

June 24, 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, July 2, 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 June 4, 2008 Meeting Minutes</u>	2. Corrections and approval of June 4, 2008 minutes.
3. <u>2007 & 2008 Cases</u>	3. Review of pending cases and submission of new cases for consideration. NOTE: This is the last meeting for submittal of new cases for consideration this calendar year.
4. <u>General Discussion</u>	4. For information and discussion.
5. <u>Adjournment</u>	5. No action required.

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

June 4, 2008

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

AGENCY MEMBERS

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

ADVISORY MEMBERS

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

MAG ADMINISTRATIVE STAFF

Gordon Tyus

- * Members not attending or represented by proxy.

GUESTS/VISITORS

John Rapacz, StrongGo, LLC (Tekway Dome Tiles)
Dennis Shoffner, StrongGo, LLC (Tekway Dome Tiles)
Eric Whitney, Contech Construction Products, Inc.

1. Call to Order

Chairman, Bob Herz, called the meeting to order at 1:32 p.m.

2. Approval of Minutes

The members reviewed the May 7, 2008 meeting minutes. John Ashley introduced a motion to accept the minutes as written. Gordon Haws 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). Jeff Benedict and James Carusone explained that the technical committee review work was complete. Members were requested to review 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. Dale Phelan handed out revised details that addressed all previous comments and feed back from various agencies. Dale also made a CD on PVC catch basin case histories available to members. Discussion by the committee included revising the drawings to better define the location of the slab under curbs/gutters and changing backfill shading to denote differences between subgrade and backfill behind curbs. 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 committee had no discussion on this item. Mark Palichuk is waiting on input from his public works department will prepare and update as soon as this is received.

d. **Case 07-11 – Revision to Detail 370, Vertical Realignment of Water Mains:** Include an option for realignment of ductile iron mechanical joint. The committee had no discussion on this item. Jesse Gonzalez will have revisions for the next meeting.

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 committee had no discussion on this item. Jesse Gonzalez will have revisions for the next meeting.

4. 2008 Cases (new cases)

a. **Case 08-01 – Revisions to Borrow Excavation, Section 210:** Defining acceptance criteria for import borrow material. Bob Herz summarized changes to the case after the last series of comments. After committee discussion, it was decided that unless

specifically requested by the engineer, borrow fill meeting the proposed quality requirements should be limited to areas within the roadway prism. Bob will make changes per the discussion and requested members to be prepared to vote on this case at the next meeting.

b. **Case 08-02 – New Section 317, Asphalt Milling:** Construction requirements for milling existing asphalt concrete. Bob Herz provided revisions based on comments from the last meeting. After discussion, members were requested to be prepared to vote on this case at the next meeting.

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 had no discussion on this item. Bob Herz will prepare revisions for the next meeting based on earlier comments. Members were requested to continue reviewing the new section and provide any additional comments at the next meeting.

d. **Case 08-04 – New Details 180-1 & 180-2, Portable Water Tank Fill Pipe and Backflow Prevent Details:** Approved methods for filling portable water tanks and trucks. The committee discussed the applicability of including these details within the MAG Standards and Details documents. Steven Borst remarked that these types of details identify water department operational or water quality practices, not public works construction practices and are already covered by Arizona Administrative Code. A number of members explained that these types of details are needed by their agencies and that a single reference source would provide the best approach. After discussion, members recommended that agencies should not include these details within their supplements, but have their water departments provide them to contractors when supplying hydrant meters. The case was withdrawn by Warren White.

e. **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. Warren White handed out a revised detail that addressed previous comments. Discussion by the committee included renaming “safety post” as “bollards”, making separate details for bollards and hazard markers, deleting the note referencing a specific bollard height for bin enclosure use, consolidating hazard marker Notes 2 and 5, changing the term “reflective sheeting” to “retro-reflective sheeting”, and removing notes and drawings identifying pavement adjacent to bollards. The members also request that Peter Kandariz find out the function of the through drill hole for removable bollards. Warren will prepare revised details for the next meeting based on the comments.

f. **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 reviewed the case. After committee discussion Jeff noted that he would consult with City of Phoenix construction and design departments to find out what types of pipe are actually being tested and would report back to the committee at the next meeting.

g. **Case 08-07 – Modification to Measurements and Payment, Section 109:** Revisions to better define compensation with change orders. The committee had no discussion on this item. Gordon Haws will have revisions for the next meeting.

h. **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. The committee had no discussion on this item. Gordon Haws will have revisions for the next meeting.

i. **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.

j. **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 comments and included changes to Section 340. Discussion by the committee included squaring driveway wing areas and redrawing Section A-A to have the gutter and drive thicknesses match. Bob Herz will prepare revised details for the next meeting based on the comments.

k. **Case 08-12 – New Section 331, Microsealing, and Section 714, Microsurfacing Materials:** New sections for pavement microsurfacing materials and placement. Jeff Van Skike said that he had just received comments and will prepare revisions for the next meeting based on the comments. Members were requested to continue reviewing the new sections and provide any additional comments at the next meeting.

l. **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. Jeff Van Skike said he will make minor language changes as discussed and requested members to be prepared to vote on this case at the next meeting.

m. **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 said that he will modify the detail to note ½-sack controlled low-strength material or other agency approved material as pothole backfill and include other changes as discussed in previous meetings. He will prepare a new revision for the next meeting. Members were requested to continue reviewing the new section and provide any additional comments at the next meeting.

n. **Case 08-15 – Revisions to Catch Basin Grate on Detail 535:** As part of the review of Case 07-03, Dale Phelan discovered that end bars on catch basin grates are being

centered on grate bars, resulting in an unnecessarily wide space between frames and grates at the pavement surface. He suggested that the end bars be made flush with the top of grates or change the size of the end bars to match the width of the grate bars. Bob Herz will prepare revisions to the detail for the next meeting.

o. **Case 08-16 – Revisions to Concrete Cut-Off Wall Detail 552:** Clarify requirements for concrete surfaced ford crossings. Bob Herz presented a revision to the concrete surfacing note in the typical ford cross section to clarify that Class A concrete is to be used for this purpose. Concrete surface ford requirements shown on the detail conflict with requirements of Section 324 (use of 3500 psi strength mix) for concrete pavement material. Committee members were requested to review the proposal and return with comments for the next meeting.

p. **Case 08-17 – Revisions to Residential Speed Hump Detail 210:** Remove contradictory language for speed bump height tolerance. Bob Herz proposed deleting the note under Section A-A which requires humps to be at least 3 inches high. Note 1 already provides a hump tolerance of 3 to 3.25 inches. After discussion, members were in general agreement that detail only required one set of tolerances. Members were requested to be prepared to vote on this case at the next meeting.

5. General Discussion:

Steven Borst reminded members to submit their cases, comments and revisions in electronic form to speed up internal agency review. Because of the large volume of cases it is important to send comments and revisions in electronic form to Gordon Tyus as quickly as possible so they can be posted on the committee's website.

John Ashley announced that the concrete modernization subcommittee will next meet at 1:30 pm on Wednesday, June 13th at the ARPA offices (916 W. Adams Street, Phoenix).

Jeff Benedict said that AGC had received an inquiry on how approval could be obtained for the use of recycled asphalt concrete pavement in batch plant hot mixes. The rising cost of oil is rapidly driving up the price of asphalt hot mix. ARPA will be preparing a position paper on the topic.

6. Adjournment:

The meeting was adjourned at 3:34 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 710 & Section 321	AGC ARPA	Jeff Benedict (Don Green)	2/07/2007 4/10/2008		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 4/09/2008		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 4/09/2008		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		0 Yes 0 No 0 Abstain
07-11	Revision to Detail 370, Vertical Realignment of Water Mains	Peoria	Jesse Gonzalez	6/06/2007		0 Yes 0 No 0 Abstain
07-12	Revision to Detail 404-2, Water & Sanitary Sewer Separation/Protection	Peoria	Jesse Gonzalez	6/06/2007		0 Yes 0 No 0 Abstain
08-01	Revision to Section 210 Borrow Excavation	MCDOT	Bob Herz	1/02/2008 5/07/2008	Proposed vote 7/02/2008	0 Yes 0 No 0 Abstain
08-02	New Section 317, Asphalt Milling	MCDOT	Bob Herz	5/08/2008	Proposed vote 7/02/2008	0 Yes 0 No 0 Abstain
08-03	New Section 325, Asphalt – Rubber Concrete Overlay, Gap Graded	MCDOT	Bob Herz	1/02/2008		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
08-05	Revisions to Safety Post Detail 140 and add Detail 141	Chandler	Warren White (David Fern)	1/02/2008 4/01/2008		0 Yes 0 No 0 Abstain

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CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE		
						Yes	No	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 2/06/2008		0 0 0	Yes No Abstain	
08-07	Revisions to Section 109.4 Compensation for Alteration of Work	Mesa	Gordon Haws	2/06/2008 4/02/2008		0 0 0	Yes No 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 4/02/2008		0 0 0	Yes No 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 0 0	Yes No 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 0 0	Yes No Abstain	
08-11	Revisions to Detail 250 DRIVEWAY ENTRANCES and specification Section 340	MCDOT	Bob Herz	3/05/2008 7/02/2008		0 0 0	Yes No Abstain	
08-12	New Section 331, Microseal Specifications New Section 714, Microsurfacing Materials	Phoenix	Jeff Van Skike	3/05/2008 4/02/2008		0 0 0	Yes No Abstain	
08-13	Revision to Section 345 Adjusting Frames, Covers, Valve Boxes and Water Meter Boxes	Phoenix	Jeff Van Skike	3/05/2008	Proposed vote 7/02/2008	0 0 0	Yes No Abstain	
08-14	Revision to Detail 212 UTILITY POTHOLE REPAIR	Phoenix	Jeff Van Skike	4/02/2008		0 0 0	Yes No Abstain	
08-15	Revision to Detail 535 CATCH BASIN TYPE 'F' – Grate modification	MCDOT	Bob Herz	6/04/2008		0 0 0	Yes No Abstain	
08-16	Revision to Detail 552 CONCRETE CUT-OFF WALLS – Revise concrete pavement note	MCDOT	Bob Herz	6/04/2008 6/05/2008		0 0 0	Yes No Abstain	

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CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE						
08-17	Revision to Detail 210 RESIDENTIAL SPEED HUMP – Delete conflicting note.	MCDOT	Bob Herz	6/04/2008	Proposed vote 7/02/2008	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33.33%;">0</td> <td style="width: 33.33%;">Yes</td> </tr> <tr> <td>0</td> <td>No</td> </tr> <tr> <td>0</td> <td>Abstain</td> </tr> </table>	0	Yes	0	No	0	Abstain
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* Case was approved with verbal modifications at time of voting.

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

- 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 to Section 710 for the type specified. The specific required mix type shall be called out in the contract documents or as directed by the Engineer.

321.3 WEATHER AND MOISTURE CONDITIONS:

Asphalt concrete shall be placed only when the surface is dry, and when the atmospheric temperature in the shade is 40 degrees F. 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 Engineer determines that weather conditions are suitable.

321.4 APPLICATION OF TACK COAT:

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

The application of the tack coat shall comply with Section 329. The grade of emulsified asphalt shall be SS-1 h or CSS-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 Engineer. This shall be addressed in the project specifications prior to the bidding of the project.

321.5 MIX DESIGN

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

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 Engineer with a new mix design, which meets the requirements of Section 710, as amended by the Project Specifications.

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

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

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 Engineer. The Engineer will determine if the proposed target change will result in mix production that meets the contract requirements for mix design criteria and gradation limits. The target changes will not be retroactive for the purpose of acceptance.

321.6 MIX PRODUCTION:

All materials shall be proportioned by weight in a hot mix asphalt plant in the proportions required by the mix design to provide a homogeneous and workable mass. Each hot mix asphalt plant shall be inspected in accordance with the provisions contained in the 'Hot Mix Asphalt Production Facilities' by the Arizona Rock Products Association and shall have a current inspection certificate. 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 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 be stopped if the mineral admixture is not introduced into the mineral aggregate. The plant will not be permitted to operate unless the signal system is in good working condition.

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

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

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 at all times

321.8 PLACEMENT:

321.8.1 Placing

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

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

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

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

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

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

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.

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 to provide a uniform and smooth layer over the entire area compacted in this manner.

321.8.2 Joints:

Transverse joints, before a surface course is placed in contact with a cold transverse construction joint, the cold existing asphalt concrete shall be trimmed to a vertical face for its full depth and exposing a fresh face. After placement and finishing the new asphalt concrete, both sides of the joint shall be dense and the joint shall be smooth and tight. The surface in the area of the joint shall not deviate more than $\frac{1}{4}$ 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 $\frac{1}{4}$ 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.

321.8.3 Leveling Course

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

321.8.4 Compaction Base and Surface

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 AASHTO 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.

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

The Engineer will determine the acceptability of the pavement compaction in accordance with Section 321.10 – "Acceptance".

SECTION 321

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 ($\frac{1}{4}$) inch from the lower edge of a 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 to perform any desired Quality Control monitoring and/or testing during asphalt concrete production to achieve the required mix properties. The Engineer may obtain samples of any portion of any material at any point of the operations for his own use. Also, the Engineer may order the use of any drying, proportioning and mixing equipment or the handling of any material discontinued which, in his/her opinion, fails to produce a satisfactory mixture.

The asphalt concrete produced shall conform to the 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 production shall cease immediately at no additional cost to the contracting Agency or Engineer.

