

July 29, 2009

Members of the MAG Specifications and Details Committee

Robert Herz, Maricopa County DOT, Chairman

SUBJECT: MEETING NOTIFICATION AND TRANSMITTAL OF AGENDA

Wednesday, August 5, 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 July 1, 2009 Meeting Minutes</u>	2. Corrections and approval of July 1, 2009 minutes.
3. <u>2008 & 2009 Cases</u>	3. Review of pending cases and voting on cases as previously requested.
4. <u>General Discussion</u>	4. Open general discussion.
5. <u>Adjournment</u>	5. No action required.

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

July 1, 2009

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

AGENCY MEMBERS

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

ADVISORY MEMBERS

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

MAG ADMINISTRATIVE STAFF

Gordon Tyus

* Members not attending or represented by proxy.

GUESTS/VISITORS

Mike Bielecki, Lewis & Roca
Arturo Chavarria, Hansen Pipe and Precast
Shannon Ford and Jenn Stockhill, Enssolutions
Aaron Schlessinger, Contech Construction Products
Ann Seiden, Southwest Gas Company
Mark Wible, ASU-CIM/ARPA

1. Call to Order

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

2. Approval of Minutes

The members reviewed the June 3, 2009 meeting minutes. Jesse Gonzalez introduced a motion to accept the minutes as written. Tom Kaczmarowski 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, Section 336 and Section 601:** Revisions to reduce numerous agency trench backfill and pavement replacement supplemental details by combining the most common practices. Peter Kandarlis presented the results of the default value email survey. Members provided feedback and recommended that the results be incorporated into a revised detail. The committee discussed the need to scale back the scope of proposed changes so that work could be completed this calendar year. It was agreed that revisions to Sections 336 and 601 would be dropped from this case. Based on the discussions, Peter will prepare revisions to Detail 200 for 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. The committee had no discussion on this item. It is anticipated that Jami Erickson will prepare a revision for the next meeting based on earlier comments. Committee members are requested to continue reviewing the case and provide comments.

b. **Case 09-03 – New Geosynthetic Materials Specification, Section 796:** Create a geosynthetic material specification, Section 796. Peter Kandarlis provided a revision to the case that moved information on material delivery and handling to the materials section of the specification. 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 provided binder and fabric application temperature information from various state and national specifications. Members recommended that the specification include a minimum asphalt concrete hot mix temperature. Peter will provide a revision for the next meeting. Committee members are requested to continue reviewing the case and provide comments.

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. The committee had no discussion on this item. Peter Kandarlis will provide revised language to exclude the use of geotextile fabric below grouted rip rap. Committee members are requested to continue reviewing the case and provide comments.

e. **Case 09-06 – New Geogrid Fabric Specification, Section 306:** Create a new geogrid application Section 306. Members discussed the use of geogrid fabrics and methods to repair grid material cut during utility excavation work. Aaron Schlessinger of Contech Construction Products addressed this issue and provided related literature from Tensar International. 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 with new language for processes to allow use of concrete that exceeds the specified maximum temperature. Members recommended renumbering the final version to remove deleted subsection headings and revising the description for Class C concrete to insure the mix is not recommended for use as trench backfill. Peter Kandarlis will provide a cursory check of the standard details to identify references to any subsections in Section 725. Since the changes suggested are minor, 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). Members discussed the jointing requirements of Note 5 in the detail. Bob Herz will provide a revised detail for the next meeting to incorporate all previous comments. Committee members are requested to continue reviewing the case and provide comments.

h. **Case 09-09 – Modification to Dust Palliative, Section 792:** Modifications to Section 792 to update dust palliative product, compliance and environmental requirements. Shannon Ford of Enssolutions requested that material requirements for organic resins be updated to new industry standards for tall pitch oil emulsions. Peter will meet with Enssolutions prior to the next committee meeting for their input and provide revisions to the case. Committee members are requested to continue reviewing the case and provide comments.

i. **Case 09-10 – Modification of Section 321 to include Section 322:** Section 322 as a new subsection to Section 321. Members suggested replacing burning or blading of damaged pavement with milling or repair. Peter Kandarlis will provide a revision for the next meeting. Since the change suggested is minor, members are requested to be prepared to vote on this case at the next meeting.

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 Kandarlis provided new language that revises product acceptance and warranty periods based on type of application. Members suggested additional text changes to this language. Peter will provide revisions to the case at the next meeting and include input from his upcoming meeting with Enssolutions. Committee members are requested to continue reviewing the case and provide comments.

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. The committee had no discussion on this item. New Case 09-12B: Bob Herz proposes correcting the gradation table in Section 325.2.1. The percent passing range on the No. 30 sieve should be from 5 to 15 percent, not 15 to 24 percent. New Case 09-12C: Jeff Hearn identified numerous values in Table 715-1 (slurry seal) where material property ranges have been replaced by a series of meaningless numbers and proposes changing the table values to those shown in the 2005 version of the specification. Members are requested to review the proposed changes and return with comments for the next meeting.

l. **Case 09-13 – ADA-Compliant Dual Sidewalk Ramps:** Jesse Gonzalez proposes new ADA-compliant details for 35-foot and 20-foot corner radius dual sidewalk ramps. Members are requested to review the new details and return with comments for the next meeting.

m. **Case 09-14 – ADA-Compliant Single Sidewalk Ramps:** Bob Herz proposes revising Details 231, 232, 233 and 234 to obtain compliance with ADA requirements. MAG Details 321 and 233 have undersized landing areas for turning. Revised details show 5-ft by 5-ft landing dimensions. Details 232 and 234 are non-compliant since the path going across the ramp exceeds the allowable 2% maximum cross slope. Details have been revised to obtain a 1.5% cross slope for the landing at the bottom of ramps. Members are requested to review the proposed changes and return with comments for the next meeting.

n. **Case 09-15 – Revisions to Section 610.4 for Water Line Handling:** Tom Wilhite proposes modifying 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. Members are requested to review the proposed changes and return with comments for the next meeting.

5. General Discussion:

Bob Herz announced that the CAD Symbols Working Group will meet at the MAG offices (Palo Verde Room) at 1:30 pm on July 29, 2009.

6. Adjournment:

The meeting was adjourned at 3:14 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	Case 08-10 : Revisions to Detail 200 and Sections 336 and 601 – Trench Backfill and Pavement	SRP	Peter Kandariz	02/06/2008 07/01/2009		0 0 0	Yes No Abstain
09-01	Case 09-01 : 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	Case 09-02 : Revisions to Section 630.6 – Air Release and Vacuum Valves	Phoenix	Jami Erickson	02/04/2009 06/03/2009		0 0 0	Yes No Abstain
09-03	Case 09-03 : New Section 796 – GEOSYTHETICS	SRP	Peter Kandariz	02/04/2009 07/01/2009	Proposed Vote 08/05/2009	0 0 0	Yes No Abstain
09-04	Case 09-04 : Modification to Section 321 – Add Pavement Fabric Interlayer for AC Overlay	SRP	Peter Kandariz	02/04/2009 06/03/2009		0 0 0	Yes No Abstain
09-05	Case 09-05 : Revisions to Sections 220 and 703 – Riprap Construction	SRP	Peter Kandariz	02/04/2009 06/03/2009		0 0 0	Yes No Abstain
09-06	Case 09-06 : New Section 306 – MECHANICALLY STABILIZED SUBGRADE - GEOGRIDS	SRP	Peter Kandariz	02/04/2009 05/06/2009	Proposed Vote 08/05/2009	0 0 0	Yes No Abstain
09-07	Case 09-07 : Revisions to Sections 725 and 701 – Portland Cement Concrete	Goodyear	Troy Tobaiisson	03/04/2009 06/03/2009	Proposed Vote 08/05/2009	0 0 0	Yes No Abstain
09-08	Case 09-08 : Modification to Detail 240 – Valley Gutter	MCDOT	Bob Herz	03/04/2009 06/03/2009		0 0 0	Yes No Abstain
09-09	Case 09-09 : Revisions Section 792 – Dust Palliative	SRP	Peter Kandariz	03/04/2009 06/03/2009		0 0 0	Yes No Abstain

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

2009 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

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CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
09-10	Case 09-10 : Incorporate Section 322 - Asphalt Concrete Overlay into Section 321 and delete Section 322	SRP	Peter Kandarlis	05/06/2009 06/03/2009	Proposed Vote 08/05/2009	0 0 0	Yes No Abstain
09-11	Case 09-11 : Modify Section 230 - Dust Palliative Application	SRP	Peter Kandarlis	05/06/2009 07/01/2009		0 0 0	Yes No Abstain
09-12	Case 09-12 : 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		0 0 0	Yes No Abstain
09-13	Case 09-13 : Dual Ramp Curb Ramp Details	Peoria	Jesse Gonzales	07/01/2009		0 0 0	Yes No Abstain
09-14	Case 09-14 : 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	Case 09-15 : 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.

