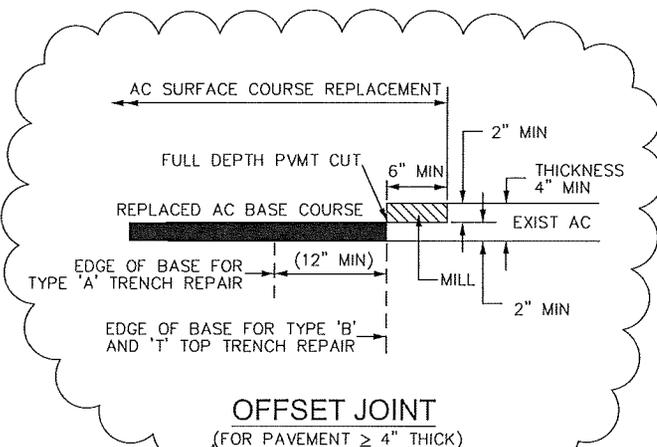
"T TOP" TRENCH REPAIR



TYPE "A" TRENCH REPAIR

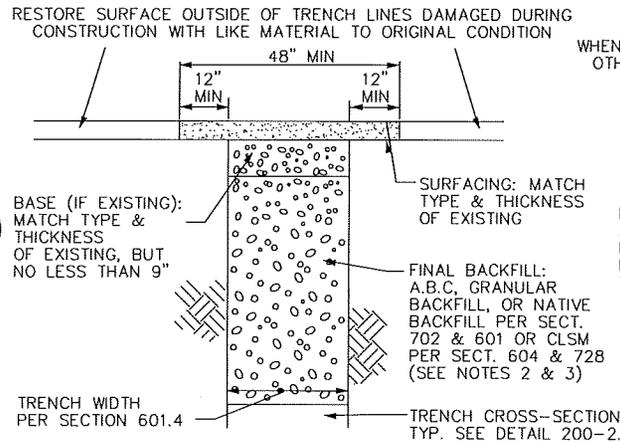


TYPE "B" TRENCH REPAIR



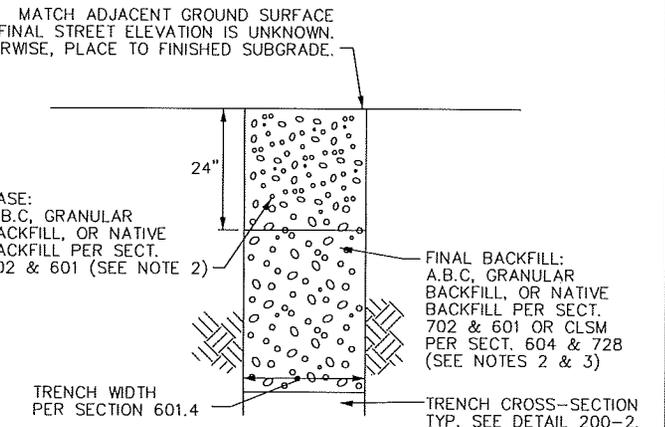
OFFSET JOINT

(FOR PAVEMENT ≥ 4" THICK)



TYPE "D" TRENCH REPAIR

(TRENCH NOT UNDER CONCRETE OR ASPHALT PAVEMENT)



TYPE "E" TRENCH REPAIR

(TRENCH IN FUTURE ROADWAY PRISM OR ALLEY)

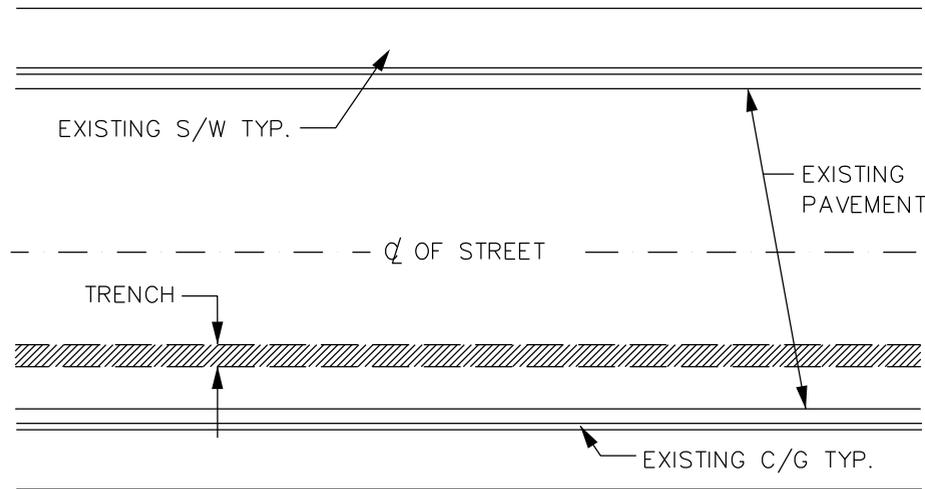
NOTES:

- PAVEMENT MATCHING AND SURFACE REPLACEMENT SHALL BE IN ACCORDANCE WITH SECTION 336.
- MATERIAL FOR FINAL BACKFILL AND BASE (IF APPLICABLE) SHALL BE AS NOTED HEREIN UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS. CLSM SHALL BE 1/2-SACK OR 1-SACK PER SECTIONS 604 AND 728.
- FINAL BACKFILL SHALL BE 1/2-SACK OR 1-SACK CLSM PER SECTIONS 604 AND 728 FOR TRENCH DEPTHS GREATER THAN 4 FEET UNLESS A SAFE (OHS COMPLIANT) WORKING SPACE AT LEAST 30" WIDE IS PROVIDED TO CONDUCT COMPACTION TESTING.
- BASE, FINAL BACKFILL, AND PIPE EMBEDMENT ZONE COMPACTION SHALL BE IN ACCORDANCE WITH SECTION 601.
- ASPHALT CONCRETE SURFACE AND BASE COURSES SHALL COMPLY WITH SECTION 336.2.4.1 UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS.
- USE TYPE "A" FOR LONGITUDINAL TRENCH REPAIR AND USE "T-TOP" FOR TRANSVERSE TRENCH REPAIR (SEE DETAIL 200-2) UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS. TYPE "B" TRENCH REPAIR MAY BE USED FOR TRANSVERSE TRENCH REPAIR IF SPECIFIED BY THE AGENCY.
- PROVIDE MINIMUM 12" WIDE SHELF AS SHOWN IN "T-TOP" TRENCH REPAIR AT ENDS OF TYPE "A" TRENCH REPAIR EXCEPT WHERE EDGE ABUTS EXISTING CONCRETE.
- USE "T-TOP" PAVEMENT REPLACEMENT WHERE A TRENCH IS NOT PARALLEL TO A STREET OR GOES THROUGH AN INTERSECTION.
- THE JOINT LOCATION OR JOINT CONFIGURATION MAY VARY FROM THAT SHOWN TO ELIMINATE REMNANTS, TO ELIMINATE FULL DEPTH SAWCUT JOINTS FROM BEING LOCATED WITHIN A WHEEL PATH AS REQUIRED BY SECTION 336, OR WHEN AN OFFSET JOINT IS CONSTRUCTED.
- SEE DETAIL 200-2 FOR REMNANT PAVEMENT REMOVAL REQUIREMENTS.
- EXPOSED COPPER OR POLYETHYLENE WATER PIPE UP TO 2" IN DIAMETER IN TRENCHES TO BE BACKFILLED WITH CLSM SHALL BE WRAPPED WITH MINIMUM 3/4" THICK PREFORMED PIPE-COVERING FOAM INSULATION BEFORE PLACING CLSM.

DETAIL NO. 200-1	MARICOPA ASSOCIATION of GOVERNMENTS	STANDARD DETAIL ENGLISH	TRENCH BACKFILL AND SURFACE REPLACEMENT	PROPOSED 01-01-2015	DETAIL NO. 200-1
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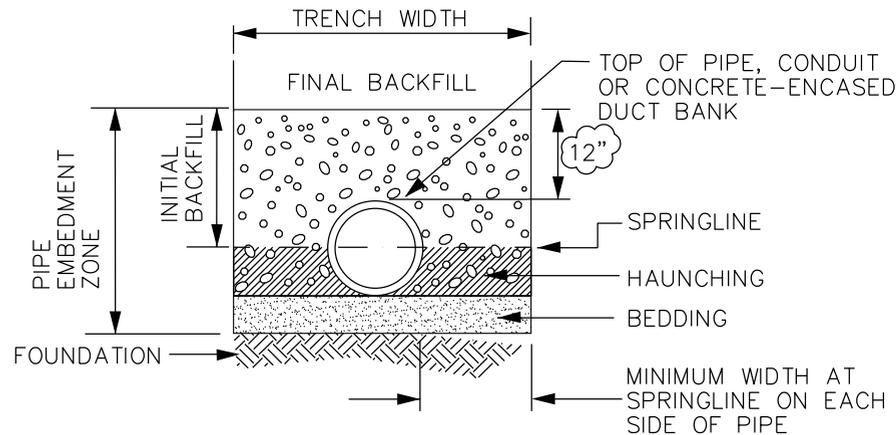
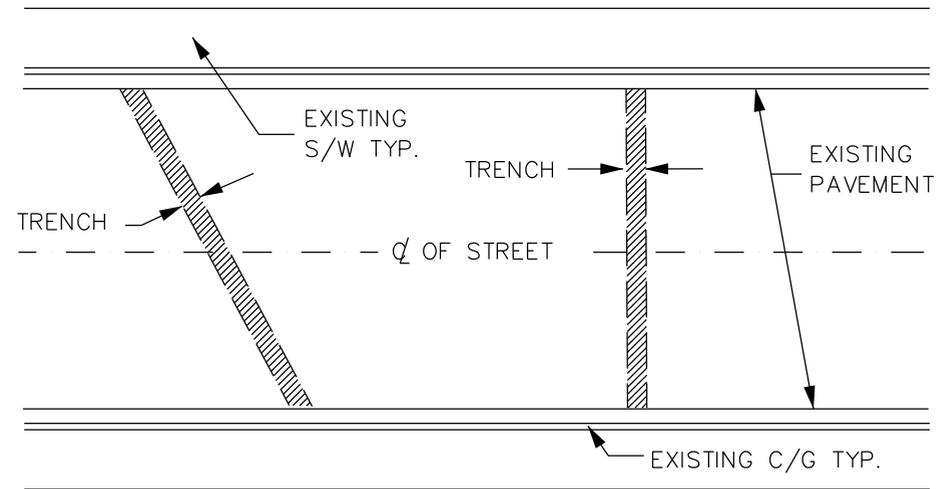
LONGITUDINAL TRENCH

(TRENCH IN PAVEMENT PARALLEL TO TRAFFIC)

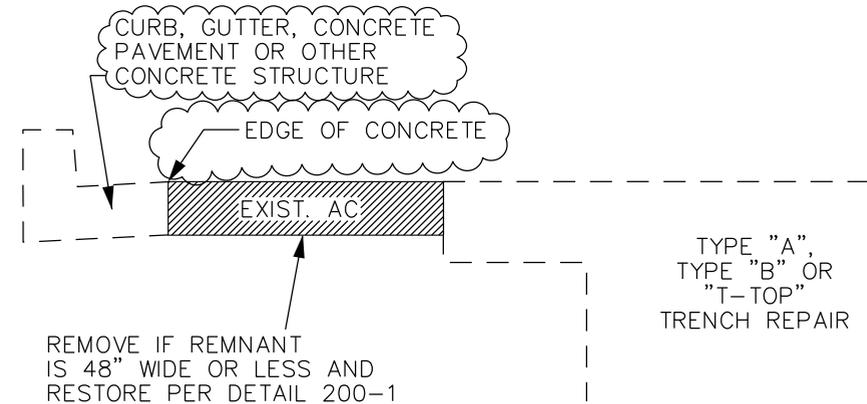


TRANSVERSE TRENCH

(TRENCH IN PAVEMENT NOT PARALLEL TO TRAFFIC)



TRENCH CROSS-SECTION DETAIL



REMNANT PAVEMENT REMOVAL

NOTES:

1. SEE SECTION 601 FOR TRENCH EXCAVATION, BACKFILLING AND COMPACTION REQUIREMENTS.
2. SEE DETAIL 200-1 FOR DETAILED TRENCH REPAIR REQUIREMENTS FOR TRENCH TYPES NOTED HEREIN.
3. SEE DETAIL 211 FOR REQUIREMENTS REGARDING THE USE OF PLATING TRANSVERSE TRENCHES. USE OF STEEL PLATES SHALL NOT EXCEED 72 HOURS AFTER COMPLETION OF BACKFILL AND PRIOR TO FINAL PATCHING.

DETAIL NO.
200-2



STANDARD DETAIL
ENGLISH

**TRENCH BACKFILL AND
SURFACE REPLACEMENT**

PROPOSED
01-01-2015

DETAIL NO.
200-2

Section 322 – Decorative Asphalt

322.1 GENERAL REQUIREMENTS:

Decorative asphalt is aAsphalt stamping that creates an imprinted surface pattern and/or installs color coatings to the surface of a newly constructed asphalt pavement.

Mock ups may be required at the owner's discretion to ensure Contractor familiarity with product and installation procedures. Acceptance of colors and application procedures should be accepted in writing from the agency/owner prior to commencement of work. Payment for mock ups, if required in the bid documents, will be considered incidental to the stamping or coating item.

The Contractor shall submit for review and approval all manufacturer product and technical data for materials proposed to be installed in the right-of-way. The Contractor shall also submit for review and approval a sample of the stamped asphalt material prior to installation. These submittals shall be submitted to the Engineer.

322.2 MATERIALS:

All products used in the surfacing system shall meet the minimum physical and performance properties in Table 322-1. The Contractor shall submit a Certificate of Compliance to the Engineer indicating that the materials to be included in the work meet these specification requirements. The color used for painted asphalt shall be as per the bid documents or as approved by the Agency.

TABLE 322-1		
ASPHALT STAMPING SURFACING SYSTEM		
PHYSICAL PROPERTIES		
CHARACTERISTIC	TEST SPECIFICATION	TEST RESULT – BASE
Solids by Volume (%)	ASTM D2697	68% Min
Solids by Weight (%)	ASTM D2369	78% Min
Density	ASTM D1475	13.7 lbs./gal Min
Dry-Time (To Recoat)	ASTM D5895	20 Min
Taber Wear Abrasion Dry H-10 Wheel	ASTM D4060 1 day cure	0.16 g/1000 cycles Max
Taber Wear Abrasion Wet H-10 Wheel	ASTM D4060 7 days cure	2.34 g/1000 cycles Max
QUV E Accel.	ASTM G154 Delta	0.53 Min

Section 322 – Decorative Asphalt

TABLE 322-1		
ASPHALT STAMPING -SURFACING SYSTEM		
PHYSICAL PROPERTIES		
CHARACTERISTIC	TEST SPECIFICATION	TEST RESULT – BASE
Hydrophobicity Water Absorption	ASTM D-570	7.6% (9 Day Immersion) Max
Shore Hardness	ASTM D2240	67 Type D Min
Mandrel Bend	ASTM D522-93A	1/4" @ 21 Degree C Pass Min
Permeance	ASTM D1653	3.77 g/m ² /hr. (52 mils) Max
VOC	Per MSDS	25 g/l Max
Adhesion to Asphalt	ASTM D4541	Substrate Failure
Friction Wet	ASTM E303 British Pendulum Tester	WP * Coated- 62 Min WP* Uncoated - 59 Min AC ** Coated - 70 Min AC ** Uncoated - 61 Min
Cure Time	Measured @ 77 Degrees Fahrenheit	Dry to touch – 20 Min Light Foot/Vehicle Traffic – 2-4 Hrs. Full Cure – 5 to 7 days

322.3 INSTALLATION & SURFACE PATTERNING:

The patterning equipment shall be metal templates that shall correspond to the patterns shown in Owner's standard details or as shown on the plans and called out in special provisions. Refer to the project plans and specifications for the pattern type to be used.

The Contractor shall obtain the Engineer's approval prior to beginning asphalt stamping.

When new asphalt is to be stamped, it shall have one overnight period to set prior to stamping for conventional mixes and ARAC mixes shall have 30 days to set prior to the stamping/coating process. Asphalt shall be fully compacted prior to positioning the patterning template and meet all the requirements set forth in Sections 321 or 325 as applicable.

For raised medians and other areas not subject to vehicular traffic, the surface course shall be at least 2-1/2" of 1/2" or 3/8" Marshall Low Traffic asphalt concrete mix in accordance with Section 710, or as approved by the engineer.

The asphalt to be stamped shall be uniformly heated using infrared technology to a temperature that shall not exceed 280 degrees Fahrenheit. Templates shall be set in place using a plate compactor and fully embedded into the asphalt.

Section 322 – Decorative Asphalt

The template imprint depth shall be 3/8" over 95% of the patterned area. Template print depth shall be inspected prior to coating to ensure compliance. All hand tooling shall be complete, full depth, aligned vertically, and shall extend to the edge of the asphalt pavement, common edge, concrete curb, gutter, or other border. There shall be no over print or shadowing of patterns and no remnants of excess print on surrounding unintended areas. Should overprinting or other imperfections occur, these areas shall be repaired by using the same process outlined in this section to return the asphalt to a smooth condition to that of the unstamped area(s).