321.10 ACCEPTANCE:

321.10.1 Acceptance Criteria:

Unless otherwise specified, asphalt concrete will be divided into lots for the purpose of acceptance. A lot shall be considered to be one day's production. When the quantity of asphalt concrete placed in a day exceeds 500 tons but is less than 2000 tons, the lot shall be divided into 500 ton sublots or fraction thereof. Where the quantity of asphalt concrete placed in a day exceeds 2000 tons, the day's production will be divided into four (4) approximately equal sublots. A minimum of one sample will be obtained from each lot. Tests used to determine acceptance will be performed by the Engineer or a laboratory employed by the Engineer. In either case the laboratory shall be accredited by the AASHTO Accreditation Program (AAP), for the tests being performed. The acceptance laboratory will take representative samples of the asphalt concrete from each subplot to allow for gradation, binder content, air voids, pavement thickness and compaction of base and surface course. Each subplot will be accepted based upon the test data from the sample(s) from that subplot. All acceptance samples shall be taken using random locations or times designated by the Engineer in accordance with ASTM D 3665.

321.10.2 Gradation, Binder Content and Air Voids:

The acceptance laboratory will take a sample of the asphalt concrete in accordance with the requirements of Section 2 or 4 of Arizona Test Methods 104 or AASHTO T168 from each subplot. The minimum weight of the sample shall be 45 pounds. Asphalt binder content and gradation shall be determined in accordance with AASHTO 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 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 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.

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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.

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	\$2.00	EA (see 321.10.6)
Over 0.1 to 0.2% points	\$6.00	EA (see 321.10.6)
Over 0.2% points	Removal*	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%	Removal*	Removal*
1.5-2.0%	\$2.50	EA (see 321.10.6)
2.1-2.7%	\$1.00	EA (see 321.10.6)
2.8-6.2%	Full Payment	No corrective action
6.3-6.9%	\$1.00	EA (see 321.10.6)
7.0-8.0%	\$2.50	EA (see 321.10.6)
Greater than 8.0%	Removal*	Removal*

Note: Removal* refers to Section 321-10.6

SECTION 321

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.

321.10.3 Surface Drainage:

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

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

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

321.10.4 Asphalt Pavement Thickness:

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

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

1. If the thickness deficiency of the pavement exceeds 0.25 inch, the limits of the deficient area will be 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.
2. If the pavement thickness from step one above deviates from the target thickness by more than 0.25 inch but not more than 0.50 inch, corrective action will be required. This corrective action will consist of application of a Type II slurry seal coat in accordance to Section 715. The Contractor may present an engineering analysis outlining other proposed remedial measures for the consideration of the Engineer. The Engineer will review the engineering analysis and decide within 30 working days whether to accept the proposed remedial measures.
3. If the pavement thickness from step one above deviates from the target thickness by more than 0.50 inch, corrective action will be required. The deficient area will be overlaid for the full width of the pavement to meet or exceed the designed thickness, with the appropriate end and edge milling, with a mixture approved by the Engineer. The Contractor may present an engineering analysis outlining other proposed remedial measures for the Engineer's consideration. The Engineer will review the engineering analysis and decide within 10 working days whether to accept the proposed remedial measures. If the Engineer chooses to reject the engineering analysis, the indicated overlay will be constructed by the Contractor at no additional cost to the Owner.

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

TABLE 321-6	
ASPHALT PAVEMENT THICKNESS PAYMENT REDUCTION	
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%

321.10.5 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 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 Engineer may exclude areas from the compaction lot that are not accessible by normal compaction equipment.

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

Cores will be taken per the Asphalt Concrete Coring Method. This method can be found 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.

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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%	\$4.00	EA
9.1% to 10.0%	\$6.00	EA and Type II Surry Seal
10.1%to 11.0%	Removal*	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 10 working days after receiving notice that a subplot of asphalt concrete is deficient for “Removal” by the 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 Engineering Analysis shall contain an analysis of the anticipated performance of the asphalt concrete if left in place. The Engineering Analysis shall also detail the effect of any proposed corrective action on the performance. The Engineering 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		
ENGINEERING ANALYSIS PENALTIES for REMOVAL* LOTS/SUBLOTS LEFT IN-PLACE		
Acceptance Criteria	Acceptance Limits	Penalty When Contracting Agency is the Owner (\$/Ton)
Asphalt Binder Content	Over 0.2% points from that Permitted	\$9.00
Laboratory Air Voids (Measured at N _{des} or 75 blows as applicable)	Less than 1.5% or Greater Than 8.0%	\$3.75
Limits of In-place Air Voids	10.1% to 11.0%	\$9.00

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

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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 Contractor will engage an independent laboratory (at the Contractor's own expense) who is accredited by AAP in all of the acceptance tests. The independent laboratory shall be acceptable to the Engineer and shall perform a complete 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 Gyratory 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.

The number of samples taken will be the same as specified in Section 321.10. The independent laboratory shall compile the test results and transmit them to both the Engineer and the Contractor. The independent laboratory shall include a 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, asphalt binder, and mineral admixture. Measurement shall include any tonnage used to construct intersections, roadways, streets, or other miscellaneous surfaces indicated on the plans or as directed by the Engineer.

321.13 PAYMENT:

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

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

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

ASPHALT CONCRETE

Revised 5-19-08

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.

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

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**TABLE 710-2
COARSE/FINE AGGREGATE REQUIREMENTS**

Characteristics	Test Method	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	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 1.00 percent, by weight of total aggregate.

710.3 MIX DESIGN REQUIREMENTS:

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

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

- (1) The name and address of the testing organization and the person responsible for the mix design report.
- (2) The mix plant identification and/or location, as well as the supplier or producer name.
- (3) A description of all products that are incorporated in the asphalt concrete along with the sources of all products, including admixtures and asphalt binder, and their method of introduction.
- (4) The supplier and grade of asphalt binder, the source and type of mineral aggregate, and the percentage of asphalt binder and mineral admixture used.
- (5) The 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.

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- (6) The results of all testing, determinations, etc., such as: specific gravity and gradation of each component, water absorption, sand equivalent, loss on abrasion, fractured coarse aggregate particles, Tensile Strength Ratio (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.
- (7) The laboratory mixing and compaction temperature ranges for the supplier and grade of asphalt binder used within the mix design.
- (8) 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.
- (9) 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.

710.3.2.1 Marshall Mix Design: The Marshall Mix Design shall be performed in accordance with the requirements of the latest edition of the Asphalt Institute’s Manual, MS-2 “Mix Design Methods for Asphalt Concrete.” The mix shall 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**

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. Stability: pounds, Minimum	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
Sieve Size	Percent Passing with Admix				
	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix	Base Mix	
1-1/4 inch				100	
1 inch			100	90-100	
3/4 inch		100	90 – 100	85-95	
1/2 inch	100	85 – 100	---	---	
3/8 inch	90-100	62 – 85	62 – 77	57-72	
No. 8	45-60	40 – 50	35 – 47	33-43	

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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.

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

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

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.

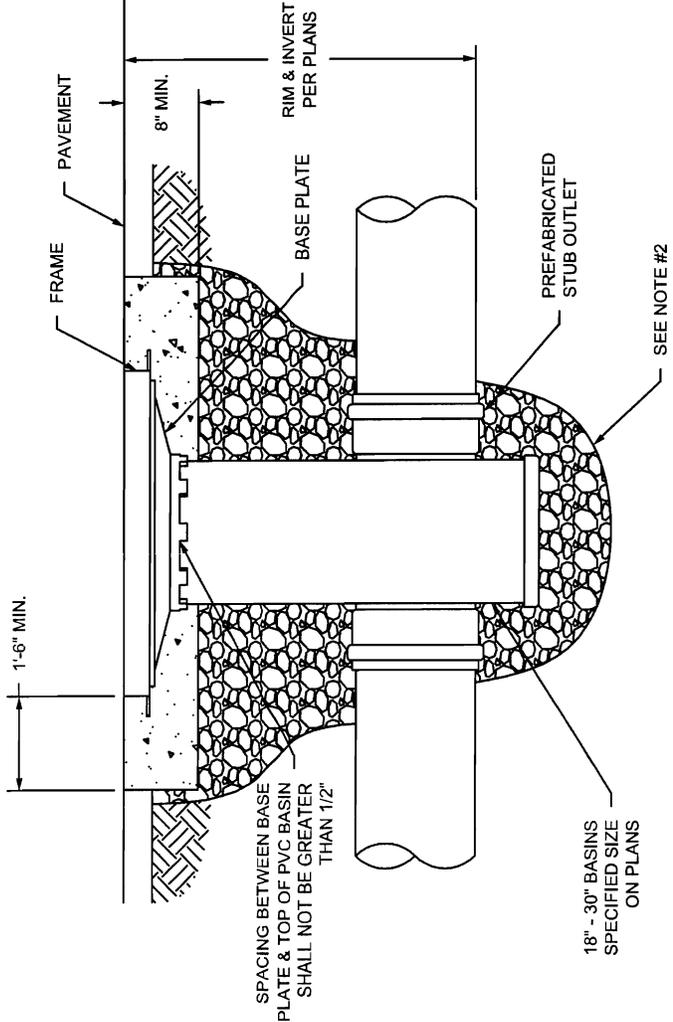
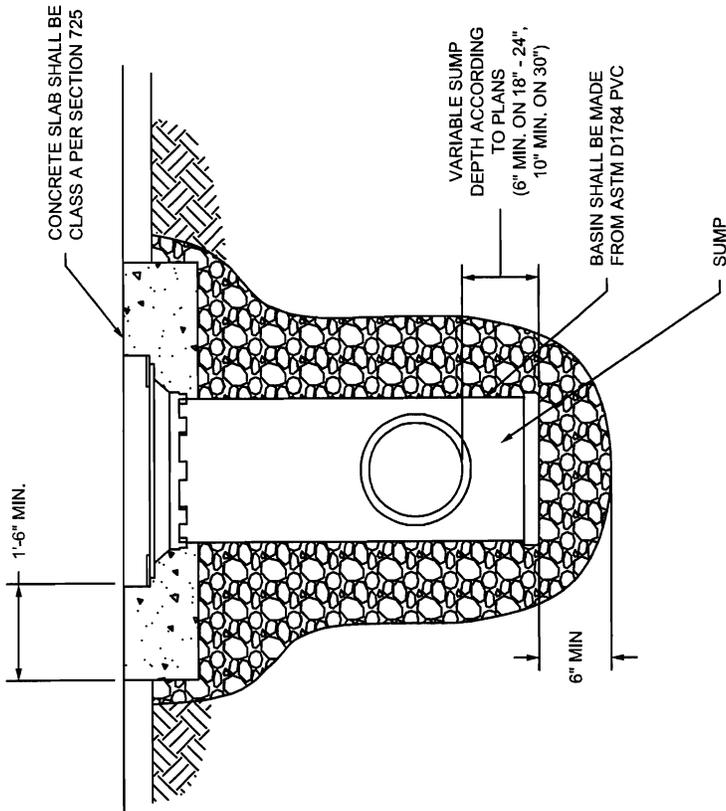
The mix shall comply with the criteria in Table 710-4.

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	

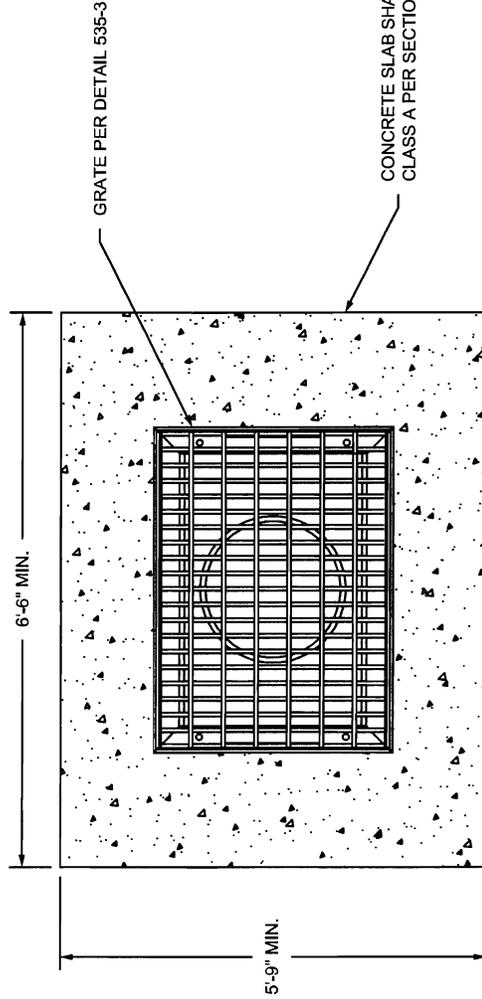
* Unless otherwise approved by the Engineer.

** 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.

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.