DEFAULT PAVEMENT REPAIR VALUES SURVEY

Participants:
Chandler, El Mirage, Gilbert, Glendale,
MCDOT, Mesa, Peoria, Surprise

Results 1. Default value for minimum pavement remnant width (outside shelf) to be removed between curb and trench:

4	24 inches (presently specified by Chandler, Glendale and Tempe)
1	36 inches (presently specified by Scottsdale)
1	48 inches or less
2	(1A) 48 inches or less (presently specified by Mesa)

2. Default value for CLSM (Controlled Low-Strength Material) when used as trench backfill:

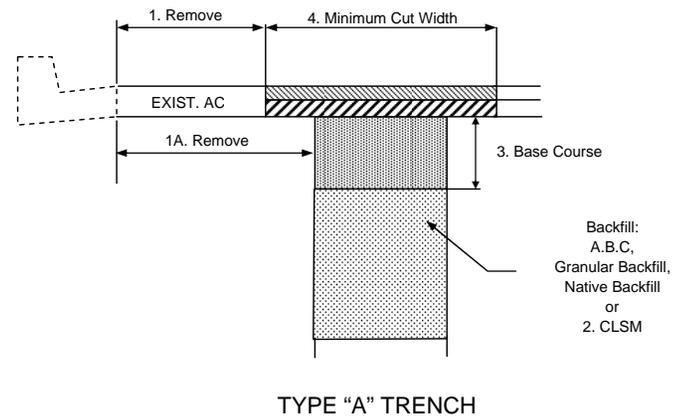
7	1/2-sack (presently specified by Chandler, Phoenix, Scottsdale)
1	1-sack (presently specified by Gilbert, Mesa, Tempe)

3. Default value for depth of base course below Type "A" trenches

3	12-inch (presently specified by Tempe & recommended by MCDOT)
1	16-inch for arterial, collector and industrial street (presently specified by Chandler)
4	24-inch (presently specified by all other agencies)

4. Default value for minimum pavement cut width for transverse and longitudinal trenches

1	24-inch
4.5	48-inch (presently specified by Chandler, Glendale)
0.5	At least 24 inches, but may be more depending on pavement age (presently specified by Scottsdale)
1	48-inch longitudinal, 96-inch transverse (presently specified by Tempe)
1	72-inch longitudinal, trench width plus 24-inch transverse (MCDOT)



SECTION 796
GEOSYNTHETICS

796.1 GENERAL:

Geosynthetic fabrics, grids and membranes 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.

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 contaminates. 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 shall be sampled according to ASTM D 4354.

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.

TABLE 796-1			
PAVEMENT GEOSYNTHETIC PROPERTIES			
Property	Class A	Class B	ASTM Test Method
Weight: oz/yd ²	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 ²	0.25 min. ⁽¹⁾	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/yd².

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.

TABLE 796-2			
FILTRATION & DRAINAGE GEOSYNTHETIC PROPERTIES			
Property	Class A ⁽¹⁾	Class B ⁽²⁾	ASTM Test Method
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, heave degree of compaction).
 (2) Class B – Use with smooth graded surface having no sharp angular projections and sharp angular aggregate.

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.

TABLE 796-3			
EROSION CONTROL GEOSYNTHETIC PROPERTIES			
Property	Class A ⁽¹⁾	Class B ⁽²⁾	ASTM Test Method
Weight: oz/yd ²	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 virgin resin polypropylene or high-density polyethylene, with a maximum of 5 percent in-plant regrind material. Geogrids shall additionally conform to the physical properties shown in Table 796-4.

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 of a specified project. Samples of materials shall be submitted for testing. 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. Each geosynthetic material lot or shipment must be approved by the Engineer before the materials may be incorporated in the work.

Testing methods and results shown in the certificate of compliance shall conform to the listed specifications for the proposed geosynthetic use. Supporting documentation including, but not limited to, product information sheets, installation procedures and recommendations, recommended use, and project references shall also be submitted by the supplier or manufacturer as part of product evaluation and pre-approval.

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.

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.

DRAFT

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.

TABLE 725-1		
CONCRETE CLASSES - MINIMUM REQUIREMENTS		
Class of Concrete	Minimum Cementitious Materials Content (lbs. per cubic yard)	Minimum Compressive Strength (1) at 28 Days (psi)
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/Agency 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

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Type III, low alkali, for high early strength, when applicable or specified
Type V, low alkali, when specified in the special provisions for use in concrete which will be exposed to contact with soils or waters containing water soluble sulfates (as SO₄) in concentration greater than 0.20% by weight of soil or 1500 PPM in solutions

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

Supplementary cementitious (pozzolanic) materials 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 (Pozzolan) Materials (SCM): Supplementary cementitious (pozzolan) 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 pozzolan 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 or Agency.

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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, the Contractor will be required to furnish samples for testing, and shall notify the Engineer as to when and where they will be available. Thereafter, additional required samples shall be furnished at the expense of the Contractor, but the cost of testing and making the grading analysis will be borne by the Contracting Agency. Samples shall be taken by the Engineer or in the presence of the Engineer.

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 incorporated into the approved mix design or authorized by the Engineer or appropriate Agency representative.

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:

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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 Agency or 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 will not require a new mix design submittal/approval:
- 1 Modifications which do not result in batch target weights for the fine aggregate or combined coarse aggregates changing by more than 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 will 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 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 cement, supplementary cementitious materials, admixtures/additives, and water as herein

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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.

Any admixture shall be measured accurately by mechanical means into each batch by equipment or in a method 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, positively. 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 other than those in which it would obviously prove to be impractical; in which latter event hand mixing will be permitted, only to the extent necessary. Regardless of the method employed, mixing shall be commenced as soon as possible after the cement is placed in contact with the aggregates. 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.

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, cement, Pozzolan 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. 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.

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 Agency or 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.

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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 725.11 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 will 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 Hand Mixed Concrete: Hand mixed concrete 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 725.7. 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.

In lieu of mixing individual ingredients for concrete placement, a prepackaged commercial product may be used, upon approval of the Engineer/Agency representative. Any mixing of a prepackaged product must be in accordance with the manufacturer's recommended procedure.

725.7.4 Dry batched Unmixed Concrete: Should the Contractor elect to use dry batched unmixed concrete, an accurate batch weight shall be provided to record the quantities of cementitious materials, aggregate 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 Agency or 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 added to powder form shall be added to the cement; if added in liquid form, it shall be added to the water.

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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 cement, aggregate, water or admixture 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:

Volumetric-batching and continuous-mixing concrete and equipment may be utilized upon approval of the Engineer/Agency 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 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 Agency and/or Engineer or his representative, 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 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 will be determined in accordance with ASTM C-1064.

Slump of the concrete mixture will be determined in accordance with ASTM C143.

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

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

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All compressive strength test specimens will 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 may be considered invalid and discarded by the Agency and/or Engineer.

725.8.2 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 will 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 Agency and/or 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 may not be considered as acceptance tests.

725.8.3 If the 28-day strength test does not meet the compressive strength requirements, the contractor or Engineer/Agency may choose to contest the compressive strength results of any test for purposes of acceptability or payment. This may involve an engineering study to determine the acceptability of the concrete in question, such as 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 or engineering study will be at the expense of the contractor, unless otherwise agreed upon by the Contractor and the Engineer/Agency. 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 Agency and/or Engineer. Cores damaged subsequent to or during removal shall be rejected and additional core samples taken. Cores must be obtained and delivered to a laboratory acceptable to the Agency and/or 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 will replace the results of the cylinder strength test for that sample.

