

August 26, 2009

Members of the MAG Specifications and Details Committee

Robert Herz, Maricopa County DOT, Chairman

SUBJECT: MEETING NOTIFICATION AND TRANSMITTAL OF AGENDA

Wednesday, September 2, 2009 at 1:30 p.m.  
MAG Office, Second Floor, Cholla Room  
302 North First Avenue, Phoenix

A meeting of the MAG Specifications and Details Committee has been scheduled for the time and place noted above. Members of the MAG Specifications and Details Committee may attend the meeting either in person, by videoconference or by telephone conference call. If you have any questions regarding the meeting, please contact Committee Chair Robert Herz at 602-506-4760 or Gordon Tyus, MAG staff at 602-254-6300.

Please park in the garage under the building, bring your ticket, parking will be validated. For those using transit, Valley Metro/RPTA will provide transit tickets for your trip. For those using bicycles, please lock your bicycle in the bike rack in the garage.

In 1996, the Regional Council approved a simple majority quorum for all MAG advisory committees. If the MAG Specifications and Details Committee does not meet the quorum requirement, no action can be taken. Your attendance at the meeting is strongly encouraged.

Pursuant to Title II of the Americans with Disabilities Act (ADA), MAG does not discriminate on the basis of disability in admissions to or participation in its public meetings. Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contacting Gordon Tyus at the MAG office. Requests should be made as early as possible to allow time to arrange the accommodation.

It is requested (not required) that written comments on active cases be prepared in advance for distribution at the meeting.

AGENDA

<u>ITEM</u>	<u>COMMITTEE ACTION REQUESTED</u>
1. <u>Call to Order</u>	1. No action required.
2. <u>Approval of August 5, 2009 Meeting Minutes</u>	2. Corrections and approval of August 5, 2009 minutes.
3. <u>New Technical Committee Policies</u>	3. Discussion of the new Technical Committee Policies approved by the MAG Regional Council
4. <u>2008 &amp; 2009 Cases</u>	4. Review of pending cases and voting on cases as previously requested.
5. <u>General Discussion</u>	5. Open general discussion.
6. <u>Adjournment</u>	6. No action required.

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

August 5, 2009

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

AGENCY MEMBERS

- |  |   |
|--|---|
| * Jim Badowich, Avondale<br>Scott Zipprich, Buckeye<br>Warren White, Chandler<br>Dennis Teller, El Mirage<br>Edgar Medina, Gilbert | * Gordon Haws, Mesa<br>Jesse Gonzalez, Peoria<br>Jeff Van Skike, Phoenix (St. Trans.)<br>Jami Erickson, Phoenix (Water) |
| * Tom Kaczmarowski, Glendale<br>Troy Tobiasson, Goodyear<br>Bob Herz, MCDOT, Chairman  | * Mark Palichuk, Queen Creek<br>Rodney Ramos, Scottsdale<br>Nick Mascia, Surprise<br>Tom Wilhite, Tempe                 |

ADVISORY MEMBERS

- |   |  |
|---|--|
| John Ashley, ACA<br>Jeff Benedict, AGC  | Mike Smith, ARPA<br>Paul R. Nebeker, Independent |
| * Brian Gallimore, AGC<br>Peter Kandararis, SRP, Vice Chairman<br>Jeff Hearne, ARPA | * William Ast, NUCA<br>* Bill Davis, NUCA        |

MAG ADMINISTRATIVE STAFF

Gordon Tyus

- \* Members not attending or represented by proxy.

GUESTS/VISITORS

Chuck Christiansen, MCDOT  
Doug Berg, Contech Construction Products  
Mark Wible, ARPA/ASU-CIM  
N. Vescia, Stronggo

1. Call to Order

Chairman, Bob Herz, called the meeting to order at 1:35 p.m.

2. Approval of Minutes

The members reviewed the July 1, 2009 meeting minutes. Troy Tobiasson 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. 2008 Cases (old cases)

a. **Case 08-10 – Modification to Trench Backfill and Pavement Replacement, Detail 200:** Revisions to reduce numerous agency trench backfill and pavement replacement supplemental details by combining the most common practices. Peter Kandarlis handed out a revision to Detail 200 that presented a more simplified version which incorporates new concepts in various agency supplements, provides more options within details to meet various agency needs and provides more room for and clarity of existing detail information. Members recommended simplifying the asphalt concrete section shown and changing the symbol noting concrete material. Peter will provide a revision prior to the next meeting. Since the changes suggested are minor, members are requested to be prepared to vote on this case at the next meeting.

4. 2009 Cases (new cases)

a. **Case 09-02 – Modifying Acceptable Vacuum Relief Valve Vendors, Section 630.6:** Include language for approved vendor lists with vacuum relief. Jami Erickson handed out a revision to the section that incorporates all changes previously recommended by the committee. There was no other discussion on this case. Members are requested to be prepared to vote on this case at the next meeting.

b. **Case 09-03 – New Geosynthetic Materials Specification, Section 796:** Create a geosynthetic material specification, Section 796. Bob Herz provided members a revised version with comments from MCDOT. Members discussed the suggested revisions and recommended additional language for the general description work scope in subsection 796.1. Peter Kandarlis will provide a revision based on this discussion prior to the next meeting. Since the changes suggested are minor, members are requested to be prepared to vote on this case at the next meeting.

c. **Case 09-04 –AC Overlay Interlayer Fabric Requirements, Section 321:** Modify Section 321 to include interlayer fabric for asphalt concrete. Peter Kandarlis recommended that either minimum asphalt concrete temperature limits for overlay work be inserted in this subsection, or that a new table be added to Section 321 that specifies minimum temperature requirements for all asphalt concrete placement. Examples were provided for both options. The committee requested that the option of a table for all placement lifts be inserted in the section (excluding maximum rolling time). Peter will provide a revision prior to the next meeting. Since the changes suggested are minor, members are requested to be prepared to vote on this case at the next meeting.

d. **Case 09-05 – Modify Riprap Construction to Include Filter Fabric, Sections 220 and 703:** Modify Sections 220 and 703 to incorporate Maricopa County Supplemental Specification Section 224 for filter fabric. Peter Kandaris handed out a revision that included language to exclude the use of geotextile fabric below grouted riprap. There was no discussion on this case. Members are requested to be prepared to vote on this case at the next meeting.

e. **Case 09-06 – New Geogrid Fabric Specification, Section 306:** Create a new geogrid application Section 306. Peter Kandaris handed out a revision that included all comments received to date. Bob Herz noted that MCDOT would be providing more comments within the next week. Members discussed the proposed use of geogrid fabrics and provided recommendations on language changes specifying geogrid use. Peter will provide a revision prior to the next meeting. Depending upon the extent of MCDOT's comments, members are requested to be prepared to vote on this case at the next meeting.

f. **Case 09-07 – Revisions to Concrete Materials Specification, Section 725 and 701:** Revisions to Section 725 and portions of Section 701 to make specifications current with modern concrete manufacture, materials and quality control practices. Troy Tobiasson and Jeff Hearne provided a case revision that incorporated most of the changes recommended by MCDOT staff in their written comments. Discussion included revision the language for job mix concrete in inserting language to insure that the contractor is responsible for core repairs, but that the repair must be approved by the agency. Members agreed that the working group should meet with MCDOT staff to resolve all remaining comments. Depending upon the results of this meeting and the scope of subsequent changes, members are requested to be prepared to vote on this case at the next meeting.

g. **Case 09-08 – Modification to Valley Gutter, Detail 240:** Modifications to Detail 240 to increase valley gutter thickness to match adjoining commercial and industrial driveways concrete driveway thickness (as noted in Detail 250). Bob Herz handed out a revised detail that incorporated all changes previously recommended by the committee. There was no other discussion on this case. Members are requested to be prepared to vote on this case at the next meeting.

h. **Case 09-09 – Modification to Dust Palliative, Section 792:** Modifications to Section 792 to update dust palliative product, compliance and environmental requirements. Peter Kandaris provided a revision that included comments received by a palliative vendor, Enssolutions. Changes included separating tall oil pitch from the generic category of organic resins and providing the material's properties. Members reviewed the changes, provided some language changes and requested that Peter check the background on EcoLogo certification. Peter will provide a revision prior to the next meeting. Since the changes suggested are minor, members are requested to be prepared to vote on this case at the next meeting.

i. **Case 09-10 – Modification of Section 321 to include Section 322:** Section 322 as a new subsection to Section 321. Peter Kandaris moved to vote on the case as shown in the

revision dated 7/29/09. Dennis Teller seconded the motion. A vote of 10 yes, 0 no, 0 abstention and 5 not present was recorded.

j. **Case 09-11 – Modification to Dust Palliative Application, Section 230:** Modifications to Section 230 to provide improved field control of palliative application to insure bid conformance. Peter Kandaris provided a revision that included all comments previously received. Discussion included changing “Agency” references to “Engineer” and linking traffic area warranty to PM10 vehicle volume limits. Mike Smith noted that he would find out if local laboratories are accredited to perform ASTM testing noted in Section 230.2.1. Peter will provide a revision prior to the next meeting. Since the changes suggested are minor, members are requested to be prepared to vote on this case at the next meeting.

k. **Case 09-12 – Miscellaneous Corrections:** Case 09-12A: Correct the table referenced in last paragraph of Section 321.10.4 from Table 321-2 to Table 321-6. Case 09-12B: Correct the gradation table in Section 325.2.1 (percent passing range on the No. 30 sieve should be from 5 to 15 percent, not 15 to 24 percent). Case 09-12C: Change values in Table 715-1 (slurry seal) to those shown in the 2005 MAG version (material property ranges have been replaced by a series of meaningless numbers). The committee had no discussion on this item. Members are requested to be prepared to vote on this case at the next meeting.

l. **Case 09-13 – ADA-Compliant Dual Sidewalk Ramps:** ADA-compliant details for 35-foot and 20-foot corner radius dual sidewalk ramps. Tom Wilhite provided City of Tempe supplemental details that are used for this purpose. The committee had no other discussion on this item. Members are requested to continue reviewing the new details and return with comments for the next meeting.

m. **Case 09-14 – ADA-Compliant Single Sidewalk Ramps:** Revising Details 231, 232, 233 and 234 to obtain compliance with ADA requirements. The committee had no discussion on this item. Members are requested to continue reviewing the proposed changes and return with comments for the next meeting.

n. **Case 09-15 – Revisions to Section 610.4 for Water Line Handling:** Modify Section 610.4 to clarify water line pipe protection measures at the job site prior to placement (during storage or staging) to help prevent contamination. Tom Wilhite summarized the intent of the case. Discussion included end protection needs during various construction phases and decontamination of water pipes. Members are requested to continue reviewing the proposed changes and return with comments for the next meeting.

5. General Discussion:  
None

6. Adjournment:  
The meeting was adjourned at 3:55 p.m.

## 2009 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

(Updated information can be found on the website: <http://www.mag.maricopa.gov/detail.cms?item=9688> )

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
08-10	<a href="#">Case 08-10</a> : Revisions to Detail 200 and Sections 336 and 601 – Trench Backfill and Pavement	SRP	Peter Kandariz	02/06/2008 08/05/2009	Proposed Vote 09/02/2009	0 0 0	Yes No Abstain
09-01	<a href="#">Case 09-01</a> : Modification to Section 340.2.1 – Detectable Warnings	MCDOT	Bob Herz	01/07/2009 02/04/2009	Approved 06/03/2009	10 0 0	Yes No Abstain
09-02	<a href="#">Case 09-02</a> : Revisions to Section 630.6 – Air Release and Vacuum Valves	Phoenix	Jami Erickson	02/04/2009 08/05/2009	Proposed Vote 09/02/2009	0 0 0	Yes No Abstain
09-03	<a href="#">Case 09-03</a> : New Section 796 – GEOSYTHETICS	SRP	Peter Kandariz	02/04/2009 07/29/2009	Proposed Vote 09/02/2009	0 0 0	Yes No Abstain
09-04	<a href="#">Case 09-04</a> : Modification to Section 321 – Add Pavement Fabric Interlayer for AC Overlay	SRP	Peter Kandariz	02/04/2009 06/03/2009	Proposed Vote 09/02/2009	0 0 0	Yes No Abstain
09-05	<a href="#">Case 09-05</a> : Revisions to Sections 220 and 703 – Riprap Construction	SRP	Peter Kandariz	02/04/2009 08/04/2009	Proposed Vote 09/02/2009	0 0 0	Yes No Abstain
09-06	<a href="#">Case 09-06</a> : New Section 306 – MECHANICALLY STABILIZED SUBGRADE - GEOGRIDS	SRP	Peter Kandariz	02/04/2009 07/29/2009	Proposed Vote 09/02/2009	0 0 0	Yes No Abstain
09-07	<a href="#">Case 09-07</a> : Revisions to Sections 725 and 701 – Portland Cement Concrete	Goodyear	Troy Tobaisson	03/04/2009 08/25/2009		0 0 0	Yes No Abstain
09-08	<a href="#">Case 09-08</a> : Modification to Detail 240 – Valley Gutter	MCDOT	Bob Herz	03/04/2009 08/05/2009	Proposed Vote 09/02/2009	0 0 0	Yes No Abstain
09-09	<a href="#">Case 09-09</a> : Revisions Section 792 – Dust Palliative	SRP	Peter Kandariz	03/04/2009 08/04/2009	Proposed Vote 09/02/2009	0 0 0	Yes No Abstain

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

## 2009 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

(Updated information can be found on the website: <http://www.mag.maricopa.gov/detail.cms?item=9688> )

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
09-10	<a href="#">Case 09-10</a> : Incorporate Section 322 - Asphalt Concrete Overlay into Section 321 and delete Section 322	SRP	Peter Kandarlis	05/06/2009 07/29/2009	Approved 08/05/2009	10 0 0	Yes No Abstain
09-11	<a href="#">Case 09-11</a> : Modify Section 230 - Dust Palliative Application	SRP	Peter Kandarlis	05/06/2009 07/01/2009	Proposed Vote 09/02/2009	0 0 0	Yes No Abstain
09-12	<a href="#">Case 09-12</a> : Miscellaneous Bloopers A- Correct reference to Table 321-6 in section 321.10.4. B- Correct percent passing #30 sieve in section 325.2.1 C- Correct values in Table 715-1	MCDOT MCDOT ARPA	Bob Herz Bob Herz Jeff Hearne	06/03/2009 07/01/2009 07/01/2009	Proposed Vote 09/02/2009	0 0 0	Yes No Abstain
09-13	<a href="#">Case 09-13</a> : Dual Ramp Curb Ramp Details	Peoria	Jesse Gonzales	07/01/2009		0 0 0	Yes No Abstain
09-14	<a href="#">Case 09-14</a> : Revise Ramps for ADA Compliance, Details 231, 232, 233 and 234	MCDOT	Bob Herz	07/01/2009		0 0 0	Yes No Abstain
09-15	<a href="#">Case 09-15</a> : Revisions to Section 610.4: Pipe Protection	Tempe	Tom Wilhite	07/01/2009		0 0 0	Yes No Abstain

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

# **MAG COMMITTEE OPERATING POLICIES AND PROCEDURES**



## CHAPTER V: OTHER TECHNICAL & POLICY COMMITTEES

<b>5.01 - Responsibilities:</b>	As approved by the Regional Council or Management Committee.
<b>5.02 - Composition:</b>	Members are professionals usually from city, town, and county staffs, as well as local, state, and federal agencies, tribal organizations and, in some cases, the private sector.
<b>Section 5.03 - Duties of the Chair:</b>	<ol style="list-style-type: none"> <li>1) Presides over the meetings of the Technical &amp; Policy Committees.</li> <li>2) Calls meetings of Technical &amp; Policy Committees, except as otherwise specifically provided in these Procedures.</li> <li>3) In the absence of the Chair, the Vice Chair will assume duties of the Chair.</li> <li>4) Approves agendas for Technical &amp; Policy Committees, except as otherwise specifically provided in Section 5.08 "Agenda Development."</li> </ol>
<b>Section 5.04 - Appointment of Chair &amp; Vice Chair:</b>	<ol style="list-style-type: none"> <li>1) A Chair and Vice Chair will be appointed by the Executive Committee.</li> <li>2) Individuals interested in being Chair or Vice Chair, pursuant to the provisions of Section 5.05 "Terms" and Section 5.06 "Vacancies," provide letters of interest submitted to the Chair of the Regional Council for appointment by the Regional Council Executive Committee.</li> <li>3) The Executive Committee shall appoint the Chair and Vice Chair of the Technical and Policy Committees, with the exception of the Transportation Policy Committee. These appointments will be staggered to assist continuity, appointing approximately half of the committee officers in June each year and the remainder in January, unless a vacancy occurs.</li> </ol>
<b>Section 5.05 - Terms of Officers:</b>	One-year terms with possible reappointment to serve up to one additional term by consent of the respective committee.
<b>Section 5.06 - Vacancies:</b>	In the event of a vacancy in the Chair position, the Vice Chair becomes Chair for the unexpired term of the previous Chair and a Vice Chair is elected to complete the remainder of the Vice Chair's term. An individual who succeeds to an unexpired term of six months or less will serve for the remainder of the term, and is eligible to serve one additional full-year term. An individual who succeeds to an unexpired term of more than six months serves for the remainder of the unexpired term, is not then eligible to serve one additional full-year term, unless the committee consents to an additional one full-year term as provided for in Section 5.05 "Terms."
<b>Section 5.07 - Meetings:</b>	Technical & Policy Committees shall meet at the call of the Chair.
<b>Section 5.08 - Agenda Development:</b>	<ol style="list-style-type: none"> <li>1) The agenda is prepared by staff under the direction of the Executive Director with approval by the Chair.</li> <li>2) The Chair does not have the unilateral power to remove an item from an agenda that has proceeded through the MAG committee process.</li> <li>3) Request for future agenda items will be placed on all agendas.</li> <li>4) Items in a MAG appeal process may be appealed to the next committee level and placed on the agenda.</li> </ol>

## Chapter V: Other Technical & Policy Committees (continued)

<p><b>Section 5.09 - Conflict of Interest:</b></p>	<p>As is done in MAG member agencies, members confer with the MAG General Counsel regarding conflict of interest, as set forth in state law.</p>
<p><b>Section 5.10 - Quorum:</b></p>	<p>According to the By-laws, a quorum is a simple majority of the members of a committee, participating in person or by teleconference and videoconference, shall constitute a quorum for the transaction of business. In the absence of a quorum, no committee shall conduct business without a quorum. The Chair of the meeting shall adjourn the meeting from time to time, as provided in the Open Meeting Law, to attempt to garner quorum, either in person, or by proxy. If a quorum is achieved following a temporary adjourned meeting, business may be transacted which might have been transacted at the meeting as originally notified.</p>
<p><b>Section 5.11 - Proxies:</b></p>	<p>Use of proxies at Technical &amp; Policy Committees is permitted in person (including by teleconference or videoconference), using a “like for like” policy.</p>
<p><b>Section 5.12 - Weighted Voting Procedure:</b></p>	<p>Use of weighted vote at Technical &amp; Policy Committees is not permitted.</p>
<p><b>Section 5.13 - Public Comment:</b></p>	<p>Public involvement will be encouraged at all committee meetings. All public comment will be in accordance with the MAG public input policy.</p>
<p><b>Section 5.14 - Minutes:</b></p>	<p>Detailed minutes for all committee meetings will be taken, posted on the MAG Web site, and distributed to all committee members and interested stakeholders.</p>
<p><b>Section 5.15 - Administrative Support:</b></p>	<p>MAG staff shall provide administrative support to Technical &amp; Policy Committees.</p>
<p><b>Section 5.16 - Rules of Order and Motion Procedures:</b></p>	<p>Current informal practice encourages regional discussion. The following motion procedures are utilized to provide guidance in the conduct of meetings at MAG:</p> <ol style="list-style-type: none"> <li>1) Motion Procedure             <ol style="list-style-type: none"> <li>a. When a motion is made and seconded, it shall be stated by the Presiding Officer before debate.</li> <li>b. The maker of the motion has the right to modify his or her motion or to withdraw it entirely. If the motion is modified, the Member who has seconded it has the right to withdraw his or her second.</li> <li>c. If a modification to a motion made by another Member is accepted by the maker of the motion, the Member who seconded the original motion shall be requested to reaffirm his or her second after modification. If the Member declines to reaffirm the second, the second is presumed made by the Member suggesting the modification.</li> <li>d. In the case of a tie in votes on any motion, the motion shall be considered defeated.</li> </ol> </li> </ol>

## Chapter V: Other Technical & Policy Committees (continued)

### Section 5.16 - Rules of Order and Motion Procedures (continued):

- 2) Motion to Recommend Approval
  - a. A motion to recommend approval shall be to recommend the agenda item as proposed or as proposed with an amendment(s) or stipulation(s). After the motion is made and seconded, it shall require an affirmative majority vote to pass.
- 3) Motion to Deny or Disapprove a Recommendation
  - a. A motion to deny or to disapprove a recommendation shall be to reject the agenda item as proposed. After the motion is made and seconded, it shall require an affirmative majority vote to defeat the item. If the motion fails, the agenda item will not be deemed recommended, unless a separate motion to recommend approval is made and seconded and passed by the requisite majority vote.
- 4) Motion to Postpone
  - a. A motion to postpone is used to dismiss an item on the agenda. This motion is debatable, and because it can be applied only to the main question, it can, therefore, only be made while the main question is immediately pending (a motion and second is on the floor). This motion is commonly used to postpone an item until a more appropriate time.
- 5) Motion to Table
  - a. Motions to table shall be to a definite time. Such motions shall be amendable and debatable only as to the propriety of postponement and the time set.
- 6) Motion to Close, Limit, or to Extend Discussion
  - a. Commonly referred to as "Calling the Question," this motion is used to limit or close debate on, or further amend, the main motion. This motion cuts off debate. The Presiding Officer may either immediately call for a vote on the main motion or ask the Members to vote on whether to call for a vote on the main motion.
- 7) Motion to Amend
  - a. A motion to amend shall be debatable only as to the amendment. A motion to amend an amendment shall be in order, but a motion to amend an amendment to the amendment shall not be in order.
  - b. A substitute motion on the same subject shall be acceptable and shall be voted on before a vote on the amendment.
  - c. Amendments shall be voted on first, then the main motion as amended.
- 8) Motion to Continue
  - a. Motions to continue shall be to a definite time. Such motions shall be amendable and debatable only as to the propriety of postponement and the time set.
- 9) Division of Question
  - a. If the question or motion contains two or more propositions that could be divided, the Presiding Officer may, upon his or her own initiative or upon the request of a Member, divide the question or motion into multiple questions or motions for separate consideration and action.
- 10) Motion to Adjourn
  - a. A motion to adjourn may be made at any time during the meeting for the purpose of immediately closing the meeting. It requires a second, is not debatable and cannot be amended. The motion requires a majority vote for passage and, if it passes, the meeting is closed.

## Frequently Asked Questions (FAQs) MAG Committee Operating Policies and Procedures

**Q1- What are the MAG Committee Operating Policies and Procedures?**

A- The MAG Committee Operating Policies and Procedures provide a set of standardized processes for all MAG committees including the MAG Regional Council, Executive Committee, Transportation Policy Committee, Management Committee and other technical and policy committees.

**Q2- Why were these policies and procedures developed?**

A- The set of policies and procedures were developed to clarify and in some cases, modify former committee practices. They will be included in a MAG resource guide that will provide member agencies a greater understanding of the MAG organization as well as their respective roles and responsibilities in MAG's various committee processes.

**Q3- When will the new rules take effect?**

A- The new policies and procedures will take effect immediately. The first half of officer appointments will be made in September 2009.

**Q4- Who will make the officer appointments?**

A- The MAG Executive Committee will make other technical and policy committee appointments, with the exception of the Transportation Policy Committee.

**Q5- Can a current chair who has served two terms serve an additional term under the new rules?**

A- No. Anyone who has served two terms or more will be replaced by a new appointment, unless otherwise directed by the MAG Executive Committee.