PLAN VIEW



NOTES:

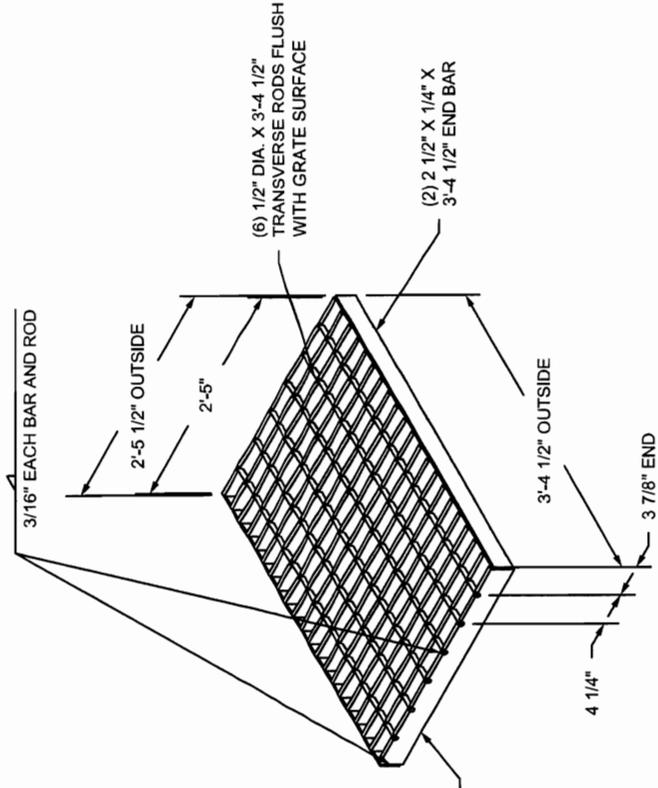
1. JOINT LOCATIONS AND STUB OUT MATERIALS SHALL BE SPECIFIED ON THE PLANS (CORRUGATED HIGH DENSITY POLYETHYLENE PIPE; PVC SDR-35; PVC SCH 40; PVC C-900, DIP). STUB OUT SHALL BE TWO FEET LONG FOR CONNECTION TO CMP AND RGRCP PIPE WITH A CONCRETE COLLAR PLACED PER MAG DETAIL 505 WITH A MAG 710.5 WATER STOP.
2. BACKFILL MATERIAL SHALL BE CRUSHED ROCK PER SECTION 701.2.1 PLACED UNIFORMLY IN MAXIMUM 8" LIFTS & COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY PER SECTION 601.4.10 OR 1/2 SACK CLSM PER SECTION 728.
3. FILL SUMP WITH CONCRETE TO INVERT CONCRETE SHALL BE A MINIMUM OF CLASS C PER SECTION 725.
4. FASTEN FRAME & BASE PLATE WITH (4) 5/8" ZINC PLATED BOLTS.

DETAIL NO.
535-2

CATCH BASIN 'J'

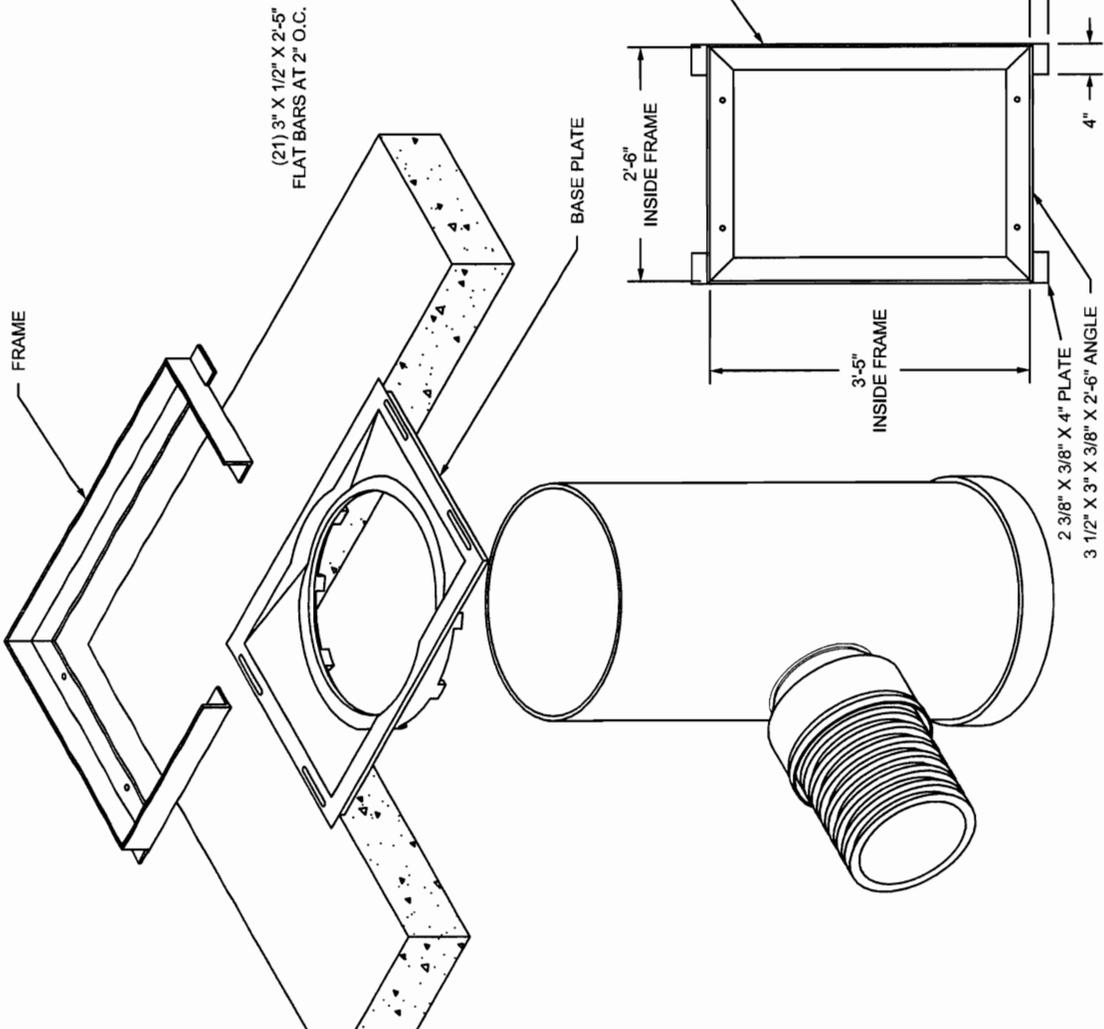
REVISED

DETAIL NO.
535-2



NOTES:

1. GRATE SHALL MEET H-20 LOAD RATING.
2. QUALITY: FRAME & GRATE MATERIALS SHALL CONFORM TO ASTM A-36 STEEL.
3. BASE PLATE MATERIALS SHALL CONFORM TO ASTM A53 GRADE 70-50-05 DUCTILE IRON.
4. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECT. 790.
5. ALL WELDS ON FRAME AND SIDE BARS ON GRATE SHALL BE FULL LENGTH OF JOINT.
6. APPROX. DRAIN AREA = 761.18 SQ IN.
7. TOP OF BASE PLATE TO TOP OF DRAIN BASIN: 18" & 24" BASE = 2 13/16", 30" BASE = 7/16".
8. FASTEN FRAME AND BASE PLATE WITH (4) 5/8" ZINC PLATED BOLTS.

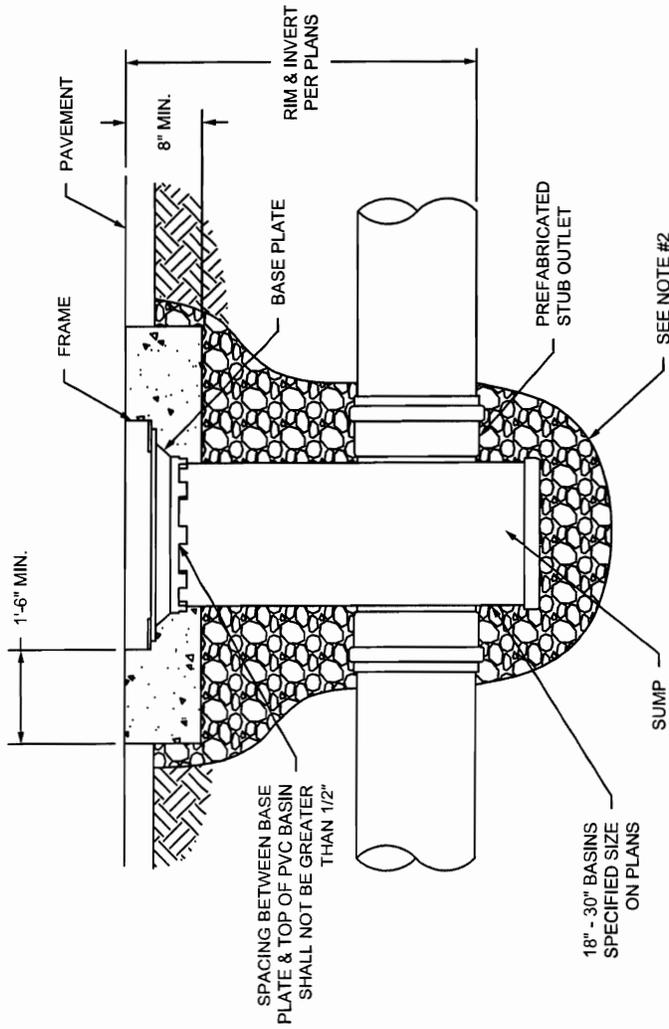
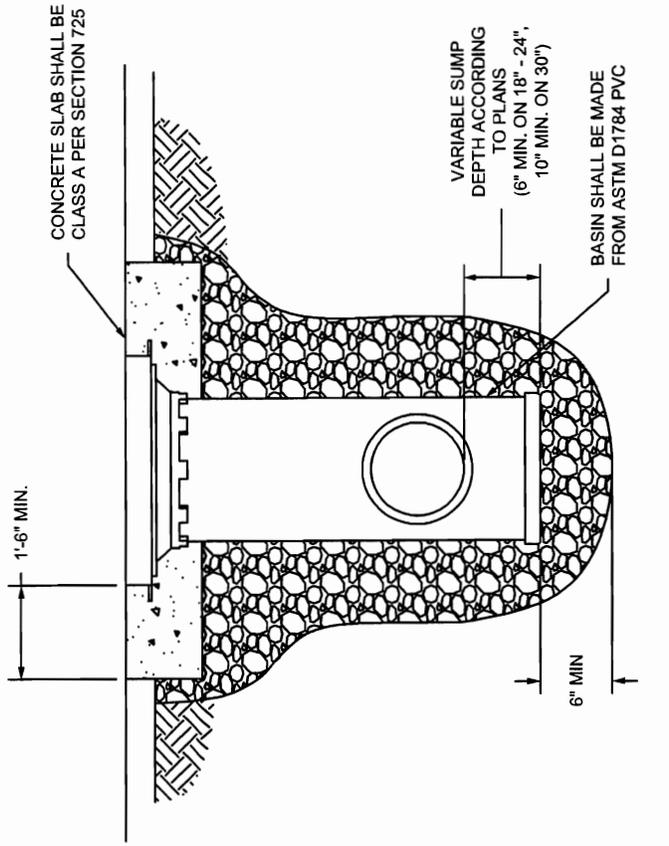


REVISION NO. 535-3

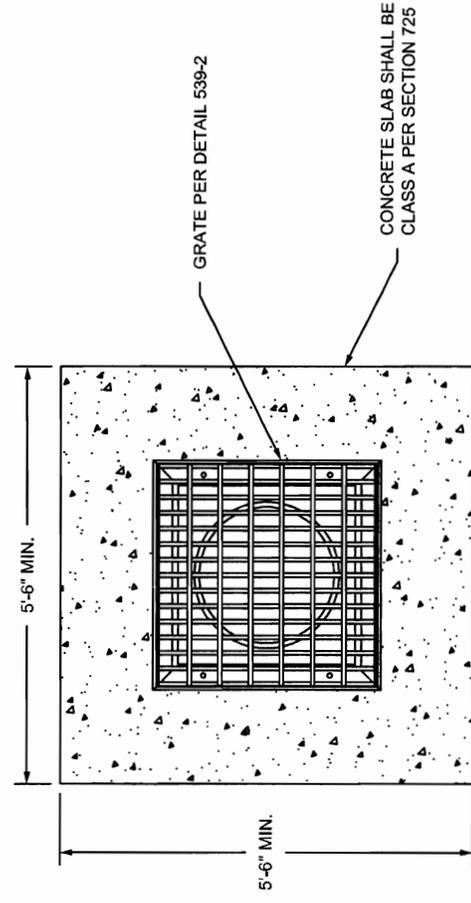
REVISED

GRATE FOR CATCH BASIN 'J'