322.3.1 Surfacing System (Painted Asphalt & Clear Coat Sealant): The air temperature shall be at least 45° F and rising before the application of surface system products begins. There shall also be no precipitation expected within 24 hours of the anticipated surfacing completion. The surface shall be free from laitance, grease, deleterious oils, or any other foreign matter prior to placing any pavement coating.

The surfacing system products shall be spray-applied. Where required to cover small areas, the surfacing system may be applied using brooms or brushes. When complete, the entire asphalt surface shall be uniformly covered with the surfacing product with no exposed asphalt present.

The Contractor shall use sufficient masking to ensure that the surface system products are applied only where specified. Masking shall be complete and no overspray, or other imperfections, onto surfaces not designated as coated surfaces shall be allowed.

The Contractor shall apply the surface system products per the manufacturer's recommendations on all ~~with a minimum of four complete passes on a~~ roadway surfaces, ~~Three complete passes shall be allowed on~~ medians, walkways, pathways, and bike paths. Thicknesses may vary between applications where traffic is primarily pedestrian with minimal or no automobile traffic and roadways. After the colorant has had sufficient time to set, ~~a minimum of two coats of~~ a clear coat sealant shall be applied per the manufacturer's recommendations.

Total thickness of the surfacing product shall be ~~20 mils in thickness~~ per the manufacturer's recommendations or greater including the sealant.

After the surfacing system products have been applied, the treated asphalt shall not be exposed to vehicular traffic for eight (8) hours, or per the manufacturer's recommendations.

322.4 MEASUREMENT:

Approved and accepted asphalt stamping installations shall be measured by the square foot for asphalt surface patterning with color coating and for asphalt surface color coating without surface patterning. The measurement for asphalt stamping specialty design shall be the number of approved and accepted installations of each specialty design. Asphalt coloring shall be measured by the square foot.

322.5 PAYMENT:

Payment for specialty designs, for Asphalt Surface Patterning With Color Coating, and for Asphalt Surface Color Coating Without Surface Patterning shall be at the contract unit price and shall be full compensation for furnishing all labor, material, tools, equipment and incidentals, and doing all work

Section 322 – Decorative Asphalt

involved in the installation of asphalt stamping complete in place, in compliance with the contract documents.

322.6 WARRANTY:

Asphalt color coating shall have a two year warranty from flaking, premature wearing and like defects. Color changes shall not be part of the warranty.

Warranty repair shall be at the expense of the Contractor. Areas that require recoating shall receive a light scuffing to remove the clear coat sealant prior to reapplication of the color coating and sealant.

Section 322 – Decorative Asphalt**322.1 GENERAL REQUIREMENTS:**

Decorative asphalt is asphalt stamping that creates an imprinted surface pattern and/or installs color coatings to the surface of a newly constructed asphalt pavement. Mock ups may be required at the owner's discretion to ensure Contractor familiarity with product and installation procedures. Acceptance of colors and application procedures should be accepted in writing from the agency/owner prior to commencement of work. Payment for mock ups, if required in the bid documents, will be considered incidental to the stamping or coating item.

The Contractor shall submit for review and approval all manufacturer product and technical data for materials proposed to be installed in the right-of-way. The Contractor shall also submit for review and approval a sample of the stamped asphalt material prior to installation. These submittals shall be submitted to the Engineer.

322.2 MATERIALS:

All products used in the surfacing system shall meet the minimum physical and performance properties in Table 322-1. The Contractor shall submit a Certificate of Compliance to the Engineer indicating that the materials to be included in the work meet these specification requirements. The color used for painted asphalt shall be as per the bid documents or as approved by the Agency.

TABLE 322-1		
ASPHALT SURFACING SYSTEM PHYSICAL PROPERTIES		
CHARACTERISTIC	TEST SPECIFICATION	TEST RESULT – BASE
Solids by Volume (%)	ASTM D2697	68% Min
Solids by Weight (%)	ASTM D2369	78% Min
Density	ASTM D1475	13.7 lbs./gal Min
Dry-Time (To Recoat)	ASTM D5895	20 Min
Taber Wear Abrasion Dry H-10 Wheel	ASTM D4060 1 day cure	0.16 g/1000 cycles Max
Taber Wear Abrasion Wet H-10 Wheel	ASTM D4060 7 days cure	2.34 g/1000 cycles Max
QUV E Accel.	ASTM G154 Delta	0.53 Min

Section 322 – Decorative Asphalt

TABLE 322-1		
ASPHALT SURFACING SYSTEM		
PHYSICAL PROPERTIES		
CHARACTERISTIC	TEST SPECIFICATION	TEST RESULT – BASE
Hydrophobicity Water Absorption	ASTM D-570	7.6% (9 Day Immersion) Max
Shore Hardness	ASTM D2240	67 Type D Min
Mandrel Bend	ASTM D522-93A	1/4" @ 21 Degree C Pass Min
Permeance	ASTM D1653	3.77 g/m ² /hr. (52 mils) Max
VOC	Per MSDS	25 g/l Max
Adhesion to Asphalt	ASTM D4541	Substrate Failure
Friction Wet	ASTM E303 British Pendulum Tester	WP * Coated- 62 Min WP* Uncoated - 59 Min AC ** Coated - 70 Min AC ** Uncoated - 61 Min
Cure Time	Measured @ 77 Degrees Fahrenheit	Dry to touch – 20 Min Light Foot/Vehicle Traffic – 2-4 Hrs. Full Cure – 5 to 7 days

322.3 INSTALLATION & SURFACE PATTERNING:

The patterning equipment shall be metal templates that shall correspond to the patterns shown in Owner's standard details or as shown on the plans and called out in special provisions. Refer to the project plans and specifications for the pattern type to be used.

The Contractor shall obtain the Engineer's approval prior to beginning asphalt stamping.

When new asphalt is to be stamped, it shall have one overnight period to set prior to stamping for conventional mixes and ARAC mixes shall have 30 days to set prior to the stamping/coating process. Asphalt shall be fully compacted prior to positioning the patterning template and meet all the requirements set forth in Sections 321 or 325 as applicable.

For raised medians and other areas not subject to vehicular traffic, the surface course shall be at least 2-1/2" of 1/2" or 3/8" Marshall Low Traffic asphalt concrete mix in accordance with Section 710, or as approved by the engineer.

The asphalt to be stamped shall be uniformly heated using infrared technology to a temperature that shall not exceed 280 degrees Fahrenheit. Templates shall be set in place using a plate compactor and fully embedded into the asphalt.

Section 322 – Decorative Asphalt

The template imprint depth shall be 3/8" over 95% of the patterned area. Template print depth shall be inspected prior to coating to ensure compliance. All hand tooling shall be complete, full depth, aligned vertically, and shall extend to the edge of the asphalt pavement, common edge, concrete curb, gutter, or other border. There shall be no over print or shadowing of patterns and no remnants of excess print on surrounding unintended areas. Should overprinting or other imperfections occur, these areas shall be repaired by using the same process outlined in this section to return the asphalt to a smooth condition to that of the unstamped area(s).

322.3.1 Surfacing System (Painted Asphalt & Clear Coat Sealant): The air temperature shall be at least 45° F and rising before the application of surface system products begins. There shall also be no precipitation expected within 24 hours of the anticipated surfacing completion. The surface shall be free from laitance, grease, deleterious oils, or any other foreign matter prior to placing any pavement coating.

The surfacing system products shall be spray-applied. Where required to cover small areas, the surfacing system may be applied using brooms or brushes. When complete, the entire asphalt surface shall be uniformly covered with the surfacing product with no exposed asphalt present.

The Contractor shall use sufficient masking to ensure that the surface system products are applied only where specified. Masking shall be complete and no overspray, or other imperfections, onto surfaces not designated as coated surfaces shall be allowed.

The Contractor shall apply the surface system products per the manufacturer's recommendations on all roadway surfaces, medians, walkways, pathways, and bike paths. Thicknesses may vary between applications where traffic is primarily pedestrian with minimal or no automobile traffic and roadways. After the colorant has had sufficient time to set, a clear coat sealant shall be applied per the manufacturer's recommendations.

Total thickness of the surfacing product shall be per the manufacturer's recommendations or greater including the sealant.

After the surfacing system products have been applied, the treated asphalt shall not be exposed to vehicular traffic for eight (8) hours, or per the manufacturer's recommendations.

322.4 MEASUREMENT:

Approved and accepted asphalt stamping installations shall be measured by the square foot for asphalt surface patterning with color coating and for asphalt surface color coating without surface patterning. The measurement for asphalt stamping specialty design shall be the number of approved and accepted installations of each specialty design. Asphalt coloring shall be measured by the square foot.

322.5 PAYMENT:

Payment for specialty designs, for Asphalt Surface Patterning With Color Coating, and for Asphalt Surface Color Coating Without Surface Patterning shall be at the contract unit price and shall be full compensation for furnishing all labor, material, tools, equipment and incidentals, and doing all work involved in the installation of asphalt stamping complete in place, in compliance with the contract documents.

Section 322 – Decorative Asphalt

322.6 WARRANTY:

Asphalt color coating shall have a two year warranty from flaking, premature wearing and like defects. Color changes shall not be part of the warranty.

Warranty repair shall be at the expense of the Contractor. Areas that require recoating shall receive a light scuffing to remove the clear coat sealant prior to reapplication of the color coating and sealant.



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: January 8, 2015
To: MAG Specifications and Details Committee
From: Robert Herz, MCDOT Representative

Subject: Miscellaneous Corrections

Case 15-01A

PURPOSE: Add omitted text to section 735.1. Text was approved by Case 14-07 and merged into Case 13-15 both cases were approved in 2014.

REVISION:

REINFORCED CONCRETE PIPE

735.1 GENERAL:

These specifications cover reinforced concrete pipe and related structures intended to be used for conveyance of sewage, industrial waste, and storm and irrigation water.

Except as modified herein reinforced concrete pipe shall be manufactured and tested in conformance with the requirements of ASTM C76 for circular pipe, ASTM C506 [for arch pipe, and ASTM C507](#) for elliptical pipe.

Whatever struts or other protective methods proved necessary to furnish and install the pipe to meet the limitation of cracks as specified herein, shall be provided and maintained throughout pipe handling and transportation.

SECTION 710

710.3 MIX DESIGN REQUIREMENTS:

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

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

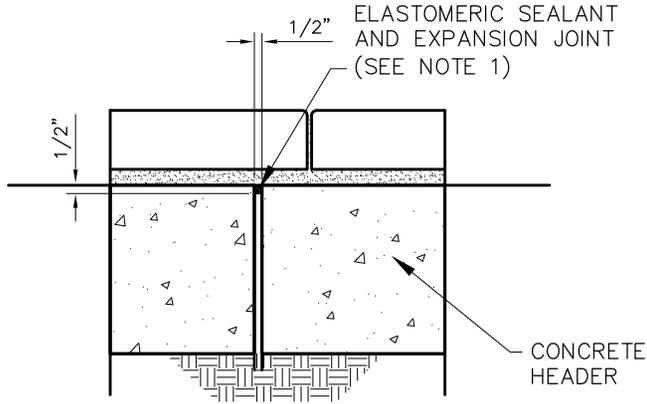
- (1) The name and address of the testing organization and the person responsible for the mix design report.
- (2) The mix plant identification and/or location, as well as the supplier or producer name.
- (3) A description of all products that are incorporated in the asphalt concrete along with the sources of all products, including admixtures and asphalt binder, and their method of introduction.
- (4) The supplier and grade of asphalt binder, the source and type of mineral aggregate, and the percentage of asphalt binder and mineral admixture used.
- (5) The percentage of RAP and RAP Binder being contributed to the total mix shall be included in the mix design report.
- (6) The mix design report whether Gyratory or Marshall shall state the traffic condition (low or high traffic) and size designation.
- (7) The results of all testing, determinations, etc., such as: specific gravity and gradation of each component, water absorption, sand equivalent, loss on abrasion, fractured coarse aggregate particles, Tensile Strength Ratio (ASTM D 4867), Marshall stability and flow, asphalt absorption, percent air voids, voids in mineral aggregate, and bulk density. Historical abrasion values may be supplied on existing sources. The submittal should include a plot of the gradation on the Federal Highway Administration's 0.45 Power Gradation Chart, plots of the compaction curves and the results of moisture sensitivity testing.
- (8) The laboratory mixing and compaction temperature ranges for the supplier and grade of asphalt binder used within the mix design.
- (9) A specific recommendation for design asphalt binder content and any limiting conditions that may be associated with the use of the design, such as minimum percentages of crushed or washed fine aggregate.
- (10) The supplier's product code, the laboratory Engineer's seal (signed and dated), and the date the design was performed.
- (11) If a Warm Mix Technology or additive is used; the following shall be included:
 - Technology type and supporting manufacturer information; including instructions pertaining to laboratory mixture temperatures and curing.
 - Amount (%) of additive (technology) used in the mixture.
 - Attached copy of the ADOT approved product list, showing additive/technology
 - Minimum plant production temperature shall not fall below manufacturer's recommendation.
 - Minimum field compaction temperature shall be identified.
 - Identify any special mixing or compaction temperatures or special methods to be used when conducting **QA** or **QC** testing of field collected samples. Example: if the field collected samples of warm mix asphalt can be treated as conventional hot asphalt mix, provide the equivalent conventional hot asphalt mix compaction temperature.

QC

QA

REVISE 'OA' TO QUALITY ASSURANCE
" 'OC' " " CONTROL

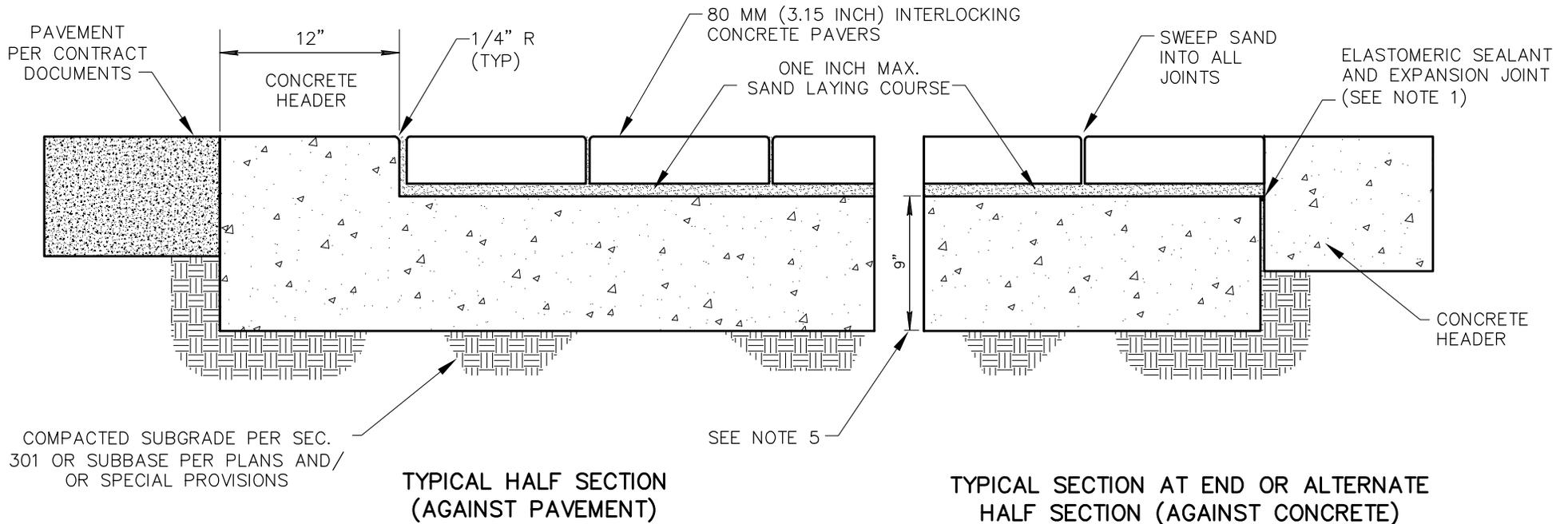
THE DEFINITIONS OF QA AND QC HAVE NOT BEEN IDENTIFIED.



EXPANSION JOINT DETAIL

NOTES:

1. 1/2 INCH EXPANSION JOINT, ASTM D-1751 PER SEC. 729 AND ELASTOMERIC SEALANT PER SEC. 342
2. CONTRACTION JOINTS PER SEC. 342
3. MATERIALS AND CONSTRUCTION PER SEC. 342
4. PORTLAND CEMENT CONCRETE SHALL BE CLASS A
5. DESIGN PARAMETERS FOR THE THICKNESS IS BASED ON:
 ASSUMES MODULUS OF SUBGRADE REACTION (K) = 100 pci
 CONCRETE WORKING STRESS (f_t) = 300 psi
 TERMINAL SERVICABILITY INDEX (P_t) OF 2.5 OVER 20 YEARS
 AND 1 MILLION TOTAL EQUIVALENT 18-KIP SINGLE-AXLE
 LOAD APPLICATIONS



TYPICAL HALF SECTION (AGAINST PAVEMENT)

TYPICAL SECTION AT END OR ALTERNATE HALF SECTION (AGAINST CONCRETE)

DETAIL NO.