725.9 ACCEPTANCE:

A) Plastic Concrete Properties

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- 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 will apply:

Specified slump:	If 3” or less	If more than 3”
Plus tolerance	0 inch	0 inch
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 will 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/Agency. At the discretion of the Agency/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 - 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 specific level by more than the allowable tolerance, additional air entraining admixture may be used 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 cement and aggregates or the introduction of the cement to the aggregates. The Engineer/Agency or their representative 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.

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Concrete failing to meet the tolerances for plastic concrete properties in 1-4 above shall be reviewed by the Engineer/Agency or their representative and may be subject to rejection.

B) Hardened Concrete Properties – Compressive Strength

- 1) Concrete represented by a cylinder strength test obtained in accordance with section **725.8.2** shall be acceptable if the 28-day strength meets or exceeds the specified design strength. Concrete failing to meet the compressive strength requirement shall be reviewed by the Engineer/Agency and may be subject to rejection and replacement or an adjustment as indicated in 725.11 B) 3). When concrete is accepted on the basis of cylinder strength tests of less than 100% of the required minimum 28-day 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.
- 2) Core strength tests obtained in accordance with section **725.8.3** shall be considered acceptable if their average is equal to or greater than 85 percent of the specified strength and no single core is less than 75 percent of the specified strength. Concrete failing to meet the acceptability requirement as evidenced by drilled core specimens shall be reviewed by the Engineer/Agency and may be subject to rejection and replacement.

TABLE 725-2	
Adjustment in Concrete Unit Price Based on Cylinder Testing	
Percent of Specified Minimum 28-day Compressive Strength Attained (Nearest 1%)	Percent of Concrete Unit Price Allowed
100 % or greater	100
95-99	95
90-94	90
85-89	85



P.O. Box 52025
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Case 09-10

DATE: June 3, 2009

TO: MAG Specifications and Details Committee Members

FROM: Peter Kandarlis, SRP Representative

RE: **Incorporating Section 322 “Asphalt Concrete Overlay” into Section 321**

Purpose: Revise Section 321 to include all requirements for asphalt concrete overlay work and eliminate Section 322. Include asphalt concrete overlay placement requirements as new subsection 321.8.6. Include reference to milling requirements in Section 317.

Rational: Changes made to Section 321 last year have resulted in a comprehensive asphalt placement specification. The existing asphalt concrete overlay specification heavily references Section 321 and is really just a subset of asphalt placement work. With minor edits, Section 322 can be incorporated in whole as a subsection within the placement section of Section 321.

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SECTION 322

MARK-UP VERSION

ASPHALT CONCRETE OVERLAY

~~322.1 DESCRIPTION:~~

321.8.6 Asphalt Concrete Overlay:

Asphalt concrete overlay consists of the placing and compaction of plant mix asphalt concrete over existing asphalt concrete paving. The thickness of the overlay shall be as shown on the plans or as specified in the special provisions. Preliminary preparation of existing surfaces will be required except when accomplished by the Contracting Agency, and it is so stipulated in the special provisions. With the exception of those which have been preheated and remixed only, existing surfaces shall receive a tack coat.

~~322.2 MATERIALS:~~

~~The tack coat, asphalt concrete mix and transportation of the mix shall be as specified in Sections 710 and 321, except for the maximum size of aggregate and percentage of binder which shall be as specified in the following paragraph.~~

Delete, already stated in 321.2 and 321.5, 6 & 7.

Delete, this is redundant since the next paragraph describes in more detail.

~~322.3 ASPHALT CONCRETE:~~

Asphalt concrete mix

asphalt concrete mix designation

~~The aggregate gradation and percentage of asphalt binder shall be in accordance with Section 710 using a 1/2 inch Marshall-Low Traffic mix for overlay more than one and one-half inch in thickness and a 3/8 inch Marshall Low Traffic mix for overlay one and one-half inch or less in thickness, unless otherwise shown or specified in the special provisions.~~

Parallel wording with Section 710.

~~322.4 PREPARATION OF SURFACES:~~

Except when they have been preheated and remixed, surfaces shall be prepared as follows:

ACG requested change.

- a. Before placing asphalt concrete overlay, severely raveled areas or cracked areas that are depressed more than 3/4 inch from the adjoining pavement shall be cut out and patched at least 48 hours prior to the resurfacing operation. Over-asphalted areas or rough high spots shall be ~~removed by burning or blading~~. Large shrinkage cracks shall be filled with asphalt sealing compound acceptable to the Engineer. The entire surface shall be cleaned with a power broom. Raveled areas that do not require removing shall be cleaned by hand brooming. The above are incidental, and the cost thereof shall be included in the bid items.

either milled or cut out and patched.

MCFOT requested change:

- c. After surfaces have been prepared to the satisfaction of the Engineer, they shall receive a tack coat as specified in Section 321.4. Traffic will not be permitted over surfaces which have received a tack coat. When the overlay is to extend onto the concrete gutter, the gutter shall be thoroughly cleaned of loose dust and cement particles and shall be tack coated.

b. Before placing asphalt concrete overlay, milling shall be done as shown on the plans or specified in the special provisions and shall be in accordance with Section 317.

~~322.5 CONSTRUCTION METHODS:~~

~~Placing and rolling on the asphalt concrete and the smoothness of the surface shall be as specified in Section 321.~~

Delete, already stated in 321.8.1 thru 321.8.5.

~~322.6 MANHOLES:~~

Manholes shall be built up and the frames set flush with the finished surface of the new paving, and tops of valve boxes, clean-outs and other existing structures shall be adjusted to finish grade. In the event the base course and original paving have been removed or disturbed in order to build up the manhole, they shall be replaced with approved materials which shall be thoroughly compacted. The asphalt concrete around the manhole frame shall be completed and made flush with the adjacent overlay.

~~322.7 PAYMENT:~~

~~Payment for tack coat and asphalt concrete will be as specified in Section 321 except as noted above.~~

Delete, already stated in 321.13.

SECTION 321

INSERT VERSION

the area of the joint shall not deviate more than ¼ inch from a 12-foot straightedge, when tested with the straightedge placed across the joint, parallel to the centerline.

Longitudinal Joints of each course shall be staggered a minimum of 6 inches with relation to the longitudinal joint of the immediate underlying course cold transverse construction joint, the cold existing asphalt concrete shall be trimmed to a vertical face for its full depth and exposing a fresh face. The fresh face shall be tacked prior to placement of the adjacent course. After placement and finishing the new asphalt concrete, both sides of the joint shall be dense and the joint shall be smooth and tight. The surface in the area of the joint shall not deviate more than ¼ inch from a 12-foot straightedge, when tested with the straightedge placed across the joint, parallel to the centerline. The joint will be tack coated if required by the Engineer.

321.8.3 Leveling Course: A leveling course shall be used when specified, or as directed in writing by the Engineer, to bring existing pavement to a uniform grade prior to placing an overlay or other course. If a leveling course is being applied on an Asphalt surface, a tack coat shall be applied. The compaction requirements contained in Section 321.10 do not apply to leveling courses.

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

Asphalt compaction equipment shall be of sufficient size and weight to accomplish the required compaction. All compaction equipment shall be operated and maintained in accordance with the manufacturer's recommendations and the project requirements. During the rolling operation, the speed of the roller shall not exceed 3 miles per hour, unless otherwise approved by the Engineer.

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

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

321.8.5 Smoothness: The completed surfacing shall be thoroughly compacted, smooth and true to grade and cross-section and free from ruts, humps, depressions or irregularities. An acceptable surface shall not vary more than one-fourth (¼) inch from the lower edge of a 12-foot straightedge when the straightedge is placed parallel to the centerline of the roadway.

321.9 QUALITY CONTROL:

It is the contractor's responsibility to perform Quality Control monitoring and/or testing during asphalt concrete production to achieve the required compaction and to perform Quality Control monitoring and/or testing during asphalt concrete production to achieve the required mix properties. The Engineer may obtain samples of any portion of any material at any point of the operations for his own use. Also, the Engineer may order the use of any drying, proportioning and mixing equipment or the handling of any material discontinued which, in his/her opinion, fails to produce a satisfactory mixture.

The asphalt concrete produced shall conform to the properties of the mix design. When the asphalt concrete does not conform to the approved mix design properties, it shall be reported to the Engineer, and corrective quality control measures shall be implemented, or production shall cease immediately at no additional cost to the contracting Agency or Engineer.

