

February 26, 2014

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, March 5, 2014 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
March 5, 2014

COMMITTEE ACTION REQUESTED

- | | |
|--|---|
| 1. <u>Call to Order and Introductions</u> | |
| 2. <u>Call to the Audience</u>
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. <u>Approval of February 5, 2014, Meeting Minutes</u> | 3. Review and approve minutes of the February 5, 2014 meeting. |

Carry Forward Cases from 2013

- | | |
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| 4. <u>Case 13-15:</u>
Revisions to MAG Sections 601, 603, 615 and 618 for installing rigid and flexible pipe.. | 4. Information and discussion.
Sponsor: Warren White, Chandler |
| 5. <u>Case 13-21:</u>
Create a new Section 742 Pre Cast Manhole Bases. Add details for construction and installation. | 5. Information and discussion. (<i>Updated</i>)
Sponsor: Craig Sharp, Buckeye |
| 6. <u>Case 13-22:</u>
Update Sections 625 and 775 to remove references to steps and the use of bricks in manholes. | 6. Information and discussion.
Sponsor: Craig Sharp, Buckeye |

New Cases for 2014

- | | |
|--|--|
| 7. <u>Case 14-01: Misc. Corrections</u>
A. Change "transverse" to "longitudinal" in Section 321.8.2 | 7. Information and discussion.
Sponsor: Rod Ramos, Scottsdale |
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- | | |
|---|--|
| 8. <u>Case 14-02: Revision to Section 405 Monuments</u>
Update specification to match current details and requirements. | 8. Information and discussion.
Sponsor: Bob Herz, MCDOT |
| 9. <u>Case 14-03: Updates to Guardrail Details</u>
Revisions to Section 415 and/or inclusion of MCDOT guardrail details. | 9. Information and discussion.
Sponsor: Bob Herz, MCDOT |
| 10. <u>Case 14-04: Revision to Detail 552 Concrete Cut-off Walls.</u>
Move cut-off walls away from roadway edge and delete design related notes. | 10. Information and discussion. (<i>Updated</i>)
Sponsor: Bob Herz, MCDOT |
| 11. <u>Case 14-05: Revision to Section 324 Portland Cement Concrete Pavement</u>
Update section for current methods. | 11. Information and discussion.
Sponsor: Jeff Hearne, Concrete Working Group |
| 12. <u>Case 14-06: Revisions to Section 718 Preservation Seal for Asphalt Concrete</u>
Update specifications for Type 'C' | 12. Information and discussion.
Sponsor: Jeff Benedict, Asphalt Working Group |

General Discussion

- | | |
|--|---|
| 13. <u>Working Group Reports</u> | 13. Information and discussion.
Water/Sewer Chair: Jim Badowich
02/18/14 Meeting
Asphalt Chair: Jeff Benedict
02/20/14 Meeting
Materials Chair: Brian Gallimore
02/20/14 Meeting
Concrete Chair: Jeff Hearne
02/20/14 Meeting
Outside ROW: Peter Kandarlis |
| 14. <u>General Discussion</u> | 14. Information and discussion. |
| 15. <u>Request for Future Agenda Items</u> | 15. Information and discussion. |

Adjournment

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

February 5, 2014

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

AGENCY MEMBERS

Jim Badowich, Avondale, Vice Chair	Dan Nissen, Peoria
Craig Sharp, Buckeye (proxy)	Syd Anderson, Phoenix (St. Trans.)
Warren White, Chandler	Jami Erickson, Phoenix (Water)
Antonio Hernandez, El Mirage	Rodney Ramos, Scottsdale
* Wayne Costa, Florence	Jason Mahkovtz, Surprise
Tom Condit, Gilbert	Tom Wilhite, Tempe, Chair
Mark Ivanich, Glendale	Harvey Estrada, Valley Metro (audio)
Bob Herz, MCDOT	Gregory Arrington, Youngtown
Bob Draper, Mesa	

ADVISORY MEMBERS

Jeff Benedict, ARPA	Jeff Hearne, ARPA
Arvid Veidmark, AZUCA	Peter Kandarlis, Independent
Mike Sanders, AZUCA	Paul R. Nebeker, Independent
* Adrian Green, AGC	Jacob Rodriguez, SRP
Brian Gallimore, AGC	

MAG ADMINISTRATIVE STAFF

Gordon Tyus

* Members not attending or represented by proxy.

GUESTS/VISITORS

Arturo Chavarria, Hanson
Stew Waller, Rinker

1. Call to Order

Chair Tom Wilhite called the meeting to order at 1:30 p.m. He introduced two new members from the Arizona Utility Contractors Association (AZUCA): Arvid Veidmark and Mike Sanders. AZUCA changed their name from NUCA of Arizona since they are no longer affiliated with the national organization. Mr. Veidmark introduced himself and said he was looking forward to working with the group.

2. Call to the Audience

Chair Wilhite opened the call to the audience. Stew Waller of Rinker Materials introduced himself.

3. Approval of Minutes

The members reviewed the January 8, 2014 meeting minutes. Rod Ramos introduced a motion to accept the minutes as written. Bob Draper seconded the motion. A voice vote of all ayes and no nays was recorded.

Carry Forward 2013 Cases

4. Case 13-15: Revisions to MAG Sections 603, 615 and 618 for Flexible Pipe.

Update pipe installation requirements to allow for flexible pipe types. Warren White said that updated draft versions of Section 601 and Section 603 were posted on the MAG website to allow those interested to review and provide comments. Mr. Tyus said they can be downloaded from the website on the next Water/Sewer working group meeting page, or today's meeting page: <http://www.azmag.gov/Events/Event.asp?CMSID=5594>

The revisions included comments from a lengthy discussion during the last working group meeting. Mr. White said he will make additional revisions, review them at the next water/sewer meeting, with plans to bring an updated packet to the committee.

5. Case 13-21: Create a new Section 742 Pre Cast Manhole Bases. Add detail drawings for construction and installation and
Case 13-22: Update Sections 625 and 775 to remove references to the use of bricks in manholes and remove references to manhole steps.

Update specifications and details for pre-cast manhole bases and other corrections. Craig Sharp said he provided updated specifications for both Case 13-21 and 13-22 which have been posted on the MAG website for review here: <http://www.azmag.gov/Events/Event.asp?CMSID=5594>

He said he is still updating the current manhole details based on input from the last working group meeting.

New Cases for 2014

6. Case 14-01: Miscellaneous Corrections.

- A. *Change "transverse" to "longitudinal" in Section 321.8.2.*
- B. No new corrections cases were introduced

7. Case 14-02: Revisions to Section 405 Monuments and Detail 120.

Update specifications to match current details and requirements. Bob Herz said the updated case in the packet included the addition of revisions to Detail 120 SURVEY MARKER. Due to a request from the county surveyors, a note was added to the Type 'B' marker so that its location is placed 6" below grade for unpaved streets and alleys. Mr. Herz asked if any agencies used the precast monuments mentioned in the first paragraph of Section 405.3. If not, he suggested the reference be removed. He also wanted to know if anyone was using the Type "C" monument on Detail 120. He thought that last year there was some interest in keeping it on the detail, but if no agencies are using it, it could also be removed. Mr. Herz asked members to review the case and provide him feedback.

8. Case 14-03: Updates to Guardrail Details.

Make revisions to Section 415 and/or include guardrail details in MAG. Bob Herz said Maricopa County will change to the 31" high (instead of 28") guardrails beginning in 2015. They are based on the Midwest Guardrail System. He said current details will be maintained for reference when repairing/replacing existing guardrails; however, they will include a note specifying that they are not to be used for new installations, only for repairs. He asked members to review the case and provide him comments.

9. Case 14-04: Revision to Detail 552 Concrete Cut-off Walls.

Move cut-off walls away from roadway edge and delete design related notes. Bob Herz said the case was handed out at the last meeting and asked if there were any comments. Jim Badowich asked about the purpose of the depth gage. Mr. Herz said it was used to measure water flowing across the ford. Rod Ramos suggested that since the drawing showed more than just the cut-off walls, that it be re-titled to something more descriptive such as FORD CROSSING WITH CUT-OFF WALLS. Peter Kandarlis commented on the use of the term "fine aggregate" near the weep holes, since that means sand, which could clog the holes. He suggested using a filter-fabric and pea gravel, and said he could look up relevant specs.

Rod Ramos suggested showing some indication of the grade on each side, with a note stating GRADE PER PLAN or similar. Tom Wilhite asked if straps should be added for longer drop-offs. Mr. Herz felt they were not necessary, but could be added per the engineer's design.

10. Case 14-05: Revisions to Section 324 Portland Cement Concrete Pavement (PCCP).

Use compressive rather than tensile strength tests, modernize and reorganize section as needed. Jeff Hearne summarized a new case submitted from the Concrete Working Group to update Section 324. He felt it was ready to bring forward to the committee for discussion. He said the case was also posted on the website where it could be viewed in color.

One of the major changes was elimination of the testing for flexible strength and use compressive strengths instead. He said there was a conversion handout at the end of the case that showed that a compressive strength of 3000 psi was equivalent to the 520 psi modulus of rupture and that 650 psi converted to about 4600 psi compressive strength. Based on this, he suggested MAG AA 4000 psi strength concrete would be a good default to use. He said this is also similar to the ADOT Class P 4000 psi concrete. In addition to this change, the language has been updated and modernized, and some areas have been moved around to make it flow more logically, such as moving the equipment specs to the compaction subsection. Mr. Hearne asked for members to review the case and provide guidance.

Jim Badowich asked if it addressed manhole and utility adjustments (Detail 422) since they are done differently than in asphalt. Suggestions included modifying or creating new details. Bob Draper said usually adjustments were addressed in the plans, but the section may want to refer to them rather than MAG's existing details. This seemed to be the best solution rather than modifying or creating new details. Mr. Hearne said he could add language to address the issue.

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

Update the specifications for the Type C preservative seal. Jeff Benedict introduced a case from the Asphalt Working Group to update the specifications of the Type C preservative seal to match the material currently being supplied by the manufacturer. He said the revised specifications match that of TRSS (Masterseal) that is used in the Valley. He also said that Note 3 was fixed to use the correct 1000 hour test. Mr. Benedict asked members to review the case with others at their agencies and provide comments. They would be reviewing it again at the next working group meeting.

12. Working Group Reports

Chair Wilhite asked for reports from the working group chairs.

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

Jim Badowich said the group met on January 21st and that notes from the meeting were included in the packet. One of the major items was the revisions to Section 601 and 603 previously discussed. Reorganizing the sections based on rigid and flexible pipes has brought up other issues. The working group suggests putting all the testing requirements into a new Section 611 since many tests (such as air pressure, video, and laser) can be used for both sanitary and storm sewers.

Other items discussed included water flushing, which is being worked on by Rob Godwin of Goodyear, and jacking and tunneling and directional boring which is being worked on by Arvid Veidmark.