225



STANDARD DETAIL
ENGLISH

CONCRETE PAVERS

REVISED

01-01-2016

DETAIL NO.

225



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: June 3, 2015 Revised 7/9/2015
To: MAG Specifications and Details Committee
From: Robert Herz, MCDOT Representative
Subject: Miscellaneous Corrections Case 15-01 D

PURPOSE: Correction titles on Detail 270 and correct the Grade Adjustment Detail.

REVISION:

Correction 1 - Detail 270 Title

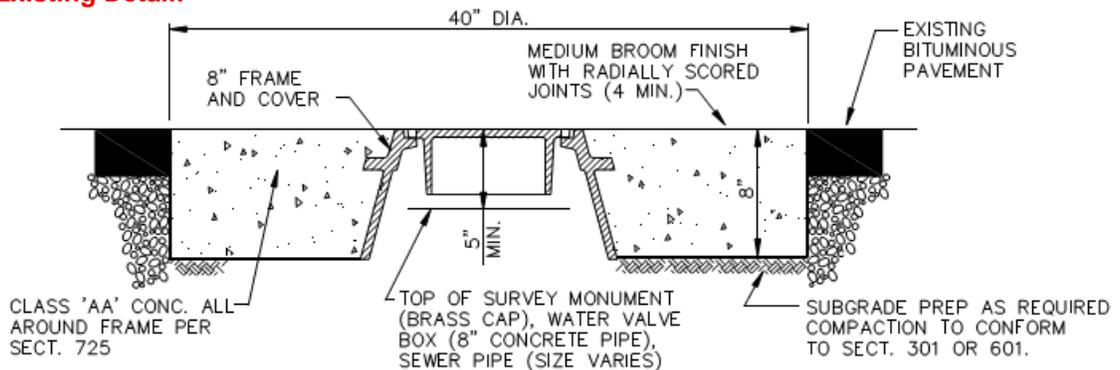
Title shown on current Detail: FRAME AND COVER
Requested corrected Detail title: FRAME AND COVER AND GRADE ADJUSTMENT

Title shown in current index: FRAME AND COVER (AND GRADE ADJUSTMENTS)
Title shown in index prior to 2001: FRAME & COVER AND GRADE ADJUSTMENT

Correction 2 - Revise the grade adjustment detail.

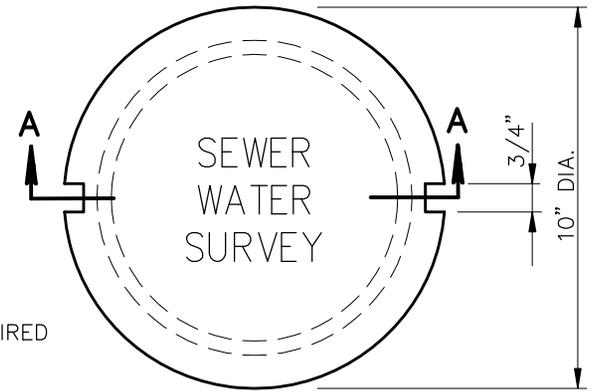
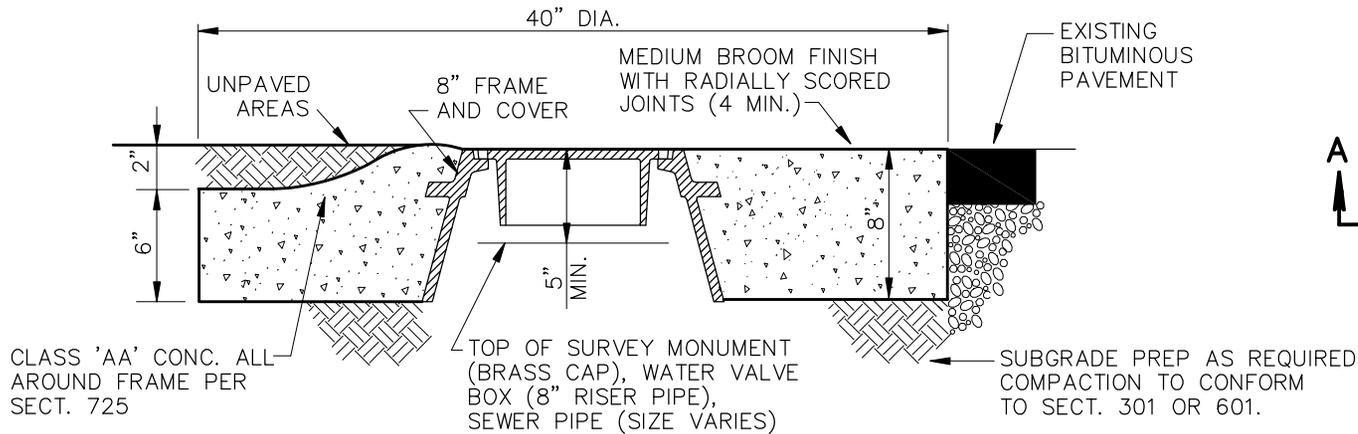
Revise the title, show both paved and unpaved conditions, and replace (8" CONCRETE PIPE) with (8" RISER PIPE).

Existing Detail:

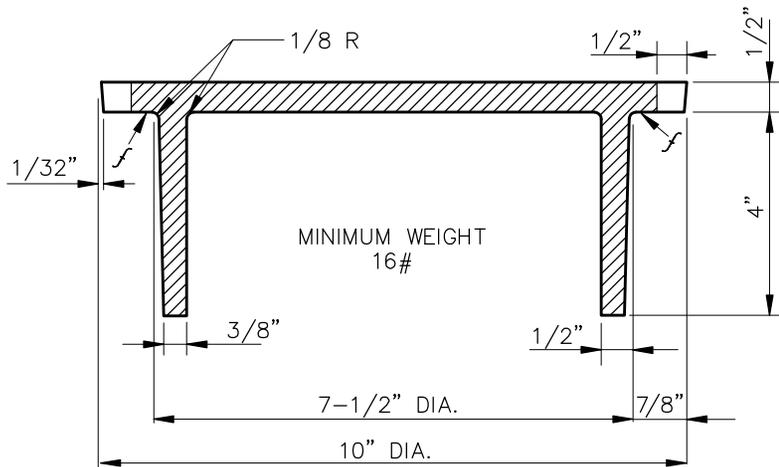


CLEAN OUT FRAME & GRADE ADJUSTMENT
WATER VALVE, SURVEY MONUMENT, OR SEWER

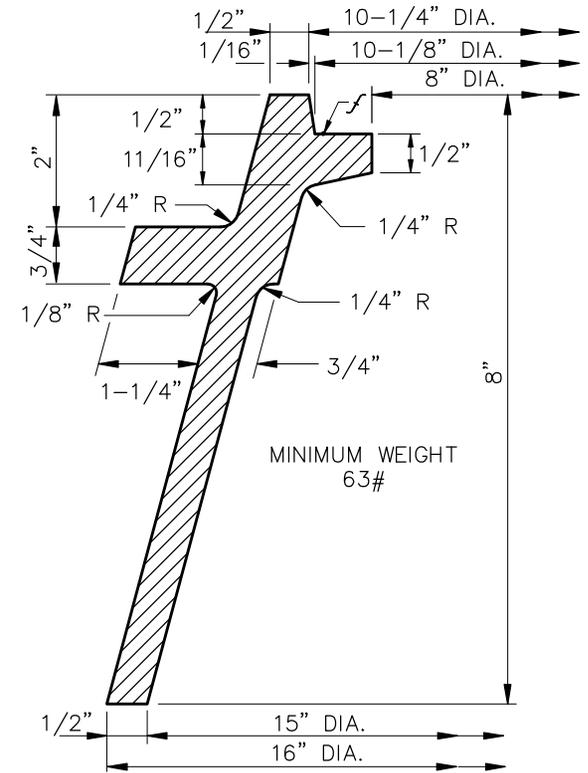
Revised Title: GRADE ADJUSTMENT FOR FRAME AND COVER



GRADE ADJUSTMENT FOR FRAME AND COVER



COVER SECTION A-A



8" C.I. FRAME AND COVER

NOTES:

1. CASTING TO CONFORM TO SECT. 787.
2. LETTERS ON COVER TO BE AS FOLLOWS:
"SEWER", "WATER", OR "SURVEY" AS DIRECTED TOTAL WIDTH OF WORD "SEWER" OR "WATER" 3-3/4". TOTAL WIDTH OF WORD "SURVEY" 4-1/2". LETTER SIZE 5/8" x 3/4", RAISED 1/16" ABOVE LEVEL OF COVER, TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL.
3. \int INDICATES MACHINE FINISHED SURFACE.

DETAIL NO.

270



STANDARD DETAIL
ENGLISH

**FRAME AND COVER
AND GRADE ADJUSTMENT**

REVISED

01-01-2016

DETAIL NO.

270



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: June 23, 2015
To: MAG Specifications and Details Committee
From: Robert Herz, MCDOT Representative
Subject: Miscellaneous Corrections

Case 15-01 E

PURPOSE: Remove a conflict between specification Section 206 (STRUCTURE EXCAVATION AND BACKFILL) and Section 601 (TRENCH EXCAVATION, BACKFILLING AND COMPACTION) concerning structural backfill requirements for manholes.

Section 206.1 identifies manholes as a structure type covered by section 206. Section 206.4.2 requires backfill to be Select Material, Type A or B in Table 702-1 and Section 206.4.4 only allows ½ sack or 1 sack controlled low strength material as an alternative backfill material. Section 601.2.6 requires the excavation be backfilled with the same material required for the adjoining pipe line trench. Section 601.4.5 allows “sound earthen material with no piece larger than 4 inches and be free from broken concrete, broken pavement, wood or other deleterious material” for final backfill.

REVISIONS:

601.2.6 Excavation for Manholes, Valves, Inlets, Catch Basins and Other Accessories: The Contractor may place concrete directly against excavated surfaces for cast-in-place items, provided that the faces of the excavation are firm, unyielding, and are at all points outside the structure lines shown on the plans. If the native material is such that it will not stand without sloughing or if precast structures are used, the Contractor shall excavate as needed to place bracing, shoring, and forms or to place the precast structure. ~~The excavation shall be backfilled with the same material required for the adjoining pipe line trench and compacted per Table 601-2.~~

Any unnecessary excavation below the elevation indicated for the foundation of any structure shall be replaced with the same class of concrete specified for the structure or with 1½ sack controlled low strength material as specified in Section 728. When the replacement material is structural concrete, the material shall be placed at the same time as the structure. However, when using 1½ sack controlled low strength material, placement of the material shall be per Section 604 which requires a time lag between placement of the controlled low strength material and the structural concrete. The placement of the additional material shall be at no cost to the Agency.

625.3.1 Manholes: (revise the eighth paragraph as shown)

Backfilling shall be done in accordance with the requirements for trench backfilling as stated in Section ~~601~~206.

REFERENCES:

206.1 DESCRIPTION:

Structure excavation shall consist of the removal of material for the construction of foundations for bridges, manholes, retaining walls, box culverts, head walls for culverts, and other structures, and other excavation designated on the plans or in these specifications or in the special provisions as structure excavation.

Structure backfill shall consist of furnishing material, if necessary, and placing and compacting backfill material around structures to the lines designated on the plans or specified or directed by the Engineer.

Structure excavation and structure backfill shall include the furnishing of all materials and equipment and the providing of other facilities which may be necessary to perform the excavations and place and compact the backfill, and the subsequent removal of these facilities, except where they are required or permitted by the plans, special provisions or Engineer to remain in place.

206.4.2 Structure Backfill for Earth Retaining Structures: Structure Backfill to be placed against concrete structures designed to retain earth loads, such as bridge abutment backwalls and wingwalls, box culvert outside walls and wingwalls, and retaining walls:

(A) Shall conform to the material and the graduation requirements for Select Material, Type A or B in Table 702-1 unless otherwise approved by the Engineer.

206.4.4 Structure Backfill for Structures within Paved Areas: Where a structure is located within an existing street, proposed street, or paved area shall be compacted to the minimum density specified in Table 601-2, for Type I or shall be filled with ½ sack or 1 sack controlled low strength material as specified in Sections 604 and 728.

TABLE 601-2				
MINIMUM TRENCH COMPACTION DENSITIES				
Backfill Type	Location	From Surface To 2 feet Below Surface	From 2 feet Below Surface To 1 foot Above Top of Pipe	From 1 foot Above Top of Pipe to Bottom of Pipe
I	Under any existing or proposed pavement, curb, gutter, attached sidewalk, roadway shoulders, and other areas within right-of-way subject to vehicular traffic, or when any part of the trench excavation is within 2-feet of the existing pavement, curb, or gutter.	100% for granular 95% for non-granular	95%	95%
II	On any utility easement or right-of-way outside limits of Type I backfill.	85%	85%	90%
III	Around any structures (manholes, etc.) or exposed utilities outside limits of Type I backfill.	95% in all cases		

601.4.5 Final Backfill: Material placed above the initial backfill to the top of the trench or to the bottom of the road base material. Final backfill shall be placed in lifts that shall not exceed 2 feet and the lift height shall not be more than can be compacted to the required density with the equipment and methods being used.

Final backfill shall be ABC per Section 702 or sound earthen material with no piece larger than 4 inches and be free from broken concrete, broken pavement, wood or other deleterious material.



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: July 8, 2015
To: MAG Specifications and Details Committee
From: Robert Herz, MCDOT Representative
Subject: Miscellaneous Corrections

Case 15-01 F

PURPOSE: Correct wrong reference in Section

REVISION: Replace 'Section 712' with 'Section 718' in the third paragraph of Section 334.3.

SECTION 334

PRESERVATIVE SEAL FOR ASPHALT CONCRETE

334.1 DESCRIPTION:

The asphalt concrete preservative seal shall be composed of an emulsified asphalt or asphalt rejuvenate, or an asphalt sealant to preserve the asphalt concrete pavement.

Preservative seals are applicable for asphalt pavements as directed on the plans, special provisions, or the Engineer.

334.2 MATERIALS:

The preservative seal shall be one of the following materials as specified by the Engineer:

<u>Type</u>	<u>Description</u>	<u>Material Conformance</u>
A	Rejuvenating emulsion	Section 718
B	Petroleum hydrocarbon emulsion	Section 718
C	"Filled" asphalt sealer such as TRMSS or equal	Section 718
D	Acrylic polymer emulsion	Section 718
Other	Diluted asphalt emulsion, CSS-1 or SS-1h	Section 713

334.3 CONSTRUCTION METHOD:

The material shall be approved by the Engineer in accordance to this specification. The application rates, dilution and curing shall be directed by the Engineer in accordance with this specification.

The contractor shall be responsible to clean the pavement to be treated free of trash, debris, earth or other deleterious substances present in sufficient quality to not interfere with the work to be performed.

The application rate will be based upon a typical surface condition test site with application rate trials to determine the needed rate. All application rates specified in [Section 712](#) shall be a diluted 50-50 emulsified asphalt and water, except as recommended by the manufacturer for Type B and C. Any over applied seal will be sanded as directed by the Engineer. Application equipment shall be in accordance with [Section 330](#).

Before opening a treated area to traffic, the surface shall be checked for slipperiness and/or tackiness. If the treated portion of the roadway must be opened to traffic prior to the disappearance of slipperiness and/or tackiness, the surface shall be sanded with a minimum of 1 ½ pounds per square yard or as directed by the Engineer. Sand Blotter shall comply with [Section 333](#).



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: January 28, 2015 Revised 7/16/2015
To: MAG Specifications and Details Committee
From: Robert Herz, MCDOT Representative
Subject: Proposed Revision to Section 601.4.5 Final Backfill and Section 601.4.8 Granular Material and Native Backfill Material **Case 15-03**

PURPOSE: Revise trench final backfill placement requirement of loose non-compacted material from 2 feet to layers not exceeding twelve inches in depth and require Agency approval for depths greater than 12". Add CLSM and granular material to the listing of acceptable materials for final backfill as presently shown on Detail 200-1. Add to Section 601.4.8 identification of the testing procedures required to determine the percent passing the 200 sieve.

REVISIONS:

601.4.5 Final Backfill: Material placed above the initial backfill to the top of the trench or to the bottom of the road base material. Final backfill shall be placed in horizontal layers not more than twelve inches in depth before compaction. With Agency approval an increase in the loose non-compacted lift depth may be obtained for a project based on specific equipment, methods, and soil conditions. For approval of an increase of the loose non-compacted lift depth, the Contractor shall demonstrate to the satisfaction of the Agency that the required density shall be obtained using the Contractor identified equipment and methods. ~~lifts that shall not exceed 2 feet and~~ The loose lift height shall not be more than can be compacted to the required density with the equipment and methods being used.

Final backfill shall be CLSM per Section 604, ABC per Section 702, granular material or ~~sound earthen native backfill material per Section 601.4.8. with no piece larger than 4 inches and be free from broken concrete, broken pavement, wood or other deleterious material.~~

Backfill under street pavement shall be constructed per Detail 200-1 with the type of trench and surface replacement as noted on the plans or in the special provisions.

Unless otherwise noted, backfill under single curb, curb and gutter, [attached](#) sidewalk, driveways, valley gutters, etc. shall be the same as the adjacent street pavement.

