

July 29, 2008

TO: Members of the MAG Specifications and Details Committee

FROM: Robert Herz, Maricopa County DOT, Chairman

SUBJECT: MEETING NOTIFICATION AND TRANSMITTAL OF AGENDA

Wednesday, August 6, 2008 at 1:30 p.m.
MAG Office, Second Floor, Cholla Room
302 North First Avenue, Phoenix

The meeting of the MAG Specifications and Details Committee will be held at the place and time indicated above. The agenda for the meeting is provided below. **Please park in the garage under the building. Bring your ticket to the meeting, parking will be validated. For those using transit, the Regional Public Transportation Authority will provide transit tickets for your trip. For those using bicycles, please lock your bicycle in the bike rack in the garage.** Please call me at (602) 506-4760 if you have questions about the upcoming meeting.

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 at (602) 254-6300. Requests should be made as early as possible to allow time to arrange the accommodation.

The discussion time for individual cases will be limited to approximately 5 minutes per case. This limitation is due to the large number of active cases and is intended to provide an opportunity for all cases to be addressed. It is requested (not required) that written comments be prepared in advance for distribution at the meeting.

AGENDA

<u>ITEM</u>	<u>COMMITTEE ACTION REQUESTED</u>
1. <u>Call to Order</u>	1. No action required.
2. <u>Approval of July 2, 2008 Meeting Minutes</u>	2. Corrections and approval of July 2, 2008 minutes.
3. <u>2007 & 2008 Cases</u>	3. Review of pending cases and voting on cases as previously requested.
4. <u>General Discussion</u>	4. For information and discussion.
5. <u>Adjournment</u>	5. No action required.

A Voluntary Association of Local Governments in Maricopa County

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

July 2, 2008

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

AGENCY MEMBERS

Jim Badowich, Avondale	Gordon Haws, Mesa
* Steven Borst, Buckeye	Jesse Gonzalez, Peoria
* Warren White, Chandler	Jeff Van Skike, Phoenix (St. Trans.)
Dennis Teller, El Mirage	Larry Smith, Phoenix (Water)
* Kelli Kurtz, Gilbert	Mark Palichuk, Queen Creek
Tom Kaczmarowski, Glendale	* Rodney Ramos, Scottsdale
Gary Jipner for Troy Tobiasson, Goodyear	Loren Kelley, Surprise
Bob Herz, MCDOT	James Bond, Tempe

ADVISORY MEMBERS

John Ashley, ACA	* Adrian Green, ARPA
Jeff Benedict, AGC	Paul R. Nebeker, Independent
Brian Gallimore, AGC	* William Ast, NUCA
Peter Kandaris, SRP, Vice Chairman	* Dale Phelan, NUCA
James Carusone, ARPA	

MAG ADMINISTRATIVE STAFF

Gordon Tyus

* Members not attending or represented by proxy.

GUESTS/VISITORS

Dennis Shoffner, StrongGo, LLC (Tekway Dome Tiles)
Doug Berg, Contech Construction Products, Inc.

1. Call to Order

Chairman, Bob Herz, called the meeting to order at 1:36 p.m.

2. Approval of Minutes

The members reviewed the June 4, 2008 meeting minutes. John Ashley introduced a motion to accept the minutes as written. Jeff Van Skike seconded the motion. A voice vote of all ayes and no nays was recorded.

3. 2007 Cases (old cases)

a. **Case 07-02 – Revisions to Asphalt Concrete, Sections 321 and 710:** Major re-writes of Asphalt Concrete placement and materials Sections 321 and 710 as proposed by the Asphalt Paving Technical Committee (APTC). Discussion by the committee on revised Section 321 included protection of tack coat and windrow hot mix, rejection of improperly stored hot mix, and rejection of out of compliance mixes in transit. Bob Herz and Gordon Haws stated that each will provide additional comments for the next meeting. Members were requested to continue reviewing proposed revisions to Sections 321 and 710 and return with comments for the next meeting.

b. **Case 07-03A – PVC Catch Basins, Proposed New Details 535-2, 535-3, 537-2 & 539-2. Case 07-03B – Inlet Structures, Proposed New Details 542-1 through 4 & 543-1 through 5:** Details to allow the use of PVC catch basins and inlet structures. Bob Herz handed out written comments on the case. Members were requested to continue reviewing the new details and provide any additional comments at the next meeting.

c. **Case 07-08 – Revision to Section 615.2, Sewer Line Construction:** Provide water ponding tolerances inside sewer pipe. The case was withdrawn by the sponsor.

d. **Case 07-11 – Revision to Detail 370, Vertical Realignment of Water Mains:** Include an option for realignment of ductile iron mechanical joint. The case was withdrawn by the sponsor.

e. **Case 07-12 – Revision to Detail 404-2, Water & Sanitary Sewer Separation/Protection:** Adding language to clarify the location of pipe and joint restraints to insure that fittings/couplings do not fail and create cross-contamination. The case was withdrawn by the sponsor.

4. 2008 Cases (new cases)

a. **Case 08-01 – Revisions to Borrow Excavation, Section 210:** Defining acceptance criteria for import borrow material. Bob Herz moved to vote on the case as presented in the 6-5-08 revision. Jim Badowich seconded the motion. A vote of 11 yes, 0 no, 0 abstention and 4 not present was recorded.

b. **Case 08-02 – New Section 317, Asphalt Milling:** Construction requirements for milling existing asphalt concrete. Bob Herz moved to vote on the case as presented in the 5-8-08 revision. Gordon Haws seconded the motion. A vote of 11 yes, 0 no, 0 abstention and 4 not present was recorded.

c. **Case 08-03 – New Section 325, Asphalt – Rubber Concrete Overlay, Gap Graded:** Material and construction requirements for gap-graded asphalt-rubber concrete used as an asphalt pavement. The committee provided comments on the new section including eliminating the 2-inch overlay mix. Bob Herz will prepare revisions for the next meeting based on the discussion and other comments received. Members were requested to continue reviewing the new section and provide any additional comments at the next meeting.

d. **Case 08-05 – Revisions to Safety Post Detail 140:** A revision to incorporate multiple agency safety post designs and include hazard marker requirements with the existing safety post detail. Peter Kandaris noted that the function of the through drill hole for removable bollards is to assist in lifting. Warren will prepare revised details for the next meeting based on comments received. Members were requested to be prepared to vote on this case at the next meeting.

e. **Case 08-06 – Modification to Storm Drain Construction, Section 618.3:** Additions to include leakage test procedures for HDPE storm drain pipes and require video inspection before final paving is allowed. Jeff Van Skike handed out revisions based on comments from the last meeting. He noted that his research indicates that the City of Phoenix only uses their specification to test HDPE storm drains, but no other pipe material types. The committee discussed the need for and application of leakage testing of storm drains. Because of improved installation materials, greater local experience of HDPE installation contractors, and the difficulty in quantifying test needs for bidding, the members determined that leakage testing is not required in the MAG document at this time. Jeff Van Skike will prepare a new revision for the next meeting that focuses on the video inspection aspects of the case.

f. **Case 08-07 – Modification to Measurements and Payment, Section 109:** Revisions to better define compensation with change orders. Gordon Haws provided a revision based on comments received to date. Members were requested to review the revised section and provide comments by the next meeting.

g. **Case 08-08 – Modification to Subgrade and Trench Compaction, Sections 301.3 and 601.4:** Revisions to modify subgrade compaction requirements and include tolerances for optimum moisture. Gordon Haws provided a revision based on comments received to date. Members were requested to review the revised section and provide comments by the next meeting.

h. **Case 08-10 – Modification to Trench Backfill and Pavement Replacement, Detail 200, Section 336 and Section 601:** Revisions to eliminate numerous agency trench backfill and pavement replacement supplemental details by combining the most common practices. The committee had no discussion on this item. Committee members were encouraged to review the proposal and return with comments for the next meeting.

i. **Case 08-11 – Revisions to Driveway Entrance Detail 250 and Section 340:** Changes to make sidewalk installations in driveway entrances ADA compliant. Bob Herz

provided revised details based on previous comments. Discussion by the committee included showing a minimum 3-foot sidewalk width dimension behind driveway ramps in the plan view of Detail 250-2 and the potential need for additional right-of-way to accommodate this change. Bob Herz will make changes per the discussion and requested members to be prepared to vote on this case at the next meeting.

j. **Case 08-12 – New Section 331, Microsealing, and Section 714, Microsurfacing Materials:** New sections for pavement microsurfacing materials and placement. Bob Herz handed out comments on the case. Jeff Van Skike will prepare revisions for the next meeting based on these and previous comments. Members were requested to continue reviewing the new sections and provide any additional comments at the next meeting.

k. **Case 08-13 – Modification to Manhole, Valve Box and Water Meter Box Adjustments, Section 345:** Revisions to require contractors be responsible for locating utilities during surface improvement projects to insure adjustments are performed. Jeff Van Skike handed out changes based on comments from the last meeting. After discussion, the committee agreed to change the last sentence of the proposal to read as follows: “These devices shall be referenced by the use of swing ties with appropriate supplemental survey data.” Jeff Van Skike moved to vote on the case as revised. Jesse Gonzalez seconded the motion. A vote of 11 yes, 0 no, 0 abstention and 4 not present was recorded.

l. **Case 08-14 – Revisions to Utility Pothole Repair Detail 212:** Revision to MAG Detail 212 to allow multiple backfill and asphalt concrete materials for repair of utility potholes. Jeff Van Skike handed out a revision based on comments from the last meeting. Committee members recommended including a note requiring vertical tack coated edges and leaving the bedding note as presently shown in the detail. Jeff Van Skike will prepare revisions based on these comments and requested that members be prepared to vote on this case at the next meeting.

m. **Case 08-15 – Revisions to Catch Basin Grate on Detail 535:** Bob Herz presented detail adjusting the size and location of grate end bars which reduces the maximum potential gap between grate and frame to prevent entrapment of bicycle tires. Because of the minor nature of the proposed change, Bob Herz moved to vote on the case as presented. Jesse Gonzalez seconded the motion. A vote of 10 yes, 1 no, 0 abstention and 4 not present was recorded.

n. **Case 08-16 – Revisions to Concrete Cut-Off Wall Detail 552:** Clarify requirements for concrete surfaced ford crossings. The committee had no discussion on this case. Members were requested to be prepared to vote on this case at the next meeting.

o. **Case 08-17 – Revisions to Residential Speed Hump Detail 210:** Remove contradictory language for speed bump height tolerance. Bob Herz handed out changes based on comments from the last meeting. After discussion, committee members recommended increasing the existing pavement removal width in Note 7B from 18 inches to 24 inches and to indicate that the dimensions in Section A-A are symmetrical on both

sides of the hump. Members were requested to be prepared to vote on this case at the next meeting.

5. General Discussion:

John Ashley announced that the concrete modernization subcommittee will next meet at 10:00 am on Friday, July 11th at the ARPA offices (916 W. Adams Street, Phoenix) and handed out a draft of some recent changes proposed by the subcommittee. He also stated that there will be a pervious concrete seminar on July 23rd from 1:30 to 3:00 pm at the City Goodyear (195 N. 145th Avenue, Room 101).

Jeff Benedict discussed an AGC/ARPA position letter recently sent to the committee discussing escalating costs of asphalt product construction materials. The letter suggests strategies that agencies can take to hold costs down and notes that ADOT is in the process of modifying their standards to allow a percentage of recycled asphalt pavement into new hot mixes. Pinal County Association of Governments has already taken similar action. He encouraged MAG agencies investigate this option for inclusion in their supplemental specifications during the near term and that the committee consider this change next year in the MAG standards.

6. Adjournment:

The meeting was adjourned at 3:52 p.m.

2008 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

(Updated information can be found on the website: <http://www.mag.maricopa.gov/detail.cms?item=8497>)

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE
07-02	Revision/ Re-Write Section 321 & Section 710	AGC ARPA	Jeff Benedict (Don Green)	2/07/2007 321 - 4/10/2008 710 - 5/19/2008		0 Yes 0 No 0 Abstain
07-03 A	PVC Catch Basins - New Details 535-2, 535-3, 537-2, 539-2	NUCA	Dale Phelan	2/07/2007 6/24/2008		0 Yes 0 No 0 Abstain
07-03 B	PVC Inlet Structures - New Details 542-1, 542-2, 543-1, 543-2, 543-3.	NUCA	Dale Phelan	2/07/2007 6/24/2008		0 Yes 0 No 0 Abstain
07-08	Revision to Section 615-Sewer Line Construction— Clarify tolerances for pipe versus trench bottom.	Queen-Creek	Mark Palichuk (Gerald Wright)	5/02/2007 8/01/2007	Case Withdrawn 7/02/2008	0 Yes 0 No 0 Abstain
07-11	Revision to Detail 370, Vertical Realignment of Water Mains	Peoria	Jesse Gonzalez	6/06/2007	Case Withdrawn 7/02/2008	0 Yes 0 No 0 Abstain
07-12	Revision to Detail 404-2, Water & Sanitary Sewer Separation/Protection	Peoria	Jesse Gonzalez	6/06/2007	Case Withdrawn 7/02/2008	0 Yes 0 No 0 Abstain
08-01	Revision to Section 210 Borrow Excavation	MCDOT	Bob Herz	1/02/2008 6/05/2008	Approved 7/02/2008	11 Yes 0 No 0 Abstain
08-02	New Section 317, Asphalt Milling	MCDOT	Bob Herz	1/02/2008 5/08/2008	Approved 7/02/2008	11 Yes 0 No 0 Abstain
08-03	New Section 325, Asphalt – Rubber Concrete Overlay, Gap Graded	MCDOT	Bob Herz	1/02/2008 7/21/2008		0 Yes 0 No 0 Abstain
08-04	New Details 180-1 and 180-2, Portable Water Tank Fill Pipe and Backflow Prevent Details	Chandler	Warren White (David Fern)	1/02/2008	Case Withdrawn 6/04/2008	0 Yes 0 No 0 Abstain

* Case was approved with verbal modifications at time of voting.

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CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE
08-05	Revisions to Safety Post Detail 140 and add Detail 141	Chandler	Warren White (David Fern)	1/02/2008 7/22/2008	Proposed vote 8/06/2008	0 Yes 0 No 0 Abstain
08-06	Revision to Section 618.3 Construction Methods, add Leakage Test Procedures for HDPE Storm Drain Pipe.	Phoenix	Jeff Van Skike	2/06/2008 7/02/2008		0 Yes 0 No 0 Abstain
08-07	Revisions to Section 109.4 Compensation for Alteration of Work	Mesa	Gordon Haws	2/06/2008 7/02/2008		0 Yes 0 No 0 Abstain
08-08	Revisions to Section 301.3 Relative Compaction and Section 601.4 Foundation, Bedding, Backfilling and Compaction concerning optimum moisture and percent compaction.	Mesa	Gordon Haws	2/06/2008 7/02/2008		0 Yes 0 No 0 Abstain
08-09	Revisions to Section 625-3-1 Manholes	Mesa	Gordon Haws	2/06/2008 4/02/2008	Case Withdrawn 4/02/2008	0 Yes 0 No 0 Abstain
08-10	Detail 200 and Sections 336 and 601 – Trench backfill and pavement Replacement	SRP	Peter Kandaris	2/06/2008 4/02/2008		0 Yes 0 No 0 Abstain
08-11	Revisions to Detail 250 DRIVEWAY ENTRANCES and specification Section 340	MCDOT	Bob Herz	3/05/2008 7/17/2008		0 Yes 0 No 0 Abstain
08-12	New Section 331, Microseal Specifications New Section 714, Microsurfacing Materials	Phoenix	Jeff Van Skike	3/05/2008 4/02/2008		0 Yes 0 No 0 Abstain
08-13	* Revision to Section 345 Adjusting Frames, Covers, Valve Boxes and Water Meter Boxes	Phoenix	Jeff Van Skike	3/05/2008 7/02/2008	Approved 7/02/2008	11 Yes 0 No 0 Abstain
08-14	Revision to Detail 212 UTILITY POTHOLE REPAIR	Phoenix	Jeff Van Skike	4/02/2008 7/02/2008	Proposed vote 8/06/2008	0 Yes 0 No 0 Abstain

* Case was approved with verbal modifications at time of voting.

2008 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

(Updated information can be found on the website: <http://www.mag.maricopa.gov/detail.cms?item=8497>)

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE		
						10	Yes 1 No 0	Abstain
08-15	Revision to Detail 535 CATCH BASIN TYPE 'F' – Grate modification	MCDOT	Bob Herz	6/04/2008	Approved 7/02/2008	0	Yes 1 No 0	Abstain
08-16	Revision to Detail 552 CONCRETE CUT-OFF WALLS – Revise concrete pavement note	MCDOT	Bob Herz	6/04/2008 6/05/2008	Proposed vote 8/06/2008	0	Yes 0 No 0	Abstain
08-17	Revision to Detail 210 RESIDENTIAL SPEED HUMP – Delete conflicting note.	MCDOT	Bob Herz	6/04/2008 7/21/2008	Proposed vote 8/06/2008	0	Yes 0 No 0	Abstain

* Case was approved with verbal modifications at time of voting.

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Engineering Construction

MEMORANDUM

DATE: Monday, July 07, 2008

TO: Peter Knudson
Deputy Engineer, Construction

FROM: Stephen Ganstrom
Sr. Civil, Construction

SUBJECT: MAG Case 07-02 – Revisions to Asphalt Concrete, Section 321 and 710
by the Asphalt Paving Technical Committee.

The following issues brought to the Technical Sub-Committee's attention and are yet to be address: *(The following list is a summery of issues requested throughout the process verbally and in writing)*

1. A strike-add version of 321's or 710's original vs. the new re-writes has not been provided.
 - a. Comments provided by other jurisdictions such as McDOT, City of Phoenix, and City of Scottsdale where not cataloged, shown to be incorporated, or address during the subsequent meetings.
 - b. In general, the method for incorporation of comments has been haphazard and very cumbersome.
2. The new Section 321.8 "Placement" is missing many of the quality control items from the old Section 321.5
 - a. How and where will placement temperatures are taken
 - b. Spread requirements
 - c. Lane staggering
 - d. Many topics like: joint heaters, in-place rutting, screed length requirements, spreader box restrictions, etc...)
3. The sub-division of pavement in Lots and Sub-Lots is unacceptable. (321.10)
4. AGC's "Asphalt Concrete Coring Method" is not a regionally or nationally recognized procedure. (321.10.4)
5. Use of "Engineering Analysis" is unacceptable. (321.10.6)

In the process of working with the MAG Sections 321 and 710 Sub-committee, only some of the comments provided have been addressed. It is recommended that the City of Mesa does not support the proposed Case 07-02.

[Attached: 4-10-08 DRAFT Copies of Sec. 710 and 321, Meeting Comments from 3/12/2008]

SECTION 321

Revised 4-10-08

ASPHALT CONCRETE PAVEMENT

321.1 DESCRIPTION:

This section is to provide specifications for furnishing all materials, mixing at a plant, hauling and placing a mixture of aggregate materials, mineral admixture and asphalt binder to form a pavement course for the following situations or projects

SURFACE, BASE AND/OR CURB

No (needed) shown etc. Notes to be added to same section

- A capital improvement project where the work is being performed under a contract directly between the contractor and the Owner.
- A project being constructed under a permit, where the Owner's control and responsibility for maintenance will eventually be transferred upon dedication of the project or roadway to a city, county, or other entity.
- A project where the Owner is a private individual, company, or group and no city, county or other agency specifications apply to the project.

321.2 MATERIALS AND MANUFACTURE:

The materials shall conform with Section 710 for the type specified. The specific required mix type shall be called out in the contract documents or as directed by the engineer.

321.3 WEATHER AND MOISTURE CONDITIONS:

at least

Asphalt concrete shall be placed only when the surface is dry, and when the atmospheric temperature in the shade is 40 degrees F. or above. No asphalt concrete shall be placed when the weather is foggy or rainy, or when the base on which the material is to be placed contains excessive moisture and is unstable. Excessive moisture is defined as the base or subgrade moisture is in excess of 2 percent above optimum moisture, determined in accordance with AASHTO T 99 corrected for the appropriate rock percentage. Asphalt concrete shall be placed only when the Owner's Engineer determines that weather conditions are suitable

321.4 APPLICATION OF TACK COAT:

2.0

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

SHOULD BE BETTER DEF.

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

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

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

321.5 MIX DESIGN

10 WORKING DAYS

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

SECTION 321

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

If the contractor elects to change its source of material, the contractor shall furnish the ~~Owner's Engineer~~ Engineer with a new mix design, which meets the requirements of Section 710, as amended by the Project Specifications.

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

The self-directed target changes must meet the contract requirements for mix design criteria and gradation limits.

TABLE 321-1	
ALLOWABLE SELF DIRECTED TARGET CHANGES	
MEASURED CHARACTERISTICS	ALLOWABLE SELF-DIRECTED TARGET CHANGES
Gradation (Sieve Size)	
3/8 inch	+ 2% from mix design target value
No 8	+ 2% from mix design target value
No 30	+ 1% from mix design target value
No 200	None
Binder Content	+ 0.2% from mix design target value
Effective Air Voids	None

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

321.6 MIX PRODUCTION:

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

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

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

The hot plant and equipment shall be constructed and operated to prevent ~~so there is not a significant~~ loss of mineral admixture through the dust collection system of the plant.

SECTION 321

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

The introduction of bituminous material shall be controlled by an automated system fully integrated with the controls or the mineral aggregate and mineral admixture. The production of the plant shall be controlled by the rate required to obtain a uniform mixture of all components. Drying and heating shall be accomplished in such a manner as to preclude the mineral admixture from becoming coated with un-spent fuel. The completed asphalt concrete may be held in storage for up to 24-12 hours in insulated or heated silos, providing the minimum temperature noted herein for placement and compaction is met behind the placement device. If the Engineer determines that there is an excessive amount of heat, heat loss, drain down, segregation and/or oxidation of the mixture due to temporary storage, use of surge bins or storage bins will be discontinued

← This will be allow for "Modified" Now ADD SECTION FOR MODIFIED...

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

321.7 TRANSPORTATION

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

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

Tarpaulins shall be furnished and used when the ambient temperature is below 65 degrees F. at all times

321.8 PLACEMENT:

321.8.1 Placing

*MISSING SECTION LARGE SECTION FROM ON-TXT FROM LAST / OLD SECTION
* How temps are taken
* How lanes are genes
* SP READ REQ.
* Joint Headers (2 in. out)
* IN-PLACE PUTTING
* LENGTH OF AUGERS*

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

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

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

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

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

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

SECTION 321

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

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

Resk. use of SPREADER BOX

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.

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

USE OLD # FROM 321.5 (421)

~~321.8.2 Joints~~ 321.8.2 Joints:

CHANGE TO

~~Longitudinal joints of each course shall be staggered a minimum of 6 inches with relation to the longitudinal joint of the immediate underlying course. Transverse joints, before a surface course is placed in contact with a cold transverse construction joint, the cold existing asphalt concrete shall be trimmed to a vertical face for its full depth and exposing a fresh face. After placement and finishing the new asphalt concrete, both sides of the joint shall be dense and the joint shall be smooth and tight. The surface in the area of the joint shall not deviate more than 1/4 inch from a 12-foot straightedge, when tested with the straightedge placed across the joint, parallel to the centerline.~~

Longitudinal Joints of each course shall be staggered a minimum of 6 inches with relation to the longitudinal joint of the immediate underlying course cold transverse construction joint, the cold existing asphalt concrete shall be trimmed to a vertical face for its full depth and exposing a fresh face. After placement and finishing the new asphalt concrete, both sides of the joint shall be dense and the joint shall be smooth and tight. The surface in the area of the joint shall not deviate more than 1/4 inch from a 12-foot straightedge, when tested with the straightedge placed across the joint, parallel to the centerline. The joint will be tack coated if required by the engineer.

All shall have

APPLIED ALONG VERT. SURF.

321.8.3 Leveling Course

A leveling course shall be used when specified, or as directed in writing by the Owner's Engineer/Engineer, to bring existing pavement to a uniform grade prior to placing an overlay or other course. The compaction requirements contained in Section 321.10 do not apply to leveling courses.

321.8.4 Compaction Base and Surface

*MISSING ITEMS * TACK COAT * DISTANCE * THICKNESS MAX OR MINS * ADJUSTMENTS ALL IN OLD SEC*

It is the contractor's responsibility to perform any desired Quality Control monitoring and/or testing during compaction operations to achieve the required compaction. Asphalt concrete immediately behind the laydown machine shall be a minimum of 250 degrees F as measured from a probe type thermocouple thermometer that has been calibrated to an AASHTONIST standard. The probe type thermocouple thermometer shall have a current calibration sticker attached. When measuring the temperature of the mat, the probe shall be inserted at mid-depth and as horizontal as possible to the mat.

Asphalt compaction equipment shall be of sufficient size and weight to accomplish the required compaction. All compaction equipment shall be operated and maintained in accordance with the manufacturer's recommendations and the project requirements.

W/ 100 V/AGY. 7 TON MIN? IS IN THE CURRENT MAS SEC. I CAN'T COUNT HOW MANY

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

TIMES CONTRACTORS BRING OUT

SECTION 321

The ~~Owner's Engineer~~ Engineer will determine the acceptability of the pavement compaction in accordance with Section 321.10 - "Acceptance".

321.8.5 Smoothness:

The completed surfacing shall be thoroughly compacted, smooth and true to grade and cross-section and free from ruts, humps, depressions or irregularities. An acceptable surface shall not vary more than one-fourth (1/4) inch from the lower edge of a ~~12-12-foot~~ straightedge when the straightedge is placed parallel to the centerline of the roadway.