**Q6- Which technical and policy committees will be impacted by the new appointments?**

A- There are 20 committees (w/ the Bicycle and Pedestrian Committee becoming one committee) that will be impacted. Appointments will occur by alphabetical order of committee (with the exception of the Enhancement Peer Review Group which begins in January), with the first half addressed immediately (normally, June) and the second half addressed in January.

**Q7- If the chair completes a term, does the vice chair automatically get promoted to chair?**

A- Unless the chair desires a reappointment after serving one year and the committee consents, the vice chair will automatically ascend to the chair position.

**Q8- Can nonmember agencies serve as chair?**

A- No. Only MAG member agencies will be eligible to serve in the chair and vice chair capacity.

**Q9- Can the vice chair assume the role of chair during a vacancy if the vice chair is an advisory, not an agency member?**

A- No. To remain consistent with the above, only MAG member agencies will be eligible to serve in officer positions.

**Q10- If more than one member submits letters of interest to become chair, is the chair determined by a vote of the committee or the Executive Committee?**

A- Input from the committee is welcome. Multiple names may be submitted to the MAG Executive Committee. The Executive Committee is responsible for handling other technical and policy committee appointments, with the exception of the Transportation Policy Committee.

**Q11- What if no letters of interest are submitted?**

A- The MAG Executive Committee will appoint members to fill the officer positions.

**Q12- Can the chair and vice chair switch roles every year?**

A- No. Ascension will occur through the order of officers and a new vice chair will be appointed from the committee, unless otherwise directed by the MAG Executive Committee.

**Q13- Is there a limit to the number of non-consecutive terms a chair can serve?**

A- The goal of the new procedure is to have new individuals experience being an officer. Non-consecutive terms would be the exception and determined by the MAG Executive Committee.

**Q14- Can a recording secretary be identified to take minutes?**

A- As identified in MAG's "Staffing a MAG Committee" book, MAG staff will remain responsible for staffing MAG committees and take meeting minutes. Please refer to this booklet to understand the role and responsibilities for staffing a MAG committee.

**Q15- Does a quorum require a majority of agency members or are advisory members also included?**

A- A quorum is constituted by the majority of voting members of the committee. A majority of committee members who are voting members of the committee would constitute a quorum of the committee.

**Q16- If a quorum of voting members are not present at a meeting, can the meeting continue?**

A- No. For all MAG committees, if there is no quorum present, no official business may be conducted. The chair shall adjourn the meeting, as provided in the Open Meeting Law, to attempt to garner a quorum, either in person (including by teleconference or videoconference) or by proxy. If a quorum is achieved, business may be transacted. It is the responsibility of MAG staff to call members of the committee in advance to ensure that a quorum of members will be present. Please refer to "Staffing a MAG Committee" for further information.

**Q17- Do subcommittees, not including a majority of voting members of the committee, require a quorum to have a discussion, but not conduct any formal action?**

A- A working group or subcommittee, not including a majority of voting members of the committee, could take place to have discussion if no formal action is being taken.

**Q18- Does the MAG public involvement process allow for outside stakeholders (i.e. vendors) to speak under call to the public on an agenda at a committee meeting?**

A- Yes.

**Q19- To what extent do the new rules apply to working groups and subcommittees?**

A- The new policies and procedures are to be implemented at every standing MAG committee, including working groups and subcommittees appointed by the Management Committee or Regional Council. The policies and procedures, however, are not required at informal working group and subcommittee meetings. If these informal groups include a majority of the voting membership of the standing committee (quorum), it would constitute a meeting of the standing committee and the procedures would need to be followed.

**Q20- Do these rules supersede or supplement policies and by-laws which have been adopted at the committee level?**

A- Yes. These procedures supersede any process that has been practiced by MAG committees in the following areas:

- Officer appointments
- Terms of officers
- Vacancies
- Agenda development
- Quorum
- Weighted voting
- Rules of order and motion procedures

**Q21- If committees have multiple representatives on the committee from the same agency, how many of those representatives count toward quorum and are eligible to vote?**

A- The number of representatives on a committee and how many are eligible voting members is identified when that committee was formed by the MAG Regional Council. Please consult the original meeting minutes to confirm who is supposed to be on the committee and how many slots were identified for membership. In almost all circumstances, MAG committees have one representative per member agency which counts as one vote per member agency.

**Q22- Does a vacant position on a committee count toward quorum?**

A- No. Quorum of a committee is determined by the total number of currently filled slots on the committee.

**Q23- What should I do if I am having attendance issues affecting quorum?**

A- Staff members are encouraged to follow a three step process to address member attendance issues. First, discuss the matter directly with the member to provide the member an opportunity to address reasons for his or her lack of attendance. Second, if the member continues to miss meetings, contact the Senior Policy Planner to coordinate discussion with the member's respective agency's intergovernmental relations liaison. Third, as the last measure, please consult the MAG Executive Director and refer to the process outlined in "Staffing a MAG Committee" guidebook on page 34. At this point a member attendance letter can be sent to the city or town manager of the member agency and a new member recommended for the committee.



P.O. Box 52025  
Phoenix, AZ 85072-2025  
(602) 236-5900

Case # 08-10

DATE: August 5, 2009

TO: MAG Specifications and Details Committee Members

FROM: Peter Kandaris, SRP Representative

RE: **Modifications to Detail 200: Trench Backfill and Pavement Replacement Revisions per Committee Request of 7/1/09**

Attached are the revised Detail 200 (now titled "200-1") and additional detail elements in a new Detail 200-2. This is a simplified version intended to (a) introduce a number of concepts present in many agency supplements, (b) provide more options within details to meet various agency supplement needs, and (c) provide more room for and clarity of existing detail information. No changes are being proposed for Sections 336 and 601 at this time.

Changes to the original Detail 200 are summarized below (shown as Detail 200-1):

'T' Top

- Base shown separately from backfill. Allows option of CLSM along with ABC.
- 1" minimum AC surface course deleted. AC section to be specified by existing Section 336 requirements (eliminates contradiction between Det 200 & Sec 336).
- AC base and surface courses separately identified.
- Allows milled edges along with sawcut edges.
- Allows backfill options of select & native along with CLSM & ABC.
- References trench width to Sections 336 & 601.

Type A

- Allows option of CLSM along with ABC for base.
- AC section to be specified by existing Section 336 requirements.
- AC base and surface courses separately identified.
- Allows milled edges along with sawcut edges.
- References trench width to Sections 336 & 601.

Type B

- Base shown separately from backfill - matching existing thickness. Allows option of ABC along with CLSM.
- Allows backfill option of ABC, select & native along with CLSM.
- Allows milled edges along with sawcut edges.
- References trench width to Sections 336 & 601.
- 2" minimum AC thickness deleted. AC section to be specified by existing Section 336 requirements (eliminates contradiction between Det 200 & Sec 336).
- AC base and surface courses separately identified.

Type C

- Edge sawcut included.
- References trench width to Sections 336 & 601.

#### Types D, E & F

- Combined into new Type D.
- Recommended for trenches in ROW but not in paved roadway.
- ABC base shown separately – match existing if present (incorporates old Note 4).
- Defines backfill options to allow ABC, select, native or CLSM.
- Surfacing to match existing – no minimums provided.
- References trench width to Sections 336 & 601.

#### New Type E

- Recommended for use in future roadway prism or alley
- Same as Type A, but with no pavement section

#### Notes

- Original Note 1 moved to new bedding detail in 200-2.
- Original Note 2 → New Note 1: modified, and references Section 336 (not 321) where all material requirements are presently identified.
- Original Note 3 → New Note 3: minimum trench width for slurry backfill increased from 18" to 24"; ½-sack CLSM allowed (no ABC slurry).
- Original Note 4 moved to Type D detail.
- Original Note 5 included in New Note 2, with ½-sack CLSM specified.
- New Note 2 requires base and backfill to be specified in special provisions or plans.
- New Note 4 references base, backfill & bedding compaction requirements to Section 601.
- New Note 5 requires AC base and surface course to use default values in Section 336.2.4.1 unless otherwise specified in special provisions or plans.
- New Notes 6, 7 & 8 give a summary of requirements of the first 3 paragraphs in Section 336.3, and reference the graphic presentation in new Detail 200-2.
- New Note 9 references remnant pavement removal in new Detail 200-2.
- New Note 10 provides for protection of copper and PE water pipes in CLSM.

#### New Detail 200-2:

Graphical descriptions of longitudinal and transverse trenches are shown. A number of agencies include these graphics in their supplements. Also, the terminology is used in Section 336. Graphics are provided to improve clarity.

#### New Bedding Detail 1

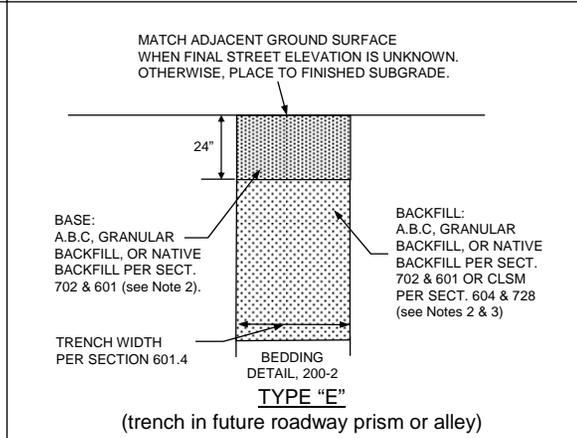
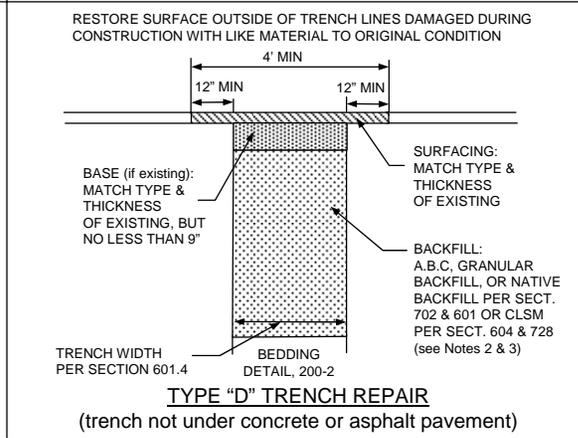
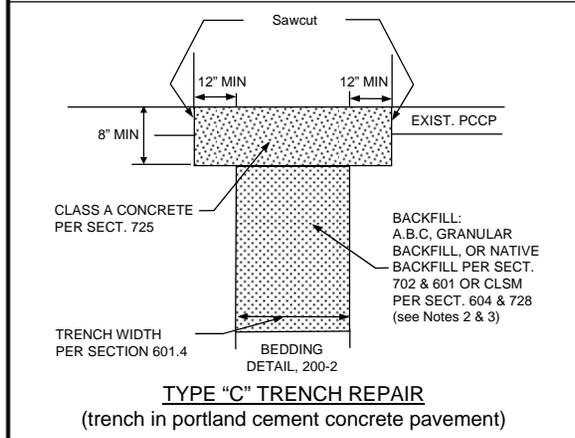
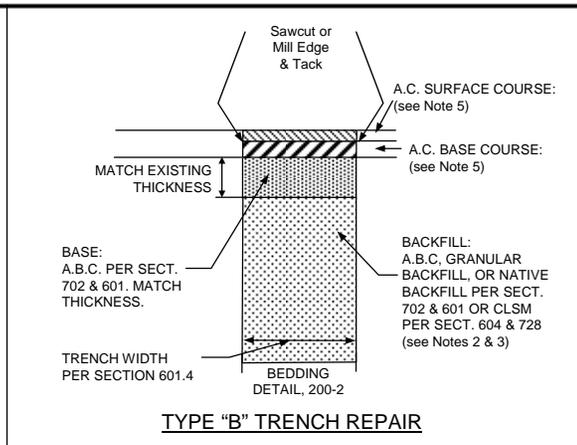
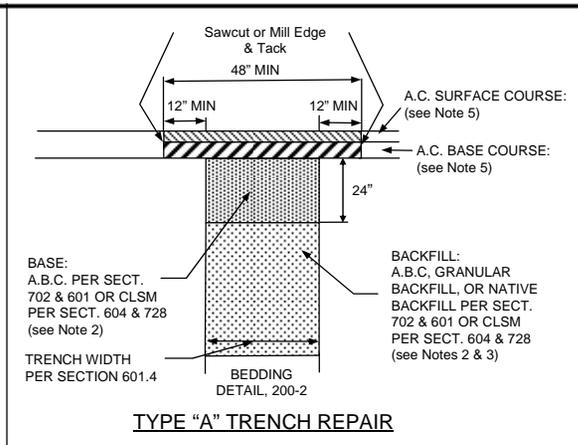
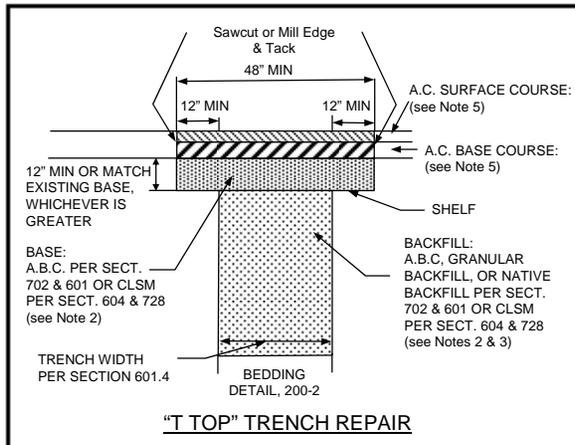
- Identifies minimum cover over utility.
- Bedding per Sections 101.2 and 601 or per utility specifications.

#### New Remnant Pavement Removal Detail

- Provides requirements for remnant pavement removal that are not presently in MAG, but are extensively noted in agency supplements. A default value of 48" or less is provided.
- Can be applied to Type "A", "B" or "T-Top" repairs.

#### Notes

- New Note 1 references back to Detail 200-1 for all other requirements.
- New Note 2 references plating detail MAG 211 and gives a maximum time for plates to remain in place (72 hrs) after trench work is complete.

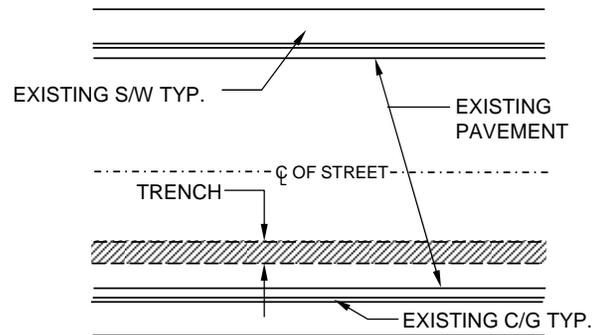


**NOTES:**

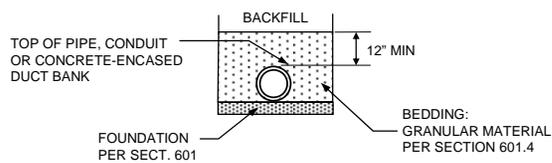
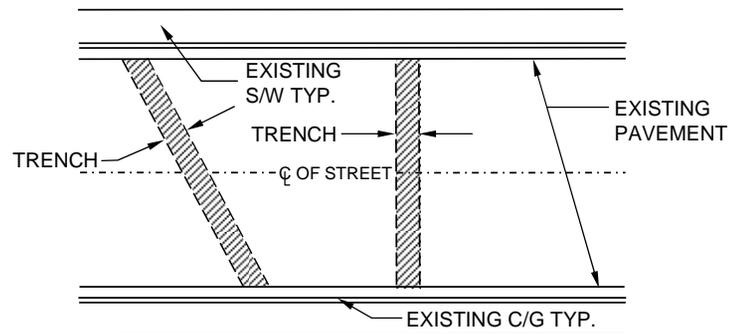
1. PAVEMENT MATCHING AND SURFACE REPLACEMENT SHALL BE IN ACCORDANCE WITH SECTION 336.
2. TYPE OF BACKFILL AND BASE (IF APPLICABLE) SHALL BE AS NOTED HEREIN UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS. IF SPECIFIED, CLSM SHALL BE 1/2-SACK PER SECTIONS 604 AND 728.
3. TRENCHES LESS THAN 24" WIDE SHALL BE BACKFILLED FROM TOP OF BEDDING TO BOTTOM OF SURFACING MATERIALS WITH 1/2-SACK CLSM PER SECTIONS 604 AND 728.
4. BASE, BACKFILL, BEDDING AND FOUNDATION COMPACTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 601.
5. ASPHALT CONCRETE BASE AND SURFACE COURSE SHALL COMPLY WITH SECTION 336.2.4.1 UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS.
6. USE TYPE "A" FOR LONGITUDINAL TRENCH REPAIR AND USE "T-TOP" FOR TRANSVERSE TRENCH REPAIR (SEE DETAIL 200-2) UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS. TYPE "B" TRENCH REPAIR MAY BE USED FOR TRANSVERSE TRENCH REPAIR IF SPECIFIED BY THE AGENCY.
7. PROVIDE MINIMUM 12" WIDE SHELF AS SHOWN IN "T-TOP" TRENCH REPAIR AT ENDS OF TYPE "A" TRENCH REPAIR EXCEPT WHERE EDGE ABUTS EXISTING CONCRETE.
8. USE "T-TOP" PAVEMENT REPLACEMENT WHERE A TRENCH IS NOT PARALLEL TO A STREET OR GOES THROUGH AN INTERSECTION.
9. SEE DETAIL 200-2 FOR REMNANT PAVEMENT REMOVAL REQUIREMENTS.
10. COPPER OR POLYETHYLENE WATER PIPES EXPOSED IN TRENCHES TO BE BACKFILLED WITH CLSM SHALL BE WRAPPED WITH MIN 3/4" THICK CLOSED CELL FOAM INSULATION OR 3/4" WIDE BLACK INSULATION BEFORE PLACING CLSM.

DETAIL NO. <b>200-1</b>	 <b>MARICOPA ASSOCIATION of GOVERNMENTS</b>	STANDARD DETAIL ENGLISH	<b>BACKFILL, PAVEMENT AND SURFACE REPLACEMENT</b>	REVISED <b>8/5/09</b> <b>DRAFT</b>	DETAIL NO. <b>200-1</b>
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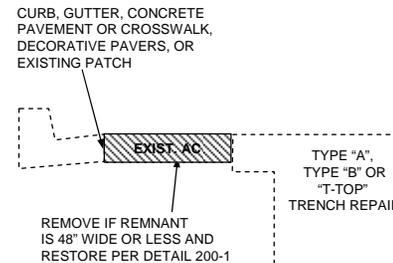
**LONGITUDINAL TRENCH**  
(trench in pavement parallel to traffic)



**TRANSVERSE TRENCH**  
(trench in pavement not parallel to traffic)



**BEDDING DETAIL**



**REMNANT PAVEMENT REMOVAL**

**NOTES:**

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

DETAIL NO.

**200-2**



STANDARD DETAIL  
**ENGLISH**

**BACKFILL, PAVEMENT  
AND SURFACE REPLACEMENT**

REVISED  
**8/5/09**  
**DRAFT**

DETAIL NO.

**200-2**

TAPPING SLEEVES, VALVES AND VALVE BOXES ON WATER LINES

630.6 AIR RELEASE AND VACUUM VALVES:

Valve assemblies shall be furnished and installed where shown and as detailed on the drawings.

(A) Air release on water mains shall be controlled by the use of an air release valve assembly, of size and type as shown on the plans. Air release valves shall be of the flanged or screwed type as designated on the Agency's approved products list or in the special provisions.

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Deleted: shown and shall be similar and equal to Apco, Crispin or Simplex.

(B) Vacuum and Air Relief when called for on the plans shall be controlled by a vacuum relief valve on the air release valve noted above. The valves shall be of the same manufacture or may be a combination air and vacuum valve assembly designated on the Agency's approved products list or in the special provisions.

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**SECTION 796**  
**GEOSYNTHETICS**

**796.1 GENERAL:**

This section defines requirements for geosynthetic fabrics, grids and membranes, it is not inclusive of all available geosynthetic materials and applications.

**796.2 MATERIALS AND REQUIREMENTS;**

Identification, packaging, delivery, storage and handling of geosynthetic materials shall be in accordance with manufacturer's recommendations and ASTM D4873. Each roll shall be labeled or tagged to provide product identification sufficient to determine the product type, manufacturer, quantity, lot number, roll number date of manufacture, and shipping date.

Geosynthetic materials shall be inert to commonly encountered chemicals, resistant to rot and mildew, and shall have no tears or defects which adversely affect or alter its physical properties.

Geosynthetic materials shall be packaged with material that will protect the geosynthetic (including ends of rolls) from damage due to shipment, water, sunlight and contaminants. During storage, geosynthetic materials shall be elevated off the ground and protected from the following: site construction damage, precipitation, extended ultraviolet radiation, strong acid or strong base chemicals, flames (including welding sparks), temperatures in excess of 160°F, and any other environmental condition that may damage geosynthetic material property values. Protection shall be in accordance with manufacturer's specifications and shall be maintained during periods of shipment and storage.

Materials required for complete and proper installation of geosynthetic materials that are not specifically described herein (such as pins, nails, washers, etc.) shall conform to the manufacturer's recommendations and be as selected and supplied by Contractor subject to final approval by the Engineer.

Requirements represent minimum average roll values in the weaker principal direction. Average of test results from any sampled roll in a lot shall meet or exceed the minimum values noted herein. Lot sampling shall be according to ASTM D 4354.

**Deleted:** for construction purposes shall be in conformance with this Section. This specification is intended to provide requirements for geosynthetic materials used by MAG agencies and does not include all available geosynthetic materials and applications.¶

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**796.2.1 Pavement:** Pavement fabric geosynthetics are non-woven polyester or polypropylene fabrics that are field saturated with an asphalt binder and placed as an interlayer beneath a pavement overlay or between pavement layers. When placed, the fabric becomes an integral part of the roadway section, forming a barrier to water infiltration and absorbing stresses to reduce reflective and fatigue cracking of the new pavement surface layer.

Pavement fabric shall be constructed of at least 95 percent (by weight) nonwoven synthetic fibers of polyester or polypropylene, thermally bonded on one side. The fabric material shall additionally conform to the physical properties shown in Table 796-1.

<b>TABLE 796-1</b>			
<b>PAVEMENT GEOSYNTHETIC PROPERTIES</b>			
<b>Property</b>	<b>Class A</b>	<b>Class B</b>	<b>ASTM Test Method</b>
Weight: oz/yd <sup>2</sup>	4.1 min.	4.0 min	D3776
Grab tensile strength: lbs.	100 min.	90 min	D4632
Elongation at break: %	50 min.	50 min	D4632
Melting point: degree F	300 min.	300 min	D276
Asphalt retention: gal/yd <sup>2</sup>	0.25 min. <sup>(1)</sup>	0.20 min	D6140

(1) May be reduced within street intersections, on steep grades or in other zones where vehicle braking is common, but not less than 0.20 gal/yd<sup>2</sup> when approved by the Engineer.

**796.2.2 Filtration (Drainage) and Separation:** Filtration and separation fabrics are nonwoven or woven polypropylene or polyester fabrics with specified strength characteristics used as permeable separators to restrain soil or other particles subjected to hydrodynamic forces while allowing the passage of fluids into or across a geotextile and to prevent inter-migration of adjacent soil layers of vastly different particle sizes and particle distributions.

Filtration and separation fabrics shall be nonwoven or woven fabric consisting only of long chain polymeric filaments such as polypropylene or polyester formed or woven into a stable network such that the filaments retain their relative position to each other. The fabric material shall additionally conform to the physical properties shown in Table 796-2.

<b>FILTRATION &amp; DRAINAGE GEOSYNTHETIC PROPERTIES</b>			
<b>Property</b>	<b>Class A <sup>(1)</sup></b>	<b>Class B <sup>(2)</sup></b>	<b>ASTM Test Method</b>
Grab tensile strength: lbs.	180 min	80 min.	D4632
Seam strength: lbs.	160 min	70 min.	D4632
Puncture strength: lbs.	80 min	25 min.	D4833
Trapezoidal tear: lbs	50 min	25 min.	D4533
Apparent opening size: US Standard sieve size	> 50	>50	D4751
Ultraviolet Stability: %	50 min.	50 min	D4355

- (1) Class A - Use where installation stresses are more severe than for Class B application (i.e. very coarse sharp angular aggregate or high compaction requirements).
- (2) Class B - Use with smooth graded surface having no sharp angular projections and sharp angular aggregate.

