

July 12, 2011

TO: Members of the MAG Standard Specifications and Details Committee

FROM: Troy Tobiasson, City of Goodyear, Chair

SUBJECT: MEETING ADDENDUM

Wednesday, July 13, 2011 at 1:30 p.m.  
Arizona Rock Products Association (ARPA)  
9 W Adams St, Ste 1, Phoenix, AZ 85007 (9th Avenue and Adams Street)

This addendum includes updated case information and working group reports not included in the original agenda packet. Included are:

- Updated Case List
- Updated Case 10-05: Revise Foreword
- Report on Case 11-03: Cadmium Plated Bolts
- Memo from Jeff Hearne to add Sections 341 and 703 (deletions) to Case 11-06.
- Additional Case 11-11 B: Superseded ASTM Specification - Section 772 Chain Link Fence
- New Case 11-16: Modify Section 415: Steel Flexible Metal Guardrail
- New Case 11-17: Revise Section 520: Steel and Aluminum Handrails
- New Case 11-18: Update Section 350: Removal of Existing Improvements
- New Case 11-19: Modify Section 340: Detectable Warnings
- New Case 11-20: Update MAG specifications for brass and bronze water line construction materials to meet federal low lead standards.
- Asphalt Working Group 6/17/11 Minutes
- Materials Working Group 6/17/11 Minutes

Additional new cases are expected to be presented during the meeting from the Asphalt, Materials and Concrete Working Groups.

## 2011 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

(Updated information can be found on the website: <http://www.azmag.gov/Projects/Project.asp?CMSID=1055&CMSID2=1136>)

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
10-05	Case 10-05: Revise FOREWORD to clarify use of the <i>MAG Specifications and Details for Public Works Construction</i> document.	Peoria/ SRP	Javier Setovich Peter Kandarlis	03/03/2010 07/13/2011		0 0 0	Yes No Abstain
10-08	Case 10-08: Re-write Section 717 ASPHALT-RUBBER.	MCDOT	Bob Herz	05/05/2010 02/18/2011		0 0 0	Yes No Abstain
10-12	Case 10-12: New Section 361 – Shallow Depth Fiber Optic Micro-Conduit Installation.	Scottsdale	Rod Ramos	05/05/2010 02/02/2011	Withdrawn 05/04/2011	0 0 0	Yes No Abstain
11-01	Case 11-01: Miscellaneous Corrections. A. Correct typographical errors in Table 711-1. B. Correct typographical error in Table 705-1. C. Correct errors in Detail 212.	MCDOT/ SRP	Bob Herz Peter Kandarlis	01/05/2011 04/06/2011		0 0 0	Yes No Abstain
11-02	Case 11-02: Add an Asphalt Pavement Safety Edge option to Detail 201.	MCDOT	Bob Herz	01/05/2011 04/06/2011		0 0 0	Yes No Abstain
11-03	Case 11-03: Replace cadmium plated bolts referenced in Section 610.13 with zinc plated bolts as described in ASTM-B633.	Peoria	Javier Setovich	02/02/2011		0 0 0	Yes No Abstain
11-04	Case 11-04: Replace reference to MAG Detail 190 in MAG Section 301 with ASTM D4718. Delete MAG Detail 190.	OROW WG/ SRP	Peter Kandarlis	03/02/2011 05/23/2011		0 0 0	Yes No Abstain
11-05	Case 11-05: Move MAG Section 225 Water Requirements into MAG Section 104.1.3.	OROW WG/ SRP	Peter Kandarlis	03/02/2011 05/04/2011		0 0 0	Yes No Abstain
11-06	Case 11-06: Remove sections and details of the MAG specifications that are no longer used or refer to outdated technologies.	OROW WG/ Buckeye	Scott Zipprich	03/02/2011 06/01/2011	07/13/2011	0 0 0	Yes No Abstain
11-07	Case 11-07: Revisions to Section 327 - Hot In-Place Recycling.	AGC/ Asphalt WG	Jeff Benedict	05/04/2011 05/13/2011		0 0 0	Yes No Abstain

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CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
11-08	Case 11-08: Revise Section 711 Paving Asphalt to update performance tables and reference AASHTO standards.	AGC/ Asphalt WG	Jeff Benedict	05/04/2011 05/13/2011		0 0 0	Yes No Abstain
11-09	Case 11-09: Preservative Seal for Asphalt Concrete – Revise sections 334 and 718.	AGC/ Asphalt WG	Jeff Benedict	05/04/2011 05/13/2011		0 0 0	Yes No Abstain
11-10	Case 11-10: Curb Ramp Modification for Radial Installations – Create new Detail 234. Revise details 235-1, 235-2 and 235-3.	MCDOT	Bob Herz	05/04/2011		0 0 0	Yes No Abstain
11-11	Case 11-11: Superseded ASTM Specifications: A. Nuclear Density Testing of Soil B. Section 772 Chain Link Fence	OROW WG/ SRP	Peter Kandarlis	05/04/2011 07/13/2011		0 0 0	Yes No Abstain
11-12	Case 11-12: Modifications to Regulatory Requirements, MAG 107.	OROW WG/ SRP	Peter Kandarlis	05/04/2011		0 0 0	Yes No Abstain
11-13	Case 11-13: Replace Manhole Frame and Cover Details 423, 424 and 523 with new updated versions: 423-1, 423-2, 424-1, 424-2, 523-2 and 523-3.	Water/Sewer WG/ Buckeye	Scott Zipprich	06/01/2011		0 0 0	Yes No Abstain
11-14	Case 11-14: Update Fire Hydrant Detail 360-1, and add Wet Barrel Option (360-2) and Details (360-3).	Water/Sewer WG/ Buckeye	Scott Zipprich	07/13/2011		0 0 0	Yes No Abstain
11-15	Case 11-15: Modify Residential Speed Hump: Detail 210.	Chandler	Warren White	07/13/2011		0 0 0	Yes No Abstain
11-16	Case 11-16: Modify Section 415: Steel Flexible Metal Guardrail.	OROW WG/ SRP	Peter Kandarlis	07/13/2011		0 0 0	Yes No Abstain
11-17	Case 11-17: Revise Section 520: Steel and Aluminum Handrails.	OROW WG/ SRP	Peter Kandarlis	07/13/2011		0 0 0	Yes No Abstain

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CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
11-18	Case 11-18: Update Section 350: Removal of Existing Improvements.	OROW WG/ SRP	Peter Kandarlis	07/13/2011		0 0 0	Yes No Abstain
11-19	Case 11-19: Modify Section 340: Detectable Warnings.	OROW WG/ SRP	Peter Kandarlis w/ N. Vescio	07/13/2011		0 0 0	Yes No Abstain
11-20	Case 11-20: Update MAG specifications for brass and bronze water line construction materials to meet federal low lead standards.	Chandler	Warren White	07/13/2011		0 0 0	Yes No Abstain
11-21	Case 11-21:			07/13/2011		0 0 0	Yes No Abstain
11-22	Case 11-22:			07/13/2011		0 0 0	Yes No Abstain
11-23	Case 11-23:			07/13/2011		0 0 0	Yes No Abstain
11-24	Case 11-24:			07/13/2011		0 0 0	Yes No Abstain
11-25	Case 11-25:			07/13/2011		0 0 0	Yes No Abstain
11-26	Case 11-26:			07/13/2011		0 0 0	Yes No Abstain
11-27	Case 11-27:			07/13/2011		0 0 0	Yes No Abstain

## FOREWORD

Publication of these Uniform Standard Specifications and Details for Public Works Construction fulfills the goal of a group of agencies who joined forces in 1966 to produce such a set of documents. Subsequently, in the interest of promoting county-wide acceptance and use of these standards and details, the Maricopa Association of Governments accepted their sponsorship and the responsibility of keeping them current and viable.