321.9 QUALITY CONTROL:

It is the contractor's responsibility to perform any desired Quality Control monitoring and/or testing during asphalt concrete production to achieve the required compaction and ~~it is the supplier's responsibility to perform any desired Quality Control monitoring and/ or testing during asphalt concrete production to achieve the required mix properties.~~ The ~~Owner's Engineer~~ Engineer reserves the right ~~to~~ may obtain samples of any portion of any material at any point of the operations for his own use. Also, the ~~Owner's Engineer~~ Engineer reserves the right ~~to~~ may order the use of any drying, proportioning and mixing equipment or the handling of any material discontinued which, in his/her opinion, fails to produce a satisfactory mixture. *R when will the results of this QC be available to the agency.*

The asphalt concrete produced shall conform to the properties of the mix design. When the asphalt concrete does not conform to the approved mix design properties, it shall be reported to the Engineer, and corrective quality control measures shall be implemented, or the production shall cease immediately at no additional cost to the contract Agency or Engineer. *WHAT will the initiate "start-up"?*

321.10 ACCEPTANCE:

~~321.10.1 Acceptance~~ 321.10.1 Acceptance Criteria:

Unless otherwise specified, asphalt concrete will be divided into lots for the purpose of acceptance. A lot shall be considered to be one day's production. When the quantity of asphalt concrete placed in a day exceeds 500 tons but is less than 2000 tons, the lot shall be divided into 500 ton sublots or fraction thereof. Where the quantity of asphalt concrete placed in a day exceeds 2000 tons, the day's production will be divided into four (4) approximately equal sublots. A minimum of one sample will be obtained from each lot, day's production.

Tests used to ~~determine~~ determine acceptance will be performed by the Engineer or a laboratory employed by the Engineer. In either case the laboratory shall be accredited by the AASHTO Accreditation Program (AAP), for the tests being

performed. The acceptance laboratory will take a representative samples of the asphalt concrete from each subplot to allow for gradation, binder content, air voids, pavement thickness and compaction of base and surface course. Each subplot will be accepted based upon the test data from the sample(s) from that subplot. All acceptance samples shall be taken using random locations or times designated by the ~~Owner's Engineer~~ Engineer in accordance with ASTM D 3665.

~~The random locations or times shall be determined per ASTM D 3665.~~

321.10.2 Gradation, ~~Binder~~, Binder Content and Air Voids:

The acceptance laboratory will ~~take a sample of the asphalt concrete in accordance with the requirements of Section 2 or 4 of Arizona Test Methods 104 or AASHTO T168 from each subplot. The minimum weight of the sample shall be 45 pounds. Asphalt Binder~~ binder content and gradation shall be determined in accordance with AASHTO T308 using the ignition furnace for each subplot. The acceptance laboratory is responsible for obtaining the necessary materials and performing an ignition furnace calibration as outlined in AASHTO T308 for each asphalt concrete mixture utilized on the project. The correction factor used for each test shall be clearly indicated on the report. The bulk density for Marshall ~~mix~~ Mix designs shall be tested in accordance with AASHTO T245. The bulk density for Gyratory mix designs shall be tested in accordance with AASHTO T312. The maximum theoretical density shall be tested in accordance with the requirements of AASHTO T209. Effective voids determined on the laboratory

Still to big why 25-30 needed

No way to track and reduces overall penalties

SECTION 321

compacted specimens will be determined at a minimum of once per lot in accordance with the requirements of AASHTO T269. Should the testing for effective air voids not meet the "Full Payment" or "No Corrective Action" requirements of Table 321-5, additional testing for laboratory air voids on the remaining sublots will be performed as necessary to determine the extent of the deficiency. Acceptance testing results will be furnished to the contractor within five working days of receipt of samples by the acceptance laboratory.

TOO LONG
The allowable deviations for acceptable production of each measured characteristic from the values established in the JMF for each subplot are as follows:

TABLE 321-3	
ACCEPTANCE LIMITS FOR ASPHALT CONCRETE	
Maximum Aggregate Size	100% passing
Nominal Maximum Aggregate Size	±7%
No. 8 Sieve to the Nominal Maximum Aggregate Size	±6%
No. 100 and No. 30 Sieves	±4%
No. 200 Sieve	±2%

If the results from a single acceptance sample fall outside of the acceptance limits in Table 321-3 a second sample shall be taken and if the second acceptance sample is also outside of the acceptance limits in Table 321-3 production of asphalt concrete shall cease. Production shall not begin again until calibration test results verify that adjustments made to materials or proportions yield a gradation that falls within acceptance limits in table 321-3. the results of an asphalt concrete mix sample fall within the acceptance limits in Table 321-3.

WHERE WOULD THIS SAMPLE COME FROM?

TABLE 321-4		
ASPHALT BINDER CONTENT CORRECTIVE ACTION FOR DEVIATIONS		
Deviation from that permitted	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
0.0 to 0.1% points	\$0.501.00/ton	EA (see 321.10.6) No corrective action
Over 0.1 to 0.2% points	\$2.0036.00/ton	EA (see 321.10.56)
Over 0.2% points	EA (see 321.10.5) or Removal*	EA (see 321.10.5) or Removal*

Note: Removal* refers to Section 321-10.6

TABLE 321-5		
LABORATORY VOIDS ACCEPTANCE AND PENALTIES		
Laboratory Air Voids (Measured at N _{des} or 75 blows as applicable)	When the contracting agency is the owner: Payment Reduction (\$ per ton of asphalt concrete)	When the contracting agency is not the owner (i.e. permits): Corrective Action
Less than 1.5%	EA (see 321.10.5) or Removal*	EA (see 321.10.5) or Removal*
1.5-2.0%	\$1.252.50	EA (see 321.10.56)
2.1-2.7%	\$0.501.00	EA (see 321.10.6) No corrective action
2.8-6.2%	Full Payment	No corrective action

SECTION 321

6.3-6.9%	\$0.501.00	EA (see 321.10.6) No corrective action
7.0-8.0%	\$1.252.50	EA (see 321.10.56)
Greater than 8.0%	Removal* EA (see 321.10.5) or Removal	Removal*EA (see 321.10.5) or Removal

Note: Removal* refers to Section 321-10.6

If an agency or Engineer is purchasing asphalt concrete directly from a commercial material supplier, the agency or Engineer will use Section 321.10 and specifically tables 321-3, 321-4 and 321-5 from Section 321.10 when determining the acceptance of the asphalt concrete with the material supplier.

321.10.253 Surface Drainage:

If directed by the Engineer surface drainage test shall be performed. ~~in accordance with (?).~~ 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.

AND HORIZONTAL?

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

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.

REF. ?

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

~~If directed by the Engineer surface drainage shall be performed in accordance with (). 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.~~

321.10.4 Asphalt Pavement Thickness:

Asphalt Pavement thickness will be determined from cores secured from each subplot for this purpose. Such cores will be taken and measured by the Asphalt Concrete Coring Method. This method can be found at www.azrockproducts.org or www.azagc.org websites. Each core location will be patched by the party responsible for the testing.

AT THE TIME OF CORE. AGAIN, NOT A RECOGNIZED SPEC.

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

If the thickness deficiency of the pavement exceeds 0.25 inch, the limits of the deficient area will be isolated by coring at maximum intervals of 100 feet from the deficient core. The thicknesses of the original deficient core will be averaged with the thicknesses of the cores taken from 100 feet on each side of it to determine compliance with the acceptance requirements.

SECTION 321

2. If the pavement thickness from step one above deviates from the target thickness by more than 0.25 inch but not more than 0.50 inch, corrective action will be required. This corrective action will consist of application of a Type II slurry seal coat in accordance to Section 715. The Contractor may present an engineering analysis outlining other proposed remedial measures for the consideration of the ~~Owner's Engineer~~ Engineer. The ~~Owner's Engineer~~ Engineer will review the engineering analysis and decide within ~~10-30~~ working days whether to accept the proposed remedial measures.

No SKIN PATCHES!


If the pavement thickness from step one above deviates from the target thickness by more than 0.50 inch, corrective action will be required. The deficient area will be overlaid ~~equal in thickness to the deficiency but not less than 1/2" inch depth~~ for the full width of the pavement to meet or exceed the designed thickness, with the appropriate end and edge milling, with a mixture approved by the ~~Owner's Engineer~~ Engineer. The Contractor may present an engineering analysis outlining other proposed remedial measures for the ~~Owner's Engineer~~ Engineer's consideration. The ~~Owner's Engineer~~ Engineer will review the engineering analysis and decide within ~~10-10~~ working days whether to accept the proposed remedial measures. If the ~~Owner's Engineer~~ Engineer chooses to reject the engineering analysis, the indicated overlay will be constructed by the Contractor at no additional cost to the Owner.

If the pavement thickness deficiency is greater than 0.25 inches and the contracting agency is the owner, Table 321-2 will apply.

TABLE 321-26	
ASPHALT PAVEMENT THICKNESS PAYMENT REDUCTION (AC)	
For Thickness Deficiency of More Than 0.25 inches and less than 0.50 inches	
Specified Mat Thickness	Reduction in Payment or Corrective Action
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%

321.10.4-5 Density:

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

In-place air voids shall be determined in accordance with AASHTO T269 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 ~~Owner's Engineer~~ Engineer will designate two random test locations for each subplot and the acceptance laboratory will obtain two cores from each location. The two cores will be averaged for acceptance. The outside one foot of each pass of the pavement course or any unconfined edge will be excluded from testing. The ~~Owner's Engineer~~ 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.

SECTION 321

NOT A RECOGNIZED PROCEDURE

Cores will be taken per the Asphalt Concrete Coring Method. This method can be found at www.azrockproducts.org or www.azagc.org websites. The acceptance laboratory will furnish test results within 3 working days of receipt of the cores.

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 limits of the deficient area will be isolated within the subplot by coring at maximum intervals of 100 feet from the deficient core. The in-place voids of the original deficient core will be averaged with the in-place voids of the cores taken from 100 feet on each side of it to determine compliance with the acceptance requirements. If the average of the in-place voids is greater than 8.0% then Table 321-6 shall apply to the subplot.

UPPER LIMIT OK, WHAT ABOUT LOW IN-PLACE VOIDS.

TABLE 321-7		
PAVEMENT DENSITY PENALTIES		
Limits of In-place Air Voids	When the contracting agency is the owner: Payment Reduction (\$ per ton of asphalt concrete)	When the contracting agency is not the owner (i.e. permits): Corrective Action
8.1% to 9.0%	\$41.00/ton of Asphalt Concrete penalty	EA
9.1% to 10.0%	\$64.00/ton of Asphalt Concrete penalty	EA and Type II Surry Seal
Greater than 10.1% to 11.0%	Removal* \$96.00/ton and an EA (see 321.10.5) or Removal*	EA (see 321.10.5) or Removal*
Greater than 11.0%	Removal	Removal

Notes: Removal refers to Section 321-10.6. The Contractor shall remove and replace the entire subplot that is deficient. Removal for In-place Air Voids greater than 11.0% is not eligible for Section 321.10.6.

321.10.6 Engineering Analysis (EA):

Within ten 10 working days after receiving notice that a subplot of asphalt concrete is deficient for removal "Removal" by the Owner's Engineer/Engineer, the contractor may submit a written proposal (Engineering Analysis) to accept the material in place at the applicable penalties listed in the "Removal" 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 proposal Engineering Analysis shall contain an engineering an analysis of the anticipated performance of the asphalt concrete if left in place. The engineering Engineering analysis Analysis shall also detail the effect of any proposed corrective action on the performance. The engineering Engineering analysis Analysis shall be performed by a professional engineer experienced in asphalt concrete testing and mix designs. If the subplot is submitted for referee testing by the contractor, the ten working days allowed to prepare an engineering analysis will begin upon notification of referee test results.

When an Engineering Analysis recommends that a specific lot or subplot not be removed, the Engineering Analysis will recommend that the following penalties (Table 321-8) be paid when the contracting agency is the owner, for the specific criteria being reviewed by the EA.

TABLE 321-8

New

SECTION 321

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

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

Payment is req. by who?

321.11 REFEREE:

In the event the contractor elects to question the acceptance test results for a subplot, the Contractor may make a written request for additional testing of that subplot. The ~~Owner's Engineer~~ Contractor will engage an independent laboratory (at the Contractor's own expense) who is accredited by AAPAML or equivalent in all of the acceptance tests. The independent laboratory shall be acceptable to the Engineer ~~paid by the Owner's Engineer~~ and shall perform a completely new set of acceptance tests (as required by Section 321.10 representing the area or set of tests in question).

These tests shall include asphalt binder content, aggregate gradation, Marshall or Gyrotory unit weight, and maximum theoretical unit weight. Samples for referee testing shall come from representative samples obtained from the completed pavement, as directed by the Engineer. ~~splits from the acceptance tests held by the acceptance laboratory, or from additional samples cored from the roadway.~~

The number of samples taken will be the same as specified in Section 321.10. The independent laboratory shall compile the test results and transmit them to both the ~~Owner's Engineer~~ Engineer and the Contractor. The independent laboratory shall include a letter signed by an Engineer registered in the State of Arizona, who is experienced in asphalt concrete testing and mix designs. The signed letter shall give an opinion that the material evaluated either does or does not comply with project specifications, and shall clearly describe any deficiencies, and the results will be binding between all parties.

321.12 MEASUREMENT:

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

~~The bid price per ton or square yard for asphalt concrete shall include the cost of the asphalt cement in the percentages as specified in Section 710.~~

321.13 PAYMENT:

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

SECTION 321

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

No payment will be made for any overrun in quantity of asphalt concrete in excess of 10 percent based on actual field measurement of area covered, design thickness, and the mix design unit weight. The calculations and payment for overrun will be by individual bid item. To compensate or adjust for a thickness deficiency in an underlying asphalt concrete course, the ~~Owner's Engineer~~ 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 bid price.

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

SECTION 710

7-7-08

ASPHALT CONCRETE

SDG

Revised 54-115190-08

710.1 GENERAL:

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

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

MM?

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

The following table (Table 710-1) displays the recommended lift thickness for various asphalt concrete mix designations found within Section 710. Please note that these recommended lift thicknesses are minimums based on each mix designation's "Nominal Aggregate Size" and the relative coarseness of its gradation. The compacted thickness of layers placed shall not exceed 150% of the Design Target Lift Thickness of Table 710-1 except as otherwise provided in the plans and specifications, or if approved in writing by the Engineer. (From 321.5.4 of existing MAG)

TABLE 710-1		
RECOMMENDED MINIMUM LIFT THICKNESS'S for ASPHALT CONCRETE MIXES		
Designation (inches)	Target Lift Thickness Marshall Mixes	Target Lift Thickness Gyratory Mixes
3/8"	1.0 inches	1.5 inches
1/2"	1.5 inches	2.0 inches
3/4"	2.5 inches	3.0 inches
Base	3.0 inches	n/a

710.2 MATERIAL:

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

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

Coarse aggregate for hot mix the No. 4 sieve.

4 sieve and Fine aggregate is material passing

that prevent coating with the asphalt binder. tested in accordance with the applicable test methods.

conform to the following requirements when

TOO VAGUE, PRESENTLY IS "FREE OF"

TABLE 710-2

COARSE/FINE AGGREGATE REQUIREMENTS

Characteristics	Test Method	Low Traffic	High Traffic
Fractured Faces, % (Coarse Aggregate Only)	Arizona 212	75, 1 or more	85, 1 or more 80, 2 or more
Uncompacted Voids, % Min.	AASHTO T-304, Method A	42	45
Flat & Elongated Pieces, % 5:1 Ratio	ASTM D-4791	10.0 Max.	10.0 Max.
Sand Equivalent, %	AASHTO T-176	50 Min.	50 Min.
Plasticity Index	AASHTO T-90	Non-plastic	Non-plastic
L.A. Abrasion, % Loss <i>NOT GOOD ENOUGH! NEEDS NEW METHOD!</i>	AASHTO T-96	9 max. @ 100 Rev. 40 max. @ 500 Rev.	9 max. @ 100 Rev. 40 max. @ 500 Rev.
Combined Bulk Specific Gravity	AI MS-2/SP-2	2.35 - 2.85	2.35 - 2.85
Combined Water Absorption	AI MS-2/SP-2	0 - 2.5%	0 - 2.5%

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

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

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

710.2.3 Mineral Admixture: Mineral admixture when used as an anti-stripping agent in asphalt concrete shall conform to the requirements of AASHTO M-17. Mineral admixture used in asphalt concrete shall be dry hydrated lime, conforming to the requirements of ASTM C-1097 or Portland cement conforming to ASTM C 150 Type II or ASTM C 595 Type IP. The amount of hydrated lime or Portland cement used shall be determined by the mix design. The minimum Mineral admixture content within a mix will be ~~0.75~~ 1.00 percent, by weight of total aggregate.

AND PRODUCTION

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 ~~current~~ latest list of approved laboratories. The ~~current~~ 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 two years from the date of submittal, unless supportive documentation is provided and approved by the Engineer.

1yr! 2 is too long

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 mix design report shall state the traffic condition (low or high traffic) and size designation. In all cases Gyratory based mix designs shall be designated as high traffic mixes. Marshall based mix design shall be designated either low or high traffic mixes.

SECTION 710

56) 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, ~~immersion compression results~~ Tensile Strength Ratio (Index of Retained Strength, wet and dry strengths AASHTO T 283), 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.

No
Needs
Now

(67) The laboratory mixing and compaction temperature ranges for the supplier and grade of asphalt binder used within the mix design.

(78) 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.

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

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 asphalt binder, including modifiers in the asphalt binder, or any other item that will cause an adjustment in the mix, shall be justification for a new mix design to be submitted.

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

Why is 76A-1

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

TABLE 710-3
MARSHALL MIX DESIGN CRITERIA

Restricted Zone
Has Been Removed.

Criteria	Requirements				Designated Test Method
	3/8" Mix	1/2" Mix	3/4" Mix	Base Mix	
1. Voids in Mineral Aggregate: %, min	15.0	14.0	13.0	12.0	AI MS-2
2. Effective Voids: %, Range	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2	AI MS-2
3. Absorbed Asphalt: %, Range *	0 - 1.0	0 - 1.0	0 - 1.0	0 - 1.0	AI MS-2
4. Dust to Eff. Asphalt Ratio, Range **	0.6 - 1.4	0.6 - 1.4	0.6 - 1.4	0.6 - 1.4	*AI MS-2
5. Tensile Strength Ratio: %, Min.	60	60	60	60	AASHTO T-283
6. Dry Tensile Strength: psi, Min.	100	100	100	100	AASHTO T-283
7.	2,000	2,500	2,500	3000	AASHTO T-245
8. Flow: 0.01-inch, Range	8 - 16	8 - 16	8 - 16	8 - 16	AASHTO T-245
9. Mineral Aggregate Grading Limits					AASHTO T-27
	Percent Passing with Admix				
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix	Base Mix	
1-1/4 inch				100	
1 inch			100	90-100	
3/4 inch		100	100	85-95	

SECTION 710

1/2 inch	100	85 - 100	---	---
3/8 inch	90-100	62 - 85	62 - 77	57-72
No. 8	45-60	40 - 50	35 - 47	33-43
No. 40	10-22	10 - 20	10 - 20	9-18
No. 200	2.0 - 10.0	2.0 - 10.0	2.0 - 8.0	1.0 - 7.0

* Unless otherwise approved by the Engineer.

** The ratio of the mix design composite gradation target for the No. 200 sieve, including admixture, to the effective asphalt content shall be within the indicated range 0.6 to 1.4.

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

The mix design shall be formulated in a manner described for volumetric mix designs in the current edition of the Asphalt Institute Manual SP-2, except the number of trial blend gradations necessary will be determined by the mix design laboratory. Duplicate gyratory samples shall be prepared at a minimum of four (4) binder contents to select the recommended binder content. The completed mix design shall meet all the mineral aggregate and mix design criteria specified herein.

WHY DOES THIS NEED TO CHANGE? For purposes of design, the number of gyrations shall be 8 for Nini, 100 for Ndes, and 160 for Nmax. The corrected density of the specimens shall be less than 89.0 percent of maximum theoretical density at 8 gyrations. The corrected density of the specimens shall be less than 98.0 percent of maximum theoretical density at 160 gyrations.

The mix shall comply with the criteria in Table 710-4.

**TABLE 710-4
GYRATORY MIX DESIGN CRITERIA**

Criteria	Requirements			Designated Test
	3/8" Mix	1/2" Mix	3/4" Mix	Method
1. Voids in Mineral Aggregate: %, Min.	15.0	14.0	13.0	AI SP-2
2. Effective Voids: %, Range	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2	AI SP-2
3. Absorbed Asphalt: %, Range *	0 - 1.0	0 - 1.0	0 - 1.0	AI SP-2
4. Dust to Eff. Asphalt Ratio, Range **	0.6 - 1.4	0.6 - 1.4	0.6 - 1.4	*AI SP-2
5. Tensile Strength Ratio: %, Min.	70	70	70	AASHTO T-283
6. Dry Tensile Strength: psi, Min.	75	75	75	AASHTO T-283
7. Mineral Aggregate Grading Limits				AASHTO T-27
	Percent Passing with Admix			
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix	
1 inch			100	
3/4 inch		100	90-100	
1/2 inch	100	90-100	43-89	
3/8 inch	90-100	53-89	-	
No. 8	32-47	29-40	24-36	
No. 40	2-24	3-20	3-18	
No. 200	2.0-8.0	2.0-7.5	2.0-6.5	

* Unless otherwise approved by the Engineer.

** The ratio of the mix design composite gradation target for the No. 200 sieve, including admixture, to the effective asphalt content shall be within the indicated range 0.6 to 1.4.

SECTION 710

710.3.2.3 Moisture Sensitivity Testing: Moisture sensitivity testing will be performed in accordance with AASHTO Test Method T-283 for both Marshall and Gyratory mix designs, without the freeze/thaw cycle(s). The minimum required Tensile Strength Ratio is indicated in the tables above.

Comments (taken from revision draft dated "11/9/07" supplied to city staff February 1st)

1. Fix, compete or spell-out any outstanding text, acronyms and revisions noted in the text. (ie. "?" in section 321.10.3)
2. (Section 321.5, add this text) The contractor shall be responsible for providing the engineer with an acceptable product per the applicable current MAG Section. Routine testing of the aggregates, binder, anti-strip material and the asphalt mixture shall be the responsibility of the contractor or his representative.
3. (Section 321.6, last paragraph) ...minimum temperature noted herein.. **where?** .excessive amount of ~~heat loss~~...**heat, heat loss, drain down,**
4. (Section 321.7, last sentence) Tarpaulins shall be furnished and used ~~when the ambient temperature is below 65degrees F.~~ **at all times.**
5. (Section 321.9, second paragraph) The production shall cease immediately **at no additional cost to the Contracting Agency or Engineer.**
6. (Acceptance Tables 321-4, -5, -6 and -7) Up penalties by attached Table #1 for -4, -5 and -7, change -6 to simple \$/sy AND to \$ shown in Table #1 also.
7. (Section 321.10, first paragraph). Specify "patching material" and acceptable time frame the patch occurred.
8. Replace any and all "EA" with only "removal". In the majority of cases an "engineering analysis" is not needed and can be used as just referee by the contractor. **(NOT ADDRESSED)**
9. (Section 321.11, first paragraph)

Issues (to the discussion would be):

1. Who will keep track of the "sub-lots" and/or "lots" **(NOT ADDRESSED)**
The pavers and rollers should not start and stop as the mat is being put down. Once begun, the paving process should be continuous. **?**
3. Delivery Temperatures 6"below surface **?**
4. Any use of a "Referee" shall be at the contractor's expense.

Review comments Case 07-03A, PVC Catch Basins

Location	Comment
Detail 535-2	<p>Elevation Views</p> <ul style="list-style-type: none"> - Variable Sump depth shows as 6" to 10" minimum depending upon pipe size. Revise note to indicate concrete fill required if bottom of basin is below outlet invert elevation. Show concrete fill line such that positive drainage into the outlet pipe is obtained. Use minimum of 3-inch depth opposite side of the outlet invert elevation similar to the 6-inch fall required in concrete catch basins. - Backfill material is shown extending to the bottom of pavement. Have slurry backfill limited to under the concrete slab. Show aggregate base under the pavement. <p>Note 1</p> <ul style="list-style-type: none"> - The water stop reference to MAG 710.5 is not valid – Revise. - Delete from the first sentence: "Joint Locations and": "specified on the plans" and delete the parentheses. Add at the end of the sentence: "unless otherwise indicated on the plans". <p>Note 4 – Delete, the note duplicates note 8 on detail 535-3</p>
Detail 535-3	<p>Provide fabrication dimensions for the Base Plate</p> <p>Frame dimensioning detail</p> <ul style="list-style-type: none"> - Locate and dimension bolt holes. - Angle size callout, delete the length or make compatible with the required inside dimensions. - Dimension the width of the angle in the plan view to establish angle orientation. <p>Grate – reference grate on detail 535-1 (Detail 535 will become 535-1). Do not create a new detail for the same size grate. Adjust note 5.</p> <p>Note 6 – Correct effective drainage area opening. Provide justification for calculated number. Value should be approximately 592 square inches.</p> <p>Note 8 – Clarify the bolt diameter and length and how the attachment is to be made. Is the base plate to be tapped to accept the bolts or are washers and nuts required?</p> <p>Revise title to FRAME AND BASE PLATE FOR CATCH BASIN 'J'.</p>
Detail 537-2	<p>Elevation Views</p> <ul style="list-style-type: none"> - Variable Sump depth shows as 6" to 10" minimum depending upon pipe size. Revise note to indicate concrete fill required if bottom of basin is below outlet invert elevation. Show concrete fill line such that positive drainage into the outlet pipe is obtained. Use minimum of 3-inch depth opposite side of the outlet invert elevation similar to the 6-inch fall required in concrete catch basins. - Backfill material is shown extending to the bottom of pavement. Have slurry backfill limited to under the concrete slab. Show aggregate base under the pavement. <p>Note 1</p> <ul style="list-style-type: none"> - The water stop reference to MAG 710.5 is not valid – Revise. - Delete from the first sentence: "Joint Locations and": "specified on the plans" and delete the parentheses. Add at the end of the sentence: "unless otherwise indicated on the plans". <p>Note 4 – Delete, the note duplicates note 8 on detail 539-2</p>
Detail 539-2	<p>Provide fabrication dimensions for the Base Plate</p> <p>Frame dimensioning detail</p> <ul style="list-style-type: none"> - Locate and dimension bolt holes. - Angle size callout, delete the length or make compatible with the required inside dimensions. - Dimension the width of the angle in the plan view to establish angle orientation. <p>Grate – Reference grate on detail 539. Do not create a new detail for the same size grate. Adjust note 5.</p> <p>Note 6 – Provide backup justification (calculations) for area shown.</p> <p>Note 8 – Clarify the bolt diameter and length and how the attachment is to be made. Is the base plate to be tapped to accept the bolts or are washers and nuts required?</p> <p>Revise Detail No. to 537-3 and adjust title to FRAME AND BASE PLATE FOR CATCH BASIN 'I'.</p>

SECTION 325

ASPHALT-RUBBER CONCRETE OVERLAY, GAP GRADED

325.1 DESCRIPTION:

Asphalt-rubber concrete consists of supplying, placing and compaction of plant mixed gap graded asphalt-rubber concrete over asphalt surfaces. The thickness of the finished asphalt-rubber concrete overlay shall be within the range of one to two inches as shown on the plans or as specified in the special provisions.