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**796.2.3 Erosion Control:** Erosion control fabrics are woven monofilament fabrics or nonwoven fabrics similar to filtration and separation fabrics, but are thicker and stronger (higher survivability) to absorb stress and resist abrasion. These fabrics are used below all areas to receive aggregate or rip-rap rock slope protection and act as filter/separators to provide sustained permeability while maintaining structural stability.

Erosion control fabrics shall be a woven monofilament fabric or a nonwoven fabric consisting only of long chain polymeric filaments such as polypropylene or polyester formed into a stable network that the filaments retain their relative position to each other. The fabric material shall additionally conform to the physical properties shown in Table 796-3.

<b>EROSION CONTROL GEOSYNTHETIC PROPERTIES</b>			
<b>Property</b>	<b>Class A <sup>(1)</sup></b>	<b>Class B <sup>(2)</sup></b>	<b>ASTM Test Method</b>
Weight: oz/yd <sup>2</sup>	8.0 min	6.0 min	D3776
Grab tensile strength: lbs.	270 min	200 min.	D4632
Elongation at break: %	45min,115 max	15 min.,115 max.	D4632
Puncture strength: lbs.	110 min	75 min.	D4833
Burst strength: psi	430 min	320 min.	D3786
Trapezoidal tear: lbs	75 min	50 min.	D4533
Apparent opening size: US Standard sieve size	30 – 140	30 - 140	D4751
Ultraviolet Stability: %	70 min.	70 min	D4355

- (1) Class A - Use where installation stresses are more severe than for Class B applications.
- (2) Class B - Use with structures or under conditions where the fabric is protected by sand cushion or by "zero drop height" placement of stone (stone placement depth < 3 ft; stone wt < 250 lbs).

**796.2.4 Soil or Base Reinforcement:** Geogrid geosynthetic materials are used for improving the stability of weak soils or reinforcing aggregate bases. Geogrids are defined as biaxial or triaxial polymeric grids

formed by a regular network of integrally connected polymer tensile elements with apertures of sufficient size to permit significant mechanical interlock with the surrounding soil, aggregate, or other fill materials to function primarily as reinforcement.

The geogrid structure shall be dimensionally stable and able to retain its geometry under manufacture, transport and installation. Geogrids shall be comprised of 100 percent punched and drawn or extruded resin polypropylene or high-density polyethylene. Geogrids shall additionally conform to the physical properties shown in Table 796-4.

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TABLE 796-4			
REINFORCEMENT GEOGRID PROPERTIES			
Property	Requirement		Test Method
	Type 1	Type 2	
Aperture size: in	1 min.	1-3/8 min.	ID callipered
Rib Thickness: mil	30 min.	50 min.	ASTM D1777
Rib Shape	Rectangular or Square	Rectangular or Square	Observation
Junction Thickness: mil	60 min.	60 min.	ASTM D1777
Ultimate Tensile Strength: lb/ft	850	1300	ASTM D4945
Flexural Rigidity: Mg-cm	250,000	750,000	ASTM D1388
Min Tensile Strength @ 2% Strain: lb/ft MD	280	410	ASTM D6637
Min Tensile Strength @ 2% Strain: lb/ft CMD	450	620	ASTM D6637
Min Tensile Strength @ 5% Strain: lb/ft MD	580	810	ASTM D6637
Min Tensile Strength @ 5% Strain: lb/ft CMD	920	1340	ASTM D6637
Junction Strength: %	80 min.		ASTM 638
Ultraviolet Stability: %	70 min		D4355

(1) (MD) Machine Direction (2) (CMD) Cross-Machine (transverse) Direction

**796.3 TEST & CERTIFICATION REQUIREMENTS:**

Certificates of compliance shall be submitted to the engineer upon delivery of material for use on a specified project. Samples of materials shall be submitted for testing. Each geosynthetic material lot or shipment must be approved by the Engineer before the materials may be incorporated in the work.

**Deleted:** of  
**Deleted:** No samples shall be taken within five feet from either end of roll. Dimension and determination of the amount of samples needed shall be determined by the Engineer.

Testing methods and results shown in the certificate of compliance shall conform to the listed specifications for the proposed geosynthetic use. Manufacturer's supporting documentation including, but not limited to, product information sheets, installation procedures and recommendations, recommended use, and project references shall be submitted to the Engineer for product evaluation and approval.

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## Case 09-04 – Modified Section 322: Add Pavement Fabric Interlayer for AC Overlay

Comments from 7/1/09 Meeting:

**1. Include a minimum asphalt concrete hot mix temperature in the specification.**

Response: There are two options – (a) include a minimum temperature for overlays only, or (b) include a minimum temperature for all asphalt lifts by replacing the second sentence in Section 321.8.4 with a minimum temperature table similar to the Asphalt Institute’s Table VI-2 (MS-11). Noted below are the specific changes needed (changes to existing text in red):

Option a. Modify the overlay specification (existing language in Section 322):

All areas where fabric has been placed shall be paved with asphaltic concrete during the same workshift. Placement of the asphaltic concrete shall closely follow fabric lay down. The temperature of the asphaltic concrete **immediately behind the laydown machine** shall not exceed 325 degrees F **but shall be no less than 310 degrees F when the pavement temperature is between 40 degrees and 60 degrees F**. In the event that asphalt binder coat bleeds through the fabric causing construction problems before the overlay is placed, the affected areas shall be sanded with a sand blotter in compliance with Section 333. Excess sand shall be removed before beginning the paving operation. In the event of a rainfall on the fabric prior to the placement of the asphaltic concrete, the fabric must be allowed to dry completely before the asphalt concrete is placed.

Option b. Modify the asphalt placement specification, 321:

as shown in Table 321.X

**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.

TABLE 321.X						
MINIMUM ASPHALT CONCRETE PLACEMENT TEMPERATURES						
Base <sup>(1)</sup> Temp (°F)	Mat Thickness (inches)					
	½	¾	1	1 ½	2	3 and greater
40 - 50	---	--	310	300	285	275
50 - 60	---	310	300	295	280	270
60 - 70	310	300	290	285	275	265
70 - 80	300	290	285	280	270	265
80 - 90	290	280	275	270	265	260
+ 90	280	275	270	265	260	255
Maximum Rolling Time (minutes)	4	6	8	12	15	15

(1) Base on which mix is to be placed.

## **SECTION 306**

### **MECHANICALLY STABILIZED SUBGRADE - GEOGRID**

#### **306.1 DESCRIPTION:**

The work under this section shall consist of furnishing and placing a geogrid material within or below the aggregate base as shown on the project plans to mechanically stabilize the subgrade. Work shall provide a stabilized paving platform section on which paving materials can be placed. Geogrid type, fill thickness, pavement cross-section and associated details, shall be as shown on the contract drawings.

This specification shall be used for a construction platform and not as a means of mitigating swell (retaining moisture in subgrades) unless retaining moisture in the section can be assured by other means.

#### **306.2 MATERIALS:**

The geogrid material shall be supplied in accordance with and conform to the material requirements of Section 796 and Table 796-4.

Other than the specified geogrid, no structural contribution shall be attributed to other geosynthetic fabrics that may be specified as part of the pavement or subgrade cross-section to provide separation, filtration or drainage.

#### **306.3 PREPARATION:**

The surface upon which the geogrid is to be placed shall be brought to a compacted condition, true to line and grade as directed by the Engineer or as shown on the plans. During this process any unsuitable soil or material shall be removed and replaced with acceptable material. The compacted surface shall be at the proper elevation as specified, shown on the plans, or as directed by the Engineer, for the placement of the geogrid. At completion of this phase, the material and surface shall be approved by the Engineer before proceeding with the next step.

The geogrid shall not be placed when weather or surface conditions, in the opinion of the Engineer, are not suitable for placement. This will normally be at times of wet and snowy conditions, heavy rainfall, extreme cold or frost conditions, or extreme heat.

#### **306.4 EQUIPMENT:**

Mechanical or manual laydown equipment shall be capable of laying the geogrid properly and smoothly, according to the manufacturer's recommendations.

#### **306.5 GEOGRID PLACEMENT:**

The geogrid shall be installed in accordance with the installation guidelines provided by the manufacturer or as directed by the engineer.

The geogrid may be temporarily secured in place with ties, staples, pins, sand bags or backfill as required by fill properties, fill placement procedures or weather conditions or as directed by the Engineer. A 12-inch minimum secured overlap is required at all joints (both transverse and longitudinal). At transverse joints, the preceding roll shall overlap the following roll in the direction that the aggregate base will be placed. The geogrid shall be rolled out along the alignment in the direction of advancing construction. All wrinkles and folds shall be removed.

The geogrid shall be tensioned by hand and anchored to the ground at the edges, including overlaps, and in the center of the roll at 30-foot intervals along the roll length, at the corners if applicable, or as directed by the Engineer. Securing locations may be reduced or eliminated by the Engineer if it can be shown that by careful installation the geogrid is adequately tensioned by hand and anchored by the placed aggregate in a progressive installation process as recommended by the manufacturer's representative.

Care shall be taken to ensure that geogrid sections do not separate at overlaps during construction. Placement of geogrid around corners will require cutting of the geogrid product and diagonal overlapping of the same to make sure that excessive buckling of geogrid material does not occur.

**306.6 PLACING AND COMPACTING AGGREGATE FILL:**

The aggregate shall be back dumped and spread in a uniform lift maintaining the design aggregate thickness at all times. The aggregate material shall be bladed onto the geogrid in such a manner that the aggregate rolls onto the grid ahead, by gradually raising the dozer blade while moving ahead.

When underlying substrate is trafficable with minimal rutting, rubber-tired equipment may pass over the geogrid reinforcement at slow speeds (less than 10 mph) when integrally-formed geogrids are used. Sudden stops and turning by trucks shall be avoided while on the grid. Traffic shall not be allowed with coated geogrids. A minimum loose fill thickness of 6 inches is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles shall be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

Any ruts which might develop during spreading or compacting the aggregate shall be filled with additional aggregate rather than bladed from surrounding areas. Placing additional aggregate into the rutted areas insures that the design aggregate thickness is maintained.

Aggregate base shall be compacted as specified in Section 310. Aggregate base material shall not be mixed or processed on the geogrid. The aggregate base material shall be premixed at the stockpile area or another location in a manner approved by the Engineer. Aggregate base materials will be sampled for acceptance after premixing and prior to placement on the geogrid material. Contamination and segregation of aggregate base materials prior to or during placement shall be minimized.

**306.7 REPAIR:**

Any roll of geogrid damaged before, during and after installation shall be replaced by the contractor at no additional cost to the owner.

Proper replacement shall consist of replacing the affected area overlapping geogrid at least 3 feet beyond all sides of the affected area.

Paving platform found deficient shall be removed and replaced.

**306.8 PAYMENT:**

Geogrid reinforcement will be measured by the square yard in-place. Measurement will be to the nearest square yard. No allowance will be made for material in laps.

The accepted quantity of geogrid reinforcement, measured as provided above, will be paid for at the contract unit price per square yard, which price shall be full compensation for furnishing all labor, material, and equipment, and performing all operations in connection with placing the geogrid as shown on the project plans. No payment will be made for geogrid reinforcement rejected due to either contamination or damage due to either the fault or negligence of the contractor.

SECTION 306

MECHANICALLY STABILIZED SUBGRADE - GEOGRID REINFORCEMENT

306.1 DESCRIPTION:

Mechanically stabilized subgrade shall consist of furnishing and placing a geogrid material within or below the untreated base to provide a stabilized paving platform on which paving materials can be placed. Geogrid type, fill thickness, pavement cross-section and associated details, shall be as shown on the contract drawings.

306.2 MATERIALS:

The geogrid material shall be supplied in accordance with and conform to the material requirements of Section 796 and Table 796-4.

306.3 PREPARATION:

Prior to placement of geogrid material unsuitable soil or material shall be removed and replaced with acceptable material. The surface upon which the geogrid is to be placed shall be brought to a compacted condition, true to line and grade. The placement of the geogrid shall be approved by the Engineer before placement of overlaying materials.

Geogrid shall not be placed during unsuitable weather or surface conditions. The Engineer shall determine when wet and snowy conditions, heavy rainfall, extreme cold, frost, or extreme heat constitute unsuitable conditions.

306.4 EQUIPMENT:

Mechanical or manual laydown equipment shall be capable of laying the geogrid properly and smoothly, in compliance with the manufacturer's recommendations.

306.5 GEOGRID PLACEMENT:

The geogrid shall be installed in accordance with the installation guidelines provided by the manufacturer or as directed by the engineer.

The geogrid may be temporarily secured in place with ties, staples, pins, sand bags or acceptable fill material as required by fill placement procedures, weather conditions or as directed by the Engineer. A 12-inch minimum secured overlap is required at all joints (both transverse and longitudinal). At transverse joints, the preceding roll shall overlap the following roll in the direction that the aggregate base will be placed. The geogrid shall be rolled out along the alignment in the direction of advancing construction. All wrinkles and folds shall be removed.

The geogrid shall be tensioned by hand and anchored to the ground at the edges, including overlaps, and in the center of the roll at 30-foot intervals along the roll length, at the corners if applicable, or as directed by the Engineer. Securing locations may be reduced or eliminated when it can be shown to the satisfaction of the Engineer that an alternative installation process will provides satisfactory results.

Geogrid shall be placed to obtain full coverage of the indicated area. Placement of geogrid on irregular shaped areas and radii may require cutting of the geogrid material and the use of diagonal overlapping joints. Buckling of geogrid material will not be allowed.

306.6 PLACING AND COMPACTING AGGREGATE FILL:

The aggregate shall be back dumped and spread in a uniform lift maintaining the design aggregate thickness at all times. The aggregate material shall be bladed on the geogrid in such a manner that the aggregate rolls forward onto the grid ahead.

When underlying substrate is trafficable with minimal rutting, rubber-tired equipment may pass over integrally-formed geogrid reinforcement at slow speeds (less than 10 mph). Sudden stops and turning by trucks shall be

- Deleted: The work under this section
- Deleted: aggregate
- Deleted: as shown on the project plans to mechanically stabilize the subgrade. Work shall
- Deleted: section
- Deleted: ¶ This specification shall be used for a construction platform and not as a means of mitigating swell (retaining moisture in subgrades) unless retaining moisture in the section can be assured by other means.¶
- Deleted: ¶ Other than the specified geogrid, no structural contribution shall be attributed to other geosynthetic fabrics that may be specified as part of the pavement or subgrade cross-section to provide separation, filtration or drainage.¶ ¶ (Possible change per Peoria comment this week): The geogrid shall not result in a reduction in the pavement section if the geogrid is being used primarily to allow pavement construction on soft subgrades.¶
- Deleted: as directed by the Engineer or as shown on the plans. During this process any unsuitable soil or material shall be removed and replaced with acceptable material. The compacted surface shall be at the proper elevation as specified, shown on the plans, or a ... [1]
- Deleted: . At completion of this ... [2]
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- Deleted: by careful installation t ... [4]
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- Deleted: when integrally-forme ... [9]

avoided on the geogrid. Traffic shall not be allowed onto coated geogrid material. A minimum loose fill thickness of 6 inches is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles shall be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

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Any ruts which develop during spreading or compacting aggregate fill shall have additional aggregate added rather than bladed from surrounding areas. Placing additional aggregate into the rutted areas limits disturbance to the underlying geogrid keeping it intact.

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Untreated base shall be compacted as specified in Section 310. Untreated base material shall not be mixed or processed on the geogrid. Base materials will be uniformly blended and sampled for acceptance prior to placement on the geogrid material. Contamination and segregation of base materials during placement shall be minimized.

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**306.7 REPAIR:**

Any geogrid material damaged before, during or after installation shall be replaced by the contractor at no additional cost to the owner.

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Replacement of geogrid reinforcement shall consist of removal and replacement of the geogrid and aggregate fill from the defective area. The aggregate fill shall be removed at least 3 feet beyond of the limits of the defective area. The replacement geogrid shall be installed with proper overlaps. Aggregate fill replacement shall not commence until placement of the geogrid material has been inspection and approved.

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**306.8 PAYMENT:**

The surface area of accepted in-place geogrid reinforcement will be measured to the nearest square yard. No allowance will be made for material overlaps.

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Payment for geogrid reinforcement at the contract unit price shall be full compensation for furnishing all labor, material, equipment, and installing complete in place the geogrid as shown on the project plans.

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Paving platform found deficient shall be removed and replaced. ¶

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Deleted: No payment will be made for geogrid reinforcement rejected due to either contamination or damage due to either the fault or negligence of the contractor.

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as directed by the Engineer or as shown on the plans. During this process any unsuitable soil or material shall be removed and replaced with acceptable material. The compacted surface shall be at the proper elevation as specified, shown on the plans, or as directed by the Engineer, for		
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. At completion of this phase, the material and surface		
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, are not suitable for placement. This will normally be at times of		
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by careful installation the geogrid is adequately tensioned by hand and anchored by the placed aggregate in a progressive installation process as recommended by the manufacturer's representative		
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Care shall be taken to ensure that geogrid sections do not separate at overlaps during construction		
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around corners will require cutting of the geogrid product and		
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of the same to make sure that excessive		
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, by gradually raising the dozer blade while moving ahead		
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when integrally-formed geogrids are used		

ITEM #	LOCATION	COMMENT
1.	General <b>REVISED</b> <b>VARIOUS</b>	Revise all occurrences the terms "the Agency or Engineer", "the Agency and/or Engineer", "the Engineer or Agency", "the Engineer/Agency" and "the engineer or appropriate Agency representative" to read "the Engineer".
2.	General <b>REVISED</b> <b>725.2</b> <b>725.2.1</b> <b>725.7</b> <b>725.7.1</b> <b>725.7.4</b>	Terms used in the specification should be used consistently. It seems that the first half of the document used the term "cementitious material" to mean "cement", and tried not to use the word "cement"; but in the second half of the specification, the word "cement" is used very frequently. Another example is for the "pozzolan": so many terms were used to mean the same thing. These terms included "pozzolan", "supplementary cementitious materials" and its acronym "SCM", and "pozzolanic materials". If needed provide a definition for a term giving a list of synonyms, and then use one term consistently for the rest of the document.
3.	General <b>REVISED</b>	Replace the word "will" with "shall" when used as a Contractor requirement.
4.	Section 725.2 Type V Cement <b>REVISED</b>	Express the water soluble sulfate ion as $SO_4^{2-}$ not as $SO_4$ . Define the requirements of the solution mentioned or reference an ASTM or AASHTO standard test procedure (e.g. a solution of x grams of soil mixed with y milliliter of demineralized water).
5.	Section 725.2 <b>DISCUSS</b> <b>725.6</b>	Add back into the specification at the end of section 725.2 the last paragraph of the current Section 725.2 which reads as follows: "A cement shall not be mixed with any other brand or type unless written permission has first been obtained from the Engineer. All cement used in the manufacture of concrete for any individual structure shall be of the same brand unless otherwise approved by the Engineer."
6.	Section 725.8 <b>REVISED</b>	Add section titles and bold section numbers 725.8.1 through 725.8.3
7.	Section 725.7 <b>REVISED</b>	In the fourth paragraph, delete the word "positively".
8.	Section 725.7.3 <b>REVISED</b>	Item A in the procedure indicates that the mixing should be done in a mechanical batch mixer. This is contrary to the title of the section. Delete the word "batch".
9.	<b>REVISED</b> <b>725.6</b> <b>725.7.3</b> <b>725.9</b>	Format revision to match other MAG sections. Revise the lettered sections to be in full parentheses. Place the sub numbered sections in full parentheses or replace the closing parenthesis with a period. Example change A) to (A) and change 1) to 1. or (1)
10.	Section 725.9 B) 1) <b>REVISED</b>	Change reference of 725.11 B) 3) to Table 725-2. Review wording of last two sentences – They appear to be overlapping sentences.
11.	Section 725.9 B) 2) <b>ACI-318</b> <b>DISCUSS</b>	The acceptability of 85% of the specified design strength with samples showing only 75% of specified strength is below the quality desire by MCDOT. Keep the required strength at or above the 95% requirement of the present specifications
12.	Section 725.9 <b>DISCUSS</b>	Table 725-2 - Revise the penalty to match the current penalties where test results of 95% of the required strength have a 20% penalty.
13.	Section 725.9 <b>DISCUSS</b>	Discussion item: Penalties are defined for work contacted by agencies. What penalties should be established for permitted work?

**PORTLAND CEMENT CONCRETE****725.1 GENERAL:**

Portland cement concrete shall be composed of cementitious materials, fine and coarse aggregates, water, and, if specified or allowed, certain chemical admixtures and additives.

<b>TABLE 725-1</b>		
<b>CONCRETE CLASSES - MINIMUM REQUIREMENTS</b>		
<b>Class of Concrete</b>	<b>Minimum Cementitious Materials Content (lbs. per cubic yard)</b>	<b>Minimum Compressive Strength (1) at 28 Days (psi)</b>
AA	600	4000
A	520	3000
B	470	2500
C	420	2000

(1) In accordance with section 725.8.

Class AA concrete shall be used as specified.

Class A concrete shall be used for concrete structures, either reinforced or non-reinforced, and for concrete pavements.

Class B concrete may be used for curbs, gutters and sidewalks.

Class C concrete may be used for thrust blocks, encasements, or with pre-approval from the Engineer as structural fill for over excavations

**725.2 CEMENTITIOUS MATERIALS:**

Cementitious materials to be used or furnished under this specification shall be:

Portland cement, meeting the requirements of ASTM C-150  
 Type II, low alkali, when no other specific type is specified  
 Type III, low alkali, for high early strength, when applicable or specified  
 Type V, low alkali, when specified in the special provisions for applications requiring high sulfate resistance

Portland Pozzolan Cement ASTM C-595  
 Type IP (MS), when no other specific type is specified

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Supplementary Cementitious Materials (SCM) shall not be used as an additional cementitious materials replacement in concrete in combination with Portland Pozzolan Cement.

Cementitious materials shall be sampled and tested as prescribed in the applicable ASTM specifications. The Contractor shall obtain and deliver to the Engineer a certification of compliance signed by the material manufacturer, identifying the cementitious material and stating that the cementitious material delivered to the batching site complies with the appropriate specifications. When requested by the Engineer, the Contractor shall furnish 3 copies of the cementitious materials certification. The cost of furnishing tested cementitious materials shall be considered as included in the contract bid price and no additional allowance will be made therefore.

When suitable facilities, as recommended by the Concrete Plant Manufacturer's Bureau, and approved by the Engineer, are available for handling and weighing bulk cementitious materials, such facilities shall be used. Otherwise the cementitious material shall be delivered in original unopened sacks that bear the name or brand of the manufacturer. The type of cementitious material, and the weight contained in each sack shall be plainly marked thereon.

Cementitious materials shall be stored in such manner as to permit ready access for the purpose of inspection and identification, and so as to be suitably protected against damage by contamination or moisture. Should any lot of bulk cementitious material be delivered to the site show evidence of contamination, the Engineer may require that such lot be removed from the site.

**725.2.1 Supplementary Cementitious Materials (Pozzolans):** Supplementary Cementitious Materials to be used in concrete or furnished under this specification shall conform to the appropriate ASTM requirements as follows:

Fly ash or natural pozzolan	ASTM C-618 and C-311
Silica Fume	ASTM C-1240

Up to 25 percent by weight of the Table 725-1 minimum cementitious materials requirements may be an approved fly ash or natural pozzolan. Additional pozzolanic material in excess of the minimum Table 725-1 requirements may be incorporated into a concrete mix design to achieve enhanced performance, upon approval of the Engineer.