These specifications and details, representing the best professional thinking of representatives of several Public Works Departments, reviewed and refined by members of the construction industry, were written to fulfill the need for uniform rules governing public works construction performed for Maricopa County and the various cities and public agencies within Maricopa County in the county. It further fulfills the need for adequate standards by the smaller communities and agencies who could not afford to promulgate such standards for themselves. Agencies in other regions or climes within the state of Arizona wishing to apply these specifications may need to make adjustments for local conditions.

~~A uniform set of specifications and details, updated and embracing the most modern materials and construction techniques will redound to the benefit of the public and the private contracting industry. Uniform specifications and details will eliminate conflicts and confusion, lower construction costs, and encourage more competitive bidding by private contractors.~~

These uniform specifications and details are intended to aid in the private construction industry in providing modern materials and construction techniques, eliminate conflicts and confusion, lower construction costs and encourage more competitive bidding by private contractors for the benefit of public works construction in the right-of-way. Use of these standards for projects outside of the right-of-way should be reviewed by professional engineers and architects and applied with care to insure relevance to the planned work.

Specifications and details contained herein should be incorporated into project plans and specifications after careful review by the design engineer or architect of specific project needs. Not all specifications will apply to all projects as these standards are developed to meet a variety of public works needs. Prepared plans and specifications should clearly call out specific uniform specifications and details required for the project.

Uniform specifications and details are not a substitute for good engineering judgment. Unique conditions will arise that are outside the scope of these standards. When this happens, professional engineers and architects are required to use their judgment to amend these standards to best meet site-specific project needs in accordance with the rules set forth by the State of Arizona and policy statements made by the Arizona State Board of Technical Registration.

The Uniform Standard Specifications and Details for Public Works Construction will be revised periodically and reprinted to reflect advanced thinking and the changing technology of the construction industry. To this end a Specifications and Details Committee has been established as a permanent organization to continually study and recommend changes to the Specifications and Details. Interested parties may address suggested changes and questions to:

Standard Specifications & Details Committee  
c/o Maricopa Association of Governments  
302 North First Avenue, Suite 300  
Phoenix, Arizona, 85003.

These suggestions will be reviewed by the committee and appropriate segments of the industry and cumulative annual revisions will be published the first of each year. A copy of this publication is available for review on the internet at the website listed below. Please follow the links to the publications page and look for *Uniform Standard Specifications for Public Works Construction and/or Uniform Standard Details for Public Works Construction Within Public Rights of Way*:

[www.mag.maricopa.gov](http://www.mag.maricopa.gov)

| While in the interest of regional uniformity, it is hoped that all using agencies will adopt these standards with as few changes as possible, it is recognized that because of charter requirements and for other reasons, some agencies will find it necessary to modify or supplement certain requirements. In the interest of reducing a proliferation of agency specific modifications, it is strongly recommended that the agency representatives to MAG bring their modifications for consideration by the committee for inclusion into these standards.



## PUBLIC WORKS-UTILITIES DEPARTMENT

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### MEMORANDUM

**Date:** July 11, 2011

**To:** Members of the MAG Standard Specifications and Details Committee

**FROM:** Javier Setovich (City of Peoria)

**RE:** Progress Report  
Case 11-03 Replace Cadmium Plated Bolts Referenced in Section 610.13 with Zinc Plated Bolts as Described in ASTM-B633

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This case is addressing the current use of cadmium plated bolts on potable water pipe mechanical joints that are buried. Cadmium plating is used in this manner to minimize the effects of aggressive soils and reduce corrosion, allowing for an extended lifespan of these fittings as well as easier disassembling if needed.

Concerns with the use of cadmium have been raised to this committee. These concerns are related to the following areas:

1. Health effects to personnel
2. Quality of the material. Accepted use of cadmium plated bolts in the industry
3. Effects on the environment

#### Health Effects to Personnel

Extensive information can be found that attributes considerable health hazards to the use of cadmium in various manufacturing processes as well as the plating process. Exposure limits are defined and enforced in the industry. The majority of hazards seem to be related to airborne particles generated during manufacturing. There is no evidence that handling bolts is a cause for concern. In addition, simple protection equipment like gloves, and proper hygiene practices, like washing hands, would eliminate any potential direct contact with a hazardous level of exposure.

#### Quality of Materials

Cadmium bolts are generally specified as the material of choice for mechanical joints and other fittings to be buried. A check with a local vendor identified cadmium plated bolts as the standard issue for this purpose. Differing from this standard would be considered a special order. Currently MAG and AWWA accept and/or recommend cadmium plated bolts as acceptable. Online research has revealed the exception of these bolts as a choice material, but only in certain aeronautical related uses. A construction/water industry related issue has not been found to this point.

### Effects on the Environment

The EPA has classified cadmium as a potential contaminant source in drinking water, with health effects related to long term exposure to levels above the MCL (Maximum Contaminant Level). No data could be located at this point that identifies cadmium plated bolts as a potential source of contamination. More study would be needed to prove or discount this possibility.

### Interim Conclusion

The current research related to case 11-03 has not been able to identify measurable issues that would warrant the ban by MAG of cadmium plated bolts. The most significant effect could possibly be related to the environmental impact to drinking water, by leaching of the material to the aquifer. Extensive research would need to be done to isolate these bolts as a potential source of contamination in damaging levels. Research of this type would be beyond the scope of the MAG Standard Specifications and Details Committee.

Comments on this document are requested from the committee and can be sent to my email at [javier.setovich@peoriaaz.gov](mailto:javier.setovich@peoriaaz.gov)

## Gordon Tyus

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**From:** Hearne, Jeff [jhearne@srmaterials.com]  
**Sent:** Thursday, June 30, 2011 1:25 PM  
**To:** Scott Ziprich  
**Cc:** Peter Kandaris (SRP); Gordon Tyus  
**Subject:** MAG Sections to add to Case 11-06  
**Attachments:** SECTION 341 - TERRAZZO SIDEWALKS - revised 6-9-11.doc; SECTION 703 RIPRAP - Revision 5-18-11.doc; SECTION 220 RIPRAP - Revision 5-18-11.doc

Scott:

Please add in Sections 341 and 703 to your removal case 11-06 as follows:

- 1) Section 341 - not used in right-of-way applications.
- 2) Section 703 - not needed as the appropriate wording has been moved to Section 220.2

Thanks

### Jeff Hearne

Vice President of Quality Assurance

Salt River Materials Group /  
Phoenix Cement Company and  
Salt River Sand & Rock

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

Case 11-11(b)

DATE: July 11, 2011

TO: MAG Specifications and Details Committee Members

FROM: Peter Kandaris, SRP Representative  
Outside of Right-of-Way Working Group

RE: **Superseded ASTM Specification: Section 772 Chain Link Fence**

Purpose: Review ASTM standards referenced in MAG Section 772. Find outdated standards and recommend replacement standards.

Revisions: Below is a table of the ASTM standards referenced in Section 772. Replace withdrawn standard ASTM A569 with ASTM A1011. All other standards are current.