325.2 MATERIALS:

Asphalt-rubber concrete shall consist of a mixture of aggregate and asphalt-rubber binder. Tack coat, asphalt-rubber concrete mix and transportation thereof shall be as specified in Sections 710 and 321, except as modified below:

325.2.1 Aggregate:

The aggregate shall meet the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
25 mm (1")	100
19 mm (3/4")	100
12.5 mm (1/2")	100
9.5 mm (3/8")	78-92
4.745 mm (#4)	28-42
2.36 mm (#8)	15-25
600 μm (#30)	5-15
75 μm (#200)	3-7
*Type II portland cement	1.5%
Or	
*Hydrated Lime	1.0%

***By total weight of the mineral aggregate.**

The aggregate shall conform to the requirements of Sections 701 and 710 for asphalt concrete, except as modified below:

Sand Equivalent	65 minimum
Crushed Aggregate (retained on 2.36 mm (#8) sieve, at least one crushed face, produced by crushing)	85 minimum

325.2.2 Asphalt-Rubber Binder: The asphalt-rubber binder shall conform to Section 717.

325.2.3 Mix Designs: At the Pre-Construction Meeting, the Contractor shall submit the name of the asphalt-rubber concrete supplier, a description of the materials, and the job mix design(s). The design method used shall be in accordance with the Marshall Mix procedure, 75 blows, as described in "Design Methods for Hot-Mixed Asphalt-Rubber Concrete Paving Materials" by James G. Chehovits, October 1989. The job mix designs are subject to approval by the Engineer.

Asphalt Rubber Binder Content:

The percent of asphalt-rubber binder in the mix(es) shall be within the following range:

Overlay Traffic Volume	Asphalt Rubber Binder
Low Traffic	8.4% to 8.8%
High Traffic	8.0% to 8.4%

The amount of asphalt-rubber binder in each mix shall be provided in the design subject to approval by the Engineer. Low traffic areas include residential streets. High traffic areas include arterial streets.

Air Voids:

The percent of air voids in the mix(es) shall be within the following range:

Overlay Traffic Volume	Air Voids
Low Traffic	3.0% to 5.0%
High Traffic	4.0% to 6.0%

The amount of air voids in each mix shall be provided in the design subject to approval by the Engineer.

Mix designs shall include the following information as a minimum:

1. Aggregate
 - Source and identification (for each material used)
 - Gradation (for each material used)
 - Blend percentage
 - Mixture gradation

2. Asphalt - Rubber Binder (No extender oil allowed)
 - Source and PG grade of asphalt cement
 - Source and identification of ground rubber
 - Ground rubber gradation
 - Ground rubber percentage of the asphalt - rubber binder

Type and amount of additive(s), if required
Temperature when added to aggregate

3. Recommended asphalt - rubber binder content by both weight of total mix and by weight of dry aggregate.
4. Recommendations for maximum / minimum temperatures during material production and lay down; and the allowable ambient air and existing pavement surface temperatures during lay down.

The mix design shall include sufficient test results and documentation to assure that all requirements for rubber, aggregate and the asphalt-rubber binder are fulfilled.

325.2.4 Production Tolerance: Production requirements for asphalt-rubber concrete shall be as specified in Section 710.4.4 Volumetrics, Section 710.5.1 Quality Control, and Section 321.6 Corrective Requirements for Deficiencies. The production tolerances including compaction requirements and corrective action will be enforced for asphalt-rubber concrete.

Calibration Factors

A minimum of one week prior to the production of asphalt rubber hot mix, the Contractor shall submit to the Engineer samples of all hot mix materials that will be used on the project. The materials shall be used to determine the calibration factors using the acceptance laboratory and the Contractor supplied ignition furnaces and related quality control test equipment. Calibration factors shall be recalculated whenever a change in the asphalt rubber hot mix materials occurs and when requested by the Engineer.

325.3 SURFACE PREPARATION:

Before placing asphalt-rubber concrete 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 Asphalt-Rubber Concrete paving operations, and the cost thereof shall be included in the Asphalt-Rubber Concrete pay item. Pavement repairs and crack sealing when required are to be compensated for by other appropriate contract pay items.

Prior to placing the asphalt-rubber concrete 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 321.

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.

325.4 CONSTRUCTION METHODS:

Asphalt-rubber concrete shall be placed only when the surface is dry, and when the atmospheric temperature in the shade is 55° F or above. No asphalt-rubber concrete shall be placed when the weather is foggy or rainy. Asphalt-rubber concrete shall be placed only when the Engineer determines that weather conditions are suitable.

Except as otherwise noted, placing and rolling of the asphalt-rubber concrete and the smoothness of the surface shall be as specified in Section 321 for asphalt concrete. The spreading equipment shall be equipped with a mat reference ski-type control device of not less than 30 feet in length, or other method of control approved by the Engineer.

The density of the compacted mixture shall not be less than 95% of the laboratory unit weight composed of the same mixture compacted by the 75 blow method of ASTM D-1559 at 290° F \pm 5° F, or at the job mix design specified compaction temperature. Pneumatic rollers shall not be used.

Placement and compaction temperature shall be specified with the submitted mix design data but in no case less than 275° F at the point of placement. The temperature of the material in the truck shall be measured by inserting a thermometer, or other approved measuring device, to a point at least 6" below the surface of material.

If asphalt-rubber concrete is placed in a windrow during paving, the windrow shall not exceed a distance greater than 150 feet in front of the paving machine.

325.4.1 Lime Water: An application of lime water shall be applied by the Contractor to the compacted asphalt rubber concrete surface after final compaction, prior to opening the roadway to traffic, or when requested by the Engineer to cool the pavement to prevent tracking and pick-up. The lime water solution shall be applied at the rate of approximately 1/2 gallon/square yard. The lime shall be mixed using a minimum of (1) one 50-pound bag per 3,000 gallons of water.

325.4.2 Corrective Requirements for Deficiencies: Corrective measures shall be as specified in Section 321.6 Corrective Requirements for Deficiencies and in Section 710.4.4 Volumetrics.

325.4.3 Adjustments: After installation of an overlay course all necessary frame and cover adjustments for manholes, valve boxes, survey monuments, sewer clean-outs, etc., shall be completed by the Contractor within the given segments being surfaced.

On roads without curb and gutter, the existing shoulder elevation shall be adjusted by the Contractor to match the elevation at the edge of new overlay and slope away from the new pavement surface at a rate that the existing quantity of shoulder material will allow. Shoulder material includes the existing shoulder, millings, untreated base materials, or a granular material approved by the Engineer. Shoulder material shall be compacted to a minimum of 95% of maximum density, determined in accordance with section 301.3.

325.5 MEASUREMENT:

Asphalt-Rubber Concrete shall be measured by the ton, for the mixture actually used, which shall include the required quantities of mineral aggregates, filler material, rubberized asphalt binder and anti-strip agent.

Application of Lime Water shall be measured by the square yard. The measured area shall be the area of asphalt-rubber 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 asphalt-rubber pavement section.

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 Asphalt-Rubber Concrete or other related pay items.

325.6 PAYMENT:

Payment for Asphalt Milling will be as specified in Section 317.

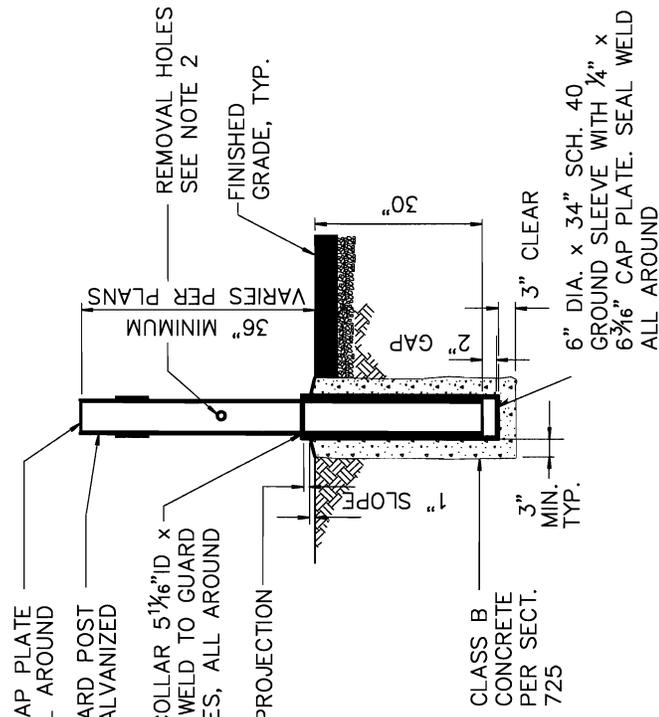
Payment for Tack Coat will be as specified in Section 321.

Payment for Asphalt-Rubber Concrete will be at the contract unit price, complete in place.

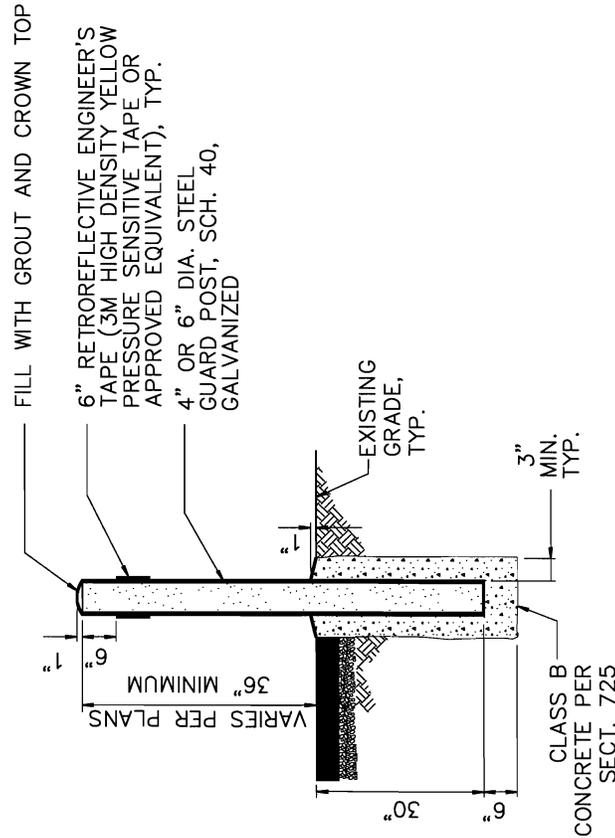
Application of Lime Water as approved by the Engineer will be paid at the contract unit price.

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

CASE 08-05



TYPE 2 REMOVABLE



TYPE 1 PERMANENT

NOTES

1. BOLLARDS SHALL HAVE A HEIGHT OF 3 FEET OR BE EQUAL TO THE HEIGHT OF THE BACK SCREEN WALL OF BIN ENCLOSURES. POSTS SHALL BE PLACED A MINIMUM OF 4" FROM THE WALL.
2. REMOVABLE POSTS SHALL HAVE 1" DIA. HOLES DRILLED THROUGH AT A DISTANCE 1/3 THE OVERALL POST LENGTH FROM TOP.

DETAIL NO.

140

REVISED

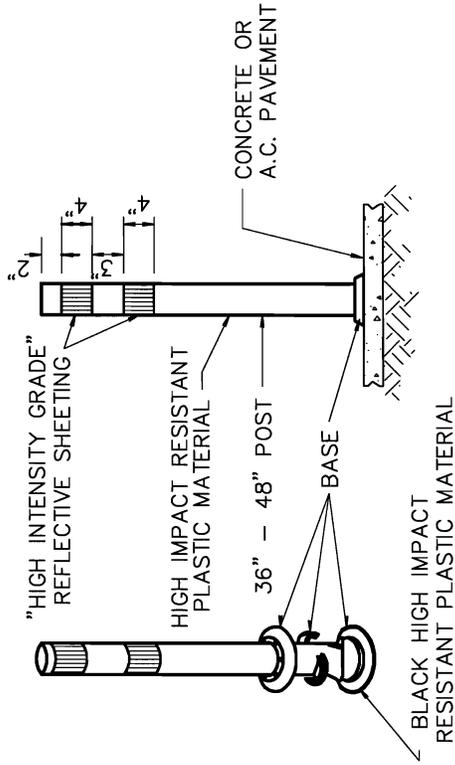
BOLLARD

**STANDARD DETAIL
ENGLISH**

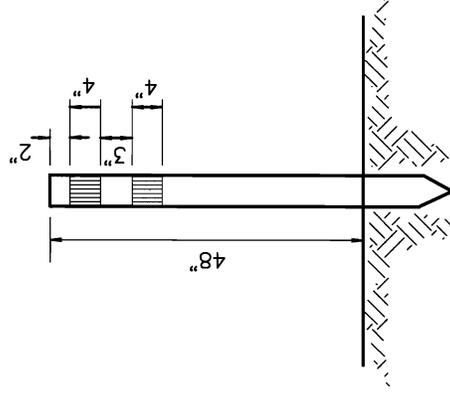


DETAIL NO.

140



TYPE 1 SURFACE MOUNT



TYPE 2 GROUND MOUNT

NOTES

1. CONTRACTOR SHALL CLEAN ROADWAY SURFACE PRIOR TO PLACEMENT OF FLEXIBLE TUBULAR MARKER.
2. FLEXIBLE TUBULAR MARKERS SHALL BE INSTALLED WITH AN ADHESIVE AS PER TUBULAR MARKER MANUFACTURER'S SPECIFICATIONS.
3. YELLOW TUBULAR MARKERS SHALL HAVE A YELLOW POST AND YELLOW "HIGH INTENSITY GRADE" RETROREFLECTIVE SHEETING. ORANGE TUBULAR MARKERS SHALL HAVE AN ORANGE POST AND WHITE HIGH INTENSITY RETROREFLECTIVE SHEETING.
4. POST SHALL BE FLEXIBLE, HIGH IMPACT RESISTANT PLASTIC MATERIAL.
5. BASE SHALL BE CEMENTED TO SURFACE WITH EPOXY MATERIAL AS RECOMMENDED BY THE MANUFACTURER.

DETAIL NO.

141



**STANDARD DETAIL
ENGLISH**

HAZARD MARKER

REVISED

DETAIL NO.

141

Case 08-07, Revision Date July 1, 2008

SECTION 109

MEASUREMENTS AND PAYMENTS

109.1 MEASUREMENT OF QUANTITIES:

All work completed under the contract will be measured by the Engineer according to United States standard measures. The methods of measurement and computation to be used in determination of quantities of materials furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice. A station, when used as a definition or term of measurement, will be 100 linear feet.

Unless otherwise specified, longitudinal measurements will be made along the grade line.

Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the Engineer.

The term ton will mean the short ton consisting of 2,000 pounds avoirdupois.

Unless otherwise specified, structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.

In computing volumes of excavations or fill, the average end area method or other acceptable methods as determined by the Engineer will be used.

Volumes will be computed at 60°F, using ASTM D-1250 for Asphalt or ASTM D-633 for Tars.

Lumber will be measured by the thousand board foot measure actually used in the work. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.

The term lump sum, when used as a pay item, will mean complete payment for the work described.

Sundry items which have a basis for measurement and payment herein and which are incidental to or required in the construction of the work but are not included as items in the bid schedule shall be considered an integral part of the contract, and all labor, materials, etc. required for such items shall be furnished by the Contractor and the cost of same included in the unit price bid.

Where the units of measurement shown on the bid proposal form or the methods of measurement specified in the project specifications differ from the measurement and payment provisions of the Uniform Standard Specifications, the project documents shall have precedence.

109.2 SCOPE OF PAYMENT:

Measurement and payment for pay items in the proposal will be as indicated in the applicable standard specification or in the special provisions.

When payment is specified to be made on the basis of weight, the weighing shall be done on certified platform scales sealed by the State Inspector or the City Sealer of Weights and Measures as defined by Arizona Revised Statutes Sections 44-2112 and 44-2116. The Contractor shall furnish the Engineer with duplicate Weighmaster's Certificates showing the actual net weights together with the information required by Arizona Revised Statutes Section 44-2142. The Contractor shall furnish the Engineer with duplicate Weighmaster's Certificates at the time of delivery unless the Engineer designates a different submittal time. The Contracting Agency will accept the certificates as evidence of the weight delivered.

Payment for the various items in the proposal will be made at the unit price bid in the proposal, and shall be compensation in full for furnishing all labor, materials, equipment and appurtenances necessary to complete the work in a satisfactory manner as shown on the plans and as required in the specifications, with all connections, testing, and related work

completed. Each item, fixture, piece of equipment, etc., shall be complete with all necessary connections and appurtenances, for the satisfactory use and operation of said item. No additional payment will be made for work related to any item unless specifically called for in the proposal. This compensation shall also cover all risk, loss, damage or expense of whatever character arising out of the nature of the work or the prosecution thereof, subject to the provisions of Section 107.

The unit prices bid shall include all costs for salaries and wages, all payroll additives to cover employee benefits, allowances for vacation and sick leave, company portion of employee insurance, social and retirement benefits, all payroll taxes, contributions and benefits imposed by any applicable law or regulation and any other direct or indirect payroll-related costs. The unit prices bid shall also include all costs for indirect charges, overhead, mileage, travel time, subsistence, materials, freight charges for materials to Contractor's facility or project site, equipment rental, consumables, tools, insurance costs, all applicable taxes and fees, as well as Contractor's fee and profit. The unit prices bid shall further include all site clean-up costs, hauling of construction debris, and proper disposal in accordance with all laws and regulations and the project plans and specifications.

Payment will be made for only those items listed in the proposal. All materials and work necessary for completion of the project are included in proposal items. Work or materials not specifically identified by a proposal item are considered as included in the unit price of related proposal items.

Unless otherwise specified, payment will not be made for unused materials.

109.2.1 Taxes and Fees:

Taxes are deemed to include all sales, use, consumer and other taxes that are legally enacted at the time the project bids, whether or not they are yet effective or merely scheduled to go into effect. Any such taxes shall be paid by Contractor and shall be included in the unit bid prices.

The Contractor shall also be responsible to contact all municipalities and other governmental agencies having jurisdictional authority over the project or the project area to determine if they will charge the Contractor other fees (e.g., permit fees) for the project work. Unless otherwise specified in the project documents or on the bid proposal form, the Contractor shall include the cost of such fees in the unit bid prices on the bid proposal form.

109.3 ASSIGNMENT OF PAYMENTS:

The Contractor shall not assign payments of a contract or any portion thereof without approval of surety and written consent of the Contracting Agency.

Claims for monies due or to become due the Contractor may be assigned to a bank, trust company, or other financing institution, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Any assignment of money shall be subject to all proper setoffs and withholdings in favor of the Contracting Agency and to all deductions provided for in these specifications.

109.4 COMPENSATION FOR ALTERATION OF WORK:

All compensation due the Contractor for alteration of work shall be documented by a Change Order. Except in emergency situations or as otherwise directed by the Engineer, the Contractor shall not proceed with Change Order work until said Change Order has been approved by the Agency and issued.

***109.4.1 By The Contracting Agency:**

(A) For a decrease greater than 20 percent in either the total cost of the contract or the total cost of a major item and when a reasonable cost analysis supports an increase in the pro rata share of fixed cost chargeable to this item in total, an increase adjustment in the monies due the Contractor may be made. This adjusted compensation will not exceed 80 percent of the original lump sum contract amount or, if for a unit price item, the adjustment will not exceed 80 percent of the original extended unit bid price. This does not apply to items labeled as contingent bid item in the bid proposal.

(B) For an increase greater than 20 percent in either the total cost of the contract or the total cost of a major item, any adjustment made will only apply to that cost in excess of 120 percent of the original total cost of the contract or, in the case of a major item, in excess of 120 percent of the original extended unit price bidding schedule. If either party presents a reasonable cost analysis that shows a change in the pro rata share of fixed costs chargeable to this item in total, an increase or decrease adjustment will be made. This increase or decrease adjustment will be made on such basis as is necessary to cover a reasonable estimate of cost, plus an allowance, not to exceed 15 percent, for overhead and profit. If the parties are unable to reach an agreement, the Engineer has the authority to order the excess work done on an actual cost basis as specified in Subsection 109.5.

(C) For either an increase or decrease in cost, no claim shall be made by the Contractor for any loss of anticipated profits.

***109.4.2 Due to Physical Conditions:**

(A) If the Engineer, after his investigation of the site conditions, agrees that they materially differ from those indicated in the contract and would cause an increase in the Contractor's bid cost of accomplishing the work, new unit bid prices or a lump sum cost (for the additional work only) may be negotiated. If the parties are unable to reach an agreement on price, the Engineer has the authority to order this additional work accomplished on an actual cost basis as specified in Subsection 109.5.

(B) If the Engineer, after his investigation of the site conditions, finds that these conditions do not materially differ from those indicated in the contract, he has the authority to order the work to be accomplished at the original bid price(s).

***109.4.3 Due to Extra Work:** If the Contractor can present valid, factual evidence, satisfactory to the Engineer, that the work in question is an item not provided for in the contract as awarded then a unit bid price or lump sum cost, for this item only, may be negotiated. If the parties are unable to reach an agreement on price or cost, the Engineer has the authority to order the extra work accomplished on an actual cost basis as specified in Subsection 109.5.

109.4.4 Made at the Contractor's Request: Any alterations, if approved, will be a reduction in cost or at no additional cost to the Contracting Agency.

109.4.5 Due to Failure of Contractor to Properly Maintain the Project:

(A) For any suspension of work during normal working hours due to failure of the Contractor to properly maintain the project, there will be no additional compensation or time allowed.

(B) If the Engineer provides the Contractor with a written order to provide adequate maintenance of traffic, adequate cleanup, adequate dust control or to correct deficiencies resulting from abnormal weather conditions and the Contractor fails to comply in the time frame specified, the Contracting Agency may have the work accomplished by other sources.

The Contracting Agency will deduct the cost of accomplishing the work from monies due or to become due to the Contractor. Computation of the cost will be in accordance with Subsection 109.5.4.2.

109.4.6 Allowable Mark-Ups:

Only the allowable mark-ups as defined in Subsection 109.5 shall be allowed. Additional compensation for other items, including extended overhead and conditions, shall not be considered or allowed.

***109.5 ACTUAL COST WORK:**

The compensation for actual cost work performed by the Contractor (Subcontractor) shall be determined by the Engineer in the following manner.

109.5.1 Equipment: For all equipment, the use of which has been authorized by the Engineer, except for small tools and manual equipment, the Contractor will be paid in accordance with the latest Schedule of Equipment Rates used by the

Arizona Department of Transportation. Payment for equipment will be made following the calculations in Section 109 of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction. The value of 0.933 shall be used for the adjustment factor F used in the rental rate formulas ($F = 0.933$).

109.5.2 Material: For all material, accepted by the Engineer and used in the work, the Contractor will be paid the actual cost of such material including transportation cost, to which total cost will be added a sum equal to 15 percent thereof.

109.5.3 Labor: For all labor and for the foreman, when he is in direct charge of the operation, the Contractor will be paid:

(A) The actual wages paid plus the current percentage thereof as determined by the Arizona Department of Transportation which is deemed to cover the Contractor's cost incurred as a result of payment imposed by State or Federal Law and payments that are made to, or on behalf of, the workman other than the actual wage. Actual wage is defined as the required current hourly rate paid to the labor classification concerned and does not include any fringe benefits or dislocation allowances. If the Contractor is not required to pay fringe benefits equivalent to the Current rates published in the Federal Register, an equitable deduction will be made from the current percentage established by the Arizona Department of Transportation.

(B) For the first \$50,000 of labor cost computed under paragraph (A) above, the Contractor will be paid an amount equal to (15) fifteen percent for overhead and profit.

(C) For all labor cost computed under paragraph (A) above, in excess of \$50,000 but not exceeding \$100,000, the Contractor will be paid an amount equal to (12) twelve percent for overhead and profit.

(D) For any labor cost computed under paragraph (A) above in excess of \$100,000 the Contractor will be paid an amount equal to (10) ten percent for overhead and profit.