601.4.8 Granular Material and Native Backfill Material: For purposes of this specification, granular material is material for which the sum of the plasticity index and the percent of the material passing a No. 200 sieve does not exceed 23. The plasticity index shall be tested in accordance with AASHTO T-146 Method A (Wet Preparation), T-89 and T-90. [The percent of the material passing a No. 200 sieve shall be tested in accordance with ASTM C136 and ASTM C117.](#)

Native material used for backfill shall be sound earthen material free from broken concrete, broken pavement, wood or other deleterious material with no piece larger than 4 inches.



Chandler • Arizona
Where Values Make The Difference

MEMORANDUM

Case # 15-07

DATE: August 5, 2015

TO: MAG Specifications and Details Committee Members

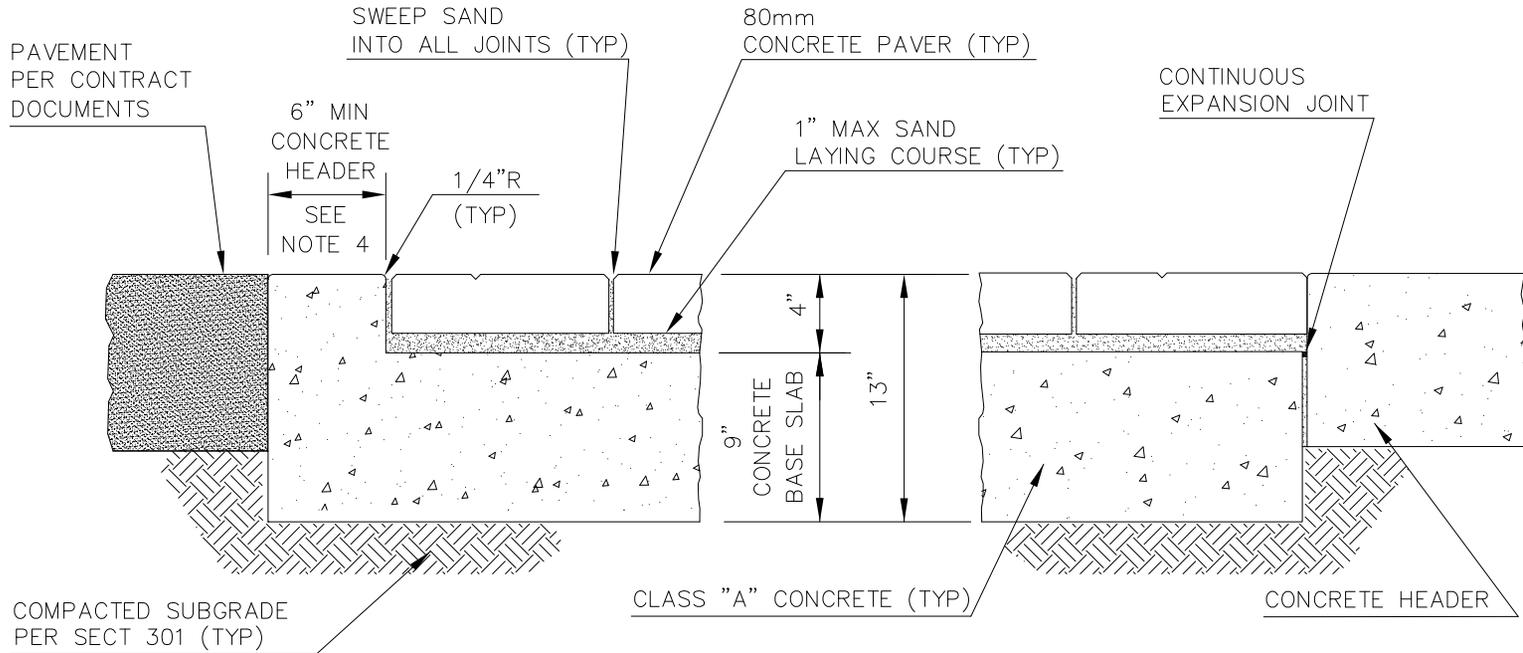
FROM: Warren White, City of Chandler Representative

SUBJECT: Proposed revisions to Detail 225 and Section 342

Purpose: Add a raised median (non-traveled) typical section to Detail 225 Concrete Pavers and incorporate revisions into Section 342 Decorative Pavement.

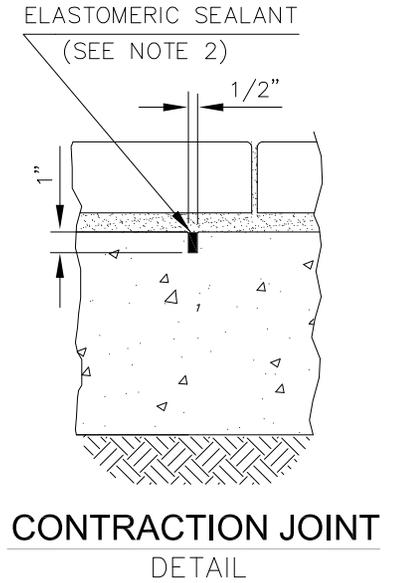
Revisions:

- Revisions to Detail 225 including title change to “INTERLOCKING CONCRETE PAVERS”, added typical section for raised median and contraction joint detail. Revisions to notes for clarification and consistencies based on comments received from Bob Herz. See attached updated detail.
- Revisions to Section 342 including title change to “INTERLOCKING CONCRETE PAVER INSTALLATIONS”. Incorporated further refinements and clarification comments received from Bob Herz. See attached markup and clean versions.



TYPICAL SECTION
(AGAINST PAVEMENT)

TYPICAL AT END OR ALTERNATE SECTION
(AGAINST CONCRETE)



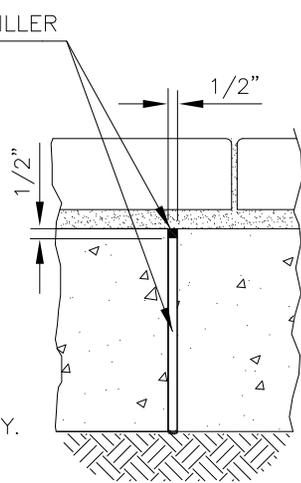
CONTRACTION JOINT
DETAIL

COMPACTED SUBGRADE PER SECT 301 (TYP)

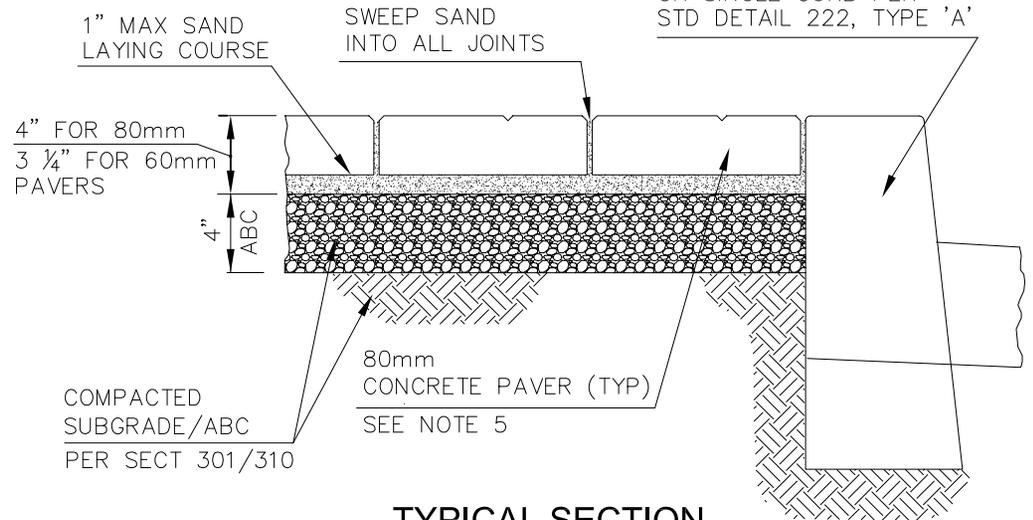
ELASTOMERIC SEALANT AND EXPANSION JOINT FILLER (SEE NOTE 1)

NOTES:

1. EXPANSION JOINTS PER SECT 342, EVERY 50'.
2. CONTRACTION JOINTS PER SECT 342, EVERY 10'.
3. MATERIALS AND CONSTRUCTION PER SECT 342.
4. HEADERS SHALL BE 12" AT CROSSWALKS.
5. 60mm PAVERS MAY BE ACCEPTED WITH AGENCY APPROVAL IN NON TRAFFIC AREAS ONLY.



EXPANSION JOINT
DETAIL



TYPICAL SECTION
(RAISED MEDIAN)

CURB PER CONTRACT DOCUMENTS - VERT CURB & GUTTER PER STD DETAIL 220-1, TYPE A OR SINGLE CURB PER STD DETAIL 222, TYPE 'A'

SECTION 342
DECORATIVE PAVEMENT
INTERLOCKING CONCRETE PAVER INSTALLATIONS-PAVING STONE

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342.1 GENERAL:

The Contractor shall furnish all necessary labor, material, tools and equipment to complete the proper installation of decorative interlocking concrete pavers used in medians, crosswalks, intersections ~~or as otherwise and other locations~~ noted in the Contract Documents. This includes furnishing a 10-foot straightedge to accomplish the level-testing ~~when~~ required by this specification.

~~The decorative pavement shall be true in line and grade and installed to coincide and align with the adjacent work elevation. All edges shall be retained to secure the pavers and sand laying course.~~

Comment [RTH1]: This requirement is included in Section 342.3.7.

~~The Contractor shall construct a sample panel 10 feet by 10 feet for inspection and approval by the Engineer, prior to the actual installation for the project. Once approved, the panel shall be used as a standard for the remainder of the work. The panel shall remain undisturbed throughout the construction of the pavers and final approval by the Engineer.~~

Comment [RTH2]: Why is a sample needed prior to project installation?

Comment [RTH3]: Why should the sample be the standard? This is typical of architectural specifications but not appropriate for MAG specifications. This specification is to identify acceptability standards. Suggest this entire paragraph be deleted.

342.2 MATERIALS:

342.2.1 Aggregate Base Course: Aggregate Base Course shall be per Table 702-1.

342.2.2 Portland Cement Concrete: ~~When the pavers are For installations~~ subject to vehicular traffic, ~~p~~Portland ~~C~~concrete used for headers or underlying base slabs for pavers shall be Class A per Section 725. ~~All other~~At locations ~~not subject to vehicle traffic loads~~, the ~~p~~Portland ~~C~~concrete shall be a minimum of Class B per Section 725.

342.2.3 Sand: Sand used for laying course shall conform to ASTM C33 except for the gradation. The gradation shall comply with Table 342-1.

TABLE 342-1								
SAND GRADATION								
Sieve Size	3/8 inch	No. 4	No. 8	No. 16	No.30	No. 50	No. 100	No. 200
Percent Passing	100	95-100	85-100	15-85	25-60	10-30	2-10	0-1

342.2.4 Concrete Pavers: Pavers shall have a minimum ~~of~~ thickness of 80 mm (3.15 inches) when installed in vehicular traffic bearing areas and 60 mm (2.36 inches) ~~When when~~ installed in ~~non-non~~ traffic bearings areas. Pavers shall be of an interlocking design conforming to ASTM C936-82. Pavers shall be sound and free of defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction. The Contractor shall submit two samples of each type of pavers used on the project for review and approval by the Engineer prior to any work. The pavers and materials used in their manufacture shall conform to the following:

- (A) Compressive Strength: Pavers shall have a minimum compressive strength of 8,000 psi in accordance with ASTM C140.
- (B) Absorption: The average absorption shall not be greater than 5 percent, with no individual unit absorption greater than 7 percent.
- (C) Portland Cement: Cement shall comply with Section 725.2, Type II.
- (D) Aggregates: Aggregates shall conform to ASTM C33 (washed, graded sand and rock, no expanded shale or lightweight aggregates).
- (E) Other Constituents: Coloring pigments shall be applied integrally to the concrete. Air entraining admixtures, coloring pigments, integral water repellents, and finely ground silica shall be previously established as suitable for use in concrete and either shall conform to ASTM standards where applicable, or shall be shown by test or experience not to be detrimental to the concrete.
- (F) Physical Properties: The size, shape, design and color of the pavers shall be as noted in the Contract Documents.

SECTION 342

342.2.5 Expansion Joint Filler: Expansion joint filler material shall be 1/2-inch premolded ~~joint filler and comply that complies~~ with Section 729 and ASTM D1751.

342.2.6 Joint Sealant: Joint sealant shall be elastomeric joint sealant conforming to ASTM C920, Type S, Grade NS, Class 25.

342.3 CONSTRUCTION PROCEDURES:

342.3.1 Subgrade: The subgrade shall be constructed true to grades and lines shown on the plans in compliance with subgrade tolerances and compaction requirements compacted to a minimum dry density of 95% as specified in MAG-Section 301.

342.3.2 Aggregate Base Course: When aggregate base course is specified, the aggregate base course shall be constructed true to grades and lines shown on the plans in compliance with grade and cross-section tolerances and compaction requirements of and compacted to a minimum dry density of 100% per Section 301-310 ~~with the surface of the aggregate base course not varying by more than +1/8 inch in 10 feet.~~

342.3.3 Concrete Header and Base Slab: Forms shall be thoroughly cleaned each time they are used, and shall be coated with a light oil, or other releasing agent of a type which will not discolor the ~~p~~Portland ~~c~~Cement concrete.

The ~~p~~Portland ~~c~~Cement concrete shall be thoroughly spaded away from the forms so that there will be no rock pockets next to the forms. Compacted by mechanical vibrators may be used when approved by the Engineer. Tamping or vibrating shall continue until the mortar flushes to the surface, and the coarse aggregate has been tamped below the surface.

All edges shall be shaped with a suitable tool to form a rounded edge of radius as shown on the referenced detail directed in Detail 225.

The ~~p~~Portland ~~c~~Cement concrete header face form shall not be removed before the concrete has taken the initial set and has sufficient strength to carry its own weight. The concrete header outer form shall not be removed until the concrete has hardened sufficiently to prevent any damage to the concrete. Any porting of concrete damaged while stripping forms shall be repaired or if the damage is severe, replaced at no additional cost to the Contracting Agency. The face and top of the concrete header shall be tested with a 10-foot straightedge or curve template, longitudinally along the surface. Any deviation in excess of 1/4-inch in 10-feet shall be corrected at no additional cost to the Contracting Agency.

Any section of the work deficient in depth or not conforming to the plans or specifications shall be removed and replaced by the Contractor at no additional cost to the Contracting Agency.

Finishing and curing of the concrete shall be done in the manner specified in Section 340.

342.3.4 Expansion Joints: Expansion joints in the concrete base slab shall be constructed to the full depth and width of the concrete base slab with the top of the filler material recessed one-half inch below the top surface of the concrete base slab as depicted in Detail 225 unless otherwise specified. After the concrete is cured, the top one-half inch shall be filled to the surface of the concrete with a ~~premium-grade, high-performance, moisture-cured, single-component, polyurethane-based, non-sag elastomeric joint sealant, ASTM C920, Type S, Grade NS, Class 25, Sikaflex IA or equal.~~

Expansion joints in the concrete base slab and header shall be aligned. Joints shall be constructed in a straight line and vertical ~~plane~~ plane perpendicular to the longitudinal line of the concrete header, except in cases of curved alignment when they ~~will~~ shall be constructed along the radial lines of the header. Expansion joints shall be located at 50-foot maximum intervals. ~~In the case of base slabs, p~~Pavers shall be placed continuously over the expansion joints.

Comment [RTH4]: Compaction requirement in section 301.3 is 95% for areas subject to vehicle traffic and 85% for areas not subject to vehicle traffic. Subgrade tolerance is 1/4" under concrete structures and 3/4" aggregate base material.

Comment [RTH5]: Section 310.2 provides ± 1/2 inch tolerance

Comment [RTH6]: Section 310.3 requires 95% compaction under concrete and 85% compaction for areas not subject to vehicle traffic.

Comment [RTH7]: Specifications should avoid referencing specific details.

Comment [RTH8]: premium-grade and high-performance are undefined and therefor deleted.

Comment [RTH9]: This is Type S

Comment [RTH10]: I do not know why polyurethane-based was written into the specification.

Comment [RTH11]: This is Grade NS

SECTION 342

342.3.5 Contraction Joints: Contraction joints in the base slab and header shall be aligned. Joints shall be constructed in a straight line and vertical plane perpendicular to the longitudinal line of the concrete header, except in cases of curved alignment when they ~~will~~ shall be constructed along the radial lines of the header. ~~They~~ Contraction joints in the concrete base slab shall be constructed one-half inch in width to a depth of one inch ~~with rounded edges and placed located~~ at 10-foot maximum intervals. Contraction Joints shall be filled to the top surface of the ~~surrounding~~ concrete base slab with elastomeric joint sealant specified in 342.3.3.

342.3.6 Sand Laying Course: The maximum thickness of the sand course shall be one-inch. Screeding boards shall be used to ensure a uniform thickness. The sand shall not be compacted, walked on or wet down.

342.3.7 Concrete Paving Stones/Pavers: The concrete pavers shall be clean and free of foreign materials before installation. Paving work shall be plumb, level and true to line and grade and shall be installed to properly coincide and align with adjacent work and elevations. All edges ~~must~~ shall be fixed or retained to secure the perimeter pavers and the sand laying course. The pavers shall be laid in such a manner that the desired pattern is maintained and joints between the pavers are as tight as possible.