MAG Section 772 – Chain Link Fence  
Referenced ASTM Standards:

ASTM F-1083	Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM A-569	<b>Withdrawn – replaced with ASTM A1011-10</b> Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
ASTM A-500	Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM F-1043	Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework
ASTM A-653	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A-924	Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM A-789	Standard Specification for Seamless and Welded Ferritic/Austenitic Stainless Steel Tubing for General Service
ASTM A-392	Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A-491	Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A-824	Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence
ASTM F-626	Standard Specification for Fence Fittings
ASTM A-121	Standard Specification for Metallic-Coated Carbon Steel Barbed Wire



P.O. Box 52025  
Phoenix, AZ 85072-2025  
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Case 11-16

DATE: July 11, 2011

TO: MAG Specifications and Details Committee Members

FROM: Peter Kandarlis, SRP Representative  
Outside of Right-of-Way Working Group

RE: **Section 415: Steel Flexible Metal Guardrail**

Purpose: Existing MAG guardrail standards (Section 415 and Details 135-1 thru 4) are outdated and generally not followed by MAG agencies. Some details may not be safe to use.

Revisions:

- a) Adopt MCDOT supplemental Section 415 in whole as a replacement section, with minor revisions to referenced details. Replace reference to details with selected ADOT guardrail details and limited use of MCDOT details where ADOT details are not sufficient.
- b) Delete Details 135-1 through 4.

The revisions include standard modern guardrail materials and construction, but exclude oncoming traffic terminal end options as these seem to be where ADOT and MCDOT have the greatest difference and the most variety exists between agencies. Attached is a proposed revised Section 415 that includes the MCDOT supplemental section, but with references ADOT details (except for measurement).

SECTION 415

FLEXIBLE METAL GUARDRAIL

415.1 DESCRIPTION:

~~This~~ The work under this section shall consist of furnishing all materials, constructing metal beam new guard-railing, and delineating guardrail sections at the locations and in accordance with the details shown on the plans, and as specified in the special provisions per the requirements of this section.

415.2 MATERIALS ~~AND CONSTRUCTION:~~

~~Materials and construction for the railings shall conform to the following requirements:~~

The rail elements, ~~terminal sections~~, bolts, nuts and other fittings shall conform to the specifications of AASHTO M-180, except as modified in this specification. ~~The edges and center of the rail element shall contact each post or block. Rail element joints shall be lapped not less than 12 1/2 inches and bolted.~~ The rail metal shall be open hearth, electric furnace, or basic oxygen steel and, in addition to conforming to the requirements of AASHTO M-180, shall withstand a cold bend, without cracking of 180 degrees around a mandrel of a diameter equal to 2 1/2 times the thickness of the plate.

~~The ends of each length of railing shall be fitted with terminal sections.~~

Three certified copies of mill test reports of each heat from which the rail element is formed shall be furnished to the Engineer.

All material shall be new.

Railing Parts furnished under these specifications shall be interchangeable with similar parts regardless of source. All surfaces of guardrail elements that are exposed to traffic shall present a uniform, pleasing appearance and shall be free of scars, stains or corrosion.

Nails shall be 16 penny common galvanized. Nails for retainer strap shall be 10 penny common, galvanized.

Bolts shall have shoulders of such shape as will prevent the bolts from turning.

Unless otherwise specified the rail elements, terminal sections, bolts, nuts, and other fittings shall be galvanized in accordance with Section 771. Where galvanizing has been damaged, the coating shall be repaired in accordance with Section 771.

Prismatic guardrail reflector tabs shall have a minimum thickness of 3/16", and be either galvanized steel or ultraviolet-resistant plastic. Prismatic guardrail-mounted barrier markers shall have an ultraviolet-resistant reflective surface, be secured to the body in accordance with the manufacturer's recommendations, and have a trapezoidal-shaped body as shown in the Reflector Tab Detail of ADOT Roadway Standard Drawing C-10.01.

~~Posts, including blocks, shall be construction grade, Douglas Fir, free of heart center.~~

Timber for posts and blocks shall be rough sawn (unplanned) or S4S with the nominal dimensions indicated. Any species or group of woods graded in accordance with the requirements for Timber and Posts of the Western Wood Products Association may be used. Timber shall be No. 1 or better, and the stress grade shall be as follows:

<u>6" by 8" Post and Block</u>	<u>1200 psi</u>
<u>8" by 8" Post and Block</u>	<u>900 psi</u>
<u>10" by 10" Post and Block</u>	<u>900 psi</u>

When the plans show guardrail systems using 8" by 8" timber posts and blocks, the Contractor may use 8¼" nominal size posts and blocks with a stress grade of 825 pounds per square inch. Substitution of 8" by 8" posts for 6" by 8" post may be approved on a per project basis by the engineer.

At the time of installation, the dimensions of timber posts and blocks shall vary no more than plus or minus ½" from the nominal dimensions as specified on the project plans.

The size tolerance of rough sawn block in the direction of the bolt holes shall vary no more than plus or minus 3/8". Only one type of post and block shall be used for any one continuous length of guardrail.

The posts and blocksAll timber shall be pressure treated, have a preservative treatment after fabrication with oil borne pentachlorophenol, or coppernaphthenate, as provided inper the requirements of Section 779.

**415.3 CONSTRUCTION REQUIREMENTS:**

415.3.1 General: The construction of the various types of guardrail shall include the assembly and erection of all component parts complete at the locations shown on the project plans or as requested by the Engineer. All materials shall be new except as provided for under the project plans.

General guardrail construction shall be done in accordance with ADOT Roadway Standard Drawings C-10.01, C-10.02 and C-10.03. Departure end terminals shall be done in accordance with ADOT Roadway Standard Drawing C-10.8

Terminal sections shall be installed in accordance with the manufacturer's recommendations.

Workmanship shall be equivalent to good commercial practice and all edges, bolt holes and surfaces shall be free of torn metal, burrs, sharp edges and protrusions.

The various types of guardrail shall be constructed with wood posts and wood blocks, except where other post materials to be used are noted on the plans.

The bolted connection of the rail element to the post shall withstand a 5,000 pound pull at right angles to the line of the railing. ~~The All~~ metal work shall be fabricated in the shop, ~~and a~~ No punching, cutting or welding will be permitted shall be done in the field, except as provided for by the project plans. All metal cut in the field shall be cleaned and the galvanizing repaired in accordance with Section 771.

Where field cutting or boring of wood posts and blocks is permitted, the affected areas shall be thoroughly swabbed with at least two passes of the same type of wood preservative as initially used.

Where Wood posts with rectangular sections are used, the posts shall be set so that the longest dimension is perpendicular to the rail.

All bolts shall extend beyond the nuts a minimum of two threads, except that all bolts adjacent to pedestrian traffic shall be cut off flush to the nut.

Bolts extending more than 2" beyond the nut shall be cut off to less than ½" beyond the nut.

Unless otherwise shown on the plans, bolts shall be torqued as follows:

<u>Diameter of Bolt</u>	<u>Torque, Foot/Pounds</u>
<u>5/8"</u>	<u>45-50</u>
<u>3/4"</u>	<u>70-75</u>
<u>7/8" and larger</u>	<u>120-125</u>

All bolts, other than those specified to be torqued, shall be securely tightened.

When guardrail is being constructed under traffic, the work shall be conducted so as to constitute the least hazard to the public. Guardrail work shall be performed in the direction of traffic flow when feasible.

Any section of guardrail that is removed for modification shall be replaced within five calendar days of the date the guardrail is removed, unless otherwise directed by the Engineer. At the end of each day, incomplete guardrail sections having an ~~Rail elements shall be lapped so that the exposed ends toward oncoming will not face approaching traffic.~~ shall have a buffer end section (MAG Standard Detail 135-4, Detail No. 5 Buffer End Section) bolted securely in place together with approved overnight traffic control devices in place.