109.5.4 Work Performed by Subcontractors or Other Sources:

109.5.4.1 Work Performed by Subcontractors: If it is determined by the Engineer that portions of the Actual Cost Work to be performed requires specialized labor or equipment not normally used by the Contractor and such work is then authorized to be performed by a subcontractor(s), the subcontractor(s) will be paid by the Contractor in accordance with the actual cost work procedures outlined herein. The Contractor will be paid by the Contracting Agency the full amount of the subcontract plus the following percentages for administration and supervision.

(A) For the first \$10,000 accumulated total of all change order work performed by subcontractors (less mark-up for overhead and profit), the Contractor will be paid an amount equal to 10 percent of the accumulated total for administration and supervision. If the accumulated total is \$3,000 or less, the Contractor will be paid \$300 for administration and supervision.

(B) For all change order work in excess of \$10,000 accumulated total performed by subcontractors (less mark-up for overhead and profit), the Contractor will be paid an amount equal to five percent of the accumulated total for administration and supervision.

109.5.4.2 Work Performed by Other Sources: If the Contracting Agency has work performed by other sources, in accordance with Subsection 109.4.5 (B), the Contracting Agency will deduct, from monies due or to become due to the Contractor, the full amount of the cost of accomplishing the work by other sources plus the following percentages for administration and supervision:

(A) For the first \$10,000 accumulated total of work performed by other sources, the Contracting Agency will deduct an amount equal to 10 percent of the accumulated total for administration and supervision. If the accumulated total is \$3,000 or less, the Contracting Agency will deduct \$300 for administration and supervision.

(B) For all work in excess of \$10,000 accumulated total performed by other sources, the Contracting Agency will deduct an amount equal to 5 percent of the accumulated total for administration and supervision.

109.5.5 Documentation:

(A) Except in emergency situations, the Contracting Agency will not be liable for any Actual Cost Work performed by the Contractor prior to written authorization by the Engineer or prior to full execution of a written agreement by all parties concerned.

(B) Payment for work performed on an actual cost basis will not be made until the Contractor has furnished the Engineer, on forms agreed to by the Contracting Agency, duplicate itemized statements of such work, including subcontractor(s) costs, detailed as follows:

- (1) Name, classification, date, daily hours, total hours, rate and extension for each laborer and foreman.
- (2) Designation, dates, daily hours, total hours, rental rates and extension for each unit of equipment, and machinery.
- (3) Quantities of material, prices, extension and transportation cost on a daily basis. These charges shall be substantiated by vendor invoices.

(C) The Engineer will compare his records with the statement furnished by the Contractor, resolving any differences and making the required adjustments. This statement when agreed upon and signed by both parties, shall be the basis of payment for the work performed.

109.5.6 Bonds and Insurance: The Contractor shall be paid for the actual cost plus (10%) ten percent for Administrative cost when the Contractor can provide evidence of payment for premiums on required payment and performance bonds, premiums on railroad and/or airport extended liability insurance, and premiums for property damage and/or public liability insurance. No duplication of payment for Contractor's costs included under Subsection 109.5.3(A) will be allowed.

109.5.7 Authority of Engineer: The Engineer is in charge of Actual Cost Work and has the authority to direct which labor and equipment will be used, to suspend operations, and to refuse to pay for any labor or equipment which he feels is not doing productive work.

109.6 PAYMENT FOR IMPROVEMENT DISTRICT PROJECTS:

Payment to the Contractor shall be made in accordance with ARS Sections 48-523 to 48-613, both inclusive.

As soon as the Contractor has fulfilled his contract, the Superintendent of Streets shall estimate the benefits arising from the work and make assessments to cover the work performed and specified in the contract, including incidental expenses in accordance with ARS Section 48-589.

The Contractor agrees to accept payment in the form of Assessments with attached Warrants and/or Improvement Bonds at the rate of interest declared in the resolution of intention prepared by the Contracting Agency.

***109.7 PAYMENT FOR BOND ISSUE AND BUDGET PROJECTS:**

(A) Partial Payments: The Contracting Agency will make a partial payment to the Contractor on the basis of an estimate prepared by the Contractor or Engineer for work completed through the last day of the preceding calendar month. Payment will be within 14 calendar days after the estimate has been certified and approved by the Engineer and received by the owner.

The Contracting Agency will retain 10 percent of all estimates as a guarantee for complete performance of the contract in accordance with Arizona Revised Statutes Section 34-221 or 34-607, unless the Contractor elects to deposit securities in accordance with Arizona Revised Statutes Section 34-221, Paragraph C.5. or 34-607, Paragraph B.5.

*Not applicable to Improvement District Projects.

When the Contractor is fifty percent completed, one-half of the amount retained shall be paid to the Contractor provided he is making satisfactory progress on the contract and there is no specific cause or claim requiring a greater amount to be retained. After the contract is fifty percent completed, no more than five percent of the amount of any subsequent progress payments made under the contract will be retained providing the Contractor is making satisfactory progress on the project. Except that, if at any time the owner determines satisfactory progress is not being made, ten percent retention shall be reinstated for all progress payments made under the contract subsequent to the determination.

Any material or equipment which will become an integral part of the completed project will be considered for partial payment in the Contractor's monthly progress payments. The intent of making partial payments is to provide the Contractor payment for direct material or equipment purchased. The purpose is to minimize the effect of escalating costs by procuring key materials. It is not the intent to pay for all materials but only those meeting the following conditions.

- (1) A total value of all items requested for payment must be greater than \$20,000. No payment will be processed until the material or equipment has been observed, reviewed or verified by the Contracting Agent representative. Only the material or equipment meeting the requirements of the plans and specifications will be paid. Payment for material or equipment does not constitute final acceptance.
- (2) Materials or equipment must be stored or stockpiled either on site, in a warehouse, or secured storage area. The Contractor assumes all responsibility for protection of these materials or equipment and shall insure them to cover loss or damage to same without additional liability or added costs to the Agency for providing this security, insurance, and storage.
- (3) The Contractor will provide access to the storage area or warehouse upon request of the Contracting Agent's representative for the purpose of verifying the inventory of items paid for under this section. None of the materials or equipment paid for under this section will be removed from the storage site until incorporated into the work of the project. The storage site shall be within the general geographical area of the project.
- (4) The Contractor shall provide a paid invoice and/or lien waiver for items paid for under this section. The Agency will not pay more than the invoice price for the item or items, less retention.
- (5) The Engineer may exclude individual payment requests which in the Engineer's judgement do not warrant storage and prepayment under the intent of this section.

(B) Final Payment: When the project has been accepted as provided in Section 105, and within 30 calendar days after final inspection of the work completed under the contract, the Engineer will render to the Contracting Agency and the Contractor, a final estimate which will show the amount of work performed and accepted under the contract. All prior estimates and partial payments will be subject to correction in the final estimate for payment.

Within sixty (60) calendar days after final acceptance, the Contracting Agency will pay the Contractor all amounts due him under the contract, except that before final payment will be made, the Contractor shall satisfy the Contracting Agency by affidavit that all bills for labor and materials incorporated in the work have been paid. The Contractor's Affidavit may be obtained from the Engineering Office of the Contracting Agency.

If payment will be longer than 60 days after final completion and acceptance, the owner will provide the Contractor specific written findings for reasons justifying the delay in payment.

The acceptance of the project and the making of the final payment shall not constitute a waiver by the Contracting Agency/Owner of any claims arising from faulty or defective work appearing after the completion or from failure of the Contractor to comply with the requirements of the contract documents.

109.8 PAYMENT FOR DELAY:

The procedures contained in this Subsection shall not be construed to void any provision of the contract which require notice of delays, provides for negotiation of other procedures for settlement or provide for liquidated damages.

109.8.1 Failure to Locate or Incorrect Location of Utilities: Arizona Revised Statutes 40-360 states “that if the owner or operator fails to locate or incorrectly locates the underground facility, pursuant to this article, the owner or operator becomes liable for resulting damages, costs and expense to the injured party.” The Contracting Agency will deny any claims for damages or delays if another owner or operator is at fault.

109.8.2 Contracting Agency Delays: Arizona Revised Statutes 34-221 states “A contract for the procurement of construction shall include a provision which provides for negotiations between the Agent and the Contractor for the recovery of damages related to expenses incurred by the Contractor for a delay for which the Agent is responsible, which is unreasonable under the circumstances and which was not within the contemplation of the parties to the contract.”

In this case, if the Contractor sustains damages which could not have been avoided by the judicious handling of forces, equipment and plant or by reasonable revision in the Contractor's schedule of operation, the compensation for such damages will be negotiated. The Contractor shall notify the Engineer of the condition in writing by the next work day. Failure to notify the Engineer within this time may be just cause to reject any claims for such damages.

Compensation for such damages will be negotiated as follows:

(A) The Engineer shall be satisfied that the Contractor has made every reasonable effort to prosecute the work despite any delays encountered or revisions in the Contractor's scheduling of work.

(B) The Compensation paid to the Contractor shall be in accordance with Section 109.

109.8.3 Extension of Contract Time: For any such delays, the contract time will be adjusted in accordance with Subsection 108.7.

109.9 DOLLAR VALUE OF MAJOR ITEM:

Revised 2000
TABLE 109-1

DOLLAR VALUE OF MAJOR ITEM	
Original Contract Amount	Dollar Value of Major Item
\$0.00 to \$1,000,000.00	\$50,000 or 10% of original contract amount, whichever is less
\$1,000,000.00 to \$5,000,000.00	5.0% of original contract amount
\$5,000,000.00 or greater	\$250,000.00 or 2.5% of original contract amount, whichever is greater

109.10 PAYMENT FOR MOBILIZATION/DEMobilIZATION

The Agency will compensate Contractor for a single round trip mobilization/demobilization of Contractor's personnel, equipment, supplies and incidentals, including establishment of offices, buildings and other facilities required for the performance of the work on the project, as well as preparatory work and operations prior to the commencement of the work on the project site. Such shall collectively be referred to herein as “mobilization/demobilization”.

Mobilization/demobilization will be measured for payment by the lump sum as a single complete unit of work.



July 29, 2008

To: MAG Standard Specifications and Details Committee

From: Jeff Van Skike, City of Phoenix

Subject: Modification to Section 618 Storm Drain Construction

This change will require a video inspection of the mainline pipe before final paving is allowed.

Add new Section 618.5, renumber existing 618.5 and 618.6 to 618.6 and 618.7, respectively:

618.5 VIDEOTAPING OF NEW MAINLINE STORM DRAINS:

Before final paving is installed over new HDPE mainline storm drain pipe, the Contractor shall provide the Engineer with an annotated video inspection record (either VHS or DVD format) of the entire mainline storm drain pipeline and lateral connections. The video shall clearly show all joints, seals, connecting pipes, and manholes. This video shall be provided to the Engineer, and reviewed and approved by the Engineer prior to the Contractor being allowed to place the final pavement over the storm drain line. No separate payment will be made for this inspection; the cost of the video inspection shall be incidental to the contract cost.

SECTION 109

MEASUREMENTS AND PAYMENTS

109.1 MEASUREMENT OF QUANTITIES:

All work completed under the contract will be measured by the Engineer according to United States standard measures. The methods of measurement and computation to be used in determination of quantities of materials furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice. A station, when used as a definition or term of measurement, will be 100 linear feet.

Unless otherwise specified, longitudinal measurements will be made along the grade line.

Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the Engineer.

The term ton will mean the short ton consisting of 2,000 pounds avoirdupois.

Unless otherwise specified, structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.

In computing volumes of excavations or fill, the average end area method or other acceptable methods as determined by the Engineer will be used.

Volumes will be computed at 60° F, using ASTM D-1250 for Asphalt or ASTM D-633 for Tars.

Lumber will be measured by the thousand board foot measure actually used in the work. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.

The term lump sum, when used as a pay item, will mean complete payment for the work described.

Sundry items which have a basis for measurement and payment herein and which are incidental to or required in the construction of the work but are not included as items in the fee schedule shall be considered an integral part of the contract, and all labor, materials, etc. required for such items shall be furnished by the Contractor and the cost of same included in the unit price.

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Where the units of measurement shown on the proposal form or the methods of measurement specified in the project special provisions differ from the measurement and payment provisions of the Uniform Standard Specifications, the project documents shall have precedence.

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109.2 SCOPE OF PAYMENT:

Measurement and payment for pay items in the proposal will be as indicated in the applicable standard specification or in the special provisions.

When payment is specified to be made on the basis of weight, the weighing shall be done on certified platform scales sealed by the State Inspector or the City Sealer of Weights and Measures as defined by Arizona Revised Statutes Sections 44-2112 and 44-2116. The Contractor shall furnish the Engineer with duplicate Weighmaster's Certificates showing the actual net weights together with the information required by Arizona Revised Statutes Section 44-2142. The Contractor shall furnish the Engineer with duplicate Weighmaster's Certificates at the time of delivery unless the Engineer designates a different submittal time. The Contracting Agency will accept the certificates as evidence of the weight delivered.

Payment for the various items in the proposal will be made at the unit price in the proposal, and shall be compensation in full for furnishing all labor, materials, equipment and appurtenances necessary to complete the work in a satisfactory manner as shown on the plans and as required in the specifications, with all connections, testing, and related work completed. Each item, fixture, piece of equipment, etc., shall be complete with all necessary connections and appurtenances, for the

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satisfactory use and operation of said item. No additional payment will be made for work related to any item unless specifically called for in the proposal. This compensation shall also cover all risk, loss, damage or expense of whatever character arising out of the nature of the work or the prosecution thereof, subject to the provisions of Section 107.

The unit prices shall include all costs for salaries and wages, all payroll additives to cover employee benefits, allowances for vacation and sick leave, company portion of employee insurance, social and retirement benefits, all payroll taxes, contributions and benefits imposed by any applicable law or regulation and any other direct or indirect payroll-related costs.

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The unit prices shall also include all costs for indirect charges, overhead, mileage, travel time, subsistence, materials, freight charges for materials to Contractor's facility or project site, equipment rental, consumables, tools, insurance costs, all applicable taxes and fees, as well as Contractor's fee and profit. The unit prices shall further include all site clean-up costs, hauling of construction debris, and proper disposal in accordance with all laws and regulations and the project plans and specifications.

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Payment will be made for only those items listed in the proposal. All materials and work necessary for completion of the project are included in proposal items. Work or materials not specifically identified by a proposal item are considered as included in the unit price of related proposal items.

Unless otherwise specified, payment will not be made for unused materials.

109.2.1 Taxes and Fees:

Taxes are deemed to include all sales, use, consumer and other taxes that are legally enacted at the time of submittal of the project fee proposal, whether or not they are yet effective or merely scheduled to go into effect. Any such taxes shall be paid by Contractor and shall be included in the unit prices.

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The Contractor shall also be responsible to contact all municipalities and other governmental agencies having jurisdictional authority over the project or the project area to determine if they will charge the Contractor other fees (e.g., permit fees) for the project work. Unless otherwise specified in the project documents or on the proposal form, the Contractor shall include the cost of such fees in the unit prices on the proposal form.

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109.3 ASSIGNMENT OF PAYMENTS:

The Contractor shall not assign payments of a contract or any portion thereof without approval of surety and written consent of the Contracting Agency.

Claims for monies due or to become due the Contractor may be assigned to a bank, trust company, or other financing institution, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Any assignment of money shall be subject to all proper setoffs and withholdings in favor of the Contracting Agency and to all deductions provided for in these specifications.

109.4 COMPENSATION FOR ALTERATION OF WORK:

All compensation due the Contractor for alteration of work shall be documented by a Change Order. Except in emergency situations or as otherwise directed by the Engineer, the Contractor shall not proceed with Change Order work until said Change Order has been approved and issued by the Agency.

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***109.4.1 By The Contracting Agency:**

(A) For a decrease greater than 20 percent in either the total cost of the contract or the total cost of a major item and when a reasonable cost analysis supports an increase in the pro rata share of fixed cost chargeable to this item in total, an increase adjustment in the monies due the Contractor may be made. This adjusted compensation will not exceed 80 percent of the original lump sum contract amount or, if for a unit price item, the adjustment will not exceed 80 percent of the original extended unit price. This does not apply to items labeled as contingent item in the proposal.

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* Not applicable to Improvement District Projects

(B) For an increase greater than 20 percent in either the total cost of the contract or the total cost of a major item, any adjustment made will only apply to that cost in excess of 120 percent of the original total cost of the contract or, in the case of a major item, in excess of 120 percent of the original proposed extended unit price. If either party presents a reasonable cost analysis that shows a change in the pro rata share of fixed costs chargeable to this item in total, an increase or decrease adjustment will be made. This increase or decrease adjustment will be made on such basis as is necessary to cover a reasonable estimate of cost, plus an allowance, not to exceed 15 percent, for overhead and profit. If the parties are unable to reach an agreement, the Engineer has the authority to order the excess work done on an actual cost basis as specified in Section 109.5.

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(C) For either an increase or decrease in cost, no claim shall be made by the Contractor for any loss of anticipated profits.

***109.4.2 Due to Physical Conditions:**

(A) If the Engineer, after his investigation of the site conditions, agrees that they materially differ from those indicated in the contract and would cause an increase in the Contractor's cost of accomplishing the work, new unit prices or a lump sum cost (for the additional work only) may be negotiated. If the parties are unable to reach an agreement on price, the Engineer has the authority to order this additional work accomplished on an actual cost basis as specified in Section 109.5.

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(B) If the Engineer, after his investigation of the site conditions, finds that these conditions do not materially differ from those indicated in the contract, he has the authority to order the work to be accomplished at the original price(s).

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***109.4.3 Due to Extra Work:** If the Contractor can present valid, factual evidence, satisfactory to the Engineer, that the work in question is an item not provided for in the contract as awarded then a unit price or lump sum cost, for this item only, may be negotiated. If the parties are unable to reach an agreement on price or cost, the Engineer has the authority to order the extra work accomplished on an actual cost basis as specified in Section 109.5.

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109.4.4 Made at the Contractor's Request: Any alterations, if approved, will be a reduction in cost or at no additional cost to the Contracting Agency.

109.4.5 Due to Failure of Contractor to Properly Maintain the Project:

(A) For any suspension of work during normal working hours due to failure of the Contractor to properly maintain the project, there will be no additional compensation or time allowed.

(B) If the Engineer provides the Contractor with a written order to provide adequate maintenance of traffic, adequate cleanup, adequate dust control or to correct deficiencies resulting from abnormal weather conditions and the Contractor fails to comply in the time frame specified, the Contracting Agency may have the work accomplished by other sources. The Contracting Agency will deduct the cost of accomplishing the work from monies due or to become due to the Contractor. Computation of the cost will be in accordance with Section 109.5.4.2.

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109.4.6 Allowable Mark-Ups:

Only the allowable mark-ups as defined in Section 109.5 shall be allowed. Additional compensation for other items, including extended overhead and conditions, shall not be considered or allowed.

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***109.5 ACTUAL COST WORK:**

The compensation for actual cost work performed by the Contractor (Subcontractor) shall be determined by the Engineer in the following manner.

109.5.1 Equipment: For all equipment, the use of which has been authorized by the Engineer, except for small tools and manual equipment, the Contractor will be paid in accordance with the latest Schedule of Equipment Rates used by the Arizona Department of Transportation. Payment for equipment will be made following the calculations in Section 109 of the

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Arizona Department of Transportation Standard Specifications for Road and Bridge Construction. The value of 0.933 shall be used for the adjustment factor F used in the rental rate formulas ($F = 0.933$).

109.5.2 Material: For all material, accepted by the Engineer and used in the work, the Contractor will be paid the actual cost of such material including transportation cost, to which total cost will be added a sum equal to 15 percent thereof.

109.5.3 Labor: For all labor and for the foreman, when he is in direct charge of the operation, the Contractor will be paid:

(A) The actual wages paid plus the current percentage thereof as determined by the Arizona Department of Transportation which is deemed to cover the Contractor's cost incurred as a result of payment imposed by State or Federal Law and payments that are made to, or on behalf of, the workman other than the actual wage. Actual wage is defined as the required current hourly rate paid to the labor classification concerned and does not include any fringe benefits or dislocation allowances. If the Contractor is not required to pay fringe benefits equivalent to the Current rates published in the Federal Register, an equitable deduction will be made from the current percentage established by the Arizona Department of Transportation.

(B) For the first \$50,000 of labor cost computed under paragraph (A) above, the Contractor will be paid an amount equal to (15) fifteen percent for overhead and profit.

(C) For all labor cost computed under paragraph (A) above, in excess of \$50,000 but not exceeding \$100,000, the Contractor will be paid an amount equal to (12) twelve percent for overhead and profit.

(D) For any labor cost computed under paragraph (A) above in excess of \$100,000 the Contractor will be paid an amount equal to (10) ten percent for overhead and profit.

109.5.4 Work Performed by Subcontractors or Other Sources:

109.5.4.1 Work Performed by Subcontractors: If it is determined by the Engineer that portions of the Actual Cost Work to be performed requires specialized labor or equipment not normally used by the Contractor and such work is then authorized to be performed by a subcontractor(s), the subcontractor(s) will be paid by the Contractor in accordance with the actual cost work procedures outlined herein. The Contractor will be paid by the Contracting Agency the full amount of the subcontract plus the following percentages for administration and supervision.

(A) For the first \$10,000 accumulated total of all change order work performed by subcontractors (less mark-up for overhead and profit), the Contractor will be paid an amount equal to 10 percent of the accumulated total for administration and supervision. If the accumulated total is \$3,000 or less, the Contractor will be paid \$300 for administration and supervision.

(B) For all change order work in excess of \$10,000 accumulated total performed by subcontractors (less mark-up for overhead and profit), the Contractor will be paid an amount equal to five percent of the accumulated total for administration and supervision.

109.5.4.2 Work Performed by Other Sources: If the Contracting Agency has work performed by other sources, in accordance with Section 109.4.5 (B), the Contracting Agency will deduct, from monies due or to become due to the Contractor, the full amount of the cost of accomplishing the work by other sources plus the following percentages for administration and supervision:

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(A) For the first \$10,000 accumulated total of work performed by other sources, the Contracting Agency will deduct an amount equal to 10 percent of the accumulated total for administration and supervision. If the accumulated total is \$3,000 or less, the Contracting Agency will deduct \$300 for administration and supervision.

(B) For all work in excess of \$10,000 accumulated total performed by other sources, the Contracting Agency will deduct an amount equal to 5 percent of the accumulated total for administration and supervision.

109.5.5 Documentation:

(A) Except in emergency situations, the Contracting Agency will not be liable for any Actual Cost Work performed by the Contractor prior to written authorization by the Engineer or prior to full execution of a written agreement by all parties concerned.

(B) Payment for work performed on an actual cost basis will not be made until the Contractor has furnished the Engineer, on forms agreed to by the Contracting Agency, duplicate itemized statements of such work, including subcontractor(s) costs, detailed as follows:

- (1) Name, classification, date, daily hours, total hours, rate and extension for each laborer and foreman.
- (2) Designation, dates, daily hours, total hours, rental rates and extension for each unit of equipment, and machinery.
- (3) Quantities of material, prices, extension and transportation cost on a daily basis. These charges shall be substantiated by vendor invoices.

(C) The Engineer will compare his records with the statement furnished by the Contractor, resolving any differences and making the required adjustments. This statement when agreed upon and signed by both parties, shall be the basis of payment for the work performed.

109.5.6 Bonds and Insurance: The Contractor shall be paid for the actual cost plus (10%) ten percent for Administrative cost when the Contractor can provide evidence of payment for premiums on required payment and performance bonds, premiums on railroad and/or airport extended liability insurance, and premiums for property damage and/or public liability insurance. No duplication of payment for Contractor's costs included under Section 109.5.3(A) will be allowed.

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109.5.7 Authority of Engineer: The Engineer is in charge of Actual Cost Work and has the authority to direct which labor and equipment will be used, to suspend operations, and to refuse to pay for any labor or equipment which he feels is not doing productive work.

109.6 PAYMENT FOR IMPROVEMENT DISTRICT PROJECTS:

Payment to the Contractor shall be made in accordance with ARS Sections 48-523 to 48-613, both inclusive.

As soon as the Contractor has fulfilled his contract, the Superintendent of Streets shall estimate the benefits arising from the work and make assessments to cover the work performed and specified in the contract, including incidental expenses in accordance with ARS Section 48-589.

The Contractor agrees to accept payment in the form of Assessments with attached Warrants and/or Improvement Bonds at the rate of interest declared in the resolution of intention prepared by the Contracting Agency.

***109.7 PAYMENT FOR BOND ISSUE AND BUDGET PROJECTS:**

(A) Partial Payments: The Contracting Agency will make a partial payment to the Contractor on the basis of an estimate prepared by the Contractor or Engineer for work completed through the last day of the preceding calendar month. Payment will be within 14 calendar days after the estimate has been certified and approved by the Engineer and received by the owner.

The Contracting Agency will retain 10 percent of all estimates as a guarantee for complete performance of the contract in accordance with Arizona Revised Statutes Section 34-221 or 34-607, unless the Contractor elects to deposit securities in accordance with Arizona Revised Statutes Section 34-221, Paragraph C.5. or 34-607, Paragraph B.5.

When the Contractor is fifty percent completed, one-half of the amount retained shall be paid to the Contractor provided he is making satisfactory progress on the contract and there is no specific cause or claim requiring a greater amount to be retained. After the contract is fifty percent completed, no more than five percent of the amount of any subsequent progress payments made under the contract will be retained providing the Contractor is making satisfactory progress on the project. Except that,

* Not applicable to Improvement District Projects

if at any time the owner determines satisfactory progress is not being made, ten percent retention shall be reinstated for all progress payments made under the contract subsequent to the determination.

