Development of Electrical Approved Product List (EAPL)

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PRODUCT APPROVAL DATABASE (PAD) NOTEBOOKS PRODUCED BY THIS PROJECT

NOTE: Notebooks are Contained Under a Separate Cover.

Book No.

1. Subcategory - V-32 Electrical Underground Material, Volume I of III / (New EAPL has 6 section with 12 subsection listings)

2. Subcategory - V-32 Electrical Underground Material, Volume II of III / (New EAPL has 2 section with 16 subsection listings)

3. Subcategory - V-32 Electrical Underground Material, Volume III of III / (New EAPL has 5 section with 9 subsection listings)

4. Subcategory - V-33 Signal Indications and Mounting Assemblies, Volume I of III / (New EAPL has 4 section with 13 subsection listings)

5. Subcategory - V-33 Signal Indications and Mounting Assemblies, Volume II of III / (New EAPL has 1 section with 4 subsection listings)

6. Subcategory - V-33 Signal Indications and Mounting Assemblies, Volume III of III / (New EAPL has 5 section with 9 subsection listings)

7. Subcategory - V-34 Traffic Controller Assembly, Volume I of II / (Proposed outline of EAPL has 2 section with 12 subsection listings.)

8. Subcategory - V-34 Traffic Controller Assembly, Volume II of II / (Proposed outline of EAPL has 4 section with 29 subsection listings.)

9. Subcategory - V-35 Detectors, (New EAPL has 5 section with 22 subsection listings.)

10. Subcategory - V-36 Highway and Sign Lighting, Volume I of II / (New EAPL has 6 section with 13 subsection listings.)

11. Subcategory - V-36 Highway and Sign Lighting, Volume II of II / (New EAPL has 3 section with 22 subsection listings.)
EXECUTIVE SUMMARY

The portion of the ADOT approved product list (APL) that relates to traffic signal and roadway lighting electrical items (the Electrical Approved Product List) needed to be reorganized and updated. Additionally, a process needed to be developed that would allow ADOT field inspectors to better utilize the Electrical Approved Product List (EAPL) to review contractor material and shop drawing submittals of common use electrical items (e.g. conduit, conductors, etc.) without having to send the submittal back to the design office. This is regarded as an over allocation of design office resources for items that should be able to be routinely reviewed in the field by a qualified inspector.

To address these EAPL problems ADOT through the Arizona Transportation Research Center (ATRC) and Procurement developed a research project. The goal of this project was to hire a consultant to study and update the current EAPL in fourteen product subcategories. In June of 1997, after a competitive proposal process, TASK Engineering Company (TASK), Inc. (formally Chalmers Engineering Company), was awarded a contract to do this project.

This report presents detailed information on the approach that was taken to "redevelop" ADOT's Electrical Approved Product List. Recommendations are presented on how ADOT should refine and improve its practices in this area. Suggestions are also given regarding future work that may result in additional improvements, not only to the Approved Product List (APL) but ADOT's specifications as well. It is believed that these improvements will allow the APL and the specifications to function more as a unit, thus making them more useful and user friendly for design, material testing, procurement, vendors, construction and maintenance persons.

This project has resulted in a completely new EAPL structure. The new EAPL has been reorganized so its basic content directly follows the content of ADOT’s standard specifications. Thus, the list and the specifications will function as a unit. It also better reflects the products that are currently being used to construct and maintain traffic signal and lighting facilities. The intent of this format is to make the EAPL more user friendly, especially for the electrical field inspector. It will allow the inspectors to approve, approve as noted with/or without conditions and/or reject contractor material submittals of certain common use type items. Changes will be needed to the standard specifications to make this field review process possible. A formal request to make these changes has been submitted to ADOT Contracts and Specifications as a part of this project.

Making the new EAPL compatible with the ADOT Standard Specifications required that this portion of the APL be completely reformatted. All of the topics or product classes for the subcategory headings were completely reassigned. The new subcategory headings (e.g. V-31, V-32, etc.) now correspond to the actual section number (e.g. 731, 732, etc) of the Standard Specifications. Then, to make room for all of the products represented under these new Standard Specification based subcategories, sections and subsections were added.
The majority of the information and product data used to develop the updated EAPL was gained by utilizing years worth of ADOT Electrical Design Branch electrical product reviews. The findings of these product reviews have been compiled into a series of Product Approval Database notebooks. These PAD notebooks provide general and specific information on the products that have been approved and are on the new EAPL. These notebooks are intended to act as the master file for the management and maintenance of the new EAPL. The make-up of the PAD notebooks has been specifically designed to facilitate this goal.

To handle the unique requirements for common use (or commodity) electrical items a special "two list" approach has been developed. The first list presents technical application and requirements regarding that product type. Then the second list presents information on products that have been previously found by ADOT to meet the requirements of the first list. It is thought that this approach offers the most flexibility in dealing with product areas that have numerous (e.g. conductors, cables and conduits).

As a part of this research, an analysis of how ADOT's current APL practices conform with state and FHWA procurement requirements was conducted. ADOT's current APL approach does not generally conform to these requirements. Efforts were made to make the new EAPL compatible with these requirements whenever possible. However, this was not always possible, therefore it appears that ADOT will need to consider additional work in this area to achieve full compatibility. Significant restructuring of ADOT's current APL process will be necessary to accomplish this.
CHAPTER 1- INTRODUCTION/BACKGROUND

ADOT has an Approved Product List (APL). This APL is divided into over twenty-six categories. The categories deal with products that range all the way from adhesives to pavement admixtures. These categories are further divided into hundreds of product subcategories. The intent of maintaining an APL is to provide a record of what ADOT uses to construct and maintain roadways. An APL also helps to provide "brand name specification" illustration(s) of the requirements of the specifications and/or standard drawings. This provides other potential suppliers with information on what functional and quality requirements are expected.

In terms of historic perspective it appears that the primary reason APLs exist in the United States is related to a long standing FHWA program mandate. This program (23 CFR 635.126) requires, for all projects costing more than $1 million dollars that are located on the National Highway System, that state department of transportation maintain, through their contractors, detail records (as reported on form PR-47) of type of materials/supplies, quantities, labor and their total costs on these types of federal-aid construction projects (1). FHWA in-turn uses this information to maintain databases on usage factors. The use and potential benefits of APLs has expanded beyond this FHWA mandate. However, this does appear to be the "spark" that started it all. It appears that almost every state in the Union has some form of APL. ADOT's Arizona Transportation Research Center (ATRC) is charged with administering and maintaining the ADOT's APL. Additional details on how ADOT ATRC does this is presented later in this Chapter.

The focus of this research project is on Category V Traffic Control Materials of ADOT's APL. More specifically on the subcategories within this category that deal directly with products that are related to traffic signal and highway lighting applications. This area of the Traffic Control Material APL has been termed the Electrical Approved Product List (EAPL). Fourteen electrical product areas have been identified to be addressed by this research project (2).

The previous version of the EAPL had not been updated in over fifteen years. In addition to being out-of-date it also was incomplete and did not reflect ADOT's current design practices in terms of specified materials and products. Another EAPL related problem has also developed. In the past ten years the number and size of ADOT's highway, especially freeway, construction projects has increased dramatically. A lot of these projects involve the installation of new traffic signal and lighting features.

To assure conformance with the specifications and standard drawings it has been ADOT's practice to have the electrical contractors submit detailed material and shop drawing packages for all of the electrical items they intended to use on the project. These packages were then forwarded by the field inspector to ADOT's Electrical Design Branch for review. The Electrical Design Branch would then approve, approve as noted with/or without conditions or reject items. However, difficulties have developed with this
process due to the increased volume of construction projects and the fact that a lot of the design work is being done by consultants. It often takes months before reviews are completed. Also, many of the consultants are unfamiliar with the products ADOT uses and often approve and/or reject products without justification. Therefore, ADOT's construction organizations have requested that a process be developed that will allow a field inspector the authority to review routine electrical commodity or common use items. Examples of commodity items would be materials such as conductors, cables, electrical tape, spring connectors and conduit. Examples of common use items would be such materials as pull boxes, signal indications, signal mounts, pedestrian push buttons and luminaires.

ADOT's Approved Product List Process

In 1992, through the issuance of Highway Division Policy and Implementation Memorandum Number 92-08, New Products Evaluation and Approval Process (see Appendix A) the State Engineer authorized the Arizona Transportation Research Center to institute and administer the Product Resource Investment Deployment and Evaluation (PRIDE) process. The main goal of the PRIDE process is to develop, organize and implement a centralized fair and objective way to determine the viability of old and new products as they related to the state highway system. If a product is determined to be acceptable and have value, then through the PRIDE procedures it will be listed on the Approved Products List (APL).

The PRIDE process is divided into three disciplines: materials, maintenance and traffic control. ATRC administers the PRIDE process under the leadership of the product evaluation committees for each of these disciplines. The product evaluation committees have the authority to establish all procedures regarding the evaluation, use and nonuse of new products for ADOT within their assigned discipline. Since the object of this project is traffic signal and roadway lighting products the focus herein will relate solely to the traffic control products portion of PRIDE and the corresponding Traffic Control Products Evaluation Committee (TCPEC or TPEC).

TCPEC meets quarterly (March in Tucson, June in Flagstaff, September in Prescott and December in Phoenix) to review current status of product evaluations, discuss products, assign product evaluation projects and vote disposition of products either requesting evaluation or evaluated. Currently the committee is made up of representatives from several groups/sections of ADOT, two representatives from the Arizona Chapter of American Traffic Safety Services Association (ATSSA), two local governments representatives and a representative from the Federal Highway Administration (FHWA). TCPEC can also establish subcommittees to deal with specific issues and/or sub-disciplines. Currently, TCPEC has chartered an electrical subcommittee and Intelligent Transportation System (ITS) subcommittee.

The electrical subcommittee has been formed to focus on the product issues related to traffic signal and highway lighting systems. The electrical subcommittee has representatives from ADOT's signal and lighting maintenance/operations organizations
(one from each traffic region), Phoenix District's Electrical Inspection, Vision Field Office, Maintenance Group/Traffic Operations, Electrical Design Branch and a local government representative. The electrical subcommittee represents a cross section of one of the main user groups for the end product of this electrical approved product list project.

The ITS subcommittee has been formed to focus on the product issues related to those involved with the newly formed ADOT Technology Group. This includes Freeway Management Systems, Rural ITS systems and other types of technology applications. This subcommittee is composed of representatives from a variety of ADOT Groups/Districts and one representative from FHWA.

Evaluation of products through the PRIDE process often involves literature searches, polling of users, laboratory tests, field tests and an economic study as to the value benefit of the product (see Appendix B for the evaluation policy). The PRIDE process specifies that all such evaluations are conducted and documented via a written work plan. A work plan can take on any form, but the specific design should conform to the product or product(s) under consideration. However, its main goal is to produce an engineering document that provides a basis on which the product is defined, tested and evaluated. This in turn gives ADOT an objective engineering process in which to consider the use or nonuse of products.

A listing of a product on the APL also helps to illustrates the requirements of the applicable ADOT specifications so there is a clear understanding as to their meaning. In other words, a listing of a product or material defines ADOT's intent of the specifications. Thus, the listing provides a useful milestone on which can be used to judge other competing products seeking approval. A non-listed manufacturer has to submit sufficient evidence and information to prove that their product is of equal or better quality and performance of the listed product and is in compliance with ADOT specifications. This in turn helps ADOT review the suitability of previously listed products and their status of the current specification.

The PRIDE also allows an opportunity for the validity and/or applicability of the configurational, compositional and/or test requirements of ADOT specifications and testing methods to be evaluated and/or considered. Manufacturers and/or users can formally petition the TCPEC via the PRIDE process to consider additions or changes to specifications and testing methods. This affords the manufacturer and/or user a single open forum in which a matter such as this can be discussed and acted upon. Without this process the manufacturer and/or user would have to navigate through all of the different sections and groups of ADOT to try and achieve some sort of consideration.

All that a manufacturer and/or user needs to do is to submit a written request via the PRIDE. The PRIDE does require that this petition (or application) offer complete and convincing evidence that the proposed addition and/or change will meet or exceed a need either not being fulfilled or being fulfilled by another product, approach and/or
requirement. With the submission of this application ADOT then has a certain amount of time to act upon it.

The PRIDE also offers manufacturers an opportunity to be pre-approved. Thus, manufacturers are strongly encouraged to submit PRIDE application for evaluation prior to attempting to supply materials either on an ADOT construction project or through ADOT's procurement process. This allows ADOT the time to properly evaluate the new and/or non-listed product without the time constraints and pressures of a specific project. This will also minimize the risk to the contractor and/or manufacturer if the product needs to be tested and/or is rejected. It also can smooth and speed the project material list reviews by informing all involved that the product being considered has been formally approved by ADOT and is currently listed on the APL.

ADOT's use of the PRIDE process and corresponding Approved Products List (APL) is not intended to limit or restrict competition, rather it is to set the standard of quality, performance and characteristics of the product needed for a certain application that are based on sound engineering principles. The PRIDE APL process as presently configured does not supersede any of the applicable requirements of Article 4. Specifications (CODE PROVISION 41-2561 to 2568) and Article 3 Source Selection and Contract Formation (CODE PROVISION 41-2536 to 2537) of the State Procurement Rules and Regulations (3) & (See Appendices C and D). Nor does the PRIDE APL necessarily conform to the requirements stated in ADOT's Highway Division Policy and Implementation Memorandum Number 88-1, Proprietary Items (see Appendix E) or Federal Highway Administration's (FHWA) processes (as defined per Contract Administration Core Curriculum Participant's Manual and Reference Guide, 1997, Part II, Federal Statute or Regulation, C. Other Program Requirements, 4. Materials, b. Patented/Proprietary Products, Page 64) for the handling of patented/proprietary products (1) & (see Appendix F).

Depending on the procurement/project application, Procurement or Contracts and Specifications and/or non-federal aid or federal aid, the use of the PRIDE APL needs to be carefully evaluated as to how it is applied within the requirements specific to the rules and regulations for that contracting process.

Outline of ADOT Standard Specifications

ADOT's Standard Specifications for Road and Bridge Construction follow a basic format that was established by the American Association of State Highway and Transportation (AASHTO). The involved divisions and sections for this research project are as follows (4 & 5):

DIVISION I - GENERAL PROVISIONS

- Section 105 Control of Work
- Section 106 Control of Materials
DIVISION VII - TRAFFIC CONTROL FACILITIES

- Sections 701 - 708 are sections dealing with traffic control and pavement markings.
- Sections 709 - 729 are currently blank.
- Section 730 General Requirements for Traffic Signal and Highway Lighting System
- Section 731 Structural Supports and Foundations for Traffic Signal and Highway Supports
- Section 732 Electrical Underground Material
- Section 733 Signal Indications and Mounting Assemblies
- Section 734 Traffic Control Assemblies
- Section 735 Detectors
- Section 736 Highway and Sign Lighting
- Section 737 Incidental Electrical Work

The key Sections for this project are Sections 730, 732 through 736. It is important to keep this structure in mind as consideration is given to the recommended restructuring of the EAPL that has been developed by this project.

Problem Statement

General

This research project to develop an Electrical Approved Product List (EAPL) identified and addressed the following problems:

• The standard specifications have been evaluated and recommendations made as to what revisions are necessary to give ADOT field inspectors the authority to approve, approve as noted with conditions, and/or reject items that are within the scope of field review on the revised EAPL.

Previous Version of the EAPL

As with the previous list the new Electrical APL will still be contained under Category V - Traffic Control Materials. However, the previous list had products scattered in forty different subcategories (V-28 through V-68). This included three blank categories. Within these subcategories there were 93 products listed which were made by a total of 48 different manufacturers (6).

Many of these listings were incomplete and/or out-of-date. Numerous listings only referenced the manufacturer; no information was provided regarding the product to which they applied or the basis (evaluation report number) for their approval. Many of the listed products were based on a list that was originally established by Traffic Operations over fifteen years ago. As a result, a number of the products are no longer made or have been replaced by newer versions. Additionally, there has been numerous changes regarding many of the manufacturers and local distributors.

The previous structure of the electrical portion of the APL was somewhat organized based on subject, however it was not consistent. The subcategories did not follow a sequence that was applicable to the Sections in Division VII of the ADOT Standard Specifications for Road and Bridge Construction. Nor did it cross-reference applicable bid item numbers or ADOT procurement contract numbers. This made this list very difficult to use, especially for those unfamiliar with these items.

The lack of detail and substance on the previous APL often resulted in confusion over which product was approved or not. If not caught during the design phase, this often resulted in designer specifying and/or approving the wrong items. This then leads to a lack of standardization, which then causes problems for ADOT maintenance forces. Another problem is that most consultants, suppliers and contractors are either unaware that ADOT has an APL or do not have a copy of the current version.

It is also believed that the lack of a detailed, up-to-date and market-based APL has an impact on potential supplier and contractor competition. The current system makes it difficult and riskier for new suppliers and contractors to bid for ADOT work. Currently, suppliers and contractors have to interpret ADOT standards and specifications without the aid of a complete and up-to-date APL to provide them with specific information on what to bid. This somewhat favors the suppliers and contractors who are familiar with the system.