321.10 ACCEPTANCE:

321.10.1 Acceptance Criteria: Unless otherwise specified, asphalt concrete will be divided into lots for the purpose of acceptance. A lot shall be considered to be one day's production. When the quantity of asphalt concrete placed in a day exceeds 500 tons but is less than 2000 tons, the lot shall be divided into 500 ton sublots or fraction thereof. Where the quantity of asphalt concrete placed in a day exceeds 2000 tons, the day's production will be divided into four (4) approximately equal sublots. A minimum of one sample will be obtained from each lot. Tests used to determine acceptance will be performed by the Engineer or a laboratory employed by the Engineer. In either case the laboratory shall be accredited by the AASHTO Accreditation Program (AAP), for the tests being performed. The acceptance laboratory will take representative samples of the asphalt concrete from each

321.8.6 Asphalt Concrete Overlay: Asphalt concrete overlay consists of the placing and compacting plant mix asphalt concrete over existing asphalt concrete paving. The thickness of the overlay shall be as shown on the plans or as specified in the special provisions. Preliminary preparation of existing surfaces will be required except when accomplished by the Contracting Agency, and it is so stipulated in the special provisions. With the exception of those which have been preheated and remixed only, existing surfaces shall receive a tack coat.

Asphalt concrete mix aggregate gradation and percentage of asphalt binder shall be in accordance with Section 710 using a 1/2-inch Marshall-Low Traffic asphalt concrete mix designation for overlay more than one and one-half inch in thickness and a 3/8-inch Marshall-Low Traffic asphalt concrete mix designation for overlay one and one-half inch or less in thickness, unless otherwise shown or specified in the special provisions.

Except when they have been preheated and remixed, pavement surfaces shall be prepared as follows:

- a. Before placing asphalt concrete overlay, severely raveled areas or cracked areas that are depressed more than 3/4 inch from the adjoining pavement shall be cut out and patched at least 48 hours prior to the resurfacing operation. Over-asphalted areas or rough high spots shall be either milled or cut out and patched. Large shrinkage cracks shall be filled with asphalt sealing compound acceptable to the Engineer. The entire surface shall be cleaned with a power broom. Raveled areas that do not require removing shall be cleaned by hand brooming. The above are incidental, and the cost thereof shall be included in the bid items.
- b. Before placing asphalt concrete overlay, milling shall be done as shown on the plans or specified in the special provisions and shall be in accordance with Section 317.
- c. After surfaces have been prepared to the satisfaction of the Engineer, they shall receive a tack coat per Section 321.4. Traffic will not be permitted over surfaces which have received a tack coat. When the overlay is to extend onto the concrete gutter, the gutter shall be thoroughly cleaned of loose dust and cement particles and shall be tack coated.

Asphalt concrete overlay shall be placed as specified in Section 321.8.1 and compacted as specified in Section 321.8.4. The surface smoothness shall meet the tolerances specified in Section 321.8.5.

Manholes shall be built up and the frames set flush with the finished surface of the new paving, and tops of valve boxes, clean-outs and other existing structures shall be adjusted to finish grade. In the event the base course and original paving have been removed or disturbed in order to build up the manhole, they shall be replaced with approved materials which shall be thoroughly compacted. The asphalt concrete around the manhole frame shall be completed and made flush with the adjacent overlay.

SECTION 323

The Contractor shall furnish the Engineer with the brand name and name of the manufacturer of the Type I asphalt rejuvenating agent he proposes to use and the material shall be approved by the Engineer before it is used. The Contractor shall also furnish the Engineer with a manufacturer's certificate of compliance indicating quality and specification control.

(B) Type II asphalt emulsion shall be SS-1 or SS-1h emulsified asphalt as specified in Section 713 and shall be applied at the rate of 0.10 to 0.20 gallons per square yard undiluted. However, the exact quantity shall be as directed by the Engineer.

323.8 ASPHALT CONCRETE OVERLAY:

Asphalt concrete overlay shall be in accordance with applicable requirements specified in Section ~~322~~ ← **321.8.6**

The asphalt concrete overlay shall be placed within 48 hours after the heating and remixing operation, unless otherwise specified in the special provisions.

The overlay shall also cover existing pavement over areas not accessible to the heater remixer. Such areas including edges of adjoining concrete, shall receive a tack coat and joints shall be finished as specified in Section 321.

323.9 PAYMENT:

Payment for heater remix surfacing will be made on the basis shown below:

- | | |
|---------------------------------------|--------------------|
| (A) Heater Remix Only | Square Yard |
| (B) Type I Asphalt Rejuvenating Agent | Ton (Undiluted) |
| (C) Type II Asphalt Emulsion | Ton (Undiluted) |
| (D) Asphalt Concrete Overlay | Ton or Square Yard |
| (E) Tack Coat | Ton (Diluted) |

End of Section

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. 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 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 ~~12~~ 6 months from completed product application ~~substantial completion~~ (warranty period) in traffic areas and a minimum of 12 months from completed product application 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 can 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	5-15
#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