Any material or equipment which will become an integral part of the completed project will be considered for partial payment in the Contractor's monthly progress payments. The intent of making partial payments is to provide the Contractor payment for direct material or equipment purchased. The purpose is to minimize the effect of escalating costs by procuring key materials. It is not the intent to pay for all materials but only those meeting the following conditions.

(1) A total value of all items requested for payment must be greater than \$20,000. No payment will be processed until the material or equipment has been observed, reviewed or verified by the Contracting Agent representative. Only the material or equipment meeting the requirements of the plans and specifications will be paid. Payment for material or equipment does not constitute final acceptance.

(2) Materials or equipment must be stored or stockpiled either on site, in a warehouse, or secured storage area. The Contractor assumes all responsibility for protection of these materials or equipment and shall insure them to cover loss or damage to same without additional liability or added costs to the Agency for providing this security, insurance, and storage.

(3) The Contractor will provide access to the storage area or warehouse upon request of the Contracting Agent's representative for the purpose of verifying the inventory of items paid for under this section. None of the materials or equipment paid for under this section will be removed from the storage site until incorporated into the work of the project. The storage site shall be within the general geographical area of the project.

(4) The Contractor shall provide a paid invoice and/or lien waiver for items paid for under this section. The Agency will not pay more than the invoice price for the item or items, less retention.

(5) The Engineer may exclude individual payment requests which in the Engineer's judgement do not warrant storage and prepayment under the intent of this section.

(B) Final Payment: When the project has been accepted as provided in Section 105, and within 30 calendar days after final inspection of the work completed under the contract, the Engineer will render to the Contracting Agency and the Contractor, a final estimate which will show the amount of work performed and accepted under the contract. All prior estimates and partial payments will be subject to correction in the final estimate for payment.

Within sixty (60) calendar days after final acceptance, the Contracting Agency will pay the Contractor all amounts due him under the contract, except that before final payment will be made, the Contractor shall satisfy the Contracting Agency by affidavit that all bills for labor and materials incorporated in the work have been paid. The Contractor's Affidavit may be obtained from the Engineering Office of the Contracting Agency.

If payment will be longer than 60 days after final completion and acceptance, the owner will provide the Contractor specific written findings for reasons justifying the delay in payment.

The acceptance of the project and the making of the final payment shall not constitute a waiver by the Contracting Agency/Owner of any claims arising from faulty or defective work appearing after the completion or from failure of the Contractor to comply with the requirements of the contract documents.

109.8 PAYMENT FOR DELAY:

The procedures contained in this Section shall not be construed to void any provision of the contract which require notice of delays, provides for negotiation of other procedures for settlement or provide for liquidated damages.

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109.8.1 Failure to Locate or Incorrect Location of Utilities: Arizona Revised Statutes 40-360 states "that if the owner or operator fails to locate or incorrectly locates the underground facility, pursuant to this article, the owner or operator becomes liable for resulting damages, costs and expense to the injured party." The Contracting Agency will deny any claims for damages or delays if another owner or operator is at fault.

109.8.2 Contracting Agency Delays: Arizona Revised Statutes 34-221 states "A contract for the procurement of construction shall include a provision which provides for negotiations between the Agent and the Contractor for the recovery of damages related to expenses incurred by the Contractor for a delay for which the Agent is responsible, which is unreasonable under the circumstances and which was not within the contemplation of the parties to the contract." In this case, if the Contractor sustains damages which could not have been avoided by the judicious handling of forces, equipment and plant or by reasonable revision in the Contractor's schedule of operation, the compensation for such damages will be negotiated. The Contractor shall notify the Engineer of the condition in writing by the next work day. Failure to notify the Engineer within this time may be just cause to reject any claims for such damages.

Compensation for such damages will be negotiated as follows:

(A) The Engineer shall be satisfied that the Contractor has made every reasonable effort to prosecute the work despite any delays encountered or revisions in the Contractor's scheduling of work.

(B) The Compensation paid to the Contractor shall be in accordance with Section 109.

109.8.3 Extension of Contract Time: For any such delays, the contract time will be adjusted in accordance with Section 108.7.

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109.9 DOLLAR VALUE OF MAJOR ITEM:

Revised 2000
TABLE 109-1
DOLLAR VALUE OF MAJOR ITEM

Original Contract Amount	Dollar Value of Major Item
\$0.00 to \$1,000,000.00	\$50,000 or 10% of original contract amount, whichever is less
\$1,000,000.00 to \$5,000,000.00	5.0% of original contract amount
\$5,000,000.00 or greater	\$250,000.00 or 2.5% of original contract amount, whichever is greater

109.10 PAYMENT FOR MOBILIZATION/DEMOBILIZATION

The Agency will compensate Contractor for a single round trip mobilization/demobilization of Contractor's personnel, equipment, supplies and incidentals, including establishment of offices, buildings and other facilities required for the performance of the work on the project, as well as preparatory work and operations prior to the commencement of the work on the project site.

Deleted: Such shall collectively be referred to herein as "mobilization/demobilization".

Mobilization/demobilization will be measured for payment by the lump sum as a single complete unit of work. Payment for mobilization/demobilization will be made at the contract lump sum price. Payment shall be made in equal one-third portions. The first payment will be paid with the Contractor's initial billing. The second payment will be made when the total payments to the Contractor for the pay items, exclusive of payments for mobilization/demobilization, equal greater than one-half of the initial contracted amount, exclusive of mobilization/demobilization. The remaining one-third will be paid as part of the final payment due to the Contractor.

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When other contract items are adjusted as provided in Section 109, and if the costs applicable to such items of work include mobilization costs, such mobilization costs will be considered as recovered by Contractor in the lump sum price paid for mobilization, and will be excluded from consideration in determining compensation under Section 109.

If the Contractor performs a second or additional mobilization/demobilization of personnel, material and/or equipment at the Engineer's express written request, the Agency will compensate the Contractor for such expenses at the Contractor's actual costs. The Contractor shall provide all documentation for these costs at the request of the Engineer.

For projects that do not list mobilization/demobilization as a pay item, a single round trip mobilization/demobilization shall be considered a non-pay item for said projects, the cost of which shall be spread across other appropriate items. Should a

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second or additional mobilization/demobilization be required at the Engineer's express written request, compensation for such shall be handled as detailed in the foregoing paragraph.

SECTION 301

SUBGRADE PREPARATION

301.1 DESCRIPTION:

This section shall govern the preparation of natural, or excavated areas prior to the placement of sub-base material, pavement, curbs and gutters, driveways, sidewalks or other structures. It shall include stripping and disposal of all unsuitable material including existing pavement and obstructions such as stumps, roots, rocks, etc., from the area to be paved.

301.2 PREPARATION OF SUBGRADE:

With the exception of areas where compacted fills have been constructed as specified in Section 211 in the areas where new construction is required the moisture content shall be brought to that required for compaction by the addition of water, by the addition and blending of dry, suitable material or by the drying of existing material. The material shall then be compacted to the specified relative density. If pumping subgrade should become evident at any time prior to paving, the Engineer may require proof rolling with a pneumatic-tire roller or other approved equipment in order to identify the limits of the unacceptable area. The proof rolling will be performed at no additional cost to the Contracting Agency.

Subgrade preparation shall also include preparing the subgrade to the required line and grade for paved or unpaved shoulders, tapers, turnouts, and driveways, and at all other project locations where aggregate base and/or select material courses are used in accordance with the Project Plans.

301.2.1 The Contractor may use removed existing asphalt concrete and other existing bituminous roadway surfacing materials originating on the project site, as embankment fill. All materials used shall be thoroughly crushed to sizes not exceeding four inches, or as approved by the Engineer. These asphalt/bituminous materials shall be placed not less than two feet below finished subgrade elevation.

Project earthwork quantities when included as separate contract pay items will include removed asphalt/bituminous material volumes, unless otherwise specified in the Special Provisions.

All unsuitable material and all excess material shall be disposed of in accordance with the requirements of Sections 205.2 and 205.6, respectively. When additional material is required for fill, it shall conform to Section 210.

301.3 RELATIVE COMPACTION:

The subgrade shall be scarified and loosened to a depth of 6 inches. Rock 6-inches or greater in size that becomes exposed due to scarification shall be removed from the scarified subgrade. When fill material is required, a layer of approximately 3 inches may be spread and compacted with the subgrade material to provide a better bond. The subgrade cut and fill areas shall be constructed to achieve a uniform soil structure having the following minimum compaction, measured as a percentage of maximum dry density when tested in accordance with AASHTO T-99, Method A, and T-191 or ASTM D-2922 and D-3017 with the percent of density adjusted in accordance with the rock correction procedures for maximum density determination, standard detail, to compensate for the rock content larger than that which will pass a No. 4 sieve. Unless otherwise noted in the project plans or project specifications, all compaction shall be performed within 2 percentage points of the optimum moisture content.

(A) Below pavement, sidewalk, or curb & gutter	All Streets	95 percent
(B) Below aggregate-surfaced areas subject to vehicular traffic (e.g., aggregate-surfaced parking lots, alleys, roadway shoulders, drive lanes, etc.)		90 percent
Other traffic ways		90 percent
(C) Below unsurfaced areas subject to vehicular traffic (e.g., unsurfaced parking lots, alleys, roadway shoulders, etc.)		85 percent

(C)Curbs, gutters and sidewalks..... 85 percent

Areas not subject to vehicular traffic, including but not limited to raised landscape medians and other landscaped areas outside the limits of designated vehicle parking and travel paths, shall not be subject to the foregoing requirements unless otherwise specified by the Engineer.

301.4 SUBGRADE TOLERANCES:

Subgrade upon which pavement, sidewalk, curb and gutter, driveways, or other structures are to be directly placed shall not vary more than 1/4 inch from the specified grade and cross-section. Subgrade upon which sub-base or base material is to be placed shall not vary more than 3/4 inch from the specified grade and cross-section. Variations within the above specified tolerances shall be compensating so that the average grade and cross-section specified are met.

301.5 GRADING OF AREAS NOT TO BE PAVED:

Areas where grade only is called for on the plan shall be graded to meet the tolerances for the subgrade where sub-base or base material is to be placed. The surface shall be constructed to a straight grade from the finished pavement elevations shown on the plans to the elevation of the existing ground at the extremities of the area to be graded.

301.6 CLEAN UP

Adjacent grades will be dressed as needed to leave the site in a workmanlike appearance.

301.6 PROTECTION OF EXISTING FACILITIES:

The Contractor shall exercise extreme caution to prevent debris from falling into manholes or other structures. In the event that debris should fall into a structure it shall immediately be removed.

301.7 MEASUREMENT:

Measurement for subgrade preparationgrading under pavement will be by the square yard. The area to be measured will be the total accepted area of new asphalt or Portland cement pavement, including paved shoulders, tapers, and turnouts, and unpaved roadway shoulders. Measurement will also include driveways that are paved or are surfaced with aggregate base or select materials. The area under concrete curb and gutter, sidewalk, concrete driveway entrances, and concrete alley entrances will not be included in this pay item.

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

301.8 PAYMENT:

Payment for this grading work will be made only when it is performed for street or roadway paving projects. Payment for necessary grading for items outside of the lip of gutter shall be included in the cost of those items.

Payment will be made at the unit price bid per square yard, and such payment shall be compensation in full for the item complete in place, including stripping, excavating, hauling, filling, compacting, and disposing of excess or unsuitable materials, together with all costs incidental thereto.

SECTION 601

TRENCH EXCAVATION, BACKFILLING AND COMPACTION

601.1 DESCRIPTION:

The work covered by this specification consists of furnishing all plant, labor, equipment, appliances and materials, and performing all operations in connection with the excavation and backfilling of trenches for a single pipe installation in accordance with the plans and special provisions, except for the installation of high density polyethylene pipe (HDPE). See Section 603 for trench excavation, backfilling, and compaction of HDPE pipe.

Excavation for appurtenance structures, such as manholes, inlets, transition structures, junction structures, vaults, valve boxes, catch basins, etc., shall be deemed to be in the category of trench excavation.

601.2 EXCAVATION:

601.2.1 General: The Contractor shall perform all excavation of every description and of whatever substances encountered, to the depths indicated on the plans, and including excavation ordered by the Engineer of compacted backfill for the purpose of making density tests on any portion of the backfill.

All excavation shall be open cut unless otherwise shown on the plans or approved by the Engineer.

601.2.2 Trench Widths: Trenches for other than cast-in-place concrete pipe shall conform to the dimensions in Table 601-1, unless otherwise specified in the special provisions, indicated on the plans, and/or approved by the Engineer.

TABLE 601-1		
TRENCH WIDTHS		
Size Of Pipe (I.D.)	Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel	Minimum Width At Springline Each Side of Pipe (1)
Less than 18 inches	16 inches	6 inches
18 inches to 24 inches inclusive	19 inches	7 1/2 inches
27 inches to 39 inches inclusive	22 inches	9 inches
42 inches to 60 inches inclusive	1/2 O.D.	12 inches
Over 60 inches	36 inches	12 inches

(1) When the specified compaction cannot be obtained in the haunch area and/or bedding zone, the Contractor shall make necessary changes in his methods and/or equipment to obtain the desired results. In some instances, the Minimum Width at Springline shall be adjusted wider to assist the Contractor in obtaining the compaction. The Engineer must be satisfied with the Contractor's compaction effort, concur with the change and approve the revised distance. There shall be no additional cost to the Agency for the extra trench width.

For multiple pipe installations in a single trench, the Engineer shall provide details on the plans or in the Special/Technical Provisions as to the layout, pipe configuration, distances between pipes and trench walls, the type of backfill, bedding and foundation materials, etc.

The width of the trench shall not be greater than the maximum indicated in Table 601-1, at and below the level of the top of the pipe. The width of the trench above that level may be made as wide as necessary for sheeting and bracing, and for proper installation of the work.

If the maximum trench width as specified in Table 601-1 is exceeded at the top of the pipe the Contractor shall provide, at no additional cost to the Contracting Agency, the necessary additional load bearing capacity by means of bedding, having a higher bedding factor than that specified, higher strength pipe, a concrete cradle, cap or encasement, or by other means approved in writing by the Engineer.

601.2.3 Trench Grade: Alignment and elevation stakes shall be furnished the Contractor at set intervals and agreed upon offsets. On water main projects, elevation stakes will be furnished only when deemed necessary by the Engineer. In all cases where elevation stakes are furnished, the Engineer will also furnish the Contractor with cut sheets.

For all pipe 12 inches or greater in diameter, the Contractor shall excavate for and provide an initial granular bedding at least 4 inches thick or 1/12 the O.D. of the pipe whichever is greater. This bedding material shall be placed at a uniform density with minimum compaction and fine graded as specified below.

Bell or coupling holes shall be dug after the trench bottom has been graded. Such holes shall be of sufficient width to provide ample room for caulking, banding, or bolting. Holes shall be excavated only as necessary to permit accurate work in the making of the joints and to insure that the pipe will rest upon the prepared bottom of the trench, and not be supported by any portion of the joint.

Depressions for joints, other than bell-and-spigot, shall be made in accordance with the recommendations of the joint manufacturer for the particular joint used.

601.2.4 Fine Grading: Unless otherwise specified in the plans and/or special provisions, the bottom of the trench shall be accurately graded to provide uniform bearing and support for each section of the pipe at every point along its entire length, except for portions of the pipe where it is necessary to excavate for bells and for proper sealing of the pipe joints.

601.2.5 Overexcavation: Except at locations where excavation of rock from the bottom of the trench is required, care shall be taken not to excavate below the depth indicated.

Unauthorized excavation below the specified grade line shall be refilled at the Contractor's expense with ABC material compacted to a uniform density of not less than 95 percent of the maximum density as determined by AASHTO T-99 and T-191 or ASTM D-2922 and D-3017. When AASHTO T-99, method A or B, and T-191 are used for density determination, MAG Detail 190 will be used for rock correction.

Whenever rock is encountered in the trench bottom, it shall be overexcavated to a minimum depth of six inches below the O.D. of the pipe. This overexcavation shall be filled with granular material placed with the minimum possible compaction.

Whenever unsuitable soil incapable of supporting the pipe is encountered, the Contractor will notify the Engineer and a field determination will be made as to the depth of overexcavation and the granular fill required.

601.2.6 Excavation for Manholes, Valves, Inlets, Catch Basins and Other Accessories: The Contractor may excavate to place the concrete structure directly against the excavated surface, provided that the faces of the excavation are firm and 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 overexcavate to place the structure and this overexcavation 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 1 1/2 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 1 1/2 sack controlled low strength material, placement of the material shall be per Section 604 which will require a time lag between the material and the structural concrete. The placement of the additional material shall be at no cost to the Agency.

601.2.7 Pavement and Concrete Cutting and Removal: Where trenches lie within the portland cement concrete section of streets, alleys, driveways, or sidewalks, etc., such concrete shall be sawcut to neat, vertical, true lines in such a manner that the adjoining surface will not be damaged. The minimum depth of cut shall be 1 1/2 inches or 1/4 of the thickness, whichever is greater.

Asphalt pavement shall be clean-cut, 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.

601.2.8 Grading and Stockpiling: All grading in the vicinity of trench excavation shall be controlled to prevent surface water from flowing into the trenches. Any water accumulated in the trenches shall be removed by pumping or by other approved methods.

During excavation, material suitable for backfilling shall be piled in an orderly manner, a sufficient distance back from the edges of trenches, to avoid overloading and to prevent slides or cave-ins. Material unsuitable for backfilling, or excess material, shall be hauled from the job site and disposed of by the Contractor.

The Contractor shall, prior to final acceptance of the work, submit a letter to the Contracting Agency stating the location of each disposal site for all excess or unsuitable material and certify that he has obtained the property owner's permission for the disposal of all such materials.

Where the plans and/or special provisions provide for segregation of topsoil from underlying material for purposes of backfill, the material shall not be mixed.

601.2.9 Shoring and Sheeting: The Contractor shall do such trench bracing, sheathing, or shoring necessary to perform and protect the excavation as required for safety and conformance to governing laws. The bracing, sheathing, or shoring shall not be removed in one operation but shall be done in successive stages as determined by the Engineer to prevent overloading of the pipe during backfilling operations. The cost of the bracing, sheathing, or shoring, and the removal of same, shall be included in the unit price bid for the pipe.

All shoring and sheeting deemed necessary to protect the excavation and to safeguard employees, shall be installed. See Section 107.

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 separate 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. 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 be maintained at all times.

601.3 PROTECTION OF EXISTING UTILITIES:

601.3.1 Utilities: Unless otherwise shown on the plans or stated in the specifications, all utilities, both underground or overhead, shall be maintained in continuous service throughout the entire contract period. The Contractor shall be responsible and liable for any damages to or interruption of service caused by the construction.

If the Contractor desires to simplify his operation by temporarily or permanently relocating or shutting down any utility or appurtenance, he shall make the necessary arrangements and agreements with the owner and shall be completely responsible for all costs concerned with the relocation or shutdown and reconstruction. All property shall be reconstructed in its original or new location as soon as possible and to a condition at least as good as its previous condition. This cycle of relocation or shutdown and reconstruction shall be subject to inspection and approval by both the Engineer and the owner of the utility.

The Contractor shall be entirely responsible for safeguarding and maintaining all conflicting utilities that are shown on the plans (Sections 107 and 105 apply). This includes overhead wires and cables and their supporting poles whether they are inside or outside of the open trench. If, in the course of work, a conflicting utility line that was not shown on the plans is discovered, the Contracting Agency will either negotiate with the owner for relocation, relocate the utility, change the alignment and grade of the trench or as a last resort, declare the conflict as "extra work" to be accomplished by the Contractor in accordance with Section 104.

601.3.2 Irrigation Ditches, Pipes and Structures: The Contractor shall contact the owners of all irrigation facilities, and make arrangements for necessary construction clearances and/or dry-up periods.

All irrigation ditches, dikes, headgates, pipe, valves, checks, etc., damaged or removed by the Contractor, shall be restored to their original condition or better, by the Contractor at no additional cost to the Contracting Agency.

601.3.3 Building, Foundations and Structures: Where trenches are located adjacent to building, foundations, and structures, the Contractor shall take all necessary precaution against damage to them. The Contractor shall be liable for any damage caused by the construction.

Except where authorized in the special provisions or in writing by the Engineer, water settling of backfill material in trenches adjacent to structures will not be permitted.

601.3.4 Permanent Pipe Supports: Permanent pipe supports for the various types and sizes of sewer, water and utility lines shall conform to the Standard Details or the details shown on the plans. Such pipe supports shall be erected at the locations shown on the plans and/or at any other locations as necessary as determined by the Engineer.

601.3.5 Electronic, Telephonic, Telegraphic, Electrical, Oil and Gas Lines: These underground facilities shall be adequately supported by the Contractor. Support for plastic pipes shall be continuous along the bottom of the pipe. Support for metal pipe and electrical conduit may be continuous or nylon webbing may be used for suspension at no greater than ten-foot intervals.

The Contractor shall avoid damaging the plastic pipe, pipeways or conduits during trench backfilling and during foundation and bedding placement.

There will be no measurement or payment for this work. The Contractor will include all associated costs in the unit bid price for the conduit installation.

601.4 FOUNDATION, BEDDING, BACKFILLING AND COMPACTION:

601.4.1 Foundation: The material upon which the conduit or structure is to be placed shall be accurately finished to the grade or dimensions shown on the plans or as directed by the Engineer. The bottom portion of the trench shall be brought to grade so that the conduit or structure will be continuously in contact with the material on which it is being placed. If rocky or unsuitable soil is encountered, Subsection 601.2.5 applies.

601.4.2 Bedding: Bedding shall consist of granular material containing no pieces larger than 1 1/2 inches and free of broken concrete, broken pavement, wood or other deleterious material. Open graded rock will not be used without the written approval of the Engineer.

Where water consolidation is used, bedding for conduits, 24 inches or less in I.D., may be placed in one lift. For larger conduits the first lift shall not exceed the springline of the pipe.

Where mechanical compaction is used, the moisture content shall be such that the specified compaction can be obtained. The first lift shall be 8 inches or two-thirds of the distance to the springline whichever is greater. Succeeding lifts shall not exceed 2 feet loose and extreme care will be taken to prevent damage to or movement of the conduit by the compaction equipment.

601.4.3 Backfill: Backfill shall be sound earthen material free from broken concrete, broken pavement, wood or other deleterious material. Unless otherwise specified, this may be native material with no piece larger than 4 inches, select material or aggregate base course. Backfill under street pavement shall be constructed per Detail 200 with the type of replacement noted on the plans or in the special provisions. Unless otherwise noted, backfill under single curb, curb and gutter, sidewalk, driveways, valley gutters, etc. shall be the same as the adjacent street pavement.

Where water consolidation is used, backfill will be placed in lifts as required in the following table prior to settlement.

Trench Width	Backfill Lifts
18" to 24"	Not to exceed 4'
25" to 36"	Not to exceed 6'
Over 36"	Not to exceed 8'

The above backfill lift limitations are not applicable when water saturation is done by the jetting method.

Where mechanical compaction is used, backfill shall be placed in lifts the height of which shall not exceed that which can be effectively compacted depending on the type of material, type of equipment and methods used, and under no circumstances shall exceed 4 feet.

Backfill, around utilities that are exposed during trench excavation, shall be placed in accordance with the bedding methods.

601.4.4 Compaction Densities: Unless otherwise provided in the plans and/or special provisions, the trench backfill shall be thoroughly compacted to not less than the densities in Table 601-2 when tested and determined by AASHTO T-99 and T-191 or ASTM D-2922 and D-3017. When AASHTO T-99, method A or B, and T-191 are used for density determination, MAG Detail 190 will be used for rock correction. All compaction discussed within this section shall be performed within 2 percentage points of optimum moisture content unless otherwise noted in the project plans or project specifications.

The density required will depend on the Type shown on the plans and/or called for in the special provisions. Density required for each type shall comply to Table 601-2.

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 Trench
I	Under any existing or proposed pavement, curb, gutter, sidewalk, or such construction included in the contract, or when any part of the trench excavation is within 2-feet of the above.	100% for granular 95% for non-granular	90%	90%
II	On any utility easement street, road or alley right-of-way outside limits of (I).	85%	85%	90%
III	Around any structures or exposed utilities.	95% in all cases		

Note: The type required will generally be shown on the plans and the plans will govern. Where no type is shown on the plans, the type shall comply with Table 601-2.

A consideration in determining the backfill Types as shown on the plans, is based on the trench widths as shown in the Contract Documents. If these trench widths increase beyond those widths referred to above and fall within the 2-foot limit of paved surfaces and other improvements due to construction exigencies, the backfill designation for that portion within the 2-foot limit of such improvements shall be Type I even though Type II backfill is shown on the plans.

601.4.5 Compaction Methods: Water consolidation by jetting shall be accomplished with a 1 1/2 inches pipe of sufficient length to reach the bottom of the lift being settled with adequate hose attached and a water pressure of not less than 30 psi. All jetting shall be accomplished transversely across the trench at intervals of not more than 6 feet with the jetting locations on one side of the trench offset to the jetting locations on the other side of the trench. The entire lift shall be leveled and completely saturated working from the top to the bottom.

Jetting shall be used as the consolidation method for all conduit bedding. The Contractor shall be entirely responsible for establishing each lift depth so as to avoid floating the conduit being placed and shall make any repair or replacement at no cost to the Contracting Agency. However, for conduit larger than 24 inches I.D. the first lift shall not exceed the springline of the conduit.

Flooding is not acceptable as a water consolidation method unless authorized in the specification or by a written change order. It will consist of the inundation of the entire lift with water and then puddled with poles or bars to insure saturation of the entire lift.

Where jetting or flooding is utilized and the surrounding material is such that it does not permit proper drainage, the Contractor shall provide, at his expense a sump and a pump at the downstream end to remove the accumulated water.