ADOT's policy regarding the status of proprietary products for all construction projects that are bid through ADOT's Contracts and Specifications (C & S) is stated per Implementation Memorandum Number 88-1 (see Appendix E). This policy, which
embraces FHWA's requirements, states that "sufficient competition" has been achieved if three (3) or more totally separate proprietary items are listed. If the listing is less than three, then written justification must be submitted and special approval granted by ADOT and FHWA if this requirement can not be met. The current EAPL has 19 subcategories were two or less products are listed.

It should be noted that the listing of three products does not necessary constitute a definition of “sufficient competition.” It should be regarded as a rule of thumb, it is still up to the responsible party to try and make a reasonable survey of the market and then determine which products will conform to the requirements of the design and/or satisfied the need.

Current Construction Project Product Review Process

ADOT's current system, as detailed in the standard specifications, calls for contractors to compile six to seven copies of material lists and shop drawings and submit them to ADOT's construction field office (4 & 5). Then the Field Office transmits these packages to the responsible design engineer (ADOT or consultant) for review. The reviews, resubmittals and approvals of these types of packages can take months to fully complete. This results in a lot of lost time for the labor to handle and review these submittals.

These contractor submittal packages often include standard "use almost every time" items such as conductors, cables, conduit, pull boxes, signal mounts, signal indications and many other items. The compiling, reviewing and processing of these items through the field and design office subjects both groups to time consuming paper work. It is believed that a lot of this work (approximately 50% of it) could be reduced or eliminated if a more detailed, complete and easy-to-use and understand EAPL was in-place.

The contractor would still need to submit material lists to the field office. However, given this new EAPL and material list review process the field office could then approve, approve as noted with conditions and/or reject the contractor's proposed standard items which are within the scope of field review of the new EAPL. Non-standard and/or specialty items would still require design office review and approval.

The concept of obtaining prior approval for materials is still a very important quality assurance task and should continue. However, the authority for reviewing the standard "use almost every time" items (commodity or common use items) should be delegated to the field office. The current system of having the design office review all items project after project is clearly miss-allocation of design office technical review resources that is achieving little if any benefit.

Therefore, it was a major goal of this project to develop and implement a revised EAPL and corresponding specifications that organize and streamline ADOT project by project product review system so that the commodity and common use items are clearly defined and can be approved by the inspector in the field. The new system reserves the design office material list and shop drawing approval reviews for those items which are clearly
non-standard and require the designer to review for compliance with the plans, specifications and special provisions.

To transfer the authority of product review to the field for commodity items certain changes to the standard specification are necessary. Section 105 - Control of Work, Section 106 - Control of Materials and Section 730 - General Requirements for Traffic Signal and Highway Lighting Systems need to be modified (4 & 5). The location and the basic content of the needed modifications are as follows:

- The current version of subsections 105.03 (Blue Book) (4) and 105.04 (Green Book) (5) Conformity with Plans and Specifications and/or 105.10 (Blue Book) (4) and 105.11 (Green Book) (5) Duties of the Inspector: of the Standard Specifications need to be modified to add that the inspector has the authority to approve materials that have been specified for the project, are on the current EAPL, and have been properly identified by the contractor as those to be ordered and supplied.

- Subsection 730-4 Equipment List and Drawings: of the Standard Specifications also needs to be modified (4 & 5). Note: This subsection of the standard specifications goes into detail on what the submittal is to contain. This subsection needs to be revised to clarify the difference between EAPL listed (or standard) items and items still needing to be submitted for design office review and approval.

A letter along with a draft of the needed modification to the subsections of the standard specification was sent to ADOT Contracts and Specification's Specification Writer (Mr. Joe Roman, P.E.). Additional details on this correspondence are contained in the next Chapter.

 Specification and Standard Drawing Technical Issues

The last major revision to ADOT Standard Specification was in 1990. The last major revision to the Standard Drawings was 1985. This is not counting the metric version of the Standard Specifications and Standard Drawings which were issued in 1996. When this metric effort was done very little resource was expended to update the technical content of either. Therefore, the basic technical content of the Standard Specifications is eight years old and the Standard Drawings are fourteen years old. Needless-to-say, many of the sections and drawings are out-of-date and need the attention of an engineer.

Given that the EAPL and the specifications are so interrelated, an attempt was made during the course of this study to try and identify some of those specific areas where technical revisions appeared to be needed. Including those areas of the current specification that were regarded to be proprietary in nature were also identified. Additional information regarding specification technical issues is contained in the next Chapter.
CHAPTER 2- FINDINGS

EAPL Structure

One of the major findings of this research was that there appears to be a significant potential benefit to reorganize the EAPL's to match the basic structure of ADOT's standard specifications. It is believed that this approach will enhance a user's ability to utilize the EAPL since the list and the specifications are organized to compliment each other. The EAPL literally becomes an illustration of the format, requirements and intent of the specifications.

To account for all the possible products it was necessary to add subdivisions to the current EAPL product subcategory outline. Sections and subsections were added to provide the needed additional headings to list products that would then follow the structure of the standard specifications and provide areas to list all of the related component products. For example; a standard ADOT electrical connection consists of a total of five separate products. A spring wire connector (wire nut), three types of electrical tape (vinyl, cloth and rubber) and a spray on water proof coating. Also, it was necessary to organize the EAPL with these additional sections and subsections to account for after market products. For example; there are a number of companies that make complete traffic signal indications. Typically, a signal indication consists of a back plate, visor, lens and housing. However, there are also a number of companies that just make back plates, visors or lenses. Therefore, the structure of the EAPL needs to allow a way for the makers of these after market or component products to have access to the ADOT market.

To account for the large number of possible supplier product markets (or commodity markets) a "two list" approved product list approach has been developed. This "two list" approach involves:

1. a "Generic" Approved Product List and
2. a "Specific" Previously Approved Product List.

The "two list" approach was developed to account for commodity type products that are typically manufactured to a nationally recognized standard(s) (e.g. ASTM, IMSA and UL) and are made by lots of companies. This approach typically applies to most conductors, cables and conduits.

List number one, the "Generic" Approved Product List, is intended to define the subsection title, product type, the product's application and the requirements for that product to be approved. No specific manufacturer or product information is listed. List number two, which follows directly behind the "generic" list, is called the "Specific" Previously Approved Product List. The "specific" list provides information on all the
products and manufacturers that have been previously found by ADOT to be in compliance with the requirements of the "generic" list and therefore have been approved.

A standard one-list listing is used for all other approved products.

The column for distributors information that was on the previous APL has been eliminated on the revised EA PL (6). The new EA PL will only give product and manufacturer information. The listing of distributor information seems inappropriate and beyond ADOT's resources to maintain. This is especially true when you consider that there are numerous products that are handled in the same market area by multiply distributors. Also, it is not uncommon for manufacturer's to change distributors often.

Based on the recommended EA PL structure developed per this study, the Electrical Design Branch is reorganizing their product files to match it.

The Electrical Design Branch has all of the electronic files of the revised EA PL. The file names correspond to the subcategory/section/subsection designation.

The Traffic Control Product Evaluation Committee (TCPEC) and the Electrical Design Branch will need to review the new EA PL. A number of products on the new lists will need to be evaluated for final approval. Only those products that appear to be in compliance with ADOT's practice and/or specifications have been listed, however, there is nothing in the records (e.g. a shop drawing review) that indicate that they have ever been approved. The listing of these products have been marked as "pending" in the approval date column of the new EA PL. Also, a number of new listing classifications that have been added to the new lists. A final decision will be needed on these new classifications and the products listed under them.

Updating and Field Use of the EA PL

Updating and organizing the EA PL to allow for field personnel to use it for a guide to review contractor material submittals is interrelated. The updated list has to have sufficient detail so it better reflects the products that are actually used to construct traffic signals and roadway lighting facilities. Additionally, the EA PL has to be organized in such a manner that it gives the ADOT field inspector sufficient information and direction so they can conduct meaningful and accurate reviews. To accomplish this it was necessary to completely redo the EA PL. The complete outlines of how this was done is presented in Appendix H of this report.

ADOT's Electrical Design Branch's previous material and shop drawing reviews were used as the primary source of information on products that have been reviewed and approved for the new EA PL. Over ten years worth of reviews were used. It is believed that this is a fairly good representation of ADOT's use of traffic signal and highway lighting products. However, it should be noted that it does not necessarily represent a complete survey of the market of available ADOT compliant products. Attempts were made to research the market, but a full survey was beyond the scope of this study.
The compilation of these previous reviews are organized per the new EAPL structure and are contained in separate approved product database notebooks. These EAPL approved product database notebooks will now be kept and maintained by ADOT's Electrical Design Branch in their library as the permanent record/file of the EAPL.

The listing method developed for this project is intended to clearly define and note, whenever possible and applicable, the requirements needed for a product to be approved and what the scope of that approval is directly on the EAPL if possible. If this was not possible then the applicable standard drawings and/or standard specification subsection were referenced. Further, if this was not possible, then a note that stated that a specification and/or drawing would need to be developed and/or used if the product listed were to be specified on a project by a designer was added.

The new EAPL is more that just a listing of product information, it is also a summary and/or cross-referencing of application and specification requirements for that product class. This in-turn will allow the designers, materials lab personnel, specification writers, procurement personnel, vendors, maintenance personnel and construction personnel an EAPL that is more user friendly and understandable. It will also ease the ability of construction inspectors to use the EAPL in the field to review contractor submittals for commodity and common use items without having to unnecessarily involve design personnel or go searching through a number of different references.

The concept of allowing field personnel the ability to approve, approve as noted with conditions and/or reject contractor submitted commonly used electrical items (e.g. conduit, conductors, pull boxes, etc.) within the scope of the new EAPL is not intended to circumvent ADOT's current review and approval process. Rather it is intended to streamline the system so the design office's involvement is reserved for non-standard items that warrant the designer's review. Certain changes to the standard specifications will be necessary to accomplish EAPL approvals in the field. A letter has been sent to ADOT's Contracts and Specifications requesting these changes. A copy of this letter and the recommended language for these specification changes is presented in Appendix G of this report.

State and FHWA Procurement Requirements

The EAPL needs to conform and account for the applicable state procurement code and Federal Highway Administration (FHWA) contract/program requirements (1 & 3). Reports are that the current APL has on many occasions been used to limit or restrict competition without justifiable reasons. Both the state (through the State Procurement Office) and FHWA (through the Division Administrator) have separate procedures that require official written approval from them to restrict the market.

ADOT is governed by two sets (or sides) of rules when it comes to buying goods and services. There is the exempt side, which provides for the large construction and refurbishment type projects. Then there is the non-exempt side which provides for the
maintenance and the basic operations of ADOT. The exempt side typically involves federal-aid funding, therefore the requirements (title 23) administered by FHWA apply. Contracts and Specifications (C & S) is the lead group for ADOT in the development of specifications and bidding of contracts under these requirements. The non-exempt typically involves state funding, therefore the requirements (State Procurement Code) administered by the Arizona State Department of Administration (DOA) - State Procurement Office (SPO) apply. ADOT Procurement is the lead group for developing specifications and contracts on this side. These are simplified statements, there is much more to the exempt and non-exempt than what has been indicated here. However, for the potential user this is the most important part that they need to know to apply the APL correctly to either the exempt or non-exempt sides of ADOT.

Both FHWA and state requirements require that written justification be submitted to them that proves that it is in the public interest to restrict the market to specific products. ADOT's current Product Resource Investment Deployment and Evaluation program (PRIDE) does not conform to these requirements. Therefore, in most cases, ADOT's current APL should only be used as a guide, it is not an official procurement document and does not have any official contractual standing by itself. To do this the APL has to be specifically mentioned in the specifications for that construction project or procurement. However, before a user does this they are cautioned to make sure they are aware of the applicable federal or state requirements and how that portion of the APL measures up to them. More information about these requirements are presented within this chapter.

The APL should not be used arbitrary to limit or restrict access to ADOT's market. The only time that this is allowable is if the user takes the time to ensure that the applicable state or FHWA procedure has been followed and official approval has been given. Measures have been taken with regards to the new EAPL to clarify how the state procurement code and FHWA requirements apply to each product area.

According to FHWA requirements a "reasonable number" of acceptable materials or products have to be listed if brand names are used to define the requirements of the specifications. According to past practices it has been generally accepted that at least three or more viable products that are manufactured by separate companies provides a "reasonable number." This does not mean that the market can be absolutely limited to these three products. The state agency still has to have a reasonable process that will allow other products an opportunity to prove themselves as equals to the listed products. See subsection 106.08 "Proprietary Products, Trade Names and Substitutions:" of the 1990 ADOT Standard Specifications.

However, this does mean that once ADOT achieves a listing of three or more viable products that are made by separate companies for a specific APL subcategory this listing is probably in general compliance with the intent of FHWA regulations. However, the success of this "rule-of-thumb" definition of a reasonable number depends on the nature of the market and the degree of competition in that market. It was a goal throughout this
research project to achieve a product listing of at least three products for each subcategory, section or subsection.

The state procurement code (the code) does not have an informal definition of adequate competition. The code does have what is termed a Qualified Product List (QPL) specification process (3) (see Appendix C). The QPL specification process requires the state to develop requirements and then publicly advertise that a QPL for a certain product area is going to be developed. Potential vendors then submit technical non-priced responses to this advertisement. The state then reviews these submittals to determine which products meet the requirements. Then once this phase of the process is completed the state then issues invitation for bids (IFB) to those vendor whose products made the QPL. A QPL can not be changed once an IFB is issued. Additionally, the code specifies that QPL test results shall protect the identity of the vendor.

It is interesting to note that the code's QPL process in a way is very similar to the ATRC's PRIDE process. However, the basic difference is that the QPL process is active, the state goes out and actively solicits vendors in certain product areas to submit information and/or samples of their product for examination and/or testing. Whereas the PRIDE is more reactive, it basically waits for vendors to come to the state to submit their products for examination and/or testing.

It is recommended that ATRC consider modifying the PRIDE process to be in compliance with the code's QPL requirements. This may prove to be a more effective method of establishing and maintaining the APL. Those portions of the APL which are developed per the code's QPL requirements could then be used directly as procurement specifications for IFBs. As it is now the PRIDE and procurement QPL process are separate. This often results in duplicate and time-consuming effort.

As it stands now, ADOT's APL can only be used as a "brand name or equal specification" with regards to the requirements of the code. The code states that as many different brands as practical are to be referenced (3) (see Appendix C). Additionally, there needs to be a statement included that explains to potential vendors that the naming of the brands in the specifications is only for the purpose of describing the standard of quality, performance and characteristics of the needed product and is not intended to limit or restrict competition.

In conducting this study it was noted that there appears to be general lack of knowledge of the state procurement code and FHWA contract/program requirements (1 & 3). There is also evidence that numerous ADOT specifications and standard drawings are proprietary in nature (4 & 5). It appears that an aggressive training program by ADOT and Federal Highway Administration (FHWA) should be implemented to ensure that all are aware of these requirements. These requirements are not optional; they are the law. If personnel do not adhere to them they could encounter criminal as well as civil trouble.
Status of Standard Specifications and Drawings

The Standard Specifications and Drawings for the traffic signal and lighting features is in need of revisions and updating. There are also a number of different new technologies which ADOT should give serious consideration to using. An engineering evaluation needs to be performed concerning the viability of these technologies. The following is a basic list, referenced by Standard Section, of some of the areas which need to be addressed:

• Section 732 Electrical Underground Material - The specifications and drawings need to be developed and/or revised to better account for the technical and application requirements for IMSA cable, THW/XHHW-2 insulated conductors, loop detector cables, electrical tapes, flexible cords and communication cables. An evaluation of the standard electrical connections and the development of suitable alternatives connector systems needs to be done. Specifications and drawings need to be developed for polymer composite type pull boxes (an ADOT procurement version has been completed). An evaluation is needed for the use of plastic and composite type junction boxes for use in cast-in-place concrete structures as well as for welded grounding connections.

• Section 733 Signal Indications and Mounting Assemblies - The specifications and drawings for traffic signal (vehicle, pedestrian and special use) indications need to be revised to include more details regarding the requirements for each type. Additionally, a more comprehensive evaluation needs to be done on the interchangeability of components between different manufacturers. The program visibility specification needs to be revised to make it less proprietary. The evaluations that ADOT currently are doing need to be continued on traffic signal light sources (e.g. incandescent and LEDs). The development of better testing methods, specification requirements and field tracking methods of traffic signal light source performance are needed. The specifications and drawings for signal mounts need to be evaluated and revised.

• Section 734 Traffic Control Assemblies - ADOT currently has a consultant working on up-dating the traffic controller specifications. The new specification will include both NEMA TS-1 and TS-2. Also, the 170 and 179 standards will be accounted for. Therefore, it appears that a solution to the problems with this section is well underway. Additionally, work is needed to evaluate and develop specifications for closed loop signal systems.

• Section 735 Detectors - Specifications and drawings need to be developed for preformed detector and temporary surface mount loops. An evaluation is needed regarding the viability of other types of detector systems (e.g. ultrasonic, radio, radar, video and microwave). ADOT has installed a video detection demonstration at Loop 101/Baseline TI with the City of Tempe. A sound detection system is being used on SR 51 as a part of the Phoenix area freeway management system. Specifications and drawings need to be developed for ADA type pedestrian push buttons (a draft has
been developed by the Electrical Design Branch. A comprehensive testing program needs to be developed and implemented to determine the best performing loop cut sealants. ADOT really needs to consider developing a comprehensive vehicle and pedestrian detection study to evaluate all detection technologies and approaches, and then recommend what changes and additions need to be made to ADOT’s current practices.