The Contractor shall lay the pavers starting from the longest straight line and from a true 90-degree corner. The pavers shall be installed hand-tight and level on the undisturbed sand course in a manner that eliminates gaps between ~~the stones pavers and between pavers and the edge retention headers.~~ The maximum gap between pavers shall not exceed 3/16-inch. String lines or other approved methods shall be used to hold all pattern lines true. ~~The~~ Gaps between pavers at headers exceeding 3/8-inch the edge of the paver surface shall be filled with pavers cut to fit. Cutting shall be accomplished using a masonry saw. ~~The cut paver shall be placed with the to leave a clean surface edge exposed~~ to the traffic (vehicular or pedestrian) ~~surface using a masonry saw cut.~~

After the pavers are in place, they shall be vibrated into the sand laying course using a vibrator capable of 3,000 to 5,000 pounds compaction force. This will require two passes at 90 degrees to each other. After vibration, approximately 1/4-inch of clean masonry sand containing at least 30 percent of 1/8-inch particles shall be placed over the paver surface, allowed to dry, and vibrated into the joints with additional vibrator passes and brushing so as to completely fill joints. Excess sand shall be swept from the surface.

The finished paver surface shall be tested longitudinally and transverse to the concrete header or curb with a 10-foot straightedge along the surface. Any deviation in excess of 1/8-inch shall be corrected at no additional cost to the Contracting Agency.

Any broken or damaged pavers shall be removed and replaced. Replacement pavers shall be tamped into place and the joints filled with masonry sand as specified herein. The completed installation shall be cleaned of all debris, surplus material and equipment.

342.4 MEASUREMENT AND PAYMENT:

~~Measurement will be the square foot surface area of pavers and headers. Separate measurements shall be made for areas subject to vehicle traffic and areas not subject to vehicle traffic. Concrete paver installations of the various types as shown on the plans will be measured to the nearest square foot. Separate measurements shall be made for areas subject to vehicle traffic and areas not subject to vehicle traffic.~~

Headers of the various types as shown on the plans will be measured by the linear foot to the nearest foot.

342.5 PAYMENT:

Payment for concrete pavers in areas subject to vehicle traffic will be ~~made~~ at the contract unit ~~bid-price-per square foot set forth in the proposal.~~ This ~~p~~Payment shall be full compensation for all labor, materials, tools and equipment required for the subgrade preparation, construction of the concrete base slab, and installation of concrete pavers ~~to complete the work.~~

Comment [RTH12]: Why is this needed for areas not subject to vehicle traffic loading? WW - we need to discuss this question.

SECTION 342

Payment for concrete pavers in areas not subject to vehicle traffic will be at the contract unit price set forth in the proposal. Payment shall be full compensation for all labor, materials, tools and equipment required for the subgrade preparation, installation of aggregate base and concrete pavers.

Payment for each type of header will be at the contract unit price set forth in the proposal. Payment shall be full compensation for all labor, materials, tools and equipment required for the construction complete in place in conformance with the contract documents.

- End of Section -

SECTION 342

CLEAN

INTERLOCKING CONCRETE PAVER INSTALLATIONS

342.1 GENERAL:

The Contractor shall furnish all necessary labor, material, tools and equipment to complete the proper installation of interlocking concrete pavers used in medians, crosswalks, intersections and other locations noted in Contract Documents. This includes furnishing a 10-foot straightedge to accomplish the testing required by this specification.

342.2 MATERIALS:

342.2.1 Aggregate Base Course: Aggregate Base Course shall be per Table 702-1.

342.2.2 Portland Cement Concrete: For installations subject to vehicular traffic, portland cement concrete used for headers or underlying base slabs for pavers shall be Class A per Section 725. At locations not subject to vehicle traffic loads, the portland cement concrete shall be a minimum of Class B per Section 725.

342.2.3 Sand: Sand used for laying course shall conform to ASTM C33 except for the gradation. The gradation shall comply with Table 342-1.

TABLE 342-1								
SAND GRADATION								
Sieve Size	3/8 inch	No. 4	No. 8	No. 16	No.30	No. 50	No. 100	No. 200
Percent Passing	100	95-100	85-100	15-85	25-60	10-30	2-10	0-1

342.2.4 Concrete Pavers: Pavers shall have a minimum thickness of 80 mm (3.15 inches) when installed in vehicular traffic bearing areas and 60 mm (2.36 inches) when installed in non-traffic bearings areas. Pavers shall be of an interlocking design conforming to ASTM C936. Pavers shall be sound and free of defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction. The Contractor shall submit two samples of each type of pavers used on the project for review and approval by the Engineer prior to any work. The pavers and materials used in their manufacture shall conform to the following:

(A) Compressive Strength: Pavers shall have a minimum compressive strength of 8,000 psi in accordance with ASTM C140.

(B) Absorption: The average absorption shall not be greater than 5 percent, with no individual unit absorption greater than 7 percent.

(C) Portland Cement: Cement shall comply with Section 725.2, Type II.

(D) Aggregates: Aggregates shall conform to ASTM C33 (washed, graded sand and rock, no expanded shale or lightweight aggregates).

(E) Other Constituents: Coloring pigments shall be applied integrally to the concrete. Air entraining admixtures, coloring pigments, integral water repellents, and finely ground silica shall be previously established as suitable for use in concrete and either shall conform to ASTM standards where applicable, or shall be shown by test or experience not to be detrimental to the concrete.

(F) Physical Properties: The size, shape, design and color of the pavers shall be as noted in the Contract Documents.

342.2.5 Expansion Joint Filler: Expansion joint filler material shall be 1/2-inch premolded joint filler that complies with Section 729 and ASTM D1751.

342.2.6 Joint Sealant: Joint sealant shall be elastomeric joint sealant conforming to ASTM C920, Type S, Grade NS, Class 25.

SECTION 342

342.3 CONSTRUCTION PROCEDURES:

342.3.1 Subgrade: The subgrade shall be constructed true to grades and lines shown on the plans in compliance with subgrade tolerances and compaction requirements as specified in Section [301](#).

342.3.2 Aggregate Base Course: When aggregate base course is specified, the aggregate base course shall be constructed true to grades and lines shown on the plans in compliance with grade and cross-section tolerances and compaction requirements of Section [310](#).

342.3.3 Concrete Header and Base Slab: Forms shall be thoroughly cleaned each time they are used, and shall be coated with a light oil or other releasing agent of a type which will not discolor the portland cement concrete.

The portland cement concrete shall be thoroughly spaded away from the forms so that there will be no rock pockets next to the forms. Compacted by mechanical vibrators may be used when approved by the Engineer. Tamping or vibrating shall continue until the mortar flushes to the surface, and the coarse aggregate has been tamped below the surface.

All edges shall be shaped with a suitable tool to form a rounded edge of radius as shown on the referenced detail.

The portland cement concrete header face form shall not be removed before the concrete has taken the initial set and has sufficient strength to carry its own weight. The concrete header outer form shall not be removed until the concrete has hardened sufficiently to prevent any damage to the concrete. Any porting of concrete damaged while stripping forms shall be repaired or if the damage is severe, replaced at no additional cost to the Contracting Agency. The face and top of the concrete header shall be tested with a 10-foot straightedge or curve template, longitudinally along the surface. Any deviation in excess of 1/4-inch in 10-feet shall be corrected at no additional cost to the Contracting Agency.

Any section of the work deficient in depth or not conforming to the plans or specifications shall be removed and replaced by the Contractor at no additional cost to the Contracting Agency.

Finishing and curing of the concrete shall be done in the manner specified in Section [340](#).

342.3.4 Expansion Joints: Expansion joints in the concrete base slab shall be constructed to the full depth and width of the concrete base slab with the top of the filler material recessed one-half inch below the top surface of the concrete base slab unless otherwise specified. After the concrete is cured, the top one-half inch shall be filled to the surface of the concrete with joint sealant.

Expansion joints in the concrete base slab and header shall be aligned. Joints shall be constructed in a straight line and vertical plane perpendicular to the longitudinal line of the concrete header, except in cases of curved alignment when they shall be constructed along the radial lines of the header. Expansion joints shall be located at 50-foot maximum intervals. Pavers shall be placed continuously over the expansion joints.

342.3.5 Contraction Joints: Contraction joints in the base slab and header shall be aligned. Joints shall be constructed in a straight line and vertical plane perpendicular to the longitudinal line of the concrete header, except in cases of curved alignment when they shall be constructed along the radial lines of the header. Contraction joints in the concrete base slab shall be constructed one-half inch in width to a depth of one inch and located at 10-foot maximum intervals. Contraction Joints shall be filled to the top surface of the concrete base slab with joint sealant.

342.3.6 Sand Laying Course: The maximum thickness of the sand course shall be one-inch. Screeding boards shall be used to ensure a uniform thickness. The sand shall not be compacted, walked on or wet down.

342.3.7 Concrete Pavers: The concrete pavers shall be clean and free of foreign materials before installation. Paving work shall be true to line and grade and shall be installed to properly coincide and align with adjacent work and elevations. All edges shall be fixed or retained to secure the perimeter pavers and the sand laying course. The pavers shall be laid in such a manner that the desired pattern is maintained and joints between the pavers are as tight as possible.

SECTION 342

The Contractor shall lay the pavers starting from the longest straight line and from a true 90-degree corner. The pavers shall be installed hand-tight and level on the undisturbed sand course in a manner that eliminates gaps between pavers and between pavers and headers. The maximum gap between pavers shall not exceed 3/16-inch. String lines or other approved methods shall be used to hold all pattern lines true. Gaps between pavers at headers exceeding 3/8-inch shall be filled with pavers cut to fit. Cutting shall be accomplished using a masonry saw. The cut paver shall be placed with the clean surface edge exposed to the traffic (vehicular or pedestrian).

After the pavers are in place, they shall be vibrated into the sand laying course using a vibrator capable of 3,000 to 5,000 pounds compaction force. This will require two passes at 90 degrees to each other. After vibration, approximately 1/4-inch of clean masonry sand containing at least 30 percent of 1/8-inch particles shall be placed over the paver surface, allowed to dry, and vibrated into the joints with additional vibrator passes and brushing so as to completely fill joints. Excess sand shall be swept from the surface.

The finished paver surface shall be tested longitudinally and transverse to the concrete header or curb with a 10-foot straightedge along the surface. Any deviation in excess of 1/8-inch shall be corrected at no additional cost to the Contracting Agency.

Any broken or damaged pavers shall be removed and replaced. Replacement pavers shall be tamped into place and the joints filled with masonry sand as specified herein. The completed installation shall be cleaned of all debris, surplus material and equipment.

342.4 MEASUREMENT:

Concrete paver installations of the various types as shown on the plans will be measured to the nearest square foot. Separate measurements shall be made for areas subject to vehicle traffic and areas not subject to vehicle traffic.

Headers of the various types as shown on the plans will be measured by the linear foot to the nearest foot.

342.5 PAYMENT:

Payment for concrete pavers in areas subject to vehicle traffic will be at the contract unit price set forth in the proposal. Payment shall be full compensation for all labor, materials, tools and equipment required for the subgrade preparation, construction of the concrete base slab, and installation of concrete pavers.

Payment for concrete pavers in areas not subject to vehicle traffic will be at the contract unit price set forth in the proposal. Payment shall be full compensation for all labor, materials, tools and equipment required for the subgrade preparation, installation of aggregate base and concrete pavers.

Payment for each type of header will be at the contract unit price set forth in the proposal. Payment shall be full compensation for all labor, materials, tools and equipment required for the construction complete in place in conformance with the contract documents.

- End of Section -

Date: May 29, 2015

To: MAG Specifications and Details Committee

From: Brian Gallimore, Chairman Materials Working Group

Subject: Revisions to Sections 321

Case # 15-10

PURPOSE: Incorporate revisions to Section 321, "*Rehabilitation Work*" into the MAG Specifications.

REVISIONS:

321.10.5.3 - Added this subsection to allow for some relief on asphalt density when provisions for reworking substandard bases (removals) or existing asphalts (overlays) to meet Section 310 or Section 321 for overlays are missing from bid documents or scope of work.

Currently, industry is being held to same standards on spot removals and edge mill/overlays as new construction over optimal base materials.

TABLE 321-6	
ASPHALT PAVEMENT THICKNESS PAYMENT REDUCTION	
For Thickness Deficiency of More Than 0.25 inches and less than 0.50 inches	
Total Specified Asphalt Pavement Thickness exclusive of ARAC (if any)	Reduction in Payment Applied to asphalt concrete Except ARAC layers (if any)
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%

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](#).

TABLE 321-7				
ROLLING SEQUENCE FOR LIFT THICKNESS 1½” OR LESS				
Rolling Sequence	Type of Compactor		No. of Coverages	
	Option No. 1	Option No. 2	Option No. 1	Option No. 2
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 degree F. Initial and intermediate compaction shall be accomplished before the temperature of the asphaltic concrete falls below 200 degree 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.

Compaction effort is not solely dependent on the type and/or quantity of equipment on the job, but also includes the speed at which such equipment is utilized. It shall be the contractor’s responsibility to prove to the agency that every effort has been made to achieve the greatest possible density on projects that do not have provisions for reworking the base materials to compaction standards set forth in Section 301 for pavements over native subgrade, Section 310 for pavements over aggregate base course (ABC), or Section 321 (overlays).

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.

TABLE 321-8		
PAVEMENT DENSITY PENALTIES		
Limits of In-place Air Voids for design lift thicknesses 1.5 inches and greater	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
Below 3.0%	Removal* or EA	Removal* or EA
3.0% to below 4.0%	\$10.00	EA and Type II Surry Seal
4.0% to 8.0%	Full Payment	No Corrective Action
Greater than 8.0% to less than 9.0%	\$6.00	EA
9.0% to 10.0%	\$10.00	EA and Type II Surry Seal
Greater than 10.0%	Removal* or EA	Removal* or EA

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

321.10.5.3 Rehabilitation Work

In-place voids on rehabilitation work should take into consideration the underlying base materials and not be subject to penalties in Table 321-8, other than in place voids shall not exceed 10%. Rehabilitation work shall be considered any mill and overlays or remove and replace projects that do not have provisions for reworking the base materials to compaction standards set forth in Section 301 for pavements over native subgrade, Section 310 for pavements over aggregate base course (ABC), or Section 321 (overlays).

OR

321.10.5.3 Placement of Pavement on Surfaces with Questionable Support Characteristics: This section shall only apply when any mill and overlay or remove and replace projects **do not** have provisions for reworking the base materials to compaction standards set forth in Section 301 for pavements over native subgrade, Section 310 for pavements over aggregate base course (ABC), or Section 321 (overlays). When pavement is to be placed on a surface suspected by the Contractor of having conditions that may adversely impact compaction, the Contractor at their own expense and prior to paving may demonstrate to the agency that the existing surface has characteristics that may prevent obtaining the standard required density. Unreliable compaction conditions may result from: base materials that provide inadequate support; extremely fractured pavement that moves when subjected to various loading conditions; or milled areas where the pavement thickness was less than anticipated and breaking of the remaining underlying pavement occurs sporadically. When the agency agrees in writing that the surface conditions within a specified area may significantly impact compaction and directs that paving proceed without corrective measures, then the Contractor shall not be subject to air void penalties within the specified area unless the in place air voids exceed 10%.

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 a lot or subplot is accepted for referee testing and the referee test results still show a deficiency, the contractor shall have ten working days to submit an engineering analysis beginning 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.

TABLE 321-9		
ENGINEERING ANALYSIS PENALTIES for REMOVAL* LOTS/SUBLOTS LEFT IN-PLACE		
Acceptance Criteria	Acceptance Limits	Penalty When Contracting Agency is the Owner (\$/Ton)
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%	\$7.50
Limits of In-place Air Voids	Less than 3% or Greater than 10.0%	\$15.00

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

321.11 REFEREE:

If the Contractor has reason to question the validity of any of the acceptance test results, the Contractor may request that the Engineer consider referee test for final acceptance. Any request for referee testing must describe the contractor’s reasons for questioning the validity of the original acceptance test results and must clearly describe which set of acceptance tests are in question. The engineer may either accept or reject the request for referee testing. When referee testing is accepted the

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ASPHALT-RUBBER ASPHALT CONCRETE

717.1 DESCRIPTION:

The work under this section shall consist of furnishing, proportioning and mixing all the ingredients necessary to produce an asphalt-rubber Asphalt Concrete (ARAC) material. ARAC mixes may be used for low or high traffic conditions, as determined by the agency. Low traffic conditions are conditions where the asphalt mix will be subject to low volume and low weight vehicle usage. Examples of this condition are residential streets, most parking lots and residential minor collector streets. High traffic conditions are conditions where the asphalt mix will be subject to high volume and/or heavy weight vehicle usage as found on major collector, arterial and commercial streets. Street classifications (i.e. minor collector and major collector) shall be determined by the specifying agency.

717.2 MATERIALS:

717.2.1 Asphalt-Rubber Binder (ARB): The blended ARB shall meet the criteria list below. The ARB may be blended in a dedicated blending and storage unit connected to the hot plant or at the asphalt binder supplier's facility.