The use of water consolidation does not relieve the Contractor from the responsibility to make his own determination that such methods will not result in damage to existing improvements. The Contractor shall be responsible for any damage incurred.

Where water consolidation is not permitted or does not result in adequate compaction, the backfill material shall be compacted with hand and/or mechanical work methods using equipment such as rollers, pneumatic tamps, and hydro-hammers or other approved devices which secure uniform and required density without injury to the pipe or related structures.

Where Type I backfill is required, water consolidation will not be permitted for non-granular material, except in the following situation. In a new development prior to paving and prior to opening the area to public traffic, water consolidation, will be permitted for non-granular material at the Contractor's discretion and responsibility.

601.4.6 Specifications for Granular Material: For purposes of this specification, granular material shall mean material for which the sum of the plasticity index and the percent of the material passing a No. 200 sieve shall not exceed 23. The plasticity index shall be tested in accordance with AASHTO T-146 Method A (Wet Preparation), T-89 and T-90.

601.4.7 Rights-Of-Way Belonging to Others: Backfill and compaction for irrigation lines of the Salt River Valley Water Users' Association and Roosevelt Irrigation Districts and for trenches in State of Arizona and Maricopa County rights-of-way outside the limits of the Contracting Agency shall be accomplished in accordance with their permit and/or specifications.

601.4.8 Test Holes: Boring logs shown on the plans do not constitute a part of the contract and are included for the Contractor's convenience only. It is not intended to imply that the character of the material is the same as that shown on the logs at any point other than that where the boring was made. The Contractor shall satisfy himself regarding the character and amount of rock, gravel, sand, silt, clay and water to be encountered in the work to be performed.

601.4.9 Foundation and Bedding for Electronic, Telephonic, Telegraphic, Electrical, Oil and Gas Lines: Foundation and bedding for these underground facilities shall be native material or sand which conforms to the grading requirement of ASTM C-33 for fine aggregate. When backfill material consists of aggregate base course, crushed stone, or other material containing stones, only sand will be used for foundation, and bedding. The foundation depth shall be six inches and bedding depth shall be one foot above the top of the facility. Compaction will be in accordance with Section 601.

601.5 CONTRACTOR CERTIFICATION OF INSTALLATION PROCEDURES:

When requested in the Special Provisions or by the Engineer prior to installation, the Contractor shall furnish to the Contracting Agency an affidavit (certification) from the pipe manufacturer (or his designee) stating that the Contractor is familiar with the manufacturer's suggested installation methods and procedures and the installation complies with those procedures and is consistent with MAG requirements.

Also, when required in the Special/Technical Provisions or requested by the Engineer, the pipe manufacturer or his designee will review the Contractor's methods and procedures for pipe installation in the field. The Contractor will make any adjustments in the installation as recommended by the manufacturer or his representative. If necessary, the Contractor may be required to reinstall or provide corrections to pipe installed prior to the field review at no cost to the Agency. Once the manufacturer or his representative has reviewed the Contractor's installation methods and the Contractor has adjusted his installation methods as recommended by the same, the manufacturer or his representative shall furnish to the Contracting Agency an affidavit (certification) that the Contractor's installation methods and procedures, at the time of the review, complied with the manufacturer's installation practices. The affidavit must provide the name of the manufacturer's representative witnessing the pipe installation.

601.6 PAVEMENT REPLACEMENT AND SURFACE RESTORATION:

601.6.1 Grading: The Contractor shall do such grading in the area adjacent to backfilled trenches and structures as may be necessary to leave the area in a neat and satisfactory condition approved by the Engineer.



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: March 5, 2008 Revised 7/17/2008- *7/24/2008*

To: MAG Specifications and Details Committee

From: Robert Herz, MCDOT Representative

Subject: Revisions to Detail 250 DRIVEWAY ENTRANCES

Case 08- 11

PURPOSE: Revise Detail 250 to obtain ADA compliant sidewalk installations.

REVISION: Created separate installation details for driveways when the sidewalk is detached or attached to the back of curb.

Revised Industrial Driveways to Class A concrete and increased driveway thickness from 6-inches to 8-inches.

Revised Specification section 340 to allow a change in concrete class and modified expansion joint placement requirements.

Gordon Tyus

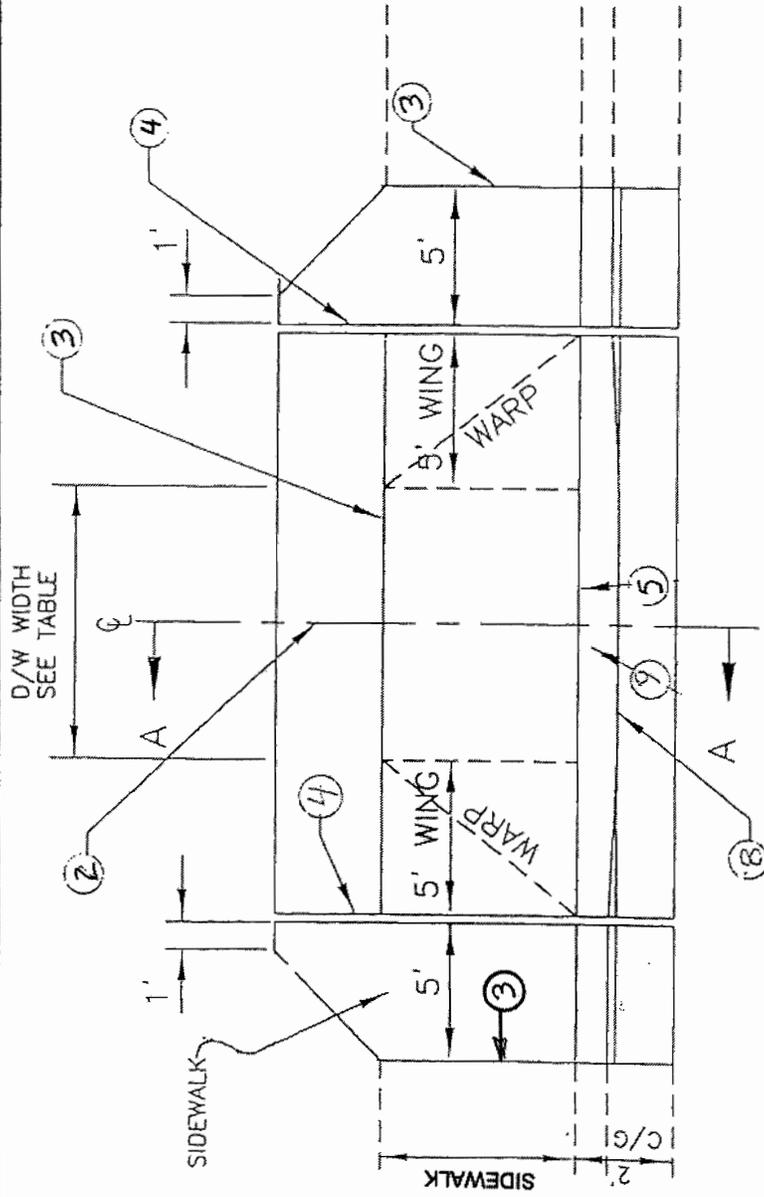
From: Robert Herz - MCDOTX [rherz@mail.maricopa.gov]
Sent: Monday, July 21, 2008 9:29 AM
To: Brian Gallimore (E-mail); Dale Phelan (E-mail); dramirez@goodyearaz.gov; dteller@cityofelmirage.org; Don Cornelison (E-mail); Don Moseley (E-mail); gordon.haws@cityofmesa.org; Greg Rodzenko (E-mail); JCarusone@srmaterials.com; James E. Bond (E-mail); jami.erickson@phoenix.gov; Jeff Benedict (E-mail); Jeff Van Skike (E-mail); jesse.gonzales@peoriaaz.gov; Jim Badowich (E-mail); dotsplace491@yahoo.com; kelli.kurtz@ci.gilbert.az.us; larry.smith@phoenix.gov; loren.kelly@surpriseaz.com; marc.palichuk@queenecreek.org; Paul Nebeker (E-mail); Peter Kandaris (E-mail); Robert Herz - MCDOTX; Rodney Ramos (E-mail); Steven Borst (E-mail); tkaczmarowski@glendaleaz.com; troy.tobiasson@goodyearaz.gov; Warren.White@chandleraz.gov; William Ast (E-mail)
Cc: Gordon Tyus
Subject: Revision to MAG Case 08-11 [DETAIL 250 Driveway Entrances]
Attachments: Case 08-11 Detail 250 -Spec Section 340 Rev 2008-07-17.pdf

I am distributing new revisions to MAG Case 08-11 [DETAIL 250 Driveway Entrances]. Since I am changing the proposed case, I will postpone my request for a vote until the September meeting, but please bring any discussion items on this case to the August meeting.

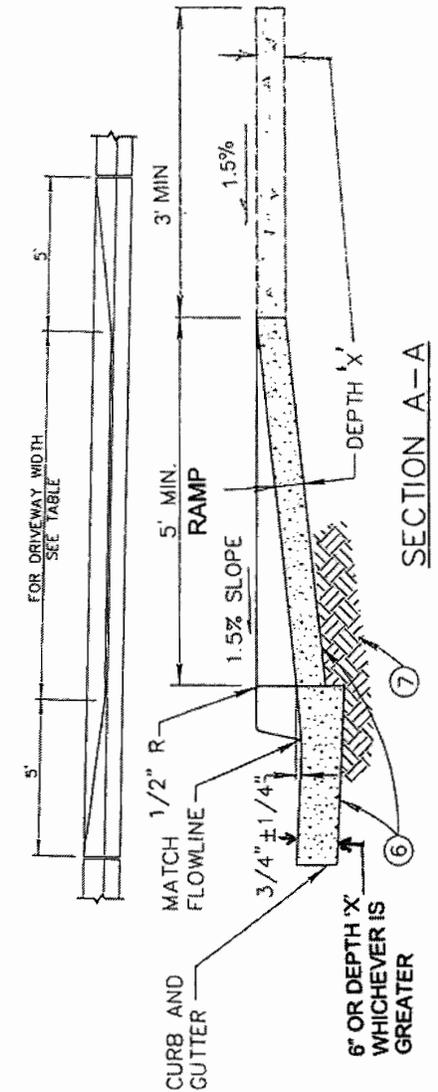
The main purpose of this case is to bring the standard detail into compliance with ADA requirements. The attached revision returns the concrete thicknesses for Commercial and Residential driveways back to their present thickness of 6" and 5" respectively. Increasing the required concrete thicknesses was consistent with many of the existing supplements; however increasing the depth would increase the discrepancy within design standards for residential subdivisions where roll curb and gutter with attached sidewalk (4" thick) is considered acceptable at driveway locations and in MCDOT's opinion, increasing residential driveway thickness would unnecessarily penalize the public with higher costs. This new revision does take into consideration requirements to accommodate heavy trucks by changing the Industrial driveways to Class A concrete 8" thick; this is consistent with the requirements for concrete valley gutters (Detail 240).

NOTES:

1. DEPRESSED CURB SHALL BE PAID FOR AT THE UNIT PRICE BID FOR THE TYPE OF CURB USED AT THAT LOCATION.
2. ~~WHEN WIDTH EXCEEDS 22' PROVIDE~~
3. CONTRACTION JOINT ON D/W CENTERLINE.
4. CONTRACTION JOINT.
5. 1/2-INCH EXPANSION JOINT SHALL COMPLY WITH SECTION 340.
6. BACK OF CURB - CONSTRUCTION JOINT.
7. CONCRETE CLASS AS NOTED IN TABLE, CONCRETE PER SECTION 725.
8. SUBGRADE PREPARATION, SECT. 301.
9. FLOW LINE OF GUTTER.
10. DEPRESSED CURB.
11. SECTION A - A AND ELEVATION, DW SHOWN WITH VERTICAL CURB AND GUTTER, ROLL TYPE CURB AND GUTTER TREATED SIMILARLY.
12. ROUGH BROOM FINISH FULL WIDTH OF RAMP AND WARP AREA OF WINGS. TROWEL AND USE LIGHT HAIR BROOM FINISH FOR WALKWAY AREAS.



DRIVEWAY WITH SIDEWALK ATTACHED TO CURB



COMMERCIAL AND INDUSTRIAL			
DRIVEWAY WIDTH	MIN.	MAX.	CLASS
COMMERCIAL	* 16'	40'	B
INDUSTRIAL	* 16'	40'	A
* 24' MIN. FOR TWO WAY TRAFFIC			
RESIDENTIAL			
DRIVEWAY WIDTH	MIN.	MAX.	CLASS
MAJOR STREET	16'	30'	B
COLLECTOR STREET	* 12'	30'	B
LOCAL STREET	12'	30'	B
* 16' DESIRABLE			

	STANDARD DETAIL ENGLISH	DRIVEWAY ENTRANCES
DETAIL NO. 250	REVISED 01-01-2008	DETAIL NO. 250-Z

SECTION 340

CONCRETE CURB, GUTTER, SIDEWALK, SIDEWALK RAMPS, DRIVEWAY AND ALLEY ENTRANCE

340.1 DESCRIPTION:

The various types of concrete curb, gutter, sidewalk, sidewalk ramps, driveways, and alley entrances shall be constructed to the dimensions indicated on the plans and standard detail drawings.

Deleted: intersections

340.2 MATERIALS:

Concrete shall be class B unless otherwise noted. Concrete shall conform to the requirements of Section 725.

Deleted: Joints shall be designated as expansion joints or contraction joints and shall be constructed as per Subsection 340.3.

Expansion joint filler shall comply with Section 729.

Deleted: , conforming to the applicable

Deleted: s

340.2.1 Detectable Warnings Detectable warnings shall consist of raised truncated domes aligned in a square grid pattern in conformity to the Americans with Disabilities Accessibility Guidelines. Truncated domes shall have the following nominal dimensions: base diameter of 0.9 inches, top diameter of 0.4 inches, height of 0.2 inches, and dome spacing center-to-center spacing of 2.35 inches, measured between the most adjacent domes on the square grid. Detectable warnings shall contrast visually with adjoining surfaces. Visual contrast shall be obtained by color, use safety yellow or other approved color. The color shall be an integral part of the material surface. The material is to be durable with a non-slip surface not subject to spalling, chipping, delamination, or separation. All detectable warnings shall be approved by the jurisdictional agency prior to installation.

340.3 CONSTRUCTION METHODS:

Existing pavements and concrete, that are joined by new construction, shall be cut in accordance with Section 601.

The subgrade shall be constructed and compacted true to grades and lines shown on the plans and as specified in Section 301. All soft or unsuitable material shall be removed to a depth of not less than 6 inches below subgrade elevation and replaced with material satisfactory to the Engineer. When the Engineer determines that the existing subgrade consists of soils with swelling characteristics, the moisture content shall be brought as close as possible to the optimum required for compaction. This shall be done by the addition of water, by the addition and blending of dry suitable material or by the drying of existing material. The subgrade shall then be compacted to a relative density of 75% minimum to 85% maximum with 80% as ideal.

Material displaced in the construction shall not be placed on the base and/or surfacing material already in place on the roadway nor shall the excavated material be placed in such a manner as to interfere with access to property or traffic flow in the street.

Existing concrete sidewalks and driveways which abut the new sidewalks and driveway entrances shall be removed to a distance required to maintain a slope as indicated by standard details or not to exceed 1 inch per foot where sidewalks are concerned. Sawcutting is required at the match lines and payment will be made under the respective pay items as provided in the proposal.

Concrete curbs, gutters and sidewalks shall be constructed by the conventional use of forms, or may be constructed by means of an appropriate machine when approved by the Engineer.

If machines designed specifically for such work and approved by the Engineer are used, the results must be equal to or better than that produced by the use of forms. If the results are not satisfactory to the Engineer, the use of the machine shall be discontinued and the Contractor shall make necessary repairs at his own expense. All applicable requirements of construction by use of forms shall apply to the use of machines.

Forms conforming to the dimensions of the curb, gutter, sidewalk, sidewalk ramps, driveway, and alley entrance shall be carefully set to line and grade, and securely staked in position. The forms and subgrade shall be watered immediately in advance of placing concrete.

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 concrete. The concrete shall be thoroughly spaded away from the forms so that there will be no rock pockets next to the forms. The concrete may be compacted by mechanical vibrators approved by the Engineer. Tamping or vibrating shall continue until the mortar flushes to the surface, and the coarse aggregate is below the concrete surface.

Unless otherwise specified, expansion joints shall be installed at all radius points, at both sides of each driveway, at both sides of each alley entrance, at adjoining structures and at every change of depth in the concrete. The maximum distance between expansion joints shall be 50 feet. Expansion joints shall be constructed in a straight line, vertical plane and perpendicular to the

longitudinal line of the sidewalk, curb and gutter, single curb, etc., except in cases of curved alignment, where they will be constructed along the radial lines of the curve. Expansion joints shall be placed to match the joints of the adjacent concrete such as sidewalk to the curb and gutter or single curb, etc. Expansion joints shall be constructed to the full depth and width of the concrete and extend one inch into the subgrade with the top of the expansion joint material one-quarter inch below the top surface as depicted in Detail 230. Expansion joint material shall be secured in place prior to placement of concrete. Unless otherwise specified, all expansion joints installed against newly placed concrete, sawcut or other smooth surfaces shall comply with Section 729.1 - Premolded Joint Filler per ASTM D-1751, 1/2 inch, Bituminous Type. Expansion joints installed against existing uneven surfaces shall be per Section 729.2 - Pour Type Joint Filler.

Contraction joints, unless otherwise specified, shall be constructed in accordance with the standard details, and in a straight line and vertical plane perpendicular to the longitudinal line of the sidewalk, sidewalk ramp or curb and gutter, except in cases of curved alignment when they will be constructed along the radial lines of the curb.

Sidewalk or sidewalk ramp score marks, unless otherwise specified, shall be constructed in accordance with the standard detail.

All edges shall be shaped with a suitable tool so formed as to round the edges to a radius as indicated on the standard details.

The front face form shall not be removed before the concrete has taken the initial set and has sufficient strength to carry its own weight, gutter forms and rear forms shall not be removed until concrete has hardened sufficiently to prevent damage to the edges. Special care shall be taken to prevent any damage. Any portion 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, top, back, and flow line of the curb and gutter shall be tested with a 10-foot straightedge or curve template, longitudinally along the surface. Any deviation in excess of 1/4 inch shall be corrected at no additional cost to the Contracting Agency.

The surface of concrete sidewalk or sidewalk ramp shall be tested with a 5-foot straightedge. Any deviation in excess of 1/8 inch shall be corrected at no additional cost to the Contracting Agency.

When required by the Engineer, gutters having a slope of 0.8 foot per hundred feet or less, or where unusual or special conditions cast doubt on the capability of the gutters to drain, they shall be water tested. Water testing shall consist of establishing flow in the length of gutter to be tested by supplying water from a hydrant, tank truck or other source. One hour after the supply of water is shut off, the gutter shall be inspected for evidence of ponding or improper shape. In the event water is found ponded in the gutter to a depth greater than 1/2 inch, or on the adjacent asphalt pavement, the defect or defects shall be corrected in a manner acceptable to the Engineer without 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 505.

The Contractor shall stamp his name and year on all work done by him, on each end of the curb, gutter, sidewalk or sidewalk ramp. The letters shall not be less than 3/4 inch in height.

340.3.1 Detectable Warnings The detectable warning surface shall be located so that the edge nearest the curb line is 6 inches minimum and 8 inches maximum back from the face of curb. Detectable warning surfaces for railroads shall be located so that the edge nearest the rail crossing is 6 inches minimum and 8 inches maximum from the vehicle dynamic envelope.

Detectable warnings shall be installed perpendicular to the direction of pedestrian/wheelchair travel and have a minimum width of 24 inches measured perpendicular to the edge of the roadway or rail crossing. The base surface of detectable warnings shall be installed flush with the adjacent walkway surface, the truncated domes shall extend above the walkway surface. The boundary between detectable warnings and the adjacent walkway shall provide a flush uniform surface that will not cause ponding of water nor present a tripping hazard. Partial domes at the edge of the detectable warning shall be made flush to match the base surface of the detectable warning. Detectable warnings installed on curb ramps shall extend the full width of the ramp depression.

Detectable warnings installed on sidewalk ramps shall modify the sidewalk concrete thickness at the detectable warning to provide a minimum thickness of four-inches (4"). When detectable warnings are modules inset into the sidewalk ramp, the bottom surface of the sidewalk shall be lowered a distance equal to or greater than the module thickness to maintain the minimum sidewalk thickness. The sidewalk bottom surface shall have a minimum transition taper length of 12" between the thickened and normal depth sections of sidewalk.

340.4 BACKFILLING:

Unless otherwise specified the Contractor shall backfill behind the curbs, sidewalk or sidewalk ramps with soil native to the area to the lines and grades shown on the plans.

340.5 MEASUREMENT:

Concrete curbs and gutters of the various types shown on the plans and in the proposal, will be measured along gutter flow line through inlets, catch basins, driveways, sidewalk ramps, etc., by the lineal foot to the nearest foot for each type, complete in place.

Concrete sidewalks, sidewalk ramps, driveways, alley intersections, valley gutters and aprons will be measured to the nearest square foot complete in place. When concrete sidewalk, sidewalk ramps, driveways, alley intersections, valley gutters, and/or aprons are cut during trenching operations, the square foot measurement for payment will be in accordance with Section 336.

Detectable warnings shall not be measured for payment. Detectable warnings are considered integral to the walking surface that they form a part of and the cost is included in the related pay item.

340.6 PAYMENT:

Payment for the above named items will be made in accordance with the unit prices or lump sums as set forth in the proposal. Such payment shall include full compensation for furnishing all labor, material, tools and equipment and accomplishing all work in conformance with the contract documents.

SECTION 331

MICROSURFACING SPECIFICATIONS

1. DESCRIPTION

The work covered by this specification consists of furnishing all labor, equipment, and materials for the application of a "quick traffic solid/polymer microsurface."

This specification covers the equipment and construction procedures for rut filling and/or resurfacing of existing paved surfaces. The microsurface shall be a mixture of cationic polymer modified asphalt emulsion, mineral aggregates, mineral filler, water and other additives properly proportioned, mixed and spread on the pavement surface in accordance with this specification and as directed by the Engineer.

2. MATERIALS

The Contractor shall supply all materials necessary for the performance of the work in accordance with the specifications. The asphalt emulsion, aggregate, and mineral filler shall be as specified in Section 714. Materials shall be approved by the Engineer prior to the start of construction. Certificates of Compliance will accompany each delivery of emulsion.

The Contractor shall be responsible for the safety of all materials of which he has taken delivery until they are in place on the road, and shall take all necessary precautions to avoid loss by fire or theft, or damage by water, and shall bear the cost of replacing any such material that is lost, spilt, destroyed or damaged after delivery.

3. PROPORTIONING

The microsurface shall be proportioned in accordance with the mix design. Calibrated sign flowmeters shall be provided to measure both the addition of water and additives to the pugmill. Emulsion and cement flow shall be tied directly to aggregate flow. All additive flows shall be calibrated.

3.1 Performance

The microsurface mixture shall be proportioned per the mix design to ensure:

- a. Trafficability - with a relative humidity at not more than 50% and ambient air temperature of at least 77 degrees F, the material will permit controlled traffic without damage to the surface within thirty (30) minutes and uncontrolled traffic without damage within sixty (60) minutes.
- b. Prevent development of bleeding, raveling, separation or other distress for seven (7) days after placing the microsurface.
- c. The finished mixture will be warranted against material defects for one year; existing conditions excluded.

4. MIX DESIGN

4.1 GENERAL

- 4.1.1 The Contractor shall provide a job mix formula from an approved laboratory and present certified test results for the Engineer's approval. Compatibility of the aggregate and polymer modified emulsion shall be certified by the emulsion manufacturer. All the materials used in the job mix formula shall be representative of the materials proposed by the Contractor for use in the project.
- 4.1.2 All the products used in the construction shall have certifications from the suppliers and they shall be given to the Engineer upon delivery to the project.
- 4.1.3 Mix design and proportioning will be approved by the Engineer prior to the start of the project.

4.2 SPECIFICATIONS

- 4.2.1 The Engineer shall approve the mix design prior to use. The specification limits are as follows:

Residual Asphalt	6%- 11.5% by dry weight of aggregate
Mineral Filler	.1% - 1% by dry weight of aggregate
Polymer Content/Type	4% min. (see Section 714.4)
Additive	As required for mix properties
Water	As required for mix properties
Aggregate Grading	Type as specified meeting Section 4.3
Consistency	2.5 to 3.0 cm
Traffic Time	See Section 6.2.2
Abrasion Loss	75 g/sf max.
Adhesion	90% minimum
Loaded Wheel Sand Adhesion	See Section 4.2.3

4.2.2 MODIFIED COHESION TEST

Furnish laboratory test data showing the mix design to be trafficable thirty (30) minutes after application at 77°F conforming to the following criteria in accordance with test methods described in the applicable specifications.

Set Time Test: 15 minutes 12 kg-cm minimum.

Early Rolling Traffic Time: 60 minutes 20 kg-cm minimum.

4.2.3 LOADED WHEEL SAND ADHESION TEST

Furnish laboratory test data showing the mix design conforming to the following criteria in accordance with test methods described in the appropriate specifications.

<u>Vehicles/day</u>	<u>Minimum Sand Adhesion</u>
0-30	70 g/ft
250-1500	60 g/ft
1500-3000	55 g/ft
greater than 3000	50 g/ft

4.3 The laboratory shall further report the quantitative effects of moisture content in the unit weight of the aggregate (bulking effect). The report must clearly show the theoretical recommended proportion of aggregate, mineral filler (Min. & Max.), water (Min. & Max.), additive(s), and asphalt and how the proportions are based (dry aggregate weight, total mix, etc.).