- Section 736 Highway and Sign Lighting - Specifications and drawings need to be developed for underdeck lighting fixtures, tunnel lighting fixtures, high mast lighting fixtures and high mast lighting raising/lowering devices. The development of better testing methods, specification requirements and tracking methods of field performance of high-pressure sodium lamps are needed. An evaluation of longer lasting HPS lamps (dual arch tube or lamps with built in starters) needs to be done. All of the load center cabinet and cabinet component (circuit breakers, contractors, PE cells, etc.) specifications and drawing need to be reviewed and revised to better meet current needs.
CHAPTER 3- ELECTRICAL APPROVED PRODUCT LIST

Work Plan

The work for this project was divided into eight tasks. The first five tasks involved grouping (or organizing) the fourteen EAPl project scope subcategory items by their applicable ADOT Standard Specification section (e.g. Sections 732 to 736) (4 & 5). This required that all the previously assigned ADOT APL subcategories designations from V-29 through V-68 be reassigned (or restructured) (6) after a section of the Standard Specifications. The new structure is as follows:

(1) V-29 & 30 are now unassigned. V-29 could be utilized in the future. However, it is recommended that V-30 not be used since Section 730 is a general requirement section of the Standard Specifications and does not deal with any specific requirements for any type of device or product.

(2) V-31 is now the EAPl listing corresponding to Section 731 Structural Supports and Foundations for Traffic Signal and Highway Supports.

(3) V-32 is now the APL listing corresponding to Section 732 Electrical Underground Material.

(4) V-33 is now the APL listing corresponding to Section 733 Signal Indications and Mounting Assemblies.

(5) V-34 is now the APL listing corresponding to Section 734 Traffic Control Assemblies.

(6) V-35 is now the APL listing corresponding to Section 735 Detectors.

(7) V-36 is now the APL listing corresponding to Section 736 Highway and Sign Lighting.

(8) V-37 is now the APL listing corresponding to Section 737 Incidental Electrical Work.

It should be noted that items (2) V-32 through (7) V-36 are the only subcategories that were included in the scope of this project (2). In most cases only that work specifically involved in those 14 specific product areas within those five subcategories were worked on in detail. Never the less, numerous recommendations regarding out-of-scope items were made and/or established. The other three tasks involve preparing this report, a summary report, giving the executive presentation and progress reports/meetings.

The new EAPl numeric designations were then restructured to correspond to the last two digits of the Standard Specification section number with the "V" APL Traffic Control
Materials category designation. Additionally, the subcategory was assigned the same title as that section of the standard specifications. Additional subdivisions of the subcategories for specific product listings were achieved by placing a sequential capital letter (e.g. A through Z) after the two-digit numeric subcategory designation to achieve product area sections. Then, if necessary, a further subdivision was achieved by placing a number in parenthesis "(#)") to achieve product subsections.

The grouping of the fourteen APL item subcategories based on their Standard Specification section enabled a more logical and sequential process to be followed throughout this project. Each of these subcategories was basically worked on in sequence. The basic data used for the research into these fourteen product areas came from prior ADOT approvals given by the Electrical Design Branch per material reviews that were carried out over the past ten years.

Research Approach

The first step on this research project was to reassign the current subcategories set aside for the electrical portion of the APL so they would conform to the sections of the Standard Specifications. The results of this effort is summarized as follows:

- Section 732 and new Subcategory V-32 - Electrical Underground Material - Cables and conductors; Electrical conduits; Electrical connectors; In-line fuses; and Pull boxes.

- Section 733 and new Subcategory V-33 - Signal Indication and Mounting Assemblies -Pedestrian signal assemblies; Signal lamps; and Vehicle signal assemblies.

- Section 734 and new Subcategory V-34 - Traffic Controller Assembly - Controllers, NEMA and 179.

- Section 735 and new Subcategory V-35 - Detectors - Detector loop sealants; Pedestrian push buttons; and Preformed loop detectors.

- Section 736 and new Subcategory V-36 - Highway and Sign Lighting - Luminaries and Photo-cells.

The next step, as already mentioned in the Work Plan, was to develop a detailed product outline for each of the subcategories. Additional sections and subsections were established under each of the subcategories as needed to cover the products areas as detailed in the Standard Specifications, the Standard Drawings or is in current use via special provisions and/or plan details. Also, sections and subsections were added for product technologies that may offer ADOT some potential improvement or use. The numbering or referencing sequence that was described in the Work Plan is illustrated as follows using the new subcategory V-32 Electrical Underground Material as an example:
Subcategory: V-32 ELECTRICAL UNDERGROUND MATERIAL

Section: V-32A Electrical Conductors

Subsections: V-32A(1) Insulated Copper - Lighting and Signals
V-32A(2) Bare Copper
V-32A(3) Insulated Copper - General Use
V-32A(4) Flexible Cords
V-32A(5) Insulated Aluminum

This same outline format was followed for all of the remaining four subcategories (V-33, V-34, V-35 and V-36) within the scope of this project. These outlines then became the basis on which the EAPL and the product approval database (PAD) notebooks were developed.

The product approval database notebooks became the focus of the work being done on this project. Each notebook was subdivided into sections [e.g. V-36B Vertically Mounted Roadway Luminaire (Offset)] as set forth in subcategory outlines (V-32, V-33, V-34, V-35 and V-36). Each section is divided in the notebooks with a labeled divider.

Each subsection in the notebooks was further divided, with divider tabs, into four or five physical divisions. These divisions are as follows:

- The first division, which typically has the section or subsection designation and title [e.g. V-33E(1) Long Life Incandescent Lamps], contains a copy of the latest applicable EAPL for that product area or class. Typically, the colored tab used to designate this division has been green.

- The second division entitled "Product Information" contains copies of information about the products listed (e.g. product data/specification/catalog sheets). The colored tab used to designate this division has been yellow.

- The third division entitled "Applications" contains a copy of the applicable ADOT standard specifications, special provision, standard drawing and/or special detail that defines and applies to that product. This division can also contain any information regarding this product listing that may be deemed important and/or related to the successful use or application of it. The colored tab used to designate this division has been blue.

- The fourth division entitled "Tests/Listing/Other" then provides an area for test reports and/or copies of listing (e.g. UL) reports. Typically the colored tab used to designate this division has been clear. Most of the listing only have the four divisions.
The fifth division should be regarded as a "catch-all" or "wild card" division that can be used when the other divisions do not apply. Such an instance would be to place information on a new product that is under consideration, but has not been acted on or approved yet.

All of this information is intended to give ADOT a permanent and readily accessible record. If properly maintain and preserved this database of notebooks should be very useful in updating and managing the EAPL. These notebooks will become ADOT master records regarding the basis of approval and what was approved per this project. It is anticipated that these notebooks will reside permanently in the Electrical Design Branch's library.

The main source of product information that was placed in the PAD notebooks (eleven were developed) was obtained by examining ten years worth of ADOT Electrical Design Branch material and shop drawing review packages that had been done for a variety of projects throughout the state. These files provided a wealth of information and insight in helping to refine the subcategory outlines that were produced earlier. Some supplemental market research was conducted, however, the majority of the product information came from the Electrical Design Branch and material TASK Engineering already had on file.

One of the main challenges that developed as this project progressed was how to handle the listing of the commodity type products (e.g. conductors, cables, conduit, etc.). As already mentioned in Chapter 2, a "two list" approach was taken to solve this problem. The first list, entitled the "Generic" APL is non-product name listing that presents the requirements that a product has to meet if it is to be approved for use for this section or subsection. The second list, entitled "Specific" Previously Approved Product List gives the product information on the products that have been found to be in compliance with the requirements of the "Generic" APL.

Standard Specification Changes

As previously mentioned in the Problem Statement, changes to the standard specifications will be necessary. Therefore, in November of 1997, a letter explaining the goals of this project with an attachment detailing what changes to the specifications need to be made was sent to ADOT Contracts and Specifications (see Appendix H). To date no reply has been received from ADOT C & S.

As a separate effort, ADOT needs to consider undertaking a major effort to evaluate and develop revisions to the Standard Specification and Standard Drawings. A general listing of some of the work needed to be done to this regard is presented in Chapter 2.

Subcategory Outlines

Six of the subcategory outlines that have been produced per the efforts of this project are attached to this report (see Appendix I). This outline represents the table of contents for the new EAPL and the product approval database notebooks.
Traffic Signal Controllers

The majority of work necessary to revise ADOT’s current traffic controller assembly specification is being done through ADOT Electrical Design Branch via a contract with BRW. The object of BRW’s project is to develop an all-inclusive specification that embraces both the latest in NEMA (TS-1 and TS-2) and 179 traffic signal technologies. Once this project is completed the EAPL and the database notebook for subcategory V-34 Traffic Controller Assemblies will need to be revisited and updated to conform to the new specifications and to make way for additional product listings. The EAPL and notebook developed during this project are based on ADOT’s previous NEMA TS-1 specifications.
CHAPTER 4- CONCLUSIONS AND SUGGESTED RESEARCH

Conclusions

1. Through this effort procedures and documents have been produced that will enable the ADOT Electrical Design Branch to shift the review and approval authority of many commodity and common use type electrical items to the ADOT field inspector. It is anticipated that this effort will yield savings in time not only for ADOT, but the industry as well without any loss of quality or competition.

2. These revisions to the EAPL have provided an opportunity to document ADOT’s needs per previous product reviews conducted by ADOT’s Electrical Design Branch. This, in turn, has establish the basis (or paper trail) of why certain products are approved and specified. It is anticipated that this will allow improvements to design practices, specifications and standards to be more easily determined in the future because the basis for the current approach is well documented and centralized in a product approval database that is readily accessible. These documents could also help in mitigating disputes that may arise over the intent of the EAPL and related specifications and standards.

3. It is believed that this revision effort of the EAPL and corresponding specifications will produce additional competition that should help to lower and/or maintain current costs without any loss of necessary performance or quality. The goal of this project was to always attempt to list at least three products of equal performance within the scope of this previous statement. Where this was not possible, recommendations are provided on the EAPL on possible alternatives and/or actions that will need to be taken when that product section and/or subsection is used by a designer (e.g. brand name specification and/or sole source justification, etc.). This will help provide EAPL users with the information they need to know to be in compliance with state and FHWA procurement requirements.

4. Care needs to be taken in structuring and managing APLs to ensure that fair and equal competition is achieved. Granted, there is a need to keep the APL as simple as possible; however, the mandate from both state and FHWA procurement regulations requires that reasonable effort be expended to maximize competition. For example: often there are small specialty companies that typically make one or two component products of a larger assembly product (e.g. traffic signal indications, controller assemblies, load centers, luminaries, etc.). Therefore, if the APL is structured in a fashion that only allows for the vendors who supply the entire assembly, then the one or two component companies may be unfairly excluded. Not only would this limit competition which may increase costs, but it may exclude a component product that is as good as or if not better than those supplied via the whole assembly supplier.

5. The practice of listing product distributor information on the APL should be discontinued. Often products are available from numerous distributors (in and out of
state) and it will almost be impossible for ADOT to keep the APL up-to-date since distributorship are often changing. Therefore, it does not appear to be a good practice to list distributors. Besides if a user calls the manufacturer they will be able to give them the latest distributor information. The revised EAPL produced by this project does not include distributor information.

6. The new EAPL features a listing method that not only defines specific product information, but also summarizes the requirements, the scope of why the product is listed and in a number of cases, the appropriate application of those products. These features are believed to be an important factor in helping the EAPL to be easier to understand.

7. A "two list" method has been developed to handle those commodity items (e.g. conductors, cables and conduits) that are manufactured by numerous companies to a nationally recognized specification (e.g. ASTM, IMSA or UL). It is believed that this "generic" approved product list and "specific" previously approved product list provides the most flexible and effective way to handle these product areas. A more detailed explanation of the advantageous of the "two list" method is contained in Chapters 2 and 3.

Suggestions For Further Research/Action

1. Setting a goal to reorganize ADOT's entire APL to correspond with the basic structure of the Standard Specifications should be set by ADOT.

2. There are a number of product areas that require additional research to better determine the performance and value of competing products. The most pressing product areas that need attention are: poles, yielding devices for poles, electrical connections, traffic signal component interchangeability, traffic signal light sources, traffic signal controllers/cabinets, signal systems, new detector system technologies, loop detector sealants, high intensity high pressure sodium discharge lamps and a variety of luminaries. It is recommended that ADOT develop a project or series of projects to evaluate and revise all the Traffic Signal and Roadway Lighting sections of the Standard Specifications along with the related Standard Drawings. Given the amount of work and the fact that the needs are immediate, either additional staff should be dedicated to this task and/or consultants should be hired.

3. The Electrical Design Branch needs to dedicate a staff member to maintain the EAPL database compiled through this study. This person's responsibility would be to ensure the books are kept in the proper order and the EAPL and the corresponding notebooks are updated and revised as new products are evaluated and approved. This person would become the main coordinator with ATRC on the flow of PRIDE applications for those products that apply to the new subcategories V-31, V-32, V-33, V-34, V-35, V-36 and V-37. This person could also be assigned the project to develop and compile product approval database notebooks for subcategories V-31 and V-37.
4. When possible, it is recommended that ADOT add the applicable C & S item number and/or ADOT Procurement solicitation/contract number to the product sections and/or subsections to which they apply. Cross referencing the C & S number will enable the inspector to better understand the applicable specifications to those items and how they are to be paid for. The cross-referencing of the Procurement solicitation/contract number will enable ADOT personnel to better determine the availability of the products listed.

5. Consideration needs to be given to modifying the current PRIDE process to conform to the requirements of the State Procurement Code Qualified Product List specification process. The QPL process may prove to be more effective, especially since it can be used as a specification on procurement contracts.

6. There is evidence that the current APL is being arbitrarily used to limit or restrict access to ADOT's market. There is also evidence that a number of ADOT specification and standard drawings are proprietary in nature. These occurrences are typically not in compliance with state and FHWA requirements. Measures need to be taken to inform persons of the limits of the APL and to train them on the proper procedures that need to be followed when dealing with procurement of products with public funds.

7. ADOT's Policy Memorandum No. 92-08, which established the PRIDE, needs to be evaluated and revised to better reflect the current structure and operations of this process. Discussion about the applicable state and federal laws also need to be included in this document.

8. ADOT's Policy Memorandum No. 88-1 stating how Proprietary Items are to be handled needs to be evaluated and revised. There is a new Federal Aid Policy Guide available that needs to be accounted for.

9. The Traffic Control Product Evaluation Committee (TCPEC) and the Electrical Design Branch need to review the new EAPL and take an official action on its adoption. Additionally, all of the product listing marked "pending" on the approval dated column need to be evaluated and voted on.
REFERENCES


(2) Request For Proposals, Development of Electrical Approved Product List - R044908P, Arizona Department of Transportation, Intermodal Transportation Division, Arizona Transportation Research Center, RFP T97-08-00057, March 7, 1997

(3) Arizona Department of Administration, Procurement Rules and Regulations - March 1, 1995

(4) Arizona Department of Transportation, Standard Specifications for Road and Bridge Construction - 1990

(5) Arizona Department of Transportation, Standard Specifications for Road and Bridge Construction (Metric Version) - 1996

(6) Arizona Department of Transportation, Approved Products List, November 1995 Version

(7) Arizona Department of Transportation, Traffic Signal and Highway Lighting Standard Drawings - 1985
APPENDIX A:

ADOT POLICY MEMORANDUM NO. 92-08
Memorandum No.: 92-08
Effective Date: July 1, 1992
Responsible Office: ATRC, TPD
Supersede Date: December 27, 1994
Number Of Pages: 7
Review Date: December 27, 1996
Number of Attachments: 2

TITLE: NEW PRODUCTS EVALUATION AND APPROVAL PROCESS

APPROVED: Gary K. Peterson
State Engineer
Highways Division

Director
Transportation Planning Division

STATEMENT OF PURPOSE

The purpose of this policy and implementation memorandum is to delineate responsibilities and procedures for the evaluation and approval of new products.

AUTHORITY AND RESPONSIBILITY

This Policy is jointly promulgated under the authority and approval of the State Engineer and the Director, Transportation Planning Division.

The New Products Policy Committee (NFPC) is the ADOT committee responsible for the success of the New Products Evaluation and Approval Process. It shall resolve any issues brought to the committee by either TPEC or MPEC. NFPC is responsible for pro-actively introducing new, cost-effective products and technologies to the Highways Division.

The Traffic Control Products Evaluation Committee (TPEC) is the ADOT committee responsible for establishing the operating policy under which all traffic control products are evaluated. The committee has the authority to approve or disapprove all traffic control products for addition to the Approved Products List (APL) or to remove the unacceptable traffic control products from the APL.

The Materials Products Evaluation Committee (MPEC) is the ADOT committee responsible for establishing the operating policy under which all non-traffic control products are evaluated. The committee has the authority to approve or disapprove all non-traffic control products for addition to the APL or to remove the unacceptable non-traffic control products from the APL.

The Arizona Transportation Research Center (ATRC) is assigned the responsibility of serving as the clearinghouse for all new products. The Manager of the ATRC will serve as the Secretary to the NFPC and shall maintain the APL.

The assigned section, for example, the Traffic Group for traffic control products, with the assistance of other ADOT units as necessary, is responsible for developing and maintaining specifications and standard drawings for the various products.

DEFINITIONS

AASHTO: American Association of State Highway and Transportation Officials
Approved Products List (APL): A list of products which have been evaluated and/or meet ADOT specifications, standard drawings (when required), and are approved for use for construction and maintenance.