End of Section

2005 MAG

CASE 09-12C

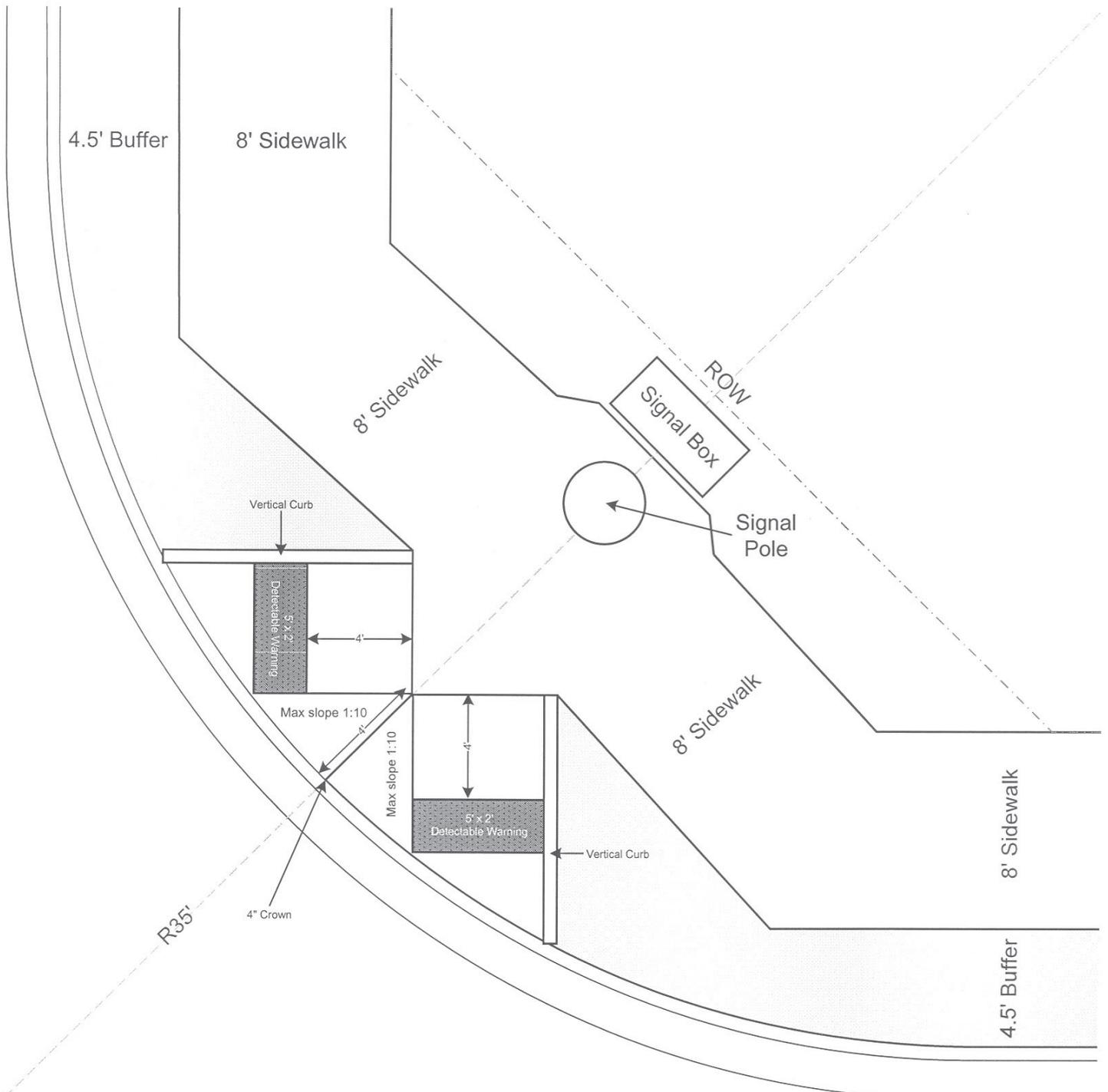
SECTION 715

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

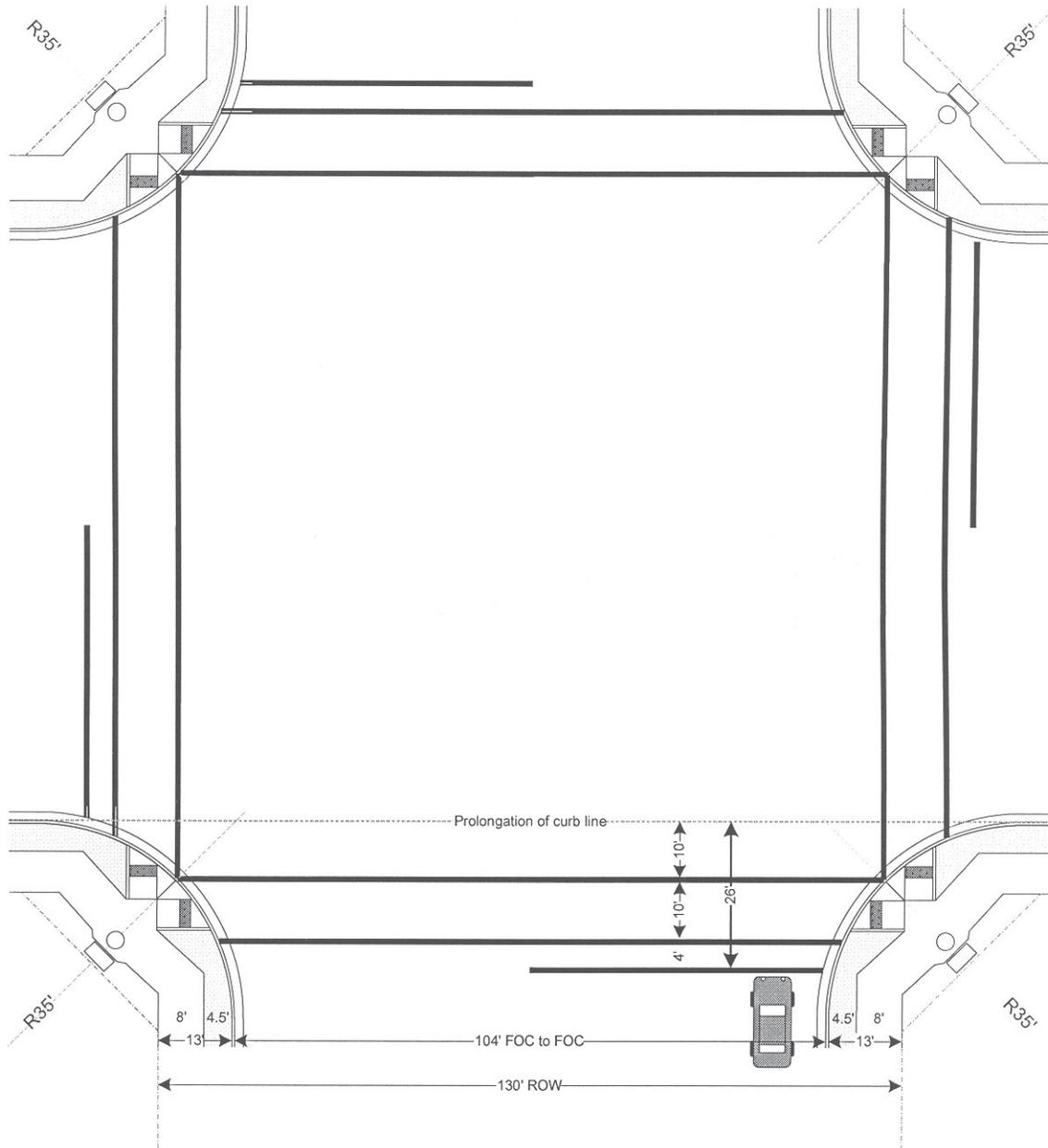
End of Section

Case 09-13

35' Radius Wheelchair Ramps

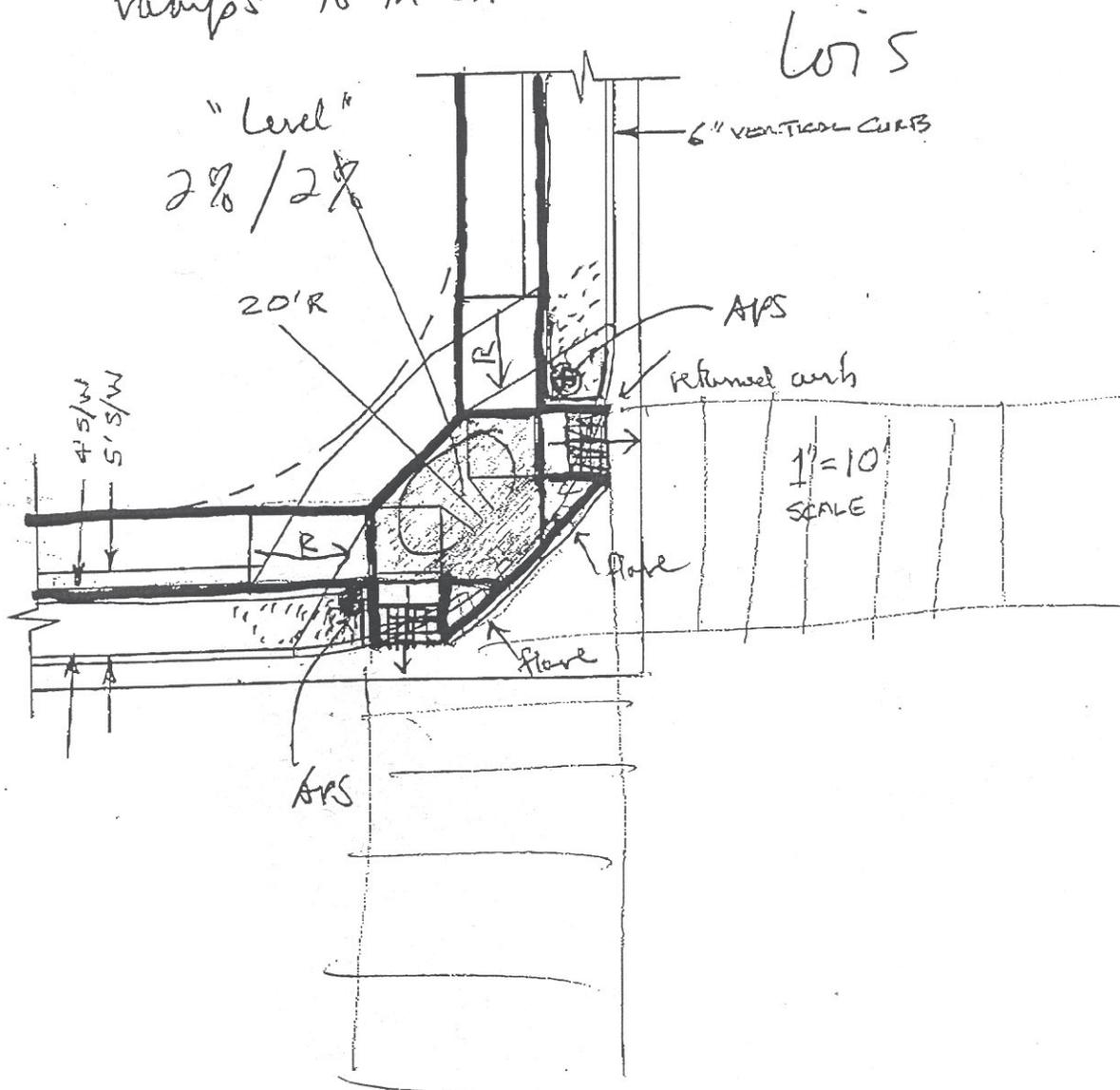


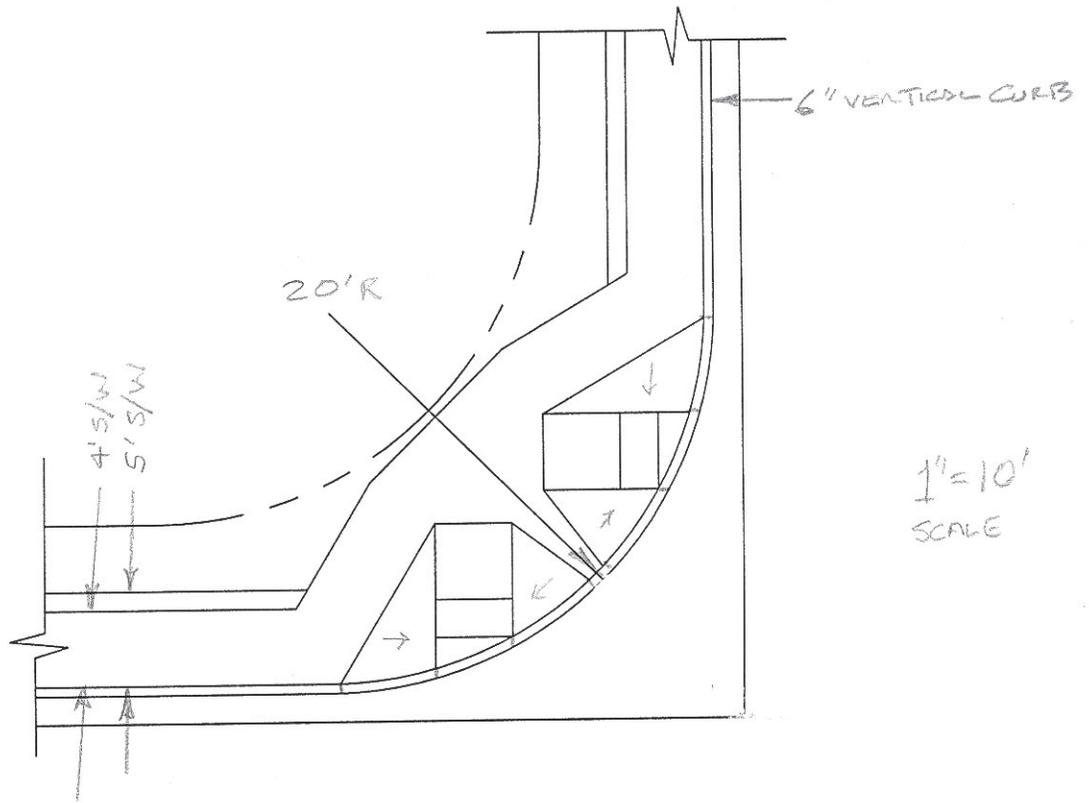
Major Arterial Intersection



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







MARICOPA COUNTY
Department of Transportation