Mr. Veidmark said the concrete jacking pipe in subsection 618.4 was moved to a new Section 607 that is being updated. He said he is also working on a new Section 608 for directional boring of dry utilities. Peter Kandaris asked if dry utilities should be in Section 600. Jim Badowich said directional boring is used a lot for water lines as well. He said it was becoming popular and cheaper even in new construction. Mr. Herz said he would like these sections to come forward for the committee to review. Mr. Veidmark said he would bring them back to the working group with plans to prepare new cases.

Tom Wilhite asked about the use of pipe bursting. He said Tempe has used this technique. Bob Draper commented on potential for potholes. Mr. Veidmark said he could prepare a presentation on the issue if members were interested.

Mark Ivanich said Glendale allows contractors to use various techniques, but cautioned that the technology changes quickly, so it may be hard to write specifications. Jim Badowich suggested that any new specs be generalized. Paul Nebeker said if there is no trench it is easy to hit utilities when digging if there is no indication they are present. Tom Wilhite asked about the use of tracer wire. Arvid Veidmark said he knows a project in the Midwest where directional boring was used for 24" ductile iron pipe. He commented that SRP policy requires a bore plan, and also described new software that can create a CAD profile based on the located utilities. It was suggested that agencies review their supplements to see if they could be included in MAG.

Mr. Badowich said he would like feedback if there was a better date and time for the meeting. Currently the next meeting is tentatively scheduled for February 18th at 1:30 p.m. at the MAG office.

b. Asphalt/Materials Working Groups

Jeff Benedict said the group met on January 30th, and that a copy of the meeting notes was handed out. One of the items the group discussed was the permit side of projects in Section 321. What is the acceptance criteria on projects that agencies, contractors and developers can all agree upon? He said that rather than having the working group tackle the issue, it may need to be addressed through the AGC and meeting with individual cities.

There was also discussion on the use of warm mix. He suggested that agencies may want to do some test projects with warm mix to determine what specifications are needed to ensure they are successful. Mr. Benedict said ADOT's reporting of results was not very good or useful. Bob Herz suggested modifying the language to allow warm mix as an option would be a start, since it currently is not allowed.

Tom Wilhite asked if MAG needed specs for asphalt pavement stamping. Gilbert and Surprise do it. Bob Draper said Mesa allows it through the special provisions. Mr. Wilhite asked if we should have some basic specs such as the heater temperature. Harvey Estrada via the audio-conference commented that Valley Metro is using this on several intersections and crosswalks. Rod Ramos said Scottsdale also uses it extensively, but said it should only be on new pavement and after it has properly cured. The basic process was described, but there was no consensus that specifications were needed, or if they should be done on a per-project basis. Jim Badowich brought up infrared heaters. Brian Gallimore said patching has been done with them. Peter Kandarlis said there was a test section in Kyrene that used the process. Mr. Wilhite asked about use on rubberized asphalt. Others felt it made no difference, although track out can be a problem.

Jeff Benedict said the next asphalt/materials working group meeting is planned for February 20th at the ARPA office at noon.

c. Concrete Working Group

The concrete working group followed the Asphalt/Materials working group meeting on January 30th and notes from the meeting were provided. Mr. Hearne said that a presentation of penetrating concrete sealers was given and more discussion was planned. In addition the group discussed City of Phoenix revisions to 340 and supplements in general. He suggested bringing them to MAG and they wanted to work with Phoenix to help eliminate supplements such as the extruded curb provisions in Section 725. Other issues included mixing requirements and frequency of testing. They also discussed adding water to concrete at the jobsite, and what to do if you have low strength test cylinders. He said they plan to review Section 725 to clarify language and hopefully bring a case forward in a few months.

Jim Badowich asked if there was interest in having a 6" roll curb. He said Goodyear uses them in subdivisions, when 6" is needed for drainage. Rod Ramos said Scottsdale uses a ramp curb because of the large drop-off in roll curbs, mainly for areas that need fire access.

Tom Wilhite asked about traffic circles and roundabouts, noting Phoenix is using them. He said Tempe also has details for garage entrances based on sight distance. Mr. Herz felt this was more of a design than a construction issue. Peter Kandarlis said there were a lot of city supplements for different driveway types and entrances. Phoenix has an additional manual for them.

Mr. Hearne said the next Concrete working group meeting would follow the Asphalt/Materials group on February 20th.

d. Outside Right-of-Way Working Group

Peter Kandarlis handed out a listing of suggested outside right-of-way standards. They were divided into SITE EARTHWORK, FACILITY WORK, and MATERIALS. The list was based on the materials and discussion items received to date. He asked members to review the list and let him know what they thought should be included. He included

items from SRP and suggested there were many specifications currently in agency supplements that could be adopted for the outside ROW document. Mr. Kandaris said he would also be relying on other working groups to work on specifications, such as the concrete group reviewing pervious concrete.

Other items brought up included backflow preventers for fire sprinkler systems on buildings, reclaimed water specs, and trash receptacle details. Jami Erickson suggested Mr. Kandaris contact the development services groups at the cities who are more involved with on-site work. Mark Ivanich said there is a cross-connection group that also deals with these issues.

Peter Kandaris said he could modify the list to create a survey to email out to the group to compile their feedback and interest.

13. General Discussion

Gordon Tyus noted that at their place was a few updated pages of the 2014 packet that were reprinted due to minor errors found by Mr. Herz. Bob Draper asked if the online versions were correct. Mr. Tyus said, yes, the PDF version on the web was corrected the same day the errors were found, and that these pages were updated after the first set of revision packets that were provided to them at the last meeting were printed.

Rod Ramos asked if other agencies had grate details to prevent theft. Other members said they didn't have a problem. Bob Herz asked about modifying or deleting the specs for asbestos concrete pipe (ACP). He said MCDOT and Phoenix had lawsuits against them, and he wanted to add notices to the specs so it was not used in new construction and that if it was used for repairs, contractors were directed to follow required OSHA requirements. Jim Badowich said the water/sewer group could review the issue and asked for Mr. Herz's help. Mr. Wilhite said MAG had a copy of the greenbook that could also be referenced.

14. Adjournment:

Seeing no further business, the chair entertained a motion to adjourn. This was moved by Bob Herz and seconded by Dan Nissen. The motion passed and the meeting was adjourned at 3:02 p.m.

2014 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=5827>)

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
	CARRY FORWARD CASES FROM 2013						
13-15	Case 13-15: Revisions to MAG Sections 601, 603, 615 and 618 for installing rigid and flexible pipe.	Chandler/ Water-Sewer WG	Warren White	05/01/2013 09/04/2013		0 0 0	Yes No Abstain
13-21	Case 13-21: Create a new Section 742 Pre Cast Manhole Bases. Add detail drawings for construction and installation.	Buckeye/ Water-Sewer WG	Craig Sharpe	06/05/2013 02/20/2014		0 0 0	Yes No Abstain
13-22	Case 13-22: Update Sections 625 and 775 to remove references to steps and the use of bricks in manholes.	Buckeye/ Water-Sewer WG	Craig Sharpe	06/05/2013 08/21/2013		0 0 0	Yes No Abstain
	NEW CASES FOR 2014						
14-01	Case 14-01: Miscellaneous Corrections: A. Change "transverse" to "longitudinal" in Section 321.8.2.	Scottsdale	Rod Ramos	01/08/2014		0 0 0	Yes No Abstain
14-02	Case 14-02: Revision to Section 405 Monuments. Update specification to match current details and requirements.	MCDOT	Bob Herz	01/08/2014		0 0 0	Yes No Abstain
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
14-04	Case 14-04: Revision to Detail 552 Concrete Cut-off Walls. Move cut-off walls away from roadway edge and delete design related notes.	MCDOT	Bob Herz	01/08/2014 02/20/2014		0 0 0	Yes No Abstain
14-05	Case 14-05: Revisions to Section 324 Portland Cement Concrete Pavement	Concrete WG	Jeff Hearne	02/05/2014 02/20/2014		0 0 0	Yes No Abstain
14-06	Case 14-06: Revisions to Section 718 Preservative Seal for Asphalt Concrete	Asphalt WG	Jeff Benedict	02/05/2014		0 0 0	Yes No Abstain

TYPE 'A' TOP
(PRE-CAST ECCENTRIC CONICAL TOP M.H.)

24" OR 30" FRAME & COVER PER DET. 423, 424, 425

24" TO 26-3/4" ON 48" M.H.
30" ON 60" M.H.

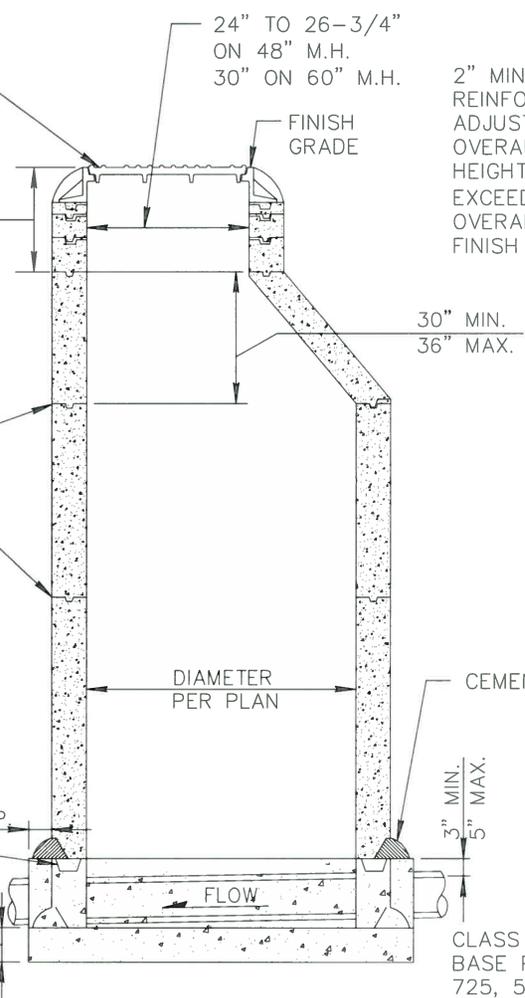
2" MIN. - 8" MAX. REINFORCED CONC. ADJUSTING RINGS. OVERALL ADJ RING HEIGHT NOT TO EXCEED 18" (24" OVERALL FROM FINISH GRADE)

USE BUTYL RUBBER MASTIC JOINT SEALANT ON ALL JOINTS; EXCEPT TOP ADJ. RINGS

PRE-CAST RISER SECTIONS AS REQUIRED

KEYWAY PRESSED INTO BASE TO MATCH PRECAST RISER

8" IF M.H. IS 13' OR LESS
12" IF M.H. IS OVER 13'



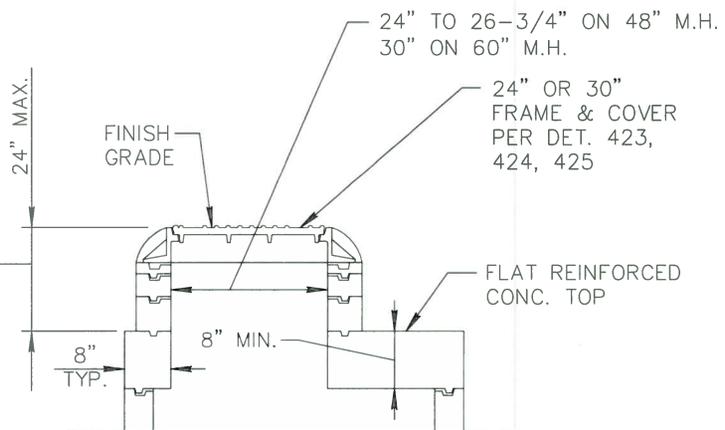
2" MIN. - 8" MAX. REINFORCED CONC. ADJUSTING RINGS. OVERALL ADJ RING HEIGHT NOT TO EXCEED 18" (24" OVERALL FROM FINISH GRADE)

30" MIN.
36" MAX.