ATRC: Arizona Transportation Research Center


Experimental Feature: A material, process, method, equipment item, traffic operational device, or other feature that: (1) has not been sufficiently tested under actual service conditions to merit acceptance without reservation in normal highway construction, or (2) has been accepted but needs to be compared with alternative acceptable features for determining their relative merits and cost effectiveness.

Experimental Project: A state funded or federal-aid highway construction project incorporating one or more experimental features.

FHWA: Federal Highway Administration, U.S. Department of Transportation

Independent Testing Laboratory: A testing laboratory which has been approved by the ADOT to perform testing and which has been determined to be free from any conflict of interest.

Materials Products Evaluation Committee (MPEC): The ADOT Committee responsible for establishing operating policy for evaluating and approving/disapproving all non-traffic control products.

Material Specification: Any specification which defines the material properties of a product.


New Product: Any product submitted for approval which has not previously been evaluated and/or does not meet a current ADOT specification or standard drawing. Any new materials, equipment, or methods to be used on a federal-aid project, which may be included and evaluated in experimental construction (IAW Vol. 6, Chap 4, Sec 2, Subsec 4 of the Federal-Aid Highway Program Manual).

Performance Specification: Any specification which defines the performance requirements of a product.

Tested/Evaluated Products List (T/EPL): A list of products which have been tested and/or evaluated and failed to meet ADOT specifications or standard drawings or a product which is deemed unnecessary to the needs of the department.

Traffic Control Devices Handbook: A handbook intended to augment the MUTCD by serving an interpretative function and by linking the MUTCD standards with the activities related to complying with these national uniform standards.

Traffic Control Products: Various types of materials and equipment necessary to carry out the requirements of the MUTCD and/or FHWA Safety Standards, which shall include but not be limited to signing materials, pavement marking materials, energy attenuators, temporary traffic barrier systems, flexible and non-flexible delineators and those items which are used in traffic signal systems, highway lighting systems and overhead sign lighting systems.

Traffic Control Products Evaluation Committee (TPEC): The ADOT Committee responsible for establishing operating policy for evaluating and approving/disapproving all traffic control products.
Work Plan: A written program of action including a description of the experimental feature, objectives, measurements to be made, characteristics to be evaluated, time schedules, reporting requirements, cost estimates, construction and post-construction inspection schedules, and control sections.

Work Plan Administrator: The individual assigned by the TPEC or the MPEC to administer the work plan.

REFERENCES

AASHTO Materials Specifications

ADOT Standard Drawings, Signing and Marking

ADOT Standard Drawings, Traffic Signal and Lighting

ADOT Standard Drawings, construction

ADOT Stored Specifications

International Municipal Signal Association (IMSA) Specifications


National Equipment Manufacturers Association (NEMA) specifications

National Cooperative Highway Research Program Report 230

Standard Specification for Road and Bridge Construction, State of Arizona, Department of Transportation, Highways Division, current edition


Steel Structures Paint Council Specifications

POLICY

The New Products Policy Committee shall consist of the following members:

1. Assistant State Engineer, Maintenance Group, Chair
2. Assistant State Engineer, Roadway Engineering Group
3. Assistant State Engineer, Construction Group
4. Assistant State Engineer, Traffic Group
5. Assistant State Engineer, Materials Group
6. Assistant State Engineer, Bridge Group
7. Administrator, Equipment Services
8. Manager, ATRC
9. Two District Engineers
10. Value Engineering Coordinator
* District representations are rotated annually as following:
  First: Phoenix Maintenance District and Holbrook District
  Second: Flagstaff District and Yuma District
  Third: Tucson District and Kingman District
  Fourth: Phoenix Construction District and Globe District
  Fifth: Prescott District and Safford District

+ The Coordinator will serve as a non-voting member.

The Traffic Control Products Evaluation Committee shall consist of the following members:

1. Assistant State Engineer, Traffic Group, Chair
2. Phoenix Region Traffic Engineer
3. Tucson Region Traffic Engineer (BTA)
4. Prescott Region Traffic Engineer (Westرن)
5. Flagstaff Region Traffic Engineer (نورم)
6. Traffic Engineer, Maintenance. Traffic Operations Services
7. Materials Group Representative
8. Purchasing Section Representative (بروكتور جون)
9. Roadway Engineering Group Representative
10. ATRC Representative
11. ATSSA Representative
12. FHWA Representative
13. IEEE Representative
14. Construction Group Representative
15. Traffic Design Representative
16. Electrical Design Representative
17. Local Govt. Representative
18. Local Govt. Representative
19. HOST, Traffic Signal Consultant (هست)
20. C15 Representative

The Materials Products Evaluation Committee shall consist of the following members:

1. Assistant State Engineer, Materials Group, Chair
2. Phoenix Region Materials Engineer
3. Tucson Region Materials Engineer
4. Prescott Region Materials Engineer
5. Flagstaff Region Materials Engineer
6. Purchasing Section Representative
7. Roadway Engineering Group Representative
8. Maintenance Group Representative
9. ATRC Representative
10. FHWA Representative
11. National Materials Engineer

Committee Membership: The above stated are the permanent memberships for each committee. When it is necessary, with 2/3 majority approval, each committee can invite additional members to participate in its functions. These new members should contribute the lacking specialties from the regular membership. The term of new membership shall be determined by the permanent memberships as well as the restrictions on their voting rights.

Establishment of Specialty Sub-committees and Teams: Specialty sub-committees or teams can be established by any committee to review specialty issues. The sub-committees and teams should conduct themselves within the charters that were set by their originating committee, and should report in writing all their findings and recommendations in writing to the originating committee for decision. When the tasks are completed, the originating committee shall dissolve the sub-committee or the team.

Approval Process: The New Products Approval Process is shown in Attachment 1.

Appeal Process: If a Products Evaluation Committee indicates no interest in a product before the vendor has submitted a completed proposal to ATRC, the vendor will be notified. If the vendor wishes to pursue the matter
further, they can submit a completed proposal according to the application procedure stated in the latter part of this document. This proposal will be processed through the normal procedures.

If a product receives an unfavorable decision from a Products Evaluation Committee after the committee has reviewed the vendor's proposal and all relevant information, the vendor will be notified. The vendor may file a completed appeal. The completed appeal must be received by ADOT within 30 calendar days after the vendor receives notification from ATRC. The appeal shall be in writing and shall include the following information as a minimum:

1. The name, address and telephone number of the appellant.
2. The authorized signature of the appellant.
3. Identification of the product, test/evaluation number, and date of the evaluation.
4. A detailed statement of the factual grounds for this appeal with supporting documents to specifically address the short-comings of the analysis or the procedural errors made by the Products Evaluation Committee.
5. The form of relief suggested.

All appeal correspondence shall be addressed to ATRC. ATRC will review the completeness of the appeal submitted by the vendor. The appeal will be considered incomplete if it addresses only the disagreement with the committee's decision without pointing out any error in the committee's analysis or the procedure which this product was processed through. Only those completed appeals received by ATRC within the stated 30-calendar-day limit will be presented to the New Products Policy Committee for ruling. Presentation of the completed appeals will be in the next committee meeting if they are received by ATRC more than 14 calendar days before the scheduled meeting. After considering all the facts that have been presented by the vendor and the responsible Products Evaluation Committee, the New Products Policy Committee may select one or more of the following resolutions:

1. Require a new test or evaluation by ADOT.
2. Require a new test or evaluation by an independent testing laboratory.
3. Add the subject product to the Approved Products List.
4. Deny the appeal.

IMPLEMENTATION

Application: All vendors shall contact the ATRC for submittal of new products for use by the ADOT. The ATRC will provide the vendor with application forms and vendor proposal requirements. A separate proposal shall be submitted for each product. Specifications shall be submitted with each product and, when required, an engineering drawing. When requested by the ATRC, the vendor shall submit a current certificate of analysis or test prepared by an independent testing laboratory for each product. When applicable, all testing shall be done in accordance with ADOT testing policies and procedures. An application and testing fee shall be charged in accordance with the current application and testing fee schedule. All requests for product evaluation shall be sent to:

Arizona Transportation Research Center
7755 South Research Park Drive
Suite #106
Tempe, AZ 85284
Phone: (602) 832-3629
Fax: (602) 832-3677

Testing: All products will normally require laboratory and/or field testing. Testing may be done by ADOT or by an independent testing laboratory. The TPEC or the MPEC will determine the appropriate tests to be performed on a
given product and make an assignment as outlined in the New Products Approval Process flow chart. See Attachment 1. Each test conducted shall culminate in a report of the test results. Each report shall have a test/evaluation number for identification purposes. All reports prepared by engineering consultants or independent testing laboratories shall be sealed and signed by a registered professional engineer.

**Approval/Disapproval Process:** All new products to be considered for use by the ADOT shall be submitted to the ATRC. The submittal shall include all required paperwork, including a cover letter, vendor's proposal, and other supporting data. Those submittals not meeting ATRC's requirements will not be forwarded to the TPEC or the MPEC for consideration. Once the ATRC's requirements are satisfied, the product proposal will be scheduled for the next regular meeting of the appropriate committee. It is anticipated that once a product has met the requirements of the ATRC, it should take approximately 3 months for the applicant to receive notice whether a product has or has not been accepted for further testing, or immediate use by the ADOT. The ATRC will provide a written notification to the applicant as to the decision of the committee concerning the approval or disapproval of the subject product. If a product is disapproved, a copy of the test/evaluation report will be sent to the applicant. The disapproval notice will contain sufficient information to ensure the applicant can understand the reason(s) the subject product was disapproved. When a product is approved, the notice to the applicant will contain the approval date, the date the product requires recertification and the cycle recertification is required, for example, every five years or any time the product is modified.

**Approved and Tested/Evaluated Products Lists:** The ATRC will maintain a comprehensive listing of products which have been approved by the committees. The APL shall have the following format:

<table>
<thead>
<tr>
<th>Report No.</th>
<th>Product Name</th>
<th>Notes</th>
<th>Approval Date</th>
<th>Recertify Date</th>
<th>Manufacturer</th>
<th>Local Distributor</th>
</tr>
</thead>
<tbody>
<tr>
<td>92-3</td>
<td>Stimsonite 911</td>
<td></td>
<td>5/90</td>
<td>5/95</td>
<td>Amerace Corp.</td>
<td>Same as Manufacturer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Signal Prod Div</td>
<td>2542 N. Natchez</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Niles, IL 60648</td>
<td></td>
</tr>
</tbody>
</table>

The ATRC shall also maintain a Tested/Evaluated Products List (T/EPL). The T/EPL shall have a format similar to the APL except the Approval Date and Recertify Date columns will be omitted and a Disapproved Date column will be added. All products shall have the approval of either the TPEC or the MPEC before it can be added to the APL.

**Field Evaluation:** A work plan for a field evaluation should consider the following:

1. Complexity of Product (i.e. Sign Post System vs. Snow Pole)
2. Environment (wind, snow, sun, rain, etc.)
3. Traffic Volumes
4. Operating Speeds
5. Visibility
6. Geometrics
7. Terrain
8. Installation and removal
(9) Traffic control required  
(10) Type of pavement  
(11) Explicit evaluation criteria  
(12) Cost benefit analysis  
(13) Frequency of testing  
(14) Type of testing  
(15) Cost of testing

Analysis of the above factors will provide insight into the location of a test site(s), as well as determination of a representative product sample size. Field evaluations will primarily be the responsibility of the District personnel in conjunction with the ATRC and/or the Materials Group. The District will install or assist manufacturers in the installation of test sites. The District will also monitor and regularly inspect test sites and report on the performance of the product, as determined by the work plan. The final report of performance will be the responsibility of the Work Plan Administrator. The duration of the field test section will be determined based on the complexity and the type of product being evaluated. Phased implementation/evaluation of some products may be required.

Specifications and Standard Drawings: The assigned Section, for example, the Traffic Group for traffic control products, is responsible for the preparation and maintenance of product specifications and Standard Drawings. The specifications may be material specifications, performance specifications, or a combination of the two. Other ADOT units may be required to provide assistance to the assigned Section in preparing product specifications and Standard Drawings.

The use of trade names in specifications should be avoided. Instead, specifications should be formulated that will obtain the desired results and at the same time assure full opportunity for competition among equivalent materials, equipment, and methods.

Specifications from other agencies: When it is to the ADOT's advantage, specifications developed by other agencies may be used. Prior to using a specification developed by another agency, an evaluation of their test data should be made to determine if the product was tested in an environment and operating conditions which are similar to the proposed use in Arizona. If after the review of this test data there exists sufficient evidence that the product may be successfully used in Arizona, an interim specification which will be identical to that specification developed by the other agency may be promulgated. An evaluation of the interim specification will be made and if found acceptable, the interim specification will be made permanent.

Technology Transfer: The Arizona Transportation Research Center (ATRC) will be responsible for notifying affected sections regarding the status of new products. This will include listings of products currently considered for evaluation, products which will be evaluated, interim and final evaluations. The ATRC will publish and distribute an APL and a T/EPL. Also, an agenda item will be included for each District Traffic Engineer's Meeting to permit the ATRC, the District, the Materials Group, or other unit to present the status of traffic control products under test or evaluation.

Product Performance Feedback: All products during field use or evaluation are observed by numerous ADOT employees. These employees can provide valuable information on the operating characteristics of a given product. The form, Product Performance Feedback, Attachment 2, can be used to provide information on the performance of a product. This information may be positive or negative depending on the individual's experience.
APPENDIX B:
ADOT PRODUCT EVALUATION POLICY
ARIZONA DEPARTMENT OF TRANSPORTATION

Product Evaluation Policy

Product evaluations are often requested by outside parties as a means for demonstrating claimed advantages of a product or procedure. These evaluations require commitments of time and resources by the Department. Therefore, it is the applicant's responsibility to comply with the policy stated herein in order for the Department to administer requests uniformly and impartially. Deviations from this policy may cause delay or rejection of your request.

A request for evaluation requires submission of a complete formal proposal. The format of this submittal will be discussed in the following sections. A separate proposal shall be submitted for each product. Furthermore, a product with more than one application in the highway industry shall be submitted with a separate proposal for each application. All requests must be submitted to the Arizona Transportation Research Center (ATRC) with the appropriate forms and the required information.

Arizona Transportation Research Center
Arizona Department of Transportation
1130 N. 22nd Avenue, Mail Drop 075R
Phoenix, Arizona 85009
Attention: PRIDE, (602)407-3134

A. Evaluation Options

Please select only one of the following options.

(1) For products which are to be accepted based on current ADOT specifications, please refer to Section B of this policy.

(2) For products which have no applicable ADOT specifications, please refer to Section C of this Policy.

B. Acceptance Based on Current Specifications

ADOT has standard specifications and standard drawings which encompass many of the products in the highway industry. Products which require acceptance based on current specifications are submitted to the Materials Section for evaluation.

In order to initiate such an evaluation the vendor needs to submit two copies of the proposal to the Arizona Transportation Research Center. Each copy of the proposal contains the following: (1) one completed "Cover Letter" (Form 1, attached), (2) one completed "Request for Product Acceptance Under Current ADOT Specifications" (Form 2, attached), and (3) additional supporting information, i.e. certifications of compliance from independent laboratories. It is the applicant's responsibility to satisfy all criteria set forth in ADOT current specifications.

C. Request for Evaluation

Products which have no applicable ADOT specifications require an evaluation. The evaluation program will be based on the recommendation of the Products Evaluation Committee.

A request for evaluation is made by submitting twelve copies of the completed proposal with all supporting documentation (i.e., reports, brochures, etc.) to the Arizona Transportation Research Center. The supporting material should demonstrate the product's credentials and benefits to the Department. The proposal will be reviewed by the Products Evaluation Committee. Each proposal, under this option, shall contain, as a minimum, the following essentials:
1) The attached "Cover Letter" (Form 1) signed by an authorized agent of the company.
2) A full description of the product or procedure.
3) An estimated cost of the product or procedure (delivered to Phoenix).
4) Specifications for the product or procedure.
5) Claimed advantages over existing product or procedure (be specific).
6) Verification of advantages: Include laboratory reports, data, calculations, etc.
7) History of past use, if any. Include shall be any and all evaluations available, names
   and phone numbers of contacts, and whether or not such evaluations support the
   claimed advantages.
8) Availability of product. (i.e., Is the product presently in commercial production? If so in
   what quantities? If not when will it be?)
9) Safety and environmental precautions. Include a completed copy of the Occupational
   Safety and Health Administration Materials Safety Data Sheet.
10) Description of desired evaluation program, specifically. Include project type, project
    length, quantities, controls, specifications, special features, etc.
11) Agreement to provide product or procedure free of charge in support of the above
    proposed evaluation program.
12) Agreement to provide technical assistance in formulating evaluation program at no
    cost to the Department.
13) Agreement to reimburse ADOT for costs involved in conducting any special tests or
    other extra costs involved in testing. The boundaries of this agreement should be
    clearly stated. (i.e., the maximum funding that is committed by the vendor to the
    proposed evaluation, the proposed joint adventure agreement, the terms of
    reimbursement, etc.)
14) Agreement to provide technical assistance on-site during any field tests at no cost to
    the Department.
15) Permission for ADOT to reproduce in full or in part any information supplied by the
    submitting organization unless specifically marked otherwise. This includes any
    material with copyrights held by the submitting organization.