The Contractor shall obtain and deliver to the Engineer a certification of compliance signed by the pozzolan supplier identifying the pozzolanic material and stating the pozzolan delivered to the batching site complies with the appropriate specifications. The cost of furnishing tested pozzolan shall be considered as included in the contract bid price and no additional allowance will be made therefore.

Pozzolanic materials shall be handled and stored in the same manner as other cementitious materials. When facilities for handling a bulk pozzolan are not available, the pozzolan shall be delivered in original unopened sacks bearing the name and brand of the supplier, the type and source of the pozzolan, and the weight contained in each

sack plainly marked thereon.

**725.3 AGGREGATES:**

Coarse aggregates, consisting of crushed rock or gravel or a combination thereof, and fine aggregate shall conform to the requirements prescribed in Section 701.3.3. Prior to the delivery of the aggregates and whenever required during concrete production, the Contractor shall make stockpiles available to the Engineer for testing. All required samples shall be furnished at the expense of the Contractor, and the cost of sampling and testing shall be at the expense of the Contracting Agency.

**725.4 WATER:**

The water used for mixing concrete shall be potable or shall meet the requirements of ASTM C-1602, when tested by a qualified independent testing laboratory.

**725.5 ADMIXTURES AND ADDITIVES:**

Admixtures or additives of any type, except as otherwise specified, shall not be used unless identified in the approved mix design or authorized by the Engineer.

Water reducing admixtures incorporated into the approved concrete mix design shall meet the requirements of ASTM C-494 for the appropriate type.

Air entraining admixtures incorporated into the approved concrete mix design shall meet the requirements of ASTM C-260.

Pigments incorporated into the approved concrete mix design for integrally colored concrete shall meet the requirements of ASTM C-979.

Fibers incorporated into the approved concrete mix shall meet the requirements of ASTM C-1116.

Any admixtures used shall be included in the bid price for that item.

**725.6 MIX DESIGN PROPORTIONING:**

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

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

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

(1) Modifications which do not result in batch target weights for the fine

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aggregate or combined coarse aggregates changing by more than 5 percent from the original approved mix design.

(2) Modifications to the percentage of coarse aggregate fractions that do not change the total coarse aggregate volume.

(3) Modifications to dosages of chemical or air-entraining admixtures, within the manufacturer's recommendations.

(4) The incorporation or elimination of chemical admixtures which are listed on the mix design to effect a change in the time-of-set (retarders or accelerators).

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

(1) Modification to the class of concrete per Table 725-1.

(2) Modification to the type/class/source of cement, fly ash, natural pozzolan, or silica fume.

(3) Modification to the percentage of fly ash, natural pozzolan, or silica fume.

(4) Modification to a coarse aggregate size designation.

(5) Modification of the type of chemical admixture, or the incorporation or elimination, of an air-entraining admixture.

(6) Modification of coarse or fine aggregate source

### **725.7 MIXING:**

All proportioning/batching/mixing equipment shall comply with the standards of the Concrete Plant Manufacturer's Bureau and the certification requirements of the Arizona Rock Products Association or National Ready Mixed Concrete Association. The proportioning shall consist of combining the specified sizes of aggregates with cementitious materials, admixtures/additives, and water as herein provided. No method which may cause the segregation or degradation of materials shall be used.

Weighing and metering devices used for the purpose of proportioning materials shall fulfill requirements as to accuracy and tolerance prescribed by the Weights and Measures Division of the State of Arizona and shall be sealed and certified in accordance with the procedures established by this agency. This certification shall not be over 12 months old and shall be renewed whenever required by the Engineer. When portable plants are set up at a new or temporary location, the scales and scale assembly shall be inspected and certificate issued regardless of the date when the scales were last tested. The Engineer may require the Contractor to run a quick scale check at any time with certified weights furnished by the Contractor and order the scale recertified if necessary.

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Any admixture/additive shall be measured accurately by mechanical means into each batch by equipment or in a method pre-approved by the Engineer.

The equipment for measuring and supplying the water in the mixer shall be so constructed and arranged that the amount of water to be added to the mixture can be measured, in gallons or by weight. The amount of water shall be varied in accordance with the percentage of free moisture in the material and the requirements of the workability of the aggregate.

Machine mixing will be required in all cases unless pre-approved by the Engineer. Regardless of the method employed, mixing shall be commenced as soon as possible after the cementitious material is placed in contact with the aggregates or water. All concrete mixers shall be of such design and construction, and so operated, as to provide a thoroughly and properly mixed concrete in which the ingredients are uniformly distributed.

**725.7.1 Paving and Stationary Mixers:** Paving and stationary mixers shall comply with the standards of the Concrete Plant Manufacturer's Bureau and the certification requirements of the Arizona Rock Products Association or the National Ready Mixed Concrete Association.

Mixers shall be maintained in proper and serviceable working condition, and any part or portion thereof that is out of order, or becomes worn to such extent as to detrimentally affect the quality of mixing, shall be promptly repaired or replaced.

The proper proportions of aggregate, cementitious materials, admixtures/additives and water for each batch of concrete shall be placed in the mixer, and shall be mixed for a period of not less than 50 seconds after all such materials are in the drum.

The rotating speed at which the mixer shall be operated shall conform to that recommended by the manufacturer.

The total volume of materials mixed in any one batch shall neither exceed the water level capacity of the mixer nor the manufacturer's catalog rated capacity of the mixer.

**725.7.2 Transit Mixers:** Transit mixers shall meet the requirements of the Truck Mixer Manufacturer's Bureau and the certification requirements of the Arizona Rock Products Association or the National Ready Mixed Concrete Association. Ready mix concrete and shall comply with ASTM C-94 except as herein specified.

Each mixer and agitator shall have attached thereto in a prominent place a metal plate or plates, installed by the manufacturer, on which is plainly marked the capacity of the drum in terms of the volume of mixed concrete and the speed of rotation for the agitating and mixing speeds of the mixing drum or blades.

Each mixer shall have an identification number painted on the truck in such a location that it can be easily read from the batching platform.

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The total volume of materials introduced into the mixer for mixing purposes shall not exceed the manufacturer's guaranteed mixing capacity. If the concrete so mixed does not meet the uniformity requirements of this section, the amount of materials charged into the mixer shall be reduced.

The rotation speed at which the mixer shall be operated shall conform to that recommended by the manufacturer.

Each batch of concrete placed in the mixer shall be mixed for not less than 70 nor more than 100 revolutions of the drum or blades, at the speed designated by the manufacturer of the equipment as mixing speed. Additional mixing shall be at the agitating speed designated by the manufacturer of the equipment. The revolving of the drum shall be continuous until the concrete is completely emptied from the drum. Before any portion of the materials for any batch of concrete is placed therein, the drum of the mixer shall be completely emptied of the previously mixed batch.

At the time of delivery to the job site, the Engineer shall be provided with a legible delivery ticket which shall contain the following information:

Date and Truck Number.

Name of the Supplier.

Name of the Contractor.

Specific designation of job (name and location).

Number of cubic yards in the batch.

Time the transit mixer is loaded.

Amount of water added at the job site at request of receiver, and his signature or initials.

Suppliers' mix design code number.

Type and amount of admixture or additive that is not already included in the approved mix design, if any.

Serial number of the ticket.

Additional water may be added on the jobsite in accordance with ASTM C-94 Tolerances in Slump section to adjust slump providing the slump after such water addition does not exceed the maximum allowed by these specifications in section 725.9 (A) (1) and that water so added is mixed into the batch for a minimum of 30 additional revolutions at mixing speed. Loss of cement mortar during discharge which in the opinion of the Engineer would be of sufficient amount to affect the homogeneity of the concrete shall be cause for rejection of the load. The Contractor shall be responsible for all concrete to which water is added at the job site.

**725.7.3 Job Mixed Concrete:** All job mixed materials and procedures shall be pre-approved by the Engineer. A prepackaged commercial product shall be used for job mixed concrete placement in accordance with the manufacturer's recommended procedure.

In lieu of the use of a prepackaged commercial product, individual ingredients for concrete placement shall be prepared in a watertight container of suitable volume in batches not to exceed 1/3 cubic yard each. Proportioning of batches shall be in accordance with the applicable required mix design in Table 725-1 and section 725.6. All mixing shall be done prior to placement in the forms and in accordance with the following procedure:

- (A) Mixing shall be done in a mechanical batch mixer of approved type.
- (B) The mixer shall be rotated at a speed recommended by the manufacturer.
- (C) Mixing shall continue for at least 1-1/2 minutes after all materials are in the mixer, unless a shorter time is shown to be satisfactory by the mixing uniformity tests of ASTM C-94.
- (D) Materials handling, batching, and mixing shall conform to the applicable provisions of ASTM C-94.
- (E) Suitable records shall be kept to identify the number of batches, proportions of materials used, and time and date of mixing and placement along with the approximate location in the structure.

**725.7.4 Dry batched Unmixed Concrete:** All dry batched unmixed concrete materials and procedures shall be pre-approved by the Engineer. An accurate batch weight shall be provided to record the quantities of cementitious materials, aggregate, admixtures/additives, and water batched into the containers. The date of batching, the container number and the batching certificate number shall be recorded at the time of batching. Copies of the batch weight records shall be submitted to the Engineer upon request.

All dry batched unmixed concrete delivered to the job site shall be stored in containers so constructed that the cement cannot come in contact with the water and aggregate within the container. Any admixture/additive added in powder form shall be added to the cement; if added in liquid form, it shall be added to the water.

The contents of the container shall be discharged into a mixer at the job site. Following discharge of the first container into the mixer, the mixer shall be operated at mixing speeds during the discharge of the remaining containers. After the contents of the last container have been discharged into the mixer, the concrete shall be mixed as specified in this specification for transit mixers, and drum or turbine type mixers.

Any spillage of cementitious materials, aggregate, water or admixtures/additives during the filling, transporting, or the discharging of the container, shall be cause for rejection of the container or the contents of the mixer if any portion of the rejected container is discharged into the mixer.

**725.7.5 Volumetric Batching and Continuous Mixing Concrete and Equipment:**

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Volumetric-batching and continuous-mixing concrete and equipment may be utilized upon approval of the Engineer for job site concreting applications. Material handling, procedures, and operations shall be in accordance with ACI 304.6R, Guide for the use of Volumetric-Measuring and Continuous-Mixing Concrete Equipment and all concrete produced and all test performed shall be in accordance with ASTM C-685, Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing. All equipment shall meet the requirements of the Volumetric Mixer Standards of the Volumetric Mixer Manufacturers Bureau and shall have a suitable copyrighted rating plate furnished by the Bureau and attached to the volumetric mixing equipment.

### **725.8 TESTS AND TEST METHODS:**

**725.8.1 Field Sampling and Tests:** Concrete shall be sampled in accordance with ASTM C-172 for determination of temperature, slump, unit weight and yield (when required) and air content (when required) as well as for fabrication of test cylinders for compressive strength determination at 28 days. Samples shall be of sufficient size to perform all the required tests and fabricate the necessary test cylinders but in no case less than 1 cubic foot. Concrete shall be sampled during discharge of the middle portion of the batch. At the discretion of the Engineer, a sample may be obtained at the beginning of the discharge if the properties of the concrete do not appear to be within the specification limits for slump or temperature.

All sampling and testing shall be done by a certified technician meeting the requirements of the ACI Concrete Field Testing Technician, Grade I or equivalent.

Temperature of the concrete mixture shall be determined in accordance with ASTM C-1064.

Slump of the concrete mixture shall be determined in accordance with ASTM C-143.

Air content of the concrete mixture (when required) shall be determined in accordance with ASTM C-231 or C-173, whichever is applicable.

Unit weight and yield of the concrete mixture (when required) shall be determined in accordance with ASTM C-138.

All compressive strength test specimens shall be made, cured, handled, protected, and transported in accordance with the requirements of ASTM C-31. The contractor shall provide and maintain for the sole use of the testing laboratory/technician adequate facilities for safe storage and proper curing of concrete test cylinders on the project site including sufficient access on weekends and holidays to allow the timely pick-up of cylinders specimens. Any and all deviations from the standard procedure of any test method shall be promptly identified and corrected. Any deviations shall be clearly noted by the testing laboratory on all written reports. Testing results obtained from non-standard testing procedures shall be considered invalid and discarded by Engineer.

Sampling and testing performed for concrete acceptance will be at the expense of the Contracting Agency. Sampling and testing for the Contractor's purposes of quality

control or other needs shall be at the Contractor's expense.

**725.8.2 Concrete Cylinder Test:** A cylinder strength test shall be the average of the strengths of at least two 6 inch by 12 inch cylinders or at least two 4 inch by 8 inch cylinders made from the same sample of concrete and tested at 28 days. An adequate number of cylinder specimens shall be made for each 50 cubic yards or not less than each half-day's placement of each class of concrete. All specimens will be tested in a laboratory approved by the Engineer in accordance with ASTM C-39 for concrete acceptance. Should an individual cylinder show evidence of improper sampling, molding, curing, or testing, the results shall be discarded and the compressive strength shall be the result of the average of the remaining cylinder(s). Additional cylinder specimens may be made and tested at other ages to obtain additional compressive strength information and shall not be considered as acceptance tests. Cylinder testing performed for concrete acceptance will be at the expense of the Contracting Agency. Cylinder testing for the Contractor's purposes of quality control or other needs shall be at the Contractor's expense.

**725.8.3 Additional Concrete Testing:** If the 28-day strength test does not meet the compressive strength requirements, additional concrete testing may be performed to further evaluate the concrete in question for purposes of acceptability or payment. This may involve testing of additional cylinders at later ages, (for example - hold cylinders at 56 days or more), or core testing to determine in-place concrete strengths. This additional testing and all coring repairs shall be at the expense of the Contractor and pre-approved by the Engineer, unless otherwise agreed upon by the Contractor and the Engineer. If core testing is performed, at least three representative cores shall be obtained, conditioned and tested in accordance with ASTM C-42 from each concrete member or area of concrete to be tested at locations designated by the Engineer. Cores damaged subsequent to or during removal shall be rejected and additional core samples taken. Cores shall be obtained and delivered to a laboratory acceptable to the Engineer in time to allow complete strength testing within 48 days of original concrete placement. The Contractor may elect to have a representative present during sampling and testing. A core strength test shall be the average of the results of the three cores. Should an individual core show evidence of improper sampling, curing, or testing, the results shall be discarded and the compressive strength shall be the result of the average of the remaining core(s). Results of the core strength testing shall replace the results of the cylinder strength test for that sample.

**725.9 ACCEPTANCE:**

**(A) Plastic Concrete Properties**

(1) The slump of the concrete shall meet the requirements of ASTM C-94 Tolerances in Slump section. When the approved mix design or project specification requirements for slump are a "maximum" or "not to exceed", the following tolerances apply:

Specified slump:	If 3" or less	If more than 3"
Plus tolerance	0 inch	0 inch

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Minus tolerance

1 1/2 inch

2 1/2 inch

When the approved mix design or project specification requirements for slump are not written as a “maximum” or “not to exceed”, the following tolerances apply:

For design slump of:	Tolerance
2 inch and less	+/- 1/2 inch
More than 2 through 4 inch	+/- 1 inch
More than 4 inch	+/- 1 1/2 inch

(2) Limit the maximum allowable temperature of the concrete mixture immediately before placement to 90 degrees F unless otherwise specified or unless a higher allowable temperature is pre-approved by the Engineer. At the discretion of the Engineer, recommended practices in ACI 305, Specification for Hot Weather Concreting, can provide good reference information and may be used to modify maximum allowable concrete temperature and acceptance.

Per ACI 306, Specification for Cold Weather Concreting, when the atmospheric temperature at the time of placing concrete is above 30°F the temperature of the concrete, as placed, shall not be less than 60°F. When the atmospheric temperature at the time of placing concrete is between 0°F and 30°F the temperature of the concrete, as placed, shall not be less than 65°F.

(3) Air entrained concrete shall meet the requirements of ASTM C-94 Air-Entrained Concrete section. The air content of air-entrained concrete when sampled from the transportation unit at the point of discharge shall be within the approved mix design tolerance or +/- 1.5 % of the specified value. When a representative sample taken prior to discharge shows an air content below the specified level by more than the allowable tolerance, additional air entraining admixture shall be added to the concrete mix to achieve the desired air content level, followed by a minimum of 30 revolutions at mixing speed.

(4) Per ASTM C-94 Mixing and Delivery section, discharge of the concrete shall be completed within 1 1/2 hour after the introduction of the mixing water to the cementitious materials or the introduction of the cementitious materials to the aggregates. The Engineer may allow the continuation of concrete placement after the 1 1/2 hour time limit has been reached if the concrete is of such slump or workability that it can be placed without the addition of water to the batch.

Any concrete failing to meet the tolerances for plastic concrete properties in 725.9 (A) (1) through (4) shall be reviewed by the Engineer and is subject to rejection.

**(B) Hardened Concrete Properties – Compressive Strength**

Compressive strength of concrete shall be determined on the basis of cylinder strength tests obtained in accordance with section 725.8.2 and shall be acceptable if the tests meet or exceed the minimum specified strength. When the validity of cylinder strength

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tests are suspect, the strength of concrete in question shall be determined in accordance with section 725.8.3.

When compressive strength test results are less than the specified minimum, an Engineering Analysis to determine the impact of the strength reduction may be required by the Engineer prior to the decision to accept or reject the concrete. The Engineering Analysis will be at the Contractor’s expense, unless otherwise agreed upon by the Contractor and the Engineer. Any concrete that is rejected by the Engineer shall be removed and replaced by the Contractor at the Contractor’s expense.

When concrete is accepted by the Engineer on the basis of test results of less than 100% of the required minimum compressive strength, an adjustment in the concrete unit price may be made for the quantity of concrete represented by such strength tests in accordance with table 725-2.

<b>TABLE 725-2</b>			
<b>Adjustment in Concrete Unit Price Based on Strength Deficiency</b>			
<b>Class AA and Class A</b>		<b>Class B and Class C</b>	
<b>Percent of Specified Minimum 28-day Compressive Strength Attained (Nearest 1%)</b>	<b>Percent of Concrete Unit Price Allowed</b>	<b>Percent of Specified Minimum 28-day Compressive Strength Attained (Nearest 1%)</b>	<b>Percent of Concrete Unit Price Allowed</b>
<b>100 % or greater</b>	<b>100</b>	<b>100 % or greater</b>	<b>100</b>
<b>98-99</b>	<b>90</b>	<b>95-99</b>	<b>95</b>
<b>96-97</b>	<b>85</b>	<b>90-94</b>	<b>90</b>
<b>95</b>	<b>80</b>	<b>85-89</b>	<b>85</b>

## **ROCK, GRAVEL, AND SAND**

### **701.1 GENERAL:**

The following specifications set forth the requirements for crushed rock, gravel, sand, and quarry stone. Samplings and sieve analysis shall be performed in accordance with ASTM D-75 and ASTM C-136. Sand equivalents shall be determined in accordance with AASHTO T-176. The liquid limit and plasticity index shall be determined in accordance with AASHTO T-89 and T-90.

### **701.2 CRUSHED ROCK AND GRAVEL:**

Rock and gravel shall be clean, hard, sound, durable, uniform in quality, and free of any detrimental quantity of soft, friable, thin elongated, or laminated pieces, disintegrated material, organic matter, oil, alkali, or other deleterious substance.

The loss by abrasion in the Los Angeles abrasion machine, determined as prescribed in ASTM C-131, Grading A, shall not exceed 10 percent, by weight, after 100 revolutions nor 40 percent after 500 revolutions.

**701.2.1 Crushed Rock:** Crushed rock shall consist of the product obtained by crushing rock, stone, or gravel so that at least 50 percent by weight of aggregate retained on the No. 4 sieve for 3/4 inch or larger maximum sizes, and 50 percent retained on the No. 8 sieve for maximum sizes less than 3/4 inch shall consist of particles which have at least one rough, angular surface produced by crushing. All material that will pass a grizzly with bars spaced 15 inches apart, clear opening, shall be crushed when producing from the Contracting Agency's source.

The gradation of crushed rock shall comply with ASTM D-448.

**701.2.2 Gravel:** Material designated herein as gravel shall be composed entirely of particles that are either fully or partially rounded and water-worn. Crushed rock obtained by crushing rock which exceeds ASTM D-448 maximum gradation sizes may be combined provided it is uniformly distributed throughout and blended with the gravel. The quality and gradation requirements shall be as stated in this specification.

### **701.3 AGGREGATE:**

Sand shall be fine granular material produced by the crushing of rock or gravel or naturally produced by disintegration of rock and shall be sufficiently free of organic material, mica, loam, clay, and other deleterious substances to be thoroughly suitable for the purpose for which it is intended.

**701.3.1 Sand for Asphalt Concrete Pavement:** Sand for asphalt concrete pavement shall comply with AASHTO M-29 except that grading requirements shall be deleted and have a minimum sand equivalent of not less than 50 and shall be non-plastic when tested in accordance with AASHTO T-89 and T-90.

**701.3.2 Sand for Mortar and Plaster:** It shall be thoroughly and uniformly washed and shall be entirely free from oil and deleterious substances.

The average value of sand equivalent determined on 3 successive samples shall not be less than 70. No individual sample shall have a sand equivalent less than 65.

The size and grading of sand to be used in mortar, and plaster shall be such as to conform with the requirements specified as follows:

Mortar:                ASTM C-144

Plaster:                ASTM C-35

**701.3.3 Aggregate for Portland Cement Concrete:** Coarse and fine aggregate shall conform to the applicable requirements of ASTM C-33.

Coarse aggregate grading requirements shall conform to the appropriate rock size designation in the Grading Requirements for Coarse Aggregate Table. Fine aggregate grading requirements shall conform to the Fine Aggregate Grading section.

The average value of 3 successive sand equivalent samples shall not be less than 70 when tested in accordance with AASHTO T-176. No individual sample shall have a sand equivalent less than 65.

The loss by abrasion in the Los Angeles abrasion machine, determined as prescribed in ASTM C-131, Grading A, shall not exceed 10 percent, by weight, after 100 revolutions nor 40 percent after 500 revolutions.

**701.3.4 Aggregate for Masonry Grout:** The size and grading of the fine or coarse aggregate to be used in masonry grout shall conform to ASTM C-404.

**701.3.5 Aggregate for Controlled Low Strength Material:** Coarse aggregate shall conform to ASTM C-33 grading size No. 57. The size and gradation of fine aggregates (sand) shall conform to ASTM C-33.

#### **701.4 QUARRY STONE:**

**701.4.1 General:** Quarry stone shall be angular, sound, durable, hard, resistant to abrasion; free from laminations, weak cleavages, and undesirable weathering, leaching, exfoliation tendencies, and slaking; and of such character that it will not disintegrate from the action of air, water, or the conditions to be met in handling and placing. Stone shall be clean and free from deleterious impurities, including alkali, earth, clay, refuse, and adherent coatings. Suitable tests and/or service records will be used to determine the acceptability of the stone. Tests to which the material may be subjected include petrographic analysis, X-ray diffraction, specific gravity, absorption, abrasion, rock drop, soundness, wetting and drying, and such other tests as may be considered necessary

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to demonstrate to the Engineer that the materials are acceptable for use in the work. In connection therewith, the Contractor shall notify the Engineer in writing at least 60 days prior to use of the intended sources of quarry stone.

**701.4.2 Test Requirements:** Quarry stone shall meet the following requirements except as may be otherwise provided on the plans and in the special provisions:

(A) Apparent specific gravity: 2.65 minimum.

(B) Breakdown:

Rock drop breakdown:	5 percent maximum
Abrasion breakdown at 1000 revolutions:	40 percent maximum
Breakdown after 10 cycles of wetting and drying:	5 percent maximum
Solubility in water, breakdown, or softening:	None

**701.4.3 Test Methods:** Unless otherwise specified in the special provisions or indicated on the plans, test methods for quarry stone shall be as follows:

Apparent specific gravity per ASTM C-127.

(B) Abrasion characteristics to be determined by either Rock Drop Test or Los Angeles Rattler, ASTM C-131, as required on the plans or the special provisions.