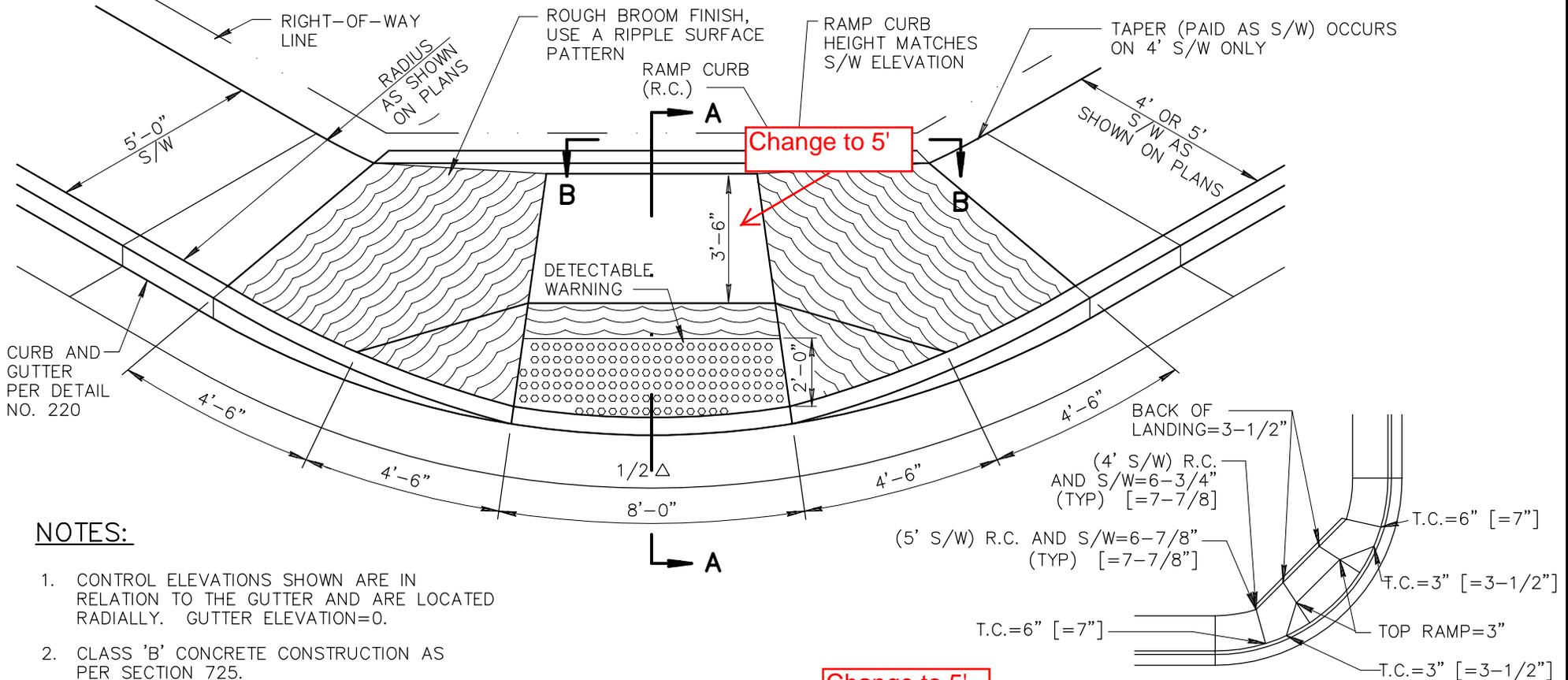
MEMORANDUM

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

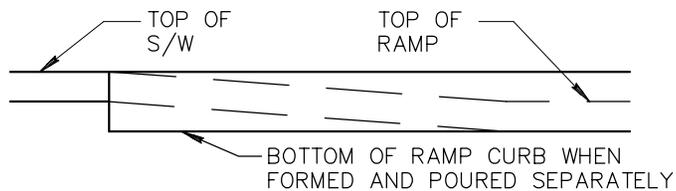
PURPOSE: Revise Details 231, 232, 233, and 234 to obtain compliance with ADA requirements. MAG Details 231 and 233 have undersized landing areas for turning. Details 232 and 234 are non-compliant since the path going across the ramp exceeds the allowable 2% maximum cross slope for sidewalk.

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.