717.2.1.1 Asphalt Cement: Asphalt cement shall conform to the requirements of Section [711](#).

717.2.1.2 Crumb Rubber: Crumb Rubber shall meet the gradation requirements as shown in Table [717-1](#) below when tested in accordance with Arizona Test Method 714.

TABLE 717-1	
GRADATION REQUIREMENTS OF CRUMB RUBBER	
Sieve Size	Percent Passing Type B
2.36 mm (#8)	
2.00 mm (#10)	100
1.18 mm (#16)	65 - 100
600 µm (#30)	20 - 100
300 µm (#50)	0 - 45
75 µm (#200)	0 - 5

The crumb rubber shall have a specific gravity of 1.15 ± 0.05 and shall be free of wire or other contaminating materials, and shall contain not more than 0.5 percent fabric. Calcium carbonate, up to four percent by weight of the crumb rubber, may be added to prevent the particles from sticking together.

Certificates of Compliance conforming to Arizona State Department of Transportation Standard Specifications for Road and Bridge Construction Section 106.05 shall be submitted. In addition, the Certificates shall confirm that the rubber is a crumb rubber, derived from processing at ambient temperature, whole scrap tires or shredded tire materials; and the tires from which the crumb rubber is produced is taken from automobiles, trucks, or other equipment owned and operated in the United States. The Certificates shall also verify that the processing does not produce, as a waste product, casings or other round tire material that can hold water when stored or disposed of above the ground. The crumb rubber to be used in ARB shall be the type produced through a process of mechanical grinding at ambient temperature. Use of crumb rubber granules produced from a cryogenic process is prohibited.

717.2.1.3 ARB Proportions and Properties: Ground crumb rubber in ARB shall be a minimum of 18 percent by weight of total binder,

ARB shall be Type 1 unless otherwise specified and conform to the requirements of Table [717-2](#) below:

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TABLE 717-2			
PHYSICAL PROPERTIES OF ARB			
Property	Requirement		
	Type 1	Type 2	Type 3
Grade of base asphalt cement	PG 64-16	PG 58-22	PG 52-28
Rotational Viscosity*; 350° F, Pascal seconds	1.5-4.0	1.5-4.0	1.5-4.0
Penetration; 39° F (4° C), 200g, 60 sec. (ASTM D5); dmm, min	10	15	25
Softening Point; (ASTM D36); °F, min.	135	130	125
Resilience; 77°F (ASTM D3407); %,min	25	20	15
* The Viscometer used must be a hand held rotational viscometer, such as a Rion (formerly Haake) Model VT – 04, or an equivalent, using Rotor No. 1. The rotor, while in the off position, shall be completely immersed in the binder at a temperature from 350° to 355° F for a minimum heat equilibrium period of 60 seconds, and an average viscosity determined from three separate constant readings (± 0.5 pascal-seconds) taken within a 30 second time frame with the viscotester level during testing and turned off between readings. Continuous rotation of the rotor may cause thinning of the material immediately in contact with the rotor, resulting in erroneous results.			

717.2.1.4 ARB Design: At least two weeks prior to paving, the Contractor shall submit an ARB design prepared by an ADOT approved laboratory. Such design shall meet the requirements specified herein. The design shall show the values obtained from the required tests, along with the following information: percent, grade and source of the asphalt cement used; and percent, gradation and source(s) of the crumb rubber used, as well as the ARB blending location: on-site or at the asphalt binder supplier's facility.

717.2.2 Aggregate: Coarse and fine aggregates shall conform to the applicable requirements of Tables [717-3](#) and [717-4](#) below. Coarse mineral aggregate shall consist of crushed gravel, crushed rock, or other approved inert material with similar characteristics, or a combination thereof, conforming to the requirements of these specifications.

Coarse aggregate is material retained above the Number 8 sieve and fine aggregate is material passing the Number 8 sieve. Aggregates shall be free of deleterious materials, clay balls, and adhering films or other material that prevent thorough coating with the asphalt cement. Mineral aggregate shall conform to the following requirements when tested in accordance with the applicable test methods.

TABLE 717-3		
MIX DESIGN GRADATION REQUIREMENTS WITH MINERAL ADMIXTURE		
Overlay Thickness	1" & 1- 1/2" – TYPE A	2" – TYPE B
Sieve Size	Percent Passing	Percent Passing
1" (25 mm)	100	100
3/4" (19 mm)	100	95-100
1/2" (12.5 mm)	95-100	78-92
3/8" (9.5 mm)	78-92	61-75
No. 4 (4.75 mm)	28-45	30-40
No. 8 (2.36 mm)	15-25	15-25
No. 30 (600 µm)	5-15	5-15
No. 200 (75 µm)	3.0-7.0	2.0-6.0

The combined aggregate properties shall conform to the requirements of Table [717-4](#) below.

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TABLE 717-4		
COARSE/FINE AGGREGATE REQUIREMENTS		
Characteristics	Test Method	Requirements
Fractured Faces, % (Plus No. 8)	ARIZ-212	85, 1 fracture 80, 2 or more
Uncompacted Voids, %	ARIZ-247	45.0 (High Traffic Volume) 42.0 (Low Traffic Volume)
Sand Equivalent (Minus No. 4)	AASHTO T-176	65 minimum
Plasticity Index	AASHTO T-89 & T-90	Non Plastic
L.A. Abrasion, % Loss	AASHTO T-96	9 max. @ 100 Rev. 40 max. @ 500 Rev.
Combined Bulk Specific Gravity	AI MS-2	2.35-2.85
Combined Water Absorption, %	AI MS-2	0-2.5

717.2.3 Mineral Admixture: Mineral admixture used in ARAC shall be dry hydrated lime conforming to the requirements of ASTM C1097 or Portland cement conforming to ASTM C150 for Type II, or ASTM C595 for Type IP. The minimum mineral admixture content will be 1.0 percent, by weight of total aggregate.

717.3 MIX DESIGN REQUIREMENT:

717.3.1 General: The mix design for ARAC shall be prepared by a laboratory that is accredited through the AASHTO Accreditation Program (AAP) in Hot Mix Asphalt Aggregates and Hot Mix Asphalt. The laboratory shall be under the direct supervision of a Civil Engineer, registered by the State of Arizona, and who is listed by ADOT as a “Qualified Asphalt Concrete Mix Design Engineer” within ADOT’s latest list of approved laboratories. The latest list of approved laboratories is available on ADOT’s web page: http://www.azdot.gov/highways/materials/quality_assurance.asp.

The date of the design shall not be older than two years from the date of submittal, unless supportive documentation is provided and approved by the Engineer.

The mix design method used shall be in accordance with the Marshall Mix procedure, 75 blows, as described in Arizona Test Method 832 “Marshall Mix Design Method for Asphaltic Concrete (Asphalt Rubber) [AR-AC]” **with the exceptions that:**

- (1) Mineral admixture shall be considered part of the total weight of aggregate and all combined specific gravity and combined absorption calculations for aggregates and mineral admixture will be done in accordance with Asphalt Institute’s Manual MS-2.
- (2) Course aggregate shall be separated from the fine aggregate on the #8 sieve.

Mix designs are subject to approval by the Engineer.

717.3.2 Mix Design Criteria: The mix shall comply with the criteria in Table [717-5](#) below.

TABLE 717-5		
MARSHALL MIX DESIGN CRITERIA		
Criteria	Low Volume Traffic	High Volume Traffic
ARB Content		
1” and 1-1/2” Overlay Thickness	8.4% minimum	8.0% minimum
2” Overlay Thickness	N/A	7.0% minimum
Mixture Air Voids, %	3.5-4.5	4.5-5.5
Voids in Mineral Aggregate, %	19.0 min	19.0 min
Tensile Strength Ratio, AASHTO T-283	65% minimum	65% minimum
Marshall Stability, pounds minimum	800	800
Marshall Flow, 0.01 inch minimum	16	16

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

- (1) The name and address of the testing organization and the person responsible for the mix design report.
- (2) The mix plant identification and/or location, as well as the supplier or producer name.

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(3) The traffic condition (low or high traffic) and lift thickness.

(4) A description of all products that are incorporated in the ARAC along with the sources of all products, including the base asphalt cement, crumb rubber, mineral aggregate, and admixtures. (5) The results of all testing, determinations, etc., such as: specific gravity and gradation, water absorption, sand equivalent, loss on abrasion, fractured coarse aggregate particles, Tensile Strength Ratio (AASHTO T-283), Marshall bulk density, stability and flow, asphalt absorption, percent air voids, voids in mineral aggregate, and mineral admixture content. Historical abrasion values may be supplied on existing sources. The submittal should include a plot of the gradation on the Federal Highway Administration's 0.45 Power Gradation Chart and plots of the compaction curves.

(6) The laboratory mixing and compaction temperature ranges for the ARB used within the mix design.

(7) A specific recommendation for design ARB content and any limiting conditions that may be associated with the use of the design, such as minimum percentages of crushed or washed fine aggregate.

(8) The supplier's product code, the laboratory Engineer's seal (signed and dated), and the date the design was completed.

(9) The ARB design.

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

-End of Section-

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ASPHALT-RUBBER ASPHALT CONCRETE

717.1 DESCRIPTION:

The work under this section shall consist of furnishing, proportioning and mixing all the ingredients necessary to produce an asphalt-rubber Asphalt Concrete (ARAC) material. ARAC mixes may be used for low or high traffic conditions, as determined by the agency. Low traffic conditions are conditions where the asphalt mix will be subject to low volume and low weight vehicle usage. Examples of this condition are residential streets, most parking lots and residential minor collector streets. High traffic conditions are conditions where the asphalt mix will be subject to high volume and/or heavy weight vehicle usage as found on major collector, arterial and commercial streets. Street classifications (i.e. minor collector and major collector) shall be determined by the specifying agency.

717.2 MATERIALS:

717.2.1 Asphalt-Rubber Binder (ARB): The blended ARB shall meet the criteria list below. The ARB may be blended in a dedicated blending and storage unit connected to the hot plant or at the asphalt binder supplier's facility.

717.2.1.1 Asphalt Cement: Asphalt cement shall conform to the requirements of Section [711](#).

717.2.1.2 Crumb Rubber: Crumb Rubber shall meet the gradation requirements as shown in Table [717-1](#) below when tested in accordance with Arizona Test Method 714.

TABLE 717-1	
GRADATION REQUIREMENTS OF CRUMB RUBBER	
Sieve Size	Percent Passing Type B
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600 µm (#30)	20 - 100
300 µm (#50)	0 - 45
75 µm (#200)	0 - 5

The crumb rubber shall have a specific gravity of 1.15 ± 0.05 and shall be free of wire or other contaminating materials, and shall contain not more than 0.5 percent fabric. Calcium carbonate, up to four percent by weight of the crumb rubber, may be added to prevent the particles from sticking together.

Certificates of Compliance conforming to Arizona State Department of Transportation Standard Specifications for Road and Bridge Construction Section 106.05 shall be submitted. In addition, the Certificates shall confirm that the rubber is a crumb rubber, derived from processing at ambient temperature, whole scrap tires or shredded tire materials; and the tires from which the crumb rubber is produced is taken from automobiles, trucks, or other equipment owned and operated in the United States. The Certificates shall also verify that the processing does not produce, as a waste product, casings or other round tire material that can hold water when stored or disposed of above the ground. The crumb rubber to be used in ARB shall be the type produced through a process of mechanical grinding at ambient temperature. Use of crumb rubber granules produced from a cryogenic process is prohibited.

717.2.1.3 ARB Proportions and Properties: Ground crumb rubber in ARB shall be a minimum of 18 percent by weight of total binder,

ARB shall be Type 1 unless otherwise specified and conform to the requirements of Table [717-2](#) below:

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TABLE 717-2			
PHYSICAL PROPERTIES OF ARB			
Property	Requirement		
	Type 1	Type 2	Type 3
Grade of base asphalt cement	PG 64-16	PG 58-22	PG 52-28
Rotational Viscosity*; 350° F, Pascal seconds	1.5-4.0	1.5-4.0	1.5-4.0
Penetration; 39° F (4° C), 200g, 60 sec. (ASTM D5); dmm, min	10	15	25
Softening Point; (ASTM D36); °F, min.	135	130	125
Resilience; 77°F (ASTM D3407); %,min	25	20	15
* The Viscometer used must be a hand held rotational viscometer, such as a Rion (formerly Haake) Model VT – 04, or an equivalent, using Rotor No. 1. The rotor, while in the off position, shall be completely immersed in the binder at a temperature from 350° to 355° F for a minimum heat equilibrium period of 60 seconds, and an average viscosity determined from three separate constant readings (± 0.5 pascal-seconds) taken within a 30 second time frame with the viscotester level during testing and turned off between readings. Continuous rotation of the rotor may cause thinning of the material immediately in contact with the rotor, resulting in erroneous results.			

717.2.1.4 ARB Design: At least two weeks prior to paving, the Contractor shall submit an ARB design prepared by an ADOT approved laboratory. Such design shall meet the requirements specified herein. The design shall show the values obtained from the required tests, along with the following information: percent, grade and source of the asphalt cement used; and percent, gradation and source(s) of the crumb rubber used, as well as the ARB blending location: on-site or at the asphalt binder supplier's facility.

717.2.2 Aggregate: Coarse and fine aggregates shall conform to the applicable requirements of Tables [717-3](#) and [717-4](#) below. Coarse mineral aggregate shall consist of crushed gravel, crushed rock, or other approved inert material with similar characteristics, or a combination thereof, conforming to the requirements of these specifications.

Coarse aggregate is material retained above the Number 8 sieve and fine aggregate is material passing the Number 8 sieve. Aggregates shall be free of deleterious materials, clay balls, and adhering films or other material that prevent thorough coating with the asphalt cement. Mineral aggregate shall conform to the following requirements when tested in accordance with the applicable test methods.

TABLE 717-3		
MIX DESIGN GRADATION REQUIREMENTS WITH MINERAL ADMIXTURE		
Overlay Thickness	1" & 1- 1/2" – TYPE A	2" – TYPE B
Sieve Size	Percent Passing	Percent Passing
1" (25 mm)	100	100
3/4" (19 mm)	100	95-100
1/2" (12.5 mm)	95-100	78-92
3/8" (9.5 mm)	78-92	61-75
No. 4 (4.75 mm)	28-45	30-40
No. 8 (2.36 mm)	15-25	15-25
No. 30 (600 µm)	5-15	5-15
No. 200 (75 µm)	3.0-7.0	2.0-6.0

The combined aggregate properties shall conform to the requirements of Table [717-4](#) below.

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TABLE 717-4		
COARSE/FINE AGGREGATE REQUIREMENTS		
Characteristics	Test Method	Requirements
Fractured Faces, % (Plus No. 8)	ARIZ-212	85, 1 fracture 80, 2 or more
Uncompacted Voids, %	ARIZ-247	45.0 (High Traffic Volume) 42.0 (Low Traffic Volume)
Sand Equivalent (Minus No. 4)	AASHTO T-176	65 minimum
Plasticity Index	AASHTO T-89 & T-90	Non Plastic
L.A. Abrasion, % Loss	AASHTO T-96	9 max. @ 100 Rev. 40 max. @ 500 Rev.
Combined Bulk Specific Gravity	AI MS-2	2.35-2.85
Combined Water Absorption, %	AI MS-2	0-2.5

717.2.3 Mineral Admixture: Mineral admixture used in ARAC shall be dry hydrated lime conforming to the requirements of ASTM C1097 or Portland cement conforming to ASTM C150 for Type II, or ASTM C595 for Type IP. The minimum mineral admixture content will be 1.0 percent, by weight of total aggregate.

717.3 MIX DESIGN REQUIREMENT:

717.3.1 General: The mix design for ARAC shall be prepared by a laboratory that is accredited through the AASHTO Accreditation Program (AAP) in Hot Mix Asphalt Aggregates and Hot Mix Asphalt. The laboratory shall be under the direct supervision of a Civil Engineer, registered by the State of Arizona, and who is listed by ADOT as a “Qualified Asphalt Concrete Mix Design Engineer” within ADOT’s latest list of approved laboratories. The latest list of approved laboratories is available on ADOT’s web page: http://www.azdot.gov/highways/materials/quality_assurance.asp.

The date of the design shall not be older than two years from the date of submittal, unless supportive documentation is provided and approved by the Engineer.

The mix design method used shall be in accordance with the Marshall Mix procedure, 75 blows, as described in Arizona Test Method 832 “Marshall Mix Design Method for Asphaltic Concrete (Asphalt Rubber) [AR-AC]” with the exceptions that:

- (1) Mineral admixture shall be considered part of the total weight of aggregate and all combined specific gravity and combined absorption calculations for aggregates and mineral admixture will be done in accordance with Asphalt Institute’s Manual MS-2.
- (2) Course aggregate shall be separated from the fine aggregate on the #8 sieve.

Mix designs are subject to approval by the Engineer.