(1) Standard Rock Drop Test. Tests shall be made on groups of 5 accurately weighed sizes of rocks: No. 1, ranging from 75 to 100 lbs.; No. 2, 100 to 125 lbs.; No. 3, 125 to 150 lbs.; No. 4, 150 to 175 lbs.; No. 5, 175 to 225 lbs.

Each rock of the 5 sizes shall be dropped 3 times on the group of the other 4, in an enclosure, from successive heights of 10, 15, and 18 feet. The enclosure shall have a flexible medium weight galvanized iron floor or equivalent, set on a solid foundation. Order of dropping shall be Nos. 3, 2, 4, 1, 5. All rock passing a 3 inch square mesh screen after test shall be weighed and recorded as a percentage of the total initial weight of the 5 rocks.

(2) Los Angeles abrasion machine, per ASTM C-131, Grading B.

C) Wetting and drying. The stone shall be crushed, screened, and 1000 or 1500 grams of the 3/4 inch to 3/8 inch fraction taken for the test.

The crushed and graded stone shall be submerged in water for 18 hours at room temperature, after which the sample shall be drained and oven-dried at 140°F. When dry, the sample shall be cooled to room temperature. This would complete one cycle.

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The percent loss shall be determined by screening the tested sample on a No. 4 sieve and shall be computed as follows:

$$\frac{100 \times \text{Weight of Materials Passing No. 4 Sieve}}{\text{Total Weight of Sample}} = \% \text{ Loss}$$

(D) Accelerated water breakdown and solubility test. Air-dry samples of representative stone weighing approximately 1 lb. each shall be immersed for 8 hours at 140°F., in distilled water, local tap water, or 3.5 percent sodium chloride solution.

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## SECTION 505

An adjustment in the contract unit price, to the nearest cent, will be made for the quantity of concrete represented by the results of cylinder strength tests that are less than the specified 28-day compressive strength. Strength tests will be conducted in accordance with Section ~~725.10~~ 725.8 of the Uniform Standard Specifications. The adjustment in contract unit price, if the concrete is accepted, will be based on ~~Table 725-2~~ the schedule in Section ~~725.11~~ 725.9.

The contract unit price for structural concrete shall include full compensation for all items incidental to providing a concrete structure complete in place, including waterstops, roadway drains, scuppers, metal inserts, and bearing pads.

### 505.12.3 Minor Concrete Structures and Accessories:

The accepted quantities of:

Minor Structures	Each
Deck Joint Assemblies	0.1 Foot
Bridge Pedestrian Fence and Curb	0.1 Foot
Bridge Pedestrian Fence and Parapet	0.1 Foot
Bridge Fence and Parapet	0.1 Foot
Bridge Traffic and Pedestrian Rail	Foot
Bridge Concrete Barrier	0.1 Foot
Bridge Concrete Barrier Transition	Each
Reinforced Concrete Approach Slab	Square Yard

will be paid for at the unit price and/or lump sums as set forth in the proposal. The contract unit price shall include full compensation for all labor, materials, tools and equipment necessary to provide the concrete structure or accessory complete in place, including all concrete, reinforcing steel, and items embedded in the concrete, such as anchor bolts, grates and frames, metal inserts, etc.

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End of Section

## SECTION 728

### CONTROLLED LOW STRENGTH MATERIAL

#### 728.1 GENERAL:

Controlled Low Strength Material (CLSM) is a mixture of portland cement, aggregate and water that, as the cement hydrates, forms a soil replacement. CLSM is a self-compacting, flowable, cementitious material that is primarily used as a backfill or structural fill in lieu of compacted fill or unsuitable native material.

#### 728.2 MATERIALS:

Portland Cement shall conform to Section 725.2.

Coarse and fine aggregates shall conform to Section 701.

Water shall conform to Section 725.5. 725.4

#### 728.3 PROPORTIONING OF MIXTURES AND PRODUCTION TOLERANCES:

Proportioning of the mixture shall comply to Section 701.3.5, Section 725.7 725.6 and Table 728-1. A mix design shall be submitted with test data for the Engineer's approval prior to the excavation for which the material is intended for use.

TABLE 728-1			
CONTROLLED LOW STRENGTH MATERIAL REQUIREMENTS			
Description of CLSM	Cement Content, lbs/cu yd	Slump, inches	Compressive Strength at 28 days, psi
1/2 Sack CLSM	47±5%	7±1	70±30
1 Sack CLSM	94±5%	7±1	150±50
1 1/2 Sack CLSM	141±5%	7±1	425±75

Notes for Table 728-1:

- The values specified in the table are for both mix design requirements and field production. The deviations are for production, testing and sampling tolerances.
- Slump shall be tested in accordance with ASTM C-143. Flow consistency test can be substituted for the slump test. When used, the CLSM shall have a flow consistency of 8 inches as tested in accordance with ASTM D-6103.
- Compressive strength shall be tested in accordance with ASTM D-4832 . The supplier shall provide laboratory and/or field test data to verify the design strength.
- Sampling shall be in accordance with ASTM D-4832.
- Unit weight shall be obtained by ASTM D-6023.
- Temperature shall be taken in accordance with ASTM C-1064.
- Cement content shall be tested in accordance with ASTM D-5982.

Where CLSM is to be used as backfill around gas pipelines (totally encapsulating the gas pipeline), the material shall meet a minimum permeability coefficient (k) of  $1 \times 10^{-5}$  cm/sec or more, based on ASTM D-5048.

#### 728.4 MIXING:

The total elapsed time between the addition of the water and placement of the complete mix shall not exceed 90 minutes. The Engineer may waive this limitation if the slump is such that the material can be placed without addition of water.

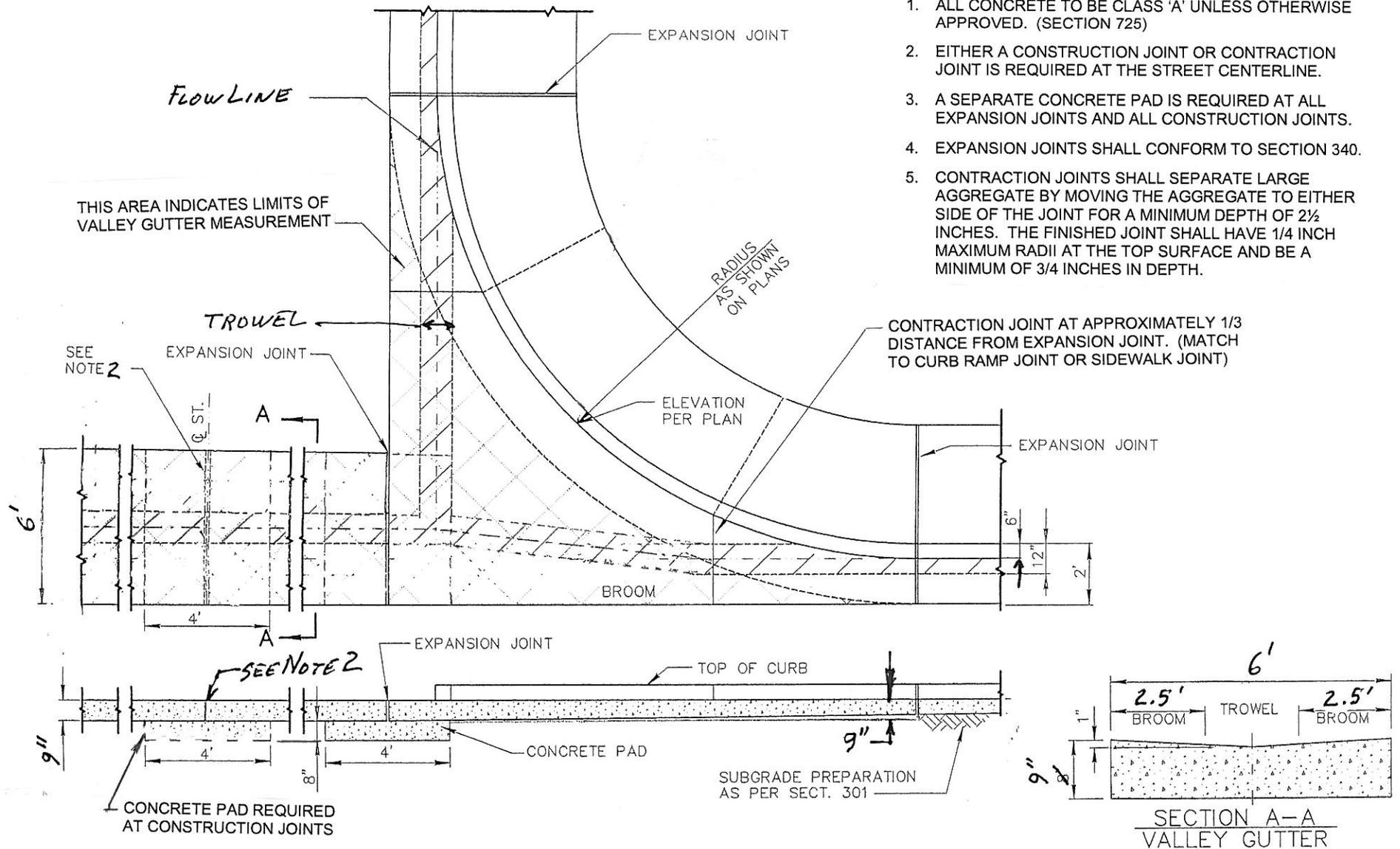
Mixing shall continue until the cementitious material and water are thoroughly dispersed throughout the material. Mixes shall be homogenous, readily placeable and uniformly workable. Proportioning of ingredients shall produce consistency, durability, workability and other required properties appropriate for the intended usage. When the

## SECTION 728

CLSM is mixed other than at the project site, the mixing shall comply with Section ~~725.8~~ **725.7**. When the CLSM is mixed at the job site, the Contractor will submit for the Engineer's approval, the methods, equipment and procedures for proportioning and mixing of the material.

**NOTES:**

1. ALL CONCRETE TO BE CLASS 'A' UNLESS OTHERWISE APPROVED. (SECTION 725)
2. EITHER A CONSTRUCTION JOINT OR CONTRACTION JOINT IS REQUIRED AT THE STREET CENTERLINE.
3. A SEPARATE CONCRETE PAD IS REQUIRED AT ALL EXPANSION JOINTS AND ALL CONSTRUCTION JOINTS.
4. EXPANSION JOINTS SHALL CONFORM TO SECTION 340.
5. CONTRACTION JOINTS SHALL SEPARATE LARGE AGGREGATE BY MOVING THE AGGREGATE TO EITHER SIDE OF THE JOINT FOR A MINIMUM DEPTH OF 2½ INCHES. THE FINISHED JOINT SHALL HAVE 1/4 INCH MAXIMUM RADII AT THE TOP SURFACE AND BE A MINIMUM OF 3/4 INCHES IN DEPTH.



DETAIL NO.  
240



MARICOPA  
ASSOCIATION of  
GOVERNMENTS

STANDARD DETAIL  
ENGLISH

VALLEY GUTTER

REVISED  
01-01-2003

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240

CASE 09-08  
Revised 8/05/2009

SECTION 792

DUST PALLIATIVE

792.1 GENERAL:

Dust palliatives shall consist of various chemical dust suppressants which work by binding together lighter soil particles.

All materials must meet the environmental requirements of Section 792.3 and must be approved by the Engineer prior to their use.

792.2 TYPE OF MATERIALS AND APPLICATION RATES:

Emulsions shall be miscible with water in all proportions as noted in Table 792-1. The dilution ratio will vary based upon the local soil and weather conditions. The ratios shall be proposed by the Contractor and agreed upon by the Engineer.

The rate of application noted in Table 792-1 shall be for the treatment, method and use specified by the Contracting Agency, or as directed by the Engineer. To compensate for local conditions, the Contractor may adjust the application rate within the ranges specified.

Products specifically formulated as tackifiers which prevent wind-blown erosion shall not be acceptable as dust palliatives for vehicular traffic, but may be used for their intended purposes.

Based on input from product vendors, the values shown in Table 792-1 need to be adjusted. Also, the market is now broadened for polymers, copolymers and tall oils. Modifications are intended to keep up with changes in products.

Product Type	Use/Treatment <sup>(1)</sup>	Dilution Ratio <sup>(2)</sup>		Application Rate <sup>(3)</sup> (gal/sy) [l/m <sup>2</sup> ]
		Range	Typical	
Acrylic Copolymer	Topical - Road or parking Lot	20:1 to 4:1	9:1	0.20 to 0.10
	Topical - Road Shoulder	20:1 to 4:1	15:1	0.16 to 0.09
	Surface Course (per inch of depth)	20:1 to 4:1	9:1	0.10 to 0.06
Petroleum Resin Emulsified	Topical - Road or parking Lot	4:1	4:1	0.15 to 0.10
	Topical - Road Shoulder	10:1 to 7:1	8:1	0.15 to 0.07
	Surface Course (per inch of depth)	4:1	4:1	0.11 to 0.07
Lignin-Based Type (Lignosulfonate)	Topical - Road or parking Lot	1:1	1:1	0.10 to 0.05
	Topical - Road Shoulder	7:1 to 4:1	4:1	0.05 to 0.03
	Surface Course (per inch of depth)	1:1	1:1	0.30 to 0.10
Organic Resin	Topical - All	10:1 to 2:1	5:1	0.25 to 0.15
	Surface Course (per inch of depth)	2:1 to 1:1	1:1	0.15 to 0.10
Other	As approved by the Engineer			

Product Type	Use/Treatment <sup>(1)</sup>	Dilution Ratio <sup>(2)</sup>		Application Rate <sup>(3)</sup> (gal/sy)
		Range	Typical	
Acrylic Copolymer and Polymer	Topical – Road or parking Lot	20:1 to 4:1	9:1	0.20 to 0.15
	Topical – Road Shoulder	20:1 to 4:1	15:1	0.16 to 0.12
	Surface Course (per inch of depth)	20:1 to 4:1	9:1	0.08 to 0.06
Lignin-Based Type (Lignosulfonate)	Topical – Road or parking Lot	1:1	4:1	0.10 to 0.05
	Topical – Road Shoulder	7:1 to 4:1	8:1	0.05 to 0.03
	Surface Course (per inch of depth)	1:1	4:1	0.30 to 0.10
Organic Resin	Topical – All	10:1 to 2:1	5:1	0.25 to 0.15
	Surface Course (per inch of depth)	2:1 to 1:1	1:1	0.15 to 0.10
Petroleum Resin Emulsified	Topical – Road or parking Lot	4:1	4:1	0.15 to 0.10
	Topical – Road Shoulder	10:1 to 7:1	8:1	0.15 to 0.07
	Surface Course (per inch of depth)	4:1	4:1	0.11 to 0.07
Tall Oil Pitch Emulsion	Topical – Road or parking Lot	20:1 to 5:1	5:1	0.20 to 0.15
	Topical – Road Shoulder	20:1 to 3:1	3:1	0.16 to 0.12
	Surface Course (per inch of depth)	20:1 to 2:1	10:1	0.08 to 0.06
Other	As approved by the Engineer			

- (1) Topical application rates shown are to obtain 1/2 to 1 inch penetration. Higher rates should be used if greater penetration is anticipated.
- (2) The dilution ratio (water:product) is variable and shall be appropriate for the local soil and weather conditions, as proposed by the Contractor and agreed upon by the Engineer.
- (3) Application rate of undiluted concentrate.

(A) Acrylic Copolymer Types: \_\_\_\_\_ and Polymer

The material shall be a white or clear emulsion that can penetrate, saturate and bond together treated soils to create a hard, dust-free and water resistant surface. The material shall have the following properties in its undiluted state:

Paragraph included to insure testing and product compliance are performed, with the responsibility on the contractor.

Contractor shall submit proof of conformance in the form of test reports to verify that the dust palliative product proposed for use meets the minimum material requirements specified in this section. Testing must be specific to the proposed product and not generic to similar type palliative products. Testing shall be performed by independent AASHTO accredited laboratories, and signed and sealed by Professional Engineers registered in the State of Arizona. The Contractor is responsible for any costs associated with the testing of soil and palliative product prior to the application of as specified herein.

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Specification Designation	ASTM Test Method	Requirements
Composition	–	Acrylics, acrylates & acetates
pH	E 70	4.0 - 9.5
Residue (active solids content), %	D 244	40 min.
Flash Point, °F	D 92	None
Absolute Viscosity (Brookfield), cP, 77 °F.	–	1500 max.
Specific Gravity, 60/60 °F.	D 1298	1.00 - 1.15

(D) ~~(B)~~ Petroleum Resin Emulsified Types:

The materials shall be a light yellow petroleum resinous emulsion suitable for use as an agglomerate for soil particles. The material shall have the following properties in its undiluted emulsified state:

Specification Designation	ASTM Test Method	Requirements
Kinematic Viscosity, SFS at 77 °F.	D 244	15 min.
pH	E 70	4.0 - 7.0
Residue, % wt. (1)	D 244	64±4
Sieve Test, % wt. Retained (2)	D 244	0.1 max.
Particle Charge Test	D 244	Positive
Flash Point of base product, CO, °F.	D 92	400 °F. min.
Specific Gravity of base product, 60/60°F.	D 1298	1.00 to 1.04

(A) ASTM test modified by heating 50 g of sample to 300 °F. until foaming ceases, then cooling immediately and calculation results.

(B) Replace 2% sodium oleate solution with distilled water in test.

The emulsion shall be stable, i.e., should not break when stored in clean closed containers at temperatures between 35°F. and 200 °F. for a minimum of 3 months. The sequestering agents shall make the preparation stable against hard water, thus permitting dilution of the emulsion with almost all types of water. The emulsion shall be non-corrosive to metal containers. The materials shall penetrate into the soil and not form a skin at the surface or a crusted surface.

(B) ~~(C)~~ Lignin-Based Types:

Lignin-based dust palliative shall be an aqueous lignosulfonates (a residual co-product of wood pulping by the sulfite process in the manufacturer of cellulose products) that dispersed readily in water to yield a stable, brown-colored solution. The material shall have the following properties in its undiluted state:

Specification Designation	ASTM Test Method	Requirements
Absolute Viscosity (Brookfield), cP, 77°F.	–	< 1,000
Residue (total solids content), %	D 244	48 min.
Lignin sulfonate content (% of solids)	D 244	60 min.
pH	E 70	5.0 - 7.0
Specific Gravity (liquid), 77/60°F.	D 1298	1.00 min.

Language from COP Aviation specification for acrylic products to quantify the binding characteristics of the product.  
 Moved – Now a new subsection 792.3 and can be applied to all stabilizers

~~Acrylic Copolymer/Polymer Performance Tests: Product shall be blended at the specified stabilizer content application rate with soil that is either representative of the site soils to be treated or be a local A-7 in accordance with AASHTO M145 (as determined by the Engineer) and tested in accordance with ASTM D1883. Results of treated soil must show a minimum 25% increase in CBR (California Bearing Ratio) value over the untreated soil for the acrylic copolymer/polymer product to be accepted for either topical dust suppression or soil stabilization.~~

~~Test Method: Testing shall be in accordance with ASTM D1883, as modified herein. Test reporting shall include all the information required by ASTM D1883, Section 10.0 for both treated and untreated CBR samples. In addition, the penetration vs. stress plow for each test shall be included (ASTM D1883, Fig. 2). CBR specimens, after molding, shall be left in their mold, on their sides and cured in the laboratory air for 7 days prior to being immersed in water for 96 hours and then tested for CBR. At least three CBR test specimens shall be compacted at the optimum moisture content, both treated and untreated (ASTM D698, method C), with the result reported as the average value. The surcharge weight shall be 10 pounds.~~

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(C) ~~(D)~~ Organic Resinous Types:

The material shall be a tan emulsion designed specifically for dust control of unpaved roads, traffic surfaces, and road shoulders that utilizes non-petroleum based organic esters and resins combined with other additives to penetrate, bond and coat treated soils. The material shall have the following properties in its undiluted state:

Specification Designation	Test Method	ASTM	Requirements
Absolute Viscosity (Brookfield), cP, 77°F	-		50 - 200
PH	E 70		3.0 - 9.0
Residue (active solids content), %	D 244		45 min
Flash Point	D 92		None
Specific Gravity, 60/60°F	D 1298		1.00 min.

(F) ~~(E)~~ Other Types:

Other types of dust palliative may be approved for use by the Engineer. Test methods, requirements, dilution ratios and application rates shall be as specified by the manufacturer.

792.4 ~~792.3~~ ENVIRONMENTAL CRITERIA:

Products shall not contain or emit chlorinated fluorocarbons (CFS's Freon's) and shall not contain or emit volatile organic compounds (VOC's) that exceed Federal, State or Local air quality limitations.

Products and their degradation products shall not be composed of elements, compounds, mixtures or produce runoffs with the characteristics identified under Arizona Revised Statutes 36-2822 of the Arizona Hazardous Waste Management Act, emit or off-gas during placement, use or degradation of any hazardous air pollutant listed under Section 112 of the Federal Clean Air Act [42 U.S.C. § 7412], be a hazardous chemical substance or mixture pursuant to Section 7 of the Federal Toxic Substances Control Act [15 U.S.C. § 2606], be designated by rule an extremely hazardous chemical substance pursuant to the Arizona Environmental Quality Act, produce runoffs that contain concentrations exceeding the parameters designated in Section 2.18 "Table 5" of the National Pollution Discharge Elimination System (NPDES) Multi-Sector General Permit for Industrial Activities (see Note A), be prohibited for use by the Arizona Department of Environmental Quality, the Environmental Protection Agency, or any applicable law, rule or regulation.

Products or their components and degradation products shall be tested and certified by the manufacturer not to be substances or composed of substances known to be, or reasonably anticipated to be carcinogenic or toxic by the U.S. Department of Health and Human Services.

Products must have hazardous Materials Identification System (HMIS) ratings equal to or less than the following for each category: H=1; F=1; R=1; PPE=X.

Note A: Parameter benchmark values shall be provided by the Engineer and based on the Contracting Agency's requirements.

End of Section

(E) Tall Oil Pitch Emulsion:

The material shall be a light brown tree resinous emulsion produced from distilled tall oil and not associated with the use of chlorine-based chemicals to bleach pulp from the production of paper. The product shall be designed specifically for dust control of unpaved roads, traffic surfaces, and road shoulders that can penetrate, saturate and bond together soils to create a hard, dust-free and water repellant surface. The product shall be non-water soluble once cured. The emulsion shall have the following properties in its undiluted state:

Specification Designation	ASTM Test Method	Requirements
pH	E70	2.5 – 9.0
Residue (active solids content), %	D244	35 min.
Flash Point	D92	None
Specific Gravity, 60°/60°F	D1298	0.998 min.

792.3 PERFORMANCE STANDARDS AND TEST METHODS:

Product shall be blended at the specified stabilizer content application rate with soil that is either representative of the site soils to be treated or be a local A-7 in accordance with AASHTO M145 (as determined by the Engineer) and tested in accordance with ASTM D1883. Results of treated soil must show a minimum 25% increase in CBR (California Bearing Ratio) value over the untreated soil for the product to be accepted for either topical dust suppression or soil stabilization.

Testing shall be in accordance with ASTM D1883, as modified herein. Test reporting shall include all the information required by ASTM D1883, Section 10.0 for both treated and untreated CBR samples. In addition, the penetration vs. stress plow for each test shall be included (ASTM D1883, Fig. 2) along with the rate of product application and the percent stabilizer solids. CBR specimens, after molding, shall be left in their mold, on their sides and cured in the laboratory air for 7 days prior to being immersed in water for 96 hours and then tested for CBR. At least three CBR test specimens shall be compacted at the optimum moisture content, both treated and untreated (ASTM D698, method C), with the result reported as the average value. The surcharge weight shall be 10 pounds.

Paragraph included to insure testing and product compliance are performed, with the responsibility on the contractor.

Contractor shall submit proof to the Agency in the form of test reports and certificates to verify that the dust palliative product is in environmental compliance. The Contractor is responsible for any costs associated with the testing of soil and palliative product prior to the application of as specified herein.

Included to provide more defined method to insure environmental compliance (language adapted from COP Aviation specification).