DETAIL NO. 535-3



PLAN VIEW



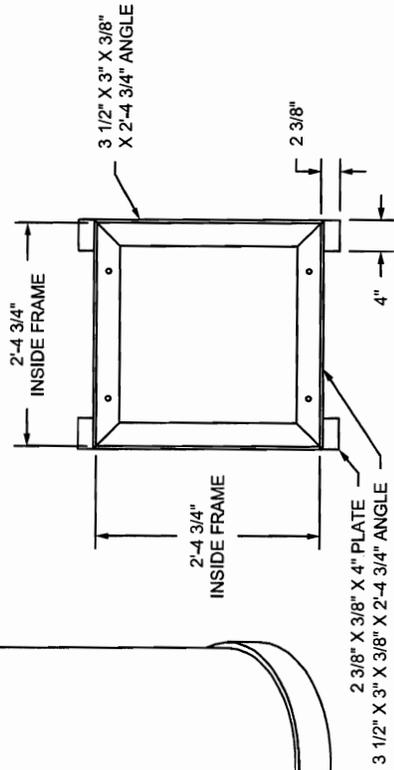
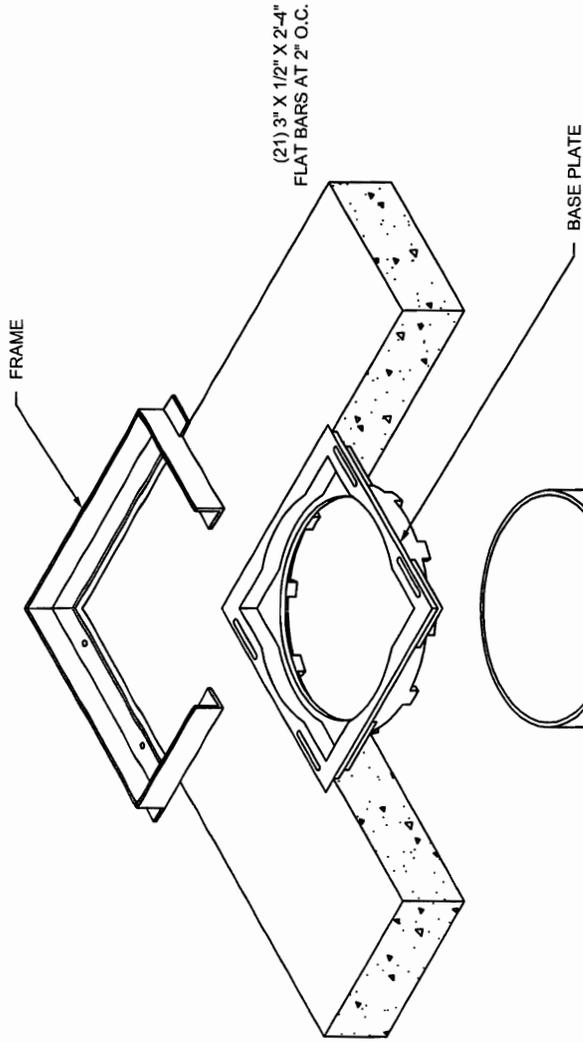
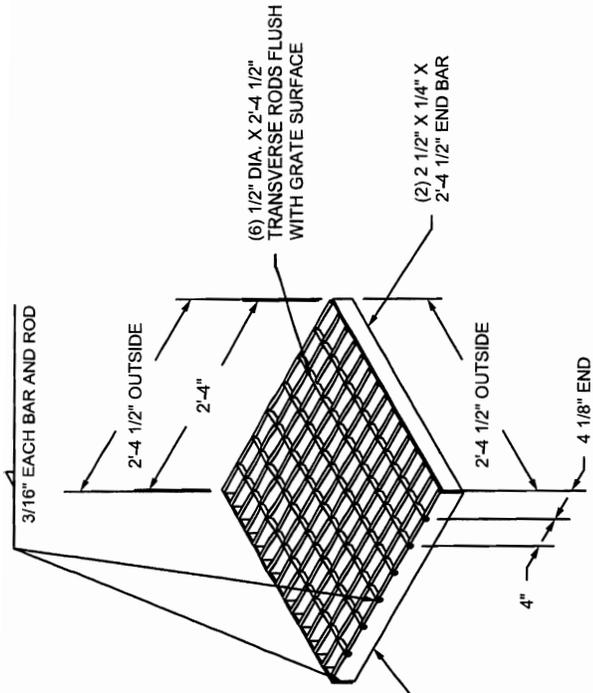
- NOTES:
1. JOINT LOCATIONS AND STUB OUT MATERIALS SHALL BE SPECIFIED ON THE PLANS (CORRUGATED HIGH DENSITY POLYETHYLENE PIPE, PVC SDR-35, PVC SCH 40, PVC C-900, DIP). STUB OUT SHALL BE TWO FEET LONG FOR CONNECTION TO CMP AND RGRCP PIPE WITH A CONCRETE COLLAR PLACED PER MAG DETAIL 505 WITH A MAG 710.5 WATER STOP.
 2. BACKFILL MATERIAL SHALL BE CRUSHED ROCK PER SECTION 701.2.1 PLACED UNIFORMLY IN MAXIMUM 8" LIFTS & COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY PER SECTION 601.4.10 OR 1/2 SACK CLSM PER SECTION 728.
 3. FILL SUMP WITH CONCRETE TO INVERT CONCRETE SHALL BE A MINIMUM OF CLASS C PER SECTION 725.
 4. FASTEN FRAME & BASE PLATE WITH (4) 5/8" ZINC PLATED BOLTS.

DETAIL NO.
537-2

CATCH BASIN - TYPE 'I'

REVISED

DETAIL NO.
537-2



NOTES:

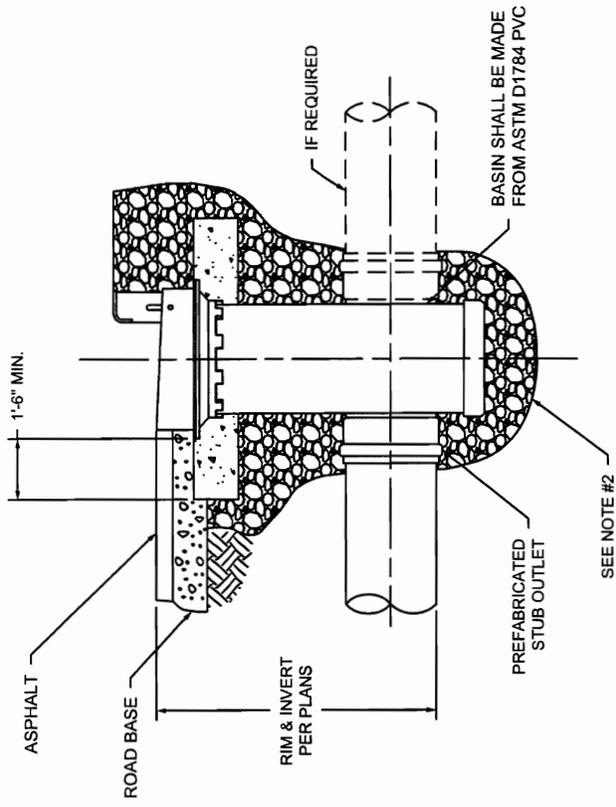
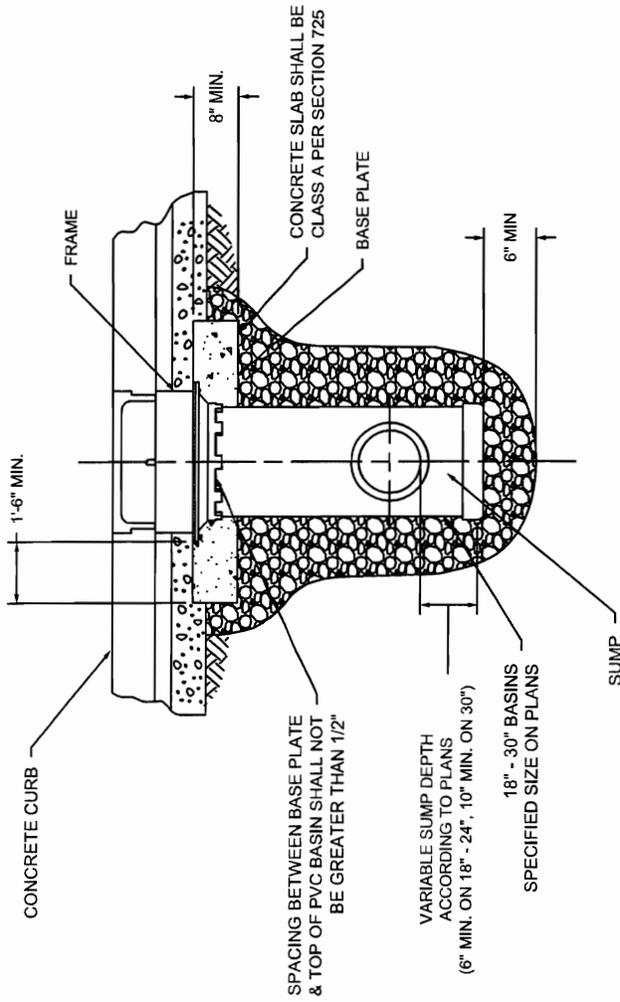
1. GRATE SHALL MEET H-20 LOAD RATING.
2. QUALITY: FRAME & GRATE MATERIALS SHALL CONFORM TO ASTM A-36 STEEL.
3. BASE PLATE MATERIALS SHALL CONFORM TO ASTM A53 GRADE 70-50-05 DUCTILE IRON.
4. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECT. 790.
5. ALL WELDS ON FRAME AND SIDE BARS ON GRATE SHALL BE FULL LENGTH OF JOINT.
6. APPROX. DRAIN AREA = 551.25 SQ IN.
7. TOP OF BASE PLATE TO TOP OF DRAIN BASIN: 18" & 24" BASE = 2 13/16", 30" BASE = 7/16".
8. FASTEN FRAME AND BASE PLATE WITH (4) 5/8" ZINC PLATED BOLTS.

DETAIL NO.
539-2

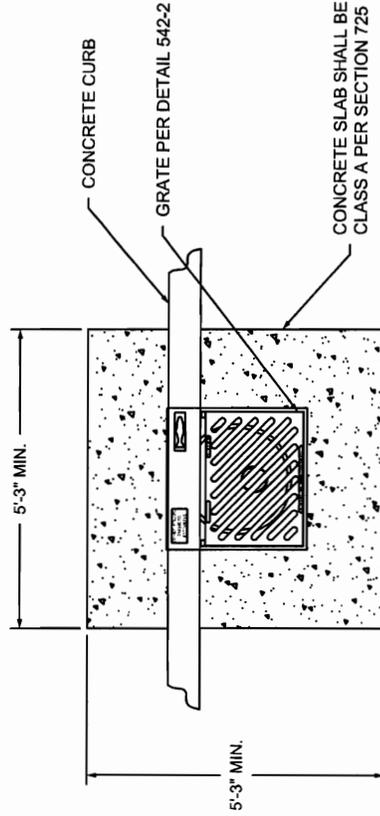
GRATE FOR CATCH BASIN '1'

REVISED

DETAIL NO.
539-2

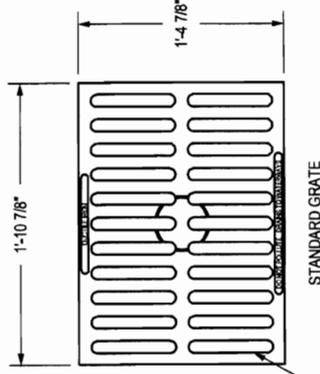
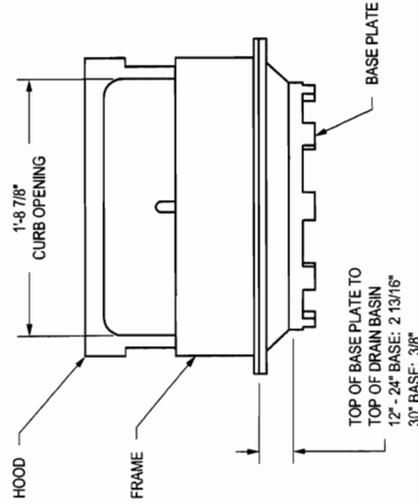
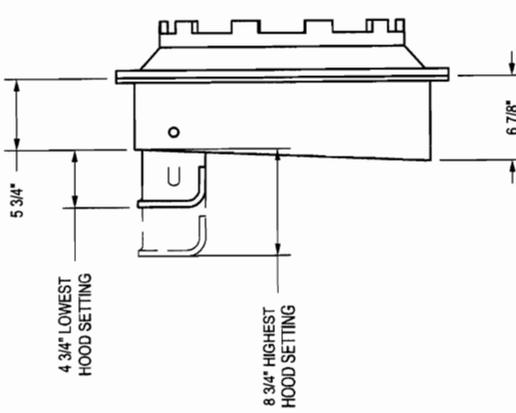
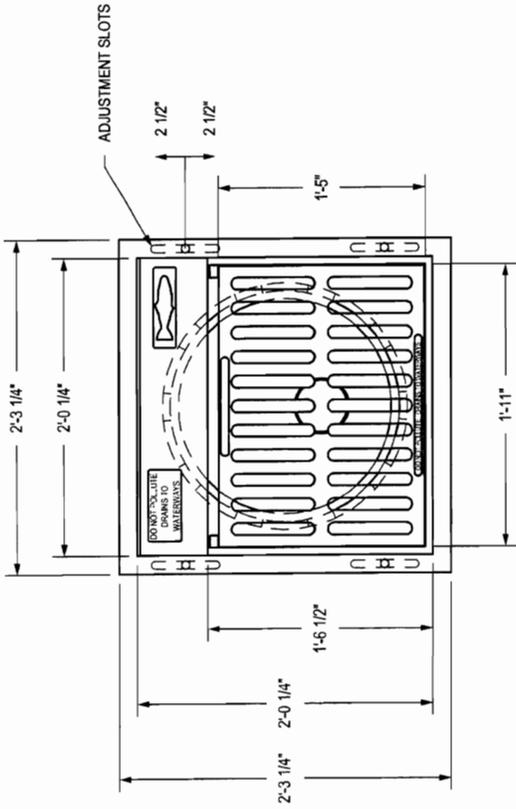


PLAN VIEW

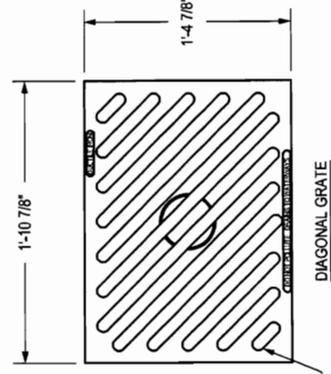


NOTES:

1. JOINT LOCATIONS AND STUB OUT MATERIALS SHALL BE SPECIFIED ON THE PLANS (CORRUGATED HIGH DENSITY POLYETHYLENE PIPE, PVC SDR-35, PVC SCH 40, PVC C-900, DIP). STUB OUT SHALL BE TWO FEET LONG FOR CONNECTION TO CMP AND RGRCP PIPE WITH A CONCRETE COLLAR PLACED PER MAG DETAIL 505 WITH A MAG 710.5 WATER STOP.
2. BACKFILL MATERIAL SHALL BE CRUSHED ROCK PER SECTION 701.2.1 PLACED UNIFORMLY IN MAXIMUM 8" LIFTS & COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY PER SECTION 601.4.10 OR 1/2 SACK CLSM PER SECTION 728.
3. FILL SUMP WITH CONCRETE TO INVERT CONCRETE SHALL BE A MINIMUM OF CLASS C PER SECTION 725.
4. FASTEN FRAME & BASE PLATE WITH (4) 5/8" ZINC PLATED BOLTS.