The items 11 through 15 stated above must be explicitly stated in the proposal:
agree, disagree, or conditionally agree. In all cases, the submitting party shall state
specifically the terms and boundaries of each agreement.

Additionally, any product samples, photos, or slides which could enhance the presentation
to the Products Evaluation Committee would be appreciated.

The Department will conduct the evaluation program, which is recommended by the
Products Evaluation Committee, at its convenience. Evaluations will be performed in strict
accordance with a work plan developed for the said program.

D. Exceptions

This policy shall not preclude the Department from performing, on its own initiative,
evaluations or field tests of any product or procedure which may benefit the Department. This
includes products or procedures originating from sources other than vendors, as well as vendor
proposals which include exceptions to requirements set forth in this policy.

E. Product Endorsement

The evaluation and/or use of a product in the Product Evaluation System does not
constitute an endorsement by the Department nor does it imply a commitment to purchase,
recommend, or specify the product in the future. Furthermore, the vendor is prohibited from using
ADOT or it's test results in product advertising.
F. Deadline

Proposals submitted for review by the Products Evaluation Committee shall be received by the ATRC at least two months prior to the Products Evaluation Committee Meeting. The Traffic Control Products Evaluation Committee and the Non-traffic Control Products Evaluation Committee convene once every three months. In order for your request to be presented at the next scheduled meeting your proposal must be received by the respective deadline listed below. Incomplete or late proposals will not be presented or considered at the upcoming meeting. Requests for acceptance based on current specifications and request for changes in Standard Specifications or Standard Drawings may be received at any time.

<table>
<thead>
<tr>
<th>For traffic control products</th>
<th>For non-traffic control products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting Schedule</td>
<td>Deadlines</td>
</tr>
<tr>
<td>3rd week of March</td>
<td>January 15</td>
</tr>
<tr>
<td>3rd week of June</td>
<td>April 15</td>
</tr>
<tr>
<td>3rd week of September</td>
<td>July 15</td>
</tr>
<tr>
<td>1st week of December</td>
<td>October 15</td>
</tr>
</tbody>
</table>
COVER LETTER

I, ___________________________________________ being an authorized name
agent of ______________________________________ request that
company
the Arizona Department of Transportation performs a product evaluation of
______________________________ product

I have read and understood the Product Evaluation Policy that was transmitted to me along with this form. I recommend that the following course of action be taken: (one action per request)

_____ Submit the product to Materials Testing for acceptance under current specifications (submit Form 2 and all the necessary information addressed in Section B of ADOT's Product Evaluation Policy with this form)

_____ Submit the product for evaluation by the Products Evaluation Committee (submit all the necessary information addressed in Section C of ADOT's Product Evaluation Policy with this form)

______________________________ signature

Please return this sheet with the appropriate forms and information attached to:

Arizona Transportation Research Center
Arizona Department of Transportation
1130 N. 22nd Avenue, Mail Drop 075R
Phoenix, Arizona 85009
Attention: PRIDE, (602)407-3134
REQUEST FOR PRODUCT ACCEPTANCE UNDER CURRENT ADOT SPECIFICATIONS

DATE __________________________

MANUFACTURER: ____________________ DISTRIBUTOR: ____________________
ADDRESS: ________________________ ADDRESS: ________________________
TELEPHONE: ______________________ TELEPHONE: ______________________

PRODUCT:
Trade Name: ______________________
Description: _____________________
Primary Use: _____________________
Secondary Use: ___________________
Guarantee: _______________________

PRODUCT MEETS SPECIFICATIONS AND TEST PROCEDURES AS FOLLOWS:
ADOT: ________________________ AASHTO: ________________________
ASTM: _________________________ OTHER: _________________________

Product is proposed for the following uses: ________________________________
_____________________________________________________________________
_____________________________________________________________________

A free sample has been or will be shipped, date: ___________________________

GENERAL:

Attach literature pertaining to the product to include instructions and limitations for use, composition or laboratory analysis, precautions in handling, hazards to health, a complete Material Safety Data Sheet, specifications, cost, etc. The Department reserves the right to refuse to test any material that can not be safely tested with the present laboratory equipment. If the product is considered a hazardous material, then the manufacturer or the distributor must accept the unused portion of the sample and the expense involved in the transfer of the material.

Signature _______________________
Address _________________________
Telephone ________________________
How to Submit A Product To
The Arizona Department of Transportation

Review Introduction Letter

Obtain Relevant ADOT Specifications and Standard Drawings from
ADOT Engineering Records
1655 W. Jackson, Room 112F, Phoenix, AZ 85007
(602)255-7498

Compare Relevant ADOT Specifications and Standard Drawings with Your Product

Do ADOT Specifications or Standard Drawings cover your product?

Yes

Prepare Your Request According to Section B of the Attached Policy

No

Prepare Your Request According to Section C of the Attached Policy

Have you responded to all requirements?

Yes

No

Complete the Attached "PRIDE Packet Evaluation Form" (post card)

Have you completed the evaluation post card?

No

Yes

Mail Your Request with the Evaluation Card to
ADOT PRIDE Program
Arizona Transportation Research Center
1130 N. 22nd Avenue, Drop 075R, Phoenix, AZ 85009
APPENDIX C:

STATE OF ARIZONA PROCUREMENT RULES AND REGULATIONS, ARTICLE 4- SPECIFICATIONS
ARTICLE 4. SPECIFICATIONS

CODE PROVISION

§ 41-2561. Definition

As used in this article, "specification" means any description of the physical or functional characteristics, or of the nature of a material, service or construction item. Specification may include a description of any requirement for inspecting, testing, or preparing a material, service, or construction item for delivery.

R2-7-401. Definitions

In this article, unless the context otherwise requires:

1. "Brand name or equal specification" means a specification that uses one or more manufacturers' names or catalogue numbers to describe the standard of quality, performance, and other characteristics needed to meet state requirements, and that provides for the submission of equivalent products.

2. "Brand name specification" means a specification limited to one or more items by manufacturers' names or catalogue numbers.

3. "Proprietary specification" means a specification that describes a material made and marketed by a person having the exclusive right to manufacture and sell such material and excludes other material with similar quality, performance or functional characteristics from being responsive to the solicitation.

4. "Qualified products list" means an approved list of materials described by model or catalogue numbers, that, prior to competitive solicitation, the state has determined will meet the applicable specification requirements.

5. "Specification for a common or general use item" means a specification that has been developed and approved for repeated use in procurements pursuant to R2-7-404(A).
6. "Standard commercial material" means material that, in the normal course of business, is
customarily maintained in stock or readily available by a manufacturer, distributor or dealer for
the marketing of such material.

CODE PROVISION

§ 41-2562. Duties of the director

The director shall establish guidelines governing the preparation, maintenance and content of specifications for
materials, services, and construction required by this state. The director shall prepare, issue, revise, maintain
and monitor the use of specifications for materials, services, and construction required by this state.

R2-7-402. Preparation of specifications

A. Specifications shall be prepared by the director, or by using agencies pursuant to R2-7-408 or by
contract pursuant to R2-7-410.

B. In an emergency under § 41-2537, any necessary specifications may be utilized by the purchasing or
using agency without regard to the provisions of this chapter.

R2-7-403. Content of specifications

A. A specification may provide alternate descriptions of materials, services, or construction items where
two or more design, functional, or performance criteria will satisfactorily meet the state's requirements.

B. To the extent practicable, a specification shall not include any solicitation term or condition or any
contract term or condition.

C. If a specification for a common or general use item has been developed in accordance with R2-7-404(A)
or a qualified products list has been developed in accordance with R2-7-404(D) for a particular material,
service, or construction item, it shall be used unless the state procurement administrator makes a written
determination that its use is not advantageous to the state and that another specification shall be used.

D. To the extent practicable, specifications shall emphasize functional or performance criteria. To facilitate
the use of such criteria, using agencies shall use reasonable efforts to include the principal functional or
performance requirements as a part of their purchase requisitions.
R2-7-404. Types of specifications

A. Specifications for common or general use items. To the extent practicable, a specification for common or general use item shall be prepared and utilized when:

1. A material, service or construction item is used in common by several using agencies or used repeatedly by one using agency, and the characteristics of the material, service, or construction item, as commercially produced or provided, remain relatively stable while the frequency or volume of procurements is significant;

2. The state's recurring needs require uniquely designed or specially produced items; or

3. The state purchasing administrator or using agency authorized to prepare such specifications finds it to be advantageous to the state.

B. Brand name or equal specification

1. A brand name or equal specification may be used when the procurement officer determines in writing that use of a brand name or equal specification is advantageous to the state and that:
   a. No specification for a common or general use item or qualified products list is available;
   b. Time does not permit the preparation of another form of specification, other than a brand name specification; or
   c. The nature of the product or the state's requirements makes use of a brand name or equal specification suitable for the procurement.

2. Such determination may be made for categories of materials, services, or construction items or, in appropriate circumstances, for an entire procurement action even though a number of different items are being procured.

3. A brand name or equal specification shall designate as many different brands as are practicable as "or equal" references.

4. A brand name or equal specification shall include a description of the particular design, functional, or performance characteristics that are required unless the procurement officer
authorized to approve specifications determines that the essential characteristics of the brand names designated in the specifications are commonly known.

5. A solicitation that uses a brand name or equal specification shall explain that the use of a brand name is for the purpose of describing the standard of quality, performance, and characteristics desired and is not intended to limit or restrict competition. The solicitation shall state that products substantially equivalent to those brands designated shall qualify for consideration.

C. Brand name specification

1. A brand name specification may be prepared and utilized only if the state procurement administrator makes a written determination that only the identified brand name item will satisfy the state’s needs.

2. If a brand name specification is utilized the procurement officer shall, to the extent practicable, identify sources from which the designated brand name item can be obtained and shall solicit such sources to achieve the maximum practicable competition. If only one source can supply the requirement, the procurement shall be made under § 41-2536.

D. Qualified products list

1. A qualified products list may be prepared and utilized when the procurement officer authorized to develop qualified products lists determines that testing or examination of the materials or construction items prior to issuance of the solicitation is desirable or necessary in order to best satisfy state requirements.

2. The procurement officer shall solicit as many potential suppliers as practicable to submit products for testing and examination to determine acceptability for inclusion on a qualified products list. Any potential supplier, even though not solicited, may offer its products for consideration in accordance with the schedule or procedure established for this purpose. The qualified products list shall not be modified after the solicitation is issued.
3. Inclusion on a qualified products list shall be based on results of tests or examinations conducted in accordance with requirements published by the state procurement office.

4. Qualified products lists' test results shall protect the identity of the suppliers.

R2-7-405. Confidentiality
A. Specifications and any written determination or other document generated or used in the development of a specification shall be available for public inspection, except to the extent that the withholding of such information is permitted or required by law.

B. If the supplier believes that information it has provided to the procurement officer contains trade secrets or proprietary data that should be kept confidential, a statement advising the procurement officer of this fact must accompany the specification in accordance with R2-7-104.

CODE PROVISION

§ 41-2563. Exempted services
Specifications for services procured under § 41-2513 may be prepared by a purchasing agency in accordance with this article and regulations promulgated under this article.

R2-7-406. [Reserved]

CODE PROVISION

§ 41-2564. Relationship with using agencies
The director may obtain advice and assistance from using agencies in the development of specifications or plans and may delegate in writing to a using agency the authority to prepare and use its own specifications or plans.

R2-7-407. Using agency advice and assistance
The using agency shall submit advice and assistance in the development of specifications or plans pursuant to a request from the director.

R2-7-408. Preparation and utilization of specifications or plans by using agencies
A. The director may delegate the authority to prepare and utilize specifications or plans to using agencies pursuant to R2-7-201.
B. Using agencies delegated the authority to prepare and utilize specifications or plans shall comply with the requirements of article 4.

C. Notwithstanding the provisions of this rule or R2-7-410, the director retains the authority to approve or disapprove all specifications and plans.

CODE PROVISION

§ 41-2565. Maximum practicable competition

All specifications shall seek to promote overall economy for the purposes intended and encourage competition in satisfying this state's needs and shall not be unduly restrictive.

R2-7-409. Requirements of nonrestrictiveness

A. Nonexclusive specifications

1. Unless otherwise permitted by this chapter, all specifications shall describe the state's requirements in a manner that does not unnecessarily exclude a material, service, or construction item.

2. Proprietary specifications shall not be used unless the state procurement administrator determines in writing that such specifications are required by demonstrable technological justification and that it is not practicable or advantageous to use a less restrictive specification. Past success in the material's performance, traditional purchasing practices, or inconvenience of drawing specifications do not justify the use of proprietary specifications.

B. To the extent practicable, the state shall use accepted commercial specifications and shall procure standard commercial materials.

CODE PROVISION

§ 41-2566. Specifications prepared by architects and engineers

All specifications, including those prepared by architects, engineers, consultants and others for public contracts, shall seek to promote overall economy for the purposes intended and encourage competition in satisfying this state's needs and shall not be unduly restrictive.
R2-7-410. Preparation of specifications or plans by persons other than state personnel

A. The director may contract for the preparation of specifications or plans for public contracts by persons other than state personnel including but not limited to architects, engineers, designers and other draftsmen.

B. The requirements of this article shall apply to all specifications or plans prepared by persons other than state personnel pursuant to subsection (A) of this rule. Contracts for the preparation of specifications or plans by persons other than state personnel shall require them to adhere to such requirements.

R2-7-411. Conflict of interest

A. No person preparing or assisting in the preparation of specifications, plans or scopes of work shall receive any direct benefit from the utilization of those specifications, plans or scopes of work.

B. A procurement officer may waive the restriction set forth in subsection (A) of this rule if the procurement officer determines in writing that its application would not be in the state's best interest. The procurement officer shall use as guidance in making that determination the organizational conflicts of interest regulations set forth in the Code of Federal Regulations, 48 CFR, chapter 1, subpart 9.5 (October 1, 1991), excluding later amendments or additions, incorporated by reference herein and on file with the secretary of state. The determination shall state the specific reasons that the restriction in subsection (A) of this rule has been waived.

CODE PROVISION

§ 41-2567. Specifications for energy consumptive materials

The director shall, in conjunction with the department of commerce, establish specifications based on considerations of energy conservation for the procurement of selected energy consumptive material.

R2-7-412. [Reserved]
CODE PROVISION

§ 41-2568. Specifications for recycled materials

To the extent practicable, specifications shall emphasize functional or performance criteria which do not discriminate against the use of recycled materials.
APPENDIX D:

STATE OF ARIZONA PROCUREMENT RULES AND REGULATIONS, ARTICLE 3- SOURCE SELECTION AND CONTRACT FORMATION
4. Procurements made under this rule shall also comply with R2-7-336(A)(4) and (5).

5. Quotations shall be recorded and a record sufficient to facilitate auditing of the purchasing agency shall be placed in the procurement file.

D. For purchases of $1,000 or less, purchasing agencies shall utilize procedures providing for adequate and reasonable competition and for making records to facilitate auditing of the purchasing agency.

E. For purposes of a multi-term contract, the total amount of the contract over the full term including the amounts of any options to extend, will determine whether it is subject to this section.

R2-7-337. Other procurements not exceeding an aggregate amount of $10,000

A. If material, service or construction is available from only one vendor, and the purchase is estimated to cost less than $10,000, the sole source procurement method set forth in § 41-2536 shall be used, except that head of the purchasing agency or the state procurement administrator may make the determination that the sole source method is appropriate. This subsection does not apply to procurements described in R2-7-336(C).

E. If purchases of services specified in §§ 41-2513 and 41-2578 are estimated to cost less than $10,000, the methods specified in this rule may be used in lieu of the procedure specified in §§ 41-2538 and 41-2578.

CODE PROVISION

§ 41-2536. Sole source procurement

A contract may be awarded for a material, service or construction item without competition if the director determines in writing that there is only one source for the required material, service or construction item. The director may require the submission of cost or pricing data in connection with an award under this section. Sole source procurement shall be avoided, except when no reasonable alternative sources exist. A written determination of the basis for the sole source procurement shall be included in the contract file.
R2-7-338. Sole source procurement

A. A using agency seeking a sole source procurement shall prepare a written request documenting the existence of a sole source condition, including the specific efforts made to determine the availability of any other source. The request shall include an explanation of the procurement need. The request shall be signed by a designated official of the using agency at the assistant director level, its equivalent or above.

B. Except as provided in R2-7-337(A), a sole source procurement may be conducted only if the director determines in writing before the initiation of the procurement that a sole source procurement is required. Sole source procurement shall not be used unless there is clear and convincing evidence that there is only one source for the required material or service and that no other type of material or service will satisfy the requirements of the using agency. The using agency requesting sole source procurement shall provide written evidence to support a sole source determination.

C. The procurement officer shall negotiate with the single supplier, to the extent practicable, a contract advantageous to the state. The procurement officer shall use the state's terms and conditions as the contract document unless the procurement officer receives an exemption from the state procurement administrator.

D. The provisions of this rule apply to all sole source procurements unless emergency conditions exist as defined in § 41-2537.

CODE PROVISION

§ 41-2537. Emergency procurements

Notwithstanding any other provision of this chapter, the director may make or authorize others to make emergency procurements if there exists a threat to public health, welfare, or safety or if a situation exists which makes compliance with § 41-2533 or 41-2534 impracticable, unnecessary or contrary to the public interest as defined in regulations promulgated by the director, except that such emergency procurements shall be made
APPENDIX E:

ADOT POLICY MEMORANDUM NO. 88-1, PROPRIETARY ITEMS
PURPOSE

To describe and implement a method for incorporation of proprietary materials, products or processes into construction plans and specifications.