5. TESTING

Samples will be taken throughout the project for testing by the approved laboratory per ISSA TB101. Testing shall be at the expense of the Agency for the following:

- a. Asphalt content
- b. Aggregate gradation
- c. Percent polymer content and type—certified by supplier

6. EQUIPMENT

6.1 GENERAL

All equipment, tools and machines used in the performance of this work shall be maintained in satisfactory working condition at all times to ensure a high quality product.

6.2 MIXING EQUIPMENT

The mixing machine shall be a self-propelled or truck-mounted mixing machine which shall be able to accurately deliver and proportion the aggregate, mineral filler, water, additive, and polymer-modified asphalt emulsion to a revolving multi-blade mixer capable of minimum speeds of 200 RPM and discharge the product on a continual flow basis. The machine shall have sufficient storage capacity for aggregate, polymer modified asphalt emulsion, mineral filler, water, and additive to maintain an adequate supply to the proportioning controls.

6.3 MATERIAL CONTROL

6.3.1 CALIBRATION

Each mixing unit to be used in the performance of the work shall be calibrated prior to construction. Calibration data, if done within the calendar year, using the same material, may be used, providing a verification of the aggregate feed agrees.

Individual volume or weight controls for proportioning each material to be added to the mix shall be provided, and shall be accessible to the Engineer. Each material control device shall be calibrated prior to work and documented for inspection by the Engineer.

6.3.2 AGGREGATE FEED

The aggregate feed to the mixer shall be equipped with a revolution counter or similar device so the amount of aggregate used may be determined at any time.

6.3.3 EMULSION PUMP

The emulsion pump shall be the positive displacement type with a jacketed housing for uniform heating. A revolution counter or similar device shall be fitted so that the amount of emulsion used may be determined at any time.

6.3.4 FINES FEEDER

An approved fines feeder is required that will provide a uniform, positive, accurately metered range of 0 to 1 percent by dry aggregate weight. The fines feeder shall have a counter so the amount of mineral filler can be filler determined at any time.

6.3.5 LIQUID ADDITIVE

The mixing machine shall be equipped with a liquid additive system that provides a pre-determined amount of additive to the mixing chamber. This additive system must be equipped with a counter that can determine the amount used at any time.

6.3.6 WATER SYSTEM

The mixing machine shall be equipped with a water system that provides a pre-determined amount of water to the mixing chamber. This water system must be equipped with a counter that can determine the amount used at any time.

6.4 OPERATOR CONTROLS

Controls will allow the operator to sequence and proportion the material per the mix design.

6.5 SPRAY BARS

The mixing machine shall be equipped with a water pressure system that provides a water spray immediately ahead of and outside the spreader box.

6.6 SPREADING EQUIPMENT

6.6.1 The paving mixture shall be spread uniformly by means of mechanical type laydown box attached to the mixer, equipped with agitation, to spread the materials throughout the box without any dead zones. The paddles shall be designed and operated so all the fresh mix will be agitated. Flexible seals, front and rear, shall be in contact with the road surface to prevent loss of mixture from the box. The spreader box shall be equipped with hydraulic cylinders for controlling the thickness of the spread mixture.

6.6.2 The rut filling spreader box shall have 6 to 8 skids to provide for leveling and filling uneven depressed areas. Two adjustable steel strike-off plates are required. The rear flexible seal shall act a final strike-off and shall be adjustable. The steel strike-offs shall be controlled by hydraulic cylinders placed at the rear of the spreader

box.

6.6.3 The spreading equipment shall be maintained free from build-up of the mixture on the paddles or side walls. Skips, lumps, or tears will not be allowed in the finished product.

7. APPLICATION

7.1 GENERAL

The microsurface shall be of the desired consistency when deposited in the spreader box and nothing more shall be added to it. The mixing time shall be sufficient to produce a complete and uniform coating of the aggregate and the mixture shall be chuted into the moving spreader box at a sufficient rate to maintain an ample supply across the full width of the strike-off squeegee at all times.

7.2 WEATHER

The microsurfacing shall be placed when the temperature is at least 45 degrees F and rising, and it is not raining. The surface temperature shall be 50 degrees F or higher when the mixture is applied.

7.3 PROTECTION OF EXISTING SERVICES

The Contractor shall take all necessary precautions to prevent microsurface or other material used from entering or adhering to gratings, hydrants, valve boxes, manhole covers, bridge or culvert decks, and other road fixtures. Immediately after resurfacing, the Contractor shall clean off any such material and leave any grating, manholes, etc. in a satisfactory condition.

7.4 FOGGING PAVEMENT

The surface should be pre-wetted by fogging ahead of the spreader box. The rate should be adjusted as dictated by the pavement temperatures, surface texture, humidity, and dryness of existing pavement.

7.5 MIX STABILITY

The mix shall possess sufficient stability so that premature breaking of material in the spreader box does not occur. The mixture shall be homogeneous during mixing and spreading; it shall be free of excess water or emulsion, and free of segregation of the emulsion and aggregate fines from the coarser aggregate.

7.6 APPLICATION RATE

The application rates, pounds per square yard of mix specified, are average rates; the surface texture variation throughout the work will dictate the actual spreading rates. The strike-off squeegee shall be adjusted to provide a microsurface thickness which will completely fill the surface voids and provide an additional thickness not exceeding one and one-half times the largest top-size stone. The requirement of 1-1/2 stone depth does not apply to rut filling operations as these depths vary greatly according to the surface irregularities.

7.7 JOINTS

No excessive build-up or unsightly appearance shall be permitted on longitudinal or transverse joints. A maximum of 4.0" overlap will be permitted on longitudinal joints. The Contractor shall provide suitable width spreading equipment to produce a minimum number of longitudinal joints throughout the work. Half passes and odd width passes will be used in minimal amounts. If half passes are used, they cannot be the last pass on any area. Care shall be taken to ensure straight lines along curbs and shoulders. No runoff will be permitted on these areas.

Construction joints shall be neat in appearance and shall be tapered or feathered to conform to the existing surface. All excess material shall be removed from the surface upon completion of each run.

7.8 HANDWORK

Approved squeegees and lutes shall be used to spread the mixture in areas inaccessible to the spreader box and in other areas where hand spreading may be required.

7.9 PROTECTION OF MICROSURFACE

Adequate means shall be provided by the Contractor to protect the uncured product. Any damage done to the product shall be repaired at the Contractor's expense.

7.10 DAMAGE TO MICROSURFACE

The Contractor's responsibility to replace microsurface damaged by unexpected rain after spreading shall be limited to the period within four (4) hours of placement of the microsurface.

8. PAYMENT

The micro-surfacing shall be paid for by the weight of the aggregate and weight of emulsified asphalt, as shown on certified weight tickets from the supplies delivered to the project, less weigh backs. The price shall be full compensation for furnishing, mixing and applying all materials; and for all labor, equipment, tools, design tests, and incidentals necessary to complete the job as specified herein.

Section 714

Microsurfacing Materials

714.1 GENERAL:

Microsurfacing/microseal shall consist of a properly proportioned mixture of cationic polymer modified asphalt emulsion, mineral aggregates, mineral filler, water, and other additives.

714.2 AGGREGATE:

714.2.1 Mineral Filler: Mineral filler, as required by the mix design, shall be any recognized brand of nonairentrained Type I normal Portland cement that is free of lumps and clods, with a minimum of 85% passing the #200 sieve, added by weight of aggregate as specified by the mix design.

714.2.2 Mineral Aggregate: Mineral aggregate shall consist of sound, durable crushed stone or crushed gravel, as per MAG Section 701, and approved mineral filler. The material shall be free from vegetable matter and other deleterious substances. Aggregates shall be 100% crushed with no rounded particles. No natural sand will be allowed. The gradation of mineral aggregate shall conform to Table 714-1.

Table 714-1		
Microsurfacing Aggregate		
Percent Passing		
Sieve Size	Type III	Type II
½	100	100
3/8	100	100
No. 4	70-90	85-100
No. 8	45-70	65-90
No. 16	28-50	45-70
No. 30	19-34	30-50
No. 50	12-25	18-30
No. 100	7-18	10-21
No. 200	5-15	5-15
Application Rate Pounds/Sq. Yd.	24-35	18-24

The mineral aggregate and mineral filler shall have a sand equivalency value not less than 50 (ASTM D 2419) and be non-plastic.

If more than one kind of aggregate is used, the correct amount of each kind of aggregate needed to produce the required gradation shall be proportioned separately in a manner that will result in a uniform and homogeneous blend. The final blended aggregate shall meet the requirements for grading, sand equivalency, and plasticity per above.

714.3 BITUMINOUS MATERIAL:

The polymerized Cationic Emulsion is herein classified as CSS-1H, quick-setting, cationic type emulsion for mixing applications and seal coats. A minimum of 4% saturated polymer shall be high sheared into the asphalt prior to the emulsification process. The Agency may choose to sample the polymerized asphalt for testing. The amount of polymer will be based on weight of polymer and asphalt (total weight) and be certified by the supplier. The polymerized emulsion will meet the following specifications listed in Table 714-2.

Table 714-2		
Microseal Emulsion		
Test	AASHTO Method	Specification Limits
Tests on Emulsion		
Viscosity, SSF, @ 77°F. sec.	T-59	15-100
Sieve Test, %	T-59	0.30 Maximum
Particle Charge	T-59	Positive
Storage Stability, 24 hr. %	T-59	1.0 Maximum
Evaporation Residue, %	Arizona 512	60 Minimum
Tests on Evaporation Residue Arizona 504		
Kinematic Viscosity 275°F.cst	T-201	650 Minimum
Penetration, 77°F 100g @ 5 sec	T-49	40-90
Softening Point, degrees F.	T-53	140 Minimum
Ductility, 77%, 5 cm/min.	T-51	60 Minimum
Tests on Evaporation Residue after RTFO		
Kinematic Viscosity, 275°F. aging ratio, cst	T-201	2.5 Maximum
Softening Point, degrees F.	T-53	140 Minimum

- * The emulsion, upon standing undisturbed for a period of twenty-four (24) hours, shall show no white or milky colored substance on its surface, and shall be a homogeneous brown color throughout.

714.4 MODIFIER TYPE AND CONTENT:

The modifier shall be saturated. The use of latex type modifier will be allowed only if both the test results and field performance are accepted by the Engineer. The asphalt cement shall contain a minimum of 4% solid polymer by weight of asphalt residue, sheared into the asphalt prior to emulsification. Plant verification by the Agency, and certification of the polymer content and type by the supplier, will be required throughout the duration of the contract. Each tank of emulsion produced shall be certified as to its compliance with these specifications; this certification shall be provided to the Agency.

714.5 WATER:

Water shall be potable water, free of any injurious impurities. The Contractor shall state the source of water with the bid.

714.6 ADDITIVES:

Additives may be used to accelerate or retard the breaking point and set times of the mix, or to improve the resulting finished surface.

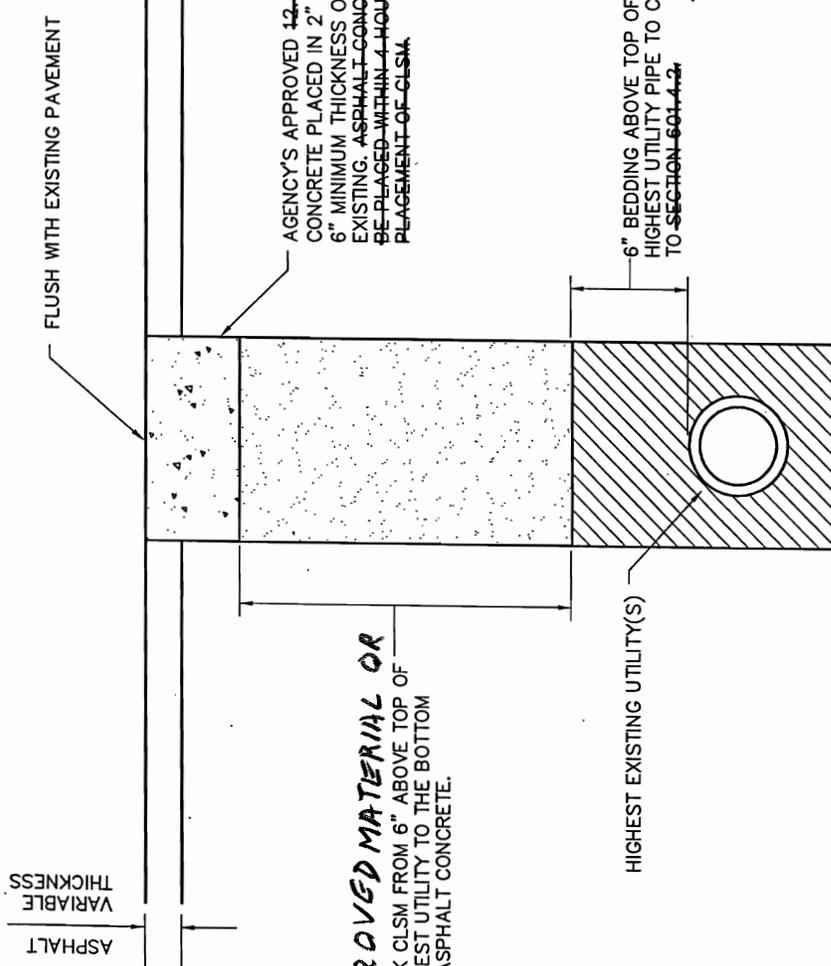
The use of additives in the mix shall be supplied in quantities predetermined by the laboratory mix design.

714.7 TEST CERTIFICATES AND REPORTS:

Test certificates and reports for the bituminous material shall be furnished in accordance with Section 711.3.

Review Comments Case 08-12
MCDOT 7/2/2008

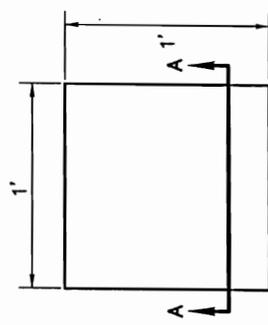
Page #	COMMENT
Comments for Section 331	
General	Adjust formatting to be consistent with MAG.
2	Section 4.2: Testing methods or procedures should be specified.
3	Section 5: Testing methods or procedures should be specified. Tests to determine polymer content and type are not common. Should we use certificates instead of verification testing? See Section 714.3.
3	Section 5: It should be specified that these tests are quality assurance tests. We also need to know what the agencies need to do if the test results are out of spec.
3	Section 5: Our experience is that the emulsion is easily out of spec; do we need to perform verification tests on the emulsion? What will be the frequencies for the tests?
Comments for Section 714	
2	The polymerized Cationic Emulsion for Microsurface seal should be classified as something other than "CSS-1H" for this designation has been defined as "Cationic Slow Setting" in MAG 713.



AGENCY-APPROVED MATERIAL OR
 1/2 SACK CLSM FROM 6" ABOVE TOP OF THE HIGHEST UTILITY TO THE BOTTOM OF NEW ASPHALT CONCRETE.

UTILITY COMPANY SPECIFICATIONS OR SECTION 601.4.2.

SECTION A-A



POTHOLE PLAN VIEW
 (NOMINAL DIMENSIONS)

DETAIL NO. 212	 STANDARD DETAIL ENGLISH	UTILITY POTHOLE REPAIR	REVISED 01-01-2005	DETAIL NO. 212
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MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: June 4, 2008 – Revised 6/05/2008

To: MAG Specifications and Details Committee

From: Robert Herz, MCDOT Representative

Subject: Detail 552 CONCRETE CUT-OFF WALLS

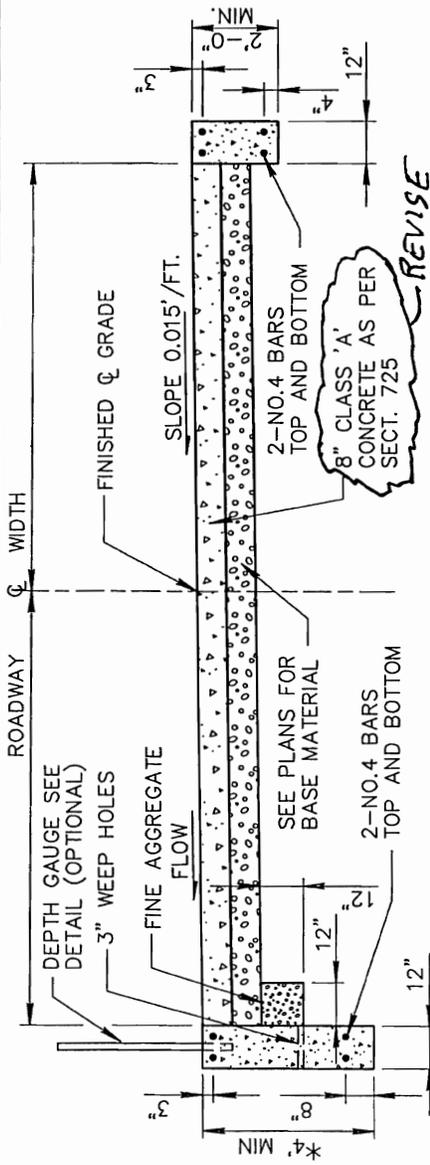
Case 08- 16

PURPOSE: Clarify requirements for concrete surfaced ford crossings. The concrete surfaced ford requirements shown in Detail 552 conflict with requirements of Section 324 Portland Cement Concrete Street Pavement. Detail 552 requires Class A Concrete, the third paragraph of Section 324.5 PROTECTION OF PAVEMENT states. "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." The 28-day strength required of Class A concrete is 3000 psi. Maricopa County uses concrete ford crossings as a hard non-erodible surface for local roads, the requirements of Section 324 are not needed with Detail 552.

REVISION: Revise the concrete surfacing note in the typical section titled CONCRETE SURFACE FORD CONCRETE WALLS as follows:

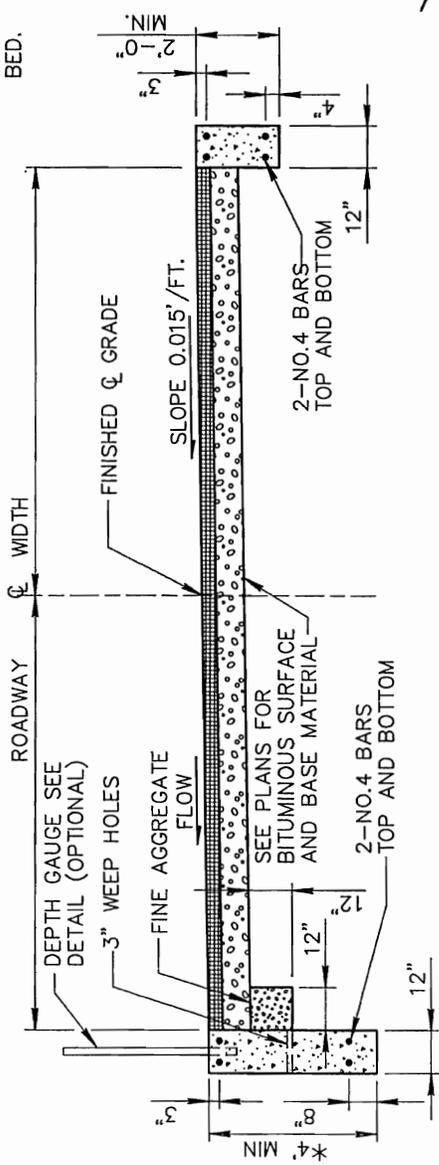
8" CLASS 'A' CONCRETE PER SECTIONS 505 AND 725,
SECTION 324 DOES NOT APPLY

Deleted: AS
Deleted: .



CONCRETE SURFACE FORD CONCRETE WALLS

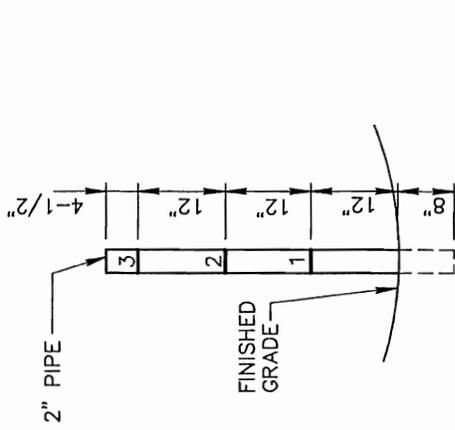
*MIN. DISTANCE BELOW STREAM BED.



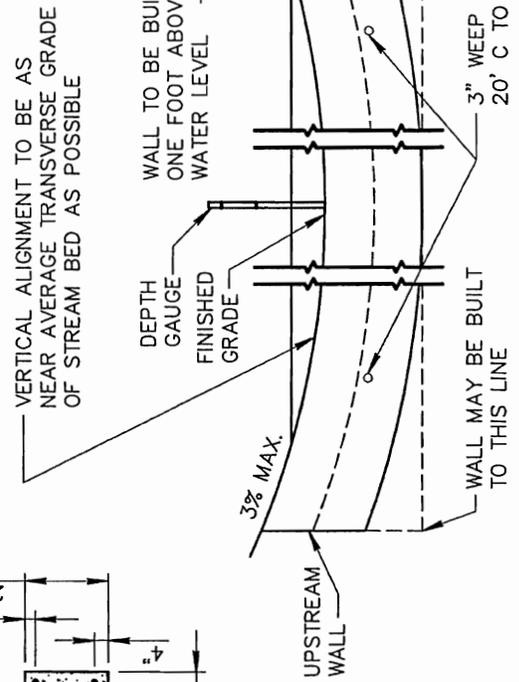
BITUMINOUS SURFACE FORD CONCRETE WALLS

NOTES:

1. FORD WALLS SHALL BE CLASS 'A' CONCRETE PER SECT. 725
2. DEPTH GAUGE SHALL BE PAINTED 2 COATS WHITE ENAMEL. NUMERALS AND MARKERS SHALL BE 1 COAT BLACK ENAMEL.
3. NUMBERS ON DEPTH GAUGE TO BE 2" HIGH.
4. HEIGHT OF DEPTH GAUGE OPTIONAL.
5. TWO DEPTH GAUGES MAY BE USED. ONE ON EACH END OF UPSTREAM WALL. START WITH 2 INSTEAD OF 1.



DEPTH GAUGE DETAIL
(OPTION OF THE CONTRACTING AGENCY)



ELEVATION LOOKING UPSTREAM

SECTION 324

PORTLAND CEMENT CONCRETE STREET PAVEMENT

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 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.

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.

Metal sleeves of an approved design shall be provided for use with dowel bars. Sleeves shall cover 2 inches, plus or minus ¼ 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.

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.

Performed expansion joint filler shall conform to the requirements of ASTM D-1751.

SECTION 324

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.

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 removal 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, 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.



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: June 4, 2008 – Revised 7/02/2008

To: MAG Specifications and Details Committee

From: Robert Herz, MCDOT Representative

Subject: Detail 210 RESIDENTIAL SPEED HUMPS

Case 08- 17

PURPOSE: Clarify requirements for maximum height of speed hump. Notes 1 and 2 indicate a maximum height of 3.25" while a note under Section A-A indicates a maximum height of 3".

REVISION:

1. Delete the note located under Section A-A
2. Revise note 2 to read:

HUMPS CONSTRUCTED OVER 3.25" OR LESS THAN 3.00" SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

NOTES:

- HUMPS MUST BE THE FULL 3" FOR MAXIMUM EFFECT BUT SHALL NOT EXCEED 3.25".
- HUMPS CONSTRUCTED OVER 3.25" OR LESS THAN 3.00" SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE. *ADDED*
- CROSS-SECTION ELEVATIONS SHALL HAVE A MAXIMUM TOLERANCE OF +0.25".
- SPEED HUMPS SHALL NOT BE PLACED OVER MANHOLES, WATER VALVES, SURVEY MONUMENTS, JUNCTION CHAMBERS, ETC. OR IN CONFLICT WITH DRIVEWAYS.
- SPEED HUMPS MUST BE PLACED AT LOCATIONS APPROVED BY THE AGENCY.
- HUMP TO BE CONSTRUCTED WITH ASPHALT MIX APPROVED BY THE AGENCY. ASPHALT COMPACTION SHALL BE PER SECTION 321. A TACK COAT PER SECTION 713 SHALL BE APPLIED PRIOR TO APPLICATION OF PAVEMENT.