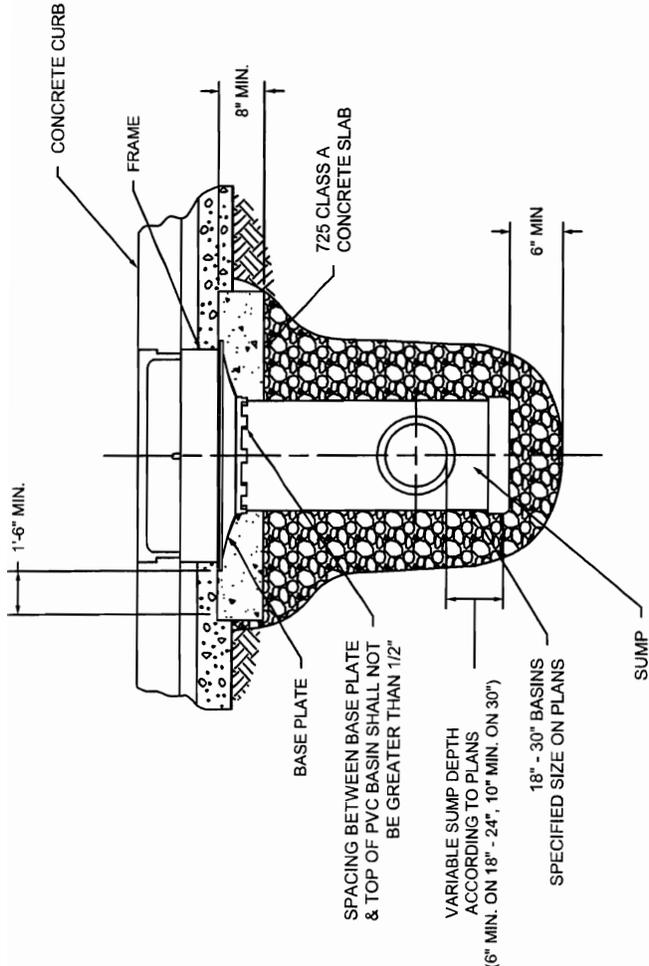
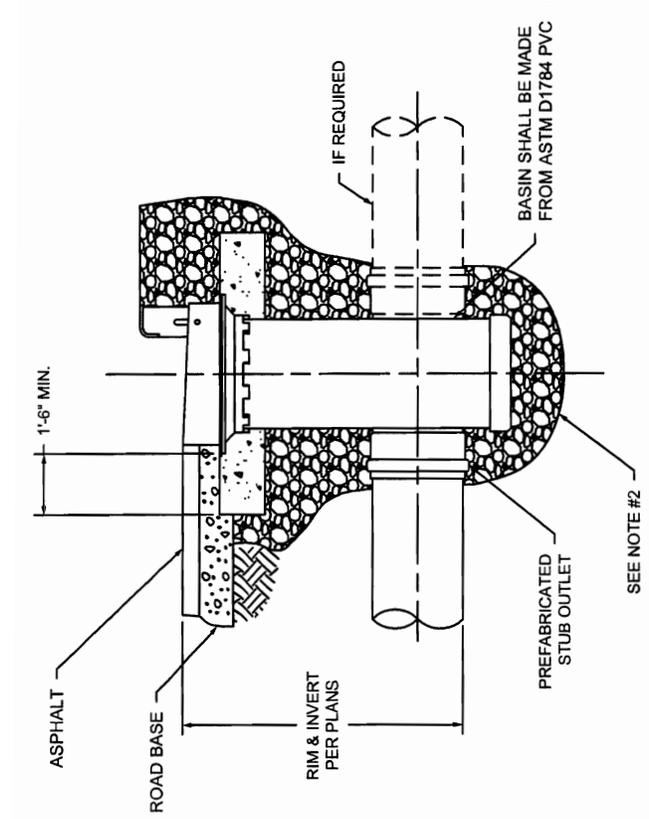


APPROX. DRAIN AREA OF STANDARD GRATE = 146.18 SQ IN.
 APPROX. DRAIN AREA OF STANDARD GRATE & HOOD
 LOWEST HOOD SETTING = 227.37 SQ IN
 LOWEST HOOD + 1" SETTING = 248.25 SQ IN
 LOWEST HOOD + 2" SETTING = 269.12 SQ IN
 LOWEST HOOD + 3" SETTING = 290.00 SQ IN
 HIGHEST HOOD SETTING = 310.87 SQ IN

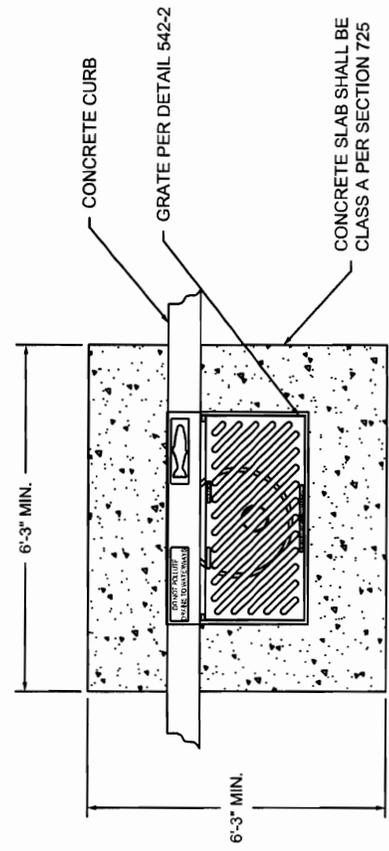


APPROX. DRAIN AREA OF DIAGONAL GRATE = 146.70 SQ IN.
 APPROX. DRAIN AREA OF DIAGONAL GRATE & HOOD
 LOWEST HOOD SETTING = 227.89 SQ IN
 LOWEST HOOD + 1" SETTING = 248.77 SQ IN
 LOWEST HOOD + 2" SETTING = 269.64 SQ IN
 LOWEST HOOD + 3" SETTING = 290.52 SQ IN
 HIGHEST HOOD SETTING = 311.39 SQ IN

- NOTES:
1. MATERIAL: DUCTILE IRON GRATE SHALL MEET H-20 LOAD.
 2. RATING & CONFORMING TO ASTM A536 GRADE 70-50-05.
 3. ALL CASTINGS ARE FURNISHED WITH BLACK PAINT.
 4. SLOPE OF GRATE SURFACE IS 5.2%.
 5. CURB INLET FRAME INSIDE VOLUME IS APPROX. 1.76 CU FT.
 6. FASTEN FRAME & BASE PLATE WITH (4) 5/8" ZINC PLATED BOLTS.

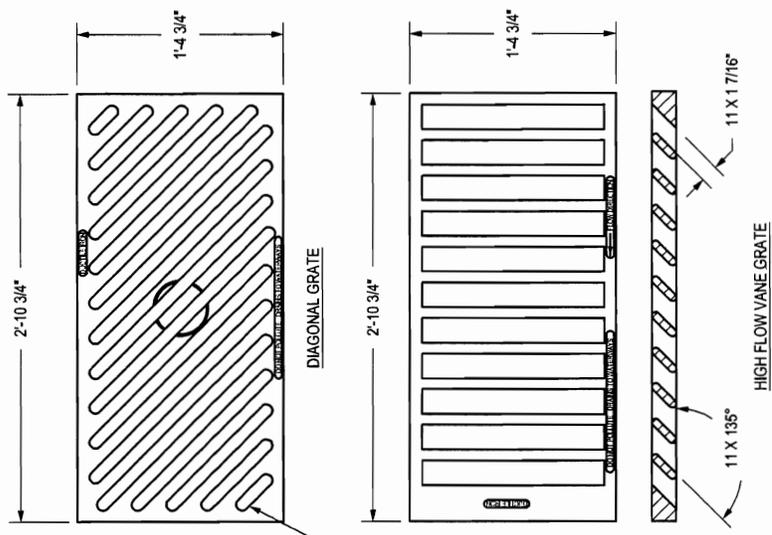
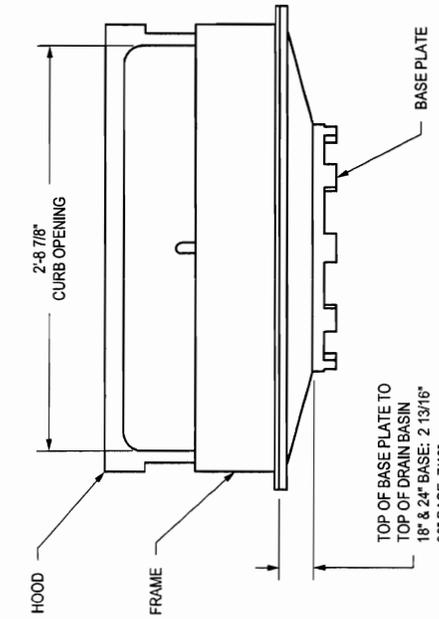
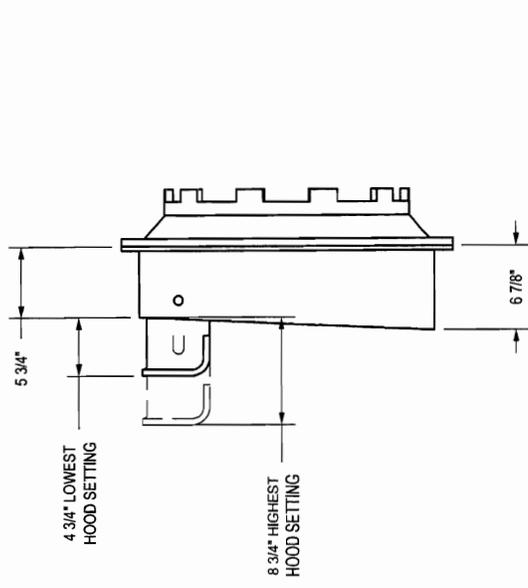
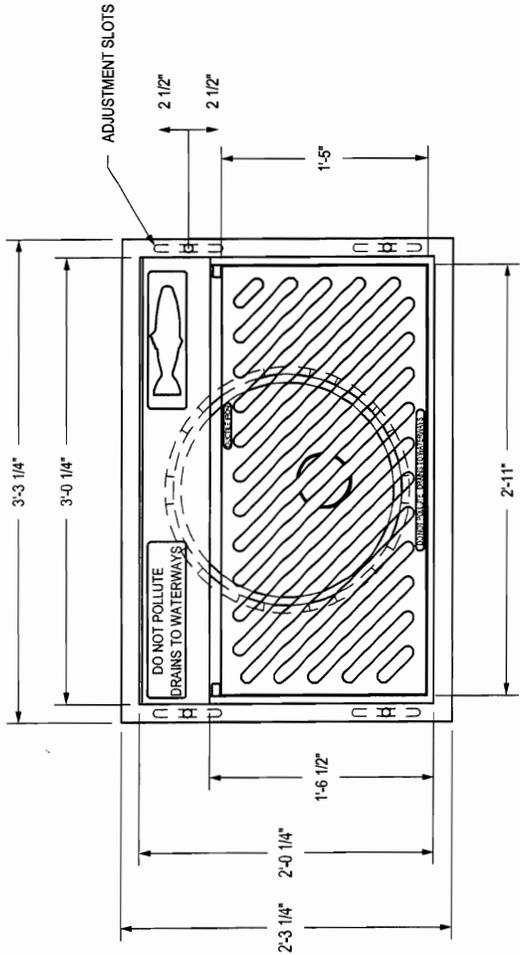


PLAN VIEW



- NOTES:**
1. JOINT LOCATIONS AND STUB OUT MATERIALS SHALL BE SPECIFIED ON THE PLANS (CORRUGATED HIGH DENSITY POLYETHYLENE PIPE, PVC SDR-35, PVC SCH 40, PVC C-900, DIP). STUB OUT SHALL BE TWO FEET LONG FOR CONNECTION TO CMP AND RGRCP PIPE WITH A CONCRETE COLLAR PLACED PER MAG DETAIL 505 WITH A MAG 710.5 WATER STOP.
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 3. FILL SUMP WITH CONCRETE TO INVERT CONCRETE SHALL BE A MINIMUM OF CLASS C PER SECTION 725.
 4. FASTEN FRAME & BASE PLATE WITH (4) 5/8" ZINC PLATED BOLTS.