POLICY

The Highways Division may specify proprietary items when such items are essential for synchronization with other highway facilities, when competitive bidding with equally suitable non-proprietary items has been afforded or when experimental construction is involved for research purposes.

BACKGROUND

In order to insure the lowest possible cost for all materials and processes involved in the Department's (ADOT) construction projects, it is necessary to establish the best competition possible. The practice of soliciting three or more bids (or quotes) is desirable whenever possible.

There are numerous highway construction items that are unique or "state-of-the-art" that can bring overall cost or safety benefits to ADOT projects. In recognition of this, the FHWA and ADOT have published information to guide the designer/specification writer. The subject of proprietary items is addressed in ADOT's Standard Specifications under Section 106 and in FHWA's Federal-Aid Policy Guide.
IMPLEMENTATION

The use of trade names in specifications and on plans should be avoided. Whenever possible, pre-approved plans and/or specifications for products or processes shall be developed and kept on file for use on specific projects when applicable. It is unacceptable to create pre-approved plans or specifications which are duplications of proprietary items, thus serving to exclude competing products or processes. When a proprietary item is included on an ADOT project, there shall be, at least two other alternates specified, if possible.

NON-FEDERAL AID PROJECTS

If it is determined that only one or two particular products or processes are available to serve the required purpose, the project leader shall provide documentation to the Assistant State Engineer-Design justifying the use of less than three products or patented processes. The documentation shall include factors such as uniqueness, essentiality, cost, synchronization with existing highway facilities, maintenance, availability, experimental (research), safety and potential benefit to the Department. This documentation shall be submitted for approval prior to the products/processes being included in the plans or specifications. This shall be accomplished as early in the design process as possible to avoid any adverse impact or schedule delay. Copies of the approval shall be forwarded to Contracts and Specifications, any affected Services or Consultants, and shall be placed in the project file.

FEDERAL-AID PROJECTS

The designation of patented or proprietary items in federal-aid projects shall be governed by Policy Guide Section 635.411. In sub-paragraph 2b of the non-regulatory supplement, the reference to a "reasonable number" is to be interpreted as meaning three or more. Requests for exceptions to the "three or more" rule must be made in writing to the FHWA through the Assistant State Engineer-Design with appropriate justification attached.

Proprietary items may be listed in the stored Special Provisions where the items have been pre-approved for use by ADOT. Some of the items that presently fall in this category are Attenuation Devices, Preformed Pavement Markings and Precast Concrete Structures. The Special Provisions will state whenever alternatives to specified pre-approved items are allowed. Justifications associated with pre-approved proprietary items shall be documented and placed in a reference file in the Materials Section.
Refer to the current Retaining Wall Policy for details on pre-approved proprietary wall systems.

Refer to the current policy on New Products or Processes for details on ADOT's method of receipt and approval of new items for possible use in highway construction.

An excerpt from the FHWA Policy Guide showing Section 635.411, Material or Product Selection, is attached to this Policy and Implementation Memorandum for reference.
Sec. 635.411 Material or product selection.

(a) Federal funds shall not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

(1) Such patented or proprietary item is purchased or obtained through competitive bidding with equally suitable unpatented items; or

(2) The State highway agency certifies either that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or

(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

(b) When there is available for purchase more than one nonpatented, nonproprietary material, semifinished or finished article or product that will fulfill the requirements for an item of work of a project and these available materials or products are judged to be of satisfactory quality and equally acceptable on the basis of engineering analysis and the anticipated prices for the related item(s) of work are estimated to be approximately the same, the FHWA for the project shall either contain or include by reference the specifications for each such material or product that is considered acceptable for incorporation in the work. If the State highway agency wishes to substitute some other acceptable material or product for the material or product designated by the successful bidder or bid as the lowest alternate, and such substitution results in an increase in costs, there will not be Federal-aid participation in any increase in costs.

(c) A State highway agency may require a specific material or product when there are other acceptable materials and products, when such specific choice is approved by the Division Administrator as being in the public interest. When the Division Administrator's approval is not obtained, the item will be nonparticipating unless bidding procedures are used that establish the unit price of each acceptable alternative. In this case Federal-aid participation will be based on the lowest price so established.

(d) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.
2. MATERIAL OR PRODUCT SELECTION (23 CFR 635.411)
   a. Direct reference to patented or proprietary material, specifications, or processes of any nature should not be included in standard or supplemental specifications since they are subject to change without notice to or acceptance by the States or the Federal Highway Administration. In specific circumstances where the State's certification in accordance with 635.411(a)(2) is approved, the complete specification or such parts as are applicable should be incorporated in the standard or supplemental specifications.

   b. The use of trade names in specifications and on plans should be avoided. Instead, specifications should be formulated that will obtain the desired results and at the same time assure full opportunity for competition among equivalent materials, equipment and methods. In exceptional cases, however, where satisfactory specifications cannot be developed by the highway agencies or obtained from organizations maintained for the specific purpose of developing specification requirements based on laboratory tests or other performance requirements, there will be no objection to the use of trade name designations provided all, or at least a reasonable number, of acceptable materials or products are listed. The foregoing procedure will be permitted for a reasonable period while specifications based on performance requirements are being developed. These requirements are not intended to limit the development of new materials, equipment or methods or to discourage ingenious utilization of them. New materials, equipment or methods that show sufficient promise may be approved for inclusion and evaluated as experimental construction.
APPENDIX F:

FHWA ACCEPTANCE LETTER OF THIS RESEARCH AND UPDATED VERSION OF SECTION 635.411; MATERIAL OR PRODUCT SELECTION (4/1/98) AND NON-RESOLUTION SUPPLEMENT (10/95)
Mr. Muhammad M.A. Zubi  
Arizona Trans Research Center, #075R  
Arizona Department of Transportation  
Phoenix, Arizona 85007

Dear Mr. Zubi:

We have reviewed the draft final report for the research project: SPR-PL-1(47)439, Development of Electrical and Landscape Approved Products List. In one of our past reviews we noted that two FAPG references needed to be updated to the most current editions. Section 635.411 on Material or Product Selection was updated April 1, 1998 and the Non-Regulatory Supplement was updated in October 1995. These are pages 56 and 57 of the report. With inclusion of these updates, we consider the report complete and ready for final printing.

If you have any questions, please contact our office at 379-6856.

Sincerely,

Alan R. Hansen  
Transportation Engineer
FEDERAL-AID POLICY GUIDE
October 9, 1996, Transmittal 16

SUBCHAPTER G - ENGINEERING AND TRAFFIC OPERATIONS

PART 635 - CONSTRUCTION AND MAINTENANCE

Subpart D - General Material Requirements

Sec.

635.401 Purpose.

635.403 Definitions.

635.405 Applicability.

635.407 Use of materials made available by a public agency.

635.409 Restrictions upon materials.

635.410 Buy America requirements.

635.411 Material or product selection.

635.413 Warranty clauses.

635.417 Convict produced materials.

Appendix A - Summary of Acceptable Criteria for Specifying Types of Culvert Pipes


Source: 41 FR 36204, Aug. 27, 1976, unless otherwise noted.

Sec. 635.401 Purpose.

The purpose of this subpart is to prescribe requirements and procedures relating to product and material selection and use on Federal-aid highway projects.

Sec. 635.403 Definitions.

As used in this subpart, the following terms have the meanings indicated:

(a) "FHWA Division Administrator" means the chief Federal Highway Administration (FHWA)

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official assigned to conduct business in a particular State;

(b) "Material" means any tangible substance incorporated into a Federal-aid highway project;

(c) "PS&E" means plans, specifications, and estimates;

(d) "Special provisions" means additions and revisions to the standard and supplemental specifications applicable to an individual project;

(e) "Standard specifications" means a compilation in book form of specifications approved for general application and repetitive use;

(f) "State" has the meaning set forth in 23 U.S.C. 101;

(g) "State highway agency" means that department, commission, board, or official of any State charged by its laws with the responsibility for highway construction;

(h) "Supplemental specifications" means approved additions and revisions to the standard specifications.

Sec. 635.405 Applicability.

The requirements and procedures prescribed in this subpart apply to all contracts relating to Federal-aid highway projects, except those constructed under a Certification Acceptance Plan.

Sec. 635.407 Use of materials made available by a public agency.

(a) Contracts for highway projects shall require the contractor to furnish all materials to be incorporated in the work and shall permit the contractor to select the sources from which the materials are to be obtained. Exception to this requirement may be made when there is a definite finding by the State highway agency and concurred in by the FHWA Division Administrator, that it is in the public interest to require the contractor to use material furnished by the State highway agency or from sources designated by the State highway agency. In cases such as this, the FHWA does not expect mutual sharing of costs unless the State highway agency receives a related credit from another agency or political subdivision of the State. Where such a credit does accrue to the State highway agency, it shall be applied to the Federal-aid project involved. The designation of a mandatory material source may be permitted based on environmental considerations, provided the environment would be substantially enhanced without excessive cost. Otherwise, if a State highway agency proposal to designate a material source for mandatory use would result in higher project costs, Federal-aid funds shall not participate in the increase even if the designation would conserve other public funds.

(b) The provisions of paragraph (a) of this section will not preclude the designation in the plans and specifications of sources of local natural materials, such as borrow aggregates, that have been investigated by the State highway agency and found to contain materials meeting specification requirements. The use of materials from such designated sources shall not be mandatory unless there is a finding of public interest as stated in paragraph (a) of this section.

(c) Federal funds may participate in the cost of specifications materials made available by a public agency when they have been actually incorporated in accepted items of work, or in the cost of such materials meeting the criteria and stockpiled at the locations specified in Sec. 635.114 of this chapter.

(d) To be eligible for Federal participation in its cost, any material, other than local natural
materials, to be purchased by the State highway agency and furnished to the contractor for 
mandatory use in the project, must have been acquired on the basis of competitive bidding, 
except when there is a finding of public interest justifying the use of another method of 
aquisition. The location and unit price at which such material will be available to the 
contractor must be stated in the special provisions for the benefit of all prospective bidders. The 
unit cost eligible for Federation participation will be limited to the unit cost of such material to 
the State highway agency.

(e) When the State highway agency or another public agency owns or has control over the 
source of a local natural material the unit price at which such material will be made available to 
the contractor must be stated in the plans or special provisions. Federal participation will be 
limited to (1) the cost of the material to the State highway agency or other public agency; or (2) 
the fair and reasonable value of the material, whichever is less. Special cases may arise that will 
justify Federal participation on a basis other than that set forth above. Such cases should be 
fully documented and receive advance approval by the FHWA Division Administrator.

(f) Costs incurred by the State highway agency or other public agency for acquiring a 
designated source or the right to take materials from it will not be eligible for Federal 
participation if the source is not used by the contractor.

(g) The contract provisions for one or a combination of Federal-aid projects shall not specify a 
mandatory site for the disposal of surplus excavated materials unless there is a finding by the 
State highway agency with the concurrence of the FHWA Division Administrator that such 
placement is the most economical except that the designation of a mandatory site may be 
permitted based on environmental considerations, provided the environment would be 
substantially enhanced without excessive cost.

Sec. 635.409 Restrictions upon materials.

No requirement shall be imposed and no procedure shall be enforced by any State highway agency in 
connection with a project which may operate:

(a) To require the use of or provide a price differential in favor of articles or materials produced 
within the State, or otherwise to prohibit, restrict or discriminate against the use of articles or 
materials shipped from or prepared, made or produced in any State, territory or possession of 
the United States; or

(b) To prohibit, restrict or otherwise discriminate against the use of articles or materials of 
foreign origin to any greater extent than is permissible under policies of the Department of 
Transportation as evidenced by requirements and procedures prescribed by the FHWA 
Administrator to carry out such policies.

Sec. 635.410 Buy America requirements.

(a) The provisions of this section shall prevail and be given precedence over any requirements 
of this subpart which are contrary to this section. However, nothing in this section shall be 
construed to be contrary to the requirements of Sec. 635.409(a) of this subpart.

(b) No Federal-aid highway construction project is to be authorized for advertisement or 
otherwise authorized to proceed unless at least one of the following requirements is met:

1) The project either: (i) Includes no permanently incorporated steel or iron materials, or (ii) if 
steel or iron materials are to be used, all manufacturing processes, including application of a 
coating, for these materials must occur in the United States. Coating includes all processes 
which protect or enhance the value of the material to which the coating is applied.

(2) The State has standard contract provisions that require the use of domestic materials and products, including steel and iron materials, to the same or greater extent as the provisions set forth in this section.

(3) The State elects to include alternate bid provisions for foreign and domestic steel and iron materials which comply with the following requirements. Any procedure for obtaining alternate bids based on furnishing foreign steel and iron materials which is acceptable to the Division Administrator may be used. The contract provisions must (i) require all bidders to submit a bid based on furnishing domestic steel and iron materials, and (ii) clearly state that the contract will be awarded to the bidder who submits the lowest total bid based on furnishing domestic steel and iron materials unless such total bid exceeds the lowest total bid based on furnishing foreign steel and iron materials by more than 25 percent.

(4) When steel and iron materials are used in a project, the requirements of this section do not prevent a minimal use of foreign steel and iron materials, if the cost of such materials used does not exceed one-tenth of one percent (0.1 percent) of the total contract cost or $2,500, whichever is greater. For purposes of this paragraph, the cost is that shown to be the value of the steel and iron products as they are delivered to the project.

(c)(1) A State may request a waiver of the provisions of this section if;

(I) The application of those provisions would be inconsistent with the public interest; or

(ii) Steel and iron materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality.

(2) A request for waiver, accompanied by supporting information, must be submitted in writing to the Regional Federal Highway Administrator (RFHWA) through the FHWA Division Administrator. A request must be submitted sufficiently in advance of the need for the waiver in order to allow time for proper review and action on the request. The RFHWA will have approval authority on the request.

(3) Requests for waivers may be made for specific projects, or for certain materials or products in specific geographic areas, or for combinations of both, depending on the circumstances.

(4) The denial of the request by the RFHWA may be appealed by the State to the Federal Highway Administrator (Administrator), whose action on the request shall be considered administratively final.

(5) A request for a waiver which involves nationwide public interest or availability issues or more than one FHWA region may be submitted by the RFHWA to the Administrator for action.

(6) A request for waiver and an appeal from a denial of a request must include facts and justification to support the granting of the waiver. The FHWA response to a request or appeal will be in writing and made available to the public upon request. Any request for a nationwide waiver and FHWA's action on such a request may be published in the Federal Register for public comment.

(7) In determining whether the waivers described in paragraph (c)(1) of this section will be granted, the FHWA will consider all appropriate factors including, but not limited to, cost, administrative burden, and delay that would be imposed if the provisions were not waived.

(d) Standard State and Federal-aid contract procedures may be used to assure compliance with the requirements of this section. (23 U.S.C. 315, sec. 10 of Pub. L. 98-229, 98 Stat. 55, sec. 165


Appendix F- Page 5/1
Sec. 635.411 Material or product selection.

(a) Federal funds shall not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

(1) Such patented or proprietary item is purchased or obtained through competitive bidding with equally suitable unpatented items; or

(2) The State highway agency certifies either that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or

(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

(b) When there is available for purchase more than one nonpatented, nonproprietary material, semifinished or finished article or product that will fulfill the requirements for an item of work of a project and these available materials or products are judged to be of satisfactory quality and equally acceptable on the basis of engineering analysis and the anticipated prices for the related item(s) of work are estimated to be approximately the same, the PS&E for the project shall either contain or include by reference the specifications for each such material or product that is considered acceptable for incorporation in the work. If the State highway agency wishes to substitute some other acceptable material or product for the material or product designated by the successful bidder or bid as the lowest alternate, and such substitution results in an increase in costs, there will not be Federal-aid participation in any increase in costs.

(c) A State highway agency may require a specific material or product when there are other acceptable materials and products, when such specific choice is approved by the Division Administrator as being in the public interest. When the Division Administrator's approval is not obtained, the item will be nonparticipating unless bidding procedures are used that establish the unit price of each acceptable alternative. In this case Federal-aid participation will be based on the lowest price so established.

(d) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.

Sec. 635.413 Warranty clauses.

The SHA may include warranty provisions in National Highway System (NHS) construction contracts in accordance with the following:

(a) Warranty provisions shall be for a specific construction product or feature. Items of maintenance not eligible for Federal participation shall not be covered.

(b) All warranty requirements and subsequent revisions shall be submitted to the Division.
Administrator for advance approval.

(c) No warranty requirement shall be approved which, in the judgment of the Division Administrator, may place an undue obligation on the contractor for items over which the contractor has no control.

(d) A SHA may follow its own procedures regarding the inclusion of warranty provisions in non-NHS Federal-aid contracts.


Sec. 635.417 Convict produced materials.

(a) Materials produced after July 1, 1991, by convict labor may only be incorporated in a Federal-aid highway construction project if such materials have been:

(1) Produced by convicts who are on parole, supervised release, or probation from a prison or

(2) Produced in a qualified prison facility and the cumulative annual production amount of such materials for use in Federal-aid highway construction does not exceed the amount of such materials produced in such facility for use in Federal-aid highway construction during the 12-month period ending July 1, 1987.