**415.3.2 Delineation:** The maximum spacing between reflector tabs shall not exceed six posts. The slotted part of the tab shall be installed under the mounting bolt head so that the ReflectORIZED surface of the tab faces oncoming traffic. The exposed ends of the slotted part of the tab shall be bent up against and then over the top of the bolt head. The color of the reflective portion of the barrier markers shall conform to the color of the adjacent edge line. Silver-faced reflector tabs shall be installed on the right hand side of all roadways, and yellow-faced tabs shall be installed on the left-hand side of one-way, or median divided roadways.

All guardrail delineation shall be installed in accordance with the manufacturer's recommendations and as specified herein.

**415.3.3 Roadway Guardrail:** Wood posts shall either be driven, or placed in manually or mechanically dug holes; however, driven posts will not be permitted at locations where damage to the curb, gutter, sidewalk, buried items, shoulders or pavement might occur. The Engineer will be the sole judge as to whether driving of posts will be allowed. Driving of posts shall be accomplished in a manner that will prevent battering, burring, or distortion of the post. Any post which is damaged to the extent it is unfit for use in the finished work, as determined by the Engineer, shall be removed and replaced at no additional cost to the Agency.

The posts shall be firmly placed in the ground. The space around posts shall be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer shall be moistened and thoroughly compacted to the density of the surrounding material.

Where pavement is disturbed in the construction of guardrail, the damaged surfacing shall be repaired as approved by the Engineer. Where a culvert or other obstacle is at an elevation, which would interfere with full depth post placement, guardrail installation shall comply with requirements of Section 415.3.4 Bolted Guardrail Anchors or Section 415.3.5 Nested Guardrail.

Wood blocks shall be toe nailed to the wood post with one 16 penny galvanized nail on each side of the top of the block. Wood blocks shall be set so that the top of the block is no more than 1/2" above or below the top of the post, unless otherwise shown on the project plans.

Rail elements shall be spliced at 25 foot intervals or less. Rail elements shall be spliced at posts unless otherwise shown on the project plans. The rail element shall have full bearing at joints. When the radius of curvature is 150 feet or less, the rail elements shall be ~~shaped in the shop~~ curved.

Posts shall be placed at equal intervals, as shown on the plans, except that the end posts may be spaced closer to adjacent posts if directed by the Engineer.

The Contractor shall dispose of ~~S~~ surplus excavated material remaining after the guard railing has been constructed shall be disposed of.

Railing parts furnished under these specifications shall be interchangeable with similar parts regardless of source.

**415.3.4 Bolted Guardrail Anchors:** Where the elevation of the top surface of a box culvert or other similar installation prevents the placement of a post of the specified length, the posts shall be shortened and anchored in accordance with *ADOT Roadway Standard Drawing C-10.07* at the locations shown on the plans.

**415.3.5 Nested Guardrail:** This work shall consist of furnishing and constructing nested guardrail, Type 1, 2, or 3, as shown in *ADOT Roadway Standard Drawing C-10.06* including all materials, in accordance with the requirements of the project plans.

Nested guardrail consists of additional steel W-beam sections attached as an appurtenance to guardrail.

**415.3.6 Guardrail to Structure Transitions:** Guardrail transitions shall be constructed in accordance with the details shown on the project plans, at the locations shown on the plans. *Thrie beam to concrete half barrier guardrail transitions shall be in accordance with ADOT Roadway Standard Drawing C-10.30.*

**415.4 MEASUREMENT:**

The limits of measurement for roadway guardrail shall be as detailed in *Maricopa County Department of Transportation Standard Detail 3016* and as shown on the project plans. Guardrail, of the type shown on the project plans, will be measured by the linear foot along the face of the rail element from center to center of end posts, exclusive of guardrail terminals, guardrail end terminal assemblies, and guardrail transitions and anchor assemblies.

Delineation is considered a part of installation of guardrail and hence will not be measured as a separate item.

The accepted quantities of bolted guardrail anchors, will be measured by the unit each, complete in place, including steel brackets, hardware, excavation, backfill, removing and replacing surfacing, cutting and fitting steel beam posts or timber posts, drilling anchor bolt holes in steel posts, timber posts, and box culverts, and disposal of surplus materials.

Nested guardrail, Type 1, 2, or 3, installed as an appurtenance to new guardrail, shall be measured by the linear foot of additional steel W-beam, installed using guardrail hardware, complete in place and accepted, as shown on the plans.

Guardrail transitions will be measured by the unit each, complete and accepted as shown on the project plans.

**415.5 PAYMENT:**

Payment for accepted quantities of each type of guardrail will be made at the contract unit price. Payment shall be full compensation for furnishing materials and installing guardrails, complete in place including excavation, backfill, and disposal of surplus material.

Payment for Bolted Guardrail Anchors will be at the contract unit price, and shall be full compensation for the work, complete in place, including steel brackets, hardware, excavation, backfill, removing and replacing surfacing, cutting and fitting steel beam posts or timber posts, drilling anchor bolt holes in steel posts, timber posts, and box culverts, and disposal of surplus materials.

Payment for Additional Steel W-beam will be at the contract unit price.

Payment for guardrail transitions will be at the contract unit price.

**415.3 PAINTING:**

~~All metal surfaces of the guard rails shall have a zinc chromate prime coat and two coats of white enamel. The exposed portions of the wood posts shall have a wood primer and two coats of finish paint. Materials and application shall be as specified in Sections 790 and 530. Colors shall be as directed by the Engineer.~~



---

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

Case 11-17

DATE: July 11, 2011  
TO: MAG Specifications and Details Committee Members  
FROM: Peter Kandarlis, SRP Representative  
RE: **Section 520: Steel and Aluminum Handrails**

Purpose: The existing section allows aluminum handrails, but provides no requirements for use of aluminum (steel only). Also, Detail 145, "Safety Rail" requires the use of steel railing. The welding standard is nearly 25 years out of date.

Revisions:

- a) Provide material requirements for aluminum handrails. Add material requirements to 520.2.
- b) Change the title on Detail 145 to "Steel Safety Rail" to be consistent with the specification.
- c) Update the welding reference to current standards (AASHTO/AWS Standard D1.5, Bridge Welding Code).

## SECTION 520

### STEEL AND ALUMINUM HANDRAILS

#### 520.1 DESCRIPTION:

Metal handrail shall consist of furnishing all materials and constructing handrail of steel or aluminum, including railing, posts, fittings and anchorages. Metal handrail shall be fabricated, installed and painted, when required, in accordance with the details shown on the plans and these specifications.

#### 520.2 FABRICATION:

Prior to beginning any work on the fabrication of the railing, the Contractor shall submit shop drawings for approval, showing complete railing details.

Materials furnished for metal handrail shall conform to the requirements specified on the plans.

The Engineer shall be furnished complete, copies in triplicate of all mill reports on steel and aluminum materials furnished.

Railings shall be fabricated from welded or seamless members of the size and thickness shown on the plans. Steel members shall conform to the requirements of ASTM A-53. Grade B structural steel conforming to ASTM A-36, or tubular sections of hot rolled mild steel, as shown. [Aluminum handrails shall conform to the requirements of either ASTM B-429 for round extruded tube or ASTM B-221 for semi-hollow extruded tube with rounded corners.](#)

Welding shall be performed by the electric arc process and shall be done in conformance with [AASHTO/AWS D1.5, Bridge Welding Code Specifications for Welded Highway and Railway Bridges of the AWS](#). All butt welds on exposed surfaces shall be ground flush with adjacent surfaces.