CEMENT MORTAR

3" MIN.
5" MAX.

CLASS "A" CONCRETE BASE PER SECTION 725, 505



(PRECAST FLAT TOP M.H.)

NOTES:

1. PRE-CAST, STEEL REINFORCED M.H. SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C 478 EXCEPT AS MODIFIED HEREIN.
2. USE LOW ALKALI CEMENT ONLY.
3. CAST-IN-PLACE M.H. BASE TO BE CONSTRUCTED IN ONE PLACEMENT.
4. CAST-IN-PLACE MH BASE SHELF AND CHANNEL TO RECEIVE SMOOTH TROWEL FINISH.
5. M.H. COATINGS PER AGENCY.
6. SEE MAG DETAIL 422 FOR FINAL ADJUSTMENT TO GRADE.
7. ANY MANHOLE OVER 20' SHALL REQUIRE ENGINEER (STRUCTURAL) CALCS.
8. THE MANHOLE ACCESS POINT SHALL BE ORIENTED IN SUCH A WAY THAT THE OPENING IS DIRECTLY ABOVE THE LOWEST INVERT.
9. FLAT TOP MANHOLE TO BE USED UPON DIRECTION OF THE ENGINEER.
10. FOR PRE-CAST BASE SEE DETAIL 420-2.

DETAIL NO.
420-1

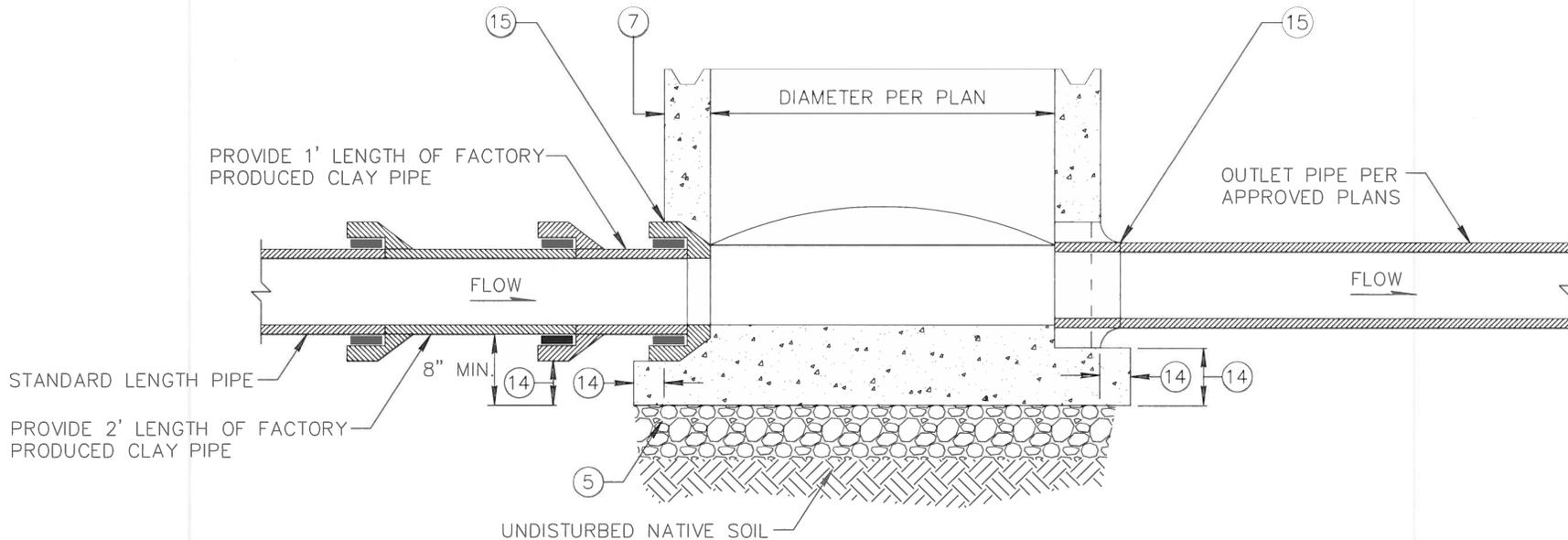


**STANDARD DETAIL
ENGLISH**

PRE-CAST CONCRETE SEWER MANHOLE

REVISED
01-01-2015

DETAIL NO.
420-1



NOTES:

- ① PRE-CAST, MANUFACTURER SHALL BE AN NPCA CERTIFIED PLANT.
- ② MAG "AA" 4000 PSI CONCRETE SHALL BE USED FOR MANHOLE BASES PER ASTM C478.
- ③ SPRING LINE OF CAST-IN-PLACE BELL SHALL STOP AT INSIDE FACE OF MANHOLE.
- ④ JOINTS FOR BARREL SECTION SHALL BE TONGUE AND GROOVE OR LAP JOINT. ALL LIFTING HOLES SHALL BE SEALED WITH NON METALLIC NON-SHRINK GROUT.
- ⑤ ALL PRECAST MANHOLE BASES SHALL BE PLACED ON 10" MINIMUM OF #57 CRUSHED ROCK PER ASTM D448 OR 8" MINIMUM ABC COMPACTED TO 100% RELATIVE DENSITY.
- ⑥ ALL MODIFICATIONS SHALL BE APPROVED BY THE ENGINEER.
- ⑦ MINIMUM WALL THICKNESS SHALL BE 5".
- ⑧ REINFORCEMENT SHALL BE DESIGNED BY AN ARIZONA REGISTERED PROFESSIONAL ENGINEER.
- ⑨ CHANNEL WIDTH SHALL REMAIN CONSTANT THROUGH THE MANHOLE BASE, AS PER DETAIL 420-3.
- ⑩ THERE SHALL BE NO HARD CONNECTIONS (GROUTED) INTO THE MANHOLE BASE UNLESS APPROVED BY THE ENGINEER.
- ⑪ ALL SEWER SERVICE CONNECTIONS SHALL HAVE THE SAME CONNECTION TYPES IN THE PRE-CAST MANHOLE BASE.
- ⑫ ALL CORE HOLES INTO THIS STRUCTURAL PRE-CAST BASE SHALL BE COATED WITH APPROVED COATING MATERIAL.
- ⑬ ENTIRE PRE-CAST BASE SHALL BE MANUFACTURED AT THE PLANT.
- ⑭ THE MINIMUM ANTI-FLOAT RING SHALL BE 6" WIDE ON 48" BASES, 7" WIDE ON 60" BASES, AND 8" WIDE ON 72" BASES. ANTI-FLOAT RING SHALL BE A MINIMUM OF 5" THICK.
- ⑮ ALL PIPE CONNECTIONS SHALL BE RUBBER GASKET/BOOT PER ASTM C425. ADDITIONALLY, A POLYURETHANE JOINT MAY BE USED ON VCP.

DETAIL NO.

420-2



STANDARD DETAIL
ENGLISH

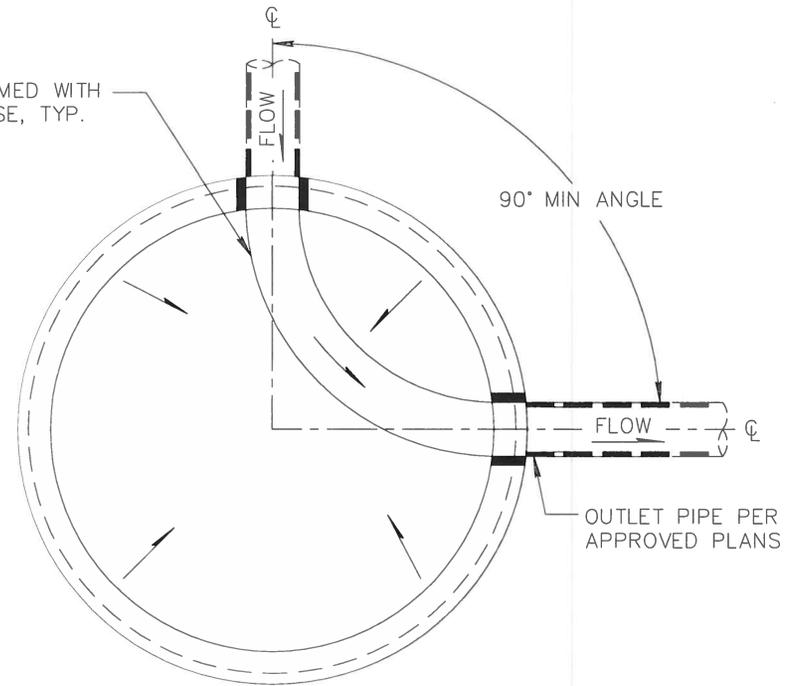
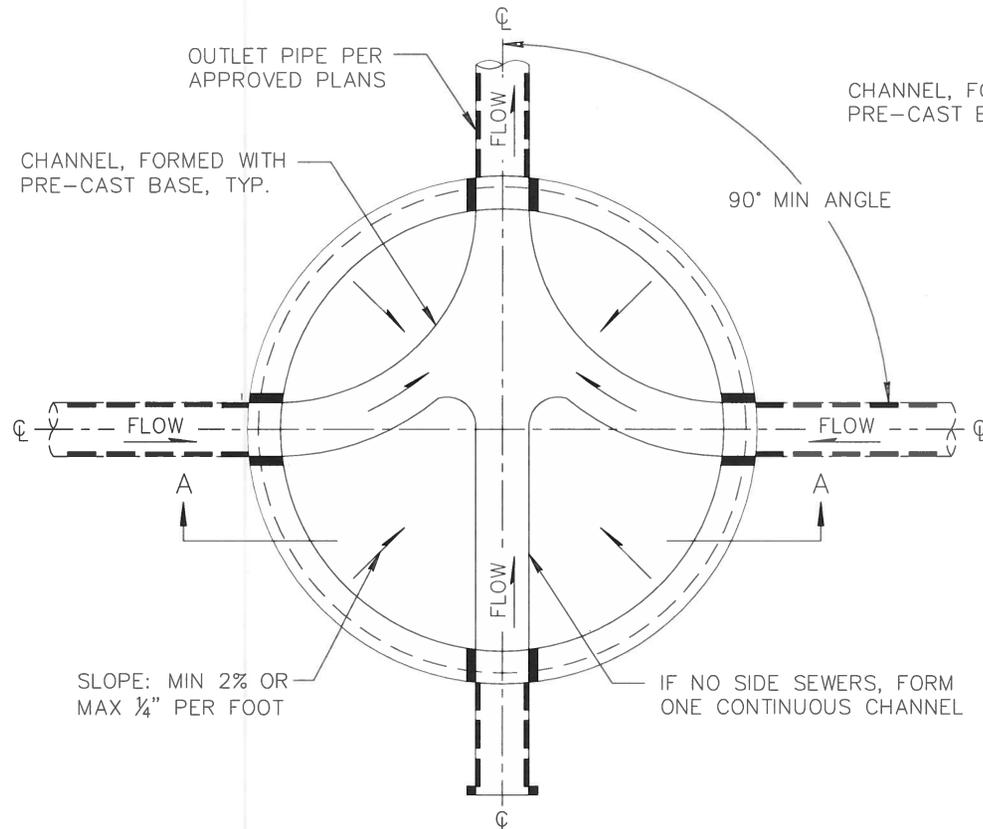
PRE-CAST CONCRETE MANHOLE BASE