(b) Qualified prison facility means any prison facility in which convicts, during the 12-month period ending July 1, 1987, produced materials for use in Federal-aid highway construction projects.

Appendix A - Summary of Acceptable Criteria for Specifying Types of Culvert Pipes

<table>
<thead>
<tr>
<th>Type of drainage installation</th>
<th>Alternatives required</th>
<th>AASHTO designations to be included with alternatives</th>
<th>Application</th>
<th>Remarks</th>
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<tr>
<td>Cross drains under high-type pavement</td>
<td>Yes</td>
<td>M-170 and M-190.</td>
<td>Statewide..</td>
<td>Any AASHTO-approved material,2</td>
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<td>No</td>
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<td>Other cross-drain installations</td>
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<td>Side-drain installations</td>
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<td>Special installations conditions</td>
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<td>Specified to meet special conditions.</td>
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<td>Special drainage (storm sewers, inverted siphons, etc.)</td>
<td>x...</td>
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<td>Specified to meet site requirements.</td>
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</table>

2Types not included in currently approved AASHTO specifications may be specified if recommended by the State with adequate justification and approved by FHWA.

http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0635d.htm  
1/15/99
1. USE OF MATERIAL MADE AVAILABLE BY A PUBLIC AGENCY (23 CFR 635.407)
   a. It is expected that in most instances a disposal site for surplus material will be at the contractor's option. This would not preclude the State highway agency from showing a possible disposal site in the contract provisions.
   b. Where mandatory borrow or waste sites will be permitted based on environmental considerations and which were discussed in the Environmental Impact Statements, such considerations may be used as the basis for subsequent PS&E public interest findings.

2. NATIONWIDE WAIVER OF BUY AMERICA FOR FERRYBOAT EQUIPMENT AND MACHINERY (23 CFR 635.410)
   a. On February 9, 1994, the FHWA published, in the Federal Register (39 FR 6080), a nationwide waiver of the Buy America requirements for certain steel items used in the construction of ferryboats. The effective date of the waiver is February 9, 1994. The waiver permits the use of specifically identified steel equipment and machinery manufactured outside of the United States in Federal-aid highway construction projects for ferryboats.
   b. Because the construction of ferryboats is increasingly difficult within the requirements of Buy America, a nationwide waiver of these requirements was granted for certain ferryboat equipment and machinery items. The items included in the waiver are marine diesel engines, electrical switchboards and switchgear, electric motors, pumps, ventilation fans, boilers, electrical controls, and electronic equipment. Items not included in the waiver are products which are readily available in the United States such as steel and stainless steel plate and shapes, sheet steel and stainless steel, steel and stainless steel pipe and tubing, and galvanized steel products. Items not specifically included in the waiver remain subject to the Buy America requirements.
   c. The basis for the nationwide waiver is that the equipment and machinery identified in paragraph b are not manufactured in the United States, using exclusively United States steel and iron, in sufficient and reasonably available quantities to avoid an enormous administrative burden on the State, contractor, and suppliers. Therefore, imposing Buy America requirements in this limited instance is not in the public interest.

3. WARRANTY CLAUSES (23 CFR 635.413)
   a. The 1991 ISTEA permitted a State to exempt itself from FHWA oversight of projects located off the National Highway System (NHS). Therefore, a State highway agency (SHA) may use warranty clauses on non-NHS construction contracts in accordance with its own procedures.
   b. On April 19, 1996, the FHWA adopted as its Final Rule (61 FR 17234) the Interim Final Rule (60 FR 44271) expanding the use of warranty clauses on Federal-aid highway construction projects. Within prescribed limits and with the advanced approval of the FHWA Division Administrator, a SHA may choose to include warranty clauses in Federal-aid highway
construction contracts for projects located on the NHS. This regulation became effective on August 25, 1995.

c. The warranty clauses must be for specific construction products or features within the control of the contractor. General project warranty or maintenance bonds (which are broad or general in nature) should not be approved for NHS projects. Preventive maintenance activities may be included when a SHA can demonstrate, to the satisfaction of the FHWA, that a proposed activity is a cost-effective means of extending the useful life of a Federal-aid highway. Maintenance items not eligible for Federal-aid funds cannot be included. The SHA remains responsible for ordinary maintenance of wear and tear resulting from normal use.

d. The regulation explicitly states that the contractor will not be liable for items over which he/she has no control. Since a construction contractor typically has no control over the project design, the warranty provision cannot hold the contractor responsible for early deterioration resulting from inaccurate design assumptions. However, when the contractor has control of the design of a contract element such as a value engineering proposal or alternate design, a warranty of the element may include its design.

e. The June 1995 FHWA publication "Rebuilding America: partnership for Investment, Innovative Contracting Practices" identifies warranty applications which may enhance the quality of a Federal-aid highway construction project.

4. BUY AMERICA CERTIFICATION (23 CFR 635.410)

a. The American Association of State Highway and Transportation Officials on July 17, 1989, proved a resolution supporting the use of step-step (i.e. step) certification. Furthermore, the DOT Office of Inspector General (OIG) in an audit report issued December 20, 1994, on FHWA's Buy America enforcement efforts, endorsed the step certification process as a method "to pro vide greater awareness of and adherence to BuyAmerica requirements." The process would also establish accountability and better enable States to take enforcement actions... against intentional violators."

b. The FHWA supports step certification as an effective way to ensure Buy America requirements are met and encourages State highway agencies to implement such a process. Step certification creates a paper trail which documents the location of the manufacturing process involved with the production of steel and iron materials. The step certification process requires the placement of a certification on all mill test reports and requires a separate certification by each corporate entity involved in the manufacturing process (from melting to fabrication) on transfer of the intermediate product, thereby generating "a chain of custody" documentation trail.

c. A certification containing language substantially as follows is recommended for use in step certification or other certification process a State may choose to establish:

"All manufacturing processes for these steel and iron materials, including the application of coatings (unless granted a waiver pursuant to 23 CFR 635.410), have occurred in the United States."

5. MATERIAL OR PRODUCT SELECTION (23 CFR 635.411)

a. Direct reference to patented or proprietary material, specifications, or processes of any nature should not be included in standard or supplemental specifications since they are subject to change without notice to or acceptance by the States or the Federal Highway Administration. In specific circumstances where the State's certification in accordance with 635.411(a)(2) is approved, the complete specification or such parts as are applicable should be incorporated in

http://www.fhwa.dot.gov/legsregs/directives/fapg/0635dsup.htm

1/15/99
the standard or supplemental specifications.

b. The use of trade names in specifications and on plans should be avoided. Instead, specifications should be formulated that will obtain the desired results and at the same time assure full opportunity for competition among equivalent materials, equipment and methods. In exceptional cases, however, where satisfactory specifications cannot be developed by the highway agencies or obtained from organizations maintained for the specific purpose of developing specification requirements based on laboratory tests or other performance requirements, there will be no objection to the use of trade name designations provided all, or at least a reasonable number, of acceptable materials or products are listed. The foregoing procedure will be permitted for a reasonable period while specifications based on performance requirements are being developed. These requirements are not intended to limit the development of new materials, equipment or methods or to discourage ingenious utilization of them. New materials, equipment or methods that show sufficient promise may be approved for inclusion and evaluated as experimental construction.

6. GUARANTY AND WARRANTY CLAUSES (23 CFR 635.413)

a. The guaranty or warranty restrictions are not intended to prevent a State from benefiting under any warranty or guaranty given as a customary trade practice for any material or product purchased for use on a Federal-aid project. No objection will be made to provisions in Federal-aid contracts requiring the contractor to obtain, and assign to the State, such warranties or guarantees. Plant establishment periods are not to be considered under this provision.

b. The intent of the warranty and/or guaranty requirements of 635.413(b) is clarified below:

(1) It is the intent of paragraph b(1) to provide for equipment which performs as intended by the manufacturer for the period guaranteed by the manufacturer when installed in accordance with the recommendations of the manufacturer. Failure to perform as indicated above requires that the manufacturer replace in kind or repair, at his/her option, the equipment in question. User labor costs resulting from replacement of the equipment are not a burden to be borne by either the manufacturer or the contractor. Likewise, it is not the intent of the paragraph that user labor costs due to normal maintenance or emergency, or costs not normally provided as trade practice be borne by either the manufacturer or the contractor.

(2) Paragraph b(2) recognizes the fact that installations involving electrical or mechanical components often require a period of operation before an acceptable level of service can be established. It is the intent of paragraph b(2) to obtain from the contractor a level of workmanship which will assure the State of an operational system devoid of contractor laxities. The stated operational period will allow for adjustment, repair or replacement of equipment or materials not covered by manufacturers' guarantees and the correction of malfunctions attributable to installation deficiencies.

c. The cost of operating motorist-aid facilities for a period of time after installation is considered an integral part of installing and ironing out early operational problems. A contract requirement for such work is considered acceptable on Federal-aid projects. The following special provision may be included in Federal-aid highway construction contracts where a State considers it warranted:

(1) For a period of 18 months after acceptance of the construction work by the State the contractor shall perform, or with the State's approval arrange for the performance of, all the work necessary to keep the completed facility in full operation. The work shall include furnishing all necessary labor, materials, equipment, tools, transportation, supplies, and incidentals required to complete the work. The work shall not include
repairs or replacements made necessary by damage resulting from vandalism or traffic accidents.

(2) No direct payment will be made for this work but payment will be considered as included in the bid prices for other items of the contract.

d. Section 635.413 of 23 CFR generally prohibits guaranty and warranty clauses from being used on Federal-aid contracts. Section 109(p) of 23 U.S.C. titled 'Compliance with State Laws for non-NHS Projects' states that exempted non-National Highway System (NHS) projects shall be designed and constructed in accordance with State laws, regulations and directives. A State, therefore, has the latitude to follow its own procedures on exempted non-NHS projects, and include provisions such as guaranties and/or warranties on these projects to the same degree they are permitted to include them on State funded only projects. For NHS projects where a State desires to include a guaranty or warranty clause, the project must be submitted to the Contract Administration Branch, HNG-22 for approval under Special Experimental Project (SEP) 14. The SEP 14 requirements and approval process were transmitted with the September 18, 1992, Design/Build, SEP 14 memorandum to the field from the Director, Office of Engineering.

e. Due to the FHWA's interest in the application of guaranty and warranty clauses on highway projects, information on those exempted non-NHS projects where the State includes a guaranty or warranty clause should be provided to the Contract Administration Branch, HNG-22.

7. CONVICT PRODUCED MATERIALS (23 CFR 635.417). Standard State and Federal-aid contract procedures should be used to assure compliance with the requirements of 635.417.
APPENDIX G:

ADDITIONAL INFORMATION ON FHWA REQUIREMENTS REGARDING PATENTED/PROPRIETARY PRODUCTS
projects directly (23 CFR 635.112e). but may act as
construction contractors.

Prison materials may also be approved as State-furnished.
However, since public agencies may not bid in competition
firms, direct acquisition of materials from a prison industry for use as
State-furnished material is subject to a public interest finding with
the division administrator's concurrence (23 CFR 635.407d). Selection
of materials produced by convict labor as State-furnished materials for
mandatory use should be cleared prior to the PS&E. Mr. Rex Leathers'
May 8, 1985 memorandum and Mr. Ronald E. Heinz's February 5, 1988
memorandum provide additional guidance on the subject and are included
in the Appendix (see pp. A-138 to A-139, and A-142 to A-143).

Use of Convict Labor is discussed in more detail in paragraph A.1 of
Chapter II.

b. **Patented/Proprietary Products**

References:

23 U.S.C. 112
23 CFR 635.411

Applicability:

Applies to all Federal-aid highway construction projects except exempt
non-NHS projects.
Guidance:

It is the policy of the FHWA not to participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

- the item is purchased or obtained through competitive bidding with equally suitable unpatented items.

- the SHA certifies either that the proprietary or patented item is essential for synchronization with the existing highway facilities or that no equally suitable alternative exists, or

- the item is used for research or for a special type of construction on relatively short sections of road for experimental purposes.

The primary purpose of the policy is to have competition in selection of materials and allow for development of new materials and products. The policy further permits:

- Materials and products that are judged equal may be bid under generic specifications. If only patented or proprietary products are acceptable, they shall be bid as alternatives with all, or at least a reasonable number of, acceptable materials or products listed; and

- The division administrator may approve a single source if it can be found that its utilization is in the public interest.

Trade names are generally the key to identifying patented or proprietary materials. Trade name examples include 3M, Corten, etc. Generally, products identified by their brand or trade name are not to be specified without an "or equal" phrase. If trade names are to be used, all, or at least a reasonable number of acceptable materials or products should be listed. The licensing of several suppliers to produce a product does not change the fact that it is a single product and should not be specified to the exclusion of other equally suitable products.
Scenarios:

Below are examples of conditions under which patented or proprietary materials may be approved on Federal-aid projects.

Case I. The item is identified by the contract specifications along with a listing of other acceptable products, and the list includes a reasonable number of acceptable products. The FHWA may then participate in the cost of a patented or proprietary item since it is acquired competitively.

Case II. The SHA certifies that the product is essential for synchronization. This is particularly appropriate when upgrading or expanding existing traffic signal systems. The existing controller(s) is part of an existing system which is not compatible with any system hardware. To convert the overall system would be more expensive than to add to what is already there. Thus, it is in the public interest to require the compatible proprietary item, and upon the division administrator's concurrence, the item may be specified.

Case III. The SHA certifies that there is no equally suitable alternate. This situation should be reasonably verified by the division office. Based on a public interest finding with the division administrator's concurrence, the item may be specified.

Case IV. Products appear from time to time that are new and innovative, i.e., research item or experimental feature. Based on the developer's claim, manufacturer's claims, or because of certain local conditions, there may be sufficient justification to evaluate the product in actual highway usage. The SHA may then elect to submit a detailed plan of research and evaluation (work plan) for the product. The work plan may also be used to develop specifications in order to provide a basis for future competition with other materials. The work plan should be approved with or prior to PS&E approval, and the specifications may then require the proprietary item.

A good discussion of FHWA's policy on product selection was included in Mr. Ronald E. Heinz's memorandum dated November 25, 1987. A copy of this memorandum is included in the Appendix (see pp. A-140 to A-141).
APPENDIX H:

LETTER TO ADOT CONTRACTS AND SPECIFICATIONS ON
ESTABLISHING FIELD AUTHORITY FOR APPROVAL OF LISTED
PRODUCTS
November 24, 1997

Mr. Joe Roman, P.E.
Specification Writer
Arizona Department of Transportation
Contracts & Specifications
1651 West Jackson, 121F
Phoenix, AZ 85007-3276

RE: Electrical Approved Product List (EAPL)

Dear Joe:

In June of this year Chalmers Engineering Company, Inc. (CEC) was awarded a contract to revise ADOT's approved product list (APL) that relates to traffic signal and roadway lighting electrical items (the electrical APL). Mr. Al Zubi, P.E. (407-3134), who is a Product Evaluation Engineer for ADOT's Arizona Transportation Research Center (ATRC), is the project manager. This effort is being supported by the Electrical Design Branch (Mark Poppe) and the Phoenix Construction District (Dan Lance). We are going to need your assistance on this project to revise certain portions of the standard specifications.

The basic problems to be addressed through this electrical approved product list (EAPL) research project are:

- The incompleteness, obsolescence and short comings of the current electrical portion of the approved product list for a variety of item categories.

- Evaluate related specifications for these categories and develop revisions and/or suggestions to update them. Additionally, the procedures regarding the status of the ADOT field inspector and the APL need to be clearly defined so they can be effectively used in the field to approve products without involvement of the design office.

The key area where we need your assistance is how the review and approval of electrical-related items are handled via the current standard specifications and how this relates to the new EAPL.
ADOT's current electrical materials review and approval system requires the contractor to submit a complete shop drawing/technical information package on all those items intended to be used. This package is supposed to be submitted to the ADOT Field Office at the pre-construction conference. The Field Office then transmits these packages to the responsible design engineer (ADOT or consultant) for review. The reviews, resubmittals and approvals of these types of packages can take months to fully complete.

These contractor submittal packages often include standard "use almost every time" items such as conductors, cables, conduit, pull boxes and many other items. The compiling, reviewing and processing of these items through the field and design office subjects both groups to a lot of time consuming paper work.

The contractor will still need to submit material lists to the field office. However, given this new RAPEL and material list review process, the field office could then "approve, approve as noted and/or reject" the contractor's proposed standard items which are within the scope of the new electrical APL. Non-standard and/or specialty items would still require design office review and approval.

The concept of obtaining prior approval for materials is still a very important quality assurance task and it will continue under this new process. However, the authority for approving the standard "use almost every time" items (commodity items) will be delegated to the field office.

Therefore, it is the major goal of this project to develop and implement a revised approved product list and corresponding specifications that organize and streamline ADOT's project by project product approval system so that the commodity items are clearly defined and can be approved by the inspector in the field. The new system will be structured to reserve the design office material list and shop drawing approval reviews for those items which are clearly non-standard and require the designer to review for compliance with the plans and special provisions.

To accomplish this, certain changes to the Standard Specification will be necessary. The current version of subsections 105.03 (Blue Book) and 105.04 (Green Book) Conformity with Plans and Specifications and/or 105.10 (Blue Book) and 105.11 (Green Book) Duties of the Inspector of the standard specifications may need to be modified to add that the inspector has the authority to approve materials that have been specified for the project, are on the current APL, and have been properly identified by the contractor as those to be ordered and supplied. Additionally, subsection 730-4 Equipment List and Drawings will need to be modified in a similar fashion.
Please review and comment on the attached proposed draft on how the revisions to the standard specifications might be worded. I would like to schedule a meeting with you sometime in early December to discuss this issue.