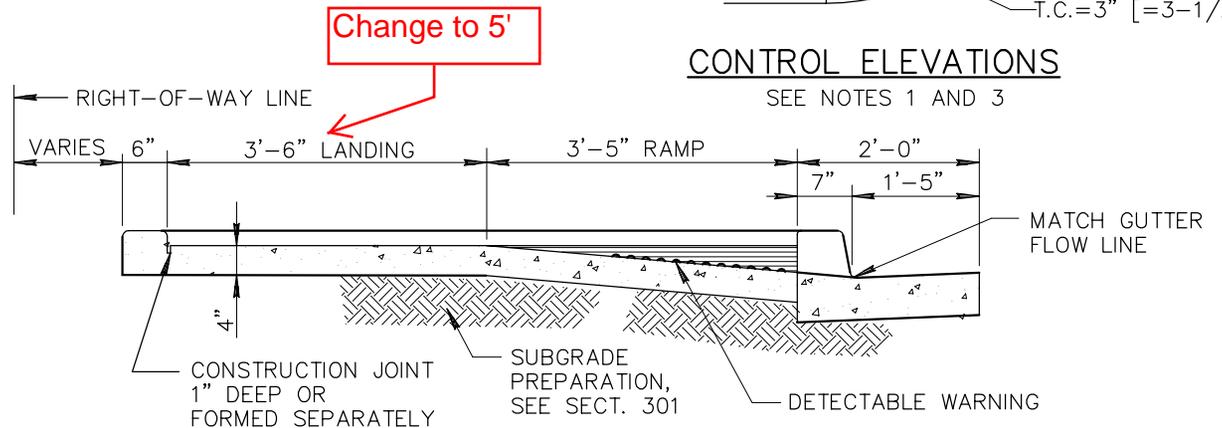


NOTES:

- 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**

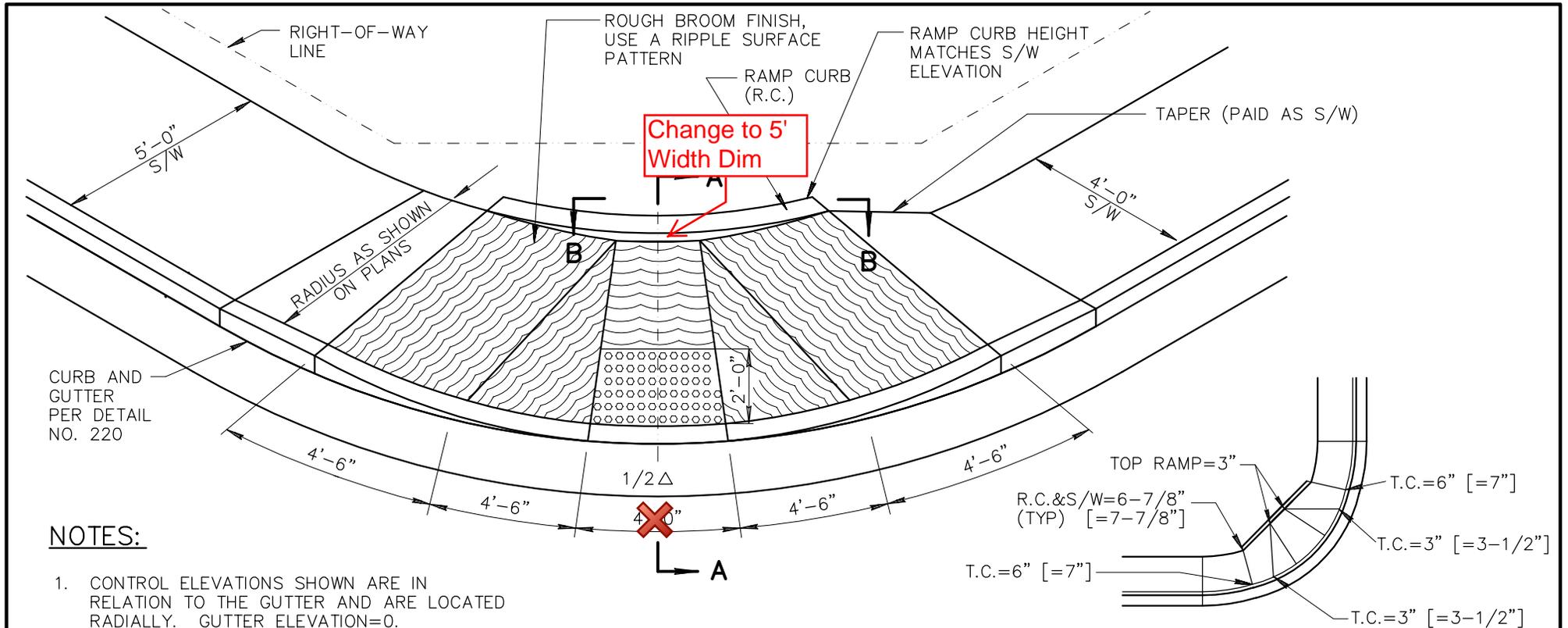
SIDEWALK RAMPS - TYPE 'A'

REVISED

01-01-2006

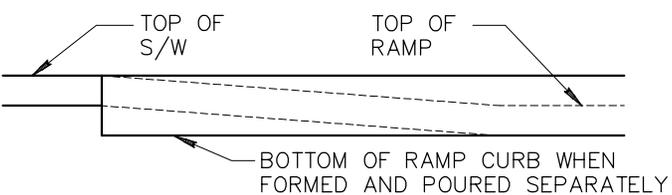
DETAIL NO.

231

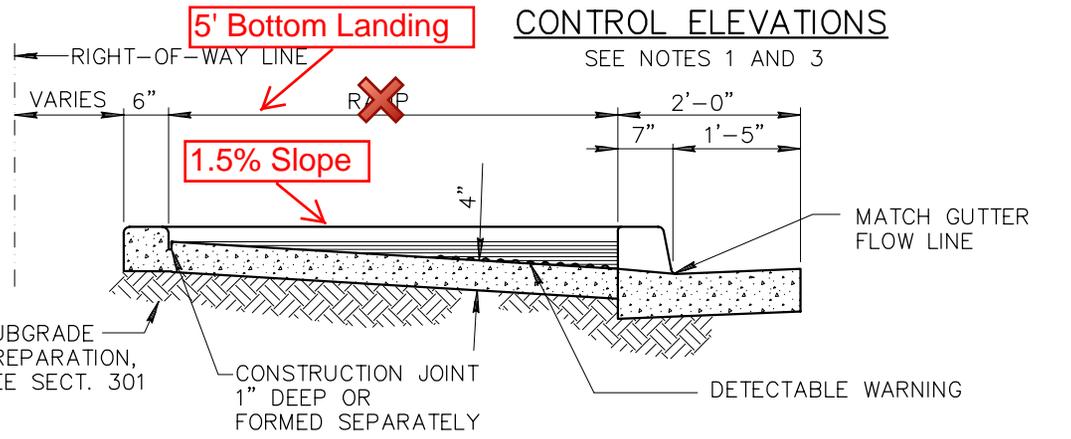


NOTES:

- CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER AND ARE LOCATED RADIALLY. GUTTER ELEVATION=0.
- CLASS 'B' CONCRETE CONSTRUCTION AS PER SECT. 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.