REVISED

01-01-2015

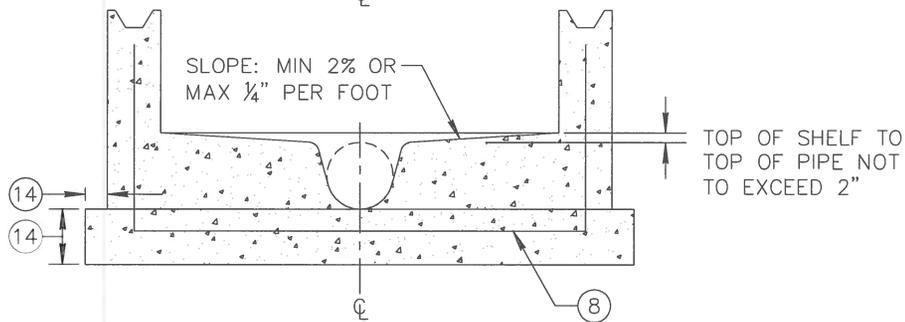
DETAIL NO.

420-2

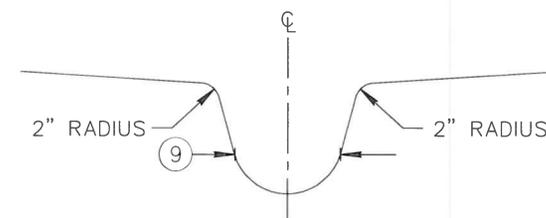


SLOPE: MIN 2% OR
MAX ¼" PER FOOT

IF NO SIDE SEWERS, FORM
ONE CONTINUOUS CHANNEL



SECTION A-A



MINIMUM CHANNEL DEPTH AND
WIDTH SHALL BE THE SAME AS
THE OUTLET PIPE SIZE.

TYPICAL CHANNEL

SEE DETAIL 420-2 FOR NOTES

DETAIL NO.
420-3



STANDARD DETAIL
ENGLISH

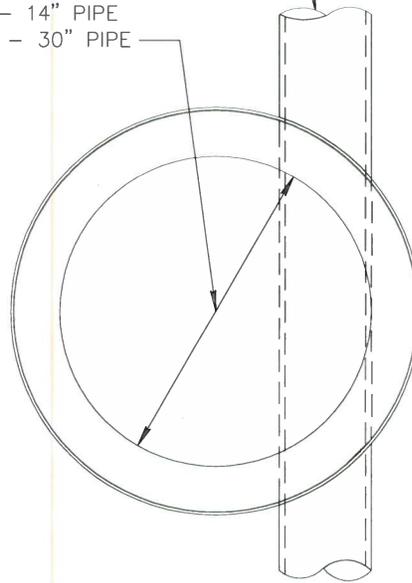
PRE-CAST CONCRETE MANHOLE BASE

REVISED
01-01-2015

DETAIL NO.
420-3

PIPE SIZE & ELEVATION
AS SHOWN ON PLANS

48" I.C. FOR 8" - 14" PIPE
60" I.D. FOR 15" - 30" PIPE



MANHOLE FRAME &
COVER PER DETAILS
423, 424 & 425

COMBINED CURB
AND GUTTER

2" MIN. - 8" MAX.
REINFORCED CONC. ADJUSTING
RINGS. OVERALL ADJ RING
HEIGHT NOT TO EXCEED 18"
(24" OVERALL FROM F/G)

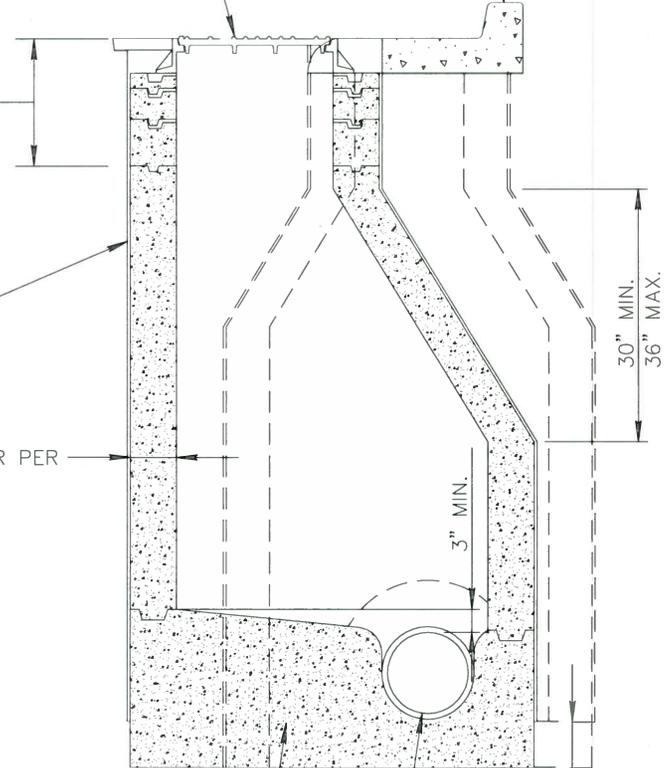
MANHOLE TO BE
PRECAST PER
SECT. 625

PRECAST RISER PER
ASTM C-478

CLASS AA CONCRETE
PER SECT. 725, 505

TROWEL
FINISH
SMOOTH

8" IF MH IS 13'
OR LESS
12" IF MH IS
OVER 13'



DETAIL NO.

421



STANDARD DETAIL
ENGLISH

OFFSET MANHOLE 8" TO 30" PIPE

REVISED

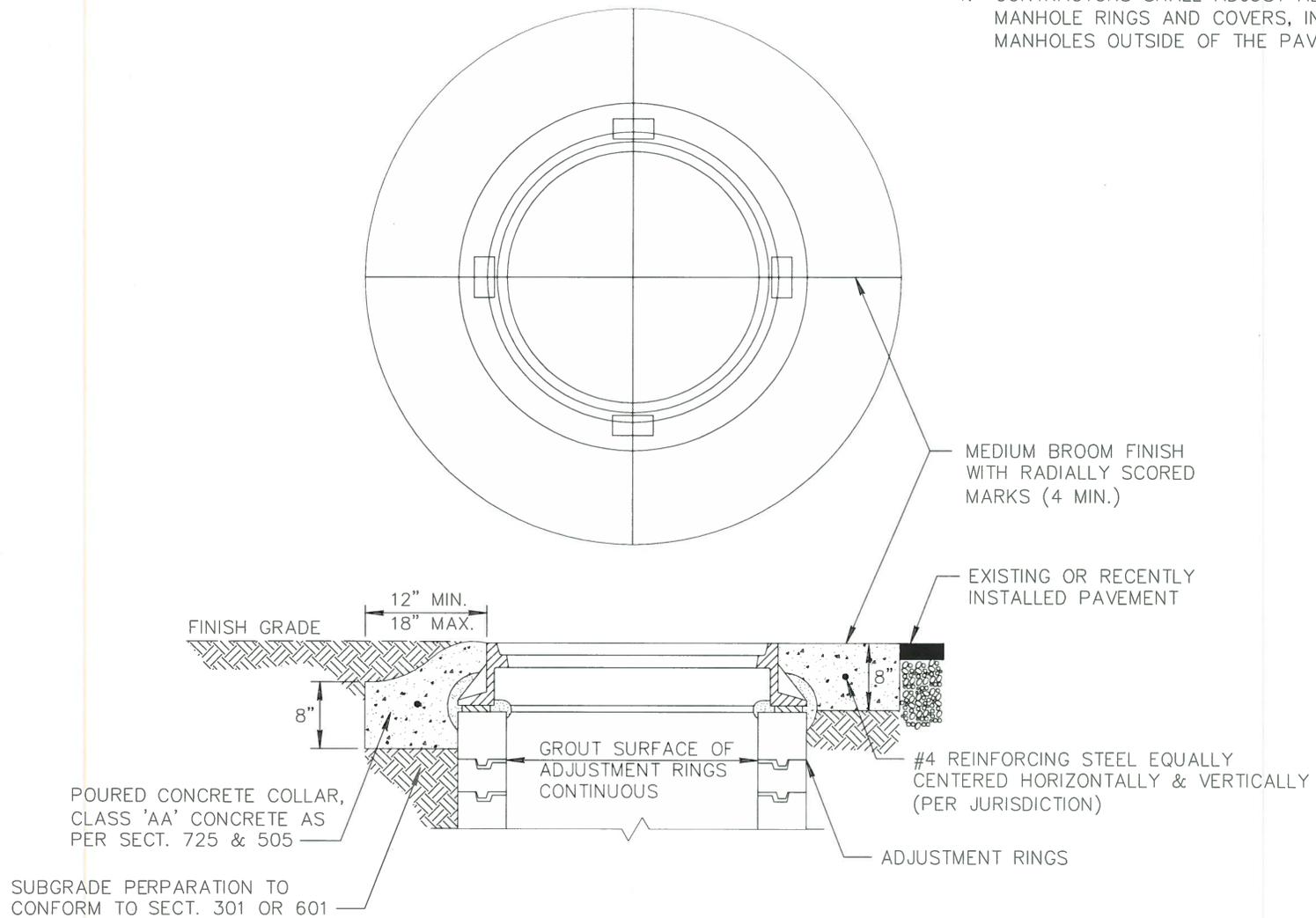
01-01-2015

DETAIL NO.

421

NOTES:

1. CONTRACTORS SHALL ADJUST ALL MANHOLE RINGS AND COVERS, INCLUDING MANHOLES OUTSIDE OF THE PAVEMENT.



DETAIL NO.

422



STANDARD DETAIL
ENGLISH

MANHOLE FRAME
AND COVER ADJUSTMENT

REVISED
01-01-2015

DETAIL NO.

422



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: January 8, 2014

To: MAG Specifications and Details Committee

From: Robert Herz, MCDOT Representative

Subject: Revision to Detail 552 CONCRETE CUT-OFF WALLS **Case 14-04**

PURPOSE: To move cut-off walls away from roadway edge. Scour holes are hazards that form at the edge of cut-off walls. The hazard should not be located at the edge of the roadway but should be no closer than the edge of the roadway shoulder.