Product runoff and their degradation product runoffs shall not contain concentrations that exceed the parameters designated in Section 2.18 "Table 5" of the National Pollution Discharge Elimination System (NPDES) Multi-Sector General Permit for Industrial Activities (see Note A). Adequate proof can be shown by providing one of the following:

- A. Complete aquatic toxicity test for lethal concentration at 50% (LC50).
- B. Provide complete and accurate listing of all individual chemical constituents (including proprietary chemical information) and percentage of each in a given volume of pure chemical product.
- C. Surface water runoff test. This test involves running distilled water over a treated soil area, collecting the test water, and submitting to a certified lab for analysis.

Contractor shall obtain from the dust palliative product manufacturer independent verification and certification of performance and environmental claims by a recognized agency of the United States, Canadian Precertification, Environmental Technology Verification, or EcoLogo Certification programs for chemical dust suppressants.

SECTION 230

DUST PALLIATIVE APPLICATION

230.1 DESCRIPTION:

This section shall govern the application of dust control palliatives (agents) on unpaved roads, traffic surfaces, vacant lots, construction sites and road shoulders. Dust palliatives may also be used to protect erosion of slopes, embankments, sediment control and re-vegetated areas.

Dust palliatives may be applied as topical treatments to penetrate an undisturbed surface, or may be applied to larger areas using mixing methods that blend the product with surface material and then compact the mixture to provide a stabilized, dust resistant, surface course.

230.2 MATERIALS:

Materials to be used as dust palliatives shall conform to the requirements of Section 792. The specific dust palliative to be used shall be as shown on the plans or as directed by the Engineer.

Water used for diluting dust palliatives and for pre-wetting of treated subgrade shall be either potable or from a source compatible with dust palliative ingredients.

230.2.1 Product Verification :

The Contractor, in the presence of the Engineer or his designee, shall obtain samples of the bulk, undiluted liquid dust palliative/stabilizer product as it is delivered to the job site. Samples shall be taken from each bulk tanker that delivers the liquid dust palliative/stabilizer for product verification testing purposes. If the bulk undiluted liquid dust palliative/stabilizer is delivered in containers, a sample must be taken from each container delivered to the job site. The Engineer will select the exact locations and times of sampling. The obtained liquid dust palliative/stabilizer samples will be split in three equal portions (minimum 2 ounce each), whereby the Contractor may retain one sealed portion for verification testing, and the Engineer will retain two sealed portions. One portion of the Agency's samples will be provided to an AASHTO accredited test lab chosen by the Contractor. The other sample will be held for backup until the testing is completed. Sample containers will be labeled and sealed under the supervision of the Engineer.

The accredited lab will test the product in accordance with ASTM D2834 to confirm that the liquid dust palliative/stabilizer meets the Agency.

If the test reports indicate that the minimum acceptable active solids content value as specified in Section 792.2 is not met, the quality of the liquid dust palliative/stabilizer product shall be deemed deficient by the Engineer. The delivery and application of a deficient product shall be stopped, and the Agency will make no additional orders or award future bids to a supplier of a deficient product.

The Contractor may perform additional verification testing on the split samples. In case of dispute where the verification tests produce different results by the Contractor than the Engineer, the Engineer will hire a different independent AASHTO accredited testing laboratory to perform a third round of testing. Such testing and the results of the testing shall be considered final by both the Engineer and Contractor for verification.

230.3 COMPLIANCE:

At least two weeks prior to the start of work, the Contractor shall provide the Engineer the following Applicator qualifications: (a) Information showing that the Applicator shall have at least three years of experience within the last five years serving as either a primary contractor or subcontractor in delivering and applying dust palliative/stabilizer product services, (b) A minimum 3 local references (including company/organization name, contact person and telephone number) to demonstrate that the Applicator is familiar with local environmental and permitting requirements associated with soil stabilization and dust palliative, and (c) Copy of the Applicator's of State of Arizona Registrar of Contractors License.

At least two weeks prior to the start of work, the Contractor shall provide the Engineer the proposed application methods and equipment for the project. The information provided shall include: (a) curing time for each application method required for the project, (b) application and dilution rates proposed for the project, and (c) equipment to be used during all phases of application that are in conformance with Section 230.4.

Prior to the commencement of any work, the Contractor shall provide copies of all required environmental/dust control permits, any required notices of intent, and the current Material Safety Data Sheet (MSDS) for the dust palliative/stabilizer product. The MSDS must include all chemical compounds present in concentrations greater than ~~0.4%~~ 1% for dust palliative/stabilizer product.

~~230.3~~ **EQUIPMENT:**

**230.4**

The Contractor shall provide all equipment necessary to complete the work. The equipment may include but not be limited to motorized graders, distribution trucks, mixing and pulverizing equipment, pneumatic-tired rollers, sprinkler systems, etc. All equipment used for this work is subject to approval by the Engineer. Equipment that does not perform satisfactorily shall be removed from the job.

which fails to provide an acceptable application of properly diluted dust palliative/stabilizer product or

and replaced with acceptable equipment meeting the requirement of this specification.

~~Distributor trucks shall be pressure type with a computer-controlled applicator. Spray bars and extensions on distribution trucks shall be of the full circulating type. The spray bar shall be adjustable to permit varying height above the surface to be treated.~~

Repeated in 230.6. Move to 230.6 to combine similar concepts in the same place.

**230.4 PREPARATION OF SURFACE:**

**230.5**

All surface preparation shall be in conformance with Maricopa County Rule 310 and 310.01 as applicable.

**5**

**230.4.1 Topical Preparation:** Prior to the application of the dust palliative, the surface shall be graded to provide drainage.

Distributor trucks shall be in accordance with ADOT Section 404-3.02. Distributor trucks shall be designed, equipped, maintained and operated so that dust palliative/stabilizer product may be applied uniformly on variable widths of surface up to 16 feet at readily determined and controlled rates from 0.03 to 1.0 gallons per square yard, with uniform pressure, and with an allowable transverse variation from any specified rate not to exceed 10% or 0.02 gallon per square yard, whichever is less. The maintenance and calibration of this vehicle shall be checked periodically. The record of maintenance and calibration shall be submitted to the Engineer for review upon request.

~~Unless otherwise stated in the manufacturer's technical data, all areas to receive the dust palliative shall be uniformly moistened. Moisture must be maintained on the surface until the time of the application. Dust palliatives shall not be applied when the surface is excessively wet or saturated. Surfaces shall be pre-moistened only if required by the product manufacturer.~~

Distributor trucks proposed for use shall have been tested within 6 months from the date of spreading to determine the rate of the transverse spread. If requested, the contractor shall furnish the Engineer with evidence that the transverse spread of the distributor truck, when the trucks were approved for use, was as uniform as practicable and under no condition was there a variance on any of the test pads greater than the allowable transverse variation; however, the Engineer may require that each distributor truck be tested to determine the rate of the transverse spread. The rate of the transverse spread shall be determined in accordance with the requirements of Arizona Test Method 411.

**5**

**230.4.2 Surface Course Preparation:** Areas to receive dust palliative shall be graded and scarified to at least the minimum depth and width shown on the plans. The material shall be damp at time of scarification to reduce dust and aid in pulverization. Soil clods shall be pulverized until all material, exclusive of gravel or stone, will pass a ~~1 1/2~~ <sup>2</sup> inch sieve.

From vendors: Pre-moistening for topical application may result in poor product performance and cause dilution. Vendors suggest either deleting this requirement or performing only when required by the vendor/manufacturer.

All debris, weeds, organic material, stone larger than 4 inches, etc. shall be removed from the site. Surface gravel or stones shall be removed or thoroughly mixed with the surrounding soils to obtain a homogeneous mixture.

If pre-wetting is required, ample amount of water shall be added and mixed with the in-place material to obtain a moisture content near optimum. This moisture content shall be established prior to and maintained until the application of the dust palliative. The methods to establish and maintain the moisture shall be done in accordance with manufacturer's recommendations. The moisture must be uniformly distributed throughout the surface course and over the underlying undisturbed soil. Dust palliatives shall not be applied when the soil is excessively wet or saturated. Moisture content shall be determined in accordance with either ASTM ~~D 2922~~, D 3017 or D 4944.

The soil shall be scarified/loosened by tilling, disking, ripping, or by other soil preparation methods, which achieves uniform results to the minimum depth shown on the plans

6938

SECTION 230

~~230.6~~

~~230.5 APPLICATION:~~

~~6~~  
230.5.1 General: The dust palliative shall be applied by a pressure type distributor truck. Spray bars and extensions shall be of the full circulating type. Valves which control the flow from nozzles shall be of a positive active design so as to provide a uniform, unbroken spread of dust palliative on the surface.

Corners or surface that cannot be accessed by the distributor truck shall be hand sprayed by means of hoses or bars pressurized by a gear pump or air tanks.

~~The distributor shall be equipped with certified meter or weight tickets and calibration charts relating to the specific gravity of the concentrate and/or dilution to provide for accurate, rapid determination and control of the amount of dust palliative being applied. The spreading equipment shall be designed so that uniform application of a dust palliative can be applied in controlled amounts ranging from 0.05 to 2.00 gallons per square yard.~~

The dust palliative shall be applied at the dilution ratio and application rate specified in accordance with Section 792, unless otherwise directed by the Engineer. Products may be applied in multiple passes at reduced application rates to meet the total application rate specified and/or assure uniform coverage.

~~6~~  
230.5.2 Topical Application: Topical applications shall be rolled only when recommended by the manufacturer. Complete penetration of palliative will be required prior to the surface rolling. Complete penetration occurs when the compaction equipment will not track or pick up the dust palliative and/or the top layer of the surface material.

~~6~~  
230.5.3 Surface Course Application: Mixing shall be done in-place using mixing equipment or by motorized grader (blade mixing). The blending methods utilized shall result in a uniformly treated mixture of soil and dust palliative at or near optimum moisture content (minus any post-compaction dust palliative top coat application quantity). The dilution ratio may be adjusted to bring the mixture to the desired moisture content. The amount of area treated each day shall be limited to that which the Contractor can thoroughly mix and compact within that work day.

Complete penetration of palliative will be required prior to compaction. Complete penetration occurs when the compaction equipment will not track or pick up the blended material.

The blended material shall be shaped to the required grade line and cross section shown on the plans and be compacted at least 95% of maximum density in accordance with ASTM D 698, unless otherwise directed by the Engineer. The final surface shall be rolled to a smooth and even grade. Immediately after the compaction, a top coat of dust palliative shall be applied.

~~230.7~~

~~230.6 CURING:~~

No equipment or traffic will be permitted on the treated surface for 24 hours unless otherwise approved by the Engineer.

~~230.8~~

~~230.7 WEATHER CONDITIONS:~~

~~Dust palliatives shall be applied only when the ambient temperature is above 40 °F and there is no possibility of rainfall during or within 24 hours after placement. Application during high wind should be avoided.~~

Moved from 230.4:

vehicle equipped with a power unit for the pump, full circulation spray bars adjustable laterally and vertically, and computer controls. The distribution vehicle shall be calibrated to ensure a controlled application method.

Paragraph reworded to update to current equipment and practices:

Distributor equipment shall be equipped with a tachometer and pressure gauge. To provide for accurate, rapid determination and control of the amount of dust palliative being applied, distributor equipment shall include one or more of the following: accurate volume measuring devices, a calibrated tank, and/or a certified meter or weight tickets and calibration charts relating to the specific gravity of the concentrate and/or dilution.

Last sentence moved to 230.4

The Contractor shall dilute the dust palliative product as needed, with the dilution ratio adjusted within the ranges specified in Section 792, to bring the mixture to the desired moisture content.

The stabilization product shall be applied, incorporated and thoroughly blended into the soil until the homogeneous mixture is obtained to the full depth of treatment

Sufficient grading shall be done to provide reasonable drainage within the limits of existing drainage patterns.

Once cured, the dust palliative final coat shall form a skin at the surface or a crusted surface.

Changes per vendor recommendations:

Dust palliative/stabilizer product shall be applied only when the ambient temperature is above 50°F. Application should be avoided during high wind or when there is the chance of rain within the next 8 hours. The Contractor shall be responsible to retreat at no additional cost if the application is degraded by weather within the first 24-hours of placement.

**230.9 QUALITY CONTROL**

The Contractor must provide manufacture-trained personnel for on-site technical assistance during initial delivery and application. This technical assistance is to assure that the dust palliative/stabilizer product is applied to proper dilution ratios and application rates on various soil, and subgrade types for optimum results.

At the start of each work day, the bulk tanker will be measured to verify the gallons of liquid dust palliative/stabilizer product brought to the job site. At the end of the day, the bulk tanker will be measured to verify the gallons of liquid dust palliative/stabilizer product remaining at the job site. The distributor truck shall be inspected to insure it is empty at the end of the day. The total gallons of liquid dust palliative/stabilizer product used for the day will be established by the start and end of day measurements of the bulk tanker.

A daily "Gallon Use Report" will be filled out by the distributor truck driver. The report will also identify the size of area treated for the day. It will be verified and signed by the Engineer or his designee. This report will be used to verify application rate and total product used. If the report indicates that the minimum application rate was not achieved, the work shall be deemed deficient by the Engineer.

**230.10 DEFICIENCIES AND WARRANTY**

If applied product active solids content is found deficient per Section 230.2.1, the Engineer may allow the Contractor to apply to any surfaces already treated by the deficient product additional topical coats of a different approved liquid dust palliative/stabilizer product to remedy the deficiency. Otherwise, the Contractor shall be required to repeat all work as directed by the Engineer with a different approved liquid dust palliative/stabilizer product that is compatible with the original product and will not result in adverse effects. The Contractor shall bear the cost of all remediation work for deficient product.

If the application rate as determined by the methods described in Section 230.9 or as agreed to in the contract documents is found to be deficient, the Contractor shall apply additional product within 24-hours of the original application to bring the total application rate to at least the minimum specified amount. If liquid dust palliative/stabilizer product was used as a soil stabilizer per Section 230.6.3, at the discretion of the Engineer, the Contractor shall re-scarify the stabilized section to its full depth and re-apply product at the original application rate, discounting the stabilizing value of any product previously applied. The Contractor shall bear the cost of all remediation work for deficient application rate.

Unless otherwise specified, application of the dust palliative/stabilizer product placed in accordance with this Section shall provide a stabilized surface, as defined herein and in accordance with the application methods described in Subsection 230.6, for a minimum of 6 months from ~~completed product application~~ acceptance by the agency (warranty period) in traffic areas and a minimum of 12 months from ~~completed product application~~ acceptance by the agency in non-traffic areas ~~with all other applications~~. For purpose of this work, a "skin" on the surface will be a formation of any palliative on the surface of the soil that cannot be dislodged from the soil by winds. Any formation of the palliative on the soil surface must adhere to the underlying soil to a depth of 1/8th inch when applied topically.

Contractor shall provide and install the product free of charge if the finished project fails to meet the performance requirement and specification/criteria outlined under this technical specification. The Contractor shall provide additional applications when within five working days of notification from the Engineer of performance failure. Payment will only be made upon satisfactory performance determined by the Engineer.

**230.11**

~~230.8~~ **MEASUREMENT:**

Dust palliative surface course application shall be measured by the square yard [meter], in place, treated, compacted, to the proper depth and accepted.

Dust palliative materials will be measured by the ton of undiluted material. Any conversion from volumetric quantities shall be done with Contractor-supplied calibration charts relating to the specific gravity of the concentrate and/or dilution.

**230.12**

~~230.9~~ **PAYMENT:**

Payment will be made for the applicable items at the Contract unit prices bid in the proposal, and shall constitute full compensation for the item completed, as herein described and specified.

End of Section



MARICOPA COUNTY  
Department of Transportation

MEMORANDUM

Date: May 12, 2009  
To: MAG Specifications and Details Committee  
From: Robert Herz, MCDOT Representative  
Subject: Miscellaneous Bloopers Case 09-A

**PURPOSE:** Correct typographical errors.

**REVISION:** Change the table reference shown in the last paragraph of section 321.10.4 prior to Table 321-6 from Table 321-2 to Table 321-6 as indicated below.

If the pavement thickness deficiency is greater than 0.25 inches and the contracting agency is the owner, Table 321-6 will apply.

Deleted: 321-2

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.



**MARICOPA COUNTY**  
*Department of Transportation*

MEMORANDUM

**Date:** July 1, 2009  
**To:** MAG Specifications and Details Committee  
**From:** Robert Herz, MCDOT Representative  
**Subject:** Miscellaneous Bloopers **Case 09-12 B**

**PURPOSE:** Correct typographical error.

**REVISION:** Correct the table value for the percent passing the #30 sieve in section 325.2.1.

**325.2.1 AGGREGATE:**

The aggregate shall meet the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
1/2 inch	100
3/8 inch	78-92
#4	28-42
#8	15-25
#30	<del>5-15</del>
#200	3-7

Deleted: 15-24

## SECTION 715

TABLE 715-1			
SLURRY SEAL AGGREGATE			
SIEVE SIZE	Type I % PASSING	Type II % PASSING	Type III % PASSING
38053	100	100	100
No. 4	100	85/100	70/90
No. 8	90/100	65/90	45/70
No. 16	65/90	45/70	28/50
No. 30	40/60	30/50	19/34
No. 50	25/42	18/30	38345
No. 100	15/30	38280	38185
No. 200	38279	38121	38121
Emulsified Asphalt content as a % of Dry Wt. Of Aggregate (approx.) ASTM D-3910 (W.T.A.T. TEST)	18	16	14
Residual Asphalt Range requirements % of Dry Wt. of Aggregate ASTM D-3910 (W.T.A.T. TEST)	38275	7.5-13	6.5-12
Pounds of Aggregate per Square Yard (approx.)	38208	38338	18-25

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 End of Section
 

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2005 MAG

CASE 09-12C

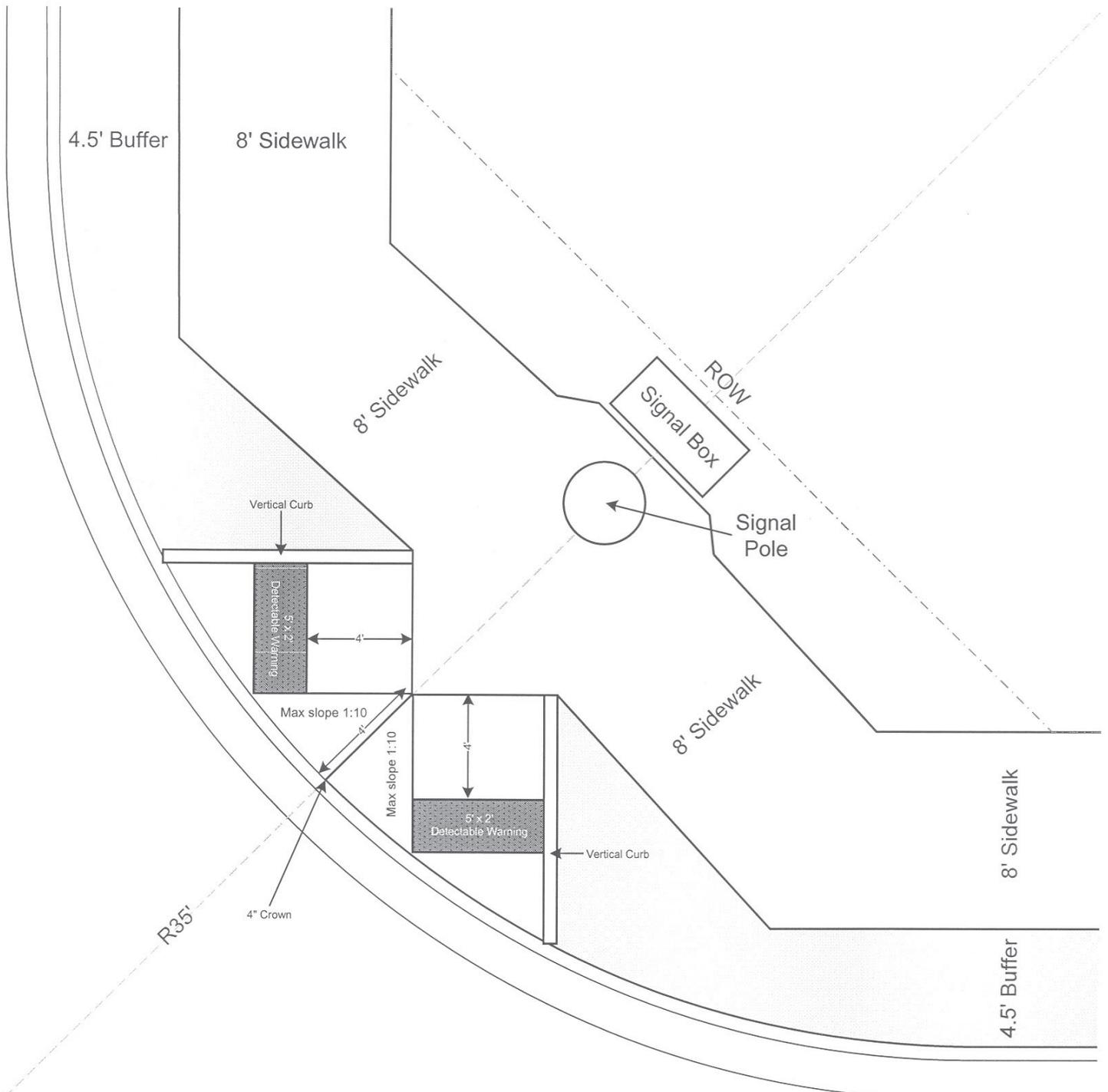
SECTION 715

TABLE 715-1			
SLURRY SEAL AGGREGATE			
SIEVE SIZE	Type I % PASSING	Type II % PASSING	Type III % PASSING
3/8	100	100	100
No. 4	100	85/100	70/90
No. 8	90/100	65/90	45/70
No. 16	65/90	45/70	28/50
No. 30	40/60	30/50	19/34
No. 50	25/42	18/30	12/25
No. 100	15/30	10/21	7/18
No. 200	10/20	5/15	5/15
Emulsified Asphalt content as a % of Dry Wt. Of Aggregate (approx.) ASTM D-3910 (W.T.A.T. TEST)	18	16	14
Residual Asphalt Range requirements % of Dry Wt. of Aggregate ASTM D-3910 (W.T.A.T. TEST)	10-16	7.5-13	6.5-12
Pounds of Aggregate per Square Yard (approx.)	8-10	12-18	18-25