Please feel free to call me at work, (602) 949-0925, if you have any questions.

Sincerely,

Seth W. Chalmers, P.E.
President

cc: Al Zubi, ATRC
Mark Poppe, Electrical Design
Dan Lance, Phoenix Construction District
ATTACHMENT

PROPOSED DRAFT MODIFICATION TO THE STANDARD SPECIFICATIONS AS IT RELATES TO THE STATUS OF THE NEW ELECTRICAL APPROVED PRODUCT LIST (EAPL) AND DELEGATION OF PRODUCT APPROVAL AUTHORITY FOR THOSE PRODUCTS LISTED

NOVEMBER 24, 1997

These provisions could be made applicable to the follow Standard Specification Sections/Subsections:

Section 105 - Control of Work (see subsections 105.03 (Blue Book) and 105.04 (Green Book) Conformity with Plans and Specifications and/or 105.10 (Blue Book) and 105.11 (Green Book) Duties of the Inspector), Section 106 - Control of Materials and/or Section 730 - General Requirements for Traffic Signal and Highway Lighting Systems (see subsection 730-4 Equipment List and Drawings: . may need to be modified. For example:

The Department maintains an approved product list (APL) for certain items. This APL is not intended to limit or restrict competition; rather, it is to set the standard of quality, performance and characteristics that a product needs to have in order to be in conformance with the applicable requirements of the specifications. If a product is listed on the APL it is an indication that the product has previously been evaluated by the Department and has been found, at that time, to conform to the applicable specification. It is per the contractor's option, unless otherwise specified in the project special provisions, to use or not use the products on the APL. If the contractor elects to use non-listed products then the applicable provisions of subsection 106.08 and 730-4 shall apply.

If a product is on the APL and has been properly identified and certified (as required) by the contractor as the product to be furnished and the contractor has satisfied the Engineer to this regard, then the Engineer has the authority to "approve," "approve as noted," or "reject" that product within the scope of the published APL in effect at the time of the project bid and the applicable specifications, plans and special provisions.
APPENDIX I:

OUTLINE OF NEW EAPL WITH A STANDARD SPECIFICATION STRUCTURE:

SECTION 731/V-31 - STRUCTURAL SUPPORTS AND FOUNDATIONS FOR TRAFFIC SIGNAL AND HIGHWAY LIGHTING

SECTION 732/V-32 - ELECTRICAL UNDERGROUND MATERIAL

SECTION 733/V-33 - SIGNAL INDICATIONS AND MOUNTING ASSEMBLIES

SECTION 734/V-34 - TRAFFIC CONTROLLER ASSEMBLY

SECTION 735/V-35 - DETECTORS

SECTION 736/V-36 - HIGHWAY AND SIGN LIGHTING
APPENDIX  I

ARIZONA DEPARTMENT OF TRANSPORTATION
APPROVED PRODUCT LIST (APL)
OUTLINE

CATEGORY:  V - TRAFFIC CONTROL MATERIALS

SECTION 731 STRUCTURAL SUPPORTS AND FOUNDATIONS FOR
TRAFFIC SIGNAL AND HIGHWAY LIGHTING
AND
NEW SUBCATEGORY V-31 STRUCTURAL SUPPORTS FOR
TRAFFIC SIGNAL AND HIGHWAY LIGHTING

12/1/98 Version

V-31A Type A Signal Pole
V-31(1) Pedestrian Push Button Version
V-31(2) 8 through 15 foot Versions
V-31(6) Grand Avenue Version

V-31B Type B Tie Back Mast Arm Lighting Pole

V-31C Type C Tie Back Mast Arm Combination Pole

V-31D Type D Tie Back Mast Arm Lighting Pole

V-31E Type E Lighting Pole

V-31F Type F Combination Pole

V-31G Type G Lighting Pole
V-31G(1) Steel
V-31G(2) Aluminum

V-31H Type H Lighting Pole
V-31H(1) Steel for Standard Base Applications
V-31H(2) Steel for Yielding Base Applications
V-31H(3) Aluminum

V-31I Type I Lighting Pole
V-31I(1) Steel for Standard Base Applications
V-31I(2) Steel for Yielding Base Applications
V-31I(3) Aluminum

V-31J Type J Signal Pole
CATHOLIC: V - TRAFFIC CONTROL MATERIALS
NEW SUBCATEGORY V-31 STRUCTURAL SUPPORTS FOR
TRAFFIC SIGNAL AND HIGHWAY LIGHTING

V-31K Type K Signal Pole
V-31Q Type Q Combination Pole
V-31R Type R Combination Pole
V-31S Type S Lighting Pole
V-31T Type T Lighting Pole
  V-31T(1) Slip away/ Breakaway Versions
  V-31T(2) Standard Base Versions
  V-31T(6) Camera Pole Version
V-31U Type U Lighting Pole
  V-31U(1) Barrier Mounted Versions
  V-31U(2) Ground Mounted Versions
  V-31U(3) Camera Pole Version
V-31V High Mast Lighting Poles (80, 100, 120, 130 & 150 feet)
  V-31V(1) Poles
  V-31V(2) Raising and Lowering Devices
  V-31V(3) Cabling Systems
V-31W Wood Poles
V-31X Square Shaft Poles
  V-31X(1) Poles
  V-31X(2) Accessories
V-31Y Yielding Bases
  V-31Y(1) Transformer Bases
  V-31Y(2) Multi-Directional Slip-Bases
  V-31Y(3) Other Type Systems
V-31Z Miscellaneous Items
  V-31Z(1) Cable Grips
ARIZONA DEPARTMENT OF TRANSPORTATION
APPROVED PRODUCT LIST (APL)
OUTLINE

CATEGORY: V - TRAFFIC CONTROL MATERIALS
SECTION 732 ELECTRICAL UNDERGROUND MATERIAL
AND
NEW SUBCATEGORY: V-32 ELECTRICAL UNDERGROUND MATERIAL

12/1/98 Version

Notebook Volume I of III (Notebook #1):

Section: V-32A Electrical Conductors (s)
  V-32A(1) Insulated Copper - Lighting and Signals
  V-32A(2) Bare Copper
  V-32A(3) Insulated Copper - General Use
  V-32A(4) Flexible Cords
  V-32A(5) Insulated Aluminum

Section: V-32B Roadway Loop Detector Tube/Wire (s)
  V-32B(1) Roadway Loop Detector Tube/Wire

Section: V-32C Wire Marking Tags
  V-32C(1) Systems

Section: V-32D Communications/Loop Lead-In Shielded Type Cables (s)
  V-32D(1) Communication Cables
  V-32D(2) Loop Detector Lead-In Cables
  V-32D(3) Other Types

Section: V-32E Fiber Optic Cable
  V-32E(1) Fiber Optic Cable

Section: V-32F IMSA Traffic Signal Cable (s)
  V-32F(1) IMSA Traffic Signal Cable

(Note: "(s)" - scope item. "(*)" - list not developed.)
Notebook Volume II of III (Notebook #2):

Section: V-32G Electrical Connections (s)

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<tr>
<td>V-32G(1)</td>
<td>Spring Connectors (Wire Nuts)</td>
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<td>Electrical Tape</td>
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<td>V-32G(3)</td>
<td>Electrical Coatings</td>
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<td>V-32G(4)</td>
<td>Self-Sealing Connectors</td>
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<td>Field Constructed ADOT Standard Splice</td>
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<td>V-32G(6)</td>
<td>Detector Lead-In Cable Connections Solder (*)</td>
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<td>V-32G(7)</td>
<td>Silicone Dielectric Gel</td>
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<tr>
<td>V-32G(8)</td>
<td>In-Line Fuses</td>
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<td>V-32G(9)</td>
<td>In-Line Fuse Connector Kits</td>
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Section: V-32H Electrical Conduit, Fittings and Warning Tape (s)

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<td>Schedule 40 PVC Conduit and Fittings</td>
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<td>V-32H(2)</td>
<td>Rigid Galvanized Steel</td>
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<td>V-32H(3)</td>
<td>Intermediate Metal</td>
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<td>V-32H(4)</td>
<td>Liquid-Tight Flexible</td>
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<td>V-32H(5)</td>
<td>PVC Cement and Primer</td>
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<td>V-32H(6)</td>
<td>Pulling Lubricants</td>
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<td>V-32H(7)</td>
<td>Warning Tape</td>
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(Note: "(s)" - scope item. "(*)" - list not developed.)
Notebook Volume III of III (Notebook #3):

Section: V-32I Pull Boxes and Extensions (s)
   V-32I(1) Number 3-1/2, 5 & 7 PCC - Precast Concrete
            Reinforced (PCC)
   V-32I(2) Number 5, 7, & 8 PCF - Polymer Concrete
            Fiberglass Reinforced (PCF)
   V-32I(3) Other

Section: V-32J Junction Boxes
   V-32J(1) Surface Mounts (*)
   V-32J(2) Cast-In-Place

Section: V-32K Cable Ties/Straps
   V-32K(1) Nylon Type (*)
   V-32K(2) Metal Type (*)

Section: V-32L Bonding and Grounding
   V-32L(1) Ground Rods
   V-32L(2) Electrolytic Rod

Section: V-32S Special Use Items

(Note: "(s)" - scope item. "(*)" - list not developed.)
ARIZONA DEPARTMENT OF TRANSPORTATION
APPROVED PRODUCT LIST (APL)
OUTLINE

CATEGORY: V - TRAFFIC CONTROL MATERIALS

SECTION 733 SIGNAL INDICATIONS AND MOUNTING ASSEMBLIES
AND
NEW SUBCATEGORY V-33 SIGNAL INDICATIONS AND MOUNTING ASSEMBLIES

12/1/98 Version

Notebook Volume I of III (Notebook #4):

V-33A Vehicle Signal Face/Indication (s)

V-33A(1) Incandescent Type
V-33A(2) Fiber Optic Arrow Type
V-33A(3) Programmed Visibility Type
V-33A(4) Strobe Unit Type
V-33A(5) Accessories/Other/Tattle-Tale

V-33B Lane Use Indication

V-33B(1) Fiber Optic Type
V-33B(2) LED Type

V-33C Illuminated Sign

V-33C(1) Blankout Type
V-33C(2) Street Name or Traffic Control Sign

V-33D Pedestrian Signal Face/Indication (s)

V-33D(1) Neon Type
V-33D(2) Incandescent Type (two types)
V-33D(3) Fiber Optic/LED Type
V-33D(4) Audible Type

(Note: "(s)" - scope item, "(*)" - list not developed)
CATEGOR Y: V - TRAFFIC CONTROL MATERIALS
NEW SUBCATEGORY V-33 SIGNAL INDICATIONS AND MOUNTING ASSEMBLIES

Notebook Volume II of III (Notebook #5):

V-33E Vehicle Signal Indication Light Sources

V-33E(1) Long Life Incandescent Lamps (s)
V-33E(2) Longer Life Incandescent Lamps (s)
V-33E(3) LED
V-33E(4) Neon

Notebook Volume III of III (Notebook #6):

V-33F Signal Face/Indication Lenses

V-33F(1) For Vehicle/Ped/General Use

V-33G Signal Face/Indication Visors

V-33G(1) For Vehicles and Pedestrian Signals

V-33H Vehicle Signal Backplates

V-33H(1) Metal or Plastic Types

V-33I Signal Mounting Assemblies (s)

V-33I(1) Pipe and Fitting Mounts, Etc.
V-33I(2) Strap-On Adjustable Types Mounts
V-33I(3) Other Type Mounts and Hardware

V-33J For Future Use

V-33J(1) For Future Use
V-33J(2) For Future Use
V-33J(3) For Future Use

(Note: "(s)" - scope item, "(*)" - list not developed)
ARIZONA DEPARTMENT OF TRANSPORTATION
APPROVED PRODUCT LIST (APL)
OUTLINE

CATEGORY: V - TRAFFIC CONTROL MATERIALS
SECTION 734 TRAFFIC CONTROLLER ASSEMBLY
AND
NEW SUBCATEGORY: V-34 TRAFFIC CONTROLLER ASSEMBLY

12/31/98 Version

Notebook Volume I of II (Notebook # 7):

Section: V-34A Traffic Signal Controller/Systems

V-34A(1) NEMA TS-1
V-34A(2) NEMA TS-2
V-34A(3) 179
V-34A(4) 170
V-34A(5) Other (2070, ATC, etc.)
V-34A(6) Closed Loop Systems

Section: V-34B Controller Cabinets

V-34B(1) NEMA Types
V-34B(2) 170/179 Types
V-34B(3) Pre-Cast Cabinet Foundations/Maintenance Pads
V-34B(4) Electrical Service Enclosures
V-34B(5) Cabinet Locks
V-34B(6) Flasher cabinets
Notebook Volume II of II (Notebook # 8):

Section: V-34C  Cabinet Accessories

V-34C(1)  Cabinet Light
V-34C(2)  Detector Test Panel/Switches
V-34C(3)  Convenience Outlet
V-34C(4)  Cabinet Fan and Filters
V-34C(5)  Power Panel Components
V-34C(6)  Radio Interference Suppressor (Line Filter)
V-34C(7)  Surge Protector
V-34C(8)  Inductive Suppressor
V-34C(9)  Conducors and Cables
V-34C(10) Police Panel
V-34C(11) Load Bays (Panels or Bases)
V-34C(12) Pedestrian Push Button Isolators

Section: V-34D  Other Devices

V-34D(1)  Flasher
V-34D(2)  Flash Transfer Relay
V-34D(3)  Load Switches
V-34D(4)  Auxiliary Control Relay (Diming Relays and Diodes)
V-34D(5)  Conflict Monitor/ Malfunction Management Unit
V-34D(6)  Rack Mounted Loop Detector Systems
V-34D(7)  Shelf Mounted Loop Detector Systems
V-34D(8)  Time Base Coordinators (TBC)
V-34D(9)  WWV Clocks
V-34D(10) Bus Interface Unit (BIU)
V-34D(11) Power Supplies
V-34D(12) Terminal Blocks and Ground Bus
V-34D(13) Other Type Devices (lamp outage sensors, etc.)

Section: V-34E  Communication Systems

V-34E(1)  Modems
V-34E(2)  Wireless

Section: V-34F  Field/Bench Test Equipment

V-34F(1)  Controllers
V-34F(2)  Other
ARIZONA DEPARTMENT OF TRANSPORTATION
APPROVED PRODUCT LIST (APL)
OUTLINE

SUBCATEGORY: V - TRAFFIC CONTROL MATERIALS

SECTION 735 DETECTORS
AND
NEW SUBCATEGORY V-35 DETECTORS

12/1/98 Version

Notebook (Notebook #9):

V-35A  Loop Detectors Systems (s)

V-35A(1)  Preformed Loop Detectors
V-35A(2)  Standard Loop Assembly
V-35A(3)  Temporary Surface Mount Loop Detectors
V-35A(4)  Loop Installation Equipment
V-35A(5)  Loop Field Test Equipment

V-35B  Probe Type Detectors Systems

V-35B(1)  Magnetometer Types
V-35B(2)  Encapsulated Probe Types

V-35C  Other Vehicle and Pedestrian Detector Systems

V-35C(1)  Machine Vision
V-35C(2)  Ultra Sonic/Sound Sensing Types
V-35C(3)  Radar
V-35C(4)  Emergency Vehicle Preemption
V-35C(5)  Transit Priority
V-35C(6)  Microwave
V-35C(7)  Radio

V-35D  Pedestrian Push Button Detectors (s)

V-35D(1)  Can or Box Type
V-35D(2)  Type I & II
V-35D(3)  ADA Type

V-35E  Detector Loop Saw Cut Sealants (s)

V-35E(1)  Asphaltic Emulsified Crack Filler (Cold Pour)
V-35E(2)  One-Part Elastomeric
V-35E(3)  Hot Melt/Applied Rubberized
V-35E(4)  Two-Part

(Note: "(s)", scope item)
CATEGORt: V - TRAFFIC CONTROL MATERIALS
NEW SUBCATEGORY: V-36 HIGHWAY AND SIGN LIGHTING

Notebook Volume II of II (Notebook #11):

V-36G Luminaire Components

V-36G(1) High Pressure Sodium (HPS) Lamps
V-36G(2) Dual Arc-Tube HPS Lamps (*)
V-36G(3) Other Lamps (*)
V-36G(4) Starters (*)
V-36G(5) Ballast
V-36G(6) Other (*)

V-36H Lighting Controls

V-36H(1) Photo Electric Controls (s)
V-36H(2) Contactors (*)
V-36H(3) Toggle Switches (*)
V-36H(4) Standard Switches (*)

V-36I Load Center Cabinets (LCC) (*)

V-36I(1) Meter Pedestal
V-36I(2) Type II
V-36I(3) Type III
V-36I(4) Type IV
V-36I(5) Cabinet Mounted Service Enclosure
V-36I(6) Sign/Underdeck Lighting Fuse Box
V-36I(7) Main Disconnect/Meter Sockets
V-36I(8) Circuit Breakers
V-36I(9) Blocks/Bars/Lugs
V-36I(10) Dry Type Transformers
V-36I(11) GFI Outlets
V-36I(12) Cabinet Fans

(Note: "(s)" - scope item. "(*)" - list not developed)