717.3.2 Mix Design Criteria: The mix shall comply with the criteria in Table [717-5](#) below.

TABLE 717-5		
MARSHALL MIX DESIGN CRITERIA		
Criteria	Low Volume Traffic	High Volume Traffic
ARB Content		
1” and 1-1/2” Overlay Thickness	8.4% minimum	8.0% minimum
2” Overlay Thickness	N/A	7.0% minimum
Mixture Air Voids, %	3.5-4.5	4.5-5.5
Voids in Mineral Aggregate, %	19.0 min	19.0 min
Tensile Strength Ratio, AASHTO T-283	65% minimum	65% minimum
Marshall Stability, pounds minimum	800	800
Marshall Flow, 0.01 inch minimum	16	16

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

- (1) The name and address of the testing organization and the person responsible for the mix design report.
- (2) The mix plant identification and/or location, as well as the supplier or producer name.

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(3) The traffic condition (low or high traffic) and lift thickness.

(4) A description of all products that are incorporated in the ARAC along with the sources of all products, including the base asphalt cement, crumb rubber, mineral aggregate, and admixtures. (5) The results of all testing, determinations, etc., such as: specific gravity and gradation, water absorption, sand equivalent, loss on abrasion, fractured coarse aggregate particles, Tensile Strength Ratio (AASHTO T-283), Marshall bulk density, stability and flow, asphalt absorption, percent air voids, voids in mineral aggregate, and mineral admixture content. Historical abrasion values may be supplied on existing sources. The submittal should include a plot of the gradation on the Federal Highway Administration's 0.45 Power Gradation Chart and plots of the compaction curves.

(6) The laboratory mixing and compaction temperature ranges for the ARB used within the mix design.

(7) A specific recommendation for design ARB content and any limiting conditions that may be associated with the use of the design, such as minimum percentages of crushed or washed fine aggregate.

(8) The supplier's product code, the laboratory Engineer's seal (signed and dated), and the date the design was completed.

(9) The ARB design.

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

-End of Section-

**SECTION 608
HORIZONTAL DIRECTIONAL DRILLING**

608.1 DESCRIPTION:

This specification covers requirements for installation of underground infrastructure using the trenchless technology method known as Horizontal Directional Drilling (HDD). All installations shall be in accordance with the approved HDD Consortium’s “Horizontal Directional Drilling Good Practices Guideline, third edition” and updates thereof.

The HDD method involves first drilling a pilot bore in the location(s) as indicated on the plans, next enlarging the drilled pilot bore to facilitate the installation of the required pipe line or bundle, herein referred to as the “product pipe”. The pilot bore is enlarged approximately 1.5 times the size of the product pipe and is pulled into the enlarged borehole.

Installations are classified as small, medium or large which serves as a general indication of the level of equipment required for the installation. The size of bore is measured in inch-feet and is calculated by multiplying the nominal product pipe diameter in inches multiplied by the minimum allowable length of crossing in feet as indicated on the plans or as can reasonably be inferred from the locations of such bends, fittings, service connections, valves and any other equipment requiring excavation and/or connection to the pipe line at a specified location. The bore shot size refers to each individual bore shot, not the total footage of the permitted design.

Bore size calculation: 200 foot installation of a 4 inch diameter pipe has a bore size of 800 in-ft.
(200ft × 4in = 800 in-ft)

Table 608-1	
Classification of Bore Sizes	
Classification	Bore Size
Small	Up to 6,000 in-ft
Medium	6,001 in-ft to 15,000 in-ft
Large	Above 15,000 in-ft

608.2 HDD TERMS AND DEFINITIONS:

- a. Pilot Hole: The initial controlled drilled horizontal shaft used to guide the enlargement to design size and eventual installation of the pipe.
- b. Reaming: The back reaming hole opener is attached to the drill pipe and rotated and pulled back through the pilot hole to enlarge the bore in one or more passes to the size for pipe installation.
- c. Pullback: The pipe installation pulled back by a swivel/pulling head connected behind the reamer, which pulls the prepared pipe into place.
- d. Drilling Fluids: Fluids consisting of water, bentonite, and any approved additives such as environmentally safe polymers, lubricants, and viscosifiers.
- e. Bore-tracking Equipment: Methods and systems generally defined as a walkover or non-walkover. To be specified by the Contractor and used to measure the actual accuracy of the bore to the specific line and grade. The bore path is monitored during the pilot bore by taking periodic readings of the inclination and azimuth of the probe located within the drive bit.
- f. Bore-tracking Pit: An excavated area for entry, exit, slurry sump pits or any other excavation used to manage, control and track the progress of the bore.
- g. Critical Structure: Any pipeline, utility, building, structure, bridge, pier, or similar construction partially or entirely located within a zone of active excavation.

608.3 MATERIALS:

All product pipe material shall be of the size type and classes shown on the plans.

Sectional pipe is pipe that requires assembly of the joints, such as a bell and spigot type pipe, shall be of a type that is specifically designed for installation by HDD.

Non-sectional pipe is pipe that requires joining together by a fusion or welding process. It is assembled prior to pulling the product pipe into the bore hole.

Non-sectional pipe that requires fusion of the joints, such as HDPE or Fusible-PVC, shall be fused by a skilled operator. The facility owner is responsible for maintaining a training program to ensure qualifications are maintained for joining procedures. Pipe manufacturer or accredited training agency certifications are also acceptable. Untrained personnel shall not be permitted to perform fusion of any pipe on the project. The contractor shall utilize a data-logger or manually record the following information for each fused joint in the product pipe line, unless the product pipe is pulled through a sleeve.

- Date and Time of joint
- Temperature
- Fusion pressure applied to joint
- Joining/Fusion time
- Cooling time

Non-sectional pipe used for dry utilities and/or as a sleeve will not require items listed above.

#14 or larger AWG solid tracer wire may be used if the product pipe is pulled through a sleeve and the tracer wire is pulled with the product pipe. Comply with ARS 40-360.22, para M.

608.4 RECORD DOCUMENTS AND SUBMITTAL REQUIREMENTS:

The Record Documents requiring submission to the Project Engineer for the facility owner are based on the bore size classification and are as shown in Table 608-2. The Contractor shall provide the indicated documents based on the bore size. The required items contained in items 1 through 9 shall be submitted to the Project Engineer for the facility owner prior to the authorization to commence field construction. Copies of all documents shall also be maintained at the construction site and be available for inspection.

Table 608-2			
Submittal Requirements			
Required Record Document	Bore Size Classification		
	Small	Medium	Large
1. Agency Approved Plans	•	•	•
2. Personnel Qualifications	•	•	•
3. Surface Survey		•	•
4. Bore Plan/Profile		•	•
5. Drilling Fluid Management Plan		•	•
6. Equipment & Site Setup			•
7. Drilling Fluid Pressure Calculations			•
8. Pipe Stress and Pullback Calculations			•
9. Bore Data	•	•	•
10. As-Built		•	•

608.4.1 Agency Approved Plans: The facility owner shall submit plans for approval to the Agency in whose ROW the facility owner is proposing to install the new utility. Any changes from the approved plans will require a re-submittal of plans and re-approval. Identify all property lines, ROW, and easements. No work is to take place outside of the construction limits as show on the Agency Approved Plans.

608.4.2 Personnel Qualifications: The Contractor shall provide a competent and experienced individual who shall be present at all times while HDD operations are being performed. The individual shall be a responsible representative who is thoroughly familiar with the equipment and type of work and shall be in direct charge and control of the operation at all times. The individual shall possess experience with projects of a similar kind and nature, and have undergone appropriate training evidenced by a certificate of attendance from a training program,. Documentation of experience and training shall be .provided upon request.

608.4.3 Surface Survey: A surface survey is only required when specified by contract documents. Prior to starting the drilling operation the contractor shall submit to the Engineer a surface survey of elevations along the planned bore alignment, the maximum interval between elevations shall be ten feet (10'). Upon completion of the installation of the product pipe, the Contractor shall have a second survey performed and shall have the elevations compared with the pre-bore survey elevations. The second survey and the comparative results shall be submitted to the Engineer. Any change in elevation greater than ½" shall be considered excessive and shall be repaired at the Contractor's expense. Any elevation deviation of a flow line that is greater than ¼" shall be considered excessive and shall be repaired at the Contractor's expense.

608.4.4 Bore Plan/Profile: A scaled drawing of the pilot bore plan and profile shall be submitted by the Contractor. Show finished grade, the proposed pilot bore size and path, all existing utilities with minimum vertical and horizontal clearances.

608.4.5 Drilling Fluid Management Plan: Indicate the type and amount of the drilling fluid planned to be used on the project. Include MSDS sheets for the identified drilling fluid components and additives. The drilling fluid plan is developed based upon the anticipated soil conditions and a sufficient supply of fluid is to be available to enable successful completion of the bore. Indicate the intended method of disposal of spent drilling fluids and include approvals from off-site disposal sources. The Drilling Fluid Management Plan shall identify contingency measures to be employed in case of inadvertent returns. The contingency plan may include containment with sediment control devices, removal with vacuum equipment or other such contingency measures. In all cases, the plan shall indicate that should primary control measures fail and inadvertent returns cannot be controlled, work will be suspended until such a time as the plan can be revised and effective control measures can be implemented.

608.4.6 Equipment & Site Setup: Specifications on directional drilling equipment shall be utilized to ensure that the equipment will be adequate to complete the project. Equipment list is to include but not be limited to: drilling rig, mud system, mud motors (if applicable), down-hole tools, guidance system, and rig safety systems. Include calibration records for guidance equipment. Identify the site setup dimensions and where the equipment shall be located. Equipment shown on the site layout is to include but not be limited to: drilling rig, mud system, drill rod stock pile and mud return pit. Identify the pipe staging and assembly areas.

608.4.7 Drilling Fluid Pressure Calculations: Provide documentation sealed by the permitting agency's Arizona registered professional engineer for the calculations of minimum required and maximum allowable drilling fluid pressures anticipated throughout the bore to maintain drilling fluid circulation and minimize the occurrence of inadvertent returns. Indicate how such pressures shall be monitored and recorded throughout the progression of the bore. Provide manufacturers specifications for any down hole fluid pressure monitoring systems and properly calibrate such systems prior to commencing the installation.

608.4.8 Pipe Stress and Pullback Calculations: Submit documentation indicating the product pipe manufacturer's specified maximum allowable bending radius and maximum allowable pulling force for the pipe being installed. Provide calculations sealed by the permitting agency's Arizona registered professional engineer that show the anticipated bending radii for each segment of the pipe and the total anticipated pulling force required to complete the installation do not exceed the maximum allowable pulling forces for the pipe. The Drill Rig to be employed shall be capable of exerting a pullback force of at least 2 times that of the total anticipated pulling force required to complete the installation of the pipe specified. Furnish documentation indicating how the pulling forces introduced to the pipe will be monitored and indicate the methods that will be employed to record such data and ensure that the force exerted on the pipe does not exceed the pipes maximum allowable pulling force.

608.4.9 Bore Data: Identify the installed location bore by writing down each rod and indicating the depth and pitch, submit a copy of this information when requested.

- Rod/joint number
- Depth and pitch of locate reading

608.4.10 AS Built: Identify the installed location of the bore on a scaled drawing referencing any benchmark information provided on the original construction drawings. Also indicate the location of all existing utilities as provided on the original construction drawings and verified in the field as well as any undisclosed utilities as discovered in the field throughout the prosecution of this work. Also submit copies of any drilling fluid logs, pipe fusion logs and any other such information as it pertains to the work undertaken pursuant to this specification.

608.5 CONSTRUCTION:

608.5.1 Horizontal Directional Drilling Equipment The HDD equipment is to have an electronic "walkover" tracking system or a Magnetic Guidance System (MGS) to accurately guide boring operations; a system to monitor maximum pullback pressure during pull-back operations; a system to detect electrical current from the drill string shall be in place with an audible alarm that automatically sounds when an electrical current is detected; a vacuum unit of sufficient capacity to handle the drilling fluid volume, and trained and competent personnel to operate the systems. All equipment shall be in good, safe condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of the project.

608.5.2 Guidance System: An electronic "walkover" tracking system or a Magnetic Guidance System (MGS) probe or proven (non-experimental) gyroscopic probe and interface for continuous and accurate determination of the location of the drill head shall be used during the drilling operation. The locating system shall be capable of determining the in ground position of the drill head and shall be accurate to $\pm 2\%$ of the distance from the transmitter to the receiver. It shall enable the driller to guide the drill head by providing information on the pitch; roll and clock face orientation of the drill head. The locating system shall be capable of determining the depth of the drill head from the transmitter to the surface at any location along the path of the bore. The locating system shall be calibrated per the manufacturer's specifications prior to commencing the bore.

608.5.3 Drilling Fluid (Mud) System: A self-contained, closed, drilling fluid mixing system of sufficient size to mix and deliver drilling fluid composed of bentonite clay, uncontaminated water, and appropriate additives. The mixing system shall be able to molecularly shear individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. The drilling fluid reservoir tank shall be of sufficient capacity to supply an amount of drilling fluid that is equal to the maximum rated output of the drilling fluid pump over at least fifteen minute duration. Ensure the drilling fluid is mixed per drilling fluid manufacturer's recommendations and continually agitate the drilling fluid during drilling operations.

Drilling fluid shall be uncontaminated water mixed with bentonite clay, polymer or appropriate drilling fluid additive. The Contractor shall be responsible to monitor drilling fluid properties and return fluid properties and shall modify the drilling fluid mix as appropriate for the soil conditions encountered. Contractor shall continually monitor and record any necessary drilling fluid properties such as viscosity as determined by a marsh funnel. The

drill fluid pumping system shall be capable of delivering drilling fluid at a sufficient output rate and at minimum pressures as necessary to enable successful completion of the bore. Furnish pumping equipment and/or vacuum truck(s) of sufficient size to convey drilling fluid from containment areas, to storage and recycling facilities or disposal.

608.5.4 Directional Drilling Operation: Prior to drilling the pilot hole, “Walk” the bore path with the locating system as per the manufacturer’s specifications attempting to identify any areas of potential interference and record the results of such inspections. Verify that all known utilities have been located and there is no conflict with the proposed work. Ensure all utilities that run parallel within 2’ of the proposed work are exposed at intervals sufficient to determine there will be no conflict with the proposed work.

Profile the ground along the bore path every 10’ and tie to an existing local temporary benchmark that will not be impacted by proposed construction. After the pull back is complete confirm the ground has not heaved, any heaving greater than 1” or settlement less than 1” will require the contractor to submit a plan to repair all damaged areas.

Determine the depth of the drill head every 10 ft or every rod length, whichever distance is greater. Record location information for the entirety of the bore, either manually in a driller’s log or automatically via the locating system. Make all recorded readings and plan and profile information available at all times. Do not allow the deflection radius of the drill pipe exceed the deflection limits of the product pipe at any time throughout the crossing. Use white paint and mark the depth of the pilot bore on the ground at an interval not exceeding ten feet (10’).

Stabilize the open bore hole by means of bentonite drilling slurry pumped through the drill rod and through openings in the drill head or reamer. The drilling slurry shall be in a homogenous/flowable state serving as an agent to carry the loose cuttings to the surface through the annulus of the borehole. Calculate the volume of drilling fluid required for each reamer pass based upon hole size and soil conditions. The driller shall not be permitted to “outrun his mud” which is the condition occurring when the drilling penetration or retrieval rate is generating cuttings at a rate faster than the drill fluid pumping system can suspend and convey the cuttings out of the bore hole.

Contain all drilling fluids in pits or holding tanks for recycling or disposal. Monitor drill fluid circulation throughout the duration of the bore activity and immediately take corrective actions to restore fluid circulation should circulation be lost.

Upon completion of the pilot bore, ream the bore hole up to a large enough diameter to accommodate the pullback of the product pipe. The final reamed hole opening shall be 1.5 times the outside diameter of the product pipe for pipe lines 24” or less, or no larger than 12” plus the outside diameter of the product pipe for pipe lines greater than 24”.

Maintain a one foot (1’) minimum separation between the outside of the pilot bore hole and the outside of the utility when no reaming is required to install the product pipe.

When the pilot bore hole is to be reamed maintain a minimum separation between the outside of the pilot bore hole and the outside of existing utility equal to one foot greater than the largest required reamer diameter.

608.5.5 Handling Product Pipe: Care shall be taken during transportation of the product pipe to prevent it from being cut, kinked or damaged. Use ropes, fabrics or rubber protected slings and straps when handling pipes. Do not use chains, cables or hooks inserted into the pipe ends. Use slings spread apart for lifting each length of pipe. Do not drop pipe or fittings onto rocky or unprepared ground.

Store pipe on level ground that is free of sharp objects that could damage the pipe. Limit the stacking of pipes to a height that will not cause excessive deformation of the bottom layers of pipe under anticipated temperature conditions. Where necessary due to ground conditions store the pipe on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.

Handle assembled pipe in a manner that avoids damage to the pipe. The pipe is not to be dragged over sharp objects. Position slings to prevent stress on pipe joints. Product pipe that has cuts, gouges, or excessive deformation shall be removed and replaced.