Other miscellaneous adjustments include the deletion of design related notes from the construction detail.

REVISION: See the attached marked up detail for revisions.

SECTION 324 – REVISED 2-20-14**PORTLAND CEMENT CONCRETE PAVEMENT (PCCP)****324.1 DESCRIPTION:**

This item shall consist of construction of a pavement composed of plain jointed portland cement concrete on a prepared subgrade. The Contractor shall furnish all labor, materials and equipment necessary for the construction of the pavement in accordance with these specifications and in reasonably close conformity to the lines, grades, thicknesses and details indicated by the plans or as established by the Engineer. All tests shall be performed by a laboratory approved by the Engineer.

324.2 MATERIALS:

324.2.1 Portland Cement Concrete: Portland cement concrete shall conform to the applicable requirements of MAG Standard Specifications Section 725 for Class AA (Table 725-1) and the additional requirements of this section.

~~Concrete shall develop a modulus of rupture of not less than 520 psi within 14 days after placement, and not less than 650 psi at 28 days' age as determined by tests of specimens fabricated in accordance with ASTM C 31 and tested in accordance with ASTM C 78 procedures. The Contractor shall submit data acceptable to the Engineer at least 30 days in advance of the start of concrete paving operations which demonstrate that concrete produced with materials and proportions as proposed for use in the construction will conform to the modulus of rupture requirements of these specifications. The data shall include results of compressive strength tests conducted at the same age as modulus of rupture tests to establish the correlation which can be expected between the flexural and compressive strength properties of the concrete. The Engineer may, at his option, use compressive strength tests of specimens fabricated in accordance with ASTM C 31 and tested in accordance with ASTM C 39 to verify conformance to the modulus of rupture requirements of these specifications.~~

The maximum concrete slump shall be as determined by the approved mix design in accordance with tolerances of Section 725.9.(A)1.

324.2.2 Concrete Materials: ~~Portland cement conforming to the requirements of ASTM C 150 for Type III, low-alkali, may be used at the Contractor's option. Aggregates shall be crushed rock or gravel conforming to the requirements of ASTM C 33. Coarse aggregate gradation shall conform to requirements for Size No. 57. Fine aggregates shall have an average sand equivalent of not less than 75 when tested in accordance with the requirements of AASHTO T-176 or ASTM D-2419.~~

324.2.3 Reinforcement: Tie bars shall be deformed billet steel reinforcing bars conforming to the requirements of ASTM A-615, Grade 40.

Dowel bars shall be plain round bars conforming to the requirements of ASTM A-615, Grade 40. One-half the length of each dowel bar shall be ~~painted with one coat of tar paint.~~ Find appropriate product and wording

Metal sleeves of an approved design shall be provided for use with dowel bars. Sleeves shall cover 2 inches, plus or minus 1/4 inch, of the dowel, shall have a closed end with a suitable stop to hold the end at least 1 inch from the end of the bar, and shall be designed to prevent collapse during construction. An approved basket support shall be used to hold bars parallel to pavement surface.

324.2.4 Curing Materials: Materials for curing concrete shall conform to the requirements of Section 726.

324.2.5 Joint Materials: Joint sealant shall be ~~a one-component, hot-~~ poured type, conforming to the requirements of ASTM D 3406 Section 729.2 or as approved by the Engineer.

Back-up rod or tape and bond breakers provided to control the depth of sealant, achieve the desired shape factor, support sealant against indentation and sag, or to prevent bond of the sealant to the bottom concrete surface shall be compatible with the joint sealant material.

~~Other pour type joint sealants conforming to the requirements of Subsection 729.2 may be used if approved by the Engineer.~~

Preformed expansion joint filler shall conform to the requirements ~~of ASTM D 1754~~ Section 729.1 or as approved by the Engineer.

324.3 CONSTRUCTION METHODS:

324.3.1 General: Pavement shall be constructed with mechanical equipment utilizing stationary side forms or by the use of slipform paving equipment without stationary side forms. Manual methods of placing and finishing concrete with stationary side forms may be permitted by the Engineer for areas inaccessible for mechanical equipment.

Curbs, or combined curb and gutter, shall be constructed along the edges of all pavement where shown in the plans and shall be formed to the cross-section in accordance with the plans. Curbs may be constructed integrally with the pavement using a slipform or extrusion equipment or placed immediately after finishing operations by hand forming or using face forms. They may also be constructed as a separate operation after pavement construction using forms, slipform, or extrusion equipment. The edge of each gutter of the curb and gutter section built first may be used as a form in lieu of the setting of stationary side forms. Curbs, or curb and gutter, constructed as a separate operation shall otherwise conform to the requirements of Section 340. All curbs and gutters shall have the same thickness as the main roadway section. All joints shall be aligned with roadway joints.

324.3.2 Equipment: Design, capacity, and mechanical condition of equipment and tools necessary for handling materials and performing all parts of the work shall be approved by the Engineer. Equipment shall be at the jobsite sufficiently ahead of the start of concrete paving operations to permit thorough examination and approval by the Engineer prior to start of concrete paving.

Equipment used to place concrete may consist of one or more machines, shall be capable of uniformly distributing and consolidating the concrete as it is placed without segregation and shall be capable of producing concrete pavement which will conform to the required cross-section with a minimum of hand work. The number and capacity of machines furnished shall be adequate to perform the work required at a rate equal to the concrete delivery rate.

Vibrators shall be used to consolidate concrete; the rate of vibration shall be not less than 3,500 cycles per minute for surface vibrators and not less than 8,000 cycles per minute for internal vibrators. Power to vibrators mounted on mechanical equipment shall be so connected that vibration ceases when forward or backward motion of the machine is stopped. Contractor shall furnish a tachometer or other suitable device for measuring and indicating the frequency of vibration.

Slipform pavers shall be equipped with high frequency internal vibrators mounted with axes either parallel or normal to pavement alignment for the full paving width. Vibrators mounted with axes parallel with pavement alignment shall be spaced at intervals not to exceed 24 inches, measured center-to-center. Vibrators mounted with axes normal to pavement alignment shall be spaced so that lateral clearance between individual vibrating units does not exceed 6 inches.

Slipform paving equipment which will be wholly or partially supported on subgrade shall be equipped with traveling side forms of sufficient dimensions, shape and strength to support the concrete at free edges laterally for a sufficient length of time during placement to produce pavement of the required cross-section, and shall be equipped and operate with automatic sensing and control devices such that the machine automatically senses deviations from the established guideline and performs the necessary corrective maneuvers to overcome variations from correct grade and alignment.

When concrete will be placed adjacent to existing pavement or curb and gutter, that part of the equipment supported on the existing pavement or curb and gutter shall be equipped with protective pads on crawler tracks or rubber-tired wheels with bearing surfaces offset a sufficient distance from the edge of the pavement or curb and gutter to avoid

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edge damage, or the surface of the existing pavement or curb and gutter shall be otherwise protected against such damage in a manner approved by the Engineer.

324.3.3 Subgrade Preparation: Subgrade shall conform to the compaction and elevation tolerances specified for the material involved, shall be kept smooth and compacted, and shall be free of all loose and extraneous material when concrete is placed.

The surface of the subgrade shall be uniformly moist when concrete is placed. The surface of the subgrade shall be moistened immediately prior to placement of concrete if necessary to produce a uniformly moist condition. Any excess water standing in pools or flowing on the surface shall be removed prior to placing concrete.

~~Construction equipment shall not operate on the subgrade in the paving lane when conditions of the job will permit operation from outside the lane. When job conditions make it necessary to operate equipment on the subgrade in the paving lane, suitable runways or other precautions shall be taken to prevent rutting or displacement of subgrade material. The grade shall be checked and corrected immediately ahead of concrete placement and all disturbed grade shall be properly recompactd. (moved to 3.5)~~

~~When concrete pavement will be placed with slipform paving equipment which will be supported and operate on the subgrade, the subgrade and slipform paver track area shall be brought to proper grade and cross-section by means of a properly designed and operated machine. (moved to 3/6(a))~~

324.3.4 Stationary Side Forms and Setting of Forms: Side form sections shall be straight, free from warps, bends, indentations or other defects. Side forms shall be of metal, have a base width of at least four inches and a minimum depth equal to the thickness of the pavement. No section shall show a variation from a true plane greater than 1/8 inch in ten feet on the top of the form or more than 1/4 inch in ten feet on the inside face. Flexible or curved forms of proper radius shall be used for curves of 100 feet radius or less. Suitable materials other than metal may be used to form end closures or at other locations where use of metal forms is not practical when approved by the Engineer. Forms shall be thoroughly cleaned and oiled each time they are used.

Forms shall be of such cross-section and strength and so secured and supported on the subgrade as to resist the pressure of the concrete when placed and the impact and vibration of any equipment they are to support without springing or settlement. The method of connection between sections shall be such that the joints shall not move in any direction.

Subgrade under forms shall be compacted and cut to grade so that the form when set will be uniformly supported for its entire length at the specified elevation. Forms shall be so supported and secured during the entire operation of placing and finishing that they will not deviate vertically at any point more than 1/8 inch from the proper elevation. Forms shall be set to the required lines and grades well in advance and for a distance sufficient to prevent delay in placing concrete, and shall be approved by the Engineer prior to placing concrete. When any form has been disturbed or any grade has become unstable, the form shall be reset and rechecked.

Side forms shall remain in place until the day after placing concrete, and in all cases until the edge of the pavement no longer requires the protection of the forms. Forms shall be carefully removed in such a manner as to avoid damage to the pavement. Use of pry bars between the pavement and the forms will not be permitted.

324.3.5 Placing, Spreading and Compacting: Construction equipment shall not operate on the subgrade in the paving lane when conditions of the job will permit operation from outside the lane. When job conditions make it necessary to operate equipment on the subgrade in the paving lane, suitable runways or other precautions shall be taken to prevent rutting or displacement of subgrade material. The grade shall be checked and corrected immediately ahead of concrete placement and all disturbed grade shall be properly recompactd. Except when otherwise approved by the Engineer, concrete shall be deposited on the subgrade and spread full width using mechanical methods that result in minimal a minimum of handling and segregation. Necessary hand spreading shall be done with shovels, not rakes. Placement shall be continuous between transverse joints without the use of intermediate bulkheads.

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The Contractor shall make adequate advance arrangements for preventing delay in delivery and placing of concrete. An interval of more than 15 minutes between placing of any two consecutive batches shall constitute cause for stopping operations, and Contractor shall install a construction joint in the concrete already placed at the location and of the type directed by the Engineer.

Concrete shall be deposited as near to expansion and construction joints as possible without disturbing them but shall not be dumped onto a joint assembly. Concrete shall be thoroughly consolidated against and along the faces of all forms, adjacent pavement or curb and gutter, and on both sides of all joint assemblies. Vibrators shall not be permitted to come in contact with joint assemblies, the grade, or side forms, and shall not be operated longer than 15 seconds in any one location.