Railing panels shall be straight and true to dimensions.

For structures on curves, either horizontal or vertical, the railing shall conform closely to the curvature of the structure.

The completed steel railing units shall be galvanized in accordance with the requirements of Section 771 unless otherwise specified.

[Provide Series 300 stainless steel fasteners for aluminum alloy handrails.](#)

#### 520.3 ERECTION:

The railing shall be carefully erected, true to line and grade. Posts and balusters shall be vertical and parallel with the deviation from the vertical for the full height of the panel not exceeding 5/8 inch. After erecting the railing, any abrasions or exposed steel shall be repaired in accordance with Section 771 or Section 530.

#### 520.4 MEASUREMENT:

The various types of railing will be measured by the linear foot from end to end along the face of the railing including terminal sections.

#### 520.5 PAYMENT:

The price paid per linear foot for handrailing shall include full compensation for furnishing all labor, materials, tools, and equipment and doing all work involved in constructing the railing complete in place as shown on the plans and specified herein.



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Case 11-18

DATE: July 11, 2011

TO: MAG Specifications and Details Committee Members

FROM: Peter Kandaris, SRP Representative  
Outside of Right-of-Way Working Group

RE: **Section 350: Removal of Existing Improvements**

Purpose: Section 350 needs updating to include detailed information on handling utilities when renovations occur within the right-of-way and backfill of voids left from removals where structures are to be installed (manholes, vaults, etc.). Additionally, payment for removals should delineate specific removal items to insure that the scope is understood during the bid process.

Revisions:

- a) Add new language in Section 350.2 for utility removal. Utility abandonment is not permitted unless specified in the
- b) Delete Details 135-1 through 4.
- c) Identify payment for removals for each item.

## SECTION 350

### REMOVAL OF EXISTING IMPROVEMENTS

#### 350.1 DESCRIPTION:

This work shall consist of removal and disposal of various existing improvements, such as pavements, structures, pipes, conduits, curbs and gutters, and other items necessary for the accomplishment of the improvement.

#### 350.2 CONSTRUCTION METHODS:

The removal of existing improvements shall be conducted in such a manner as not to injure active utilities or any portion of the improvement that is to remain in place. See Section 107.

Utilities shall not be abandoned in place below future structures. In all other cases, in-place abandonment shall only be allowed if a plan for abandonment is provided in the plans.

Utilities to be removed shall be disconnected and taken out in accordance with the requirements of the utility owner to the limits shown on the plans. Utility removal shall not be performed until a release has been obtained from the utility stating that their respective service connection and appurtenant equipment have been disconnected, removed or sealed and plugged in a safe manner.

Sidewalks shall be removed to a distance required to maintain a maximum slope for the replaced portion of sidewalk, for one inch per foot and all driveways shall be removed to a distance as required by standard details.

Existing concrete driveway curbs and gutters shall be removed to the right-of-way line and the new end of curb faced.

Portland cement concrete pavements, curbs and gutters and sidewalks designated on the plans for removal shall be saw-cut at match lines, in accordance with Section 601 and removed.

Asphalt concrete pavements designated on the plans for removal shall be cut in accordance with Section 336.

Removal of trees, stumps, roots, rubbish, and other objectionable materials in the right-of-way shall be done in accordance with Section 201.

Backfill of all excavated areas below structures shall be in accordance with Section 206.4. Backfill and compaction of all other excavated areas shall be compacted to the densities as prescribed in Section 601 (trenches) or Section 211 (holes, pits or other depressions).

All surplus materials shall be immediately hauled from the jobsite and disposed of in accordance with Section 205.

#### 350.3 MISCELLANEOUS REMOVAL AND OTHER WORK:

This work shall include, but not be limited to the following, where called for on the plans:

(A) Relocate existing fence and gate.

- (B) Remove and reset mail boxes.
- (C) Remove signs and bases in right-of-way.
- (D) Remove planter boxes, block walls, concrete walls, footings, headwalls, irrigation structures, and storm water inlets.
- (E) Install plugs for pipes and remove existing plugs as necessary for new construction.
- (F) Remove wooden and concrete bridges.
- (G) Remove median island slabs.
- (H) Remove pavements and aggregate base where called for outside the roadway prism.

**350.4 PAYMENT:**

Payment for removals will be made at the unit ~~bid-proposal~~ prices ~~bid in the applicable proposal~~ pay for each removal items, which price shall be full compensation for the item complete, as described herein or on the plans.

DATE: July 13, 2011

TO: MAG Specifications and Details Committee Members

FROM: Outside ROW Working Group - Niranjan Vescio, Peter Kandarlis

RE: **Modification to MAG Section 340: Detectable Warnings**

Purpose: Existing section does not adequately address detectable warning material and placement requirements in accordance with ADAAG.

Revisions: Modify Section 340.2.1 to include needed detail on detectable warning color and contrast, materials, strength and performance criteria, and anchorage. Include reference to existing MAG Details 235.1 through 235.5 in Section 340.3.1.

## MAG Detectable Warning Specification – Supporting Arguments

Prepared For:

Maricopa Association of Governments, Standard Specifications and Details Committee

This document supports the edits made to the Detectable Warning specification in Arizona Uniform Standard Specifications for Public Works Construction, 1998.

Truncated dome dimensions and spacing for Detectable Warnings (DW) are defined in the ADAAG for optimal detect-ability and public safety.

Four essential DW design standards, **Color & Contrast**, **Material**, **Strength & Performance**, and **Attachment System** are left to the local authorities to define in accordance with local requirements.

The Maricopa Association of Governments (MAG) should address the interests of its various local DW stakeholders (→pyramid) by developing DW specifications for its member governments.



**1. DW Color & Contrast** - The ADAAG only requires that DWs be contrasted visually with adjoining surfaces, "either light on dark, or dark of light." The FHWA's visual detection study shows reds exhibited the highest luminance contrast and greatest detect-ability against light surfaces.<sup>i</sup> The FHWA states "**dark brick red color** (e.g. terracotta) may be a good choice where adjacent walking surfaces are light."<sup>ii</sup> **Terracotta is recommended for MAG public rights-of-way**; a natural southwest color that must be integral to the DW and made with UV-, heat-, and oxidant-stable pigments well-suited for the sun-belt.

**2. DW Material** – **Concrete is the most suitable material for DW construction** because it matches the surrounding sidewalk environment. Furthermore, concrete DWs bond best to concrete substrates, and concrete wears in a manner that sustains a consistent friction property. However, because standard concrete DWs have poor impact resistance and lack the strength and performance to achieve a compliant 20-40 year service life expected of the surrounding concrete,<sup>iii</sup> **higher-strength concrete should be used to manufacture DWs**, thereby preserving the look, feel, and inherent advantages of concrete. Consequently, we do not permit the use of other materials such as plastic, metal or rubber for the manufacture of DW's.

**Higher-Strength Concrete (HSC)**: HSC can be produced to have the desired combination of physical, chemical, and mechanical properties appropriate for DWs. With HSC it is possible to form extremely durable domes true to ADAAG specification, retain an integral color throughout, have a high flexural strength, tolerate both hot and cold extremes, and meet the most discriminating strength and performance standards.

The table below compares some physical properties of HSC and standard concrete, providing perspective on the strength, durability, and performance advantages of HSC using standard concrete as the point of reference.