DETAIL NO. 543-1	2' X 3' CURB INLET INSTALLATION DETAIL	REVISED	DETAIL NO. 543-1
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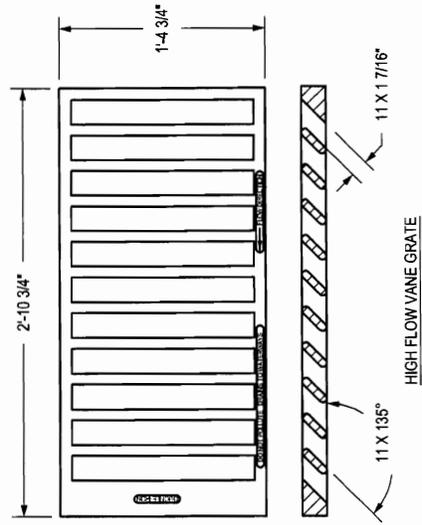
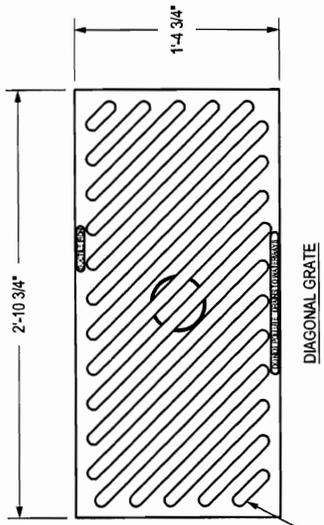
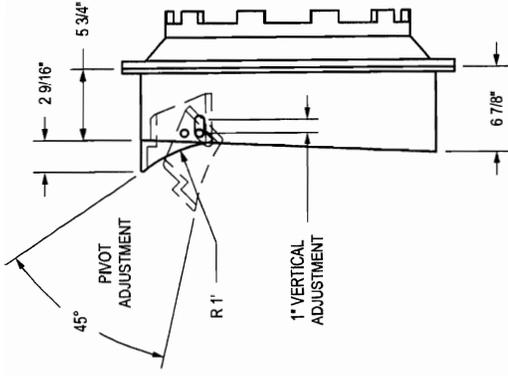
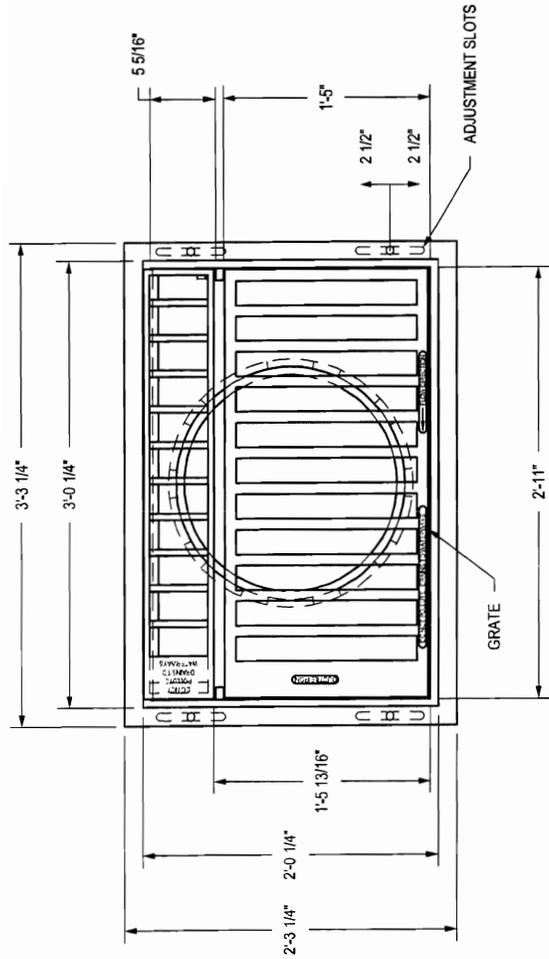


APPROX. DRAIN AREA OF DIAGONAL GRATE = 232.87 SQ IN.
 APPROX. DRAIN AREA OF DIAGONAL GRATE & HOOD
 LOWEST HOOD SETTING = 369.54 SQ IN
 LOWEST HOOD + 1" SETTING = 402.41 SQ IN
 LOWEST HOOD + 2" SETTING = 435.29 SQ IN
 LOWEST HOOD + 3" SETTING = 468.16 SQ IN
 HIGHEST HOOD SETTING = 501.044 SQ IN
 APPROX. WEIGHT OF GRATE = 112.5 LBS.
 APPROX. WEIGHT OF GRATE, FRAME & HOOD ASSEMBLY
 W/ 18" BASE = 477.5 LBS.
 W/ 24" BASE = 466.0 LBS..
 W/ 30" BASE = 436.5 LBS.

(16) 1" GRATE SLOTS

APPROX. DRAIN AREA OF DIAGONAL GRATE = 327.25 SQ IN.
 APPROX. DRAIN AREA OF DIAGONAL GRATE & HOOD
 LOWEST HOOD SETTING = 463.92 SQ IN
 LOWEST HOOD + 1" SETTING = 496.79 SQ IN
 LOWEST HOOD + 2" SETTING = 529.67 SQ IN
 LOWEST HOOD + 3" SETTING = 562.54 SQ IN
 HIGHEST HOOD SETTING = 595.42 SQ IN
 APPROX. WEIGHT OF GRATE = 123.0 LBS.
 APPROX. WEIGHT OF GRATE, FRAME & HOOD ASSEMBLY
 W/ 18" BASE = 488.0 LBS.
 W/ 24" BASE = 476.5 LBS..
 W/ 30" BASE = 447.0 LBS.

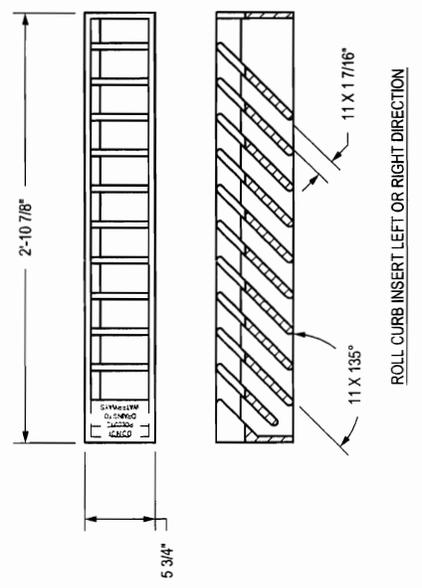
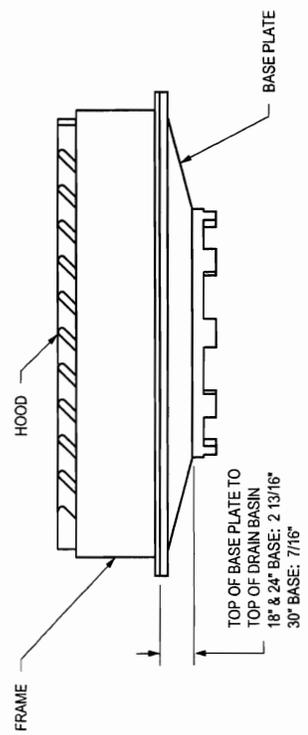
- NOTES:
1. MATERIAL: DUCTILE IRON GRATE SHALL MEET H-20 LOAD.
 2. RATING & CONFORMING TO ASTM A536 GRADE 70-50-05.
 3. ALL CASTINGS ARE FURNISHED WITH BLACK PAINT.
 4. SLOPE OF GRATE SURFACE IS 5.2%.
 5. CURB INLET FRAME INSIDE VOLUME IS APPROX. 2.73 CU FT.
 6. FASTEN FRAME & BASE PLATE WITH (4) 5/8" ZINC PLATED BOLTS.



APPROX. DRAIN AREA OF DIAGONAL GRATE = 232.87 SQ IN.
 APPROX. DRAIN AREA OF GRATE & HOOD = 307.14
 APPROX. WEIGHT OF GRATE = 112.5 LBS.
 APPROX. WEIGHT OF GRATE, FRAME & HOOD ASSEMBLY
 W/ 18\"/>

APPROX. DRAIN AREA OF GRATE = 327.25 SQ IN.
 APPROX. DRAIN AREA OF GRATE & HOOD = 401.52 SQ IN.
 APPROX. WEIGHT OF GRATE = 123.0 LBS.
 APPROX. WEIGHT OF GRATE, FRAME & HOOD ASSEMBLY
 W/ 18\"/>

- NOTES:
1. MATERIAL: DUCTILE IRON GRATE SHALL MEET H-20 LOAD.
 2. RATING & CONFORMING TO ASTM A536 GRADE 70-50-05.
 3. ALL CASTINGS ARE FURNISHED WITH BLACK PAINT.
 4. SLOPE OF GRATE SURFACE IS 5.2%.
 5. CURB INLET FRAME INSIDE VOLUME IS APPROX. 2.73 CU FT.
 6. FASTEN FRAME & BASE PLATE WITH (4) 5/8\"/>





MARICOPA COUNTY
Department of Transportation

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.



MARICOPA COUNTY
Department of Transportation

CASE 08-02

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.



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: January 2, 2008

To: MAG Specifications and Details Committee

From: Robert Herz, MCDOT Representative

Subject: 325 Asphalt - Rubber Concrete Overlay, Gap Graded

Case 08- 03

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 325 Asphalt-Rubber Concrete Overlay, Gap Graded.

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 shall be 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>Overlay Thickness</u> <u>Sieve Size</u>	<u>1" & 1-1/2"</u> <u>Percent Passing</u>	<u>2"</u> <u>Percent Passing</u>
25 mm (1")	100	100
19 mm (3/4")	100	97-100
12.5 mm (1/2")	100	78-92
9.5 mm (3/8")	78-92	61-75
4.745 mm (#4)	28-42	30-40
2.36 mm (#8)	15-25	15-25
600 µm (#30)	5-15	5-15
75 µm (#200)	3-7	2-6
*Type II portland cement Or	1.5%	
*Hydrated Lime	1.0%	

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

The aggregate shall conform to the requirements of MAG 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 Thickness	Asphalt Rubber Binder	
	High Traffic	Low Traffic
1" and 1-1/2"	8.0% to 8.4%	8.4% to 8.8%
2"	7.1% to 7.4%	N/A

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, valves, 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 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.

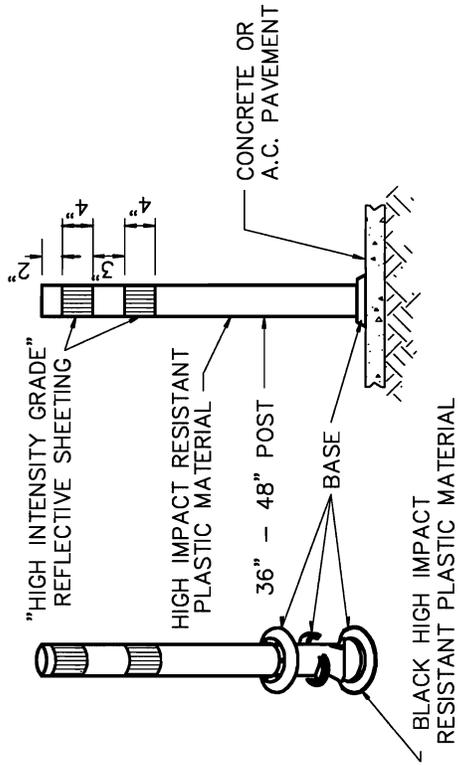
325.6 PAYMENT:

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

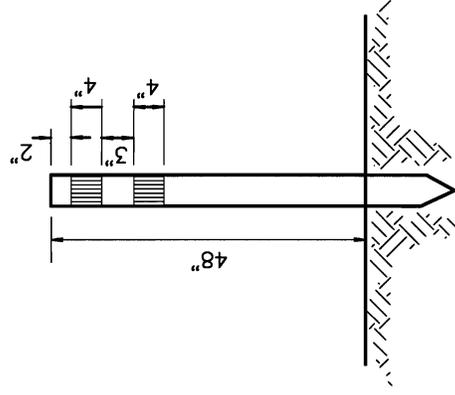
Payment for Tack Coat will be as specified in Section 321.

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.



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**



REVISED

DETAIL NO.