Manual methods of placing, spreading, and compacting may be used in the construction of pavement lanes of irregular width or widths less than 10 feet, and sections of intersections or other locations with complex variable surface configurations when permitted by the Engineer. Workmen shall not be allowed to walk in the freshly placed concrete with boots or shoes coated with earth or other foreign substances.

324.3.6 Shaping and Initial Finishing: Concrete shall be struck off, consolidated, and float-finished with a slipform paver, mechanical finishing machine, vibrating screed, or by hand finishing methods when approved by the Engineer so that the complete pavement will conform to the thickness and cross-section requirements of the plans and specifications. When the pavement being constructed is contiguous to existing parallel concrete pavement or curb and gutter, the elevation of the new pavement surface shall conform as closely as possible to the elevation of the existing pavement or gutter surface and in a manner which will prevent ponding.

Water shall not be applied to the pavement surface during screeding and finishing operations in excess of the amount lost by evaporation. Adding water to the surface of the concrete to assist in finishing operations shall not be permitted. When applications of water to the surface are required to prevent rapid evaporation of water from the surface during finishing operations, it shall be applied as a fog spray and with approved spray equipment.

324.3.6 (a) Slipform Supported on Subgrade Method: When concrete pavement will be placed with slipform paving equipment which will be supported and operate on the subgrade, the subgrade and slipform paver track area shall be brought to proper grade and cross section by means of a properly designed and operated machine. The equipment shall spread, consolidate, screed and float-finish the concrete in one complete pass of the machine. The machine shall be operated with as nearly a continuous forward movement as possible and all paving operations shall be so coordinated as to provide uniform progress with stopping and starting of the paver held to a minimum. Sliding side forms shall be rigidly held together to prevent spreading. Any edge slump of the pavement, exclusive of edge rounding, in excess of 1/4 inch shall be corrected.

No abrupt changes in longitudinal alignment of the pavement will be permitted. The horizontal deviation shall not exceed 1 inch from the alignment established by the Engineer.

While concrete is being spread, compacted and shaped, vibrating units shall be operated within fresh concrete so that the longitudinal axis, at the center of each unit, is not more than 6 inches above the top of the subgrade. Amplitude of vibration shall be sufficient to be perceptible on the surface of concrete along the entire length of vibrating units and for a distance of at least one foot ~~there from~~.

324.3.6 (b) Mechanical Equipment Supported on Fixed Form Method: When concrete is spread without the use of internal vibration, the finishing machine shall be equipped with vibrating equipment that will internally vibrate the concrete for the full paving width and with not less than two oscillating or reciprocating screeds. Concrete shall be struck off and consolidated so that the surface will conform to the finished grade and cross-section shown on the project plans and with sufficient material on the surface for floating operations.

After the concrete has been struck off and consolidated, it shall be floated with a longitudinal float of a type approved by the Engineer.

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A slipform paver or a single machine which will effectively spread, consolidate, screed, and float in one operation may be used in lieu of separate finishing and floating equipment.

324.3.6 (C) Manual Methods with Fixed Forms: Concrete shall be deposited, spread and struck off to such an elevation that, when properly consolidated, the surface will conform to the required lines and grades. Concrete shall be consolidated by internal vibration as it is struck off with a screed. A slight excess of concrete shall be kept in front of the screed at all times during the strike-off operation.

After consolidation and screeding, concrete shall be tamped to the proper surface elevation and cross-section using either a heavy plank with a length in excess of the width of pavement being placed by one foot or more, or with a mechanical vibrating unit spanning the full width between forms. The tamping plank, if used, shall be stiffened as necessary to prevent sag and shall have the lower tamping edge shod with metal. The tamping plank shall be moved forward with a combined vertical tamping and longitudinal screeding motion so that the concrete will be thoroughly consolidated and the surface screeded to the required elevation. A small surplus of concrete shall be kept in front of the tamper or vibrating unit. Tamping or vibrating shall continue until the specified cross-section is obtained and the mortar flushed slightly to the surface. On grades in excess of 5 percent a second strike board shall follow from 25 to 50 feet behind the tamper or vibrating unit and shall be used in the same manner to remove waves caused by the flow of concrete behind the first strike board.

~~Other Methods~~ other than the tamping plank may be utilized for screeding when approved by the Engineer.

Pavement shall be finished smooth and true to grade with suitable manually operated floats or powered finishing equipment.

324.3.7 Final Finishing: After the pavement has been float-finished, it shall be scraped with a 10-foot long straightedge equipped with a handle to permit operations from the edge of the pavement, and excess water and laitance shall be removed from the surface. The straightedge shall be operated parallel to the centerline of the pavement and shall be moved forward one-half length after each pass. Irregularities shall be corrected by adding or removing concrete, and disturbed places shall be again straight-edged.

Long-handled ~~wood~~ floats shall be used only in areas not accessible to finishing equipment and in emergencies, and use of such floats shall be confined to a minimum.

The addition of water to the surface of the concrete to assist in finishing operations shall not be permitted unless approved by the Engineer. When the evaporation rate on the concrete surface exceeds the rate of bleeding of the concrete, measures shall be taken ~~When addition of water to the surface is permitted~~ to prevent the rapid evaporation of water from the surface during finishing operations. When allowed by the Engineer, the addition of water to the surface may be permitted when applied as a fog spray with approved spray equipment immediately after screeding and/or between finishing operations. A commercial evaporation reducer that forms a monomolecular film may also be sprayed onto the concrete surface in accordance with the Manufacturer's recommendations. When either of these methods is approved and used it does not take the place of proper curing methods per Section 3.8.

Pavement edges and joints shall be edged in accordance with details shown on the project plans or as directed by the Engineer.

In advance of curing operations, pavement shall be given a texturing. Texturing shall be performed with an artificial turf drag with a board added to assure the weight needed to obtain an approved surface. Artificial turf shall be a molded composite structure with polyethylene face, nylon and polyester backing, a pile height of 0.85 inches, and total weight of 75 oz./sq. yd. The approved surface will be made by the Engineer on the initial construction and shall not be changed without approval. Each time the construction is stopped or causes the texturing to stop, the artificial turf must be shaken clean before continuing.

324.3.8 Curing: Curing shall begin immediately following surface texturing and edging. Before concrete placement begins. Contractor shall have at hand and ready to install ~~before concrete placement begins~~ the materials and equipment needed for adequate curing.

After finishing operations have been completed, the newly placed concrete shall be cured by moist curing methods, by application of a white liquid membrane compound, or by a combination of these methods. All surfaces not covered by reasonably waterproof forms shall be kept damp by applying water with a nozzle that so atomizes the flow of water that a fog mist and not a spray is formed until the surface is covered with liquid membrane compound, the surface has hardened sufficiently to permit sprinkling of the surface, or moist curing by covering with wet burlap or other approved materials can be initiated. Moisture from the nozzle shall not be applied under pressure directly upon the concrete and shall not be allowed to accumulate on the concrete in a quantity sufficient to cause a flow and erode the surface. Moist curing shall be continued until liquid membrane curing compound or other type of curing membrane is applied.

Membrane curing compound shall be applied to all pavement by automatic mechanical method from a construction bridge.

The edges of concrete slabs exposed by the removal of forms shall be protected immediately to provide these exposed surfaces with continuous curing treatment equal to the method selected for curing the pavement surface.

The membrane method of curing may be applied behind the final finishing operation after all free water has disappeared from the surface. Complete and uniform coverage at the rate of one gallon per 100 square feet, or as otherwise recommended by the manufacturer, shall be required. Compound shall be kept agitated to prevent pigment from settling.

324.3.9 Joints:

324.3.9.1 General: Joints shall be provided in the pavement of the type, dimensions and at the locations as indicated in the plans or as specified herein.

Joints in concrete pavement will be designated as transverse expansion joints, longitudinal or transverse construction joints, longitudinal or transverse weakened plane joints, or isolation joints. The faces of all joints shall be perpendicular to the pavement surface. Joints shall be constructed in accordance with the details shown in the plans and in accordance with the following provisions.

At all times prior to acceptance of the construction, joints shall be maintained clean and free of all soil, gravel, and other foreign material except approved types of joint filler materials.

324.3.9.2 Longitudinal Joints: Longitudinal joints shall be weakened plane or construction joints. Longitudinal weakened plane joints shall be constructed by sawing or by insertion of a parting strip in the plastic concrete to be left in place. Longitudinal construction joints shall be constructed with tie bars or keyways as indicated in the plans.

324.3.9.3 Transverse Joints: Transverse joints shall be weakened plane, construction or expansion joints. All transverse weakened plane joints will be constructed by sawing and in accordance with the details shown in the project plans. Transverse construction joints shall be constructed with dowels or with sawed keyways and in accordance with the details shown in the project plans. Transverse expansion joints shall be constructed as butt joints with vertical expansion joint filler and with or without dowel bars in accordance with the details shown in the project plans. Dowel bars shall be supported on a basket-type system with a base plate on subgrade and up the side form to prevent material from entering dowel openings.

324.3.9.4 Joint Location: Longitudinal joints shall be constructed between traffic lanes and at other locations as indicated in the project plans.

Transverse construction joints shall be constructed at the end of a day's production or when placing of concrete is discontinued for more than 45 minutes. Transverse construction joints will not be allowed within 500 feet of a structure unless otherwise approved by the Engineer.

Transverse weakened plane joints in concrete placed in lanes adjacent to -previously placed concrete shall be located to align with weakened plane joints in the adjacent lanes. No transverse weakened plane joint shall be constructed within 6 feet of another transverse joint. When the planned spacing of transverse weakened plane joints results in

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location of a weakened plane joint within 6 feet of another transverse joint, the transverse weakened plane joint shall be relocated so it is not within 6 feet of said transverse joint.

Transverse expansion joints shall be located at the junction of the normal roadway pavement slab with bridge approach slabs and at other locations as shown on the plans.

Isolation joints shall be provided around manholes, catch basins, or other elements which extend into or project through the pavement and act as point of restraint to horizontal or vertical movement of the pavement.

324.3.9.5 Construction of Joints:

324.3.9.5.1 Sawed Joints: Sawed joints shall be constructed by cutting a groove in the pavement using a single or multiple-blade power saw. The groove shall be cut to the dimensions shown on the project plans. Suitable guidelines or devices shall be used to assure joints are cut true to the lines as shown on the project plans.

If joints are sawed in stages, the initial saw cut shall be of the minimum width specified and sawed to the required depth shown on the project plans. The depth of the initial saw cut in the construction of weakened plane joints shall be a minimum of 1/4 of slab thickness.

Sawing of weakened plane joints shall be done before uncontrolled cracking takes place, and after the concrete has hardened to the extent that tearing or raveling of the edges of the saw cut is not excessive. The exact time for all sawing shall be determined by the Contractor when not otherwise specified herein.

Any procedure for sawing joints that results in premature, uncontrolled cracking shall be revised immediately. The Contractor shall be responsible for replacing or repairing areas containing uncontrolled cracking and for repairing spalled or chipped concrete along the edges of sawed joints as directed and to the satisfaction of the Engineer.