ASTM	Properties	Standard Concrete (Std)	Higher-Strength Concrete (HSC)
C 39-04	Compression Strength	3500 psi	12,000 psi
C 418	Abrasion	> 0.5 cm <sup>3</sup> /cm <sup>2</sup>	0.03 cm <sup>3</sup> /cm <sup>2</sup>
C 140	Water Absorption	> 4%	<0.50%
C 1262	Freeze Thaw	Fail	0.00% → No change
C 1028	Slip Resistance	Fa = 0.50	Fa = 0.85
C 947-03	Flexural Yield	525 psi	2,500 psi
C 496	Tensile Strength	500 psi	2,500 psi

### 3. Why DW Specifications? - *Performance specifications are a necessary instrument to protect investments, address stakeholder interests, and fully define a DW system meeting local requirements.*

The MAG Uniform Standard Specification for Public Works Construction should:

1. Adopt a single set of functional/performance standards that apply specifically to concrete DWs.
2. Set that “performance bar” to exclude materials with a history of poor performance.

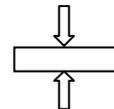
The strength and performance standards to which many concrete DWs are currently manufactured have proven inadequate for sustained strength, performance and durability. Furthermore, the ASTM C 936-08 strength/performance standards for solid concrete interlocking paving units are inadequate for DWs for the simple reason that the demands on DWs far exceed those on the concrete and pavers that form our traditional walkways. The advantages of improved strength are well noted and include optimized DW design, increased safety, lower life cycle cost, and increased service life.<sup>iv</sup>

Strength and performance factors to overcome the most common causes of concrete failure including shrinkage, creep, settlement, thermal expansion/contraction, mechanical abrasion, and environmental attack appear below:

#### Strength Factors –

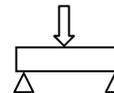
**Compressive Strength** > 12,000 psi per ASTM C39-04

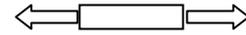
Because high compression strength is extremely important to keep concrete truncated domes intact, a minimum 12,000 psi compressive strength concrete should be used in the manufacturing of concrete truncated domes to assure durability of this feature.



**Flexural Yield Strength** >2,500 psi per ASTM C947-03

Because detectable warnings can be subject to the extreme loads of vehicle drive-overs (which can create opposing axial forces), require a minimum of 2,500 psi flexural strength. Concrete pavers of 1,100 psi flexural strength do not survive such flexural stress.



**Tensile Strength** >2,500 psi per ASTM C496

Because standard concrete can be strong in compressive strength, but comparatively weak in tensile strength, and lack the ductility to survive extreme environmental cycles, the latter being most critical for maintaining structural integrity during both hot/cold and wet/dry extremes of Arizona, require no less than 2,500 psi tensile strength.

Standard concrete is generally less than 15% as strong in flexural as compression.<sup>v,vi,vii</sup> Higher strength concrete mixtures can achieve flexural and tensile strengths at least 20% of the compressive and such standards must be required of DWs in order to achieve the desired service life.

**Performance Factors –****Freeze/Thaw** => 0.00% material loss per ASTM C 1262

Because ice expansion during freeze/thaw cycles creates internal pressure that can break apart weak concrete, require zero material loss after a 50 cycle test in order to realize an extended service life for DWs.

**Water Absorption** <0.50% per ASTM C 140

Because moisture penetration can lead to thermal expansion tension in the summer heat, require no more than 0.50% water absorption into the DW material.

**Slip Resistance** >Fa=0.85 per ASTM C 1028

Because slip resistance of advanced concretes can vary with product formulation and finish, establish greater than 0.85 slip resistance per ASTM C 1028 as the minimum standard of performance to ensure this very important performance factor is not compromised in design for gains in other factors.

**Abrasion** <0.03 cm<sup>3</sup>/cm<sup>2</sup> per ASTM 418

Because abrasion is greatly increased by the introduction of foreign particles (e.g. sand) abundant in the desert, and abrasion loss can leave the surface more susceptible to water permeation, require no more than 0.03 cm<sup>3</sup>/cm<sup>2</sup> material loss per ASTM 418.

**4. Why DW Attachment?** – A monolithic attachment of the DW to the substrate is key to a strong performance of the DW over the long term. Wet-set installation using a proven wet-set anchoring mechanism that assures constant contact of the DW's bottom surface with the concrete slurry as it chemically cures and outgases is strongly recommended because this is the only assurance of a complete and lasting void-free attachment to the substrate.

<sup>i</sup> DW Visual Detection Study; <http://www.access-board.gov/research/dw-fhwa/report.htm>; p52, p20.

<sup>ii</sup> DW Visual Detection Study; <http://www.access-board.gov/research/dw-fhwa/report.htm>; PDF Page 66

<sup>iii</sup> Concrete Network; <http://www.concretenetwork.com/concrete/walkways/construction.html>

<sup>iv</sup> Slag Cement Assoc.; [http://www.slagcement.org/image/123800\\_c\\_sU128801\\_s\\_i185541/No14\\_Compress\\_Strength.pdf](http://www.slagcement.org/image/123800_c_sU128801_s_i185541/No14_Compress_Strength.pdf)

<sup>v</sup> National Ready Mix Concrete Association; <http://www.nrmca.org/aboutconcrete/cips/16p.pdf>

<sup>vi</sup> STD Concrete Compressive to Tensile; <http://www.highbeam.com/doc/1G1-111616523.html>

<sup>vii</sup> Cement Technology; [http://www.cement.org/tech/faq\\_flexural.asp](http://www.cement.org/tech/faq_flexural.asp)

## Revisions to MAG Section 340:

### Concrete Curb, Gutter, Sidewalk, Sidewalk Ramps, Driveway and Alley Entrance

#### 340.2.1 Detectable Warnings

Truncated dome dimensions and spacing for Detectable Warnings are defined by the Americans with Disabilities Act Accessibilities Guidelines (ADAAG) for optimal detect-ability and public safety. Four essential detectable warning design factors, Color & Contrast, Material, Strength & Performance, and Attachment System, are defined in the following subsections to suit local performance requirements.

Detectable warnings shall consist of raised truncated domes aligned in a square grid pattern in conformity to the ADAAG Americans with Disabilities Accessibility Guidelines. Truncated domes shall have the following nominal dimensions: base diameter of nominal 1.0 inches (0.9 inches minimum) top diameter of 50 percent of the base diameter minimum to 65 percent of the base diameter maximum, and height of nominal 0.2 inches. Dome center-to-center spacing of 2.35 inches, measured between the most adjacent domes on the square grid. Dome center-to-center spacing for radial installations shall be 1.6 inches minimum and 2.4 inches maximum with a base-to-base spacing of 0.65 inches minimum. Detectable warning edges shall be sized and installed so that dome spacing is maintained across adjoining edges.

**340.2.1.1 Color & Contrast** Detectable warnings shall contrast visually with adjoining surfaces, either light-on-dark, or dark-on-light. Use white where adjacent walking surfaces are dark (e.g. asphalt), and a dark brick red color where adjacent walking surfaces are light (e.g. standard gray concrete). Other colors shall be approved by the jurisdictional agency prior to installation. Visual contrast shall be obtained by color, use safety yellow or other approved color. The color shall be an integral to the detectable warning part of the material surface. ~~The material is to be durable with a non-slip surface not subject to spalling, chipping, delamination, or separation.~~

**340.2.1.2 Material** Detectable warnings shall be constructed of high-strength concrete material only. The material is to be durable with a non-slip surface not subject to spalling, chipping, delamination, or separation. Detectable warning tiles shall have a design service life of 30 years and carry a warranty against manufacturer defect of at least 10 years.