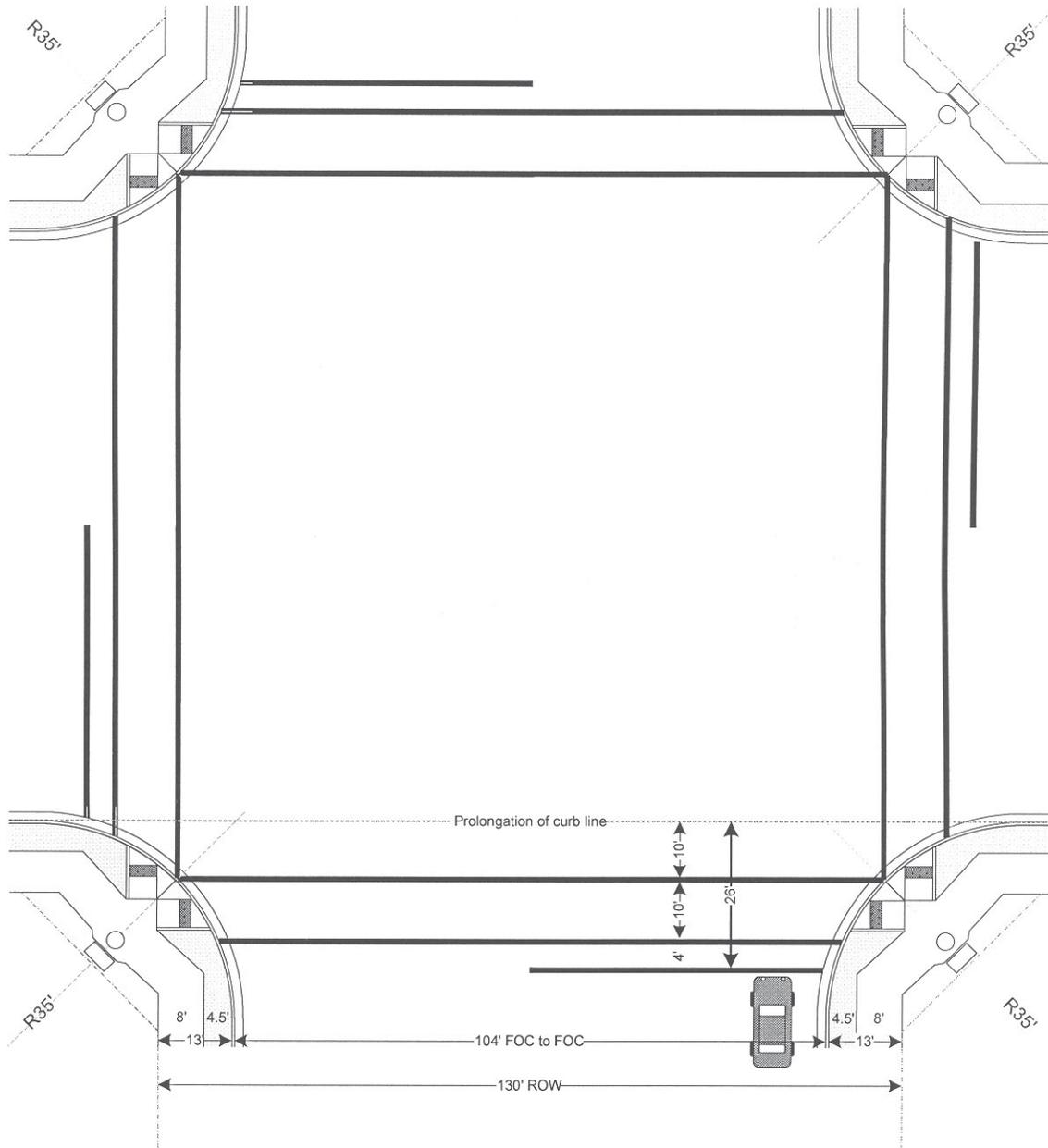
End of Section

Case 09-13

# 35' Radius Wheelchair Ramps

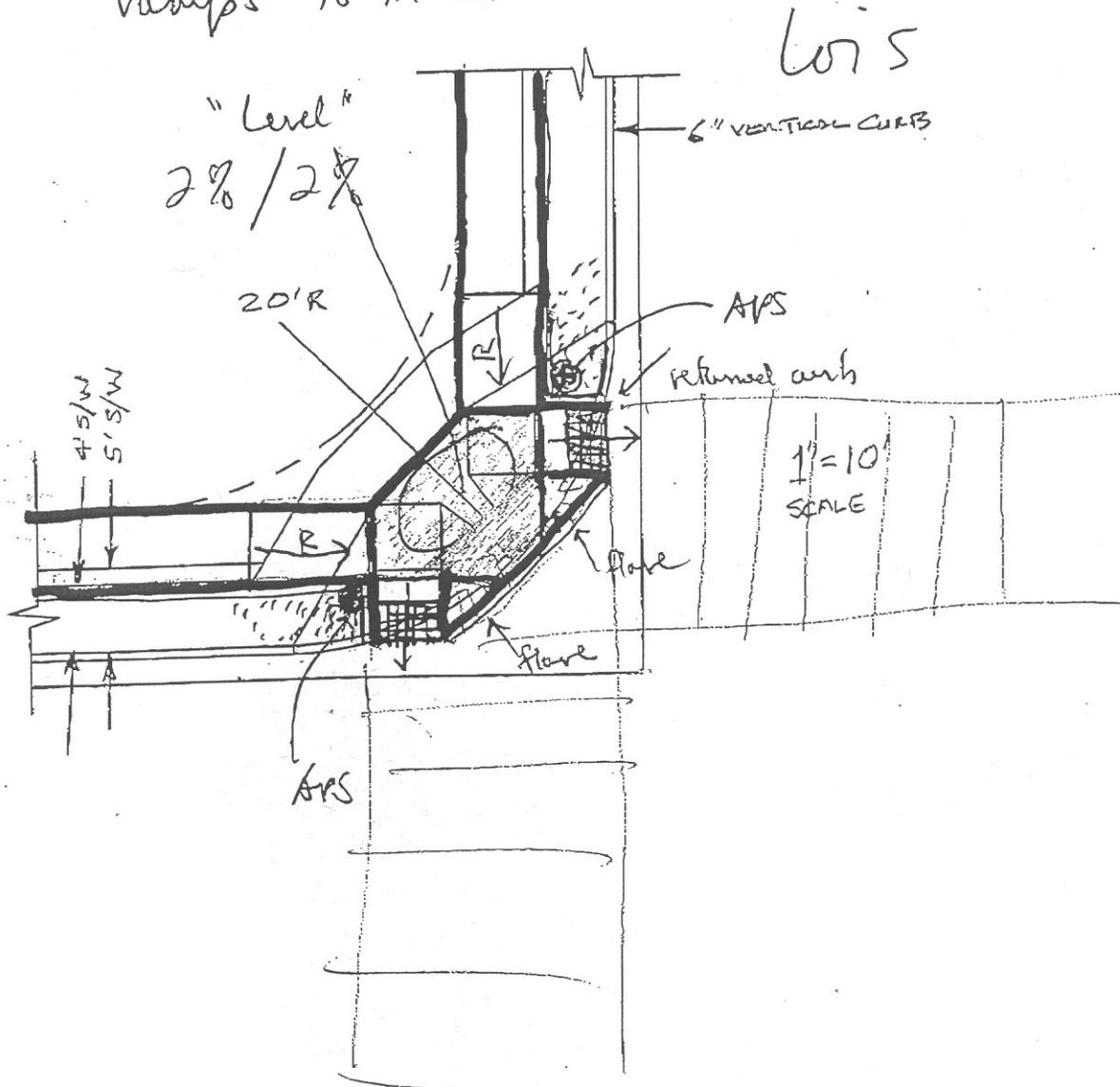


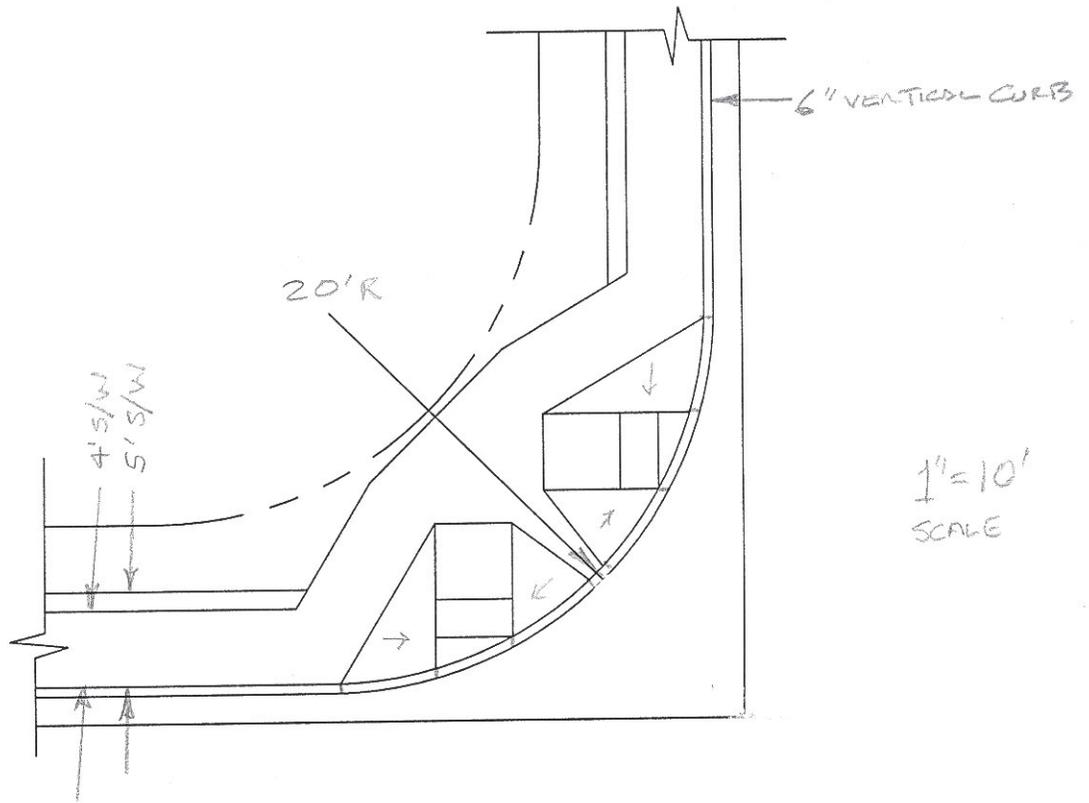
# Major Arterial Intersection

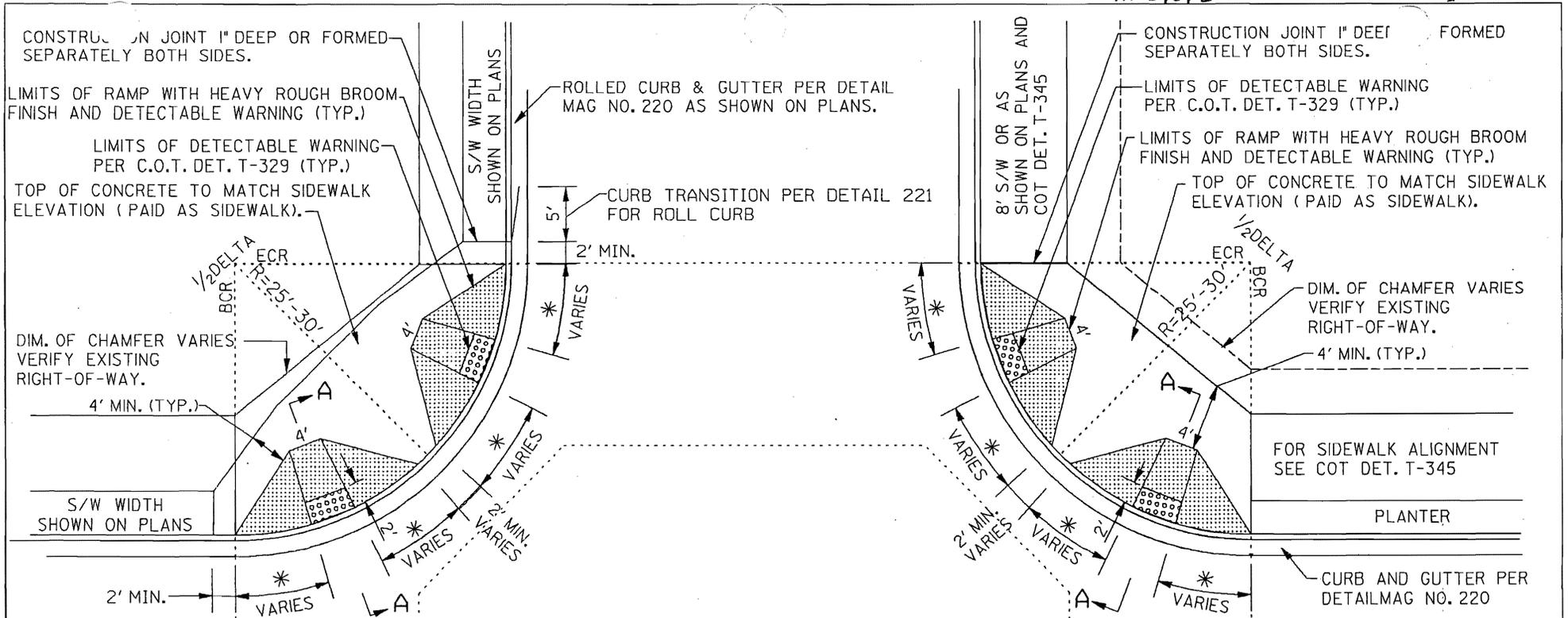


Scale 1" = 30'

This is a 'combined' ramp — you bring the sidewalk down to an intermediate leveling and then have short perpendicular ramps to the street

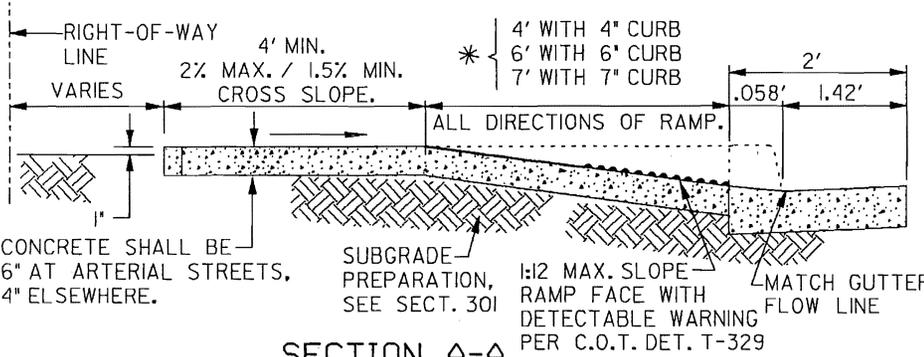






**SIDEWALK RAMP DETAIL**  
 NO PLANTERS  
 (LOCAL - LOCAL)  
 (LOCAL - COLLECTOR)

**SIDEWALK RAMP DETAIL**  
 WITH PLANTERS  
 (LOCAL - ARTERIAL)



**NOTES:**

1. RAMP PREFERENCE SEE NOTE IN DETAIL T-115. UNDER "REFER TO TEMPE STANDARD DETAILS".
2. CLASS 'B' CONC. CONSTRUCTION AS PER SECT. 725.
3. WIDTH OF CONC. SIDEWALK SHALL BE 8' ALONG ARTERIAL STREETS, 6' ELSEWHERE. 5'-6' LOCAL STREETS MAY BE APPROVED BY CITY.
4. SUFFICIENT RIGHT-OF-WAY MUST BE AVAILABLE TO CONSTRUCT RAMPS.
5. FOR SLOPING TRANSITION FROM RAMP TO CURB SEE C.O.T. DET. T-326.
6. THIS DETAIL IS APPLICABLE WHERE THE GRADE BREAK AT THE GUTTER LINE (COUNTER SLOPE) IS AT OR BELOW 11%, AND IF THE PERCENTAGE WOULD BE GREATER DUE TO AN UNUSUALLY STEEP GUTTER OR STREET CROWN, AN ALTERNATIVE DESIGN MUST BE APPROVED BY CITY.

APPROVED: Andy 7/2/07  
 DEPUTY PUBLIC WORKS MANAGER DATE  
 CITY ENGINEER



**MARICOPA COUNTY**  
*Department of Transportation*

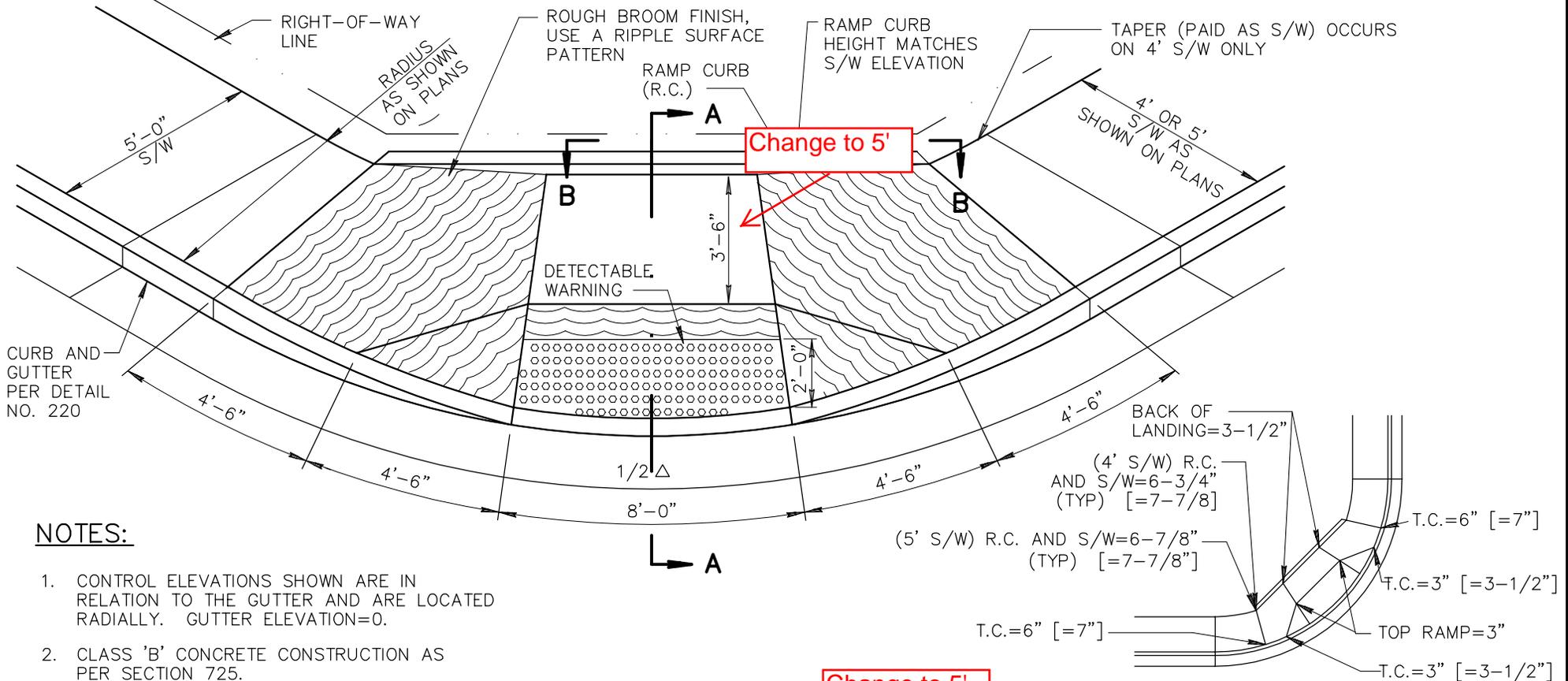
MEMORANDUM

**Date:** July 1, 2009  
**To:** MAG Specifications and Details Committee  
**From:** Robert Herz, MCDOT Representative  
**Subject:** Revise Details 231, 232, 233, and 234

**Case 09-14**

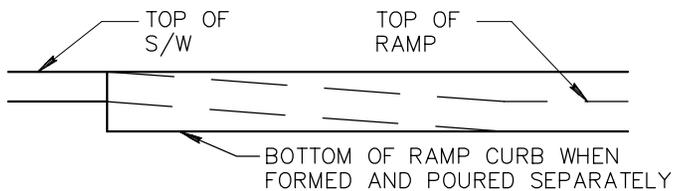
**PURPOSE:** Revise Details 231, 232, 233, and 234 to obtain compliance with ADA requirements. MAG Details 231 and 233 have undersized landing areas for turning. Details 232 and 234 are non-compliant since the path going across the ramp exceeds the allowable 2% maximum cross slope for sidewalk.

**REVISION:** Details 231 and 233 – Revise landing dimensions to obtain a 5' by 5' landing.  
Details 232 and 234 – Revise length of side ramps to obtain a 1.5% cross slope for the landing at the bottom of the ramps.

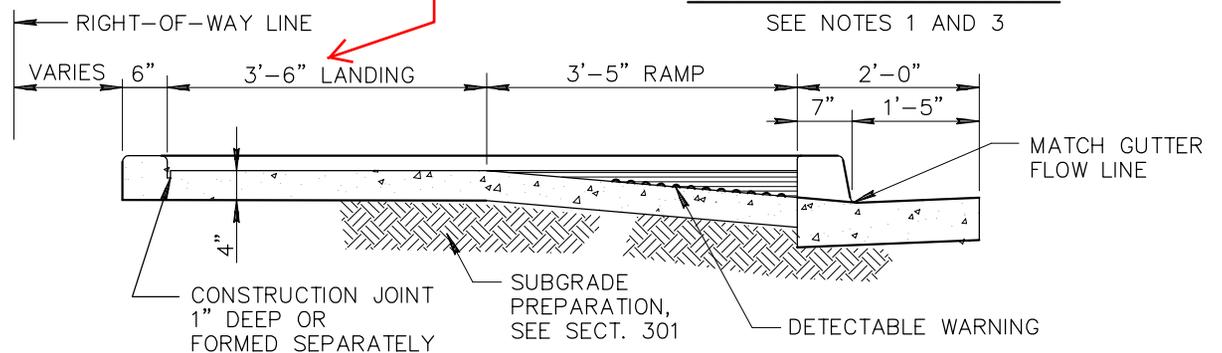


**NOTES:**

- CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER AND ARE LOCATED RADIALLY. GUTTER ELEVATION=0.
- CLASS 'B' CONCRETE CONSTRUCTION AS PER SECTION 725.
- WHEN CURB HEIGHTS OF 7" ARE SHOWN ON PLANS, USE DIMENSIONS SHOWN IN [ ]'S.
- DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.



**SECTION B-B**



**SECTION A-A**

**CONTROL ELEVATIONS**

SEE NOTES 1 AND 3

DETAIL NO.

**231**



**STANDARD DETAIL  
ENGLISH**

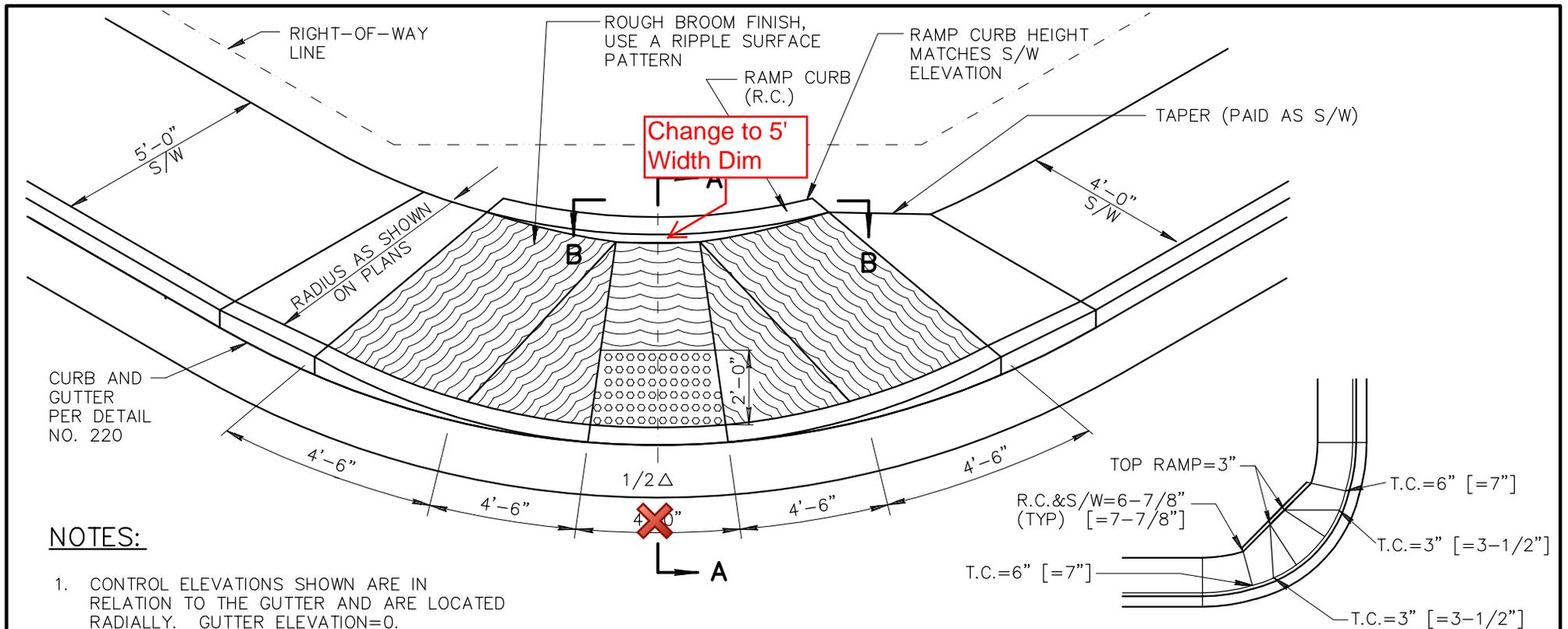
**SIDEWALK RAMPS - TYPE 'A'**

REVISED

01-01-2006

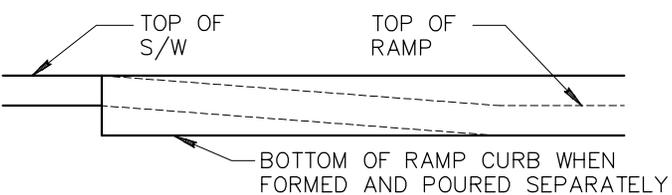
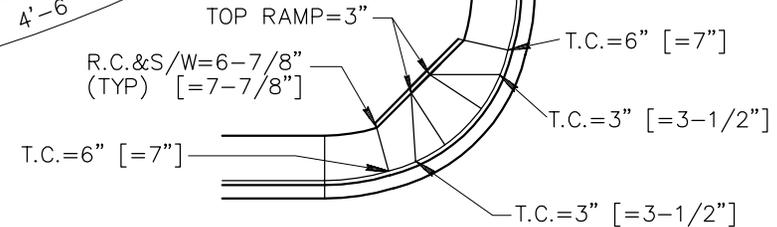
DETAIL NO.