141

HAZARD MARKER



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: March 5, 2008

To: MAG Specifications and Details Committee

From: Robert Herz, MCDOT Representative

Subject: Revisions to Detail 250 DRIVEWAY ENTRANCES

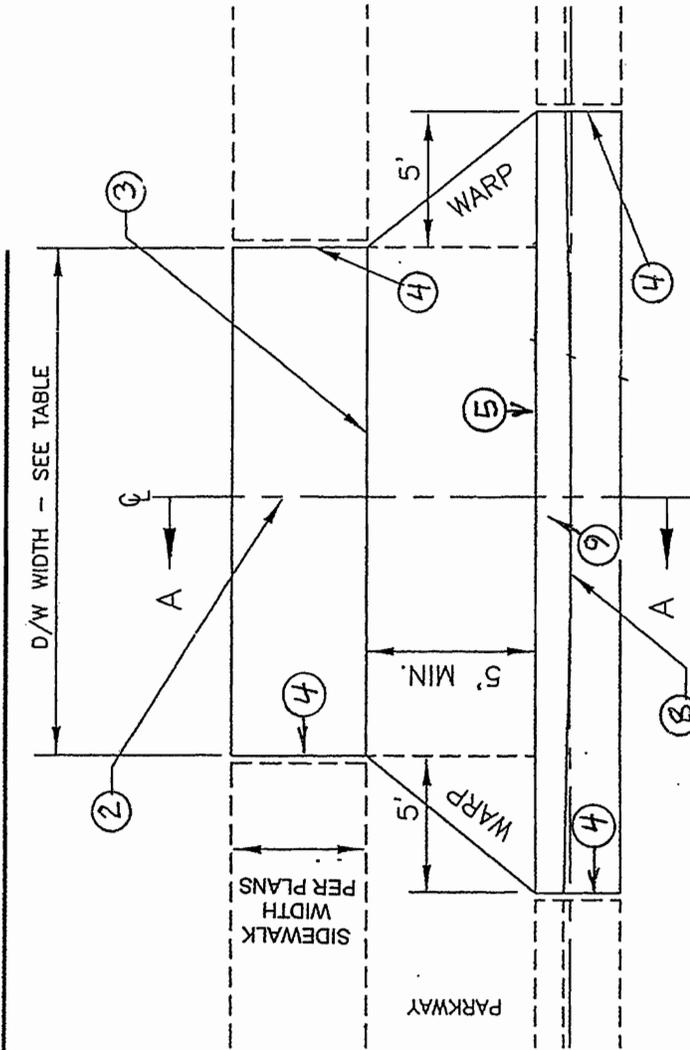
Case 08- 11

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

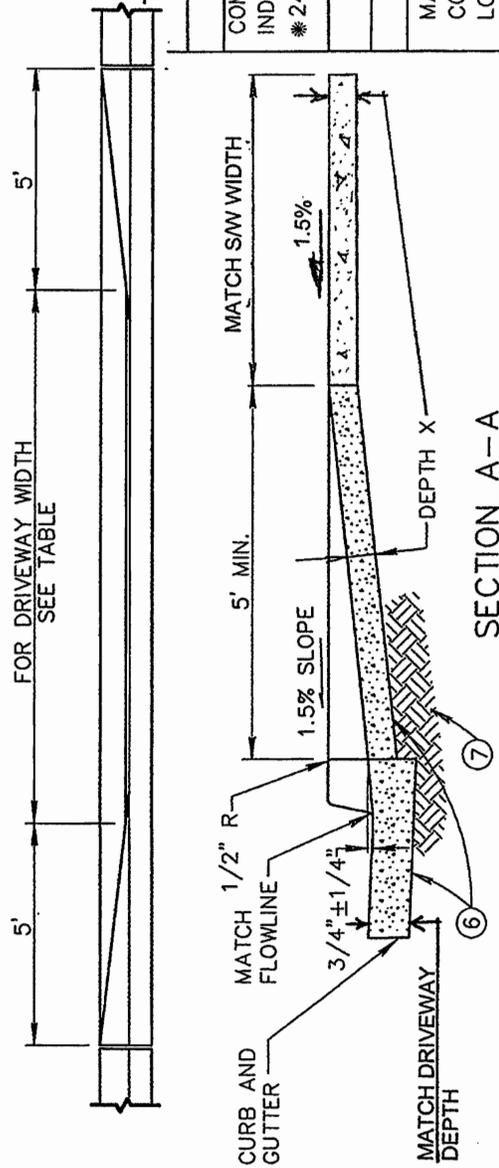
REVISION: Create separate installation details for driveways when the sidewalk is detached or attached to the back of curb.

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 A CONTRACTION JOINT ON D/W CENTERLINE.
3. CONTRACTION JOINT.
4. 1/2-INCH EXPANSION JOINT SHALL COMPLY WITH SECTION 340.
5. BACK OF CURB - CONSTRUCTION JOINT.
6. CLASS 'B' CONCRETE, SECT. 725.
7. SUBGRADE PREPARATION, SECT. 301.
8. FLOW LINE OF GUTTER.
9. DEPRESSED CURB.
10. SECTION A-A AND ELEVATION, D/W SHOWN WITH VERTICAL CURB AND GUTTER, ROLL TYPE CURB AND GUTTER TREATED SIMILARLY.



DRIVEWAY WITH DETACHED SIDEWALK



COMMERCIAL AND INDUSTRIAL

DRIVEWAY WIDTH	MIN.	MAX.	CLASS	DEPTH X
COMMERCIAL	* 16'	40'	B	8"
INDUSTRIAL	* 16'	40'	B	8"
* 24' MIN. FOR TWO WAY TRAFFIC				

RESIDENTIAL

DRIVEWAY WIDTH	MIN.	MAX.	CLASS	DEPTH X
MAJOR STREET	16'	30'	B	6"
COLLECTOR STREET	* 12'	30'	B	6"
LOCAL STREET	12'	30'	B	6"
*16' DESIRABLE				

DETAIL NO. **250**

STANDARD DETAIL
ENGLISH

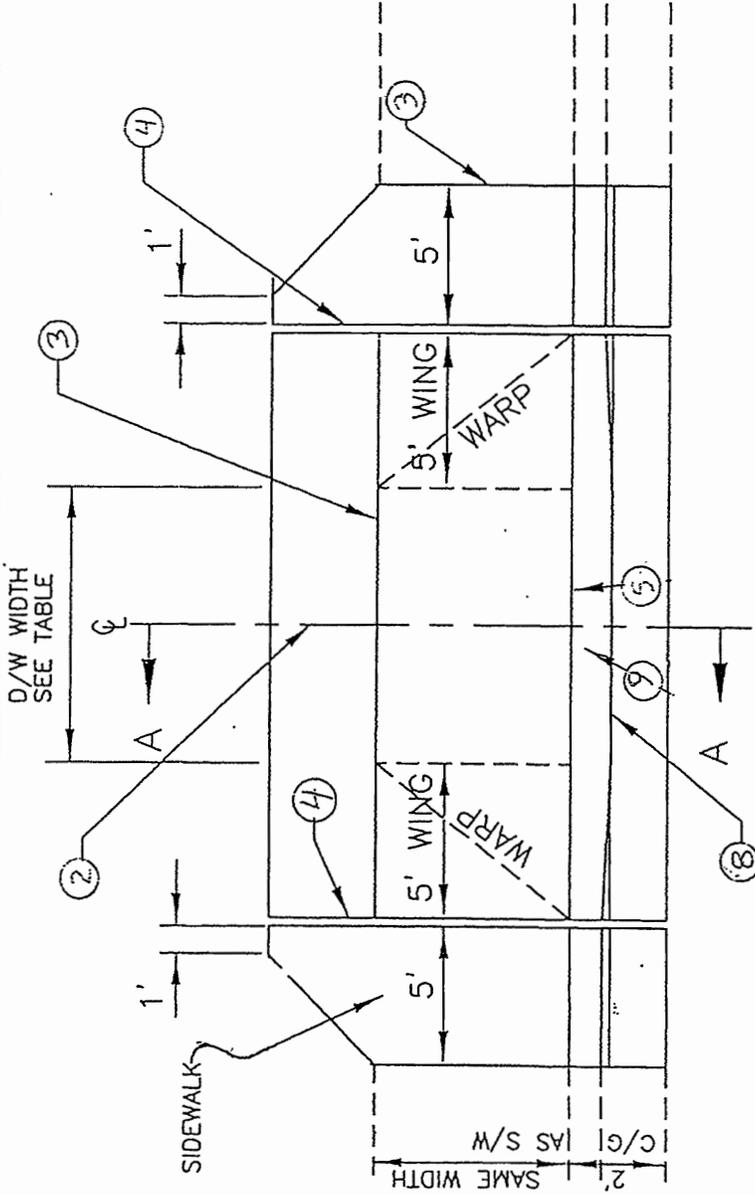
DRIVEWAY ENTRANCES

REVISED 01-01-2008
DETAIL NO. **250-1**

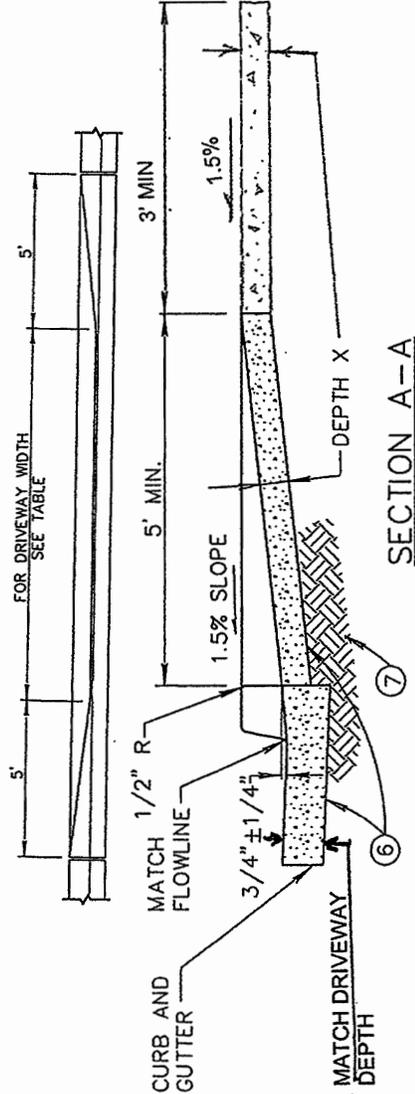


NOTES:

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 A CONTRACTION JOINT ON D/W CENTERLINE.
3. CONTRACTION JOINT.
4. 1/2-INCH EXPANSION JOINT SHALL COMPLY WITH SECTION 340.
5. BACK OF CURB - CONSTRUCTION JOINT.
6. CLASS 'B' CONCRETE, SECT. 725.
7. SUBGRADE PREPARATION, SECT. 301.
8. FLOW LINE OF GUTTER.
9. DEPRESSED CURB.
10. SECTION A - A AND ELEVATION, D/W SHOWN WITH VERTICAL CURB AND GUTTER, ROLL TYPE CURB AND GUTTER TREATED SIMILARLY.



DRIVEWAY WITH SIDEWALK ATTACHED TO CURB



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

DETAIL NO. 250	STANDARD DETAIL ENGLISH	DRIVEWAY ENTRANCES	REVISIONS 01-01-2008	DETAIL NO. 250-2
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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 intersections shall be constructed to the dimensions indicated on the plans and standard detail drawings. Joints shall be designated as expansion joints or contraction joints and shall be constructed as per Subsection 340.3.

340.2 MATERIALS:

Concrete shall be class B, conforming to the applicable requirements of Section 725.

Expansion joints filler shall comply with Section 729.

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 warning 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.



June 4, 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 ~~responsible for the surface improvements, i.e., concrete and/or asphalt paving,~~ shall also be responsible for the careful identification and location of all utility devices requiring future adjustment within the new pavement section, including manholes, water valves, sewer clean-outs, vaults, etc. These devices shall be referenced by the appropriate use of *an appropriate method, such as* swing ties and GPS datum.



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

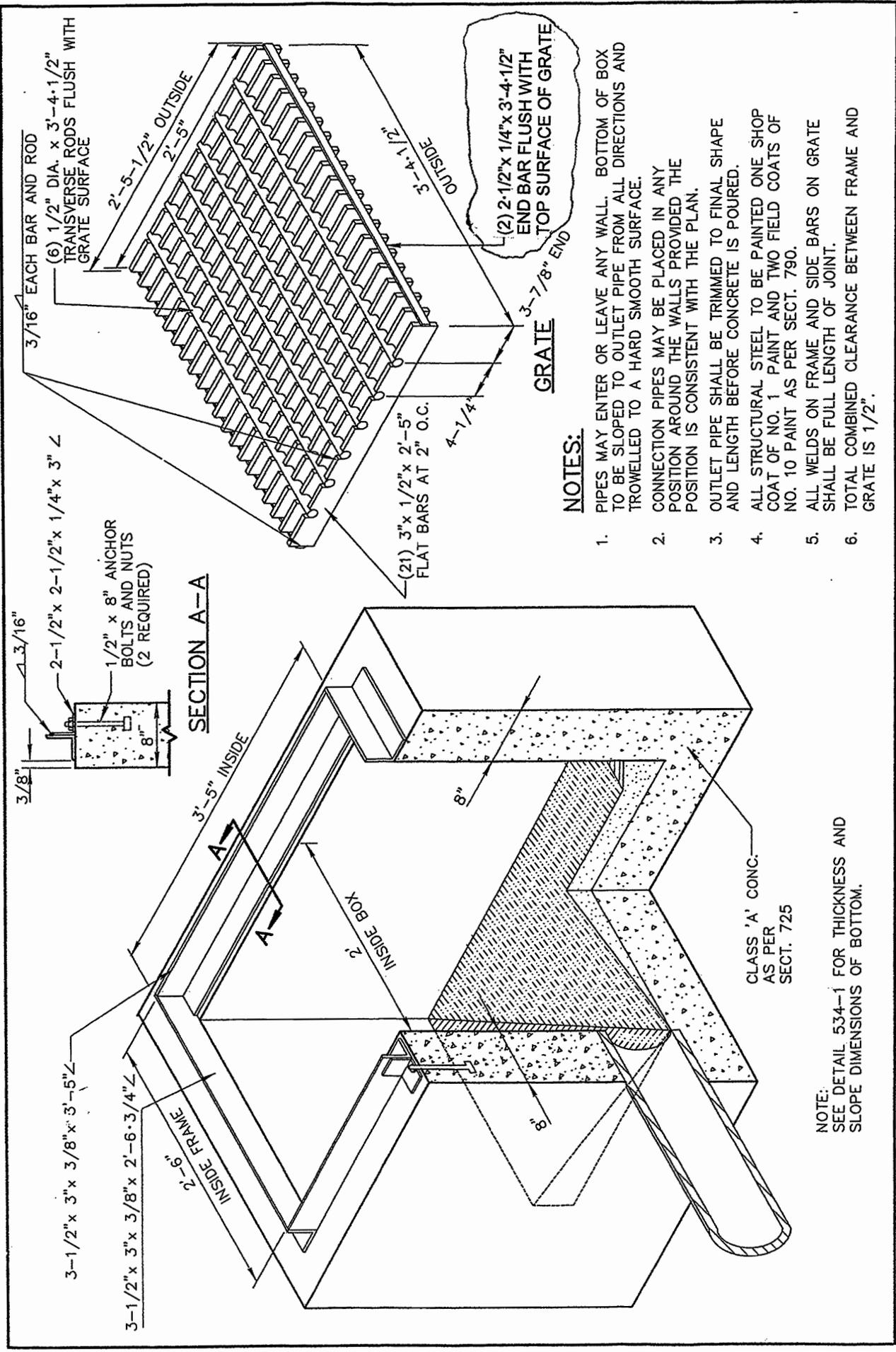
Date: June 4, 2008
To: MAG Specifications and Details Committee
From: Robert Herz, MCDOT Representative
Subject: Detail 535 CATCH BASIN TYPE 'F'

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



NOTES:

1. PIPES MAY ENTER OR LEAVE ANY WALL. BOTTOM OF BOX TO BE SLOPED TO OUTLET PIPE FROM ALL DIRECTIONS AND TROWELLED TO A HARD SMOOTH SURFACE.
2. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.
3. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS POURED.
4. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECT. 790.
5. ALL WELDS ON FRAME AND SIDE BARS ON GRATE SHALL BE FULL LENGTH OF JOINT.
6. TOTAL COMBINED CLEARANCE BETWEEN FRAME AND GRATE IS 1/2".