**340.2.1.3 Strength & Performance** High-strength concrete detectable warnings shall meet the following minimum ASTM standards for strength and performance:

<u>Strength/Performance Test</u>	<u>Minimum Requirement</u>	<u>ASTM Method</u>
<u>Compressive strength</u>	<u>&gt;12,000 psi</u>	<u>ASTM C 39-04</u>
<u>Tensile strength</u>	<u>&gt;2,500 psi</u>	<u>ASTM C 496</u>
<u>Flexural yield strength</u>	<u>&gt;2,500 psi</u>	<u>ASTM C 947-03</u>
<u>Slip Resistance</u>	<u>&gt;FA=0.85</u>	<u>ASTM C 947-03</u>
<u>Abrasion Resistance</u>	<u>&lt;0.03 cm<sup>3</sup>/cm<sup>2</sup></u>	<u>ASTM 418</u>
<u>Water Absorption</u>	<u>&lt;0.50%</u>	<u>ASTM C 140</u>
<u>Freeze/Thaw</u>	<u>0.00%</u>	<u>ASTM C 1262</u>

Manufacturer conformance with the above minimum requirements shall be demonstrated by furnishing the jurisdictional agency with results of independent laboratory tests. The jurisdictional agency may request detectable warning samples for additional supplier-paid quality assurance testing at an agency-selected laboratory. All detectable warnings shall be approved by the local jurisdictional agency prior to installation.

**340.2.1.4 Anchoring System** High-strength concrete detectable warning may be either cast-in-place or recessed. Cast-in-place detectable warnings shall be installed directly into freshly poured concrete (i.e. wet-set) with a proven wet-set anchoring mechanism that assures constant contact of the detectable warning bottom surface with the concrete slurry as it cures, thus rendering the ramp a single monolithic structure. The thicker and heavier detectable warnings lowered into preformed recesses in the concrete substrate must demonstrate a firm fitting into metal reinforced frames without gaps along the edges that can channel water, sand, or debris. They must also be able to resist movement (i.e. sliding, rocking, or lifting) once in service.

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

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

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

Detectable warnings shall be installed as shown in Details 235.1 through 235.5.

DATE: July 13, 2011

TO: MAG Specifications and Details Committee Members

FROM: Warren White, City of Chandler

RE: **Update MAG specifications for brass and bronze water line construction materials to meet federal low lead standards.**

Purpose: Modify MAG specifications to meet the national standards based on the new NSF 61-8 Annex F & G (effective on July 1, 2012) and the new Federal Law S. 3874 (effective on January 4, 2014).

Revisions: Modify Sections 610, 630, 631, 754 and 755 as noted herein.

**Suggested changes to the Standards based on the new NSF 61-8 Annex F & G (effective on July 1, 2012) and the new Federal Law S. 3874 (effective on January 4, 2014).**

**SECTION 610**

**610-1** Revised 2011

**WATER LINE CONSTRUCTION**

**610.1 DESCRIPTION:**

The construction of all water lines shall conform to applicable standard specifications and details, except as otherwise required on the plans or as modified in the special provisions.

**610.2 GENERAL:**

All pipe shall be delivered, handled and installed in accordance with the manufacturer's recommendations and/or applicable provisions of AWWA standards for installation of the various types of water mains specified, insofar as such recommendations and provisions are not in variance with the standard specifications and details.

Where water lines are to be constructed in new subdivisions or in conjunction with street repaving projects, the streets shall be pre-graded to within 6 inches of the new street sub-grade prior to trenching or cut stakes shall be set for trenching.

**610.3 MATERIALS:**

All pipes for water lines shall be of the classes shown on the plans or as specified below.

(A) The 4 inches through 16 inches diameter pipe may be asbestos-cement or ductile iron, except where a particular material is specified. All pipes shall be minimum 150 P.S.I. design unless otherwise specified.

(B) Pipe 16 inches and larger may be either ductile iron, or concrete pressure pipe-steel cylinder type.

Ductile iron water pipe and fittings - Section 750. Asbestos-cement water pipe and fittings - Section 752. Concrete pressure pipesteel cylinder type - Section 758.

Material containing Brass or Bronze must comply with the current NSF 61-8 Standards at the time the Project begins.

Or

Material containing Brass or Bronze must comply with NSF 61-8 Annex F and G as of July 1, 2012.

All service material must meet AWWA C-800 Standards and be made in the USA or Canada.

**630.3.2 Supplements Specifically Relating to Valve Sizes:**

(A) Valves smaller than 3 inches:

Valves shall be Jones, Ford, Hayes, Mueller or an approved equal, and shall be (Delete) threaded, all bronze, standard double disc, non-rising stem with wheel handles.

Material containing Brass or Bronze must comply with the current NSF 61-8 Standards at the time the Project begins.

Or

Material containing Brass or Bronze must comply with NSF 61-8 Annex F and G as of July 1, 2012.

All service Valves shall be manufactured in accordance with AWWA C-800, latest revision, and be manufactured in the USA or Canada.

NOTE: Most Valves being used under 3 inches are now Ball Style. Also, Hayes is no longer in business.

## **631.2 MATERIALS:**

Copper pipe, tubing and fittings shall conform with Section 754. Polyethylene pipe shall conform with Section 755. All fittings, pipe and tubing for polyethylene and copper pipe shall be as ~~(Delete-noted on standard details)~~ and add - indicated in Section 610.3 Materials.

## **SECTION 754**

### **754-1**

#### **COPPER PIPE, TUBING AND FITTINGS**

##### **754.1 PIPE AND TUBING:**

All copper pipe and tubing shall be new seamless copper pipes and tubes, designed for underground water services, plumbing purposes, etc. They shall conform to all the requirements of ASTM B-88, Type K.

All pipe or tubing shall be made of copper free from cuprous oxide, as determined by microscopic examination at a magnification of 75 diameters. Type K tubing, when furnished in coil, shall be annealed after coiling.

##### **754.2 FITTINGS:**

~~(Delete - All fittings used in connection with copper pipe or tubing, shall be copper or bronze fittings as manufactured by Jones, Mueller, or approved equal, as shown on standard details.)~~

~~ADD - Material containing Brass or Bronze must comply with the current NSF 61-8 Standards at the time the Project begins.~~

~~Or~~

~~Material containing Brass or Bronze must comply with NSF 61-8 Annex F and G as of July 1, 2012.~~

~~All service material must meet AWWA C-800 Standards and be made in the USA or Canada.~~

## **SECTION 755**

### **755-1**

#### **POLYETHYLENE PIPE FOR WATER DISTRIBUTION**

##### **755.1 GENERAL:**

This specification is intended to describe water service pipe with a hydrostatic design stress of 620 psi for water at 73.4 /F. produced from a high density ultrahigh molecular weight polyethylene pipe compound. Polyethylene pipe used for water distribution shall conform to all the requirements of ASTM D-2239 and with the additional provisions listed herein. This specification describes pipe of the nominal I.D. and O.D. size as manufactured by Carlon, Celanese, Orangeburg, Phillips 66 Drisco pipe and Triangle Aycee and shall provide a water pressure tight joint. ~~(Delete - when used with compression type fittings furnished by Hays, Haystite, Ford Meter Box, Ford Pack Joint, or approved equal.)~~

~~Add: Material containing Brass or Bronze must comply with the current NSF 61-8 Standards at the time the Project begins.~~

~~Or~~

~~Material containing Brass or Bronze must comply with NSF 61-8 Annex F and G as of July 1, 2012.~~

~~When using compression type valve or fitting with Polyethylene pipe or tubing a Stainless Steel Insert Stiffener must be used to make the connection.~~

~~All service material must meet AWWA C-800 Standards and be made in the USA or Canada.~~

Pipe may be rejected for failure to comply with any requirements of these specifications.