608.6 MEASUREMENT:

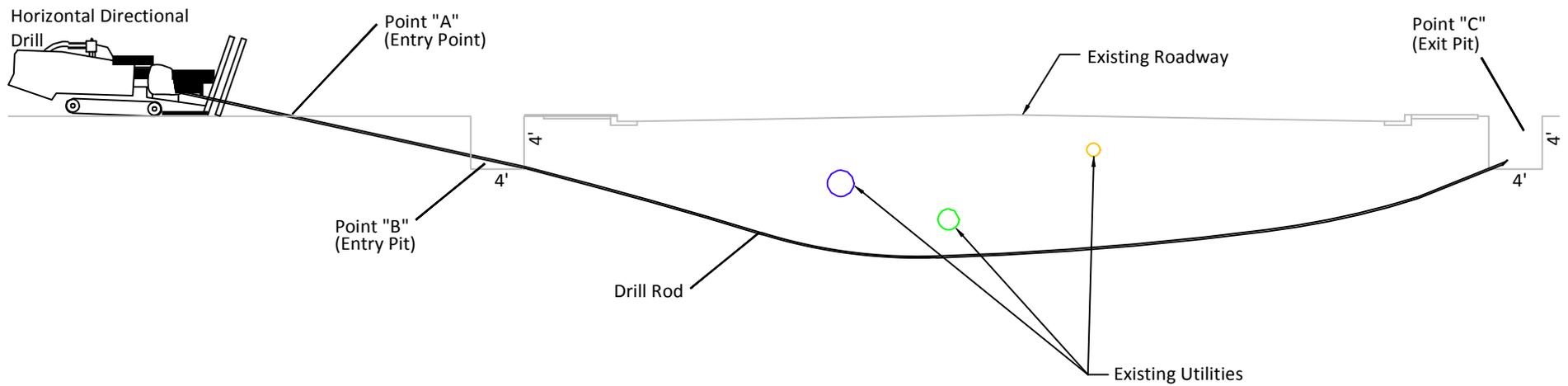
Measurement of product pipe installed by HDD shall be by the lineal foot of pipe installed. Measurement shall be along the centerline of the product pipe, through all valves, fittings and manholes, from centerline to centerline of valves, fittings or structures or to the end of pipe.

608.7 PAYMENT:

Payment will be made at the contract unit price for each type and size of product pipe. Payment shall be compensation for furnishing all labor, material, tools, and equipment required for the horizontal directional drilled installation of product pipe, complete in place, including all related excavation, shoring and bracing, backfill, and compaction. When specified payment shall also include, testing, disinfecting, and connections to existing lines or works.

- End of Section -





Notes:

- 1.) For every 1' of cover, entry point (Point "A") needs to be setback 10' from entry point (Point "B").
- 2.) Minimum setback is 40' from Point "A" to Point "B".
- 3.) Drill rod can handle 6" of steering every 10'.
- 4.) The size of the drill hole must have a minimum of 2' clearance from existing utilities.

DETAIL NO.



REVISED

DETAIL NO.

725.6 MIX DESIGN PROPORTIONING:

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

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

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

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

- (1) Modifications which do not result in batch target weights for the fine aggregate or combined coarse aggregates changing by more than 510 percent from the original approved mix design.
- (2) Modifications to the percentage of coarse aggregate fractions that do not change the total coarse aggregate volume.
- (3) Modifications to dosages of chemical or air-entraining admixtures, within the manufacturer's recommendations.
- (4) The incorporation or elimination of chemical admixtures which are listed on the mix design to effect a change in the time-of-set (retarders or accelerators).

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

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



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: June 3, 2015 Revised 7/14/2015
To: MAG Specifications and Details Committee
From: Robert Herz, MCDOT Representative
Subject: Revise Sections 321 and 325 to coordinate overlay work requirements. **Case 15-14**

PURPOSE: Coordinate overlay work requirements within Sections 321 and 325. Clarify measurement and payment for work associated with the construction of Safety Edges. Eliminate the 10% overrun penalty for pavements less than 2.5 inches in thickness (overlays). Add measurement and payment sections for Safety Edge Preparation for overlay projects that require construction of a safety edge when none exists.

REVISIONS: Shown below using red-line strike-out format.

SECTION 321 - PLACEMENT AND CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT

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.
- (b) Before placing asphalt concrete overlay thermoplastic pavement markings shall be removed, raised pavement markers shall be removed, and milling shall be ~~done-completed~~. Milling shall be 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~~ surface, the ~~gutter~~ concrete surface 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.

Frames and covers of manholes, survey monuments, valve boxes, clean-outs and other existing structures shall be adjusted in accordance with Section 345 to set flush with the finished surface of the new pavement. 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.

321.12 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.

Measurement for Safety Edge Preparation only applies to overlays of existing pavements that require the construction of a safety edge when none exists. Safety Edge Preparation will be measured by the linear foot. Safety Edge Preparation will not be measured when a safety edge is part of new pavement construction, pavement widening, or when overlaying an existing pavement that contains a safety edge. The asphalt concrete pavement measurement shall include the tonnage used to construct safety edges or the square yard measurement for asphalt concrete pavement will be increased by the horizontal extension of the safety edge beyond the roadway pavement edge.

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 for newly constructed pavement having a total thickness equal to or greater than 2.5 inches. The overrun quantity is excess tonnage above the tonnage calculated 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.

Removal of thermoplastic markings, removal of raised pavement markers, pavement repairs, and surface pavement replacements Agency-required ~~repairs of existing pavement~~ prior to roadway overlay operations will be paid for ~~as a separate by other~~ pay items unless otherwise specified.

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

Payment for Safety Edge Preparation will be at the contract unit price for the quantities measured as described above.

SECTION 325 - PLACEMENT AND CONSTRUCTION OF ASPHALT-RUBBER ASPHALT CONCRETE

325.7 PLACEMENT:

325.7.1 Surface Preparation:

~~The provisions for preparation of pavement surfaces in Section 321.8.6 (Asphalt Concrete Overlay) shall apply to ARAC overlays. Placement, compaction, and surface smoothness shall be as specified in this section—Before placing ARAC on existing pavements, severely raveled areas or cracked areas that are depressed more than 3/4" from the adjoining pavement shall be cut out and patched at least 48 hours prior to the resurfacing operation. Over-asphalted (bleeding or flushing) areas or rough high spots shall be removed by burning or blading. 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 surface cleaning requirements are included as part of the ARAC paving operations, and the cost thereof shall be included in the ARAC pay item. Pavement repairs and crack sealing when required are to be compensated for by other appropriate contract pay items.~~

~~Prior to placing the ARAC on milled surfaces, pot holes left by the milling operation shall be repaired by the Contractor, as a related non-pay item and as required by the Engineer. The milled area shall be swept.~~

After surfaces have been prepared to the satisfaction of the Engineer, they shall receive a tack coat as specified in Section 325.4.

Traffic will not be permitted over surfaces which have received a tack coat. When the overlay is to extend onto a concrete surface, the concrete surface shall be thoroughly cleaned of loose dust and cement particles and shall be tack coated.

325.7.2 Placing and Construction Methods:

All courses of ARAC 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. Safety edge construction when required shall comply with section 321.8.9.

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.

The ARAC shall be dumped from the hauling vehicles directly into the paving machine, unless otherwise approved by the Engineer.

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 ARAC 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 ARAC shall be picked up and loaded into the paving machine. If ARAC is placed in a windrow during paving, the windrow shall not exceed a distance greater than 150 feet in front of the paving machine.

Self-propelled paving machines shall spread the mixture without segregation or tearing, true to line, grade and crown as 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 shall be minimized and the paving machine shall 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.

325.11 MEASUREMENT:

ARAC shall be measured by the ton, for the mixture actually used, which shall include the required quantities of mineral aggregates, filler material, asphalt-rubber binder and admixture.

Application of lime water shall be measured by the square yard. The measured area shall be the area of ARAC pavement to which the lime water is applied. The measured area shall only be counted one time regardless of the number of applications applied to the ARAC pavement section.

Except as otherwise specified, no separate measurement will be made for work required for the construction of safety edges or for the grading and compaction for Shoulder adjustment to match the new pavement surface elevation ~~shall not be measured~~. The cost of this work shall be included in the price paid for ARAC or other related

pay items. Engineer requested imported material for shoulder adjustment is not included in the price paid for the ARAC.

Measurement for Safety Edge Preparation only applies to overlays of existing pavements that require the construction of a safety edge when none exists. Safety Edge Preparation will be measured by the linear foot. Safety Edge Preparation will not be measured when a safety edge is part of new pavement construction, pavement widening, or when overlaying an existing pavement that contains a safety edge.

325.12 PAYMENT:

Payment for asphalt milling will be as specified in Section 317.

Removal of thermoplastic markings, removal of raised pavement markers, pavement repairs, and surface pavement replacements required prior to roadway overlay operations will be paid for by other pay items unless otherwise specified.

Payment for Safety Edge Preparation will be at the contract unit price for the quantities measured as described above.

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

Payment for ARAC will be at the contract unit price, complete in place.

Application of Lime Water as approved by the Engineer will be paid at the contract unit price.

Payment for frame and cover adjustments will be at the contract unit prices specified in the proposal.

Repairs to the existing pavement prior to roadway overlay operations will be paid for by other designated pay items.

Curb Ramp Working Group Meeting

Meeting Notes

July 13, 2015

Opening:

The meeting of the Specifications and Details Curb Ramp Working Group was called to order by Warren White on June 8, 2015, at 1:05 p.m. in the MAG Cottonwood Room.

1. Attendance

Xavier Estrada (Valley Metro), Brandon Forrey (Peoria), Bob Herz (Maricopa County), Cathy Hollow (Tempe), Mark Ivanich (Glendale), Craig Sharp (Buckeye), Gordon Tyus (MAG), Tom Wilhite (Tempe), Warren White (Chandler)

2. Curb Ramp Draft Details

Brandon Forrey provided draft details for dual directional ramps based on Peoria's construction experience. They included a standard 20' radius curb that showed dimensions and slopes and a 20' radius version that used minimum right-of-way. He also developed a detail for a 35' radius dual directional curb ramp as requested by the working group at the prior meeting. He discussed the slopes for the ramps and asked the group what they thought the slopes should be (within the requirements set by draft PROWAG standards). The geometry of the ramp wings and the ramps themselves as they are move along the radius was also mentioned.

The group discussed the pros and cons of dual ramps that were not directional. The consensus was that this should be an option since many cities have supplements for them, and the constructability is more straight-forward. The disadvantage of these ramps is they still direct the pedestrian traffic into the intersection rather than straight across the crosswalk. Tom Wilhite asked about 7" curb heights, since they use them in Tempe. Mr. Herz said that different dimensions for curb height (such as 4", 6" and 7") could be addressed in a table like on the current MAG curb ramp details. Options showing details for both attached, and detached, sidewalks were also requested. Mr. Forrey said one side of the detail could show attached sidewalk and the other side, a detached option.

3. Review of Existing Ramps

Mr. Forrey brought up details developed by the city of Chicago based on the PROWAG standards, and the group reviewed and commented on them. Comments included noting the smaller radius of the corners and the close building lines. He also discussed issues when the ramps do not align, and showed an intersection in Peoria where right turn lanes created a situation where the crosswalks were set far back from curb corners. He also showed pictures of dual directional ramps that Peoria has installed.

4. Next Steps

Mr. Forrey commented that ideally a complete package of details, similar to those created by Chicago, could be adopted by MAG. Mr. Ivanich suggested that the group focus on the 35' curb detail typically used for intersections first, since Glendale still uses the single ramps for collector and residential streets. Mr. Tyus asked if Peoria or another city had CAD details that could be modified. Warren White said he would work with Mr. Forrey to plan the next revision to the proposed details. The next meeting is scheduled for the same time on August 10th.

5. Adjournment

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

Water/Sewer Working Group Meeting

Meeting Notes

July 16, 2015

Opening:

A meeting of the Specifications and Details Water/Sewer Working Group was called to order by Jim Badowich on July 16, 2015, at 1:34 p.m. in the MAG Cottonwood Room.

1. Introductions/Attendance

Tony Ayala (Avondale), Jim Badowich (Avondale), Bob Herz (Maricopa County), Souren Naradikian (Maricopa County Environmental Division), Ron Pint (Cox Communications), Craig Sharp (Buckeye), Gordon Tyus (MAG), Arvid Veidmark (SSC Boring)

2. Case 15-01: Miscellaneous Corrections

Bob Herz said he made updates to Case 15-01D by revising Detail 270 to include the option for outside ROW areas, as well as changing the note on the riser pipe and the titles. Next discussed was Case 15-01E which deletes a reference to Section 601 for manhole backfill requirements which conflict with those already in Section 206. Bob Herz introduced a new correction (F) that replaces 'Section 712' with 'Section 718' in the third paragraph of Section 334.3.

3. Case 15-03: Revise Sect 601.4.5; Trench Final Backfill

Jim Badowich reviewed the main points of the case and brought up the issue of requiring a PI of 15 for backfill. He said this could cause issues by not allowing the use of native fill. He said Avondale typically have a geotechnical reports that help them determine what treatments or changes to the fill are required. Since most members agreed that it currently wasn't a problem in the field, Mr. Herz said he would remove the PI requirement from the case.

4. Case 15-05: Reclaimed Water Boxes

Case sponsor Warren White was not present; however, there was a brief discussion on whether the box had machined surfaces. It appears current boxes are completely cast, and so the machining symbols should be removed from the draft detail.

5. New Case 15-12: Horizontal Drilling Directional Drilling (New Section 608)

Arvid Veidmark discussed changes proposed by a representative from Cox Communications at the last committee meeting. This included changing what was required to be reported in the "drillers log/as-builts" section. He explained how the drillers log is completed in the field and why agencies may want this information to locate utilities. He proposed changing it so that "pitch, roll and clock-face" reporting were only for medium and large projects, but the driller's log still would be included for all projects, and available if requested by the agency. Ron Pint of Cox Communication agreed with the revisions. Mr. Herz had some questions about the equipment setup diagram, and there was discussion on whether to include it as a figure or detail. Mr. Veidmark also handed out a copy of a presentation on the case he plans to give at the next committee meeting.

6. Case 14-12: Revisions to Section 336 and Detail 200-1

Bob Herz said this case was planned to be voted on at the next committee meeting. Mr. Badowich said he liked the offset option added to Detail 200-1, but also thought this detail may need to be reviewed and expanded in the future.

6. Spec Section 611; Water, Sewer and Storm Drain Testing

Jim Badowich brought up the issue of flushing, and believes MAG's specifications need to be updated. Tony Ayala said he has been reaching out to other agencies about the issue, and said Goodyear has done work in this area. More information on the process of flushing, that provides enough flow and velocity, size and placement of meters, etc. is needed in the MAG spec. He said there are also formulas to determine how long to flush. Members agreed that methods needed to be added to assure flushing water does not contaminate the potable city water. Other issues discussed included proper chlorination and de-chlorination of flushing water, and the need to reduce the total use of water.

7. MAG Detail 320; Concrete Meter Boxes

Jim Badowich said he is still looking at adding concrete-polymer meter boxes as a future possible case.

8. Other Issues

Souren Naradikian of Maricopa County Environmental Division brought up the problem of what to do if there is contamination due to a sewer line break. Craig Sharp said they have a plan to quickly address any problems because the penalties from ADEQ are set at \$10,000. Mr. Naradikian said there are not specifications in MAG that deal with such contingencies. Mr. Badowich said he wasn't sure MAG was the place for it. Members tended to agree that this was more of a project specific or individual agency issue.

9. Next Meeting

Jim Badowich reminded everyone that the next Water/Sewer Working Group meeting is scheduled for August 20, 2015.

10. Adjournment

The meeting was adjourned at 3:10 p.m.

**Report to MAG Technical Committee
Meeting July 23, 2015
Asphalt and Materials Working Group meetings
By Chairmen, Jeff Benedict, Brian Galimore**

The meeting was held on noon on July 23, 2015 at the ARPA offices.

Present at the meeting: Greg Groneberg (S.W. Asphalt), Robert Herz (MCDOT), Scott Thompson, Gordon Tyus (MAG), Rob Duval (Phoenix), Scott Thompson (AMEC Foster Wheeler), Robert Kostelny (AMEC Foster Wheeler)

Cases reviewed and discussed:

Case 14-06 revision to section 718: The case was discussed and decisions were made to adjust the case to address just the main table (718-1) with the added materials. Most of the AASHTO tests were replaced with ASTM versions. A minor correction to section 334 was added to the case for a complete and seamless modification. The case is felt to be in its final form. It will be distributed to whole MAG in August.

Case 14-17 Stamped (decorative) Asphalt: The new section was reviewed. It now includes revised wording that included the new technology of sealers. It was reviewed with one minor change that will go to the main MAG committee.

Case 15-03 modifications to Section 601: The case would limit horizontal lifts of ABC to 8" rather than the 2 feet limit in the specification now. It was acknowledged that it would tend to ensure better compaction for the owner. Bob has removed language that limits PI to assure non plastic fill, due to the native material used.

Case 15-09 Section 321: Temperature requirements for placement. MCDOT has language that was added to the section 321.10.4. It was discussed and agreed to add this into the case. Nothing has been removed but two sections were moved.

Case 15-10 Section 321: Compaction over poor base (Rehabilitate work). The group continued discussion on the case. There was some suggested wording proposed. This was discussed. No agreement from agency attendees was reached.

Case 15-11 Section 717 Asphalt Rubber: Methods of incorporating Add-mixture material. Industry desires to use the same method and language that Section 710 uses for clarity. Industry met with MCDOT and the agreed upon language has been incorporated.

Next meeting is August 27, 2015 at the ARPA offices.
This meeting was adjourned at 1:25 p.m.