**231**

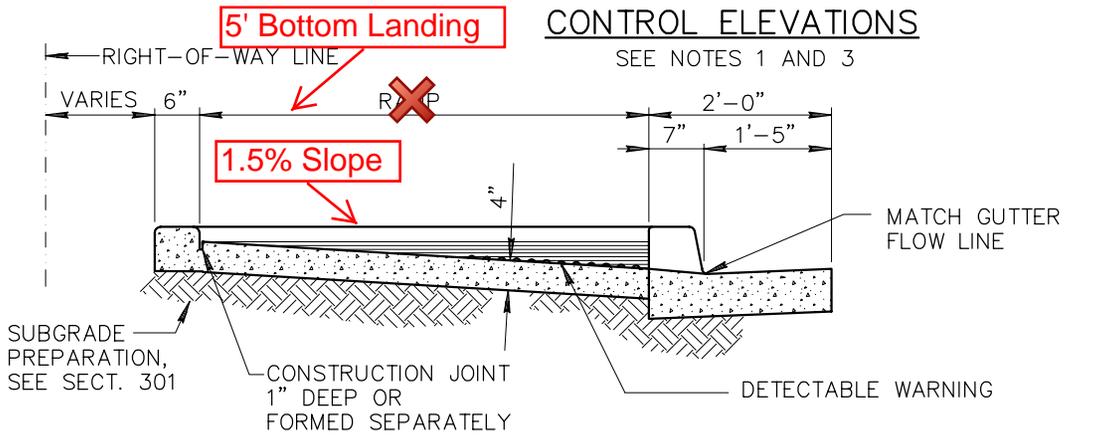


**NOTES:**

1. CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER AND ARE LOCATED RADIALLY. GUTTER ELEVATION=0.
2. CLASS 'B' CONCRETE CONSTRUCTION AS PER SECT. 725.
3. WHEN CURB HEIGHTS OF 7" ARE SHOWN ON PLANS, USE DIMENSIONS SHOWN IN [ ]'S.
4. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.



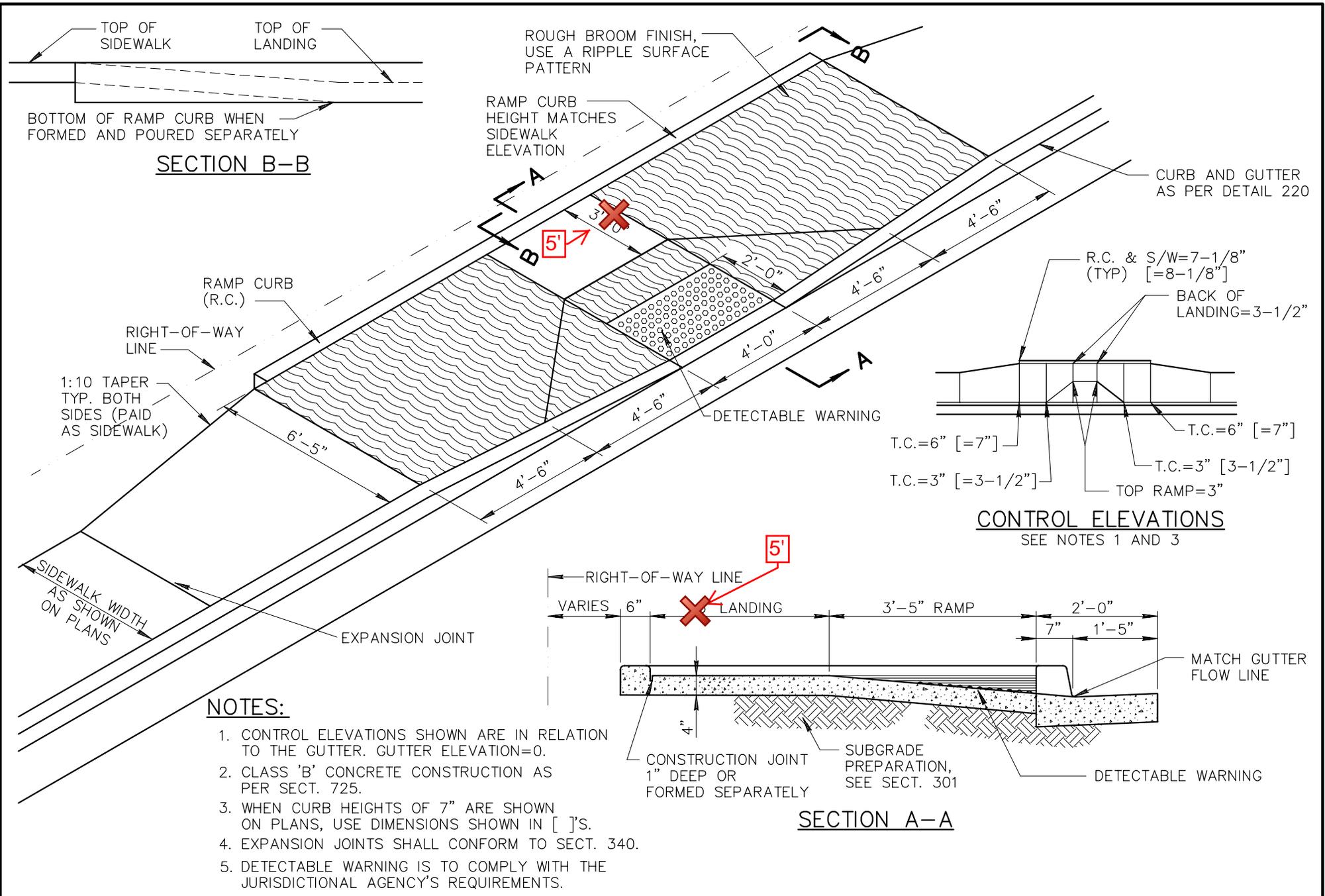
**SECTION B-B**



**SECTION A-A**

**CONTROL ELEVATIONS**

SEE NOTES 1 AND 3



DETAIL NO.

233



STANDARD DETAIL  
ENGLISH

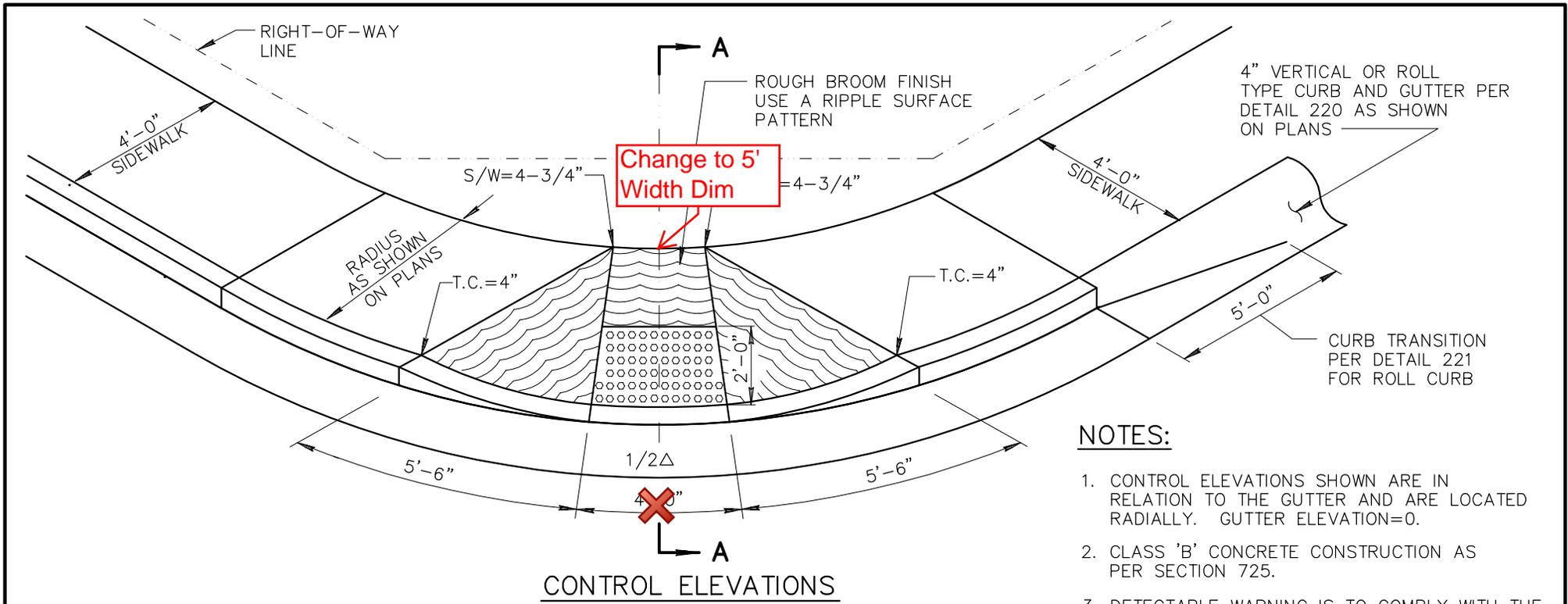
SIDEWALK RAMPS - TYPE 'C'

REVISED

01-01-2006

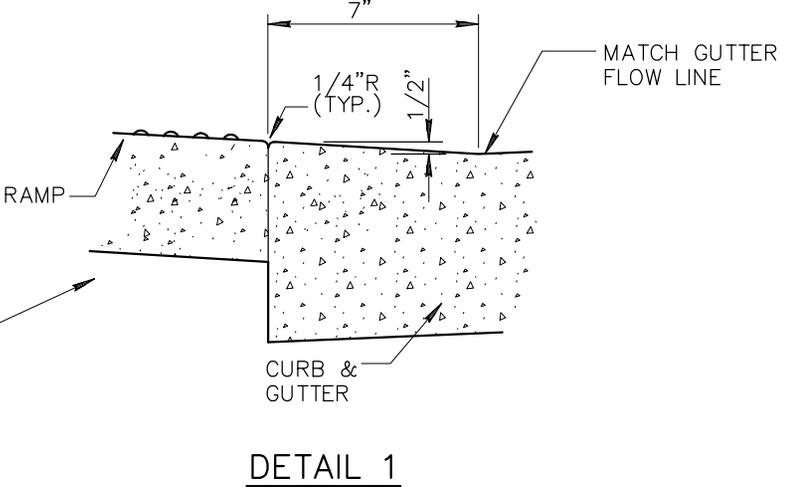
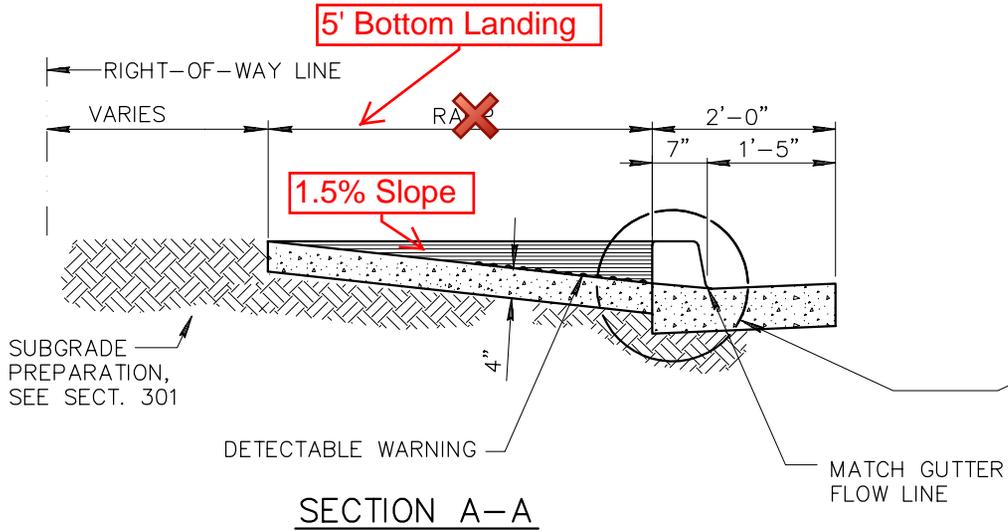
DETAIL NO.

233

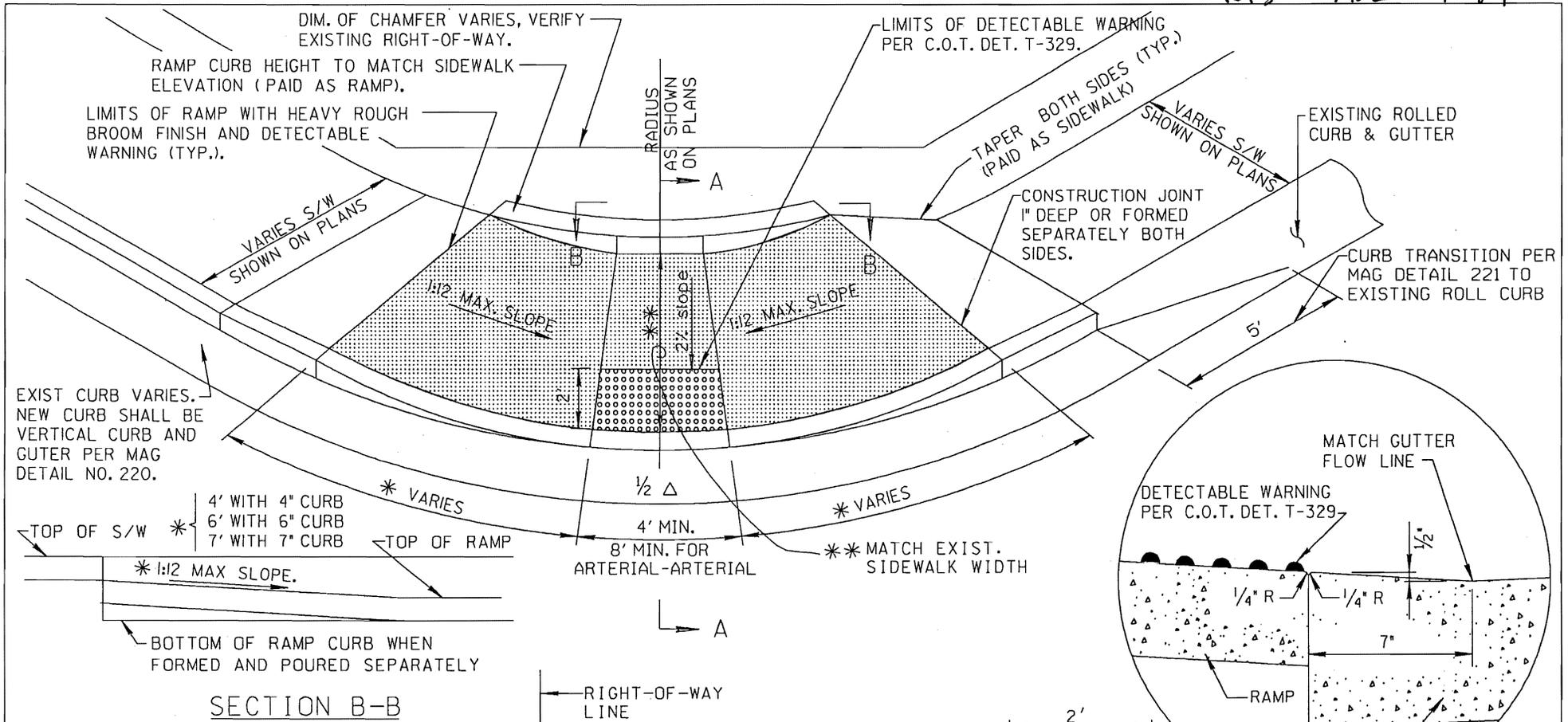


**NOTES:**

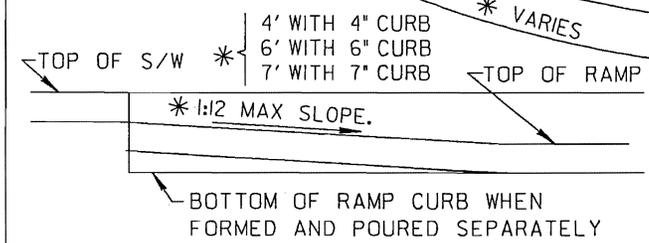
1. CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER AND ARE LOCATED RADIALLY. GUTTER ELEVATION=0.
2. CLASS 'B' CONCRETE CONSTRUCTION AS PER SECTION 725.
3. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.



COMMENTS - CASE 09-14



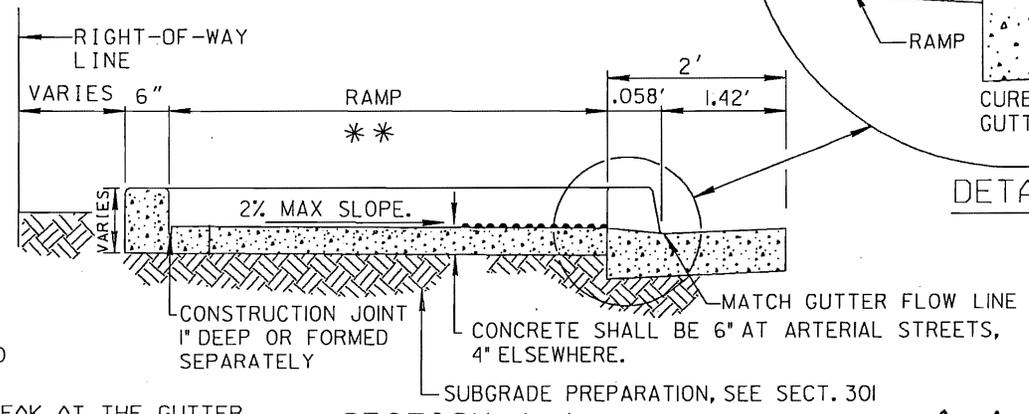
EXIST CURB VARIES. NEW CURB SHALL BE VERTICAL CURB AND GUTTER PER MAG DETAIL NO. 220.



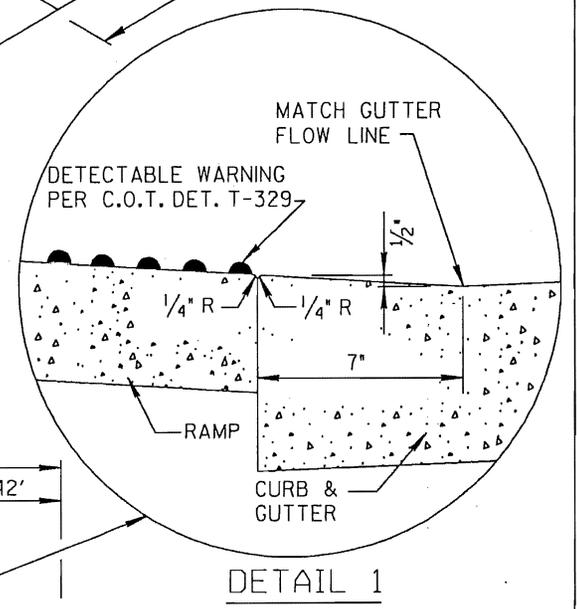
SECTION B-B

NOTES:

1. RAMP PREFERENCE SEE NOTE IN DETAIL T-115. UNDER "REFER TO TEMPE STANDARD DETAILS".
2. CLASS 'B' CONC. CONSTRUCTION AS PER SECT. 725.
3. WIDTH OF CONC. SIDEWALK SHALL BE 8' ALONG ARTERIAL STREETS, 6' ELSEWHERE. 5'-6" LOCAL STREETS MAY BE APPROVED BY CITY.
4. SUFFICIENT RIGHT-WAY-OF-WAY MUST BE AVAILABLE TO CONSTRUCT RAMPS.
5. THIS DETAIL IS APPLICABLE WHERE THE GRADE BREAK AT THE GUTTER LINE (COUNTER SLOPE) IS AT OR BELOW 11%, AND IF THE PERCENTAGE WOULD BE GREATER DUE TO AN UNUSUALLY STEEP GUTTER OR STREET CROWN, AN ALTERNATIVE DESIGN MUST BE APPROVED BY CITY.



SECTION A-A



DETAIL 1

APPROVED: Andy Cole 8/16/05  
 DEPUTY PUBLIC WORKS MANAGER  
 CITY ENGINEER  
 DATE

**610.4 CONSTRUCTION METHODS:**

All water mains in major streets shall have a minimum cover of 48 inches over the top of the pipe. Water mains in other locations shall have a minimum cover over the top of the pipe as follows:

- (A) 36 inches for mains smaller than 12 inches.
- (B) 48 inches for mains 12 inches and larger.

Cover for water mains will be measured from existing or proposed finished grade of pavement or from natural ground, whichever is deeper.

No water main shall be deflected, either vertically or horizontally, in excess of that recommended by the manufacturer of the pipe or coupling, without the appropriate use of bends or offsets.

If adjustment of the position of a length of pipe is required after it has been laid, it shall be removed and rejoined as for a new pipe.

Every precaution shall be taken to prevent foreign material from entering the pipe. The ends of the pipe shall be plugged or wrapped at all times when a pipe laying is not in progress, which includes storage and staging at the site. The open ends of each pipe section shall be protected from foreign material entering by taped closure of the polywrap when the pipe is stored or staged. The pipe line shall be protected by a water-tight plug or other means approved by the Engineer when the pipe is in the trench if pipe laying is not in progress.

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Where restrained joints are specified on mains sixteen (16) inches in diameter and smaller, ductile iron pipe shall be used with an approved joint restraint method.

On mains sixteen (16) inches in diameter and larger where plans specify welding joints and where ductile iron pipe is furnished, joints shall be restrained by an approved joint restraint method for the distance specified.

Except as otherwise required in this specification, the special provisions, or by the Engineer, trench excavation, backfilling and compaction shall be in accordance with the requirements of Section 601. Backfilling may be accomplished as soon as the pipe line has been installed to the satisfaction of the Engineer, subject to the requirements for testing, as contained below.

Hydrostatic testing shall be in accordance with this specification.

All corporation stops used for testing and chlorination shall be left in the pipe line with the stop closed and all connecting pipe removed.

Curb stops with flushing pipes or fire hydrants shall be installed at the ends of dead-end mains according to standard details.

Thrust blocks shall be installed in accordance with this specification.

Valve boxes and covers shall be according to standard details.

Asbestos-cement pipe shall be installed in accordance with AWWA C-603, except pipe and fittings shall be in accordance with Section 752.

Cast iron pipe shall be installed in accordance with AWWA C-600, except pipe and fittings shall be in accordance with Section 750.

Ductile iron pipe shall be installed in accordance with this specification and pipe and fittings shall be in accordance with Section 750.