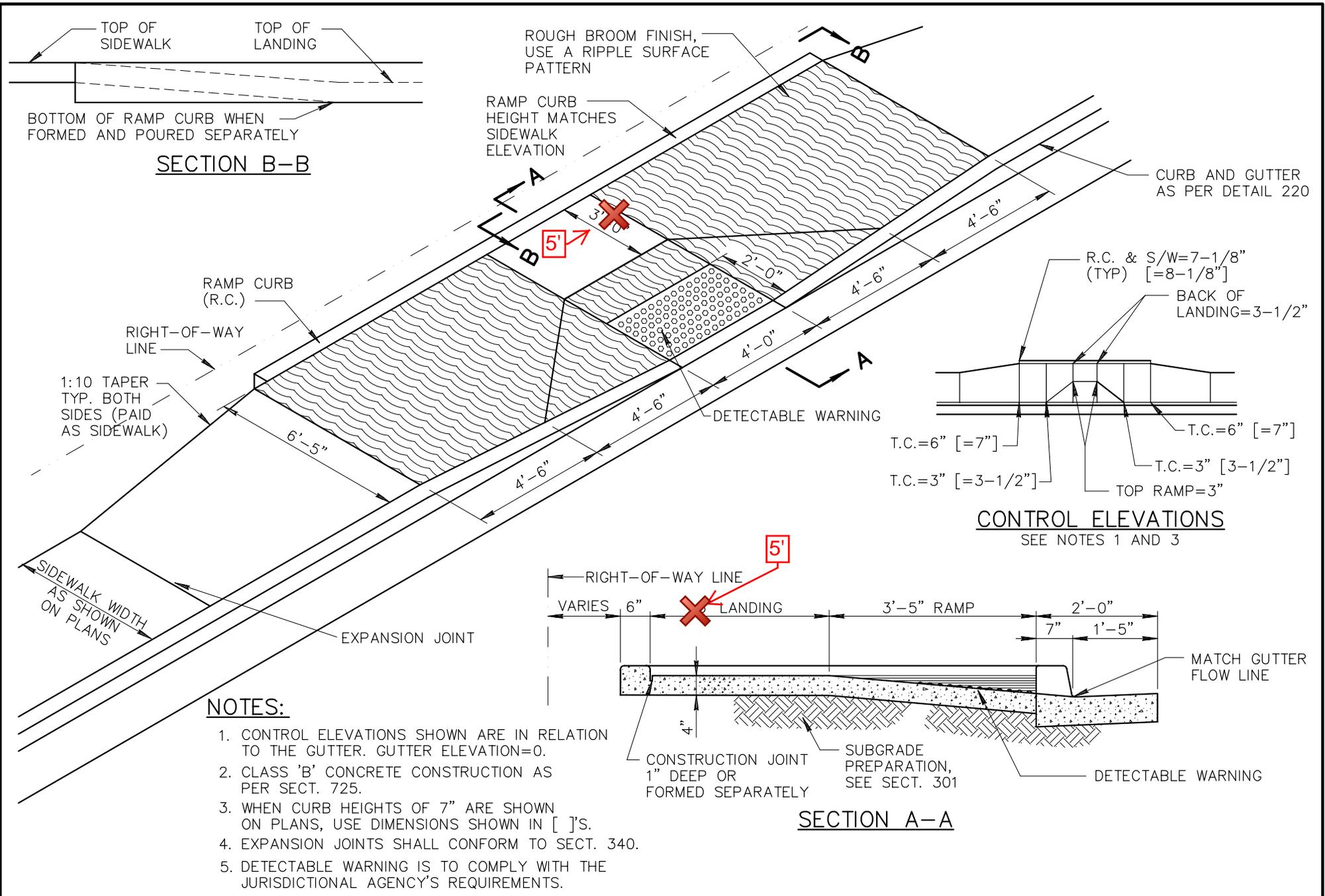
SECTION B-B



CONTROL ELEVATIONS

SEE NOTES 1 AND 3

SECTION A-A



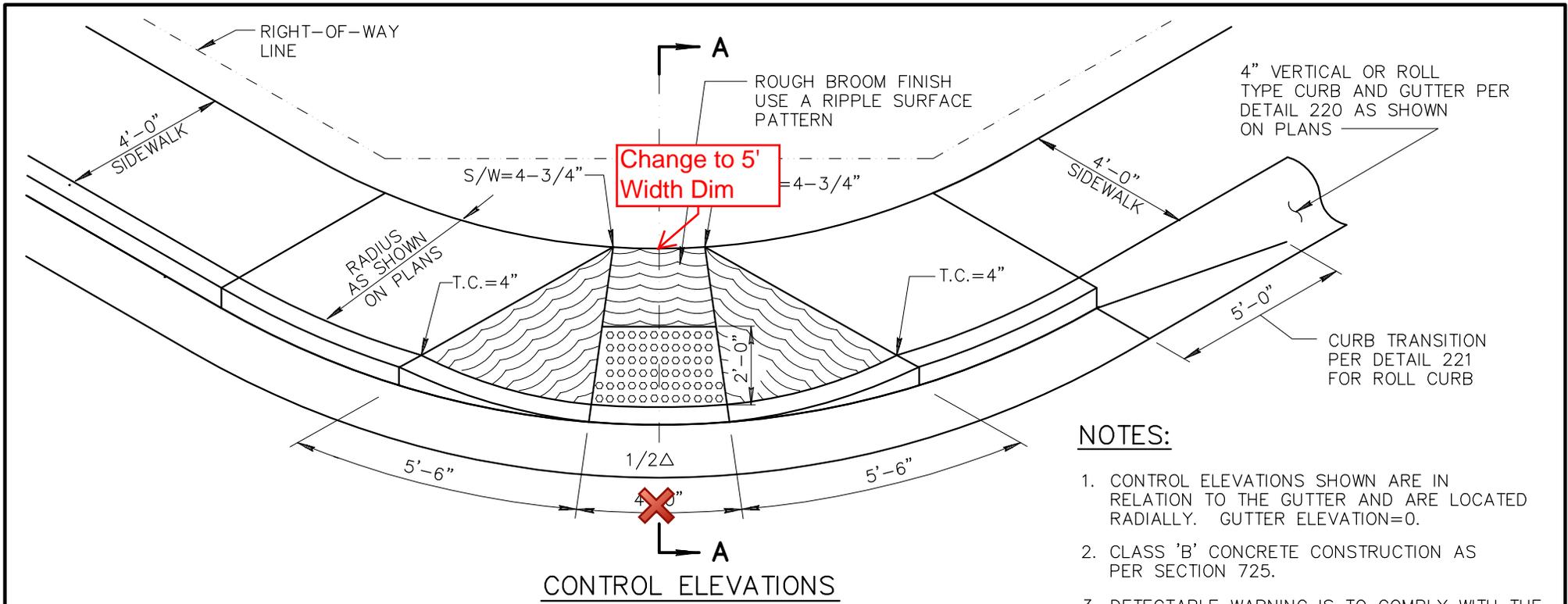
SECTION B-B

CONTROL ELEVATIONS

SECTION A-A

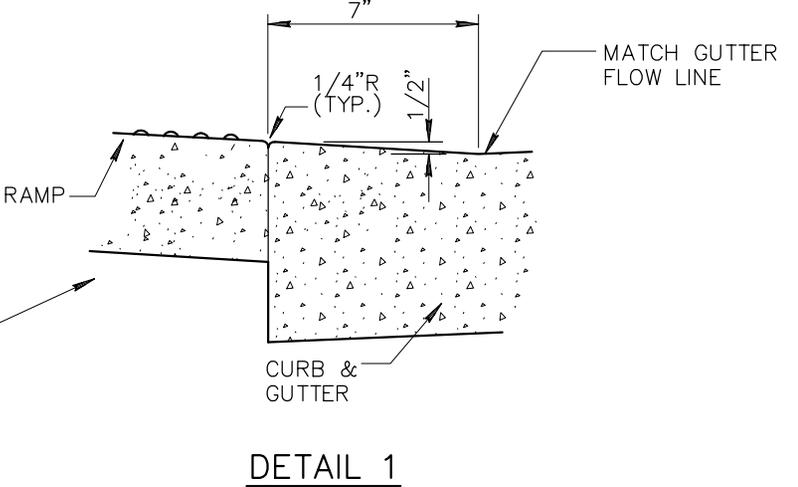
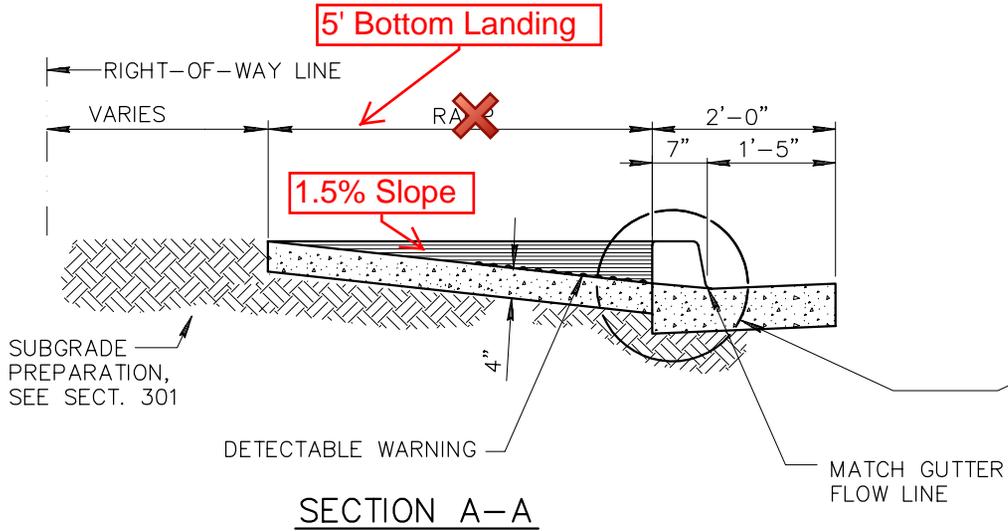
NOTES:

1. CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER. 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. EXPANSION JOINTS SHALL CONFORM TO SECT. 340.
5. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.



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.



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.~~

- Deleted: while it is being placed in the line.
- Deleted: At
- Deleted: t
- Deleted: of t
- Deleted: closed
- Deleted: .

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.