DETAIL NO. 535	CATCH BASIN TYPE 'F' (FOR USE WITHOUT CURB)	REVISION 01-01-2008	DETAIL NO. 535
STANDARD DETAIL ENGLISH		MARIICOPA ASSOCIATION of GOVERNMENTS	
CASE 08-15			



MARICOPA COUNTY
Department of Transportation

CASE 08-16

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

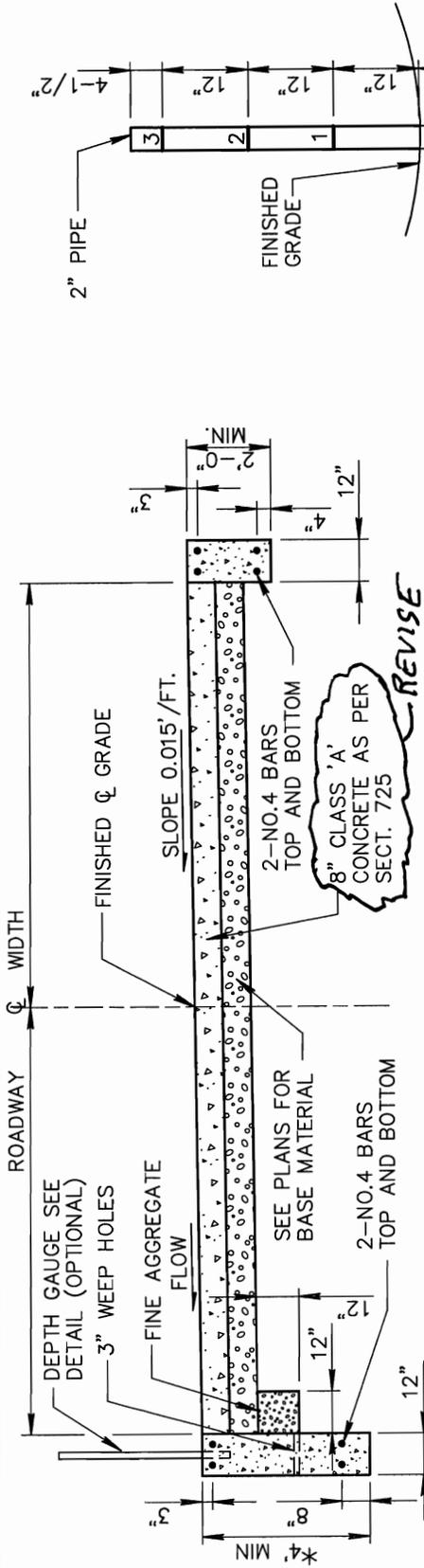
Case 08-16

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:

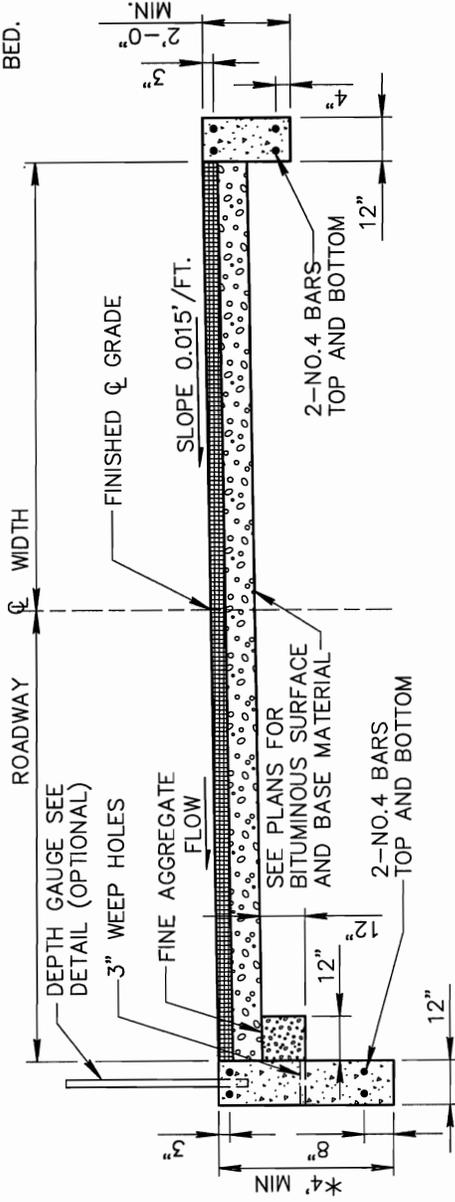
8" CLASS 'A' CONCRETE PER SECTIONS 505 AND 725,
SECTION 324 DOES NOT APPLY

Deleted: AS
Deleted: .



CONCRETE SURFACE FORD CONCRETE WALLS

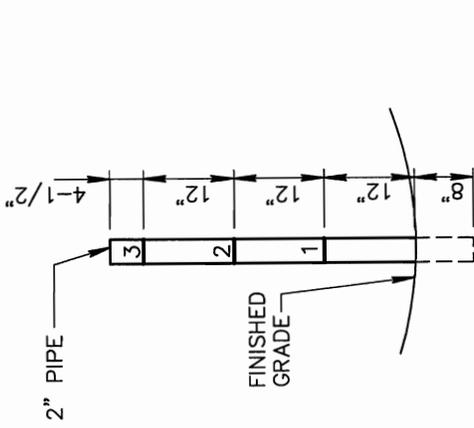
*MIN. DISTANCE BELOW STREAM BED.



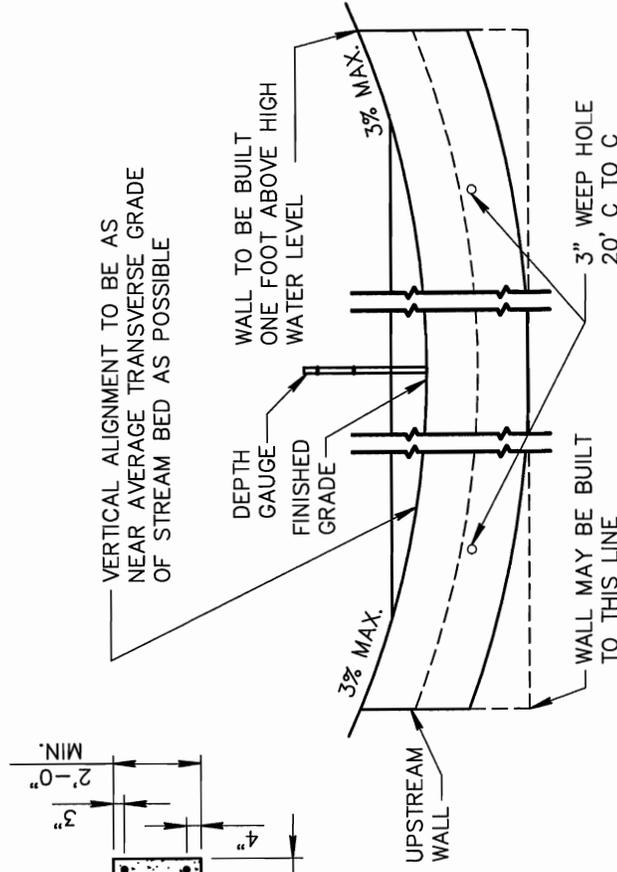
BITUMINOUS SURFACE FORD CONCRETE WALLS

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

DETAIL NO. 552



STANDARD DETAIL
ENGLISH
CONCRETE CUT-OFF WALLS

REVISED
2009

DETAIL NO. 552

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

To: MAG Specifications and Details Committee

From: Robert Herz, MCDOT Representative

Subject: Detail 210 RESIDENTIAL SPEED HUMP

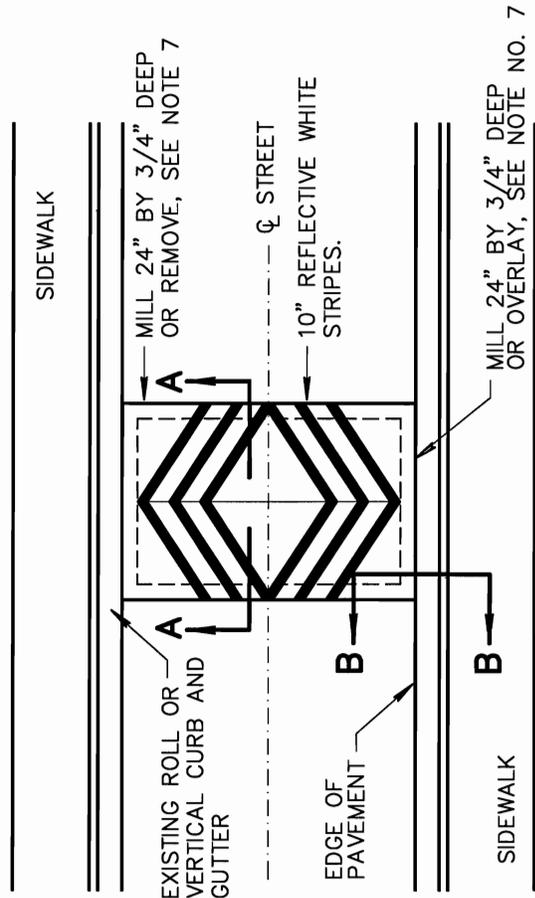
Case 08- 17

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".

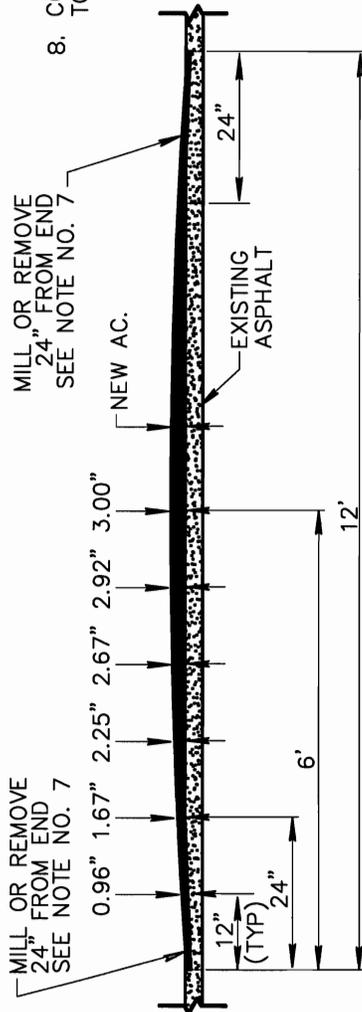
REVISION: Delete the note located under Section A-A

NOTES:

1. HUMPS MUST BE THE FULL 3" FOR MAXIMUM EFFECT BUT SHALL NOT EXCEED 3.25".
2. HUMPS CONSTRUCTED OVER 3.25" SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.
3. CROSS-SECTION ELEVATIONS SHALL HAVE A MAXIMUM TOLERANCE OF +0.25".
4. SPEED HUMPS SHALL NOT BE PLACED OVER MANHOLES, WATER VALVES, SURVEY MONUMENTS, JUNCTION CHAMBERS, ETC. OR IN CONFLICT WITH DRIVEWAYS.
5. SPEED HUMPS MUST BE PLACED AT LOCATIONS APPROVED BY THE AGENCY.
6. 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:
 - A. 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.
 - B. ALTERNATIVE INSTALLATION: FOR TRANSVERSE JOINTS (CROSS ROADWAY), THE EXISTING ASPHALT SHALL BE SAW CUT AND REMOVED FOR A WIDTH OF 18". 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.
8. CONTACT THE AGENCY (OR INSPECTOR) ONE WEEK PRIOR TO INSTALLATION TO COORDINATE PAVEMENT MARKINGS AND SIGNING.

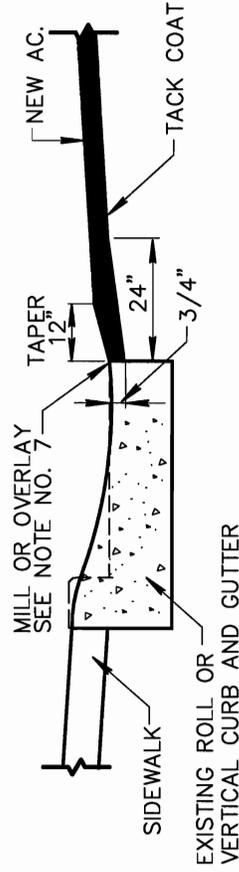


PLAN VIEW



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.	STANDARD DETAIL	REVISED	DETAIL NO.
210	ENGLISH	01-01-2006	210
RESIDENTIAL SPEED HUMP			