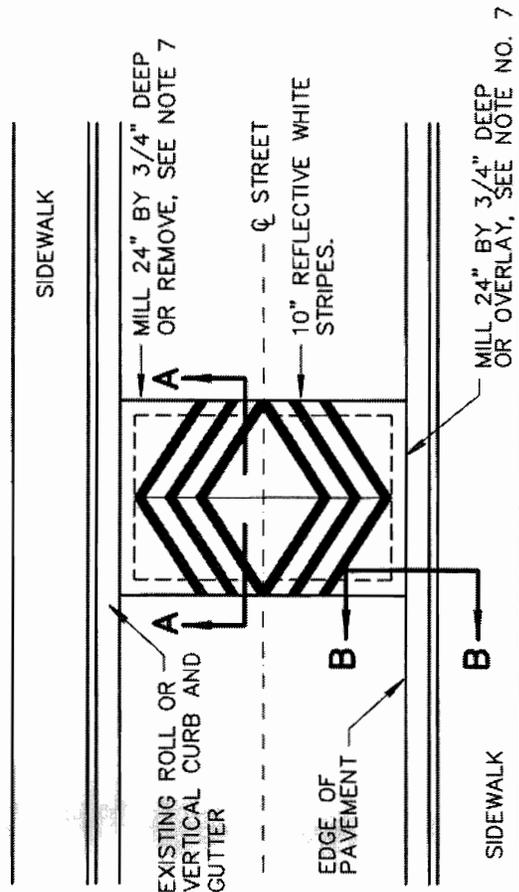
7. INSTALLATION JOINTS:

- STANDARD INSTALLATION:**
THE EXISTING ROADWAY SHALL BE MILLED TO A MINIMUM DEPTH OF 3/4" AROUND THE PERIMETER. CROSS SECTION DIMENSIONS DO NOT INCLUDE THE 3/4" MILLING. CONTRACTOR MUST PROVIDE VERIFICATION OF CROSS-SECTION DIMENSIONS. *WAS 1/8"*

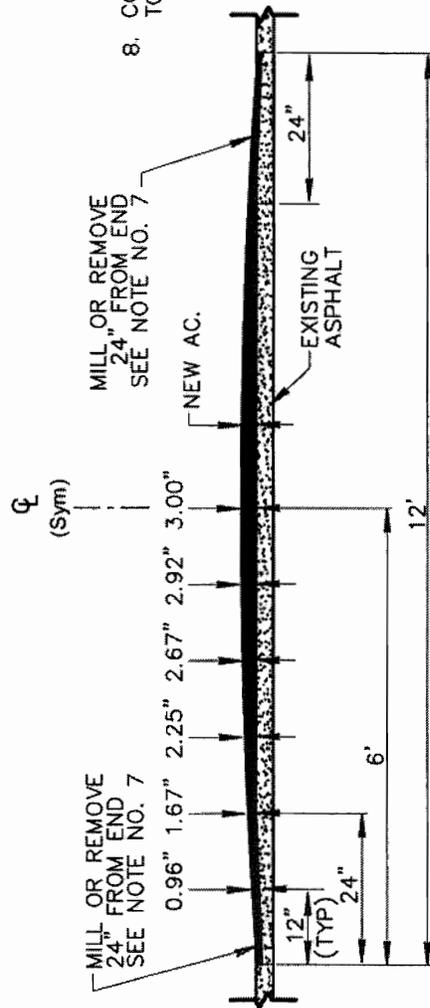
B. ALTERNATIVE INSTALLATION:

- FOR TRANSVERSE JOINTS (CROSS ROADWAY), THE EXISTING ASPHALT SHALL BE SAW CUT AND REMOVED FOR A WIDTH OF 24". THE ASPHALT SHALL BE REPLACED WITH THE SAME ASPHALT AND AT THE SAME TIME AS THE HUMP ASPHALT. FOR LONGITUDINAL JOINTS, THE EXISTING ASPHALT SHALL BE OVERLAID AND TAPERED IN 12" CROSS-SECTION DIMENSIONS REFLECT DISTANCES FROM THE SURFACE OF EXISTING ASPHALT.

- CONTACT THE AGENCY (OR INSPECTOR) ONE WEEK PRIOR TO INSTALLATION TO COORDINATE PAVEMENT MARKINGS AND SIGNING.

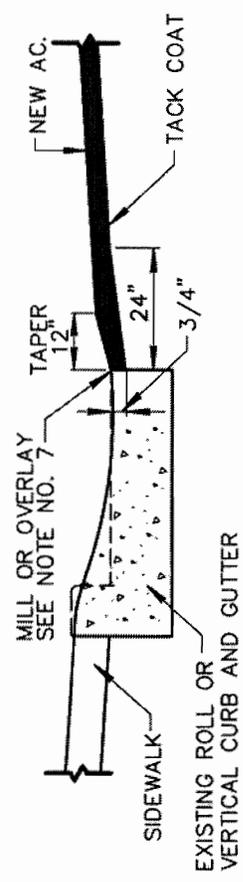


PLAN VIEW



SECTION A-A

IMPORTANT:
TO GAIN MAXIMUM EFFECT, HUMPS MUST BE THE FULL 3" CONTRACTORS MUST NOT EXCEED THIS HEIGHT BASED ON CONSIDERATION FOR EMERGENCY POLICE AND FIRE DEPARTMENT VEHICLES.



SECTION B-B

DETAIL NO.	REVISION	DETAIL NO.
210	01-01-2006	210
RESIDENTIAL SPEED HUMP		
STANDARD DETAIL ENGLISH		
CASE 08-17 Revised 7/21/2008		

PEORIA COMMENTS ON CASE 08-17

Gordon Tyus

From: Jesse Gonzales [Jesse.Gonzales@peoriaaz.gov]
Sent: Monday, July 14, 2008 11:56 AM
To: Gordon Tyus
Cc: Robert Herz (E-mail)
Subject: Case 08-17: Revisions to Detail 210 Residential Speed Hump
Attachments: Jesse Gonzales - 07-14-08 - UEKDV4B.pdf

Good Morning Gordon,

I attempting to get back in the swing of things in getting my cases resolved I took a quick look at Case 08-17 as introduced by Bob Herz and would like to offer the following observations.

- I notice that many if not all local agency details on "speed humps" or "speed cushions" use 0.96", 1.67" etc progression for rate of rise from the lip of curb. In reviewing the inventory of related details it would appear that only Chandler is using the commonly accepted engineering units of measurement, by that I mean that one inch= .08' – three inches = .024' – four inches= .33'. when quizzed about this many traffic speed hump experts could not explain what 0.96" meant in relation to engineering units of measurement.
- Chevron paint as I have deduced by conversation with many traffic staff seems to indicate that Scottsdale and Chandler have the closest to what is considered as ideal and are fairly consistent with MUTCD Fig 3B-29 (attached)
- There appears to be many variants of the standard hump or cushion that we may wish to add a couple more to MAG so there aren't the odd city specific units still floating around to increase the inventory we are trying to reduce. One of the greatest challenges to standardization seems to be fire department objections to the devices; this is something that may be a huge obstacle to standardization of humps.

More to follow on my cases and others.

Jess

Figure 3B-29. Examples of Pavement Markings for Speed Humps Without Crosswalks

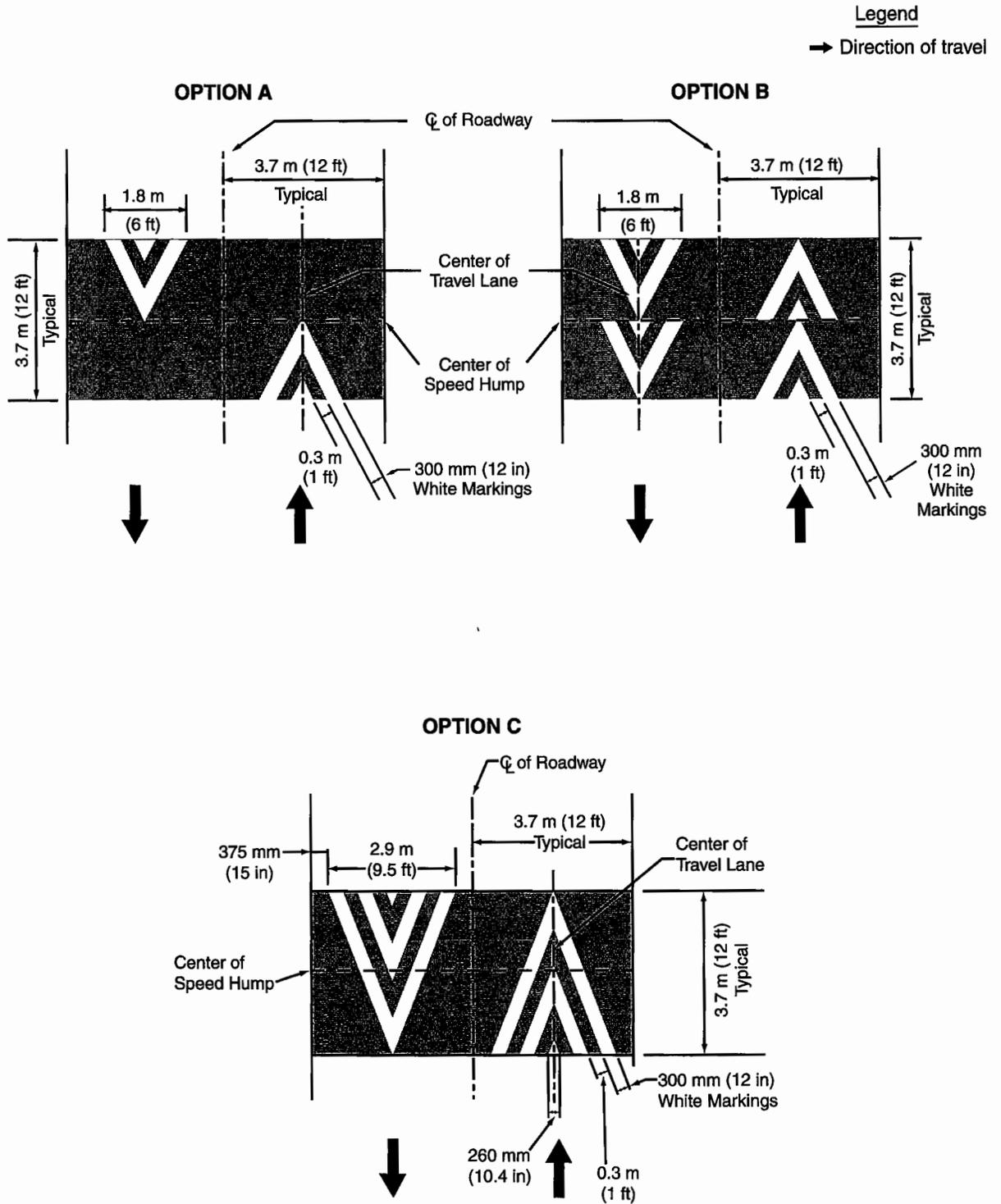
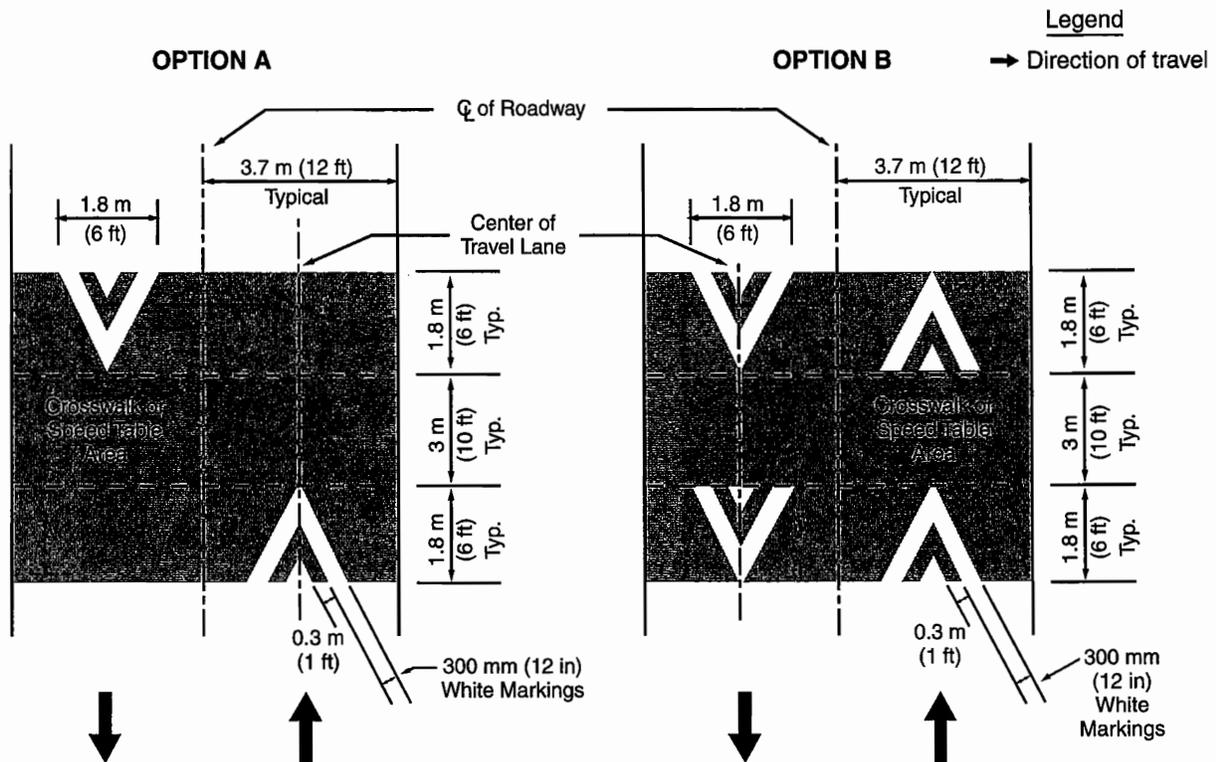


Figure 3B-30. Examples of Pavement Markings for Speed Tables or Speed Humps with Crosswalks



Option:

Advance speed hump markings may be used in advance of an engineered vertical roadway deflection where added visibility is desired or where such deflection is not expected (see Figure 3B-31).

Advance pavement wording such as BUMP or HUMP (see Section 3B.19) may be used on the approach to a speed hump either alone or in conjunction with advance speed hump markings. Appropriate advance warning signs may be used in conformance with Section 2C.24.

Guidance:

If used, advance speed hump markings should be installed in each approach lane.



MARICOPA COUNTY
Department of Transportation

CASE 08-01
* APPROVED *
07/02/08

MEMORANDUM

Date: January 2, 2008 - Revised 6/05/2008
To: MAG Specifications and Details Committee
From: Robert Herz, MCDOT Representative
Subject: Modification to Section 210 BORROW EXCAVATION Case 08- 01

PURPOSE: Define acceptance criteria for imported borrow material.

REVISION: Add paragraph and revisions as noted.

210.2 IMPORTED BORROW:

Imported borrow shall consist of material required for construction and unless otherwise designated in the special provisions, the Contractor shall make arrangements for obtaining imported borrow and shall pay all costs involved. When designated sources for imported borrow are indicated on the plans or in the special provisions, the material shall be assumed approved by the Engineer.

- Deleted: his own
Deleted: he
Deleted: shall be obtained from sources
Deleted: , designated
Deleted: or

Borrow material for fill within the roadway prism shall meet the following requirements:

The Plasticity Index (PI) (AASHTO T90) and the percent passing the number 200 sieve (Minus 200) (ASTM C136) when used in the equation below, shall give a value of X that does not exceed 62.

X = (Minus 200) + 2.83 (PI)

When the percentage of the Minus 200 material is greater than 30, the PI for the soil shall be at least 5 and at the same time in compliance with the X value requirement.

The material shall be free from wood, vegetation, or other deleterious matter. The maximum size of this material shall not be greater than 2/3 the compacted thickness of the course placed in the subgrade.

The Contractor shall notify the Engineer sufficiently in advance of opening any material sites so that cross section elevations and measurements of the ground surface after stripping may be taken and sufficient time for testing and material will be allowed.

Borrow pits shall be excavated to regular lines to permit accurate measurement; depth of excavation throughout the area of borrow pits shall be as uniform as practicable and the side slope shall be dressed to such slope as may be directed, leaving the borrow pit area in a clean and safe condition.

SECTION 210

BORROW EXCAVATION

210.1 LOCAL BORROW:

Local borrow shall consist of material excavated and used in the construction of fills or for use as selected material or for other construction purposes. Local borrow shall be obtained by widening cuts or by excavating from other sources outside the planned or authorized cross section within the right-of-way and within the limits of the project. Local borrow shall be excavated to the lines and grades established by the Engineer.

210.2 IMPORTED BORROW:

Imported borrow shall consist of material required for construction and unless otherwise designated in the special provisions, the Contractor shall make arrangements for obtaining imported borrow and shall pay all costs involved. When designated sources for imported borrow are indicated on the plans, in the special provisions, the material shall be assumed approved by the Engineer.

Borrow material for fill within the roadway prism shall meet the following requirements:

The Plasticity Index (PI) (AASHTO T90) and the percent passing the number 200 sieve (Minus 200) (ASTM C136) when used in the equation below, shall give a value of X that does not exceed 62.

$$X = (\text{Minus 200}) + 2.83 (\text{PI})$$

When the percentage of the Minus 200 material is greater than 30, the PI for the soil shall be at least 5 and at the same time in compliance with the X value requirement.

The material shall be free from wood, vegetation, or other deleterious matter. The maximum size of this material shall not be greater than 2/3 the compacted thickness of the course placed in the subgrade.

The Contractor shall notify the Engineer sufficiently in advance of opening any material sites so that cross section elevations and measurements of the ground surface after stripping may be taken and sufficient time for testing and material will be allowed.

Borrow pits shall be excavated to regular lines to permit accurate measurement; depth of excavation throughout the area of borrow pits shall be as uniform as practicable and the side slope shall be dressed to such slope as may be directed, leaving the borrow pit area in a clean and safe condition.

210.3 PLACING AND COMPACTING:

Local borrow and imported borrow shall be placed and compacted as specified in Section 211.

The Contractor shall satisfy himself that there is sufficient space available in fill locations for placing any excavated material, before placing borrow. Any excess excavation which develops as a result of placing borrow in advance of completing excavations shall be disposed of by the Contractor at no additional cost to the Contracting Agency in accordance with the provisions in Section 205 and a corresponding reduction in the quantity of borrow to be paid for will be made, for which the Contractor will have no claim for compensation.

210.4 MEASUREMENT:

Quantities of borrow will be measured as specified for roadway excavation in Section 205.

Material excavated at the borrow site and not used on the work will be deducted from the computed quantities and will not be paid for.

210.5 PAYMENT:

Quantities of borrow excavation will be paid for at the contract unit price per cubic yard. Such price shall include excavating, sloping and cleaning of borrow area, hauling, depositing, spreading and compacting the material complete in place, and disposal of surplus material, unless an alternate basis of payment is stipulated in the proposal.

End of Section



MARICOPA COUNTY
Department of Transportation

CASE 08-02
APPROVED
7/02/08

MEMORANDUM

Date: January 2, 2008 – Revised 5/8/2008 (shown in red)

To: MAG Specifications and Details Committee

From: Robert Herz, MCDOT Representative

Subject: 317 Asphalt Milling

Case 08-02

PURPOSE: Incorporate specifications from MCDOT's Supplement into the MAG specifications as requested by the MAG Standards & Details Consolidation Subcommittee.

REVISION: Add to Part 300: Section 317 Asphalt Milling.

SECTION 317

ASPHALT MILLING

317.1 DESCRIPTION:

The work under this Section shall consist of milling existing asphalt concrete pavement where shown on the Plans or requested by the Engineer.

317.2 CONSTRUCTION REQUIREMENTS:

Contractor is responsible for locating all milling hazards on and below the surface within the area to be milled including areas requiring special milling. Special milling is not a separate pay item and shall be paid for as Asphalt Milling.

The milling cut depth shall be the depth indicated on the Plans plus or minus 1/8 inch. The milling machine shall have electronic grade controls. Contractor shall remove the milled material and sweep the roadway clean with a power pick-up broom to the satisfaction of the Engineer.

Asphalt pavement adjacent to manholes, valve boxes, small radius curbs and other fixed objects that produce confined areas shall be removed with milling equipment specifically designed to operate in restricted areas. The equipment shall be capable of

removing asphalt concrete of the specified thickness without damage to, or displacement of, the adjacent object(s).

The Contractor shall be responsible for continually checking the milling operation to determine that the proper depth of milling has been achieved, that the proper profile and cross slope are achieved, and that the surface texture is (a) free from longitudinal ridges, and (b) has a uniform pattern.

Deleted: The work shall result in a clean milled surface to the specified depth for the area indicated by the construction documents including the areas immediately around and next to any individual hazard within the area to be milled.¶

The Contractor shall immediately notify the Engineer when:

- The existing pavement thickness is found to be less than anticipated and breaking of the underlying material occurs.
- Delamination of underlying material occurs.

The work shall result in a clean milled surface to the specified depth for the area indicated by the construction documents including the areas immediately around and next to any individual hazard within the area to be milled. The edge of milled areas shall form a straight clean cut line.

317.3 MEASUREMENT AND PAYMENT:

Measurement for Asphalt Milling will be by the square yard and shall only include areas milled to the required depth and cross section.

Payment for Asphalt Milling at the contract unit price shall be full compensation for the work, complete-in-place, including all asphalt milling, milling around structures, removal and disposal of milled materials, and sweeping.

Deleted: Case 08-02 Section 317 Asphalt Milling Rev 5-08-2008.doc

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End of Section



MARICOPA COUNTY
Department of Transportation

CASE 08-15
* APPROVED *
07/02/08

MEMORANDUM

Date: June 4, 2008
To: MAG Specifications and Details Committee
From: Robert Herz, MCDOT Representative
Subject: Detail 535 CATCH BASIN TYPE 'F'

Case 08-15

PURPOSE: Reduce the maximum potential gap between the grate and frame to prevent the entrapment of bicycle tires.

REVISION: Adjust the size and location of the GRATE end bars. Revise the end bar note to read:

(2) 2-1/2" x 1/4" x 3'-4-1/2"
END BAR FLUSH WITH
TOP SURFACE OF GRATE

From: Jesse Gonzales [Jesse.Gonzales@peoriaaz.gov]
Sent: Tuesday, July 15, 2008 12:49 PM
To: Gordon Tyus
Cc: Robert Herz (E-mail)
Subject: Case 08-15: Revisions to Detail 535 Catch Basin Grate
Good Afternoon Gordon,

As discussed at the last meeting I had inquired if it would be appropriate to add a note indicating the addition of an extra bar to the existing bar on existing stocks on hand so as to bring existing product into compliance, Bob indicated concurrence and was met with concurrence from Paul Nebeker as he has many on hand. I've thrown a potential note #7 in below as a starting point for anyone wishing to wordsmith it to perfection.

"An additional bar of appropriately sized dimension may be added to units previously fabricated that may remain in inventory at the time of this update. Grinding, cleaning, painting etc. as necessary to update the unit will be considered as incidental and no additional payment will be made."

Jesse

* APPROVED *
07/02/08



July 28, 2008

To: MAG Standard Specifications and Details Committee

From: Jeff Van Skike, City of Phoenix

Subject: Modification to Section 345, Adjusting Frames, Covers, Valve Boxes and Water Meter Boxes

Contractors applying paving on private or commercial development projects often fail to locate utility structures that will require raising and adjustment to finished grade. This change will ensure that the responsibility for locating those items is clear and that they are not lost under the new roadway surface.

Add to the end of Section 345.1:

The contractor shall be responsible for the careful identification and location of all utility devices requiring adjustment within the new pavement section, including manholes, water valves, sewer clean-outs, vaults, etc. These devices shall be referenced by the use of swing ties with appropriate supplemental survey data.

SECTION 345

ADJUSTING FRAMES, COVERS, VALVE BOXES AND WATER METER BOXES

345.1 DESCRIPTION:

The Contractor shall furnish all labor, materials, and equipment necessary to adjust all frames, covers and valve boxes as indicated on the plans or as designated by the Engineer. The frames shall be set to grades established by the Engineer, in a manner hereinafter specified.

The Contractor may elect to remove old frames, covers and valve boxes and to install new frames and/or boxes without any additional cost to the Contracting Agency, in accordance with standard detail drawings.

The Contractor shall be responsible for the careful identification and location of all utility devices requiring adjustment within the new pavement section, including manholes, water valves, sewer clean-outs, vaults, etc. These devices shall be referenced by the use of swing ties with appropriate supplemental survey data.

345.2 ADJUSTING FRAMES:

The Contractor shall loosen frames in such a manner that existing monuments, clean outs or valve boxes will not be disturbed or manholes damaged. Debris shall not be permitted to enter sanitary or storm sewer conduits. All loose material and debris shall be removed from the excavation and the interiors of structures prior to resetting frames.

Frames shall be set to the elevations and slopes established by the Engineer and shall be firmly blocked in place with masonry or metal supports. Spaces between the frame and the old seat shall be sealed on the inside to prevent any concrete from entering the hand hole or manhole. Class AA concrete shall be placed around and under the frames to provide a seal and properly seat the frame at the required elevation and slope. Concrete shall be struck off flush with the top of the existing pavement.

345.3 ADJUSTING VALVE BOXES:

Valve boxes shall be adjusted to the new elevations indicated on the plans, or as established by the Engineer.

Adjustable cast iron boxes shall, if possible, be brought to grade by adjustment of the upper movable section. Any excavated area shall be filled with Class AA concrete to the level of the existing pavement, or as directed by the Engineer.

Concrete pipe valve boxes in areas not subject to vehicular traffic shall be adjusted to grades by installing a suitable length of metal or concrete pipe, of the same inside diameter as the present valve box, and reinforcing the outside with a concrete collar extending from at least 2 inches below the joint up to and flush with the top of the valve box extension. This collar shall be of Class AA concrete. The dimension from the outside of the box to the outside of the collar shall not be less than 2 inches. This adjustment will be known as Type B.

In areas subject to vehicular traffic and where the existing valve box is a Type B, the adjustment to the new elevation shall be made using the old cover and installing a new 8 inches frame in accordance with the standard detail for installation of valve boxes in vehicular traffic areas. This adjustment shall be known as Type BA.

Adjustment of existing Type A valve boxes to the new elevations shall be as described in Subsection 345.2 above. This adjustment shall be known as Type A.

345.4 ADJUSTING MANHOLE AND VALVE COVERS:

Adjusting rings may be used to raise manhole covers in asphalt pavements when deemed acceptable by the Engineer. The amount of adjustment, thickness of seal or overlay, and cross slope will be considered when using adjusting rings. Each location where an adjusting ring is used must have a sufficient depth of asphalt to assure the proper installation and operation of the ring. The rings shall be made of a non-metallic, polypropylene or fiberglass material and installed per the manufacturer's specifications. The rings shall be approved by the Engineer.

345.5 MEASUREMENT:

The quantities measured will be the actual number of frames, covers and value boxes of each type, adjusted and accepted.



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For More Information contact Steve Trussell: steve@azrockproducts.org