After saw cutting of the joint and just prior to sealing the joint, the internal joint surfaces shall be cleaned of all dirt, curing and compound residue, laitance and other foreign materials. The internal joint surface shall be defined as the sawed portion of the joint and the resultant crack for the full depth of the pavement.

324.3.9.5.2 Construction Joints: Longitudinal and transverse construction joints shall be of the type and formed in accordance with the details shown on Detail 224 or as directed by the Engineer.

324.3.9.5.3 Expansion and Isolation Joints: Transverse expansion and isolation joints shall be formed in accordance with the details shown on Detail 224 or as directed by the Engineer.

324.3.9.5.4 Sealing of Joints: Sealing of sawed joints where required shall be completed prior to the opening of the pavement to traffic unless otherwise approved by the Engineer. When delayed sealing of sawed joints is permitted, saw cuts and formed recess to be filled with sealant shall be protected to ensure thorough curing of the concrete along the edges of the joint recesses and to prevent entry of foreign materials into the joint. At the Contractor's option, inert compressible joint filler material such as plastic backer rod or upholstery cord may be inserted into joints immediately after sawing or forming of the joint recess to provide curing protection and prevent entry of foreign material. If absorptive filler material is used, it shall be thoroughly moistened either before or immediately after installation in the sawed groove. When filler material is rope, or similar material which does not fill the entire depth of sawed groove, it shall be depressed not less than 1/2 inch below the pavement surface before the pavement is opened to traffic.

Sealant shall be applied in accordance with the sealant manufacturer's recommendations. A primer shall be furnished and applied after the joint has been cleaned and prepared to receive sealant if so indicated in the manufacturer's recommendations.

Prior to the application of the sealant, an approved type of inert, compressible joint filler material such as plastic backer rod or upholstery cord, or an approved type of bond breaker, shall be inserted along the joint in accordance with the details shown on the project plans. The joint shall then be filled with sealant to a level not less than 1/8 inch or more than 1/4 inch below the elevation of the pavement surface adjacent to the joint edge.

The equipment used to apply sealant shall be as recommended by the sealant manufacturer. Sealant shall not be spilled on the surface of the concrete pavement, and Contractor shall remove any sealant inadvertently spilled on the pavement surface.

324.3.9.5.5 Repair of Cracks, Spalls, Raveling and Tearing: Contractor shall be responsible for replacing or repairing all areas of pavement containing uncontrolled cracking, surface spalls, or other types of surface defects as directed by the Engineer. Repairs shall be made by methods acceptable to the Engineer and the repair shall be completed to the satisfaction of the Engineer.

324.4 Tests of Finished Pavement:

324.4.1 Smoothness: The pavement Surface Profile Index shall not exceed seven inches per mile in any 0.1 of a mile section or any remaining portion thereof as measured along any line parallel to the edge of the pavement except at and through intersections, and at and through railroad crossings. The surface profiles will be evaluated in accordance with the requirements of Arizona Department of Transportation Test Method 801.

After completion of all paving, the Contractor shall clean the pavement by brooming or any other method to allow the Engineer to obtain accurate profilograph readings. Profilograph readings will be taken one time in each wheel path of each lane.

Grinding will be required if necessary to produce a surface smoothness conforming to the requirements of this section. In addition, all high areas having deviations in excess of 0.3 of an inch shall be ground. After grinding, the finished surface of the ground area shall be provided with a uniform texture acceptable to the Engineer. The method of texturing shall be approved by the Engineer.

In addition to the Surface Profile Index requirement, the pavement surface including pavement in intersections will be tested with a ten-foot straight-edge placed parallel to the centerline of the pavement in each lane. Ordinates measured from the face of the straight-edge to pavement surface shall at no place exceed one-quarter inch. Areas that do not meet the required surface accuracy as determined by straight-edge testing shall be marked, and Contractor shall at his own expense and as required by the Engineer either:

- (1) Grind down areas higher than 1/4 inch but not more than 1/2 1/2 inch above the correct surface.
- (2) Correct areas lower than 1/4 inch but not lower than 1/2 1/2 inch below the correct surface by grinding down the adjacent areas.
- (3) Break out and replace pavement when the deviation exceeds 1/2 1/2 inch from the correct surface. Area replaced shall be of a length, width and depth as required to allow formation of a new slab of the required quality.

324.4.2 Pavement Thickness: Concrete pavement shall be constructed in accordance with the thickness requirements of the plans and specifications. Tolerances for base and subgrade construction and other provisions of these specifications which may affect thickness shall not be construed to modify such thickness requirements.

For the purpose of determining acceptability for thickness, cores shall be drilled by the Contractor at the locations specified by the Engineer. Cores shall have a minimum diameter of four inches. Length of cores will be determined in accordance with the requirements of AASHTO T-148 by measurements read to the nearest thousandth of an inch. The average of the measurements will be reported to the nearest hundredth of an inch.

In calculating average length, cores which have a length in excess of the thickness specified by more than 0.25 of an inch will be deemed to have a length of the specified thickness plus 0.25 of an inch. Field length measurements will be acceptable in lieu of average length measurement in accordance with the requirements of AASHTO T-148, provided the original core in any secondary unit meets or exceeds the specified thickness. Measurements in accordance with the requirements of AASHTO T-148 will be required on any questionable thickness measurements and on the three cores used to determine the average length for payment, regardless of length.

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A primary unit of pavement shall be the area of pavement placed in each day's paving operation. Each intersection or special section shall be considered as a primary unit.

A secondary unit of pavement shall consist of 1,000 linear feet, or fraction thereof, of each traffic lane. Each 1,300 square yards of pavement in intersections, etc., shall be considered a secondary unit regardless of when the concrete was placed.

One core shall be drilled in each secondary unit. If the length of that core is not deficient by more than 0.25 of an inch, that secondary unit will be measured for payment at 100 percent. If the length of that core is deficient by more than 0.25 of an inch but less than 1.0 inch, two additional cores shall be drilled within that secondary unit and the length of the three cores averaged. If the average length is not deficient by more than 0.25 of an inch, that secondary unit will be measured for payment at 100 percent. If the average length of the three cores is deficient by more than 0.25 of an inch, that secondary unit will be measured for payment in accordance with the requirements of Table 324-1.

If the core in the secondary unit is deficient by more than 1.00 inch, that core will not be used in determining the average thickness of that secondary unit. Additional cores shall be drilled at intervals not to exceed ten feet in each direction from the deficient core, parallel to the main-line centerline, until one core is obtained in each direction which is not deficient by more than 1.00 inch. The pavement between these two cores will be evaluated separately from the balance of the pavement in that secondary unit. The limits for evaluation shall be between the longitudinal weakened plane or construction joint on each side of the core and between the next transverse weakened plane, construction, or expansion joint beyond each of the last two cores. Unless the Engineer allows the pavement to remain, it shall be removed and replaced with pavement of the specified thickness and no payment will be made for the removed pavement. One additional core shall be drilled in the secondary unit to represent the quality of the concrete in that unit after deducting the limits of the deficient area if that pavement represented by the deficient area is allowed to remain. The core shall be measured for payment as hereinbefore specified.

If the pavement in the deficient area is removed, either by the order of the Engineer or at the option of the Contractor, it shall be removed between the limits of the evaluation. After the pavement has been replaced, one core shall be drilled at random in that secondary unit after deducting the area of the replaced pavement and one core shall be drilled in the new pavement. Pavement represented by the core drilled in the secondary unit, less the replaced pavement, will be measured for payment as hereinbefore specified. The core drilled in the replaced pavement shall be not less than the specified thickness; otherwise that pavement will not be measured or paid for.

At all locations where cores have been drilled, the resulting holes shall be filled with concrete in a manner satisfactory to the Engineer.

324.5 PROTECTION OF PAVEMENT:

The Contractor shall be responsible for taking adequate steps to protect concrete placed during rain, or hot or cold weather as defined in ACI Standards. Any concrete damaged by rain or extreme temperatures shall be removed and replaced at the Contractor's expense.

When ordered by the Engineer, pavement crossings shall be constructed for the convenience of public traffic. Where motor vehicles are encountered, a temporary bridge to span the newly placed concrete will be provided.

No traffic or Contractor's equipment, except as hereinafter provided, will be permitted on the pavement until the concrete has developed a compressive strength of 3500 psi.

Equipment for sawing joints will be permitted on the pavement when, in the Contractor's judgment, the concrete has developed sufficient strength to support the equipment without damage to the concrete. In case of visible cracking or other damage to the pavement, operation of the equipment on the pavement shall be immediately discontinued.

Any damage to the pavement resulting from early use of pavement by the Contractor's equipment shall be repaired by the Contractor at his expense.

324.6 METHOD OF MEASUREMENT:

Portland Cement Concrete pavement will be measured by the square yard. Any opening in excess of one square yard will not be measured for payment.

324.7 BASIS OF PAYMENT:

The accepted quantities of Portland Cement Concrete pavement, measured as provided for herein, will be paid for at the contract unit price complete in place, except that where the average length of cores indicates pavement deficient in thickness by more than 0.25 of an inch but not more than 1.00 inch, payment will be made as specified in Table 324-1. Payment will be made to the nearest cent.

No additional payment will be allowed for pavement constructed in excess of the thickness specified on the project plans.

TABLE 324-1	
PAVEMENT THICKNESS PAYMENT REDUCTION (AC)	
Core Thickness, Less Than Specified Thickness, Inches	Percent of Contract Unit Price Allowed
0.00 to 0.25	100
0.26 to 0.35	93
0.36 to 0.45	85
0.46 to 0.55	75
0.56 to 0.75	63
0.76 to 1.00	50

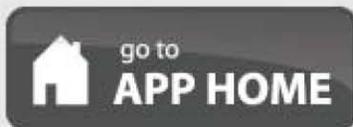


Description

This web applet, based on various established correlation equations, allows you to quickly convert between compressive strength, flexural strength, split tensile strength, and modulus of elasticity of concrete.

Terms of Use

The user accepts ALL responsibility for decisions made as a result of the use of this design tool. American Concrete Pavement Association, its Officers, Board of Directors and Staff are absolved of any responsibility for any decisions made as a result of your use. Use of this design tool implies acceptance of the terms of use.



Strength Converter

English (psi)

Metric (MPa)

Convert

Flexural Strength

to

Compressive Strength

Calculate

English (psi)	Source
2,996	MEPDG
3,399	Mindess, Young, and Darwin; Raphael
4,807	ACI 318
3,399	ACI 330*
2,704 to 4,225	Yoder and Witczak; Huang

* ACPA recommended conversion.

[Show/Hide References](#)

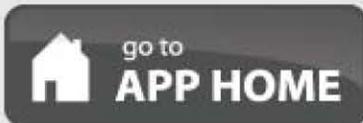


Description

This web applet, based on various established correlation equations, allows you to quickly convert between compressive strength, flexural strength, split tensile strength, and modulus of elasticity of concrete.