# MAG Outside Right-of-Way Asphalt Working Group Meeting

Meeting Minutes  
June 17, 2011

## Opening:

The meeting of the Asphalt Working Group was called to order at 7:30 AM on June 17, 2011 at Speedie & Associates, Inc. by Jeff Benedict (Chairman).

## Present:

Jeff Benedict, Tim Kramer, Adrian Green, Phil Feliz, James Carusone, Doug Laquey, Gordon Tyus, John Shi, Scott Thompson, Syd Anderson, Brian Gallimore, Don Cornelison

### A. Approval of Minutes

The minutes of the previous meeting were briefly reviewed and approved.

### B. Open Issues & Discussion

Group was apprised of goal to have reasonably complete draft versions of each section submitted to MAG prior to July 13 meeting of MAG Specification & Details Committee (hereafter S&D). They will be distributed to member agencies for review to allow opportunity to vote on cases during this year's sessions. Each subgroup then presented the status of the review and/or revision of their assigned MAG Specification section(s).

Subgroup	Summary/Status
MAG 321	Don Cornelison gave update stating that decision had been reached to address only the most critical issues related primarily to determination of compaction and application of remedial measures. Version with revisions will be submitted electronically to Gordon/MAG prior to next meeting of MAG Specification & Details Committee (S&D) scheduled for July 13, 2011.
MAG 323	Jeff Benedict reported that this section had been identified as one to be deleted and that this information had been submitted to MAG.
MAG 325/717	<p>Considerable discussion took place regarding standardizing binder design procedures to include calculation of rubber as percentage of total binder and to establish minimum rubber percentage only, with no upper limit. Binder will be required to meet physical test properties at selected rubber content. Consensus was that mix design properties should be specific to ARAC and should be identified and detailed in separate materials section – Section 717.</p> <p>Considerable discussion occurred relating to the differences in approach regarding compaction determination between attending agencies. The consensus was to address thin pavement lifts (<math>\leq 1\frac{1}{2}</math> inches) separately from thicker sections (<math>&gt; 1\frac{1}{2}</math> inches). Doug Laquey (with assistance) will work to separate materials portion from Section 325 and address comments and concerns expressed by MCDOT and City of Phoenix (COP). Goal is to submit prior to S&amp;D meeting.</p>

MAG 327	Jeff Benedict reported that this section has already been submitted to MAG.
MAG 334/718	Jeff Benedict reported that these sections have already been submitted to MAG.
MAG 335	Scott Thompson reported that he will clean up this section based on today's comments and provide draft by end of June.
MAG 337	Phil Feliz has version basically ready to submit and will email it out shortly.
MAG 709/719	The subgroup had met on June 7 to discuss these sections and is recommending elimination of Section 709 and inclusion of its general information in the materials portion of Section 719. In addition, since considerable revisions to Section 719 would be required to bring it into compliance with current methods and technology, which would exceed the scope and timeframe available for completion of this task, only a paragraph will be added to Section 719 regarding RAP as a material. That will be the only change submitted at this time.
MAG 710 (Including RAP)	It was agreed that Section 710 would not receive major revisions at this time as it was working acceptably. Some minor editorial revisions and corrections will be implemented and emailed prior to the S&D meeting.
MAG 715	Scott Thompson reported that his subgroup has this section close to completion and will be submitting it prior to the S&D meeting.

### **C. Decisions & Action Items**

- As indicated in the reports above, submittal of all the sections still undergoing revision will be submitted to working group members and MAG prior to the S&D meeting of July 13, 2011.
- No future meeting date for this working group has been scheduled. It was decided to await review and comments from the S&D Committee and then determine the need for and date of any working group meetings.
- The items discussed and submitted documents from this working group meeting will be presented to the main MAG Standard Specifications & Details Committee at its next meeting on July 13, 2011.

### **D. New Business**

No additional business was presented.

### **E. Agenda and Schedule for Next Meeting**

Should it be determined that additional working group meetings are necessary or beneficial, members will be notified in advance of the scheduled time and location.

### **Adjournment:**

Meeting was adjourned at 9:00 AM by Jeff Benedict.

Minutes submitted by: Donald L. Cornelison, P.E.

# MAG Outside Right-of-Way Materials Working Group Meeting

Meeting Minutes  
June 17, 2011

**Opening:**

The meeting of the Materials Working Group was called to order at 9:00 AM on June 17, 2011 at Speedie & Associates, Inc. by Don Cornelison.

**Present:**

Gordon Tyus, Peter Kandaris, Doug Laquey, Jeff Benedict, Michael Whitman, Don Cornelison

**A. Approval of Minutes**

The minutes of the previous meeting were briefly reviewed and approved.

**B. Open Issues & Discussion**

Group was apprised of goal to have reasonably complete draft versions of each section submitted to MAG prior to July 13 meeting of MAG Specification & Details Committee (hereafter S&D). They will be distributed to member agencies for review to allow opportunity to vote on cases during this year's sessions. Each subgroup then presented the status of the review and/or revision of their assigned MAG Specification section(s).

Subgroup	Summary/Status
MAG 301	Peter Kandaris has the latest draft of this section. Brian Gallimore will review Sections 205.2, 205.6, and 211 that are referred to in Section 301 for possible inconsistencies and/or discrepancies. Compaction designations need to be standardized and revised to reflect actual materials being tested.
MAG 309/311	Mike Smith communicated prior to the meeting that he would be unable to attend and that he still had issues with revising portions of Section 309. He did submit the revised versions of Sections 310 and 311 for review. The working group agreed that Section 311 was generally satisfactory for submittal to the S&D Committee. However, Peter Kandaris indicated that he would like to review it and some of the related sections as they apply to work specific to SRP operations. Don Cornelison will collect and forward all drafts to Peter and other members of the working group.
MAG 310, 312, 701, 702 & 705	This subgroup reported that due to the ambiguous wording and interrelated nature of all of these sections related to base course materials and construction, a considerable amount of revision would be necessary. The current versions of the revised documents were submitted for review and discussion. Considerable discussion occurred relating to Standard Detail 190, "Rock Correction Procedure" also took place. It was generally agreed that this Detail should be eliminated and the appropriate test method identified in the applicable specification sections. Again, it was emphasized that test method designations should be standardized to use either ASTM or AASHTO. This needs to be discussed with the agency members to obtain their input.
MAG 270	It was indicated that this section is now being addressed by another working group.

MAG 601	It was indicated that this section is now being addressed by another working group.
MAG 605	It was indicated that this section is now being addressed by another working group.
MAG 621	It was indicated that this section is now being addressed by another working group.

### **C. Decisions & Action Items**

- As indicated in the reports above, submittal of all the sections still undergoing revision will be submitted to working group members and MAG prior to the S&D meeting of July 13, 2011.
- No future meeting date for this working group has been scheduled. It was decided to await review and comments from the S&D Committee and then determine the need for and date of any working group meetings.
- The items discussed and submitted documents from this working group meeting will be presented to the main MAG Standard Specifications & Details Committee at its next meeting on July 13, 2011.

### **D. New Business**

No additional business was presented.

### **E. Agenda and Schedule for Next Meeting**

Should it be determined that additional working group meetings are necessary or beneficial, members will be notified in advance of the scheduled time and location.

### **Adjournment:**

Meeting was adjourned at 10:30 AM by Don Cornelison.

Minutes submitted by: Donald L. Cornelison, P.E.