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Strength Converter

English (psi)

Metric (MPa)

Convert

650

Flexural Strength

to

Compressive Strength

Calculate

English (psi)	Source
4,681	MEPDG
4,751	Mindess, Young, and Darwin; Raphael
7,511	ACI 318
4,751	ACI 330*
4,225 to 6,602	Yoder and Witczak; Huang

* ACPA recommended conversion.

[Show/Hide References](#)

SECTION 718

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.

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 .07 to .18 gallons per square yard.

TYPE B - Petroleum Hydrocarbon emulsion. Applied at .05 to .20 gallons per square yard, diluted.

TYPE C - Tire modified surface sealer (TRMSS) or equal not diluted, and applied at a rate of .10 to .20 gallons per square yard.

TYPE D - Acrylic polymer, modified emulsion. Diluted to the manufacture's recommendation and applied at a rate of .08 to .20 gallons per square yard.

718.2 TEST METHODS AND REQUIREMENTS

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

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

PRESERVATIVE SEAL SPECIFICATIONS					
Properties * (note 2)		Type-A	Type-B	Type -C	Type-D
Saybolt Viscosity @77°F (sfs)	ASTM D7496-09	45-55 (KU)* (note 1)	15-40	15-40 85(KU)*note 1	15-40
Residue by evaporation 138°C	ASTM D6934-08	30-40	.10 Max	5 30 min.	60-65
Sieve test %	ASTM D6933-08	N/A		.10 max -N/A	0.1
5 day settlement test	ASTM D6930-10		2.0% max	N/A	N/A
Test on residue from evaporation ASTM D6934-08					
Flash point °F(<u>Min</u>)	ASTM D92	450°F	450°F	450°F	385°F
Softening point	ASTM D36M-09	130°F min	N/A	130 140°F min.	N/A
Accelerated weathering test	ASTM D4799-03	Report * (note 3)	N/A	<u>Pass</u> -Report (note 3)	Plant certification within 6 months
Ductility (@77°F) 100g 5 sec.	ASTM D113-07	N/A	N/A	20 min -N/A	N/A
Storage stability, test 1 day%	ASTM 6930-10	N/A	N/A	N/A	N/A
Viscosity @ 140°F, cSt	D-445	N/A	1,000-9,500	N/A	210-390

SECTION 718

Asphaltenes, % w (max)	D-2006-70	N/A	10.0 Max.	N/A	1.00
Maltene Dist. Ratio	D-2006-70	N/A	0.2-1.4	N/A	0.3-0.6
PC/S Ratio ⁴⁵ (Min) (Note 4)	D-2006-70	N/A	0.5 Min.	N/A	0.5
Saturated Hydrocarbons, S ⁵ (note 4)	D-2006-70	N/A	28 Max.	N/A	21-28

Notes:

1. Kreb units (ASTM D562)
2. 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.
3. [ASTM G154, 1000 hours](#) - The Ultraviolet resistance testing results will be provided at no cost to the engineer.
4. Only residue by evaporation shall be run on diluted samples. Specification limits should be diluted rate times minimum residual value of concentrate.
5. PC/S ratio: $\frac{PC + A_1}{S + A_2}$

- End of Section -



Water/Sewer Working Group Meeting

Meeting Notes
February 18, 2014

Opening:

A meeting of the Specifications and Details Water/Sewer Working Group was called to order by chair Jim Badowich on February 18, 2014, at 1:35 p.m. in the MAG Cottonwood Room.

1. Introductions/Attendance

Jim Badowich (Avondale), Arturo Chavarria (Hanson), Jami Erickson (Phoenix), Jason Jackson (Oldcastle), Mike Molina (Oldcastle), Paul Nebeker (Pipe Right), Mike Sanders (AZUCA), Craig Sharp (Buckeye), Gordon Tyus (MAG), Arvid Veidmark (Specialized Services), Stew Waller (Rinker)

2. Meeting Dates

Mr. Badowich said the majority of feedback he received was to keep the meeting times the same – on the third Tuesday of the month.

3. Manhole Revisions/Update (Cases 13-21 and 13-22)

Craig Sharp said he is working with Mesa to get the CAD drawings updated. Once they are ready he proposed presenting them to the committee. Mike Molina from Oldcastle asked for a summary of the changes. Jim Badowich said bricks and steps are removed, there was a clean-up of the drawings and that reinforcement of the bases would be required at greater depths (20' +). Mr. Molina said reinforcement is also often used for larger pipe sizes. Mr. Sharp said the details were combined to include options for both precast and cast-in-place bases, and new details for precast bases were added based on Buckeye's experience.

Mr. Badowich suggested specifications for vacuum testing manholes be added in the future. Further discussion about the ADEQ and OSHA requirements regarding the vacuum testing of manholes followed, for both prior to backfill and after, as well as with and without coating. Mr. Molina said the process for vacuum testing in the Valley generally follows the ASTM standards, but cities have different testing times, such as 90 or 60 seconds. He also described the process using a test head on the top of the cone. Several agency representatives said they do the testing after the adjustments and paving was done.

4. Revisions to Rigid and Flexible Pipe Installation (Case 13-15)

Warren White was unable to attend the meeting, but Mr. Tyus supplied copies of the latest versions of Sections 601 and 603 for discussion. Paul Nebeker asked why jetting was removed. Mike Sanders said it went out of practice years ago. Mr. Badowich commented that Chandler had settling problems due to jetting and thinks mechanical compaction is preferable. Stew Waller said other than a few minor issues he thinks Sections 601 and 603 are in pretty good shape. He noted that they use the updated terminology to match ASTM and the revised Detail 200. Jami Erickson recommended that a complete package of all the revised sections and details to date be prepared for review by the full committee.

She also said that she was planning to prepare a draft for a new Section 611 that combined the testing procedures, although it likely won't include any new ones for this first draft. Mr. Waller said ASHTO has a completed a guide for laser testing procedures.

5. Water Testing/Flushing

Rob Godwin, who had been working on revising Section 610 was not present, but Mr. Badowich led a general discussion on flushing requirements. Paul Nebeker said Tempe has strict requirements in order to pass a bacteria test. He said it is not possible to get an adequate flow from a 2" connection, and that adding extra chlorine can also cause problems. Mr. Samer said it would be easier to flush if agencies allowed the lines to be tied into the main line with a new valve, rather than using a jumper. Ms. Erickson said cities are worried about contamination. Increasing the size of the connectors to be 2" smaller than the size of the pipe being flushed was suggested. There was also discussion about costs of testing and charging for water used for flushing. Mr. Badowich said due to low water reserves in Avondale, testing was only allowed on certain days. Mr. Nebeker stated that a flow rate of 10 ft/sec was required for proper flushing. He also commented that the last step in construction was to install a small portion of the line after testing, which could still contaminate the system.

6. Jacking Tunneling and Boring

Arvid Veidmark emailed out the latest draft of Section 607 TRENCHLESS INSTALLATION OF FLUSH BELL AND SMOOTH WALL JACKING PIPE FOR STORM DRAIN OR IRRIGATION. It includes revisions from Bob Herz, and replaces part of Section 618. Mr. Tyus said he could post the latest version online. Mr. Veidmark also said he was working on a draft for a new Section 608 for directional boring. He asked if he should move forward with specifications for dry or wet utilities. Mr. Badowich said it is becoming common for copper waterlines, and other utilities agencies use such as for ITS infrastructure and traffic signal cabling. He also asked about potholing requirements. Mr. Veidmark said that was determined by the blue stake law. Paul Nebeker commented on the difference between boring new and replacement lines. Mr. Veidmark said he would continue work on the section.

7. Other Items

Jami Erickson said Phoenix is considering incorporating some of their supplements. One new potential case may be adding composite polymer boxes. A difficulty is that they are not in standard sizes, so creating a detail that works for all manufacturers is not easy. She said they also have difficulty matching lids in the field. Mr. Badowich added that the polywrap size table needed to be updated. Mr. Tyus said he thought Mr. Godwin was addressing it in his update of Section 610, but that he would review material he received from a supplier.

8. Next Meeting Date

The next meeting of the Water/Sewer working group is scheduled for Tuesday, March 18th at 1:30 p.m. at the MAG office. The group agreed to schedule meetings for the third Tuesday of each month up through September 16th.

The meeting was adjourned at 3:00 p.m.

**Report to MAG Technical Committee
Meeting February 20, 2014
Asphalt and Materials Working Group meetings
By Chairmen, Jeff Benedict, Brian Galimore**

The meeting was held on noon on February 20, 2014 at the ARPA offices. Present at the meeting were Bob Herz (MCDOT), Syd Anderson (PHX), Brian Gallimore (WSP), Brad Parker (Mesa Materials), Phil Feliz (WTI), Don Cornelison (Speedie), Scott Thompson, Bob Kosteling (CardnoATC), Jeff Hearne (SRMG), and Gordon Tyus (MAG).

Cases for submittal:

Case 14-06: Section 718 revision to table 718-1, type C to bring the specification into current production limits for this material. Phil Feliz questioned the flash and softening point on the residue. I will investigate this concern.

Section 321 with regard to “permit work” was discussed at length and the working group will attempt to pull all references to “permits” to one area of 321. An industry meeting will make a draft attempt at this effort to bring it back to the working group. This may not be ready for the main MAG committee this year.

Section 321 with regard to the allowance of “warm mix” technologies was discussed. Phil Feliz will review section 710 and recommend some language to allow these technologies. Scott Thompson will review the 321 to recommend any changes for the use of warm mix technologies. It is expected that this will become a case after the next working group meeting.

Brian Gallimore volunteered to work on private (out of right of way) language to for pavements and this will be brought back to the main working group to decide where this language should be inserted.

Brian also found a city of Gilbert specification on Street Print or “Decorative Asphalt Stamping and Coating”. The committee asked that Brian contact Gilbert to see if they would be willing to call a case for the regular MAG meeting.

The next working group meeting will be held on 3-20-2014 at the ARPA office at noon. The meeting was adjourned at 1:10 p.m.

MAG Concrete Working Group

Meeting Notes

Thursday, February 20, 2014, 1:30 pm at the AGC Offices

Present:

See attached attendance sheet.

Discussion:

- 1) Revision to Section 725 – Jeff Hearne
Several areas were discussed – Section 725.2.1 on fly ash percentages
Section 725.3 on sand composite requirements
Section 725.7.2 on initial mixing requirements and moving the paragraph on water addition to Section 725.9(A)
Section 725.8.2 elimination of the sampling frequency of every 50cy
- 2) Revision to Section 324 on PCCP – Jeff Hearne
The most recent revision was discussed with a minor wording change to Section 324.2.1 suggested by Bob Herz. We discussed getting sample specifications from the COP regarding the handling of utilities at Sky Harbor Airport for review – Sid Anderson will look into obtaining these. It was determined that we also need some Contractor input on this section.
- 3) COP supplement to Section 340 was discussed relating to jointing and spacing requirements and accepted Industry recommendations.

Date for Next Meeting:

The next meeting is scheduled for **March 20, 2014 @ 1:30 pm** in the ARPA offices.
(Following the Asphalt and Materials Working Group meetings)

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

